

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 SRS-related component.*

NOTE

The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, air bag module, side-airbag module, curtain air bag module, side impact sensors, seat belt pre-tensioners, 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

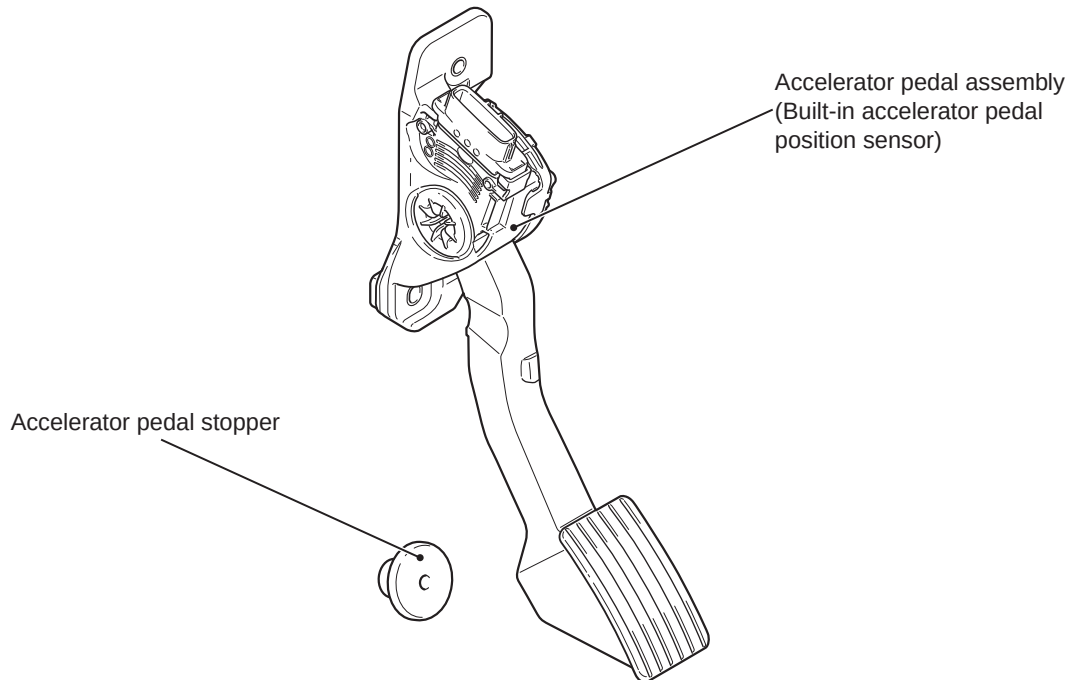
GENERAL INFORMATION

For the accelerator system, an electronic throttle valve control system has been adopted, eliminating of an accelerator cable.

This system detects the amount of the accelerator pedal movement by using an accelerator pedal position sensor in the accelerator pedal assembly for electronically controls the throttle valve.

M1171000101612

CONSTRUCTION DIAGRAM



ACC06547 AB

ENGINE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION

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

M1171002000403

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.

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

M1171002100433

SYMPTOM CHART

M1171002200474

Symptom	Inspection procedure	Reference page
Throttle valve will not fully open or close	1	P.17-4
Accelerator pedal operation not smooth (over acceleration)	2	P.17-5

SYMPTOM PROCEDURES

Inspection Procedure 1: Throttle Valve will not Fully Open or Close

COMMENT

The throttle body or accelerator pedal position sensor (APP sensor) is suspected.

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

- Malfunction of the throttle body.
- Malfunction of the APP sensor.
- Malfunction of the engine control module (ECM).

DIAGNOSIS

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

 CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Function [P.13A-10](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to check for MFI system DTC (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Function [P.13A-10](#)).

Q: Is any DTC set?

YES : Repair the MFI system (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Trouble Code Chart [P.13A-47](#)). Then go to Step 2.

NO : Go to Step 2.

STEP 2. Check the symptom.**Q: Does the throttle valve fully open and close?**

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 2: Accelerator Pedal Operation not Smooth (Over Acceleration)

COMMENT

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

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

- Malfunction of the accelerator pedal.
- Incorrectly installed accelerator pedal.
- Malfunction of the APP sensor.

DIAGNOSIS

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

Q: Is the accelerator pedal installed correctly?

YES : Go to Step 2.

NO : Remove and reinstall the accelerator pedal (Refer to [P.17-7](#)). Then go to Step 3.

STEP 2. Using scan tool MB991958, read the MFI system DTC.

⚠ CAUTION

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

- (1) Connect scan tool MB991958 to the data link connector (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Function [P.13A-10](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to check for MFI system DTC (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Function [P.13A-10](#)).

Q: Is any DTC set?

YES : Repair the MFI system (Refer to GROUP 13A, MFI Diagnosis – Diagnostic Trouble Code Chart [P.13A-47](#)). Then go to Step 3.

NO : Go to Step 3.

STEP 3. Check the symptom.

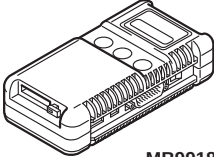
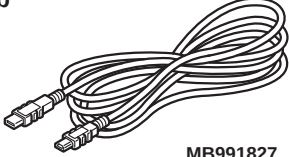
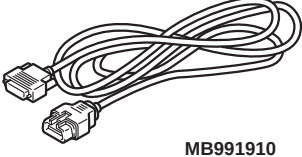
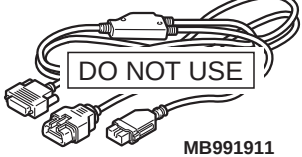
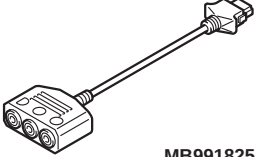
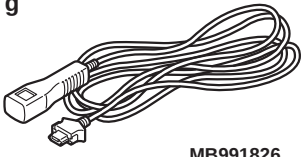
Q: Does the accelerator pedal work normally?

YES : The procedure is complete.

NO : Return to Step 1.

SPECIAL TOOL

M1171000600164

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991914 f  MB991825 g  MB991826 MB991958	MB991958 a. MB991824 b. MB991827 c. MB991910 d. MB991911 e. MB991914 f. MB991825 g. MB991826 M.U.T.-III sub assembly a. Vehicle communication interface (V.C.I.) b. M.U.T.-III USB cable c. M.U.T.-III main harness A (Vehicles with CAN communication system) d. M.U.T.-III main harness B (Vehicles without CAN communication system) e. M.U.T.-III main harness C (for Chrysler models only) f. M.U.T.-III measurement adapter g. M.U.T.-III trigger harness	MB991824-KIT <i>NOTE: g: MB991826 M.U.T.-III trigger harness is not necessary when pushing V.C.I. ENTER key.</i>	⚠ CAUTION For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B or C instead, the CAN communication does not function correctly. Checking diagnostic trouble codes

ACCELERATOR PEDAL REMOVAL AND INSTALLATION

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CAUTION

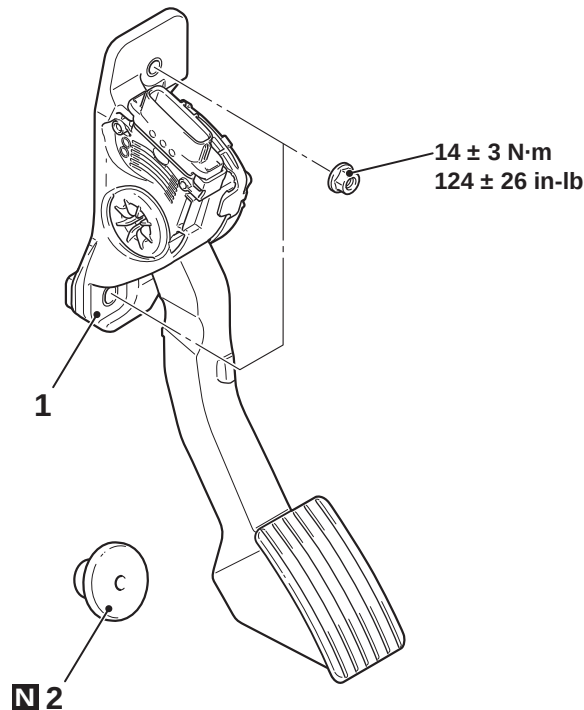
Never remove the accelerator pedal cover and connector. If the accelerator pedal cover removed, the accelerator pedal position sensor does not work normally.

Pre-removal Operation

- Instrument Panel Lower Cover Removal (Refer to GROUP 52A – Instrument Lower Panel P.52A-6).

Post-installation Operation

- Instrument Panel Lower Cover Installation (Refer to GROUP 52A – Instrument Lower Panel P.52A-6).



ACC02141AB

Removal steps

- >>A<<
1. Accelerator pedal
 2. Accelerator pedal arm stopper

INSTALLATION SERVICE POINT

>>A<< ACCELERATOR PEDAL ARM STOPPER INSTALLATION

1. Insert the accelerator pedal arm stopper straight into the stud bolt of the body.
Shall not insert the dash pad between stopper and body panel.
2. Install the accelerator pedal arm stopper securely by turning it clockwise until its underside contacts with the body panel.
3. After the installation, slightly pull the accelerator pedal arm stopper by hand to check that it cannot be removed easily (appropriate holding power: 100N or more).

CRUISE CONTROL

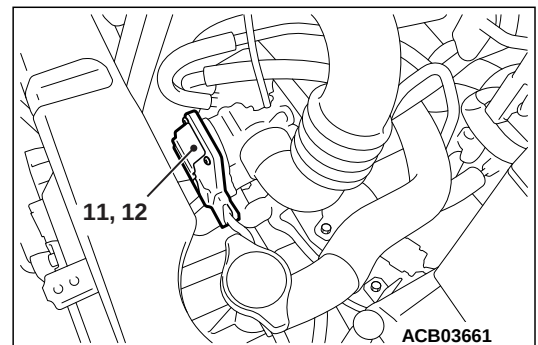
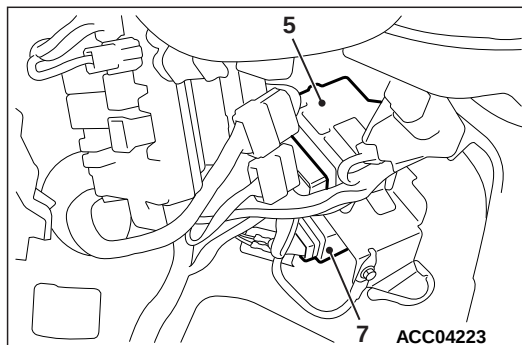
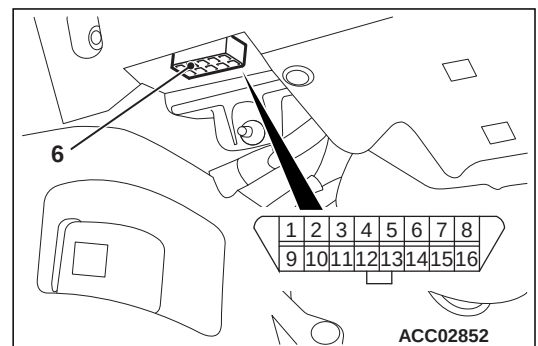
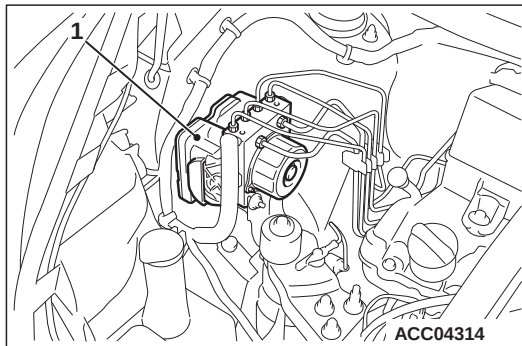
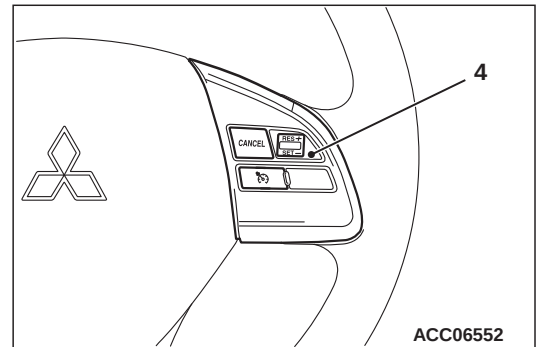
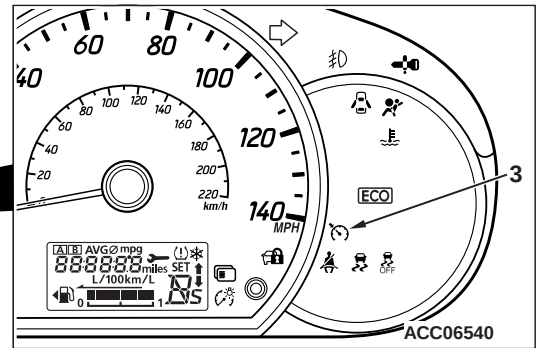
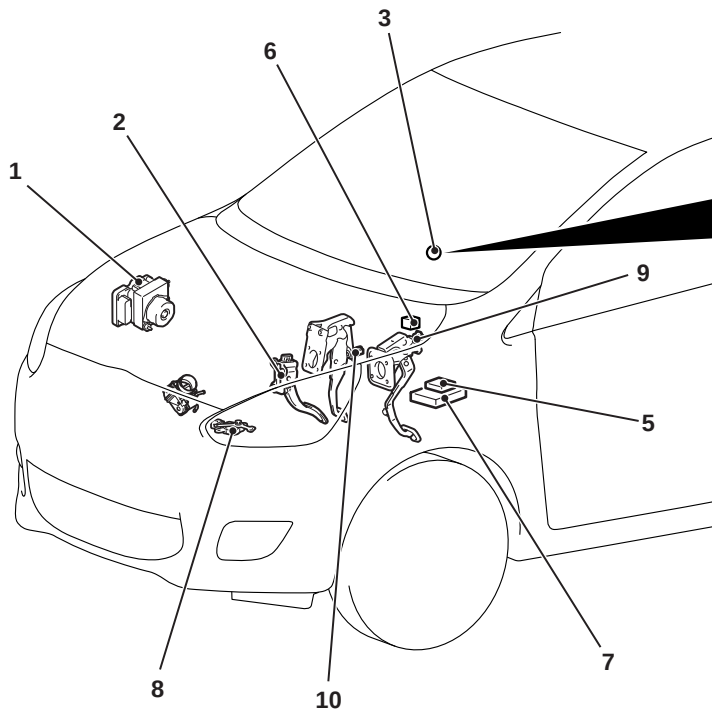
GENERAL INFORMATION

