

## GROUP 17

# ENGINE AND EMISSION CONTROL

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## ENGINE CONTROL

### GENERAL INFORMATION

#### <4G64, 4G69-L.H. DRIVE VEHICLES>

M1171000100512

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

#### <4G69-R.H. DRIVE VEHICLES>

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

### SERVICE SPECIFICATIONS

M1171000300174

Items		Standard value
Accelerator cable play mm		1.0 – 2.0
Engine idle speed r/min	4G64	700 ± 100
	4G69	750 ± 100

### TROUBLESHOOTING

#### INTRODUCTION TO ENGINE CONTROL SYSTEM DIAGNOSIS

M1171002000298

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

If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an engine control system fault.

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

#### ENGINE CONTROL SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1171002100325

Use these steps to plan your diagnostic strategy.

### SYMPTOM CHART

M1171002200366

Symptom	Inspection procedure	Reference page
Throttle valve will not fully open or close <4G64>	1	<a href="#">P.17-5</a>
Throttle valve will not fully open or close <4G69-L.H. drive vehicles>	2	<a href="#">P.17-5</a>
Throttle valve will not fully open or close <4G69-R.H. drive vehicles>	3	<a href="#">P.17-6</a>
Accelerator pedal operation is not smooth (over acceleration) <4G64, 4G69-L.H. drive vehicles>	4	<a href="#">P.17-6</a>
Accelerator pedal operation is not smooth (over acceleration) <4G69-R.H. drive vehicles>	5	<a href="#">P.17-7</a>

## SYMPTOM PROCEDURES

---

### Inspection Procedure 1: Throttle Valve will not Fully Open or Close <4G64>

---

#### DIAGNOSIS PROCEDURE

---

##### STEP 1. Check the accelerator cable adjustment.

**Q: Is the accelerator cable properly adjusted?**

**YES :** Go to Step 2.

**NO :** Adjust the accelerator cable (Refer to [P.17-7](#)). Then go to Step 3.

---

##### STEP 2. Check the throttle valve.

Check that the throttle lever of the throttle body assembly moves smoothly by moving it by hand.

**Q: Does the throttle lever of the throttle body assembly move smoothly?**

**YES :** Go to Step 3.

**NO :** . Cleaning the throttle body (Refer to GROUP 13A, On-vehicle Service [P.13A-280](#)), or replace the throttle body assembly (Refer to GROUP 13A, Throttle Body [P.13A-294](#)). Then go to Step 3.

---

##### STEP 3. Retest the system.

**Q: Does the throttle valve fully open and close?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

---

### Inspection Procedure 2: Throttle Valve will not Fully Open or Close <4G69-L.H. drive vehicles>

---

#### DIAGNOSIS PROCEDURE

---

##### STEP 1. Check the accelerator cable adjustment.

**Q: Is the accelerator cable properly adjusted?**

**YES :** Go to Step 2.

**NO :** Adjust the accelerator cable (Refer to [P.17-7](#)). Then go to Step 5.

---

##### STEP 2. Check the accelerator pedal position sensor assembly.

Check that the lever of the accelerator pedal position sensor assembly moves smoothly by moving it by hand.

**Q: Does the lever of the accelerator pedal position sensor assembly move smoothly?**

**YES :** Go to Step 3.

**NO :** Replace the accelerator pedal position sensor assembly (Refer to [P.17-10](#)). Then go to Step 5.

---

##### STEP 3. Check the accelerator pedal position sensor assembly.

Refer to GROUP 13B, On-vehicle Service [P.13B-409](#).

**Q: Is the accelerator pedal position sensor assembly normally?**

**YES :** Go to Step 4.

**NO :** Replace the accelerator pedal position sensor assembly (Refer to [P.17-10](#)). Then go to Step 5.

---

**STEP 4. Check the Throttle valve (Throttle valve control servo).**

Refer to GROUP 13B, On-vehicle Service

[P.13B-415](#).

**Q: Is the throttle valve control servo normally?**

**YES :** Go to Step 5.

**NO :** Cleaning the throttle body (Refer to GROUP 13B, On-vehicle Service [P.13B-402](#)), or replace the throttle body assembly (Refer to GROUP 13B, Throttle Body [P.13B-418](#)). Then go to Step 5.

---

**STEP 5. Retest the system.**

**Q: Does the throttle valve fully open and close?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

---

**Inspection Procedure 3: Throttle Valve will not Fully Open or Close <4G69-R.H. drive vehicles>**

---

**DIAGNOSIS PROCEDURE**

---

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

**Q: Is any diagnosis code set?**

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

[P.13B-24](#).

**NO :** Go to Step 2.

---

**STEP 2. Retest the system.**

**Q: Does the throttle valve fully open and close?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

---

**Inspection Procedure 4: Accelerator Pedal Operation is not Smooth (Over Acceleration) <4G64, 4G69-L.H. drive vehicles>**

---

**DIAGNOSIS PROCEDURE**

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**STEP 1. Check the accelerator pedal.**

**Q: Is the accelerator pedal loose?**

**YES :** Tighten the fasteners. Then go to Step 4.

**NO :** Go to Step 2.

---

**STEP 2. Check the accelerator cable wiring.**

**Q: Is the accelerator cable routing bent sharply?**

**YES :** Correct the cable routing Then go to Step 4.

**NO :** Go to Step 3.

---

**STEP 3. Check the accelerator cable lubricant.**

**Q: Is the accelerator cable lubricated sufficiently?**

**YES :** Go to Step 4.

**NO :** Refill or replace the lubricant. Then go to Step 4.

---

**STEP 4. Retest the system.**

**Q: Does the accelerator pedal work normally?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

**Inspection Procedure 5: Accelerator Pedal Operation is not Smooth (Over Acceleration) <4G69-R.H. drive vehicles>**

**DIAGNOSIS PROCEDURE**

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

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

**YES :** Go to Step 2.

**NO :** Replace and reinstall the accelerator pedal (Refer to P.17-8). Go to Step 3.

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

**Q: Is any diagnosis code set?**

**YES :** Refer to GROUP 13B, Troubleshooting – Inspection Chart for Diagnosis Code P.13B-24.

**NO :** Go to Step 3.

**STEP 3. Retest the system.**

**Q: Does the accelerator pedal work normally?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

**ON-VEHICLE SERVICE**

**ACCELERATOR CABLE CHECK AND ADJUSTMENT <4G64>**

M1171000900477

1. Turn A/C and lights OFF. Inspect and adjust at no load.

2. Warm engine until stabilized at idle.

3. Confirm idle speed is at standard value.

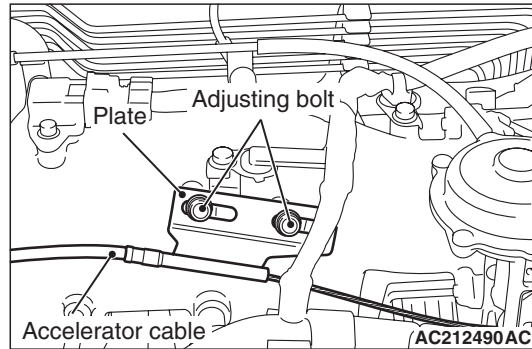
**Standard value: 700 ± 100 r/min**

4. Stop engine. [ignition switch: LOCK (OFF) position].

5. Confirm there are no sharp bends in the accelerator cable.

6. Check the inner cable for correct slack.

**Standard value: 1.0 – 2.0 mm**



7. If there is too much slack or no slack, adjust play by the following procedures.

(1) Loosen the adjusting bolts to release the cable.

(2) Move the plate until the inner cable play is at the standard value, and then tighten the adjusting bolts.

(3) After adjusting, check that the throttle lever is touching the stopper.

**ACCELERATOR CABLE CHECK AND ADJUSTMENT <4G69-L.H. DRIVE VEHICLES>**

M1171000900422

1. Turn A/C and lights OFF. Inspect and adjust at no load.

2. Warm engine until stabilized at idle.

3. Confirm idle speed is at standard value.

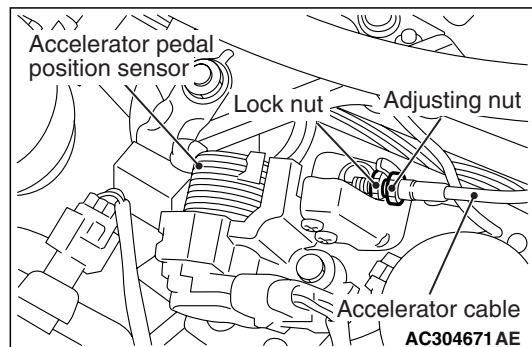
**Standard value: 750 ± 100 r/min**

4. Stop engine. [ignition switch: LOCK (OFF) position].

5. Confirm there are no sharp bends in the accelerator cable.

6. Check the inner cable for correct slack.

**Standard value: 1.0 – 2.0 mm**



7. If there is too much slack or no slack, adjust play by the following procedures.

- (1) Loosen the lock nut and adjusting nut to release the cable.

- (2) Tighten the adjusting nut until the inner cable play is at the standard value, and then tighten the lock nut.

## ACCELERATOR CABLE AND PEDAL <4G64, 4G69-L.H. DRIVE VEHICLES>

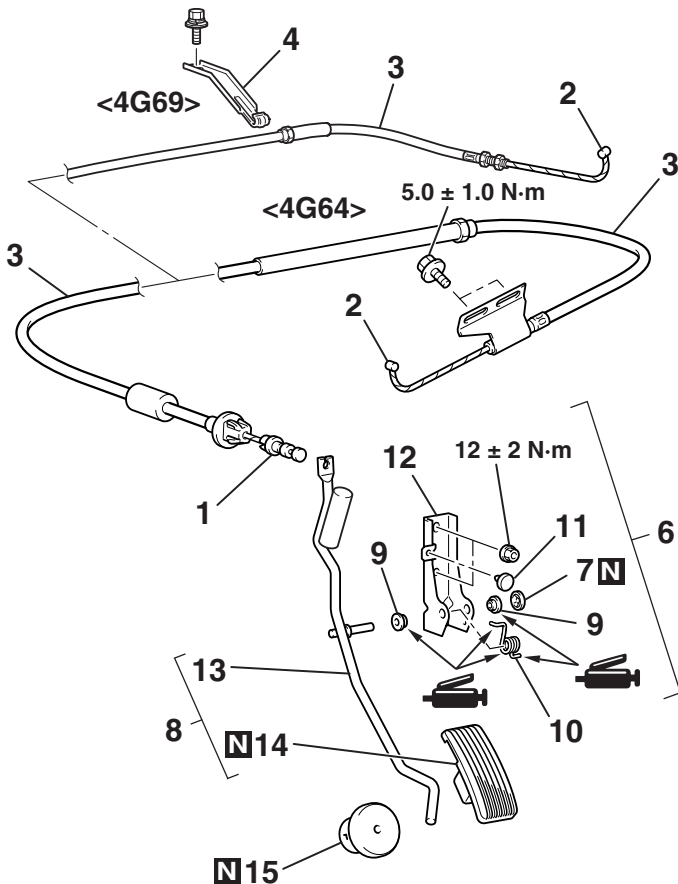
### REMOVAL AND INSTALLATION

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#### Post-installation Operation

Adjusting the Accelerator Cable (Refer to P.17-7 <4G64> or P.17-7 <4G69-L.H. drive vehicles>).

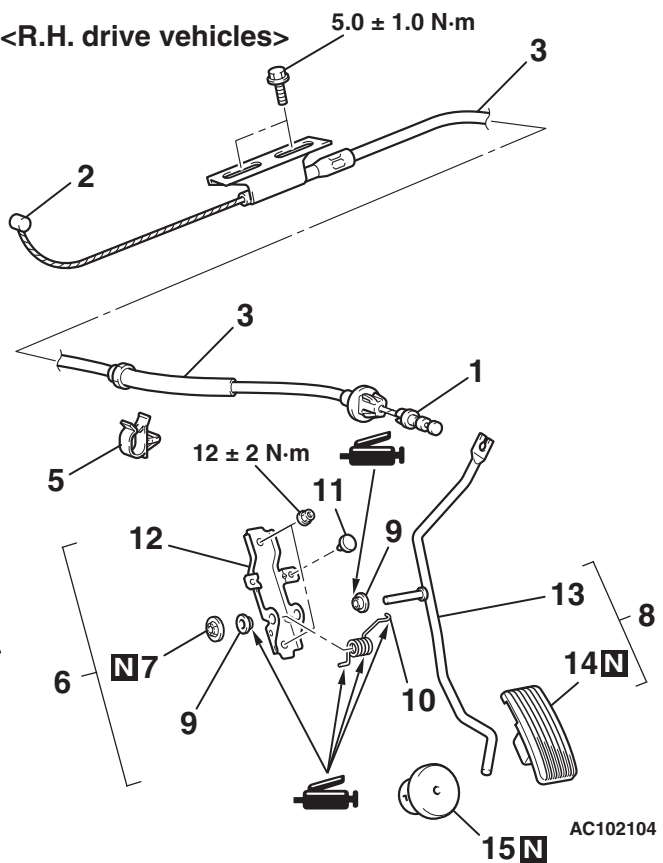
#### <L.H. drive vehicles>



#### Accelerator cable assembly removal steps

1. Inner cable connection (Accelerator pedal side)
2. Inner cable connection (Throttle body side or accelerator pedal position sensor side)
3. Accelerator cable assembly
4. Accelerator cable bracket <4G69-L.H. drive vehicles>
5. Holder <R.H. drive vehicles>

#### <R.H. drive vehicles>



#### Accelerator pedal assembly removal steps

1. Inner cable connection (Accelerator pedal side)
6. Accelerator pedal assembly
7. Push-on spring nut
8. Accelerator arm and accelerator pedal pad assembly
9. Bushing
10. Spring
11. Stopper
12. Accelerator pedal bracket
13. Accelerator arm

AC102104

AC401647AB



Accelerator pedal assembly  
removal steps (Continued)

- >>A<< 14. Accelerator pedal pad  
15. Accelerator pedal stopper

INSTALLATION SERVICE POINT

>>A<< ACCELERATOR PEDAL PAD  
INSTALLATION

**CAUTION**

To prevent damages to the Pedal Pad, warm the thumb area of the Pedal Pad with a dryer, etc. prior to assembling it.

*NOTE: If it is difficult to assemble, apply soapy water to the thumb area to enhance the assembling process.*

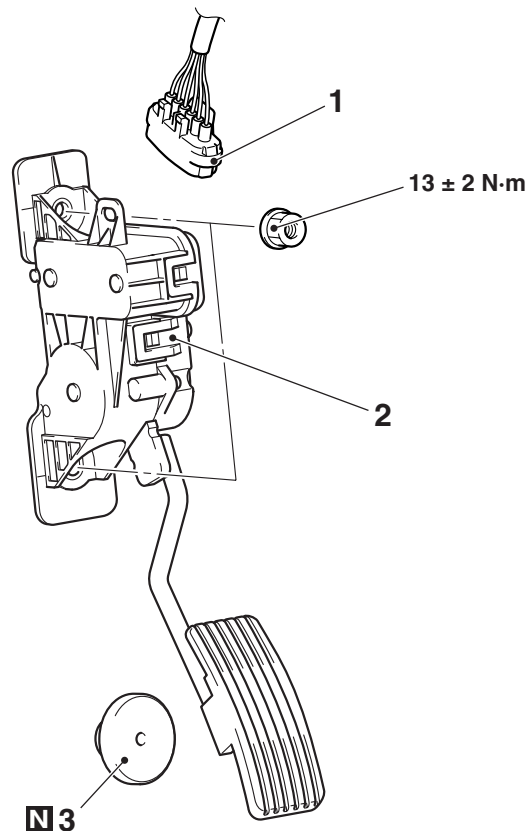
ACCELERATOR PEDAL <4G69-R.H. DRIVE VEHICLES>

REMOVAL AND INSTALLATION

M1171003000105

**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.



AC313985AC

**Removal steps**

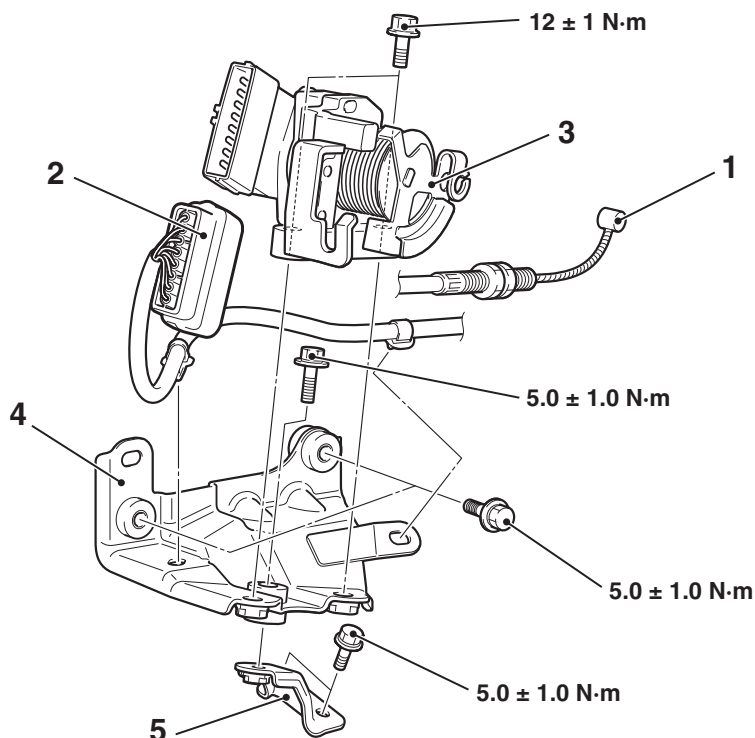
1. Accelerator pedal position sensor (APS) connector

**Removal steps (Continued)**

2. Accelerator pedal assembly
3. Accelerator pedal arm stopper

**ACCELERATOR PEDAL POSITION  
SENSOR <4G69-L.H. DRIVE  
VEHICLES>****REMOVAL AND INSTALLATION**

M1171001800075

**Post-installation Operation**Adjusting the Accelerator Cable (Refer to [P.17-7](#)).

AC305408AC

**Removal steps**

1. Inner cable connection (Accelerator pedal position sensor side)
2. Accelerator pedal position sensor connector
3. Accelerator pedal position sensor assembly

**Removal steps (Continued)**

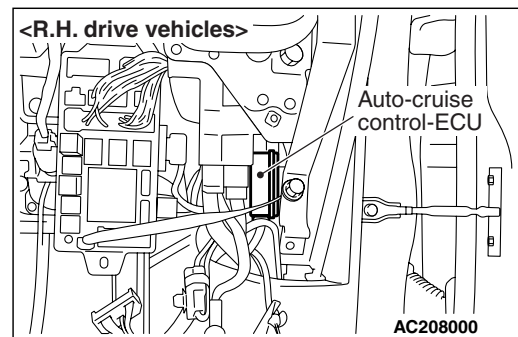
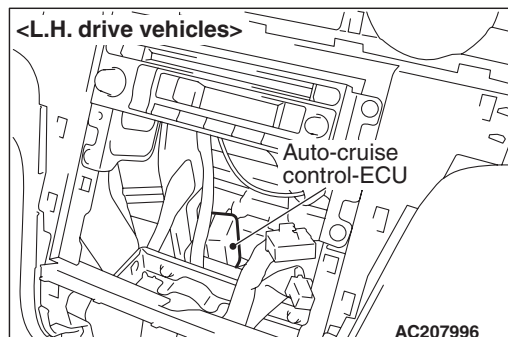
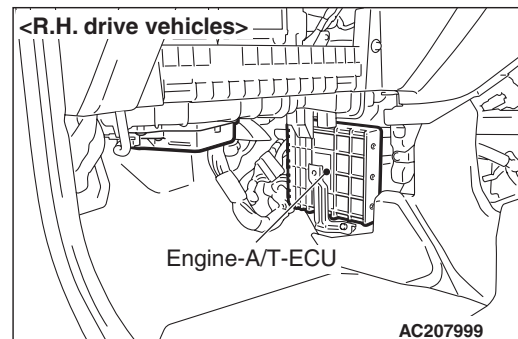
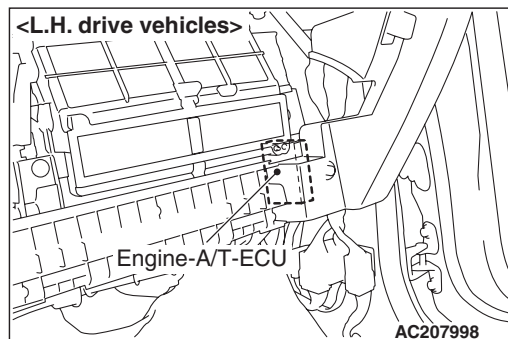
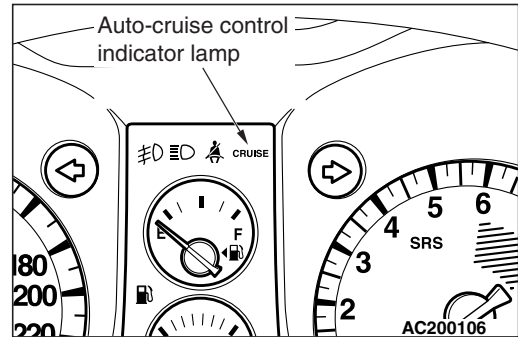
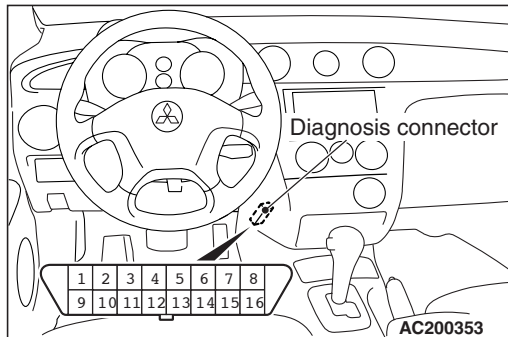
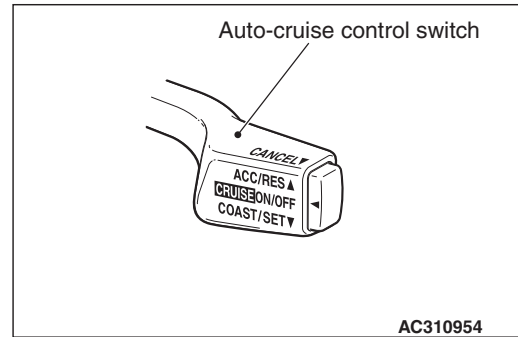
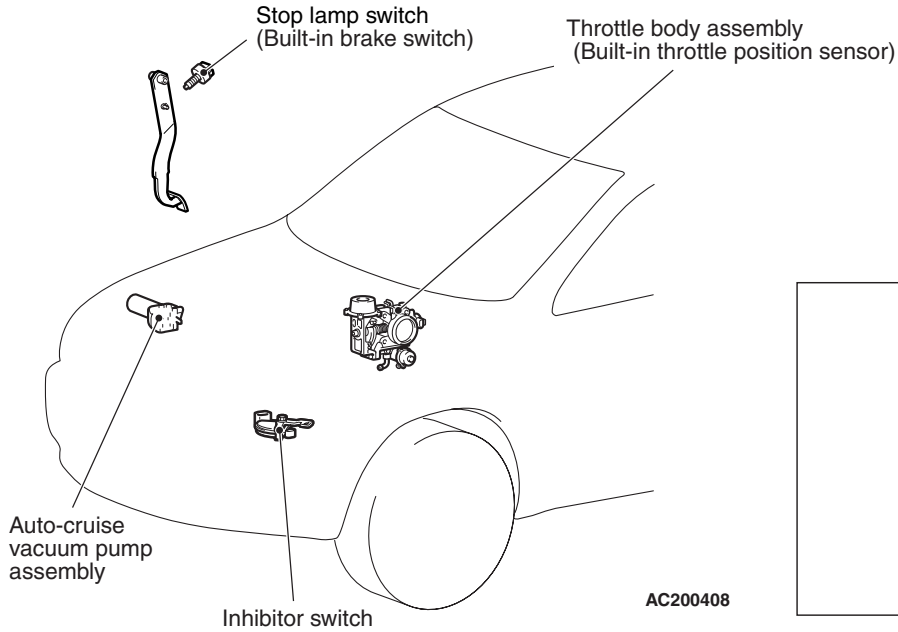
4. Accelerator pedal position sensor bracket
5. Accelerator pedal position sensor bracket support

**AUTO-CRUISE CONTROL <4G64-VEHICLES WITH  
AUTO-CRUISE CONTROL SYSTEM>****GENERAL INFORMATION**

M1172000100418

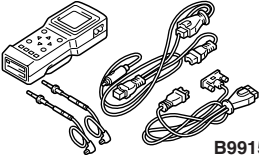
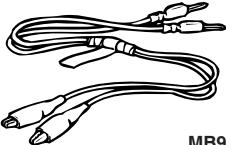
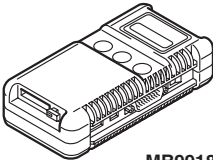
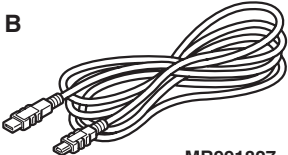

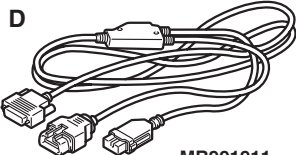
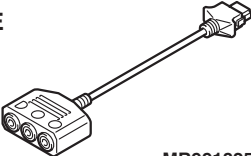
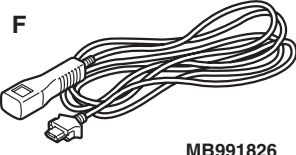
By using the auto-cruise control, the driver can drive at the speed he/she likes (in a range of approximately 40 to 200 km/h) without depressing the accelerator pedal.


