

GROUP 54A

CHASSIS ELECTRICAL

CONTENTS

BATTERY	54A-4	TROUBLESHOOTING	54A-9
SERVICE SPECIFICATIONS	54A-4	IMMOBILIZER SYSTEM TROUBLESHOOTING	54A-9
ON-VEHICLE SERVICE	54A-4	ON-VEHICLE SERVICE	54A-22
FLUID LEVEL AND SPECIFIC GRAVITY CHECK	54A-4	HOW TO REGISTER ENCRYPTED CODE	54A-22
CHARGING	54A-4		
BATTERY TEST	54A-5	IGNITION SWITCH	54A-29
IGNITION SWITCH*	54A-6	REMOVAL AND INSTALLATION.....	54A-29
		INSPECTION	54A-30
GENERAL INFORMATION	54A-6		
SPECIAL TOOLS	54A-8		

Continued on next page

WARNING

Battery posts, terminals and related accessories contain lead and lead compounds. WASH HANDS AFTER HANDLING.

WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING

- *Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).*
- *Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.*
- *MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.*

NOTE

The SRS includes the following components: SRS air bag control unit, SRS warning light, front impact sensors, air bag module, clock spring, and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

COMBINATION METER ASSEMBLY	54A-31	REAR FOG LAMP	54A-63
SERVICE SPECIFICATIONS	54A-31	TROUBLESHOOTING	54A-63
SEALANT	54A-31	SPECIAL TOOL	54A-63
SPECIAL TOOLS	54A-32	REAR FOG LAMP	54A-63
TROUBLESHOOTING	54A-33	REMOVAL AND INSTALLATION	54A-63
ON-VEHICLE SERVICE	54A-53	REAR FOG LAMP SWITCH	54A-64
SPEEDOMETER CHECK	54A-53	REMOVAL AND INSTALLATION	54A-64
TACHOMETER CHECK	54A-54	INSPECTION	54A-64
FUEL TANK GAUGE UNIT CHECK ...	54A-54	SIDE TURN-SIGNAL LAMP ...	54A-65
ENGINE COOLANT TEMPERATURE		SPECIAL TOOL	54A-65
GAUGE UNIT CHECK	54A-56	SIDE TURN-SIGNAL LAMP	54A-65
COMBINATION METER ASSEMBLY	54A-56	REMOVAL AND INSTALLATION	54A-65
REMOVAL AND INSTALLATION	54A-56	ROOM LAMP	54A-66
INSPECTION	54A-57	TROUBLESHOOTING	54A-66
DISASSEMBLY AND REASSEMBLY ..	54A-58	REAR COMBINATION LAMP .	54A-67
HEADLAMP	54A-58	TROUBLESHOOTING	54A-67
SERVICE SPECIFICATIONS	54A-58	SPECIAL TOOL	54A-67
SPECIAL TOOL	54A-58	REAR COMBINATION LAMP	54A-67
TROUBLESHOOTING	54A-59	REMOVAL AND INSTALLATION	54A-67
ON-VEHICLE SERVICE	54A-59	HIGH-MOUNTED STOP LAMP 54A-68	
HEADLAMP AIMING	54A-59	ON-VEHICLE SERVICE	54A-68
LUMINOUS INTENSITY MEASUREMENT	54A-60	HIGH-MOUNTED STOP LAMP BULB	
BULB REPLACEMENT	54A-60	REPLACEMENT <WITH REAR SHELF>	54A-68
HEADLAMP	54A-61	HIGH-MOUNTED STOP LAMP ...	54A-69
REMOVAL AND INSTALLATION	54A-61	REMOVAL AND INSTALLATION	54A-69
HEADLAMP LEVELING SWITCH .	54A-62	LICENCE PLATE LAMP	54A-71
REMOVAL AND INSTALLATION	54A-62	REMOVAL AND INSTALLATION .	54A-71
INSPECTION	54A-62		

HAZARD WARNING LAMP SWITCH	54A-71	CLOCK	54A-77
		REMOVAL AND INSTALLATION	54A-77
TROUBLESHOOTING	54A-71	CIGARETTE LIGHTER	54A-77
SPECIAL TOOL	54A-71	INSPECTION	54A-77
HAZARD WARNING LAMP SWITCH	54A-72	SPEAKER	54A-78
REMOVAL AND INSTALLATION	54A-72	REMOVAL AND INSTALLATION .	54A-78
INSPECTION	54A-72	ANTENNA	54A-79
COLUMN SWITCH	54A-73	REMOVAL AND INSTALLATION .	54A-79
SPECIAL TOOL	54A-73	REAR WINDOW DEFOGGER .	54A-79
COLUMN SWITCH	54A-73	GENERAL INFORMATION	54A-79
REMOVAL AND INSTALLATION	54A-73	TROUBLESHOOTING	54A-79
INSPECTION	54A-74	ON-VEHICLE SERVICE	54A-80
HORN	54A-75	PRINTED HEATER LINES CHECK	54A-80
REMOVAL AND INSTALLATION .	54A-75	REAR WINDOW DEFOGGER SWITCH	54A-80
HORN RELAY CONTINUITY CHECK	54A-76	REMOVAL AND INSTALLATION	54A-80
CLOCK	54A-76	INSPECTION	54A-80
SPECIAL TOOL	54A-76		

BATTERY

SERVICE SPECIFICATIONS

M1541000300209

Items	Specification
Specific gravity of the battery fluid	1.220 – 1.290 (20°C)

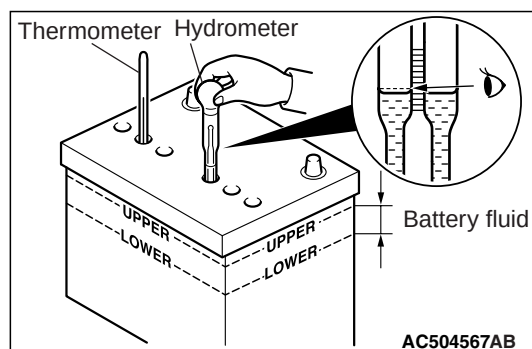
ON-VEHICLE SERVICE

FLUID LEVEL AND SPECIFIC GRAVITY
CHECK

M1541001000438

CAUTION

- If the battery fluid is below the **LOWER LEVEL**, the battery could explode in using.
 - If the battery fluid is over the **UPPER LEVEL**, leakage could result.
1. Inspect whether or not the battery fluid is between the **UPPER LEVEL** and **LOWER LEVEL** marks.



2. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.
Standard value: 1.220 – 1.290 (20°C)
3. The specific gravity of the battery fluid varies with the temperature, so use the following formula to calculate the specific gravity for 20°C. Use the calculated value to determine whether or not the specific gravity is satisfactory.

$$D20 = (t - 20) \times 0.0007 + Dt$$

D20: Specific gravity of the battery fluid calculated for 20°C

Battery type	Capacity (5-hour rate)	Normal charging current	Rapid charging current
75D23L	52 A	5.2 A	52 A

The judgment method of a charge end

When the specific gravity of the battery electrolyte is constantly within 1.250 – 1.290 for a continuous period of one hour or more.

Dt: Actually measured specific gravity

t: Actually measured temperature

CHARGING

M1541001100888

CAUTION

- The battery plus should be removed during charging.
 - The battery electrolyte level may rise and overflow from the battery during charging.
 - Explosions may occur if the battery is brought close to naked flames during charging.
 - Be careful to avoid tasks that might produce sparks or other danger while the battery is charging.
 - After charging is complete, replace the battery plus, pour water over the battery to rinse away any sulphuric acid, and let the battery stand to dry.
 - Charge the battery in a well-ventilated location.
 - Do not let the battery electrolyte temperature rise above approximately 45°C (approximately 55°C during rapid charging).
1. Remove the battery from the vehicle.
 2. The normal charging current is a value in amperes which is 1/10th of the battery capacity. If the battery needs to be charged rapidly because of reasons such as time limitations, the maximum charging current for rapid charging is the battery capacity expressed as an ampere value.

BATTERY TEST**BATTERY TESTING PROCEDURE**

M1541001200614

STEP 1. Check the battery cables.

Remove the negative cable, then the positive cable.
Check for dirty or corroded connections.

Q: Are the battery cables dirty or have corroded connections?

YES : Clean the battery cables. Then go to Step 2.

NO : Go to Step 2.

STEP 2. Check the battery post.

Check for loose battery post.

Q: Are the battery post faulty?

YES : Replace the battery. Then go to Step 4.

NO : Go to Step 3.

STEP 3. Check the battery case and cover.

- (1) Remove the hold-downs and shields.
- (2) Check for broken/cracked case or cover.

Q: Is the battery case or cover faulty?

YES : Replace the battery. Then go to Step 4.

NO : Go to Step 4.

STEP 4. Check the open circuit voltage.

- (1) Turn headlamps on for 15 seconds.

- (2) Turn headlamps off for two minutes to allow battery positive voltage to stabilize.
- (3) Disconnect the battery cables.
- (4) Read open circuit voltage.

Q: Is open circuit voltage 12.4 volts or more?

YES : Go to Step 6.

NO : Go to Step 5.

STEP 5. Charge battery.

Q: Charging the battery?

YES : Go to Step 6.

NO : Charge the battery at 5 amps for 15 hours.
Then re-test, go to Step 4.

STEP 6. Check the load test.

- (1) Connect a load tester to the battery.
- (2) Load the battery at the recommended discharge rate (See LOAD TEST RATE CHART) for 15 seconds.
- (3) Read voltage after 15 seconds, then remove load.
- (4) Compare the measured value with the minimum voltage (See LOAD TEST CHART).

Q: Is the voltage higher than minimum voltage?

NO : Replace the battery. Then go to Step 4.

YES : The battery is normal.

LOAD TEST RATE CHART

Battery type	75D23L
Charging time when fully discharged h (5-amp. rated current charging)	11
Load test (Amps)	260

LOAD TEST CHART

Temperature °C	21 and above	16	10	4	- 1	- 7	- 12	- 18
Minimum voltage	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

IGNITION SWITCH

GENERAL INFORMATION

M1543009901672

IGNITION KEY REMINDER BUZZER

The ignition key reminder buzzer will sound under the following condition, and warn the driver to remove the ignition key.

- The driver's door is opened when the ignition switch is at "LOCK" (OFF) or "ACC" position without removing the ignition key.

However, the lamp reminder buzzer will take precedence over this function.

DOOR LOCK PREVENTION FUNCTION

If the key is left in the ignition switch while the driver's door opened or the assistant door opened, all door are automatically unlock to prevent locking the ignition key in the vehicle after door is locked.

IMMOBILIZER SYSTEM

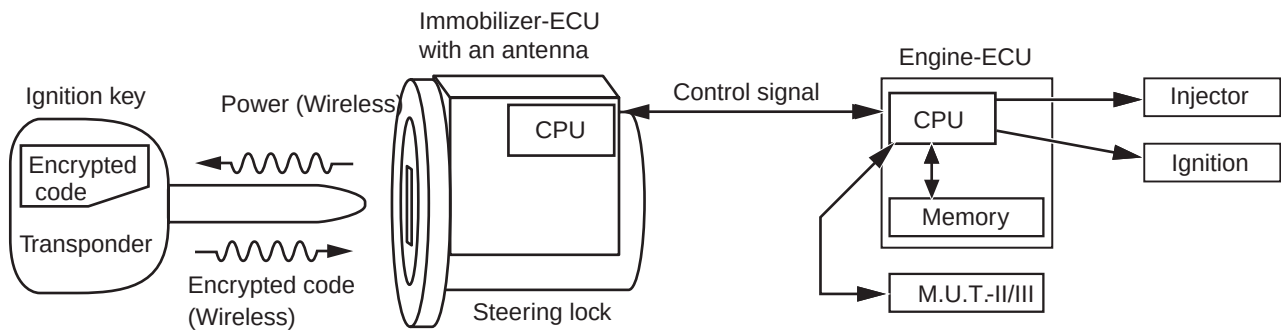
The immobilizer system consists of the ignition key with a transponder, the immobilizer-ECU, and the engine-ECU. Only the registered ignition key permits the engine to start, therefore, the engine can never be started by means of a forged key or by connecting the ignition wiring directly. The system is significantly safe and reliable against theft. In addition, the driver has only to turn the ignition switch to the "ON" position

to activate the immobilizer system. If the requirements for starting the engine are not satisfied, the engine will be immobilized. If a registered ignition key is lost, all your ignition keys need to be registered again using M.U.T.-II/III to ensure security (Refer to P.54A-22). An additional ignition key can be registered as follows (only if no ignition keys are lost):

- Using M.U.T.-II/III (Refer to P.54A-22).

OPERATION

1. When the ignition switch is turned to "ON" position, the engine-ECU sends a requirement for the encrypted code to the immobilizer-ECU (at this time, the engine is remobilised).
2. When the immobilizer-ECU receives the requirement from the engine-ECU, the immobilizer-ECU supplies power to the transponder inside the ignition key via the antenna. The energized transponder sends the encrypted code back to the immobilizer-ECU via the antenna.
3. The immobilizer-ECU judges the encrypted code with its code logic in itself. If they are identical, the immobilizer-ECU sends the encrypted code to the engine-ECU.
4. If the engine-ECU can not receive the encrypted code, the engine will be immobilized.



Encrypted code registration criteria table

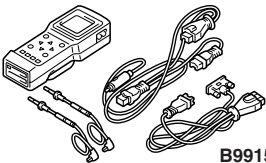
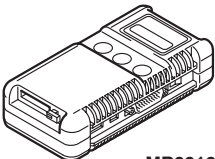
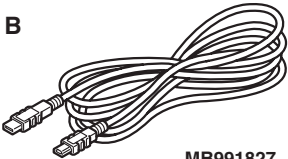
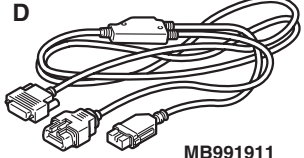
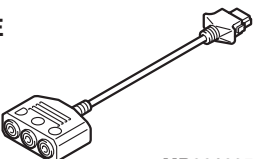
The ignition key contains a transponder (small transmitter), which retains an unique encrypted code. Under any of the conditions below, the encrypted code should be registered in the immobilizer-ECU again. The immobilizer-ECU can retain maximum eight different encrypted codes. This means that maximum eight ignition keys can be registered.

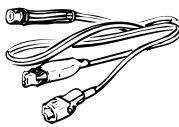
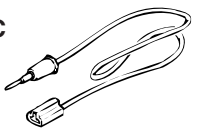
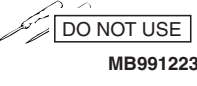
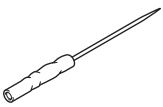
Component to be replaced	Engine-ECU	Immobilizer-ECU	Ignition key
When engine-ECU is replaced	–	Should be replaced	Should be replaced
			All ignition keys should be registered
When engine-ECU is overwritten *	–	Should not be replaced	Should not be replaced
			Should not be registered again
When immobilizer-ECU is replace	Should not be replaced	–	Should not be replaced
			All ignition keys should be registered again
When ignition key is added	Should not be replaced	Should not be replaced	• Additional ignition key should be registered • All ignition keys should be registered again
When ignition key is lost	Should not be replaced	Should not be replaced	All the ignition keys other than the lost one should be registered again

NOTE: *: When the engine-ECU other than immobilizer system is rewritten, it is not necessary to register the ignition key again.

SPECIAL TOOLS

M1543000603034

Tool	Number	Name	Use
 B991502	MB991502	M.U.T.-II sub assembly	• Immobilizer system check • Encrypted code registration
A  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	• Immobilizer system check • Encrypted code registration CAUTION M.U.T.-III main harness B (MB991911) should be used. M.U.T.-III main harness A should not be used for this vehicle.
B  MB991827			
C  MB991910			
D  MB991911			
E  MB991825			
F  MB991826 MB991955			

Tool	Number	Name	Use
A  B  C  D 	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connect pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector

TROUBLESHOOTING

IGNITION KEY REMINDER BUZZER AND DOOR LOCK PREVENTION FUNCTION TROUBLESHOOTING

M1543000701187

The ignition key reminder buzzers are controlled by the Smart Wiring System (SWS). For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, Troubleshooting [P.54C-20](#).

IMMOBILIZER SYSTEM TROUBLESHOOTING

DIAGNOSIS CODE CHART

M1543007100514

CAUTION

During diagnosis, a diagnosis code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for diagnosis code code(s). If diagnosis code code(s) are set, erase them all.

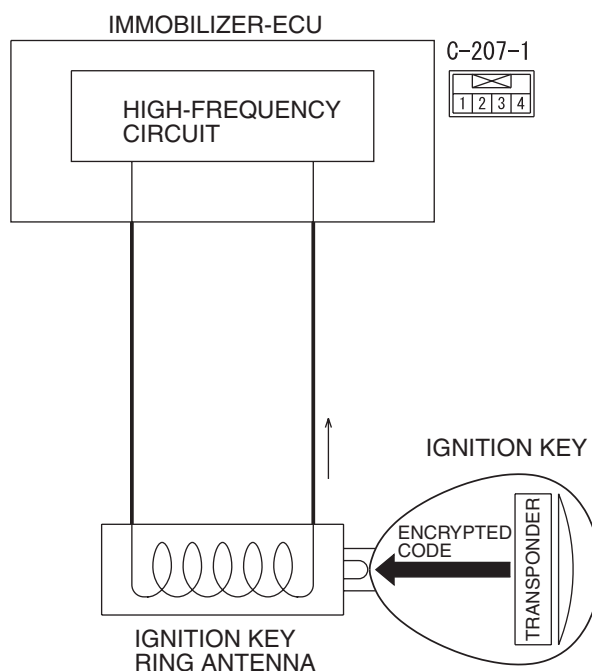
Use the following chart to develop proper diagnostic strategy.

Diagnosis code No.	Diagnosis item	Reference page
11	Transponder communication system or radio interference of encrypted code	P.54A-10 .
12	Encrypted codes are not the same or are not registered	P.54A-11 .

DIAGNOSTIC TROUBLE CODE
PROCEDURES

Code No.11: Transponder Communication System or Radio Interference of Encrypted Code

Ignition Key Ring and Immobilizer-ECU Circuit



AC504325AB

DIAGNOSIS CODE SET CONDITION

- Diagnosis code No.11 may be set if other ignition keys are in the vicinity of the vehicle as it is being started.
- The transponder's encrypted code is not sent to the immobilizer-ECU immediately after the ignition switch is turned to "ON" position.

NOTE: Diagnosis code No.11 is always set together with MPI system diagnosis code No.P0513.

TROUBLESHOOTING HINTS

- Radio interference of the encrypted code.
- Malfunction of the transponder.
- Malfunction of the immobilizer-ECU.

DIAGNOSIS PROCEDURE

STEP 1. Check for presence of other key near the key in the ignition.

Q: Is there any other key near the key in the ignition?

YES : Move the other key well away from key being used. Retest the system.

NO : Go to Step 2.

STEP 2. Check that the engine start using the spare ignition key which encrypted code has been registered.

Q: Does the engine start using the spare ignition key for which the encrypted code has been registered?

YES : Replace the ignition key that does not work. Then register the password (secret code) and encrypted code [P.54A-22](#). Retest the system.

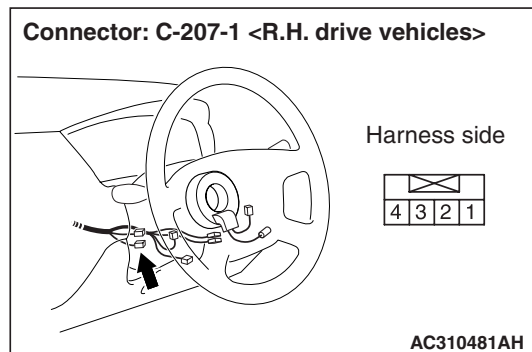
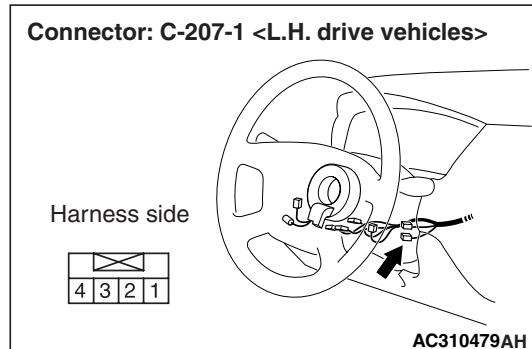
NO : Go to Step 3.

STEP 3. Check whether the diagnosis code is reset.

Q: Which diagnosis code is set, code No.11 or 12 the encrypted code has been registered?

Code No.12 is set : Refer to [P.54A-11](#).

Code No.11 is set : Go to Step 4.

STEP 4. Connector check: Immobilizer-ECU connector C-207-1.**Code No.12: Encrypted Codes are not the same or are not Registered****DIAGNOSIS CODE SET CONDITION**

The encrypted code sent by the transponder is not the same encrypted code which is registered in the immobilizer-ECU.

NOTE: Diagnosis code No.12 is always output together with MPI system diagnosis code No.P0513.

TROUBLESHOOTING HINTS

- The encrypted code in the ignition key has not been properly registered.

- Malfunction of immobilizer-ECU.

DIAGNOSIS PROCEDURE**Was the encrypted code registered?**

YES : Replace the immobilizer-ECU and then re-register the encrypted code (Refer to [P.54A-22](#)).

NO : Register the encrypted code (Refer to [P.54A-22](#)).

SYMPTOM CHART

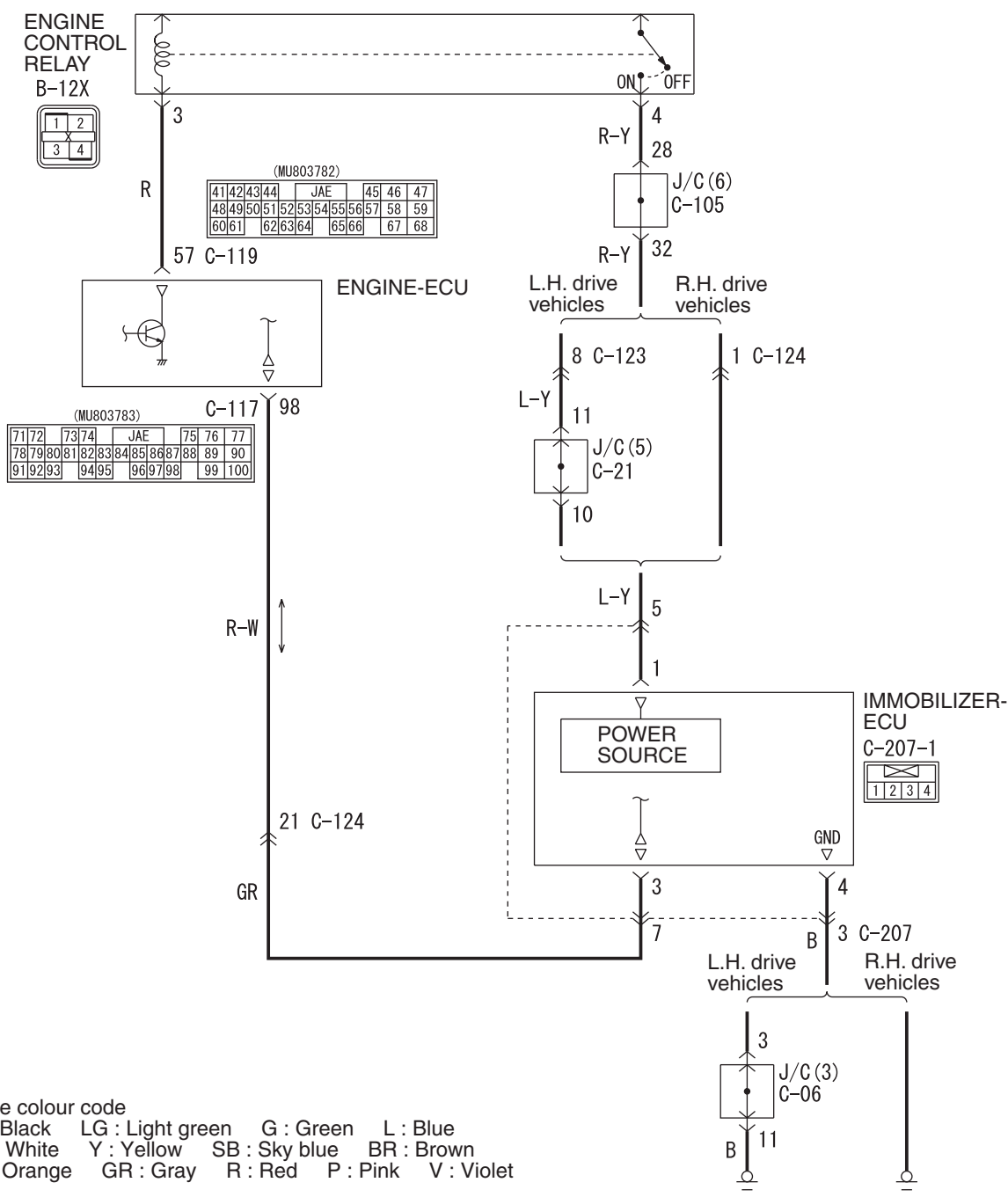
M1543007201279

Symptom	Inspection procedure No.	Reference page
Communication with M.U.T.-II/III is impossible.	1	P.54A-12
The ignition key cannot be registered.	2	P.54A-20
Engine does not start (cranking but no initial combustion).	3	P.54A-20

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Communication with M.U.T.-II/III is Impossible.

