GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

ENGINE CONTROL

GENERAL INFORMATION

M1171000100352

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

ACCELERATOR PEDAL

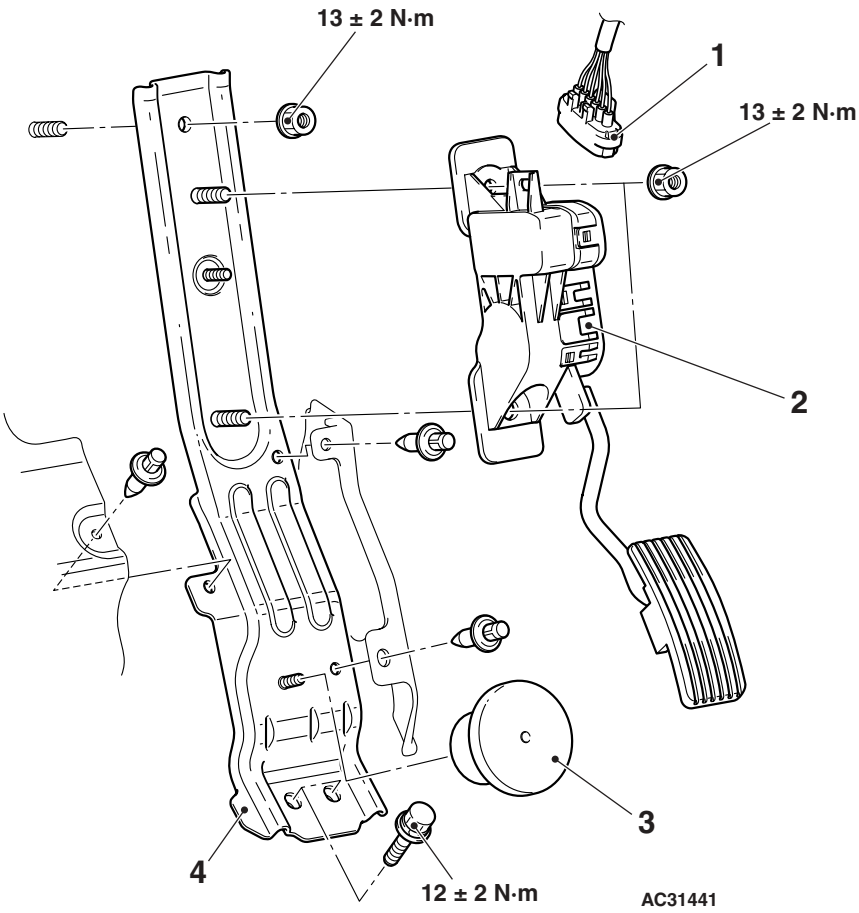
REMOVAL AND INSTALLATION

M1171003000031

⚠ CAUTION

- **Never loosen the screw fixing the accelerator pedal assembly resin cover. If the screw is loosened, the sensor incorporated in the resin cover is misaligned and the accelerator pedal position sensor (APS) do not work normally.**
- **Do not remove the accelerator pedal pad. If the pad is removed and installed, excessive force may damage APS.**

<L.H. drive vehicles>

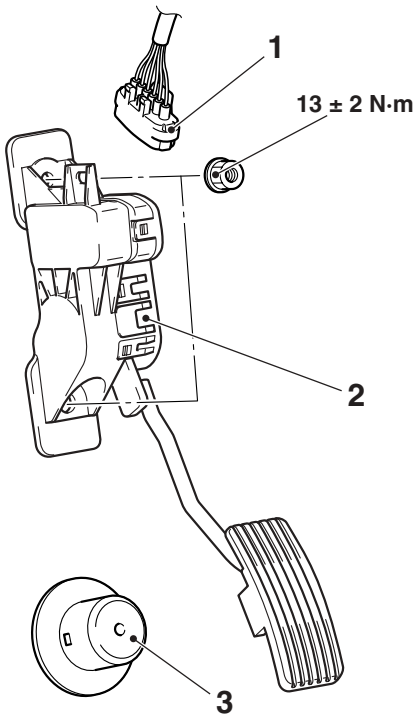


AC31441

Removal steps

1. Accelerator pedal position sensor (APS) connector
2. Accelerator pedal assembly
3. Accelerator pedal arm stopper

<R.H. drive vehicles>



AC302205

AC310547AB

Removal steps (Continued)

- Turn up the floor mat <Driver's side>

4. Accelerator pedal bracket <L.H. drive vehicles>

AUTO-CRUISE CONTROL

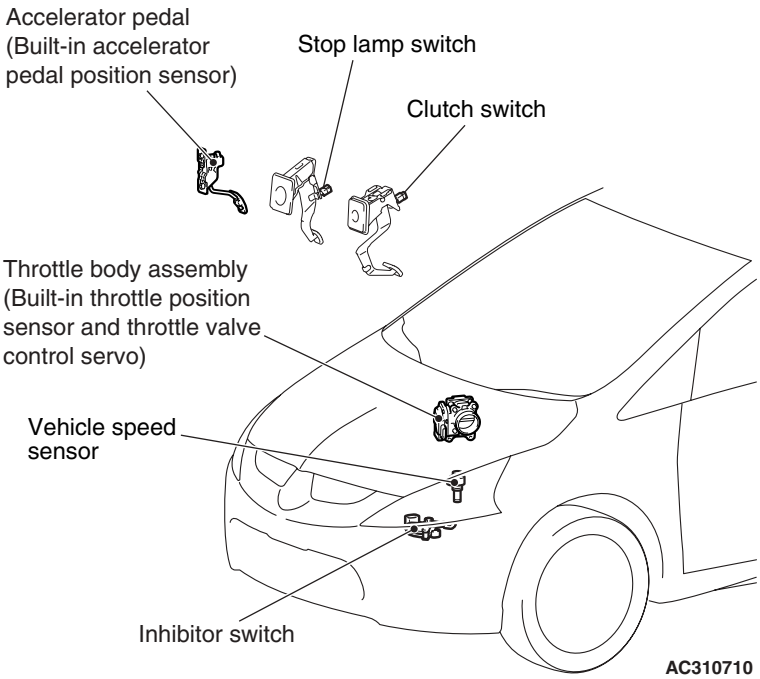
GENERAL INFORMATION

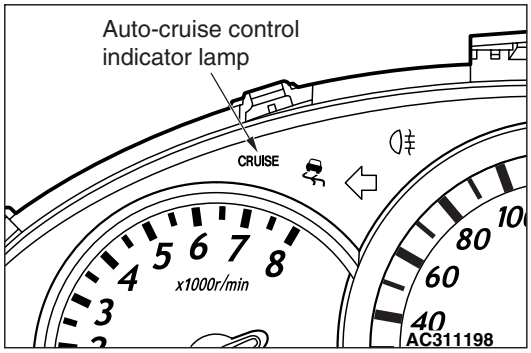
M1172000100355

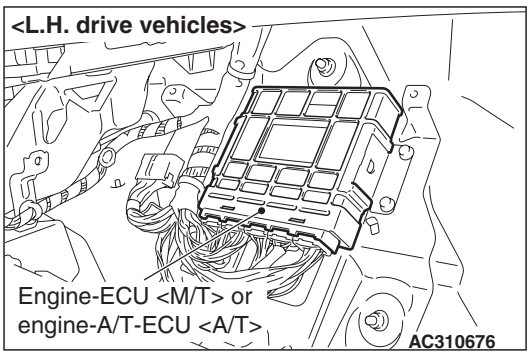
By using the auto-cruise control, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h without depressing the accelerator pedal.

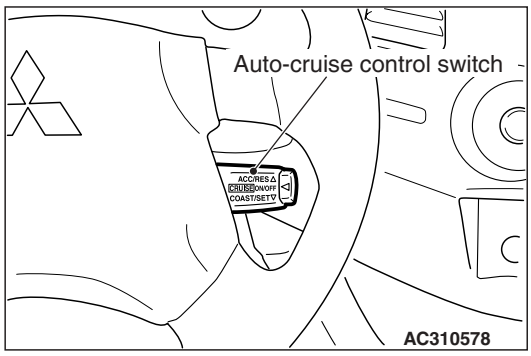
For this auto-cruise control system, in conjunction with the electronic throttle valve control system, the engine-ECU <M/T> or engine-A/T-ECU <A/T> electronically controls the throttle valve.

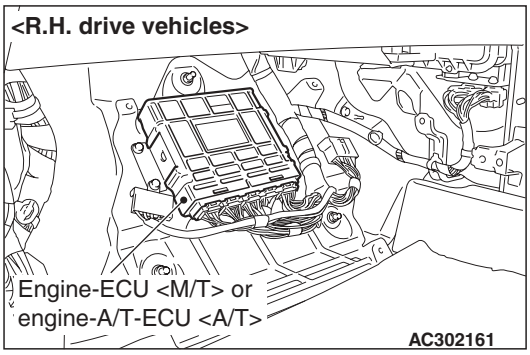
CONSTRUCTION DIAGRAM

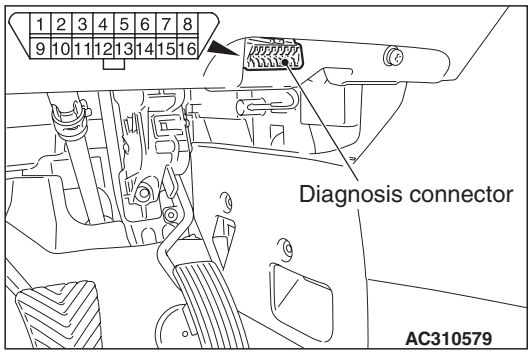








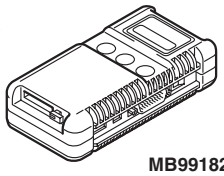
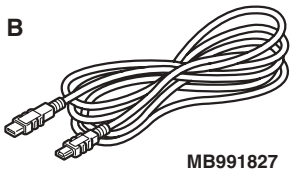
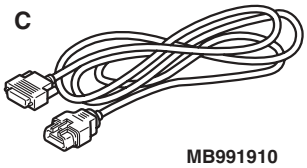
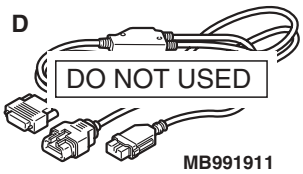
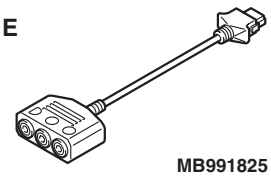
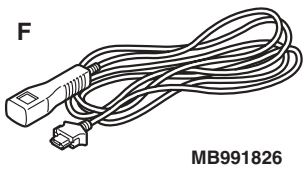
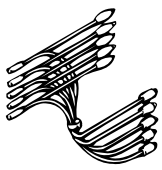




AC310711AB

SPECIAL TOOL

M1172000600361

Tool	Number	Name	Use
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991825 F  MB991826 MB991955	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	MUT-III sub-assembly A: Vehicle Communication Interface (V. C. I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III measurement adapter F: MUT-III trigger harness	Reading diagnosis code **⚠ CAUTION** **MUT-III main harness A should be used. MUT-III main harness B should not be used for this vehicle. If you connect MUT-III main harness B instead, the CAN communication does not function correctly.**
 MB991658	MB991658	Test harness	Inspection of data list

TROUBLESHOOTING

DIAGNOSIS TROUBLESHOOTING FLOW

M1172002000332

Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points P.00-5.

DIAGNOSIS FUNCTION

M1172002100340

METHOD OF READING THE DIAGNOSIS CODE

Use the MUT-III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

METHOD OF ERASING THE DIAGNOSIS CODE

Use the MUT-III to erase the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points P.00-5).

CHECK CHART FOR DIAGNOSIS CODES

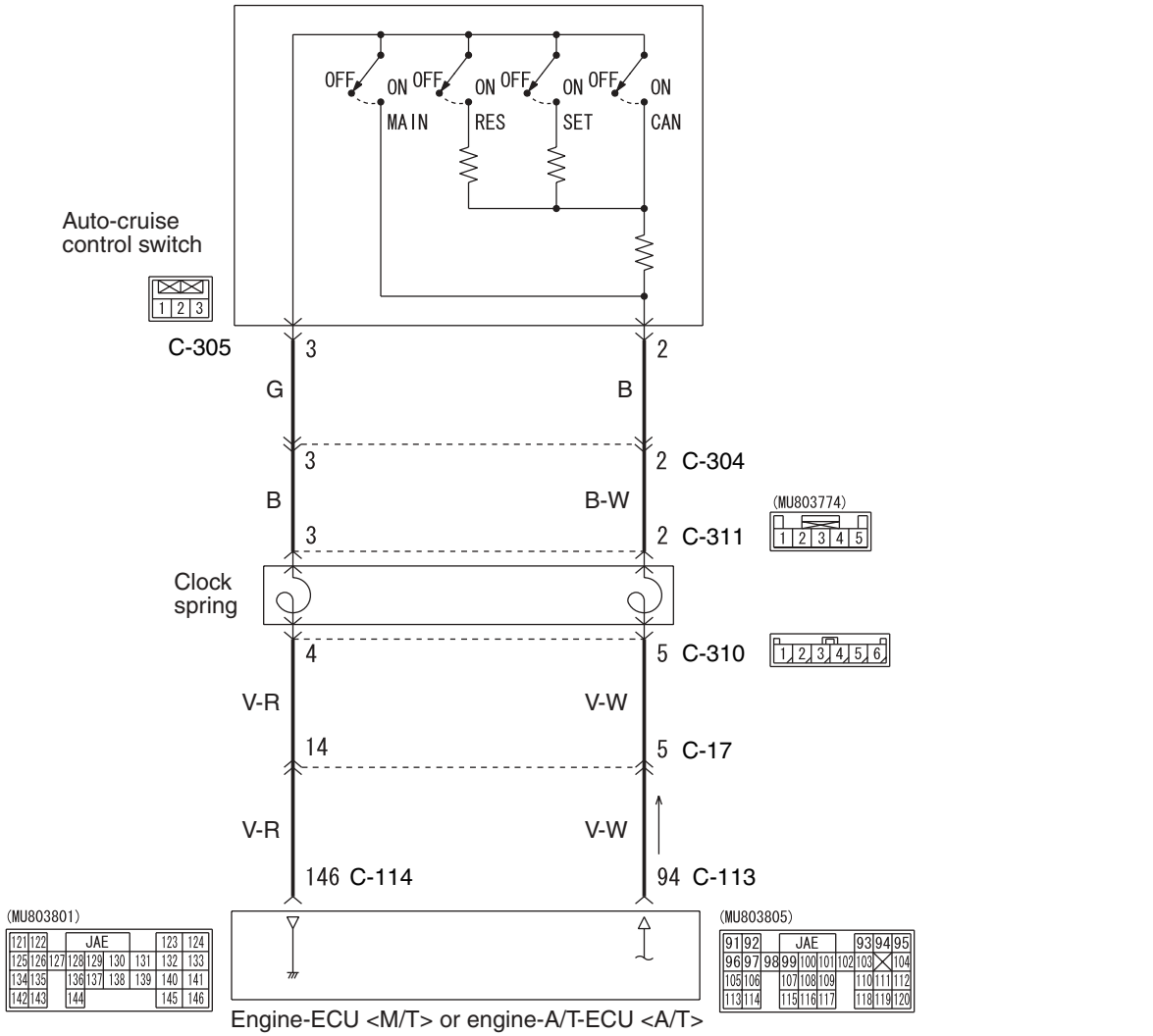
M1172002200358

Code No.	Diagnosis item	Reference page
15	Auto-cruise control switch system	P.17-7
21	Cancel latch signal system	P.17-20
22	Stop lamp switch system <L.H. drive vehicles>	P.17-21
	Stop lamp switch system <R.H. drive vehicles>	P.17-30
23	Engine-ECU <M/T> or engine-A/T-ECU <A/T> and its related components	P.17-38

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: Gray
R: Red P: Pink V: Violet

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.

POSSIBLE 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

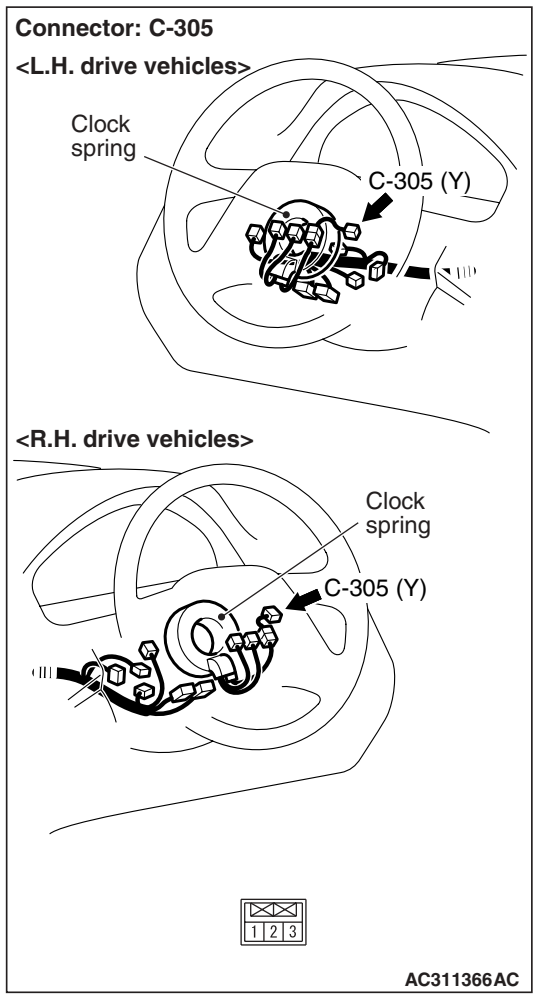
STEP 1. MUT-III data list

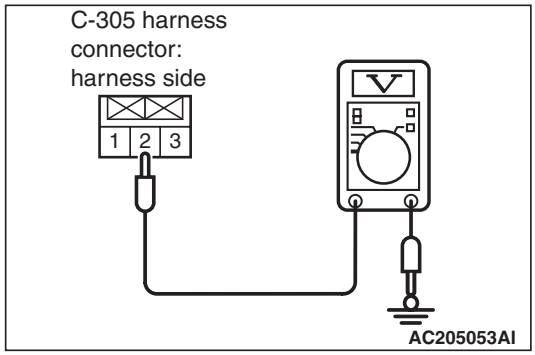
- Item 01: Main switch (Refer to data list reference table P.17-50).
- Item 02: Set switch (Refer to data list reference table P.17-50).
- Item 03: Resume switch (Refer to data list reference table P.17-50).
- Item 04: Cancel switch (Refer to data list reference table P.17-50).

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-305.

(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-225).
(2) Connect the negative (−) battery cable.
(3) Turn the ignition switch to the "ON" position and the MAIN switch to the "OFF" position.



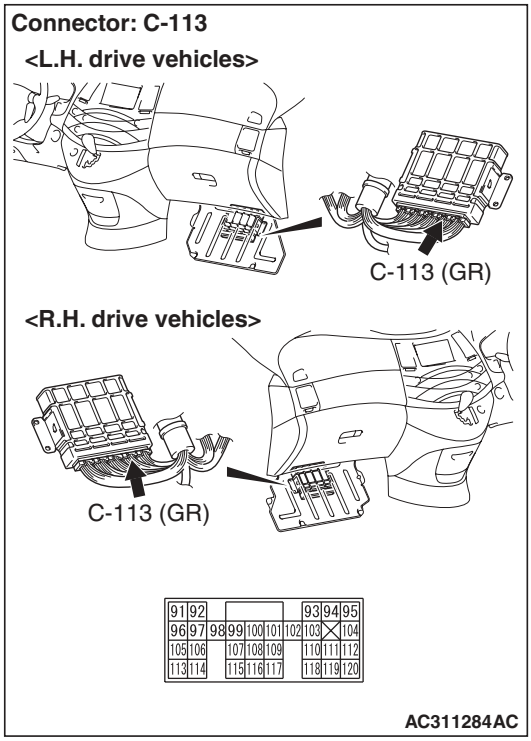


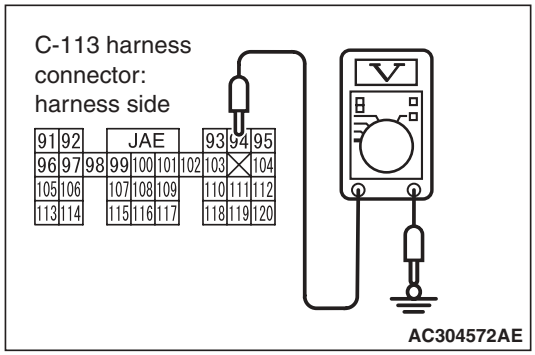
(4) Measure the voltage between connector C-305 terminal No.2 and earth.
OK: 4.7−5.0 V
(5) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Go to Step 3.

STEP 3. Measure the voltage at engine-ECU connector C-113 <M/T> or engine-A/T-ECU connector C-113 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-113 <M/T> terminal No.94 or engine-A/T-ECU connector C-113 <A/T> terminal No.94 and earth.

OK: 4.7–5.0 V

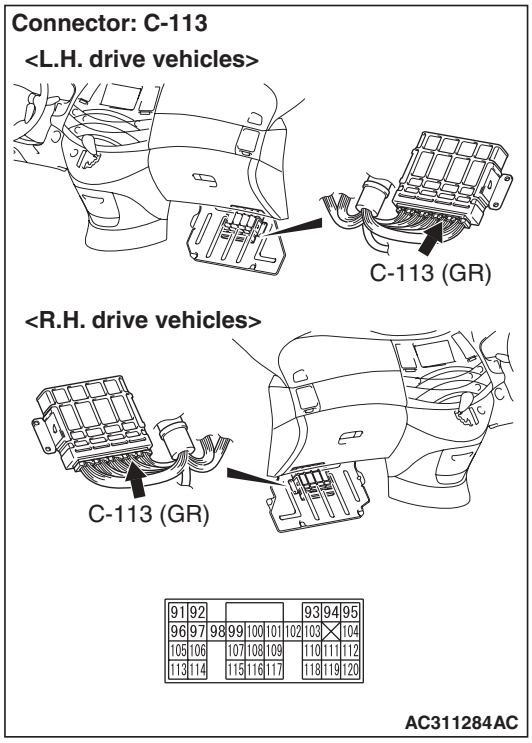
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Go to Step 4.

STEP 4. Connector check: C-113 engine-ECU connector <M/T> or C-113 engine-A/T-ECU connector <A/T>

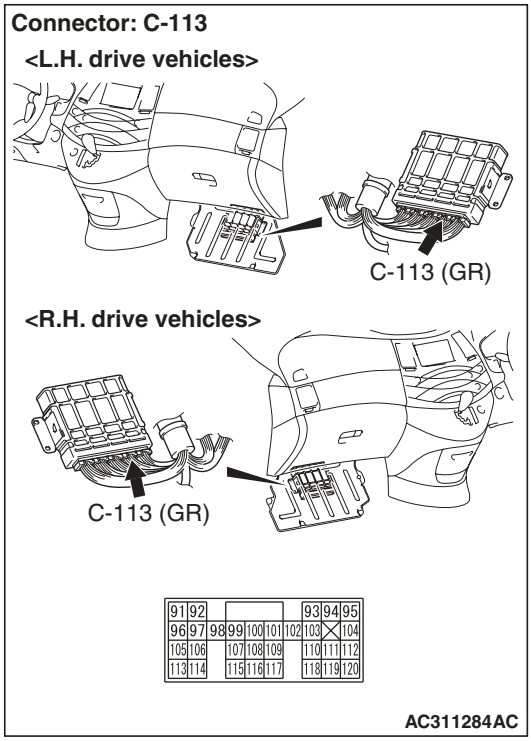


Q: Is the check result normal?

