GROUP 17

ENGINE AND EMISSION CONTROL

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WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

⚠ WARNING

- Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).

 Service or maintenance of any SRS component or SRS-related component must be performed only at an
- authorized MITSUBISHI dealer.
- MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRSrelated component.

The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, air bag module, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

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ENGINE CONTROL

GENERAL DESCRIPTION

M1171000100169

A cable-type accelerator mechanical suspendedtype pedal has been adopted.

ENGINE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO ENGINE CONTROL SYSTEM DIAGNOSIS

M1171002000157

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

ENGINE CONTROL SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

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.
- Verify that the condition described by the customer exists.
- 3. Find the malfunction by following the Symptom
- 4. Verify that the malfunction is eliminated.

SYMPTOM CHART

M1171002200184

| SYMPTOMS | INSPECTION PROCEDURE | REFERENCE PAGE |
|---|----------------------|----------------|
| Throttle valve will not fully open or close | 1 | P.17-4 |
| Accelerator pedal operation is not smooth (over acceleration) | 2 | P.17-5 |

SYMPTOM PROCEDURES

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

DIAGNOSIS

STEP 1. Check the accelerator cable adjustment.

Q: Is the accelerator cable properly adjusted?

YES: Go to Step 2.

NO: Adjust the accelerator cable by referring to

P.17-5, and then go to Step 4.

STEP 2. Check the return spring.

Q: Is the return spring damaged or deformed?

YES: Go to Step 3.

NO: Replace, then go to Step 4.

STEP 3. Check the throttle lever.

Q: Is the throttle lever damaged or deformed?

YES: Replace, then go to Step 4. NO: There is no action to be taken.

STEP 4. Check symptom.

Q: Does the throttle valve fully open and close?

YES: This diagnosis is complete.

NO: Return to Step 1.

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

DIAGNOSIS

STEP 1. Check the accelerator pedal.

Q: Is the accelerator pedal loose?

YES: Tighten, then go to Step 4.

NO: Go to Step 2.

STEP 2. Check the accelerator cable wiring.

Q: Is the accelerator cable routing bent sharply?

YES: Repair, then go to Step 4.

NO: Go to Step 3.

STEP 3. Check the accelerator cable lubricant.

Q: Is the accelerator cable lubricated sufficiently?

YES: There is no action to be taken.

NO: Refill or replace the lubricant, then go to

Step 4.

STEP 4. Check symptom.

Q: Does the accelerator pedal work normally?

YES: This diagnosis is complete.

NO: Return to Step 1.

ON-VEHICLE SERVICE

ACCELERATOR CABLE CHECK AND ADJUSTMENT

M1171000900198

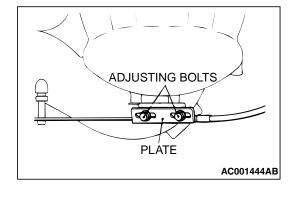
- Turn A/C and lamps OFF.
 Inspect and adjust at no load.
- 2. Warm engine until stabilized at idle.
- 3. Confirm idle speed is at standard value.

Standard value: 700 ± 100 r/min

- 4. Stop engine. [ignition switch: "LOCK" (OFF) position.]
- 5. Confirm there are no sharp bends in the accelerator cable.
- 6. Check the inner cable for correct slack.

Standard value: 1.0 - 2.0 mm (0.04 - 0.08 inch)

- 7. If there is too much slack or no slack, adjust play by the following procedures.
 - (1) Loosen the adjusting bolt to release the cable.
 - (2) Move the plate until the inner cable play is at the standard value, and then tighten the adjusting bolt.
 - (3) After adjusting, check that the throttle lever is touching the stopper.

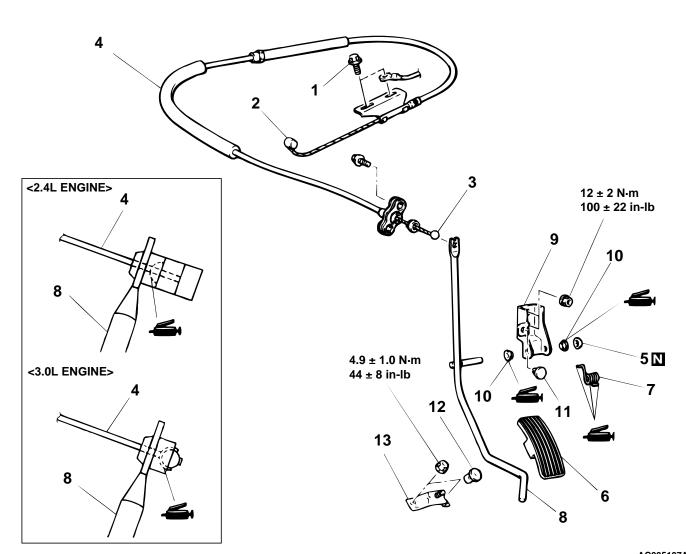


ACCELERATOR CABLE AND PEDAL REMOVAL AND INSTALLATION

M1171001200211

Post-installation Operation

Adjusting the Accelerator Cable (Refer to P.17-5.)



AC005107AB

1. ADJUSTING BOLT

REMOVAL STEPS

- 2. INNER CABLE CONNECTION (THROTTLE LEVER SIDE)
- 3. INNER CABLE CONNECTION (ACCELERATOR PEDAL SIDE)
- 4. ACCELERATOR CABLE
- 5. PUSH-ON SPRING NUT
- 6. PEDAL PAD

- 7. SPRING
- 8. ACCELERATOR ARM ASSEMBLY

REMOVAL STEPS (Continued)

- 9. ACCELERATOR PEDAL BRACKET
- 10. BUSHING
- 11. STOPPER
- 12. ACCELERATOR PEDAL STOPPER
- 13. BRACKET

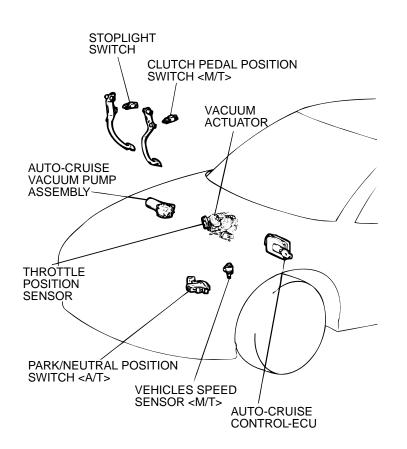
AUTO-CRUISE CONTROL

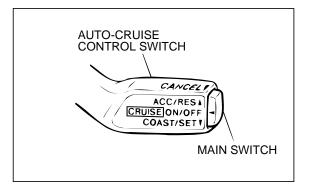
GENERAL DESCRIPTION

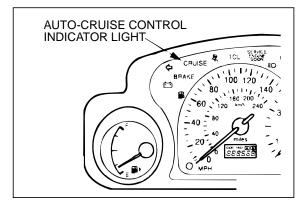
M1172000100151

By using the auto-cruise control, the driver can drive at the desired speed [in a range of approximately 40 – 200 km/h (25 – 124 mph)] without depressing the accelerator pedal.

CONSTRUCTION DIAGRAM







AC001446 AC

AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

M1172003300143

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).

Problems 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 autocruise control-ECU, control switches, sensors and vacuum pump.

The control switches and sensors monitor the state of the vehicle.

Based on input signals from those switches and sensors, the auto-cruise control-ECU activates the vacuum pump.

If the auto-cruise control-ECU detects a problem on any of those components, the ECU estimates where the problem may be occurring, and will output a diagnostic trouble code.

Diagnostic trouble codes cover the throttle position sensor, auto-cruise control switch, vehicle speed sensor <M/T>, auto-cruise control-ECU and vacuum pump.

AUTO-CRUISE CONTROL SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1172002000150

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 problem.

- 1. Gather information from the customer.
- Verify that the condition described by the customer exists.
- 3. Check the vehicle for any auto-cruise control system DTC.
- If you can verify the condition but no auto-cruise control system DTCs are set, and the malfunction may be intermittent. Refer to Introduction, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions P.00-6.
- If you can verify the condition but there are no auto-cruise control system DTCs, or the system cannot communicate with scan tool MB991502, refer to Symptom Chart P.17-43 and find the fault.
- If there is an auto-cruise control system DTC, record the number of the code, then erase the code from vehicle memory using the scan tool.
- Re-create the auto-cruise control system DTC set conditions to see if the same Auto-cruise Control System DTC will set again.
- If the same Auto-cruise Control System DTC sets again, perform the diagnostic procedures for the set code. Refer to P.17-11, Auto-cruise Control System Diagnostic Trouble Code Chart.

AUTO-CRUISE CONTROL SYSTEM DIAGNOSTIC TROUBLE CODE DIAGNOSIS

M1172002100146

Retrieving Auto-cruise Control System Diagnostic Trouble Codes.

Using scan tool MB991502

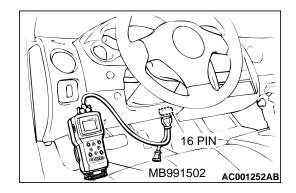
Required Special Tool:

MB991502: Scan Tool (MUT-II)

⚠ CAUTION

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

- 1. Connect scan tool MB991502 to the data link connector.
- 2. Turn the ignition switch to the "ON" position.
- 3. Use scan tool MB991502 to check for auto-cruise control system diagnostic trouble codes.
- 4. Turn the ignition switch to the "LOCK" (OFF) position.
- 5. Disconnect scan tool MB991502.

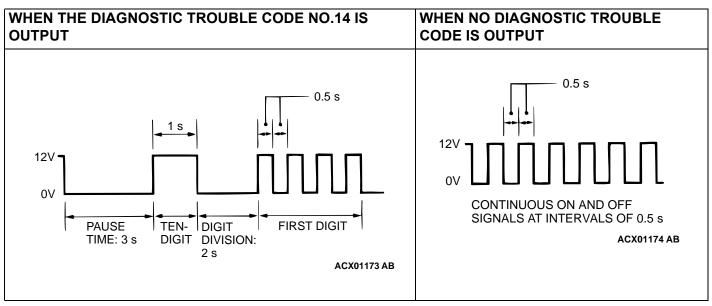


RESUME SWITCH: ON CANCELL ACC/RES A CRUISE ON/OFF COAST/SET I AUTO-CRUISE CONTROL SWITCH ACX01172 AB

Using a Auto-cruise Control Indicator Light

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

DIAGNOSTIC RESULT DISPLAY METHOD WHEN USING THE AUTO-CRUISE CONTROL INDICATOR LIGHT



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

Erasing Diagnostic Trouble Codes

The diagnostic trouble codes can be erased by the following procedure.

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

Using scan tool MB991502

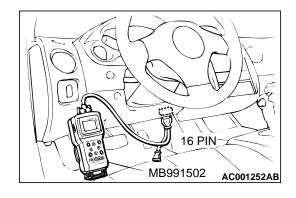
Required Special Tool:

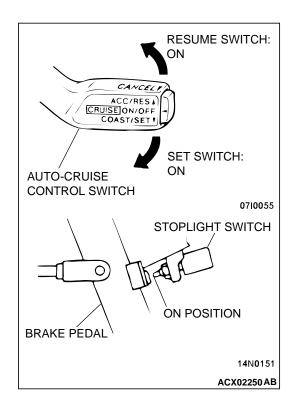
• MB991502: Scan Tool (MUT-II)

⚠ CAUTION

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

- 1. Connect scan tool MB991502 to the data link connector.
- 2. Turn the ignition switch to the "ON" position.
- 3. Use scan tool MB991502 to check for auto-cruise control system diagnostic trouble codes.
- 4. Turn the ignition switch to the "LOCK" (OFF) position.
- 5. Disconnect scan tool MB991502.





Without using scan tool MB991502

- 1. Turn the ignition switch to the "ON" position while holding the auto-cruise control switch in the "SET" (down) position. Then, within one second, more the auto-cruise control switch up to the "RES" position.
- 2. Check to make sure the "CRUISE" light on the instrument panel is flashing.
- 3. Put the auto-cruise control switch in the "SET" (down) 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(s) are now erased.



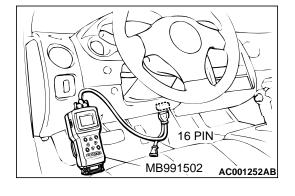
Required Special Tool:

• MB991502: Scan Tool (MUT-II)

⚠ CAUTION

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

- 1. Connect scan tool MB991502 to the data link connector.
- 2. Turn the ignition switch to the "ON" position.
- 3. Carry out inspection by means of the data list. If there is an abnormality, check and repair the chassis harnesses and components. (Refer to P.17-77, Data List Reference Table.)
- Re-check using scan tool MB991502 and check to be sure that the abnormal input and output have returned to normal because of the repairs.
- 5. Erase the diagnostic trouble code(s).
- 6. Turn the ignition switch to the "LOCK" (OFF) position.
- 7. Disconnect scan tool MB991502 from the data link connector.
- 8. Start the engine again and do a test drive to confirm that the problem is eliminated.



DIAGNOSTIC TROUBLE CODE CHART

M1172002200176

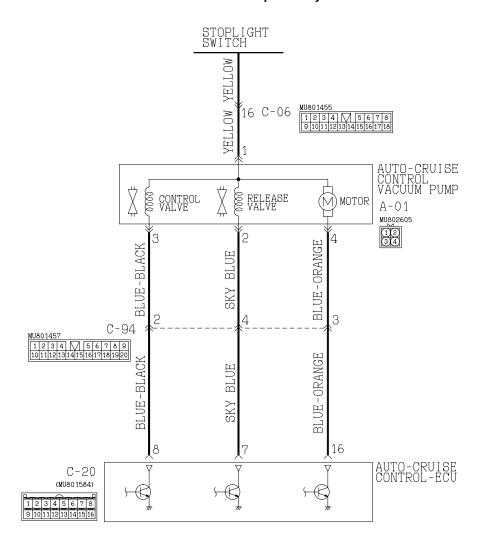
Check according to the inspection chart that is appropriate for the diagnostic trouble code.

| DIAGNOSTIC TROUBLE CODE NO. | INSPECTION ITEM | REFERENCE PAGE |
|-----------------------------|--|----------------|
| 11 | Auto-cruise vacuum pump drive system | P.17-12 |
| 12 | Vehicle speed signal system <m t=""></m> | P.17-17 |
| | Vehicle speed signal system | P.17-20 |
| 14 | Stoplight switch system | P.17-23 |
| 15 | Auto-cruise control switch system | P.17-32 |
| 16 | Auto-cruise control-ECU system | P.17-39 |
| 17 | Throttle position sensor system | P.17-39 |

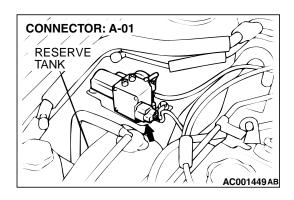
DIAGNOSTIC TROBLE CODE PROCEDURES

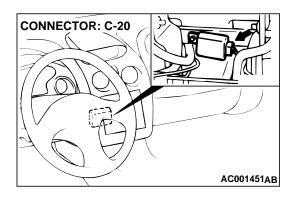
DTC 11: Auto-cruise Vacuum Pump Drive System

Auto-cruise Vacuum Pump Drive System Circuit

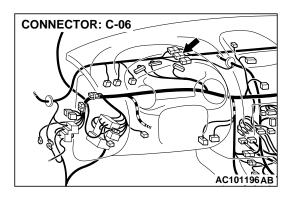


W3S13M02AA AC106578AB





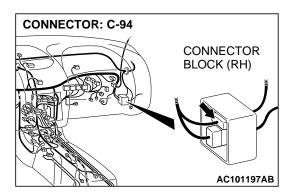
TSB Revision



CIRCUIT OPERATION

This circuit activates the vacuum pump used to accelerate/decelerate, set, and cancel the vehicle speed.

The auto-cruise control-ECU controls the control valve, release valve, and motor by turning the transistor in the ECU on and off.



DTC SET CONDITIONS

Any drive signal for the release valve, control valve or motor is not input to the auto-cruise control-ECU.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

- Malfunction of the auto-cruise vacuum pump.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

MB991223: Harness Set

STEP 1. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal numbers 7,8 and 16) by backprobing.

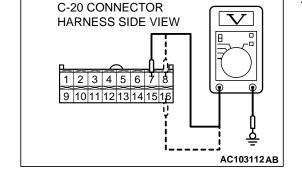
- (1) Do not disconnect auto-cruise control-ECU connector C-20.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 7 and ground by backprobing.
 - Voltage should be battery positive voltage.
 [When decelerating with the "SET" switch while driving at constant speed (Release valve open).]
- (4) Measure the voltage between terminal 8 and ground by backprobing.
 - Voltage should be battery positive voltage.
 [When decelerating with the "SET" switch while driving at constant speed. (Control valve open).]
- (5) Measure the voltage between terminal 16 and ground by backprobing.
 - Voltage should be battery positive voltage.
 (When the motor is stopped during a constant road speed.)
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

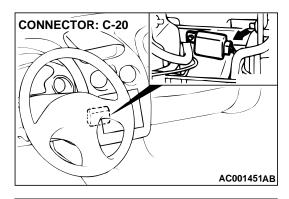
Q: Are all of the above values satisfied?

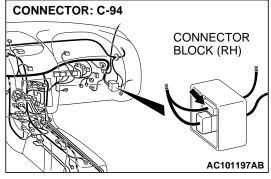
YES: Check that diagnostic trouble code 11 is not output. If diagnostic trouble code 11 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

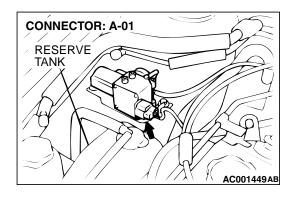
Then check that diagnostic trouble code 11 is not.

NO: Go to Step 2.









STEP 2. Check auto-cruise control-ECU connector C-20 and intermediate connector C-94.

Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

Then check that diagnostic trouble code 11 is not output.

NO: Go to Step 3.

STEP 3. Check auto-cruise control vacuum pump connector A-01.

Q: Is the connector damaged?

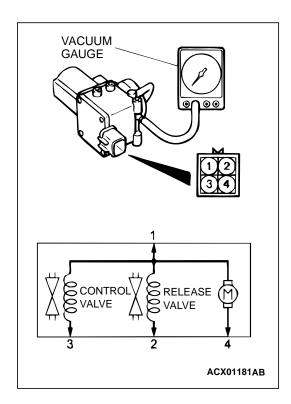
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P 00E-2

P.00E-2.

Then check that diagnostic trouble code 11 is not output.

NO: Go to Step 4.



STEP 4. Check the auto-cruise vacuum pump.

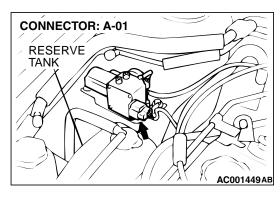
- (1) Disconnect the vacuum hose from the auto-cruise vacuum pump and connect a vacuum gauge to the vacuum pump.
- (2) Disconnect the vacuum pump connector.
- (3) Check the auto-cruise vacuum pump and valves according to the following procedure:
 - Connect the positive battery terminal to auto-cruise vacuum pump connector terminal 1, and the negative battery terminal to terminals 2, 3, and 4.
 The vacuum gauge should read 27 kPa (8.0 in Hg) or more.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 2 is disconnected from the negative battery terminal while terminals 1, and 3 remain connected.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 3 is disconnected from the negative battery terminal while terminals 1, and 2 remain connected.

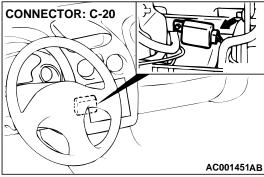
Q: Are all of the above values satisfied?

YES: Go to Step 5.

NO: Replace the auto-cruise vacuum pump. (Refer to P.17-86.)

Then check that diagnostic trouble code 11 is not output.





STEP 5. Check the harness wire between auto-cruise control vacuum pump connector A-01 (terminal numbers 2, 3 and 4) and auto-cruise control-ECU connector C-20 (terminal numbers 7, 8 and 16).

