

GROUP 17

ENGINE AND EMISSION CONTROL

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Continued on next page

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, 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

M1171000100523

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

TROUBLESHOOTING

INTRODUCTION TO ENGINE CONTROL SYSTEM DIAGNOSIS

M1171002000298

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

ENGINE CONTROL SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1171002100325

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

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

SYMPTOM CHART

M1171002200377

Symptom	Inspection procedure	Reference page
Throttle valve will not fully open or close	1	P.17-3
Accelerator pedal operation is not smooth (over acceleration)	2	P.17-4

SYMPTOM PROCEDURES

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

DIAGNOSIS PROCEDURE

STEP 1. Check the M.U.T.-II/III diagnosis code

Q: Is any diagnosis code set?

YES : Refer to GROUP 13A, Troubleshooting –
Inspection Chart for Diagnosis Code
[P.13A-19](#).

NO : Go to Step 2.

STEP 2. Retest the system.

Q: Does the throttle valve fully open and close?

YES : The procedure is complete.

NO : Return to Step 1.

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

DIAGNOSIS PROCEDURE

STEP 1. Check if the accelerator pedal and the accelerator pedal are installed correctly.

Q: Are the accelerator pedal and the accelerator pedal installed correctly?

YES : Go to Step 2.

NO : Replace and reinstall the accelerator pedal (Refer to [P.17-4](#)). Go to Step 3.

STEP 2. Check the M.U.T.-II/III diagnosis code

Q: Is any diagnosis code set?

YES : Refer to GROUP 13A, Troubleshooting – Inspection Chart for Diagnosis Code

[P.13A-19](#).

NO : Go to Step 3.

STEP 3. Retest the system.

Q: Does the accelerator pedal work normally?

YES : The procedure is complete.

NO : Return to Step 1.

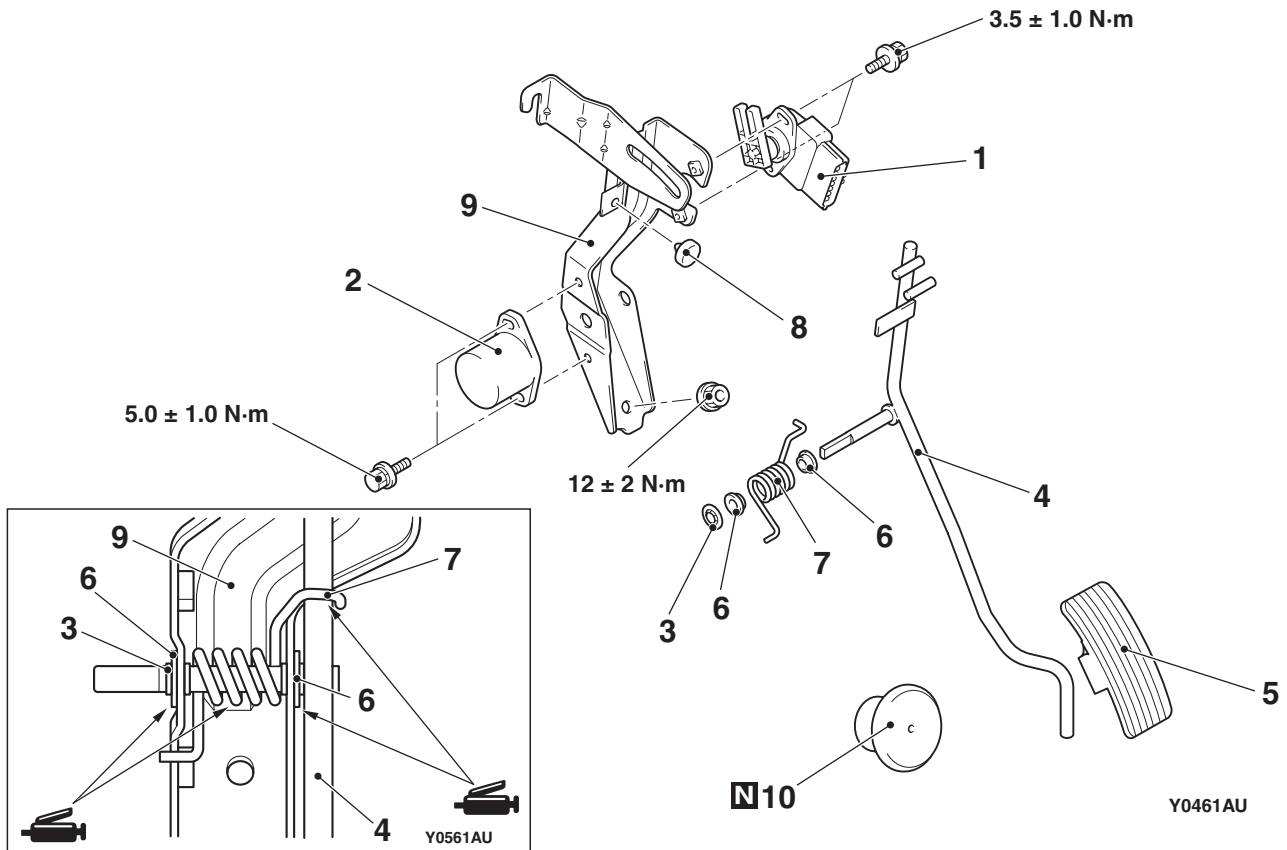
ACCELERATOR PEDAL

REMOVAL AND INSTALLATION

M1171003000213

Post-installation Operation

Accelerator Pedal Position Sensor Adjustment (Refer to GROUP 13A, On-vehicles Service [P.13A-321](#)).



Removal steps

- >>A<< 1. Accelerator pedal position sensor (APS)
2. Hysteresis assembly

Removal steps (Continued)

3. Push-on spring nut
4. Accelerator pedal arm
5. Accelerator pedal pad

AC504989AB

Removal steps (Continued)

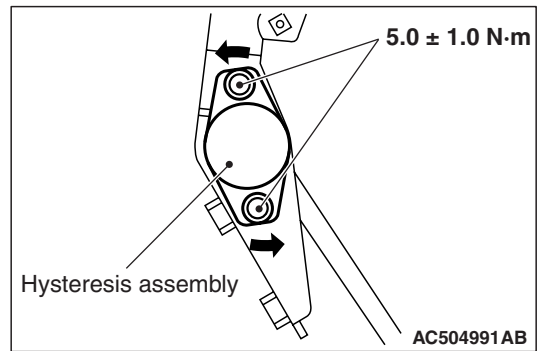
6. Bushing
7. Return spring
8. Stopper
9. Accelerator pedal bracket
10. Accelerator pedal arm stopper

INSTALLATION SERVICE POINT

>>A<< HYSTERESIS ASSEMBLY

INSTALLATION

1. Install the hysteresis assembly to the pin of the accelerator pedal arm.



2. Turn the hysteresis assembly in the arrowed direction, and tighten the mounting bolts to the specified torque at the position where there is no excessive play.

Tightening torque: 5.0 ± 1.0 N· m

AUTO-CRUISE CONTROL

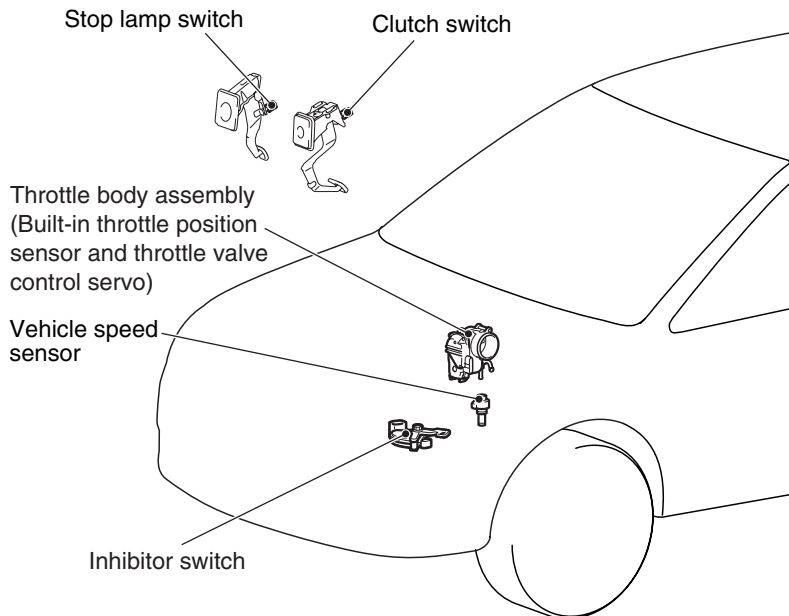
GENERAL INFORMATION

M1172000100463

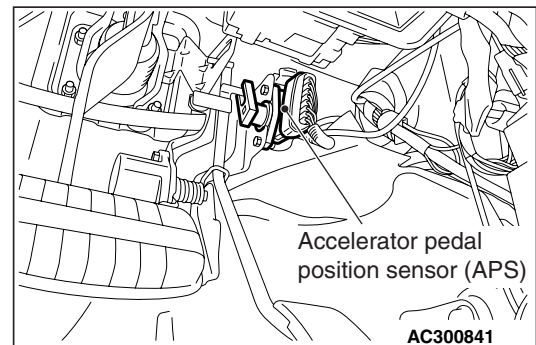
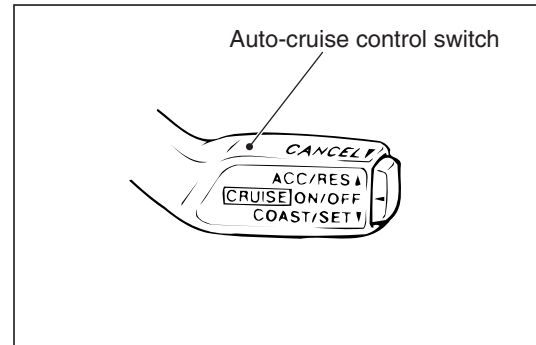
By using the auto-cruise control, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h without depressing the accelerator pedal.

For this auto-cruise control system, in conjunction with the electronic throttle valve control system, the engine-ECU <M/T> or engine-A/T-ECU <A/T> electronically controls the throttle valve.

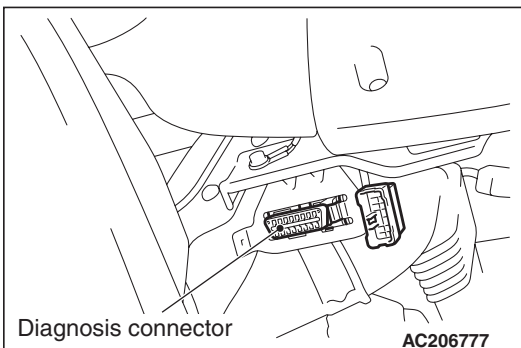
CONSTRUCTION DIAGRAM



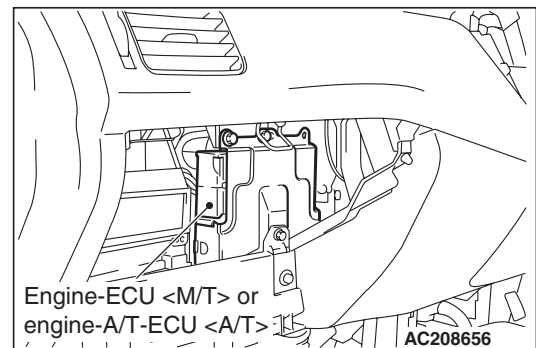
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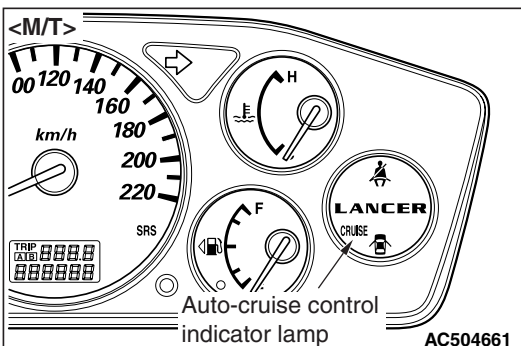
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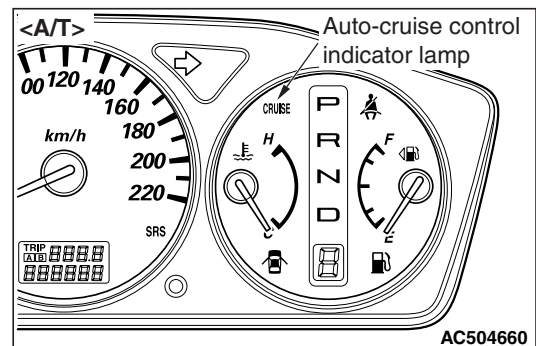
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AC208656



AC504661

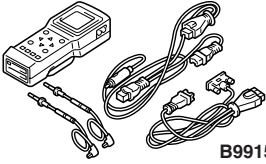
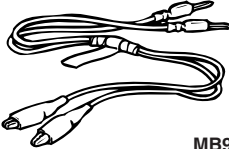
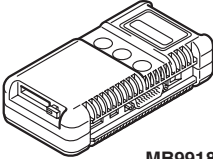


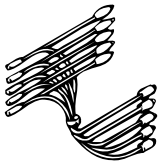
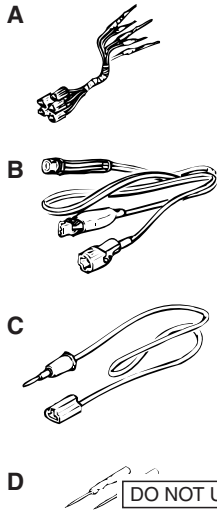
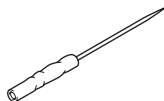
AC504660

AC504972AB

SPECIAL TOOL

M1172000600640

Tool	Number	Name	Use
 B991502	MB991502	M.U.T.-II sub assembly	<ul style="list-style-type: none"> • Reading diagnosis code • Auto-cruise control system check
 MB991529	MB991529	Diagnosis code check harness	
<p>A</p>  MB991824	<p>MB991955</p> <p>A: MB991824</p> <p>B: MB991827</p> <p>C: MB991910</p> <p>D: MB991911</p> <p>E: MB991825</p> <p>F: MB991826</p>	<p>M.U.T.-III sub-assembly</p> <p>A: Vehicle Communication Interface (V. C. I.)</p> <p>B: M.U.T.-III USB cable</p> <p>C: M.U.T.-III main harness A (Vehicles with CAN communication system)</p> <p>D: M.U.T.-III main harness B (Vehicles without CAN communication system)</p> <p>E: M.U.T.-III measurement adapter</p> <p>F: M.U.T.-III trigger harness</p>	<p>Reading diagnosis code</p> <p>CAUTION</p> <p>If you connect M.U.T.-III main harness A to a vehicle without CAN communication system to use the M.U.T.-III, a pulse signal may interfere with the simulated vehicle speed lines, thus causing the M.U.T.-III inoperative. Therefore, use the M.U.T.-III main harness B (MB991911) instead.</p>
B			
C			
D			
E			
F			

Tool	Number	Name	Use
 MB991658	MB991658	Test harness	Inspection of data list
 <p>A: MB991219 B: MB991220 C: MB991221 D: MB991222</p> <p>DO NOT USE MB991223AZ</p>	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Check harness B: LED harness C: LED harness adapter D: Probe	Continuity check and voltage measurement at harness wire or connector A: For checking connector pin contact pressure B: For checking power supply circuit C: For checking power supply circuit D: For connecting a locally sourced tester
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector

TROUBLESHOOTING

DIAGNOSIS TROUBLESHOOTING FLOW

M1172002000581

Refer to GROUP 00 –How to Use Troubleshooting/Inspection Service Points, Contents of Troubleshooting [P.00-5](#).

DIAGNOSIS FUNCTION

M1172002100447

METHOD OF READING THE DIAGNOSIS CODE

Use the M.U.T.-II/III to read the diagnosis code (Refer to GROUP 00 –How to Use Troubleshooting/Inspection Service Points, Diagnosis Function [P.00-6](#)).

METHOD OF ERASING THE DIAGNOSIS CODE

Use the M.U.T.-II/III to read the diagnosis code (Refer to GROUP 00 –How to Use Troubleshooting/Inspection Service Points, Diagnosis Function [P.00-6](#)).

CHECK CHART FOR DIAGNOSIS CODES

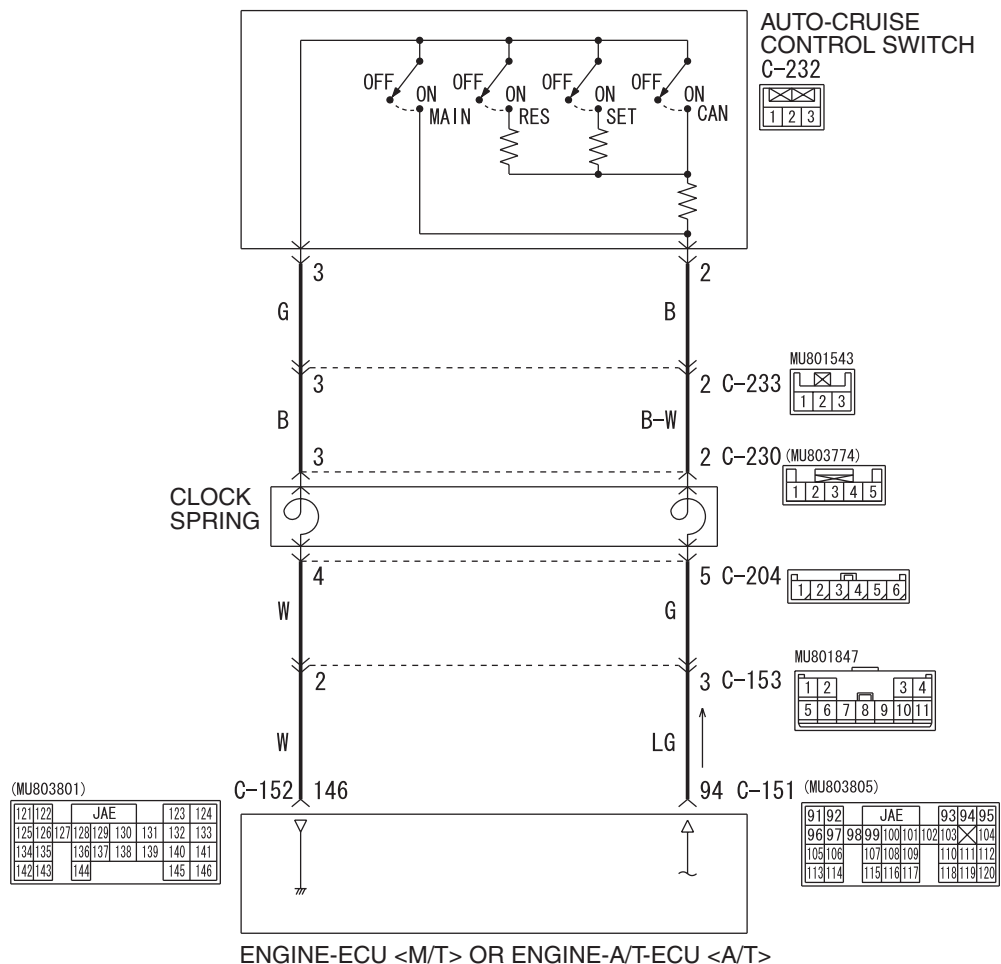
M1172002200466

Code No.	Diagnosis item	Reference page
15	Auto-cruise control switch system	P.17-9
21	Cancel latch signal system	P.17-19
22	Stop lamp switch system	P.17-20
23	Engine-ECU <M/T> or engine-A/T-ECU <A/T> and its related components	P.17-28

DIAGNOSTIC TROUBLE CODE PROCEDURES

Code No.15 Auto-cruise Control Switch System

Auto-cruise Control Switch System Circuit



Wire colour code

B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Grey R : Red P : Pink V : Violet PU : Purple

AC504992

OPERATION

This circuit judges the signals of each switch (SET, RESUME and CANCEL) of the auto-cruise control switch. The engine-ECU <M/T> or engine-A/T-ECU <A/T> detects the state of the auto-cruise control switch by sensing the voltages shown below.

- When all switches are OFF: 4.7 – 5.0 volts
- When the MAIN switch is ON: 0 – 0.3 volt
- When the SET switch is ON: 2.0 – 2.8 volts
- When the RESUME switch is ON: 3.3 – 4.1 volts
- When the CANCEL switch is ON: 0.8 – 1.5 volts

DIAGNOSIS CODE SET CONDITIONS

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

PROBABLE CAUSES

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

DIAGNOSIS PROCEDURE**STEP 1. M.U.T.-II/III data list.**

- Item 01: Main switch (Refer to data list reference table P.17-42).
- Item 02: Set switch (Refer to data list reference table P.17-42).
- Item 03: Resume switch (Refer to data list reference table P.17-42).
- Item 04: Cancel switch (Refer to data list reference table P.17-42).

