GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

ENGINE CONTROL

GENERAL INFORMATION

M1171000101559

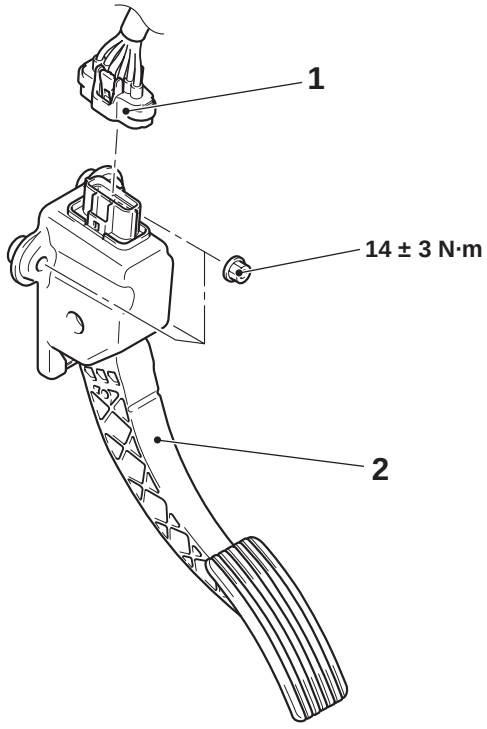
For the accelerator system, an electronic throttle valve control system has been adopted, eliminating of an accelerator cable.

ACCELERATOR PEDAL

REMOVAL AND INSTALLATION

M1171003001391

Pre-removal and post-installation operation
- Bottom Cover Assembly (driver's side) Removal and Installation (Refer to GROUP 52A – Instrument Panel Assembly).



AC703846AD

Removal steps
1. Accelerator pedal position sensor connector connection
2. Accelerator pedal assembly

CRUISE CONTROL

GENERAL INFORMATION

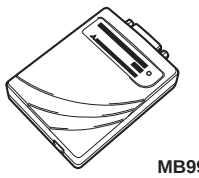
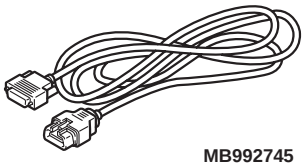
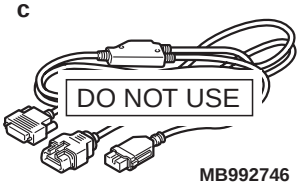
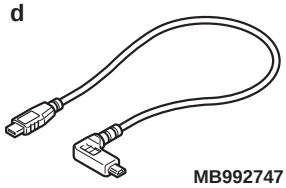
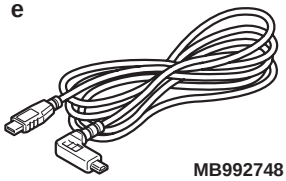
M1172000101789

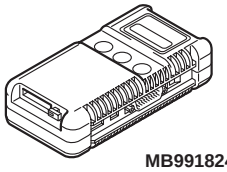
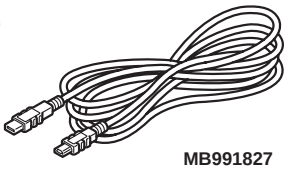
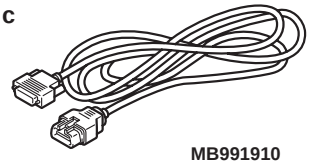
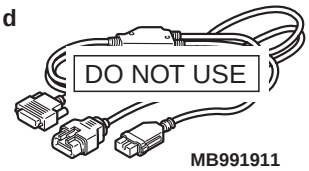
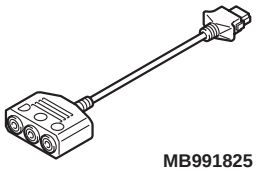
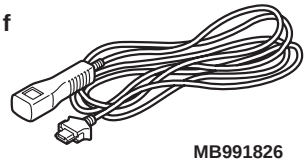
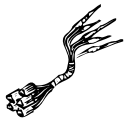
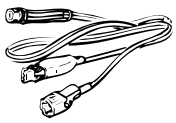
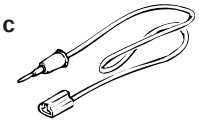
The cruise control system, which provides the constant speed driving without depressing the accelerator pedal at a vehicle speed determined by the driver (within the range from approx. 40 to 200 km/h).

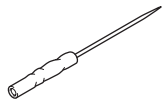
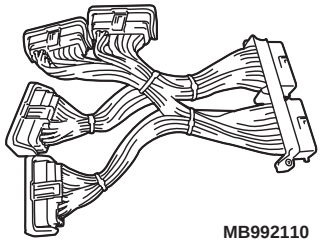
For this cruise control system, in conjunction with the electronic throttle valve control system, the engine-ECU electronically controls the throttle valve.

SPECIAL TOOLS

M1172000601911

Tool	Number	Name	Use
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	Number	Name	Use
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	**⚠ 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	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	Number	Name	Use
 MB992006	MB992006	Extra fine probe	Making voltage and resistance measurement during troubleshooting
 MB992110	MB992110	Power plant ECU check harness	Measuring the terminal voltage at the engine-ECU

TROUBLESHOOTING

DIAGNOSIS TROUBLESHOOTING FLOW

M1172002001238

Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, Contents of Troubleshooting .

DIAGNOSIS FUNCTION

M1172002101428

METHOD OF READING THE DIAGNOSIS CODE

Use the M.U.T.-III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, Diagnosis Function).

NOTE: When reading the diagnosis code, do not select the item under "CRUISE CONTROL," but select the item under "MPI/GDI/DIESEL ENGINE."

METHOD OF ERASING THE DIAGNOSIS CODE

Use the M.U.T.-III to erase the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, Diagnosis Function).

CHECK CHART FOR DIAGNOSIS CODES

M1172002201771

Code No.	Diagnosis item	Reference page
P0504	Malfunction of the stop lamp switch system	P.17-6
P0578	Abnormal voltage at cruise control switch	P.17-8
P1574	Engine-ECU and its related components	P.17-12

DIAGNOSIS CODE PROCEDURES

Code No.P0504: Malfunction of the Stop Lamp Switch System.

OPERATION

- For the stop lamp switch, two switches, a stop lamp switch for the stop lamp illumination and a brake switch exclusively for the cruise control system, are incorporated to improve the reliability.
- As for the stop lamp switch, when the brake pedal is depressed/released, the stop lamp switch ON/OFF signal is transmitted from the ETACS-ECU to the engine-ECU via CAN bus line.

- As for the brake switch, the engine-ECU 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-ECU connector terminal BRK changes. According to this change, the engine-ECU judges the state of the brake switch.

DIAGNOSIS CODE SET CONDITIONS

Check Condition

- The cruise control indicator lamp illuminates <standard meter> or the cruise control display screen is displayed <high contrast meter>.

Judgement Criteria

- Open/short in stop lamp switch circuit.
- Open circuit in the brake switch circuit (between engine-ECU connector terminal BRK and earth).
- Malfunction of CAN bus line.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the fuse No.14.
- Malfunction of the stop lamp switch.
- Malfunction of the ETACS-ECU.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 12.

STEP 2. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).

- Item 74: Stop lamp switch

Q: Is the check result normal?
YES : Go to Step 6.
NO : Go to Step 3.

STEP 3. Check the stop lamp operation.
Check the stop lamp operation.

OK:
Brake pedal depressed: Stop lamp will illuminate
Brake pedal not depressed: Stop lamp does not illuminate

Q: Is the check result normal?
YES : Go to Step 4.
NO : Check the stop lamp system (Refer to GROUP 54A – Rear Combination Lamp, Symptom Procedures, Inspection Procedure 2: The stop lamps do not illuminate or go out normally). Then go to Step 12.

STEP 4. Check the ETACS system data list.
Using M.U.T.-III, check the ETACS system data list (Refer to GROUP 54A – ETACS, Troubleshooting, data list reference table).