M1172000101983

The cruise control system, which provides the constant speed driving without depressing the accelerator pedal at a vehicle speed determined by the driver [within the range from approximately 40 km/h (25 mph) or more].

For this cruise control system, in conjunction with the electronic throttle valve control system, the engine control module electronically controls the throttle valve.

CONSTRUCTION DIAGRAM



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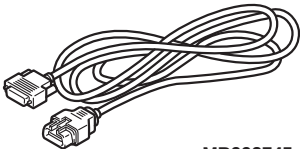
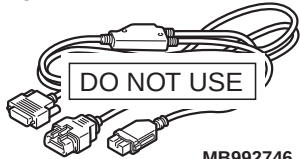
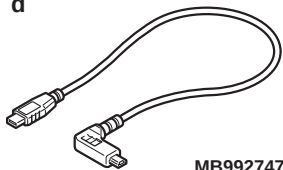
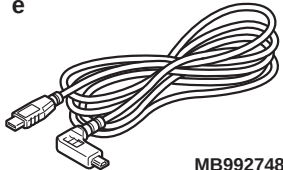
COMPONENTS AND FUNCTIONS

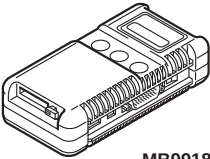
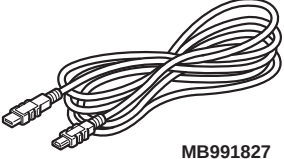
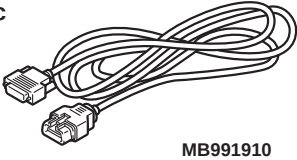
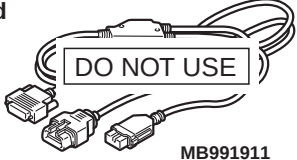
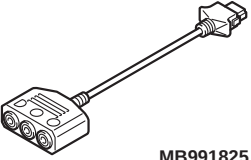
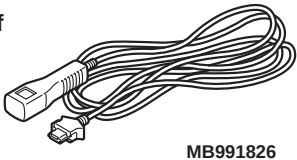
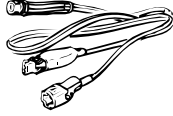
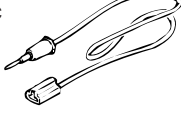
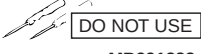
No.	Component		Function
1.	ASC-ECU		Outputs the cruise control cancel signal to the engine control module.
2.	Accelerator pedal position sensor		Informs the engine control module of the accelerator pedal depression.
3.	Cruise control indicator light		When the cruise control ON/OFF switch is pressed, a light will illuminate to inform the driver that the cruise control system is active.
4.	Cruise control switches	Cruise control ON/OFF switch	Power switch for cruise control system.
		RES + switch	Vehicle speed is set with the RES + switch and SET – switch.
		SET – switch	
		CANCEL switch	Cancels the constant speed driving.
5.	CVT-ECU		- Controls the CVT based on the CVT control signal from the engine control module. - The selector lever "N" position signal from the transmission range switch is sent to the engine control module. - Outputs the signal from the secondary pulley speed sensor to the engine control module.
6.	Data link connector		If the scan tool MB991958 is connected, the data list from the engine control module can be read.
7.	Engine control module		- Based on the input signal from each sensors and switches, the throttle opening angle indication signal is sent. - Based on the input signal from each sensors and switches, the CVT control signal is sent to the CVT-ECU. - Based on the secondary pulley speed sensor signal from the CVT-ECU, it calculates the vehicle speed. - Based on the selector lever "N" position signal from the CVT-ECU, it cancels constant speed driving. - To the cruise control indicator light, the cruise control system ON/OFF signal is sent. - The data list of the cruise control system is sent to the data link connector.
8.	Transmission range switch <CVT>		The constant speed driving is cancelled by the selector lever operation, the "N" position is detected.
9.	Clutch switch <M/T>		Detects whether the clutch is engaged or not in order to cancel the cruise control properly.
10.	stoplight switch		- Detects whether the brake pedal is depress or not in order to cancel the cruise control properly. - As for the stoplight switch, two built-in switches, the stoplight switch which is also used for the stoplight illumination and the brake switch which is used exclusively for the cruise control, are integrated, and thus the reliability is enhanced.
11.	Throttle valve control servo		The throttle valve opens and closes in response to the throttle angle control signal from the engine control module.

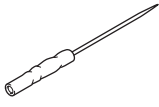
No.	Component	Function
12	Throttle position sensor	Informs the engine control module of the throttle valve opening angle.

SPECIAL TOOLS

M1172000602022

Tool	Tool number and name	Supersession	Application
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748 ACB05421AB	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748 a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	—	Checking data list

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991825 f  MB991826 MB991955	MB991955 a: MB991824 b: MB991827 c: MB991910 d: MB991911 e: MB991825 f: MB991826 M.U.T.-III sub assembly a: Vehicle communication interface (V. C. I.) b: M.U.T.-III USB cable c: M.U.T.-III main harness A (Vehicles with CAN communication system) d: M.U.T.-III main harness B (Vehicles without CAN communication system) e: M.U.T.-III measurement adapter f: M.U.T.-III trigger harness	MB991824-KIT <i>NOTE: g: MB991826 M.U.T.-III trigger harness is not necessary when pushing V.C.I. ENTER key.</i>	⚠ CAUTION M.U.T.-III main harness A should be used. M.U.T.-III main harness B should not be used for this vehicle. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly. Checking data list
a  b  c  d  MB991223	MB991223 a: MB991219 b: MB991220 c: MB991221 d: MB991222 Harness set a: Check harness b: LED harness c: LED harness adaptor d: Probe	General service tools	Making voltage and resistance measurement during troubleshooting a: Connector pin contact pressure inspection b: Power circuit inspection c: Power circuit inspection d: Commercial tester connection

Tool	Tool number and name	Supersession	Application
 MB992006	MB992006 Extra fine probe	General service tool	Making voltage and resistance measurement during troubleshooting

CRUISE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO CRUISE CONTROL SYSTEM DIAGNOSIS

M1172003300422

The cruise control system allows driving without stepping on the accelerator pedal by setting a random speed [40 km/h (25 mph) or more]. Malfunctions in this system can be investigated by the following methods.

input signals from the switches and sensors. If the ECM detects a malfunction on any of those components, the ECM estimates where the problem may be occurring, and will set a diagnostic trouble code. Diagnostic trouble codes cover the cruise control switch, stoplight switch and ECM.

Cruise control system diagnostic trouble codes

The cruise control system consists of the engine control module (ECM), control switches and sensors. The switches and sensors monitor the state of the vehicle. The ECM controls the throttle valve opening angle in the throttle body in accordance with the

DIAGNOSIS TROUBLESHOOTING FLOW

M1172002001261

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

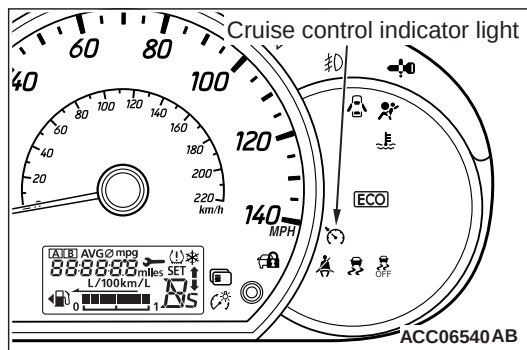
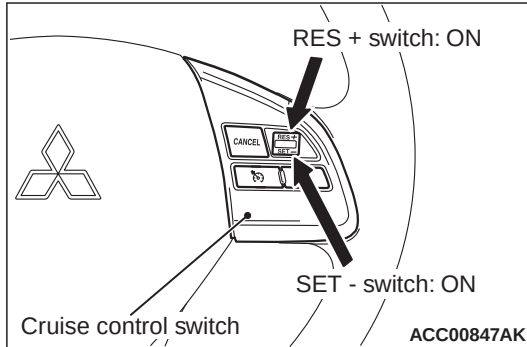
1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any cruise control system DTC. (Refer to [P.17-15](#), Diagnostic Function – How to Read Diagnostic Trouble Codes).
4. If you can verify the condition but no cruise control system DTCs are set, the malfunction may be intermittent. (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunctions [P.00-13](#)).
5. If you can verify the condition but there are no cruise control system DTCs, find the fault. (Refer to [P.17-28](#), Symptom Chart).
6. If there is an cruise control system DTC, record the number of the code, then erase the code. (Refer to [P.17-15](#), Diagnostic Function – How to Erase Diagnostic Trouble Codes).
7. Re-create the cruise control system DTC set conditions to see if the same cruise control system DTC will set again. (Refer to [P.17-15](#), Diagnostic Function – How to Read Diagnostic Trouble Codes).
 - If the same cruise control system DTC sets again, perform the diagnostic procedures for the set code. (Refer to [P.17-18](#), Diagnostic Trouble Code Chart).

DIAGNOSTIC FUNCTION

M1172004900535

HOW TO READ DIAGNOSTIC TROUBLE CODES

1. Turn the ignition switch to the "ON" position while pushing the "SET-" switch. Then, within one second, release the "SET-" switch and push the "RES+" switch.



2. Read a DTC by observing the flash display pattern of the "CRUISE" indicator light in the combination meter.

Diagnostic result display method when using the "CRUISE" indicator light

When DTC 23 is set	When no DTC is set

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

HOW TO ERASE DIAGNOSTIC TROUBLE CODES

Disconnect the negative (-) battery cable.

HOW TO CONNECT THE SCAN TOOL (M.U.T.-III).

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: M.U.T.-III USB Cable

- MB991910: M.U.T.-III Main Harness A

⚠ CAUTION

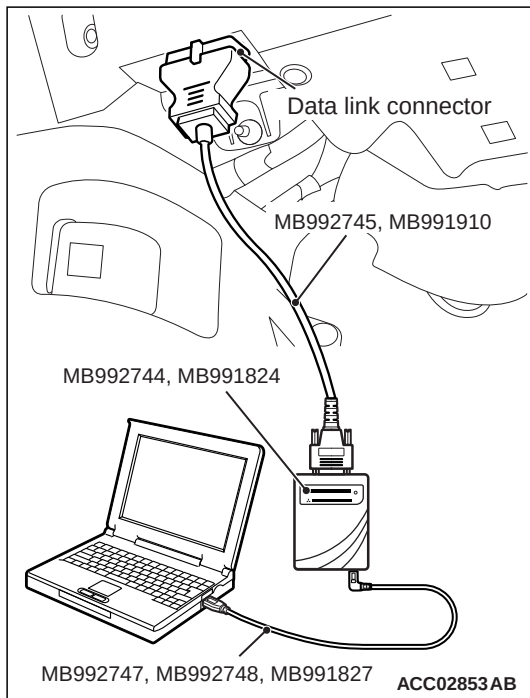
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Start up the personal computer.
2. Connect special tool MB991827 to special tool MB991824 and the personal computer.
3. Connect special tool MB991910 to special tool MB991824.
4. Connect special tool MB991910 to the data link connector.
5. Turn the power switch of special tool MB991824 to the "ON" position.