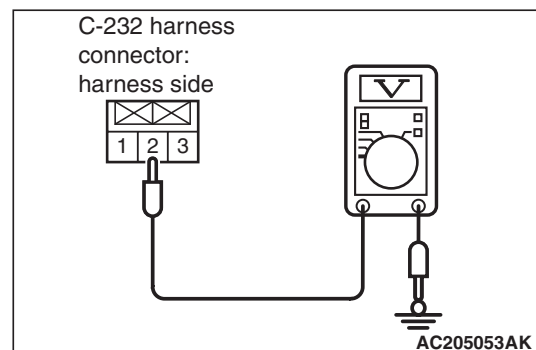
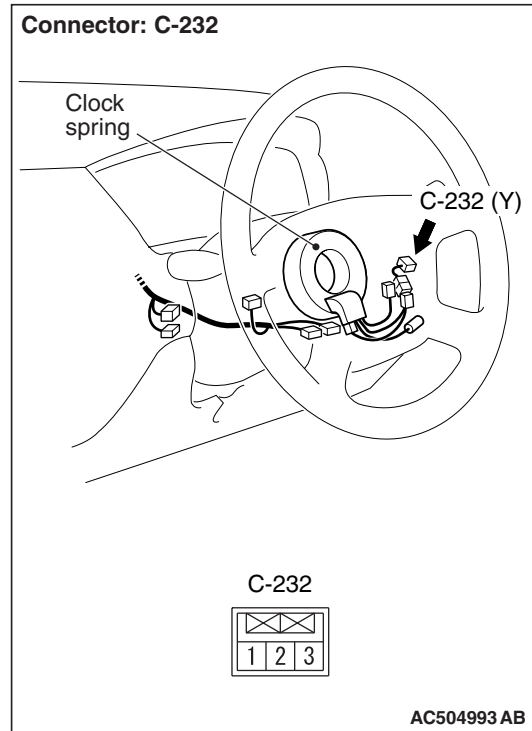
Q: Is the check result normal?

YES : Go to Step 17.

NO : Go to Step 2.

STEP 2. Measure the voltage at auto-cruise control switch connector C-232.

- (1) Remove the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157).
- (2) Connect the negative (–) battery cable.
- (3) Turn the ignition switch to the "ON" position and the MAIN switch to the "OFF" position.



- (4) Measure the voltage between connector C-232 terminal No.2 and earth.

OK: 4.7 – 5.0 V

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

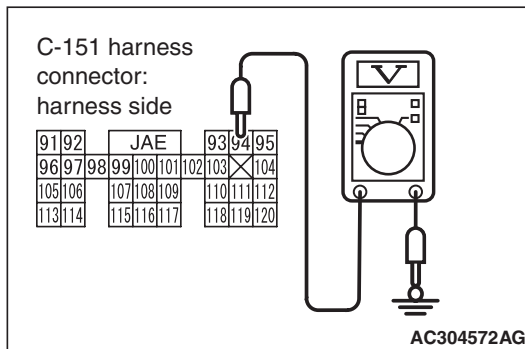
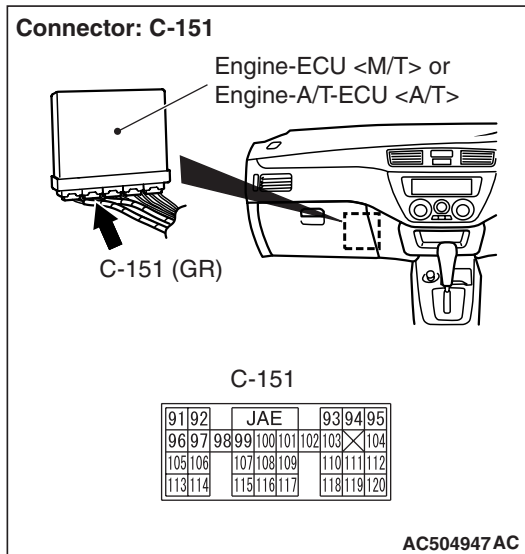
Q: Is the check result normal?

YES : Go to Step 9.

NO : Go to Step 3.

STEP 3. Measure the voltage at engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151.

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "OFF" position.



- (2) Measure the voltage between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151 terminal No.94 and earth.

OK: 4.7 – 5.0 V

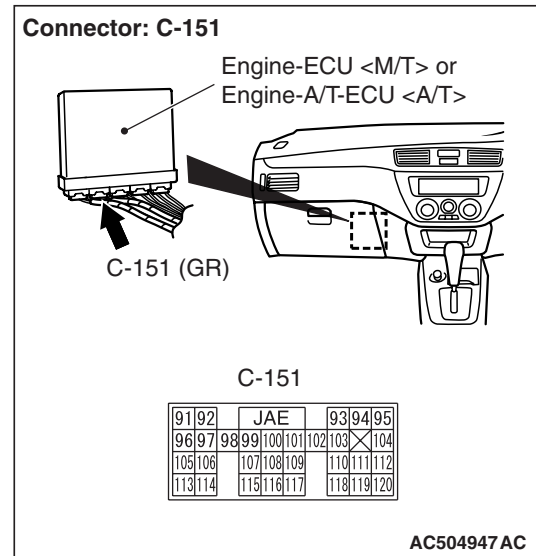
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Go to Step 4.

STEP 4. Connector check: C-151 engine-ECU <M/T> or engine-A/T-ECU <A/T> connector.

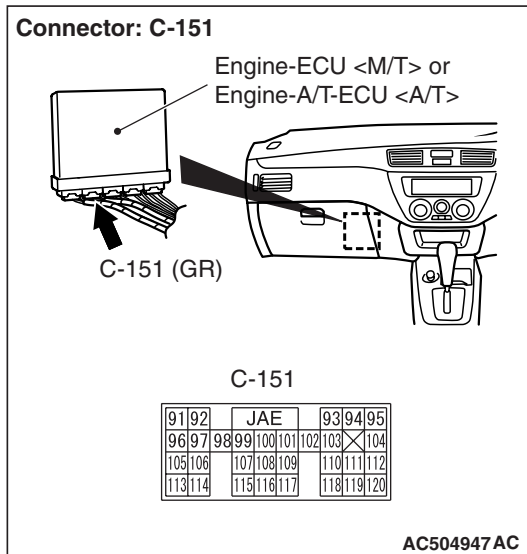


Q: Is the check result normal?

YES : Go to Step 5.

NO : Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.

STEP 5. Check the harness between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151 terminal No.94 and the auto-cruise control switch connector C-232 terminal No.2.



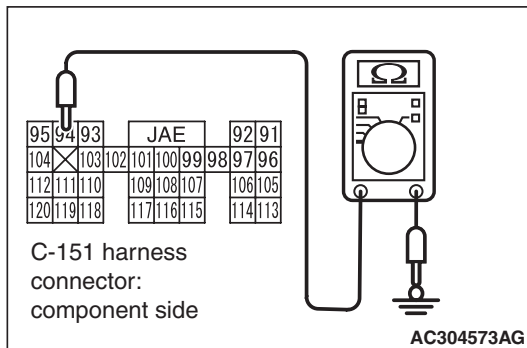
(3) Connect engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151.

Q: Is the measured continuity open circuit?

YES : Install the air bag module (driver's side)
(Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#)). Then go to Step 17.

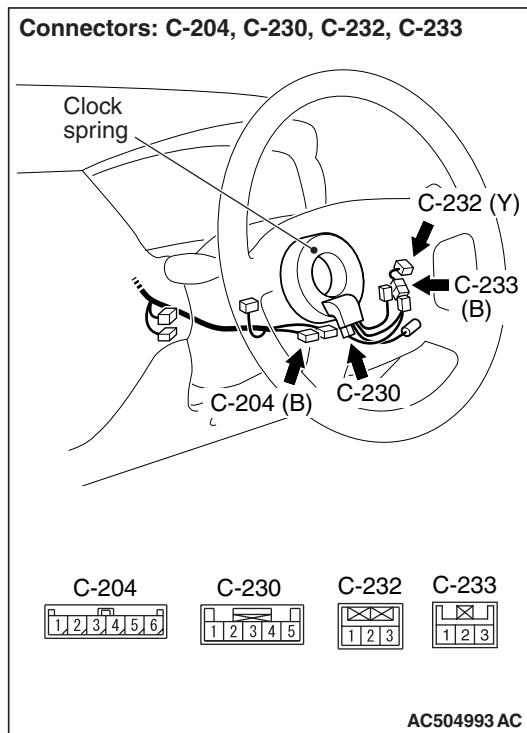
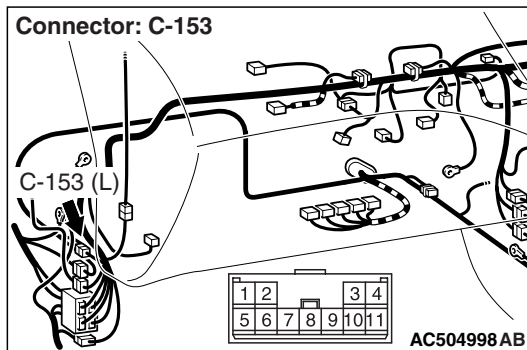
NO : Go to Step 6.

(1) Disconnect engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151 and measure at the harness connector side.



(2) Measure the continuity between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151 terminal No.94 and earth.

STEP 6. Connectors check: C-232 auto-cruise control switch connector, C-153 and C-233 intermediate connectors, C-204 and C-230 clock spring connectors.



STEP 7. Check the clock spring.

Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#).

Q: Is the check result normal?

YES : Go to Step 8.

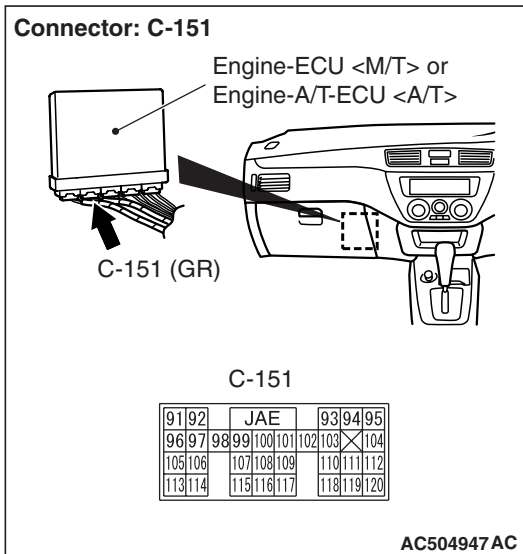
NO : Replace the clock spring and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#)). Then go to Step 18.

Q: Is the check result normal?

YES : Go to Step 7.

NO : Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#)). Then go to Step 18.

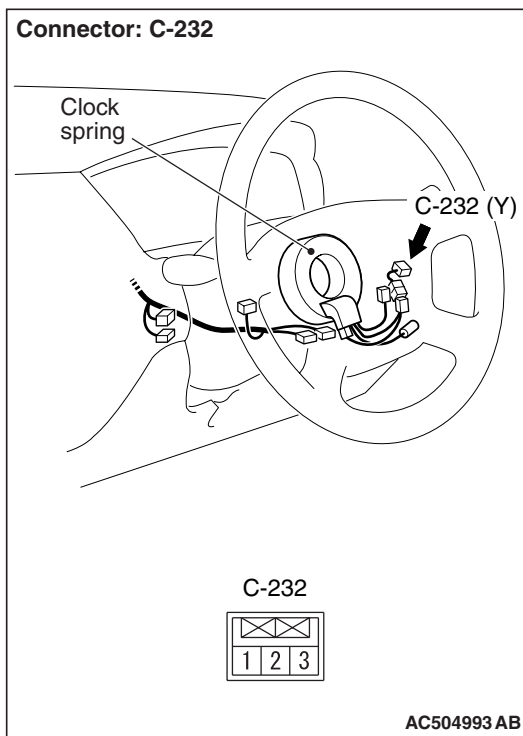
STEP 8. Check the harness between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-151 terminal No.94 and the auto-cruise control switch connector C-232 terminal No.2.



Q: Is the check result normal?

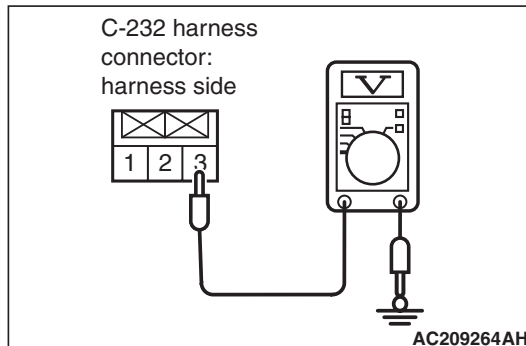
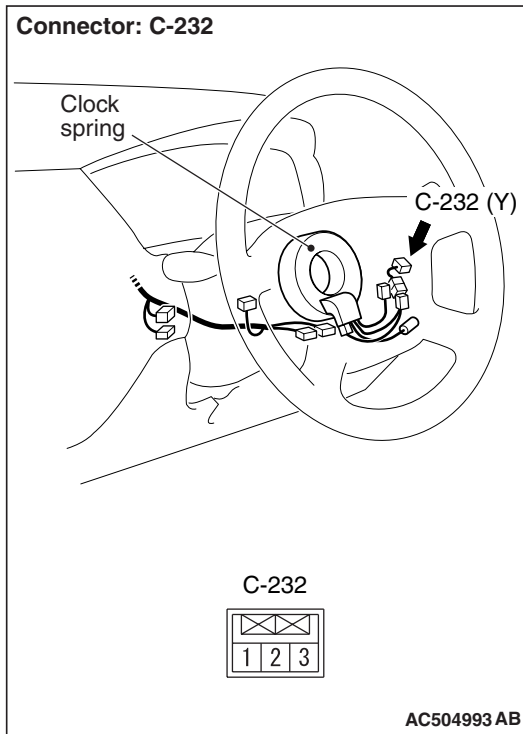
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions P.00-13), and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18 .

NO : Repair the damaged harness wire, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.



STEP 9. Measure the voltage at auto-cruise control switch connector C-232.

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "ON" position.



- (2) Measure the voltage between connector C-232 terminal No.3 and earth.

OK: 0.3 V or less

- (3) Turn the MAIN switch to the "OFF" position and the ignition switch to the "LOCK" (OFF) position.

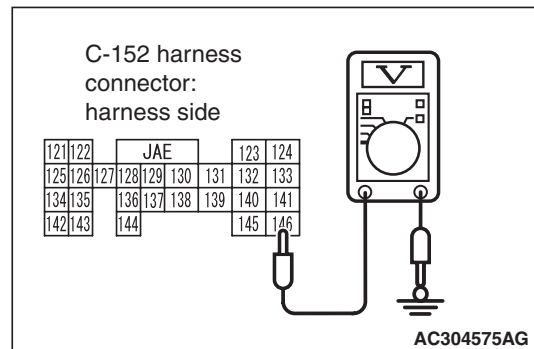
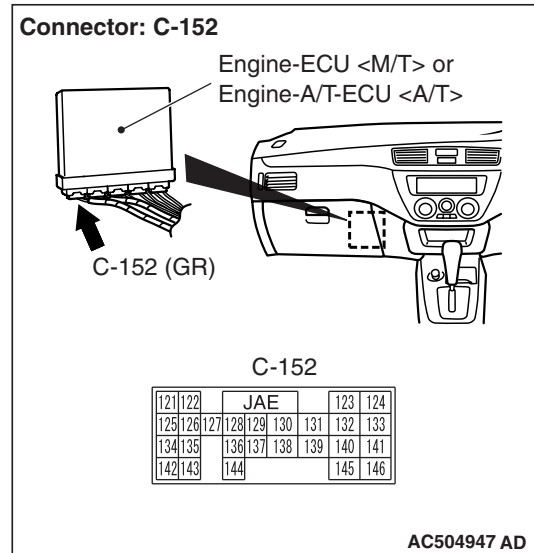
Q: Is the check result normal?

YES : Go to Step 15.

NO : Go to Step 10.

STEP 10. Measure the voltage at engine-ECU connector <M/T> or engine-A/T-ECU <A/T> connector C-152.

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "ON" position.



- (2) Measure the voltage between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-152 terminal No.146 and earth.

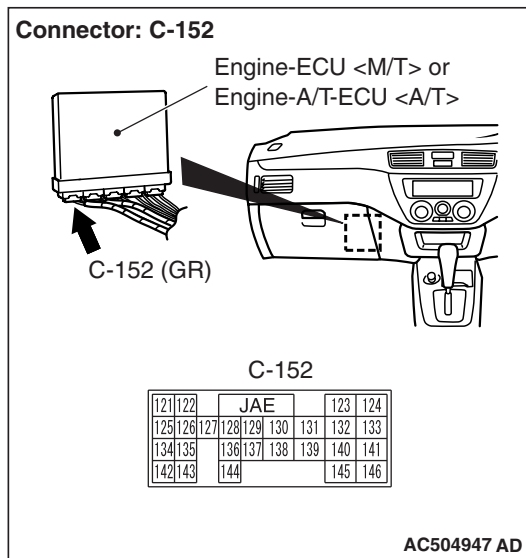
OK: 0.3 V or less

- (3) Turn the MAIN switch to the "OFF" position and the ignition switch to the "OFF" position.

Q: Is the check result normal?

YES : Go to Step 12.

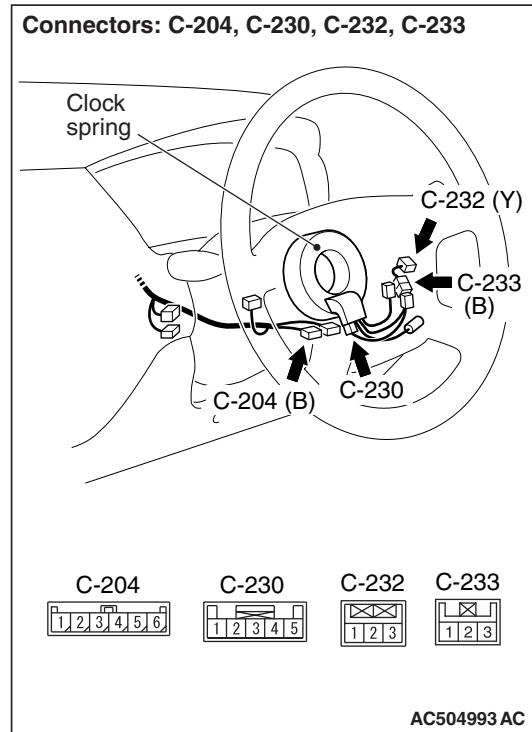
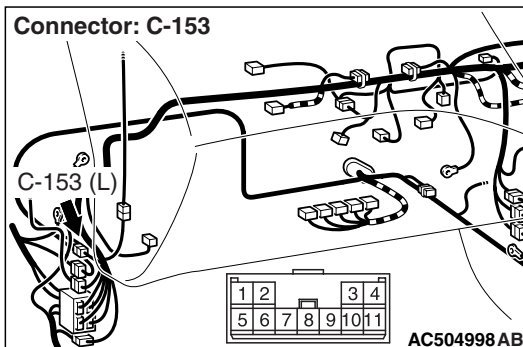
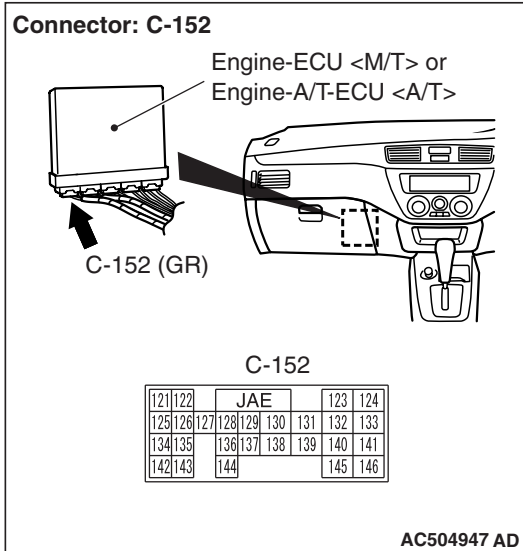
NO : Go to Step 11.

**STEP 11. Connector check: C-152 engine-ECU
<M/T> or engine-A/T-ECU <A/T> connector.****Q: Is the check result normal?**

YES : Install the air bag module (driver's side)
(Refer to GROUP 52B, Driver's, Front
Passenger's Air Bag Module(s) and Clock
Spring [P.52B-157](#)). Then go to Step 17.

NO : Repair or replace the faulty connector, and
install the air bag module (driver's side)
(Refer to GROUP 52B, Driver's, Front
Passenger's Air Bag Module(s) and Clock
Spring [P.52B-157](#)). Then go to Step 18.

STEP 12. Connectors check: C-152 engine-ECU <M/T> or engine-A/T-ECU <A/T> connector, C-153 and C-233 intermediate connector, C-232 auto-cruise control switch connector, C-204 and C-230 clock spring connectors.



Q: Is the check result normal?

YES : Go to Step 13.

NO : Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.

STEP 13. Check the clock spring.