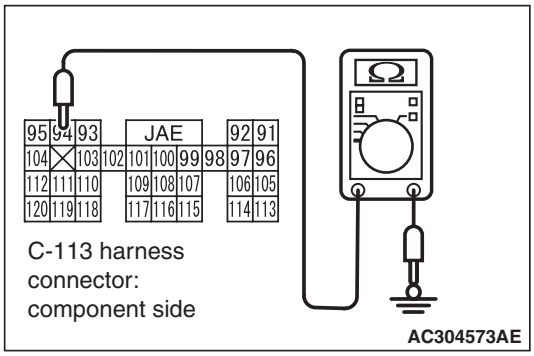
YES : Go to Step 5.

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-225). Then go to Step 18.

STEP 5. Check the harness between engine-ECU connector C-113 <M/T> terminal No.94 or engine-A/T-ECU connector C-113 <A/T> terminal No.94 and the auto-cruise control switch connector C-305 terminal No.2.



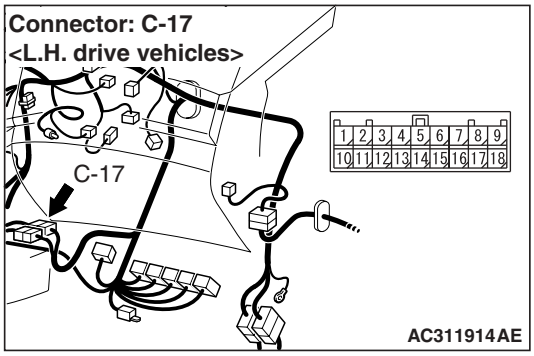
(1) Disconnect engine-ECU connector C-113 <M/T> or engine-A/T-ECU connector C-113 <A/T> and measure at the harness connector side.
(2) Turn the ignition switch to the "ON" position and the MAIN switch to the "OFF" position.

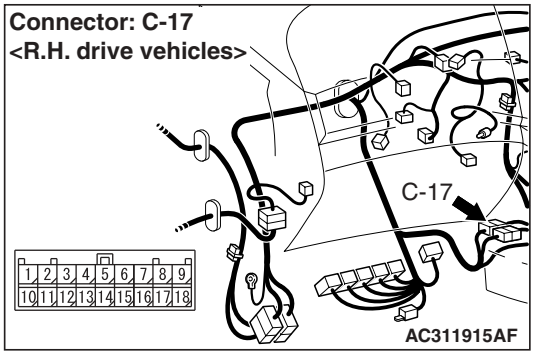


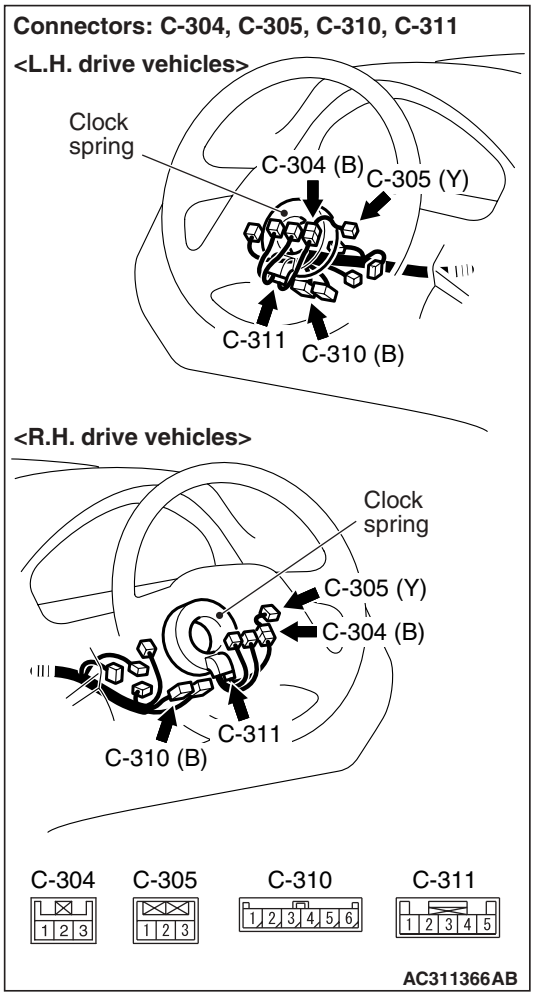
(3) Measure the continuity between engine-ECU connector C-113 <M/T> terminal No.94 or engine-A/T-ECU connector C-113 <A/T> terminal No.94 and earth.
(4) Turn the ignition switch to the "LOCK" (OFF) position.
(5) Connect engine-ECU connector C-113 <M/T> or engine-A/T-ECU connector C-113 <A/T>.

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-225). Then go to Step 17.
NO : Go to Step 6.

STEP 6. Connectors check: C-305 auto-cruise control switch connector, C-17 and C-304 intermediate connectors, C-310 and C-311 clock spring connectors



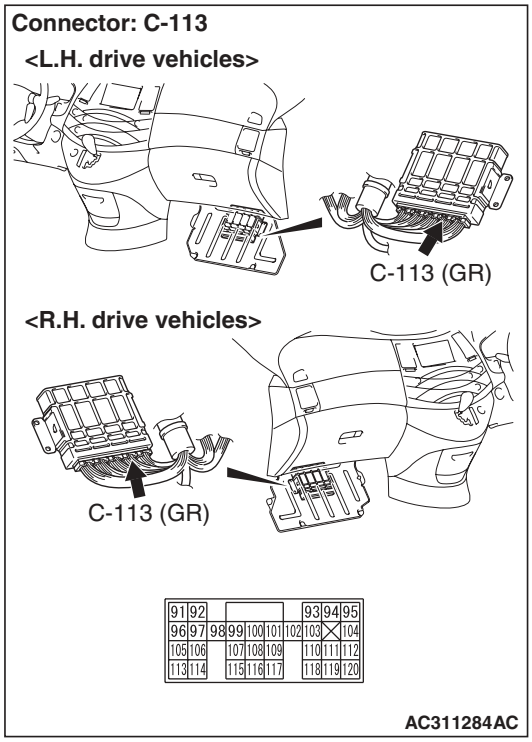


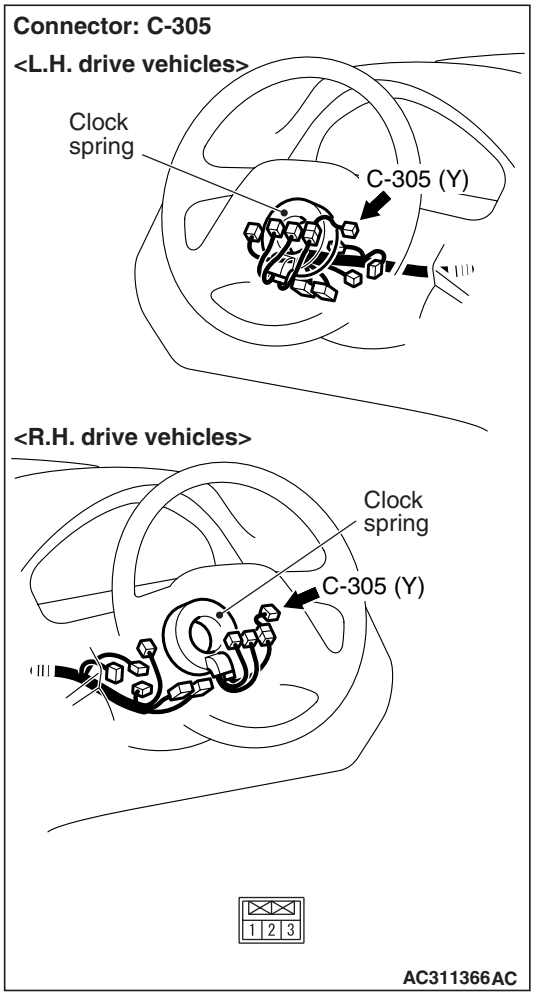


Q: Is the check result normal?

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-225). Then go to Step 18.

STEP 7. Check the harness between engine-ECU connector C-113 <M/T> terminal No.94 or engine-A/T-ECU connector C-113 <A/T> terminal No.94 and the auto-cruise control switch connector C-305 terminal No.2.





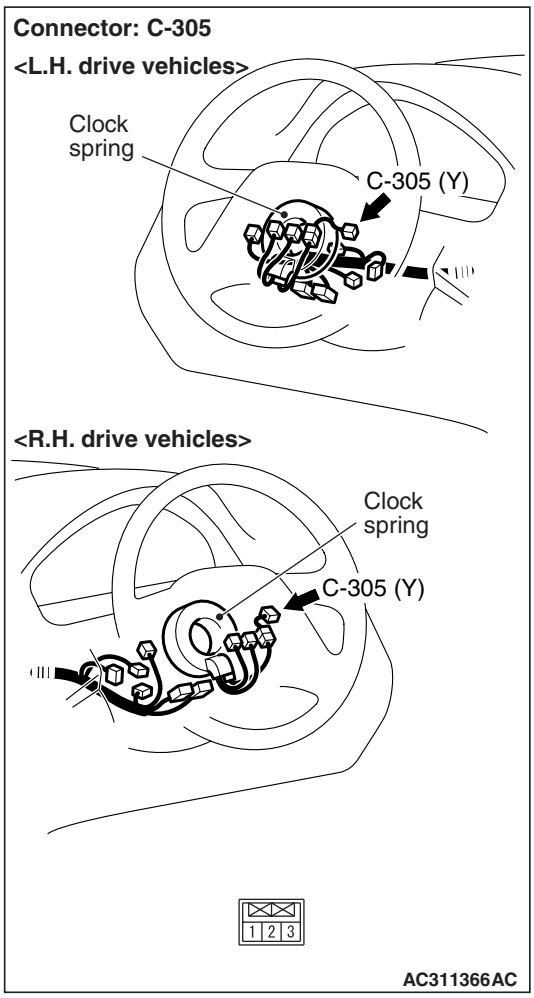
Q: Is the check result normal?

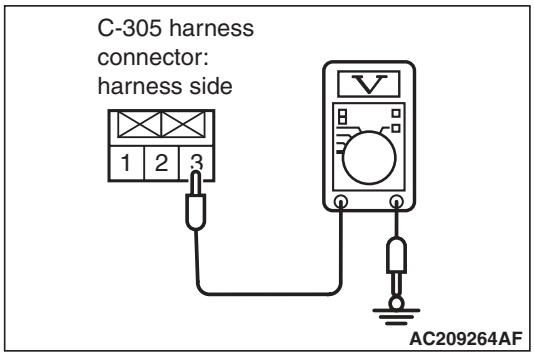
YES : Go to Step 8.
NO : Repair the damaged harness wire, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225). Then go to Step 18.

STEP 8. Check the clock spring.
Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225.

Q: Is the check result normal?
YES : It can be assumed that this malfunction is intermittent, 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-225). Then go to Step 18.
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-225). Then go to Step 18.

STEP 9. Measure the voltage at auto-cruise control switch connector C-305.
(1) Turn the ignition switch to the "ON" position and the MAIN switch to the "ON" position.



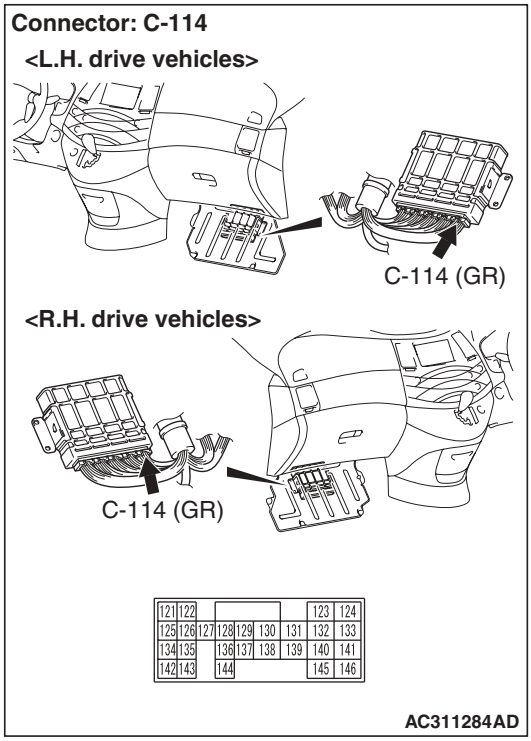


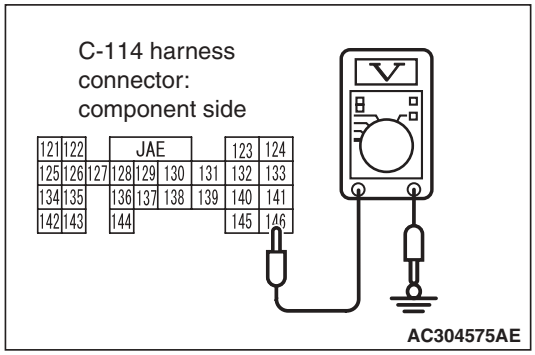
(2) Measure the voltage between connector C-305 terminal No.3 and earth.
OK: 0.5 V or less
(3) Turn the MAIN switch to the "OFF" position and the ignition switch to the "LOCK" (OFF) position.

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 C-114 <M/T> or engine-A/T-ECU connector C-114 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-114 <M/T> terminal No.146 or engine-A/T-ECU connector C-114 <A/T> terminal No.146 and earth.

OK: 0.5 V or less

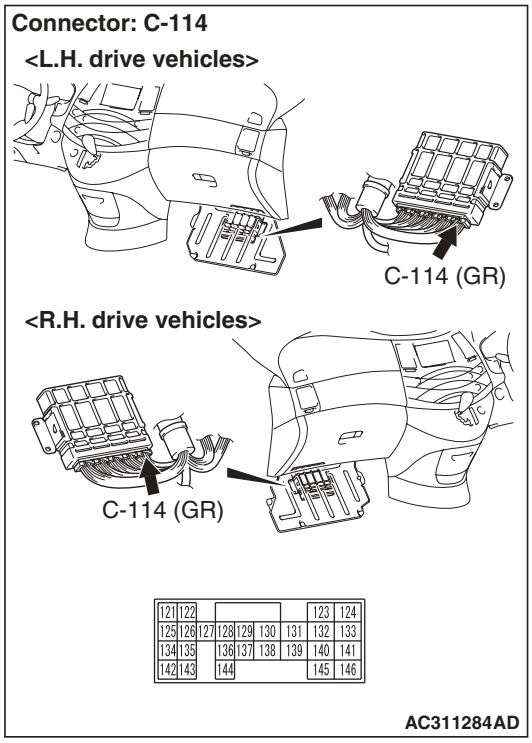
(3) Turn the MAIN switch to the "OFF" position and the ignition switch to the "OFF" position.

Q: Is the check result normal?

YES : Go to Step 12.

NO : Go to Step 11.

STEP 11. Connector check: C-114 engine-ECU connector <M/T> or C-114 engine-A/T-ECU connector <A/T>

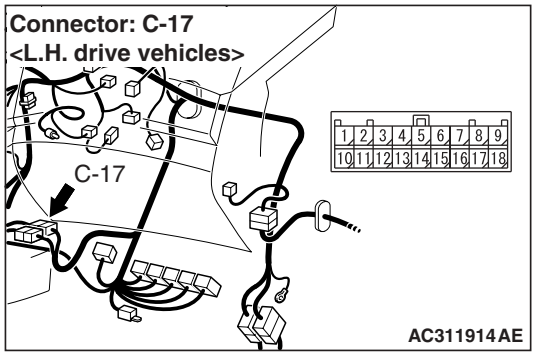


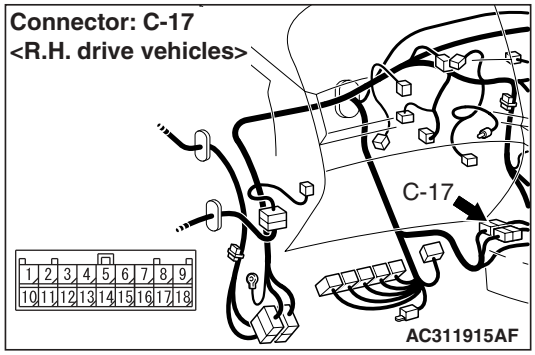
Q: Is the check result normal?

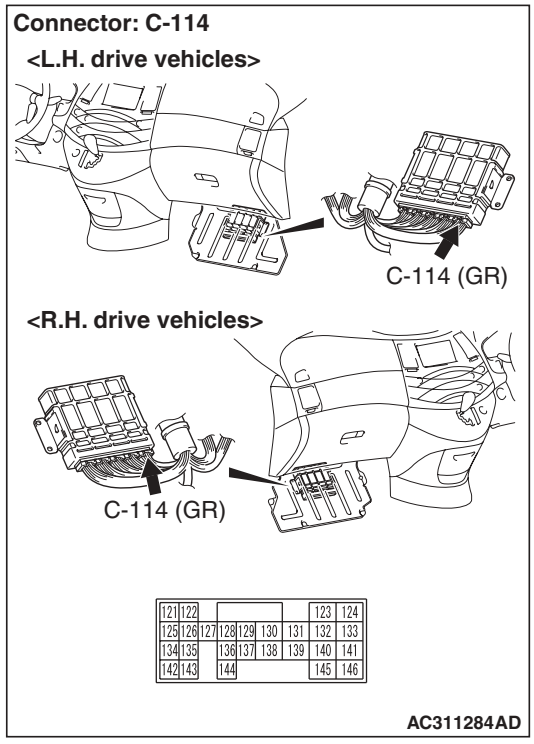
YES : Install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225). Then go to Step 17.

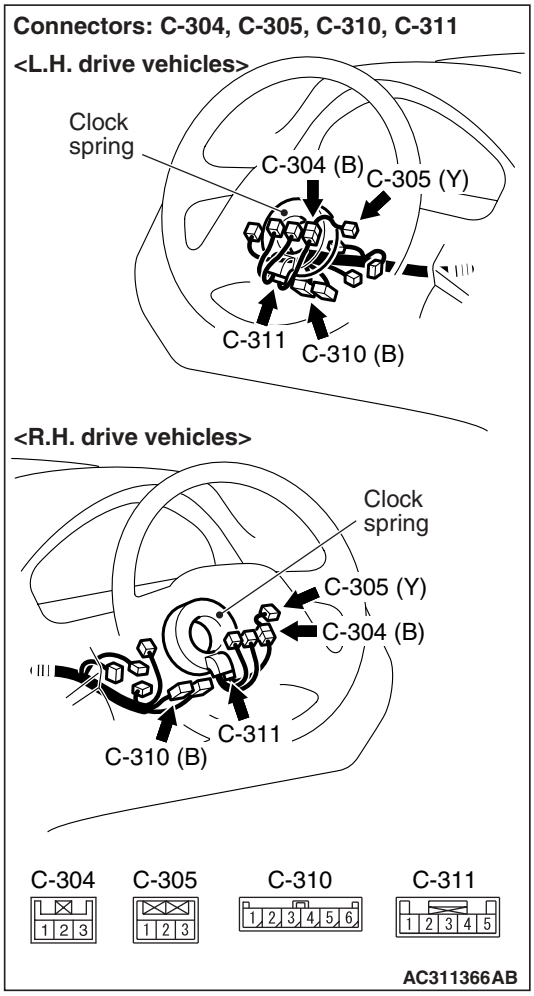
NO : Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225). Then go to Step 18.

STEP 12. Connectors check: C-114 engine-ECU connector <M/T> or C-114 engine-A/T-ECU connector <A/T>, C-17 and C-304 intermediate connector, C-305 auto-cruise control switch connector, C-310 and C-311 clock spring connectors







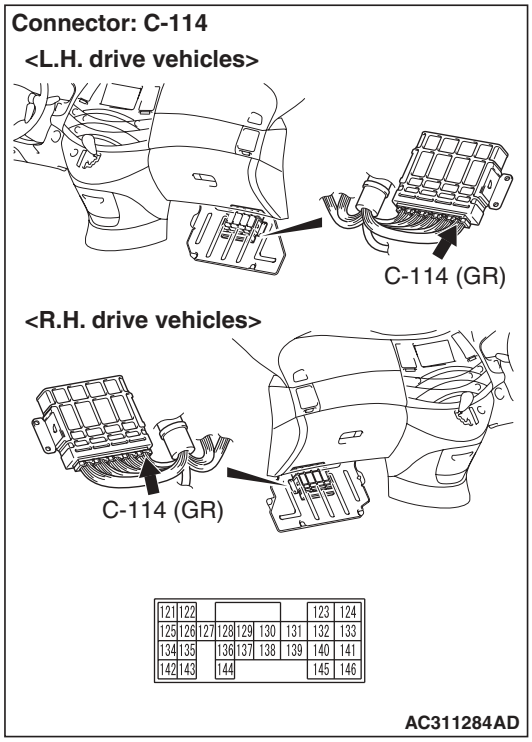


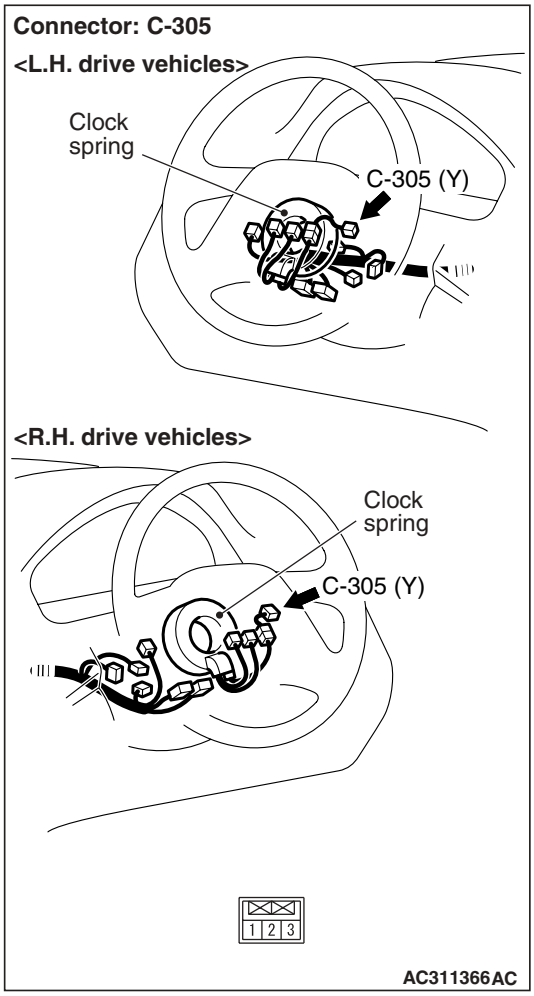
Q: Is the check result normal?

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-225). Then go to Step 18.

STEP 13. Check the harness between engine-ECU connector C-114 <M/T> terminal No.146 or engine-A/T-ECU connector C-114 <A/T> terminal No.146 and the auto-cruise control switch connector C-305 terminal No.3.