Q: Is any harness wire between auto-cruise control vacuum pump connector A-01 (terminal numbers 2, 3 and 4) and auto-cruise control-ECU connector C-20 (terminal numbers 7, 8 and 16) damaged?

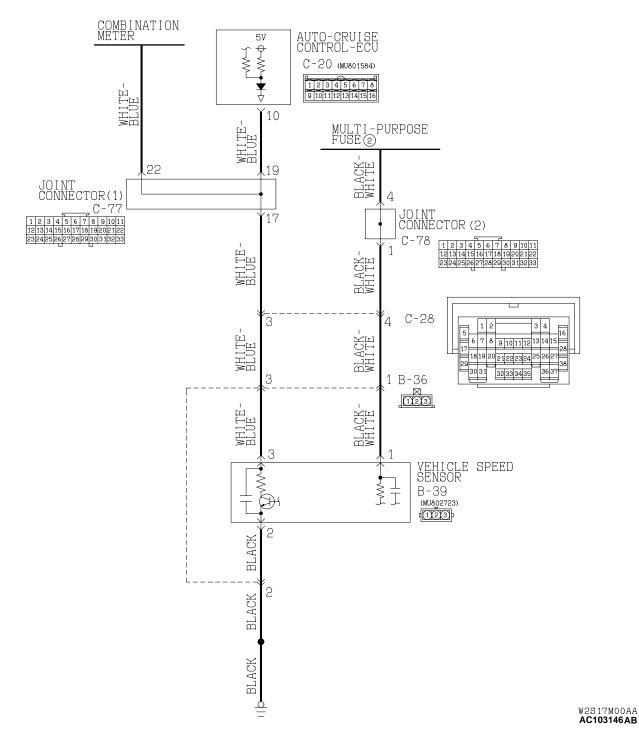
YES: Repair the harness wire and then check that diagnostic trouble code 11 is not output.

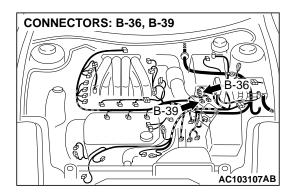
NO: Check that diagnostic trouble code 11 is not output. If diagnostic trouble code 11 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

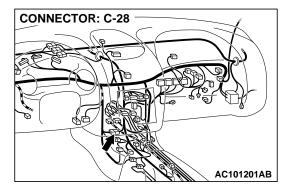
Then check that diagnostic trouble code 11 is not output.

DTC 12: Vehicle Speed Signal System <M/T>

Vehicle Speed Signal System Circuit



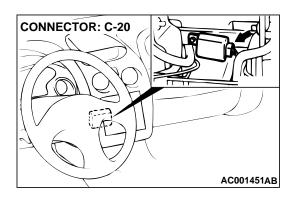


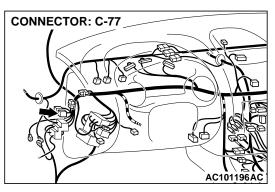


CIRCUIT OPERATION

This circuit checks the operation of the vehicle speed sensor.

When the vehicle moves forward and reverses, the sensor turns ON and OFF repeatedly.





DTC SET CONDITIONS

The vehicle speed signals from the vehicle speed sensor are not input to the auto-cruise control-ECU when the vehicle speed is 40 km/h (25 mph) or more.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

- Malfunction of the vehicle speed sensor.
- · Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

• MB991223: Harness Set

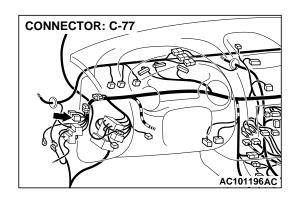
STEP 1. Check the speedometer.

Q: Does the speedometer work normally?

YES: Go to Step 2.

NO : Check the speedometer circuit and repair or replace as required.

(Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-40.)



STEP 2. Check joint connector (1) C-77.

Q: Is the connector damaged?

YES: Repair or replace connector.

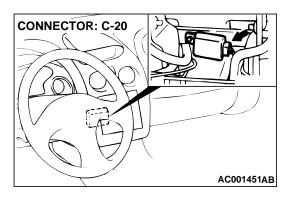
Refer to GROUP 00E, Harness Connector Inspection

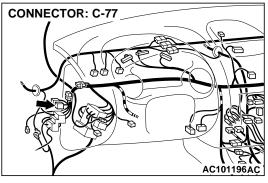
P.00E-2.

Then check that diagnostic trouble code 12 is not

output.

NO: Go to Step 3.





STEP 3. Check the harness wire between auto-cruise control-ECU connector C-20 (terminal number 10) and joint connector (1) C-77 (terminal number 19).

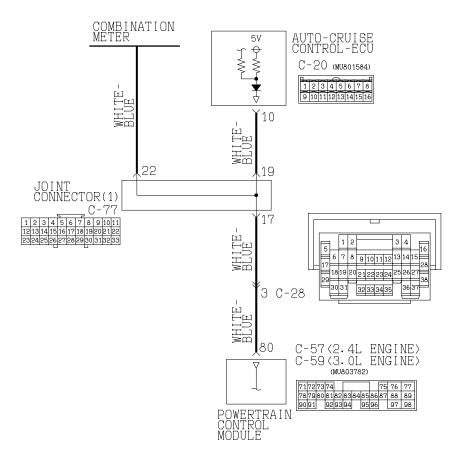
Q: Is any harness wire between auto-cruise control-ECU connector C-20 (terminal number 10) and joint connector (1) C-77 (terminal number 19) damaged?

YES: Repair the harness wire and then check that diagnostic trouble code 12 is not output.

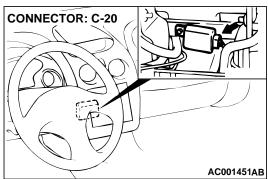
NO: Check that diagnostic trouble code 12 is not output. If diagnostic trouble code 12 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 12 is not output.

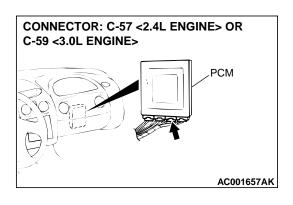
DTC 12: Vehicle Speed Signal System <A/T>

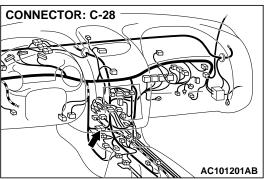
Vehicle Speed Signal System Circuit

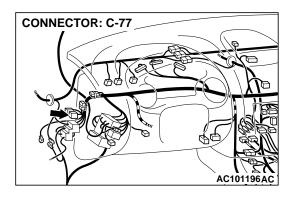


W2S17M01AA AC103147AB









TSB Revision

CIRCUIT OPERATION

This circuit checks the vehicle speed signal. When the vehicle moves forward and reverses, the sensor turns ON and OFF repeatedly.

DTC SET CONDITIONS

The vehicle speed signals from the PCM are not input to the auto-cruise control-ECU when the vehicle speed is 40 km/h (25 mph) or more.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

- Malfunction of the output shaft speed sensor.
- Damaged harness or connector.
- Malfunction of the PCM.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

MB991223: Harness Set

STEP 1. Check the speedometer.

Q: Does the speedometer work normally?

YES: Go to Step 2.

NO: Check the speedometer circuit and repair or replace as required.

(Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-40.)

STEP 2. Check joint connector (1) C-77.

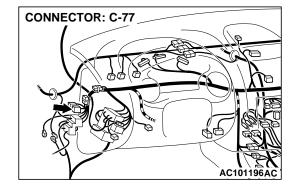
Q: Is the connector damaged?

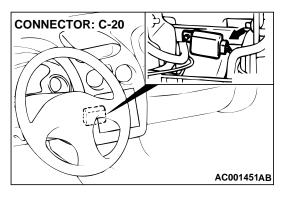
YES: Repair or replace connector.

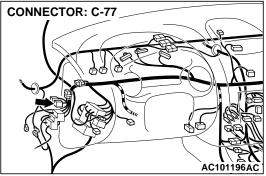
Refer to GROUP 00E, Harness Connector Inspection P 00F-2

Then check that diagnostic trouble code 12 is not output.

NO: Go to Step 3.



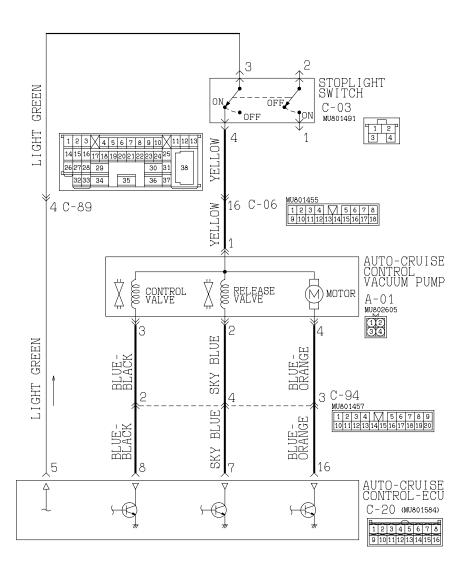




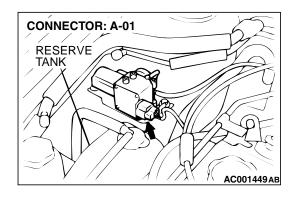
- STEP 3. Check the harness wire between auto-cruise control-ECU connector C-20 (terminal number 10) and joint connector (1) C-77 (terminal number 19).
- Q: Is any harness wire between auto-cruise control-ECU connector C-20 (terminal number 10) and joint connector (1) C-77 (terminal number 19) damaged?
 - **YES**: Repair the harness wire and then check that diagnostic trouble code 12 is not output.
 - NO: Check that diagnostic trouble code 12 is not output. If diagnostic trouble code 12 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 12 is not output.

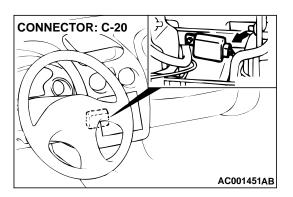
DTC 14: Stoplight Switch System

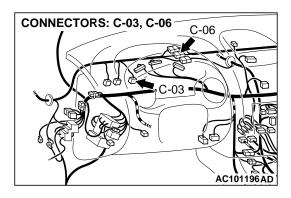
Stoplight Switch System Circuit

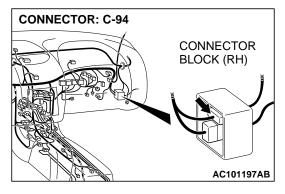


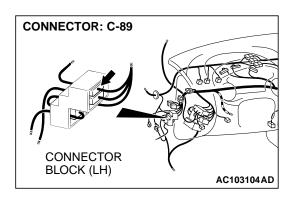
W3S13M01AA AC106577AB











CIRCUIT OPERATION

This circuit supplies the power to the vacuum pump. The battery positive voltage is supplied to the autocruise control vacuum pump by turning on the transistor at terminal number 16 of the auto-cruise control-ECU.

The conditions for turning on the transistor at terminal number 16 of the auto-cruise control-ECU are as follows.

- Ignition switch "ON."
- Auto-cruise control main switch "ON."
- Stoplight switch ON.

DTC SET CONDITIONS

None of the drive signals from release valve, control valve and motor of the auto-cruise vacuum pump are input to the auto-cruise control-ECU.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

- Malfunction of the stoplight switch.
- Malfunction of the auto-cruise vacuum pump.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

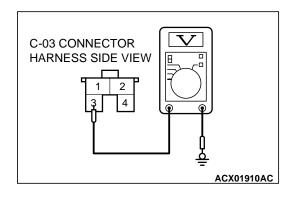
• MB991223: Harness Set

STEP 1. Check the output circuit voltage at stoplight switch connector C-03 (terminal number 3) by backprobing.

- (1) Do not disconnect stoplight switch connector C-03.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 3 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

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



STEP 2. Check stoplight switch connector C-03.

Q: Is the connector damaged?

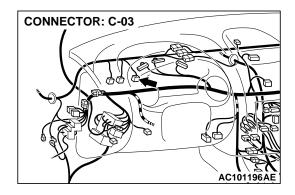
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that diagnostic trouble code 14 is not output.

NO: Go to Step 13.

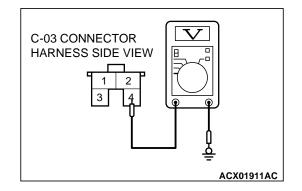


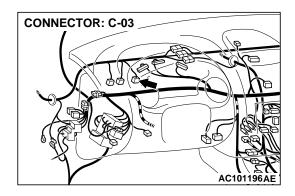
STEP 3. Check the output circuit voltage at stoplight switch connector C-03 (terminal number 4) by backprobing.

- (1) Do not disconnect stoplight switch connector C-03.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 4 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

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





STEP 4. Check stoplight switch connector C-03.

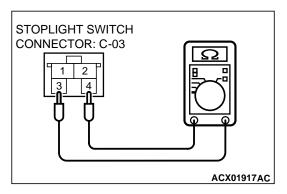
Q: Is the connector damaged?

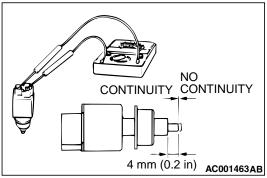
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 14 is not output.

NO: Go to Step 5.





STEP 5. Check the stoplight switch.

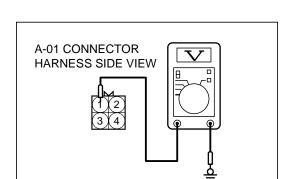
- (1) Disconnect stoplight switch connector C-03.
- (2) Connect an ohmmeter to the stoplight switch between terminals 3 and 4, and check whether there is continuity when the plunger of the stoplight switch is pushed in and an open circuit when it is released.
- (3) The stoplight switch is in good condition if the circuit is open when the plunger is pushed in to a depth of within 4 mm (0.2 inch) from the outer case edge surface, and if there is continuity when it is released.

Q: Is the circuit is open?

YES: Replace the stoplight switch.
Refer to GROUP 35A, Brake Pedal P.35A-31.
Then check that a diagnostic trouble code 14 is not output.

NO: Check that diagnostic trouble code 14 is not output. If diagnostic trouble code 14 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

Then check that diagnostic trouble code 14 is not output.



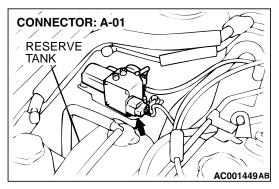
ACX01908AC

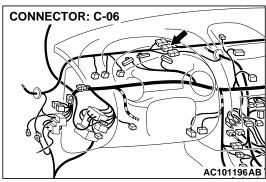
STEP 6. Check the output circuit voltage at auto-cruise control vacuum pump connector A-01 (terminal number 1) by backprobing.

- (1) Do not disconnect auto-cruise control vacuum pump connector A-01.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 1 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

YES: Go to Step 8. **NO**: Go to Step 7.





STEP 7. Check auto-cruise control vacuum pump connector A-01 and intermediate connector C-06. Q: Is any connector damaged?

YES: Repair or replace connector.

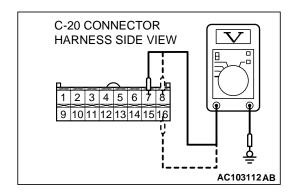
Refer to GROUP 00E, Harness Connector Inspection

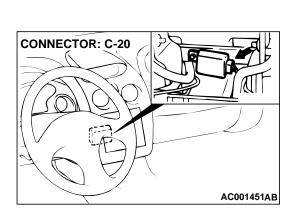
Then check that diagnostic trouble code 14 is not output.

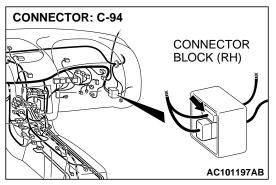
NO: Check the harness wire between stoplight switch connector C-03 and auto-cruise control vacuum pump connector A-01 for open circuit or damage.

Then repair if necessary.

Then check that diagnostic trouble code 14 is not output.







STEP 8. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal numbers 7,8 and 16) by backprobing.

- (1) Do not disconnect auto-cruise control-ECU connector C-20.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 7 and ground by backprobing.
 - Voltage should be battery positive voltage.
 [When decelerating with the "SET" switch while driving at constant speed (Release valve open).]
- (4) Measure the voltage between terminal 8 and ground by backprobing.
 - Voltage should be battery positive voltage.
 [When decelerating with the "SET" switch while driving at constant speed. (Control valve open).]
- (5) Measure the voltage between terminal 16 and ground by backprobing.
 - Voltage should be battery positive voltage.
 (When the motor is stopped during a constant road speed.)
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are all of the above values satisfied?

YES: Check that diagnostic trouble code 14 is not output. If diagnostic trouble code 14 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

Then check that diagnostic trouble code 14 is not.

NO: Go to Step 9.

STEP 9. Check auto-cruise control-ECU connector C-20 and intermediate connector C-94.

Q: Is the connector damaged?

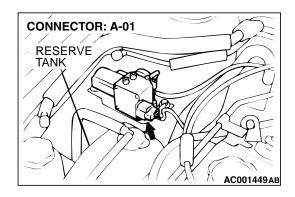
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2

Then check that diagnostic trouble code 14 is not output.

NO: Go to Step 10.



STEP 10. Check auto-cruise control vacuum pump connector A-01.

Q: Is the connector damaged?

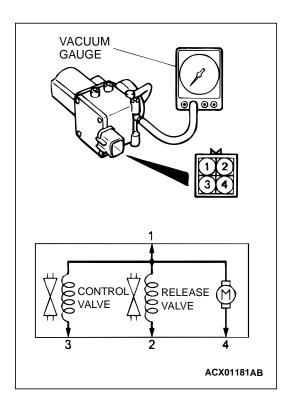
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that diagnostic trouble code 14 is not output.

NO: Go to Step 11.



STEP 11. Check the auto-cruise vacuum pump.

- (1) Disconnect the vacuum hose from the auto-cruise vacuum pump and connect a vacuum gauge to the vacuum pump.
- (2) Disconnect the vacuum pump connector.
- (3) Check the auto-cruise vacuum pump and valves according to the following procedure:
 - Connect the positive battery terminal to auto-cruise vacuum pump connector terminal 1, and the negative battery terminal to terminals 2, 3, and 4.
 The vacuum gauge should read 27 kPa (8.0 in Hg) or
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 2 is disconnected from the negative battery terminal while terminals 1, and 3 remain connected.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 3 is disconnected from the negative battery terminal while terminals 1, and 2 remain connected.

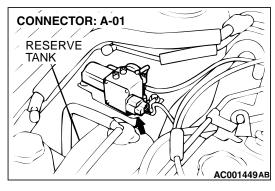
Q: Are all of the above values satisfied?

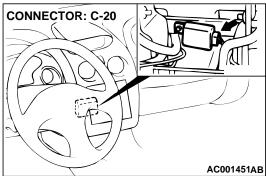
YES: Go to Step 12.

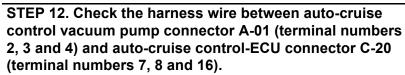
more.

NO: Replace the auto-cruise vacuum pump. (Refer to P.17-86.)

Then check that diagnostic trouble code 14 is not output.



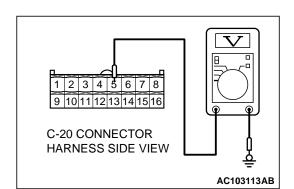




Q: Is any harness wire between auto-cruise control vacuum pump connector A-01 (terminal numbers 2,3 and 4) and auto-cruise control-ECU connector C-20 (terminal numbers 7,8 and 16) damaged?

YES: Repair harness wire and then check that diagnostic trouble code 14 is not output.

NO: Check that diagnostic trouble code 14 is not output. If diagnostic trouble code 14 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 14 is not output.

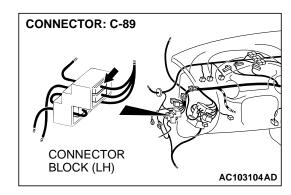


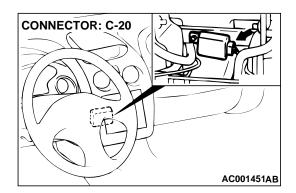
STEP 13. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 5) by backprobing.