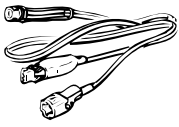
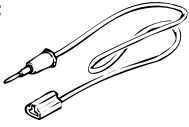

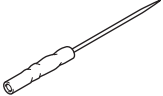
CONSTRUCTION DIAGRAM



## SPECIAL TOOLS

M1172000600628

Tool	Number	Name	Use
 B991502	MB991502	M.U.T.-II sub assembly	<ul style="list-style-type: none"> <li>• Reading diagnosis code</li> <li>• Auto-cruise control system check</li> </ul>
 MB991529	MB991529	Diagnosis code check harness	
<p><b>A</b></p>  MB991824	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	M.U.T.-III sub-assembly A: Vehicle Communication Interface (V. C. I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III measurement adapter F: M.U.T.-III trigger harness	Reading diagnosis code <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <b>⚠ CAUTION</b> </div> <b>If you connect M.U.T.-III main harness A to a vehicle without CAN communication system to use the M.U.T.-III, a pulse signal may interfere with the simulated vehicle speed lines, thus causing the M.U.T.-III inoperative. Therefore, use the M.U.T.-III main harness B (MB991911) instead.</b>
<p><b>B</b></p>  MB991827			
<p><b>C</b></p>  MB991910			
<p><b>D</b></p>  MB991911			
<p><b>E</b></p>  MB991825			
<p><b>F</b></p>  MB991826			
MB991955			

Tool	Number	Name	Use
<p><b>A</b></p>  <p><b>B</b></p>  <p><b>C</b></p>  <p><b>D</b></p>  <p>MB991223AB</p>	<p>MB991223</p> <p>A: MB991219</p> <p>B: MB991220</p> <p>C: MB991221</p> <p>D: MB991222</p>	<p>Harness set</p> <p>A: Test harness</p> <p>B: LED harness</p> <p>C: LED harness adapter</p> <p>D: Probe</p>	<p>Measurement of terminal voltage</p> <p>A: Connector pin contact pressure inspection</p> <p>B: Power circuit inspection</p> <p>C: Power circuit inspection</p> <p>D: Commercial tester connection</p>
 <p>MB992006</p>	<p>MB992006</p>	<p>Extra fine probe</p>	<p>Continuity check and voltage measurement at harness wire or connector</p>

## TROUBLESHOOTING

### DIAGNOSIS TROUBLESHOOTING FLOW

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

*NOTE: Check that the vacuum hose is connected correctly and is not damaged, and then carry out the diagnosis.*

### DIAGNOSIS FUNCTION

M1172002100403

### METHOD OF READING THE DIAGNOSIS CODE

Use the M.U.T.-II/III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

### METHOD OF ERASING THE DIAGNOSIS CODE

M1172002000462

Use the M.U.T.-II/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

M1172002200400

Code No.	Diagnosis item	Reference page
11	Auto-cruise vacuum pump drive system	<a href="#">P.17-15</a>
12	Vehicle speed signal system	<a href="#">P.17-16</a>
14	Stop lamp switch system	<a href="#">P.17-17</a>
15	Auto-cruise control switch system	<a href="#">P.17-18</a>
16	Auto-cruise control-ECU system	<a href="#">P.17-20</a>
17	Throttle position sensor, idle position signal system	<a href="#">P.17-20</a>

## DIAGNOSTIC TROUBLE CODE PROCEDURES

---

### Code No.11 Auto-cruise Vacuum Pump Drive System

---

#### DIAGNOSIS CODE SET CONDITIONS

This diagnosis code is set if the release valve, control valve or motor drive signals from the auto-cruise vacuum pump are not input to the auto-cruise control-ECU.

#### PROBABLE CAUSES

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

#### DIAGNOSIS PROCEDURE

---

##### STEP 1. Check the auto-cruise vacuum pump.

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 2.

**NO :** Replace the auto-cruise vacuum pump (Refer to [P.17-36](#)). Then go to Step 5.

---

##### STEP 2. Check auto-cruise vacuum pump connector A-03, auto-cruise control-ECU connector C-113 and intermediate connectors C-14 and C-106 <R.H. drive vehicles only>.

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Repair or replace connector. Then go to Step 5.

---

##### STEP 3. Check the harness between the auto-cruise vacuum pump connector A-03 and auto-cruise control-ECU connector C-113.

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair harness. Then go to Step 5.

---

##### STEP 4. Check the M.U.T.-II/III diagnosis code No. 11.

**Q: Is the M.U.T.-II/III diagnosis code No. 11 set?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 5.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

##### STEP 5. Check the M.U.T.-II/III diagnosis code No. 11.

**Q: Is the M.U.T.-II/III diagnosis code No. 11 set?**

**YES :** Return to Step 1.

**NO :** This procedure is complete.

---

**Code No.12 Vehicle speed signal system**

---

**DIAGNOSIS CODE SET CONDITIONS**

This diagnosis code is set if the vehicle speed signals from engine-A/T-ECU are not input to the auto-cruise control-ECU when the vehicle speed is 40 km/h or more.

**PROBABLE CAUSES**

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the engine-A/T-ECU.
- Malfunction of the auto-cruise control-ECU.

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the speed meter.**

**Q: Is the check result normal?**

**YES :** Go to Step 2.

**NO :** Check the speed meter circuit and repair or replace as required (Refer to GROUP 54A, Combination Meter Assembly - Symptom Procedures 1 [P.54A-28](#) <L.H. drive vehicles> or Symptom Procedures 3 [P.54A-29](#) <R.H. drive vehicles>). Then go to Step 5.

---

**STEP 2. Check auto-cruise control-ECU connector C-113 and joint connector (3) C-02 <L.H. drive vehicles> or joint connector (1) C-16 <R.H. drive vehicles>.**

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Repair or replace connector. Then go to Step 5.

---

**STEP 3. Check the harness between the auto-cruise control-ECU connector C-113 and joint connector (3) C-02 <L.H. drive vehicles> or joint connector (1) C-16 <R.H. drive vehicles>.**

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair harness. Then go to Step 5.

---

**STEP 4. Check the M.U.T.-II/III diagnosis code No. 12.**

**Q: Is the M.U.T.-II/III diagnosis code No. 12 set?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 5.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 5. Check the M.U.T.-II/III diagnosis code No. 12.**

**Q: Is the M.U.T.-II/III diagnosis code No. 12 set?**

**YES :** Return to Step 1.

**NO :** This procedure is complete.



---

## Code No.14 Stop Lamp Switch System

---

### DIAGNOSIS CODE SET CONDITIONS

This diagnosis code is set when none of the drive signals from the release valve, control valve and motor of the auto-cruise vacuum pump are input to the auto-cruise control-ECU.

### PROBABLE CAUSES

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the stop lamp switch.
- Malfunction of the auto-cruise vacuum pump.
- Malfunction of the auto-cruise control-ECU.

### DIAGNOSIS PROCEDURE

---

#### STEP 1. Measure at auto-cruise vacuum pump connector A-03.

Disconnect auto-cruise vacuum pump connector A-03 and measure at the harness side.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 1 and body earth.

**OK: 10 volts or more (When brake pedal is released).**

**Q: Is the check result normal?**

**YES :** Go to Step 2.

**NO :** Go to Step 5.

---

#### STEP 2. Check the auto-cruise vacuum pump.

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Replace the auto-cruise vacuum pump.  
(Refer to [P.17-36](#)). Then go to Step 14.

---

#### STEP 3. Check auto-cruise vacuum pump connector A-03, auto-cruise control-ECU connector C-113 and intermediate connectors C-14 and C-106 <R.H. drive vehicles only>.

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair or replace connector. Then go to Step 14.

---

#### STEP 4. Check the harness between the auto-cruise vacuum pump connector A-03 and auto-cruise control-ECU connector C-113.

**Q: Is the check result normal?**

**YES :** Go to Step 13.

**NO :** Repair harness. Then go to Step 14.

---

#### STEP 5. Measure at stop lamp switch connector C-101.

Disconnect stop lamp switch connector C-101 and measure at the harness side.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 3 and body earth.

**OK: 10 volts or more**

**Q: Is the check result normal?**

**YES :** Go to Step 6.

**NO :** Go to Step 9.

---

#### STEP 6. Check the stop lamp switch.

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 7.

**NO :** Replace the stop lamp switch. (Refer to GROUP 35A - Brake Pedal [P.35A-16](#)).  
Then go to Step 14.

---

#### STEP 7. Check stop lamp switch connector C-101, auto-cruise vacuum pump connector A-03 and intermediate connectors C-14.

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Repair or replace connector. Then go to Step 14.

---

#### STEP 8. Check the harness between the stop lamp switch connector C-101 and auto-cruise vacuum pump connector A-03.

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 14.

**STEP 9. Measure at auto-cruise control-ECU connector C-113.**

Do not disconnect auto-cruise control-ECU connector C-113 and measure at the backprobing.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 5 and body earth.

**OK: 10 volts or more (When brake pedal is released).**

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Go to Step 12.

**STEP 10. Check stop lamp switch connector C-101 and intermediate connector C-106 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 11.

**NO :** Repair or replace connector. Then go to Step 14.

**STEP 11. Check the harness between the stop lamp switch connector C-101 and auto-cruise control-ECU connector C-113.**

**Q: Is the check result normal?**

**YES :** Go to Step 13.

**NO :** Repair harness. Then go to Step 14.

**STEP 12. Check auto-cruise control-ECU connector C-113.**

**Q: Is the check result normal?**

**YES :** Go to Step 13.

**NO :** Repair or replace connector. Then go to Step 14.

**STEP 13. Check the M.U.T.-II/III diagnosis code No.14.**

**Q: Is the M.U.T.-II/III diagnosis code No. 14 set?**

**YES :** Replace the auto-cruise control-ECU.

(Refer to [P.17-36](#)). Then go to Step 14.

**NO :** This malfunction is intermittent. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**STEP 14. Check the M.U.T.-II/III diagnosis code No.14.**

**Q: Is the M.U.T.-II/III diagnosis code No. 14 set?**

**YES :** Return to Step 1.

**NO :** This procedure is complete.

**Code No.15 Auto-cruise Control Switch System****DIAGNOSIS CODE SET CONDITIONS**

This diagnosis code is set if the auto-cruise control RESUME switch or SET switch remains ON.

**PROBABLE CAUSES**

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

**DIAGNOSIS PROCEDURE****STEP 1. Measure at auto-cruise control switch connector C-301.**

Disconnect auto-cruise control switch connector C-301 and measure at the harness side.

- Ignition switch: ON
- Voltage between terminal 1 and body earth.

**OK: System voltage**

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Go to Step 2.

---

**STEP 2. Check the clock spring.**

Refer to GROUP 52B - Air Bag Module and Clock Spring Inspection [P.52B-91](#).

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Replace the clock spring. (Refer to GROUP 52B - Air Bag Module and Clock Spring [P.52B-87](#)). Then go to Step 11.

---

**STEP 3. Check auto-cruise control switch connector C-301, clock spring connectors C-308 and C-309, junction block connector C-205 and intermediate connector C-302.**

**Q: Is the check result normal?**

**YES :** Go to Step 4.

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

---

**STEP 4. Check the harness between the junction block connector C-205 and auto-cruise control switch connector C-301.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 11.

---

**STEP 5. Measure at auto-cruise control-ECU connector C-113.**

Do not disconnect auto-cruise control-ECU connector C-113 and measure at the backprobing.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 9 and body earth.

**OK: 2.3 - 3.5 volts (When auto-cruise control RESUME switch ON).**

**0.4 - 2.3 volts (When auto-cruise control SET switch ON).**

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Go to Step 6.

---

**STEP 6. Check the auto-cruise control switch.**

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 7.

**NO :** Replace the auto-cruise control switch. (Refer to [P.17-36](#)). Then go to Step 11.

---

**STEP 7. Check the clock spring.**

Refer to GROUP 52B - Air Bag Module and Clock Spring Inspection [P.52B-91](#).

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Replace the clock spring. (Refer to GROUP 52B - Air Bag Module and Clock Spring [P.52B-87](#)). Then go to Step 11.

---

**STEP 8. Check auto-cruise control switch connector C-301, clock spring connectors C-308 and C-309, auto-cruise control-ECU connector C-113 and intermediate connector C-302 and C-106 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 9.

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

---

**STEP 9. Check the harness between the auto-cruise control switch connector C-301 and auto-cruise control-ECU connector C-113.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 11.

---

**STEP 10. Check the M.U.T.-II/III diagnosis code No. 15.**

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

**YES :** Replace the auto-cruise control-ECU. (Refer to [P.17-36](#)). Then go to Step 11.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 11. Check the M.U.T.-II/III diagnosis code No. 15.**

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

**YES :** Return to Step 1.

**NO :** This procedure is complete.

---

**Code No.16 Auto-cruise Control-ECU System**

---

**DIAGNOSIS CODE SET CONDITIONS**

This diagnosis code is set if there is an abnormality in the cancel hold circuit or the microprocessor monitor circuit in the auto-cruise control-ECU.

**PROBABLE CAUSE**

Malfunction of the auto-cruise control-ECU.

**DIAGNOSIS**

Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then check that M.U.T.-II/III diagnosis code No. 16 is not set.

---

**Code No.17 Throttle Position Sensor, Idle Position Signal System**

---

**DIAGNOSIS CODE SET CONDITIONS**

This diagnosis code is set if the Idle position signal voltage is 2.5 volts or less and the throttle position sensor voltage is 4.0 – 5.5 volts for four seconds or more, and the Idle position signal voltage is 4.0 – 5.5 volts and the throttle position sensor voltage is 0.4 – 1.0 volt for four seconds or more.

**PROBABLE CAUSES**

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the throttle position sensor.
- Malfunction of the engine-A/T-ECU.
- Malfunction of the auto-cruise control-ECU.

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the throttle position sensor.**

**Q: Is the MPI system M.U.T.-II/III diagnosis code No. 14 set?**

**YES :** Refer to GROUP 13A - Troubleshooting [P.13A-31](#). Then go to Step 11.

**NO :** Go to Step 2.

---

**STEP 2. Measure at auto-cruise control-ECU connector C-113.**

Do not disconnect auto-cruise control-ECU connector C-113 and measure at the backprobing.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 1 and body earth.

**OK: 4.0 – 5.5 volts (When accelerator pedal is fully depressed).**

**0.4 – 1.0 volt (When accelerator pedal is released).**

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Go to Step 3.

---

**STEP 3. Check auto-cruise control-ECU**

**connector C-113 and intermediate connectors C-106 <L.H. drive vehicles only> and joint connector (1) C-16 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 4.

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

---

**STEP 4. Check the harness between the auto-cruise control-ECU C-113 and throttle position sensor connector B-06.**

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Repair harness. Then go to Step 11.

---

**STEP 5. Measure at engine-A/T-ECU connector C-110.**

Do not disconnect engine-A/T-ECU connector C-110 and measure at the backprobing.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 79 and body earth.

**OK: 4.0 – 5.5 volts**

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Go to Step 6.

---

**STEP 6. Check engine-A/T-ECU connector C-110.**

**Q: Is the check result normal?**

**YES :** Go to Step 7.

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

---

**STEP 7. Check the M.U.T.-II/III diagnosis code No.17.**

**Q: Is the M.U.T.-II/III diagnosis code No. 17 set?**

**YES :** Replace the engine-A/T-ECU (Refer to GROUP 13A - Engine-A/T-ECU

[P.13A-296](#)). Then go to Step 11.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 8. Check auto-cruise control-ECU connector C-113 and intermediate connectors C-106 <L.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 9.

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

---

**STEP 9. Check the harness between the auto-cruise control-ECU C-113 and engine-A/T-ECU connector C-110.**

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Repair harness. Then go to Step 11.

---

**STEP 10. Check the M.U.T.-II/III diagnosis code No.17.**

**Q: Is the M.U.T.-II/III diagnosis code No. 17 set?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 11.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 11. Check the M.U.T.-II/III diagnosis code No.17.**

**Q: Is the M.U.T.-II/III diagnosis code No. 17 set?**

**YES :** Return to Step 1.

**NO :** This procedure is complete.

## CHECK CHART FOR TROUBLE SYMPTOMS

M1172002300623

Trouble symptom		Inspection procedure No.	Reference page
Communication with M.U.T.-II/III is not possible.	Communication with all systems is not possible.	-	Refer to GROUP 13A – Troubleshooting, Inspection Chart for Trouble Symptoms <a href="#">P.13A-107</a>
	Communication with auto-cruise control-ECU only is not possible.	1	<a href="#">P.17-22</a>
Auto-cruise control is not cancelled.	Even if brake pedal is depressed	2	<a href="#">P.17-24</a>
	Even if select lever is set to N range	3	<a href="#">P.17-25</a>
	Even if auto-cruise control CANCEL switch in set to ON	4	<a href="#">P.17-26</a>
Auto-cruise control cannot be set.		5	<a href="#">P.17-26</a>
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.		6	<a href="#">P.17-27</a>
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).		7	<a href="#">P.17-28</a>

## SYMPTOM PROCEDURES

**Inspection Procedure 1: Communication with M.U.T.-II/III is not Possible (Communication with Auto-Cruise Control-ECU only is not Possible).**

## COMMENTS ON TROUBLE SYMPTOM

One of the following causes may be suspected.

- No power supply to the auto-cruise control-ECU.
- Defective earth circuit of the auto-cruise control-ECU.
- Defective the auto-cruise control-ECU.
- Improper communication line between the auto-cruise control-ECU and M.U.T.-II/III.

## PROBABLE CAUSES

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

## DIAGNOSIS PROCEDURE

**STEP 1. Measure at auto-cruise control-ECU connector C-113.**

Disconnect auto-cruise control-ECU connector C-113 and measure at the harness side.

- Ignition switch: ON
- Voltage between terminal 6 and body earth.

**OK: System voltage**

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Go to Step 2.

---

**STEP 2. Check auto-cruise control-ECU connector C-113, junction block connector C-205 and intermediate connector C-106 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Repair or replace connector. Then go to Step 10.

---

**STEP 3. Check the harness between the junction block connector C-205 and auto-cruise control-ECU connector C-113.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 10.

---

**STEP 4. Measure at auto-cruise control-ECU connector C-113.**

Disconnect auto-cruise control-ECU connector C-113 and measure at the harness side.

- Continuity between terminal 14 and body earth.

**OK: Continuity**

**Q: Is the check result normal?**

**YES :** Go to Step 7.

**NO :** Go to Step 5.

---

**STEP 5. Check auto-cruise control-ECU connector C-113 and joint connector (2) C-17 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 6.

**NO :** Repair or replace connector. Then go to Step 10.

---

**STEP 6. Check the harness between the auto-cruise control-ECU connector C-113 and body earth.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 10.

---

**STEP 7. Check auto-cruise control-ECU connector C-113, diagnosis connector C-24 and intermediate connector C-105 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Repair or replace connector. Then go to Step 10.

---

**STEP 8. Check the harness between the auto-cruise control-ECU connector C-113 and diagnosis connector C-24.**

**Q: Is the check result normal?**

**YES :** Go to Step 9.

**NO :** Repair harness. Then go to Step 10.

---

**STEP 9. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 10.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 10. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.



---

**Inspection Procedure 2: Even if Brake Pedal is Depressed, Auto-Cruise Control is not Cancelled.**

---

**COMMENTS ON TROUBLE SYMPTOM**

The cause is probably a malfunction of stop lamp switch or a malfunction of stop lamp circuit.

**PROBABLE CAUSES**

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the stop lamp switch.
- Malfunction of the auto-cruise control-ECU.

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the stop lamp.**

**Q: Does the stop lamp illuminated?**

**YES :** Go to Step 6.

**NO :** Go to Step 2.

---

**STEP 2. Check the stop lamp switch.**

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Replace the stop lamp switch (Refer to GROUP 35A - Brake Pedal [P.35A-16](#)).  
Then go to Step 10.

---

**STEP 3. Measure at stop lamp switch connector C-101.**

Disconnect stop lamp switch connector C-101 and measure at the harness side.

- Voltage between terminal 2 and body earth.

**OK: System voltage**

**Q: Is the check result normal?**

**YES :** Go to Step 6.

**NO :** Go to Step 4.

---

**STEP 4. Check stop lamp switch connector C-101 and intermediate connector C-116.**

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Repair or replace connector. Then go to Step 10.

---

**STEP 5. Check the harness between the relay box and stop lamp switch connector C-101.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 10.

---

**STEP 6. Measure at auto-cruise control-ECU connector C-113.**

Disconnect auto-cruise control-ECU connector C-113 and measure at the harness side.

- Voltage between terminal 4 and body earth.

**OK: System voltage (When brake pedal is depressed).**

**Q: Is the check result normal?**

**YES :** Go to Step 9.

**NO :** Go to Step 7.

---

**STEP 7. Check auto-cruise control-ECU connector C-113, stop lamp switch connector C-101, joint connector (1) C-16 <R.H. drive vehicles only> and intermediate connector C-104 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Repair or replace connector. Then go to Step 10.

---

**STEP 8. Check the harness between the stop lamp switch connector C-101 and auto-cruise control-ECU connector C-113.**

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 10.



---

**STEP 9. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 10.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 10. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.

---

**Inspection Procedure 3: Even if Select Lever is Set to N Range, Auto-Cruise Control is not Cancelled.**

---

**COMMENTS ON TROUBLE SYMPTOM**

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

**PROBABLE CAUSES**

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the inhibitor switch.
- Malfunction of the auto-cruise control-ECU.

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the inhibitor switch.**

Refer to GROUP 23A, On-vehicle Service - A/T Control Component Check [P.23A-112](#).

**Q: Is the check result normal?**

**YES :** Go to Step 2.

**NO :** Replace the inhibitor switch (Refer to GROUP 23B - Transmission [P.23B-16](#)). Then go to Step 5.

---

**STEP 2. Check auto-cruise control-ECU connector C-113, intermediate connector C-106 and joint connector (2) C-17 <R.H. drive vehicles only>.**

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Repair or replace connector. Then go to Step 5.