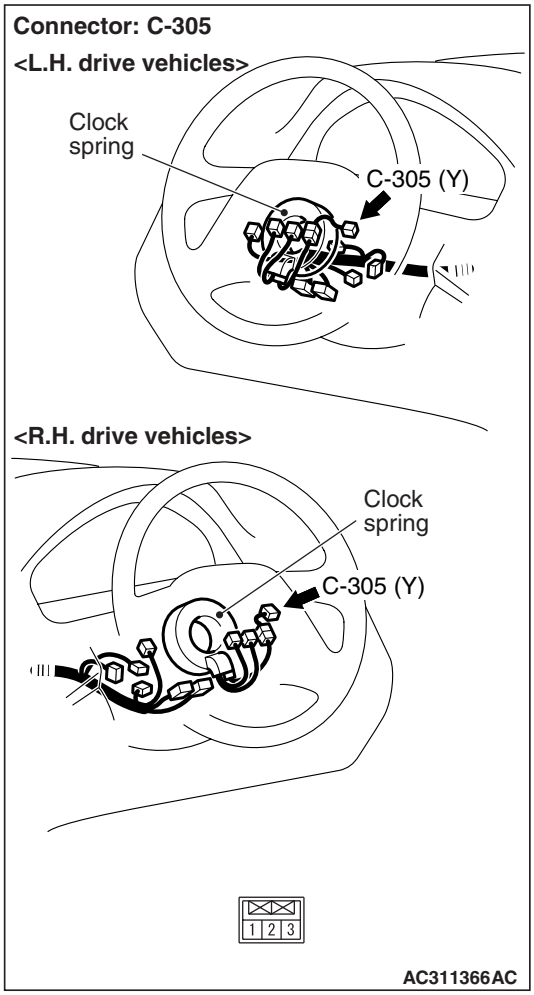
Q: Is the check result normal?

YES : Go to Step 14.
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-225). Then go to Step 18.

STEP 14. Check the clock spring.
Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225.

Q: Is the check result normal?
YES : It can be assumed that this malfunction is intermittent, 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-225). Then go to Step 18.
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-225). Then go to Step 18.

STEP 15. Connector check: C-305 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-225). Then go to Step 18.

STEP 16. Check the auto-cruise control switch.
Refer to P.17-55.

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-225). Then go to Step 17.
NO : Replace the auto-cruise control switch (Refer to P.17-56), 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-225). Then go to Step 18.

STEP 17. Check the MUT-III diagnosis code No.15.

Q: Is the MUT-III diagnosis code No.15 output?
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-399). Then go to Step 18 .
NO : It can be assumed that this malfunction is intermittent.

STEP 18. Check the MUT-III diagnosis code No.15.

Q: Is the MUT-III diagnosis code No.15 output?
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.

POSSIBLE CAUSES

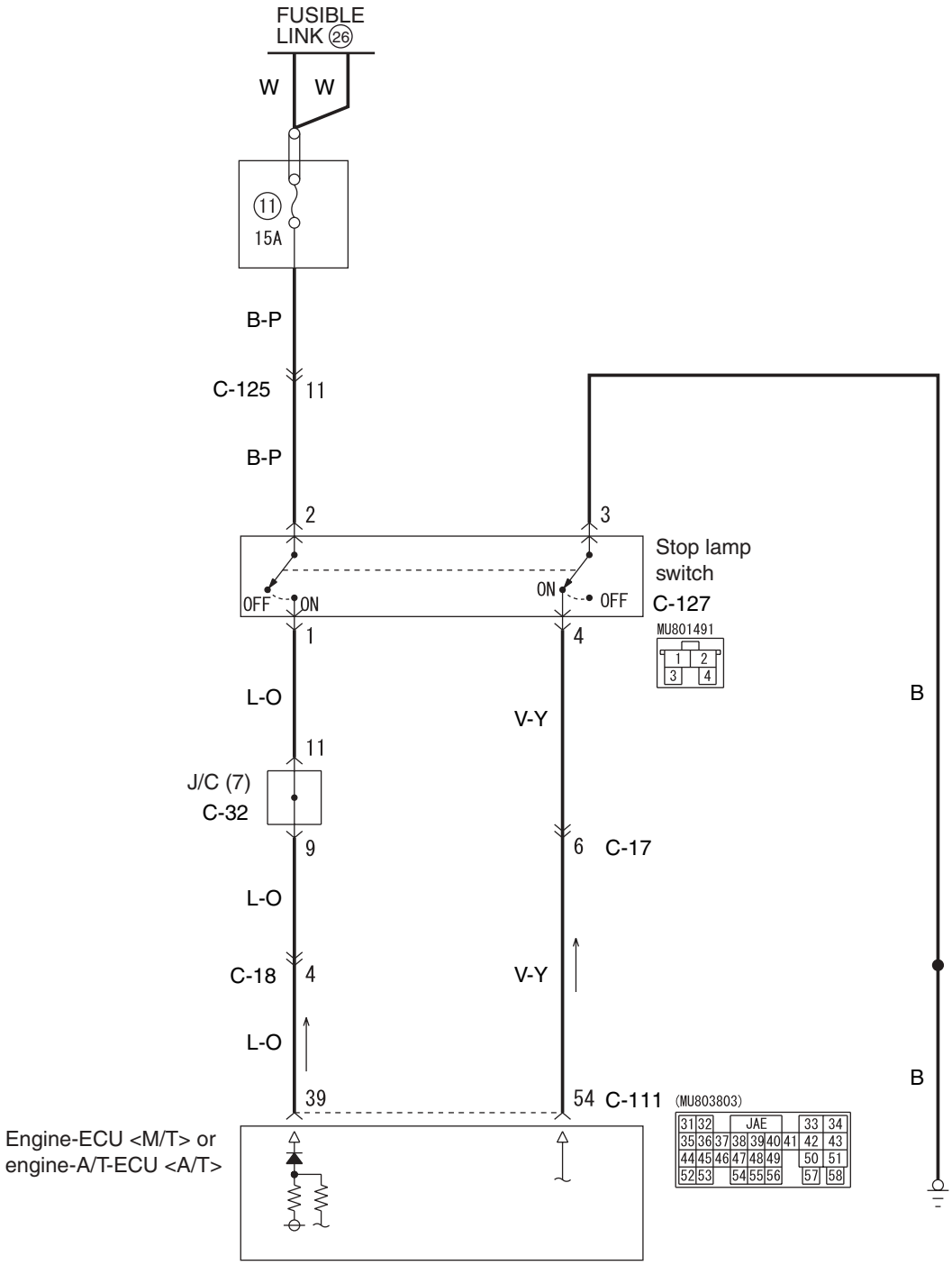
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS

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-399). Then check that diagnosis code 21 is not set.

Code No.22 Stop Lamp Switch System <L.H. drive vehicles>

Stoplight Switch System Circuit <L.H. drive vehicles>



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

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OPERATION

- Battery positive voltage is supplied to the stop lamp switch (terminal 2 and 4).
- 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).

POSSIBLE 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

STEP 1. MUT-III data list

Item 05: Stop lamp switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?

YES : Go to Step 14.

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

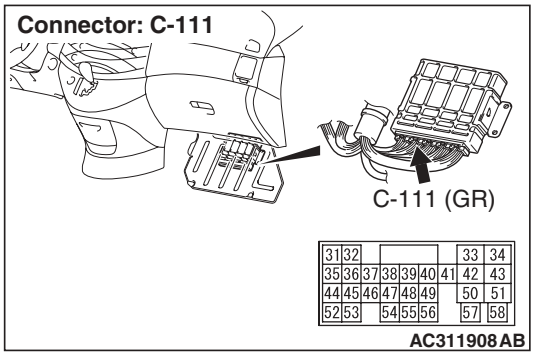
Q: Is the check result normal?

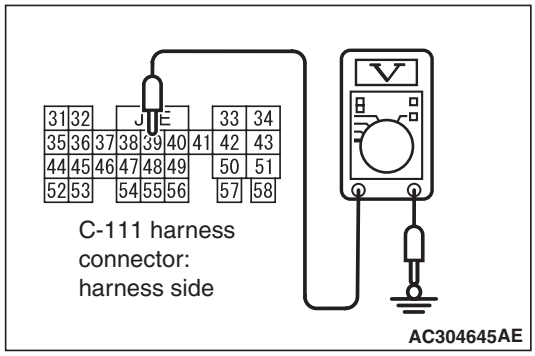
YES : Go to Step 3.

NO : Go to Step 6.

STEP 3. Measure the voltage at engine-ECU connector C-111 <M/T> or engine-A/T-ECU connector C-111 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-111 <M/T> terminal No.39 or engine-A/T-ECU connector C-111 <A/T> terminal No.39 and earth.

OK:

Brake pedal depressed: System voltage

Brake pedal not depressed: 1 V or less

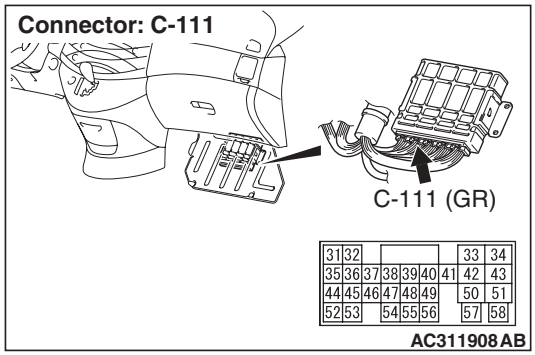
(3) Turn the ignition switch to the "LOCK" (OFF) position.

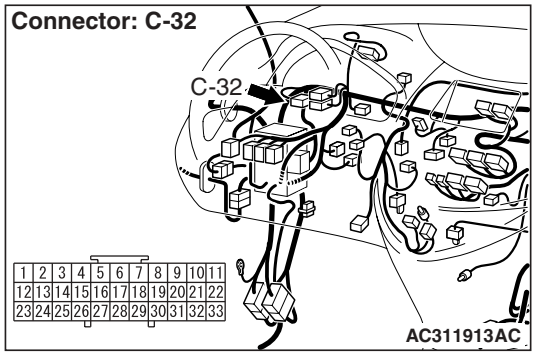
Q: Is the check result normal?

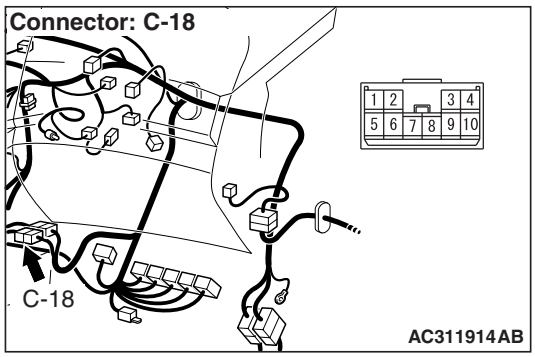
YES : Go to Step 13.

NO : Go to Step 4.

STEP 4. Connectors check: C-111 engine-ECU connector <M/T> or C-111 engine-A/T-ECU connector <A/T>, intermediate connector C-18 and C-32 J/C (7)



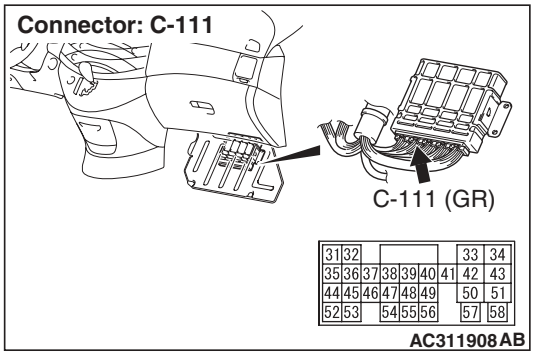


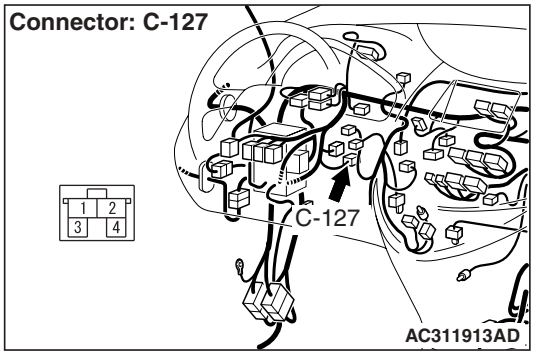


Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair or replace the damaged components. Then go to Step 23.

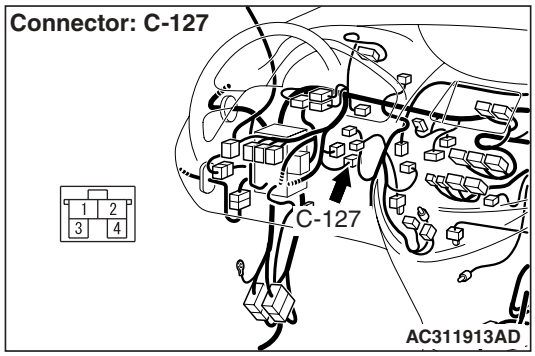
STEP 5. Check the harness between engine-ECU connector C-111 <M/T> terminal No.39 or engine-A/T-ECU connector C-111 <A/T> terminal No.39 and stop lamp switch connector C-127 terminal No.1.



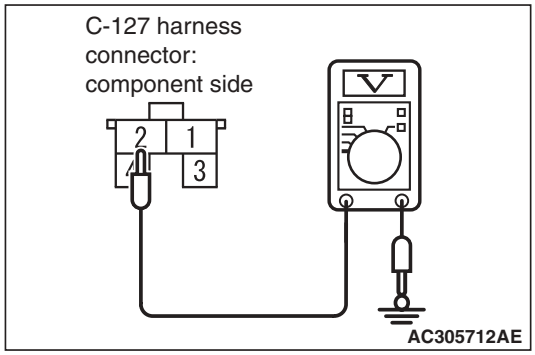


Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 6. Measure the voltage at stop lamp switch connector C-127.



(1) Disconnect stop lamp switch connector C-127.



(2) Measure the voltage between stop lamp switch connector C-127 terminal No.2 and earth.

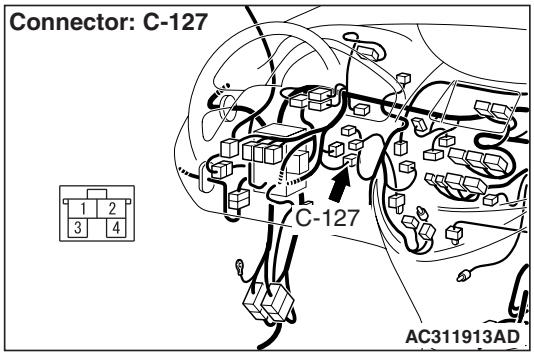
OK: System voltage

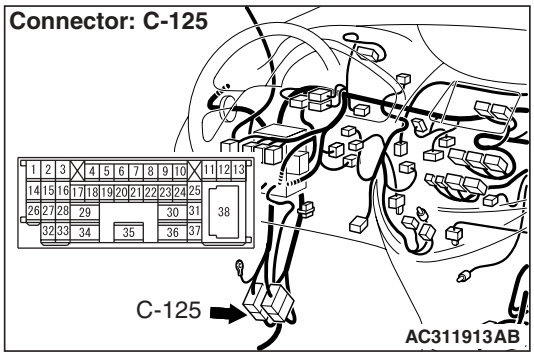
(3) Connect stop lamp switch connector C-127.

Q: Is the check result normal?

YES : Go to Step 10.
NO : Go to Step 7.

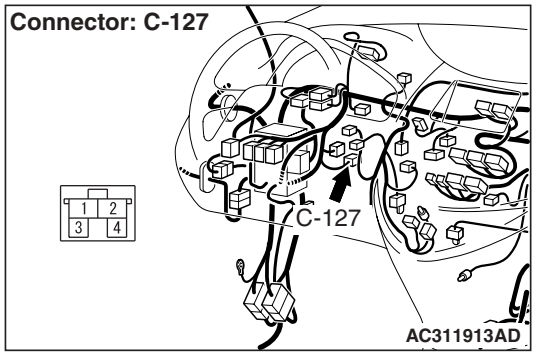
STEP 7. Connectors check: C-127 stop lamp switch connector, C-125 intermediate connector

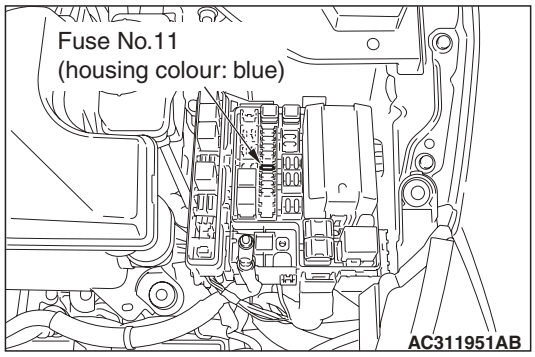




Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair or replace the damaged components. Then go to Step 23.

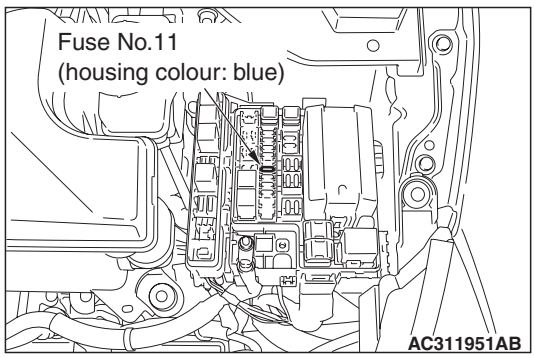
STEP 8. Check the harness between stop lamp switch connector C-127 terminal No.2 and fuse No.11 at the relay box in engine compartment for damage.





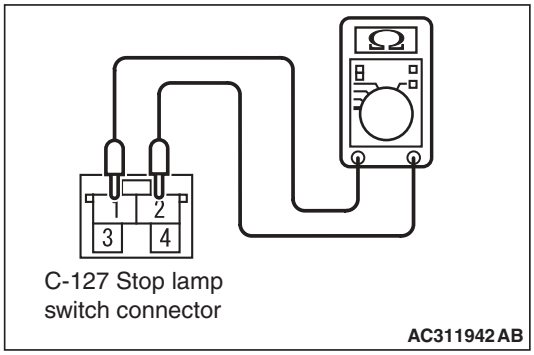
Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the damaged harness wire. Then go to Step 23.

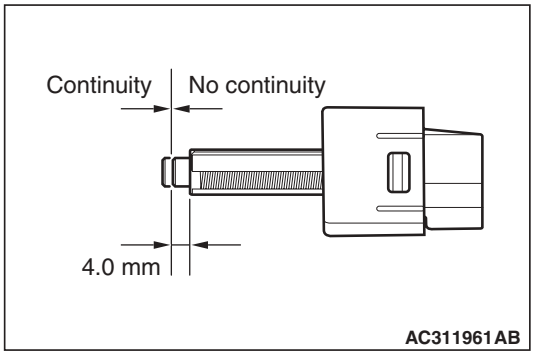
STEP 9. Check the fuse No.11 at the relay box in engine compartment.



Q: Is the check result normal?
YES : Go to Step 10.
NO : Check the stop lamp system harness and replace the fuse. Then go to Step 23.

STEP 10. Check the stop lamp switch.
(1) Remove the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12).



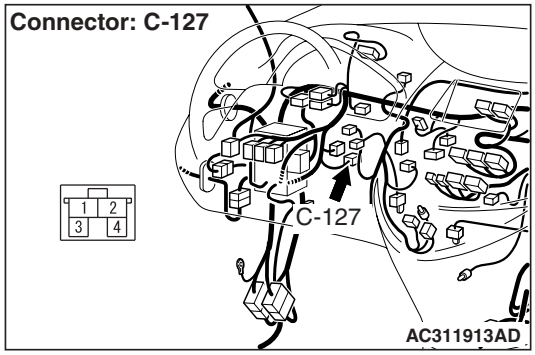


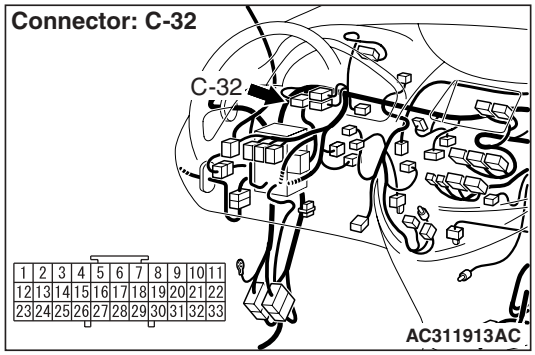
(2) Connect an ohmmeter to the stop lamp switch between terminals 1 and 2.
(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

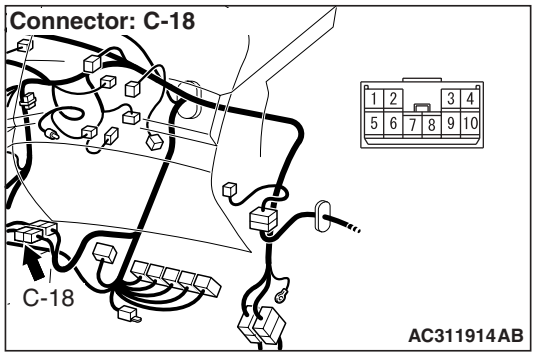
OK: The stop lamp switch is operating properly if the circuit is open between terminals 1 and 2 when the plunger is pushed in to a depth of within 4.0 mm from the outer case edge surface, and if the resistance value is less than 2 ohms between terminals 1 and 2 when it is released.

Q: Is the check result normal?
YES : Install the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 11.
NO : Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 23.

STEP 11. Connectors check: C-127 stop lamp switch connector, C-32 J/C (7), C-18 intermediate connector

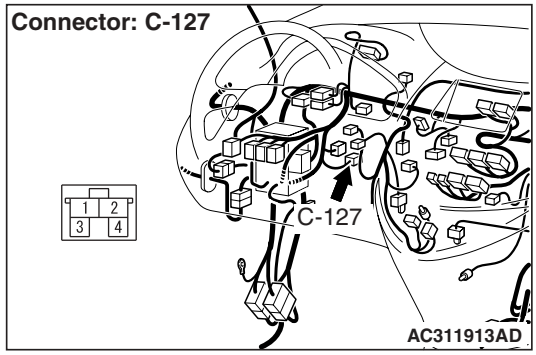


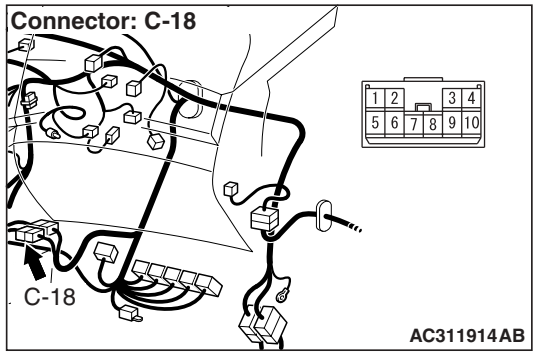




Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair or replace the damaged components. Then go to Step 23.

STEP 12. Check the harness between stop lamp switch connector C-127 terminal No.1 and intermediate connector C-18 terminal No.4.





Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 13. MUT-III data list
Item 05: Stop lamp switch (Refer to data list reference table P.17-50).

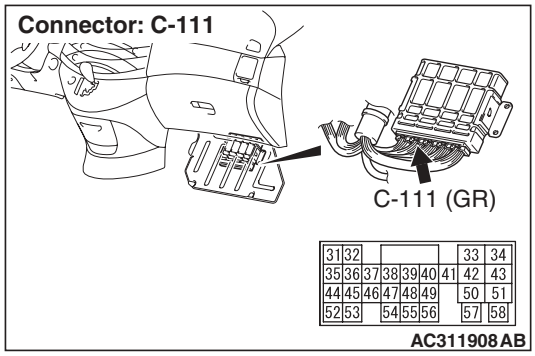
Q: Is the check result normal?
YES : Go to Step 22.
NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-399). Then go to Step 23 .