- (1) Do not disconnect auto-cruise control-ECU connector C-20.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 5 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

YES: Go to Step 14.
NO: Go to Step 15.





STEP 14. Check intermediate connector C-89.

Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 14 is not output.

NO: Check the harness wire between auto-cruise control-ECU connector C-20 and stoplight switch connector C-03 for open circuit or damage.

Then repair if necessary.

Then check that diagnostic trouble code 14 is not output.

STEP 15. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 14 is not output.

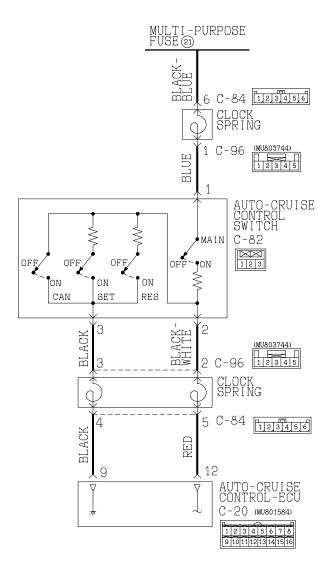
NO: Check that diagnostic trouble code 14 is not output. If diagnostic trouble code 14 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

Then check that diagnostic trouble code 14 is not

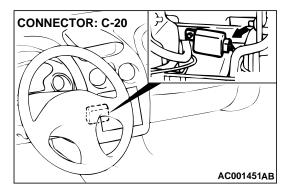
output.

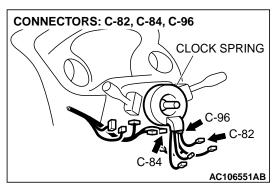
DTC 15: Auto-cruise Control Switch System

Auto-cruise Control Switch System Circuit



W3S13M05AA AC106581AB





CIRCUIT OPERATION

This circuit judges the signals of each switch ("OFF," "SET," "RESUME," "CANCEL" and "MAIN") of the auto-cruise control switch.

The auto-cruise control-ECU detects the state of the auto-cruise control switch by sensing the voltages shown below.

- When all switches are OFF, the ECU detects 3.5
 5.0 volts.
- When the "SET" switch is ON, the ECU detects 0.4 – 2.3 volts.
- When the "RESUME" switch is ON, the ECU detects 2.3 – 3.5 volts.
- When the "CANCEL" switch is ON, the ECU detects 0.4 volts or less.
- When the main switch is ON, the ECU detects 7.0 volts.

DTC SET CONDITIONS

This code is output when the auto-cruise control switch "RESUME" switch, "SET" switch or "CANCEL" switch stays ON.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

- Malfunction of the auto-cruise control switch.
- Malfunction of the clock spring.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

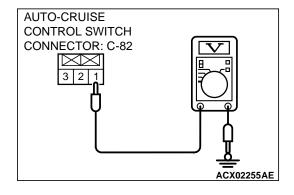
• MB991223: Harness Set

STEP 1. Check the 12-Volt supply circuit voltage at autocruise control switch connector C-82 (terminal number 1).

- (1) Disconnect auto-cruise control switch connector C-82 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 1 and ground.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

YES: Go to Step 6. **NO**: Go to Step 2.



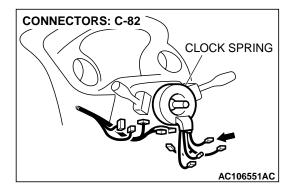
STEP 2. Check auto-cruise control switch connector C-82. Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P 00E-2

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 3.



STEP 3. Check the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-144.

Q: Is the clock spring damaged?

YES: Replace the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-144.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 4.



STEP 4. Check clock spring connector C-84.

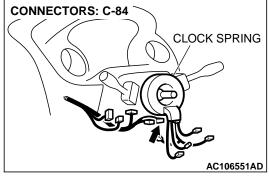
Q: Is any connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 5.



STEP 5. Check clock spring connector C-96.

Q: Is any connector damaged?

YES: Repair or replace connector.

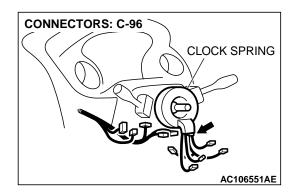
Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

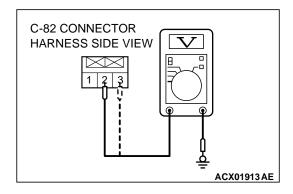
Then check that diagnostic trouble code 15 is not output.

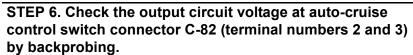
NO: Check the harness wire between multi-purpose fuse No.21 and auto-cruise control switch connector C-82 for open circuit or damage.

Then repair if necessary.

Then check that diagnostic trouble code 15 is not output.



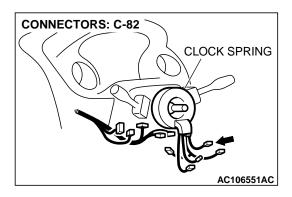




- (1) Do not disconnect auto-cruise control switch connector C-207.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 2 and ground by backprobing.
 - Voltage should be battery positive voltage. (MAIN switch is at the "ON" position.)
- (4) Measure the voltage between terminal 3 and ground by backprobing.
 - Voltage should be between 6.8 and 7.2 volts. (MAIN switch is at the "ON" position.)
 - Voltage should be between 3.5 and 5.0 volts.
 (All switches are at the "OFF" position.)
 - Voltage should be between 0.4 and 2.3 volts.
 ("SET" switch is at the "ON" position)
 - Voltage should be between 2.3 and 3.5 volts.
 ("RESUME" switch is at the "ON" position.)
 - Voltage should be between 1 volt or less.
 ("CANCEL" switch is at the "ON" position.)
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage within specifications?

YES: Go to Step 9. NO: Go to Step 7.



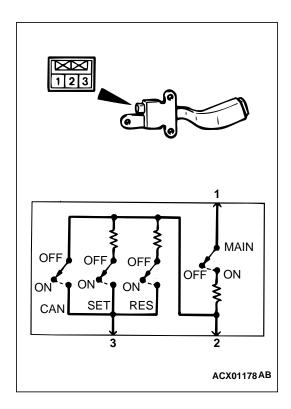
STEP 7. Check auto-cruise control switch connector C-82. Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 8.



STEP 8. Check the auto-cruise control switch.

- (1) Disconnect auto-cruise control switch. (Refer to P.17-86.)
- (2) Measure the resistance between the terminals when each of the "SET," "RESUME," "CANCEL" and MAIN switch is pressed.

| SWITCH POSITION | TERMINAL CONNECTOR OF TESTER | SPECIFIED CONDITION |
|-------------------------|------------------------------------|----------------------|
| "MAIN" switch "OFF" | 1 – 2 | Open circuit |
| "MAIN" switch "ON" | 1 – 2 | Approximately 3.9 kΩ |
| "CANCEL" switch "ON" | 2 – 3 | Less than 2 Ω |
| "RESUME" switch "ON" | 2 – 3 | Approximately 910 Ω |
| "SET" switch "ON" | 2 – 3 | Approximately 220 Ω |

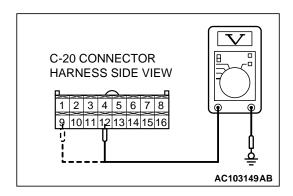
Q: Is the values measured correspond to those in the table below?

YES: Check that diagnostic trouble code 15 is not output. If diagnostic trouble code 15 is output, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that diagnostic trouble code 15 is not output.

NO : Replace the auto-cruise control switch. (Refer to P.17-86.)

Then check that diagnostic trouble code 15 is not output.



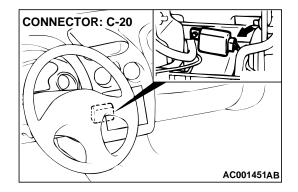
STEP 9. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal numbers 9 and 12) by backprobing.

- (1) Do not disconnect auto-cruise control-ECU connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 12 and ground by backprobing.
 - Voltage should be battery positive voltage.
 (The MAIN switch is at the "ON" position.)
- (4) Measure the voltage between terminal 9 and ground by backprobing.
 - Voltage should be between 6.8 and 7.2 volts. (MAIN switch is at the "ON" position.)
 - Voltage should be between 3.5 and 5.0 volts.
 (All switches are at the "OFF" position.)
 - Voltage should be between 0.4 and 2.3 volts. ("SET" switch is at the "ON" position.)
 - Voltage should be between 2.3 and 3.5 volts.
 ("RESUME" switch is at the "ON" position.)
 - Voltage should be between 1 volt or less.
 ("CANCEL" switch is at the "ON" position.)
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage within specifications?

YES: Check that diagnostic trouble code 15 is not output. If diagnostic trouble code 15 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 10.



STEP 10. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 11.

STEP 11. Check the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-144.

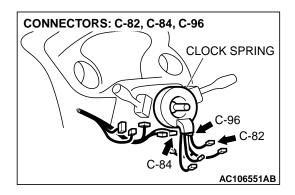
Q: Is the clock spring damaged?

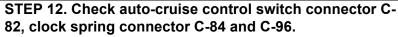
YES: Replace the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-144.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 12.



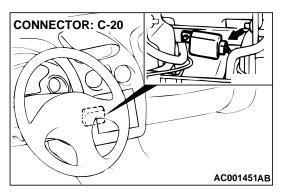


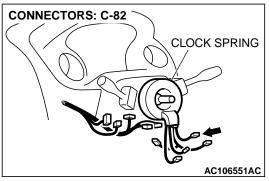
Q: Is any connector damaged?

YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that diagnostic trouble code 15 is not output.

NO: Go to Step 13.





STEP 13. Check the harness wire between auto-cruise control switch connector C-82 (terminal numbers 2 and 3) and auto-cruise control-ECU connector C-20 (terminal numbers 9 and 12).

Q: Is any harness wire between auto-cruise control switch connector C-82 (terminal numbers 2 and 3) and auto-cruise control-ECU connector C-20 (terminal numbers 9 and 12) damaged?

YES: Repair harness wire and then check that diagnostic trouble code 15 is not output.

NO: Check that diagnostic trouble code 15 is not output. If diagnostic trouble code 15 is output, replace the autocruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 15 is not output.

DTC 16: Auto-cruise Control-ECU

DTC SET CONDITIONS

This code is output when a problem is found on the cancel status hold circuit or microcomputer operation monitor circuit, which is incorporated in the autocruise control-ECU.

TROUBLESHOOTING HINTS

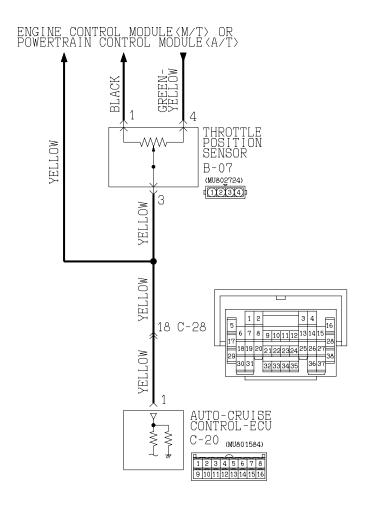
Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

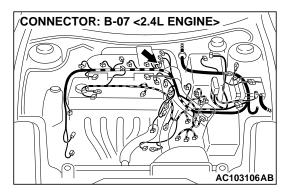
Replace the auto-cruise control-ECU. (Refer to P.17-86.) Check that diagnostic trouble code 16 is not output.

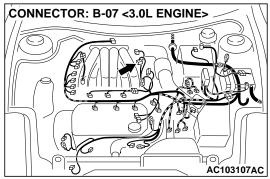
DTC 17: Throttle Position Sensor System

Throttle Position Sensor System Circuit



W3S13M03AA AC106579AB





CIRCUIT OPERATION

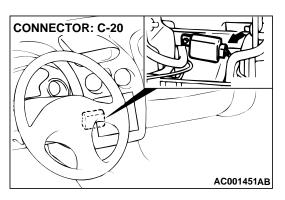
The throttle position sensor signal is sent to the autocruise control-ECU through this circuit.

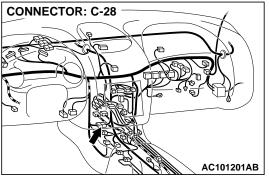
The auto-cruise control-ECU receives a signal from the throttle position sensor at terminal 3.

The signal is OFF when the accelerator pedal is depressed, and ON when the accelerator pedal is released.

The throttle position sensor sends a voltage signal to terminal 1 of the auto-cruise control-ECU.

The voltage depends on throttle opening angle.





DTC SET CONDITIONS

If 2.5 volts or more 0.2 volts or less is output for four seconds or more.

TROUBLESHOOTING HINTS

The most likely causes for this code to be set are:

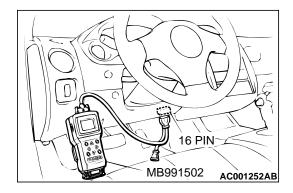
- Malfunction of the throttle position sensor.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tools:

• MB991502: Scan Tool (MUT-II)

• MB991223: Harness Set



STEP 1. Check the throttle position sensor.

↑ CAUTION

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

- (1) Using scan tool MB991502.
- (2) Connect scan tool MB991502 to the data link connector.
- (3) Turn the ignition switch to the "ON" position.
- (4) Read the MFI-DTC.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the MFI-DTC P0120 is output?

YES: For 2.4L engine, refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart P.13A-22. For 3.0L engine, refer to GROUP 13B, Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

NO: Go to Step 2.

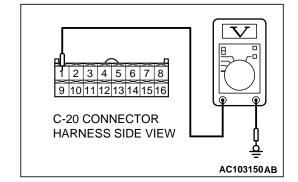
STEP 2. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 1) by backprobing.

- (1) Do not disconnect auto-cruise control-ECU connector C-20.
- (2) Turn the ignition switch to the "ON" position and the autocruise control main switch to the "ON" position.
- (3) Measure the voltage between terminal 1 and ground by backprobing.
 - Voltage should be between 4.0 and 5.5 volts.
 (When accelerator pedal is fully depressed.)
 - Voltage should be between 0.4 and 1.0 volts. (When accelerator pedal is released.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Are the voltage within specifications?

YES: Check that diagnostic trouble code 17 is not output. If diagnostic trouble code 17 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.) Then check that diagnostic trouble code 17 is not output.

NO: Go to Step 3.



CONNECTOR: C-20 AC001451AB

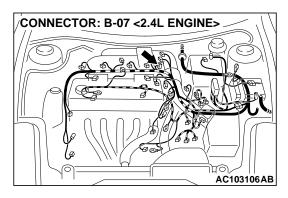
STEP 3. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

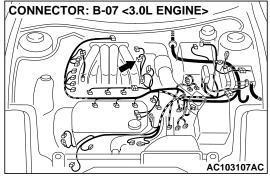
YES: Repair or replace connector.

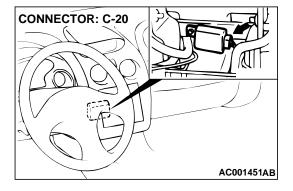
Refer to GROUP 00E, Harness Connector Inspection
P.00E-2.

Then check that diagnostic trouble code 17 is not output.

NO: Go to Step 4.







STEP 4. Check the harness wire between throttle position sensor connector B-07 (terminal number 3) and autocruise control-ECU connector C-20 (terminal number 1).

Q: Is the harness wire between throttle position sensor connector B-07 (terminal number 3) and auto-cruise control-ECU connector C-20 (terminal number 1) damaged?

YES: Repair harness wire and then check that diagnostic trouble code 17 is not output.

NO: Check that diagnostic trouble code 17 is not output. If diagnostic trouble code 17 is output, replace the auto-cruise control-ECU. (Refer to P.17-86.)

Then check that diagnostic trouble code 17 is not output.

SYMPTOM CHART

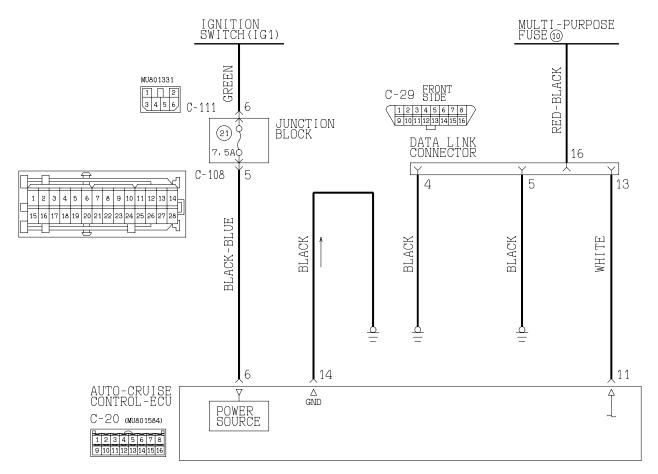
M1172002300195

| SYMPTOMS | | | INSPECTION PROCEDURE NO. | REFERENCE PAGE |
|---|--|-------------|--------------------------|-----------------------------------|
| Communication with scan tool MB991502 is not possible. | Communication with all systems is not possible. | 2.4L Engine | - | Group 13A, diagnosis P.13A-434 |
| | | 3.0L Engine | - | Group 13B, diagnosis P.13B-530 |
| | Communication with auto-cruise control- ECU only is not possible. | | 1 | P.17-44 |
| Auto-cruise control is not cancelled. | When brake pedal is depressed. | | 2 | P.17-50 |
| | When clutch pedal is depressed. <m t=""></m> | | 3 | P.17-56 |
| | When selector lever is moved to "N" range. | | 4 | P.17-61 |
| | When "CANCEL" switch is turned ON. | | 5 | P.17-65 |
| Auto-cruise control cannot be set. | | | 6 | P.17-66 |
| Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <m t=""></m> | | | 7 | P.17-67 |
| Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. | | | 8 | P.17-69 |
| Auto-cruise control indicator light inside combination meter does not illuminate. (However, auto-cruise control is normal.) | | | 9 | P.17-71 |

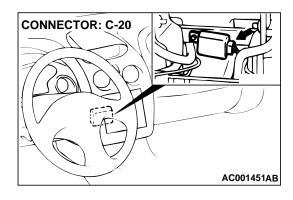
SYMPTOM PROCEDURES

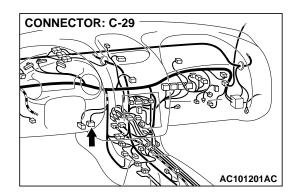
INSPECTION PROCEDURE 1: Communication with Scan Tool MB991502 is not Possible (Communication with the Auto-cruise Control-ECU Only is not Possible.)

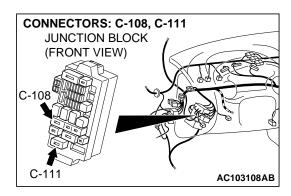
Auto-cruise Control-ECU Supply, Ground and Data Link Circuit



W2S17M03AA AC106774AB







CIRCUIT OPERATION

Power of the auto-cruise control-ECU is transmitted from the ignition switch (IG1) to the auto-cruise control-ECU through multi-purpose fuse 4 in the junction block.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a malfunction of the autocruise control-ECU power supply circuit or the autocruise control-ECU ground circuit.

TROUBLESHOOTING HINTS

- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

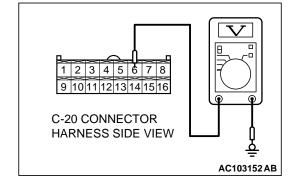
• MB991223: Harness Set

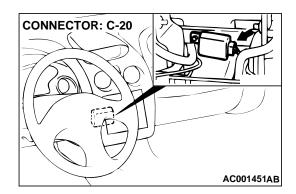
STEP 1. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 6) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 6 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

YES: Go to Step 5. NO: Go to Step 2.





STEP 2. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector.

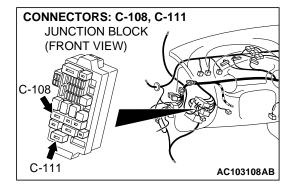
S: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 3.