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

6. Start the M.U.T.-III system on the personal computer.

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



HOW TO READ DATA LIST

Required Special Tools:

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

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System Select" from the start-up screen.
4. Select "From 2006 MY" of "Model Year." When the "Vehicle Information" is displayed, check the contents.
5. Select "AUTO CRUISE" from "System List", and press the "OK" button.

NOTE: When the "Loading Option Setup" list is displayed, check the applicable item.

6. Select the "MITSUBISHI."
7. Select the "Data List."

NOTE: When the "Data List Reference Table" button is selected, the service data reference table is displayed, and the normal values can be checked.

8. Choose an appropriate item.

HOW TO DIAGNOSE THE CAN BUS LINE

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable

- MB991910: M.U.T.-III Main Harness A
1. Connect scan tool MB991958 to the data link connector.
 2. Turn the ignition switch to the "ON" position.
 3. Select the "CAN Bus Diagnosis" from the start-up screen.
 4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
 - If they match, go to Step 8.
 - If not, go to Step 5.
 5. Select the "view vehicle information" button.
 6. Enter the vehicle information and select the "OK" button.
 7. When the vehicle information is displayed, confirm again that it matches the vehicle which whose CAN bus lines will be diagnosed.
 - If they match, go to Step 8.
 - If not, go to Step 5.
 8. Press the "OK" button.
 9. When the optional equipment screen is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.

DIAGNOSTIC TROUBLE CODE CHART

M1172002201953

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

Diagnostic trouble code number	Inspection item	Reference page
15	Cruise control switch system	P.17-18
22	Stoplight switch system	P.17-24
23	Engine control module (ECM) and its related components	P.17-27

DIAGNOSTIC TROUBLE CODE PROCEDURES**DTC 15: Cruise Control Switch System.****OPERATION**

This circuit judges the signals of each switches (cruise control ON/OFF, CANCEL, SET – and RES +) of the cruise control switches. The engine control module detects the state of the cruise control switch by sensing the voltages shown below.

- When all switches are released: 4.7 – 5.0 volts
- When the cruise control ON/OFF switch is pressed: 0.9 – 1.7 volts
- When the CANCEL switch is pressed: 1.9 – 2.7 volts
- When the SET – switch is pressed: 2.9 – 3.6 volts
- When the RES + switch is pressed: 3.8 – 4.5 volts

DIAGNOSTIC TROUBLE CODE SET CONDITIONS

- If the cruise control switches are operated, this diagnostic trouble code will be set when the engine control module terminal voltage is different from the standard value.
- Or, this code is set when the SET – switch or RES + switch is stuck to ON.

PROBABLE CAUSES

- Damaged harness or connector.
- Malfunction of the cruise control switch.
- Malfunction of the clock spring.
- Malfunction of the engine control module.

DIAGNOSIS**STEP 1. Check the data list.**

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES – switch
- Item 92: SET + switch

Q: Is the check result normal?

YES : Go to Step 19.

NO : Go to Step 2.

STEP 2. Measure the terminal voltage at cruise control switch connector.

- (1) Remove the cruise control switch from the steering wheel with the cruise control switch connector connected (Refer to [P.17-48](#)).
- (2) Connect the negative battery terminal that was disconnected when the driver's air bag module was removed.
- (3) Turn the ignition switch to the "ON" position.
- (4) Do not operate the cruise control switch.
- (5) Measure the terminal voltage between cruise control switch connector terminal engine control module CNTS (No.94) line and ground with cruise control switch connector connected.

OK: 4.7 – 5.0 V

Q: Is the check result normal?

YES : Go to Step 11.

NO : Go to Step 3.

STEP 3. Measure the terminal voltage at engine control module connector.

- (1) Turn the ignition switch to the "ON" position.
- (2) Do not operate the cruise control switch.
- (3) Measure the terminal voltage between engine control module terminal CNTS (No.94) and ground.

OK: 4.7 – 5.0 V

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 4.

STEP 4. Check the harness wire for short circuit to ground between engine control module connector terminal CNTS (No.94) and cruise control switch connector.

- (1) Check the engine control module connector.
- (2) Disconnect engine control module connector and measure at the harness connector side.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.
- (4) Measure the continuity between engine control module connector terminal CNTS (No.94) and ground.

OK: open circuit

Q: Is the check result normal?

YES : Go to Step 18.

NO : Go to Step 5.

STEP 5. Check the harness wire between engine control module connector terminal CNTS (No.94) and clock spring connector, and between clock spring connector terminal and cruise control switch connector.

- Check connector or harness wire for short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair connector or damaged harness wire. Then go to Step 20.

STEP 6. Check the clock spring.

Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring Inspection [P.52B-238](#).

Q: Is the check result normal?

YES : Go to Step 7.

NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring [P.52B-232](#)]. Then go to Step 20.

STEP 7. Check the cruise control switches.

Refer to [P.17-47](#).

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the cruise control switches (Refer to [P.17-48](#)). Then go to Step 20.

STEP 8. Check the harness wire between engine control module connector terminal CNTS (No.94) and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check connector or harness wire for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 9.

NO : Repair connector or damaged harness wire. Then go to Step 20.

STEP 9. Check the clock spring.

Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring Inspection [P.52B-238](#).

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring [P.52B-232](#)]. Then go to Step 20.

STEP 10. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES – switch
- Item 92: SET + switch

Q: Is the check result normal?

YES : Go to Step 19.

NO : Go to Step 11.

STEP 11. Measure the terminal voltage at cruise control switch connector.

- (1) Remove the cruise control switch from the steering wheel with the cruise control switch connector connected (Refer to [P.17-48](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Press the cruise control ON/OFF switch with cruise control switch connector connected, and measure the terminal voltage between cruise control switch connector terminal engine control module SW– line (No.93) and ground.

OK: 0.5 volt or less

Q: Is the check result normal?

YES : Go to Step 15.

NO : Go to Step 12.

STEP 12. Measure the terminal voltage at engine control module connector.

- (1) Turn the ignition switch to the "ON" position.
- (2) Press the cruise control ON/OFF switch, and engine control module connector terminal SW– (No.93) and ground.

OK: 0.5 volt or less

Q: Is the check result normal?

YES : Go to Step 13.

NO : Go to Step 18.

STEP 13. Check the harness wire between engine control module connector terminal SW– (No.93) and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check connector or harness wire for open circuit and damage.

Q: Is the check result normal?

YES : Go to Step 14.

NO : Repair connector or damaged harness wire. Then go to Step 20.

STEP 14. Check the clock spring.

Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring Inspection [P.52B-238](#).

Q: Is the check result normal?

YES : Go to Step 18.

NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring [P.52B-232](#)]. Then go to Step 20.

STEP 15. Check the harness wire between engine control module connector terminal SW– (No.93) and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check connector or harness wire for short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 16.

NO : Repair connector or damaged harness wire. Then go to Step 20.

STEP 16. Check the clock spring.

Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring Inspection [P.52B-238](#).

Q: Is the check result normal?

YES : Go to Step 17.

NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's Air Bag Module and Clock Spring [P.52B-232](#)]. Then go to Step 20.

STEP 17. Check the cruise control switches.

Refer to [P.17-47](#).

Q: Is the check result normal?

YES : Go to Step 18.

NO : Replace the cruise control switches (Refer to [P.17-48](#)). Then go to Step 20.

STEP 18. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES – switch
- Item 92: SET + switch

Q: Is the check result normal?

YES : Go to Step 19.

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 20.

STEP 19. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (the cruise control indicator light is turned on).
- (3) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 15 set?

YES : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 20.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 20. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#) scan tool MB991958).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES – switch
- Item 92: SET + switch

Q: Is the check result normal?

YES : Go to Step 21.

NO : Return to Step 2.

STEP 21. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (turn ON the cruise control indicator t).
- (3) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 15 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC 22: Stoplight Switch System.

OPERATION

- For the stoplight switch, two switches, a stoplight switch for the stoplight illumination and a brake switch exclusively for the cruise control system, are incorporated to improve the reliability.
- As for the stoplight switch, when the brake pedal is depressed/released, the stoplight switch ON/OFF signal is transmitted from the ETACS-ECU to the engine control module via CAN bus line.
- As for the brake switch, the engine control module connector terminal BRK monitor the state of the brake switch. The brake switch turn ON/OFF when the brake pedal is depressed/released, and the input signal to the engine control module connector terminal BRK changes. According to this change, the engine control module judges the state of the brake switch.

DIAGNOSTIC TROUBLE CODE SET CONDITIONS**Check Condition**

- The cruise control indicator light illuminates.

Judgment Criteria

- Open/short in stoplight switch circuit.
- Open circuit in the brake switch circuit (between engine control module connector terminal BRK and ground).
- Malfunction of CAN bus line.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the fuse No.12.
- Malfunction of the stoplight switch.
- Malfunction of the ETACS-ECU.
- Malfunction of the engine control module.

DIAGNOSIS **CAUTION**

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus line is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The scan tool MB991958 Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 12.

STEP 2. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 74: stoplight switch

Q: Is the check result normal?

YES : Go to Step 6.

NO : Go to Step 3.

STEP 3. Check the stoplight operation.

Check the stoplight operation.

OK:

Brake pedal depressed: stoplight will illuminate

Brake pedal not depressed: stoplight does not illuminate

Q: Is the check result normal?

YES : Go to Step 4.

NO : Check the stoplight system (Refer to GROUP 54A – Rear Combination Light, Symptom Procedures, Inspection Procedure 2: The stoplights do not illuminate or go out normally [P.54A-107](#)). Then go to Step 11.

STEP 4. Check the ETACS system data list.

Using scan tool MB991958, check the ETACS system data list (Refer to GROUP 54A – ETACS, Troubleshooting, data list reference table [P.54A-233](#)).

- Item 290: stoplight switch

Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS, ETACS-ECU [P.54A-260](#)). Then go to Step 11.

STEP 5. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 74: stoplight switch

Q: Is the check result normal?

YES : Go to Step 6.

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 11.

STEP 6. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 89: Brake switch

Q: Is the check result normal?

YES : Go to Step 10.

NO : Go to Step 7.

STEP 7. Check the harness wire between engine control module connector terminal BRK and stoplight switch connector, and between stoplight switch connector and ground.

- Check connector or harness wire for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair connector or damaged harness wire. Then go to Step 11.

STEP 8. Check the stoplight switch.

Refer to GROUP 35A – Brake Pedal, Inspection, stoplight Switch Check [P.35A-26](#).

Q: Is the check result normal?

YES : Go to Step 9.

NO : Replace the stoplight switch (Refer to GROUP 35A – Brake Pedal [P.35A-25](#)). Then go to Step 11.

STEP 9. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 89: Brake switch

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 11.

STEP 10. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (the cruise control indicator light is turned on).
- (3) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 22 set?

YES : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 11.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 11. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 74: stoplight switch
- Item 89: Brake switch

Q: Is the check result normal?

YES : Go to Step 12.

NO : Return to Step 2.

STEP 12. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (the cruise control indicator light is turned on).
- (3) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 22 set?

YES : Return to Step 1.

NO : The procedure is complete.

DTC 23: ECM and Its Related Component.

**DIAGNOSTIC TROUBLE CODE SET
CONDITIONS**

This diagnostic trouble code is set when there is an failure in the engine control module and its related components.

PROBABLE CAUSES

- Malfunction of the MFI system.
- Malfunction of the engine control module.

DIAGNOSIS

STEP 1. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function [P.13A-10](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.13A-47](#)). Then go to Step 3.

NO : Go to Step 2.

STEP 2. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (the cruise control indicator lamp is turned on).
- (3) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 23 set?

YES : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 3. Read the diagnostic trouble code.

- (1) Disconnect the negative (–) battery terminal, to erase the DTC of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (the cruise control indicator lamp is turned on).
- (3) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#)).

Q: Is diagnostic trouble code No. 23 set?

YES : Return to Step 1.

NO : This procedure is complete.

CHECK CHART FOR TROUBLE SYMPTOMS

M1172002302298

Trouble symptom		Inspection procedure No.	Reference page
Communication with M.U.T.-III is not possible.	Communication with engine control module is not possible.	–	GROUP 13A – Troubleshooting, Symptom Procedures, Inspection Procedure 1 P.13A-515 .
When the brake pedal is depressed, cruise control is not cancelled.		1	P.17-29
When the clutch pedal is depressed, cruise control is not cancelled <M/T>.		2	P.17-30
When the selector lever is set to "N" position, cruise control is not cancelled <CVT>.		3	P.17-32
When the CANCEL switch is pressed, cruise control is not cancelled.		4	P.17-33

Trouble symptom	Inspection procedure No.	Reference page
Cruise control cannot be set (No response SET – switch and RES + switch is pressed).	5	P.17-34
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <M/T>	6	P.17-37
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <CVT>	7	P.17-38
When the cruise control ON/OFF switch is turned ON, the cruise control indicator lamp does not illuminate (However, the cruise control system is normal).	8	P.17-40
When the cruise control switch is operated, the system is not turned on.	9	P.17-41

SYMPTOM PROCEDURES

Inspection Procedure 1: When the Brake Pedal is Depressed, Cruise Control is not Cancelled.