- Item 290: Stop lamp switch

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS, ETACS-ECU). Then go to Step 12.

STEP 5. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).

- Item 74: Stop lamp switch

Q: Is the check result normal?
YES : Go to Step 6.
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 12.

STEP 6. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).

- Item 89: Brake switch

Q: Is the check result normal?
YES : Go to Step 11.
NO : Go to Step 7.

STEP 7. Connectors check: engine-ECU connector and stop lamp switch connector.

Q: Is the check result normal?

YES : Go to Step 8.
NO : Repair or replace the damaged connector. Then go to Step 12.

STEP 8. Check the harness wire between engine-ECU connector terminal BRK and stop lamp switch connector, and between stop lamp switch connector and earth.
- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair or replace the damaged harness wire. Then go to Step 12.

STEP 9. Check the stop lamp switch.
Refer to GROUP 35A – Brake Pedal, Inspection, Stop Lamp Switch Check .

Q: Is the check result normal?
YES : Go to Step 10.
NO : Replace the stop lamp switch (Refer to GROUP 35A – Brake Pedal). Then go to Step 12.

STEP 10. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 89: Brake switch

Q: Is the check result normal?
YES : Go to Step 11.
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 12.

STEP 11. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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 <standard meter> or the cruise control display screen <high contrast meter> is turned on).
(4) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No.22 set?
YES : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 12.
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).

STEP 12. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 74: Stop lamp switch
- Item 89: Brake switch

Q: Is the check result normal?
YES : Go to Step 13.
NO : Return to Step 2.

STEP 13. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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 <standard meter> or the cruise control display screen <high contrast meter> is turned on).
(4) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No. P0504 set?
YES : Return to Step 1.
NO : The procedure is complete.

Code No.P0578: Abnormal voltage at cruise control switch.

OPERATION

This circuit judges the signals of each switch (cruise control ON/OFF, CANCEL, SET – and RES +) of the cruise control switch. The engine-ECU 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 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

DIAGNOSIS CODE SET CONDITIONS

- If the cruise control switch is operated, this diagnosis code will be set when the engine-ECU 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-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the data list.

Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).

- 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 25.
NO : Go to Step 2.

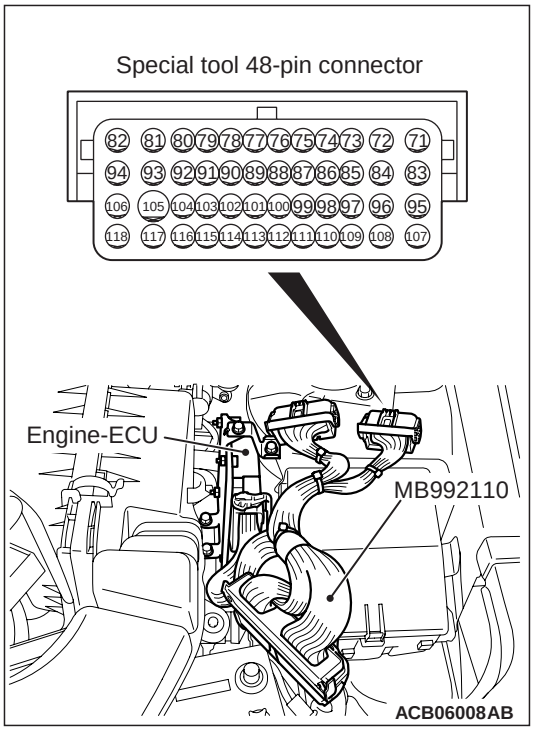
STEP 2. Measure the terminal voltage at cruise control switch connector.

(1) Remove the cruise control switch from the steering wheel with the cruise control switch connector connected (Refer to P.17-24).
(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-ECU CNTS line and earth with cruise control switch connector connected.

OK: 4.7 – 5.0 V

Q: Is the check result normal?
YES : Go to Step 14.
NO : Go to Step 3.

STEP 3. Measure the terminal voltage at engine-ECU connector.



(1) Connect special tool power plant ECU check harness (MB992110) between the engine-ECU and the body-side harness connector.
(2) Turn the ignition switch to the "ON" position.
(3) Do not operate the cruise control switch.
(4) Measure the terminal voltage between special tool 48-pin connector terminal No.107 (engine-ECU connector terminal CNTS) and earth.

OK: 4.7 – 5.0 V

Q: Is the check result normal?
YES : Go to Step 10.
NO : Go to Step 4.

STEP 4. Connector check: engine-ECU connector.

Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 5. Check the harness wire for short circuit to earth between engine-ECU connector terminal CNTS and cruise control switch connector.

(1) Disconnect engine-ECU connector and measure at the harness connector side.
(2) Turn the ignition switch to the "LOCK" (OFF) position.
(3) Measure the continuity between engine-ECU connector terminal CNTS and earth.

OK: open circuit

Q: Is the check result normal?
YES : Go to Step 24.
NO : Go to Step 6.

STEP 6. Connectors check: cruise control switch connector and clock spring connectors.

Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 7. Check the harness wire between engine-ECU connector terminal CNTS and clock spring connector, and between clock spring connector terminal and cruise control switch connector.

- Check harness wire for short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair or replace the damaged harness wire. Then go to Step 26.

STEP 8. Check the clock spring.

Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring Inspection .

Q: Is the check result normal?
YES : Go to Step 9.
NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring]. Then go to Step 26.

STEP 9. Check the cruise control switch.

Refer to P.17-23.

Q: Is the check result normal?
YES : Go to Step 13.
NO : Replace the cruise control switch (Refer to P.17-24). Then go to Step 26.

STEP 10. Connectors check: engine-ECU connector, cruise control switch connector and clock spring connectors.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 11. Check the harness wire between engine-ECU connector terminal CNTS and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check harness wire for open circuit and damage.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair or replace the damaged harness wire. Then go to Step 26.

STEP 12. Check the clock spring.

Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring Inspection .

Q: Is the check result normal?
YES : Go to Step 13.
NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring]. Then go to Step 26.

STEP 13. Check the data list.

Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).

- 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 25.
NO : Go to Step 14.

STEP 14. Measure the terminal voltage at cruise control switch connector.

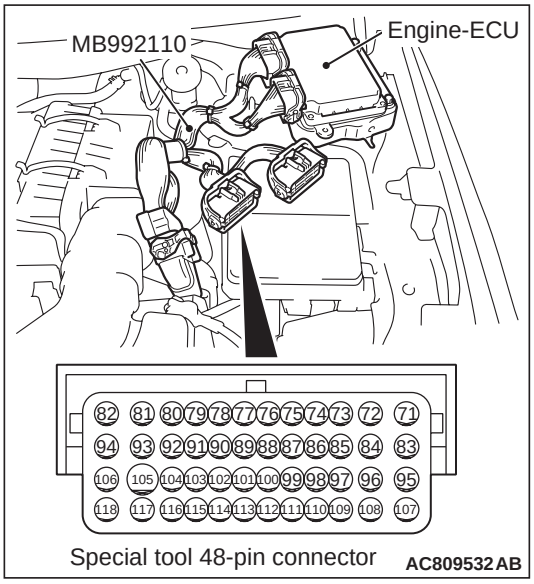
(1) Remove the cruise control switch from the steering wheel with the cruise control switch connector connected (Refer to P.17-24).
(2) Turn the ignition switch to the "ON" position.
(3) Press the cruise control ON/OFF switch with cruise control switch connector connected, and measure the terminal voltage between cruise control switch connector terminal engine-ECU

SW– line and earth.

OK: 0.9 – 1.7 V

Q: Is the check result normal?
YES : Go to Step 20.
NO : Go to Step 15.

STEP 15. Measure the terminal voltage at engine-ECU connector.