---

**STEP 3. Check the harness between the auto-cruise control-ECU connector C-113 and intermediate connector C-106.**

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair harness. Then go to Step 5.

---

**STEP 4. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 5.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 5. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.

---

**Inspection Procedure 4: Even if 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.17-36](#)). Then check the malfunction is eliminated.

---

**Inspection Procedure 5: Auto-Cruise Control cannot be Set.**

---

### COMMENTS ON TROUBLE SYMPTOM

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

### PROBABLE CAUSES

- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the auto-cruise control switch.
- Malfunction of the stop lamp switch.
- Malfunction of the inhibitor switch.
- Malfunction of the auto-cruise control-ECU.

### DIAGNOSIS PROCEDURE

---

#### STEP 1. Check the auto-cruise control-ECU communicate with the M.U.T.-II/III.

**Q: Can the auto-cruise control-ECU communicate with the M.U.T.-II/III?**

**YES :** Go to Step 2.

**NO :** Inspect for each trouble symptom (Refer to inspection procedure 1 [P.17-22](#)). Then go to Step 7.

---

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

**Q: Are any of M.U.T.-II/III diagnosis code set?**

**YES :** Repair the fault, which the M.U.T.-II/III diagnosis code indicates (Refer to diagnosis codes chart [P.17-14](#)). Then go to Step 7.

**NO :** Go to Step 3.

---

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

Check M.U.T.-II/III data list item 04: Auto-cruise control CANCEL switch (Refer to [P.17-30](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Inspect for each trouble symptom (Refer to inspection diagnosis code No.15 [P.17-18](#)). Then go to Step 7.

---

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

Check M.U.T.-II/III data list item 05: Stop lamp switch (Refer to [P.17-30](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Inspect for each trouble symptom (Refer to inspection procedure 2 [P.17-24](#)). Then go to Step 7.

---

#### STEP 5. M.U.T.-II/III data list.

Check M.U.T.-II/III data list item 14: Inhibitor switch. (Refer to [P.17-30](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 6.

**NO :** Inspect for each trouble symptom (Refer to inspection procedure 3 [P.17-25](#)). Then go to Step 7.

---

#### STEP 6. Retest the system.

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 7.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 7. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.

---

**Inspection Procedure 6: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed.**

---

**COMMENTS ON TROUBLE SYMPTOM**

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

**PROBABLE CAUSES**

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

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the vehicle speed signal.**

Check the M.U.T.-II/III diagnosis codes.

**Q: Is the M.U.T.-II/III diagnosis code No.12 set?**

**YES :** Inspect for each trouble symptom (Refer to inspection diagnosis code No.12 [P.17-16](#)).  
Then go to Step 5.

**NO :** Go to Step 2.

---

**STEP 2. Check the auto-cruise vacuum pump.**

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Replace the auto-cruise vacuum pump  
(Refer to [P.17-36](#)). Then go to Step 5.

---

**STEP 3. Check the vacuum actuator.**

Refer to [P.17-34](#).

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Replace the vacuum actuator (Refer to GROUP 13A - Throttle body [P.13A-294](#)).  
Then go to Step 5.

---

**STEP 4. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 5.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 5. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.

**Inspection Procedure 7: When the Auto-Cruise Control MAIN Switch is Turned ON, the Auto-Cruise Control Indicator Lamp dose not Illuminate. (However, the Auto-Cruise Control in Normal).**

## COMMENTS ON TROUBLE SYMPTOM

There may be a burnt-out indicator bulb or a malfunction of the auto-cruise control indicator lamp circuit.

## PROBABLE CAUSES

- Burnt-out indicator bulb.
- Malfunction of the connector.
- Malfunction of the harness.
- Malfunction of the auto-cruise control-ECU.

## DIAGNOSIS PROCEDURE

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

Remove the combination meter (Refer to GROUP 54 - Combination Meter Assembly [P.54A-42](#)), and check the auto-cruise control indicator bulb.

**Q: Is the check result normal?**

**YES :** Go to Step 2.

**NO :** Replace the indicator bulb (Refer to GROUP 54A - Combination Meter [P.54A-42](#)). Then go to Step 9.

### STEP 2. Measure at combination meter connector C-04.

Disconnect combination meter connector C-04 and measure at the harness side.

- Ignition switch: ON
- Voltage between terminal 42 and body earth.

**OK: System voltage**

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Go to Step 3.

### STEP 3. Check combination meter connector C-04 and junction block connector C-205.

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair or replace connector. Then go to Step 9.

### STEP 4. Check the harness between the junction block connector C-205 and combination meter connector C-04.

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 9.

### STEP 5. Measure at auto-cruise control-ECU connector C-113.

Do not disconnect auto-cruise control-ECU connector C-113 and measure at the backprobing.

- Ignition switch: ON
- Auto-cruise control MAIN switch: ON
- Voltage between terminal 15 and body earth.

**OK: System voltage**

**Q: Is the check result normal?**

**YES :** Go to Step 8.

**NO :** Go to Step 6.

### STEP 6. Check combination meter connector C-05, auto-cruise control-ECU connector C-113 and intermediate connector C-104 <R.H. drive vehicles only>.

**Q: Is the check result normal?**

**YES :** Go to Step 7.

**NO :** Repair or replace connector. Then go to Step 9.

### STEP 7. Check the harness between the combination meter connector C-05 and auto-cruise control-ECU connector C-113.

**Q: Is the check result normal?**

**YES :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

**NO :** Repair harness. Then go to Step 9.

---

**STEP 8. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the auto-cruise control-ECU (Refer to [P.17-36](#)). Then go to Step 9.

**NO :** This malfunction is intermittent (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

---

**STEP 9. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** This malfunction is eliminated.

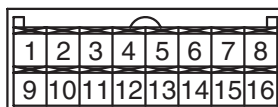
## DATA LIST REFERENCE TABLE

M1172002400460

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	
08	Accelerator switch (Idle switch)	Accelerator pedal: Depressed		OFF	
		Accelerator pedal: Released		ON	
10	Vehicle speed signal		Road test the vehicle		The speedometer and M.U.T.-II/III display the same value.
13	Throttle position sensor (TPS)	Ignition switch: ON	Accelerator pedal: Released	535 – 735 mV	
			Accelerator pedal: Depressed	Increased according to accelerator pedal stroke.	
			Accelerator pedal: Fully depressed	4,500 – 5,000 mV	
14	Inhibitor switch		Selector lever: N or P position		ON
			Selector lever: Other than N or P position		OFF
15	Over drive detective (OD-OFF→OD-ON signal)		Driving on level road (No OD-OFF request)		OFF
			Driving on uphill road (OD-OFF request)		ON

## CHECK AT ECU TERMINAL

M1172002700386



AC200937

Terminal No.	Check item	Check conditions		Normal condition
1	Throttle position sensor input	Accelerator pedal: Depressed		4.4 – 5.3V
		Accelerator pedal: Released		0.535 – 0.735 V
2	Engine-A/T-ECU output (Idle switch)	Accelerator pedal: Depressed		4.0 – 5.5 V
		Accelerator pedal: Released		2.5 V or less
3	A/T control output	Driving on level road (No OD-OFF request)		System voltage
		Driving on uphill road (OD-OFF request)		0 V
4	Stop lamp switch input	Brake pedal: Depressed	When stop lamp switch is ON	System voltage
		Brake pedal: Released	When stop lamp switch is OFF	0 V
5	Auto-cruise vacuum pump power supply	Ignition switch: ON Stop lamp switch: OFF		10 V or more
6	Auto-cruise control-ECU power supply	Ignition switch: ON		System voltage
7	Auto-cruise vacuum pump release valve	When decelerating with the auto-cruise control SET switch while driving at constant speed		1 V or less
8	Auto-cruise vacuum pump control valve			10 V or more
7	Auto-cruise vacuum pump release valve	When cancelling constant speed driving with the auto-cruise control CANCEL switch		10 V or more
8	Auto-cruise vacuum pump control valve			System voltage

Terminal No.	Check item	Check conditions		Normal condition
9	Auto-cruise control switch input	MAIN switch: ON		Approximately 7.0 V
		When input switch has not been operated	All switches: OFF	3.5 – 5.0 V
		When input switch is pushed down	SET switch: ON	0.4 – 2.3 V
		When input switch is pushed up	RESUME switch: ON	2.3 – 3.5 V
		When input switch is pulled forward	CANCEL switch: ON	0.4 V or less
10	Vehicle speed signal input	When vehicle is moved forwards and backwards, signal turns ON and OFF repeatedly	When signal is ON	0 V
			When signal is OFF	8 – 12 V*
12	Auto-cruise control-ECU power supply	Ignition switch: ON MAIN switch: ON		System voltage
13	Inhibitor switch input	Select lever: Other than N or P range		System voltage
		Select lever: N or P range		0 V
14	Earth	At any time		0 V
15	Auto-cruise control indicator lamp input	MAIN switch: ON (When indicator lamp is illuminated)		0 V
		MAIN switch: OFF (When indicator lamp is switch off)		System voltage
16	Auto-cruise vacuum pump motor input	When driving at constant speed using the SET switch	Motor stopped/running	System voltage/0 V
		When accelerating with the RESUME switch while driving at constant speed	Motor stopped/running	System voltage/0 V
		When decelerating with the SET switch while driving at constant speed	Motor stopped	System voltage
		When cancelling constant speed driving with the CANCEL switch	Motor stopped	System voltage

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



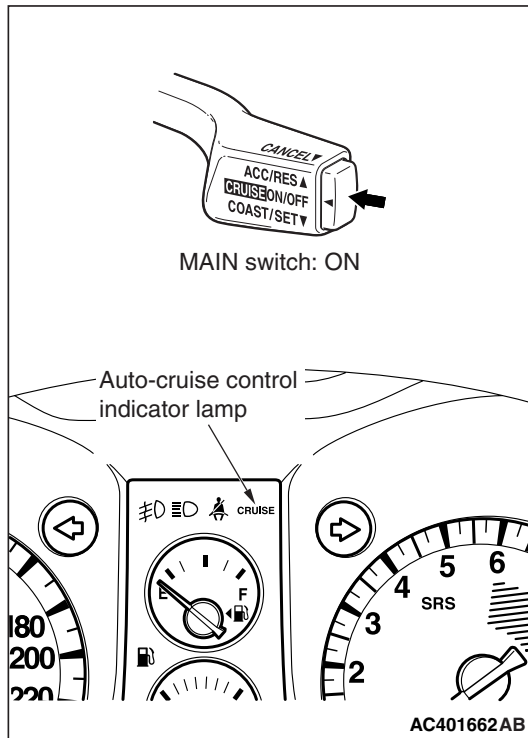
## ON-VEHICLE SERVICE

### AUTO-CRUISE CONTROL SWITCH CHECK

M1172001200139

### AUTO-CRUISE CONTROL MAIN SWITCH CHECK

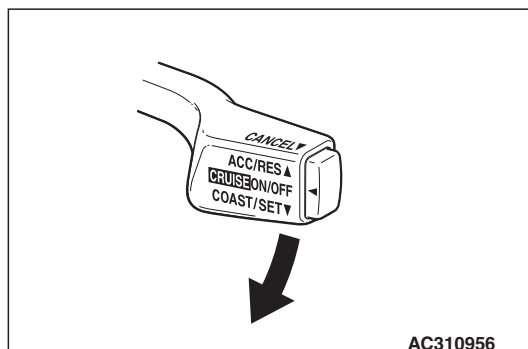
1. Turn the ignition switch to ON position.



2. Check that the 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.



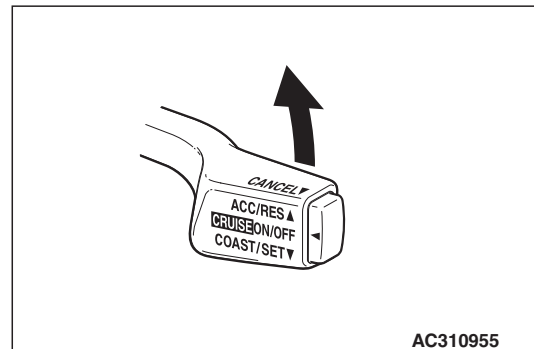
3. Push the auto-cruise control switch in the direction of arrow.

4. Check to be sure that when the switch is released the speed is the desired constant speed.

*NOTE: If the vehicle 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.

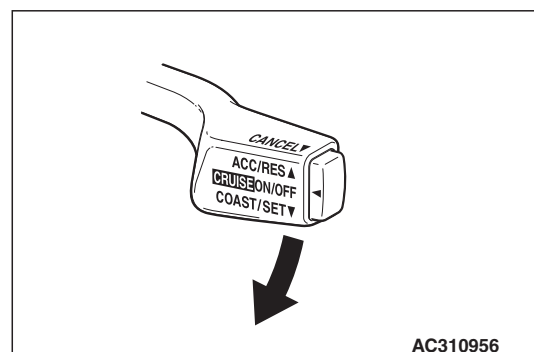


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that acceleration continues while the switch is hold, and that when it is released the constant speed at the time when it was released becomes the driving speed.

*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.

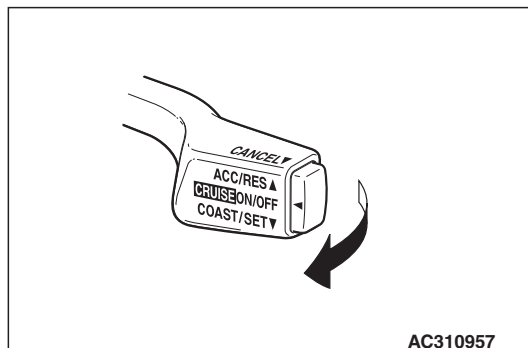


2. Push the auto-cruise control switch in the direction of arrow.
3. Check to be sure that deceleration continues while the switch is pressed, and that when it is released the constant speed at the time when it was released becomes the driving speed.

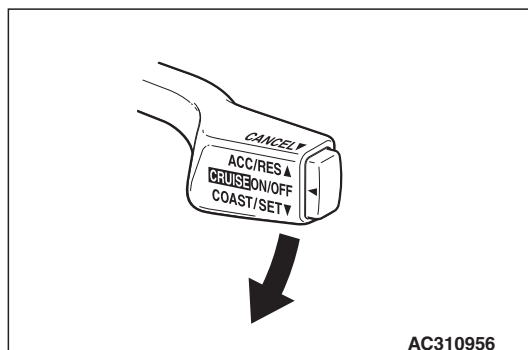
**NOTE:** When the vehicle speed reaches the low limit (approximately 40 km/h) during deceleration, the auto-cruise control will be cancelled.

## 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.

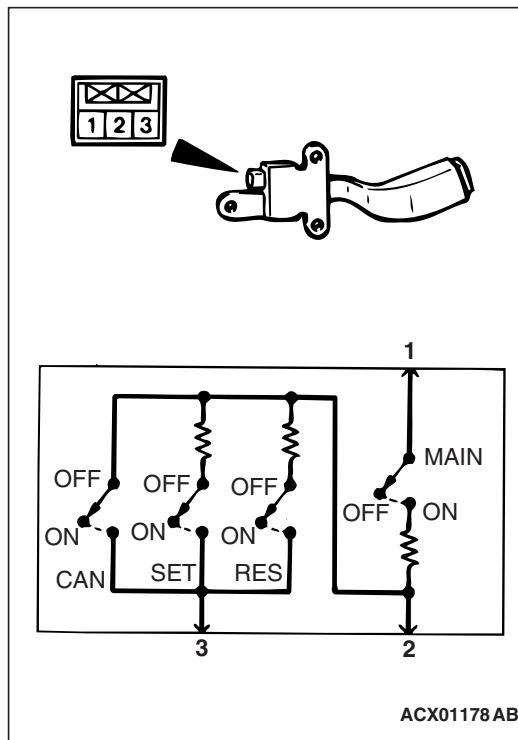


3. When the auto-cruise control switch is pushed in the direction of arrow at a vehicle speed of 40 km/h or higher, check if the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
4. When the MAIN switch is turned to OFF while driving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

## AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700587

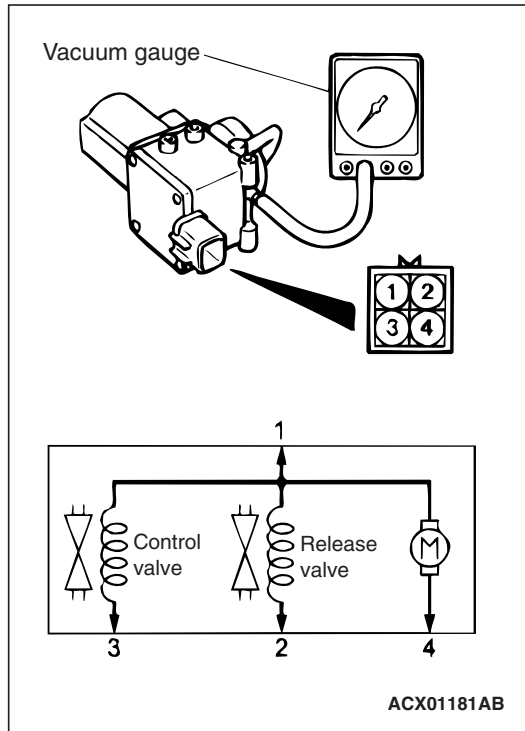
### AUTO-CRUISE CONTROL SWITCH



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.

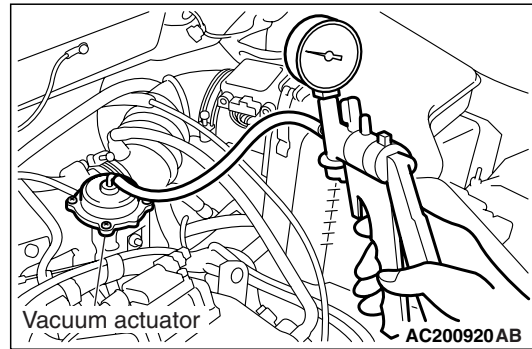
Switch position	Terminal connector of tester	Specified condition
MAIN switch: OFF	1 - 2	Open circuit
MAIN switch: ON	1 - 2	Approximately 3.9 kΩ
CANCEL switch: ON	2 - 3	Less than 2 Ω
RESUME switch: ON	2 - 3	Approximately 910 Ω
SET switch: ON	2 - 3	Approximately 220 Ω

## AUTO-CRUISE VACUUM PUMP



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

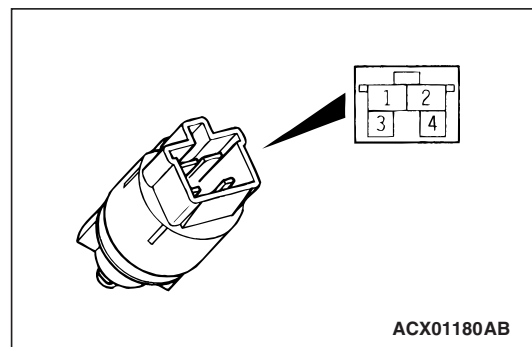
## VACUUM ACTUATOR



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

## 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 $\Omega$
	3 – 4	Open circuit
When brake pedal is not depressed. (for auto-cruise control circuit)	1 – 2	Open circuit
	3 – 4	Less than 2 $\Omega$

## INHIBITOR SWITCH ("N" POSITION)

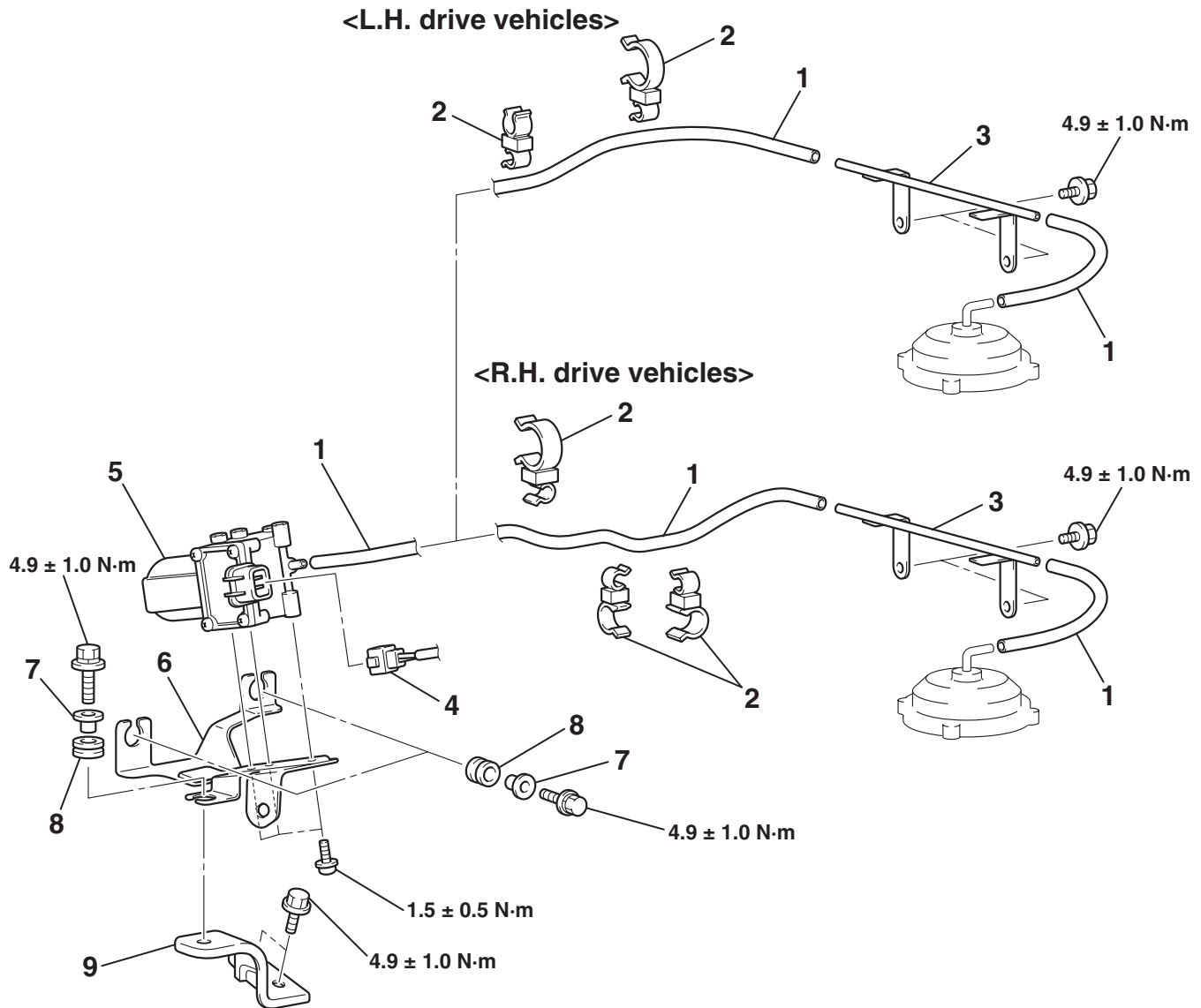
Refer to GROUP 23A, On-vehicle Service - A/T Control Component Check [P.23A-112](#).

**THROTTLE POSITION SENSOR**

Refer to GROUP 13A, On-vehicle Service – Throttle  
Position Sensor Check [P.13A-288](#).