Immobilizer-ECU Power Source, Earth and Engine-ECU Communication Line Circuit



TECHNICAL DESCRIPTION (COMMENT)

- This malfunction may be caused by a defective immobilizer-ECU, engine-ECU, or a defect in the communication line between the immobilizer-ECU and engine-ECU. If this malfunction appears when the MPI system and M.U.T.-II/III can communicate each other, MPI system diagnosis code No.P0513 will reset.
- If the MPI system is normal, the engine control relay can be determined as normal. In addition, if the MPI system and M.U.T.-II/III can communicate each other, the circuits between the diagnosis connector and the engine-ECU can be determined as normal.

NOTE: If this malfunction appears, MPI system diagnosis code No.P0513 will be set.

TROUBLESHOOTING HINTS

- Malfunction of the immobilizer-ECU.
- Malfunction of the engine-ECU.
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

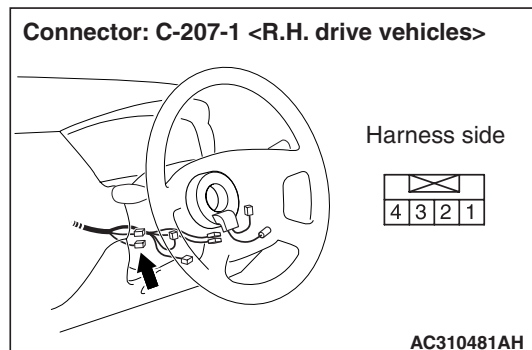
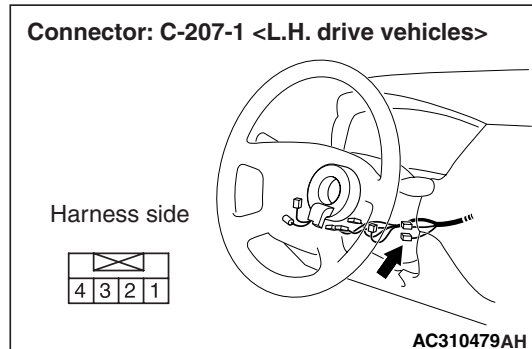
DIAGNOSIS PROCEDURE

STEP 1. Check if M.U.T.-II/III can communicate with the MPI system and if an MPI system diagnosis code other than P0513 is set.

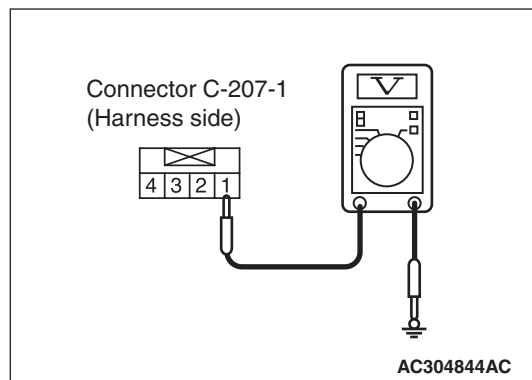
**Q: Can M.U.T.-II/III communicate with the MPI system?
Is an MPI system diagnosis code other than P0513 set?**

YES : Go to Step 2.

NO : Refer to GROUP 13A, Troubleshooting
[P.13A-17](#).

STEP 2. Voltage measurement at immobilizer-ECU connector C-207-1.

- (1) Disconnect immobilizer-ECU connector C-207-1.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 5.

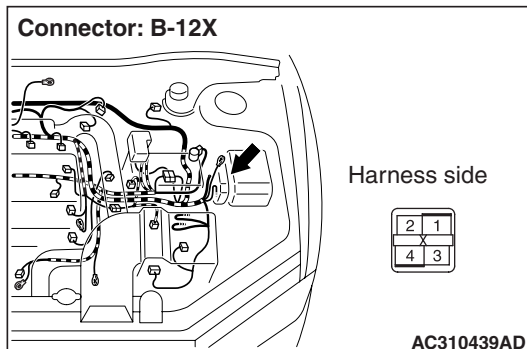
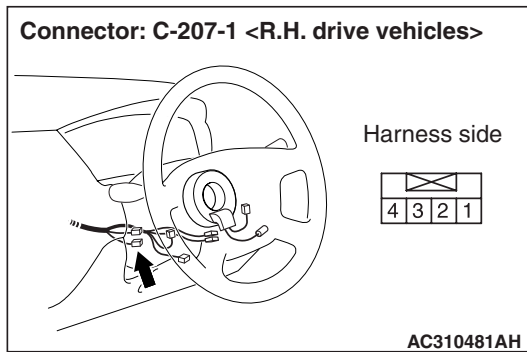
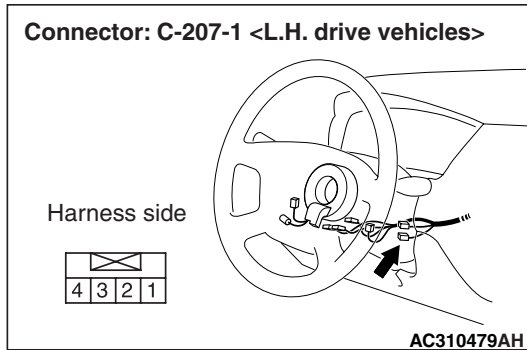
NO : Go to Step 3.

STEP 3. Connector check: Immobilizer-ECU connector C-207-1 and engine control relay connector B-12X

Q: Are immobilizer-ECU connector C-207-1 and engine control relay connector B-12X in good condition?

YES : Go to Step 4.

NO : Repair or replace the damaged component(s). Confirm that M.U.T.-II/III communicates normally.

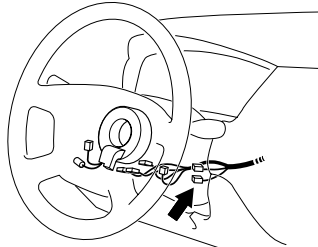


STEP 4. Check the harness wires between immobilizer-ECU connector C-207-1 (terminal 1) and engine control relay connector B-12X (terminal 4).

Connector: C-207-1 <L.H. drive vehicles>

Harness side

4	3	2	1

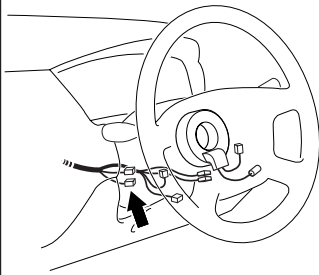


AC310479AH

Connector: C-207-1 <R.H. drive vehicles>

Harness side

4	3	2	1

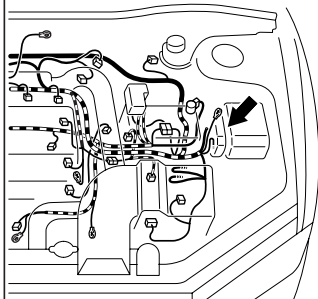


AC310481AH

Connector: B-12X

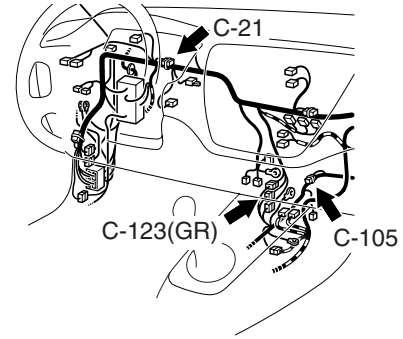
Harness side

2	1
4	3



AC310439AD

Connectors: C-21, C-105, C-123
<L.H. drive vehicles>



C-21

1	2		3	4	5
6	7	8	9	10	11

C-105

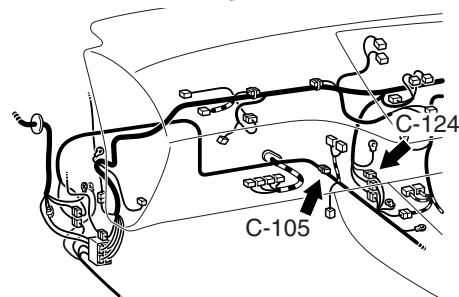
1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33

C-123

4	3			2	1
10	9	8	7	6	5

AC310447AT

Connectors: C-105, C-124
<R.H. drive vehicles>



C-105

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33

C-124

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

AC310455AK

NOTE: Prior to the wiring harness inspection, check intermediate connector C-123 <LH drive vehicles>, C-124 <RH drive vehicles>, joint connector C-21 and C-105 <LH drive vehicles>, C-105 <RH drive vehicles> and key reminder switch connector C-207, and repair if necessary.

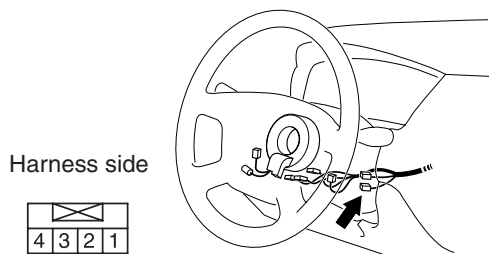
Q: Are the harness wires between immobilizer-ECU connector C-207-1 (terminal 1) and engine control relay connector B-12X (terminal 4) in good condition?

YES : There is no action to be taken.

NO : Replace damaged component(s). Confirm that M.U.T.-II/III communicates normally.

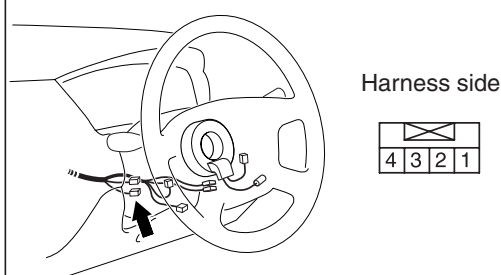
STEP 5. Resistance measurement at immobilizer-ECU connector C-207-1.

Connector: C-207-1 <L.H. drive vehicles>



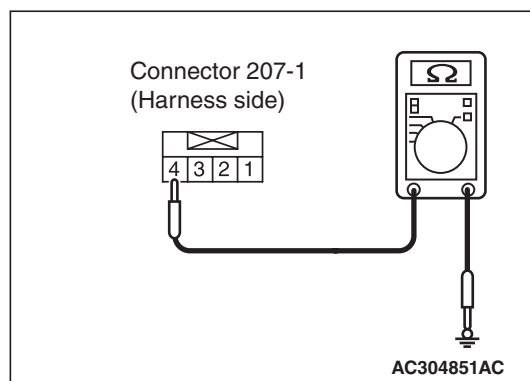
AC310479AH

Connector: C-207-1 <R.H. drive vehicles>



AC310481AH

(1) Disconnect immobilizer-ECU connector C-207-1.



AC304851AC

(2) Measure the resistance between terminal 4 and earth.

OK: 2 ohms or less

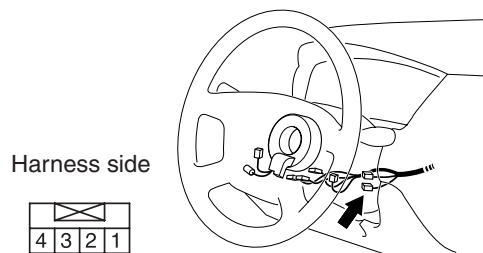
Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 6.

STEP 6. Connector check: immobilizer-ECU connector C-207-1

Connector: C-207-1 <L.H. drive vehicles>



AC310479AH

Connector: C-207-1 <R.H. drive vehicles>



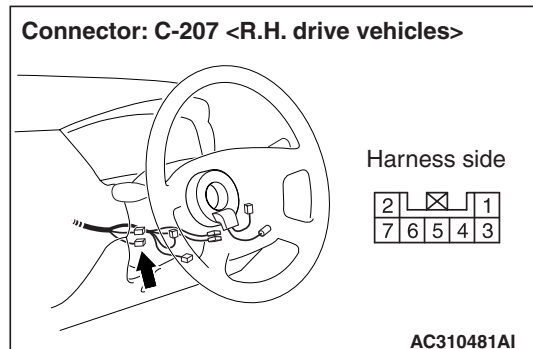
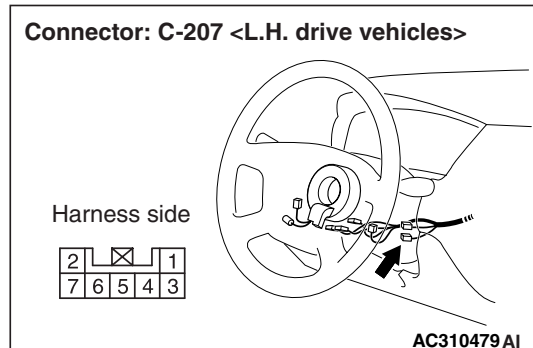
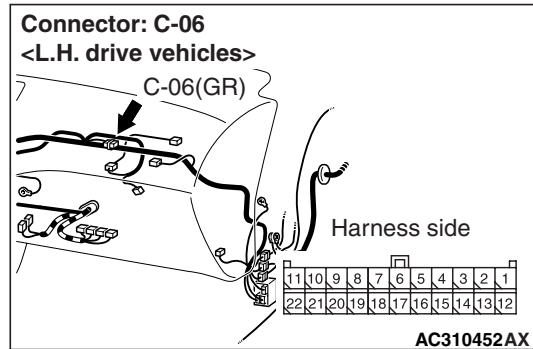
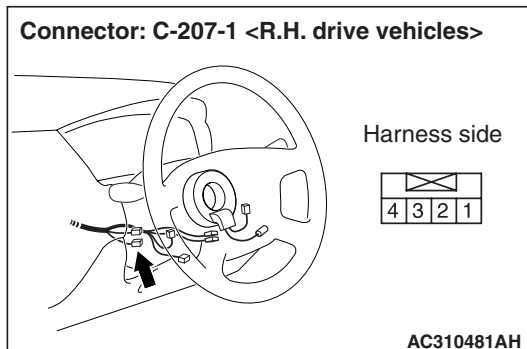
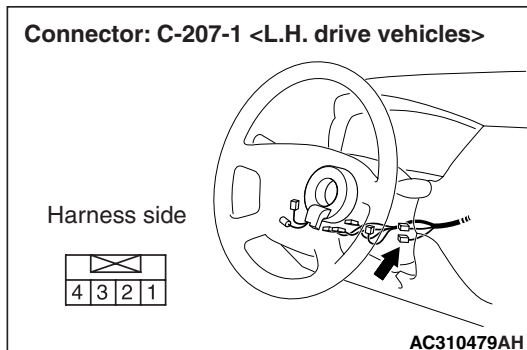
AC310481AH

Q: Is immobilizer-ECU connector C-207-1 in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 7. Check the harness wire between immobilizer-ECU connector C-207-1 (terminal 4) and earth.



NOTE: Prior to the wiring harness inspection, check joint connector C-06 <LH drive vehicles>, key reminder switch connector C-207, and repair if necessary.

Q: Is the harness wire between immobilizer-ECU connector C-207-1 (terminal 4) and earth in good condition?

YES : There is no action to be taken.

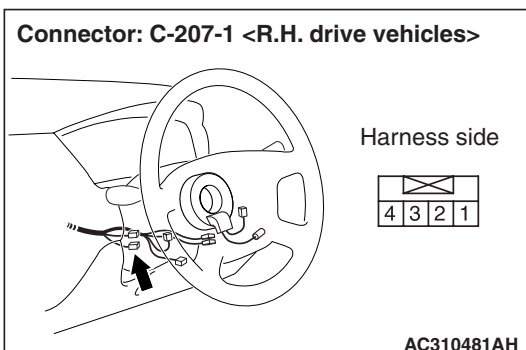
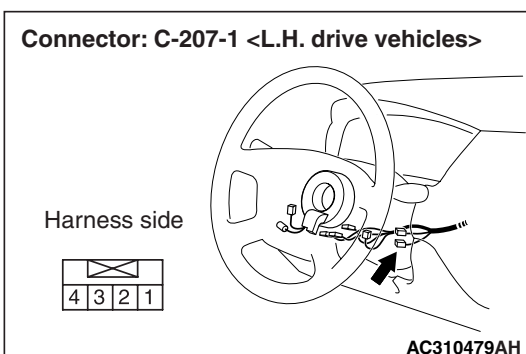
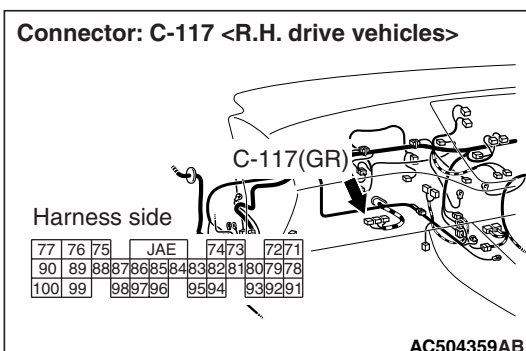
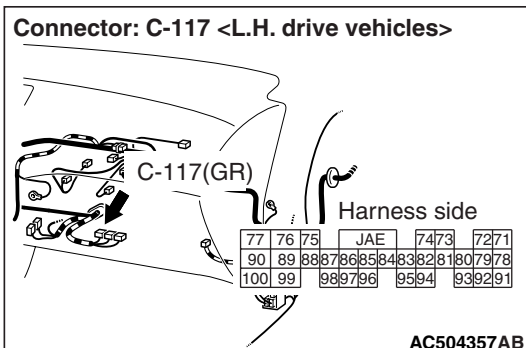
NO : Repair or replace the damaged component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 8. Connector check: immobilizer-ECU connector C-207-1 and engine-ECU connector C-117

Q: Are immobilizer-ECU connector C-207-1 and engine-ECU connector C-117 in good condition?

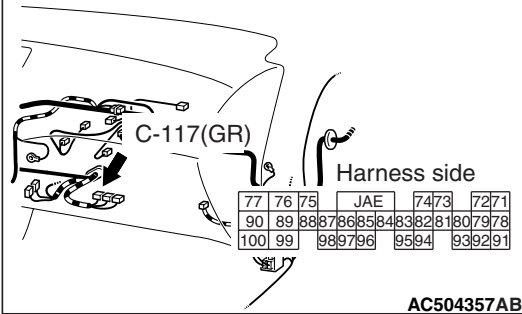
YES : Go to Step 9.

NO : Repair or replace the damaged component(s). Confirm that M.U.T.-II/III communicates normally.

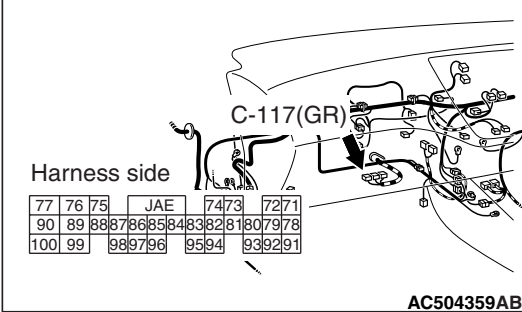


STEP 9. Check the harness wires between immobilizer-ECU connector C-207-1 (terminal 3) and engine-ECU connector C-117 (terminal 98).

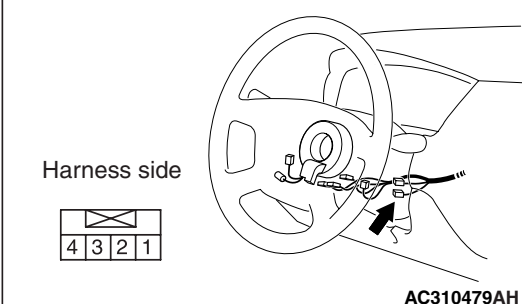
Connector: C-117 <L.H. drive vehicles>



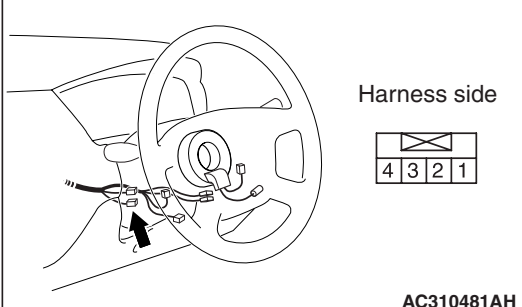
Connector: C-117 <R.H. drive vehicles>



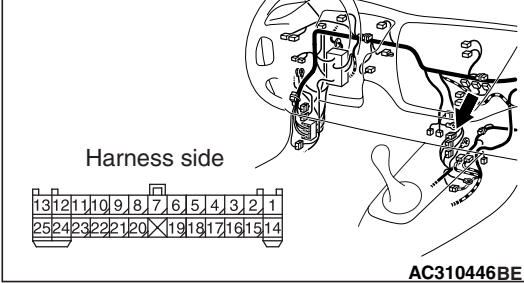
Connector: C-207-1 <L.H. drive vehicles>



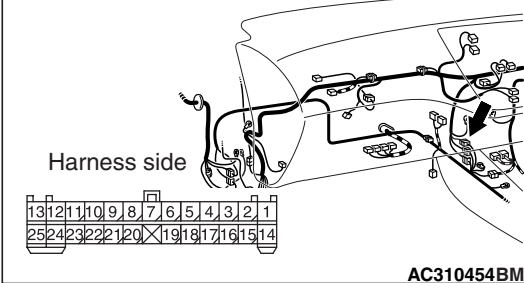
Connector: C-207-1 <R.H. drive vehicles>



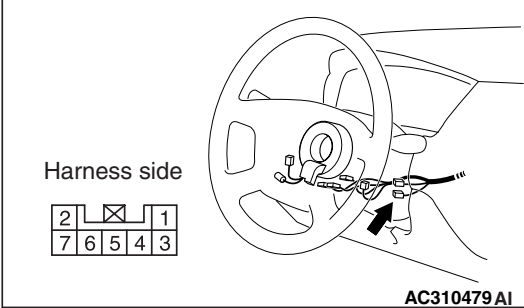
Connector: C-124
<L.H. drive vehicles>



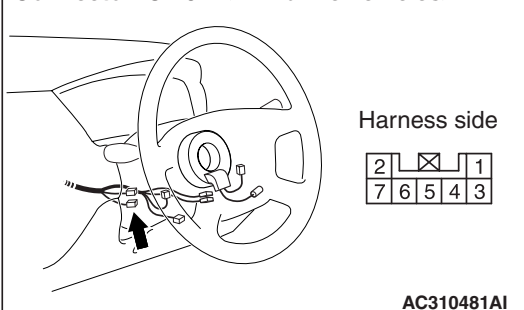
Connector: C-124
<R.H. drive vehicles>



Connector: C-207 <L.H. drive vehicles>



Connector: C-207 <R.H. drive vehicles>



NOTE: Prior to the wiring harness inspection, check key reminder switch connector C-207, intermediate connector C-124, and repair if necessary.