(1) Connect special tool power plant ECU check harness (MB992110) between the engine-ECU and the body-side harness connector.
(2) Turn the ignition switch to the "ON" position.
(3) Press the cruise control ON/OFF switch, and measure the terminal voltage between special tool 48-pin connector terminal No.95 (engine-ECU connector terminal SW–) and earth.

OK: 0.9 – 1.7 V

Q: Is the check result normal?
YES : Go to Step 17.
NO : Go to Step 16.

STEP 16. Connector check: engine-ECU connector.

Q: Is the check result normal?
YES : Go to Step 24.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 17. Connectors check: cruise control switch connector and clock spring connectors.

Q: Is the check result normal?
YES : Go to Step 18.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 18. Check the harness wire between engine-ECU connector terminal SW– and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check harness wire for open circuit and damage.

Q: Is the check result normal?
YES : Go to Step 19.
NO : Repair or replace the damaged harness wire. Then go to Step 26.

STEP 19. Check the clock spring.
Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring Inspection .

Q: Is the check result normal?
YES : Go to Step 24.
NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring]. Then go to Step 26.

STEP 20. Connectors check: engine-ECU connector, cruise control switch connector and clock spring connectors.

Q: Is the check result normal?
YES : Go to Step 21.
NO : Repair or replace the damaged connector. Then go to Step 26.

STEP 21. Check the harness wire between engine-ECU connector terminal SW– and clock spring connector, and between clock spring connector and cruise control switch connector.

- Check harness wire for short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 22.
NO : Repair or replace the damaged harness wire. Then go to Step 26.

STEP 22. Check the clock spring.
Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring Inspection .

Q: Is the check result normal?
YES : Go to Step 23.
NO : Replace the clock spring, and install the driver's air bag module [Refer to GROUP 52B – Driver's, Front Passenger's Air Bag Module(s) and Clock Spring]. Then go to Step 26.

STEP 23. Check the cruise control switch.
Refer to P.17-23.

Q: Is the check result normal?
YES : Go to Step 24.
NO : Replace the cruise control switch (Refer to P.17-24). Then go to Step 26.

STEP 24. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- 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 25.
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 26.

STEP 25. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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 <standard meter> or the cruise control display screen <high contrast meter> is turned on).
(4) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No. P0578 set?
YES : Replace the engine-ECU (Refer to GROUP 13D – Engine-ECU). Then go to Step 26.
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).

STEP 26. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- 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 27.
NO : Return to Step 2.

STEP 27. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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).
(4) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No. P0578 set?
YES : Return to Step 1.
NO : The procedure is complete.

CODE NO. P1574: Engine-ECU and its related components

DIAGNOSIS CODE SET CONDITIONS
This diagnosis code is set when there is an failure in the engine-ECU and its related components.

PROBABLE CAUSES
- Malfunction of the MPI system.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the MPI system diagnosis code.
Using M.U.T.-III, perform MPI system diagnosis code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?

YES : Repair the MPI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 3.
NO : Go to Step 2.

STEP 2. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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 <standard meter> or the cruise control display screen <high contrast meter> is turned on).
(4) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No. P1574 set?
YES : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). 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).

STEP 3. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) 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 <standard meter> or the cruise control display screen <high contrast meter> is turned on).
(4) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches, read the diagnosis code of the cruise control system (Refer to P.17-6).

Q: Is diagnosis code No. P1574 set?
YES : Return to Step 1.
NO : This procedure is complete.

CHECK CHART FOR TROUBLE SYMPTOMS

M1172002302180

Trouble symptom		Inspection procedure No.	Reference page
Communication with M.U.T.-III is not possible.	Communication with Engine-ECU is not possible.	–	GROUP 13A – Troubleshooting, Symptom Procedures, Inspection Procedure 1 .
When the brake pedal is depressed, cruise control is not cancelled.		1	P.17-14
When the selector lever is set to "N" position, cruise control is not cancelled.		2	P.17-14
When the CANCEL switch is pressed, cruise control is not cancelled.		3	P.17-15
Cruise control cannot be set (No response SET – switch and RES + switch is pressed).		4	P.17-16
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.		5	P.17-17
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).		6	P.17-18

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 stop lamp switch circuit is suspected.

PROBABLE CAUSES
- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the stop lamp switch.
- Malfunction of the ETACS-ECU.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 4.

STEP 2. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 74: Stop lamp switch
- Item 89: Brake switch

Q: Is the check result normal?
YES : Go to Step 3.
NO : Check the stop lamp switch system (Refer to P.17-6 – Diagnosis Code Procedures, Code No. P0504: Malfunction of the stop lamp 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).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). 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 Selector Lever is Set to "N" Position, Cruise Control is not Cancelled.

OPERATION
When the selector lever is operated, the selector lever position signal from the inhibitor switch is sent to the CVT-ECU. Engine-ECU 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 inhibitor switch circuit is suspected.

PROBABLE CAUSES
- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the inhibitor switch.
- Malfunction of the CVT-ECU.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 5.

STEP 2. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- 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 Diagnosis Code, Code No.P0705: Malfunction of Inhibitor Switch). Then go to Step 5.

STEP 3. Check the CVT system diagnosis code.
Using M.U.T.-III, perform CVT system diagnosis code (Refer to GROUP 23A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Diagnosis Code Chart). 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).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). 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 3: 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 switch.
- Malfunction of the clock spring.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 75: CANCEL switch

Q: Is the check result normal?
YES : Go to Step 2.
NO : Check the cruise control switch system (Refer to P.17-8 – Diagnosis Code Procedures, Code No. P0578: Abnormal voltage at cruise control switch). 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).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). 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 4: 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, MPI system, CAN bus system and CVT system diagnosis codes. The M.U.T.-III 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 MPI system.
- Malfunction of the CVT system.
- Malfunction of the cruise control switch.
- Malfunction of the stop lamp switch.
- Malfunction of the inhibitor switch.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 9.
YES : Repair the cruise control system (Refer to P.17-6 – Diagnosis Code Chart). Then go to Step 9.
NO : Go to Step 5.

STEP 2. Check the MPI system diagnosis code.
Using M.U.T.-III, perform MPI system diagnosis code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the MPI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 9.
NO : Go to Step 3.

STEP 3. Check the CVT system diagnosis code.
Using M.U.T.-III, perform CVT system diagnosis code (Refer to GROUP 23A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 9.
NO : Go to Step 4.

STEP 4. Read the diagnosis code.
(1) Disconnect the negative battery terminal, and erase the diagnosis code of the cruise control system.
(2) Connect the negative battery terminal.
(3) Turn the ignition switch to the "ON" position, and press the ON/OFF switch to turn the cruise control system to ON (turn ON the cruise control indicator lamp).
(4) After turning the cruise control system to ON, when 2 minutes or more has elapsed without operating the cruise control switches.
(5) With the cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnosis code of the cruise control system (Refer to P.17-6.)

Q: Is any diagnosis code set?

STEP 5. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 75: CANCEL switch
- Item 86: N/OFF switch
- Item 91: "RES + switch
- Item 92: SET – switch

Q: Is the check result normal?
YES : Go to Step 6.
NO : Check the cruise control switch system (Refer to P.17-8 – Diagnosis Code Procedures, Code No. P0578: Abnormal voltage at cruise control switch). Then go to Step 9.

STEP 6. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 74: Stop lamp switch
- Item 89: Brake switch

Q: Is the check result normal?
YES : Go to Step 7.
NO : Check the stop lamp switch system (Refer to P.17-6 – Diagnosis Code Procedures, Code No. P0504: Malfunction of the stop lamp switch system). Then go to Step 9.

STEP 7. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 88: Inhibitor switch

Q: Is the check result normal?
YES : Go to Step 8.
NO : Check the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Procedures for Diagnosis Code, Code No.P0705: Malfunction of Inhibitor Switch) . Then go to Step 9.