STEP 3. Check junction block connector C-108 and C-111. Q: Is any connector damaged?

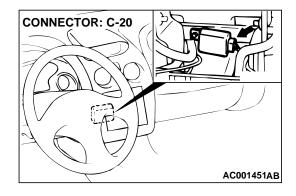
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 4.



STEP 4. Check the harness wire between ignition switch and auto-cruise control-ECU connector C-20 (terminal number 6).

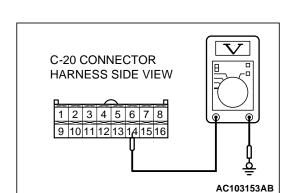
Q: Is any harness wire between ignition switch and autocruise control-ECU connector C-20 (terminal number 6) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

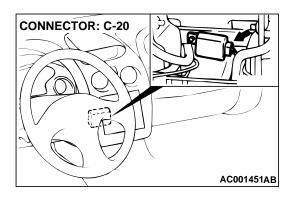


STEP 5. Check the ground circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 14) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 14 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately 0.5 volts or less?

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



STEP 6. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

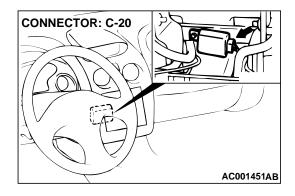
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 7.



STEP 7. Check the harness wire between auto-cruise control-ECU connector C-20 (terminal number 14) and ground.

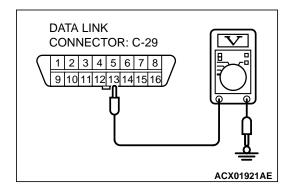
Q: Is any harness wire between auto-cruise control-ECU connector C-20 (terminal number 14) and ground damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.



STEP 8. Check the output circuit voltage at data link connector C-29 (terminal number 13).

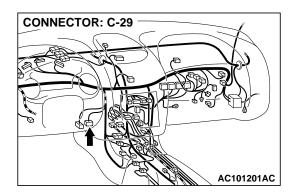
- (1) Turn the ignition switch to the "ON" position.
- (2) Measure the voltage between terminal 13 and ground.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately 4 volts or more?

YES: Check that the malfunction is eliminated. If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 9.



STEP 9. Check data link connector C-29.

Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

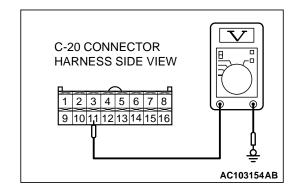
NO: Go to Step 10.

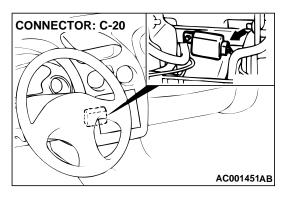
STEP 10. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 11) by backprobing.

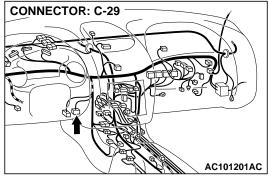
- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 11 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

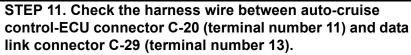
Q: Is the voltage approximately 4 volts or more?

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









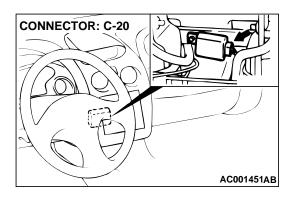
Q: Is any harness wire between auto-cruise control-ECU connector C-20 (terminal number 11) and data link connector C-29 (terminal number 13) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.



STEP 12. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection
P.00E-2.

Then check that the malfunction is eliminated.

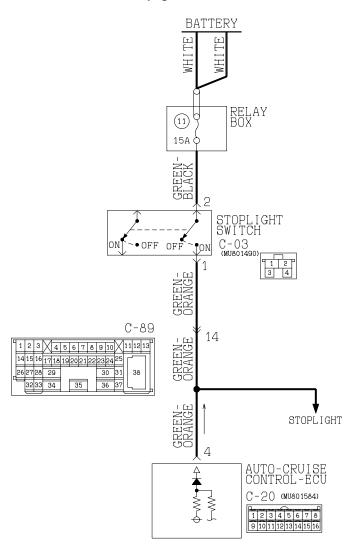
NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

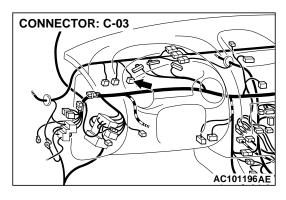
Then check that the malfunction is eliminated.

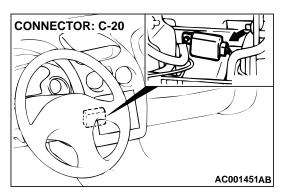
INSPECTION PROCEDURE 2: When the Brake Pedal is Depressed, Auto-cruise Control is not Cancelled.

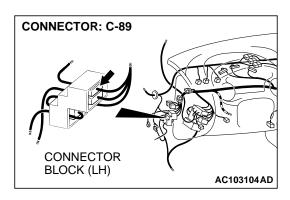
Stoplight Switch Circuit



W2S17M04AA AC106775AB







CIRCUIT OPERATION

This is the stoplight switch input signal circuit. The signal is sent to the stoplight switch from dedicated fuse 5, and is then sent to the auto-cruise control-ECU.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a malfunction of the stoplight switch circuit.

TROUBLESHOOTING HINTS

- Malfunction of the stoplight switch.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

• MB991223: Harness Set

STEP 1. Check if the stoplight illuminates.

Q: Is the stoplight illuminated?

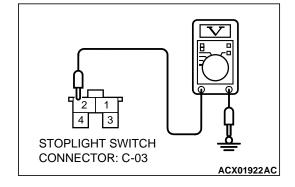
YES: Go to Step 8. **NO**: Go to Step 2.

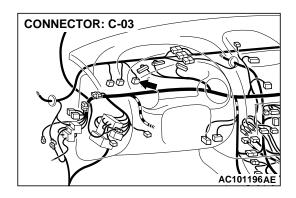
STEP 2. Check the 12-Volt supply circuit voltage at stoplight switch connector C-03 (terminal number 2).

- (1) Disconnect stoplight switch connector C-03 and measure at the harness side.
- (2) Measure the voltage between terminal 2 and ground.

Q: Is the voltage approximately battery positive voltage?

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





STEP 3. Check stoplight switch connector C-03.

Q: Is the connector damaged?

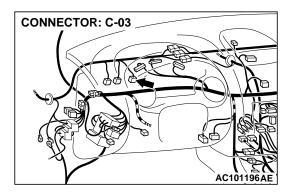
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 4.



STEP 4. Check the harness wire between dedicated fuse No.5 and stoplight switch connector C-03 (terminal number 2).

Q: Is any harness wire between dedicated fuse No.5 and stoplight switch connector C-03 (terminal number 2) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated. If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

STEP 5. Check the stoplight switch.

- (1) Disconnect harness connector C-03 at the stoplight switch.
- (2) Connect an ohmmeter to the stoplight switch, and check continuity when the plunger of the stoplight switch is pushed in and when it is released.
- (3) The stoplight switch is in good condition if the circuit is open when the plunger is pushed in to a depth of within 4 mm (0.2 inch) from the outer case edge surface, and if the resistance value is less than 2 ohm when it is released.
- (4) The check for continuity should be made at terminals 1 and 2 of the stoplight switch.

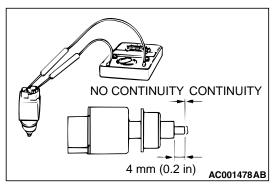
Q: Is the circuit open?

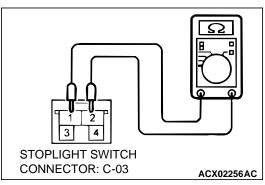
YES: Replace the stoplight switch.

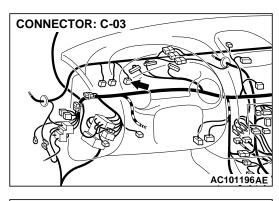
Refer to GROUP 35A, Brake Pedal P.35A-31.

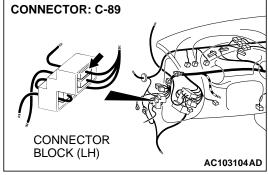
Then check that the malfunction is eliminated.

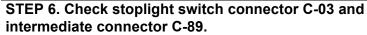
NO: Go to Step 6.











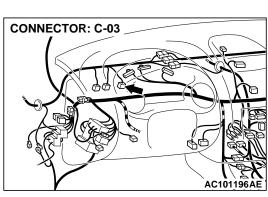
Q: Is any connector damaged?

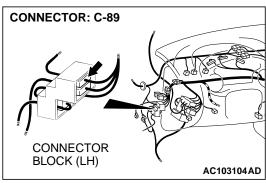
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 7.





STEP 7. Check the harness wire between stoplight switch connector C-03 (terminal number 1) and intermediate connector C-89 (terminal number 14).

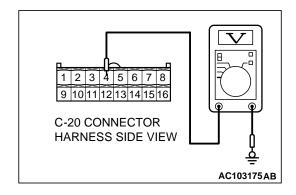
Q: Is any harness wire between stoplight switch connector C-03 (terminal number 1) and intermediate connector C-89 (terminal number 14) damaged?

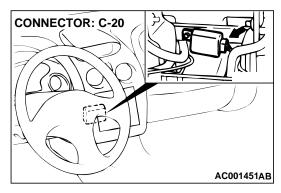
YES: Repair the harness wire and then check that the malfunction is eliminated.

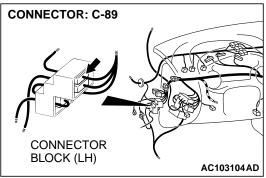
NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.







STEP 8. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 4) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 4 and ground by backprobing.
 - Voltage should be battery positive volts. (When brake pedal is depressed.)
 - Voltage should be 0.5 volts or less.
 (When brake pedal is not depressed.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage within specifications?

YES: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 9.

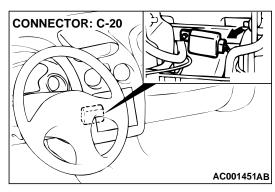
STEP 9. Check auto-cruise control-ECU connector C-20 and intermediate connector C-89.

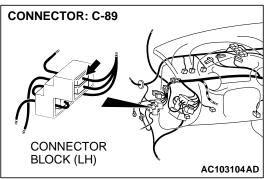
Q: Is the connector damaged?

YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 10.





STEP 10. Check the harness wire between intermediate connector C-89 (terminal number 14) and auto-cruise control-ECU connector C-20 (terminal number 4).

Q: Is any harness wire between intermediate connector C-89 (terminal number 14) and auto-cruise control-ECU connector C-20 (terminal number 4) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

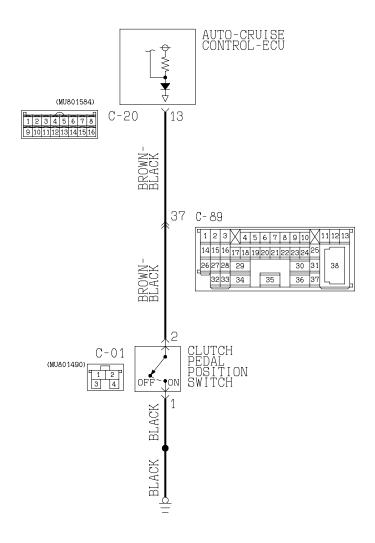
NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

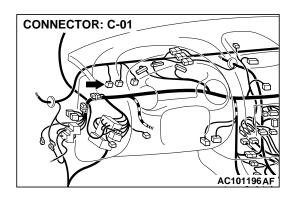
Then check that the malfunction is eliminated.

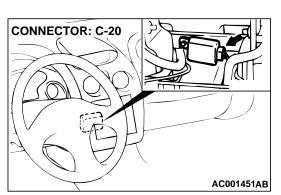
INSPECTION PROCEDURE 3: When the Clutch Pedal is Depressed, Auto-cruise Control is not Cancelled. <M/T>

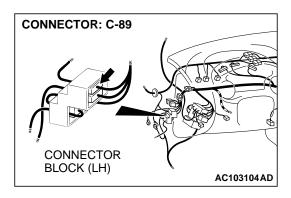
Clutch Pedal Position Switch Circuit



AC005115AB







CIRCUIT OPERATION

CLUTCH PEDAL POSITION SWITCH CONNECTOR: C-01

This circuit indicates the operation status of the clutch pedal position switch. When the clutch pedal position switch is ON (clutch pedal is depressed), the voltage of auto-cruise control-ECU terminal number 13 will indicate 0 volt.



ACX02256AF

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a malfunction of the clutch pedal position switch circuit.

TROUBLESHOOTING HINTS

- Malfunction of the clutch pedal position switch.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

STEP 1. Check the clutch pedal position switch.

- 1.Disconnect clutch pedal position switch connector C-01.
- 2. Measure the continuity between the terminals.

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

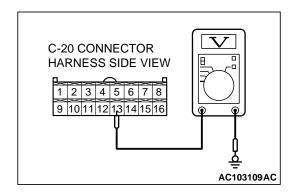
Q: Is the continuity meet the table above?

YES: Go to Step 2.

NO: Replace the clutch pedal position switch.

Refer to GROUP 21A, Clutch P.21A-10.

Then check that the malfunction is eliminated.



STEP 2. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 13) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 13 and ground by backprobing.
 - Voltage should be 0.5 volts or less. (When clutch pedal is depressed.)
 - Voltage should be battery positive voltage.
 (When clutch pedal is not depressed.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

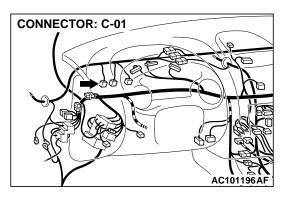
Q: Is the voltage within specifications?

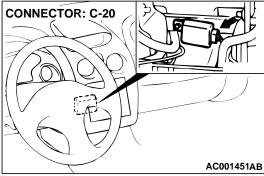
YES: Check that the malfunction is eliminated.

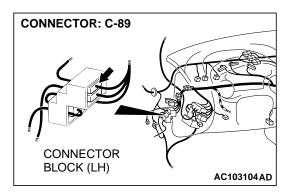
If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 3.







STEP 3. Check clutch pedal position switch connector C-01, auto-cruise control-ECU connector C-20 and intermediate connector C-89.

Q: Is any connector damaged?

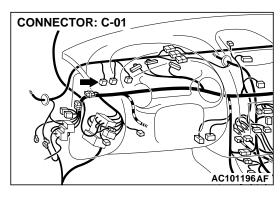
YES: Repair or replace connector.

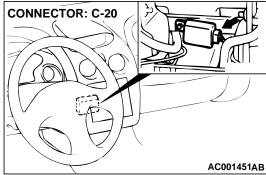
Refer to GROUP 00E, Harness Connector Inspection

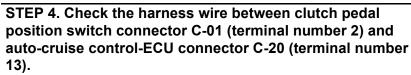
P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 4.



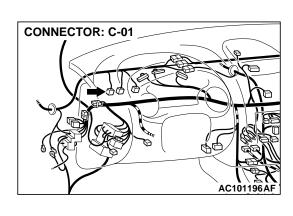




Q: Is any harness wire between clutch pedal position switch connector C-01 (terminal number 2) and autocruise control-ECU connector C-20 (terminal number 13) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Go to Step 5.



STEP 5. Check the harness wire between clutch pedal position switch connector C-01 (terminal number 1) and ground wire.

Q: Is any harness wire between clutch pedal position switch connector C-01 (terminal number 1) and ground wire damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

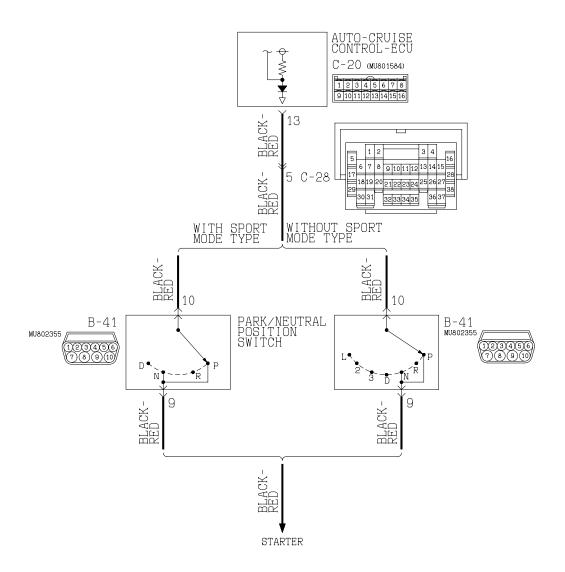
NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

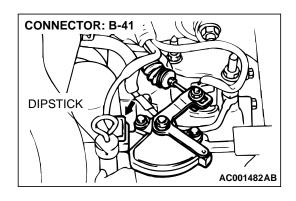
Then check that the malfunction is eliminated.

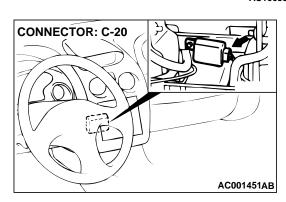
INSPECTION PROCEDURE 4: When the Selector Lever is Moved to "N" Range, Auto-cruise Control is not Cancelled. <A/T>

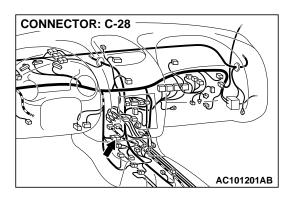
Park/neutral Position Switch Circuit



W3S13M04AA AC106580AB







CIRCUIT OPERATION

This circuit transmits the "N" or "P" position signal of the park/neutral position switch to the auto-cruise control-ECU.

When the park/neutral position switch is at the "N" or "P" position, auto-cruise control-ECU terminal number 13 will receives 0 volt.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably an open-circuit in the output signal circuit in "N" range.

TROUBLESHOOTING HINTS

- Malfunction of the park/neutral position switch.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

MB991223: Harness Set

STEP 1. Check the output circuit voltage at park/neutral position switch connector B-41 (terminal number 10) by backprobing.

- (1) Do not disconnect park/neutral position switch connector B-41.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 10 and ground by backprobing.
 - Voltage should be battery positive voltage.
 (When select lever is in a position other than "N" range.)
 - Voltage should be 0.5 volts or less.
 (When select lever is in "N" range.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

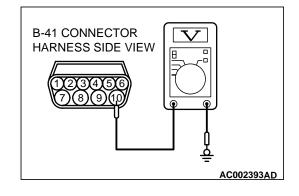
Q: Is the voltage within specifications?

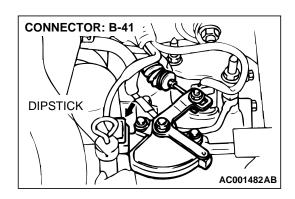
YES: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 2.





STEP 2. Check park/neutral position switch connector B-41.

Q: Is the connector damaged?

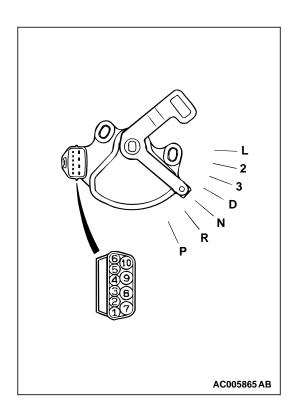
YES: Repair or replace connector.

Refer to GROUP 00E, Harness Connector Inspection

P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 3.



STEP 3. Check the circuit at the park/neutral position switch.

- (1) Disconnect the park/neutral position switch connector B-41.
- (2) Measure the continuity park/neutral position switch connector terminals.

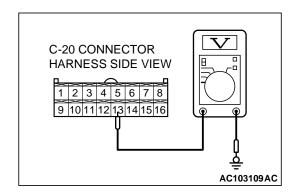
| ITEMS | TERMINAL CONNECTOR OF TESTER | SPECIFIED CONDITION |
|-------|------------------------------|---------------------|
| Р | 3 – 8, 9 – 10 | Less than 2 ohm |
| N | 4 – 8, 9 – 10 | |

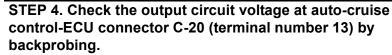
Q: Does the continuity meet the table above?