Q: Are the harness wires between immobilizer-ECU connector C-207-1 (terminal 3) and engine-ECU connector C-117 (terminal 98) in good condition?

YES : Go to Step 10.

NO : Repair or replace the damaged component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 10. Replace the immobilizer-ECU or engine-ECU.

Replace the immobilizer-ECU.

Q: Did the communication with M.U.T.-II/III become possible after replacing the immobilizer-ECU?

YES : Register the password (secret code) and encrypted code [P.54A-22](#). Confirm that M.U.T.-II/III communicates normally

NO : Go to Step 11.

STEP 11. Recheck for malfunction.

Q: Is a malfunction eliminated?

YES : The procedure is complete. If no malfunctions are found in all steps, an intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction [P.00-5](#)).

NO : Replace the engine-ECU.

INSPECTION PROCEDURE 2: The Ignition Key cannot be Registered.

TECHNICAL DESCRIPTION (COMMENT)

The ignition key transponder or the immobilizer-ECU is suspected to be defective.

TROUBLESHOOTING HINTS

- Malfunction of the ignition key
- Malfunction of immobilizer-ECU

DIAGNOSIS PROCEDURE

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

Q: Does diagnosis code No.11 reset?

YES : Refer to [P.54A-9](#).

NO : Replace the ignition key that cannot be registered. Then re-register the encrypted code. (Refer to [P.54A-22](#)). Verify that the ignition key can be registered, then Go to Step 2.

STEP 2. Retest the system.

Q: Does registered ignition key function properly?

YES : The procedure is complete.

NO : Replace the immobilizer-ECU.

INSPECTION PROCEDURE 3: Engine does not Start (Cranking but no Initial Combustion).

TECHNICAL DESCRIPTION (COMMENT)

If the fuel injectors are not operating, there might be a problem with the MPI system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.

TROUBLESHOOTING HINTS

- Malfunction of MPI system
- Malfunction of immobilizer-ECU

DIAGNOSIS PROCEDURE

STEP 1. Check the system voltage.

Measure the system voltage during cranking.

Q: Is the voltage 8 volts or more?

YES : Go to Step 2.

NO : Check the battery. Refer to [P.54A-4](#). The engine should start.

STEP 2. Check the immobilizer system diagnosis code and MPI system diagnosis code.

- Q: Which diagnosis code resets, the immobilizer system diagnosis code or the MPI system diagnosis code?**
Immobilizer system diagnosis code is set : Refer to [P.54A-9](#).
MPI system diagnosis code is set : Refer to GROUP 13A, Troubleshooting [P.13A-17](#).
No diagnosis code is set : Go to Step 3.

STEP 4. Retest the system

- Q: Is the malfunction eliminated?**
YES : The procedure is complete. If no malfunction are not found in all steps, an intermittent malfunction is suspected (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction [P.00-5](#)).
NO : Replace the immobilizer-ECU.

STEP 3. Check the starting system.

- Q: Does the engine start?**
YES : Go to Step 4.
NO : Refer to GROUP 13A, Troubleshooting – Symptom Chart [P.13A-233](#). If the malfunction is not resolved, replace the immobilizer-ECU. Then register the password (secret code) and encrypted code. (Refer to [P.54A-22](#)). The engine should start.

DATA LIST REFERENCE TABLE

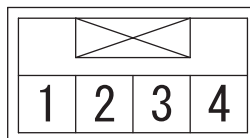
M1543007300314

Item No.	Inspection item	Inspection requirement	Normal condition
01	Key has been registered	–	Number of registered ignition keys

CHECK IMMOBILIZER-ECU

M1543007600564

TERMINAL VOLTAGE CHECK TABLE



AC304799

Terminal No.	Signal	Inspection condition	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: "LOCK" (OFF)	0V
		Ignition switch: "ON"	System voltage
2	-	-	-
3	Engine-ECU	-	-
4	Immobilizer-ECU earth	Always	0V

ON-VEHICLE SERVICE

HOW TO REGISTER ENCRYPTED CODE

M1543008100528

⚠ CAUTION

Because registering the encrypted codes is done after all previously-registered codes have been erased, you should keep all of the ignition keys that have already been registered accessible.

If the ignition key, immobilizer-ECU, engine-ECU is replaced or an ignition key is added, encrypted codes of all the ignition keys must be registered. (A maximum of eight different ignition key can be registered). Moreover, when the immobilizer-ECU has been replaced, you will need to use M.U.T.-II/III to register the immobilizer-ECU and input the vehicle secret code and to register the password (secret code) that the owner specifies into the immobilizer-ECU.

If an attempt is made to start the engine with an unregistered ignition key, cranking occurs, but fuel supply is cut off to disable the engine. In approximately.

NOTE: Engine-ECU has an encrypted code for immobilizer-ECU, and the encrypted code is registered in the immobilizer-ECU and ignition key.

POINTS TO NOTE DURING OPERATION

If none of the functions can be used, check the diagnosis codes, and after carrying out any necessary repairs, repeat the operation.

If an incorrect password is input ten times in a row, the immobilizer-ECU judges that an unauthorized operation is being attempted. Start-prevention mode will be set, and engine operation will stop and all special functions will be disabled. If the ignition switch is turned to "ON" position, "Unauthorized operation, start- prevention mode" will be cancelled.

KEY ID (ENCRYPTED CODE) REGISTRATION <M.U.T.-II>

All ignition keys can be registered with M.U.T.-II. Additional ignition keys can be registered with M.U.T.-II.

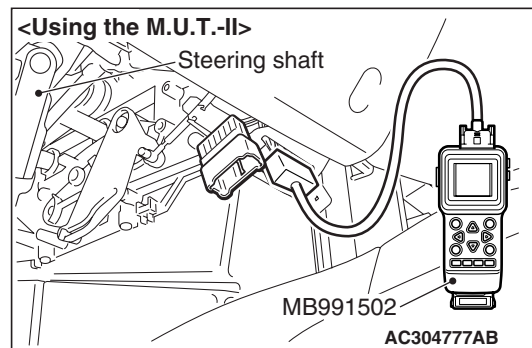
Registration with the M.U.T.-II

⚠ CAUTION

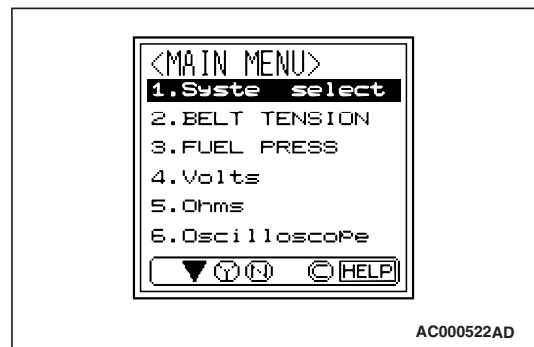
To prevent damage to M.U.T.-II, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-II.

NOTE:

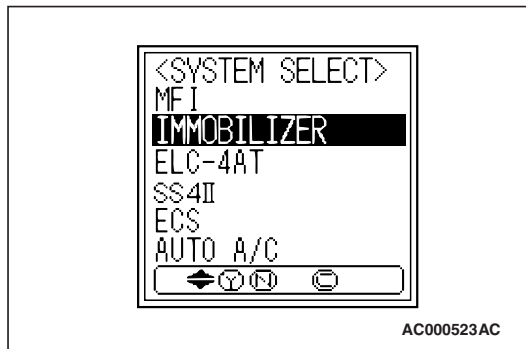
- Using the key ID register function will cause all key IDs that have been previously registered in the immobilizer-ECU to be erased. All keys need to be registered. Those which have been registered before should be on hand before using this function.
- If registering more than one key, do not disconnect M.U.T.-II halfway through the registration process.
- After registering key IDs, check that the engine can be started using all of the keys that have been registered. If the engine will not start, refer to Immobilizer System Diagnosis P.54A-6.



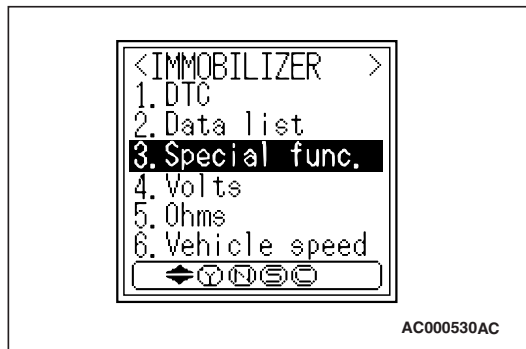
1. Connect M.U.T.-II to diagnosis connector (16-pin).
2. Turn the ignition switch to "ON" position.



3. At "System Select," press "YES"

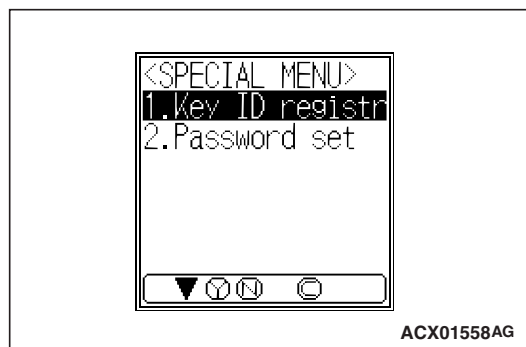
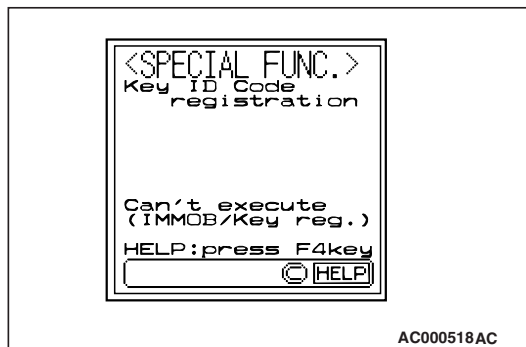


4. Select "Immobilizer," press "YES".

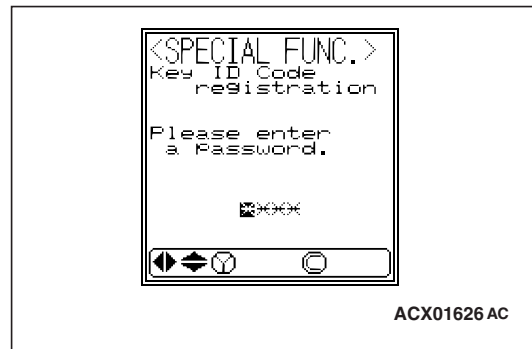


5. Select "Special Func", press "YES".

If diagnosis code No.11 exists, "Can't execute" will be displayed. Check for diagnosis code No.11(Refer to [P.54A-9](#)).



6. Select "key ID register", press "YES".



7. Input the password. Use the "UP" and "DOWN" keys to change the current password digit to a value between 0 and 9. Use the "LEFT" and "RIGHT" keys to move to a different password digit. Press the "YES" key to accept the password.

If an incorrect password is input five times in a row, this screen is displayed and the immobilizer-ECU switches to unauthorized operation, start-prevention mode.

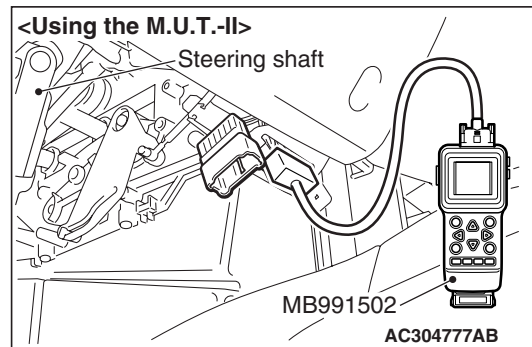
NOTE: Four separate digits must be input to make up the password.



8. Press the "YES" key to start key ID registration.



9. This will be displayed when the key ID registration is successful. If an error occurs during key ID registration, the message "Can't execute" will be displayed. If the key has already been registered, "Key ID has been registered" will be displayed.



10. The number of keys currently registered will be displayed. To register an additional key, replace the ignition key with the next key to be registered within five seconds and then press the "YES" key. Key ID registration screen will be displayed, then register another key.

If key ID registration is complete, press the "NO" key.

NOTE: A maximum of eight different keys can be registered.

11. This completes the registration operation. Turn the ignition switch "LOCK" (OFF) and leave it off for approximately ten seconds.
12. Check that the engine can be started with each of the ignition keys.
13. Check that the immobilizer system diagnosis code and MPI system diagnosis code did not set.
14. Turn the ignition switch to "LOCK" (OFF) position.
15. Disconnect M.U.T.-II.

Registration of additional keys with the M.U.T.-II

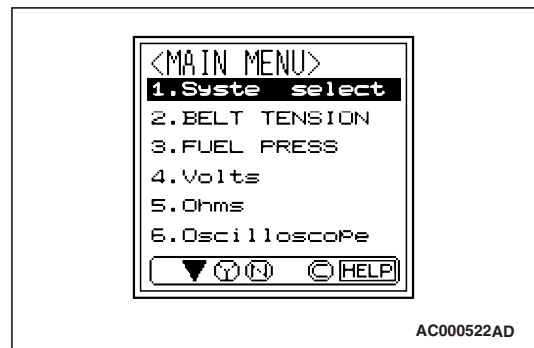
Additional key(s) can be registered with the M.U.T.-II while keeping all existing key data.

CAUTION

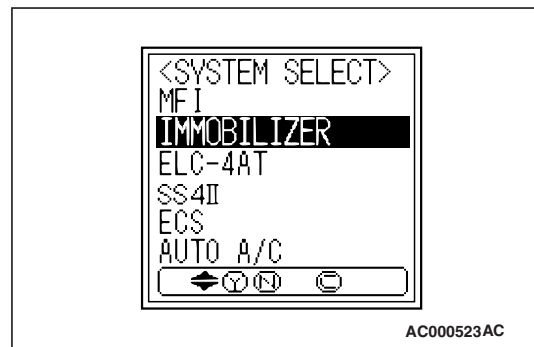
To prevent damage to M.U.T.-II, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-II.

NOTE: To register additional keys with the M.U.T.-II, no registered keys must be lost.

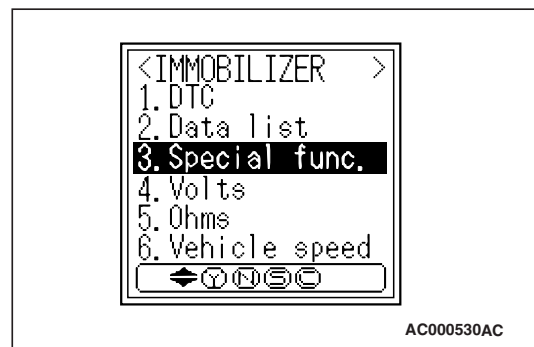
1. Connect M.U.T.-II (MB991502) to the 16-pin diagnosis connector.
2. Turn the ignition switch to "ON" position.



3. At "System Select," press "YES"

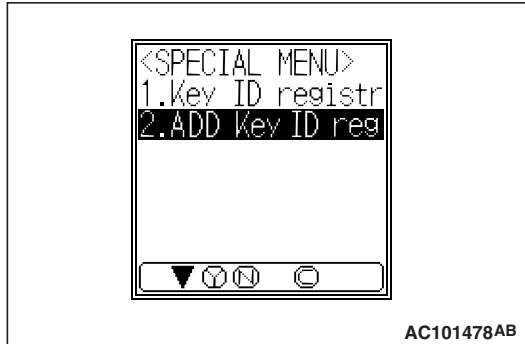
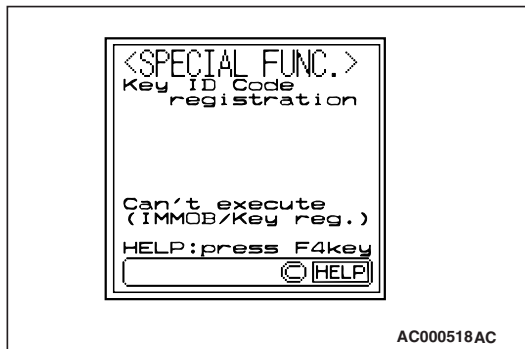


4. Select "Immobilizer," press "YES".

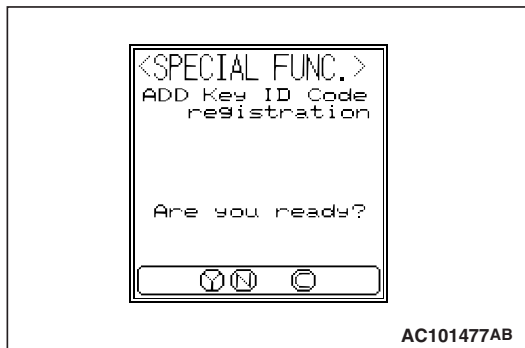


5. Select "Special Func", press "YES".

If diagnosis code No.11 exists, "Can't execute" will be displayed. Check for diagnosis code No.11(Refer to P.54A-9).



6. Select "Add key ID reg", press "YES".



7. Press the "YES" key to start key ID registration.
8. This will be displayed when the add key ID registration is successful. If an error occurs during key ID registration, the message "Can't execute" will be displayed. If the key has already been registered, "Key ID has been registered" will be displayed.



9. The number of keys currently registered will be displayed. To register an additional key, replace the ignition key with the next key to be registered within five seconds and then press the "YES" key. Key ID registration screen will be displayed, then register another key.

NOTE: A maximum of eight different keys can be registered.

If key ID registration is complete, press the "NO" key.

10. This completes the registration operation. Turn the ignition switch "LOCK" (OFF) and leave it off for approximately ten seconds.
11. Check that the engine can be started with each of the ignition keys.
12. Check that the immobilizer system diagnosis code and MPI system diagnosis code did not set.
13. Turn the ignition switch to "LOCK" (OFF) position.
14. Disconnect M.U.T.-II.

KEY ID (ENCRYPTED CODE) REGISTRATION <M.U.T.-III>

All ignition keys can be registered with M.U.T.-III. Additional ignition keys can be registered with M.U.T.-III.

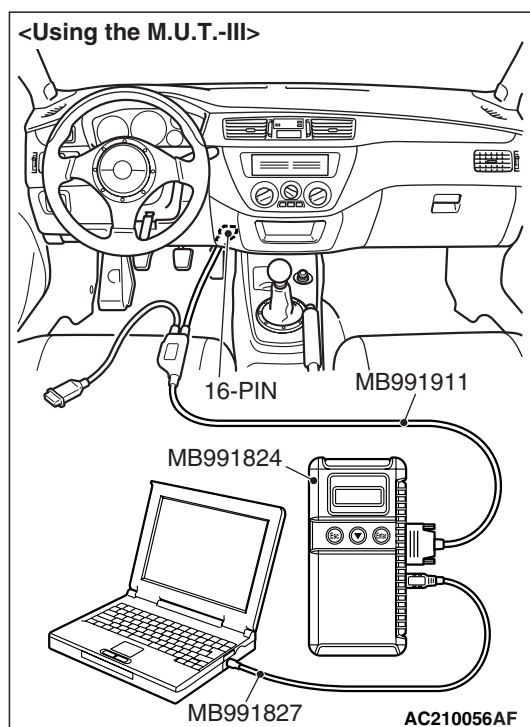
Registration with the M.U.T.-III

CAUTION

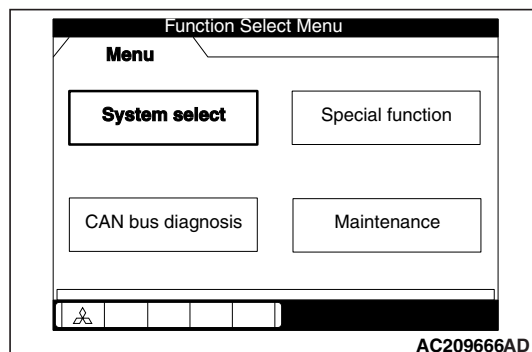
To prevent damage to M.U.T.-III, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-III.

NOTE:

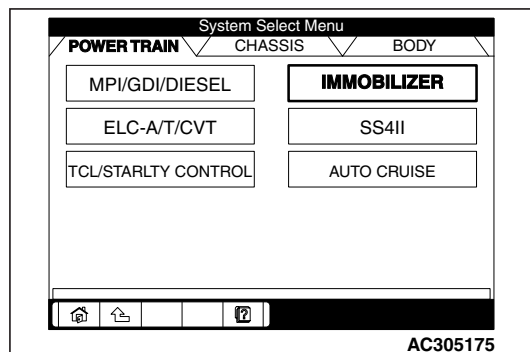
- Before registration, check that no diagnosis code is set. If a diagnosis code is set, resolve the problem beforehand.
- Using the key ID register function will cause all key IDs that have been previously registered in the immobilizer-ECU to be erased. All keys need to be registered. Those which have been registered before should be on hand before using this function.
- If registering more than one key, do not disconnect M.U.T.-III halfway through the registration process.
- After registering key IDs, check that the engine can be started using all of the keys that have been registered. If the engine will not start, refer to Immobilizer System Diagnosis [P.54A-6](#).



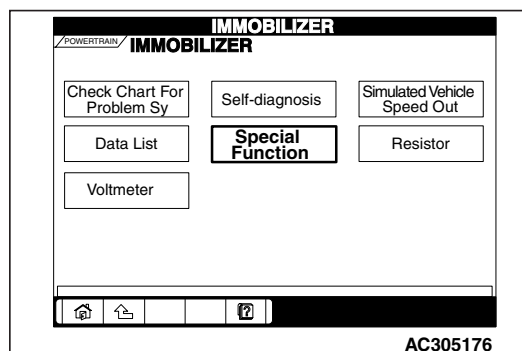
1. Connect the M.U.T.-III to the diagnosis connector (16-pin).
2. Turn the ignition switch to "ON" position.



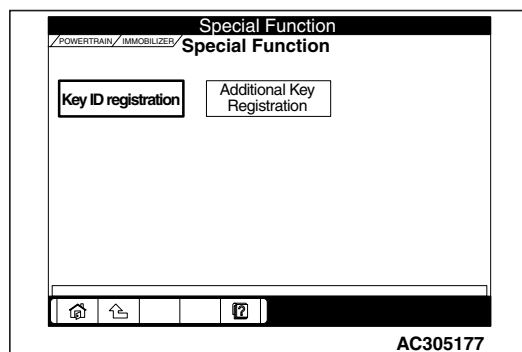
3. Select "System select" from the start-up screen.



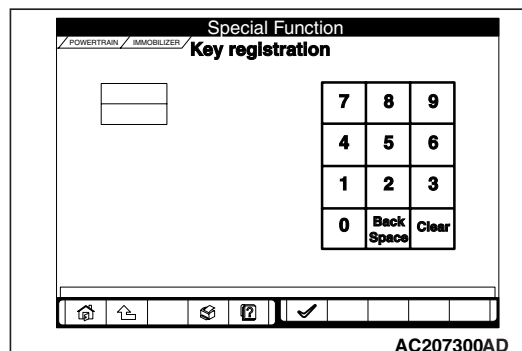
4. Choose "IMMOBILIZER" from the "POWER TRAIN" tab.



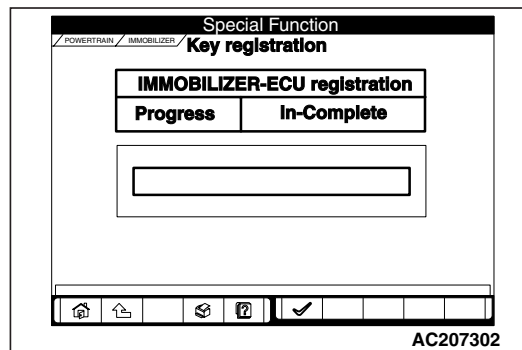
5. Choose "Special Function" from "IMMOBILIZER" screen.



6. Choose "Key registration" from "Special Function" screen.



7. Enter the vehicle's password (secret code) on the "Key registration" screen, and then click the check mark icon. Follow the prompts on the screen to insert key(s) into the ignition switch to begin key registration.