**AUTO-CRUISE CONTROL****REMOVAL AND INSTALLATION**

M1172001400553

**<AUTO-CRUISE VACUUM PUMP>**

AC212568AB

**Auto-cruise vacuum pump  
removal steps**

1. Vacuum hoses
2. Vacuum hose clips
3. Vacuum pipe
4. Auto-cruise vacuum pump connector

**Auto-cruise vacuum pump  
removal steps (Continued)**

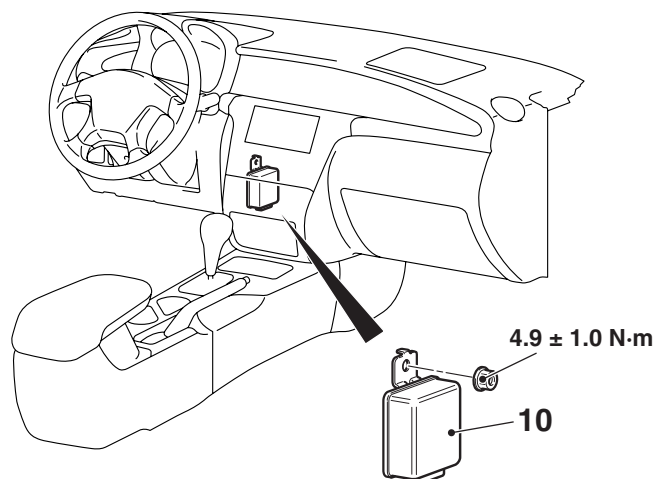
5. Auto-cruise vacuum pump assembly
6. Auto-cruise vacuum pump bracket
7. Spacers
8. Rubber mounts
9. Auto-cruise vacuum pump bracket

## <SWITCHES, CONTROL UNIT AND SENSORS>

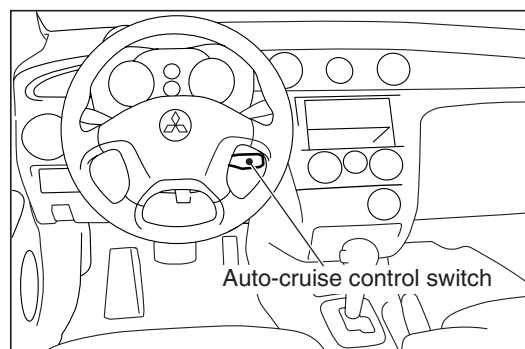
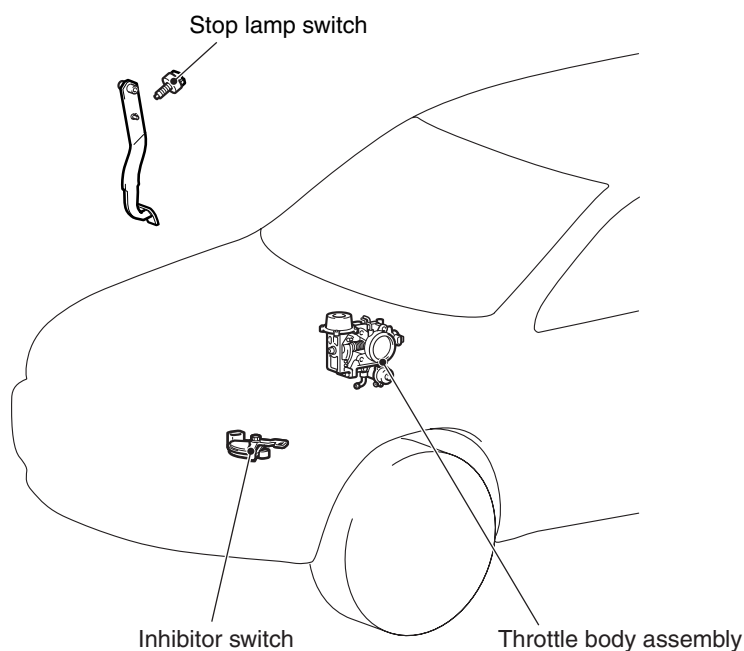
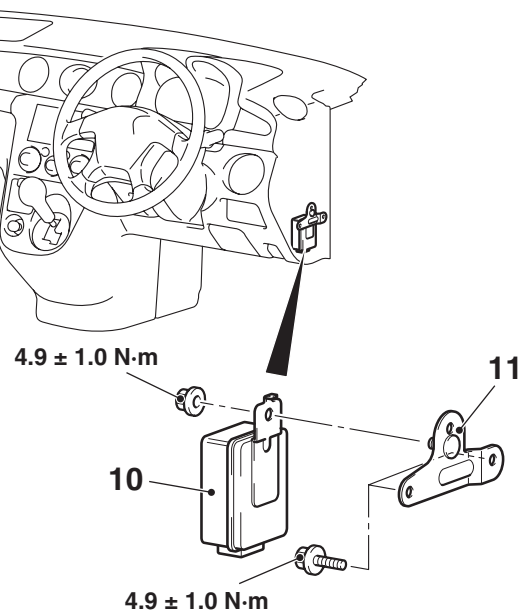
### ⚠ CAUTION

- Before removing the steering wheel and air bag module assembly and air bag module, refer to GROUP 52B - Air bag module and clock spring [P.52B-87](#).
- When removing and installing the steering wheel and air bag module assembly, do not let it bump against the air bag module.

<L.H. drive vehicles>



<R.H. drive vehicles>



### Auto-cruise control switch removal

- Auto-cruise control switch (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#))

AC401665AB

### Auto-cruise control-ECU removal steps

- Centre lower panel and centre lower box <L.H. drive vehicles> (Refer to GROUP 52A - Instrument panel [P.52A-3](#))

**Auto-cruise control-ECU removal  
steps (Continued)**

10. Auto-cruise control-ECU
11. Auto-cruise control-ECU bracket  
<R.H. drive vehicles>

**Sensor removal**

- Inhibitor switch (Refer to GROUP 23B, Transmission [P.23B-16](#))
- Throttle body assembly (Refer to GROUP 13A, Throttle body assembly [P.13A-294](#))
- Stop lamp switch (Refer to GROUP 35A, Brake pedal [P.35A-16](#))

# AUTO-CRUISE CONTROL <4G69-VEHICLES WITH AUTO-CRUISE CONTROL SYSTEM>

## GENERAL INFORMATION

M1172000100407

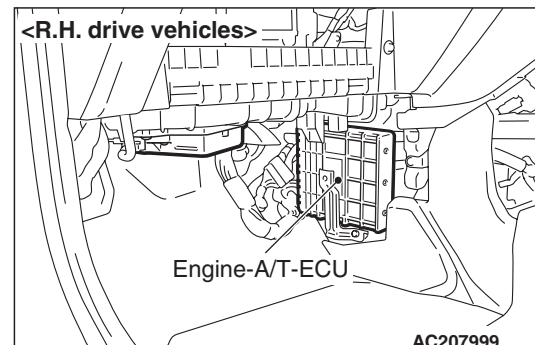
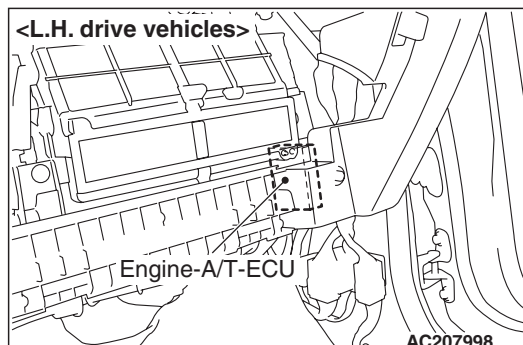
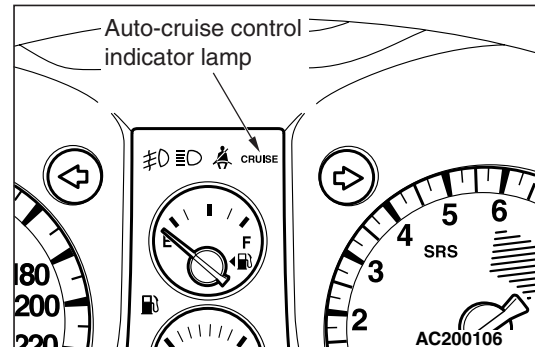
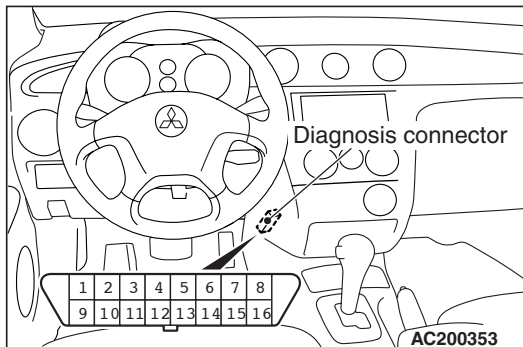
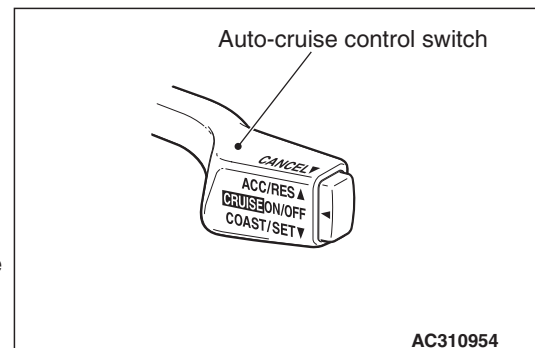
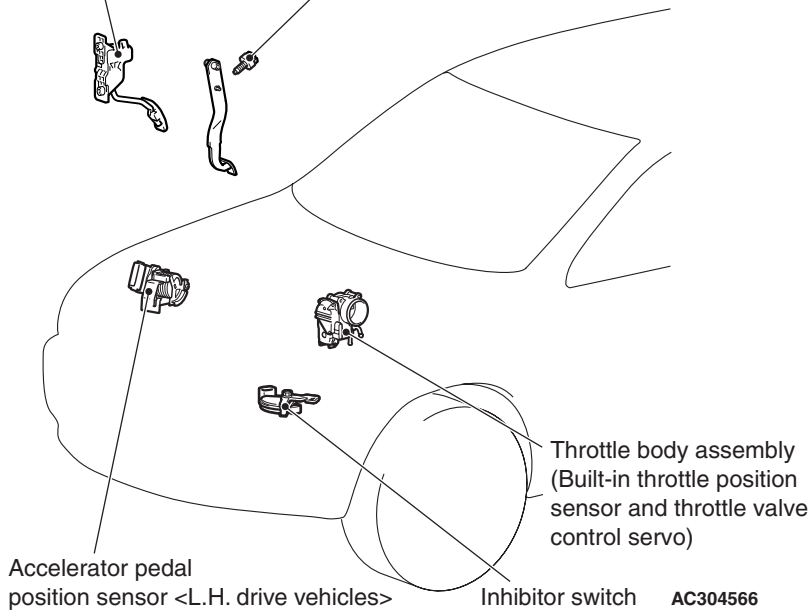
By using the auto-cruise control, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h without depressing the accelerator pedal.

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

## CONSTRUCTION DIAGRAM

Accelerator pedal  
 (Built-in accelerator  
 pedal position sensor)  
 <R.H. drive vehicles>

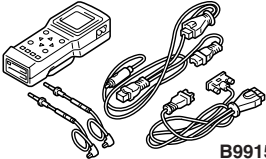
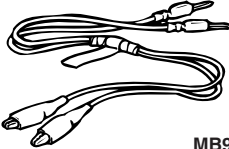
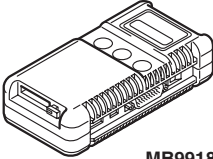
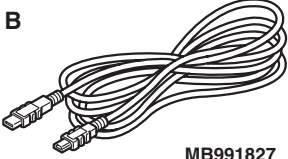

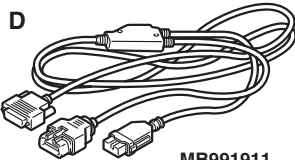
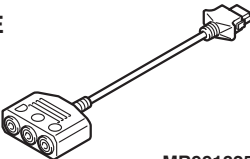
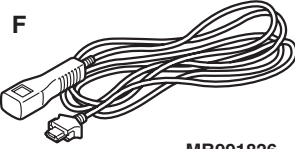
Stop lamp switch  
 (Built-in brake switch)



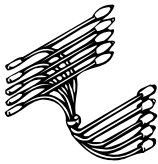

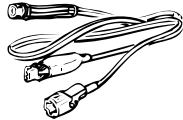
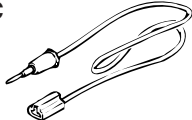

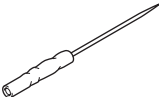


## SPECIAL TOOL

M1172000600639

Tool	Number	Name	Use
 B991502	MB991502	M.U.T.-II sub assembly	<ul style="list-style-type: none"> <li>• Reading diagnosis code</li> <li>• Auto-cruise control system check</li> </ul>
 MB991529	MB991529	Diagnosis code check harness	
<p>A</p>  MB991824	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	M.U.T.-III sub-assembly A: Vehicle Communication Interface (V. C. I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III measurement adapter F: M.U.T.-III trigger harness	Reading diagnosis code <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>CAUTION</b> </div> <b>If you connect M.U.T.-III main harness A to a vehicle without CAN communication system to use the M.U.T.-III, a pulse signal may interfere with the simulated vehicle speed lines, thus causing the M.U.T.-III inoperative. Therefore, use the M.U.T.-III main harness B (MB991911) instead.</b>
<p>B</p>  MB991827			
<p>C</p>  MB991910			
<p>D</p>  MB991911			
<p>E</p>  MB991825			
<p>F</p>  MB991826  MB991955			



Tool	Number	Name	Use
 <p>MB991658</p>	MB991658	Test harness	Inspection of data list
<p><b>A</b></p>  <p><b>B</b></p>  <p><b>C</b></p>  <p><b>D</b></p>  <p>MB991223AB</p>	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Measurement of terminal voltage A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection
 <p>MB992006</p>	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector

## TROUBLESHOOTING

## DIAGNOSIS TROUBLESHOOTING FLOW

M1172002000451

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

## DIAGNOSIS FUNCTION

M1172002100395

## METHOD OF READING THE DIAGNOSIS CODE

Use the M.U.T.-II/III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points [P.00-5](#)).

## METHOD OF ERASING THE DIAGNOSIS CODE

Use the M.U.T.-II/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

M1172002200392

Code No.	Diagnosis item	Reference page
15	Auto-cruise control switch system	<a href="#">P.17-43</a>
21	Cancel latch signal system	<a href="#">P.17-46</a>
22	Stop lamp switch system	<a href="#">P.17-46</a>
23	Engine-A/T-ECU and its related components	<a href="#">P.17-49</a>

## DIAGNOSTIC TROUBLE CODE PROCEDURES

---

### Code No.15 Auto-cruise Control Switch System

---

#### OPERATION

This circuit judges the signals of each switch (SET, RESUME and CANCEL) of the auto-cruise control switch. The engine-A/T-ECU 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-A/T-ECU terminal voltage is different from the standard value.

#### PROBABLE CAUSES

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

#### DIAGNOSIS PROCEDURE

---

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

- Item 01: Main switch (Refer to data list reference table [P.17-55](#)).
- Item 02: Set switch (Refer to data list reference table [P.17-55](#)).
- Item 03: Resume switch (Refer to data list reference table [P.17-55](#)).
- Item 04: Cancel switch (Refer to data list reference table [P.17-55](#)).

**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-301.

- (1) Remove the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)).
- (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-301 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-A/T-ECU connector C-137.**

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "OFF" position.
- (2) Measure the voltage between engine-A/T-ECU connector C-137 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-137 engine-A/T-ECU connector**

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Repair or replace the faulty connector, and install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**STEP 5. Check the harness between engine-A/T-ECU connector C-137 terminal No.94 and the auto-cruise control switch connector C-301 terminal No.2.**

- (1) Disconnect engine-A/T-ECU connector C-137 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-A/T-ECU connector C-137 terminal No.94 and earth.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Connect engine-A/T-ECU connector C-137.

**Q: Is the measured continuity open circuit?**

**YES :** Install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 17.

**NO :** Go to Step 6.

**STEP 6. Connectors check: C-301 auto-cruise control switch connector, C-106 and C-302 intermediate connectors, C-308 and C-309 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**STEP 7. Check the harness between engine-A/T-ECU connector C-137 terminal No.94 and the auto-cruise control switch connector C-301 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**STEP 8. Check the clock spring.**

Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#).

**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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**NO :** Replace the clock spring and install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**STEP 9. Measure the voltage at auto-cruise control switch connector C-301.**

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "ON" position.
- (2) Measure the voltage between connector C-301 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-A/T-ECU connector C-138.**

- (1) Turn the ignition switch to the "ON" position and the MAIN switch to the "ON" position.
- (2) Measure the voltage between engine-A/T-ECU connector C-138 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-138 engine-A/T-ECU connector**

**Q: Is the check result normal?**

**YES :** Install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

**STEP 12. Connectors check: C-138 engine-A/T-ECU connector, C-106 and C-302 intermediate connector, C-301 auto-cruise control switch connector, C-308 and C-309 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

**STEP 13. Check the harness between engine-A/T-ECU connector C-138 terminal No.146 and the auto-cruise control switch connector C-301 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

**STEP 14. Check the clock spring.**

Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#).

**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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

**NO :** Replace the clock spring and install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

**STEP 15. Connector check: C-301 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, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

**STEP 16. Check the auto-cruise control switch.**

Refer to [P.17-58](#).

**Q: Is the check result normal?**

**YES :** Install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 17.

**NO :** Replace the auto-cruise control switch (Refer to [P.17-59](#)), and install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring [P.52B-87](#)). Then go to Step 18.

---

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

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

**YES :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then go to Step 18 .

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

---

**STEP 18. Check the M.U.T.-II/III diagnosis code No.15.****Q: Is the M.U.T.-II/III diagnosis code No.15 set?****YES :** Return to Step 1.**NO :** The procedure is complete.

---

**Code No.21 Cancel Latch Signal System**

---

**DIAGNOSIS CODE SET CONDITIONS**

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

**PROBABLE CAUSE**

- Malfunction of the engine-A/T-ECU.

**DIAGNOSIS**

Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then check that diagnosis code 21 is not set.

---

**Code No.22 Stop Lamp Switch System**

---

**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-A/T-ECU (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-A/T-ECU terminal 54 and earth).

**PROBABLE CAUSES**

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

**DIAGNOSIS PROCEDURE**

---

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

Item 05: Stop lamp switch (Refer to data list reference table [P.17-55](#)).

**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-A/T-ECU connector C-135.**

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

(2) Measure the voltage between engine-A/T-ECU connector C-135 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-135 engine-A/T-ECU connector, C-16 J/C (1), C-104 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-A/T-ECU connector C-135 terminal No.39 and stop lamp switch connector C-101 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-101.**

- (1) Disconnect stop lamp switch connector C-101.
- (2) Measure the voltage between stop lamp switch connector C-101 terminal No.2 and earth.

**OK: System voltage**

- (3) Connect stop lamp switch connector C-101.

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Go to Step 7.

---

**STEP 7. Connectors check: C-101 stop lamp switch connector, C-116 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-101 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.**

Refer to [P.17-58](#).

**Q: Is the check result normal?**

**YES :** Install the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-16](#)). Then go to Step 11.

**NO :** Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-16](#)). Then go to Step 23.

---

**STEP 11. Connectors check: C-101 stop lamp switch connector, C-104 intermediate connector, C-16 J/C (1), C-135 engine-A/T-ECU 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 engine-A/T-ECU connector C-135 terminal No.39.**

**Q: Is the check result normal?**

**YES :** Go to Step 13.

**NO :** Repair the damaged harness wire. Then go to Step 23.

---

**STEP 13. M.U.T.-II/III data list**

Item 05: Stop lamp switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 22.

**NO :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then go to Step 23.

---

**STEP 14. M.U.T.-II/III data list**

Item 06: Brake switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 22.

**NO :** Go to Step 15.



**STEP 15. Measure the voltage at engine-A/T-ECU connector C-135.**

- (1) Turn the ignition switch to the "ON" position.
- (2) Measure the voltage between engine-A/T-ECU connector C-135 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.**

Refer to [P.17-58](#).

**Q: Is the check result normal?**

**YES :** Install the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-16](#)). Then go to Step 17.

**NO :** Replace the stop lamp switch (Refer to GROUP 35A, Brake Pedal [P.35A-16](#)). Then go to Step 23.

**STEP 17. Connectors check: C-135 engine-A/T-ECU connector, C-105 intermediate connector <L.H. drive vehicles> or C-106 intermediate connector <R.H. drive vehicles>, C-101 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-A/T-ECU connector C-135 terminal No.54 and stop lamp switch connector C-101 terminal No.3.**

**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-101 stop lamp switch connector, C-14 intermediate connector <R.H. drive vehicles only>**

**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-101 terminal No.4 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. M.U.T.-II/III data list**

Item 06: Brake switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 22.

**NO :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then go to Step 23 .

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

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

**YES :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then go to Step 23 .

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

**STEP 23. Check the M.U.T.-II/III diagnosis code No.22.**

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

**YES :** Return to Step 1.

**NO :** The procedure is complete.



---

Code No. 23 Engine-A/T-ECU and its related components

---

**DIAGNOSIS CODE SET CONDITIONS**

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

**PROBABLE CAUSES**

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

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the MPI system diagnosis code.**

**Q: Is any diagnosis code set?**

**YES :** Repair the MPI control system (Refer to GROUP 13B, Troubleshooting – Inspection chart for diagnosis code Trouble Code Chart [P.13B-24](#)). Then go to Step 4 .

**NO :** 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-22](#)). Then go to Step 4.

**NO :** Go to Step 3.

---

**STEP 3. Check the M.U.T.-II/III diagnosis code No. 23.**

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

**YES :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). 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 M.U.T.-II/III diagnosis code No. 23.**

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

**YES :** Return to Step 1.

**NO :** This procedure is complete.

**CHECK CHART FOR TROUBLE SYMPTOMS**

M1172002300634

Trouble symptom		Inspection procedure No.	Reference page
Communication with M.U.T.-II/III is not possible.	Communication with all systems is impossible	-	Group 13B, Symptom Procedures – Inspection Procedure 1 <a href="#">P.13B-249</a>
	Communication with the engine-A/T-ECU only is impossible	-	Group 13B, Symptom Procedures – Inspection Procedure 2 <a href="#">P.13B-251</a>
Auto-cruise control is not cancelled.	Even if brake pedal is depressed	1	<a href="#">P.17-50</a>
	Even if select lever is set to N range	2	<a href="#">P.17-51</a>
	Even if auto-cruise control CANCEL switch is set to ON	3	<a href="#">P.17-51</a>
Auto-cruise control cannot be set.		4	<a href="#">P.17-51</a>
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.		5	<a href="#">P.17-52</a>
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).		6	<a href="#">P.17-53</a>

**SYMPTOM PROCEDURES****Inspection Procedure 1: When the Brake Pedal is Depressed, Auto-cruise Control is not Cancelled.****COMMENTS ON TROUBLE SYMPTOM**

The stop lamp switch circuit is suspected.

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

**PROBABLE CAUSES**

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

**DIAGNOSIS**

Refer to [P.17-46](#), Diagnosis Trouble Code Procedures – Code No. 22: Stop lamp switch system.

---

**Inspection Procedure 2: When the Selector Lever is Moved to "N" Range, Auto-cruise Control is not Cancelled.**

---

### COMMENTS ON TROUBLE SYMPTOM

The inhibitor switch circuit is suspected.

### PROBABLE CAUSES

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

### DIAGNOSIS

Refer to GROUP 23A, Symptom Procedures – Inspection Procedure 16: Inhibitor switch system <4G69> [P.23A-85](#) .

---

**Inspection Procedure 3: 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.17-59](#)). Then check the malfunction is eliminated.

---

**Inspection Procedure 4: Auto-cruise Control cannot be Set.**

---

### COMMENTS ON TROUBLE SYMPTOM

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

### PROBABLE CAUSES

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

### DIAGNOSIS PROCEDURE

---

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

**Q: Is any diagnosis code set?**

**YES :** Refer to [P.17-42](#), Check Chart for Diagnosis Codes. Then go to Step 6.

**NO :** Go to Step 2.

---

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

Item 04: Cancel switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 3.