YES: Go to Step 4.

NO: Replace the park/neutral position switch. Refer to GROUP 23B, Transaxle P.23B-10.

Then check that the malfunction is eliminated.





- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 13 and ground by backprobing.
 - Voltage should be battery positive voltage.
 (When select lever is in a position other than "N" range.)
 - Voltage should be 0.5 volts or less.
 (When select lever is in "N" range.)
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

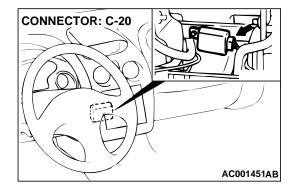
Q: Is the voltage within specifications?

YES: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 5.

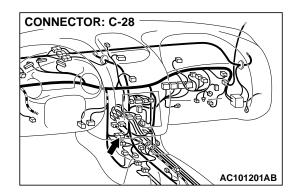


STEP 5. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 6.



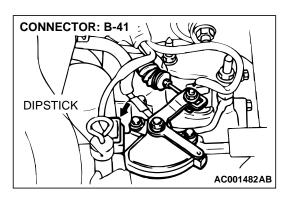
STEP 6. Check intermediate connector C-28.

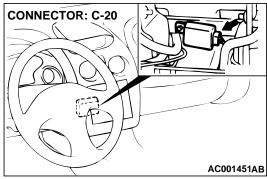
Q: Is the connector damaged?

YES : Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 7.





STEP 7. Check the harness wire between park/neutral position switch connector B-41 (terminal number 10) and auto-cruise control-ECU connector C-20 (terminal number 13).

Q: Is any harness wire between park/neutral position switch connector B-41 (terminal number 10) and autocruise control-ECU connector C-20 (terminal number 13) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

INSPECTION PROCEDURE 5: When the Auto-cruise Control "CANCEL" Switch is Set to ON, Auto-cruise Control is not Cancelled.

TECHNICAL DESCRIPTION (COMMENT)

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

TROUBLESHOOTING HINTS

Malfunction of the auto-cruise control switch.

DIAGNOSIS

Replace the auto-cruise control switch. (Refer to P.17-86.) Then check the malfunction is eliminated.

INSPECTION PROCEDURE 6: Auto-cruise Control cannot be Set.

TECHNICAL DESCRIPTION (COMMENT)

The fail-safe function is probably cancelling autocruise control.

In this case, scan tool MB991502 can be used to check the trouble symptoms in each system by checking the diagnostic trouble codes.

The scan tool 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

- Malfunction of the auto-cruise control switch.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tools:

- MB991502: Scan Tool (MUT-II)
- MB991223: Harness Set

STEP 1. Can the auto-cruise control-ECU communicate with scan tool MB991502?

⚠ CAUTION

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

- (1) Using scan tool MB991502.
- (2) Connect scan tool MB991502 to the data link connector.
- (3) Turn the ignition switch to the "ON" position.

Q: Can the auto-cruise control-ECU communicate with the scan tool?

YES: Go to Step 2.

NO: Inspect each trouble symptom.

(Refer to Inspection Procedure number 1 P.17-44.)



Q: Is any diagnostic trouble code output?

YES: Diagnostic trouble code number 11, 12, 14, 15, 16 or 17 is output, refer to the following.

(Code number 11 P.17-12.)

(Code number 12 P.17-17.) <M/T>

(Code number 12 P.17-20.) <A/T>

(Code number 14 P.17-23.)

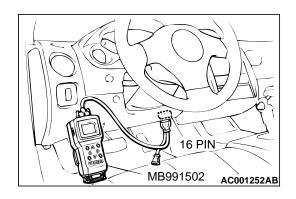
(Code number 15 P.17-32.)

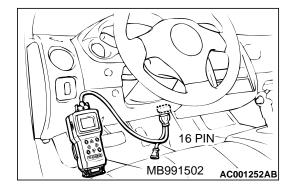
(Code number 16 P.17-39.)

(Code number 17 P.17-39.)

Then check that the malfunction is eliminated.

NO: Go to Step 3.





STEP 3. Using scan tool MB991502, check data list.

↑ CAUTION

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

- (1) Using scan tool MB991502.
- (2) Connect scan tool MB991502 to the data link connector.
- (3) Check the following items in the data list. Refer to P.17-77, Data List Reference Table.
 - Item 04: Auto-cruise control "CANCEL" switch.
 - Item 05: Stoplight switch.
 - Item 14: Clutch pedal position switch. <M/T>.
 - Item 14: Park/neutral position switch. <A/T>
- (4) Turn the ignition switch to the "ON" position.

Q: Is the check above meet the specifications?

YES: Check that the malfunction is eliminated. If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.) Then that the malfunction is eliminated.

NO: Follow the diagnostic trouble code procedures and the symptom procedures below.

- Item 04: Refer to Diagnostic Trouble Code Procedures number 15 P.17-32.
- Item 05: Refer to Symptom Procedures number 2 P.17-50.
- Item 14: Refer to Symptom Procedures number 3 <M/T>P.17-56.
- Item 14: Refer to Symptom Procedures number 4 <A/T>P.17-61.

INSPECTION PROSEDURE 7:Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed. <M/T>

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably the malfunction of the vehicle speed sensor or incorrect vacuum in the auto-cruise control vacuum pump or actuator.

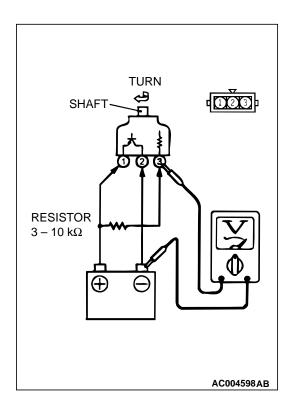
TROUBLESHOOTING HINTS

- Malfunction of the vehicle speed sensor.
- Malfunction of the auto-cruise control vacuum pump.
- Malfunction of the actuator.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

MB991223: Harness Set



STEP 1. Check the vehicle speed sensor.

- (1) Remove the vehicle speed sensor and connect a 3 10 k Ω resistor as shown in the illustration.
- (2) Turn the shaft of the vehicle speed sensor and check that there is voltage between terminals 2 3. (one turn = four pulses.)

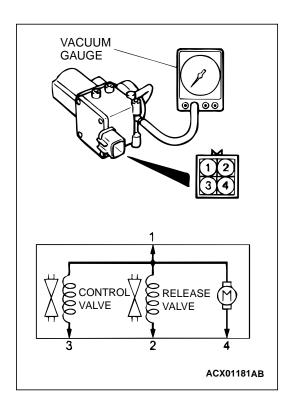
Q: Is the voltage within specifications?

YES: Go to Step 2.

NO: Replace the vehicle speed sensor.

Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.

Then check that the malfunction is eliminated.



STEP 2. Check the auto-cruise vacuum pump.

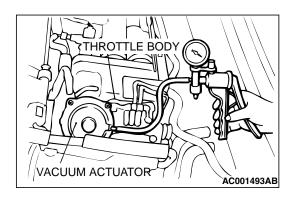
- (1) Disconnect the vacuum hose from the auto-cruise vacuum pump and connect a vacuum gauge to the vacuum pump.
- (2) Disconnect the vacuum pump connector.
- (3) Check the auto-cruise vacuum pump and valves according to the following procedure:
 - Connect the positive battery terminal to auto-cruise vacuum pump connector terminal 1, and the negative battery terminal to terminals 2, 3, and 4.
 Then the vacuum gauge should read 27 kPa (8.0 in Hg) or more.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 - Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 2 is disconnected from the negative battery terminal while terminals 1, and 3 remain connected.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 3 is disconnected from the negative battery terminal while terminals 1, and 2 remain connected.

Q: Are all of the above values satisfied?

YES: Go to Step 3.

NO: Replace the auto-cruise vacuum pump. (Refer to P.17-86.)

Then that the malfunction is eliminated.



STEP 3. Check the vacuum actuator.

- (1) Disconnect the vacuum hose from the vacuum actuator, and then connect a hand vacuum pump to the vacuum actuator.
- (2) Apply a vacuum and check that the throttle lever moves and the vacuum is maintained.

Q: Is the vacuum actuator damaged?

YES: Replace the vacuum actuator.

For 2.4L engine, refer to GROUP 13A, Throttle Body Assembly P.13A-593.

For 3.0L engine, refer to GROUP 13B, Throttle Body Assembly P.13B-690.

Then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

INSPECTION PROSEDURE 8: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed. <A/T>

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably the malfunction of the output shaft speed sensor or PCM or incorrect vacuum in the auto-cruise control vacuum pump or actuator.

TROUBLESHOOTING HINTS

- Malfunction of the output shaft speed sensor.
- Malfunction of the PCM.
- Malfunction of the auto-cruise control vacuum pump.
- Malfunction of the actuator.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

- MB991502: Scan Tool (MUT-II)
- MB991223: Harness Set

STEP 1. Check the vehicle speed signal.

⚠ CAUTION

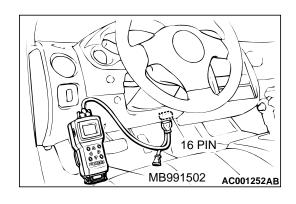
To prevent damage to scan tool MB991502, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991502.

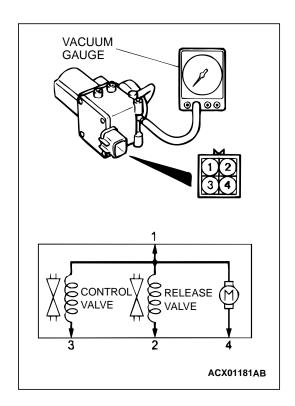
- (1) Using scan tool MB991502.
- (2) Connect scan tool MB991502 to the data link connector.
- (3) Turn the ignition switch to the "ON" position.
- (4) Read the MFI-DTC.
- (5) Turn the ignition switch to the "LOCK" (OFF) position.

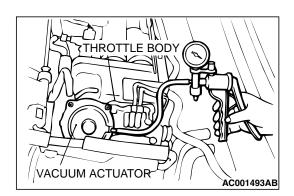
Q: Is the MFI-DTC P0720 is output?

YES: For 2.4L engine, refer to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart P.13A-22. For 3.0L engine, refer to GROUP 13B, Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

NO: Go to Step 2.







STEP 2. Check the auto-cruise vacuum pump.

- (1) Disconnect the vacuum hose from the auto-cruise vacuum pump and connect a vacuum gauge to the vacuum pump.
- (2) Disconnect the vacuum pump connector.
- (3) Check the auto-cruise vacuum pump and valves according to the following procedure:
 - Connect the positive battery terminal to auto-cruise vacuum pump connector terminal 1, and the negative battery terminal to terminals 2, 3, and 4.
 Then the vacuum gauge should read 27 kPa (8.0 in Hg) or more.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 2 is disconnected from the negative battery terminal while terminals 1, and 3 remain connected.
 - The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.
 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 3 is disconnected from the negative battery terminal while terminals 1, and 2 remain connected.

Q: Are all of the above values satisfied?

YES: Go to Step 3.

NO: Replace the auto-cruise vacuum pump. (Refer to P.17-86.)

Then that the malfunction is eliminated.

STEP 3. Check the vacuum actuator.

- (1) Disconnect the vacuum hose from the vacuum actuator, and then connect a hand vacuum pump to the vacuum actuator.
- (2) Apply a vacuum and check that the throttle lever moves and the vacuum is maintained.

Q: Is the vacuum actuator damaged?

YES: Replace the vacuum actuator.

For 2.4L engine, refer to GROUP 13A, Throttle Body Assembly P.13A-593.

For 3.0L engine, refer to GROUP 13B, Throttle Body Assembly P.13B-690.

Then check that the malfunction is eliminated.

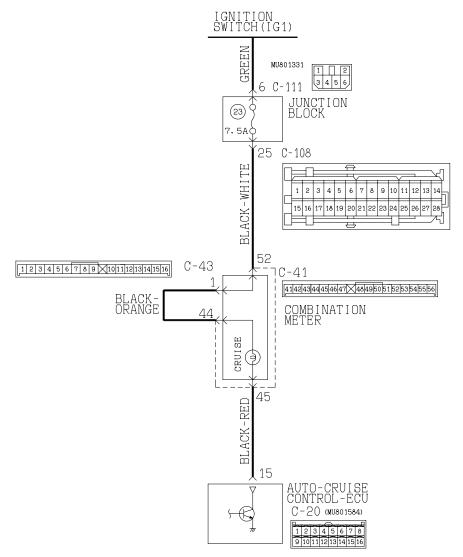
NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

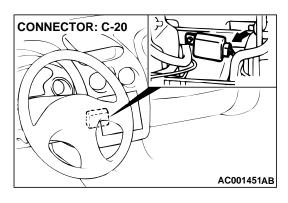
Then check that the malfunction is eliminated.

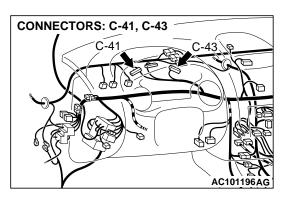
INSPECTION PROCEDURE 9: Auto-cruise Control Indicator Light Inside Combination Meter does not Illuminate. (However, Auto-cruise Control is Normal.)

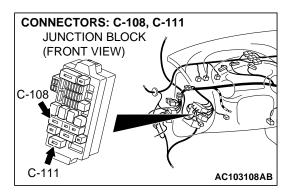
Auto-cruise Control Indicator Light Drive Circuit



W2S17M05AA AC106776AB







CIRCUIT OPERATION

The power for the auto-cruise indicator in the combination meter is supplied from the ignition switch (IG1).

When the auto-cruise control system is operating, the transistor inside the auto-cruise control-ECU illuminates the auto-cruise indicator through ECU terminal number 15.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably the malfunction of the indicator bulb or the malfunction of the connector or harness.

TROUBLESHOOTING HINTS

- Malfunction of the indicator bulb.
- Damaged harness or connector.
- Malfunction of the auto-cruise control-ECU.

DIAGNOSIS

Required Special Tool:

• MB991223: Harness Set

STEP 1. Check the auto-cruise control indicator bulb.

 Remove the combination meter.
 Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.

(2) Check the auto-cruise control indicator bulb.

Q: Is the bulb blown?

YES: Replace the bulb.

Then check that the malfunction is eliminated.

NO: Go to Step 2.

STEP 2. Check the output circuit voltage at auto-cruise control-ECU connector C-20 (terminal number 15) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-20.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 15 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

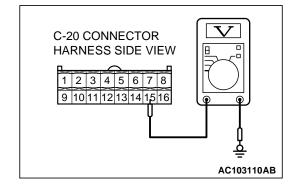
Q: Is the voltage approximately battery positive voltage?

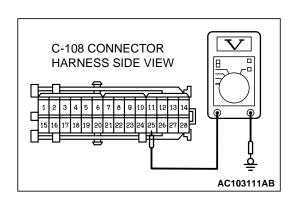
YES: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

NO: Go to Step 3.



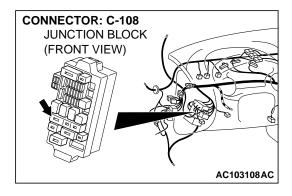


STEP 3. Check the output circuit voltage at junction block connector C-108 (terminal number 25) by backprobing.

- (1) Do not disconnect auto-cruise control switch connector C-108.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between terminal 25 and ground by backprobing.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the voltage approximately battery positive voltage?

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



STEP 4. Check junction block connector C-108.

Q: Is the connector damaged?

YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO : Replace the junction block.

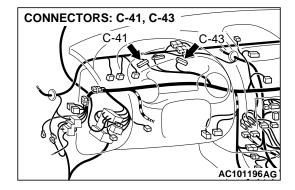
Then check that the malfunction is eliminated.

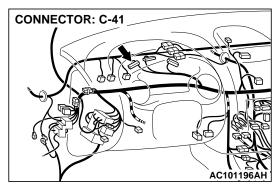
STEP 5. Check combination meter connector C-41 and C-43.
Q: Is any connector damaged?

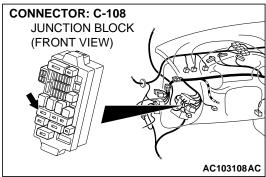
YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

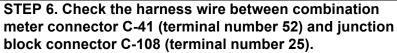
Then check that the malfunction is eliminated.

NO: Go to Step 6.





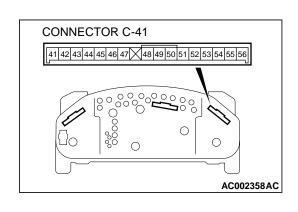




Q: Is any harness wire between combination meter connector C-41 (terminal number 52) and junction block connector C-108 (terminal number 25) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Go to Step 7.



STEP 7. Check the combination meter.

- (1) Remove the combination meter and measure at the combination meter side. (Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.)
- (2) Measure the continuity between terminal 44 and 45 at conductor C-41.

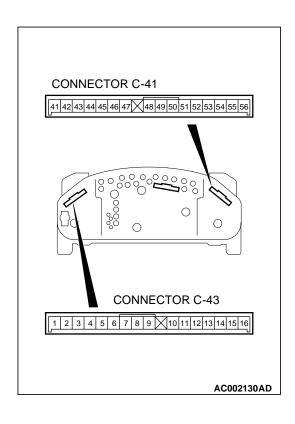
Q: Is the continuity less than 2 ohm?

YES: Go to Step 8.

NO: Replace the combination meter.

Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.

Then check that the malfunction is eliminated.



STEP 8. Check the combination meter.

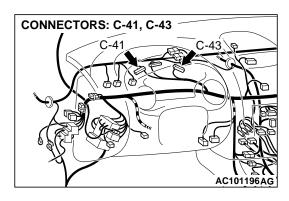
- Remove the combination meter and measure at the combination meter side. (Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.)
- (2) Measure the continuity between terminal 52 at conductor C-41 and terminal 1 at conductor C-43.

Q: Is the continuity less than 2 ohm?

YES: Go to Step 9.

NO: Replace the combination meter.
Refer to GROUP 54A, Combination Meter Assembly and Vehicle Speed Sensor P.54A-105.

Then check that the malfunction is eliminated.



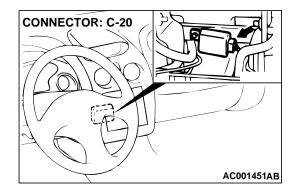
STEP 9. Check the harness wire between combination meter connector C-41 (terminal number 52) and C-43 (terminal number 1).

Q: Is any harness wire between combination meter connector C-41 (terminal number 52) and C-43 (terminal number 1) damaged?

YES: Repair the harness wire and then check that the

malfunction is eliminated.

NO: Go to Step 10.

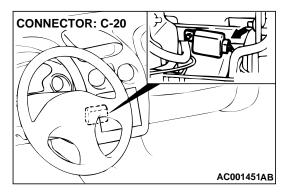


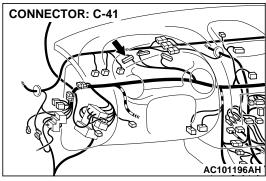
STEP 10. Check auto-cruise control-ECU connector C-20. Q: Is the connector damaged?

YES: Repair or replace connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Then check that the malfunction is eliminated.

NO: Go to Step 11.





STEP 11. Check the harness wire between combination meter connector C-41 (terminal number 52) and autocruise control-ECU connector C-20 (terminal number 15). Q: Is any harness wire between combination meter connector C-41 (terminal number 52) and auto-cruise control-ECU connector C-20 (terminal number 15) damaged?

YES: Repair the harness wire and then check that the malfunction is eliminated.

NO: Check that the malfunction is eliminated.

If the malfunction is not eliminated, replace the autocruise control-ECU. (Refer to P.17-86.)

Then check that the malfunction is eliminated.