8. If the key ID was registered successfully, "Progress" indication will turn active (gray). Then the registration process completes. If the key ID failed to be registered, "In-Complete" indication will turn active (gray).
9. The number of keys currently registered will be displayed. To register an additional key, replace the ignition key with the next key to be registered within five seconds. Key ID registration screen will be displayed, then register another key.

NOTE: A maximum of eight different keys can be registered.

10. This completes the registration operation. Turn the ignition switch "LOCK" (OFF) and leave it off for approximately ten seconds.
11. Check that the engine can be started with each of the ignition keys.
12. Check that the immobilizer system diagnosis code and MPI system diagnosis code did not set.
13. If not diagnosis code is shown, terminate the M.U.T.-III.
14. Turn the ignition switch to "LOCK" (OFF) position.
15. Disconnect M.U.T.-III.

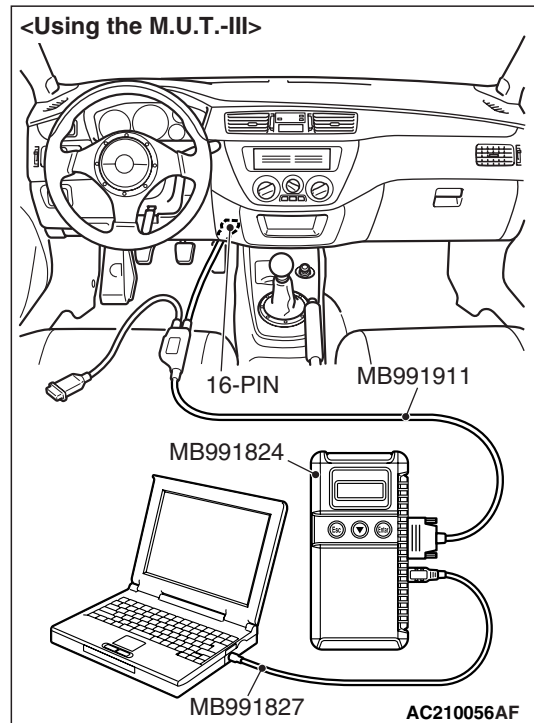
Registration of additional keys with the M.U.T.-III

Additional key(s) can be registered with the M.U.T.-III while keeping all existing key data.

CAUTION

To prevent damage to M.U.T.-III, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-III.

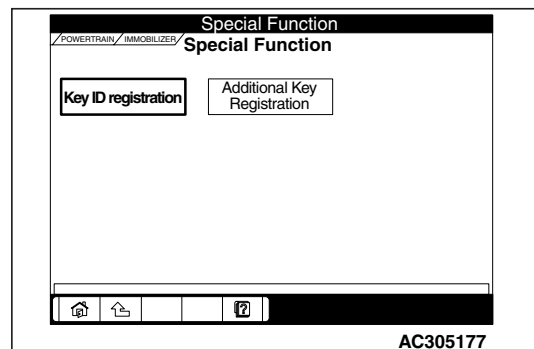
NOTE: To register additional keys with the M.U.T.-III, no registered keys must be lost.



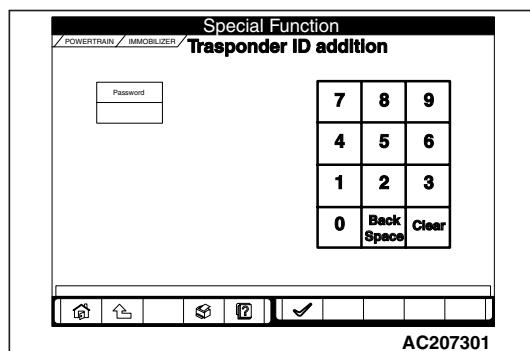
1. Connect M.U.T.-III to the 16-pin diagnosis connector.
2. Turn the ignition switch to "ON" position.

NOTE: Before registration, check that no diagnosis code is set. If a diagnosis code is set, resolve the problem beforehand.

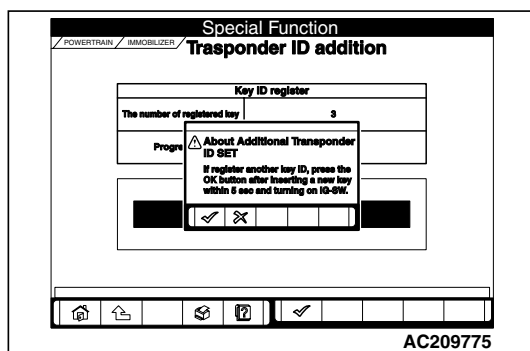
3. Carry out steps 3 to 6 of the sub-section "Registration with M.U.T.-III."



4. Choose "Transponder ID addition" from "Special Function" screen.



5. Enter the vehicles password (secret code) on the "Transponder ID addition" screen, and then click the check mark icon.



6. If an additional registration is made successfully, the screen will ask if another key is registered or not. If the third ignition key is registered, remove the key, which has been registered. Then insert the third key within five seconds, and then turn it to the ON position.
 7. Register the additional ignition key according to step 6 above. The number of the registered ignition keys are shown on "The number of registered key" screen.
- NOTE: A maximum of eight different keys can be registered.*
8. This completes the registration operation. Turn the ignition switch "LOCK" (OFF) and leave it off for approximately ten seconds.
 9. Check that the engine can be started with each of the ignition keys.
 10. Check that the immobilizer system diagnosis code and MPI system diagnosis code did not set.
 11. If not diagnosis code is shown, terminate the M.U.T.-III.
 12. Turn the ignition switch to "LOCK" (OFF) position.
 13. Disconnect M.U.T.-III.

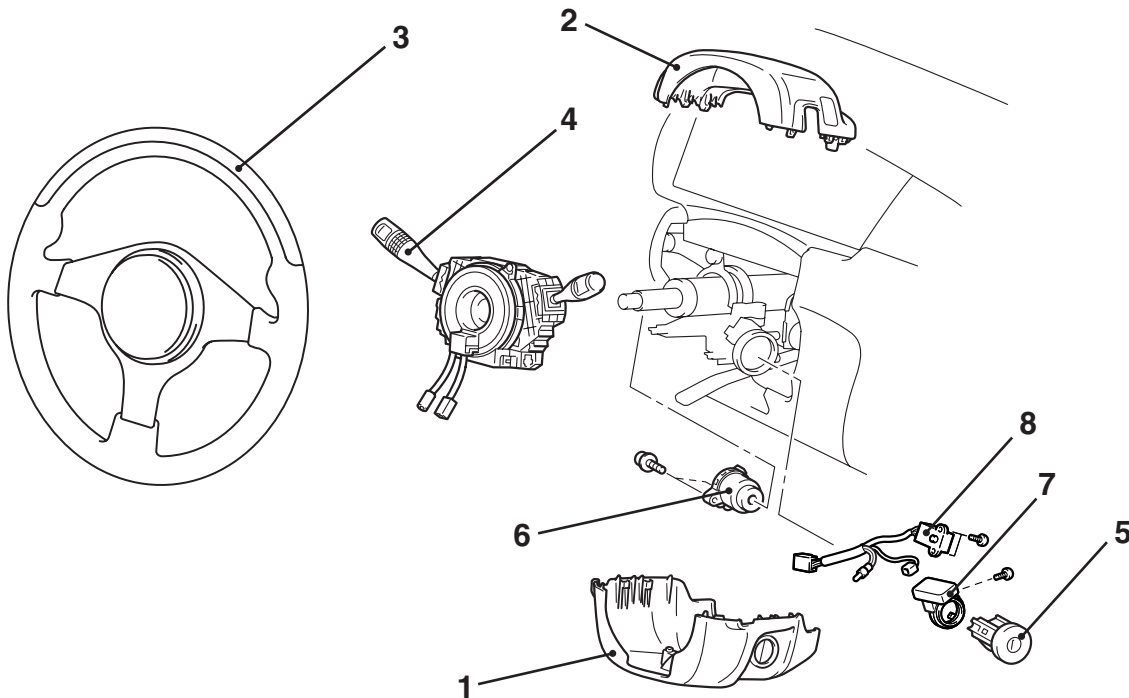
IGNITION SWITCH

REMOVAL AND INSTALLATION

M1543002101084

⚠ WARNING

- Before removal of the air bag module, refer to **GROUP 52B, SRS Service Precautions and Air Bag Module and Clock Spring P.52B-3**.
- When removing and installing the steering wheel, do not let it bump against the air bag module.



AC310331AB

Removal steps

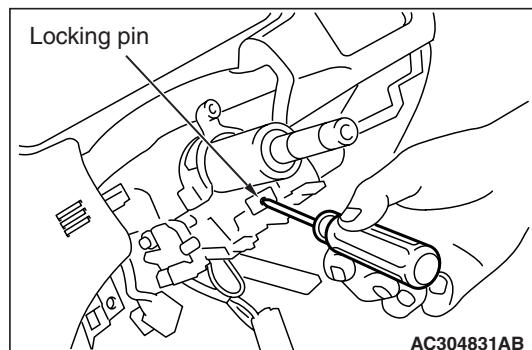
1. Column cover lower
2. Column cover upper
3. Steering wheel and air bag module assembly (Refer to GROUP 37, Steering wheel P.37-13).
4. Clock spring and column switch assembly (Refer to GROUP 52B, Driver's, Front Passenger's Air Bag Modules and Clock Spring P.52B-110).
5. Steering lock cylinder

Removal steps (Continued)

- Ignition switch connector
- 6. Ignition switch
- 7. Immobilizer-ECU
- Key reminder switch connector
- 8. Key reminder switch and bulb assembly

<<A>>

REMOVAL SERVICE POINT

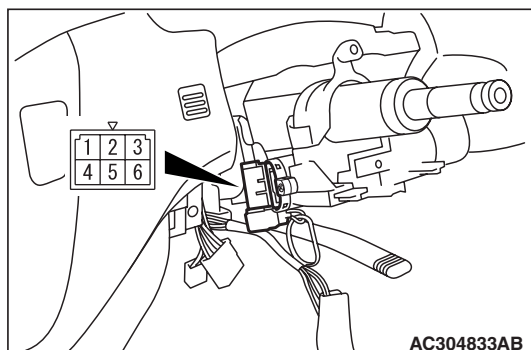
<<A>> STEERING LOCK CYLINDER
REMOVAL

1. Insert the key in the steering lock cylinder and turn it to the "ACC" position.
2. Using a small Phillips head screwdriver, pull the steering lock cylinder toward you.

INSPECTION

M1544009700270

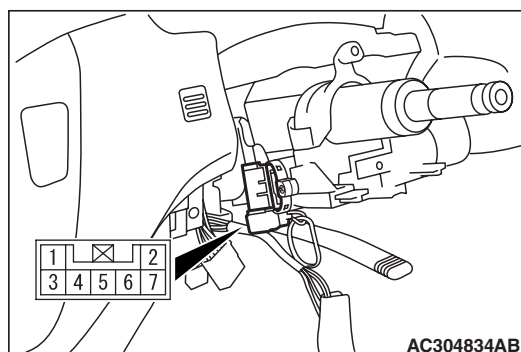
IGNITION SWITCH CONTINUITY CHECK



Disconnect ignition switch connector C-208 without removing the ignition switch. Then check the continuity.

Switch position	Tester connection	Specified condition
"LOCK" (OFF)	1 - 2, 1 - 3, 1 - 4, 1 - 5, 1 - 6, 2 - 3, 2 - 4, 2 - 5, 2 - 6, 3 - 4, 3 - 5, 3 - 6, 4 - 5, 4 - 6, 5 - 6	Open circuit
"ACC"	1 - 6	Less than 2 ohms
"ON"	1 - 2, 1 - 4, 1 - 6, 2 - 4, 2 - 6, 4 - 6	Less than 2 ohms
"START"	1 - 2, 1 - 5, 2 - 5	Less than 2 ohms

KEY REMINDER SWITCH CONTINUITY CHECK



Disconnect key reminder switch connector C-207 without removing the ignition switch and key reminder switch. Then check the continuity.

Status of ignition key	Tester connection	Specified condition
Removed	4 - 6	Less than 2 ohms
Inserted	4 - 6	Open circuit

COMBINATION METER ASSEMBLY

SERVICE SPECIFICATIONS

M1543000300432

Item		Standard value
Speedometer indication tolerance km/h	20	20 – 24
	40	40 – 44
	80	80 – 85
	120	121 – 127
	160	162 – 169
	200	203 – 211
Tachometer indication tolerance r/min	700	± 120
	2,000	– 175 + 225
	3,000	– 175 + 300
	4,000	– 225 + 375
	5,000	– 225 + 425
	6,000	– 225 + 475
	7,000	– 200 + 500
	8,000	– 100 + 500
Fuel tank gauge unit (main) resistance Ω	Float position F (highest)	2 ± 1
	Float position E (lowest)	36.4 ± 1
Fuel tank gauge unit (sub) resistance Ω	Float position F (highest)	2 ± 1
	Float position E (lowest)	73.6 ± 1
Fuel gauge unit (main) float height mm	Float position F (A)	33.3 ± 2.0
	Float position E (B)	121.9 ± 2.0
Fuel gauge unit (sub) float height mm	Float position F (A)	5.7 ± 2.0
	Float position E (B)	141.0 ± 2.0
Engine coolant temperature gauge unit resistance Ω		$104 + 13.5$ (at 70°C)
Combination meter internal resistance Ω	Engine coolant temperature gauge to earth (terminal No. 1 – 21)	233 ± 3
	Fuel gauge to earth (terminal No. 31 – 51)	181 ± 2

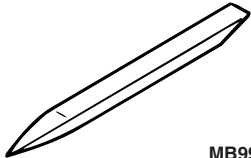
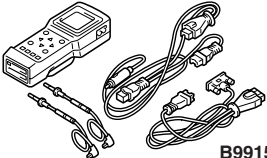
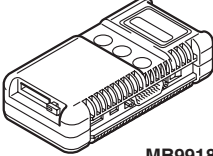
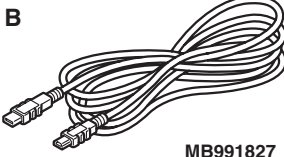
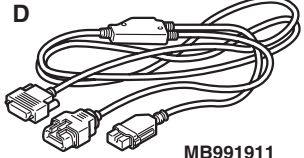
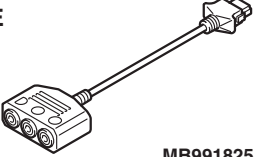
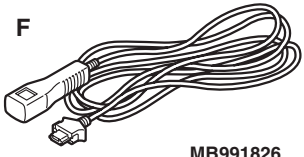
SEALANT

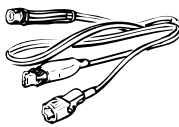
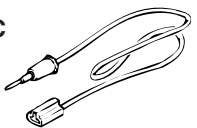
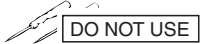
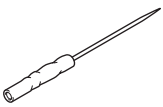
M1543024600028

Item	Specified sealant
Engine coolant temperature gauge unit	3M 1215 or equivalent

SPECIAL TOOLS

M1543000603045

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of meter bezel and Instrument panel ornament
 B991502	MB991502	M.U.T.-II sub assembly	Reading MPI system diagnosis code
A  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 MPI system diagnosis code  CAUTION M.U.T.-III main harness B (MB991911) should be used. M.U.T.-III main harness A should not be used for this vehicle.
B			
 MB991827			
C			
 MB991910			
D			
 MB991911			
E			
 MB991825			
F			
 MB991826			
MB991955			

Tool	Number	Name	Use
A  B  C  D  MB991223AZ	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connect pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector

TROUBLESHOOTING

SYMPTOM CHART

M1543007201280

Symptom	Inspection procedure No.	Reference page
Speedometer does not work.	1	P.54A-34
Tachometer does not work.	2	P.54A-38
Fuel gauge does not work.	3	P.54A-41
Engine coolant temperature gauge does not work.	4	P.54A-45
Combination meters does not work.	5	P.54A-48

INSPECTION PROCEDURE 1: Speedometer does not work.

IGNITION SWITCH (IG1)

FUSIBLE LINK (1)

COMBINATION METER (C-01)

SPEED

CONTROL CIRCUIT

VEHICLE SPEED SENSOR (B-04)

DIAGNOSIS CONNECTOR (C-14) FRONT SIDE

NOTE

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

Wire colour code

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

TECHNICAL DESCRIPTION (COMMENT)

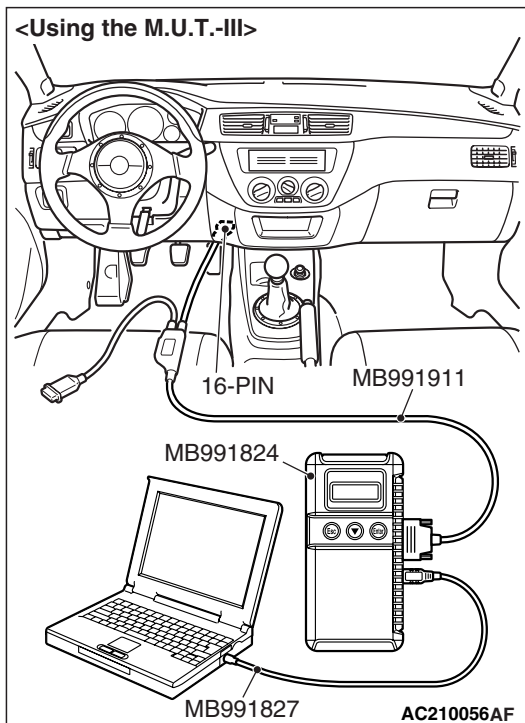
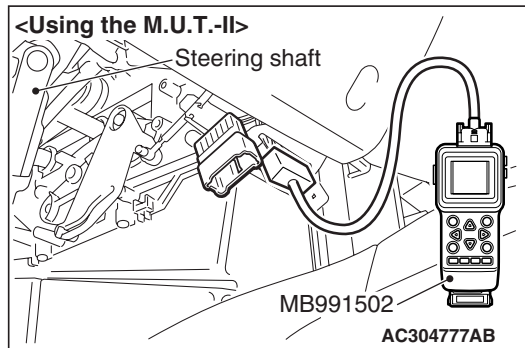
The cause may be a faulty vehicle speed sensor circuit system or a faulty speedometer. Vehicle speed sensor is also used by the engine-ECU.

TROUBLESHOOTING HINTS

- Malfunction of the vehicle speed sensor
- Malfunction of the engine-ECU
- Malfunction of the combination meter assembly
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS PROCEDURE

STEP 1. Check with other meter.



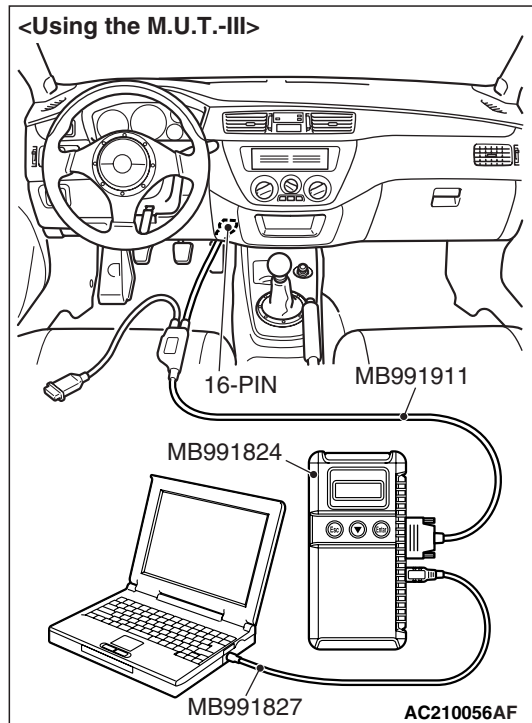
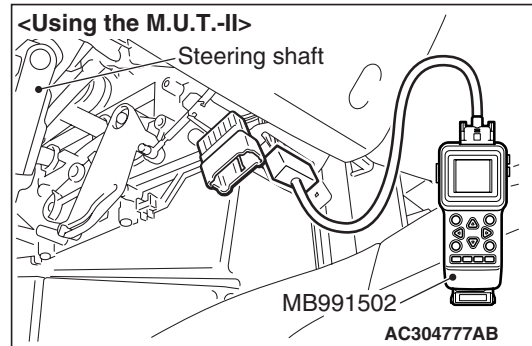
Check to see that the tachometer, fuel gauge and water thermometer are operating normally.

Q: Do all other meters operate?

YES <other meters all operate.> : Go to Step 2.

NO <one or more of the other meters does not operate.> : Refer to INSPECTION PROCEDURE
5 P.54A-48

STEP 2. Check the vehicle speed sensor. (M.U.T.-II/III MPI diagnosis code)



- (1) Connect M.U.T.-II/III to the diagnosis connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the MPI system diagnosis code.

Q: Is MPI system diagnosis code P0500 set?

YES : Refer to GROUP 13A – Troubleshooting
P.13A-372.

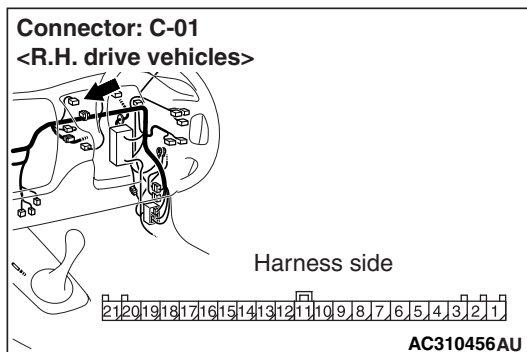
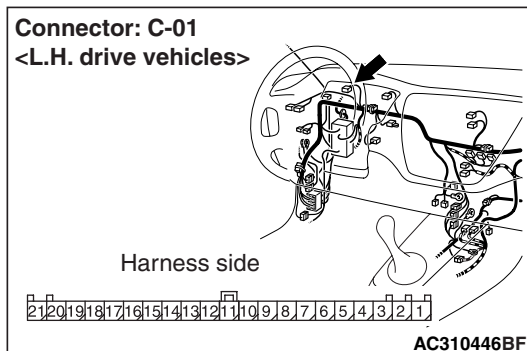
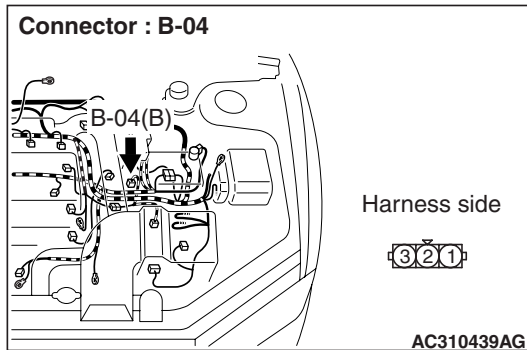
NO : Go to Step 3.

STEP 3. Check combination meter connector C-01 and vehicle speed sensor connector B-04 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are combination meter connector C-01 and vehicle speed sensor connector B-04 in good condition?