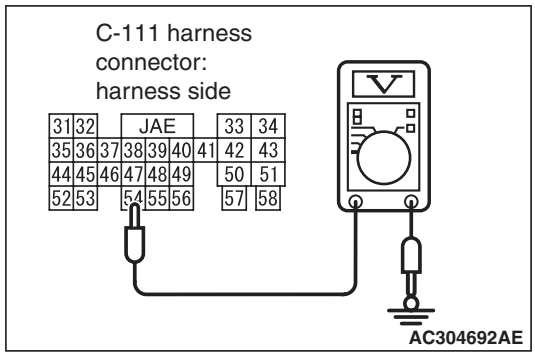
STEP 14. MUT-III data list
Item 06: Brake switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 22.
NO : Go to Step 15.

STEP 15. Measure the voltage at engine-ECU connector C-111 <M/T> or engine-A/T-ECU connector C-111 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-111 <M/T> terminal No.54 or engine-A/T-ECU connector C-111 <A/T> terminal No.54 and earth.

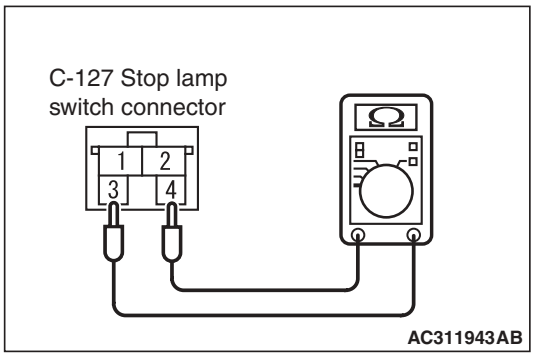
OK:
Brake pedal depressed: System voltage
Brake pedal not depressed: 1 V or less

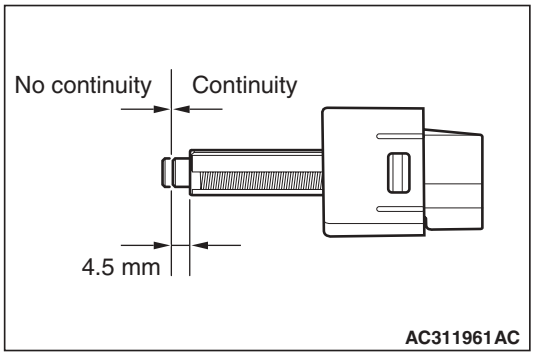
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?
YES : Go to Step 21.
NO : Go to Step 16.

STEP 16. Check the stop lamp switch.

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





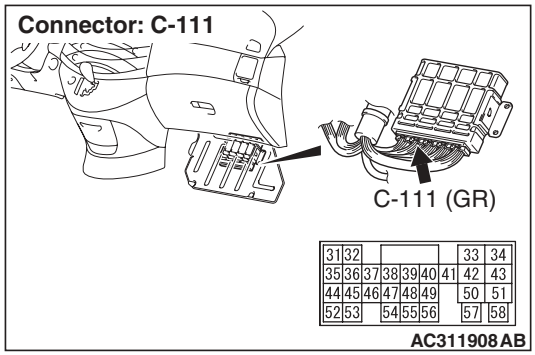
(2) Connect an ohmmeter to the stop lamp switch between terminals 3 and 4.

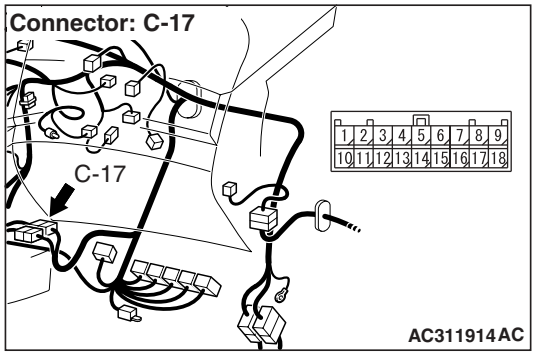
(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

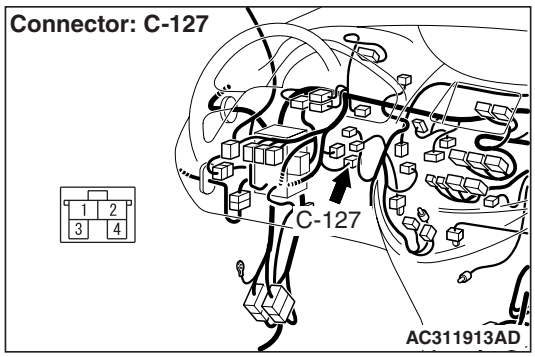
OK: The stop lamp switch is operating properly if the circuit is open between terminals 3 and 4 when the plunger is released, and if resistance value is less than 2 ohms between terminals 3 and 4 when the plunger is pushed in to a depth of within 4.5 mm from the outer case edge surface.

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 17.
NO : Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 23.

STEP 17. Connectors check: C-111 engine-ECU connector <M/T> or C-111 engine-A/T-ECU connector <A/T>, C-17 intermediate connector, C-127 stop lamp switch connector

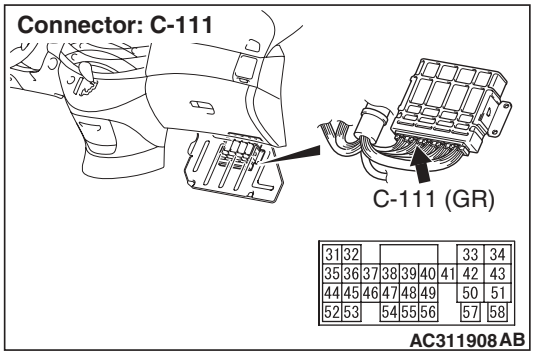


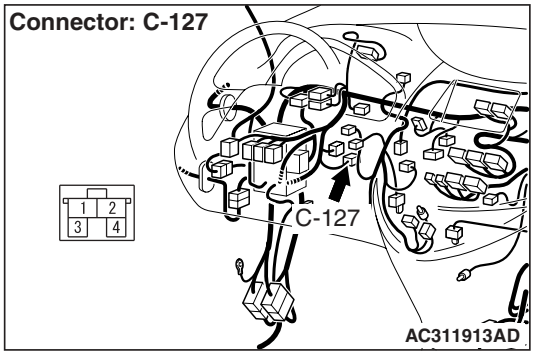




Q: Is the check result normal?
YES : Go to Step 18.
NO : Repair or replace the damaged components. Then go to Step 23.

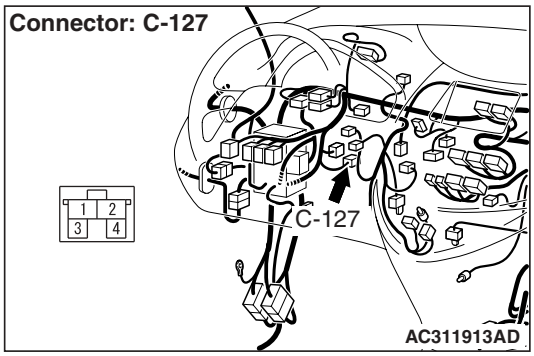
STEP 18. Check the harness between engine-ECU connector C-111 <M/T> terminal No.54 or engine-A/T-ECU connector C-111 <A/T> terminal No.54 and stop lamp switch connector C-127 terminal No.4.





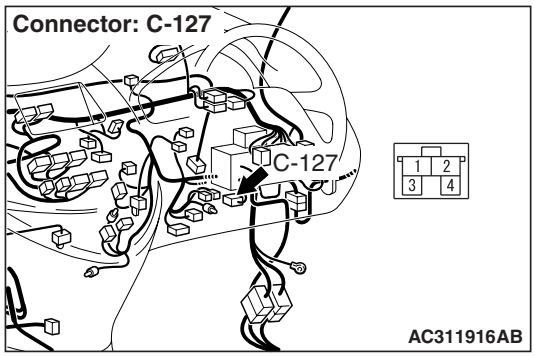
Q: Is the check result normal?
YES : Go to Step 19.
NO : Repair the damaged harness wire. Then go to Step 23.

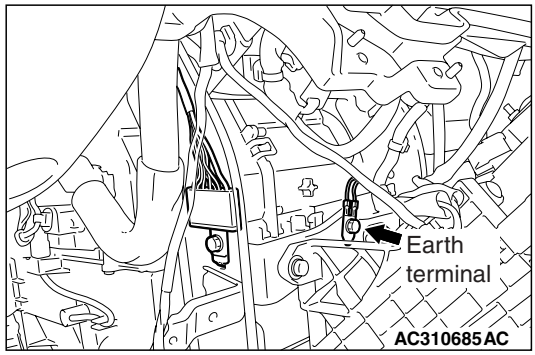
STEP 19. Connector check: C-127 stop lamp switch connector



Q: Is the check result normal?
YES : Go to Step 20.
NO : Repair or replace the damaged components. Then go to Step 23.

STEP 20. Check the harness between stop lamp switch connector C-127 terminal No.3 and earth.





Q: Is the check result normal?
YES : Go to Step 21.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 21. MUT-III data list
Item 06: Brake switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 22.
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-399). Then go to Step 23 .

STEP 22. Check the MUT-III diagnosis code No. 22.

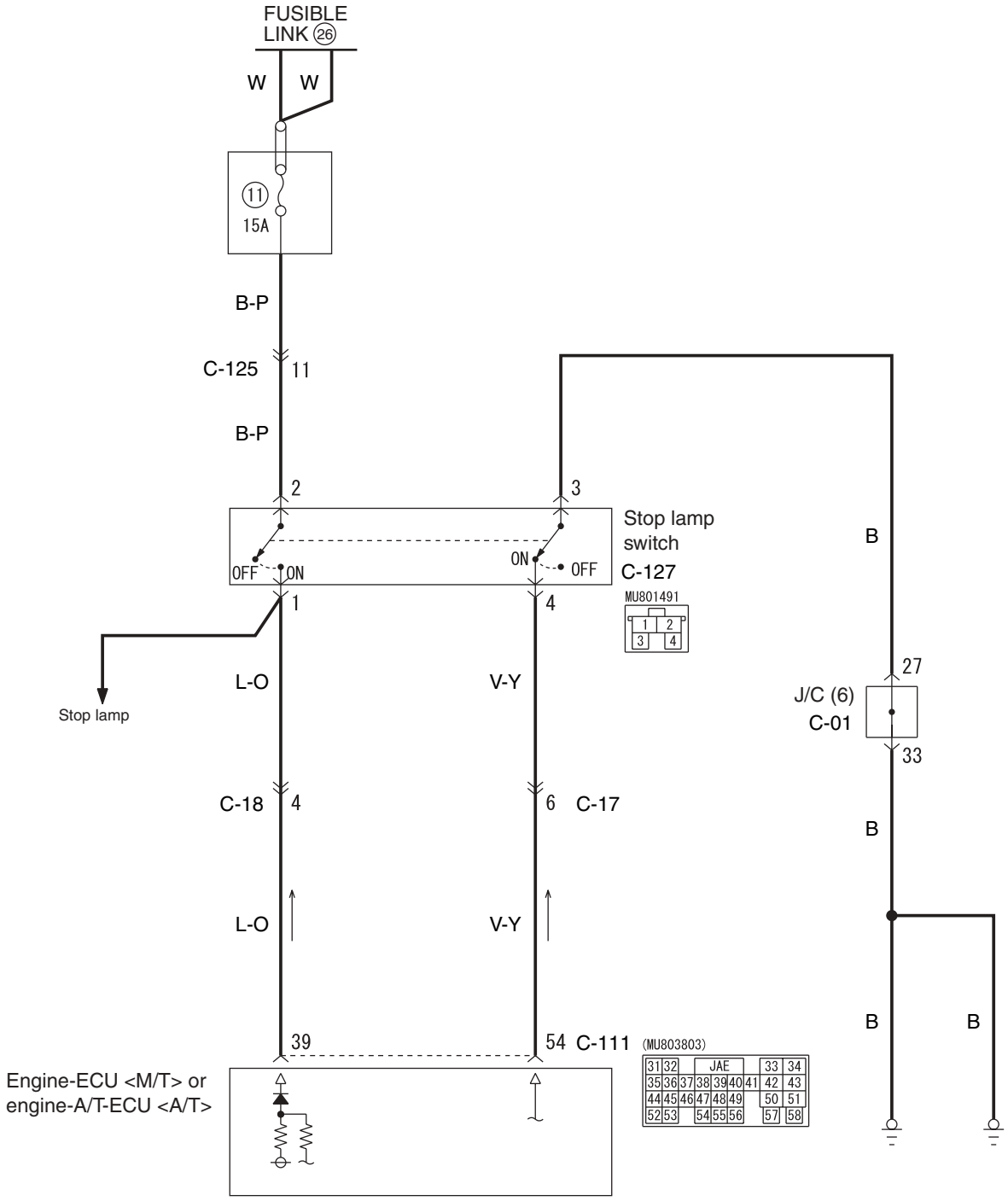
Q: Is the MUT-III diagnosis code No. 22 output?
YES : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-399). Then go to Step 23 .
NO : It can be assumed that this malfunction is intermittent.

STEP 23. Check the MUT-III diagnosis code No. 22.

Q: Is the MUT-III diagnosis code No. 22 output?
YES : Return to Step 1.
NO : The procedure is complete.

Code No.22 Stop Lamp Switch System <R.H. drive vehicles>

Stoplight Switch System Circuit <R.H. drive vehicles>



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

AC311229

OPERATION

- Battery positive voltage is supplied to the stop lamp switch (terminal 2 and 4).
- 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).

POSSIBLE 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

STEP 1. MUT-III data list

Item 05: Stop lamp switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?

YES : Go to Step 14.

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

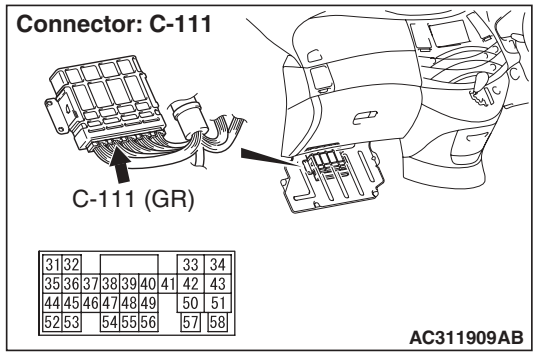
Q: Is the check result normal?

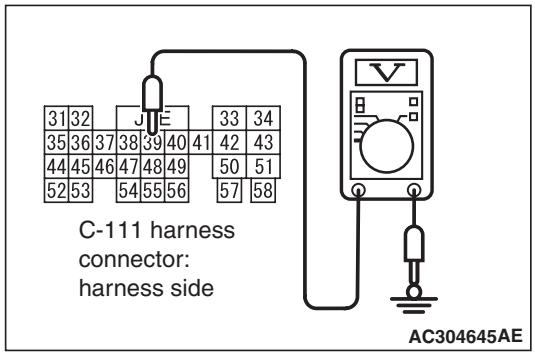
YES : Go to Step 3.

NO : Go to Step 6.

STEP 3. Measure the voltage at engine-ECU connector C-111 <M/T> or engine-A/T-ECU connector C-111 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-111 <M/T> terminal No.39 or engine-A/T-ECU connector C-111 <A/T> terminal No.39 and earth.

OK:

Brake pedal depressed: System voltage

Brake pedal not depressed: 1 V or less

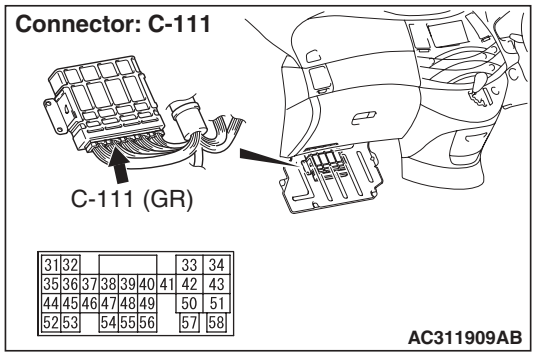
(3) Turn the ignition switch to the "LOCK" (OFF) position.

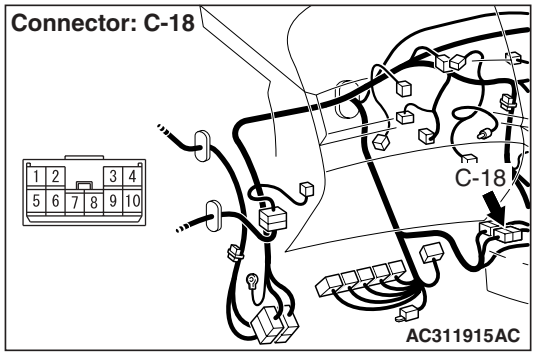
Q: Is the check result normal?

YES : Go to Step 13.

NO : Go to Step 4.

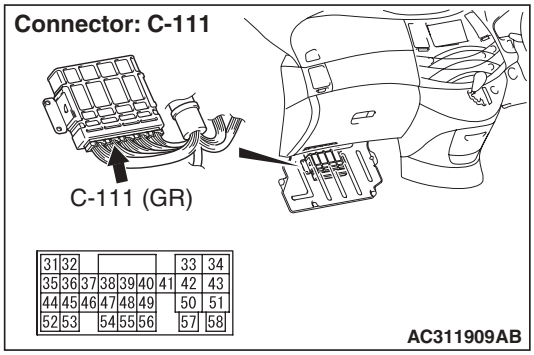
STEP 4. Connectors check: C-111 engine-ECU connector <M/T> or C-111 engine-A/T-ECU connector <A/T>, C-18 intermediate connector

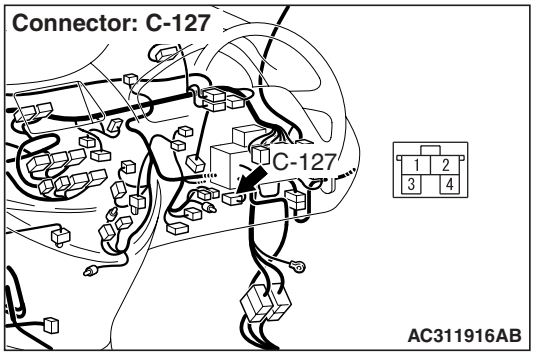




Q: Is the check result normal?
YES : Go to Step 5.
NO : Repair or replace the damaged components. Then go to Step 23.

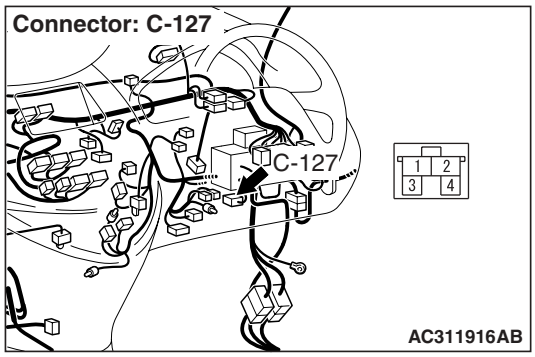
STEP 5. Check the harness between engine-ECU connector C-111 <M/T> terminal No.39 or engine-A/T-ECU connector C-111 <A/T> terminal No.39 and stop lamp switch connector C-127 terminal No.1.



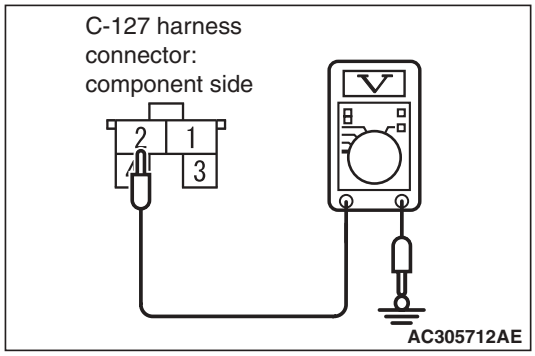


Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 6. Measure the voltage at stop lamp switch connector C-127.



(1) Disconnect stop lamp switch connector C-127.



(2) Measure the voltage between stop lamp switch connector C-127 terminal No.2 and earth.

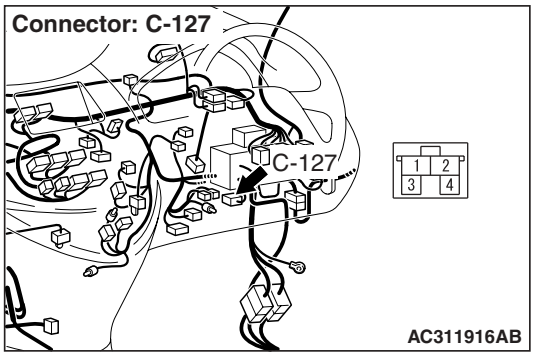
OK: System voltage

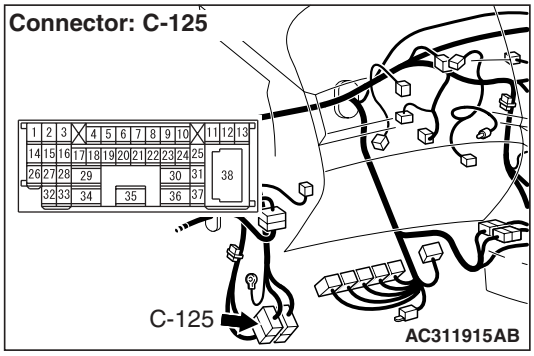
(3) Connect stop lamp switch connector C-127.

Q: Is the check result normal?

YES : Go to Step 10.
NO : Go to Step 7.

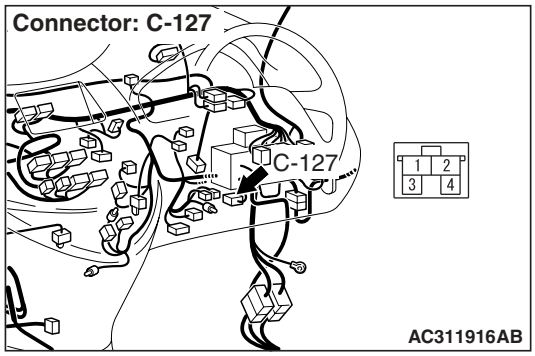
STEP 7. Connectors check: C-127 stop lamp switch connector, C-125 intermediate connector

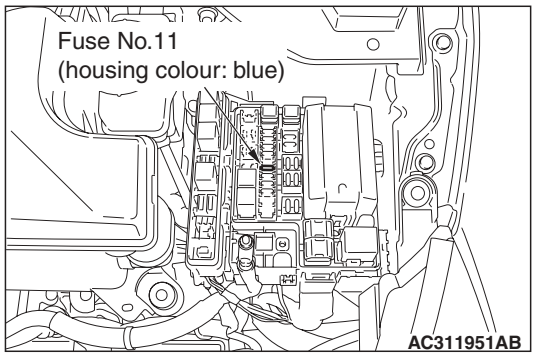




Q: Is the check result normal?
YES : Go to Step 8.
NO : Repair or replace the damaged components. Then go to Step 23.

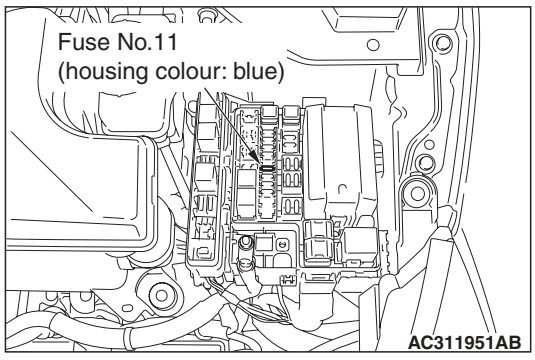
STEP 8. Check the harness between stop lamp switch connector C-127 terminal No.2 and fuse No.11 at the relay box in engine compartment for damage.