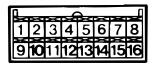
DATA LIST REFERENCE TABLE

M1172002400169

| MUT-II SCAN TOOL DISPLAY | ITEM NO. | INSPECTION ITEM | | INSPECT REQUIRE | | NORMAL CONDITION |
|-----------------------------|-------------|---|-------------|---------------------------------|--|--|
| CANCEL SWITCH | 04 | Auto-cruise | CANCEL | CANCEL | switch: "ON" | ON |
| | | control switch | | CANCEL | switch: "OFF" | OFF |
| IDLE SW SIG | 08 | Closed thrott | le position | Accelerat | or pedal: Depressed | OFF |
| | | switch | | Accelerator pedal: Released | | ON |
| MAIN SW | 01 | Auto-cruise | MAIN | MAIN swi | tch: "ON" | ON |
| | | control switch | | MAIN swi | tch: "OFF" | OFF |
| OD OFF | 15 | A/T control s | ignal | No "OD-C | FF" request | OFF |
| | | | | "OD-OFF | " request | ON |
| PNP SW/CLUTCH | 14 | Clutch pedal | • | Clutch sw | ritch: Depressed | ON |
| | | switch <m t=""></m> | > | Clutch switch: Released | | OFF |
| | | Park/neutral position switch | | Selector I position | ever: "P" or "N" | ON |
| | | | | Selector lo | ever: Other than "P" sition | OFF |
| RESUME SWITCH | 03 | Auto-cruise | RESUME | RESUME | switch: "ON" | ON |
| | | control | RESUME | switch: "OFF" | OFF | |
| SET SWITCH | 02 | switch | | SET switch | ch: "ON" | ON |
| | | | | SET switch | ch: "OFF" | OFF |
| STOPLIGHT SW | 05 | Stoplight swi | tch | Brake ped | dal: Depressed | ON |
| | | | | Brake ped | dal: Released | OFF |
| TP SENSOR | 13 | Throttle posi | tion sensor | Ignition switch: | Accelerator pedal: Fully depressed | 400 – 1,000 mV |
| | | | "ON" | Accelerator pedal: Depressed | Increases in proportion to throttle opening angle. | |
| | | | | | Accelerator pedal: Released | 4,000 – 5,500 mV |
| VSS | 10 | Vehicle spee | ed sensor | Road test | the vehicle | The speedometer and MUT-II display the same value. |

CHECK AUTO-CRUISE CONTROL-ECU TERMINALS

M1172002700201



ACX02234

| TERMINAL NO. | CHECK ITEM | CHECK CONDITIONS | | NORMAL CONDITION |
|-----------------|---|---|------------------------------|--------------------------|
| 1 | Throttle position | When accelerator pedal is fully depressed | | 4.0 – 5.5 V |
| | sensor input | When accelerator pedal is releas | • | 0.4 – 1.0 V |
| 2 | Power train | When accelerator pedal is depres | ssed | 4.0 – 5.5 V |
| | control module output (Idle switch) | When accelerator pedal is not depressed | | 2.5 V or less |
| 3 | A/T control output | No "OD-OFF" request | | Battery positive voltage |
| | | "OD-OFF" request | | 0 V |
| 4 | Stoplight switch input | When brake pedal is depressed | When stoplight switch is ON | Battery positive voltage |
| | | When brake pedal is not depressed | When stoplight switch is OFF | 0 V |
| 5 | Pump power supply | Ignition switch: "ON" position Stoplight switch: OFF | | 10 V or more |
| 6 | ECU power supply | Ignition switch: "ON" position | | Battery positive voltage |
| 7 | Release valve | When decelerating with the "SET" switch while driving at constant speed | | 1 V or less |
| 8 | Control valve | | | 10 V or more |
| 7 | Release valve | When cancelling constant speed driving with the "CANCEL" switch | | 10 V or more |
| 8 | Control valve | | | Battery positive voltage |
| 9 | Auto-cruise control switch | When main switch is "ON" | | Approximately 7.0 V |
| | input | When input switch has not been operated | When all switches are OFF | 3.5 – 5.0 V |
| | | When input switch is pushed down | When "SET" switch is ON | 0.4 – 2.3 V |
| | When input switch is pushed up | When "RESUME" switch is ON | 2.3 – 3.5 V | |
| | | When input switch is pulled forward | When "CANCEL" switch is ON | 0.4 V or less |
| 10 | Vehicle speed | When vehicle is moved forwards | When sensor is ON | 0 V |
| | sensor input | and backwards, sensor turns ON and OFF repeatedly | When sensor is OFF | 8 – 12 V* |
| 11 | Diagnosis control input | When ignition switch is "ON" pos | ition | 4 V or more |

TSB Revision

| TERMINAL NO. | CHECK ITEM | CHECK CONDITIONS | | NORMAL CONDITION |
|---|--|---|--|------------------------------|
| 12 | ECU power supply | When "MAIN" switch is ON | | Battery positive voltage |
| 13 | Clutch pedal position switch input <m t=""></m> | When pedal is not depressed | When clutch pedal position switch is OFF | Battery positive voltage |
| | | When pedal is depressed | When clutch pedal position switch is ON | 0 V |
| | Park/neutral position switch input | When select lever is in a position other than N range | When park/neutral position switch is OFF | Battery positive voltage |
| | | When select lever is in N range | When park/neutral position switch is ON | 0 V |
| 14 | Ground | At any time | | 0 V |
| 15 Indicator light input (inside combination meter) | | When indicator light is illuminated | 0 V | |
| | | When indicator light is switch off | | Battery positive voltage |
| 16 | Auto-cruise vacuum pump | When driving at constant speed using the "SET" switch | Motor stopped/ running | Battery positive voltage/0 V |
| motor input | When accelerating with the "RESUME" switch while driving at constant speed | Motor stopped/ running | Battery positive voltage/0 V | |
| | When decelerating with the "SET" switch while driving at constant speed | Motor stopped | Battery positive voltage | |
| | | When cancelling constant speed driving with the "CANCEL" switch | Motor stopped | Battery positive voltage |

NOTE: *: Auto-cruise control-ECU terminal No.10 is sending a voltage of 5 volts to the vehicle speed sensor system circuit. However, as higher voltage is mixed through the circuit a voltmeter will show 8 – 12 V.

SPECIAL TOOLS

M1172000600156

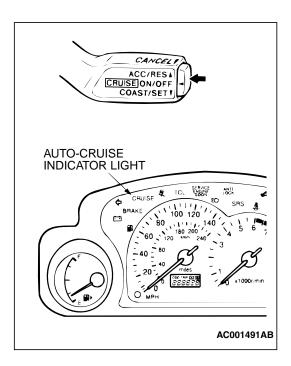
| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|----------|--|---|--|
| B991502 | MB991502 Scan tool (MUT-II) | MB991496-OD | Diagnostic trouble code check. |
| MB991529 | MB991529 Diagnostic trouble code check harness | Tool not necessary if scan tool (MUT-II) is available | |
| | MB991223 Harness set MB991219 A: Connector pin contact pressure inspection | MB991223 MB991709-01 | Checking the continuity and measuring the voltage at the harness connector |
| MB991223 | | | |

ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

M1172001100154

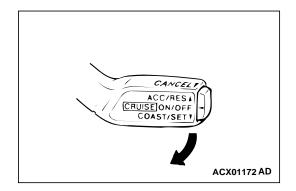
- 1. Turn the ignition switch to the "ON" position.
- 2. Check that the indicator light within the combination meter illuminates when the main switch is switched "ON."

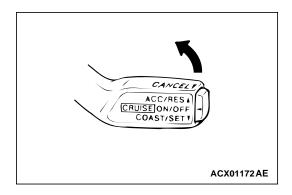


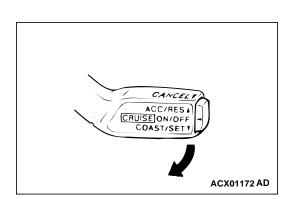
Auto-cruise Control Setting

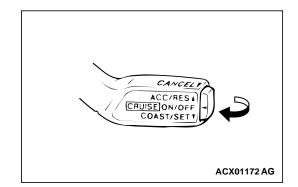
- 1. Switch "ON" the main switch.
- 2. Drive at the desired speed, above approximately 40 km/h. (25 mph)
- 3. Push the auto-cruise control switch in the direction of arrow.
- 4. Check to be sure that when the switch is released the speed is the desired constant speed.

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









Speed-increase Setting

- 1. Set to the desired speed.
- 2. Push the auto-cruise control switch in the direction of arrow.
- Check to be sure that acceleration continues while the switch is held, and that after it is released the constant speed at the time when it was released becomes the 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 speed when the auto-cruise control switch is released will be recorded as the high-speed limit.

Speed-reduction Setting

- 1. Set to the desired speed.
- 2. Push the auto-cruise control switch in the direction of arrow.
- Check to be sure that deceleration continues while the switch is pressed, and that after it is released the constant speed at the time when it was released becomes the 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

- 1. Set the auto-cruise speed control.
- 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 pushed in the direction of arrow.
 - (2) The brake pedal is depressed.
 - (3) The clutch pedal is depressed. (M/T)
 - (4) The selector lever is moved to the "N" range. (A/T)
- At a vehicle speed of 40 km/h (25 mph) or higher, check if when the "RESUME" switch is switched "ON," the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
- 4. When the main switch is turned to the "OFF" while driving at constant speed, check if normal driving is resumed and deceleration occurs.

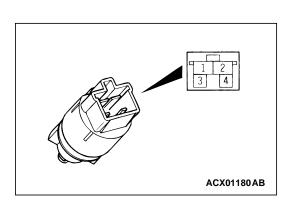
AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700167

Stoplight Switch

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

| MEASUREMENT CONDITIONS | TERMINAL CONNECTOR OF TESTER | SPECIFIED CONDITION |
|--|------------------------------------|---------------------|
| When brake pedal is depressed. (for | 1 – 2 | Less than 2 ohm |
| stoplight circuit) | 3 – 4 | Open circuit |
| When brake pedal is | 1 – 2 | Open circuit |
| not depressed. (for auto-cruise control circuit) | 3 – 4 | Less than 2 ohm |



ACX01180 AB

Clutch Pedal Position Switch

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

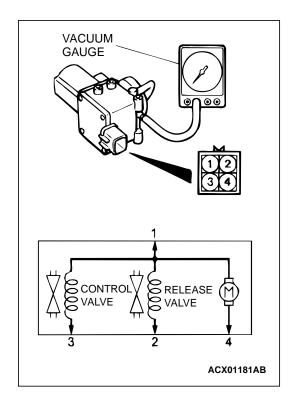
| MEASUREMENT CONDITIONS | TERMINAL CONNECTOR OF TESTER | SPECIFIED CONDITION |
|-------------------------------------|------------------------------------|---------------------|
| When clutch pedal is depressed. | 1 – 2 | Less than 2 ohm |
| When clutch pedal is not depressed. | 1 – 2 | Open circuit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

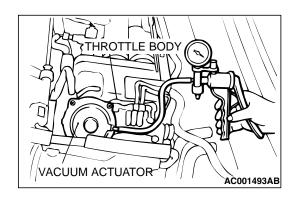
Park/Neutral Position Switch ("N" Position)

Refer to GROUP 23A, On-vehicle Service – Essential Service P.23A-351.

Throttle Position Sensor

For 2.4L engine, refer to GROUP 13A, On-vehicle Service – Throttle Position Sensor Check P.13A-584. For 3.0L engine, refer to GROUP 13B, On-vehicle Service – Throttle Position Sensor Check P.13B-683.





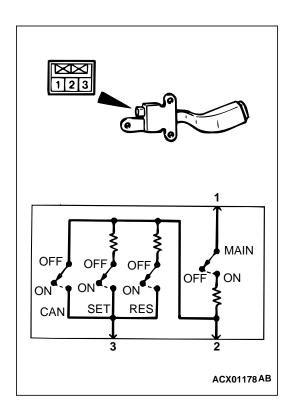
Auto-cruise Vacuum Pump

- 1. Disconnect the vacuum hose from the auto-cruise vacuum pump and connect a vacuum gauge to the vacuum pump.
- 2. Disconnect the vacuum pump connector.
- 3. Check the auto-cruise vacuum pump and valves according to the following procedure:
 - (1) Connect the positive battery terminal to auto-cruise vacuum pump connector terminal 1, and the negative battery terminal to terminals 2, 3, and 4. Then the vacuum gauge should read 27 kPa (8.0 in Hg) or more.
 - (2) The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected.

 Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 2 is disconnected from the negative battery terminal while terminals 1, and 3 remain connected.
 - (3) The vacuum should be maintained when terminal 4 is disconnected from the negative battery terminal while terminals 1, 2, and 3 remain connected. Then the vacuum gauge should read 0 kPa (0 in Hg) when terminal 3 is disconnected from the negative battery terminal while terminals 1, and 2 remain connected.

Vacuum Actuator

- 1. Disconnect the vacuum hose from the vacuum actuator, and connect a hand vacuum pump to the actuator.
- 2. Check that the throttle lever operates when applying vacuum, and the vacuum is maintained.



Auto-cruise Control Check

Measure the resistance between the terminals when each of the "SET," "RESUME," "CANCEL" and "MAIN" switches is pressed. If the values measured at the time correspond to those in the table below, the resistance values are correct.

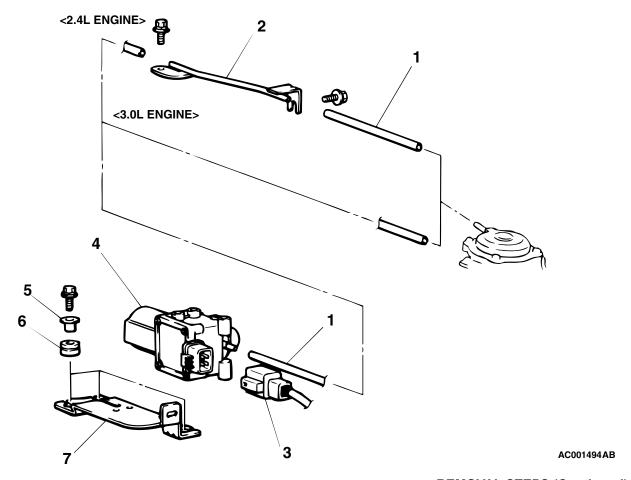
| SWITCH POSITION | TERMINAL CONNECTOR OF TESTER | SPECIFIED CONDITION |
|-------------------------|------------------------------------|----------------------|
| "MAIN" switch "OFF" | 1 – 2 | Open circuit |
| "MAIN" switch "ON" | 1 – 2 | Approximately 3.9 kΩ |
| "CANCEL" switch "ON" | 2 – 3 | Less than 2 Ω |
| "RESUME" switch "ON" | 2 – 3 | Approximately 910 Ω |
| "SET" switch "ON" | 2 – 3 | Approximately 220 Ω |

Vehicle Speed Sensor Check

Refer to GROUP 54A, Combination Meters Assembly and Vehicle Speed Sensor P.54A-105.

AUTO-CRUISE CONTROL REMOVAL AND INSTALLATION <ACTUATOR>

M1172001400144



REMOVAL STEPS

- 1. VACUUM HOSE
- 2. VACUUM PIPE
- 3. WIRING CONNECTOR
- 4. VACUUM PUMP ASSEMBLY

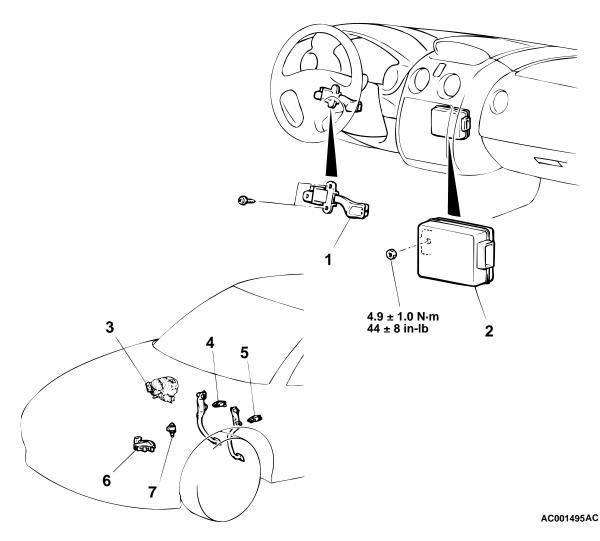
REMOVAL STEPS (Continued)

- 5. SPACER
- 6. RUBBER MOUNT
- 7. PUMP BRACKET

<SWITCHES, CONTROL UNIT AND SENSORS>

MARNING

Before removal of the air bag module, refer to GROUP 52B, SRS Service Precautions P.37A-21 and GROUP 52B, Air Bag Module and Clock Spring P.52B-144.



CONTROL SWITCH REMOVAL STEPS

- STEERING WHEEL (REFER TO GROUP 37A, STEERING WHEEL AND SHAFT P.37A-21.)
- 1. AUTO-CRUISE CONTROL SWITCH CONTROL UNIT REMOVAL STEPS
- CENTER PANEL ASSEMBLY (REFER TO GROUP 52A, INSTRUMENT PANEL P.52A-3.)
- 2. AUTO-CRUISE CONTROL-ECU

SENSOR REMOVAL STEPS

- 3. THROTTLE POSITION SENSOR
- 4. STOPLIGHT SWITCH (REFER TO GROUP 35A, BRAKE PEDAL P.35A-31.)
- 5. CLUTCH PEDAL POSITION SWITCH (REFER TO GROUP 21A, CLUTCH PEDAL P.21A-10.)
- 6. PARK/NEUTRAL POSITION SWITCH <A/T>
- 7. VEHICLE SPEED SENSOR

EMISSION CONTROL

GENERAL DESCRIPTION

M1173000100046

The emission control system consists of the following subsystems:

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

DIAGNOSIS

M1173000700026

| SYMPTOM | PROBABLE CAUSE | REMEDY |
|---------------------------------------|---|---|
| Engine will not start or hard | Vacuum hose disconnected or damaged | Repair or replace |
| to start | The EGR valve is not closed. | Repair or replace |
| | Malfunction of the evaporative emission purge solenoid | Repair or replace |
| Rough idle or engine stalls | The EGR valve 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

M1173000600063

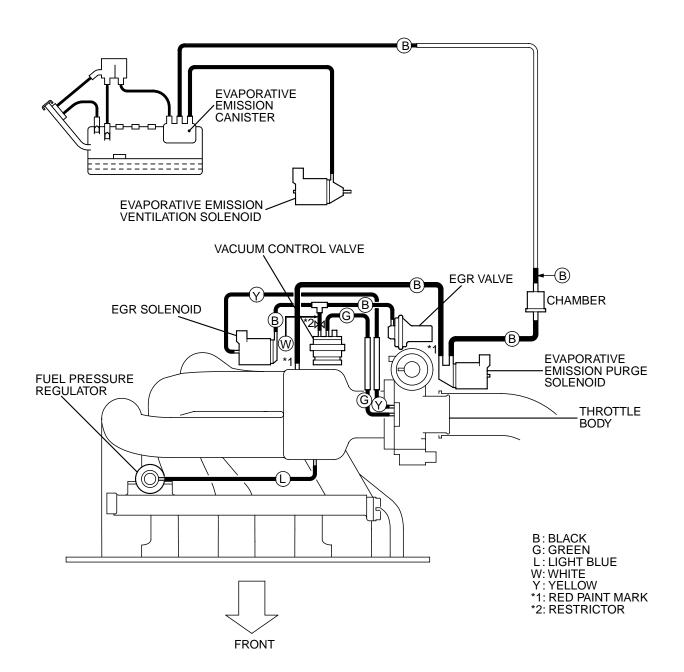
| TOOL | TOOL NUMBER AND NAME | SUPERSESSION | APPLICATION |
|----------|----------------------------------|-------------------------------------|--|
| | MD998770 Oxygen sensor wrench | MD998770-01 or General service tool | Removal/installation of heated oxygen sensor |
| M8991700 | MB995061 Purge flow indicator | MLR6890A | Inspection of purge control system |