STEP 8. 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).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 9.

STEP 9. Check the symptom.

Q: Can cruise control be set?
YES : The procedure is complete.
NO : Return to Step 1.

Inspection Procedure 5: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed.

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-ECU.

DIAGNOSIS PROCEDURE
⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 6.

STEP 2. Check the CVT system diagnosis code.
Using M.U.T.-III, perform CVT system diagnosis code (Refer to GROUP 23A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 6.
NO : Go to Step 3.

STEP 3. Check the MPI system diagnosis code.
Using M.U.T.-III, perform MPI system diagnosis code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the MPI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check the data list.
Using M.U.T.-III, check the data list (Refer to data list reference table P.17-19).
- Item 04: Vehicle speed signal

Q: Is the check result normal?
YES : Go to Step 5.
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 6.

STEP 5. Check the symptom.

Q: Does a hunting occur?
YES : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). 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).

STEP 6. Check the symptom.

Q: Does a hunting occur?
YES : Return to Step 1.
NO : The procedure is complete.

Inspection Procedure 6: When the cruise control ON/OFF Switch is Turned ON, the Cruise Control Indicator Lamp does not Illuminate <standard meter> or the cruise control display screen is not displayed <high contrast meter> (However, the Cruise Control System is Normal).

OPERATION
- The engine-ECU detects cruise control ON/OFF switch ON signal to illuminate the cruise control indicator lamp within the combination meter <standard meter> or display the cruise control display screen on the multi information display in the combination meter <high contrast meter>.
- The cruise control indicator lamp ON signal <standard meter> or the cruise control display screen ON signal <high contrast meter> is transmitted from the engine-ECU to the combination meter via CAN bus line.

COMMENTS ON TROUBLE SYMPTOM
- The CAN bus line between the engine-ECU and the ETACS-ECU and between the ETACS-ECU and the combination meter may be defective.
- The combination meter, ETACS-ECU or engine-ECU may also be defective.

PROBABLE CAUSES
- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the combination meter.
- Malfunction of the ETACS-ECU.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE
⚠ CAUTION
- **If there is any problem in the CAN bus lines, an incorrect diagnosis 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 M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III Can Bus Diagnostics).

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). Then go to Step 6.

STEP 2. Check the MPI system diagnosis code.
Using M.U.T.-III, perform MPI system diagnosis code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function).

Q: Is diagnosis code No.U0141 set?
YES : Repair the MPI system (Refer to GROUP 13A – Troubleshooting, Diagnosis Code Procedures, Code No.U0141: ETACS-ECU Time Out). Then go to Step 6.
NO : Go to Step 3.

STEP 3. Check the ETACS system diagnosis code.
Using M.U.T.-III, perform ETACS system diagnosis code (Refer to GROUP 54A – ETACS, Troubleshooting, Diagnosis Function).

Q: Is diagnosis code No.U0155 set?
YES : Repair the ETACS system (Refer to GROUP 54A – Troubleshooting, Diagnosis Code Procedures, Code No.U0155: Combination Meter-ECU CAN Communication Time Out). Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check the combination meter system special function.
Using M.U.T.-III, check the combination meter system special function (Refer to GROUP 54A – Combination Meter, Special Function Table).
- Item 2: LCD (AUTO) <High contrast meter>
- Item 6: Indicator (AUTO) <Standard meter>

Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair the combination meter system (Refer to GROUP 54A – Combination Meter, Trouble Symptom Chart). Then go to Step 6.

STEP 5. Check the symptom.

Q: When the ON/OFF switch is turned ON, is the cruise control indicator lamp illuminated <standard meter> or the cruise control display screen displayed <high contrast meter>?
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).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 6.

STEP 6. Check the symptom.

Q: When the ON/OFF switch is turned ON, is the cruise control indicator lamp illuminated <standard meter> or the cruise control display screen displayed <high contrast meter>?
YES : The procedure is complete.
NO : Return to Step 1.

DATA LIST REFERENCE TABLE

M1172002402165

⚠ 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 M.U.T.-III 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.

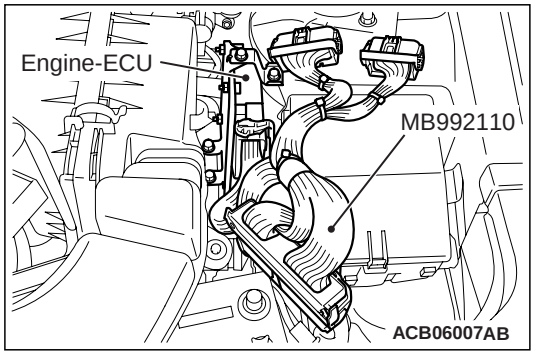
Item No.	Check item	Check condition		Normal condition
74	Stop lamp switch (for stop lamp circuit)	Ignition switch: "ON"	Brake pedal: Depressed	ON
			Brake pedal: Released	OFF
75	Cruise control switch (CANCEL switch)	Ignition switch: "ON"	CANCEL switch: Pressed	ON
			CANCEL switch: Released	OFF
81	Cruise control operation	Cruise control: active		ON
		Cruise control: Inactive		OFF
86	Cruise control switch (cruise control ON/OFF switch)	Ignition switch: "ON"	ON/OFF switch: Pressed	ON
			ON/OFF switch: Pressed again	OFF
88	Inhibitor switch	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 switch (RES + switch)	Ignition switch: "ON"	RES + switch: Pressed	ON
			RES + switch: Released	OFF
92	Cruise control switch (SET − switch)	Ignition switch: "ON"	SET − switch: Pressed	ON
			SET − switch: Released	OFF

CHECK AT ENGINE-ECU TERMINAL

M1172002701969

Use special tool power plant ECU check harness (MB992110), check the engine-ECU terminal voltage.

1. Remove the engine-ECU (Refer to GROUP 13A – Engine-ECU).

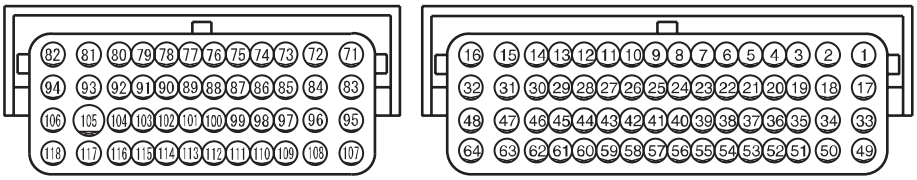


2. Connect special tool MB992110 between the engine-ECU and the body-side harness connector.
3. Measure the terminal voltages between the check connector terminals of special tool MB992110 and earth terminals No.81 or 93.

Special tool - Power plant ECU check harness (MB992110) connector

48-Pin connector
(Engine-ECU 48-pin connector)

64-Pin connector
(Engine-ECU 64-pin connector)



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Terminal No.	Check item	Check condition		Normal condition
107	Cruise control switch 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
108	Stop lamp switch (brake switch)	Ignition switch: "ON"	Depress the brake pedal.	System voltage
			Release the brake pedal.	1V or less