COMMENTS ON TROUBLE SYMPTOM

- Malfunction of CAN bus line.
- The stoplight switch circuit is suspected.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the stoplight switch.
- Malfunction of the ETACS-ECU.
- Malfunction of the engine control module.

DIAGNOSIS

CAUTION

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus lines is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C - Explanation About The Scan Tool (M.U.T.-III) Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 4.

STEP 2. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 74: stoplight switch
- Item 89: Brake switch

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair the stoplight switch system (Refer to [P.17-24](#), Diagnostic Trouble Code Procedures – DTC 22: Stoplight Switch System). Then go to Step 4.

STEP 3. Check the symptom.**Q: When the brake pedal is depressed, is the cruise control cancelled?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 4.

STEP 4. Check the symptom.**Q: When the brake pedal is depressed, is the cruise control cancelled?**

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 2: When the Clutch Pedal is Depressed, Cruise Control is not Cancelled. <M/T>

OPERATION

- Terminal CLT1 of the engine control module connector monitors the clutch switch state.
- The clutch switch turns ON/OFF when the clutch pedal is depressed/released, and the input signal to the engine control module changes. According to this change, the engine control module judges the clutch switch status.

COMMENTS ON TROUBLE SYMPTOM

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

POSSIBLE CAUSES

- Damaged harness or connector.
- Malfunction of the clutch switch.
- Malfunction of the engine control module.

DIAGNOSIS

STEP 1. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 78: Clutch switch

Q: Is the check result normal?

YES : Go to Step 5.

NO : Go to Step 2.

STEP 2. Check the harness wire between engine control module connector terminal CLT1 and clutch switch connector terminal, and between clutch switch connector terminal and ground.

- Check connector or harness wire for open/short circuit and damage.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair connector or damaged harness wire. Then go to Step 6.

STEP 3. Check the clutch switch.

Refer to GROUP 21A – On-vehicle Service, Clutch Interlock Switch Continuity Check [P.21A-3](#).

Q: Is the check result normal?

YES : Go to Step 4.

NO : Replace the clutch interlock switch (Refer to GROUP 21A – Clutch Pedal [P.21A-5](#)). Then go to Step 6.

STEP 4. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 78: Clutch switch

Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 6.

STEP 5. Check the symptom.

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

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 6.

STEP 6. Check the symptom.

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

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 3: When the Selector Lever is Set to "N" Position, Cruise Control is not Cancelled. <CVT>

OPERATION

When the selector lever is operated, the selector lever position signal from the transmission range switch is sent to the CVT-ECU. The engine control module receives the selector lever position signal from the CVT-ECU via the CAN bus line.

COMMENTS ON TROUBLE SYMPTOM

- Malfunction of CAN bus line.

- The transmission range switch circuit is suspected.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the transmission range switch.
- Malfunction of the CVT-ECU.
- Malfunction of the engine control module.

DIAGNOSIS **CAUTION**

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus lines is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C - Explanation About The Scan Tool (M.U.T.-III) Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 5.

STEP 2. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 88: Inhibitor switch

Q: Is the check result normal?

YES : Go to Step 3.

NO : Check the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Procedures for Diagnostic Trouble Code, Code No.P0705: Malfunction of Transmission Range Switch [P.23A-18](#)). Then go to Step 5.

STEP 3. Check the CVT system diagnostic trouble code.

Using scan tool MB991958, perform CVT system diagnostic trouble code (Refer to GROUP 23A – Troubleshooting, Diagnosis Function [P.23A-7](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Diagnostic Trouble Code Chart [P.23A-16](#)). Then go to Step 5.

NO : Go to Step 4.

STEP 4. Check the symptom.

Q: When the selector lever is set to "N" position, is the cruise control cancelled?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 5.

STEP 5. Check the symptom.

Q: When the selector lever is set to "N" position, is the cruise control cancelled?

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 4: When the CANCEL Switch is Pressed, Cruise Control is not Cancelled.

COMMENTS ON TROUBLE SYMPTOM

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

PROBABLE CAUSE

- Damaged harness or connector.
- Malfunction of the cruise control switches.
- Malfunction of the clock spring.
- Malfunction of the engine control module.

DIAGNOSIS

STEP 1. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch

Q: Is the check result normal?

YES : Go to Step 2.

NO : Repair the cruise control switch system (Refer to [P.17-18](#), Diagnostic Trouble Code Procedures – DTC 15: Cruise Control Switch System). Then go to Step 3.

STEP 2. Check the symptom.

Q: When the CANCEL switch is pressed, is the cruise control cancelled?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 3.

STEP 3. Check the symptom.

Q: When the CANCEL switch is pressed, is the cruise control cancelled?

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 5: Cruise Control cannot be Set (No Response SET – Switch and RES + Switch is Pressed).

COMMENTS ON TROUBLE SYMPTOM

The fail-safe function is probably cancelling cruise control system. In this case, checking the cruise control system, MFI system, CAN bus system and CVT system diagnostic trouble codes. The scan tool MB991958 can also be used to check if the circuits of each input switches are normal or not by checking the data list.

NOTE: Press the cruise control switches one by one securely. Otherwise, the cruise control system may not be started.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Malfunction of the MFI system.
- Malfunction of the CVT system.
- Malfunction of the cruise control switches.
- Malfunction of the stoplight switch.
- Malfunction of the clutch switch <M/T>.
- Malfunction of the transmission range switch <CVT>.
- Malfunction of the engine control module.

DIAGNOSIS

CAUTION

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus lines is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C - Explanation About The Scan Tool (M.U.T.-III) Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 10.

STEP 2. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnostic Function [P.13A-10](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.13A-47](#)). Then go to Step 10.

NO : Go to Step 3 <CVT>

NO : Go to Step 4 <M/T>

STEP 3. Check the CVT system diagnostic trouble code.

Using scan tool MB991958, perform CVT system diagnostic trouble code (Refer to GROUP 23A – Troubleshooting, Diagnostic Function [P.23A-7](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.23A-16](#)). Then go to Step 10.

NO : Go to Step 4.

STEP 4. Read the diagnostic trouble code.

- (1) Use the scan tool MB991958, erase the diagnostic trouble code of the cruise control system.
- (2) Turn the ignition switch to the "ON" position, and press the cruise control ON/OFF switch to turn the cruise control system to ON (turn ON the cruise control indicator lamp).
- (3) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches.
- (4) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnostic trouble code of the cruise control system (Refer to [P.17-18](#).)

Q: Is any diagnostic trouble code set?

YES : Repair the cruise control system (Refer to [P.17-18](#) – Diagnostic Trouble Code Chart). Then go to Step 10.

NO : Go to Step 5.

STEP 5. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES + switch
- Item 92: SET – switch

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the cruise control switch system (Refer to [P.17-18](#), Diagnostic Trouble Code Procedures – DTC 15: Cruise Control Switch System). Then go to Step 10.

STEP 6. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 74: stoplight switch
- Item 89: Brake switch

Q: Is the check result normal?

YES : Go to Step 7 <CVT>

YES : Go to Step 8 <M/T>

NO : Repair the stoplight switch system (Refer to [P.17-24](#), Diagnostic Trouble Code Procedures – DTC 22: Stoplight Switch System). Then go to Step 10.

STEP 7. Check the data list. <CVT>

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 88: Inhibitor switch

Q: Is the check result normal?

YES : Go to Step 9.

NO : Check the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Procedures for Diagnostic Trouble Code, Code No.P0705: Malfunction of Transmission Range Switch [P.23A-18](#)). Then go to Step 10.

STEP 8. Check the data list. <M/T>

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 78: clutch switch

Q: Is any diagnostic trouble code set?

YES : Go to Step 9.

NO : Check the clutch switch system (Refer to [P.17-30](#) – Symptom Procedures, Inspection Procedure 2). Then go to Step 10.

STEP 9. Check the symptom.**Q: Can cruise control be set?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 10.

STEP 10. Check the symptom.**Q: Can cruise control be set?**

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 6: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed. <M/T>

COMMENTS ON TROUBLE SYMPTOM

The vehicle speed sensor or the throttle body is suspected.

PROBABLE CAUSES

- Malfunction of the vehicle speed sensor.
- Malfunction of the throttle body.
- Malfunction of the MFI system.
- Malfunction of the engine control module.

DIAGNOSIS

STEP 1. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function [P.13A-10](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.13A-47](#)). Then go to Step 4.

NO : Go to Step 2.

STEP 2. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 04: Vehicle speed signal

Q: Is the check result normal?

YES : Go to Step 3.

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)). Then go to Step 4.

STEP 3. Check the symptom.**Q: Does a hunting occur?**

YES : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 4.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 4. Check the symptom.**Q: Does a hunting occur?**

YES : Return to Step 1.

NO : The procedure is complete.

Inspection Procedure 7: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed. <CVT>

COMMENTS ON TROUBLE SYMPTOM

The secondary pulley speed sensor signal (vehicle speed signal), or the throttle body is suspected.

NOTE: When the vehicle is driven with the low-speed gear in the sport mode, hunting occurs easily, however, this is not a failure.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Malfunction of the secondary pulley speed sensor.
- Malfunction of the CVT system.
- Malfunction of the throttle body.
- Malfunction of the engine control module.

DIAGNOSIS

CAUTION

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus lines is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C - Explanation About The Scan Tool (M.U.T.-III) Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 6.

STEP 2. Check the CVT system diagnostic trouble code.

Using scan tool MB991958, perform CVT system diagnostic trouble code (Refer to GROUP 23A – Troubleshooting, Diagnostic Function [P.23A-7](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.23A-16](#)). Then go to Step 6.

NO : Go to Step 3.

STEP 3. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnostic Function [P.13A-10](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.13A-47](#)). Then go to Step 6.

NO : Go to Step 4.

STEP 4. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 04: Vehicle speed signal

Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 6.

STEP 5. Check the symptom.**Q: Does a hunting occur?**

YES : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 6.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 6. Check the symptom.**Q: Does a hunting occur?**

YES : Return to Step 1.

NO : The procedure is complete.

Inspection Procedure 8: When the Cruise Control ON/OFF Switch is Turned ON, the Cruise Control Indicator Lamp does not Illuminate (However, the Cruise Control System is Normal).

OPERATION

- The engine control module detects cruise control ON/OFF switch ON signal to illuminate the cruise control indicator lamp within the combination meter.
- The cruise control indicator lamp ON signal is transmitted from the engine control module to the combination meter via CAN bus line.

COMMENTS ON TROUBLE SYMPTOM

- The CAN bus line between the engine control module and the combination meter may be defective.
- The combination meter or engine control module may also be defective.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the combination meter.
- Malfunction of the engine control module.

DIAGNOSIS **CAUTION**

- If there is any problem in the CAN bus lines, an incorrect diagnostic trouble code may be set. Prior to this diagnosis, diagnose the CAN bus lines.
- Before replacing the ECU, ensure that the CAN bus line is normal.

STEP 1. Check the CAN bus system diagnosis.

Using scan tool MB991958, perform CAN bus diagnosis (Refer to GROUP 54C - Explanation About The Scan Tool (M.U.T.-III) Can Bus Diagnostics [P.54C-7](#)).

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, Can Bus Diagnostic Table [P.54C-12](#)). Then go to Step 5.

STEP 2. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function [P.13A-10](#)).

Q: Is diagnostic trouble code No.U0155 set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Diagnostic Trouble Code Procedures, Code No.U0155: Combination Time-out [P.13A-502](#)). Then go to Step 5.

NO : Go to Step 3.

STEP 3. Check the combination meter system special function.

Using scan tool MB991958, check the combination meter system special function (Refer to GROUP 54A – Combination Meter, Special Function Table [P.54A-51](#)).

- Item 6: Indicator (AUTO)

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the combination meter system (Refer to GROUP 54A – Combination Meter, Trouble Symptom Chart [P.54A-35](#)). Then go to Step 5.

STEP 4. Check the symptom.**Q: When the cruise control ON/OFF switch is turned ON, is the cruise control indicator lamp illuminated?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – engine control module [P.13A-656](#)). Then go to Step 5.

STEP 5. Check the symptom.**Q: When the cruise control ON/OFF switch is turned ON, is the cruise control indicator lamp illuminated?**

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 9: When The Cruise Control Switch is Operated, The System is not Turned ON.

OPERATION

This circuit judges the signals of each switches (cruise control ON/OFF, CANCEL, SET – and RES +) of the cruise control switches. The engine control module detects the state of the cruise control switches by sensing the voltages shown below.