TSB Revision

VACUUM HOSES VACUUM HOSE ROUTING

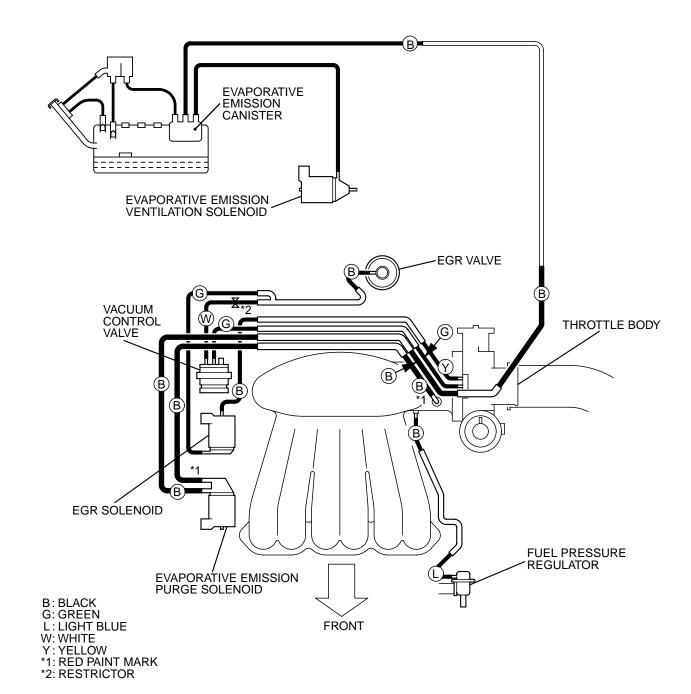
M1173000900183

<2.4L ENGINE>



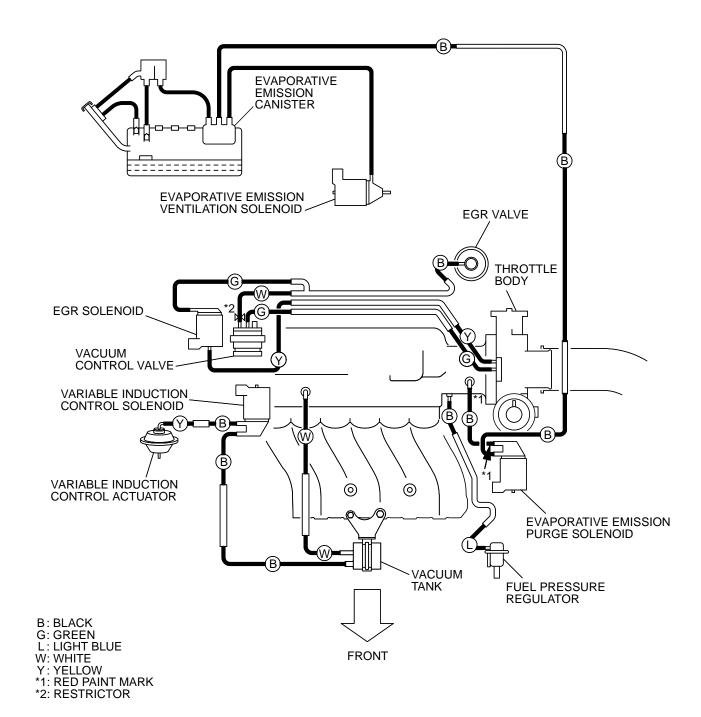
AK100995 AB

<3.0L ENGINE – without VARIABLE INDUCTION CONTROL (VIC) system>



AK100996 AB

<3.0L ENGINE – with VARIABLE INDUCTION CONTROL (VIC) system>

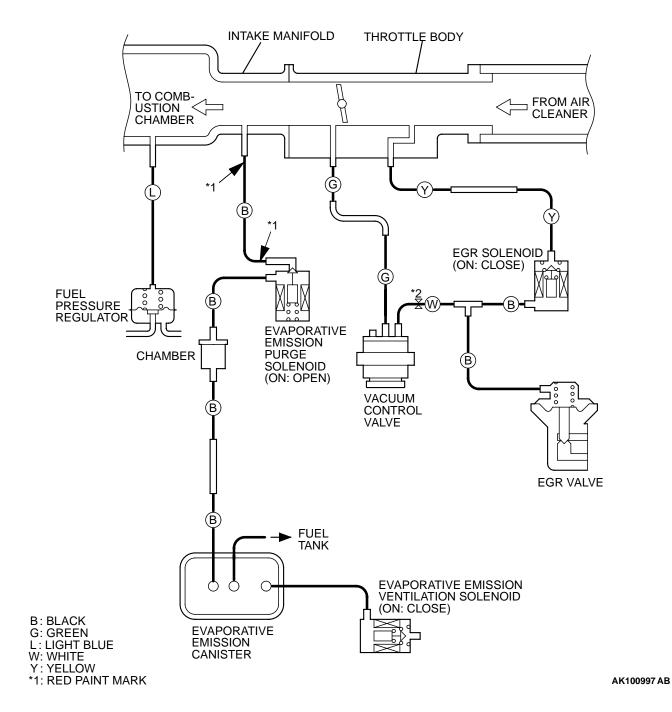


AK102959 AB

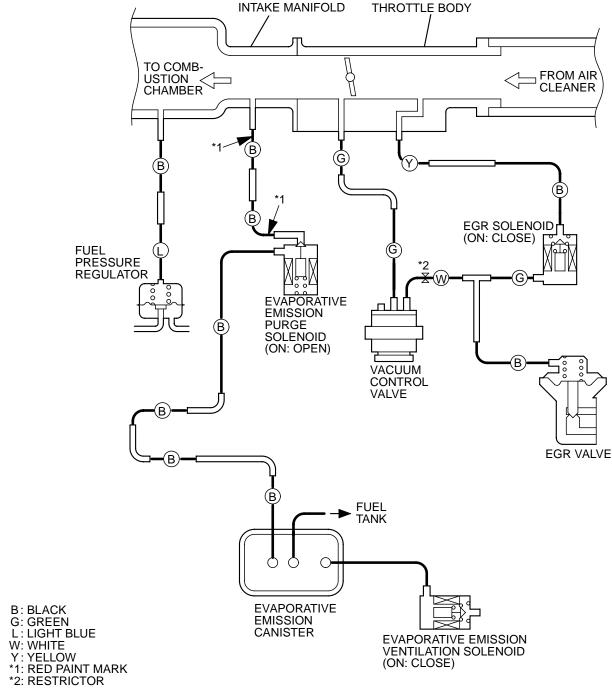
VACUUM CIRCUIT DIAGRAM

<2.4L ENGINE>

M1173007100133

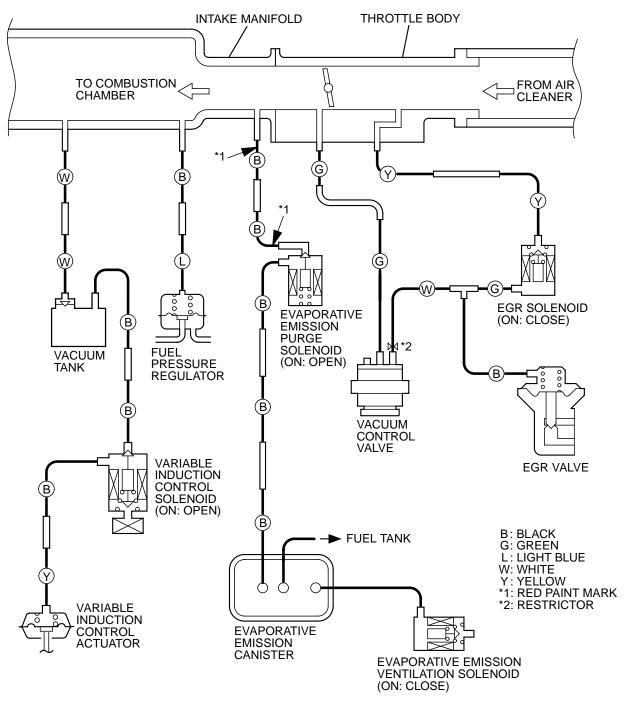


<3.0L ENGINE – without VARIABLE INDUCTION CONTROL (VIC) system>



AK100998 AB

<3.0L ENGINE – with VARIABLE INDUCTION CONTROL (VIC) system>



AK102960 AB

VACUUM HOSE INSTALLATION

M1173007200022

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

TSB Revision

VACUUM HOSE CHECK

M1173007300029

- 1. Using the VACUUM HOSE ROUTING 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.

POSITIVE CRANKCASE VENTILATION SYSTEM GENERAL INFORMATION (POSITIVE CRANKCASE VENTILATION SYSTEM)

M1173005000044

The positive crankcase ventilation system is a system for preventing the escape of blow-by gases from inside the crankcase into the atmosphere.

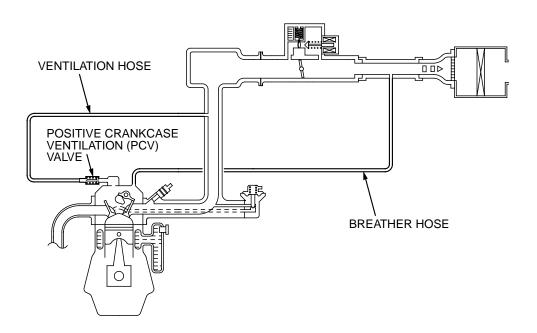
Fresh air is sent from the air cleaner into the crankcase through the breather hose to be mixed with the blow-by gas inside the crankcase.

The blow-by gas inside the crankcase is drawn into the intake manifold through the positive crankcase ventilation (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.

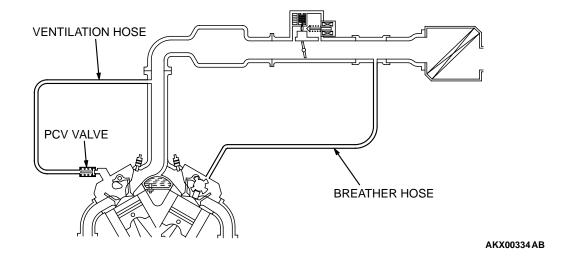
SYSTEM DIAGRAM

<2.4L ENGINE>



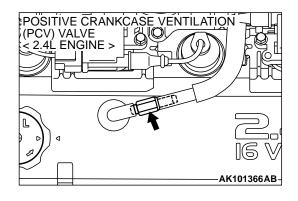
AKX01297AB

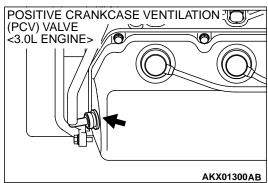
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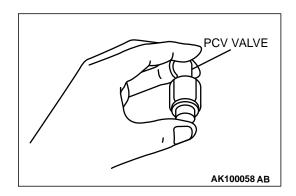


COMPONENT LOCATION









CRANKCASE VENTILATION SYSTEM CHECK

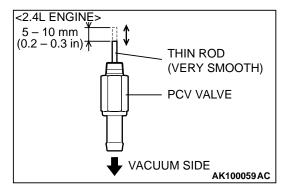
M1173001100094

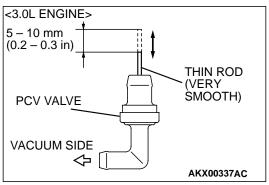
- 1. Remove the positive crankcase ventilation (PCV) valve from the rocker cover, then reconnect the PCV valve to the vacuum supply hose.
- With the engine idling, put your finger on the open end of the PCV valve, and check for negative pressure (vacuum).
 NOTE: At this time, the plunger in the PCV valve 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 he vacuum supply hose and vacuum supply hose port for restriction or plugged condition.

POSITIVE CRANKCASE VENTILATION (PCV) VALVE CHECK

M1173001200080

- 1. Hold the 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 INFORMATION

M1173005100104

The evaporative emission control 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 evaporative emission (EVAP) canister.

When the vehicle is in operation, fuel vapors stored in the EVAP canister flow through the chamber, the EVAP purge solenoid, purge port and intake manifold plenum to the combustion chamber.

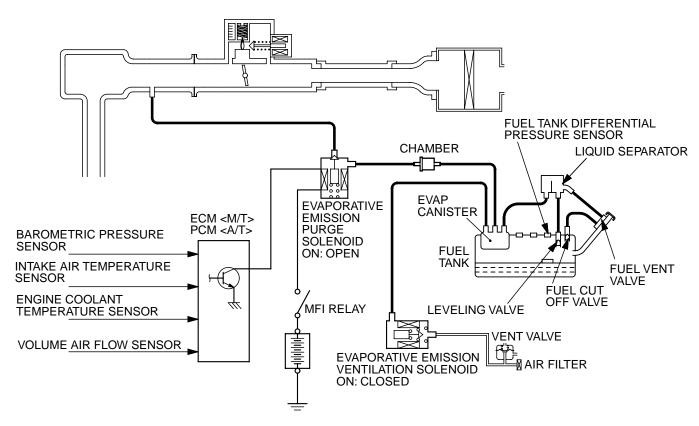
the intake air quantity is small (when the engine is at idle, for example), the engine control module brings the EVAP purge solenoid into the OFF state to shut off the fuel vapor flow to the intake manifold plenum. This ensures driveability when the engine is cold or running under low load and also stabilizes the emission level.

When the engine coolant temperature is low or when

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 vent valve and the leveling valve prevent fuel from being overfilled. The fuel vent valve and the leveling valve prevents fuel leaks just if the vehicle is rolled over in an accident.

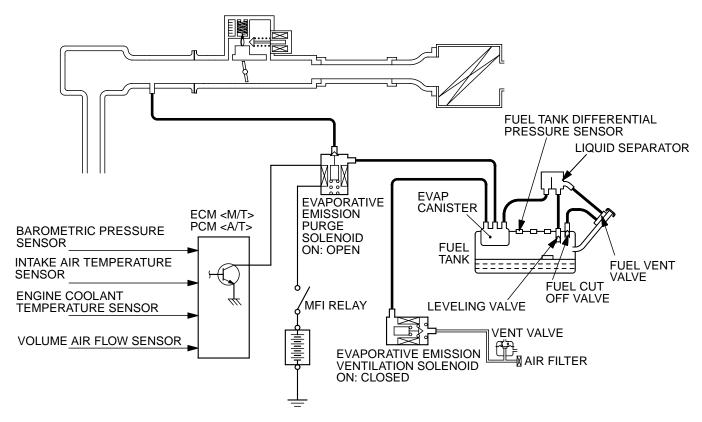
The vent valve releases the air from the fuel tank through the evaporative emission canister into the atmosphere when the fuel tank pressure increases due to refueling, etc. The vent valve and the air filter supply the atmospheric air to the evaporative emission canister when the fuel tank pressure decreases.

SYSTEM DIAGRAM <2.4L ENGINE>



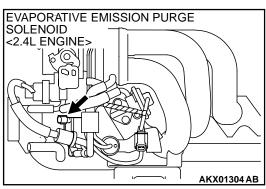
AK100999 AB

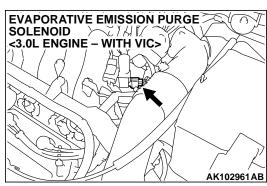
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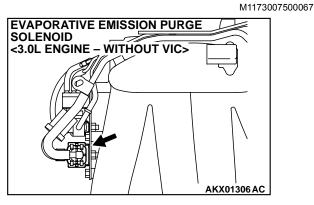


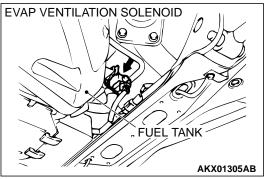
AK101000 AB

COMPONENT LOCATION





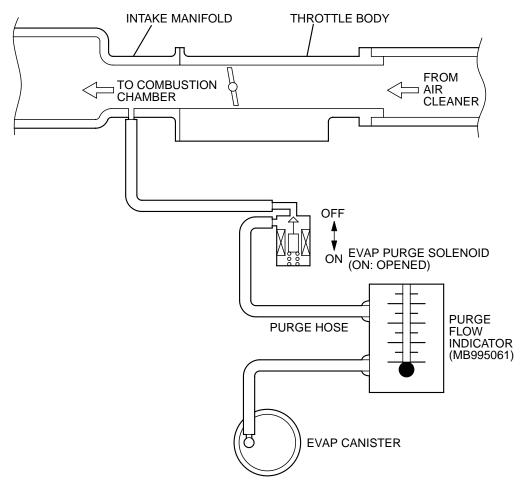




TSB Revision

PURGE CONTROL SYSTEM CHECK (PURGE FLOW CHECK)

M1173001400040



AKX00340AB

Required Special Tool:

MB995061: Purge Flow Indicator

- 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 and adjustment, 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 (A/T P range)
- 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 cm³/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 evaporative emission purge solenoid. If the purge flow volume is at the standard value, replace the EVAP canister.

EVAPORATIVE EMISSION PURGE SOLENOID CHECK

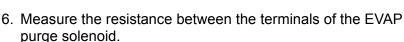
M1173001700096

- 1. Remove the air intake hose <2.4L ENGINE>.
- 2. Disconnect the vacuum hose (black, black with red paint mark) from the EVAP purge solenoid.

NOTE: When disconnecting the vacuum hose, always place an identification mark so that it can be reconnected at its original position.

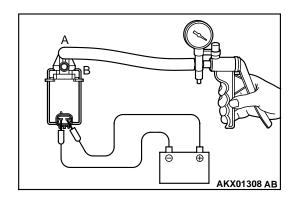
- 3. Disconnect the harness connector.
- 4. Connect a hand vacuum pump to nipple (A) of the EVAP purge solenoid (refer to the illustration at left).
- As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EVAP purge solenoid valve and without applying voltage.

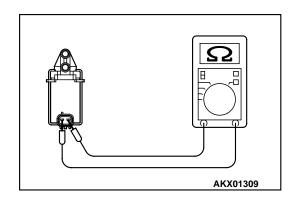
| BATTERY POSITIVE VOLTAGE | NORMAL CONDITION |
|--------------------------|-------------------|
| Applied | Vacuum leaks |
| Not applied | Vacuum maintained |



Standard value: 30 – 34 Ω [at 20°C (68°F)]

7. Replace solenoid if resistance is out of specification.





CHAMBER CHECK

M1173008400041

<2.4L ENGINE>

Remove the vacuum hose and chamber assembly, and check that the assembly is not clogged by blowing it.

VOLUME AIR FLOW SENSOR CHECK

M1173007900236

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

BAROMETRIC PRESSURE SENSOR CHECK

M1173008000117

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100211

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

INTAKE AIR TEMPERATURE SENSOR CHECK

M1173008200111

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK

M1173007700102

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

EVAPORATIVE EMISSION VENTILATION SOLENOID CHECK

M1173007800057

Refer to Evaporative Emission Canister And Fuel Tank Pressure Relief Valve – Fuel Tank Pressure Relief Valve Inspection P.17-111.

EXHAUST GAS RECIRCULATION(EGR) SYSTEM GENERAL INFORMATION

M1173005200048

The exhaust gas recirculation (EGR) system lowers the oxides of nitrogen (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 so as not to decrease the driveability.

OPERATION

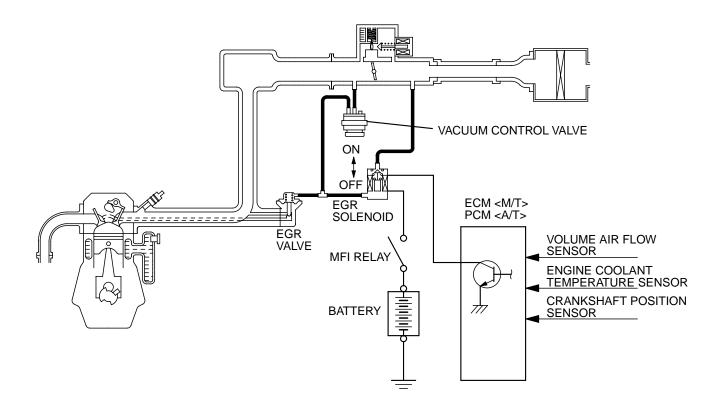
When the engine coolant temperature is low, when the engine is at idle or when a wide open throttle operation is performed, the EGR valve is kept closed, achieving no EGR.