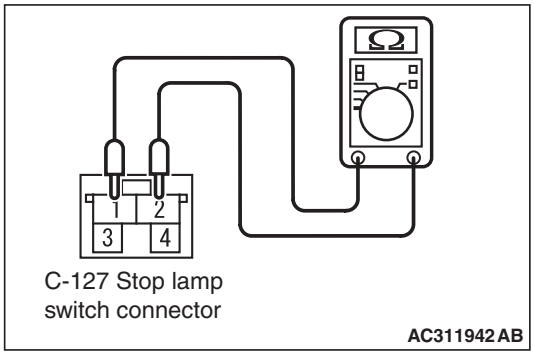
Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair the damaged harness wire. Then go to Step 23.

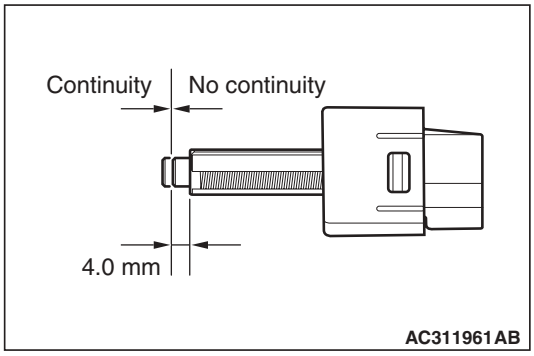
STEP 9. Check the fuse No.11 at the relay box in engine compartment.



Q: Is the check result normal?
YES : Go to Step 10.
NO : Check the stop lamp system harness and replace the fuse. Then go to Step 23.

STEP 10. Check the stop lamp switch.
(1) Remove the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12).



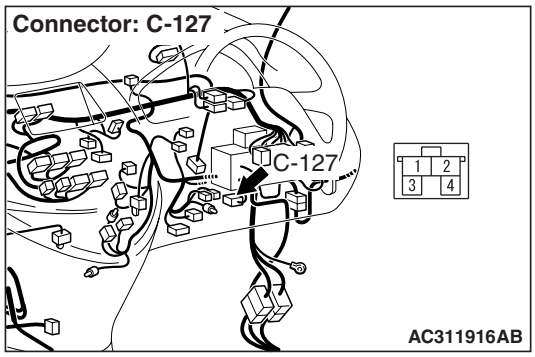


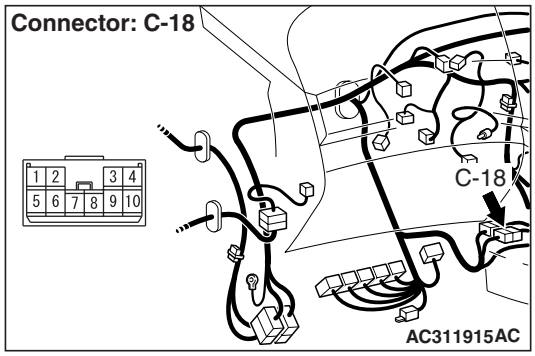
(2) Connect an ohmmeter to the stop lamp switch between terminals 1 and 2.
(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

OK: The stop lamp switch is operating properly if the circuit is open between terminals 1 and 2 when the plunger is pushed in to a depth of within 4.0 mm from the outer case edge surface, and if the resistance value is less than 2 ohms between terminals 1 and 2 when it is released.

Q: Is the check result normal?
YES : Install the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 11.
NO : Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 23.

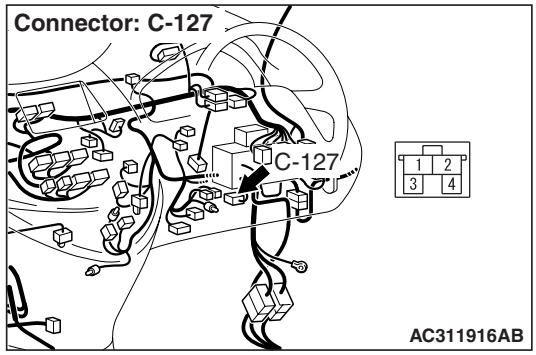
STEP 11. Connectors check: C-127 stop lamp switch connector, C-18 intermediate connector

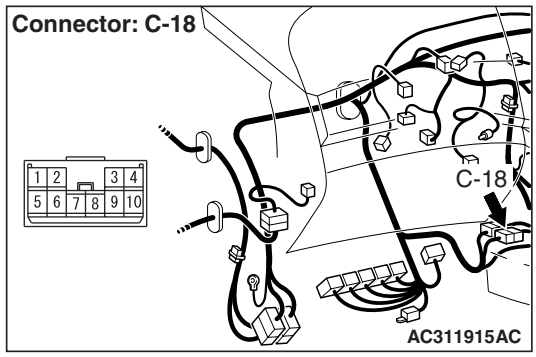




Q: Is the check result normal?
YES : Go to Step 12.
NO : Repair or replace the damaged components. Then go to Step 23.

STEP 12. Check the harness between stop lamp switch connector C-127 terminal No.1 and intermediate connector C-18 terminal No.4.





Q: Is the check result normal?
YES : Go to Step 13.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 13. MUT-III data list
Item 05: Stop lamp switch (Refer to data list reference table P.17-50).

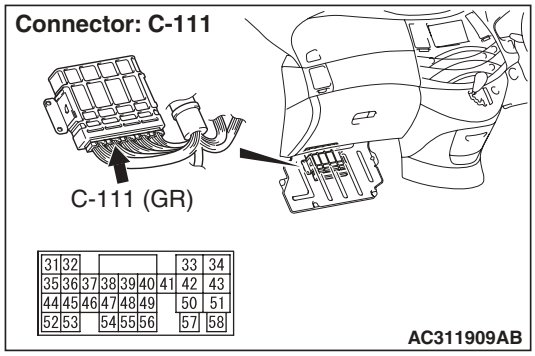
Q: Is the check result normal?
YES : Go to Step 22.
NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-399). Then go to Step 23 .

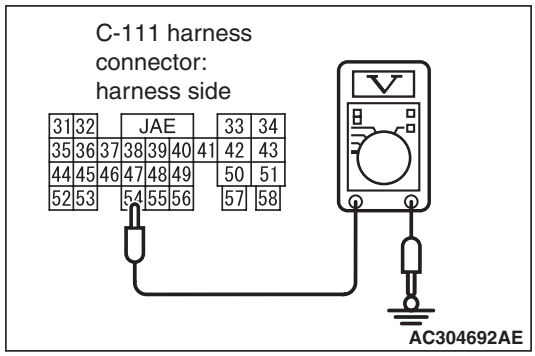
STEP 14. MUT-III data list
Item 06: Brake switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 22.
NO : Go to Step 15.

STEP 15. Measure the voltage at engine-ECU connector C-111 <M/T> or engine-A/T-ECU connector C-111 <A/T>.

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





(2) Measure the voltage between engine-ECU connector C-111 <M/T> terminal No.54 or engine-A/T-ECU connector C-111 <A/T> terminal No.54 and earth.

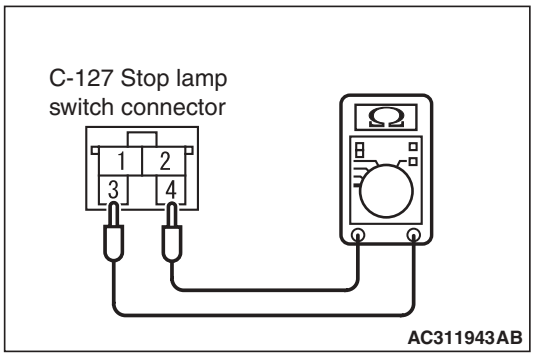
OK:
Brake pedal depressed: System voltage
Brake pedal not depressed: 1 V or less

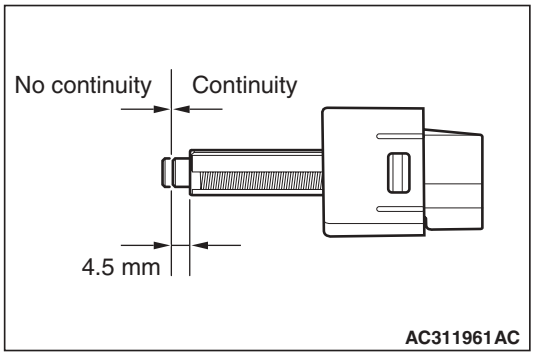
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the check result normal?
YES : Go to Step 21.
NO : Go to Step 16.

STEP 16. Check the stop lamp switch.

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





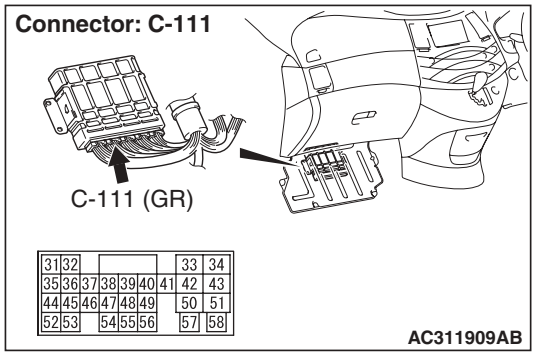
(2) Connect an ohmmeter to the stop lamp switch between terminals 3 and 4.

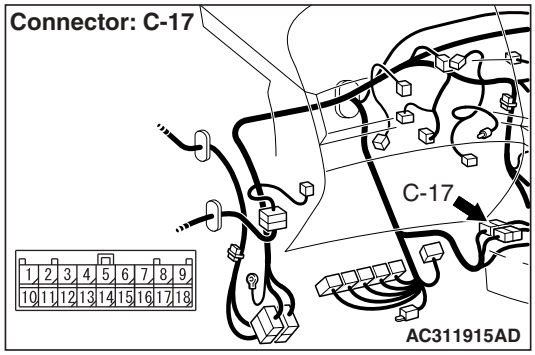
(3) Check for continuity between the terminals when the plunger of the stop lamp switch is pushed in and when it is released.

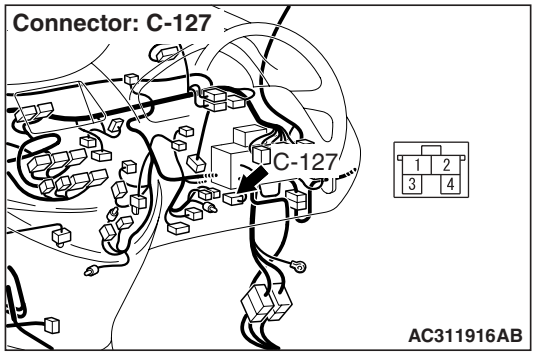
OK: The stop lamp switch is operating properly if the circuit is open between terminals 3 and 4 when the plunger is released, and if resistance value is less than 2 ohms between terminals 3 and 4 when the plunger is pushed in to a depth of within 4.5 mm from the outer case edge surface.

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 17.
NO : Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal P.35A-12). Then go to Step 23.

STEP 17. Connectors check: C-111 engine-ECU connector <M/T> or C-111 engine-A/T-ECU connector <A/T>, C-17 intermediate connector, C-127 stop lamp switch connector

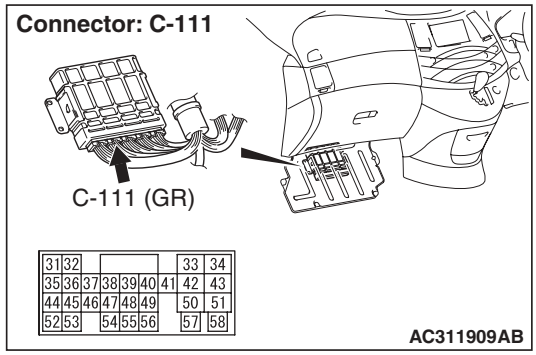


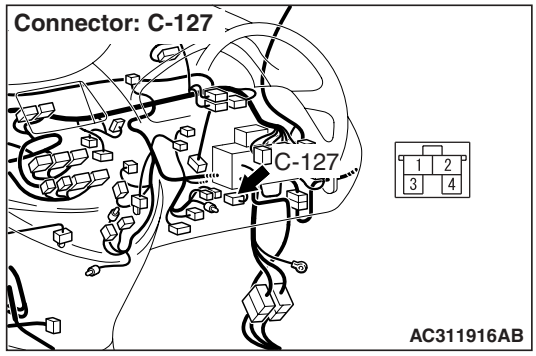




Q: Is the check result normal?
YES : Go to Step 18.
NO : Repair or replace the damaged components. Then go to Step 23.

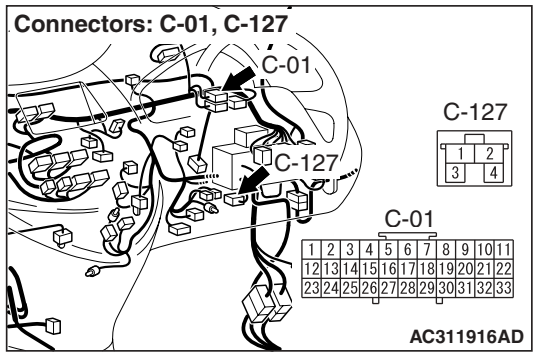
STEP 18. Check the harness between engine-ECU connector C-111 <M/T> terminal No.54 or engine-A/T-ECU connector C-111 <A/T> terminal No.54 and stop lamp switch connector C-127 terminal No.4.





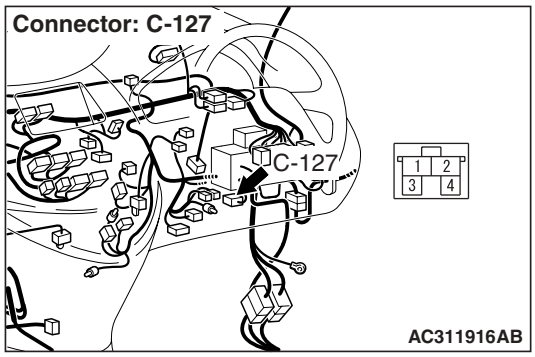
Q: Is the check result normal?
YES : Go to Step 19.
NO : Repair the damaged harness wire. Then go to Step 23.

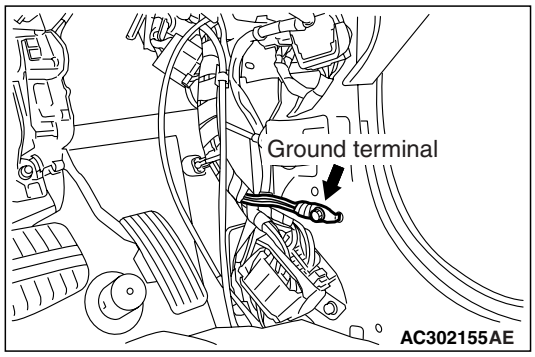
STEP 19. Connectors check: C-127 stop lamp switch connector, C-01 J/C (6)

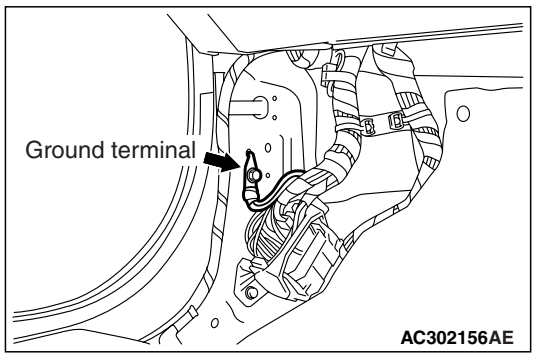


Q: Is the check result normal?
YES : Go to Step 20.
NO : Repair or replace the damaged components. Then go to Step 23.

STEP 20. Check the harness between stop lamp switch connector C-127 terminal No.3 and earth.







Q: Is the check result normal?

YES : Go to Step 21.
NO : Repair the damaged harness wire. Then go to Step 23.

STEP 21. MUT-III data list
Item 06: Brake switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 22.
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-399). Then go to Step 23 .

STEP 22. Check the MUT-III diagnosis code No. 22.

Q: Is the MUT-III diagnosis code No. 22 output?
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-399). Then go to Step 23 .
NO : It can be assumed that this malfunction is intermittent.

STEP 23. Check the MUT-III diagnosis code No. 22.

Q: Is the MUT-III diagnosis code No. 22 output?
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 CAUSE

- 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

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 codeTrouble Code Chart P.13A-20). 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-17). Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check the MUT-III diagnosis code No. 23.

Q: Is the MUT-III diagnosis code No. 23 output?
YES : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T> (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECUP.13A-399). Then go to Step 4.
NO : This malfunction is intermittent. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points P.00-5).

STEP 4. Check the MUT-III diagnosis code No. 23.

Q: Is the MUT-III diagnosis code No. 23 output?
YES : Return to Step 1 .
NO : This procedure is complete.

CHECK CHART FOR TROUBLE SYMPTOMS

M1172002300430

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-III is not possible.	Communication with the engine-ECU <M/T> or engine-A/T-ECU <A/T> only is impossible	-	Group 13A, Symptom Procedures – Inspection Procedure 1 P.13A-283
Auto-cruise control is not cancelled.	Even if brake pedal is depressed	1	P.17-39
	Even if clutch pedal is depressed <M/T>	2	P.17-40
	Even if select lever is set to N range <A/T>	3	P.17-46
	Even if auto-cruise control CANCEL switch in set to ON	4	P.17-47
Auto-cruise control cannot be set.		5	P.17-47
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <M/T>		6	P.17-48
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <A/T>		7	P.17-48
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.17-49

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.

PROBABLE CAUSE

- Malfunction of the connector.
- Malfunction of the harness.

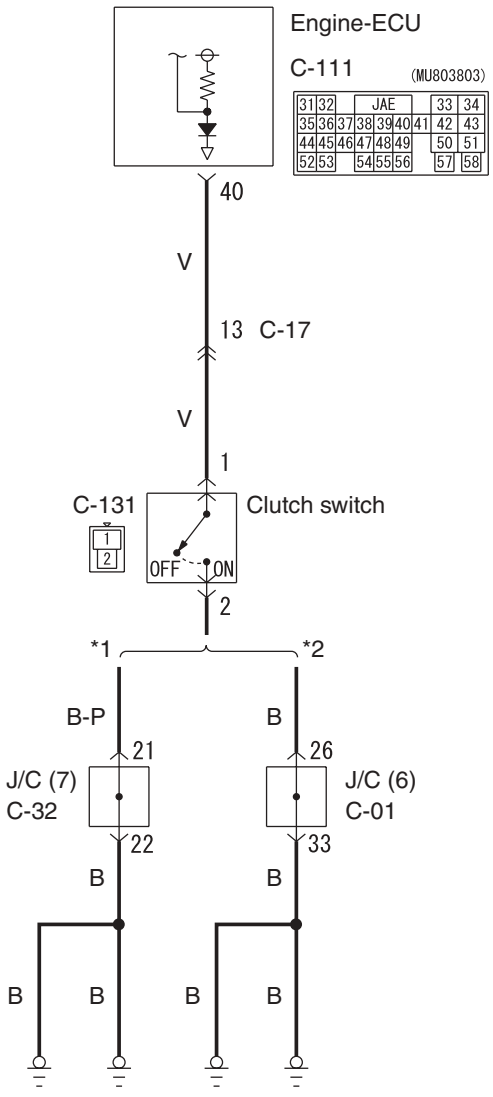
- Malfunction of the stop lamp switch.
- Malfunction of the engine-ECU <M/T>.
- Malfunction of the engine-A/T-ECU <A/T>.

DIAGNOSIS

Refer to P.17-21 <L.H. drive vehicles>, P.17-30 <R.H. drive vehicles>, 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



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NOTE
*1: L.H. drive vehicles
*2: R.H. drive vehicles

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

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.

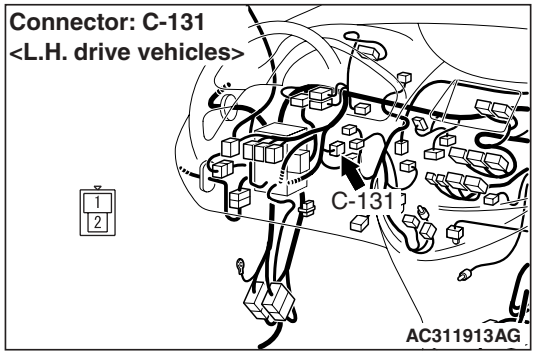
POSSIBLE CAUSES

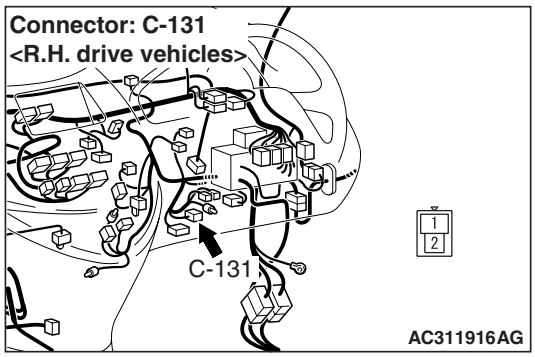
- Malfunction of the clutch switch.

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

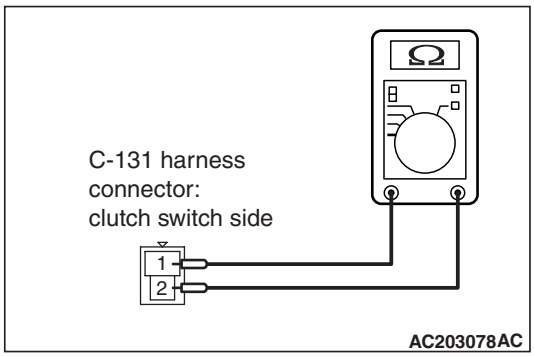
DIAGNOSIS

STEP 1. Check the clutch switch.





(1) Disconnect clutch switch connector C-131.



(2) Measure the continuity between the terminals.

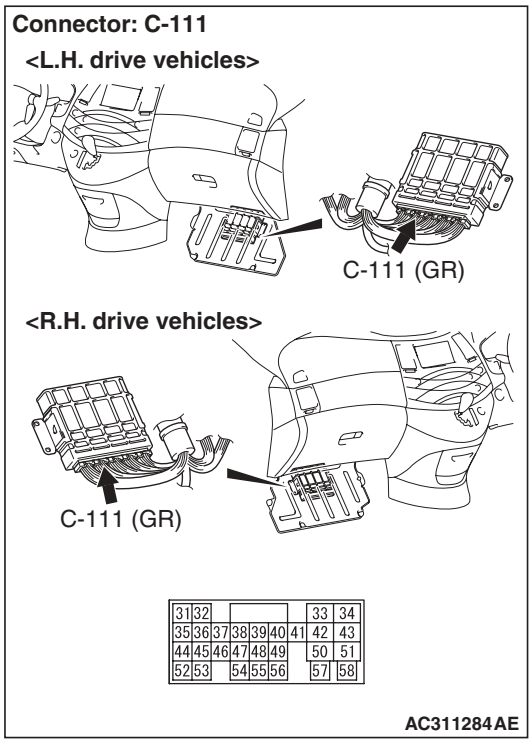
Measurement condition	Terminal connector of tester	Specified condition
When clutch pedal is depressed.	1 – 2	Less than 2 ohms
When clutch pedal is not depressed.	1 – 2	Open circuit

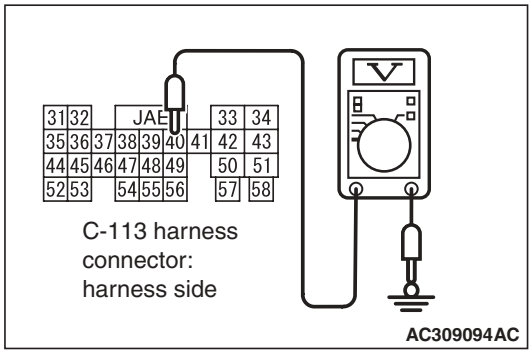
Q: Is the check result normal?