- When all switches are released: 4.7 – 5.0 volts

- When the cruise control ON/OFF switch is pressed: 0.9 – 1.7 volt
- When the CANCEL switch is pressed: 1.9 – 2.7 volts
- When the SET – switch is pressed: 2.9 – 3.6 volts
- When the RES + switch is pressed: 3.8 – 4.5 volts

COMMENTS ON TROUBLE SYMPTOM

The scan tool MB991958 can also be used to check if the circuits of each input switches are normal or not by checking the data list.

NOTE: Press the cruise control switches one by one securely. Otherwise, the cruise control system may not be started.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the cruise control switches.
- Malfunction of the clock spring.
- Malfunction of the engine control module.

DIAGNOSIS

STEP 1. Check the MFI system diagnostic trouble code.

Using scan tool MB991958, perform MFI system diagnostic trouble code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function [P.13A-10](#)).

Q: Is any diagnostic trouble code set?

YES : Repair the MFI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnostic Trouble Code [P.13A-47](#)).

NO : Go to Step 2.

STEP 2. Check the data list.

Using scan tool MB991958, check the data list (Refer to data list reference table [P.17-43](#)).

- Item 75: CANCEL switch
- Item 86: Cruise control ON/OFF switch
- Item 91: RES + switch
- Item 92: SET – switch

Q: Is the check result normal?

YES : Go to Step 4.

NO : Go to Step 3.

STEP 3. Check the cruise control switches.

Refer to [P.17-47](#).

Q: Is the check result normal?

YES : Go to Step 4.

NO : Replace the cruise control switches (Refer to [P.17-48](#)).

STEP 4. Check the symptom.**Q: Is the system turned on by operating the cruise control switch?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the engine control module (Refer to GROUP 13A – Engine Control Module [P.13A-656](#)).

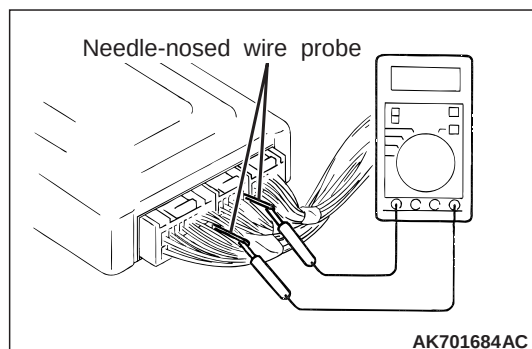
DATA LIST REFERENCE TABLE

M1172002402370

⚠ CAUTION

- Road test always needs two people: one driver and one observer.
- When shifting the selector lever to "D" position the brakes should be applied so that the vehicle does not move forward.

Item No.	Check item	Check condition		Normal condition
04	Vehicle speed signal	Road test the vehicle.		The speedometer and scan tool MB991958 (M.U.T.-III sub assembly) display the same value.
57	Cancel code	Ignition switch: "ON"		The cancel code, which set when the cruise control system was cancelled at the last time, is set again.
74	Stop lamp switch (for stop lamp circuit)	Ignition switch: "ON"	Brake pedal: Depressed	ON
			Brake pedal: Released	OFF
75	Cruise control switches (CANCEL switch)	Ignition switch: "ON"	CANCEL switch: Pressed	ON
			CANCEL switch: Released	OFF
78	Clutch switch <M/T>	Ignition switch: "ON"	Clutch pedal: Depressed	ON
			Clutch pedal: Released	OFF
81	Cruise control operation	Cruise control: active		ON
		Cruise control: Inactive		OFF
86	Cruise control switches (Cruise control ON/OFF switch)	Ignition switch: "ON"	Cruise control ON/OFF switch: Pressed	ON
			Cruise control ON/OFF switch: Released	OFF
88	Inhibitor switch <CVT>	Ignition switch: "ON"	Selector lever: "N" or "P" position	ON
			Selector lever: Other than "N" or "P" position	OFF
89	Brake switch (for cruise control circuit)	Ignition switch: "ON"	Brake pedal: Depressed	ON
			Brake pedal: Released	OFF
91	Cruise control switches (RES + switch)	Ignition switch: "ON"	RES + switch: Pressed	ON
			RES + switch: Released	OFF
92	Cruise control switches (SET – switch)	Ignition switch: "ON"	SET – switch: Pressed	ON
			SET – switch: Released	OFF



CHECK AT THE ENGINE CONTROL MODULE TERMINAL

M1172002702133

1. Connect a needle-nosed wire probe to a voltmeter probe.
2. Insert the needle-nosed wire probe into each of the engine control module connector terminals from the wire side, and measure the voltage while referring to the check chart.

NOTE:

1. Make the voltage measurement with the engine control module connector connected.
2. You may find it convenient to pull out the engine control module to make it easier to reach the connector terminals.
3. The checks can be carried out off the order given in the chart.

⚠ CAUTION

Short-circuiting the positive (+) probe between a connector terminal and ground could damage the vehicle wiring, the sensor, engine control module or all of them. Be careful to prevent this!

3. If voltmeter shows any division from standard value, check the corresponding sensor, actuator and related electrical wiring, then repair or replace.
4. After repair or replacement, recheck with the voltmeter to confirm that the repair has corrected the problem.

Engine control module Connector

1	2	3	4		5	6	7	8	41	42	43		44	45	46	71	72	73	74		75	76	77	101	102	103	104		105	106	107																			
9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	47	48	49	50	51	52	53	54	55	56	57	78	79	80	81	82	83	84	85	86	87	88	89	108	109	110	111	112	113	114	115	116	117	118	119	120
24	25	26	27	28	29	30	31	32	33	34	35	58	59	60	61	62	63	64	65	66	90	91	92	93	94	95	96	97	98	121	122	123	124	125	126	127	128	129	130											

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Terminal No.	Check item	Check condition		Normal condition
94	Cruise control switches power supply	Ignition switch: "ON"	All switches: Released.	4.7 – 5.0 V
			Cruise control ON/OFF switch: Pressed.	0.9 – 1.7 V
			CANCEL switch: Pressed.	1.9 – 2.7 V
			SET – switch: Pressed.	2.9 – 3.6 V
			RES + switch: Pressed.	3.8 – 4.5 V
121	Stop lamp switch (brake switch)	Ignition switch: "ON"	Depress the brake pedal.	System voltage
			Release the brake pedal.	1V or less
128	Clutch switch <M/T>	Ignition switch: "ON"	Release the clutch pedal.	10 V or more
			Depress the clutch pedal.	1 V or less

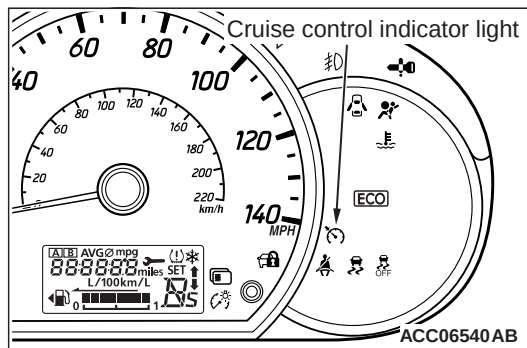
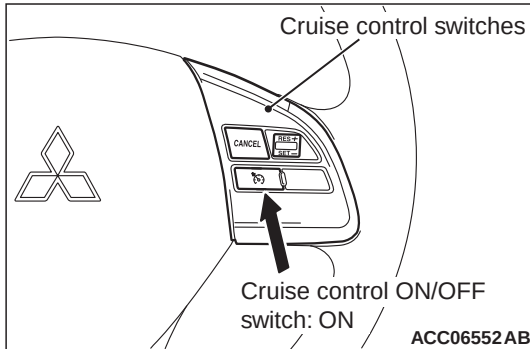
ON-VEHICLE SERVICE

CRUISE CONTROL SWITCH CHECK

M1172001201596

CRUISE CONTROL ON/OFF SWITCH CHECK

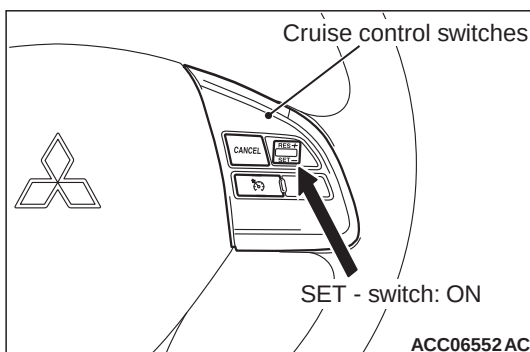
1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch of the cruise control switches, and check that the cruise control indicator light within the combination meter illuminates.
3. Push the cruise control ON/OFF switch again, and check that the cruise control indicator light within the combination meter.



CRUISE CONTROL SETTING

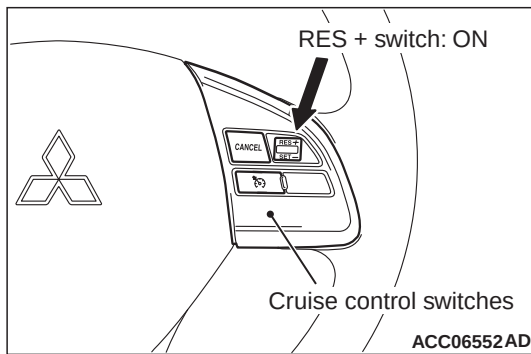
1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch (cruise control system: ON, cruise control indicator light: illuminated).
3. Drive at the desired speed within the range of approximately 40 km/h (25 mph) or more.
4. Push the SET – switch.
5. Check to be sure that when the SET – switch is released the speed is the desired constant speed.

NOTE: If the vehicle speed decreases to approximately 15 km/h (10 mph) below the set speed because of climbing a hill for example, it is normal for the cruise control to be cancelled. When the vehicle speed is decelerated to the low speed limit (approximately 40 km/h) or less, the constant speed driving will be cancelled even if the vehicle speed is not decelerated 15 km/h (10 mph) or more from the set speed.



SPEED-INCREASE SETTING

1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch (cruise control system: ON, cruise control indicator light: illuminated).



3. Set to the desired speed within the range of approximately 40 km/h (25 mph) or more.
4. Push the RES + switch.
5. Check to be sure that acceleration continues while the RES + switch is pushed, and that the speed at the time it was released becomes the constant driving speed.

NOTE: Acceleration can be continued even if the vehicle speed has passed the high speed limit. But the constant driving speed when the RES + switch is released will be recorded as the high speed limit.

SPEED-REDUCTION SETTING

1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch (cruise control system: ON, cruise control indicator light: illuminated).
3. Set to the desired speed within the range of approximately 40 km/h (25 mph) or more.
4. Push the SET – switch.
5. Check to be sure that deceleration continues while the SET – switch is pushed, and that the speed at the time it was released becomes the constant driving speed.

RETURN TO THE SET SPEED BEFORE CANCELLATION AND CRUISE CONTROL CANCELLATION

1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch (cruise control system: ON, cruise control indicator light: illuminated).
3. Set to the desired speed within the range of approximately 40 km/h (25 mph) or more.
4. When any of the following operations are performed while at constant speed during cruise control, check if normal driving is resumed and deceleration occurs.

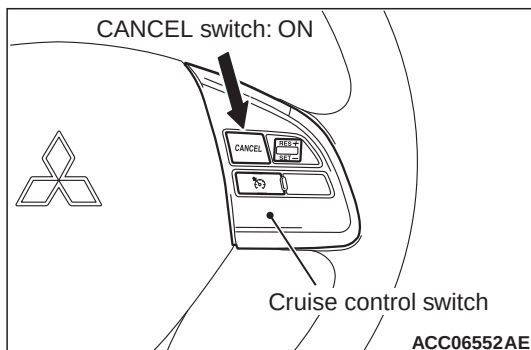
NOTE: The accelerator pedal must NOT be depressed.

(1) The CANCEL switch is pushed.

(2) The brake pedal is depressed.

5. At a vehicle speed of the low speed limit (approximately 40 km/h) or higher, check if when the RES + switch is pushed, the vehicle speed returns to the speed before cruise control driving was cancelled, and constant speed driving occurs.
6. When the cruise control ON/OFF switch is pushed again (cruise control system: OFF) while driving at constant speed, check if normal driving is resumed and deceleration occurs.

NOTE: The accelerator pedal must NOT be depressed.