After warming up of the engine, the EGR valve can be opened by the engine control module.

The engine control module monitors the EGR system and illuminates the check engine/malfunction indicator lamp to indicate that there is a malfunction.

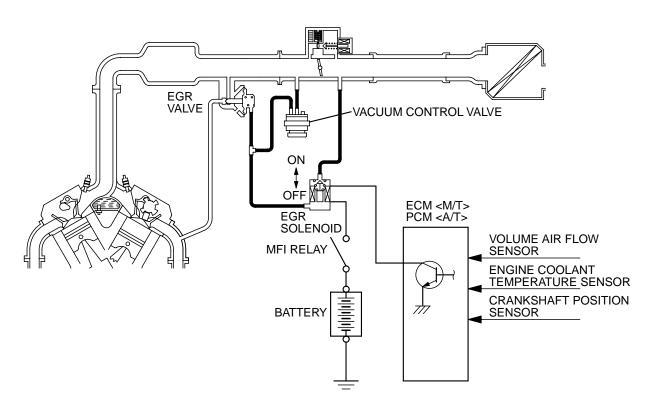
SYSTEM DIAGRAM

<2.4L ENGINE>



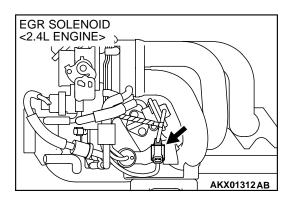
AKX01310 AB

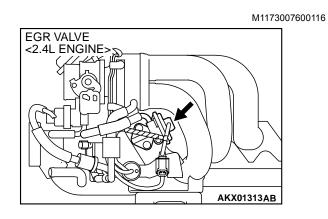
<3.0L ENGINE>



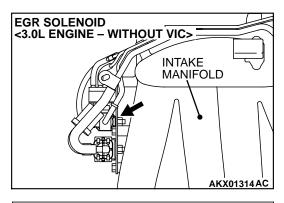
AKX00353AC

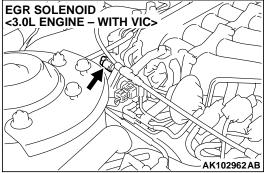
COMPONENT LOCATION

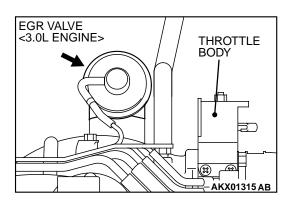


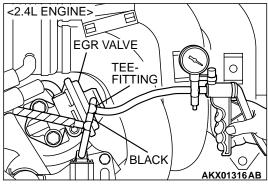


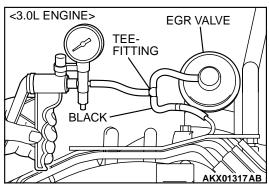
TSB Revision











EGR SYSTEM CHECK

M1173002600188

- 1. Disconnect the vacuum hose (black) from the EGR valve, and then connect a hand vacuum pump via the Tee-fitting.
- 2. Start the engine. As described in the chart below, check the vacuum condition when the throttle valve is opened suddenly (revving) during cold and hot engine conditions.

When engine is cold

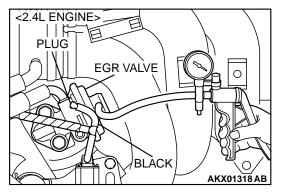
[Engine coolant temperature: 20°C (68°F) or less]

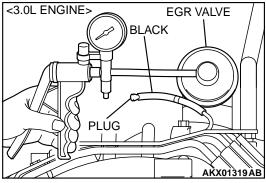
| THROTTLE VALVE | NORMAL VACUUM CONDITION |
|----------------|--|
| Open quickly | No vacuum (Remained as barometric pressure). |

When engine is hot

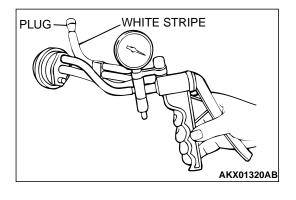
[Engine coolant temperature: 80°C (176°F) or more]

| THROTTLE VALVE | NORMAL VACUUM CONDITION |
|----------------|---|
| Open quickly | Momentarily rises over 13 kPa (3.9 in Hg) |





- 3. Stop the engine. Remove the Tee-fitting and the hand vacuum pump.
- 4. Connect the hand vacuum pump directly to the EGR valve.
- 5. Start the engine and run at idle until warm.
- 6. The engine idling speed should be rough when a vacuum of 29 kPa (8.7 in Hg) or more is applied to the EGR valve.
- 7. If engine idles rough, EGR passage is open and the system is OK. If engine idle is not rough, the EGR passage and the valve must be checked for restrictions. Perform the EGR valve check. Then repeat the EGR system check.



VACUUM CONTROL VALVE CHECK

M1173002700129

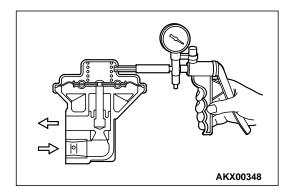
- Disconnect the vacuum hose (white stripe) from the vacuum control valve and connect the hand vacuum pump to the vacuum control valve.
- 2. Plug the end of the removed vacuum hose.
- 3. Start the engine and run at idle.
- 4. As described in the chart below, check the vacuum condition.

| ENGINE CONDITION | NORMAL VACUUM CONDITION |
|------------------|---|
| Idling | Approximately 21.3 – 24.0 kPa (6.3 – 7.1 in Hg) |

EGR VALVE CHECK

M1173002800137

- 1. Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats correctly.
- 2. Connect a hand vacuum pump to the EGR valve.
- 3. Apply 67 kPa (20 in Hg) of vacuum, and check to be sure that the vacuum is maintained.



4. As described in the chart below, apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

| VACUUM | PASSAGE OF AIR | |
|-----------------------------|----------------------|--|
| 5.3 kPa (1.6 in Hg) or less | Air is not blown out | |
| 29 kPa (8.7 in Hg) or more | Air is blown out | |

NOTE: Passage of air should be checked by blowing the valve port.

5. Reinstall the EGR valve, using a new gasket, and tighten to the specified torque.

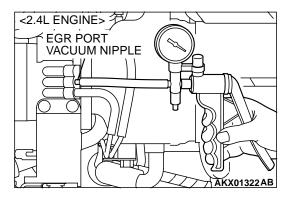
Tightening torque:

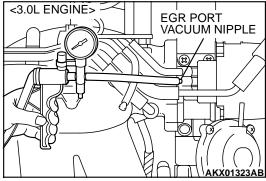
<2.4L ENGINE> 19 \pm 3 N·m (14 \pm 2 ft-lb) <3.0L ENGINE> 22 \pm 4 N·m (16 \pm 3 ft-lb)

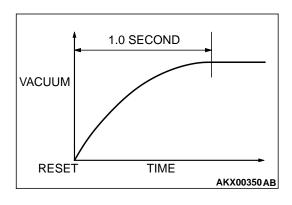
EGR PORT VACUUM CHECK

M1173002900048

1. Disconnect the vacuum hose (green stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.







- 2. Start the engine.
- 3. Measure engine vacuum at idle.

Standard value: 51 kPa (15 in Hg) or more

- 4. Reset the vacuum pump to "0" (Release vacuum).
- 5. Using a stop watch, measure how long it takes for the vacuum gauge to reach 51 kPa (15 in Hg).

Standard value: 1.0 second or less

 If it takes more than 1.0 second for the gauge to reach 51 kPa (15 in Hg), the EGR may be restricted and should be cleaned.

EGR SOLENOID CHECK

M1173003100120

- 1. Disconnect the vacuum hose from the EGR solenoid.

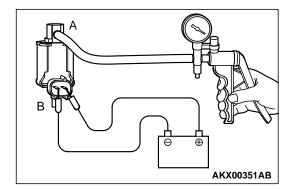
 NOTE: When disconnecting the vacuum hose, always make sure that it can be reconnected at its original position.
- 2. Disconnect the harness connector.
- 3. Connect a hand vacuum pump to nipple (A) of the EGR solenoid. (Refer to the illustration at left.)
- 4. As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EGR solenoid and without applying voltage.

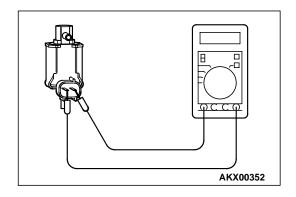
| BATTERY POSITIVE VOLTAGE | NORMAL CONDITION |
|--------------------------|-------------------|
| Not applied | Vacuum leaks |
| Applied | Vacuum maintained |

5. Measure the resistance between the terminals of the EGR solenoid.

Standard value: 29 – 35 Ω [at 20°C (68°F)]

6. Replace the solenoid if resistance is out of specification.





VOLUME AIR FLOW SENSOR CHECK

M1173007900247

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100222

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13B-22.

CRANKSHAFT POSITION SENSOR CHECK M1173008300118

<2.4L ENGINE>

To inspect the sensor, refer to GROUP 13A (2.4L), Multiport Fuel Injection (MFI) Diagnosis – Diagnostic Trouble Code Chart P.13A-22.

<3.0L ENGINE>

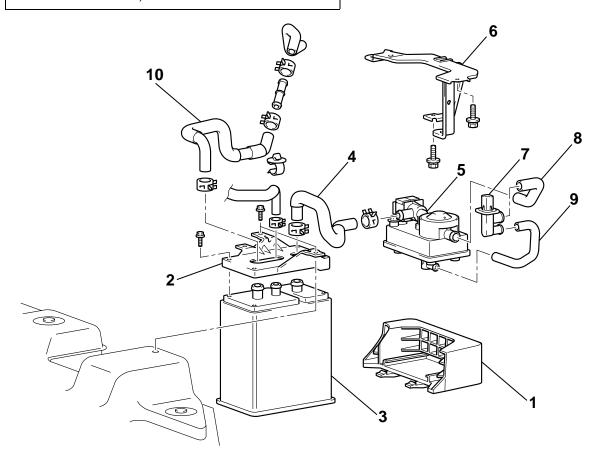
To inspect the sensor, refer to GROUP 13B (3.0L), Multiport Fuel Injection (MFI) Diagnosis - Diagnostic Trouble Code Chart P.13B-22.

EVAPORATIVE EMISSION CANISTER AND FUEL TANK PRESSURE RELIEF VALVE

REMOVAL AND INSTALLATION

M1173004800188

Pre-removal and Post-installation Operation Fuel Tank Assembly Removal and Installation (Refer to GROUP 13C P.13C-11.)



AC002235AB

REMOVAL STEPS

- 1. PROTECTOR
- 2. CANISTER UPPER BRACKET
- 3. CANISTER ASSEMBLY
- 4. VENT HOSE
- ONBOARD REFUELING VAPOR RECOVERY (ORVR) VENT VALVE MODULE

REMOVAL STEPS (Continued)

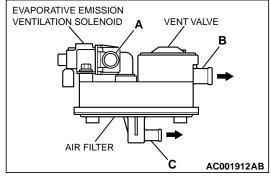
- 6. BRACKET
- 7. VENT PIPE
- 8. VENT HOSE
- 9. VENT HOSE
- 10. VAPOR HOSE



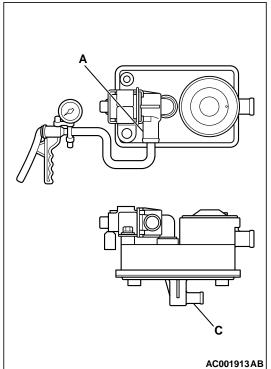
M1173004600151

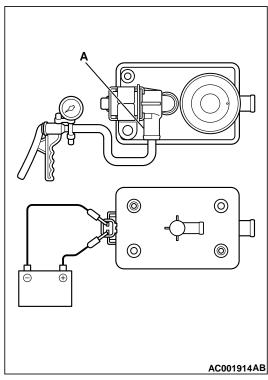
ORVR VENT VALVE MODULE CHECK

1. Blow air through orvr vent valve module nipple (A). Check that the air flows out of nipple (B) and nipple (C).



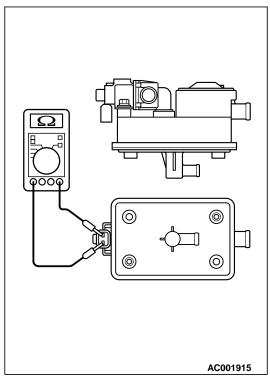
- 2. Connect a hand vacuum pump to nipple (A) of the orvr vent valve module.
- 3. With air flow through nipple (C) obstructed, apply a vacuum and check that the vacuum is maintained.





4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the orvr vent valve module and without applying voltage.

| BATTERY VOLTAGE | NORMAL CONDITION | |
|-----------------|-------------------|--|
| Applied | Vacuum maintained | |
| Not applied | Vacuum leaks | |



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

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

6. Replace orvr vent valve module if resistance is out of specification.

CATALYTIC CONVERTER

GENERAL INFORMATION (CATALYTIC CONVERTER)

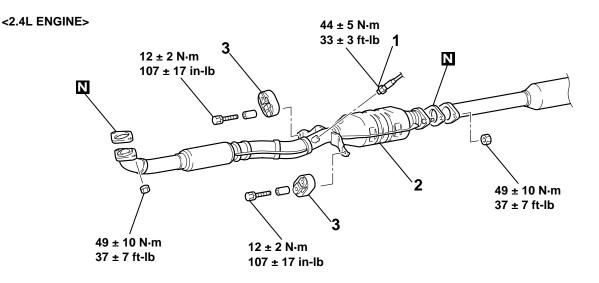
M1173005300108

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) and reduces nitrogen oxides (NOx).

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

REMOVAL AND INSTALLATION

M1173003900223



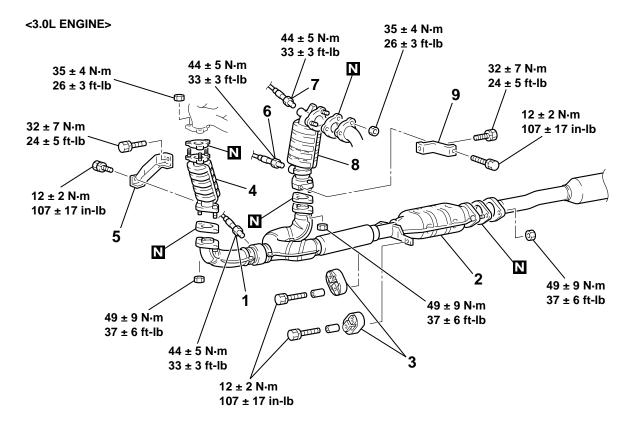
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REMOVAL STEPS

<<A>> >>A<< 1. HEATED OXYGEN SENSOR (REAR)</p>

REMOVAL STEPS (Continued)

- 2. FRONT EXHAUST PIPE (CATALYTIC CONVERTER INCORPORATED)
- 3. HANGER



AC106411AB

FRONT CATALYTIC **CONVERTER (LH) REMOVAL STEPS**

<<A>>>

- LEFT BANK HEATED OXYGEN 1. SENSOR (REAR)
- 2. FRONT EXHAUST PIPE (CATALYTIC CONVERTER INCORPORATED)
- 3. **HANGER**

STEPS

- FRONT CATALYTIC CONVERTER (LH)
- EXHAUST FITTING STAY (LH) FRONT CATALYTIC **CONVERTER (RH) REMOVAL**

<<A>>> >>A<<

- 1. LEFT BANK HEATED OXYGEN SENSOR (REAR)
- FRONT EXHAUST PIPE (CATALYTIC CONVERTER INCORPORATED)

FRONT CATALYTIC **CONVERTER (RH) REMOVAL** STEPS (Continued)

- HANGER
- >>**A**<< 6. RIGHT BANK HEATED OXYGEN SENSOR (REAR)
 - INTAKE MANIFOLD PLENUM < VEHICLE WITH VARIABLE INDUCTION CONTROL (VIC) SYSTEM> (REFER TO GROUP 15, INTAKE MANIFOLD PLENUM P.15-7.)
- <<**A>> >>A**<< 7. RIGHT BANK HEATED OXYGEN SENSOR (FRONT)
 - 8. FRONT CATALYTIC CONVERTER (RH)
 - **EXHAUST FITTING STAY (RH)**

Required Special Tool:

<<A>>>

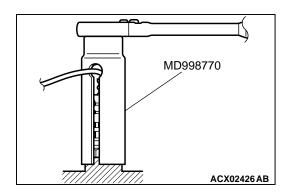
MD998770: Oxygen sensor wrench

TSB Revision

REMOVAL SERVICE POINT

<<a>>> HEATED OXYGEN SENSOR (REAR)/LEFT BANK HEATED OXYGEN SENSOR (REAR)/RIGHT BANK HEATED OXYGEN SENSOR (REAR)/RIGHT BANK HEATED OXY-GEN SENSOR (FRONT) REMOVAL

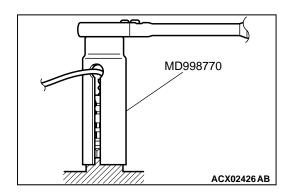
Use special tool MD998770 to remove the oxygen sensor.



INSTALLATION SERVICE POINT

>>A<< RIGHT BANK HEATED OXYGEN SENSOR (FRONT)/ RIGHT BANK HEATED OXYGEN SENSOR (REAR)/LEFT BANK HEATED OXYGEN SENSOR (REAR)/HEATED OXY-GEN SENSOR (REAR) INSTALLATION

Use special tool MD998770 to installation the oxygen sensor.



SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1173006400186

| ITEMS | SPECIFICATIONS | |
|--|------------------------------|--|
| Engine control system | | |
| Accelerator pedal bracket installation | 12 ± 2 N·m (100 ± 22 in-lb) | |
| Bracket nut | 4.9 ± 1.0 N·m (44 ± 8 in-lb) | |
| Auto-cruise control system | | |
| Auto-cruise control-ECU installation nut | 4.9 ± 1.0 N·m (44 ± 8 in-lb) | |
| Emission control system | | |
| EGR valve bolt <2.4L Engine> | 19 ± 3 N·m (14 ± 2 ft-lb) | |
| EGR valve bolt <3.0L Engine> | 22 ± 4 N·m (16 ± 3 ft-lb) | |
| Exhaust fitting stay (M8) <3.0L Engine> | 12 ± 2 N·m (107 ± 17 in-lb) | |
| Exhaust fitting stay (M12) <3.0L Engine> | 32 ± 7 N·m (24 ± 5 ft-lb) | |
| Front catalytic converter nut | 35 ± 4 N·m (26 ± 3 ft-lb) | |
| Front exhaust pipe nut | 49 ± 10 N·m (37 ± 7 ft-lb) | |
| Hanger bolt | 12 ± 2 N·m (107 ± 17 in-lb) | |
| Heated oxygen sensor | 44 ± 5 N·m (33 ± 3 ft-lb) | |

SERVICE SPECIFICATIONS

M1173000300192

| ITEMS | STANDARD VALUE | |
|---|---------------------|--|
| Engine control system | | |
| Accelerator cable free play mm (in) | 1 – 2 (0.04 – 0.08) | |
| Curb idle speed r/min | 700 ± 100 | |
| Emission control system | | |
| EGR solenoid coil resistance [at 20°C (68°F)] Ω | 29 – 35 | |
| Evaporative emission purge solenoid coil resistance [at 20°C (68°F)] Ω | 30 – 34 | |
| Evaporative emission ventilation solenoid coil resistance [at 20°C (68°C)] Ω | 17 – 21 | |
| Purge flow cm ³ /s (SCFH) [at 80 – 95°C (176 – 205°F) with sudden revving] | 20 (2.5) | |

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