**NO :** Refer to [P.17-51](#), Symptom Procedures number 3. Then go to Step 6.

---

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

- Item 05: Stop lamp switch (Refer to data list reference table [P.17-55](#)).
- Item 06: Brake switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Refer to [P.17-50](#), Symptom Procedures number 1. Then go to Step 6.

---

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

Item 07, Inhibitor switch (Refer to data list reference table [P.17-55](#)).

**Q: Is the check result normal?**

**YES** : Go to Step 5

**NO** : Refer to [P.17-51](#), Symptom Procedures number 2. 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-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). 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 5: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed.**

---

**COMMENTS ON TROUBLE SYMPTOM**

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

**PROBABLE CAUSES**

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

**DIAGNOSIS PROCEDURE**

---

**STEP 1. Check the A/T system diagnosis code.****Q: Is any diagnosis code set?**

**YES** : Repair the A/T system (Refer to GROUP 23A, Troubleshooting <A/T> – Check chart for diagnosis codes [P.23A-22](#)). 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 13B, Troubleshooting – Inspection chart for diagnosis code Trouble Code Chart [P.13B-24](#)). 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 13B, Engine-A/T-ECU [P.13B-420](#)). 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 6: When MAIN Switch is Turned "ON", Auto-cruise Control Indicator Lamp Inside Combination Meter does not Illuminate. (However, Auto-cruise Control is Normal).**

## CIRCUIT OPERATION

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

## COMMENTS ON TROUBLE SYMPTOM

Connector(s), wiring harness between the PCM and the combination meter, the combination meter and the engine-A/T-ECU may be defective. The auto-cruise control switch input signal circuit may also be defective.

## PROBABLE CAUSES

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

## DIAGNOSIS PROCEDURE

### STEP 1. Check that the indicator light inside the combination meter illuminates.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check the indicator lights other than "CRUISE" indicator light illuminate.

**Q: Is the check result normal?**

**YES :** . Go to Step 6.

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

### STEP 2. Connectors check: C-04 combination meter connector, C-205 junction block connector

**Q: Is the check result normal?**

**YES :** . Go to Step 3.

**NO :** . Repair or replace the damaged components. Then go to Step 13.

### STEP 3. Check the harness between combination meter connector C-04 terminal No.42 and junction block connector C-205 terminal No.25.

**Q: Is the check result normal?**

**YES :** Go to Step 4.

**NO :** Repair the damaged harness wire. Then go to Step 13.

### STEP 4. Check fuse number 2 at the junction block.

**Q: Is the check result normal?**

**YES :** Go to Step 5.

**NO :** Replace the fuse. Then go to Step 13.

### STEP 5. Check that the indicator light inside the combination meter illuminates.

- (1) Turn the ignition switch to the "ON" position.
- (2) Check that the indicator light inside the combination meter illuminates.

**Q: Is the check result normal?**

**YES :** It can be assumed that this malfunction is intermittent.

**NO :** Replace the combination meter. (Refer to GROUP 54A, Combination meter assembly [P.54A-42](#)). Then go to Step 13.

### STEP 6. Check the M.U.T.-II/III diagnosis code No.15.

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

**YES :** Repair the auto-cruise control switch system (Refer to [P.17-43](#), diagnosis code Procedures - Code No.15: Auto-cruise Control Switch System). Then go to Step 13.

**NO :** Go to Step 7.

### STEP 7. Measure the voltage at engine-A/T-ECU connector C-134.

- (1) Turn the ignition switch to the "ON" position.
- (2) Measure the voltage between engine-A/T-ECU connector C-134 terminal No.13 and earth.

---

**STEP 8. Connectors check: C-05 combination meter connector, C-106 intermediate connector <L.H. drive vehicles> or C-104 intermediate connector <R.H. drive vehicles>, C-134 engine-A/T-ECU connector**

**Q: Is the check result normal?**

**YES :** Go to Step 9.

**NO :** Repair or replace the damaged components. Then go to Step 13.

---

**STEP 9. Check the harness between combination meter connector C-05 terminal No.19 and engine-A/T-ECU connector C-134 terminal No.13.**

**Q: Is the check result normal?**

**YES :** Go to Step 10.

**NO :** Repair the damaged harness wire. Then go to Step 13.

---

**STEP 10. Check the auto-cruise control indicator light bulb.**

Remove the combination meter (Refer to GROUP 54A, Combination Meter Assembly [P.54A-42](#)), and check the auto-cruise control indicator bulb.

**Q: Is the check result normal?**

**YES :** Install the combination meter (Refer to GROUP 54A, Combination meter assembly [P.54A-42](#)). Then go to Step 11.

**NO :** Replace the bulb and install the combination meter (Refer to GROUP 54A, Combination meter assembly [P.54A-42](#)). Then go to Step 13.

---

**STEP 11. Measure the voltage at engine-A/T-ECU connector C-134.**

- (1) Disconnect engine-A/T-ECU connector C-134 and measure at the harness side.
- (2) Turn the ignition switch to the "ON" position.
- (3) Measure the voltage between engine-A/T-ECU connector C-134 terminal No.13 and earth.

**OK:**

- ignition switch "ON": system voltage
- ignition switch "OFF": 0.5 V or less

**Q: Is the check result normal?**

**YES :** Go to Step 12.

**NO :** Replace the combination meter (Refer to GROUP 54A, Combination meter assembly [P.54A-42](#)). Then go to Step 13.

---

**STEP 12. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Replace the engine-A/T-ECU (Refer to GROUP 13B, Engine-A/T-ECU [P.13B-420](#)). Then go to Step 13.

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

---

**STEP 13. Retest the system.**

**Q: Does a malfunction take place again?**

**YES :** Return to Step 1.

**NO :** The procedure is complete.

## DATA LIST REFERENCE TABLE

M1172002400567

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		
07	Inhibitor switch		Selector lever: N position		ON		
			Selector lever: Other than N position		OFF		
08	Accelerator switch (Idle switch)		Accelerator pedal: Depressed		OFF		
			Accelerator pedal: Released		ON		
09	Auto-cruise control operation		Auto-cruise control: active		ON		
			Auto-cruise control: Inactive		OFF		
10	Vehicle speed signal		Road test the vehicle		The speedometer and M.U.T.-II/III display the same value.		
11	Throttle position sensor (main)		<ul style="list-style-type: none"><li>Remove the intake air hose at the throttle body</li><li>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.</li><li>Ignition switch: ON</li></ul>	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"		The voltage rises

Item No.	Check item	Check condition		Normal condition
12	Accelerator pedal position sensor (main)	Ignition switch: ON	Release the accelerator pedal	800 – 1,000 mV <R.H. drive vehicles> 350 – 950 mV <L.H. drive vehicles>
			Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke
			Depress the accelerator pedal fully	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

M1172002700449

C-134										C-135								C-136								C-137								C-138												
1	2							3	4	31	32					33	34	61	62							63	64	91	92					93	94	95	121	122						123	124	
5	6	7	8	9	10	11	12	13		35	36	37	38	39	40	41	42	43	65	66	67	68	69	70	71	72	73	96	97	98	99	100	101	102	103	<del>104</del>	125	126	127	128	129	130	131	132	133	
14	15	16	17	18	19	20				44	45	46	47	48	49		50	51	74	75	76	77	78	79	80	81	82	105	106		107	108	109		110	111	112	134	135		136	137	138	139	140	141
21	22	23	24	25				26	27	52	53		54	55	56		57	58	83	84		85	86	87		88	89	113	114		115	116	117		118	119	120	142	143		144			145	146	

AC312699AD

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
51	Inhibitor switch: "N"	Ignition switch: "ON"	Select lever: N range	System voltage
			Select lever: Other than N 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-A/T-ECU 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



Terminal No.	Check item	Check conditions		Normal condition
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	0.335 – 0.935 V
			Depress the accelerator pedal.	4.0 V or more
113	Throttle position sensor (sub)	<ul style="list-style-type: none"> <li>Remove the intake air hose at the throttle body</li> <li>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).</li> <li>Ignition switch: "ON"</li> </ul>	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	4.6 V or more
114	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.335 – 0.935 V
			Depress the accelerator pedal.	4.0 V or more
115	Throttle position sensor (main)	<ul style="list-style-type: none"> <li>Remove the intake air hose at the throttle body</li> <li>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).</li> <li>Ignition switch: "ON"</li> </ul>	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-A/T-ECU power supply voltage applied to throttle valve control servo	Ignition switch: "ON"		System voltage

**ON-VEHICLE SERVICE****AUTO-CRUISE CONTROL SWITCH CHECK**

M1172001200128

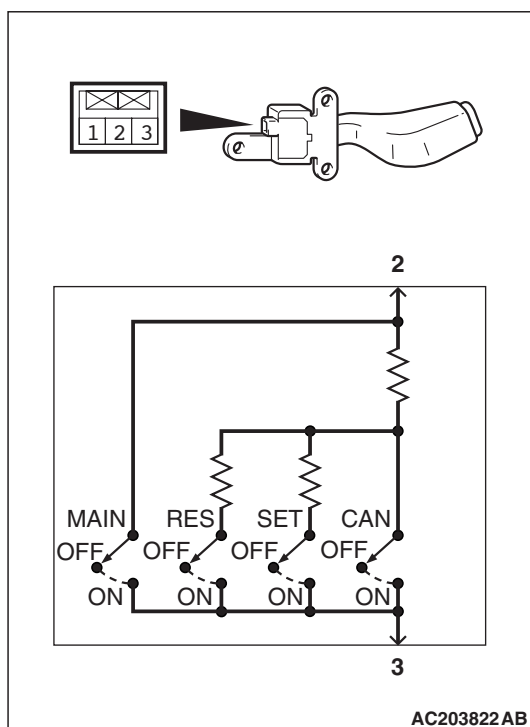
The service procedure is the same as the vehicles with 4G64 engine (Refer to [P.17-33](#)).

**AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK**

M1172001700598

**AUTO-CRUISE CONTROL SWITCH CHECK**

1. Remove the auto-cruise control switch (Refer to [P.17-59](#)).

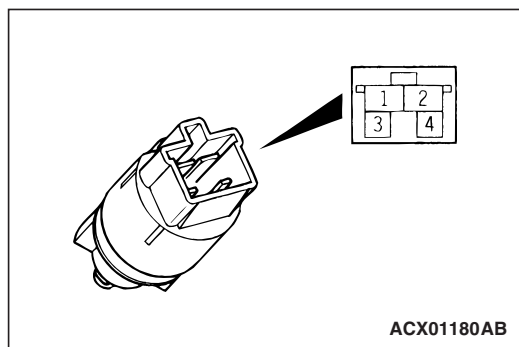


2. Measure the resistance between the terminals when each of the SET, RESUME, CANCEL and MAIN switches is pressed. If the values measured at the time correspond to those in the table below, then there is no problem.

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

**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 $\Omega$
	3 – 4	Open circuit
When brake pedal is not depressed (for auto-cruise control circuit).	1 – 2	Open circuit
	3 – 4	Less than 2 $\Omega$

**INHIBITOR SWITCH ("N" POSITION)**

Refer to GROUP 23A, On-vehicle Service – A/T Control Component Check [P.23A-116](#).

**THROTTLE POSITION SENSOR**

Refer to GROUP 13B, On-vehicle Service – Throttle Valve Control Servo Check [P.13B-415](#).

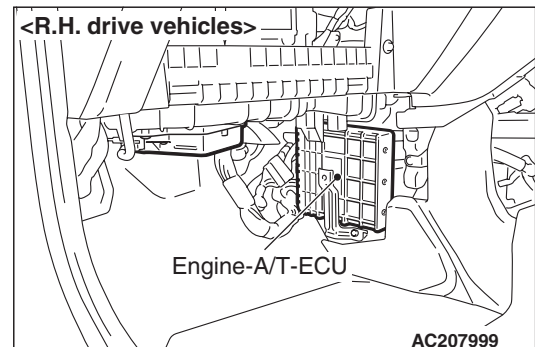
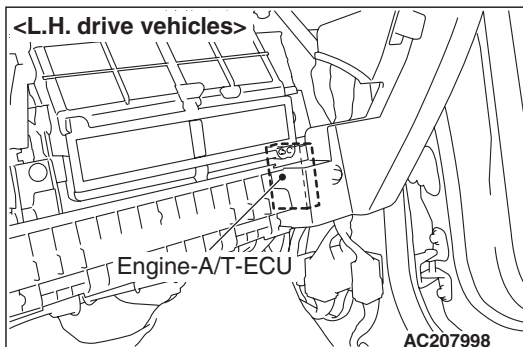
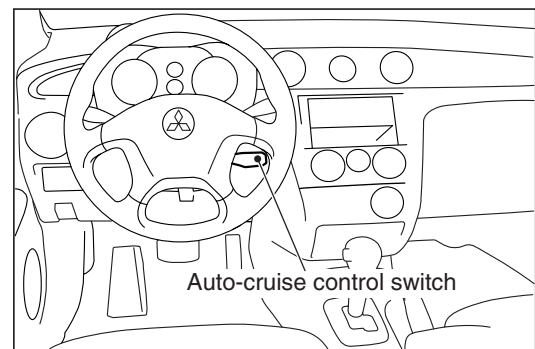
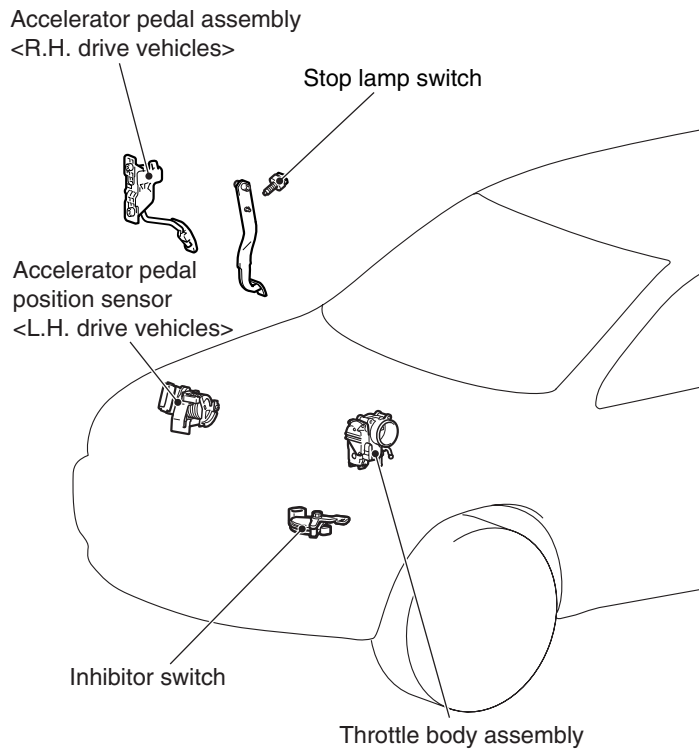
## AUTO-CRUISE CONTROL

### REMOVAL AND INSTALLATION

M1172001400564

#### **⚠ WARNING**

- **Before removal of the air bag module, refer to GROUP 52B, Service Precautions (P.52B-4) and Air Bag Module(s) and Clock Spring (P.52B-87).**
- **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**

- Auto-cruise control switch (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring P.52B-87)

#### **Control unit removal**

- Engine-A/T-ECU (Refer to GROUP 13C, Engine-A/T-ECU P.13B-420)

#### **Sensor removal steps**

- Inhibitor switch (Refer to GROUP 23B, Transmission P.23B-16)
- Accelerator pedal position sensor <L.H. drive vehicles> (Refer to P.17-10)
- Accelerator pedal assembly <R.H. drive vehicles> (Refer to P.17-10)
- Throttle body assembly (Refer to GROUP 13B, Throttle body assembly P.13B-418)
- Stop lamp switch (Refer to GROUP 35A, Brake pedal P.35A-16)

**EMISSION CONTROL <MPI>****GENERAL INFORMATION**

M1173000100734

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 <4G69>	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 <4G64> <ul style="list-style-type: none"> <li>• EGR valve</li> <li>• EGR control solenoid valve</li> </ul>	Equipped  Single type Duty cycle type solenoid valve (Purpose: NOx reduction)
	Exhaust gas recirculation system <4G69> <ul style="list-style-type: none"> <li>• EGR valve</li> </ul>	Equipped  Steeper motor type (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

**EMISSION CONTROL DEVICE  
REFERENCE TABLE**

M1173006600339

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 <4G69>		×			
MPI system component		×	×		
Catalytic converter <4G69>				×	
EGR valve <4G64>					×
EGR control solenoid valve <4G64>					×
EGR valve (Steeper motor) <4G69>					×

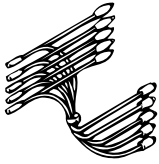
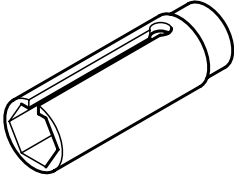
**SERVICE SPECIFICATIONS**

M1173000300653

Items	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	30 – 34 <4G69 Except for Brazil and Chile>
	22 – 26 <4G69 Vehicles for Brazil and Chile>
EGR control solenoid valve coil resistance (at 20°C) Ω	29 – 35 <4G64>
EGR valve coil resistance (at 20°C) Ω	20 – 24 <4G69>

**SPECIAL TOOL**

M1173000600308

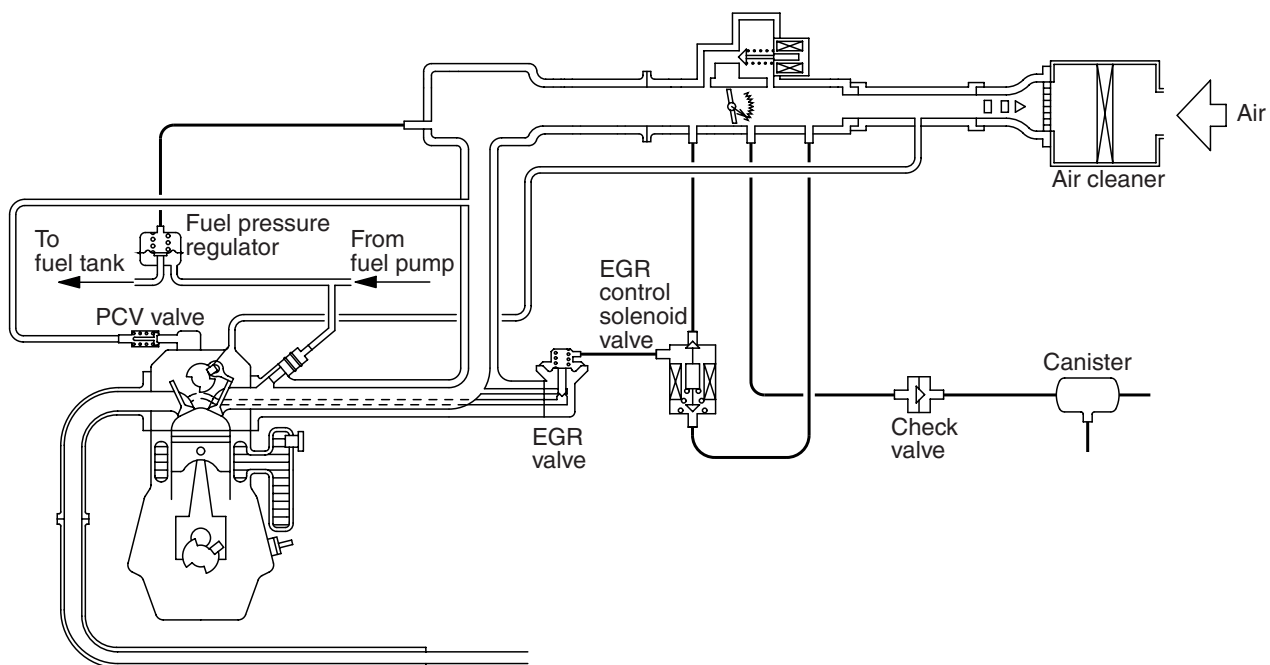
Tool	Number	Name	Use
 MB991658	MD991658	Test harness	EGR valve (Steeper motor) CHECK
	MD998770	Oxygen sensor wrench	Removal and installation of oxygen sensor

## VACUUM HOSE

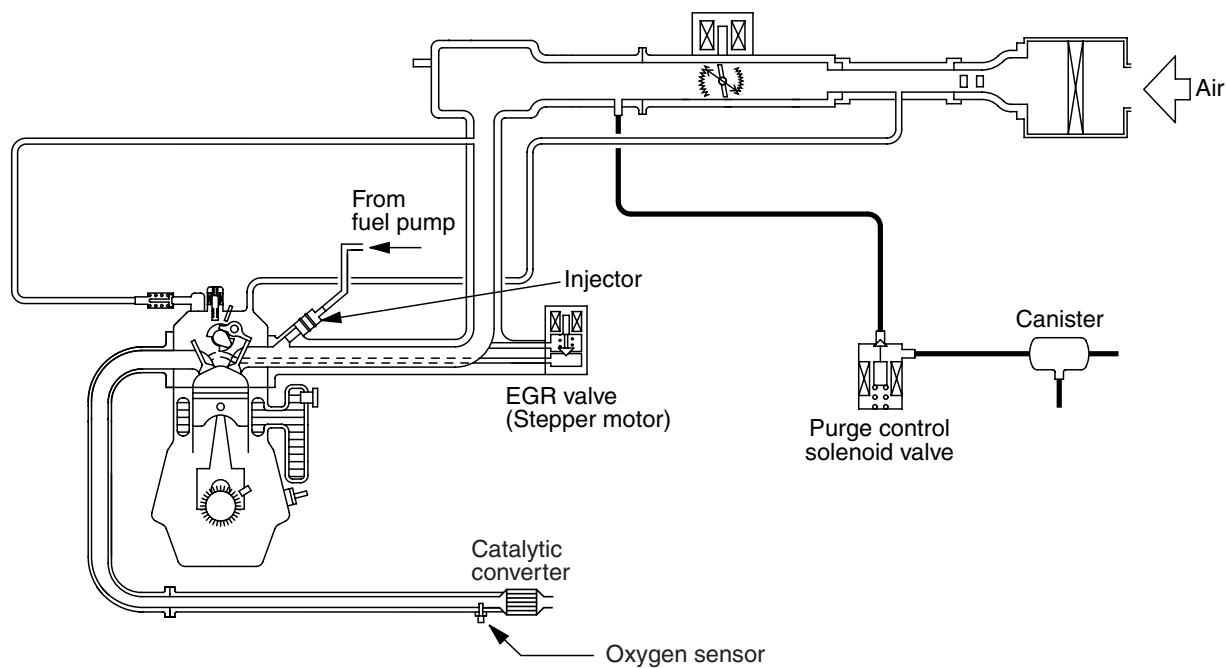
## VACUUM HOSE PIPING DIAGRAM

M1173000900785

&lt;4G64&gt;