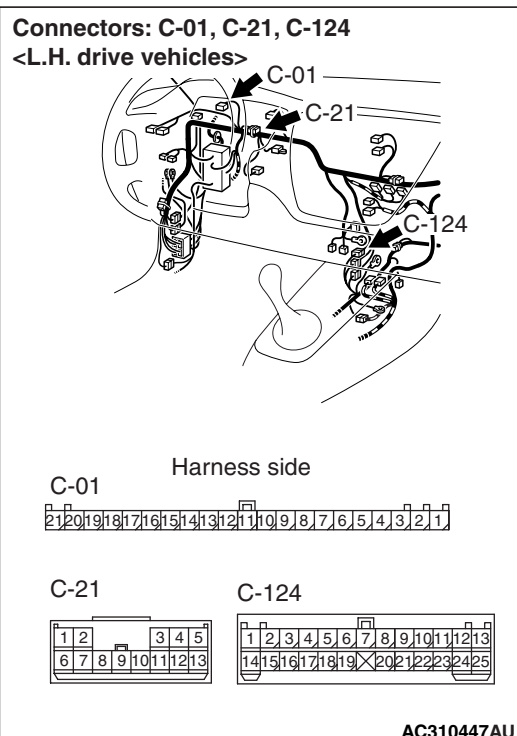
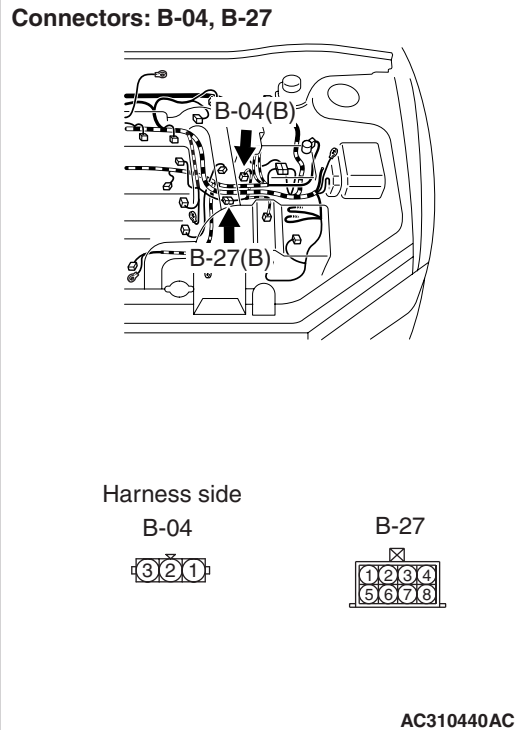
YES : Go to Step 4.

NO : Repair or replace the damage component(s).

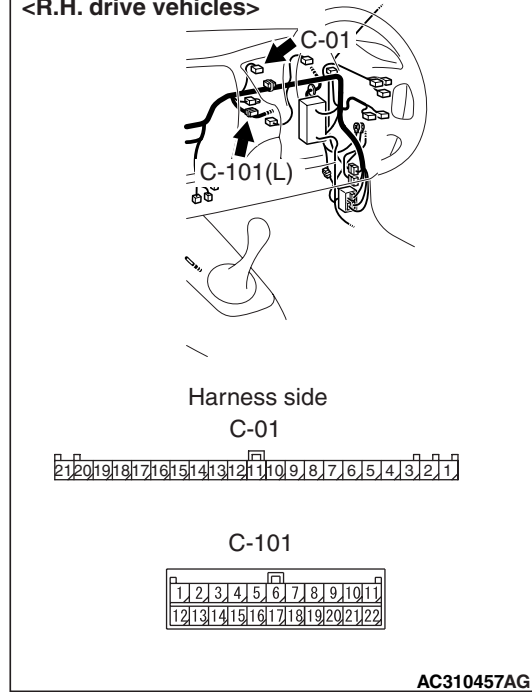


STEP 4. Check the wiring harness between combination meter connector C-01 (terminal 12) and vehicle speed sensor connector B-04 (terminal 3).

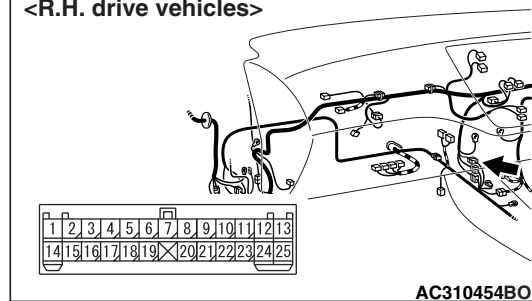
NOTE:



Connectors: C-01, C-101
<R.H. drive vehicles>



Connector : C-124
<R.H. drive vehicles>



Also check joint connector C-21 <LH drive vehicles> or C-101 <RH drive vehicles>, intermediate connector B-27 and C-124 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If joint connector C-21 <LH drive vehicles> or C-101 <RH drive vehicles>, intermediate connector B-27 or C-124 are damaged, repair or replace the connector.

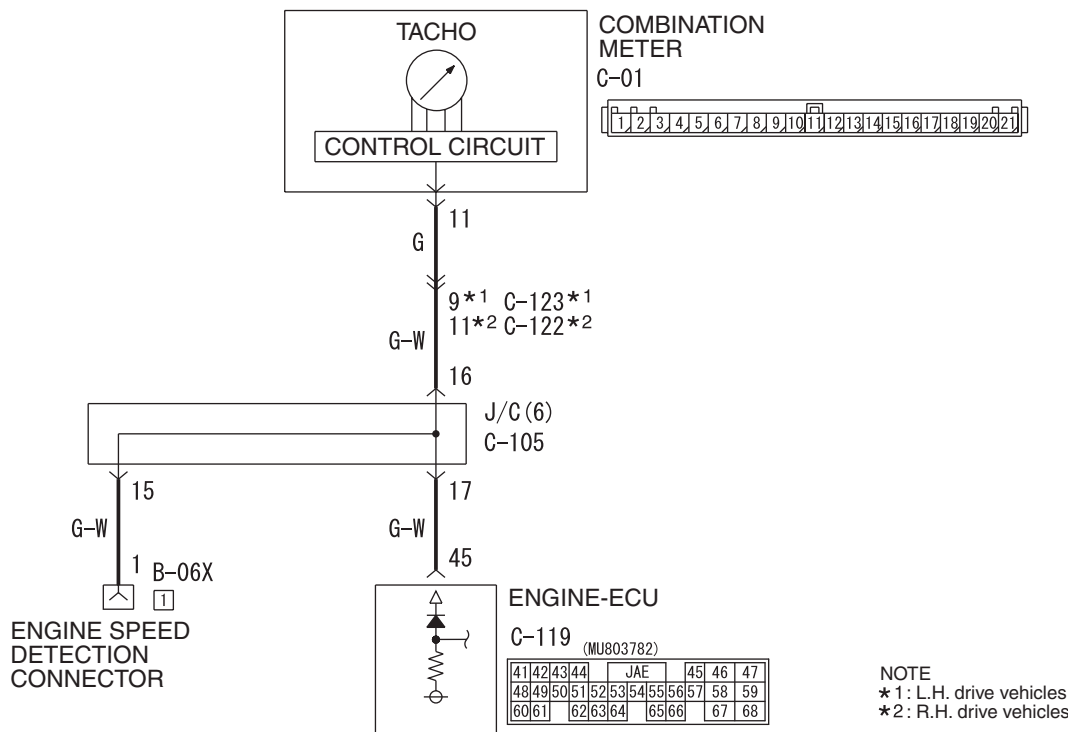
Q: Is the wiring harness between combination meter connector C-01 (terminal 12) and vehicle speed sensor connector B-04 (terminal 3) in good condition?

YES : Replace the combination meter. The speedometer should work normally.

NO : Repair the wiring harness. The speedometer should work normally.

INSPECTION PROCEDURE 2: Tachometer does not work.

Tachometer Circuit



Wire colour code

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

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TECHNICAL DESCRIPTION (COMMENT)

Ignition signal may not be received from the engine-ECU, or the combination meter assembly, the wiring harness, or the connector(s) may be defective.

TROUBLESHOOTING HINTS

- Malfunction of the combination meter assembly
- Malfunction of the engine-ECU
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS PROCEDURE

STEP 1. Check the other meters.

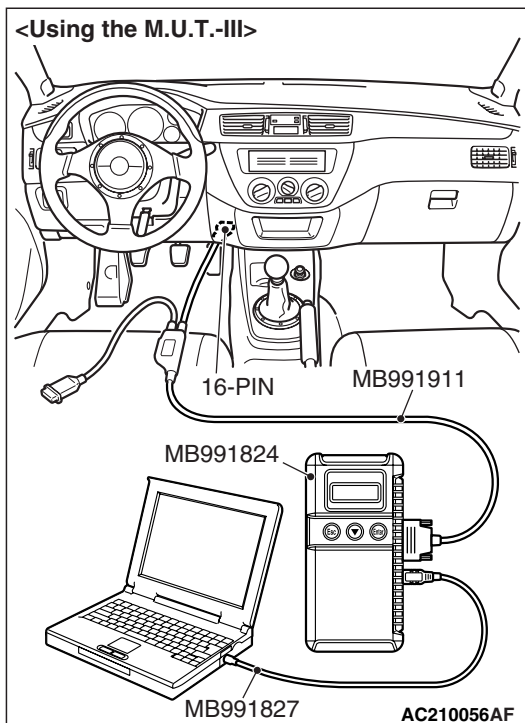
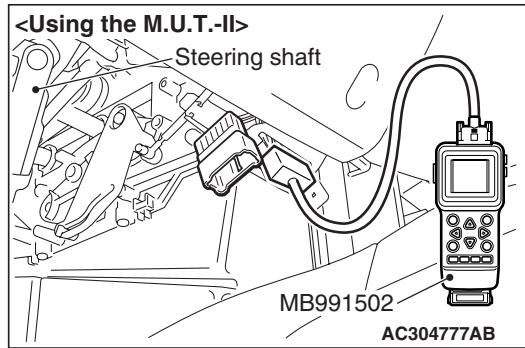
Check to see that the speedometer, fuel gauge and water thermometer are operating normally.

Q: Do all other meters operate?

Yes <other meters all operate> : Go to Step 2.

NO <one of the meters do not operate.> : Refer to INSPECTION PROCEDURE 5 [P.54A-48](#).

STEP 2. M.U.T.-II/III MPI diagnosis code is reset.



- (1) Connect M.U.T.-II/III to the diagnosis connector.
- (2) Turn the ignition switch to the "ON" position.
- (3) Read the MPI system diagnosis code.

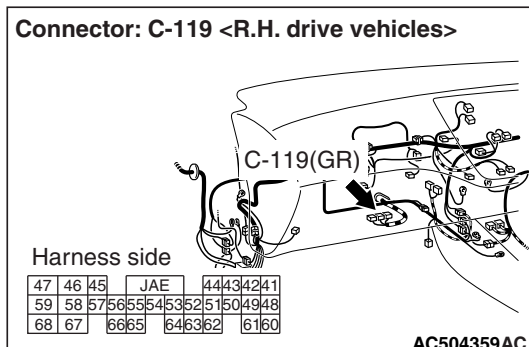
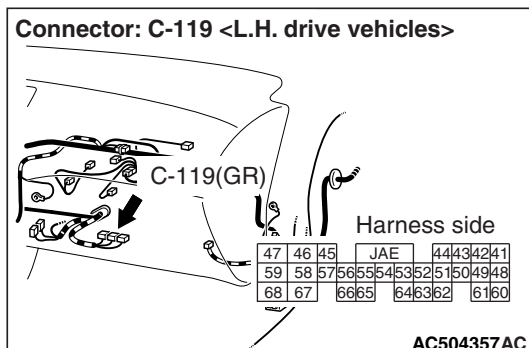
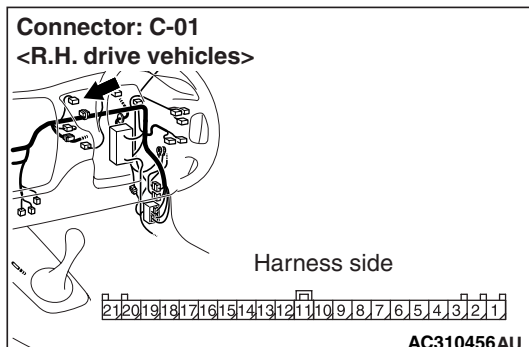
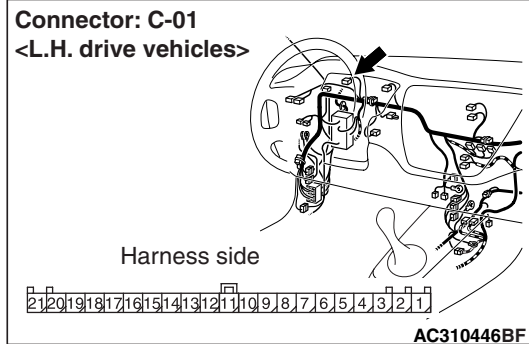
Q: Is MPI system diagnosis code P0500 set?

YES : Refer to GROUP 13A – Troubleshooting

[P.13A-372.](#)

NO : Go to Step 3.

STEP 3. Check combination meter connector C-01 and engine-ECU connector C-119 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Are combination meter connector C-01 and engine-ECU connector C-119 in good condition?

YES : Go to Step 4.

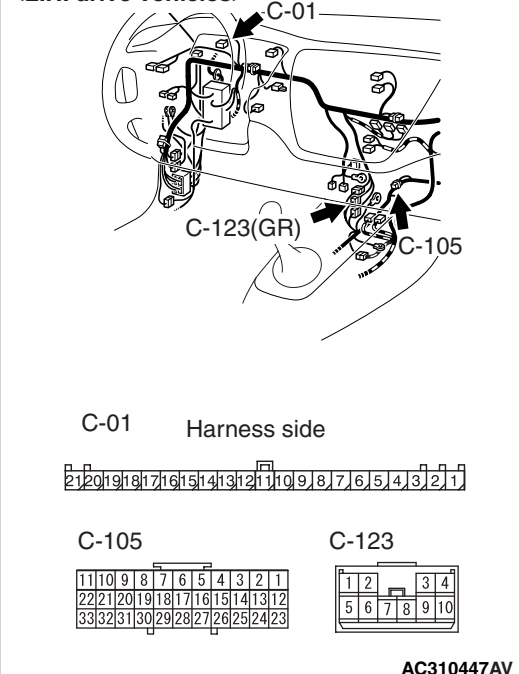
NO : Repair or replace the damage component(s). The speedometer should work normally.

STEP 4. Check the wiring harness between combination meter connector C-01 (terminal 11) and engine-ECU connector C-119 (terminal 45).

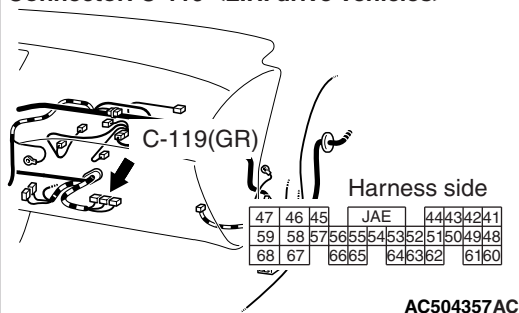
NOTE:

Connectors: C-01, C-105, C-123

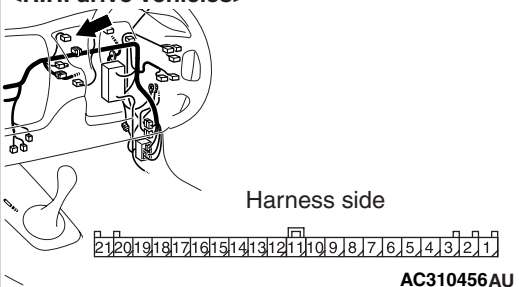
<L.H. drive vehicles>



Connector: C-119 <L.H. drive vehicles>

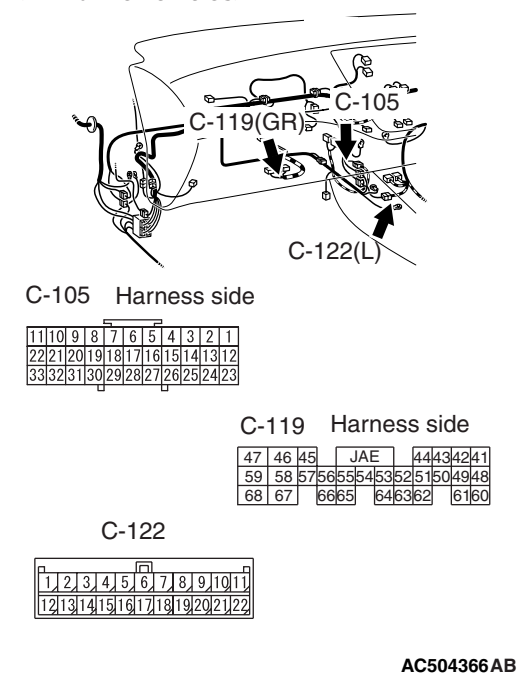


**Connector: C-01
<R.H. drive vehicles>**



Connectors: C-105, C-119, C-122

<R.H. drive vehicles>



Also check joint connector C-105 and intermediate connector C-123 <LH drive vehicles> or C-122 <RH drive vehicles> for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If joint connector C-105 or intermediate connector C-123 <LH drive vehicles> or C-122 <RH drive vehicles> are damaged, repair or replace the connector.

Q: Are the wiring harness between combination meter connector C-01 (terminal 11) and engine-ECU connector C-119 (terminal 45) in good condition?

YES : Go to Step 5.

NO : Repair the wiring harness. The speedometer should work normally.

STEP 5. Replace the combination meter and check operation.

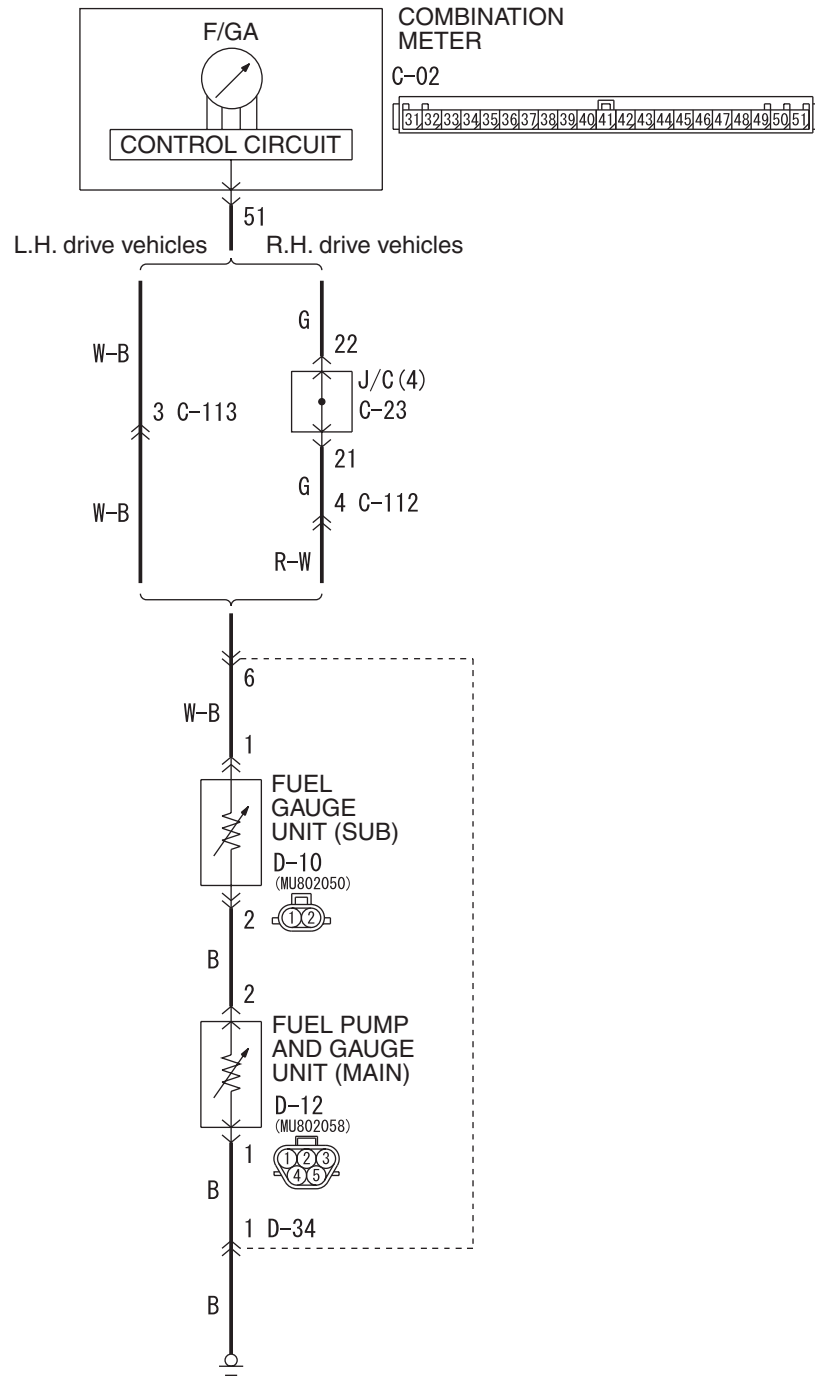
Q: Does the tachometer operate?

YES : There is no action to be taken.

NO : Repair the engine-ECU. The tachometer should work normally.

INSPECTION PROCEDURE 3: Fuel gauge does not work.

Fuel Gauge Circuit



Wire colour code

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

AC504369AB

TECHNICAL DESCRIPTION (COMMENT)

If only the fuel gauge does not operate, fuel gauge unit the combination meter, wiring harness or connector(s) may be defective.

TROUBLESHOOTING HINTS

- Malfunction of the fuel gauge unit.
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of the combination meter.

DIAGNOSIS PROCEDURE**STEP 1. Check the other meters.**

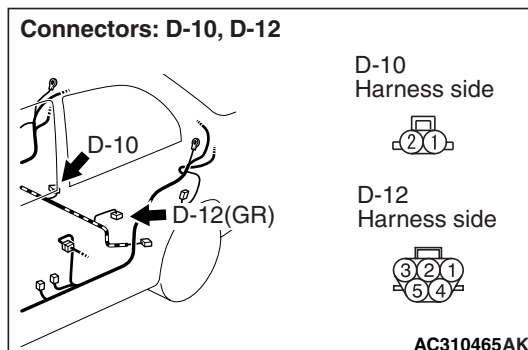
Check to see that the speedometer, fuel gauge and water thermometer operate normally.

Q: Do all other meters operate?

Yes <other meters all operate> : Go to Step 2.

NO <one or more of the other meters does not operate.> : Refer to [P.54A-48](#).

STEP 2. Check fuel gauge unit (sub) connector D-10 and fuel gauge unit (main) connector D-12 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Are fuel gauge unit (sub) connector D-10 and fuel gauge unit (main) connector D-12 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damage component(s). The fuel gauge should work normally.

STEP 3. Check the fuel gauge unit (sub) and fuel gauge unit (main).

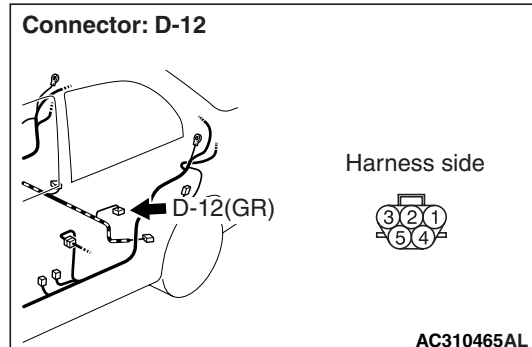
Check to see that the fuel gauge unit (sub) and fuel gauge unit (main) are normal. Refer to [P.54A-54](#).

Q: Are fuel gauge unit (sub) and fuel gauge unit (main) normal?

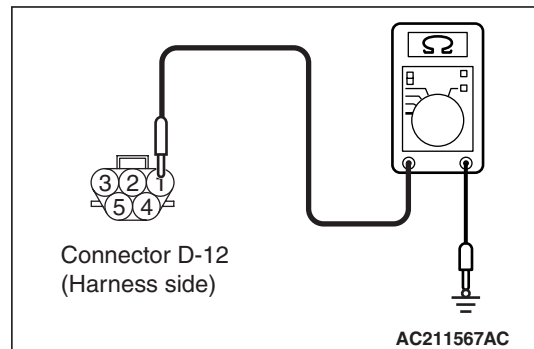
Yes : Go to Step 4.

NO : Replace fuel gauge unit (sub) and fuel gauge unit (main). The fuel gauge should work normally.

STEP 4. Check the earth circuit to the fuel gauge unit (main). Resistance measurement at fuel gauge unit (main) connector D-12.



(1) Disconnect fuel gauge unit (main) connector D-12 and measure the resistance available at the wiring harness side of the connector.



(2) Measure the resistance value between terminal 1 and earth.