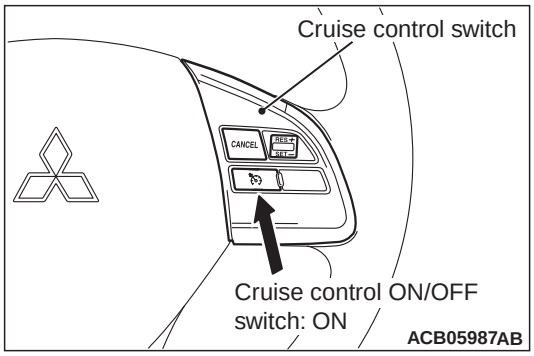
ON-VEHICLE SERVICE

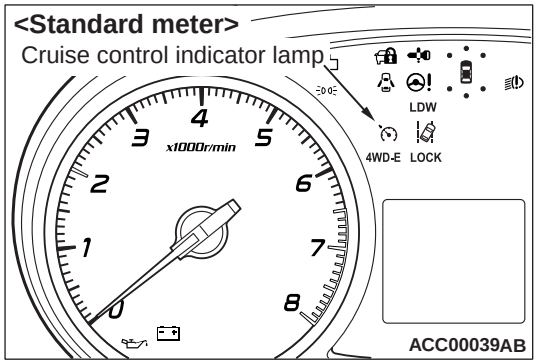
CRUISE CONTROL SWITCH CHECK

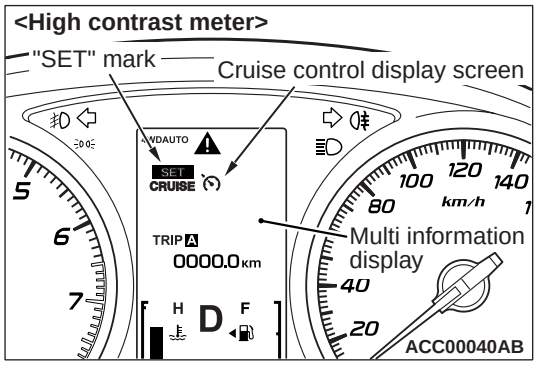
M1172001201477

CRUISE CONTROL ON/OFF SWITCH CHECK

1. Turn the ignition switch to the "ON" position.



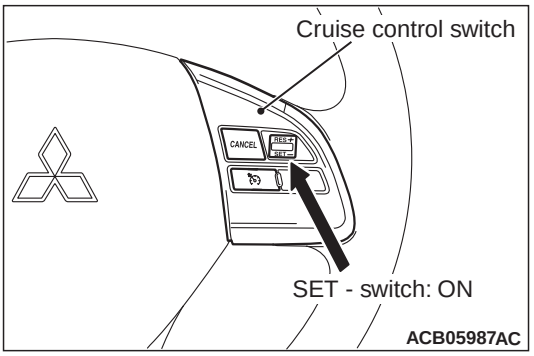




2. Push the cruise control ON/OFF switch of the cruise control switch, and check that the cruise control indicator lamp within the combination meter illuminates <standard meter> or the cruise control display screen is displayed on the multi information display in the combination meter <high contrast meter>.
3. Push the cruise control ON/OFF switch again, and check that the cruise control indicator lamp within the combination meter <standard meter> or the cruise control display screen goes out <high contrast 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 lamp: illuminated).
3. Drive at the desired speed within the range of approximately 40 – 160 km/h.



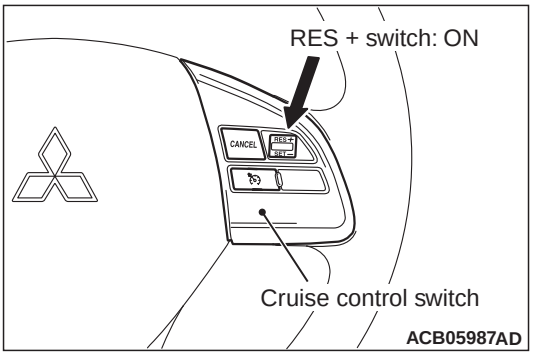
4. Push the SET – switch.
5. Check to be sure that when the SET – switch is released the speed is the desired constant speed.

NOTE: If the vehicle speed decreases to approximately 15 km/h 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 or more from the set speed.

NOTE: On the high contrast meter, when SET – switch is pressed, "SET" will be displayed on the multi information display in the combination meter.

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 lamp: illuminated).
3. Set to the desired speed within the range of approximately 40 – 160 km/h.



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 (approximately 160 km/h). But the constant driving speed when the RES + switch is released will be recorded as the high speed limit (approximately 160 km/h).

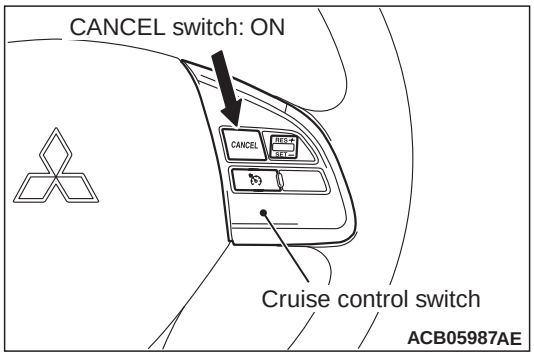
SPEED-REDUCTION SETTING

1. Turn the ignition switch to the "ON" position.
2. Push the cruise control ON/OFF switch (cruise control system: ON, cruise control indicator lamp: illuminated).
3. Set to the desired speed within the range of approximately 40 – 160 km/h.
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.

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

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 lamp: illuminated).
3. Set to the desired speed within the range of approximately 40 – 160 km/h.
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.



   (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 ON/OFF switch is pushed again (cruise control system: OFF) while driving at constant speed, check if normal driving is resumed and deceleration occurs.

CRUISE CONTROL SYSTEM COMPONENT CHECK

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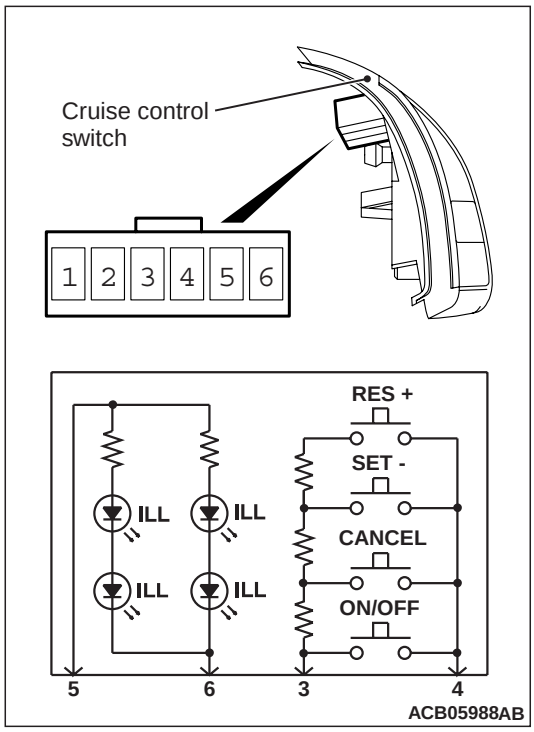
CRUISE CONTROL SWITCH CHECK

1. Remove the cruise control switch (Refer to P.17-24).



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 LAMP SWITCH CHECK

Refer to GROUP 35A – Brake Pedal, Inspection, Stop Lamp Switch Check .

INHIBITOR SWITCH ("N" POSITION) CHECK

Refer to GROUP 23A – On-vehicle Service, Essential Service, Inhibitor Switch Continuity Check .

THROTTLE VALVE CONTROL SERVO CHECK

Refer to GROUP 13A – On-vehicle Service, Throttle Valve Control Servo Check .