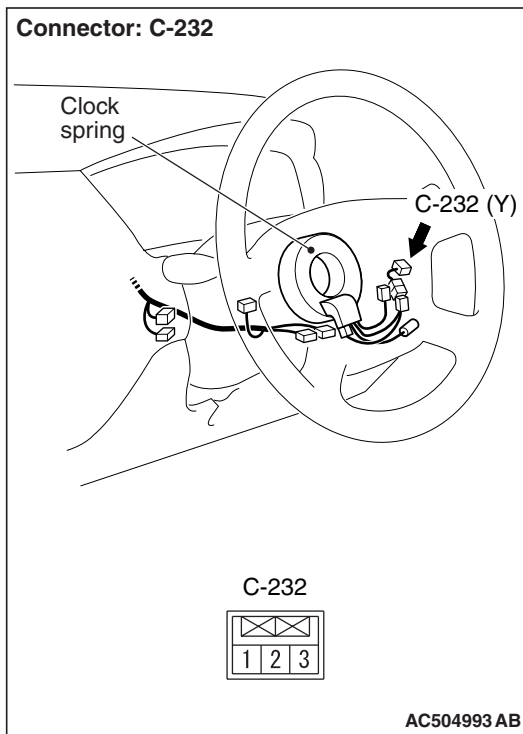
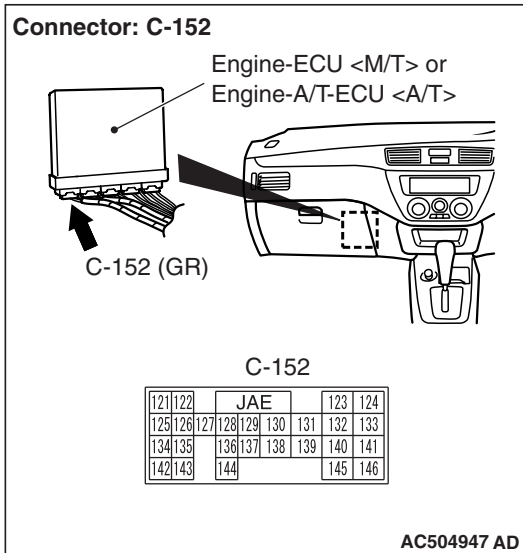
Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157.

Q: Is the check result normal?

YES : Go to Step 14.

NO : Replace the clock spring and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.

STEP 14. Check the harness between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-152 terminal No.146 and the auto-cruise control switch connector C-232 terminal No.3.

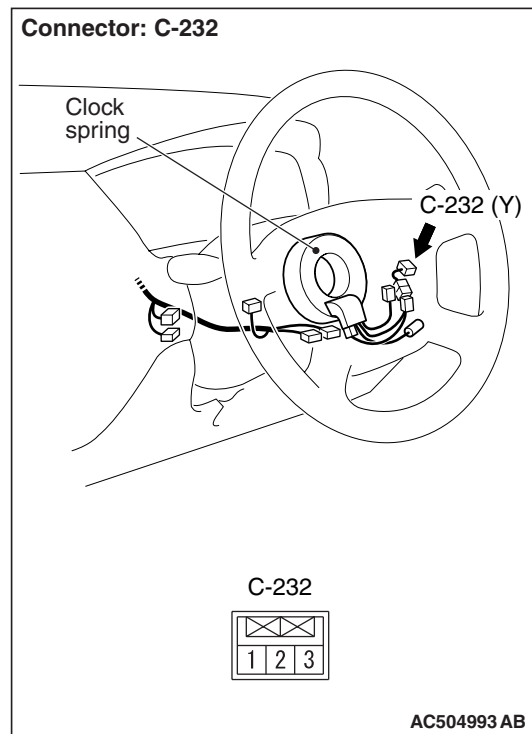


Q: Is the check result normal?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions P.00-13), and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18 .

NO : Repair the damaged harness wire, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.

STEP 15. Connector check: C-232 auto-cruise control switch connector.



Q: Is the check result normal?

YES : Go to Step 16.

NO : Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-157). Then go to Step 18.

STEP 16. Check the auto-cruise control switch.
Refer to [P.17-46](#).

Q: Is the check result normal?

YES : Install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#)). Then go to Step 17.

NO : Replace the auto-cruise control switch (Refer to [P.17-48](#)), and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring [P.52B-157](#)). Then go to Step 18.

STEP 17. Check the M.U.T.-II/III diagnosis code No.15.

Q: Is M.U.T.-II/III diagnosis code No.15 set?

YES : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 18 .

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

STEP 18. Check the M.U.T.-II/III diagnosis code No.15.

Q: Is M.U.T.-II/III diagnosis code No.15 set?

YES : Return to Step 1.

NO : The procedure is complete.

Code No.21 Cancel Latch Signal System

DIAGNOSIS CODE SET CONDITIONS

The engine-ECU <M/T> or engine-A/T-ECU <A/T> communicates cancellation retention information between the two microprocessors. This diagnosis code is set when cancellation retention information contains inconsistency.

PROBABLE CAUSES

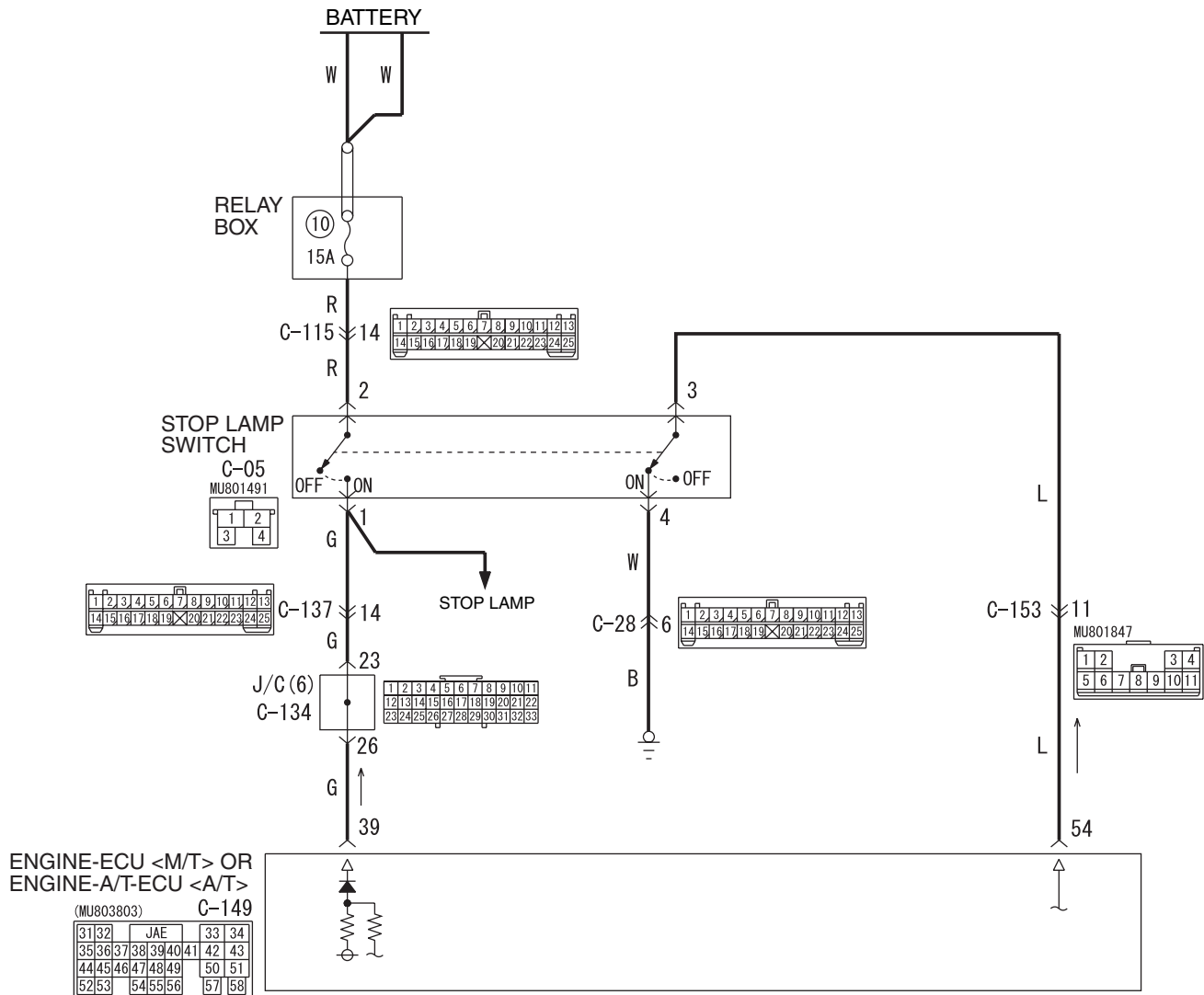
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS PROCEDURE

Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then check that diagnosis code 21 is not set.

Code No.22 Stop Lamp Switch System

Stop Lamp Switch System Circuit



AC505001

OPERATION

- Battery positive voltage is supplied to the stop lamp switch (terminal 2 and 3).
- When the brake pedal is depressed, battery positive voltage is applied to the engine-ECU <M/T> or engine-A/T-ECU <A/T> (terminal 39 and 54).

DIAGNOSIS CODE SET CONDITIONS**Check Condition**

- The "CRUISE" indicator light illuminates.

Judgement Criteria

- Short in stop lamp switch circuit.
- Open circuit in the brake switch circuit (between engine-ECU <M/T> or engine-A/T-ECU <A/T> terminal 54 and earth).

PROBABLE CAUSES

- Malfunction of the stop lamp switch.
- Damaged harness or connector.
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-II/III data list.

Item 05: Stop lamp switch (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 12.

NO : Go to Step 2.

STEP 2. 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

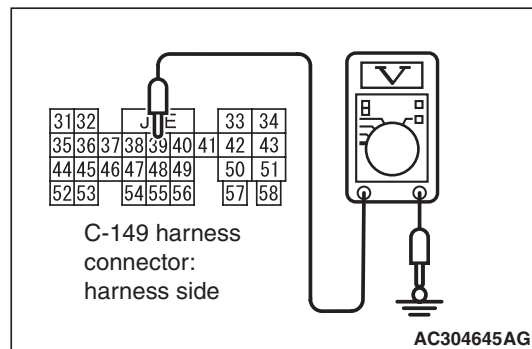
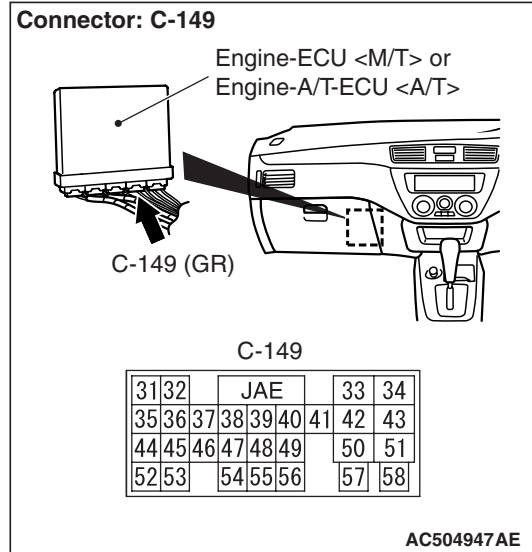
Q: Is the check result normal?

YES : Go to Step 3.

NO : Go to Step 6.

STEP 3. Measure the voltage at engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149.

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



(2) Measure the voltage between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149 terminal No.39 and earth.

OK:

Brake pedal depressed: System voltage

Brake pedal not depressed: 1 V or less

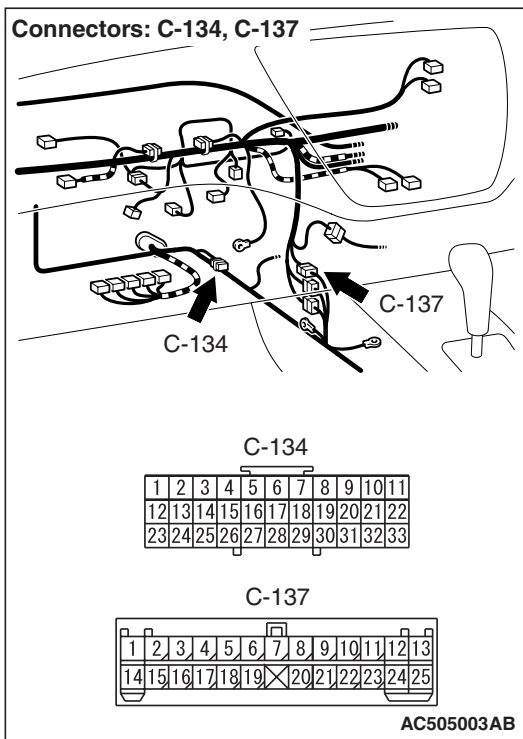
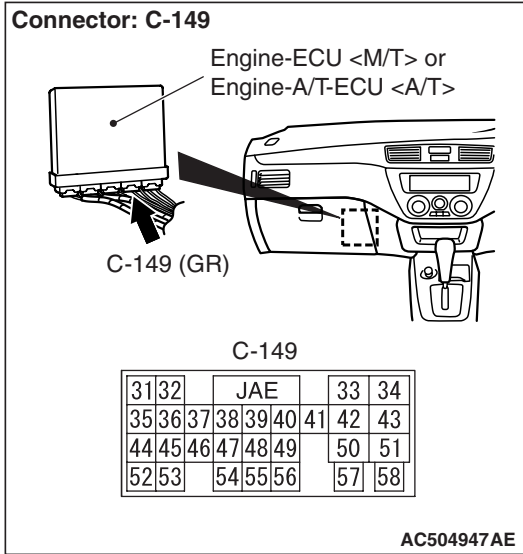
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?

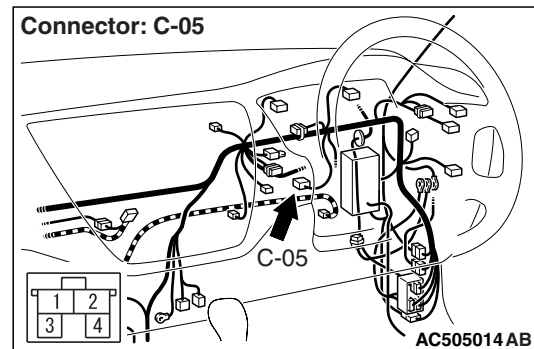
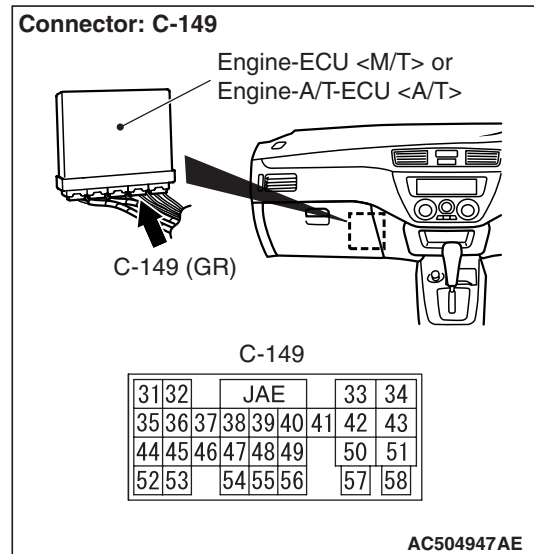
YES : Go to Step 11.

NO : Go to Step 4.

STEP 4. Connectors check: C-149 engine-ECU <M/T> or engine-A/T-ECU <A/T> connector, C-137 intermediate connector and C-134 J/C (6).



STEP 5. Check the harness between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149 terminal No.39 and stop lamp switch connector C-05 terminal No.1.



Q: Is the check result normal?

YES : Go to Step 11.

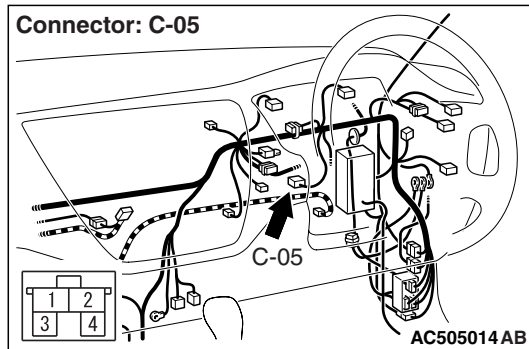
NO : Repair the damaged harness wire. Then go to Step 21.

Q: Is the check result normal?

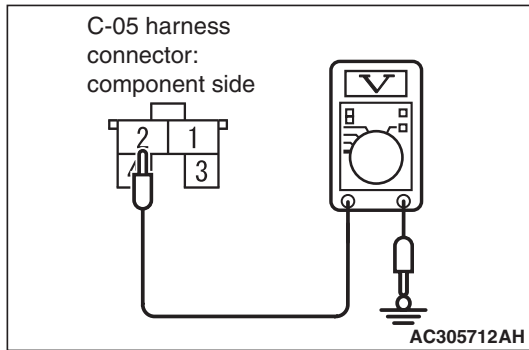
YES : Go to Step 5.

NO : Repair or replace the damaged components. Then go to Step 21.

STEP 6. Measure the voltage at stop lamp switch connector C-05.



(1) Disconnect stop lamp switch connector C-05.



(2) Measure the voltage between stop lamp switch connector C-05 terminal No.2 and earth.

OK: System voltage

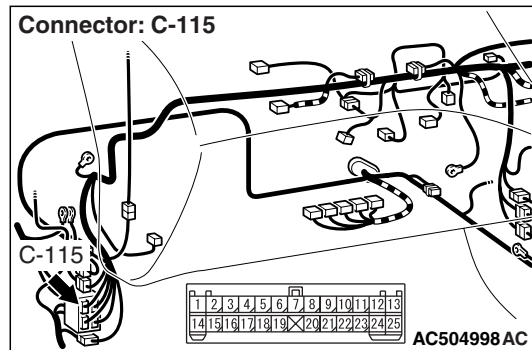
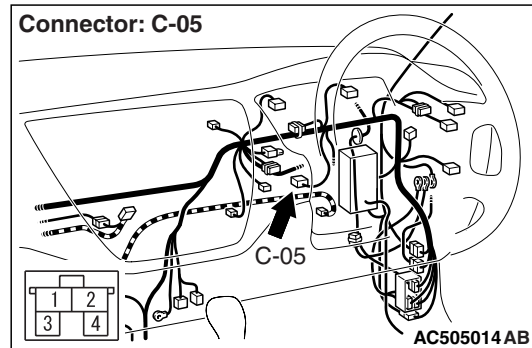
(3) Connect stop lamp switch connector C-05.

Q: Is the check result normal?

YES : Go to Step 10.

NO : Go to Step 7.

STEP 7. Connectors check: C-05 stop lamp switch connector and C-115 intermediate connector.

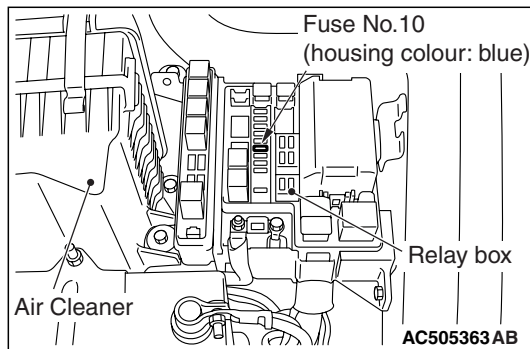
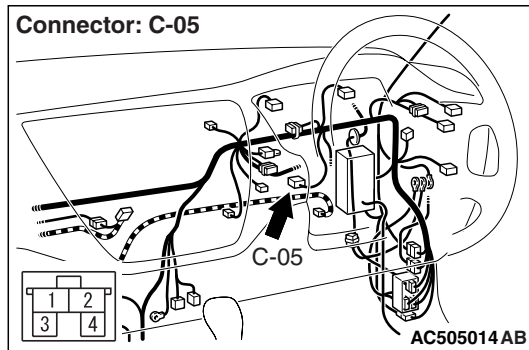


Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair or replace the damaged components. Then go to Step 21.

STEP 8. Check the harness between stop lamp switch connector C-05 terminal No.2 and fuse No.10 at relay box in the engine compartment for damage.

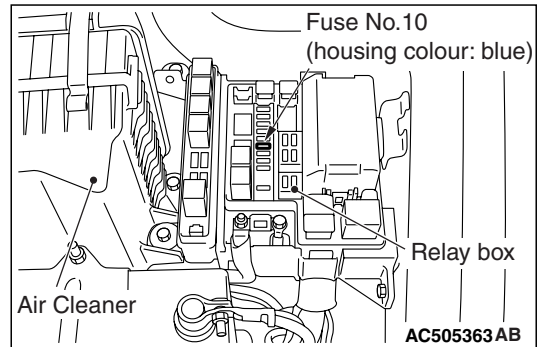


Q: Is the check result normal?

YES : Go to Step 9.

NO : Repair the damaged harness wire. Then go to Step 21.

STEP 9. Check the fuse No.10 at relay box in the engine compartment.



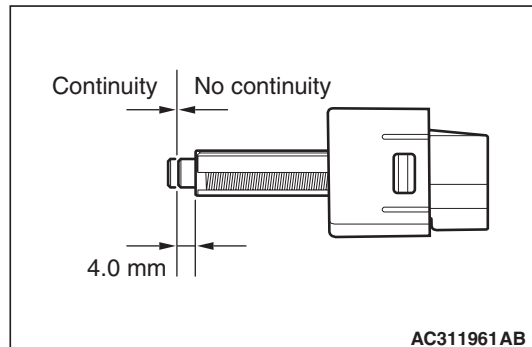
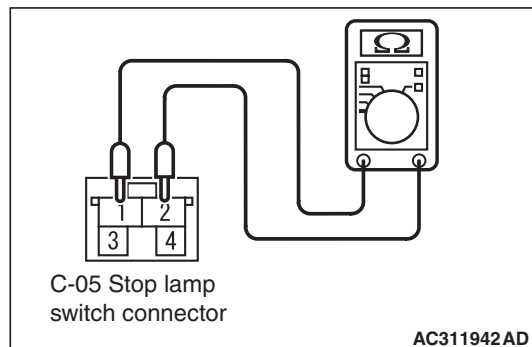
Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the fuse. Then go to Step 21.