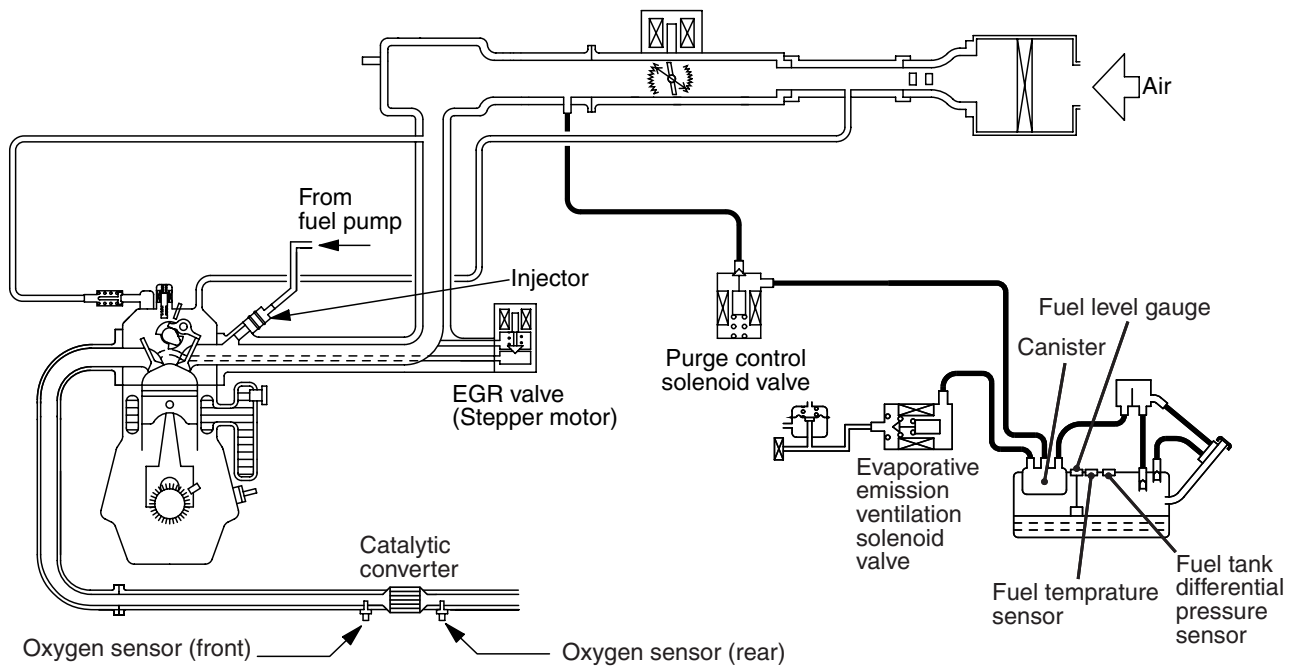


AK201209AB

<4G69 Vehicles except for Brazil, Chile,  
Australia and New Zealand>

AK501614AB

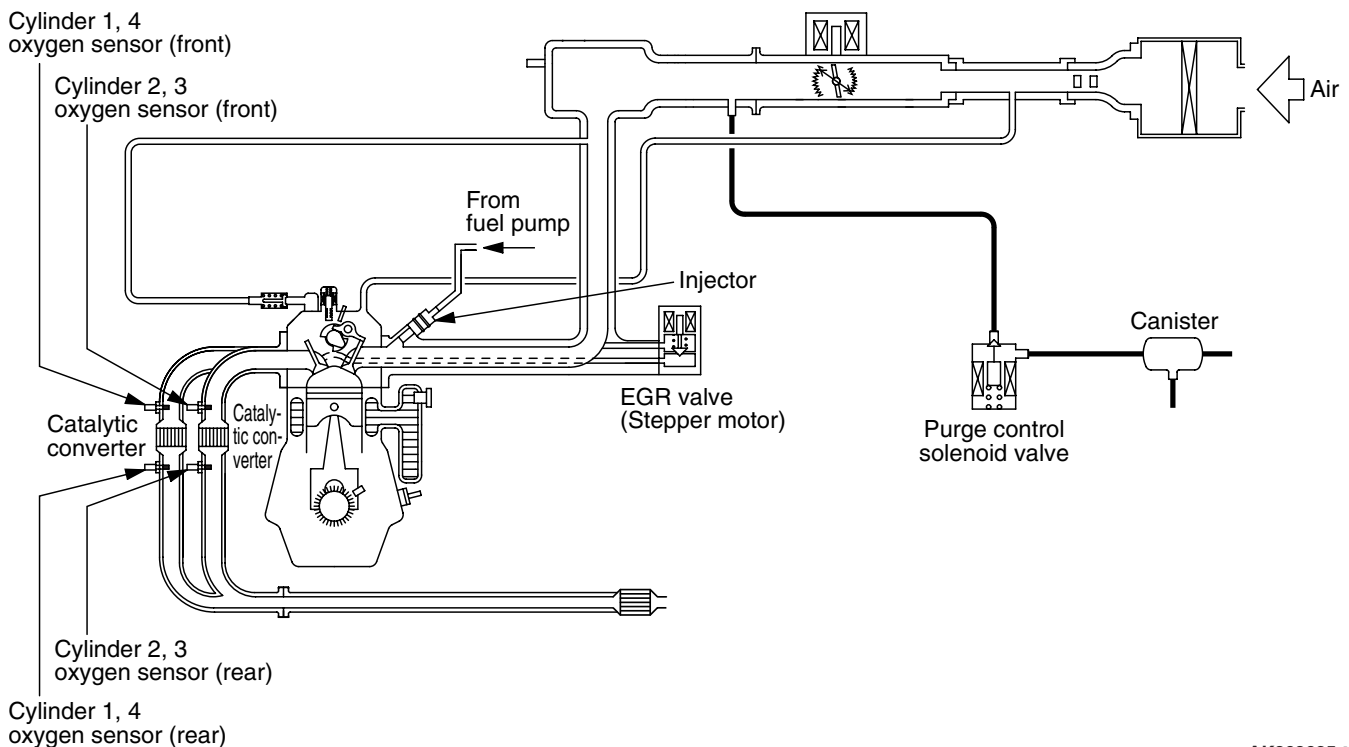
<4G69 Vehicles for Brazil and Chile>



AK501615AB

**NOTE:** The evaporative emission ventilation solenoid valve [always OPEN (OFF)], fuel tank differential pressure sensor, fuel level gauge, fuel temperature sensor are not used for engine control.

<4G69 Vehicles for Australia and New Zealand>

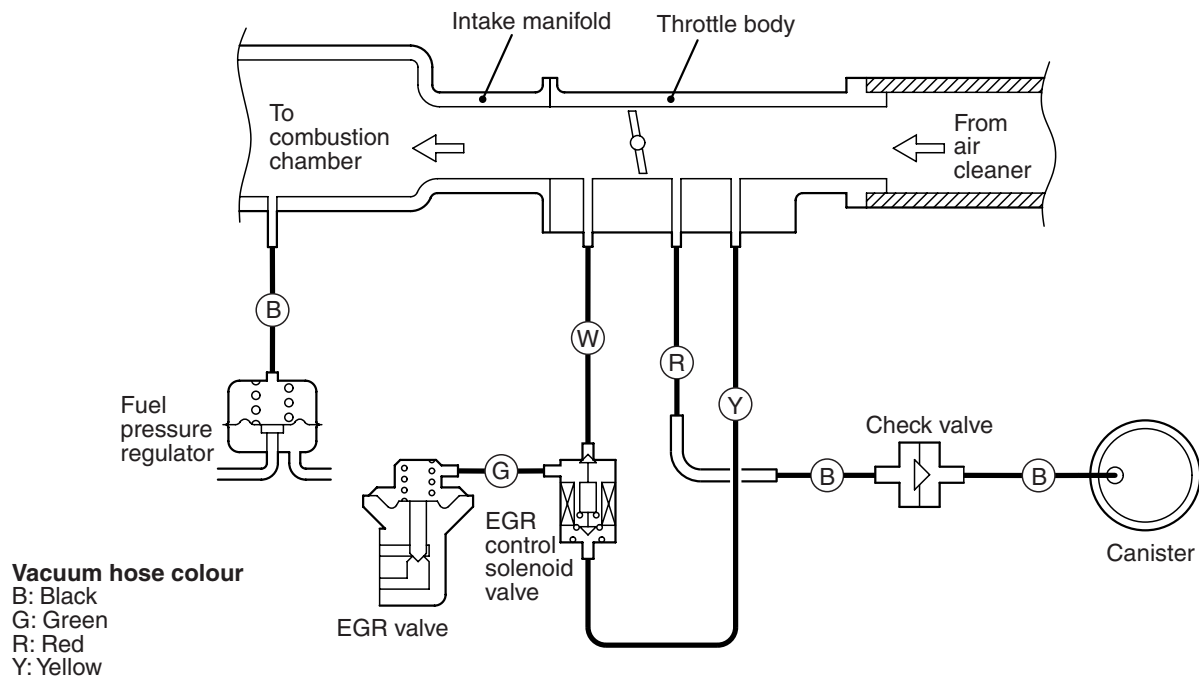


AK303625 AB

## VACUUM CIRCUIT DIAGRAM

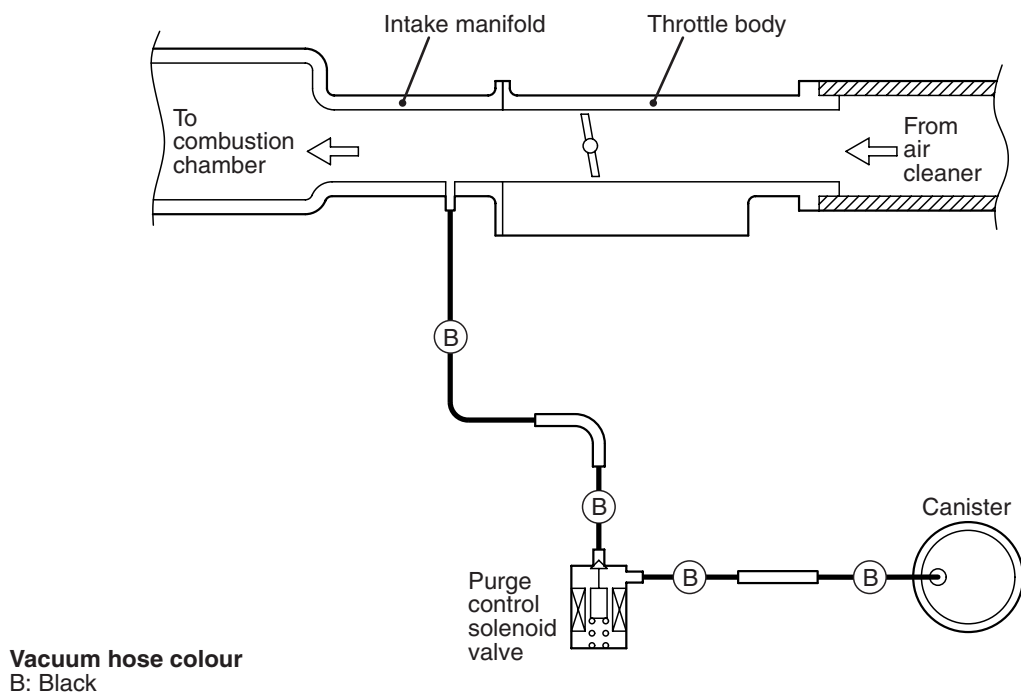
M1173007100575

&lt;4G64&gt;



AK201212 AB

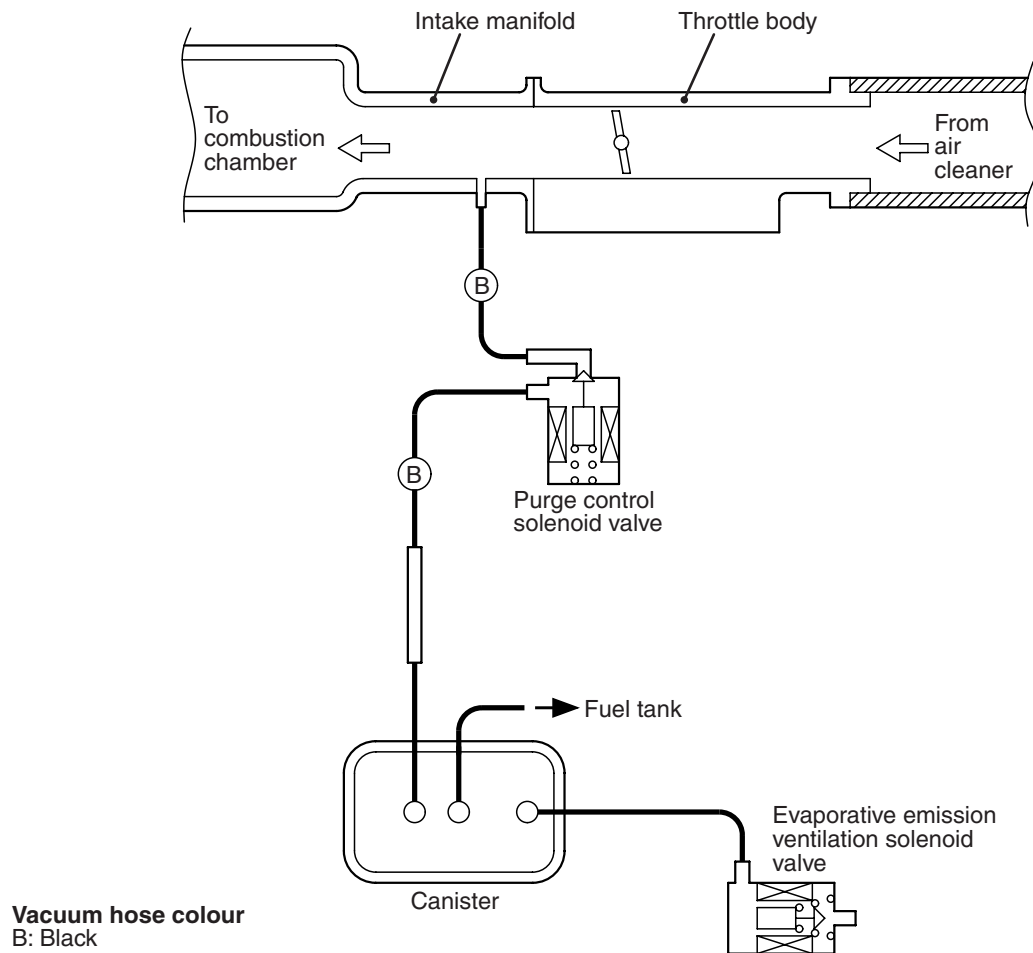
&lt;4G69 Vehicles except for Brazil and Chile&gt;



AK302823 AB



<4G69 Vehicles for Brazil and Chile>



AK400215 AB

## VACUUM HOSE CHECK

M1173007300212

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

M1173007200163

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)

M1173005000497

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.

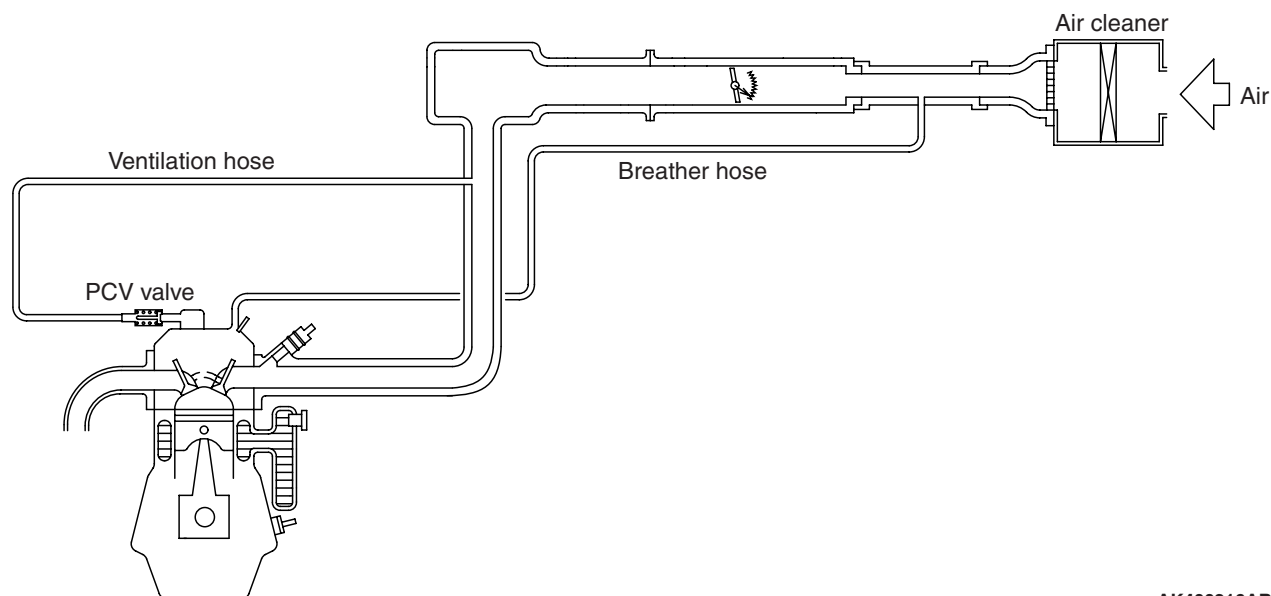
The air becomes mixed with the blow-by gases inside the crankcase.

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.

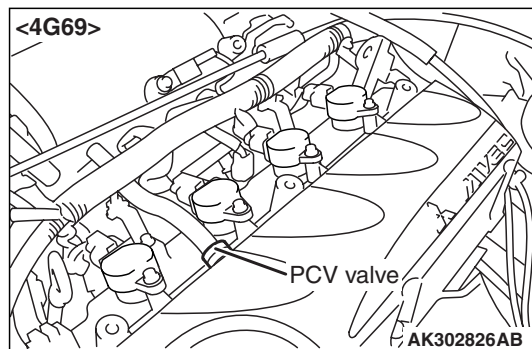
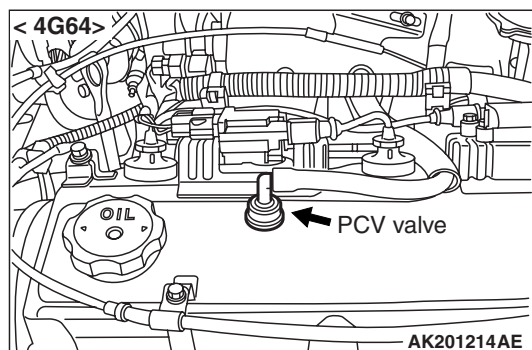
## SYSTEM DIAGRAM



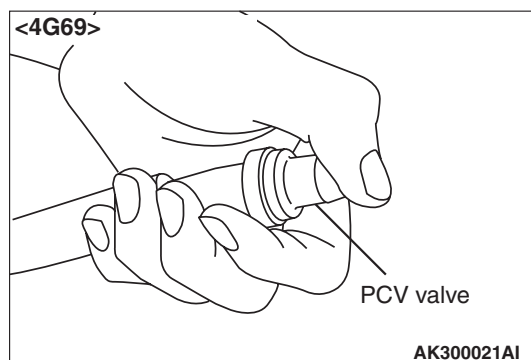
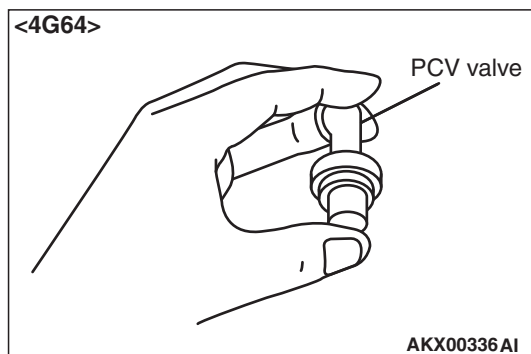
AK400216AB

COMPONENT LOCATION (CRANKCASE  
EMISSION CONTROL SYSTEM)

M1173007400424



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.

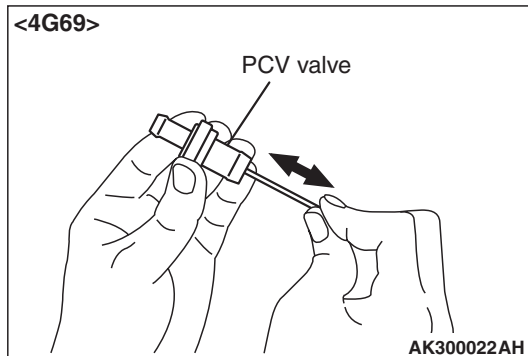
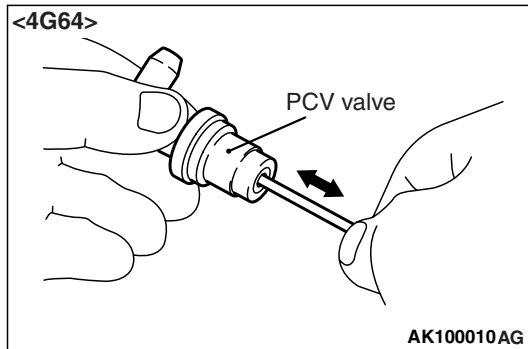
POSITIVE CRANKCASE VENTILATION  
SYSTEM CHECK

M1173001100458

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.

## POSITIVE CRANKCASE VENTILATION (PCV) VALVE CHECK

M1173001200400



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) <4G69>**

M1173005100847

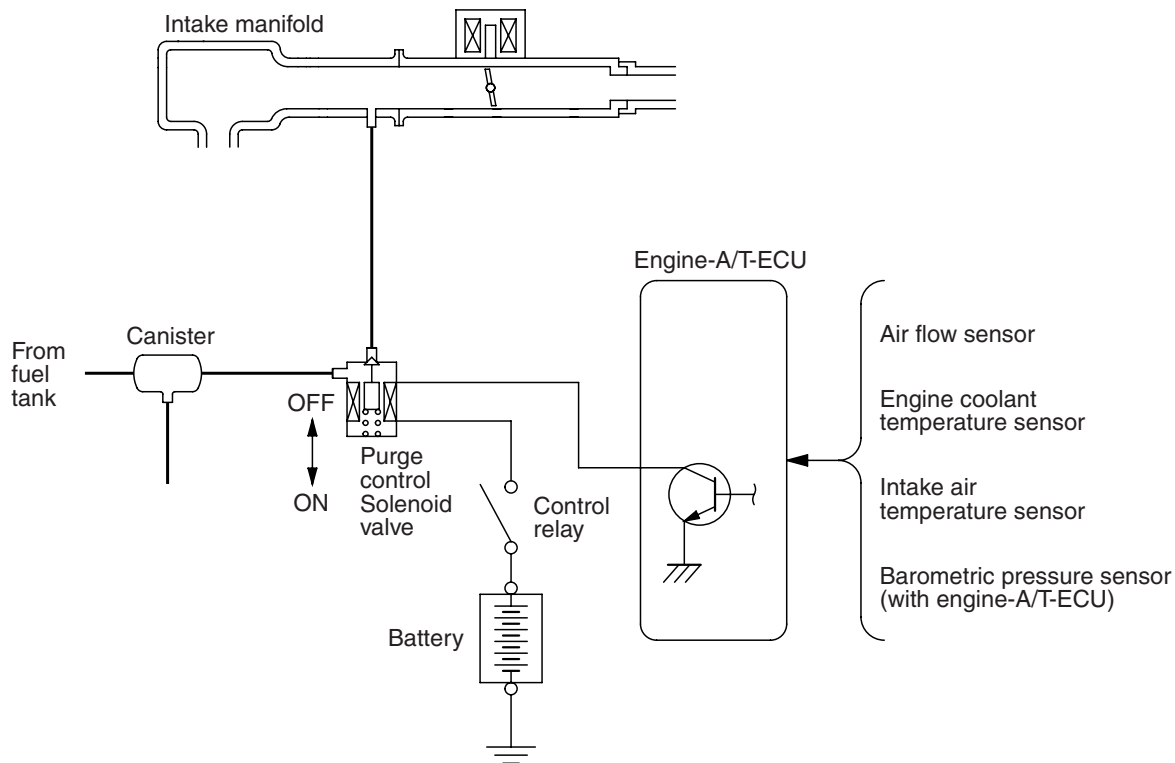
The evaporative emission control system prevents fuel vapours generated in the fuel tank from escaping into the atmosphere.

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.