CRUISE CONTROL SWITCH

REMOVAL AND INSTALLATION

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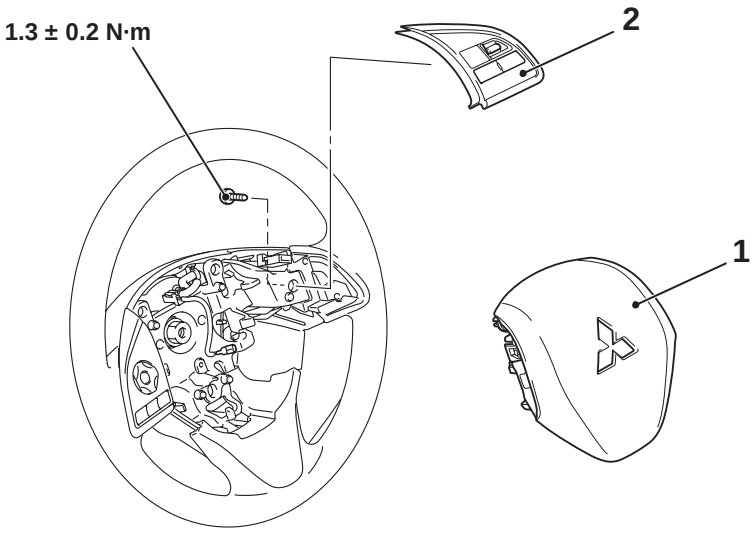
⚠ CAUTION

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



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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).
2. Cruise control switch

EMISSION CONTROL <MPI>

GENERAL INFORMATION

M1173000102105

The emission control system consists of the following subsystems:

- Crankcase emission control system
- Evaporative emission control system
- Emission reduction control system

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system	• Canister • Purge control solenoid valve	Equipped Duty cycle type solenoid valve (Purpose: HC reduction)
Emission reduction control system	Air-fuel ratio control device - MPI system	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

EMISSION CONTROL DEVICE REFERENCE TABLE

M1173006601224

Related parts	Crankcase emission control system	Evaporative emission control system	Air/fuel ratio control system	Catalytic converter
Positive crankcase ventilation valve	×	–	–	–
Purge control solenoid valve	–	×	–	–
MPI system component	–	×	×	–
Catalytic converter	–	–	–	×

SERVICE SPECIFICATION(S)

M1173000301593

Item	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	22 – 26

VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM

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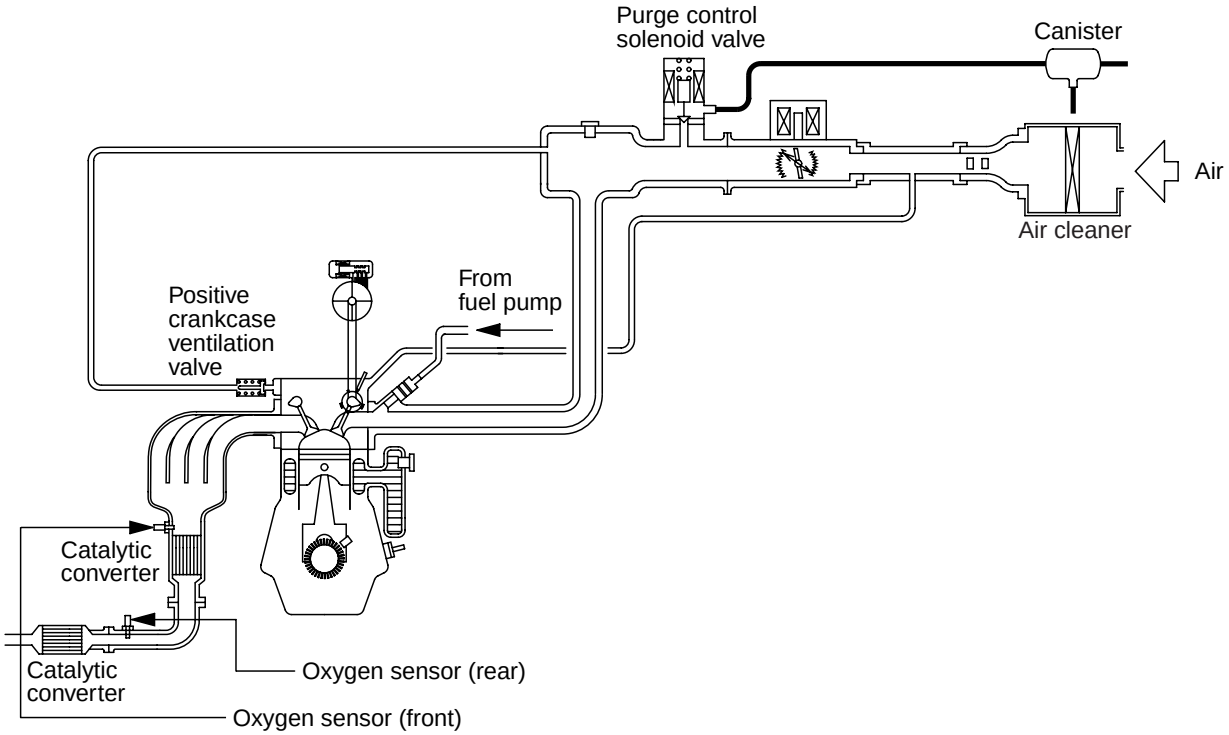

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VACUUM CIRCUIT DIAGRAM

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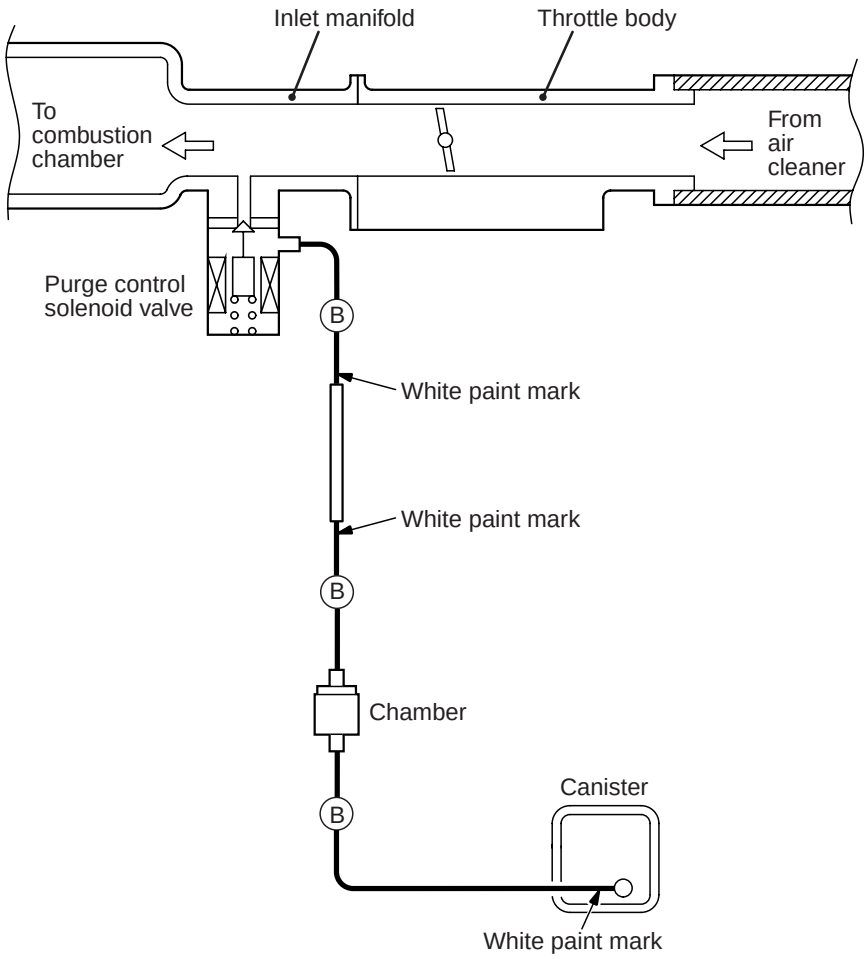

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VACUUM HOSE CHECK

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1. Using the vacuum circuit diagram as a guide, check to be sure 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.