YES : Go to Step 2.
NO : Replace the clutch switch (Refer to GROUP 21A, Clutch Pedal P.21A-5). Then check that the malfunction is eliminated.

STEP 2. Measure the voltage at engine-ECU connector C-111.

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





(2) Measure the voltage between engine-ECU connector C-111 terminal No.40 and earth.

OK:
Clutch pedal depressed: 0.5 V or less
Clutch pedal not depressed: System voltage

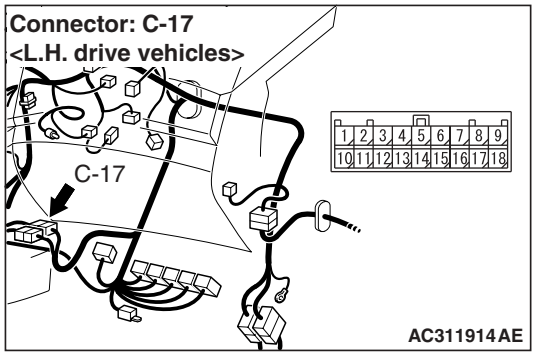
(3) Turn the ignition switch to the "LOCK" (OFF) position.

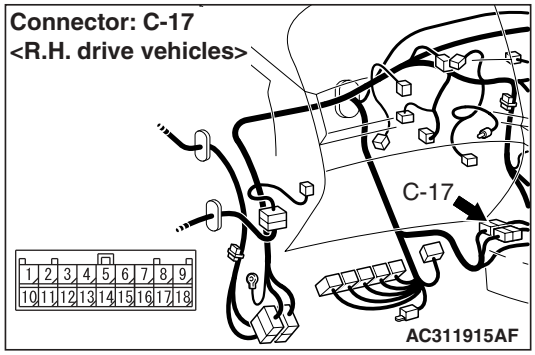
Q: Is the check result normal?

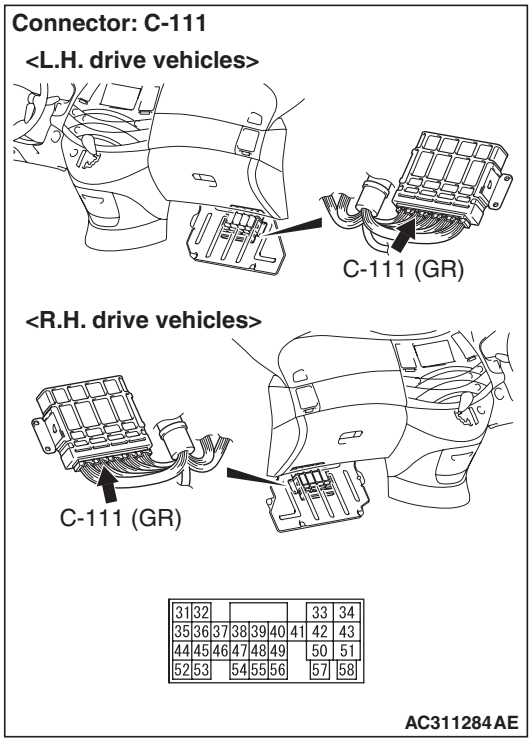
YES : Check that the malfunction is eliminated. If the malfunction is eliminated, replace the engine-ECU (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-399). Then check that the malfunction is eliminated.

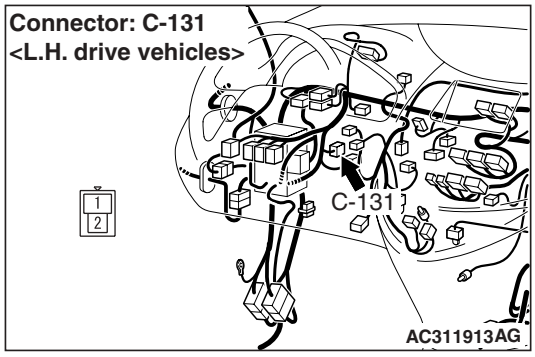
NO : Go to Step 3.

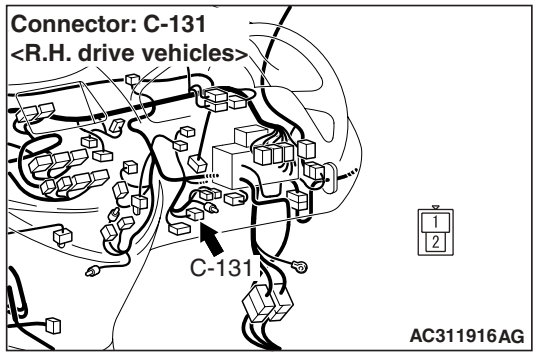
STEP 3. Connectors check: C-131 clutch switch connector, C-111 engine-ECU connector, C-17 intermediate connector









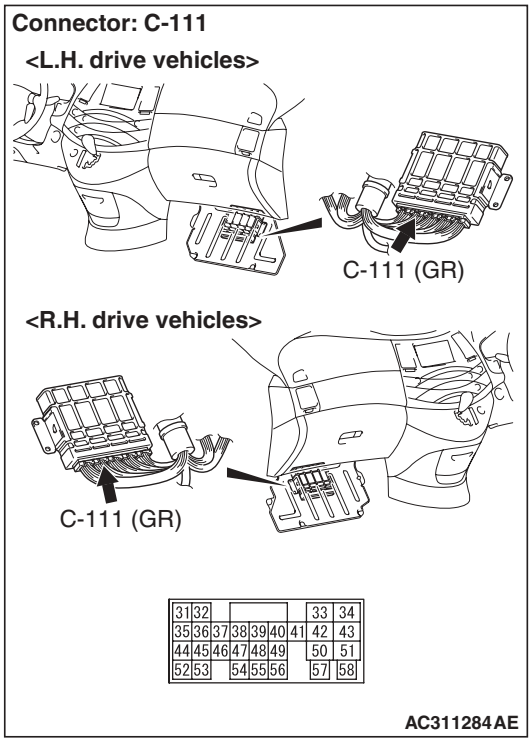


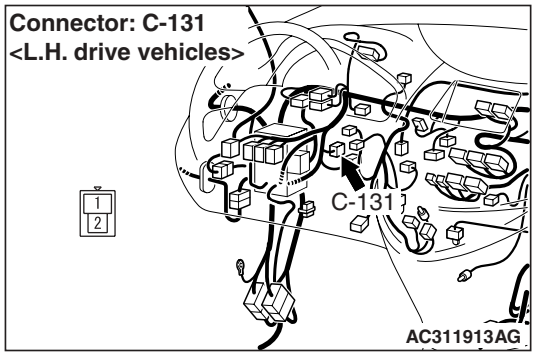
Q: Is the check result normal?

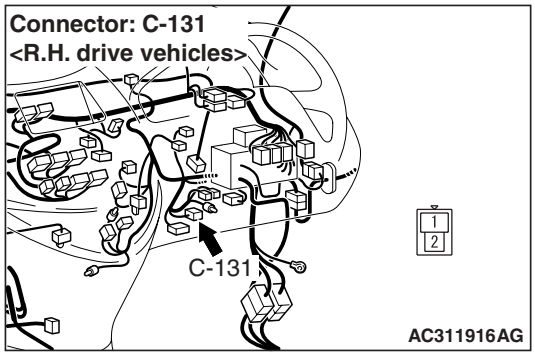
YES : Go to Step 4.

NO : Repair or replace the faulty connector. Then check that the malfunction is eliminated.

STEP 4. Check the harness between clutch switch connector C-131 terminal No.1 and engine-ECU connector C-111 terminal No.40.



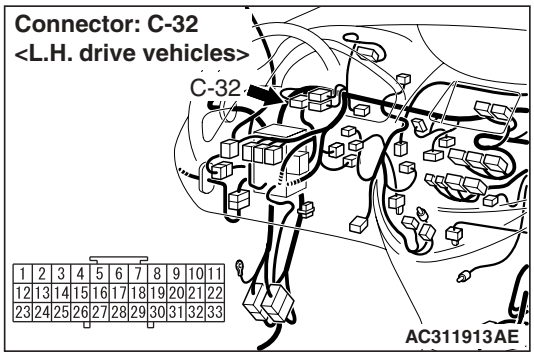


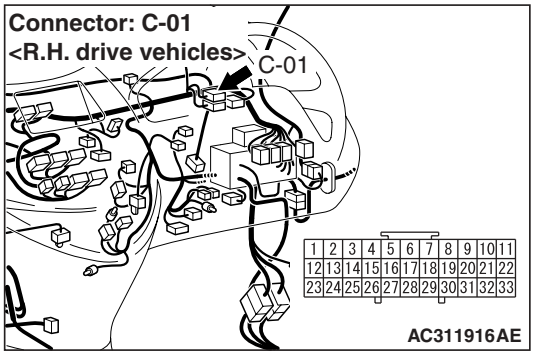


Q: Is the check result normal?

YES : Go to Step 5.
NO : Repair the harness wire and then check that the malfunction is eliminated.

STEP 5. Connector check: C-32 J/C (7) <LHD> or C-01 J/C (6) <RHD>

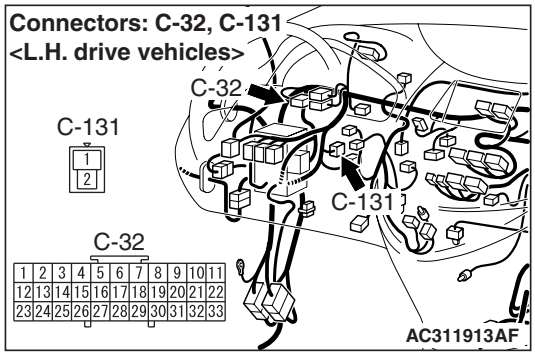


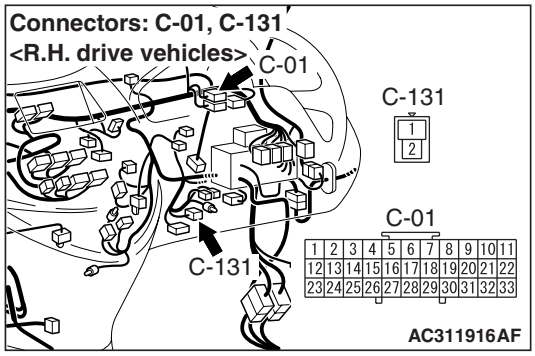


Q: Is the check result normal?

YES : Go to Step 6.
NO : Repair or replace the faulty connector. Then check that the malfunction is eliminated.

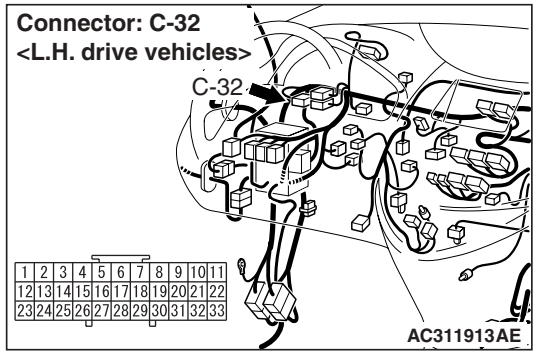
STEP 6. Check the harness between clutch switch connector C-131 terminal No.2 and J/C (7) C-32 terminal No.21 <LHD> or J/C (6) C-01 terminal No.26 <RHD>.

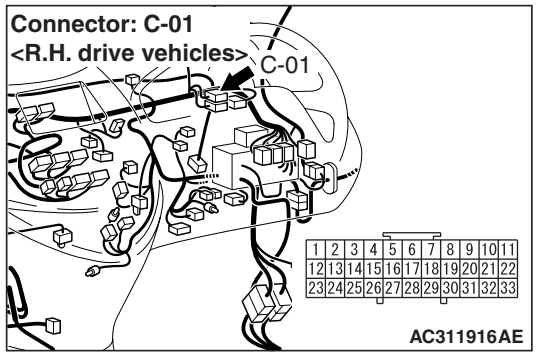




Q: Is the check result normal?
YES : Go to Step 7.
NO : Repair the harness wire and then check that the malfunction is eliminated.

STEP 7. Check the harness between J/C (7) C-32 terminal No.22 <LHD> or J/C (6) C-01 terminal No.33 <RHD> and earth.





Q: Is the check result normal?
YES : Check that the malfunction is eliminated. If the malfunction is eliminated, replace the engine-ECU (Refer to GROUP 13A, Engine-ECU and Engine-A/T-ECU P.13A-399). Then check that the malfunction is eliminated.
NO : Repair the harness wire and then check that the malfunction is eliminated.

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 CAUSE

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

DIAGNOSIS

Refer to GROUP 23A, Diagnostic Trouble Code Procedures – Code No. 27: Inhibitor switch system (Open Circuit) P.23A-52, diagnosis code 28: Inhibitor switch system (Short Circuit) P.23A-59.

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

Replace the auto-cruise control switch (Refer to P.17-56). 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, MUT-III can be used to Retest each system by checking the diagnosis trouble codes. The MUT-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 CAUSE

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

DIAGNOSIS

STEP 1. Check the MUT-III diagnosis code

Q: Is any diagnosis code set?
YES : Refer to P.17-6, Check Chart for Diagnosis Codes . Then go to Step 6.
NO : Go to Step 2.

STEP 2. MUT-III data list

Item 04: Cancel switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 3.
NO : Refer to P.17-47, Symptom Procedures number 4. Then go to Step 6.

STEP 3. MUT-III data list

- Item 05: Stop lamp switch (Refer to data list reference table P.17-50).
- Item 06: Brake switch (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 4.
NO : Refer to P.17-39, Symptom Procedures number 1. Then go to Step 6.

STEP 4. MUT-III data list

- Item 07, Clutch switch <M/T> (Refer to data list reference table P.17-50).
- Item 07, Inhibitor switch <A/T> (Refer to data list reference table P.17-50).

Q: Is the check result normal?
YES : Go to Step 5
NO <M/T> : Refer to P.17-40, Symptom Procedures number 2. Then go to Step 6
NO <A/T> : Refer to P.17-46, 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.
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-399). 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 CAUSE

- Malfunction of the vehicle speed sensor.
- Malfunction of the throttle body.
- Malfunction of the engine-ECU.

DIAGNOSIS

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-20). 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-399). Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent.

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 CAUSE

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

DIAGNOSIS

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-17). 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-20). 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-ECUP.13A-399). Then go to Step 4.

NO : It can be assumed that this malfunction is intermittent.

STEP 4. Retest the system

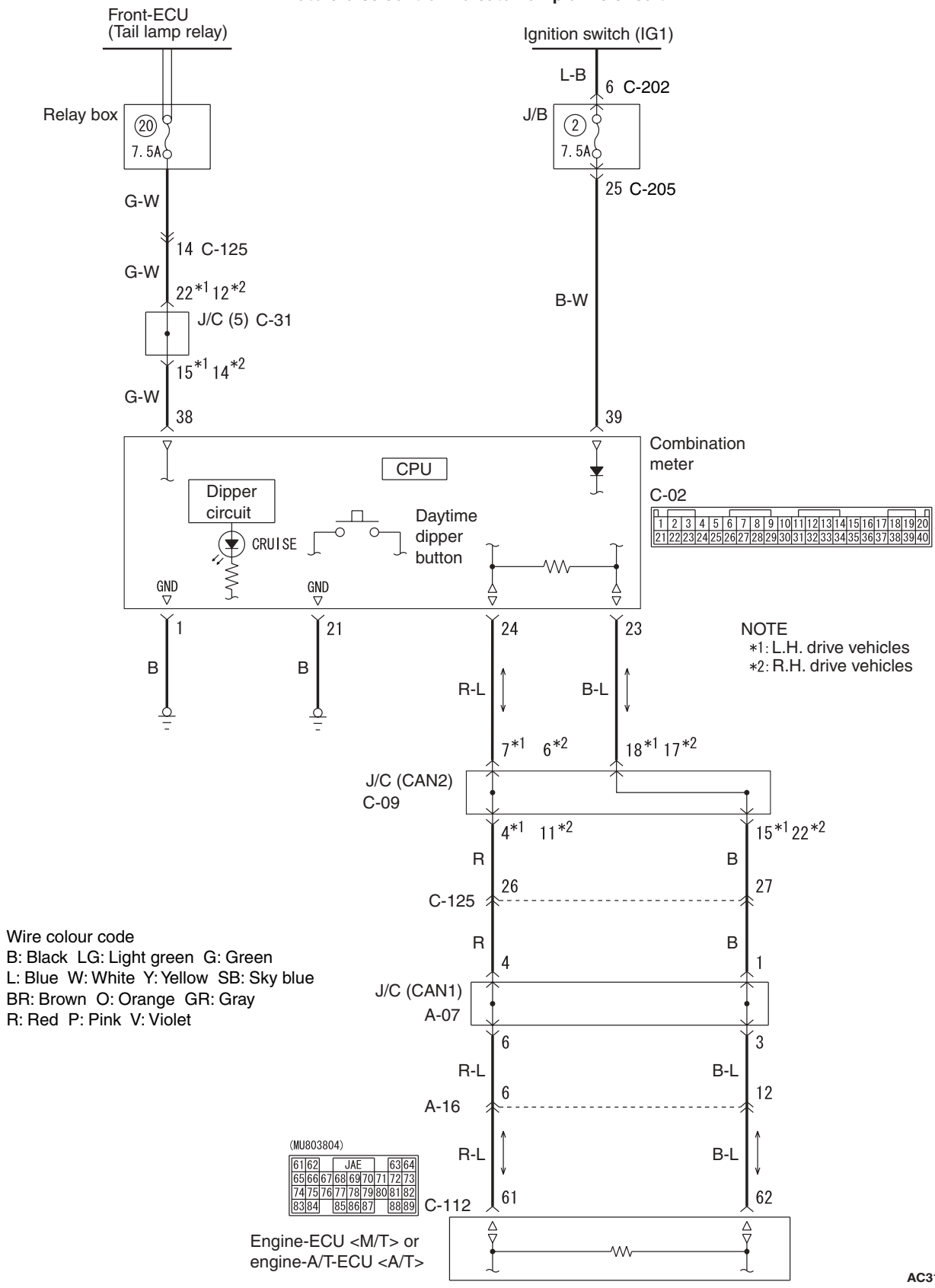
Q: Does a hunting occur?

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



CIRCUIT 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.

COMMENT

Connector(s), wiring harness in the CAN bus line 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.

TROUBLESHOOTING HINTS

- 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

STEP 1. MUT-III CAN bus diagnosis

- Using MUT-III, perform CAN busline diagnosis.

Q: Is the check result satisfactory?

YES : Go to Step 2

NO : Repair the CAN bus lines (Refer to GROUP 54D, Diagnosis-Can Bus Diagnostic Chart P.54D-16). Then go to Step 4 .

STEP 2. MUT-III MPI diagnosis

- Using MUT-III, perform MPI diagnosis.

Q: Is diagnosis code U1108 set?

YES : Refer to GROUP 13A, MPI Diagnosis - Code No U1108: Combination Meter Time-Out P.13A-276. Then go to Step 4 .

NO : Go to Step 3 .

STEP 3. Retest the system.

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.

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-399). Then go to Step 4 .

STEP 4. Retest the system.

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

M1172002400396

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	MAIN switch: ON	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	Stop lamp switch (for auto-cruise control circuit)		Brake pedal: Depressed		ON
			Brake pedal: Released		OFF

Item No.	Check item	Check condition		Normal condition
07	Clutch switch <M/T>	Clutch pedal: Depressed		ON
		Clutch pedal: Released		OFF
	Inhibitor switch <A/T>	Selector lever: N or P position		ON
		Selector lever: Other than N or P 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 MUT-III display the same value.
11	Throttle position sensor (main)	• 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	300 – 700 mV
			Fully open the throttle valve with your finger	4,000 mV or more
		No load		500 – 700 mV
		Shift lever: "N" → "D" <A/ T>		Voltage rises
12	Accelerator pedal position sensor (main)	Ignition switch: ON	Accelerator pedal: Released	800 – 1,200 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

M1172002700342

C-110

1	2						3	4	
5	6	7	8	9	10	11	12	13	
14	15		16	17	18		19	20	
21	22		23	24	25		26	27	

C-111

31	32							33	34		
35	36	37	38	39	40	41	42	43			
44	45	46	47	48	49		50	51			
52	53		54	55	56		57	58			

C-112

61	62							63	64		
65	66	67	68	69	70	71	72	73			
74	75	76	77	78	79	80	81	82			
83	84		85	86	87		88	89			

C-113

91	92						93	94	95		
96	97	98	99	100	101	102	103	X	104		
105	106		107	108	109		110	111	112		
113	114		115	116	117		118	119	120		

C-114

121	122							123	124		
125	126	127	128	129	130	131		132	133		
134	135		136	137	138	139		140	141		
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
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.	System voltage
			Release the clutch pedal.	1 V or less
51	Inhibitor switch <A/T>: "P" and "N"	Ignition switch: "ON"	Select lever: N or P range	System voltage
			Select lever: Other than N or P range	1 V or less
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
92	Accelerator pedal position sensor (main) power supply	Ignition switch: "ON"		4.9 – 5.1 V
94	Auto-cruise control switch power supply	Ignition switch: "ON"	All switches: OFF	4.7 – 5.0 V
			"CRUISE" (MAIN) switch: "ON"	0 – 0.3 V
			"COAST/SET" switch: ON	2.0 – 2.8 V
			"ACC/RES" switch: ON	3.3 – 4.1 V
			"CANCEL" switch: ON	0.8 – 1.5 V
97	Sensor impressed voltage	Ignition switch: "ON"		4.9 – 5.1 V
106	Throttle position sensor power supply	Ignition switch: "ON"		4.9 – 5.1 V
107	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	0.4 – 1.0 V
			Depress the accelerator pedal.	3.6 V or more

Terminal No.	Check item	Check conditions		Normal condition
113	Throttle position sensor (sub)	• 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	4.0 V or more
114	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.9 – 1.2 V
			Depress the accelerator pedal.	4.0 V or more
115	Throttle position sensor (main)	• 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

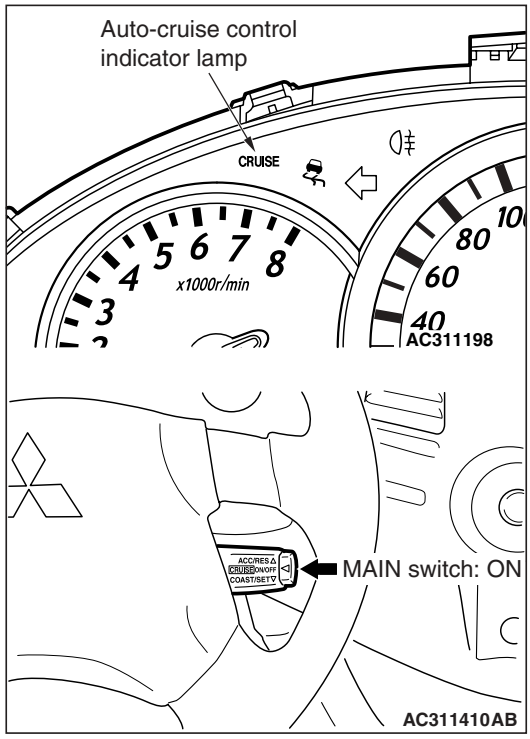
ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

M1172001200098

AUTO-CRUISE CONTROL MAIN SWITCH CHECK

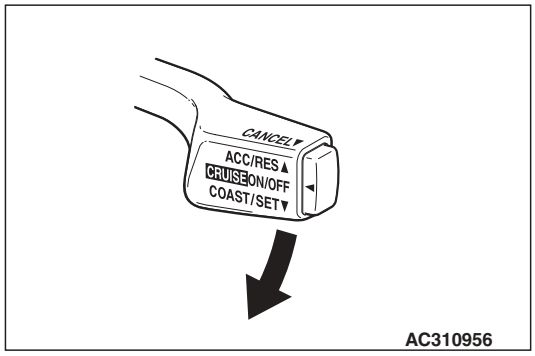
1. Turn the ignition switch to ON position.