STEP 10. Check the stop lamp switch.

(1) Remove the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-12](#)).



(2) Connect an ohmmeter to the stop lamp switch between terminals 1 and 2.

(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

STEP 11. M.U.T.-II/III data list.

Item 05: Stop lamp switch (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 20.

NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 21 .

STEP 12. M.U.T.-II/III data list.

Item 06: Brake switch (Refer to data list reference table [P.17-42](#)).

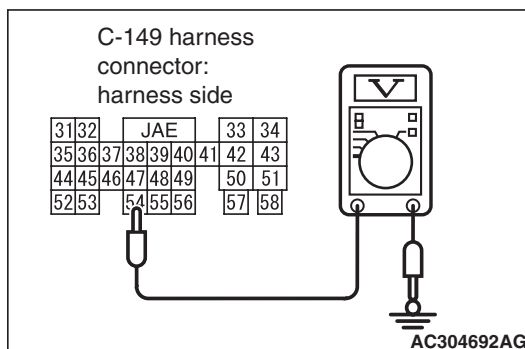
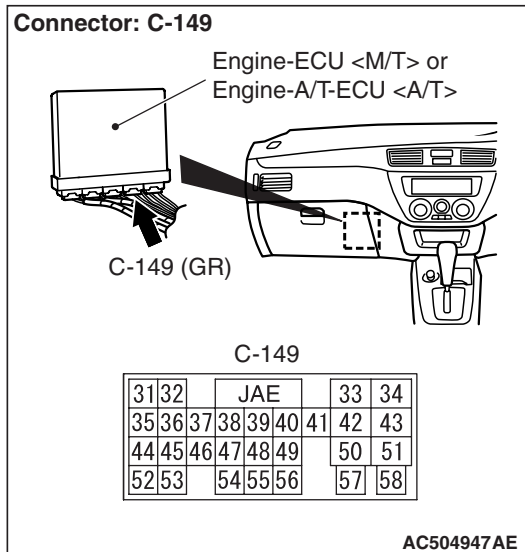
Q: Is the check result normal?

YES : Go to Step 20.

NO : Go to Step 13.

STEP 13. Measure the voltage at engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149.

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



(2) Measure the voltage between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149 terminal No.54 and earth.

OK:

Brake pedal depressed: System voltage

Brake pedal not depressed: 1 V or less

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

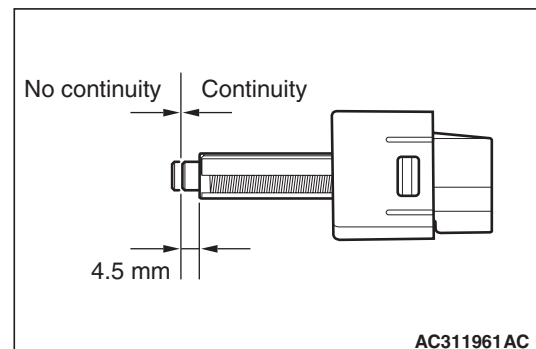
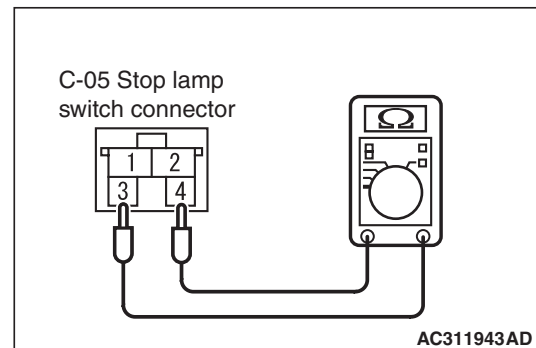
Q: Is the check result normal?

YES : Go to Step 19.

NO : Go to Step 14.

STEP 14. Check the stop lamp switch.

(1) Remove the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-12](#)).



(2) Connect an ohmmeter to the stop lamp switch between terminals 3 and 4.

(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

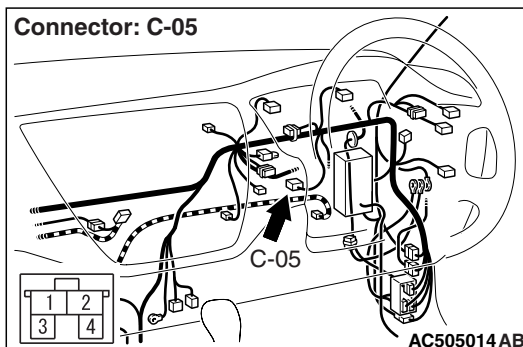
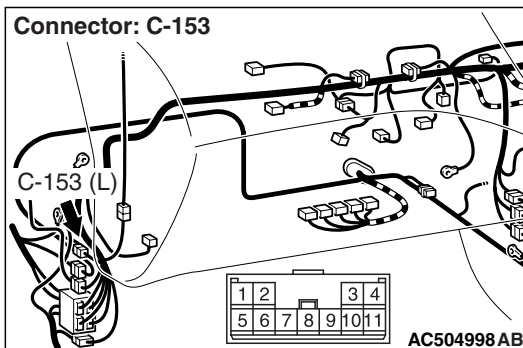
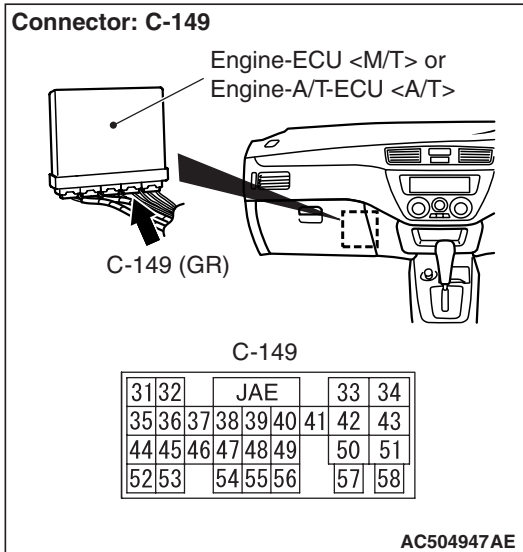
OK: The stop lamp switch is operating properly if the circuit is open between terminals 3 and 4 when the plunger is released, and if resistance value is less than 2 ohms between terminals 3 and 4 when the plunger is pushed in to a depth of within 4.5 mm from the outer case edge surface.

Q: Is the check result normal?

YES : Install the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-12](#)). Then go to Step 15.

NO : Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-12](#)). Then go to Step 21.

STEP 15. Connectors check: C-149 engine-ECU <M/T> or engine-A/T-ECU <A/T> connector, C-153 intermediate connector and C-05 stop lamp switch connector.

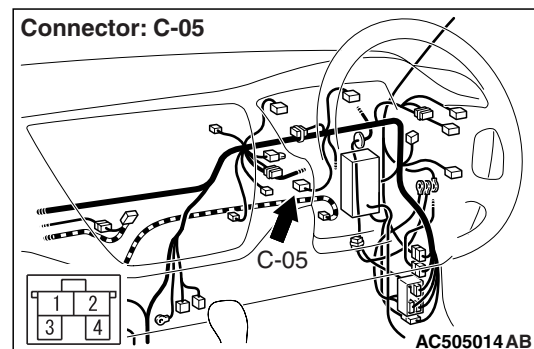
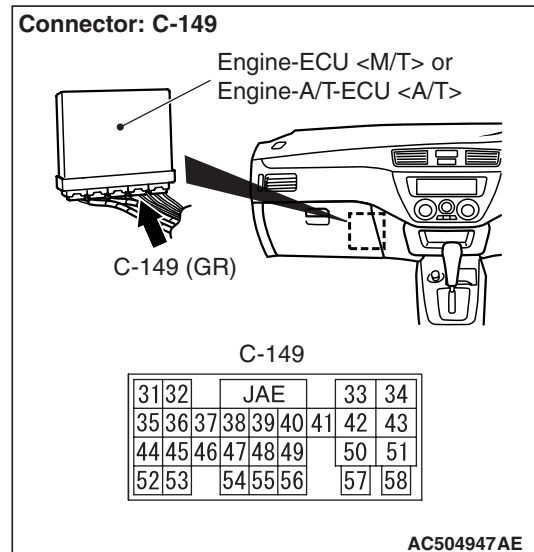


Q: Is the check result normal?

YES : Go to Step 16.

NO : Repair or replace the damaged components. Then go to Step 21.

STEP 16. Check the harness between engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-149 terminal No.54 and stop lamp switch connector C-05 terminal No.3.

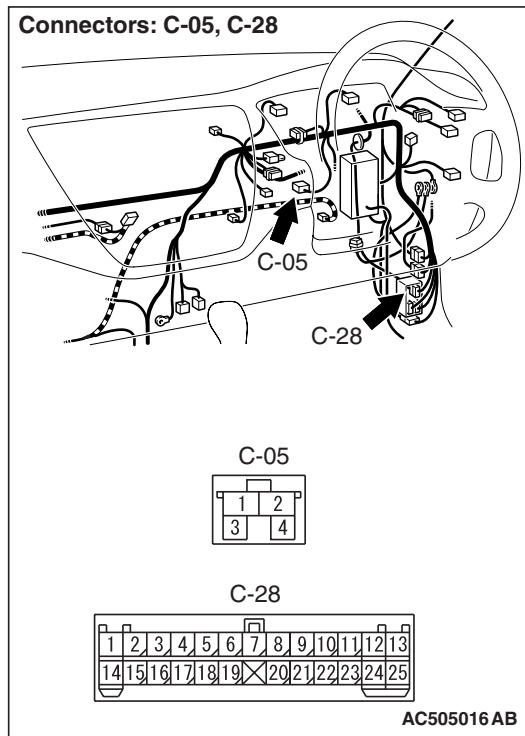


Q: Is the check result normal?

YES : Go to Step 17.

NO : Repair the damaged harness wire. Then go to Step 21.

STEP 17. Connectors check: C-05 stop lamp switch connector and C-28 intermediate connector.

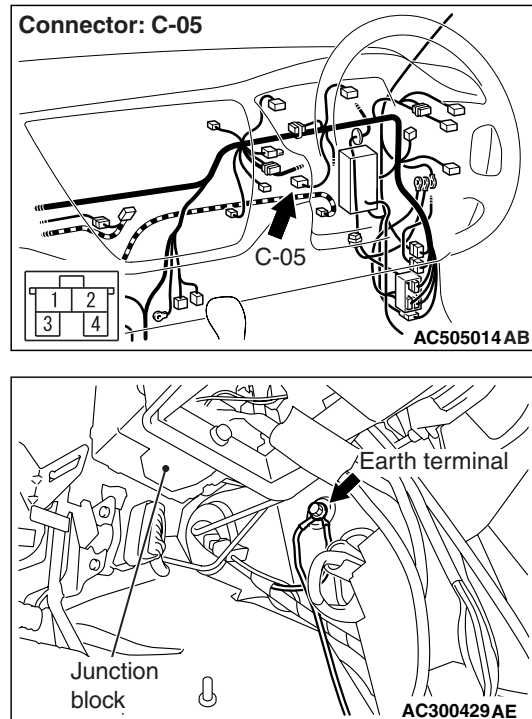


Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair or replace the damaged components. Then go to Step 21.

STEP 18. Check the harness between stop lamp switch connector C-05 terminal No.4 and earth.



Q: Is the check result normal?

YES : Go to Step 19.

NO : Repair the damaged harness wire. Then go to Step 21.

STEP 19. M.U.T.-II/III data list.

Item 06: Brake switch (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 20.

NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 21 .

STEP 20. Check the M.U.T.-II/III diagnosis code No. 22.

Q: Is M.U.T.-II/III diagnosis code No. 22 set?

YES : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 21 .

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

STEP 21. Check the M.U.T.-II/III diagnosis code No. 22.**Q: Is M.U.T.-II/III diagnosis code No. 22 set?****YES :** Return to Step 1.**NO :** The procedure is complete.

Code No. 23 Engine-ECU <M/T> or Engine-A/T-ECU <A/T> and Its Related Components

DIAGNOSIS CODE SET CONDITIONS

This diagnosis code is set when there is an failure in the engine-ECU <M/T> or engine-A/T-ECU <A/T> and its related components.

PROBABLE CAUSES

- Malfunction of the MPI system.
- Malfunction of the A/T system.
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS PROCEDURE

STEP 1. Check the MPI system diagnosis code.**Q: Is any diagnosis code set?**

YES : Repair the MPI control system. (Refer to GROUP 13A, Troubleshooting –Inspection Chart for Diagnosis Codes [P.13A-19](#)). Then go to Step 4.

NO <M/T> : Go to Step 3.

NO <A/T> : Go to Step 2.

STEP 2. Check the A/T system diagnosis code.**Q: Is any diagnosis code set?**

YES : Repair the A/T system (Refer to GROUP 23A, Troubleshooting <A/T> –Check Chart for Diagnosis Codes [P.23A-15](#)). Then go to Step 4.

NO : Go to Step 3.

STEP 3. Check the M.U.T.-II/III diagnosis code No. 23.**Q: Is M.U.T.-II/III diagnosis code No. 23 set?**

YES : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 4.

NO : This malfunction is intermittent. (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

STEP 4. Check the M.U.T.-II/III diagnosis code No. 23.**Q: Is M.U.T.-II/III diagnosis code No. 23 set?**

YES : Return to Step 1 .

NO : This procedure is complete.

CHECK CHART FOR TROUBLE SYMPTOMS

M1172002300645

Trouble symptom		Inspection procedure No.	Reference page
Communication with M.U.T.-II/III is not possible.	Communication with all systems is impossible	-	Group 13A, Symptom Procedures – Inspection Procedure 1 P.13A-208
	Communication with the engine-ECU <M/T> or engine-A/T-ECU <A/T> only is impossible	-	Group 13A, Symptom Procedures – Inspection Procedure 2 P.13A-211
Auto-cruise control is not cancelled.	Even if brake pedal is depressed	1	P.17-29
	Even if clutch pedal is depressed <M/T>	2	P.17-30
	Even if select lever is set to N range <A/T>	3	P.17-34
	Even if auto-cruise control CANCEL switch is set to ON	4	P.17-34
Auto-cruise control cannot be set.		5	P.17-34
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <M/T>		6	P.17-35
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <A/T>		7	P.17-36
When the auto-cruise control MAIN switch is turned ON, the auto-cruise control indicator lamp does not illuminate. (However, the auto-cruise control system is normal).		8	P.17-37

SYMPTOM PROCEDURES

Inspection Procedure 1: When the Brake Pedal is Depressed, Auto-cruise Control is not Cancelled.

COMMENTS ON TROUBLE SYMPTOM

The stop lamp switch circuit is suspected.

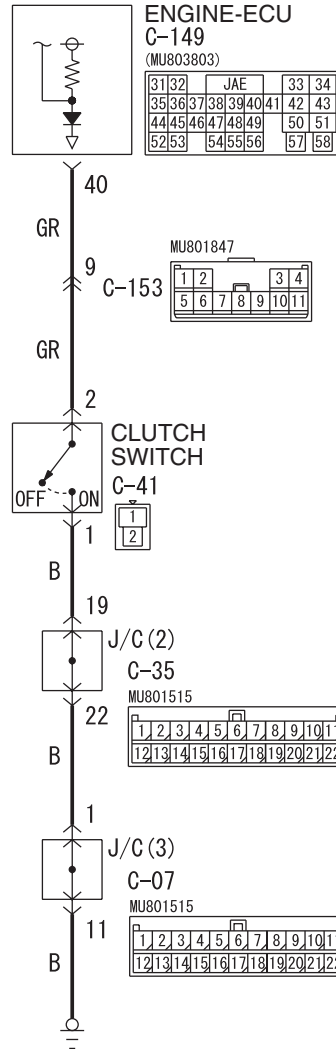
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

PROBABLE CAUSES

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the stop lamp switch.

DIAGNOSIS PROCEDURE

Refer to [P.17-20](#), Diagnosis Trouble Code Procedures –Code No. 22: Stop lamp switch system.

Inspection Procedure 2: When the Clutch Pedal is Depressed, Auto-cruise Control is not Cancelled <M/T>.**Clutch Switch Circuit****Wire colour code**

B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Grey R : Red P : Pink V : Violet PU : Purple

AC504992

OPERATION

This circuit indicates the operation status of the clutch pedal position switch. When the clutch switch is ON (clutch pedal is depressed), the voltage of engine-ECU terminal number 40 will indicate 0 volt.

COMMENTS ON TROUBLE SYMPTOM

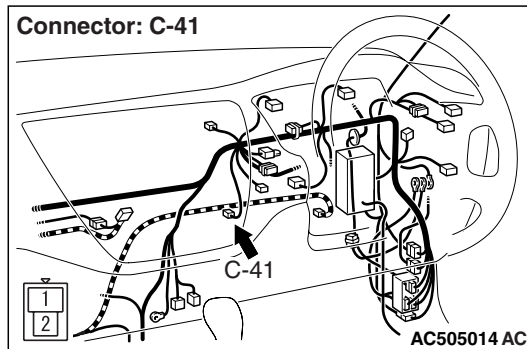
The cause is probably a malfunction of the clutch switch circuit.

PROBABLE CAUSES

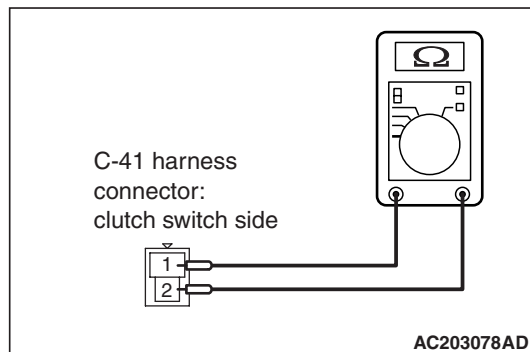
- Malfunction of the clutch switch.
- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the engine-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the clutch switch.



(1) Disconnect clutch switch connector C-41.



(2) Measure the continuity between the terminals.

Measurement condition	Terminal connector of tester	Specified condition
When clutch pedal is depressed.	1 – 2	Less than 2 ohms
When clutch pedal is not depressed.	1 – 2	Open circuit

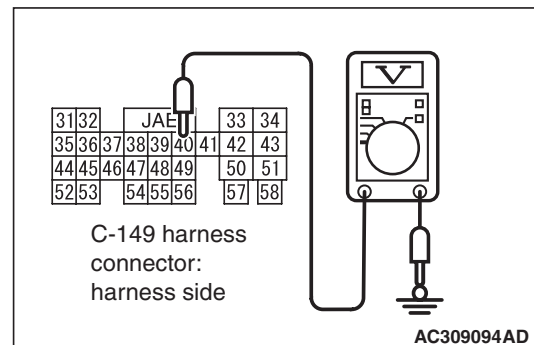
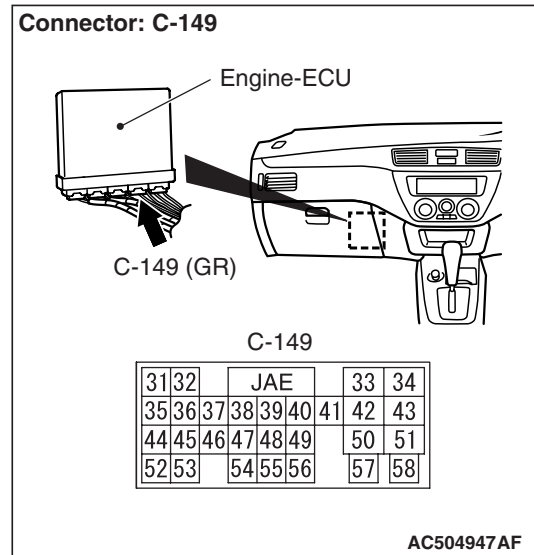
Q: Is the check result normal?

YES : Go to Step 2.

NO : Replace the clutch switch (Refer to GROUP 21A, Clutch Pedal [P.21A-4](#)). Then go to Step 8.

STEP 2. Measure the voltage at engine-ECU connector C-149.

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



(2) Measure the voltage between engine-ECU connector C-149 terminal No.40 and earth.

OK:

Clutch pedal depressed: 1 V or less

Clutch pedal not depressed: System voltage

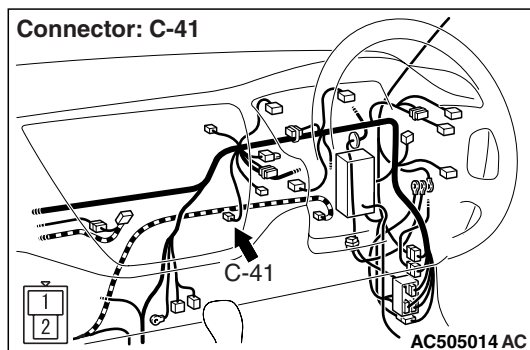
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?