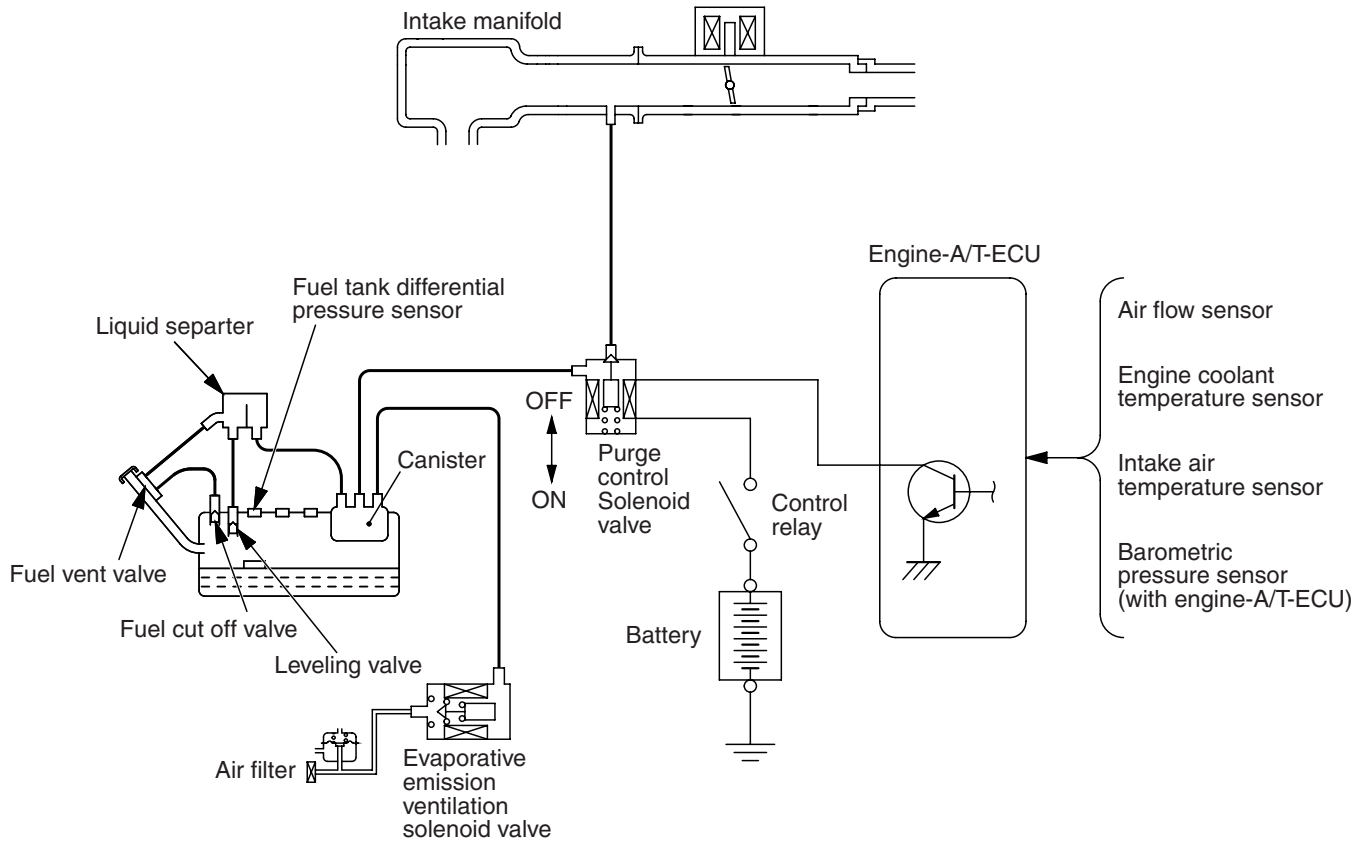
When driving the vehicle, fuel vapours stored in the canister flow through the purge control solenoid valve and purge port and go into the intake manifold to be sent to the combustion chamber.

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****<Vehicles except for Brazil and Chile>**

<Vehicles for Brazil and Chile>

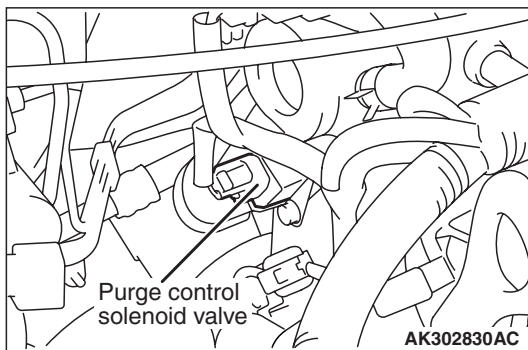


AK400217AB

**NOTE:** The evaporative emission ventilation solenoid valve [always OPEN (OFF)], fuel tank differential pressure sensor, fuel level gauge, fuel temperature sensor are not used for engine control.

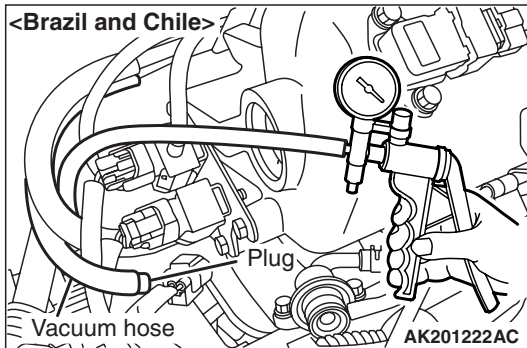
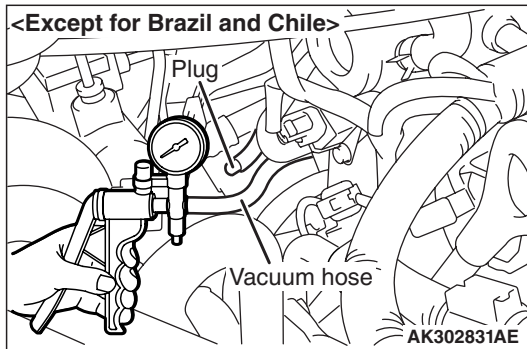
**COMPONENT LOCATION (EVAPORATIVE EMISSION CONTROL SYSTEM) <4G69>**

M1173007500432



**PURGE CONTROL SYSTEM CHECK  
<4G69>**

M1173001400772



1. Disconnect the vacuum hose (between purge control solenoid valve and intake manifold) from the 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)**

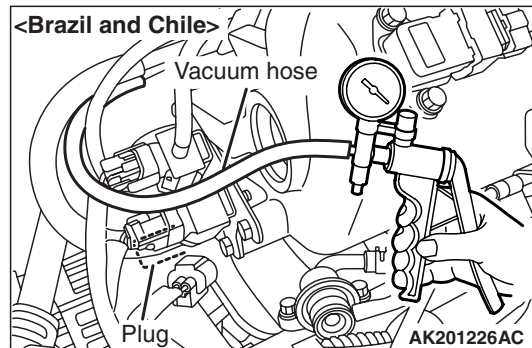
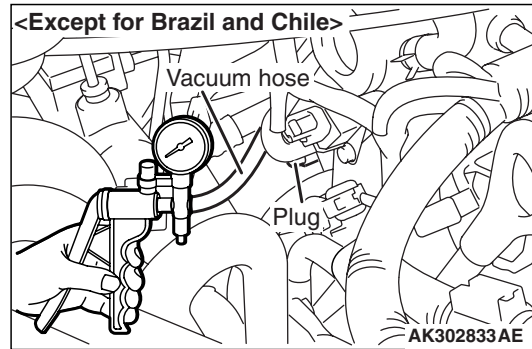
Engine condition	Normal condition
At idle	Vacuum is maintained.
3,000 r/min	

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

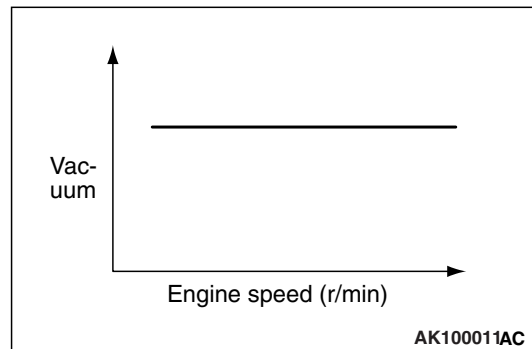
Engine condition	Normal condition
At idle	Vacuum is maintained.
3,000 r/min (within 3 minutes after engine starts)	Vacuum will leak.

**PURGE PORT VACUUM CHECK <4G69>**

M1173001500412



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.

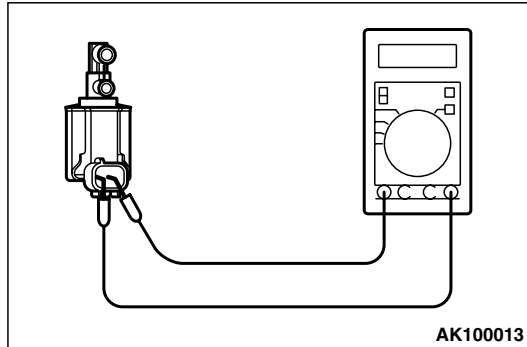
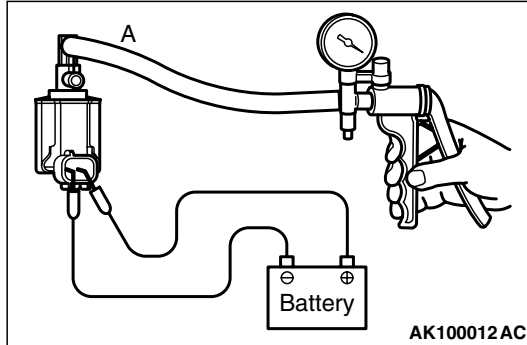


3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably blocked and should be cleaned.

## PURGE CONTROL SOLENOID VALVE CHECK <4G69>

M1173001700461

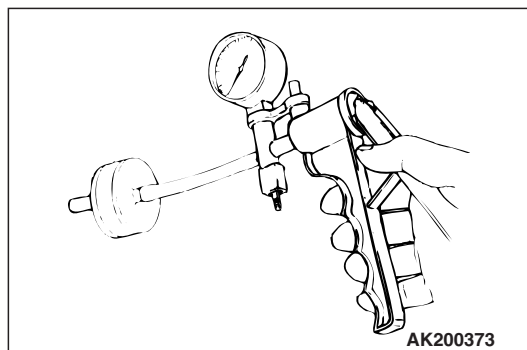
**NOTE:** When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.



1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness connector.

## CHECK VALVE CHECK

M1173006200104



Connect a hand vacuum pump to the check valve, apply negative pressure and check the airtightness.

Connect nipple colour	Normal condition
Black	Negative pressure leaks
Brown	Negative pressure is maintained

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  $\Omega$  (at 20°C) <Vehicles except for Brazil and Chile>**

**22 – 26  $\Omega$  (at 20°C) <Vehicles for Brazil and Chile>**

## GENERAL INFORMATION (EVAPORATIVE EMISSION CONTROL SYSTEM) <4G64>

M1173005100591

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 go into the intake manifold to be sent to the combustion chamber.

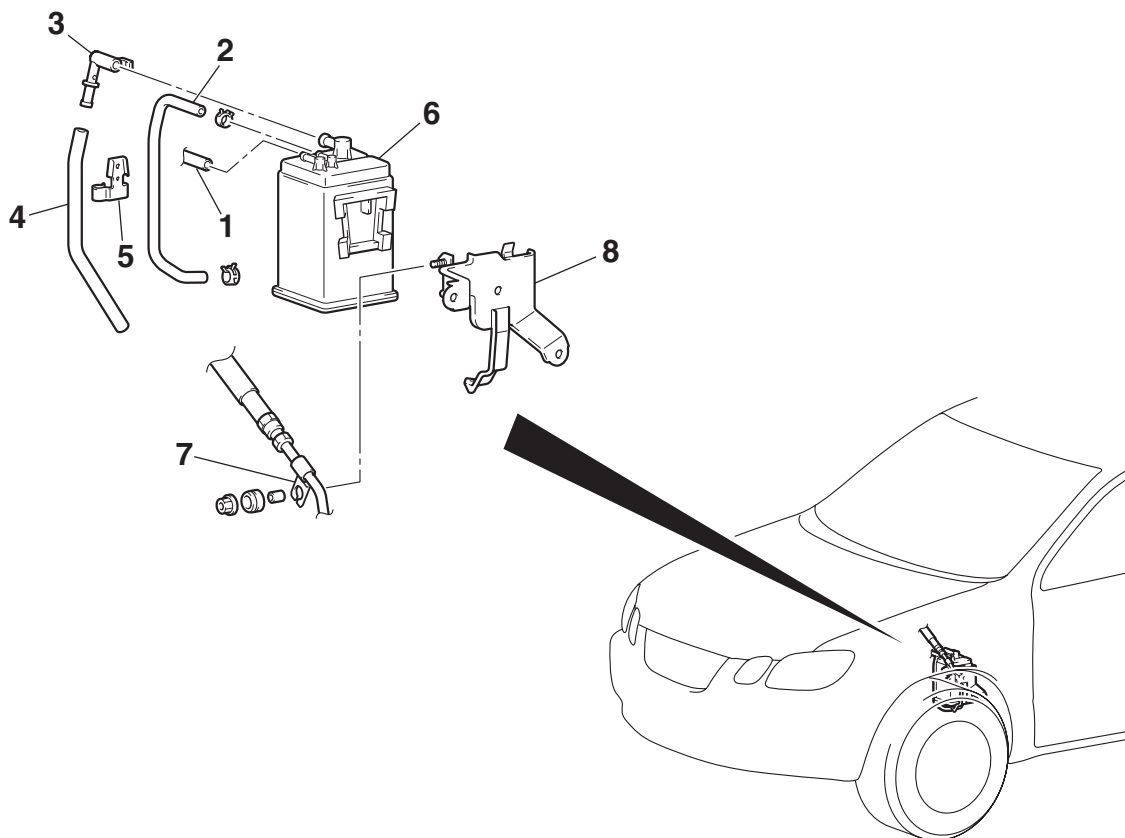
## REMOVAL AND INSTALLATION

M1173004200379

## &lt;4G64, 4G69 EXCEPT FOR BRAZIL, CHILE AND TAIWAN&gt;

**Pre-removal and Post-installation Operation**

Air Cleaner Cover and Air Intake Hose Removal and Installation (Refer to GROUP 15 - Air Cleaner

[P.15-3<4G64>](#), [P.15-3<4G69>](#)).

AC212494 AB

**Removal steps**

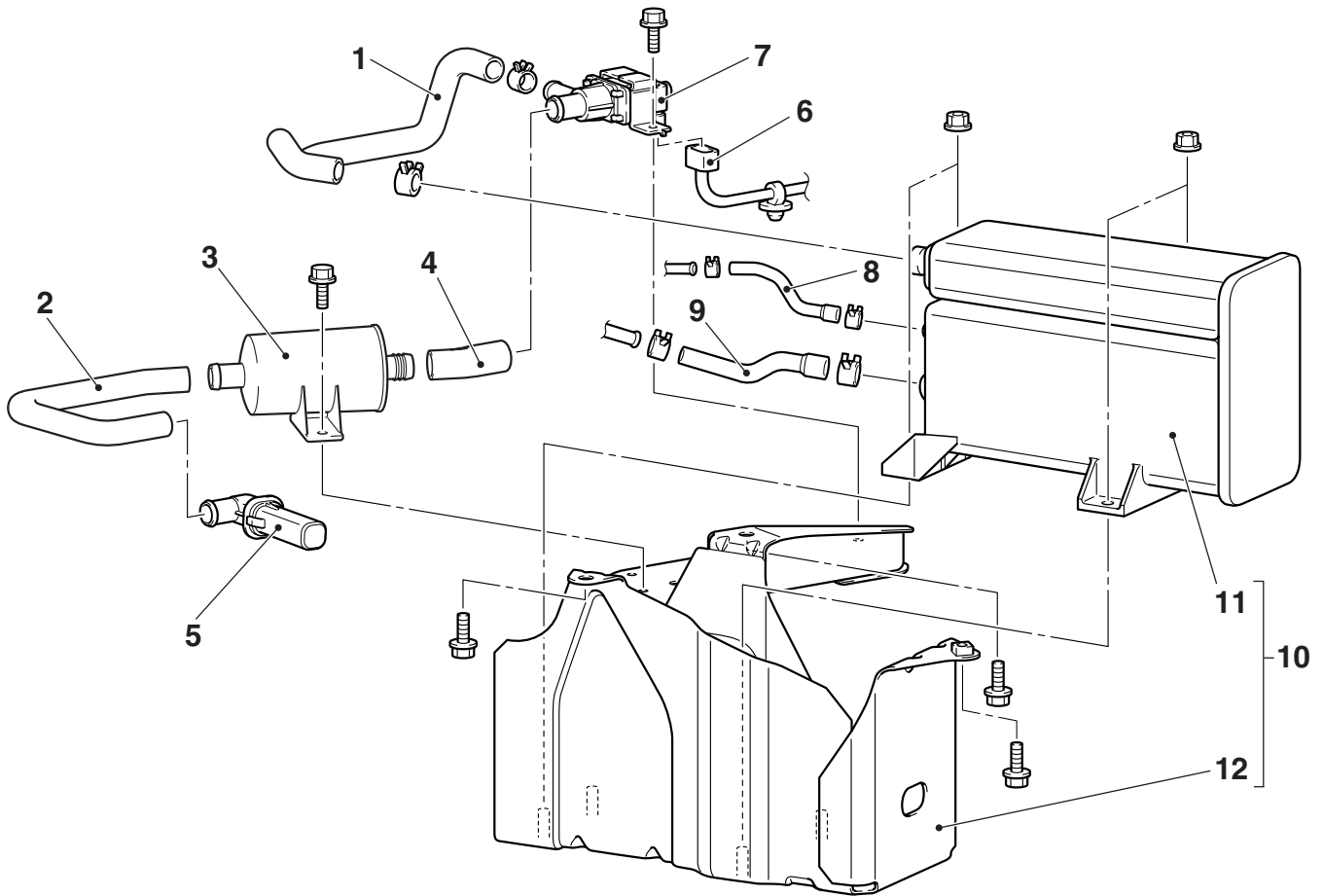
1. Purge hose connection
2. Vapour hose
3. Vent connector
4. Vapour hose

**Removal steps (Continued)**

5. Hose clamp
6. Canister
7. Fuel high-pressure hose clamp
8. Canister bracket



<4G69 VEHICLES FOR BRAZIL, CHILE AND TAIWAN>



AC407415AC

**Removal steps**

1. Vent hose A
2. Vent hose D
3. Air filter
4. Vent hose C
5. Vent pipe assembly
6. Evaporative emission ventilation solenoid valve connector

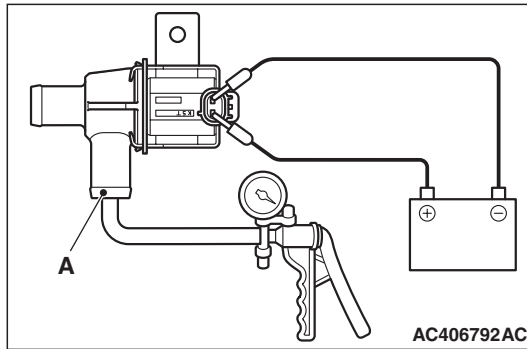
**Removal steps (Continued)**

7. Evaporative emission ventilation solenoid valve
8. Purge hose B
9. Vapour hose
10. Canister and canister bracket assembly
11. Canister
12. Canister bracket

## INSPECTION

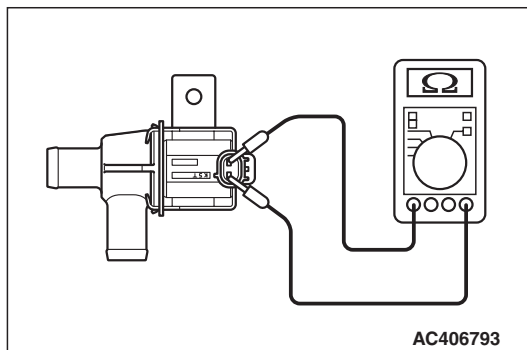
EVAPORATIVE EMISSION VENTILATION  
SOLENOID CHECK

M1173002500028



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

Battery Voltage	Normal Condition
Applied	Vacuum maintained
Not applied	Vacuum leaks



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

**Standard value: 17 – 21  $\Omega$  (at 20°C)**

EXHAUST GAS RECIRCULATION  
(EGR) SYSTEM

## GENERAL INFORMATION (EGR SYSTEM)

M1173005200703

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

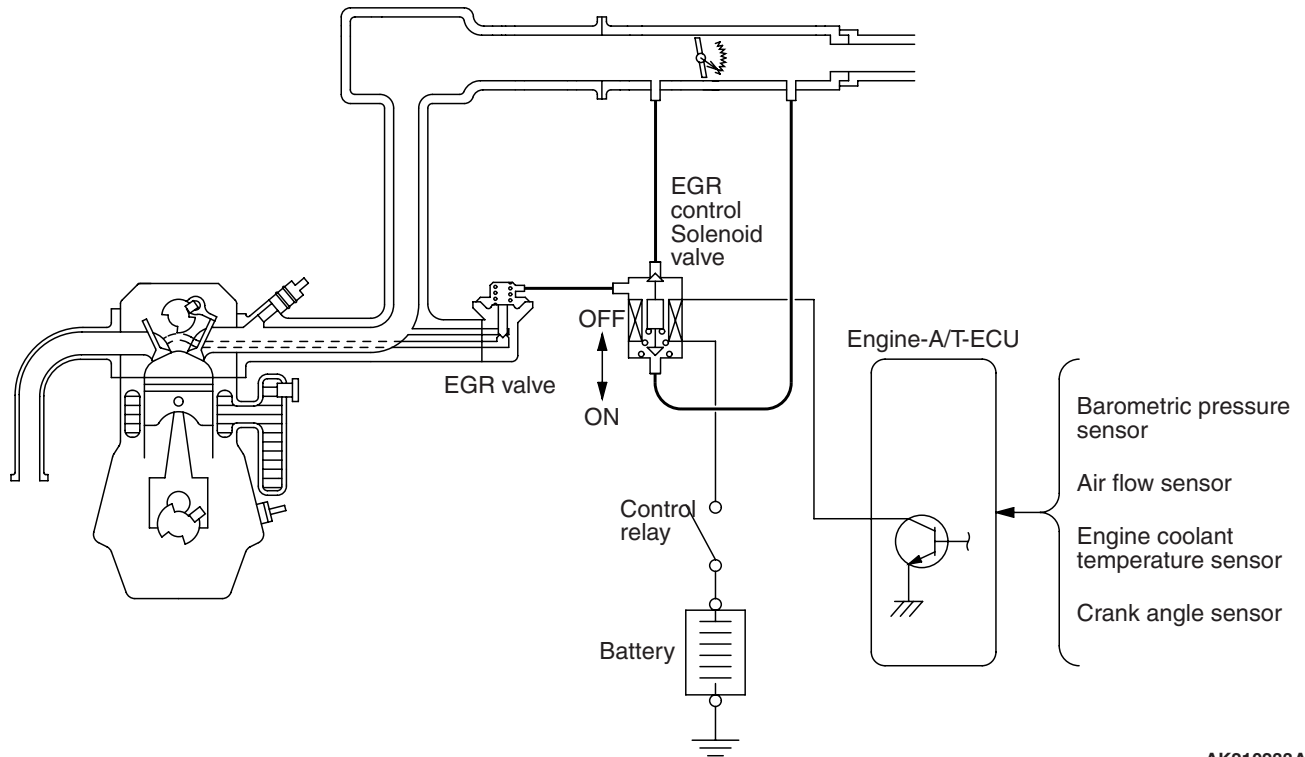
The EGR valve is being closed and does not recirculate exhaust gases under one of the following conditions.

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.