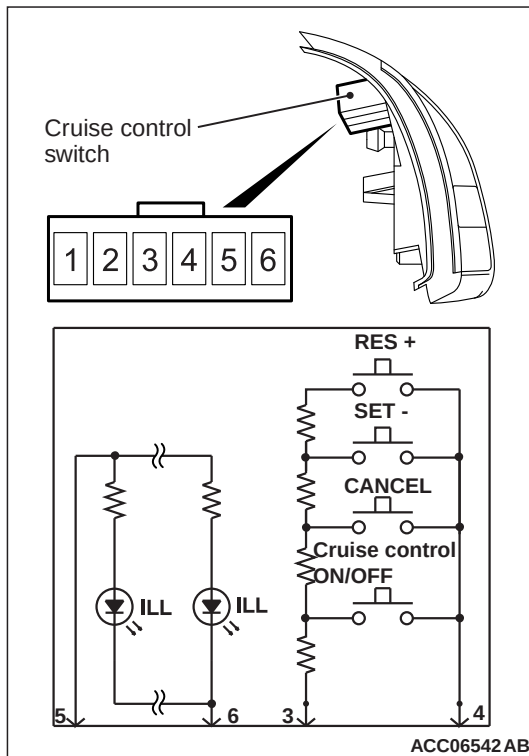


**CRUISE CONTROL SYSTEM COMPONENT
CHECK**

M1172001702011

CRUISE CONTROL SWITCH CHECK

1. Remove the cruise control switch (Refer to [P.17-48](#)).
2. Measure the resistance between terminal No.3 and terminal No.4 when each of the cruise control ON/OFF, CANCEL, SET - and RES + switches is pressed. If the values measured at the time each switch is pressed correspond to those in the table below, the resistance values are correct.



Terminal connector of tester	Switch position	Specified condition
3 - 4	All switches are released.	Open circuit
	Cruise control ON/OFF switch is pressed	176 - 180 Ω
	CANCEL switch is pressed	460 - 470 Ω
	SET - switch is pressed	1030 - 1051 Ω
	RES + switch is pressed	2725 - 2837 Ω

3. Check that illumination of the cruise control switch turns on when the battery positive terminal is connected to cruise control switch connector terminal No.5, and the battery negative terminal is connected to cruise control switch connector terminal No.6.

STOP LIGHT SWITCH CHECK

Refer to GROUP 35A – Brake Pedal, Inspection, Stop Light Switch Check [P.35A-26](#).

CLUTCH INTERLOCK SWITCH CHECK <M/T>

Refer to GROUP 21A – On-vehicle Service, Clutch Interlock Switch Continuity Check [P.21A-3](#).

**TRANSMISSION RANGE SWITCH ("N" POSITION)
CHECK <CVT>**

Refer to GROUP 23A – On-vehicle Service, Essential Service, Transmission Range Switch Continuity Check [P.23A-123](#).

THROTTLE VALVE CONTROL SERVO CHECK

Refer to GROUP 13A – On-vehicle Service, Throttle Valve Control Servo Check [P.13A-648](#).

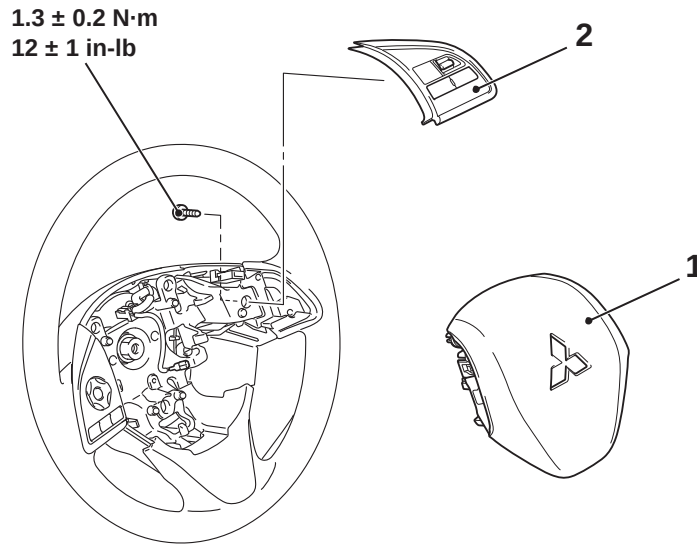
CRUISE CONTROL SWITCH

REMOVAL AND INSTALLATION

M1172007601086

⚠ CAUTION

Before removing the driver's air bag module assembly, refer to GROUP 52B – Service Precautions [P.52B-5](#) and Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-232](#).



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Removal steps

1. Driver's air bag module (Refer to GROUP 52B –Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-232](#)).
2. Cruise control switch

EMISSION CONTROL

GENERAL INFORMATION

M1173000102150

The emission control system consists of the following subsystems:

- Positive crankcase ventilation (PCV) system
- Evaporative emission system
- Exhaust emission control system

SERVICE SPECIFICATIONS

M1173000301645

Item	Standard value
Emission control system	
Evaporative emission purge solenoid coil resistance [at 20°C (68°F)] Ω	30 – 34
Evaporative emission ventilation solenoid coil resistance [at 20°C (68°F)] Ω	55 – 63
Purge flow cm^3/s (SCFH) [at 80 – 95°C (176 – 205°F) with sudden revving]	20 (2.5)

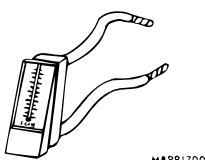
DIAGNOSIS

M1173000700297

SYMPTOM	PROBABLE CAUSE	REMEDY
Engine will not start or hard to start	Vacuum hose disconnected or damaged	Repair or replace
	Malfunction of the evaporative emission purge solenoid	Repair or replace
Rough idle or engine stalls	Vacuum hose disconnected or damaged.	Repair or replace
	Malfunction of the PCV valve	Replace
	Malfunction of the purge control system	Check the system; If there is a problem, check its component parts.
Excessive oil consumption	PCV line clogged	Check PCV system

SPECIAL TOOLS

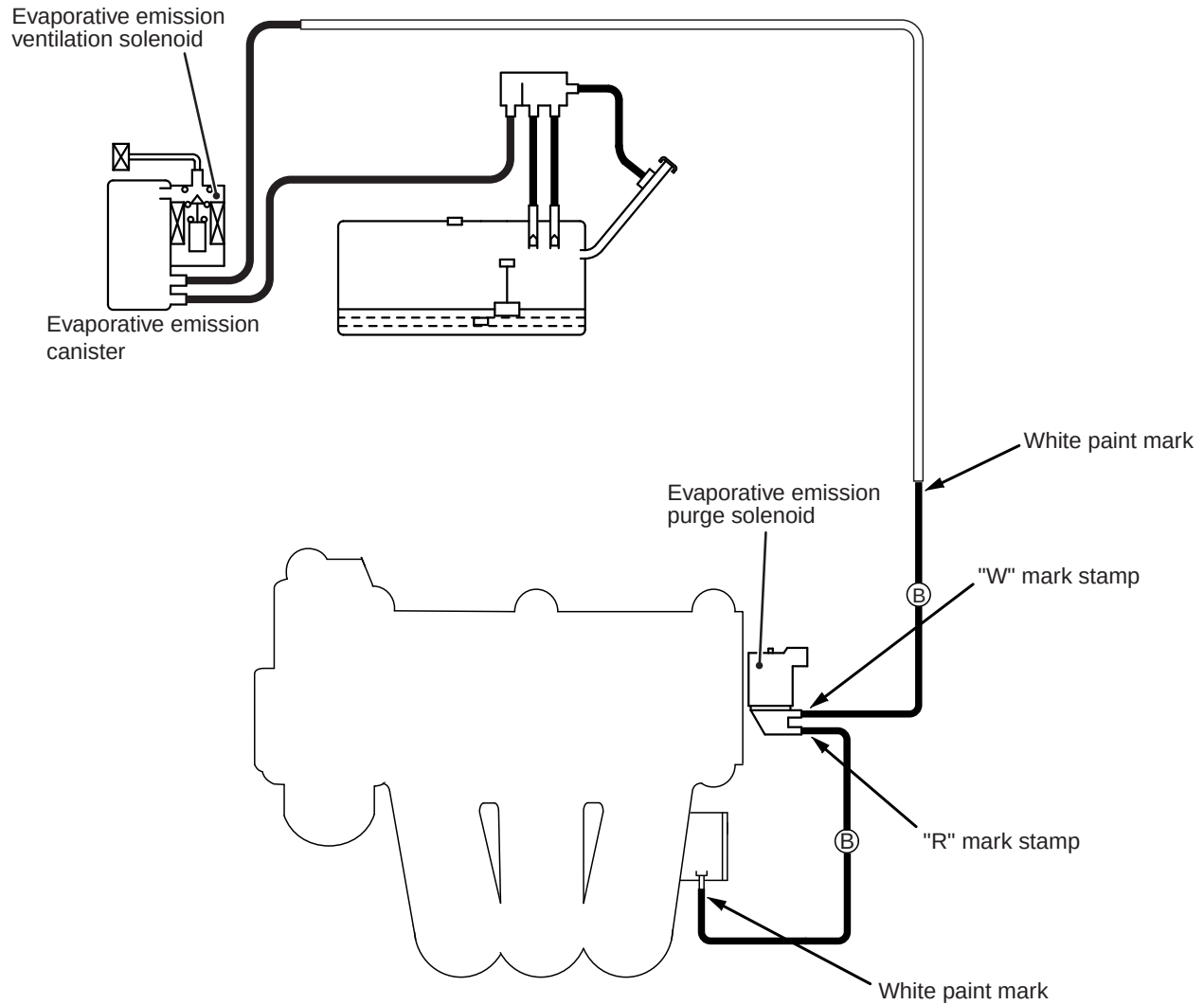
M1173000601141

Tool	Tool number and name	Supersession	Application
 MB995061 Purge flow indicator	MB995061 Purge flow indicator	MLR6890A Part of MIT280220	Inspection of purge control system

VACUUM HOSES

VACUUM HOSE ROUTING

M1173000902338

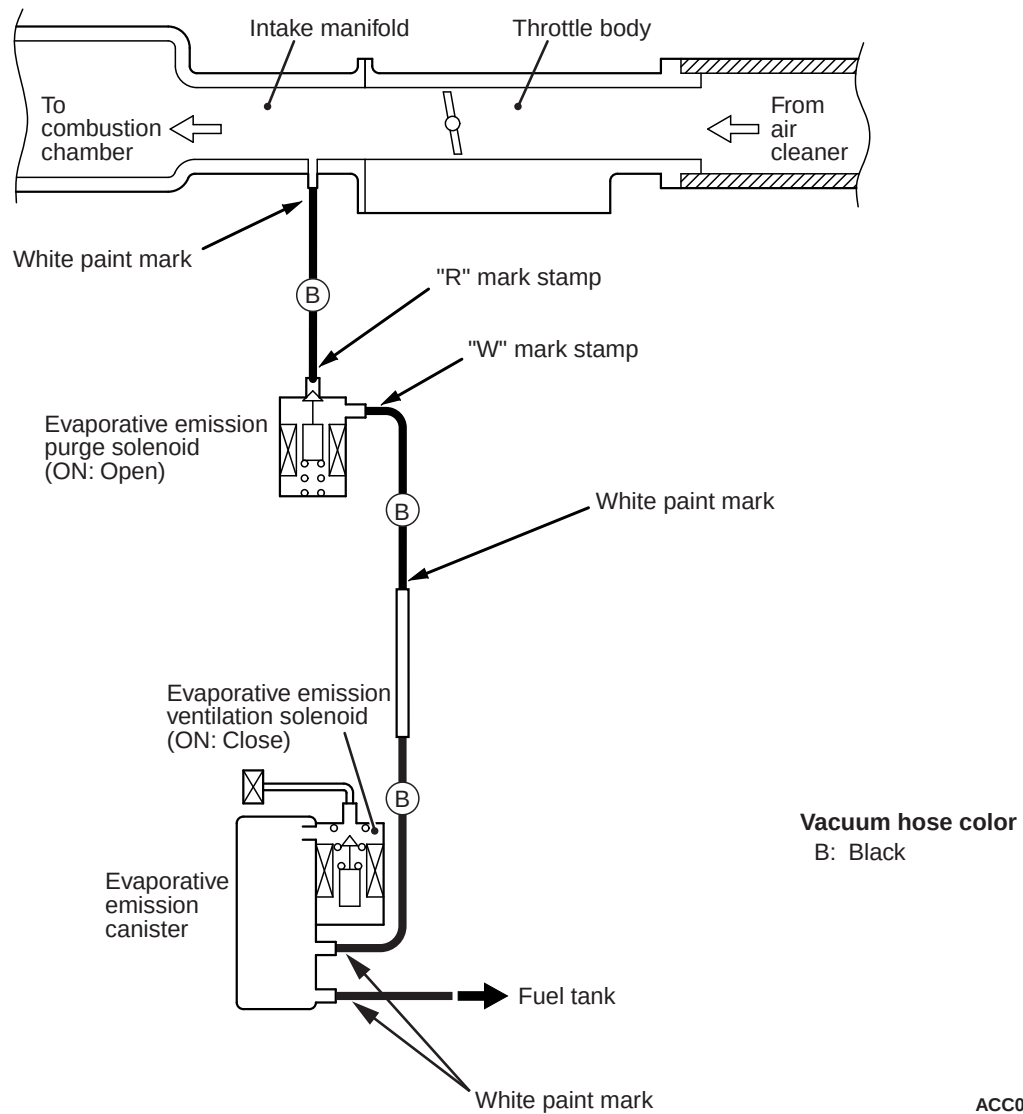
**Vacuum hose color**

B: Black

ACC06834 AB

VACUUM CIRCUIT DIAGRAM

M1173007101664



ACC06842AB

VACUUM HOSE INSTALLATION

M1173007200721

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

VACUUM HOSE CHECK

M1173007301077

1. Using the VACUUM HOSE ROUTING diagram as a guide, check that the vacuum hoses are correctly connected.
2. Check the connection condition of the vacuum hoses which can be removed, loosened, clogged possibly. And then check whether there are no folded and damaged vacuum hoses.