VACUUM HOSE INSTALLATION

M1173007200709

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

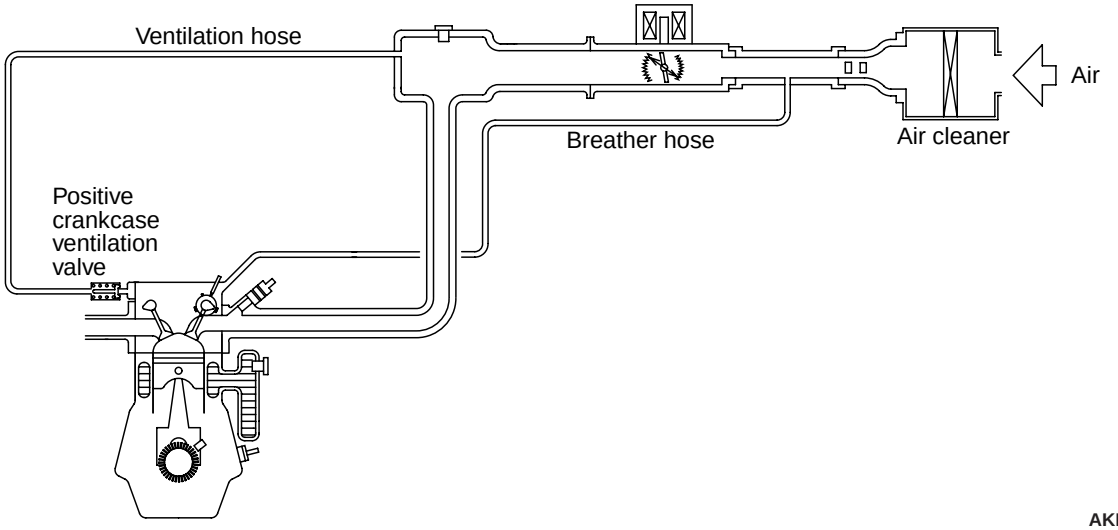
CRANKCASE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (CRANKCASE EMISSION CONTROL SYSTEM)

M1173005001713

The crankcase emission control system prevents blow-by gases from escaping inside the crankcase into the atmosphere.
Fresh air is sent from the air cleaner into the crankcase through the breather hose.
The air becomes mixed with the blow-by gases inside the crankcase.
The blow-by gas inside the crankcase is drawn into the inlet manifold through the positive crankcase ventilation valve.
The positive crankcase ventilation valve lifts the plunger according to the inlet 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



COMPONENT LOCATION (CRANKCASE EMISSION CONTROL SYSTEM)

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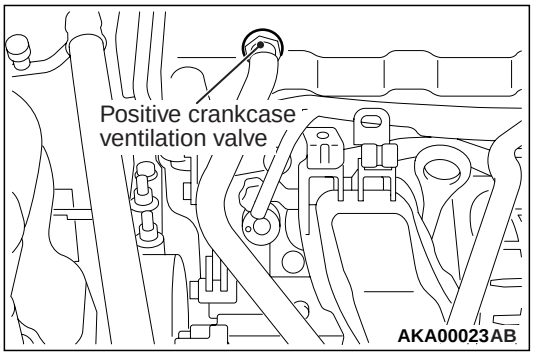

POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

M1173001101398

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

POSITIVE CRANKCASE VENTILATION VALVE CHECK

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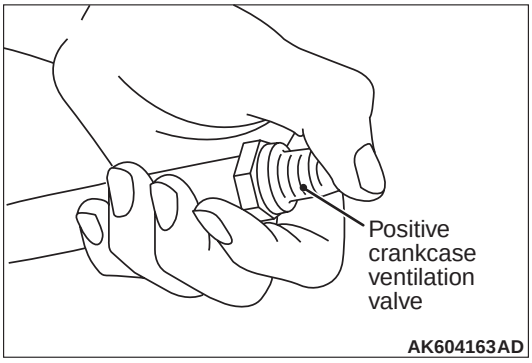
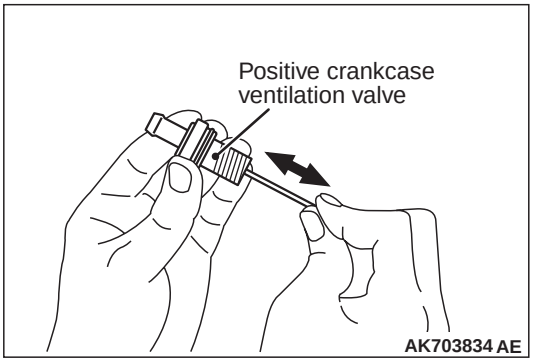


5. Place a finger at the opening of the positive crankcase ventilation valve and check that vacuum of the inlet manifold is felt.

   NOTE: At this moment, the plunger in the positive crankcase ventilation valve moves back and forth.
6. If vacuum is not felt, clean the positive crankcase ventilation valve or replace it.
7. Apply a small amount of new engine oil to the O-ring on the positive crankcase ventilation valve, and tighten to the specified torque.

   Standard value: 2.5 ± 0.4 N·m



1. Insert a thin rod into the positive crankcase ventilation valve from the side shown in the illustration (cylinder head cover installation side), and move the rod back and forth to check that the plunger moves.
2. If the plunger does not move, there is a clogging in the positive crankcase ventilation valve. In this case, clean or replace the positive crankcase ventilation valve.

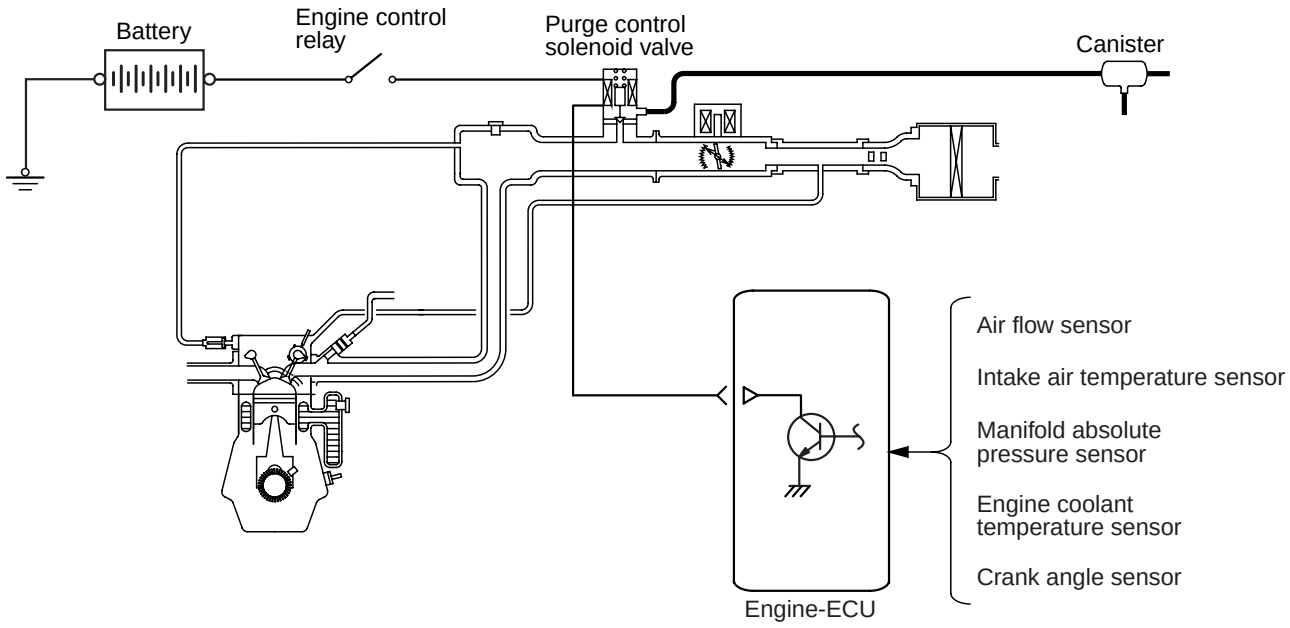
EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (EVAPORATIVE EMISSION CONTROL SYSTEM)

M1173005102047

The evaporative emission control system prevents fuel vapours generated in the fuel tank from escaping into the atmosphere.
Fuel vapours from the fuel tank flow through the vapour pipe/hose to be stored temporarily in the canister.
When driving the vehicle, fuel vapours stored in the canister flow through the purge control solenoid valve and purge port and go into the inlet manifold to be sent 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 unit turns the purge solenoid off to shut off the fuel vapour flow to the inlet manifold.
This does not only insure the driveability when the engine is cold or running under low load but also stabilize the emission level.