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.

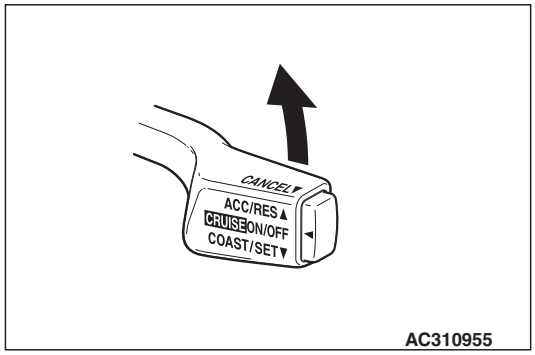


3. Push the auto-cruise control switch in the direction of arrow.
4. Check to be sure that when the switch is released the speed is the desired constant speed.

   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.

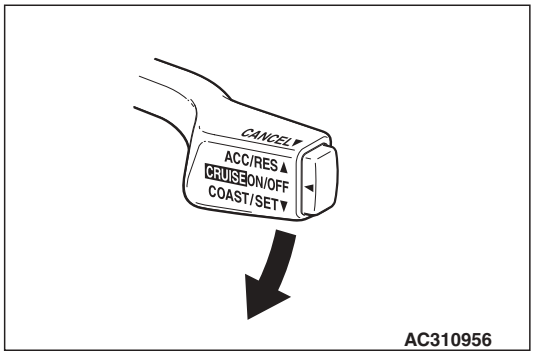


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that acceleration continues while the switch is hold, and that when it is released the constant speed at the time when it was released becomes the driving speed.

   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.

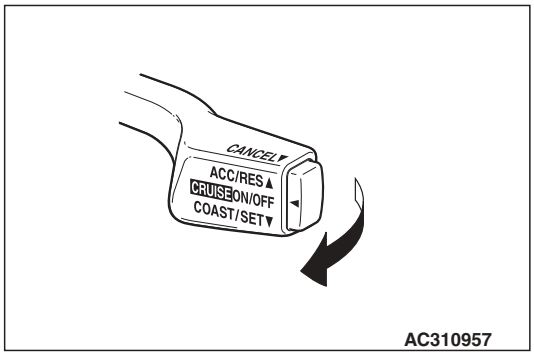


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that deceleration continues while the switch is pressed, and that when it is released the constant speed at the time when it was released becomes the driving speed.

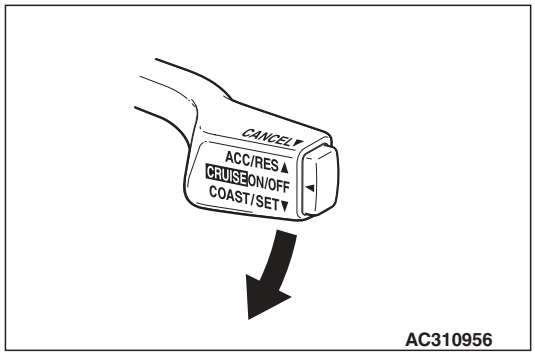
   NOTE: When the vehicle speed reaches the low limit (approximately 40 km/h) during deceleration, the auto-cruise control will be cancelled.

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 selector lever is moved to the "N" range.



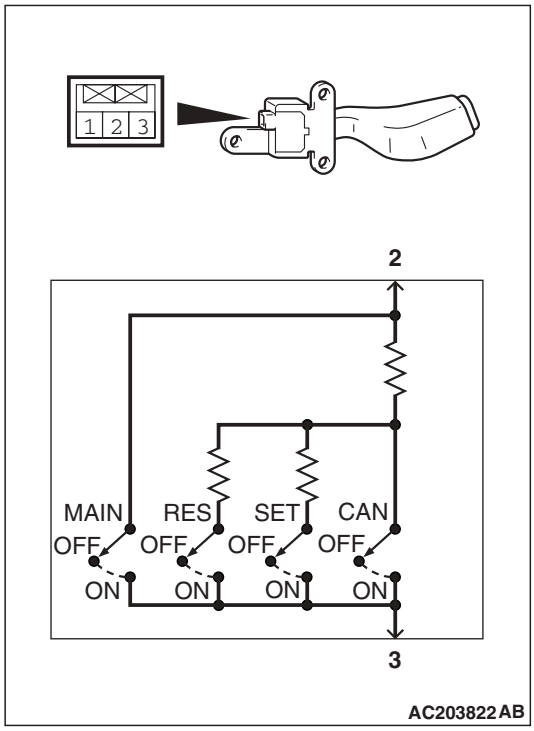
3. When the auto-cruise control switch is pushed in the direction of arrow at a vehicle speed of 40 km/h or higher, check if the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
4. When the MAIN switch is turned to OFF while driving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

AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700424

AUTO-CRUISE CONTROL SWITCH CHECK

1. Remove the auto-cruise control switch. (Refer to P.17-56).

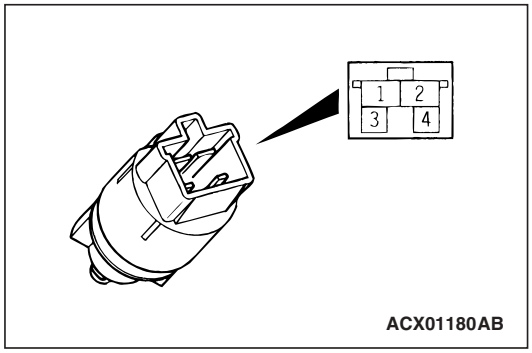


2. Measure the resistance between the terminals when each of the SET, RESUME, CANCEL and MAIN switches is pressed. If the values measured at the time correspond to those in the table below, then there is no problem.

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>

Refer to GROUP 21A, On-vehicle Service – Clutch Pedal Switch Check and Adjustment P.21A-4.

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

Refer to GROUP 23A, On-vehicle Service – A/T Control Component Check P.23A-128.

THROTTLE POSITION SENSOR

Refer to GROUP 13A, On-vehicle Service – Throttle Valve Control Servo Check P.13A-394.

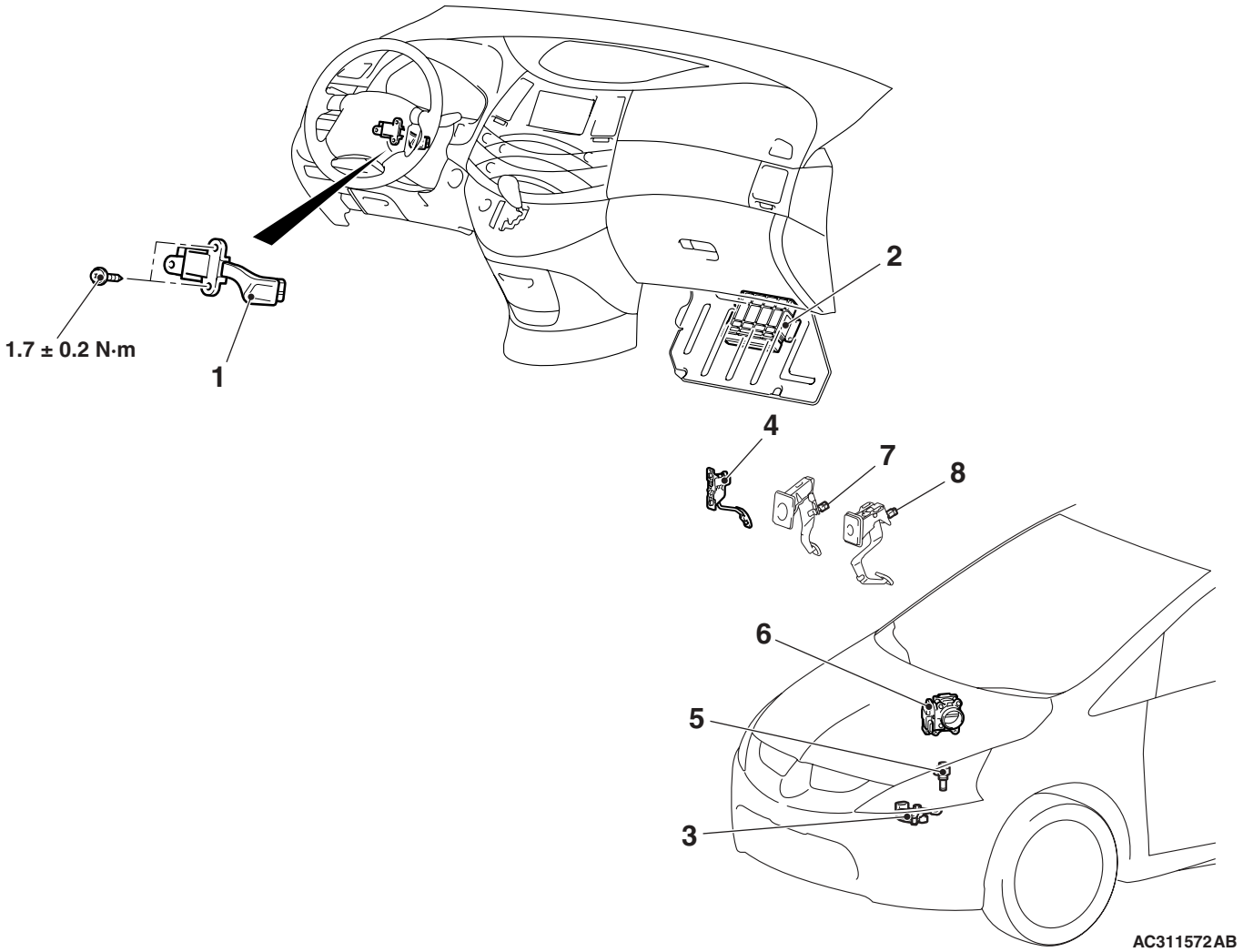
AUTO-CRUISE CONTROL

REMOVAL AND INSTALLATION

M1172001400360

⚠ ***WARNING***

- ***Before removal of the air bag module, refer to GROUP 52B, Service Precautions (P.52B-7) and Driver's, Front Passenger's Air Bag Module(s) and Clock Spring (P.52B-225).***
- ***When removing and installing the steering wheel and air bag module assembly, do not let it bump against the air bag module.***



Auto-cruise control switch removal steps

- Air bag module (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Module(s) and Clock Spring P.52B-225)

1. Auto-cruise control switch

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-399)

Sensor removal steps

3. Inhibitor switch <A/T>
4. Accelerator pedal (Refer to P.17-3)
5. Vehicle speed sensor <M/T>
6. Throttle body assembly (Refer to GROUP 13A, Throttle body assembly P.13A-397)
7. Stop lamp switch (Refer to GROUP 35A, Brake pedal P.35A-12)
8. Clutch switch <M/T> (Refer to GROUP 21A, Clutch pedal P.21A-5)

EMISSION CONTROL <MPI>

GENERAL INFORMATION

M1173000100552

The emission control system consists of the following subsystems:

- 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 Steeper motor type (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

EMISSION CONTROL DEVICE REFERENCE TABLE

M1173006600191

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 (Steeper motor)					×

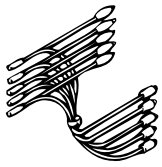
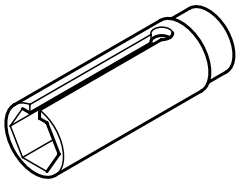
SERVICE SPECIFICATION(S)

M1173000300459

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

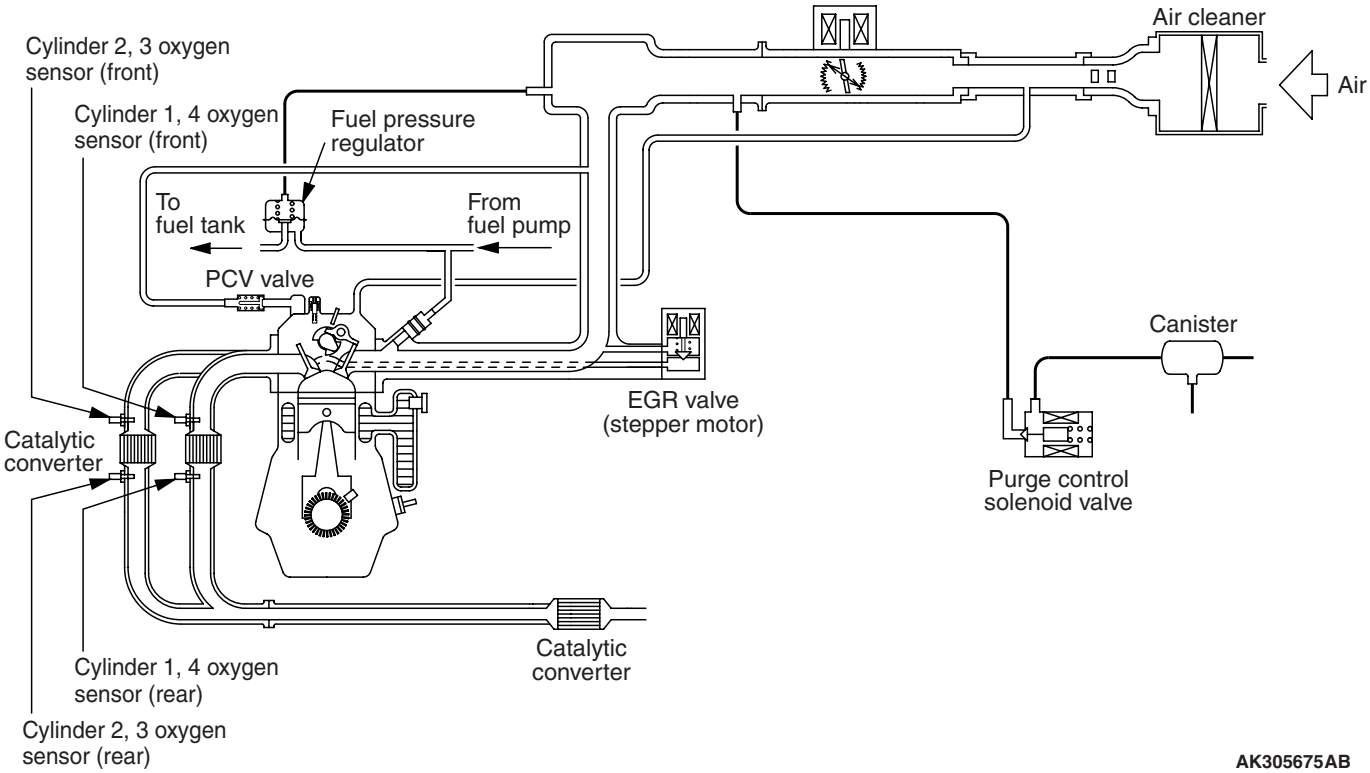
M1173000600201

Tool	Number	Name	Use
 MB991658	MD991658	Test harness	EGR valve (Steeper moter) CHECK
	MD998770	Oxygen sensor wrench	Removal and installation of oxygen sensor

VACUUM HOSE

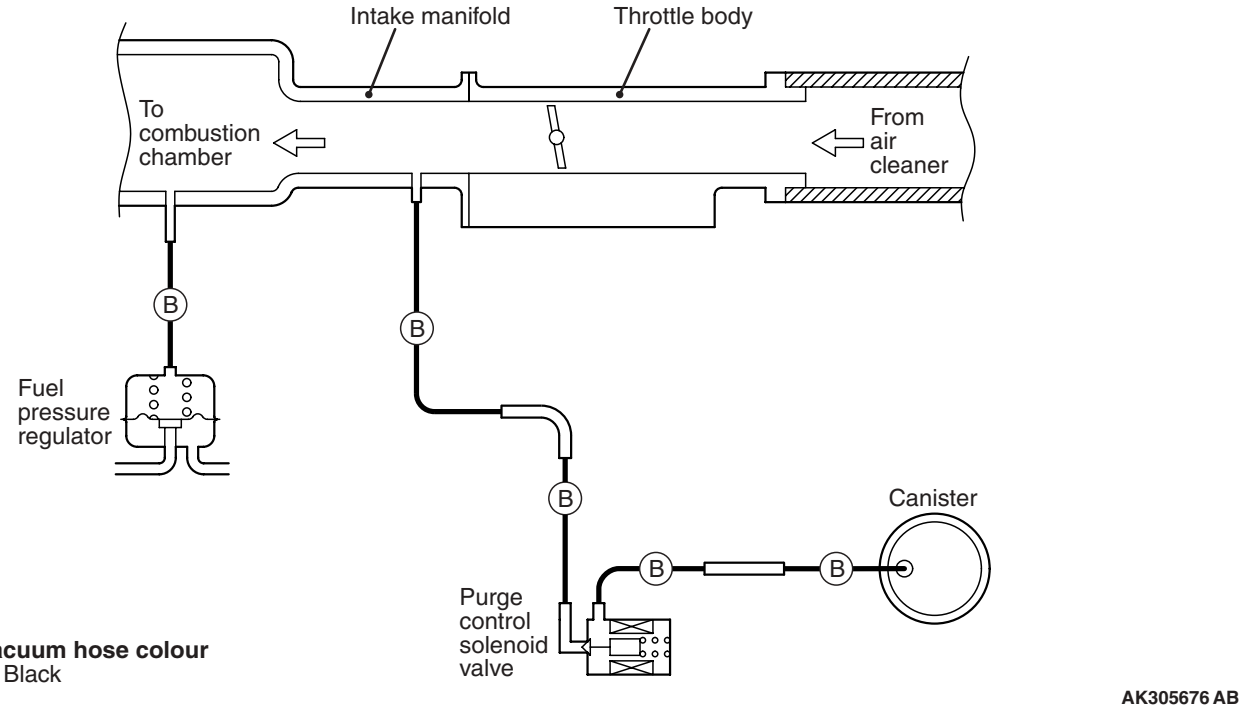
VACUUM HOSE PIPING DIAGRAM

M1173000900525



VACUUM CIRCUIT DIAGRAM

M1173007100382



VACUUM HOSE CHECK

M1173007300160

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

M1173007200118

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.

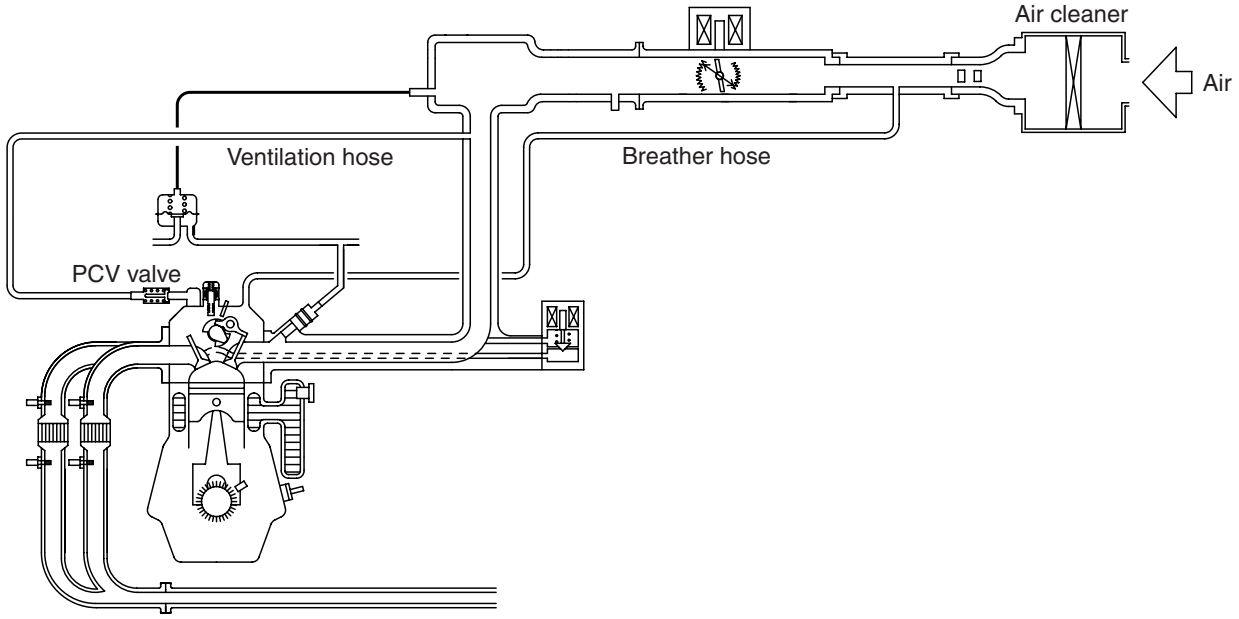
CRANKCASE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (CRANKCASE EMISSION CONTROL SYSTEM)

M1173005000420

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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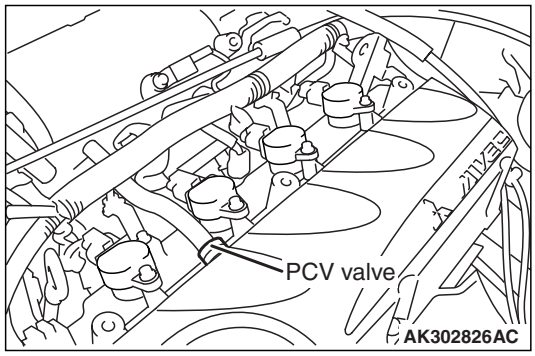
COMPONENT LOCATION (CRANKCASE EMISSION CONTROL SYSTEM)

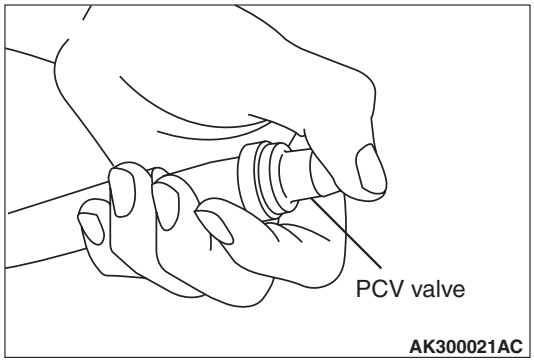
M1173007400305



POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

M1173001100221

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.

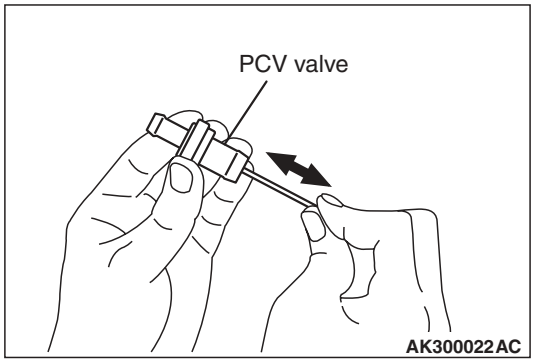


5. Place a finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.

   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.

POSITIVE CRANKCASE VENTILATION (PCV) VALVE CHECK

M1173001200217



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.