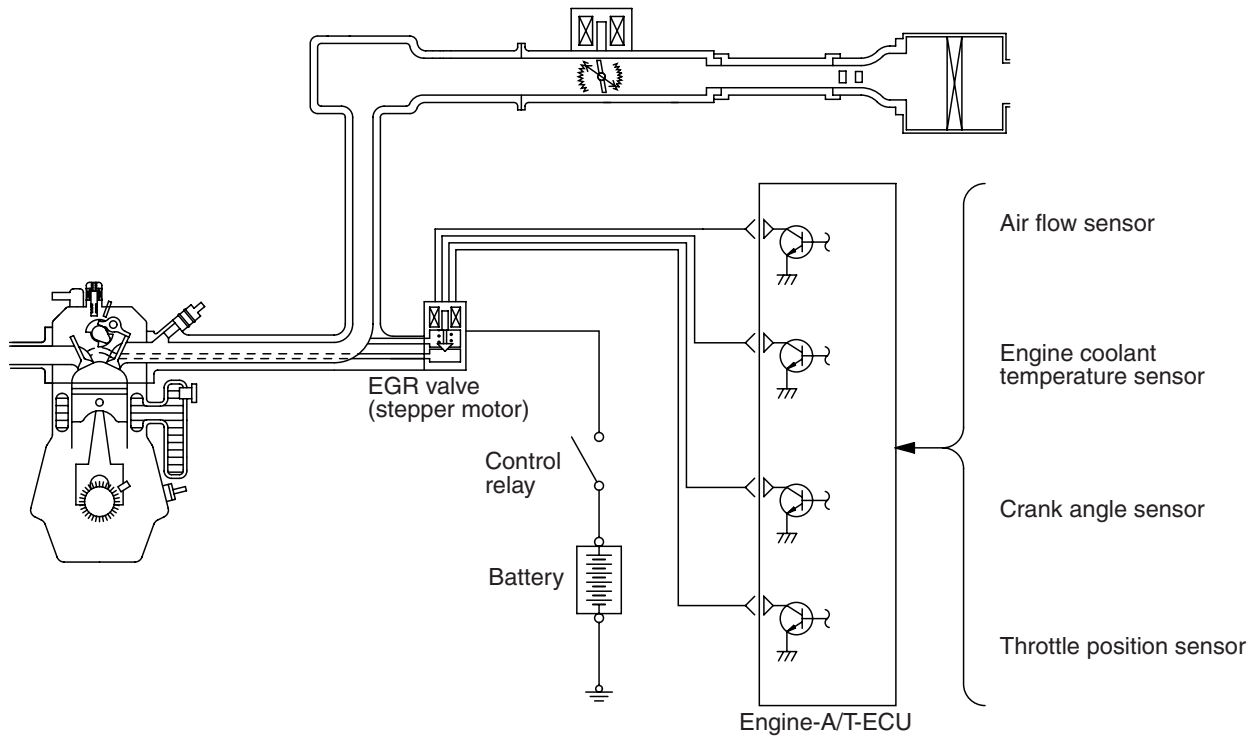
# SYSTEM DIAGRAM

<4G64>



AK210233AC

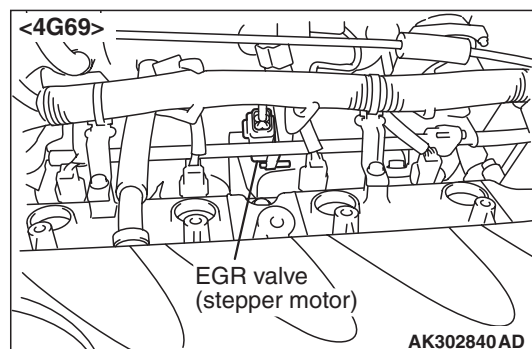
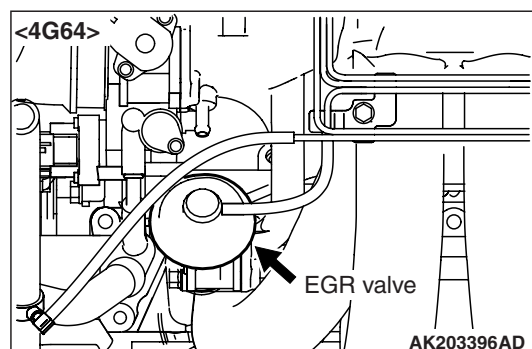
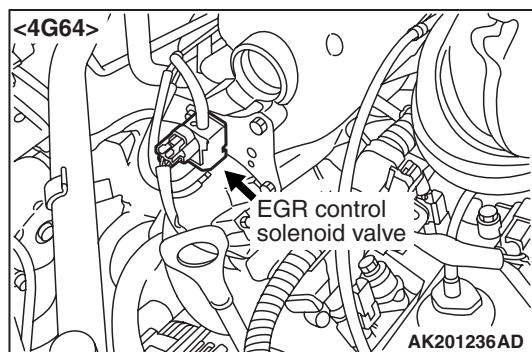
<4G69>



AK400218AB

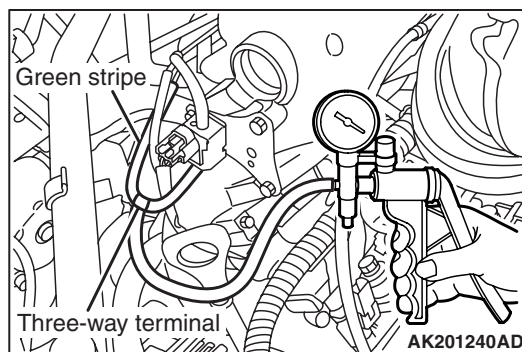
## COMPONENT LOCATION (EGR SYSTEM)

M1173007600406



## EGR SYSTEM CHECK &lt;4G64&gt;

M1173002600478



1. Disconnect the vacuum hose (Green stripe) from the EGR valve, and then connect a hand vacuum pump via the three-way terminal.
2. When the engine is hot or cold, check the condition of vacuum by racing the engine.

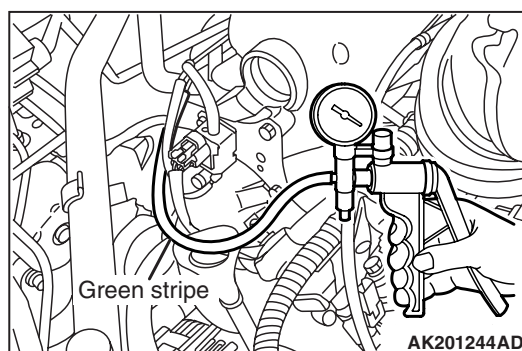
**When engine is cold****(Engine coolant temperature: 20°C or less)**

Throttle valve	Normal vacuum condition
Open quickly	No vacuum will generate (the same as barometric pressure.)

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

Throttle valve	Normal vacuum condition
Open quickly	It will momentarily rise over 13 kPa

3. Disconnect the three-way terminal.

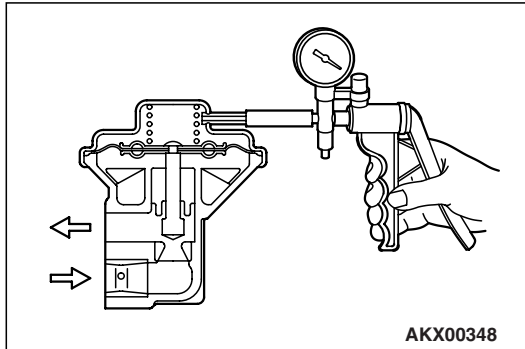


4. Connect the hand vacuum pump to the EGR valve nipple.
5. Check whether the engine stalls or the idling is unstable when a vacuum of 30 kPa or higher is applied during idling.

## EGR VALVE CHECK <4G64>

M1173002800331

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



4. Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
5.3 kPa or less	Air is not blown out
27 kPa or more	Air is blown out

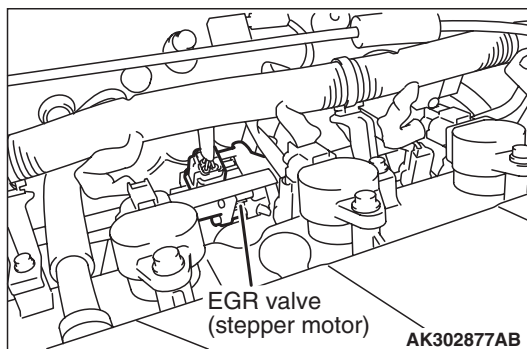
5. Replace the gasket, and tighten to the specified torque.

**Tightening torque:  $20 \pm 2$  N·m**

## EGR VALVE (STEPPER MOTOR) CHECK <4G69>

M1173050200189

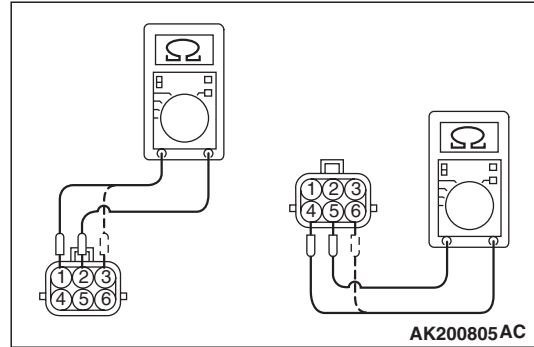
### Checking the Operation Sound



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-A/T-ECU 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:  $20 - 24 \Omega$  (at  $20^\circ\text{C}$ )**

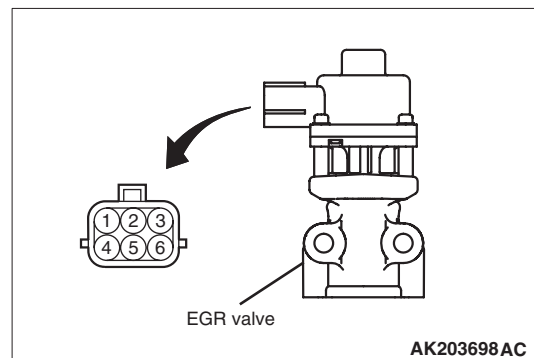
3. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

**Standard value:  $20 - 24 \Omega$  (at  $20^\circ\text{C}$ )**

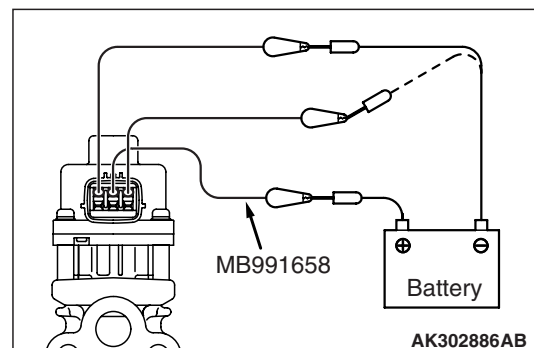
4. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

**Tightening Torque:  $24 \pm 4$  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.



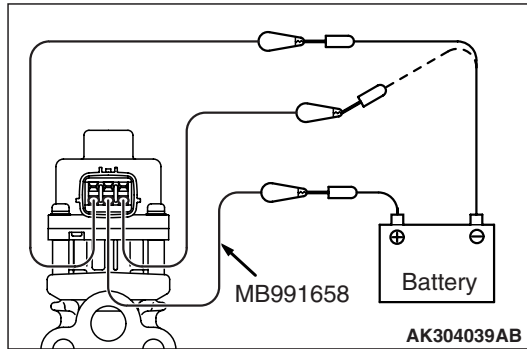
**⚠ CAUTION**

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:  $24 \pm 3$  N·m**

**Cleaning the EGR Valve****⚠ CAUTION**

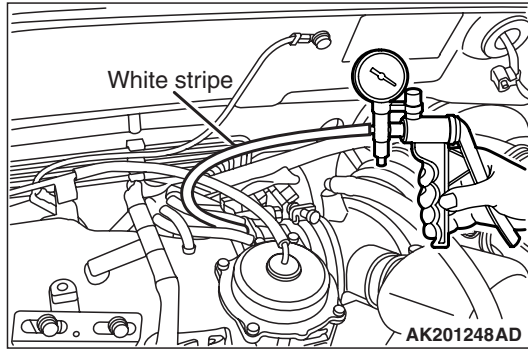
**Do not use a solvent or detergent, which could enter the motor and cause it to malfunction.**

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

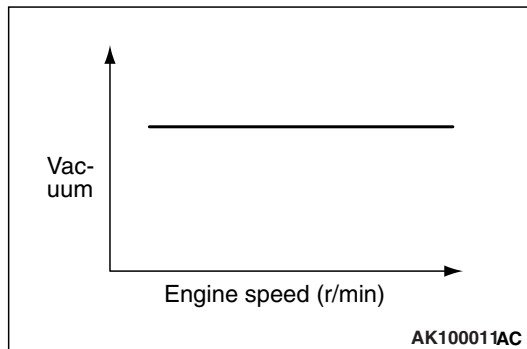
**Tightening torque:  $24 \pm 3$  N·m**

## EGR PORT VACUUM CHECK <4G64>

M1173002900275



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

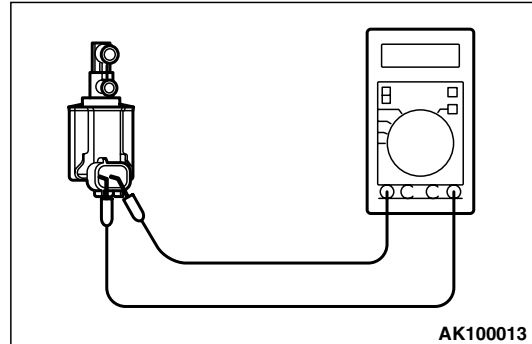
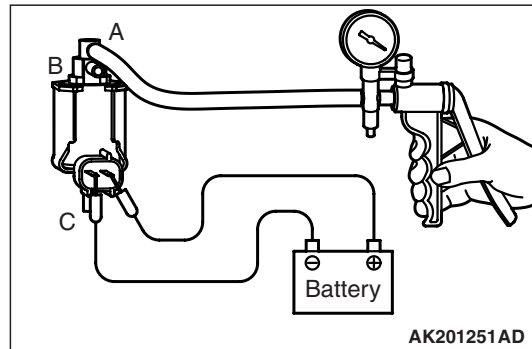


3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably.

## EGR CONTROL SOLENOID VALVE CHECK <4G64>

M1173003100391

**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 air tightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.

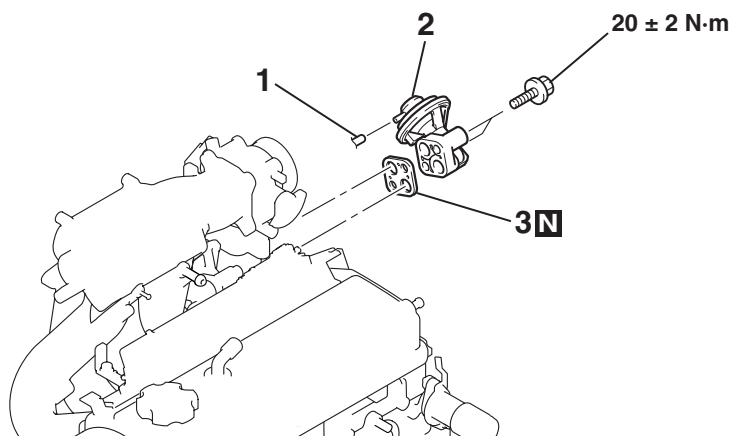
Battery voltage	B nipple condition	Normal condition
Not applied	Open	Vacuum maintained
Applied	Open	Vacuum leaks
	Closed	Vacuum maintained

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

**Standard value: 29 – 35  $\Omega$  (at 20°C)**

## REMOVAL AND INSTALLATION &lt;4G64&gt;

M1173010500539

**Pre-removal and Post-installation Operation**Air Cleaner Cover and Air Intake Hose Removal and Installation (Refer to GROUP 15 - Air Cleaner [P.15-3](#)).

AC212563AB

**Removal steps**

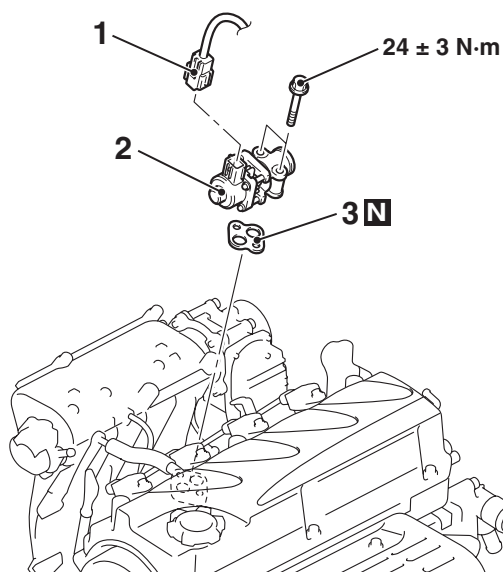
1. Vacuum hose connection

**Removal steps (Continued)**

2. EGR valve
3. EGR valve gasket

## REMOVAL AND INSTALLATION &lt;4G69&gt;

M1173010500409

**Pre-removal and Post-installation Operation**Resonator Removal and Installation (Refer to GROUP 15 - Air Cleaner [P.15-4](#)).

AC302329AE

**Removal steps**

1. EGR valve connector

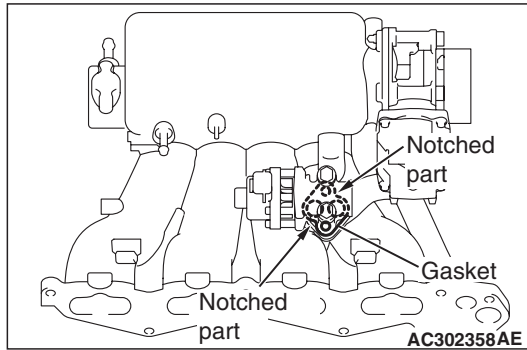
**Removal steps (Continued)**

2. EGR valve
3. EGR valve gasket



## INSTALLATION SERVICE POINT

### >>A<< EGR VALVE GASKET INSTALLATION



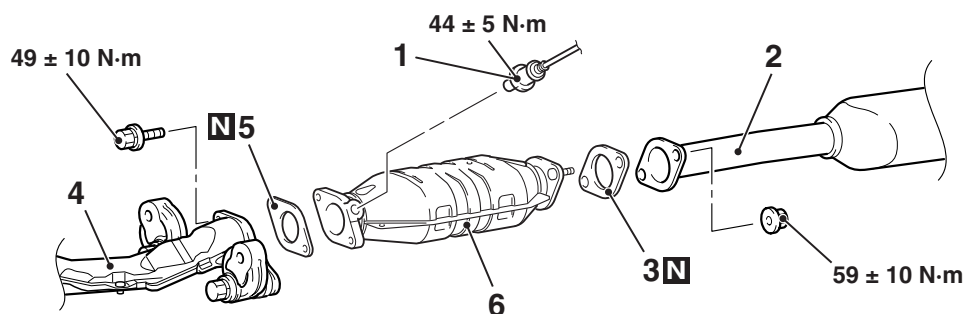
Install the EGR valve gasket as shown in the illustration.

## CATALYTIC CONVERTER &lt;4G69&gt;

## REMOVAL AND INSTALLATION

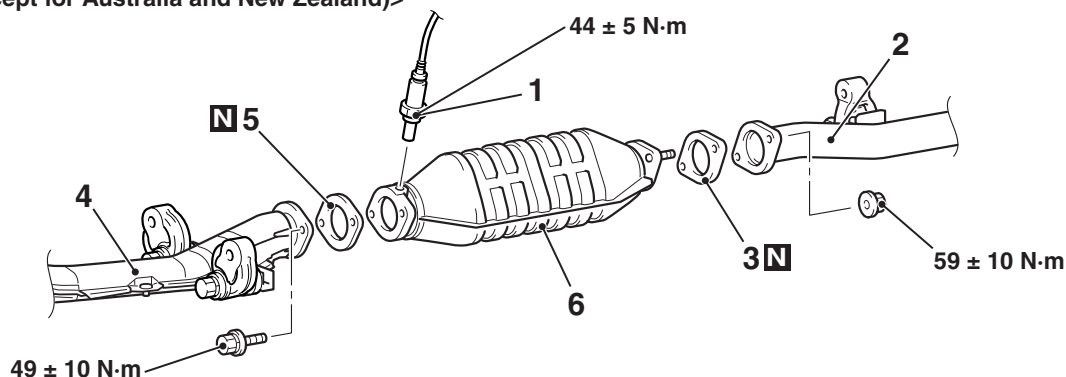
M1173003900762

&lt;2WD&gt;



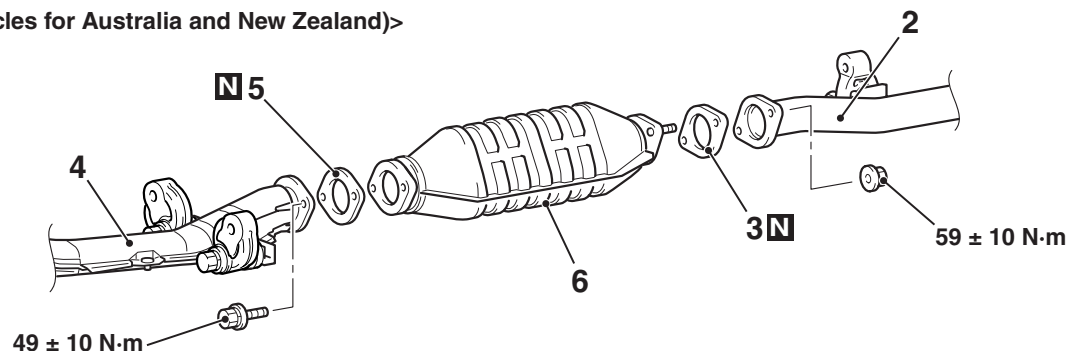
AC212564

&lt;4WD (Except for Australia and New Zealand)&gt;



AC212565

&lt;4WD (Vehicles for Australia and New Zealand)&gt;

AC309495  
AC401585 AC

&lt;&lt;A&gt;&gt; &gt;&gt;A&lt;&lt;

**Removal steps**

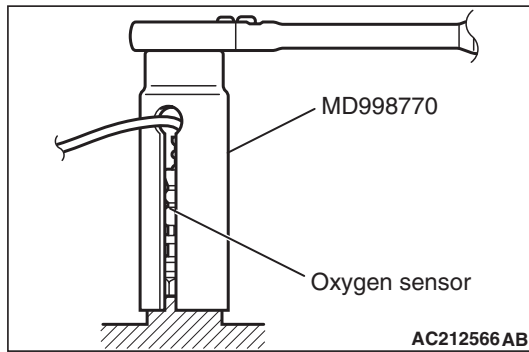
1. Oxygen sensor <2WD, 4WD (Except for Australia and New Zealand)>
2. Centre exhaust pipe connection

**Removal steps (Continued)**

3. Exhaust pipe gasket
4. Front exhaust pipe connection
5. Exhaust pipe gasket
6. Catalytic converter

**REMOVAL SERVICE POINT**

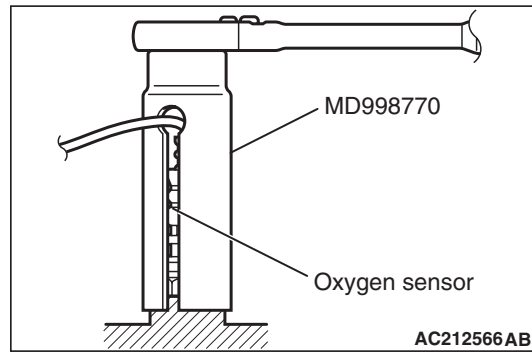
**<<A>> OXYGEN SENSOR REMOVAL**



Use special tool oxygen sensor wrench (MD998770) to remove the oxygen sensor.

**INSTALLATION SERVICE POINT**

**>>A<< OXYGEN SENSOR INSTALLATION**



Use special tool oxygen sensor wrench (MD998770) to install the oxygen sensor.

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## NOTES