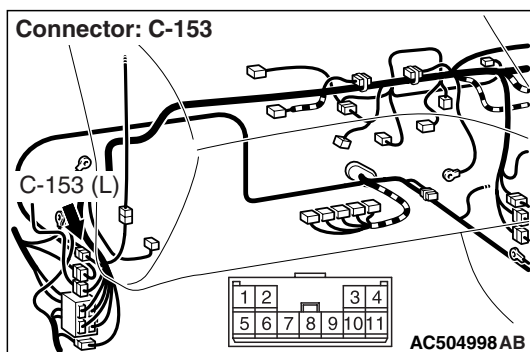
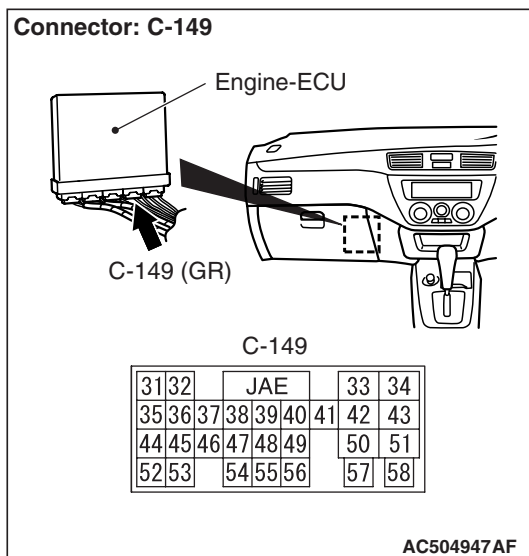
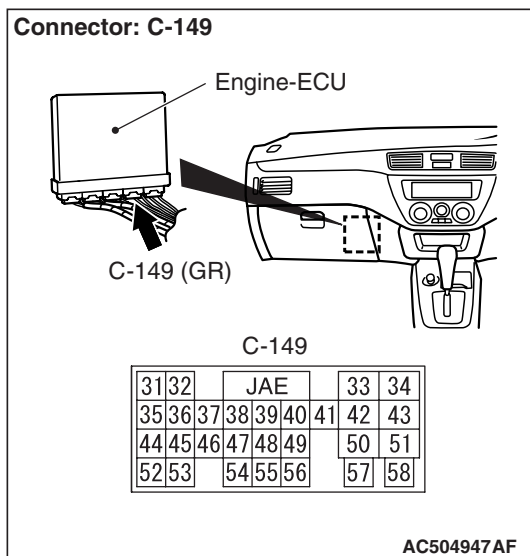
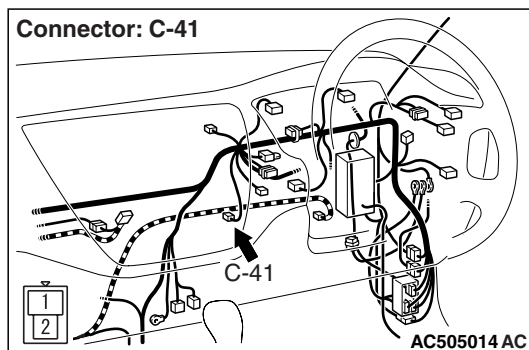
YES : Go to Step 7.

NO : Go to Step 3.

STEP 3. Connectors check: C-41 clutch switch connector, C-149 engine-ECU connector and C-153 intermediate connector.



STEP 4. Check the harness between clutch switch connector C-41 terminal No.2 and engine-ECU connector C-149 terminal No.40.



Q: Is the check result normal?

YES : Go to Step 5.

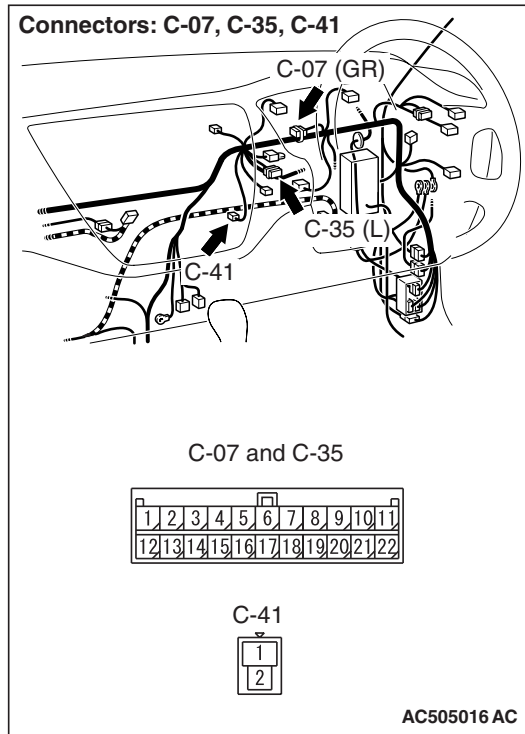
NO : Repair the harness wire. Then go to Step 8.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair or replace the faulty connector. Then go to Step 8.

STEP 5. Connectors check: C-41 clutch switch connector, C-35 J/C (2) and C-07 J/C (3).

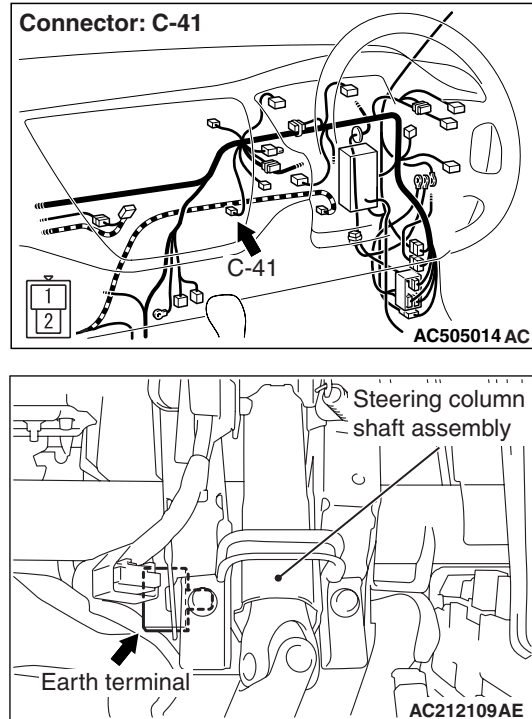


Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair or replace the faulty connector. Then go to Step 8.

STEP 6. Check the harness between clutch switch connector C-41 terminal No.1 and earth.



Q: Is the check result normal?

YES : Go to Step 7.

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

STEP 7. Retest the system

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

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

NO : Replace the engine-ECU (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 8.

STEP 8. Retest the system

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

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 3: When the Selector Lever is Moved to N Range, Auto-cruise Control is not Cancelled <A/T>.

COMMENTS ON TROUBLE SYMPTOM

The inhibitor switch circuit is suspected.

PROBABLE CAUSES

- Malfunction of the inhibitor switch.
- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the engine-A/T-ECU.

DIAGNOSIS PROCEDURE

Refer to GROUP 23A, Diagnostic Trouble Code Procedures –Code No. 56: N range lamp system [P.23A-72](#).

Inspection Procedure 4: When the Auto-cruise Control CANCEL Switch is Set to ON, Auto-cruise Control is not Cancelled.

COMMENTS ON TROUBLE SYMPTOM

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

PROBABLE CAUSE

Malfunction of the auto-cruise control switch.

DIAGNOSIS PROCEDURE

Replace the auto-cruise control switch (Refer to [P.17-48](#)). Then check the malfunction is eliminated.

Inspection Procedure 5: Auto-cruise Control cannot be Set.

COMMENTS ON TROUBLE SYMPTOM

The fail-safe function is probably cancelling auto-cruise control. In this case, M.U.T.-II/III can be used to retest each system by checking the diagnosis trouble codes. The M.U.T.-II/III can also be used to check if the circuits of each input switch are normal or not by checking the input switch codes.

PROBABLE CAUSES

- Malfunction of the auto-cruise control switch.
- Malfunction of the stop lamp switch.
- Malfunction of the clutch switch <M/T>.
- Malfunction of the inhibitor switch <A/T>.
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS PROCEDURE

STEP 1. Check the M.U.T.-II/III diagnosis code.

Q: Is any diagnosis code set?

YES : Refer to [P.17-9](#), Check Chart for Diagnosis Codes. Then go to Step 6.

NO : Go to Step 2.

STEP 2. M.U.T.-II/III data list.

Item 04: Cancel switch (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Refer to [P.17-34](#), Symptom Procedures number 4. Then go to Step 6.

STEP 3. M.U.T.-II/III data list.

- Item 05: Stop lamp switch (Refer to data list reference table [P.17-42](#)).
- Item 06: Brake switch (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 4.

NO : Refer to [P.17-29](#), Symptom Procedures number 1. Then go to Step 6.

STEP 4. M.U.T.-II/III data list.

- Item 07, Clutch switch <M/T> (Refer to data list reference table [P.17-42](#)).
- Item 07, Inhibitor switch <A/T> (Refer to data list reference table [P.17-42](#)).

Q: Is the check result normal?

YES : Go to Step 5

NO <M/T> : Refer to [P.17-30](#), Symptom Procedures number 2. Then go to Step 6.

NO <A/T> : Refer to [P.17-34](#), Symptom Procedures number 3. Then go to Step 6.

STEP 5. Check the symptoms.**Q: Can auto-cruise control be set?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 6 .

STEP 6. Check the symptoms.**Q: Can auto-cruise control be set?**

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 6: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed <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 engine-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the MPI system diagnosis code.**Q: Is any diagnosis code set?**

YES : Repair the MPI control system. (Refer to GROUP 13A, Troubleshooting –Inspection chart for diagnosis code [P.13A-19](#)). Then go to Step 3.

NO : Go to Step 2.

STEP 2. Retest the system**Q: Does a hunting occur?**

YES : Replace the engine-ECU (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

STEP 3. Retest the system**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 <A/T>.

COMMENTS ON TROUBLE SYMPTOM

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

PROBABLE CAUSES

- Malfunction of the output shaft speed sensor.
- Malfunction of the throttle body.
- Malfunction of the engine-A/T-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check the A/T system diagnosis code.

Q: Is any diagnosis code set?

YES : Repair the A/T system (Refer to GROUP 23A, Troubleshooting <A/T> –Check chart for diagnosis codes [P.23A-15](#)). Then go to Step 4.

NO : Go to Step 2.

STEP 2. Check the MPI system diagnosis code.

Q: Is any diagnosis code set?

YES : Repair the MPI control system (Refer to GROUP 13A, Troubleshooting –Inspection chart for diagnosis code [P.13A-19](#)). Then go to Step 4.

NO : Go to Step 3.

STEP 3. Retest the system

Q: Does a hunting occur?

YES : Replace the engine-A/T-ECU (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU [P.13A-335](#)). Then go to Step 4.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions [P.00-13](#)).

STEP 4. Retest the system

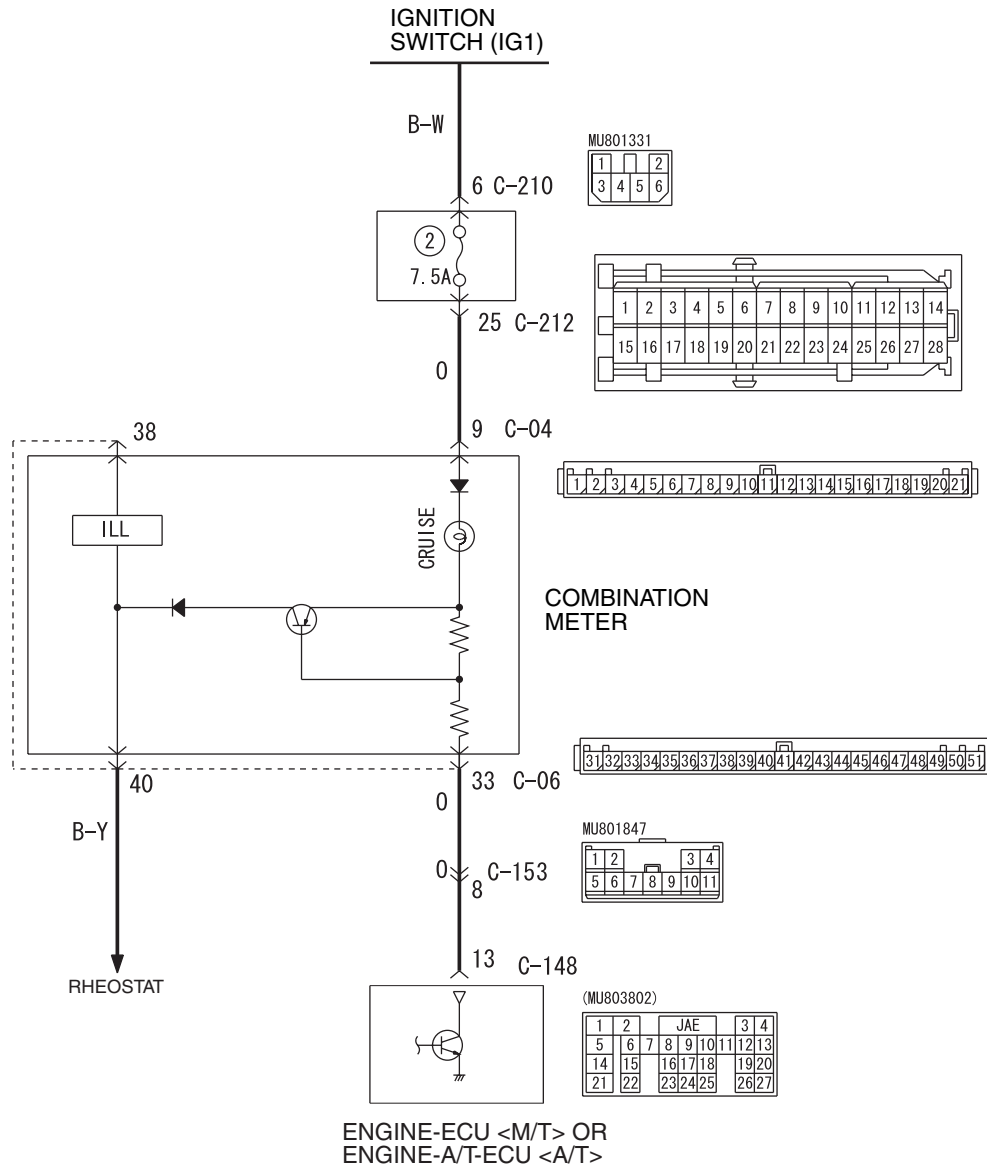
Q: Does a hunting occur?

YES : Return to Step 1.

NO : The procedure is complete.

Inspection Procedure 8: When the Auto-cruise Control MAIN Switch is Turned ON, the Auto-cruise Control Indicator Lamp does not Illuminate. (However, the Auto-cruise Control System is Normal).

Auto-cruise Control Indicator Lamp Drive Circuit



Wire colour code

B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Grey R : Red P : Pink V : Violet PU : Purple

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OPERATION

The engine-ECU <M/T> or engine-A/T-ECU <A/T> detects MAIN switch "ON" signal to illuminate the auto-cruise control indicator lamp on the combination meter.

COMMENTS ON TROUBLE SYMPTOM

Connector(s), wiring harness between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the combination meter, power supply to the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the combination meter, the engine-ECU <M/T> or engine-A/T-ECU <A/T> may be defective.

PROBABLE CAUSES

- Malfunction of the combination meter
- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

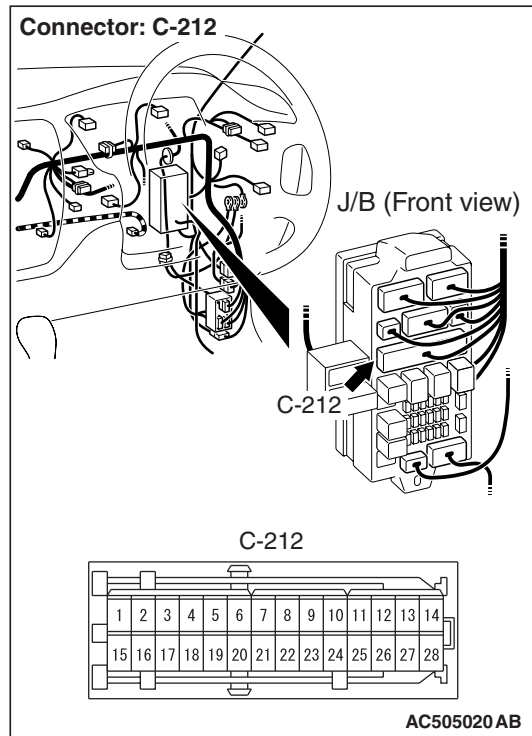
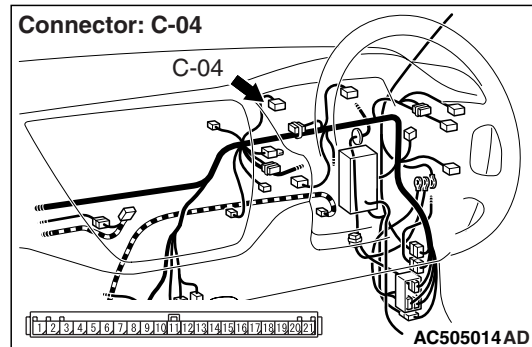
DIAGNOSIS PROCEDURE**STEP 1. Check that the indicator lamp inside the combination meter illuminates.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the indicator lamps other than auto-cruise control indicator lamp illuminate.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Do the indicator lights other than the auto-cruise control indicator lamp illuminate normally?

YES : Go to Step 6.

NO : Go to Step 2.

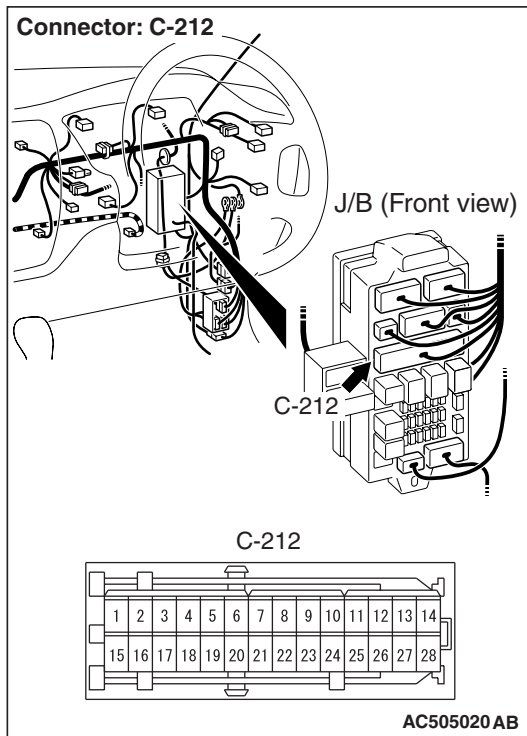
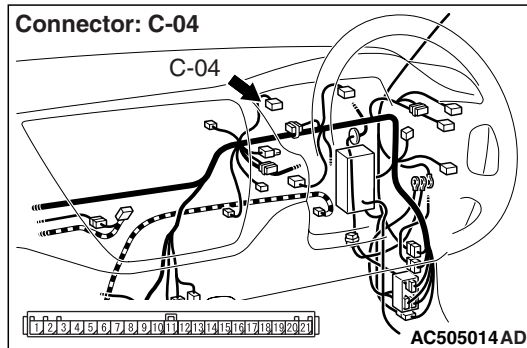
STEP 2. Connectors check: C-04 combination meter connector and C-212 J/B connector.

Q: Is the check result normal?

YES : Go to Step 3.

NO : Repair or replace the faulty connector. Then go to Step 11.

STEP 3. Check the harness between combination meter connector C-04 terminal No.9 and J/B connector C-212 terminal No.25.

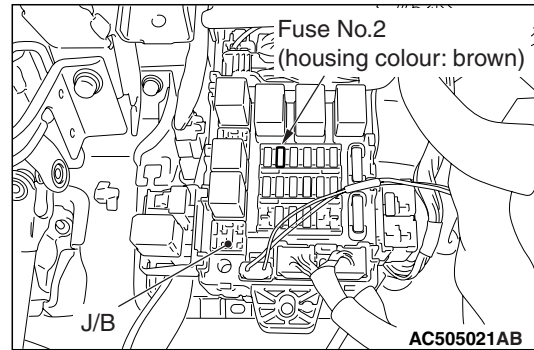


Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the harness wire. Then go to Step 11.

STEP 4. Check the fuse No.2 at the J/B.



Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the fuse. Then go to Step 11.

STEP 5. Check that the indicator lamp inside the combination meter illuminates.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the indicator lamps other than auto-cruise control indicator lamp illuminate.
- (3) Turn the ignition switch to the "LOCK" (OFF) position.