SYSTEM DIAGRAM



COMPONENT LOCATION (EVAPORATIVE EMISSION CONTROL SYSTEM)

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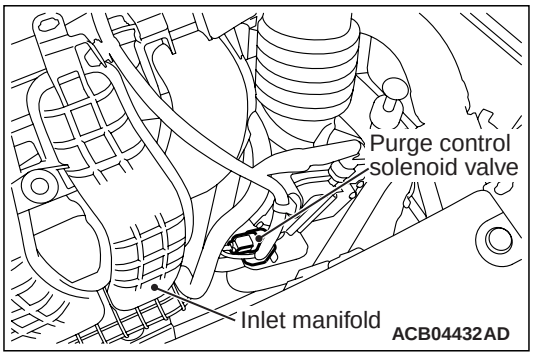

PURGE CONTROL SYSTEM CHECK

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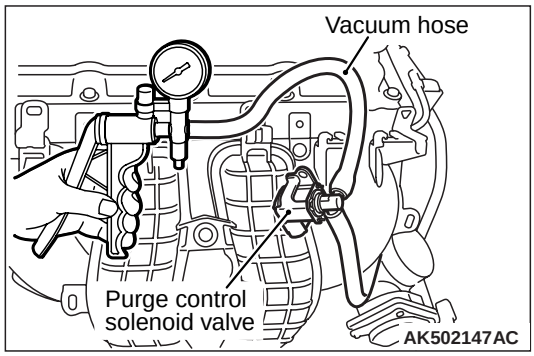

1. Remove the purge control solenoid valve from the inlet manifold, and cover the installation hole with tape and so on.
2. Connect the hand vacuum pump with the removed purge control solenoid valve.
3. When the engine is cold or hot, apply a vacuum of 53 kPa, and check the condition of the vacuum.

When engine is cold
(Engine coolant temperature: 40°C or less)

Engine condition	Normal condition
At idle	Vacuum is maintained.

When engine is hot
(Engine coolant temperature: 80°C or higher)

Engine condition	Normal condition
At idle (after 4 minutes have passed since the engine was started)	Vacuum will leak.

PURGE CONTROL SOLENOID VALVE CHECK

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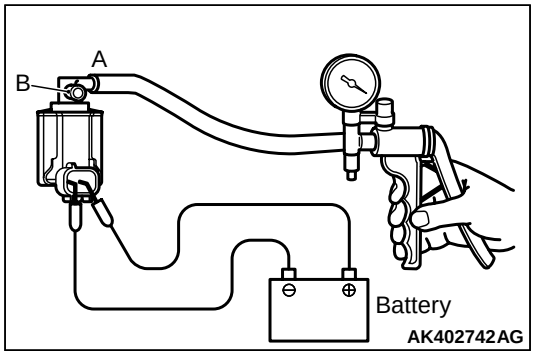
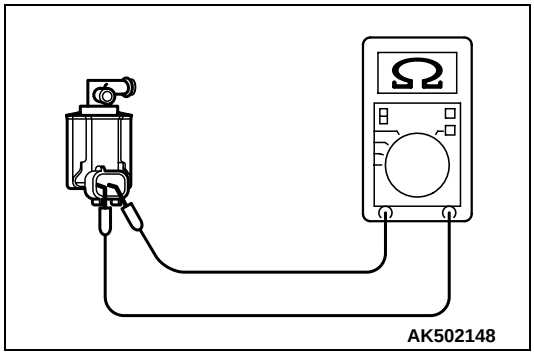
Remove the vacuum hose from the purge control solenoid valve.

1. Remove the purge control solenoid valve from the inlet manifold.
2. Disconnect the purge control solenoid valve connector.



3. Connect a hand vacuum pump to nipple (A) of the solenoid valve (refer to the illustration at left).
4. Check airtightness by applying vacuum with voltage applied directly from the battery to the solenoid valve and without applying voltage.

Battery voltage	State of nipple B	Normal condition
Applied	Opened	Vacuum leaks
	plugged	Vacuum maintained
Not applied	Opened	Vacuum maintained



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

Standard value: 22 – 26 Ω (at 20°C)

REMOVAL AND INSTALLATION

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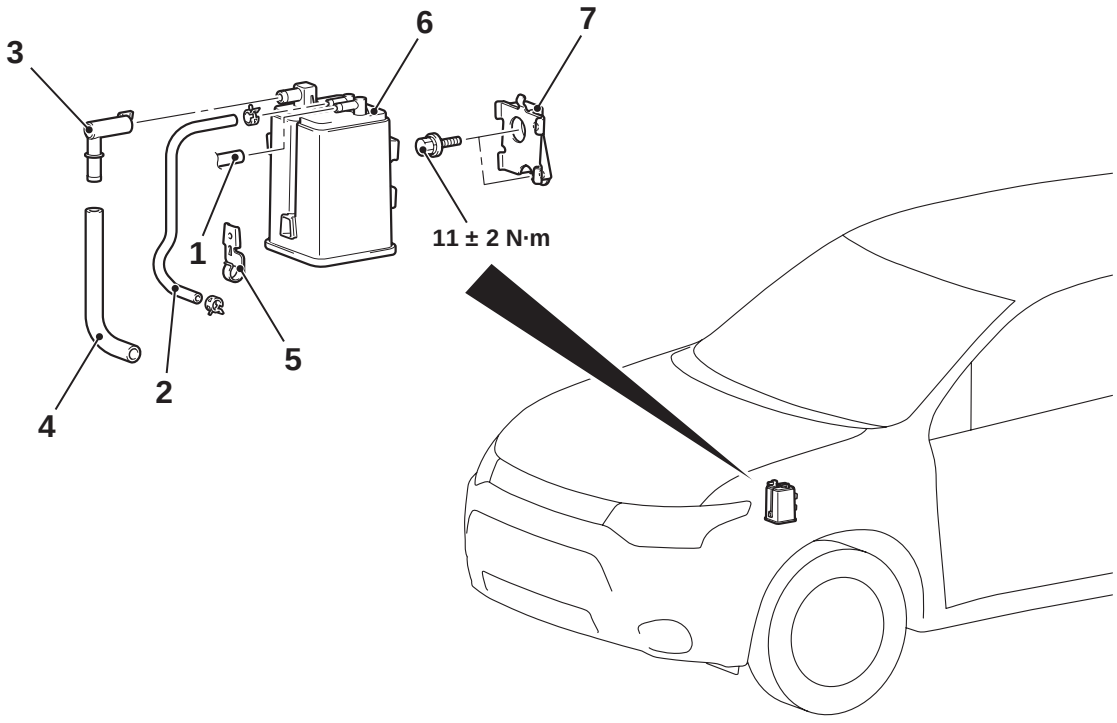
Pre-removal and post-installation operation
- Air Cleaner Assembly Removal and Installation (Refer to GROUP 15 – Air Cleaner).



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Removal steps
1. Canister vacuum hose connection
2. Fuel vapour control line hose
3. Fuel vapour control line joint
4. Fuel vapour control line hose
5. Hose clamp
6. Fuel vapour canister
7. Fuel vapour canister bracket

CATALYTIC CONVERTER

REMOVAL AND INSTALLATION

M1173003901903

The catalytic converter is integrated with the exhaust manifold and centre exhaust pipe. The removal and installation is the same as exhaust manifold (Refer to GROUP 15 – Exhaust Manifold) and centre exhaust pipe (Refer to GROUP 15 – Exhaust Pipe and Main Muffler).