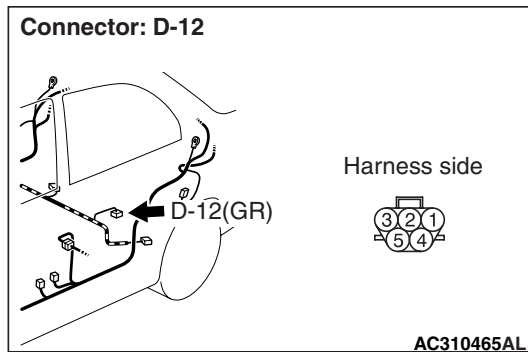
OK: 2 ohms or less

Q: Is the check result normal?

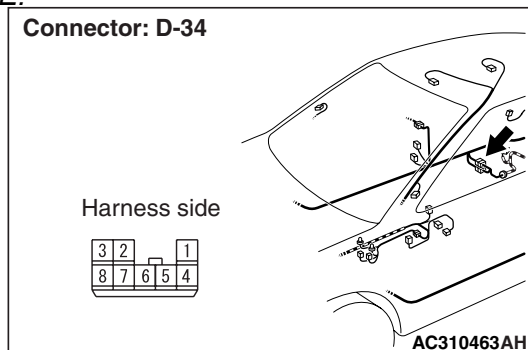
YES : Go to Step 6.

NO : Go to Step 5.

STEP 5. Check the wiring harness between fuel gauge unit (main) connector D-12 (terminal 1) and earth.



NOTE:



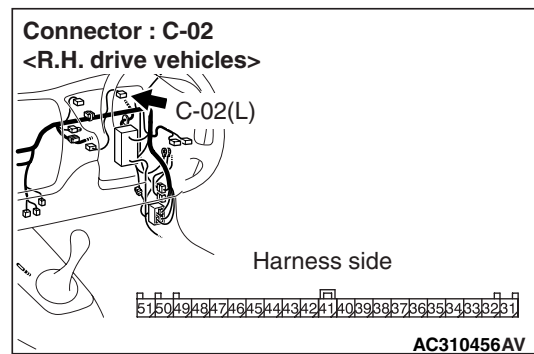
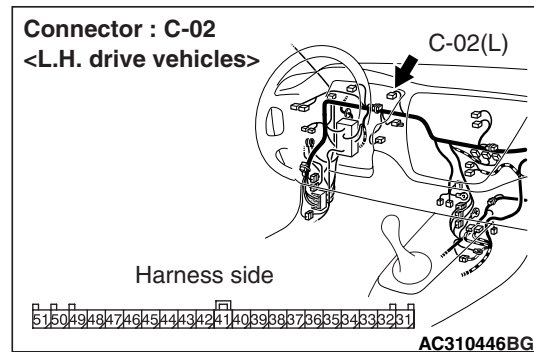
Also check intermediate connector D-34 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector D-34 is damaged, repair or replace the connector.

Q: Is the wiring harness between fuel gauge unit (main) connector D-12 (terminal 1) and earth in good condition?

YES : There is no action to be taken.

NO : Repair the wiring harness. The fuel gauge should work normally.

STEP 6. Check combination meter connector C-02 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



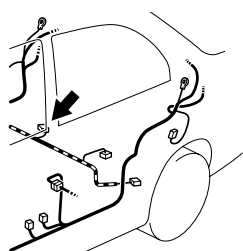
Q: Is combination meter connector C-02 in good condition?

YES : Go to Step 7.

NO : Repair or replace the damaged component(s). The fuel gauge should work normally.

STEP 7. Check the wiring harness between fuel gauge unit (sub) connector D-10 (terminal 1) and combination meter connector C-02 (terminal 51).

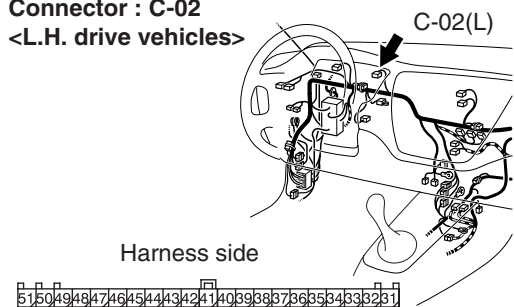
Connector: D-10



Harness side



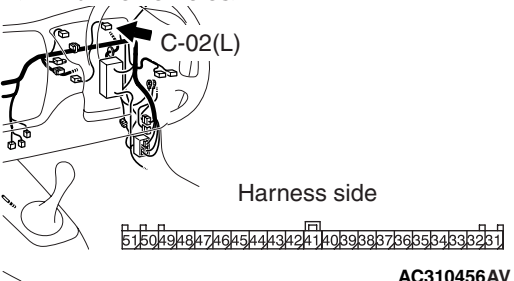
AC310465AM

Connector : C-02
<L.H. drive vehicles>

Harness side



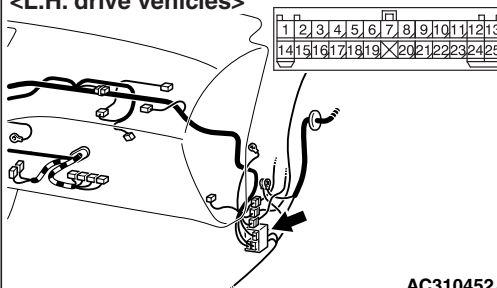
AC310446BG

Connector : C-02
<R.H. drive vehicles>

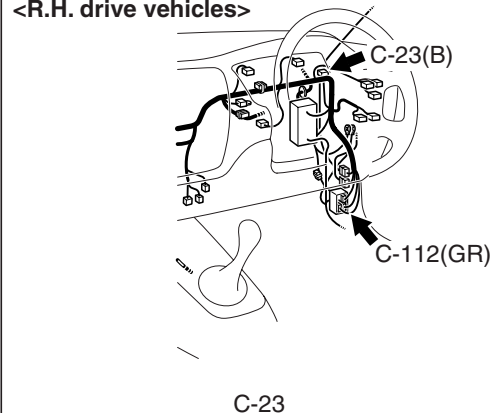
Harness side



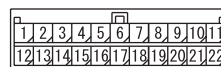
AC310456AV

NOTE:CONNECTOR: C-113
<L.H. drive vehicles>

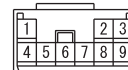
AC310452AZ

Connectors: C-23, C-112
<R.H. drive vehicles>

C-23

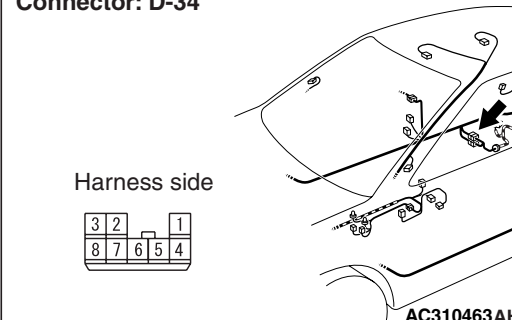


C-112

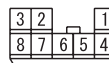


AC310457AH

Connector: D-34



Harness side

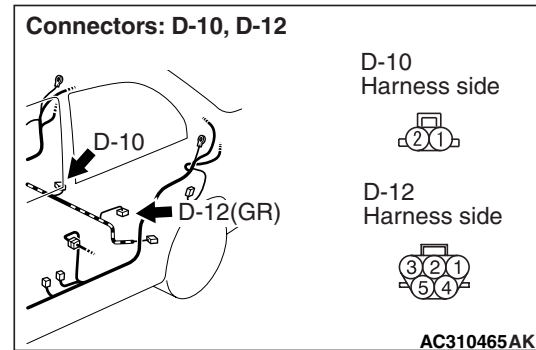


AC310463AH

Also check intermediate connectors C-112 <RH drive vehicles>, C-113 <LH drive vehicles>, D-34 and joint connector C-23 <RH drive vehicles> for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-112 <RH drive vehicles>, C-113 <LH drive vehicles> or D-34 and joint connector C-23 <RH drive vehicles> is damaged, repair or replace the connector.

Q: Is the wiring harness between fuel gauge unit (sub) connector D-10 (terminal 1) and combination meter connector C-02 (terminal 51) in good condition?
YES : Go to Step 8.
NO : Repair the wiring harness. The fuel gauge should work normally.

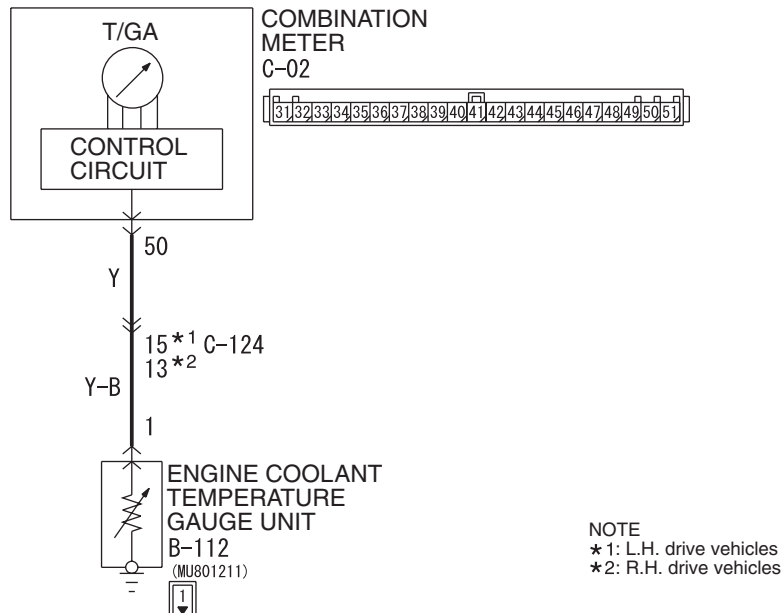
STEP 8. Check the wiring harness between fuel gauge unit (sub) connector D-10 (terminal 2) and fuel gauge unit (main) connector D-12 (terminal 2).



Q: Is the wiring harness between fuel gauge unit (sub) connector D-10 (terminal 2) and fuel gauge unit (main) connector D-12 (terminal 2) in good condition?
YES : Repair or replace the combination meter. The fuel gauge should work normally.
NO : Repair the wiring harness. The fuel gauge should work normally.

INSPECTION PROCEDURE 4: Engine Coolant Temperature Gauge does not Work.

Engine Coolant Temperature Gauge Circuit



Wire colour code

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

TECHNICAL DESCRIPTION (COMMENT)

If only the engine coolant temperature gauge does not operate, the combination meter, the wiring harness or its connector may be defective.

TROUBLESHOOTING HINTS

- Malfunction of the engine coolant temperature gauge unit
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of the combination meter.

DIAGNOSIS PROCEDURE**STEP 1. Check the other meters.**

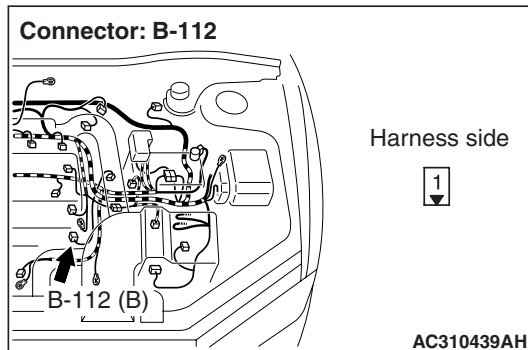
Check to see that the speedometer, tachometer and engine coolant temperature gauge unit operate normally.

Q: Do all other meters operate?

Yes <other meters all operate> : Go to Step 2.

NO <one or more of the other meters does not operate.> : Refer to [P.54A-48](#).

STEP 2. Check engine coolant temperature gauge unit connector B-112 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Is engine coolant temperature gauge unit connector B-112 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). The engine coolant temperature gauge unit should work normally.

STEP 3. Check the engine coolant temperature gauge unit.

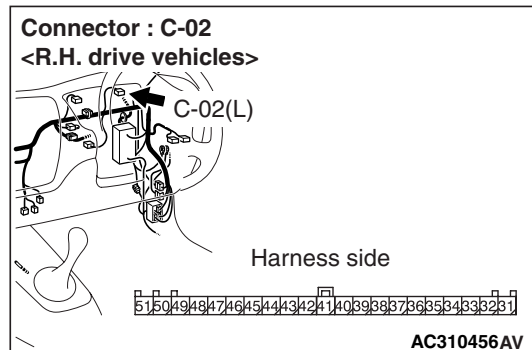
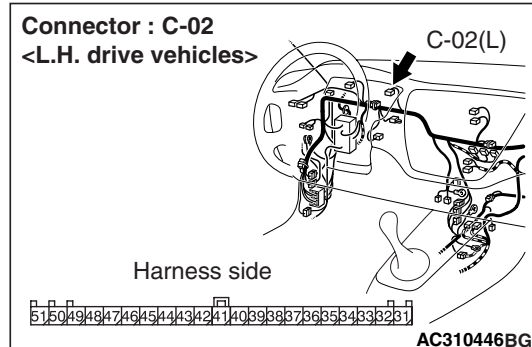
Check to see that the engine coolant temperature gauge unit operate normally. Refer to [P.54A-56](#).

Q: Is the engine coolant temperature gauge unit normal?

YES : Go to Step 4.

NO : Replace the engine coolant temperature gauge unit. The engine coolant temperature gauge unit should work normally.

STEP 4. Check combination meter connector C-02 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



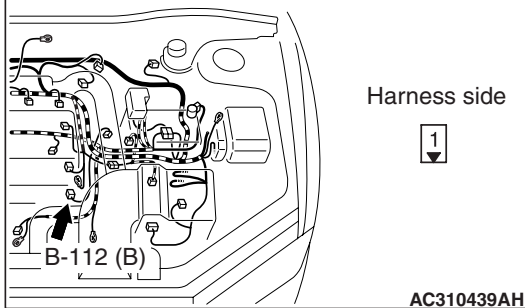
Q: Is combination meter connector C-02 in good condition?

YES : Go to Step 5.

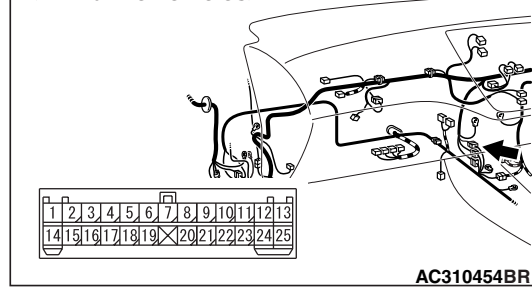
NO : Repair or replace the damaged component(s). The engine coolant temperature gauge unit should work normally.

STEP 5. Check the wiring harness between engine coolant temperature gauge unit connector B-112 (terminal 1) and combination meter connector C-02 (terminal 50).

Connector: B-112



Connector : C-124
<R.H. drive vehicles>



NOTE: Also check intermediate connector C-124 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-124 is damaged, repair or replace the connector.

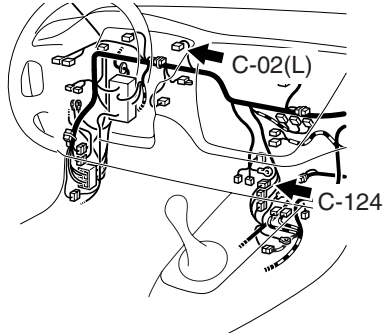
Q: Are the wiring harness between engine coolant temperature gauge unit connector B-112 (terminal 1) and combination meter connector C-02 (terminal 50) in good condition?

YES : Repair or replace the combination meter.

The engine coolant temperature gauge unit should work normally.

NO : Repair the wiring harness. The engine coolant temperature gauge unit should work normally.

Connectors : C-02, C-124
<L.H. drive vehicles>



C-02 Harness side

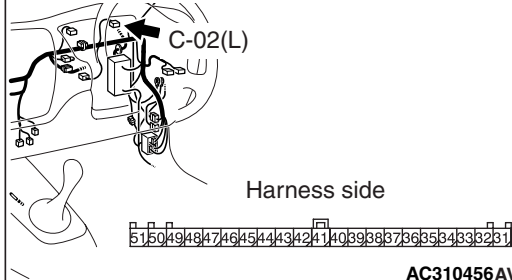
51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

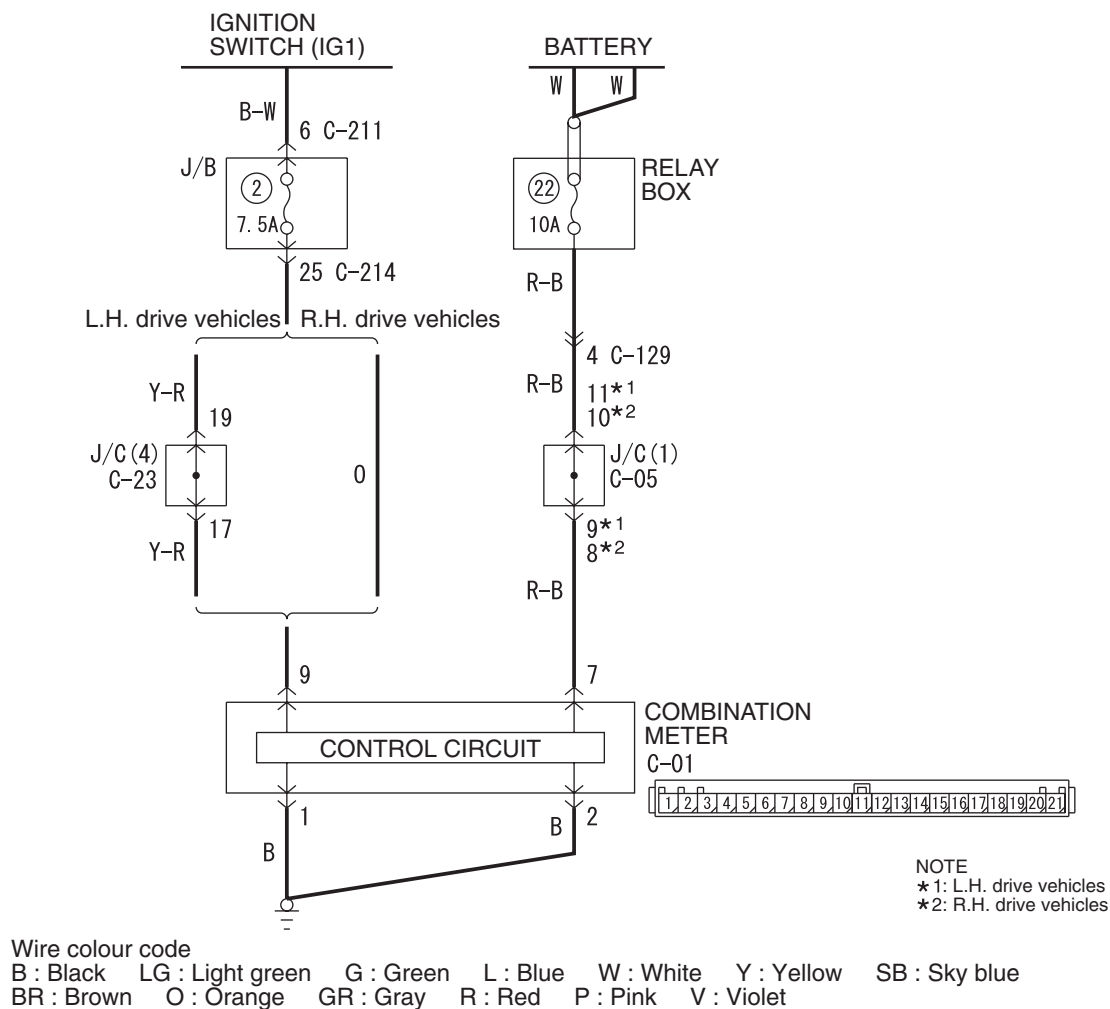
C-124

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

AC310447AW

Connector : C-02
<R.H. drive vehicles>



INSPECTION PROCEDURE 5: Combination meter does not work.**Combination Meter Power Source Circuit**

W4J54E81AA

TECHNICAL DESCRIPTION (COMMENT)

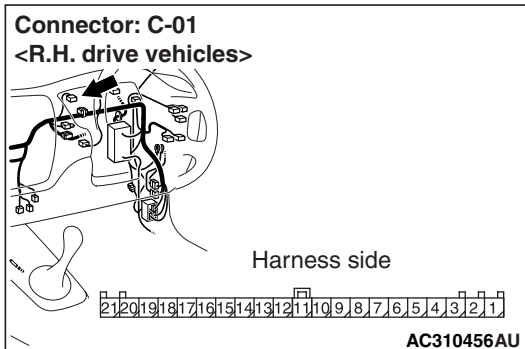
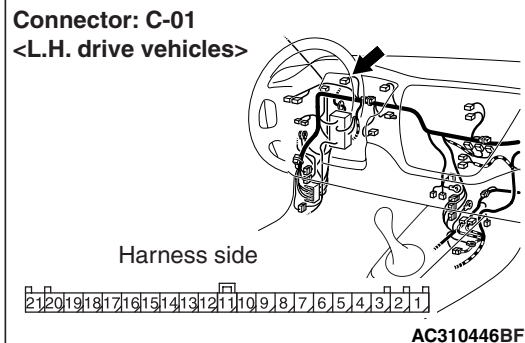
The cause is thought to be malfunction of the power, earth circuitry or combination meter.

TROUBLESHOOTING HINTS

- Malfunction of the combination meter
- Damaged wiring harness or connectors

DIAGNOSIS PROCEDURE

STEP 1. Check combination meter connector C-01 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

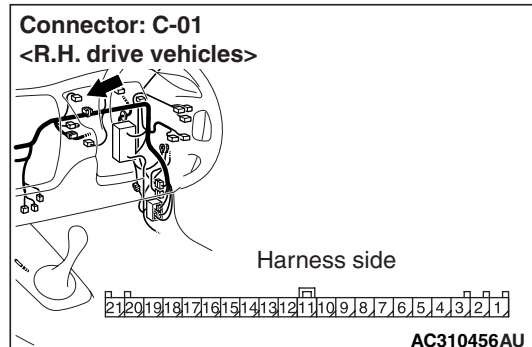
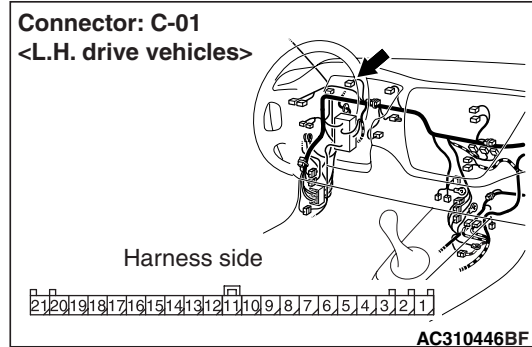


Q: Is combination meter connector C-01 in good condition?

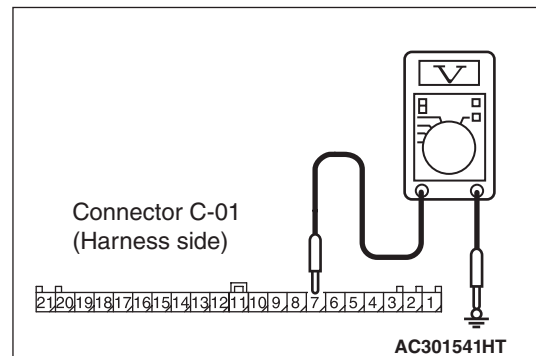
YES : Go to Step 2.

NO : Repair or replace the damaged component(s). If the functions, which are described in "CIRCUIT OPERATION", work normally, the input signal from the ignition switch (IG1) should be normal.

STEP 2. Check the battery power supply circuit to the combination meter. Voltage measurement at combination meter connector C-01.



(1) Disconnect combination meter connector C-01 and measure the voltage available at the wiring harness side of the connector.



(2) Measure the voltage between terminal 7 and earth.

OK: System voltage

Q: IS the check result normal?

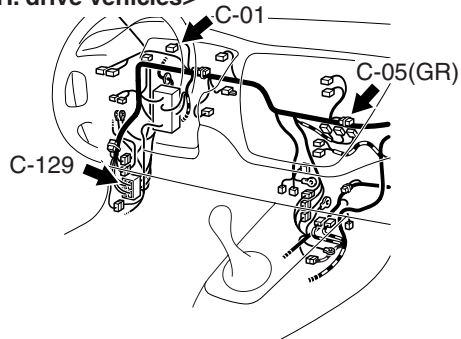
YES : Go to Step 4.