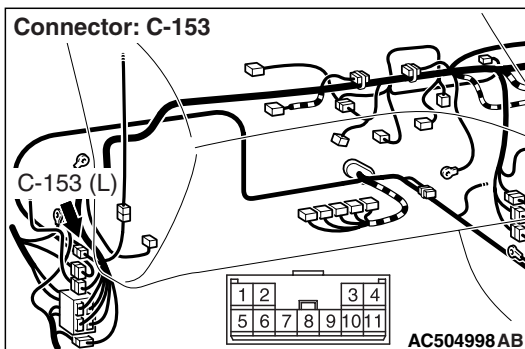
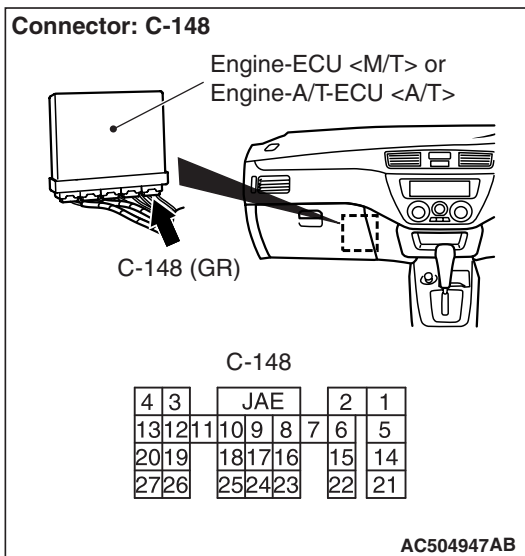
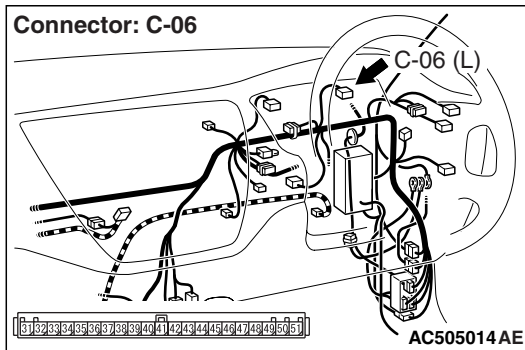
Q: Do the indicator lights other than the auto-cruise control indicator lamp illuminate normally?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions

[P.00-13](#)).

NO : Replace the combination meter (Refer to GROUP 54A, combination meter assembly [P.54A-53](#)). Then go to Step 11.

STEP 6. Connectors check: C-06 combination meter connector, C-148 engine-ECU <M/T> or engine-A/T-ECU <A/T> connector and C-153 intermediate connector.

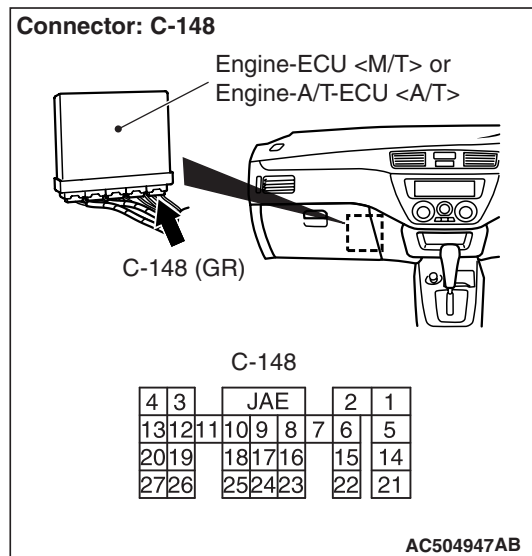
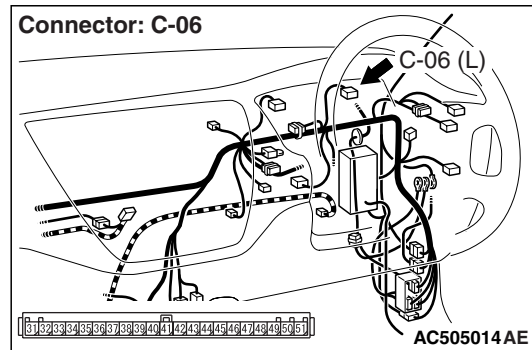


Q: Is the check result normal?

YES : Go to Step 7.

NO : Repair or replace the faulty connector. Then go to Step 11.

STEP 7. Check the harness between combination meter connector C-06 terminal No.33 and engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-148 terminal No.13.



Q: Is the check result normal?

YES : Go to Step 8.

NO : Repair the harness wire. Then go to Step 11.

STEP 8. Check the auto-cruise control indicator lamp bulb.

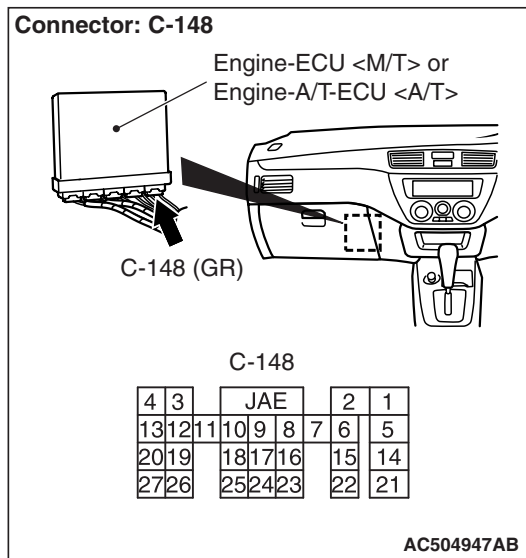
- (1) Remove the combination meter (Refer to GROUP 54A, combination meter assembly [P.54A-53](#)).
- (2) Check the auto-cruise control indicator lamp bulb.

Q: Is the check result normal?

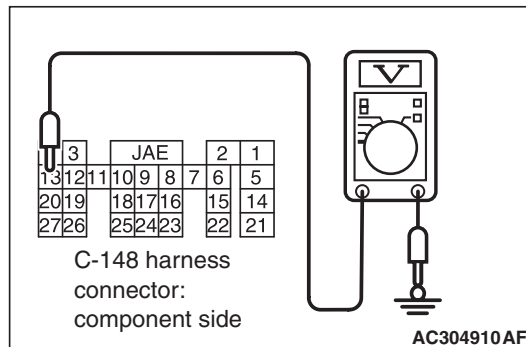
YES : Install the combination meter (Refer to GROUP 54A, combination meter assembly [P.54A-53](#)). Then go to Step 9.

NO : Replace the indicator bulb and Install the combination meter (Refer to GROUP 54A, combination meter assembly [P.54A-53](#)). Then go to Step 11.

STEP 9. Measure the voltage at engine-ECU <M/T> or engine-A/T-ECU <A/T> connector C-148.



- (1) Disconnect engine-ECU or engine-A/T-ECU <A/T> connector C-148 and measure at the harness connector side.



- (2) Measure the voltage between engine-ECU or engine-A/T-ECU <A/T> connector C-148 terminal No.13 and earth.

OK:

Ignition switch to the "ON" position: System voltage

Ignition switch to the "LOCK" (OFF) position: 1 V or less

- (3) Connect engine-ECU or engine-A/T-ECU <A/T> connector C-148.

Q: Is the check result normal?

YES : Go to Step 10.

NO : Replace the combination meter (Refer to GROUP 54A, combination meter assembly P.54A-53). Then go to Step 11.

STEP 10. Check the symptoms.

Q: Does the auto-cruise control indicator lamp illuminate when the MAIN switch is turned "ON"?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 - How to Cope with Intermittent Malfunctions P.00-13).

NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-335). Then go to Step 11 .

STEP 11. Check the symptoms.

Q: Does the auto-cruise control indicator lamp illuminate when the MAIN switch is turned "ON"?

YES : The procedure is complete.

NO : Return to Step 1.

DATA LIST REFERENCE TABLE

M1172002400578

Item No.	Check item		Check condition	Normal condition		
01	Auto-cruise control switch	MAIN	MAIN switch: ON	ON		
			MAIN switch: OFF	OFF		
02		SET/COAST	SET switch: ON	ON		
			SET switch: OFF	OFF		
03		RESUME/ACCELERATING	RESUME switch: ON	ON		
			RESUME switch: OFF	OFF		
04		CANCEL	CANCEL switch: ON	ON		
			CANCEL switch: OFF	OFF		
05	Stop lamp switch (for stop lamp circuit)		Brake pedal: Depressed	ON		
			Brake pedal: Released	OFF		
06	Brake switch (for auto-cruise control circuit)		Brake pedal: Depressed	ON		
			Brake pedal: Released	OFF		
07	Clutch switch <M/T>		Clutch pedal: Depressed	ON		
			Clutch pedal: Released	OFF		
	Inhibitor switch <A/T>		Selector lever: N position	ON		
			Selector lever: Other than N position	OFF		
08	Accelerator switch (Idle switch)		Accelerator pedal: Depressed	OFF		
			Accelerator pedal: Released	ON		
09	Auto-cruise control operation		Auto-cruise control: active	ON		
			Auto-cruise control: Inactive	OFF		
10	Vehicle speed signal		Road test the vehicle	The speedometer and M.U.T.-II/III display the same value.		
11	Throttle position sensor (main)		<ul style="list-style-type: none">Remove the intake air hose at the throttle bodyDisconnect the throttle position sensor, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool: MB991658.Ignition switch: ON	Fully close the throttle valve with your finger	300 – 700 mV	
				Fully open the throttle valve with your finger	4,000 mV or more	
					No load	520 – 620 mV
					Shift lever: "N" → "D" <A/ T>	540 – 640 mV

Item No.	Check item	Check condition		Normal condition
12	Accelerator pedal position sensor (main)	Ignition switch: ON	Accelerator pedal: Released	335 – 935 mV
			Accelerator pedal: Depressed	Increases in response to the pedal depression stroke
			Accelerator pedal: Fully depressed	4,000 mV or more
13	Cancel code	Ignition switch: "ON"		The cancel code, which set when the auto-cruise control system was cancelled at the last time, is set again.

CHECK AT ECU TERMINAL

M1172002700450

C-148										C-149										C-150										C-151										C-152									
1	2							3	4	31	32					33	34	61	62						63	64	91	92					93	94	95	121	122					123	124						
5	6	7	8	9	10	11	12	13		35	36	37	38	39	40	41	42	43	65	66	67	68	69	70	71	72	73	96	97	98	99	100	101	102	103	104	125	126	127	128	129	130	131	132	133				
14	15								19	20									74	75	76	77	78	79	80	81	82	105	106	107	108	109	110	111	112	134	135	136	137	138	139	140	141						
21	22								26	27									83	84	85	86	87	88	89			113	114	115	116	117	118	119	120	142	143	144					145	146					

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Terminal No.	Check item	Check conditions		Normal condition
15	Throttle valve control servo relay	Ignition switch: "ON"		System voltage
		Running at 3,500 r/min while engine is warming up after having been started.		1 V or less
38	Accelerator pedal position switch	Ignition switch: "ON"	Release the accelerator pedal	0 – 1 V
			Depress the accelerator pedal	4 V or more
39	Stop lamp switch	Ignition switch: "ON"	Depress the brake pedal.	System voltage
			Release the brake pedal.	1 V or less
40	Clutch switch <M/T>	Ignition switch: "ON"	Depress the clutch pedal.	1 V or less
			Release the clutch pedal.	System voltage
54	Brake switch	Ignition switch: "ON"	Depress the brake pedal.	System voltage
			Release the brake pedal.	1 V or less
57	Engine control relay	Ignition switch: "ON"		1 V or less
		Ignition switch: "LOCK" (OFF)		System voltage
58	Engine-ECU <M/T> or engine-A/T-ECU <A/T> backup power supply	Ignition switch: "LOCK" (OFF)		System voltage
75	Inhibitor switch <A/T>: "N"	Ignition switch: "ON"	Select lever: N range	System voltage
			Select lever: Other than N range	1 V or less
79	Vehicle speed sensor <M/T>	<ul style="list-style-type: none"> Ignition switch: "ON" Move the vehicle forward slowly 		0 ⇔ 5 V Changes repeatedly

Terminal No.	Check item	Check conditions		Normal condition
92	Accelerator pedal position sensor (main) power supply	Ignition switch: "ON"		4.5 – 5.5 V
94	Auto-cruise control switch	Ignition switch: "ON"	All switches: OFF	4.7 – 5.0 V
			"CRUISE" (MAIN) switch: "ON"	0 – 0.3 V
			"COAST/SET" switch: ON	2.0 – 2.8 V
			"ACC/RES" switch: ON	3.3 – 4.1 V
			"CANCEL" switch: ON	0.8 – 1.5 V
97	Sensor impressed voltage	Ignition switch: "ON"		4.9 – 5.1 V
106	Throttle position sensor power supply	Ignition switch: "ON"		4.5 – 5.5 V
107	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	0.335 – 0.935 V
			Depress the accelerator pedal.	4.0 V or more
113	Throttle position sensor (sub)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the throttle position sensor, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool (MB991658). Ignition switch: "ON" 	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	4.6 V or more
114	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.335 – 0.935 V
			Depress the accelerator pedal.	4.0 V or more
115	Throttle position sensor (main)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the throttle position sensor, and then connect terminal numbers No. 3, No. 4, No. 5 and No. 6 with the use of the special tool (MB991658). Ignition switch: "ON" 	Fully close the throttle valve with your finger	0.3 – 0.7 V
			Fully open the throttle valve with your finger	4.0 V or more
132	Engine-ECU <M/T> or engine-A/T-ECU <A/T> power supply voltage applied to throttle valve control servo	Ignition switch: "ON"		System voltage
133	Throttle valve control servo (+)	<ul style="list-style-type: none"> Ignition switch: "ON" Accelerator pedal: fully opened → fully closed 		Decreases slightly (approximately 2 V) from battery voltage.
141	Throttle valve control servo (–)	<ul style="list-style-type: none"> Ignition switch: "ON" Accelerator pedal: fully closed → fully opened 		Decreases slightly (approximately 2 V) from battery voltage.

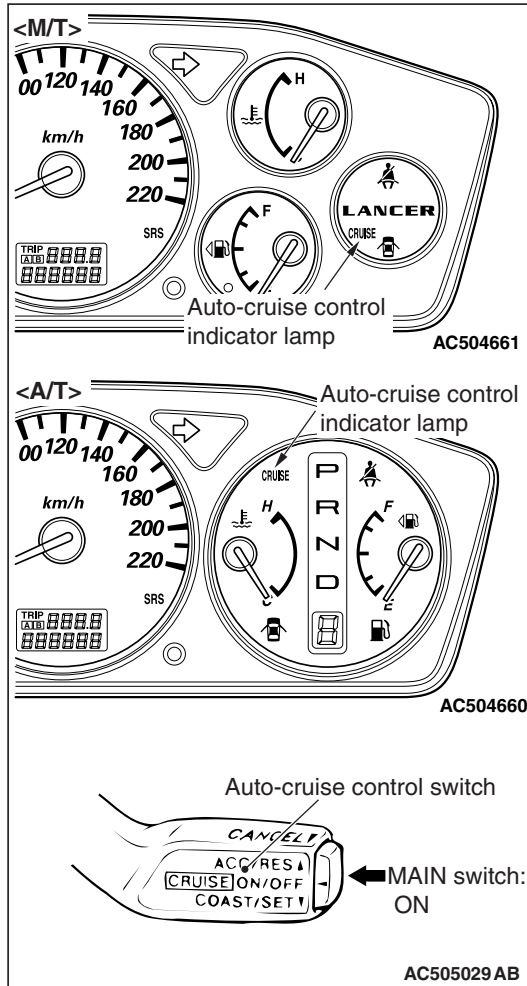
ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

M1172001200195

AUTO-CRUISE CONTROL MAIN SWITCH CHECK

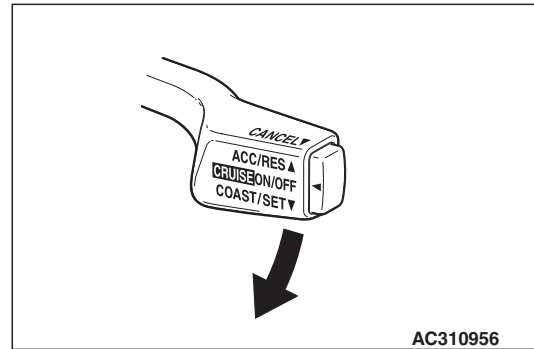
1. Turn the ignition switch to ON position.



2. Check that the auto-cruise control indicator lamp within the combination meter illuminates when the MAIN switch is switched ON.

AUTO-CRUISE CONTROL SETTING

1. Switch ON the MAIN switch.
2. Drive at the desired speed within the range of approximately 40 –200 km/h.

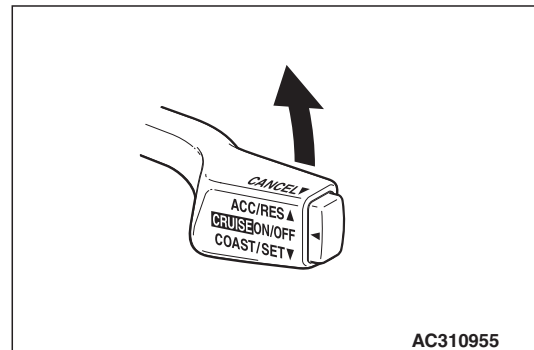


3. Push the auto-cruise control switch in the direction of arrow.
4. Check to be sure that when the switch is released the speed is the desired constant speed.

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

SPEED-INCREASE SETTING

1. Set to the desired speed.

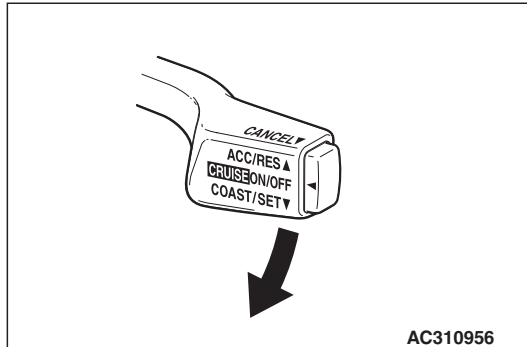


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that acceleration continues while the switch is hold, and that when it is released the constant speed at the time when it was released becomes the driving speed.

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

SPEED-REDUCTION SETTING

1. Set to the desired speed.

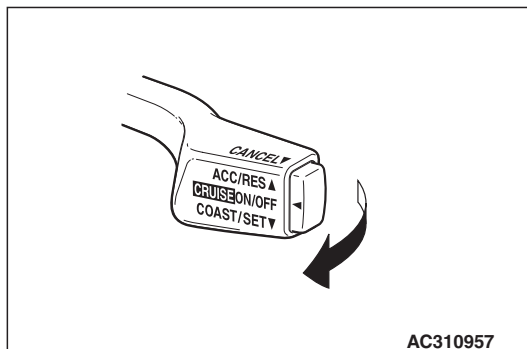


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that deceleration continues while the switch is pressed, and that when it is released the constant speed at the time when it was released becomes the driving speed.

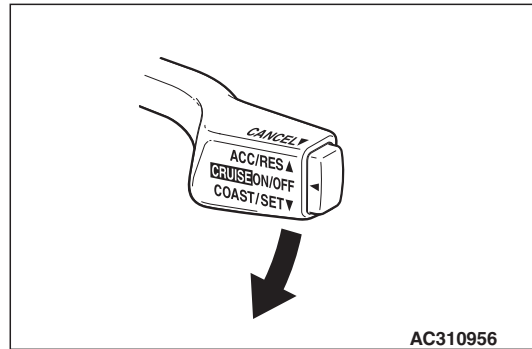
NOTE: When the vehicle speed reaches the low limit (approximately 40 km/h) during deceleration, the auto-cruise control will be cancelled.

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

1. Set the auto-cruise speed control.
2. When any of the following operations are performed while at constant speed during auto-cruise control, check if normal driving is resumed and deceleration occurs.



- (1) The auto-cruise control switch is pulled in the direction of arrow.
- (2) The brake pedal is depressed.
- (3) The clutch pedal is depressed <M/T>.
- (4) The selector lever is moved to the "N" range <A/T>.



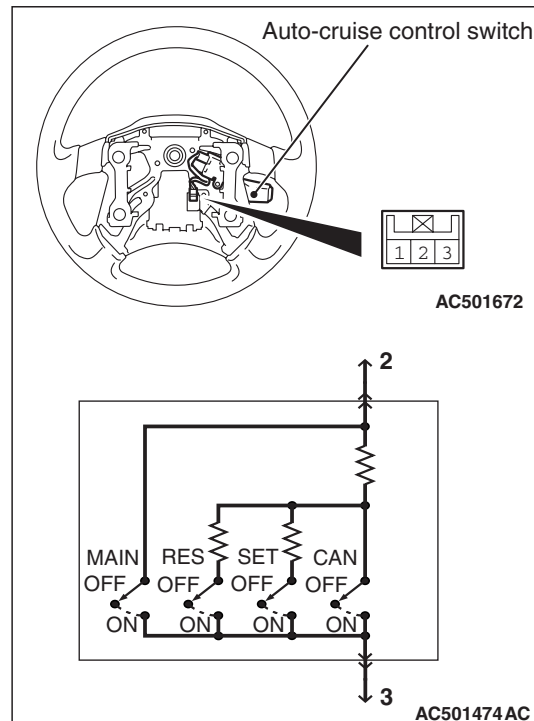
3. When the auto-cruise control switch is pushed in the direction of arrow at a vehicle speed of 40 km/h or higher, check if the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
4. When the MAIN switch is turned to OFF while driving at constant speed, check if normal driving is resumed and deceleration occurs.

AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700606

AUTO-CRUISE CONTROL SWITCH CHECK

1. Remove the steering wheel. (Refer to GROUP 37, Steering Wheel P.37-15).

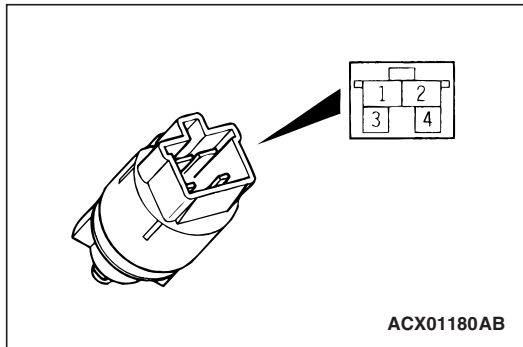


2. Measure the resistance between the terminals when each of the SET, RESUME, CANCEL and MAIN switches is pressed. If the values measured at the time correspond to those in the table below, then there is no problem.

Switch position	Specified condition
MAIN switch: OFF	Open circuit
MAIN switch: ON	Less than 2 Ω
CANCEL switch: ON	Approximately 100 Ω
RESUME switch: ON	Approximately 887 Ω
SET switch: ON	Approximately 300 Ω

STOP LAMP SWITCH

1. Disconnect the connector.

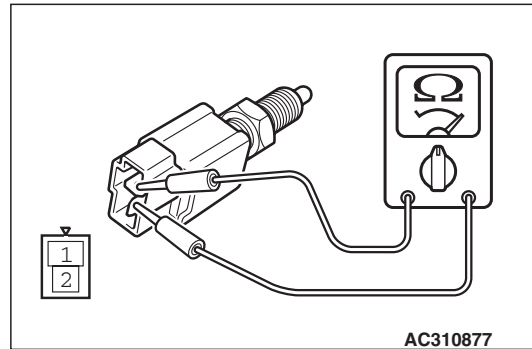


2. Check for continuity between the terminals of the switch.

Measurement conditions	Terminal connector of tester	Specified condition
When brake pedal is depressed. (for stop lamp circuit)	1 – 2	Less than 2 Ω
	3 – 4	Open circuit
When brake pedal is not depressed. (for auto-cruise control circuit)	1 – 2	Open circuit
	3 – 4	Less than 2 Ω

CLUTCH SWITCH <M/T>

1. Disconnect the connector.



2. Connect an ohmmeter to the clutch switch connector, and then check for continuity when the clutch pedal is fully depressed and when it is released outward.

Tester connection	Pedal position	Specified condition
1 - 2	Fully depressed	Less than 2 Ω
	Released	Open circuit

INHIBITOR SWITCH ("N" POSITION) <A/T>

Refer to GROUP 23A, On-vehicle Service –A/T Control Component Check [P.23A-109](#).

THROTTLE POSITION SENSOR

Refer to GROUP 13A, On-vehicle Service –Throttle Valve Control Servo Check [P.13A-331](#).

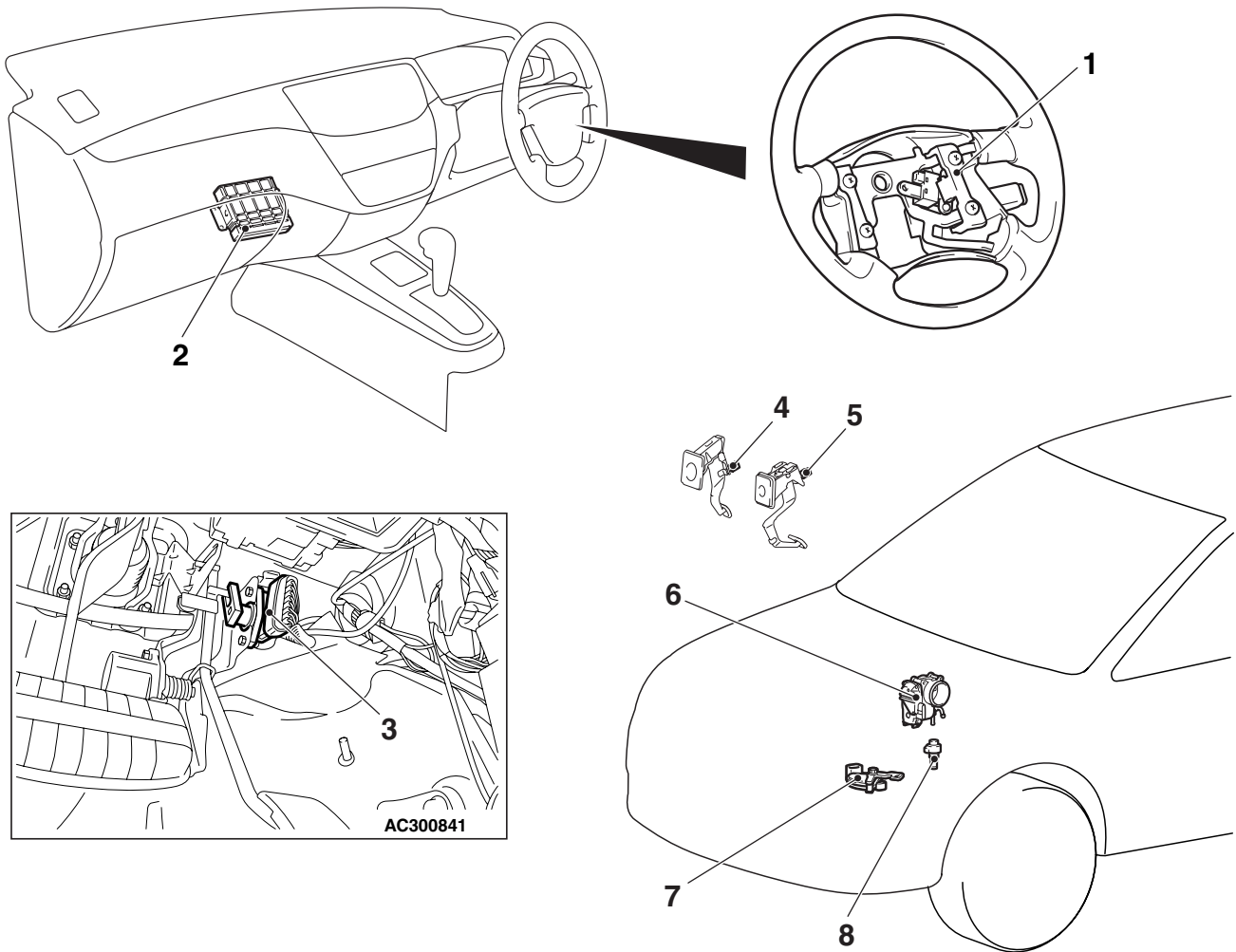
AUTO-CRUISE CONTROL

REMOVAL AND INSTALLATION

M1172001400575

⚠ WARNING

- Before removal of the air bag module, refer to GROUP 52B, Service Precautions (P.52B-5) and Driver's, Front Passenger's Air Bag Module(s) and Clock Spring (P.52B-157).
- When removing and installing the steering wheel and air bag module assembly, do not let it bump against the air bag module.



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Auto-cruise control switch removal steps

1. Steering wheel assembly (built-in auto-cruise control switch) (Refer to GROUP 37, Steering wheel P.37-15)

Control unit removal

2. Engine-ECU <M/T> or Engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-335)

Sensor removal steps

3. Accelerator pedal (Refer to P.17-4)
4. Stop lamp switch (Refer to GROUP 35A, Brake pedal P.35A-12)

Sensor removal steps (Continued)

5. Clutch switch <M/T> (Refer to GROUP 21A, Clutch pedal P.21A-4)
6. Throttle body assembly (Refer to GROUP 13A, Throttle body assembly P.13A-333)
7. Inhibitor switch <A/T> (Refer to GROUP 23B, Transmission P.23B-14)
8. Vehicle speed sensor <M/T> (Refer to GROUP 22B, Transmission P.22B-10)

EMISSION CONTROL <MPI>**GENERAL INFORMATION**

The emission control system consists of the following subsystems:

M1173000100767

- Crankcase emission control system
- Evaporative emission control system
- Exhaust emission control system

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) 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)
Exhaust emission control system	Air-fuel ratio control device - MPI system	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Exhaust gas recirculation system • EGR valve	Equipped Stepper motor type (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

**EMISSION CONTROL DEVICE
REFERENCE TABLE**

M1173006600351

Related parts	Crankcase emission control system	Evaporative emission control system	Air/fuel ratio control system	Catalytic converter	Exhaust gas recirculation system
PCV valve	×				
Purge control solenoid valve		×			
MPI system component		×	×		
Catalytic converter				×	
EGR valve (Stepper motor)					×

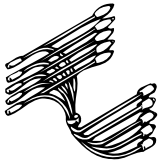
SERVICE SPECIFICATION(S)

M1173000300675

Items	Standard value
Purge control solenoid valve coil resistance (at 20° C) Ω	30 – 34
EGR valve coil resistance (at 20° C) Ω	20 – 24

SPECIAL TOOL

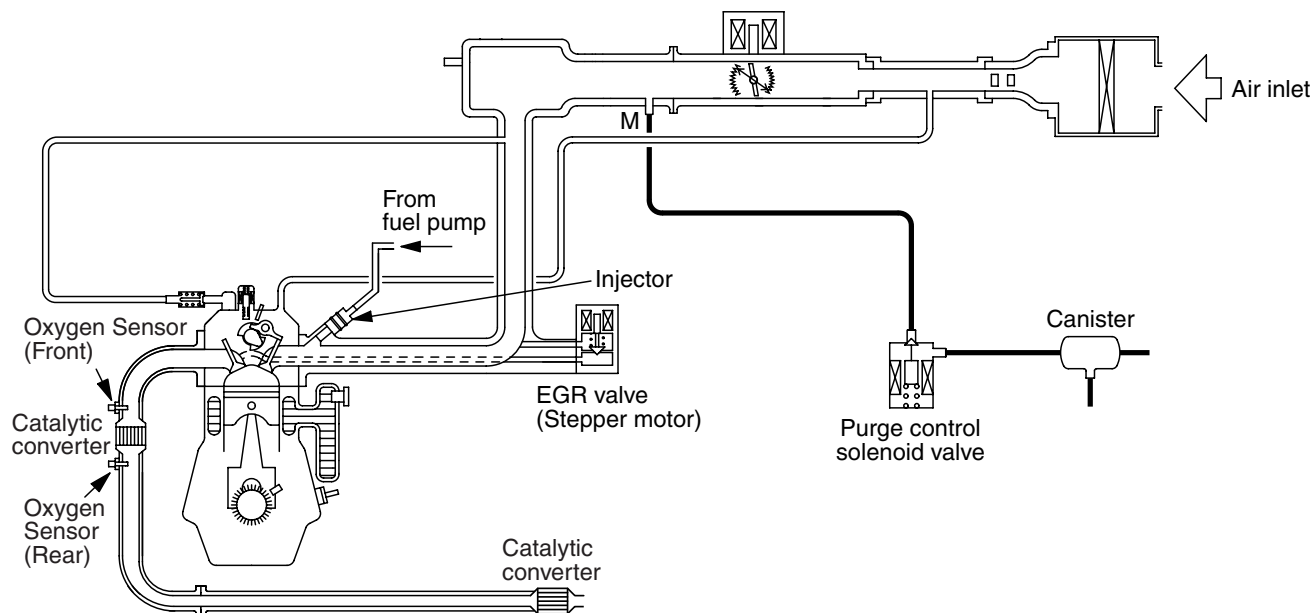
M1173000600427

Tool	Number	Name	Use
 MB991658	MD991658	Test harness	EGR valve (Stepper motor) check

VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM

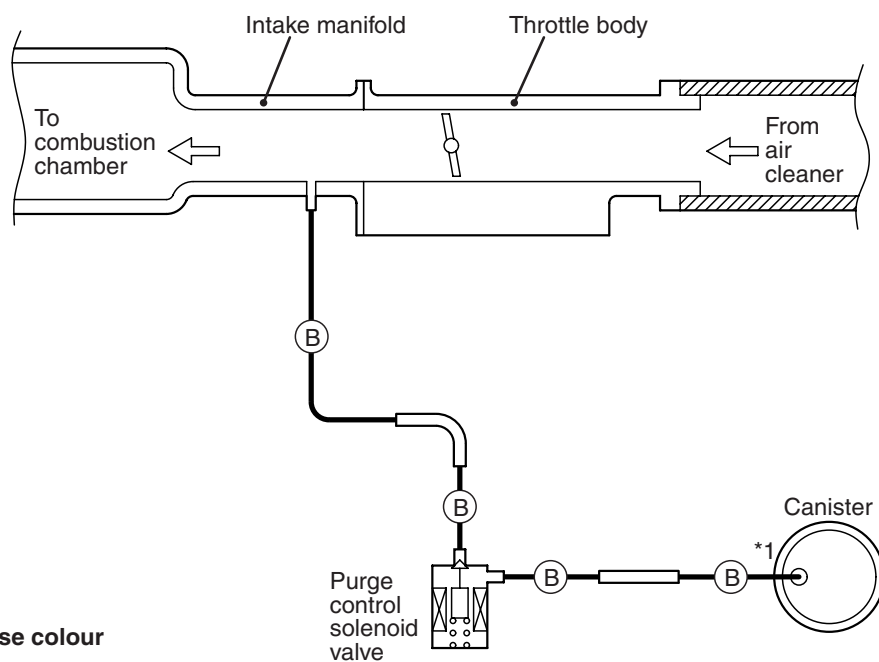
M1173000900815



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VACUUM CIRCUIT DIAGRAM

M1173007100605



Vacuum hose colour
 B: Black
 *1: Red paint mark

AK302823AD

VACUUM HOSE CHECK

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1. Using the piping diagram as a guide, check to be sure that the vacuum hoses are correctly connected.
2. Check the connection condition of the vacuum hoses, (removed, loose, etc.) and check to be sure that there are no bends or damage.

VACUUM HOSE INSTALLATION

M1173007200107

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

CRANKCASE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (CRANKCASE EMISSION CONTROL SYSTEM)

M1173005000710

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.

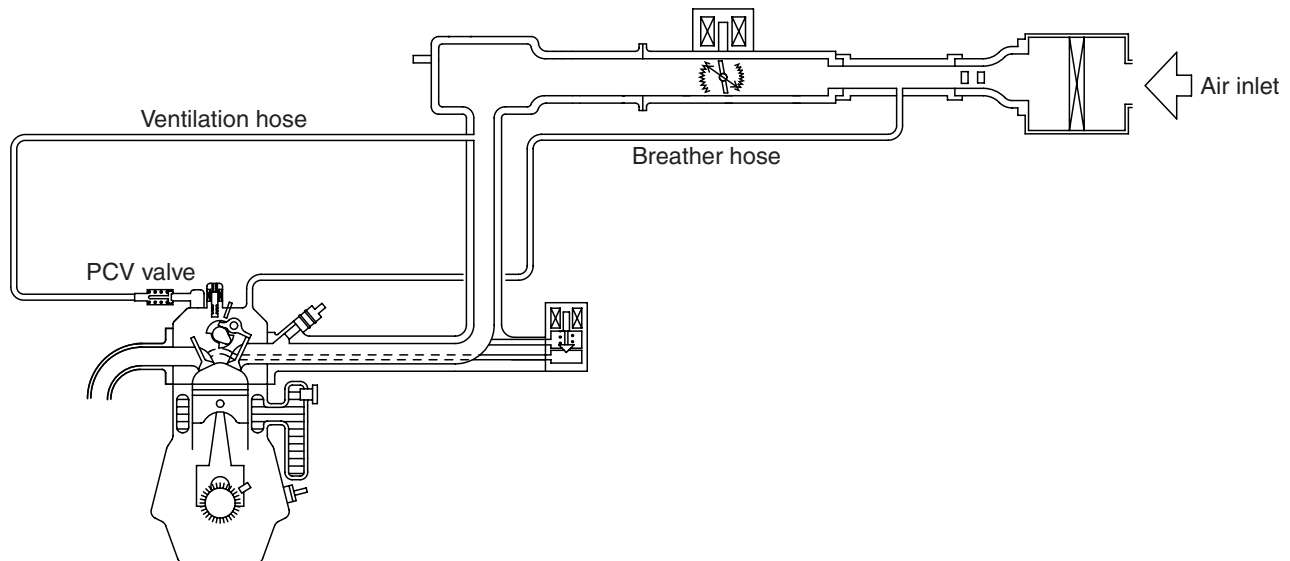
The air becomes mixed with the blow-by gases inside the crankcase.

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

The PCV valve lifts 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.

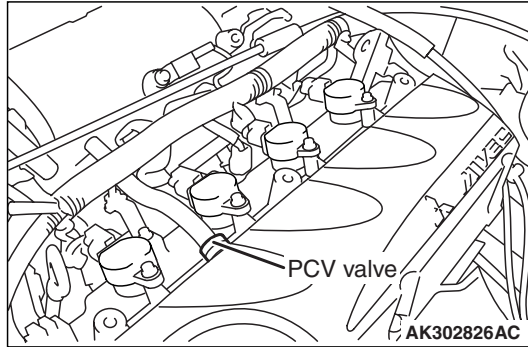
SYSTEM DIAGRAM



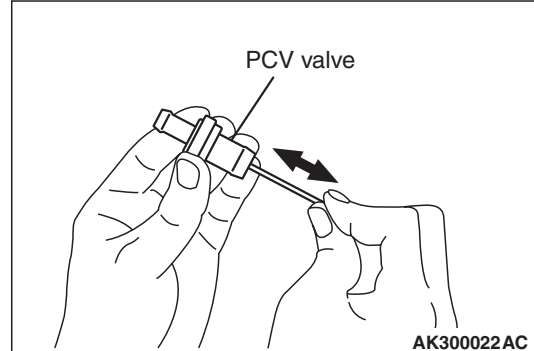
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**COMPONENT LOCATION (CRANKCASE
EMISSION CONTROL SYSTEM)**

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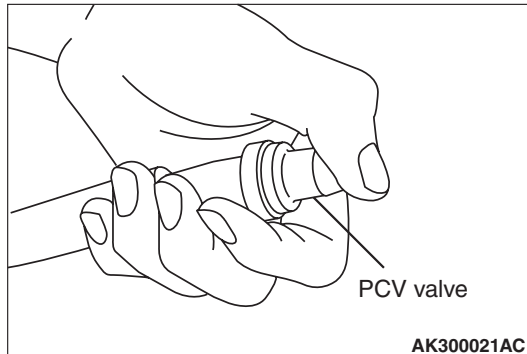
**POSITIVE CRANKCASE VENTILATION
(PCV) VALVE CHECK**

M1173001200422

**POSITIVE CRANKCASE VENTILATION
SYSTEM CHECK**

M1173001100470

1. Remove the ventilation hose from the PCV valve.
2. Remove the PCV valve from the rocker 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.

1. Insert a thin rod into the PCV valve from the side shown in the illustration (rocker 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 PCV valve. In this case, clean or replace the PCV valve.

**EVAPORATIVE EMISSION CONTROL
SYSTEM****GENERAL INFORMATION (EVAPORATIVE
EMISSION CONTROL SYSTEM)**

M1173005100869

The evaporative emission control system prevents fuel vapours generated in the fuel tank from escaping into the atmosphere.

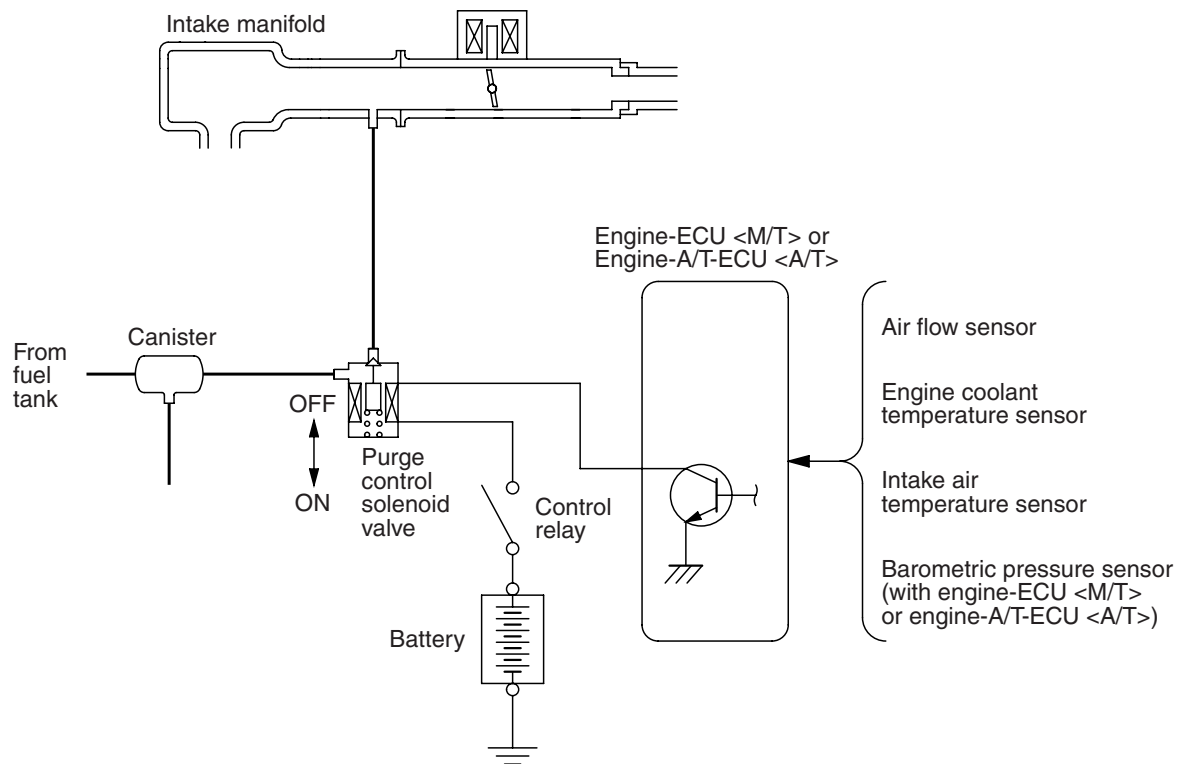
Fuel vapours from the fuel tank flow through the fuel tank pressure control valve and vapour pipe/hose to be stored temporarily in the canister.