POSITIVE CRANKCASE VENTILATION SYSTEM

GENERAL INFORMATION (POSITIVE CRANKCASE VENTILATION SYSTEM)

M1173005001779

The positive crankcase ventilation (PCV) system prevents the escape of blow-by gases from inside the crankcase into the atmosphere.

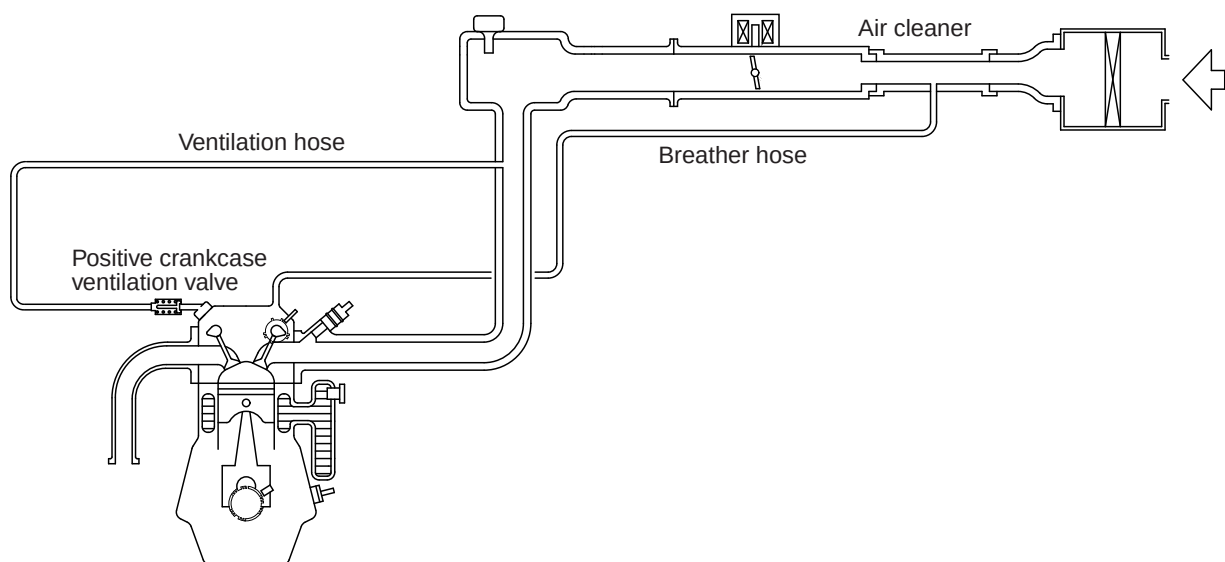
Fresh air is sent from the air cleaner into the crankcase through the breather hose to be mixed with the blow-by gas inside the crankcase.

The blow-by gas inside the crankcase is drawn into the intake manifold through the PCV valve.

The PCV valve is designed to lift the plunger according to the intake manifold vacuum so as to regulate the flow of blow-by gas properly.

In other words, the blow-by gas flow is regulated during low load engine operation to maintain engine stability, while the flow is increased during high load operation to improve the ventilation performance.

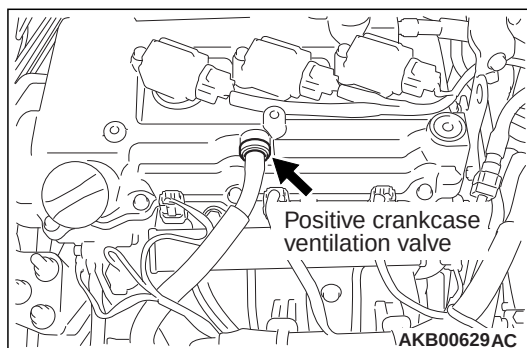
SYSTEM DIAGRAM



AK800192 AC

COMPONENT LOCATION

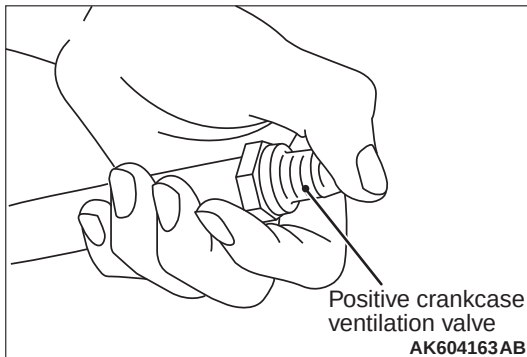
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CRANKCASE VENTILATION SYSTEM CHECK

M1173001101440

1. Remove the ventilation hose from the positive crankcase ventilation (PCV) valve.
2. Remove the PCV valve from the cylinder head cover.
3. Reinstall the PCV valve at the ventilation hose.
4. Start the engine and run at idle.

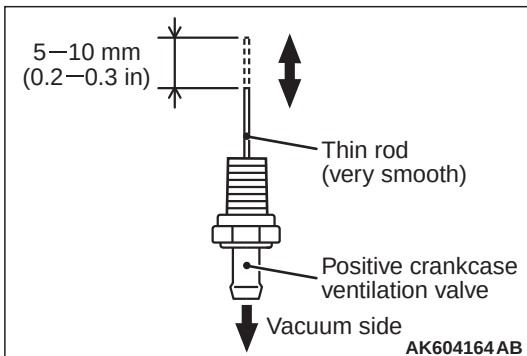


5. Place a finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.
NOTE: At this moment, the plunger in the PCV valve moves back and forth.
6. If vacuum is not felt, clean the PCV valve or replace it.
7. Apply a small amount of new engine oil to the O-ring on the PCV valve, and tighten to the specified torque.

Specified torque: 2.5 ± 0.4 N·m (22 ± 3 in-lb)

POSITIVE CRANKCASE VENTILATION (PCV) VALVE CHECK

M1173001201265



1. Remove the ventilation hose from the positive crankcase ventilation (PCV) valve.
2. Remove the PCV valve from the cylinder head cover.
3. 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.
4. 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.
5. Apply a small amount of new engine oil to the O-ring on the PCV valve, and tighten to the specified torque.

Specified torque: 2.5 ± 0.4 N·m (22 ± 3 in-lb)

EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (EVAPORATIVE EMISSION SYSTEM)

M1173005102092

The evaporative emission (EVAP) system prevents fuel vapors generated in the fuel tank from escaping into the atmosphere.

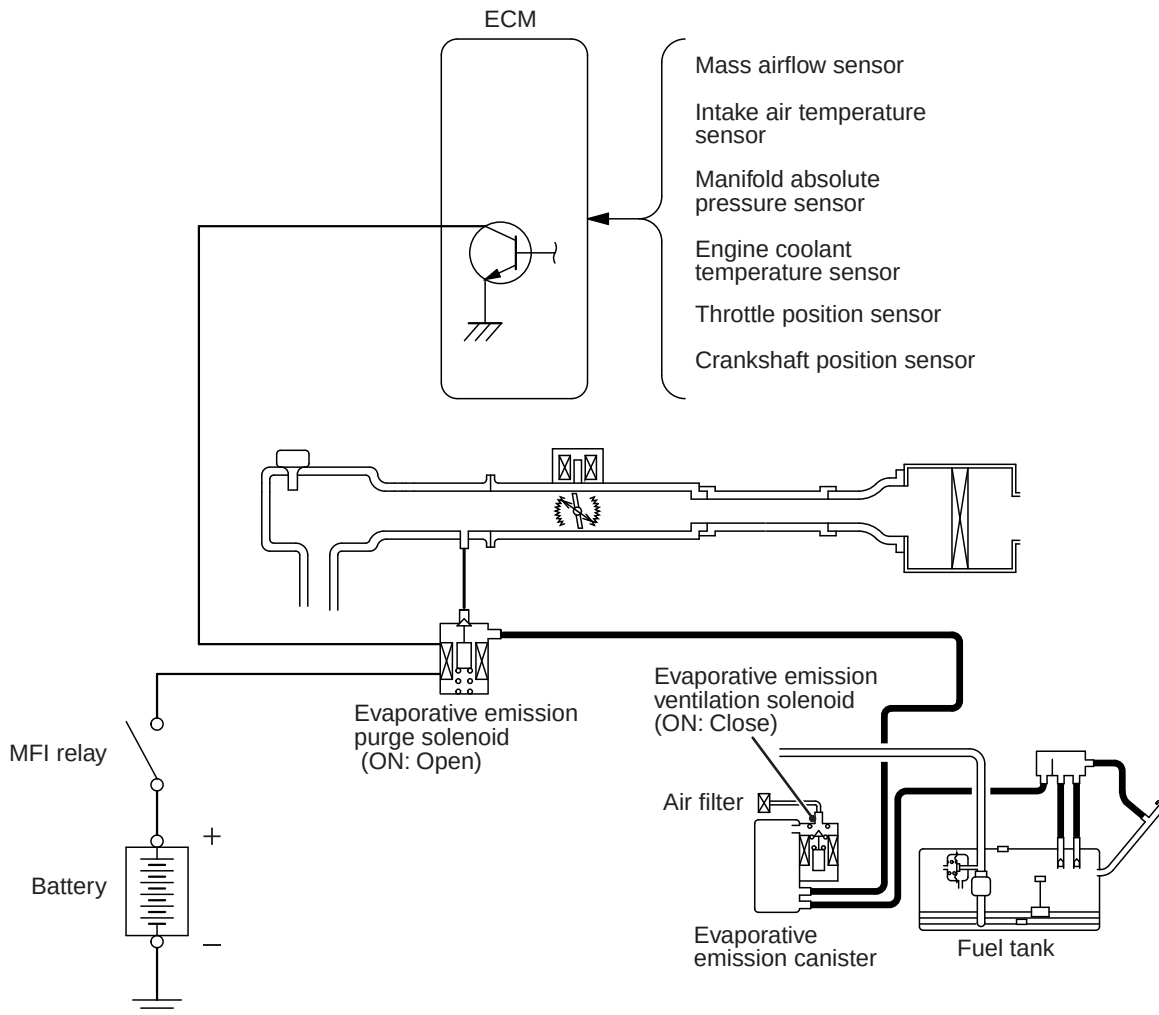
Fuel vapors from the fuel tank flow through the vapor pipe/hose to be stored temporarily in the EVAP canister.

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

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

An EVAP ventilation solenoid is provided between the EVAP canister and atmosphere to monitor for OBD-II EVAP leaks. This solenoid is normally OFF. However, it turns ON when monitoring for 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. When the fuel tank inner pressure increases due to the fuel supply, air is released to the atmosphere from the fuel tank through the EVAP canister and air filter. When the inner pressure of the fuel tank decreases, air is supplied to the fuel tank through the air filter and EVAP canister.