NO : Go to Step 3.

STEP 3. Check the wiring harness between combination meter connector C-01 (terminal 7) and battery.

Connectors: C-01, C-05, C-129

<L.H. drive vehicles>



C-01

Harness side

21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---

C-05

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

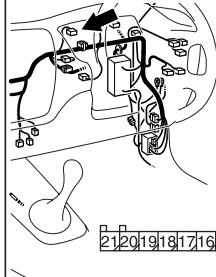
C-129

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

AC310447AX

Connector: C-01

<R.H. drive vehicles>



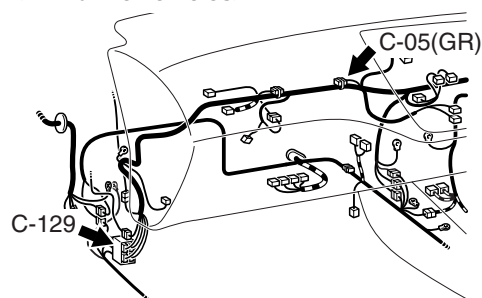
Harness side

21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---

AC310456AU

Connectors: C-05, C-129

<R.H. drive vehicles>



C-05

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

C-129

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

AC310455AL

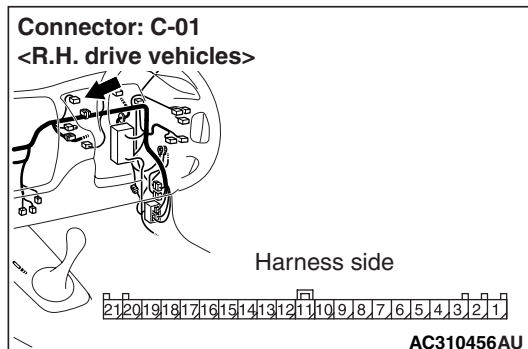
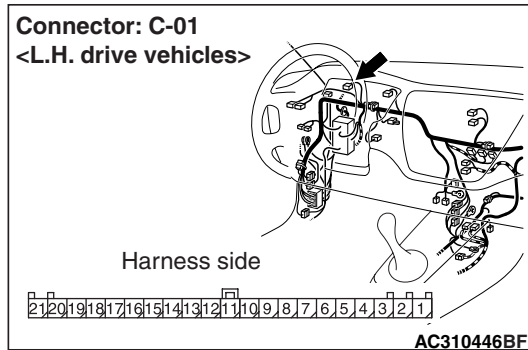
NOTE: Also check intermediate connector C-129 and joint connector C-05 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-129 or joint connector C-05 is damaged, repair or replace the connector.

Q: Is the wiring harness between combination meter connector C-01 (terminal 7) and battery in good condition?

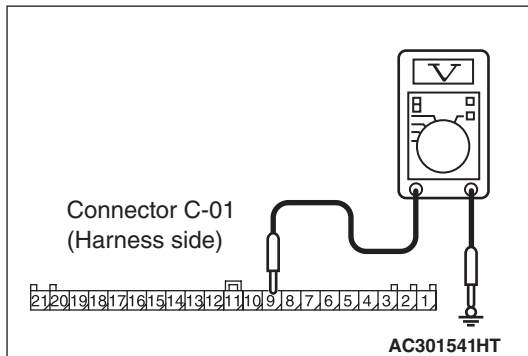
YES : There is no action to be taken.

NO : Repair the wiring harness. Check to see that all meters operate.

STEP 4. Check the ignition switch (IG1) circuit to the combination meter. Voltage measurement at combination meter connector C-01.



- (1) Disconnect combination meter connector C-01 and measure the voltage available at the wiring harness side of the connector.
- (2) Turn the ignition switch to the "ON" position.



- (3) Measure the voltage between terminal 9 and earth.

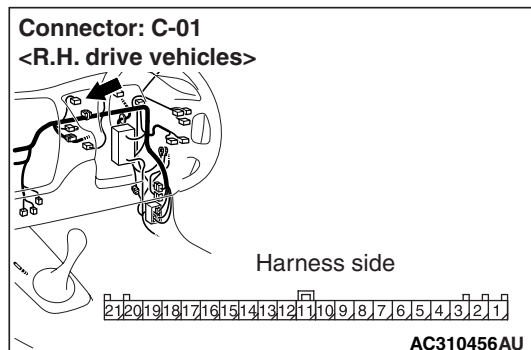
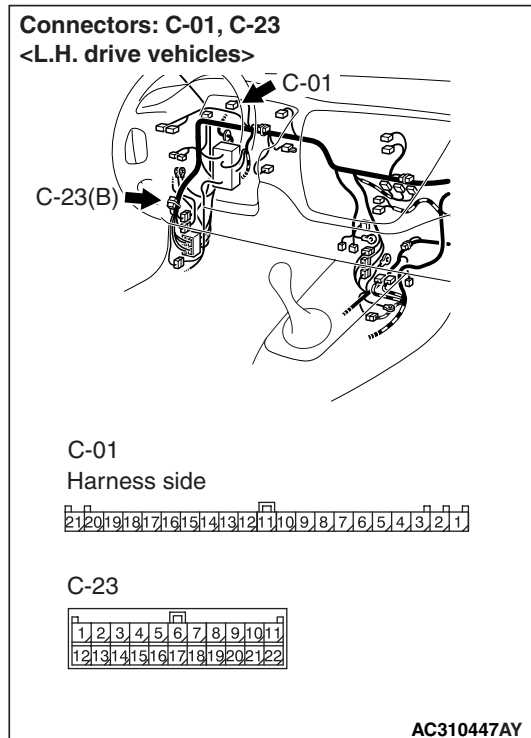
OK: System voltage

Q: Is the check result normal?

YES : Go to Step 6.

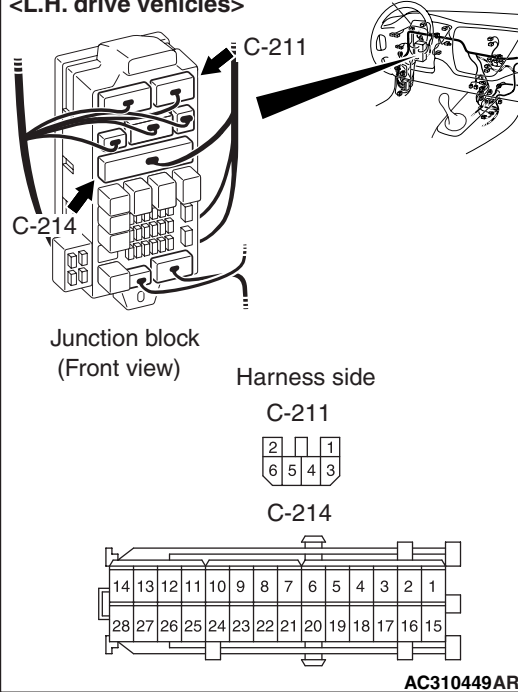
NO : Go to Step 5.

STEP 5. Check the wiring harness between combination meter connector C-01 (terminal 9) and ignition switch (IG1).

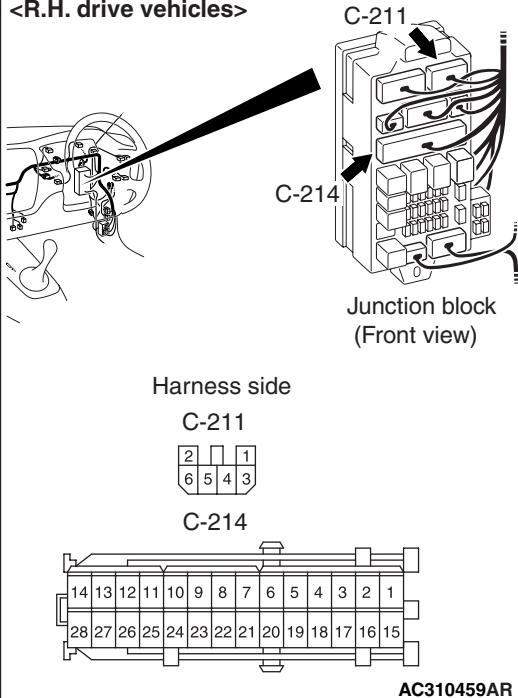


NOTE:

Connectors: C-211, C-214
<L.H. drive vehicles>



Connectors: C-211, C-214
<R.H. drive vehicles>

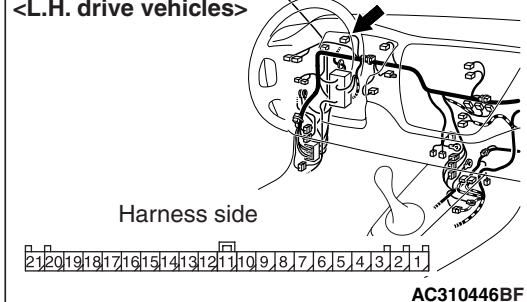


Also check junction block connector C-211 and C-214, joint connector C-23 <LH drive vehicles> for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-211 or C-214 or joint connector C-23 <LH drive vehicles> is damaged, repair or replace the connector.

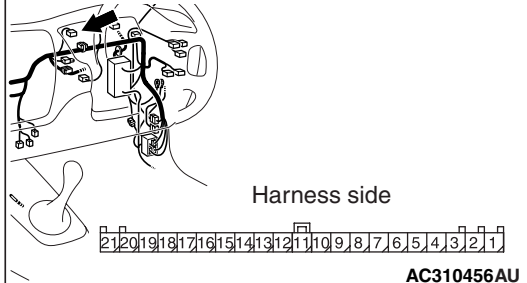
- Q: Is the wiring harness between combination meter connector C-01 (terminal 9) and ignition switch (IG1) in good condition?
 YES : There is no action to be taken.
 NO : Repair the wiring harness. Check to see that all meters operate.

STEP 6. Check the earth circuit to the combination meter. Resistance measurement at combination meter connector C-01.

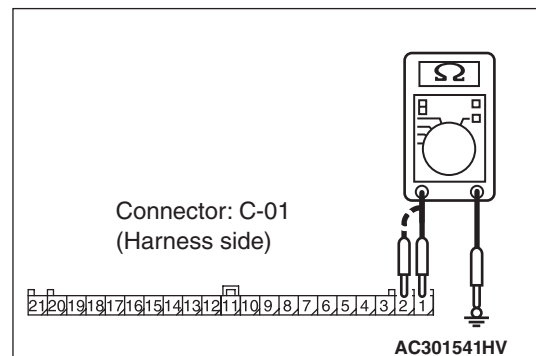
Connector: C-01
<L.H. drive vehicles>



Connector: C-01
<R.H. drive vehicles>



- (1) Disconnect combination meter connector C-01 and measure the resistance available at the wiring harness side of the connector.



- (2) Measure the resistance between terminal 1 and earth.

OK: 2 ohms or less

- (3) Measure the resistance between terminal 2 and earth.

OK: 2 ohms or less

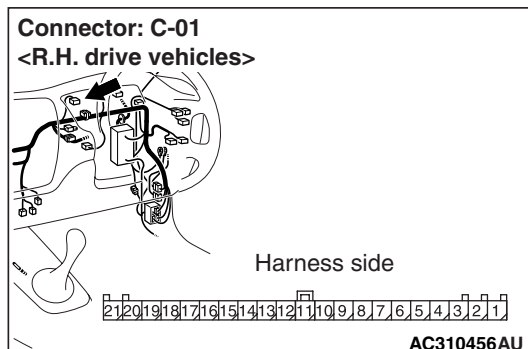
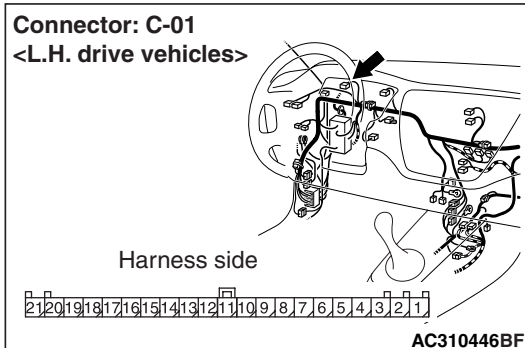
Q: Is the check result normal?

YES : Repair or replace the combination meter.

Check to see that all meters operate.

NO : Go to Step 7.

STEP 7. Check the wiring harness between combination meter connector C-01 (terminals 1 and 2) and earth.



Q: Are the wiring harness between combination meter connector C-01 (terminals 1 and 2) and earth in good condition?

YES : There is no action to be taken.

NO : Repair the wiring harness. Check to see that all meters operate.

ON-VEHICLE SERVICE

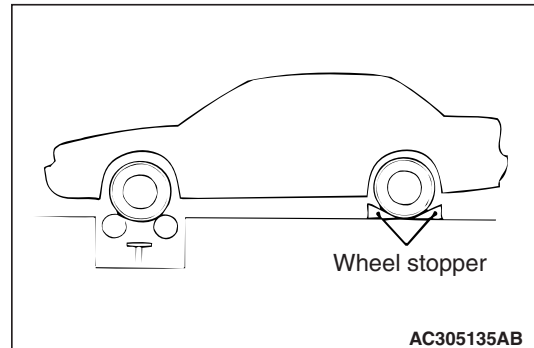
SPEEDOMETER CHECK

M1543000900531

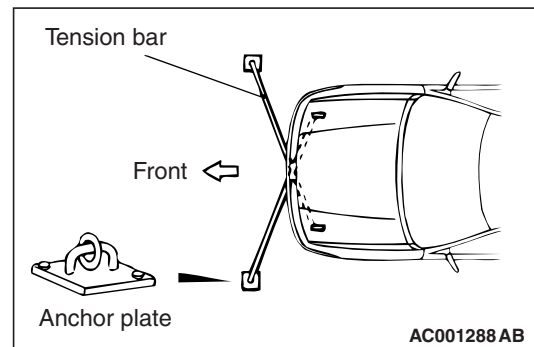
- Adjust the pressure of tyres to the specified level. (Refer to GROUP 31, On-vehicle Service P.31-7).

CAUTION

Do not operate the clutch suddenly. Do not increase/decrease speed rapidly while testing.



- Set the vehicle onto a speedometer tester and use wheel chocks to hold the rear wheels.
- To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.



- To prevent the vehicle from moving, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured.
- Check if the speedometer indicator range is within the standard values.

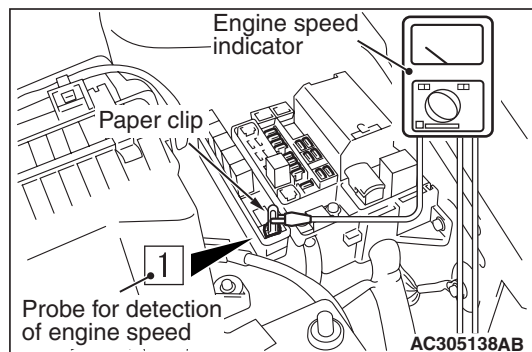
Standard value:

Standard indicator km/h	Allowance range km/h
20	20 – 24
40	40 – 44
80	80 – 85
120	121 – 127
160	162 – 169
200	203 – 211

- If not to the standard value, inspect for proper tyre size. If not correct, replace the tyres with original size tyres and retest. If correct, replace the speedometer. If still not to standard value, replace the vehicle speed sensor.

TACHOMETER CHECK

M1543001000519



1. Attach an external high quality tachometer to the engine speed detection connector on the harness side (such as with a paper clip).

NOTE: For tachometer check, use an external high quality inductive tachometer.

2. Compare the readings of the vehicle tachometer and the external tachometer at every engine speed, and check if the variations are within the standard values.

Standard values:

Engine speed (r/min)	Indication allowance of tachometer r/min
700	± 120
2,000	$- 175 + 225$
3,000	$- 175 + 300$
4,000	$- 225 + 375$
5,000	$- 225 + 425$
6,000	$- 225 + 475$
7,000	$- 200 + 500$
8,000	$- 100 + 500$

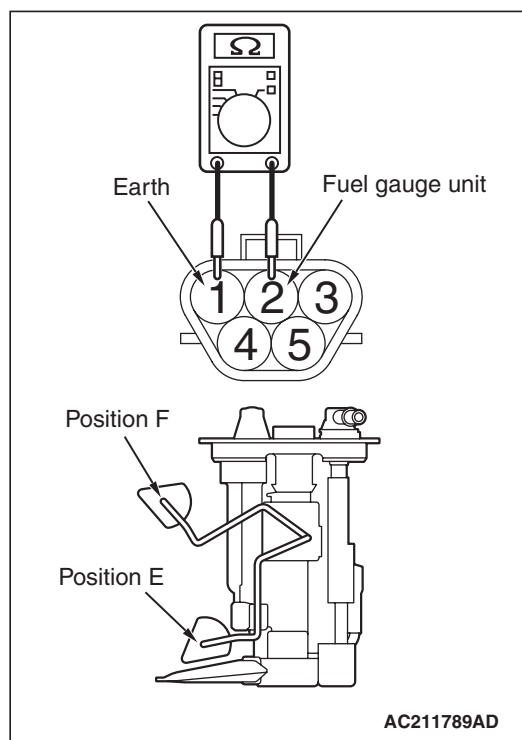
FUEL TANK GAUGE UNIT CHECK

M1543001200643

Remove the fuel tank gauge unit (Refer to GROUP 13B, Fuel Tank [P.13B-5](#)).

FUEL TANK GAUGE UNIT RESISTANCE

Fuel gauge unit (main)



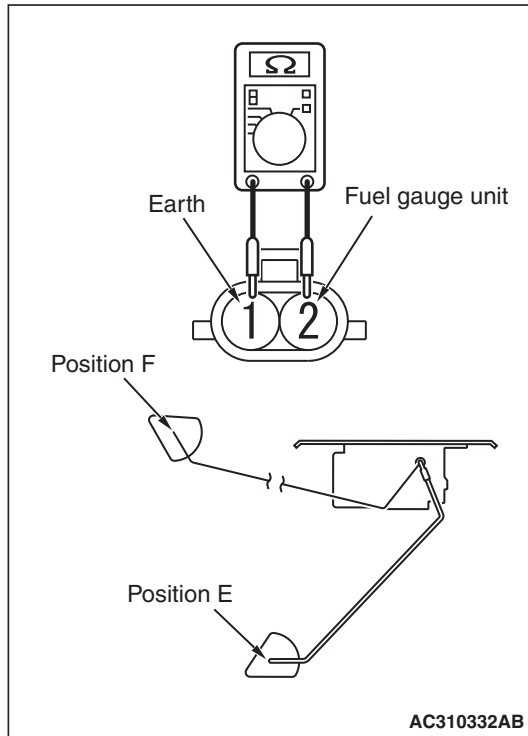
1. Check that resistance value between the fuel gauge terminal and earth terminal is at the standard value when the fuel tank gauge unit float is between position "F" (highest) and position "E" (lowest).

Standard values:

Float Position	Resistance of Gauge
Position F	$2 \pm 1 \Omega$
Position E	$36.4 \pm 1 \Omega$

2. Check that resistance value changes smoothly when the float moves slowly between position "F" (highest) and position "E" (lowest).
3. If all checks are correct, go to fuel tank gauge unit float height check. If any check is not correct, replace the fuel tank gauge unit.

Fuel gauge unit (sub)



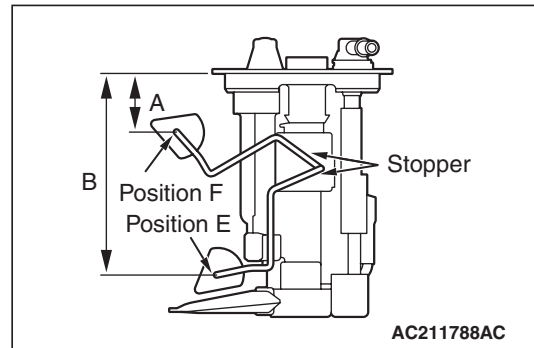
1. Check that resistance value between the fuel gauge terminal and earth terminal is at the standard value when the fuel tank gauge unit float is between position "F" (highest) and position "E" (lowest).

Standard values:

Float Position	Resistance of Gauge
Position F	$2 \pm 1 \Omega$
Position E	$73.6 \pm 1 \Omega$

2. Check that resistance value changes smoothly when the float moves slowly between position "F" (highest) and position "E" (lowest).
3. If all checks are correct, go to fuel tank gauge unit float height check. If any check is not correct, replace the fuel tank gauge unit.

FUEL TANK GAUGE UNIT FLOAT HEIGHT Fuel gauge unit (main)



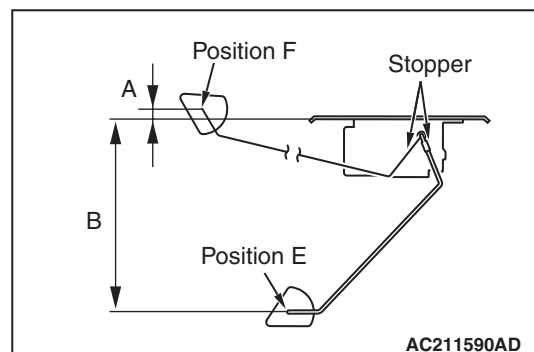
1. Move the float and measure height A at position "F" (highest) and B at position "E" (lowest) with the float arm touching stopper.

Standard values:

Float Position	Float Centre Height
Position F (A)	$33.3 \pm 2.0 \text{ mm}$
Position E (B)	$121.9 \pm 2.0 \text{ mm}$

2. If all checks are correct, go to fuel tank gauge unit float height check. If any check is not correct, replace the fuel tank gauge unit.

Fuel gauge unit (sub)



1. Move the float and measure height A at position "F" (highest) and B at position "E" (lowest) with the float arm touching stopper.

Standard values:

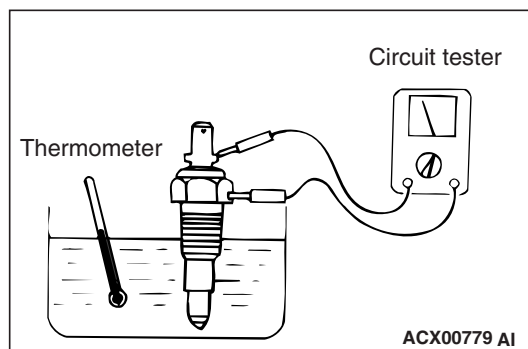
Float Position	Float Centre Height
Position F (A)	$5.7 \pm 2.0 \text{ mm}$
Position E (B)	$141.0 \pm 2.0 \text{ mm}$

2. If all checks are correct, go to fuel tank gauge unit float height check. If any check is not correct, replace the fuel tank gauge unit.

ENGINE COOLANT TEMPERATURE
GAUGE UNIT CHECK

M1543001500484

1. Drain the engine coolant (Refer to GROUP 14, On-vehicle Service [P.14-15](#)).
2. Remove the engine coolant temperature gauge unit.

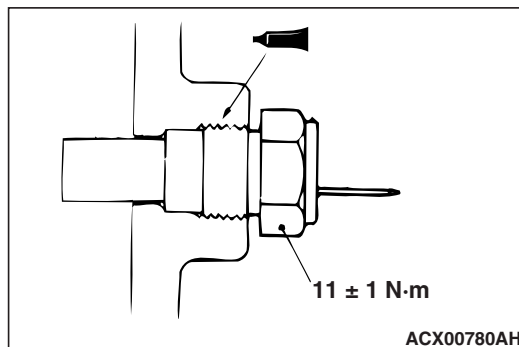


3. Put engine coolant temperature gauge unit into the hot water in specified temperature, and ensure that basic resistance is within standard value.