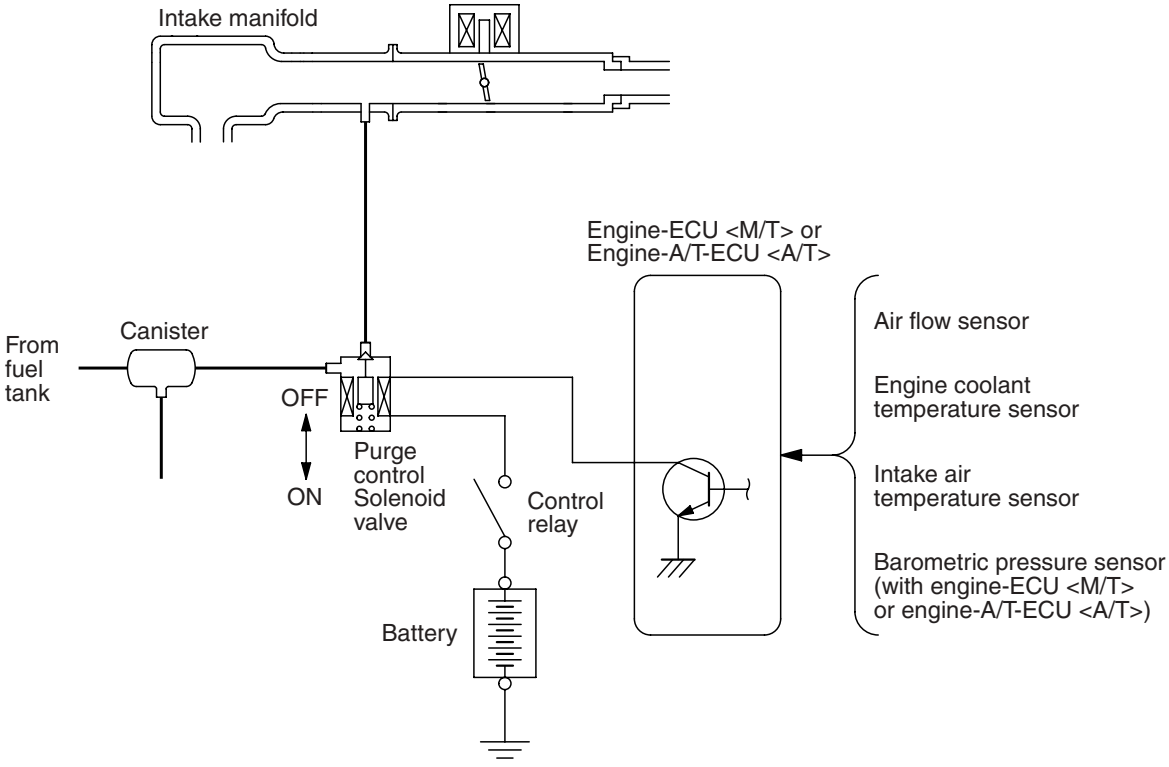
EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (EVAPORATIVE EMISSION CONTROL SYSTEM)

M1173005100524

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



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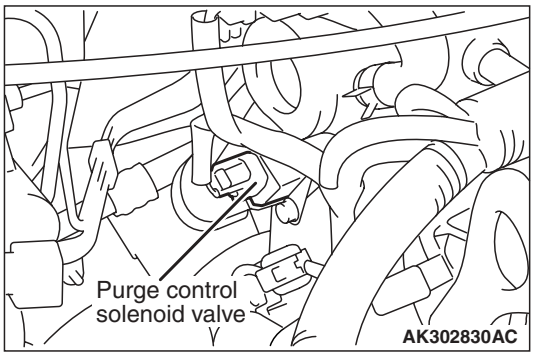
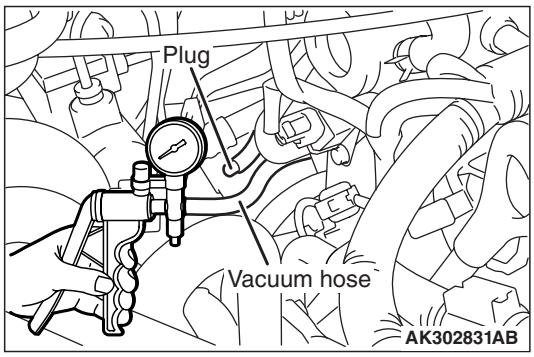
COMPONENT LOCATION (EVAPORATIVE EMISSION CONTROL SYSTEM)

M1173007500313



PURGE CONTROL SYSTEM CHECK

M1173001400437



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)

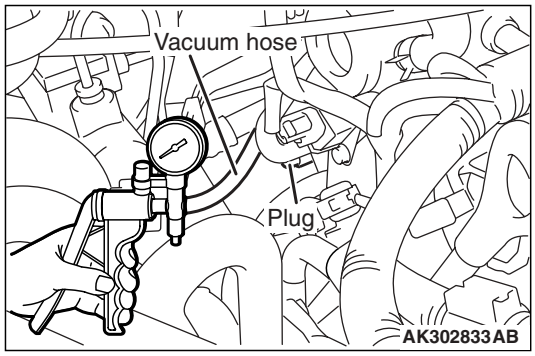
Engine condition	Normal condition
At idle	Vacuum is maintained.
3,000 r/min	

WHEN ENGINE IS HOT (ENGINE COOLANT TEMPERATURE: 80°C OR HIGHER)

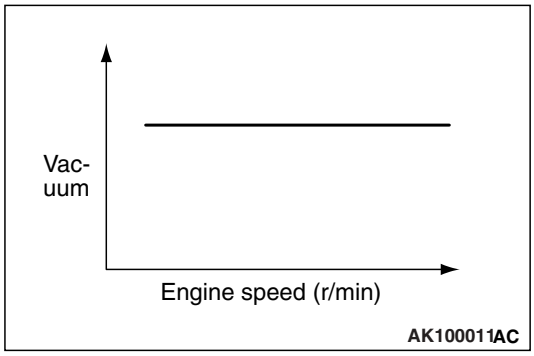
Engine condition	Normal condition
At idle	Vacuum is maintained.
3,000 r/min (within 3 minutes after engine starts)	Vacuum will leak.

PURGE PORT VACUUM CHECK

M1173001500263



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.

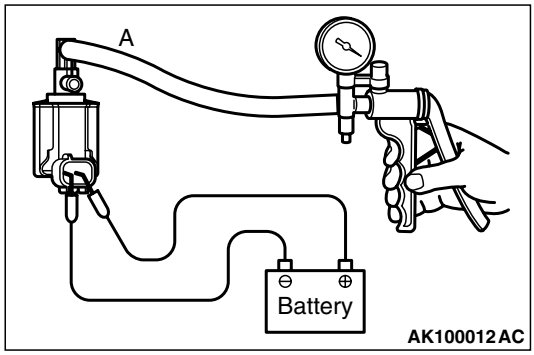


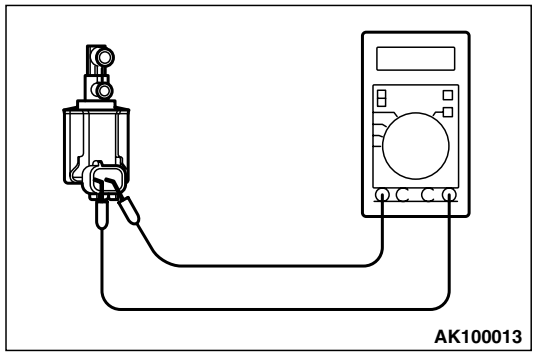
3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably blocked and should be cleaned.

PURGE CONTROL SOLENOID VALVE CHECK

M1173001700234

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

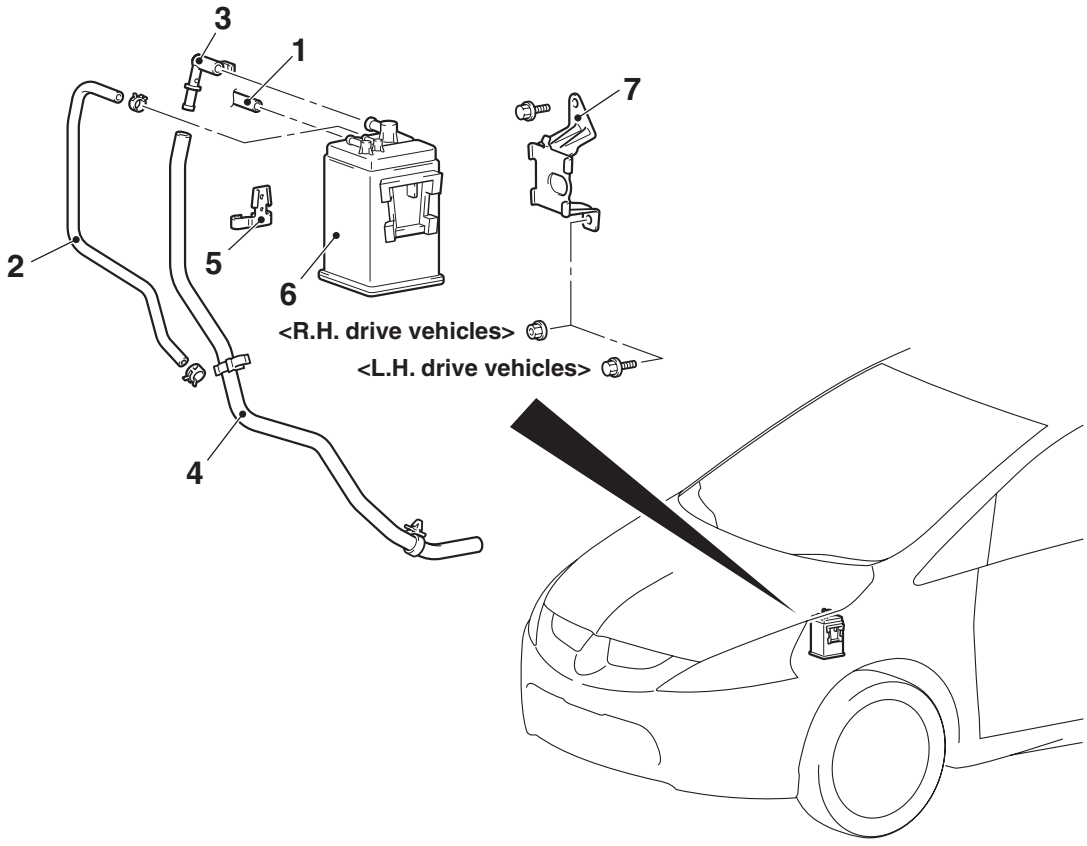
5. Measure the resistance between the terminals of the solenoid valve.

   Standard value: 30 – 34 Ω (at 20°C)

CANISTER REMOVAL AND INSTALLATION

M1173004200197

Pre-removal and Post-installation Operation
Air Cleaner assembly Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-3).



AC310442AB

Removal steps
1. Purge hose connection
2. Vapour hose
3. Vent connector
4. Vapour hose
5. Hose clamp
6. Canister
7. Canister bracket

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

GENERAL INFORMATION (EGR SYSTEM)

M1173005200435

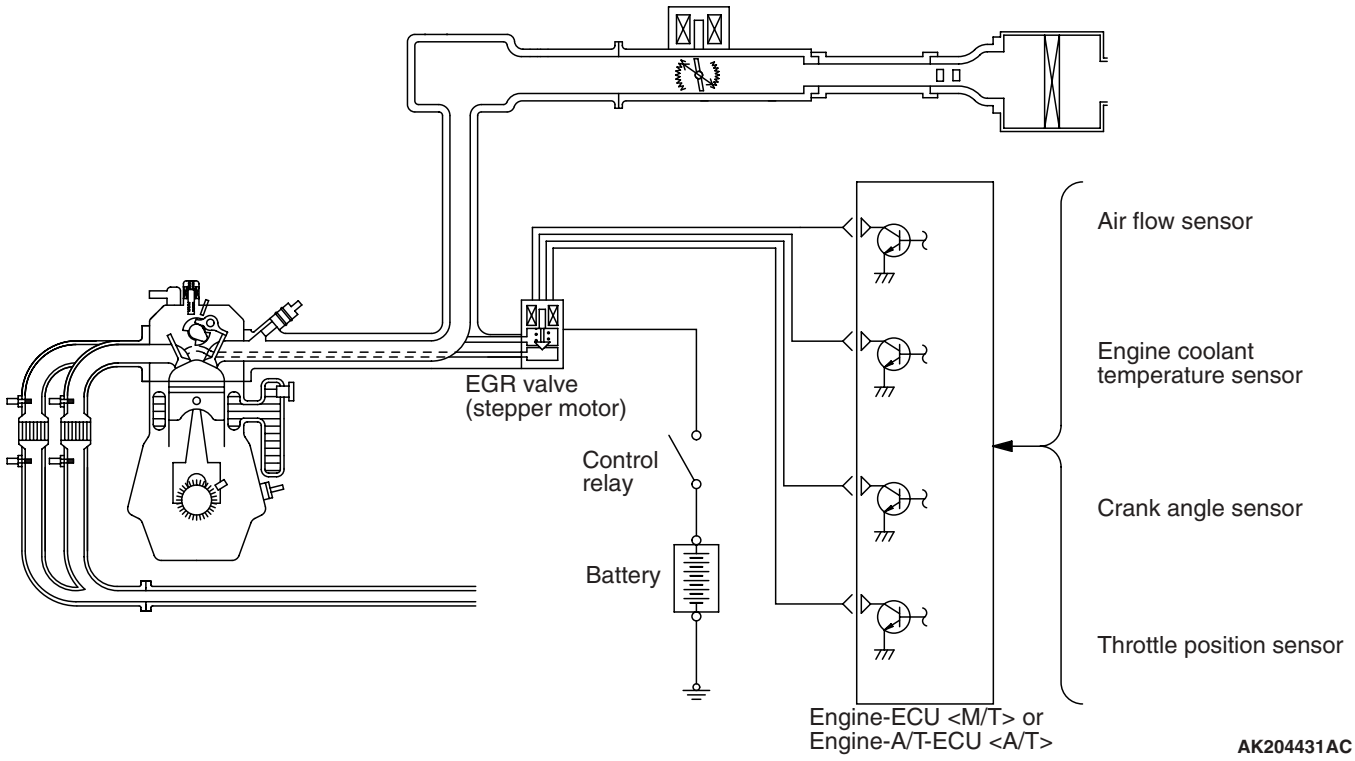
The exhaust gas recirculation (EGR) system lowers the nitrogen oxide (NOx) emission level.
When the air/fuel mixture combustion temperature is high, a large quantity of nitrogen oxides (NOx) is generated in the combustion chamber.
Therefore, this system recirculates part of emission gas from the exhaust 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.

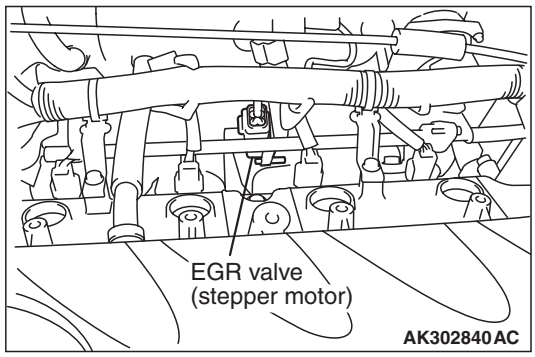
- The engine coolant temperature is low.
- The engine is at idle.
- The throttle valve is widely opened.

SYSTEM DIAGRAM



COMPONENT LOCATION (EGR SYSTEM)

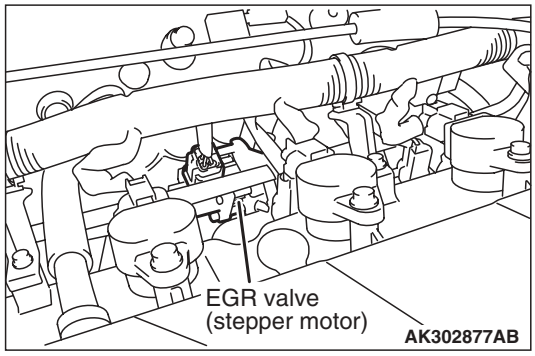
M1173007600310



EGR VALVE (STEPPER MOTOR) CHECK

M1173050200145

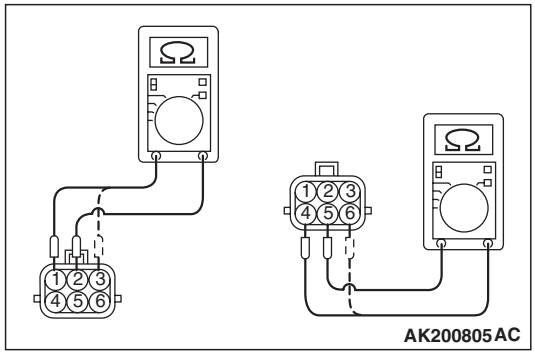
CHECKING THE OPERATION SOUND



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)

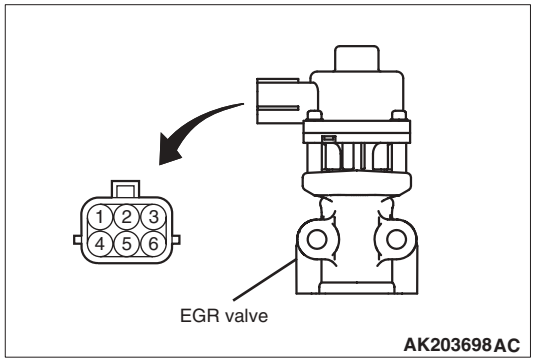
3. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

Standard value: 20 – 24 Ω (at 20°C)

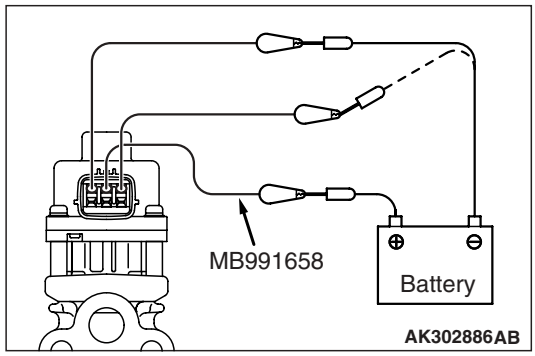
4. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening Torque: 24 ± 4 N·m

OPERATION CHECK



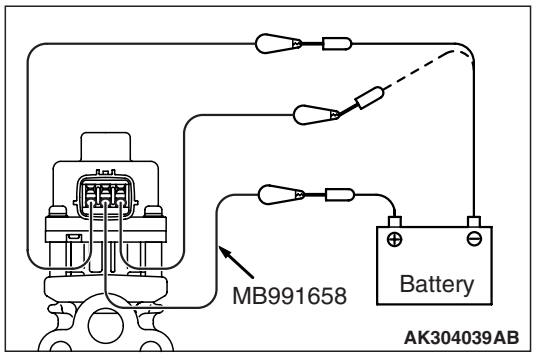
1. Remove the EGR valve.
2. Attach a test wiring harness (special tool MB991658) to the connector at the EGR valve.



⚠ 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 ± 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.

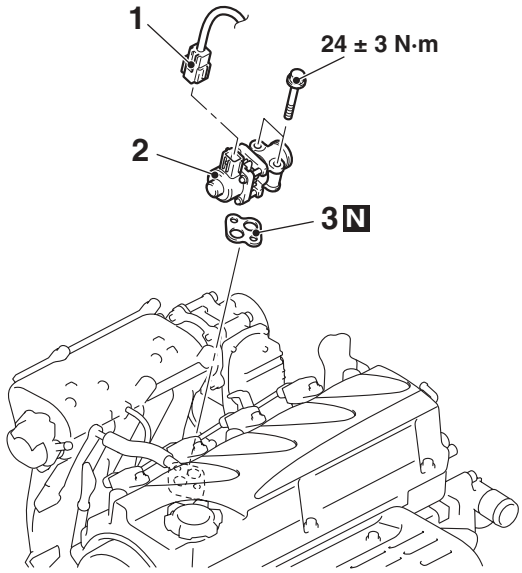
Tightening torque: 24 ± 3 N·m

EXHAUST GAS RECIRCULATION (EGR) VALVE REMOVAL AND INSTALLATION

M1173010500294

Pre-removal and Post-installation Operation

- Engine Cover and Engine Cover Bracket Removal and Installation (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-16).
- Cowl Top Panel Front Removal and Installation (Refer to GROUP 42, Loose Panel P.42-67).



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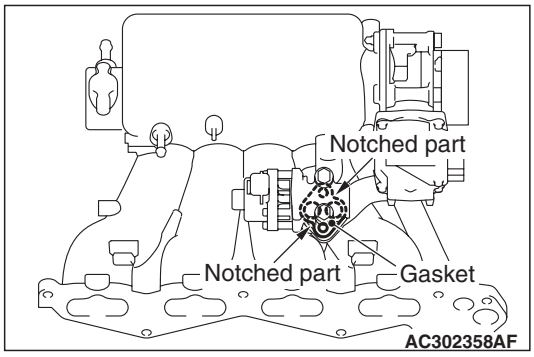
Removal steps

1. EGR valve connector
2. EGR valve

>>A<< 3. EGR valve gasket

INSTALLATION SERVICE POINT

>>A<< EGR PIPE B GASKET INSTALLATION



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Install the EGR valve gasket as shown in the illustration.

CATALYTIC CONVERTER

REMOVAL AND INSTALLATION

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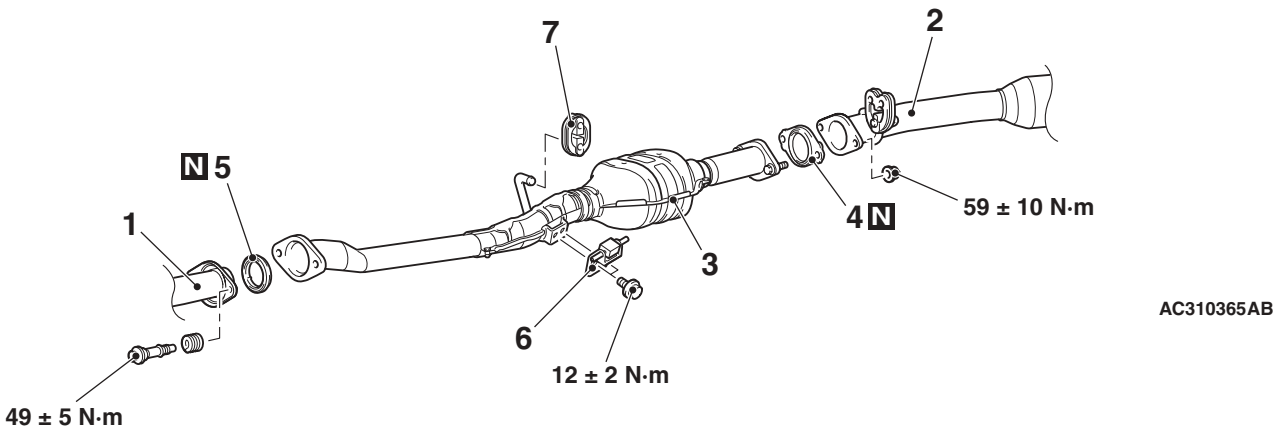

Removal steps

1. Front exhaust pipe connection
2. Centre exhaust pipe connection
3. Catalytic converter
4. Exhaust pipe gasket

Removal steps (Continued)

5. Seal ring
6. Exhaust pipe damper
7. Exhaust muffler hanger