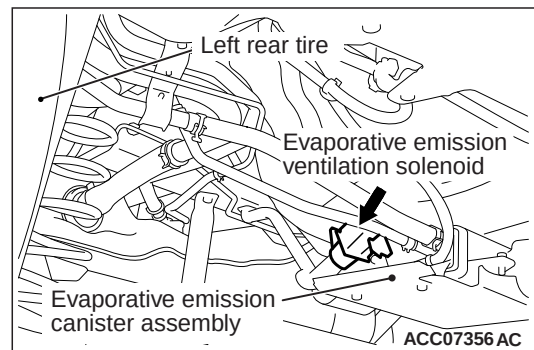
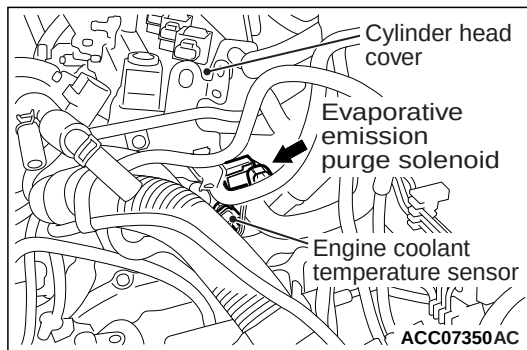
SYSTEM DIAGRAM



ACC06843 AB

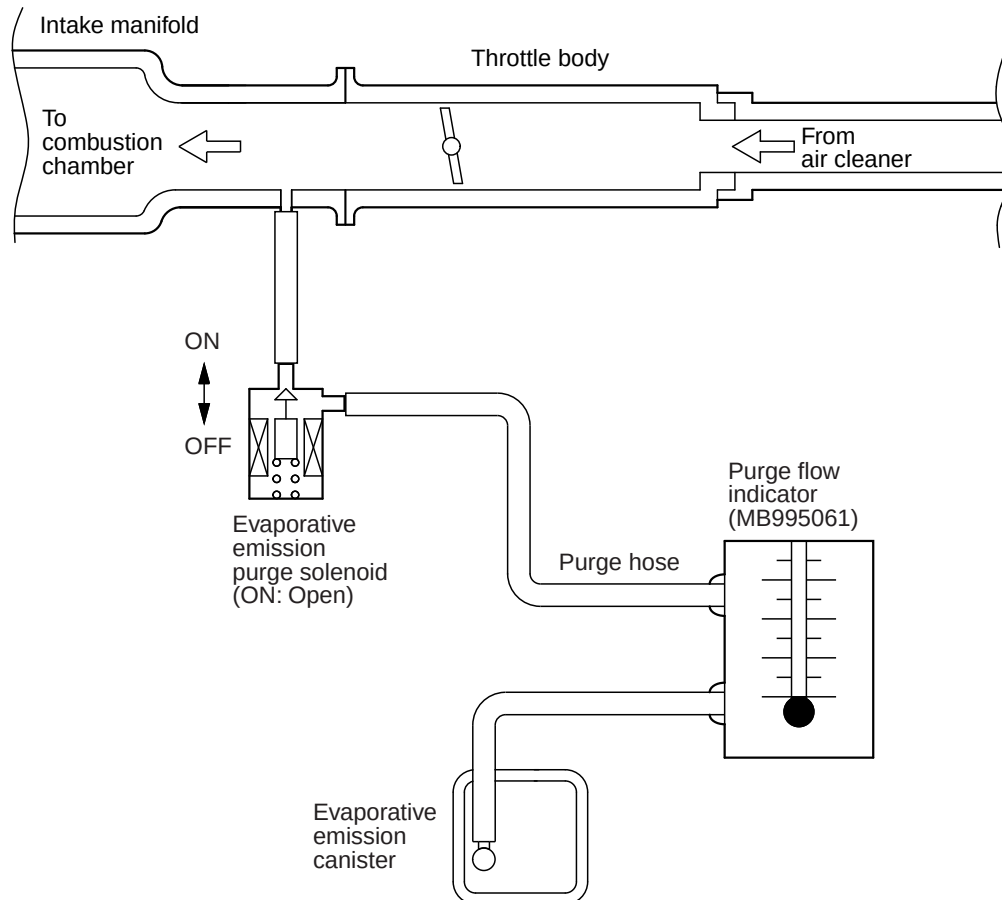
COMPONENT LOCATION

M1173007501208



PURGE CONTROL SYSTEM CHECK (PURGE FLOW CHECK)

M1173001401883



ACC06850 AB

Required Special Tool:

MB995061: Purge Flow Indicator

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

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

3. Run the engine at idle for more than four minutes.
4. Check the purge flow volume when engine is revved suddenly several times.

Standard value: Momentarily 20 cm³/s (2.5 SCFH) or more.

- If the purge flow volume is less than the standard value, check it again with the vacuum hose disconnected from the EVAP canister. If the purge flow volume is less than the standard value, check the vacuum port and the vacuum hose for clogging. Also check the EVAP purge solenoid. If the purge flow volume is at the standard value, replace the EVAP canister.

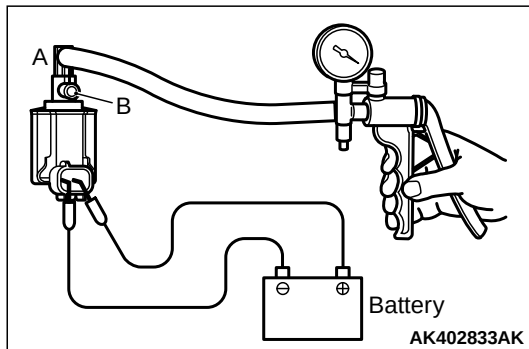
EVAPORATIVE EMISSION PURGE SOLENOID CHECK

M1173001701196

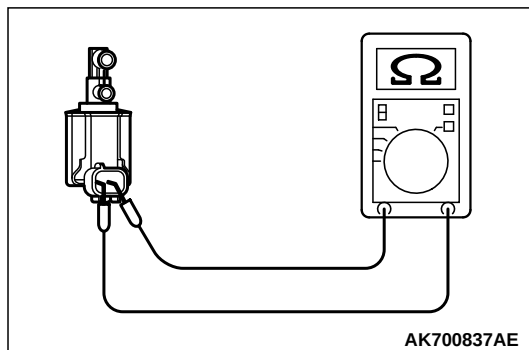
- Disconnect the vacuum hose ("R" mark stamp, "W" mark stamp) from the evaporative emission (EVAP) purge solenoid.

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

- Disconnect the harness connector.
- 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.



Jumper wire	Nipple "B" state	Normal state
Connected	Opened	Negative pressure leaks
	Closed	Negative pressure maintained
Disconnected	Opened	Negative pressure maintained



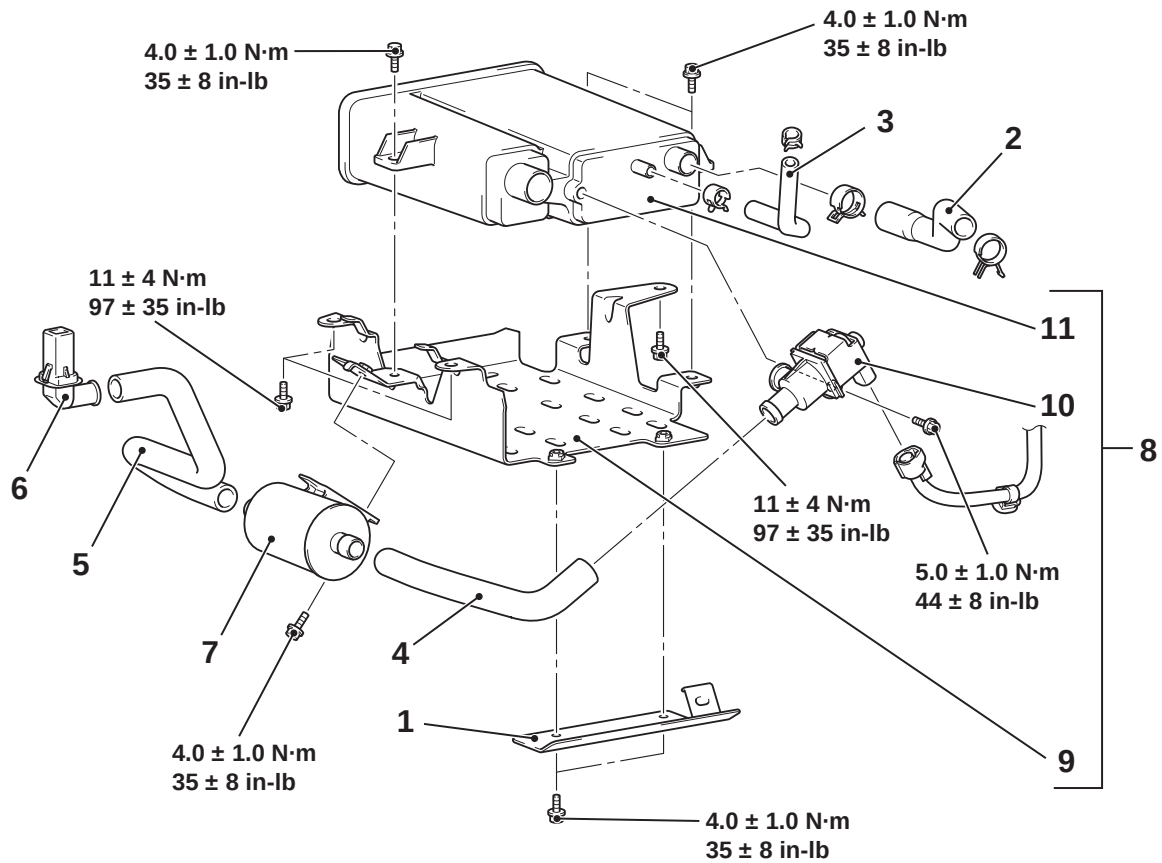
- Measure the resistance between the terminals of the EVAP purge solenoid.

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

- Replace the solenoid if airtightness or resistance is out of specification.

CANISTER REMOVAL AND INSTALLATION

M1173004201695



ACC06647AB

Removal steps

- 1. Canister protector
- >>C<< 2. Fuel vapor hose
- >>C<< 3. Purge hose
- >>B<< 4. Vent hose A
- >>B<< 5. Vent hose B
- 6. Vent pipe
- 7. Air filter

Removal steps (Continued)

- 8. Canister and canister bracket assembly
- 9. Canister bracket
- >>A<< 10. Solenoid valve assembly
- 11. Canister

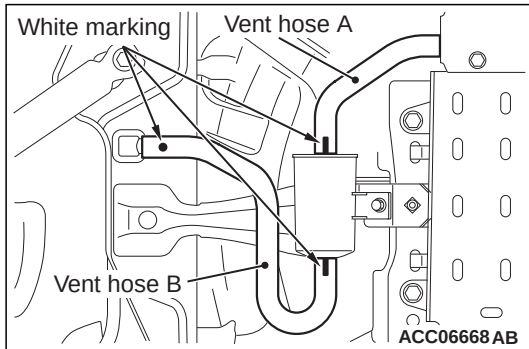
INSTALLATION SERVICE POINTS

>>A<< SOLENOID VALVE ASSEMBLY INSTALLATION

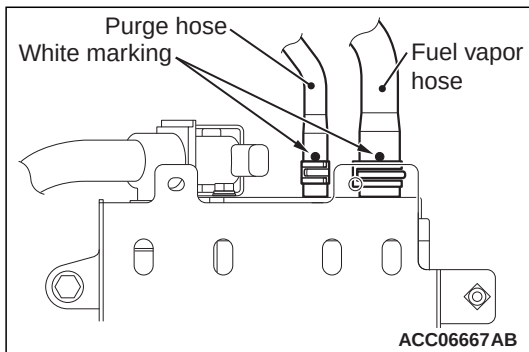
To install the solenoid valve assembly to the canister, be careful not to pinch the O-ring.

**>>B<< VENT HOSE A/VENT HOSE B
INSTALLATION**

Position the white marks on vent hoses A and B as shown.

**>>C<< FUEL VAPOR HOSE/PURGE HOSE
INSTALLATION**

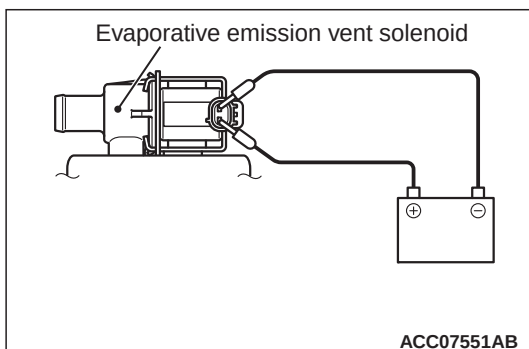
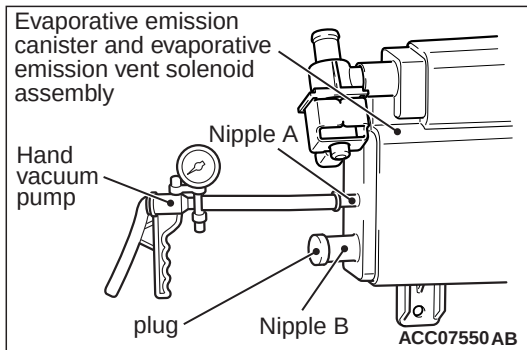
Position the white marks on the fuel vapor hose and the purge hose as shown.

**INSPECTION**

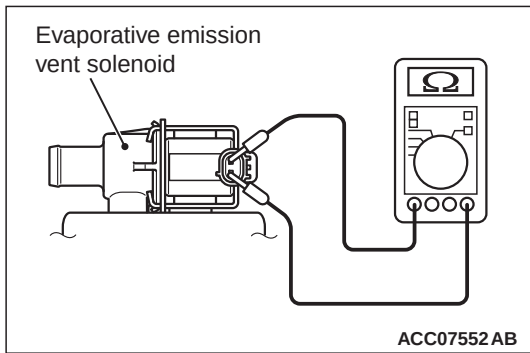
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**EVAPORATIVE EMISSION VENTILATION
SOLENOID CHECK**

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



Battery voltage	Normal condition
Applied	Vacuum maintained
Not applied	Vacuum leaks



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

Standard value: 55 – 63 Ω [at 20°C (68°F)]

CATALYTIC CONVERTER REMOVAL AND INSTALLATION

Refer to GROUP 15 – Exhaust Pipe and Main Muffler

[P.15-10.](#)

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NOTES