When driving the vehicle, fuel vapours stored in the canister flow through the purge control solenoid valve and purge port and go into the intake 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 intake manifold.

This does not only insure the driveability when the engine is cold or running under low load but also stabilize the emission level.

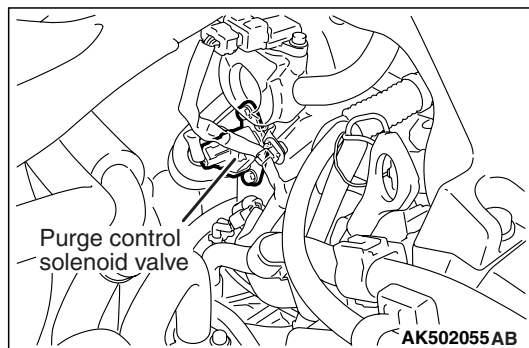
SYSTEM DIAGRAM



AK302829AG

COMPONENT LOCATION (EVAPORATIVE EMISSION CONTROL SYSTEM)

M1173007500454



1. Disconnect the vacuum hose (between purge control solenoid valve and intake manifold) from purge control solenoid valve and connect a hand vacuum pump to the nipple.
2. Plug the vacuum hose.
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.
3,000 r/min	

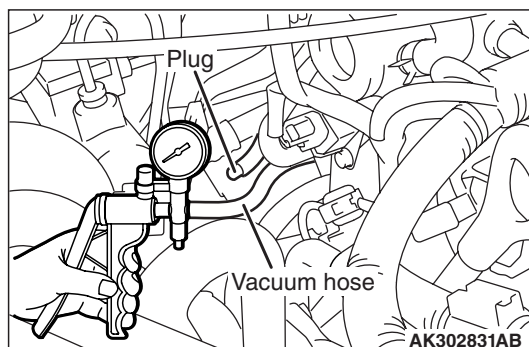
When engine is hot

(Engine coolant temperature: 80° C or higher)

Engine condition	Normal condition
At idle	Vacuum is maintained.
3,000 r/min (within 3 minutes after engine starts)	

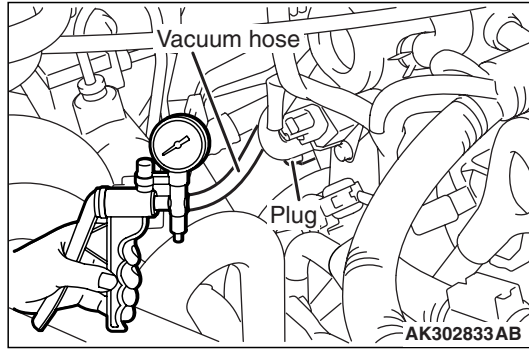
PURGE CONTROL SYSTEM CHECK

M1173001400794

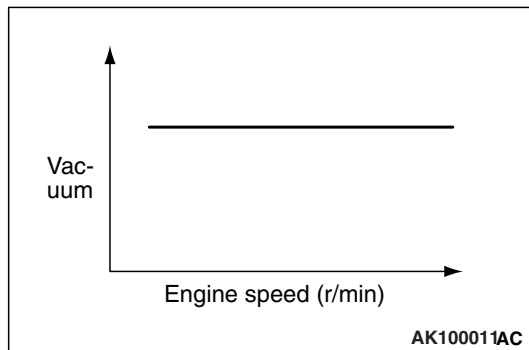


PURGE PORT VACUUM CHECK

M1173001500434



1. Disconnect the vacuum hose (between purge control solenoid valve and intake manifold) from the purge control solenoid valve and connect it to a hand vacuum pump.
2. Plug the nipple from which the vacuum hose was removed.

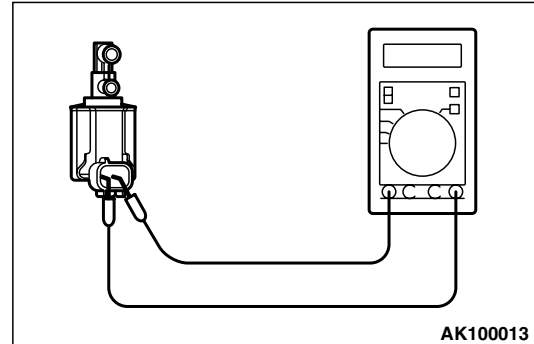
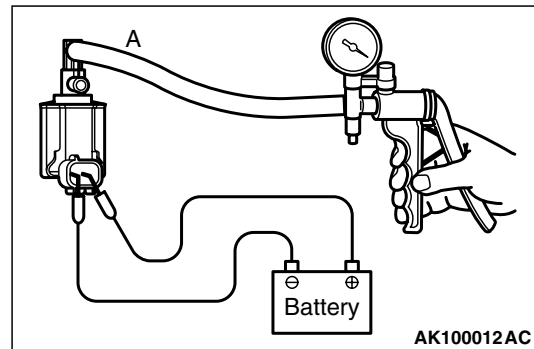


3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably blocked and should be cleaned.

PURGE CONTROL SOLENOID VALVE CHECK

M1173001700483

NOTE: When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.



1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness 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 a vacuum with voltage applied directly from the battery to the purge control solenoid valve and without applying voltage.

Battery voltage	Normal condition
Applied	Vacuum leaks
Not applied	Vacuum maintained

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

Standard value: 30 – 34 Ω (at 20° C)

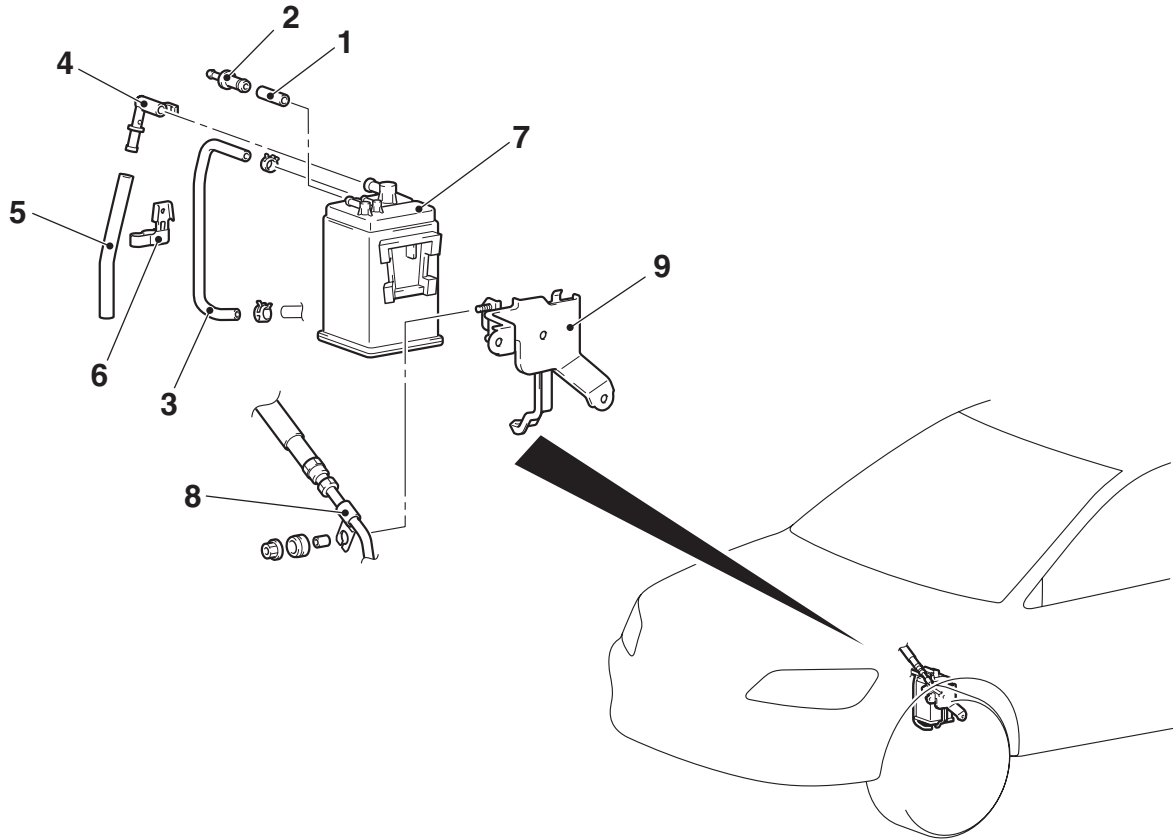
CANISTER

REMOVAL AND INSTALLATION

M1173004200380

Pre-removal and Post-installation Operation

Air Cleaner Assembly Removal and Installation (Refer to GROUP 15 –Air Cleaner P.15-3).



AC403121AB

Removal steps

1. Emission vacuum hose connection
2. Fuel vapour control check valve
3. Fuel vapour control line hose
4. Fuel vapour control line joint
5. Fuel vapour control line hose
6. Fuel vapour control line clamp
7. Fuel vapour canister
8. Fuel high-pressure hose clamp
9. Fuel vapour canister bracket

EXHAUST GAS RECIRCULATION (EGR) VALVE

GENERAL INFORMATION (EGR SYSTEM)

M1173005200714

The exhaust gas recirculation (EGR) system lowers the nitrogen oxide (NOx) emission level.

When the air/fuel mixture combustion temperature is high, a large quantity of nitrogen oxides (NOx) is generated in the combustion chamber. Therefore, this system recirculates part of emission gas from the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx. The EGR flow rate is controlled by the EGR valve so as not to decrease the driveability.

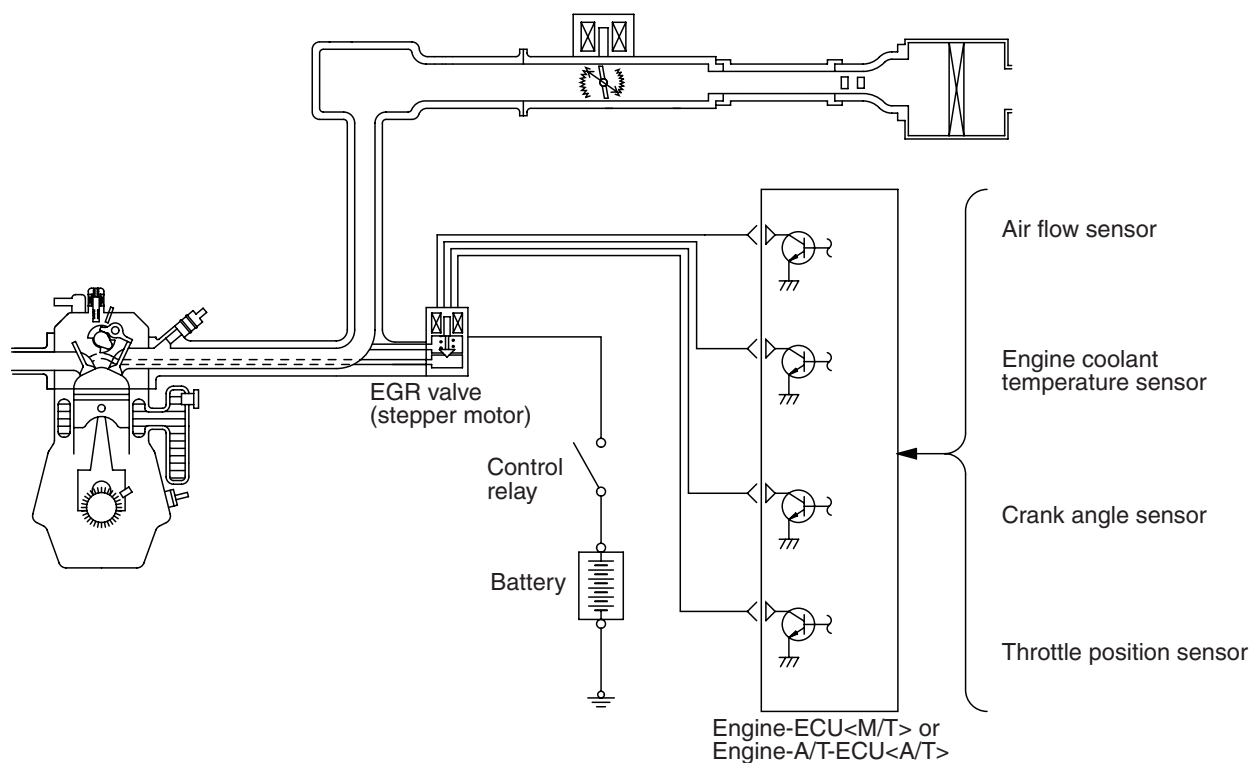
OPERATION

The EGR valve is being closed and does not recirculate exhaust gases under one of the following conditions.

Otherwise, the EGR valve is opened and recirculates exhaust gases.

- The engine coolant temperature is low.
- The engine is at idle.
- The throttle valve is widely opened.

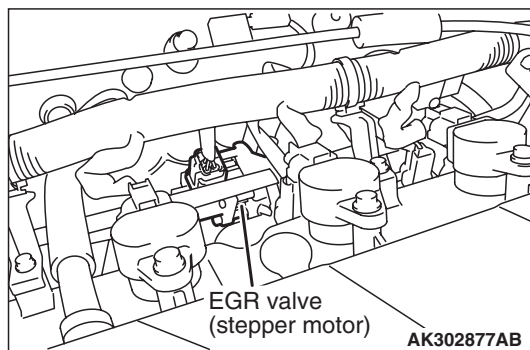
SYSTEM DIAGRAM



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COMPONENT LOCATION (EGR SYSTEM)

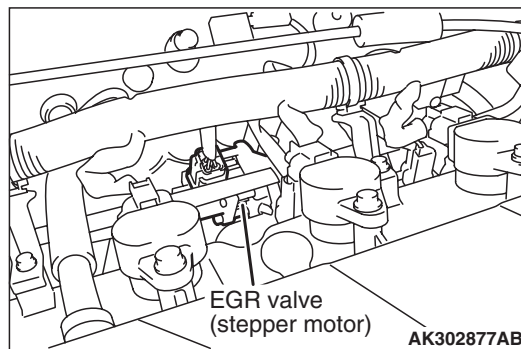
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EGR VALVE (STEPPER MOTOR) CHECK

M1173050200297

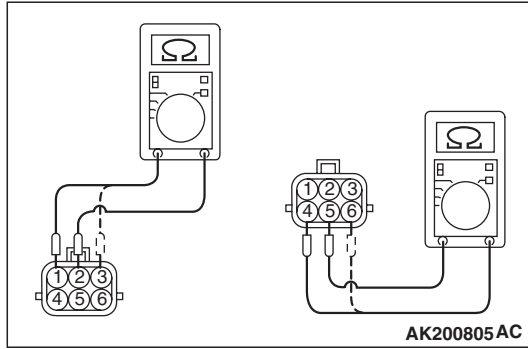
Checking the Operation Sound



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

NOTE: If the circuit is normal, either the stepper motor or the engine-ECU <M/T> or engine-A/T-ECU <A/T> may have failed.

Checking the Coil Resistance



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

Standard value: 20 – 24 Ω (at 20° C)

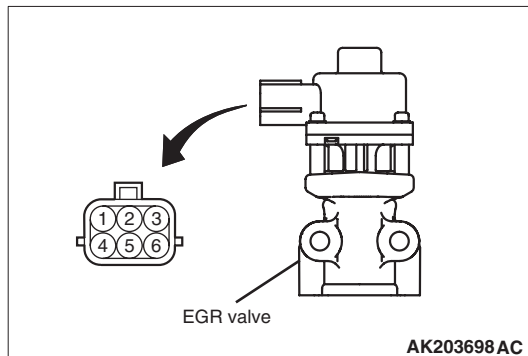
3. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

Standard value: 20 – 24 Ω (at 20° C)

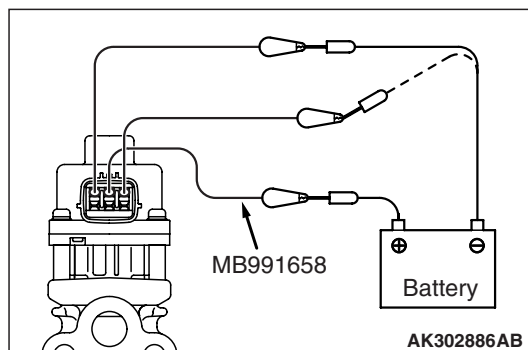
4. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening Torque: 24 \pm 3 N· m

Operation Check



1. Remove the EGR valve.
2. Attach a test wiring harness (special tool MB991658) to the connector at the EGR valve.



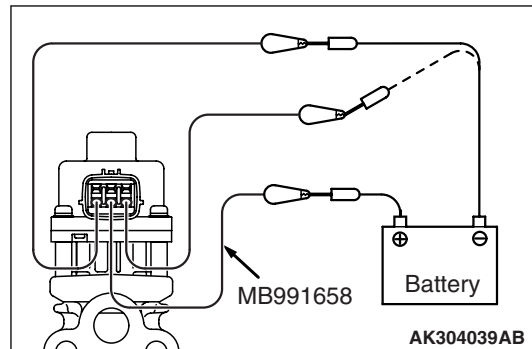
CAUTION

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

3. Connect the positive (+) terminal of the battery to terminal No. 2.
4. Connect terminals No. 1 and No. 3 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.

CAUTION

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



5. Connect the positive (+) terminal of the battery to terminal No. 5.
6. Connect terminals No. 4 and No. 6 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.
7. If a vibration can be felt during the test, the stepper motor is normal.
8. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening torque: 24 \pm 3 N· m

Cleaning the EGR Valve

CAUTION

Do not use a solvent or detergent, which could enter the motor and cause it to malfunction.

1. Remove the EGR valve and check that the EGR valve is not stuck or clogged with carbon deposits. Use a wire brush to clean the valve if necessary.
2. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

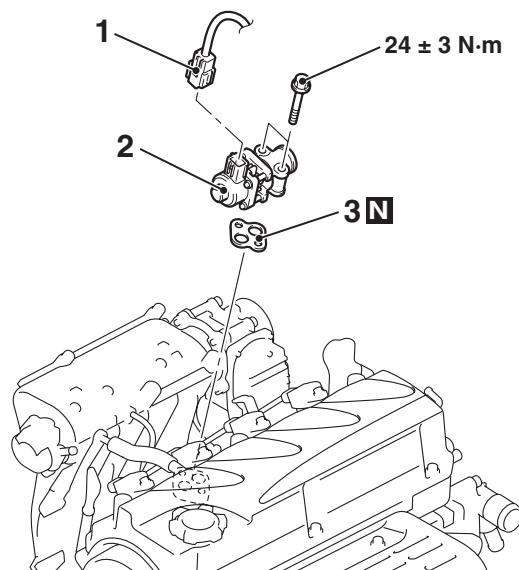
Tightening torque: 24 \pm 3 N· m

REMOVAL AND INSTALLATION

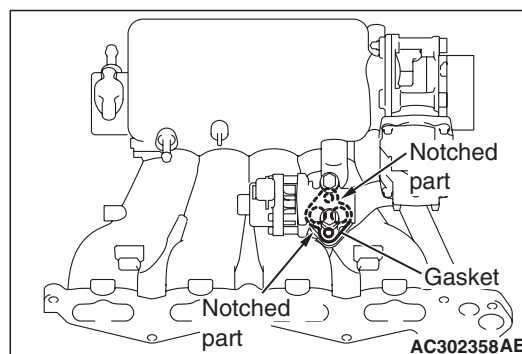
M1173010500540

Pre-removal and Post-installation Operation

Engine Cover Removal and Installation (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-19).

**Removal steps**

- >>A<<
1. EGR valve connector
 2. EGR valve
 3. EGR valve gasket

INSTALLATION SERVICE POINT**>>A<< EGR VALVE GASKET INSTALLATION**

Install the EGR valve gasket as shown in the illustration.