Standard value: $104 \pm 13.5 \Omega$ (at 70°C)

Reference value

Temperature $^\circ\text{C}$	Resistance Ω
50	230
60	155
80	73

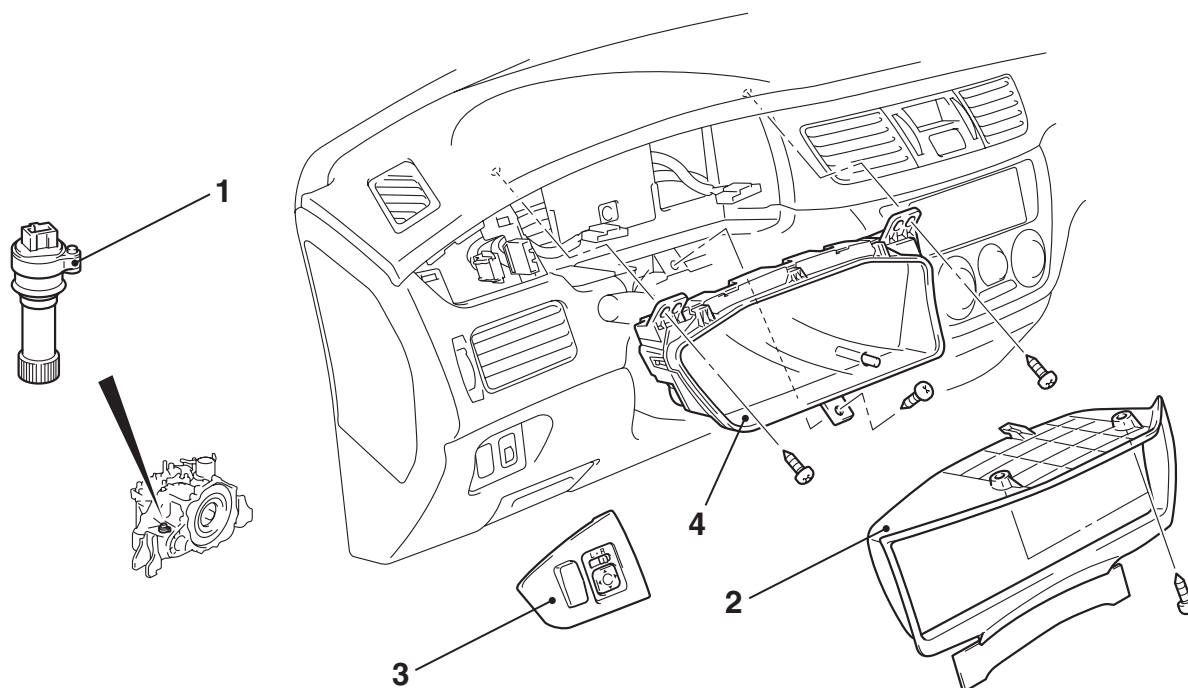


4. After inspection, apply specified sealant at threads of engine coolant temperature gauge unit, and tighten to the specified torque.
Semi-drying sealant: 3M 1215 or equivalent
5. Add engine coolant (Refer to GROUP 14, On-vehicle Service [P.14-15](#)).

COMBINATION METER ASSEMBLY

REMOVAL AND INSTALLATION

M1543021300051



1. Vehicle speed sensor

Removal steps

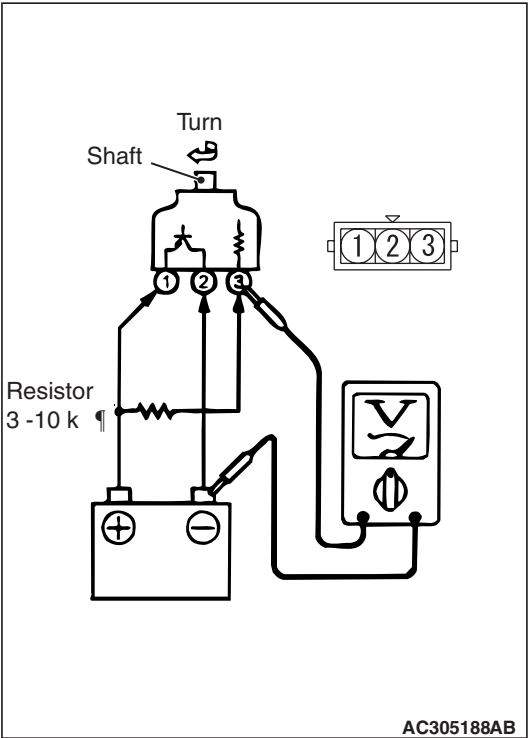
2. Meter bezel
3. Instrument panel ornament
4. Combination meter assembly

AC310333AB

INSPECTION

VEHICLE SPEED SENSOR CHECK

M1543019502797

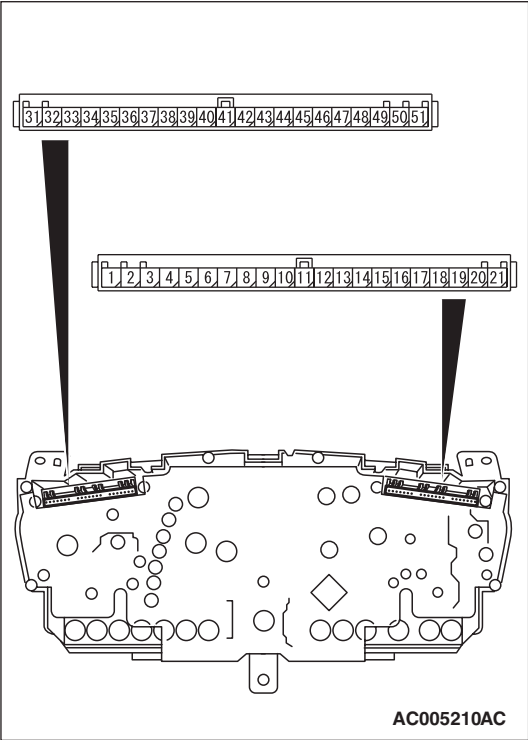


1. Remove the vehicle speed sensor and connect a 3 – 10 kΩ resistor as shown in the illustration.
2. Turn the shaft of the vehicle speed sensor and check that there is voltage between terminals 2 – 3. (1 turn = 4 pulses)
3. If within the standard value, the vehicle speed sensor is OK.

If not within the standard value, replace the vehicle speed sensor.

Standard value: 0 or System Voltage (1turn = 4pulses)

COMBINATION METER INTERNAL
RESISTANCE CHECK



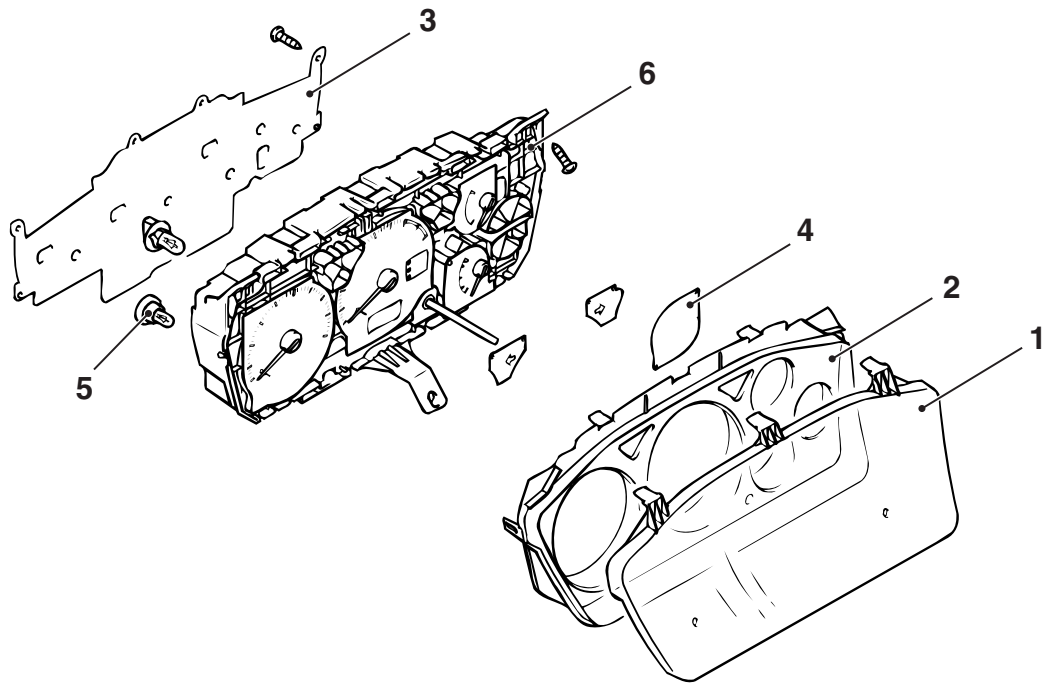
Use circuit tester to measure combination meter internal resistance.

Standard Value:

Measuring terminal No.	Terminal name	Standard value (Ω)
1-21	Engine coolant temperature gauge to earth	233 ± 3
31-51	Fuel gauge to earth	181 ± 2

DISASSEMBLY AND REASSEMBLY

M1543003100404



AC211062AC

Disassembly steps

- 1. Meter glass
- 2. Window plate
- 3. Circuit board cover

Disassembly steps (Continued)

- 4. Indicator plate
- 5. Bulb
- 6. Combination meter assembly

HEADLAMP

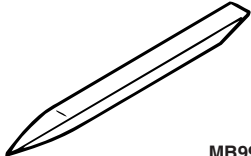
SERVICE SPECIFICATIONS

M1542000300473

Item		Standard value	Limit
Headlamp aiming	Vertical direction	0.69° below horizontal (H)	± 0.29° from the standard value
Measurement of headlamp illiminous intensity cd {When a screen is set 25 m ahead of the vehicle}		—	30,000 cd or more

SPECIAL TOOL

M1542000601165

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of switch panel

TROUBLESHOOTING

M1542000701281

Features the headlamp automatic shutdown function to avoid battery drain when the headlamps are left on. The main features are as follows:

- Extinguishes automatically in three minutes if the ignition switch is turned off with the lighting switch on.
- Extinguishes in one second if the driver's door is opened within that 3-minute period.
- If the headlamps are turned on with the ignition switch off, the headlamps and tail lamps will extinguish in three minutes after the driver's door is opened or closed.

The headlamps are controlled by the Smart Wiring System (SWS). For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

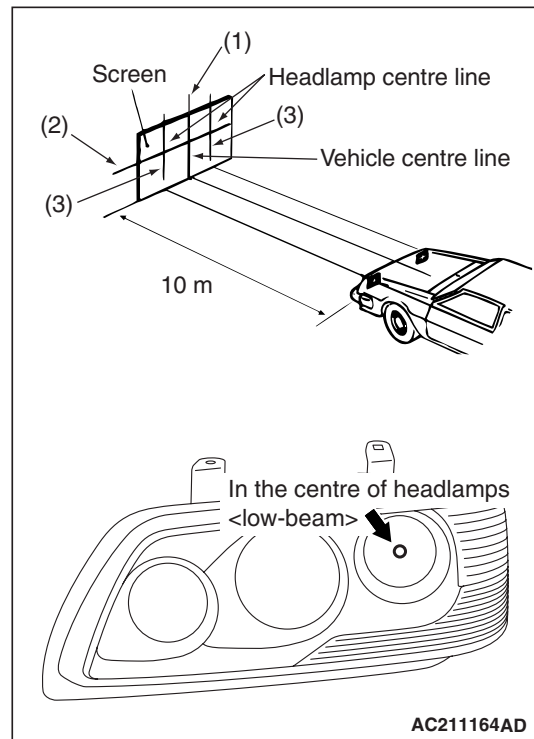
ON-VEHICLE SERVICE

HEADLAMP AIMING

M1542000900613

PRE-AIMING INSTRUCTIONS

1. Inspect for badly rusted or faulty headlamp assemblies.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Inspect tyre inflation, and adjust if it is necessary.
4. If the fuel tank is not full, place a weight in luggage room of the vehicle to simulate weight of a full tank (0.8 kg per litre).
5. There should be no other load in the vehicle other than driver or substituted weight of approximately 75 kg placed in driver's position.
6. Thoroughly clean the headlamp lenses.
7. Place the vehicle on a level floor, perpendicular to a flat screen 10 m away from the bulb centre-marks on the headlamp lens.
8. Rock vehicle sideways to allow vehicle to assume its normal position.
9. Bounce the front suspension through three oscillations by applying the body weight to hood or bumper.



AC211164AD

10. Four lines of adhesive tape (or equivalent markings) are required on screen or wall:

- (1) Position a vertical tape or mark so that it is aligned with the vehicle centre line.
- (2) Measure the distance from the centre-marks on the headlamp lens to the floor. Transfer the measurement to the screen. Horizontal tape or mark on the screen is for reference of vertical adjustment.

NOTE: Height from the floor to the centre of the headlamps (Reference value): 840 mm

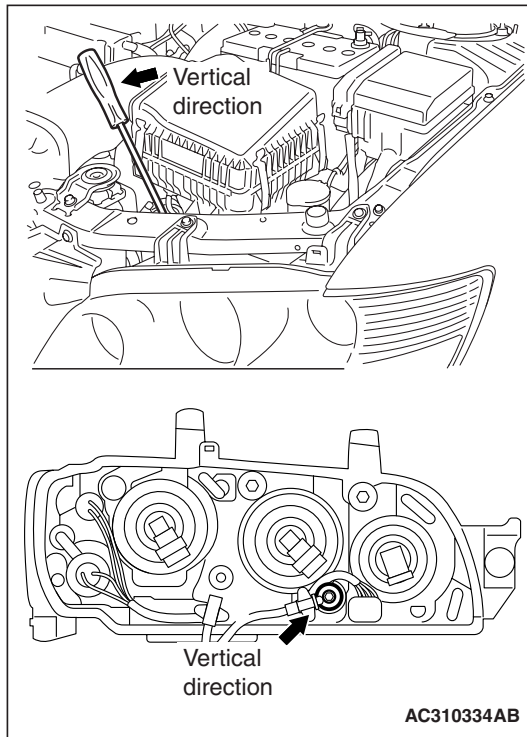
- (3) Measure the distance from the centre line of the vehicle to the centre of each headlamp. Transfer the measurement to the screen. Vertical tape or mark on the screen with reference to the centre line of each headlamp bulb.

HEADLAMP ADJUSTMENT

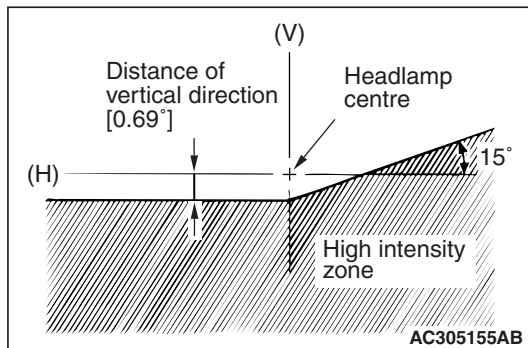
⚠ CAUTION

- Do not cover a headlamp for more than three minutes to prevent the plastic headlamp lens deformation.
- When adjusting one headlamp beam, make sure that another headlamp is off by disconnecting the connector from it. When reconnecting the connector, make sure that the headlamp beam is not disturbed accidentally.

1. The low-beam headlamp should project on the screen upper edge of the beam (cut-off).



2. If not the case, turn the adjusting screws to achieve the specified low-beam cut-off location on the aiming screen.



Standard value:

(Vertical direction) 0.69° below horizontal (H)

Limit:

Vertical direction; ± 0.29° from the standard value

LUMINOUS INTENSITY MEASUREMENT

M1542001000538

1. Set the headlamps to high-beam.

2. Using a photometer, and following its manufacturer's instruction manual, measure the headlamp centre intensity and check to be sure that the limit value is satisfied.

Limit: 30,000 cd or more {When a screen is set 25m ahead of the vehicle}

NOTE: When measuring the intensity, maintain an engine speed of 2,000 r/min., with the battery fully charged.

There may be special local regulations pertaining to headlamp intensity. Be sure to make any adjustments necessary to satisfy such regulations.

If an illuminometer is used to make the measurements, convert its values to photometer values by using the following formula.

$$I = E \times r^2:$$

- I = intensity (cd)
- E = illumination (lux)
- r = distance (m) from headlamps to illuminometer

BULB REPLACEMENT

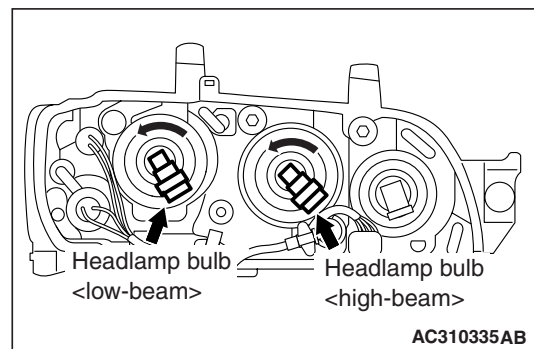
M1542001300788

HEADLAMP BULB

⚠ CAUTION

Do not touch the surface of the bulb with hands or dirty gloves as the bulb may pop after a short time. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

1. Disconnect the battery.
2. Disconnect the connector.

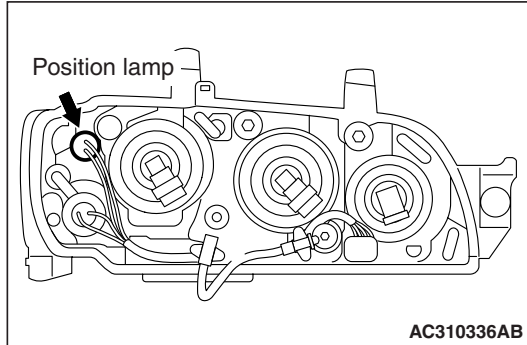


3. Screw out the headlamp bulb.
4. Replace the bulb, and connect securely the connector.

POSITION LAMP BULB

⚠ CAUTION

Do not touch the bulb surface bare-handed or with dirty gloves. If dirt is attached on surface of the bulb, immediately use alcohol or thinner to remove dirt, and install the bulb after well dried.

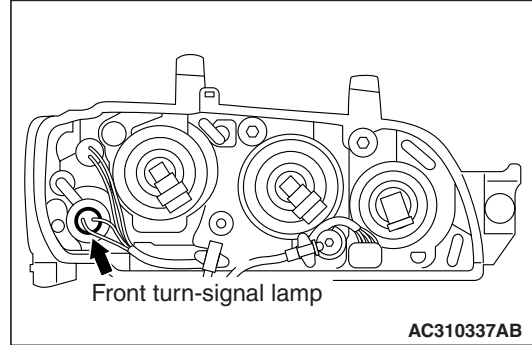


1. Remove the splash shield.
2. Screw out the position lamp socket to pull out the position lamp bulb.

FRONT TURN-SIGNAL LAMP BULB

⚠ CAUTION

Do not touch the bulb surface bare-handed or with dirty gloves. If dirt is attached on surface of the bulb, immediately use alcohol or thinner to remove dirt, and install the bulb after well dried.

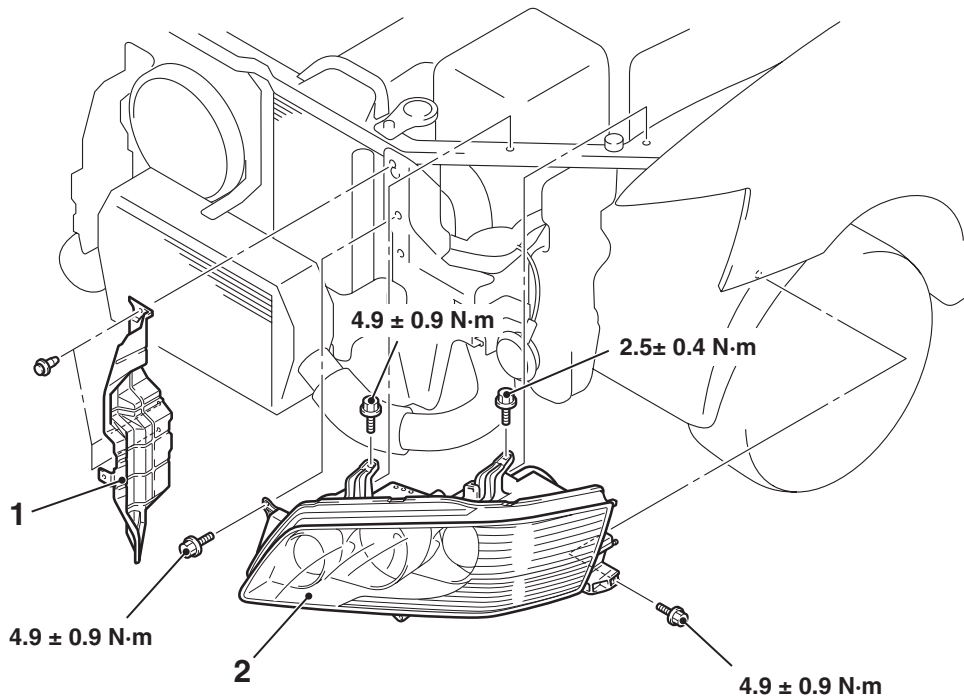


1. Remove the splash shield.
2. Screw out the front turn-signal lamp socket to pull out the front turn-signal lamp bulb.

HEADLAMP

REMOVAL AND INSTALLATION

M1542001800299

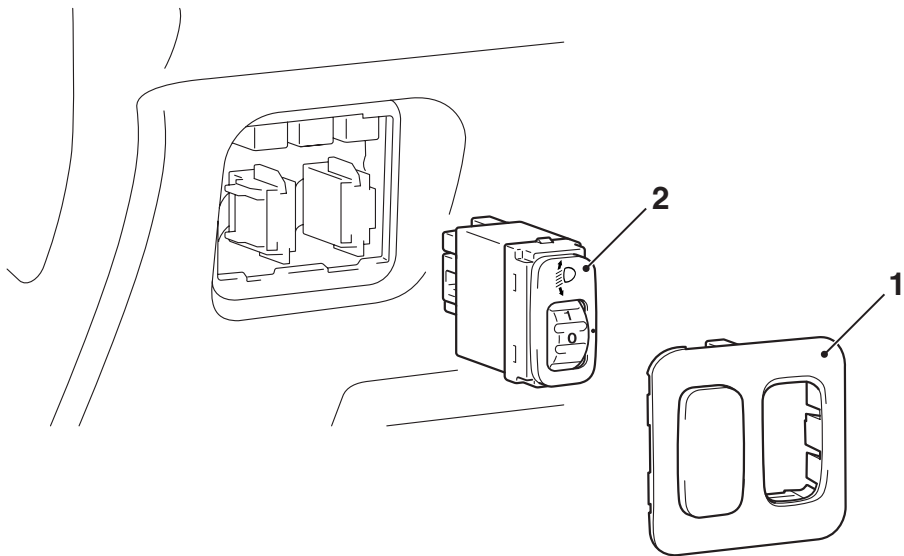
Post-installation OperationHeadlamp Aiming Adjustment (Refer to [P.54A-59](#)).**Removal steps**

1. Air guide panel
2. Headlamp assembly

HEADLAMP LEVELING SWITCH

REMOVAL AND INSTALLATION

M1542013700084



AC310339AB

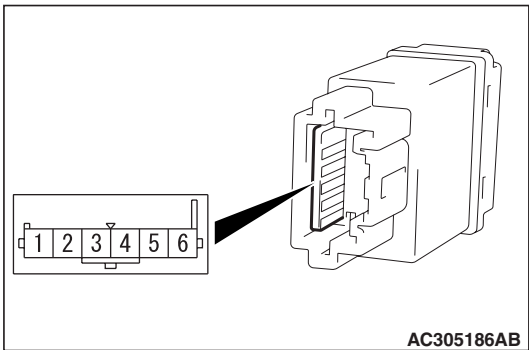
Removal steps

- 1. Switch panel
- 2. Headlamp levelling switch

INSPECTION

M1542011201127

HEADLAMP LEVELING SWITCH RESIST-
ANCE CHECK



AC305186AB

Terminal No.	Switch position	Resistance
4 - 6	0	750 ohms
	1	1050 ohms
	2	1410 ohms
	3	1710 ohms
	4	2010 ohms
5 - 6	0, 1, 2, 3, 4	2830 ohms

REAR FOG LAMP

TROUBLESHOOTING

M1542000701623

If the rear fog lamp switch is turned ON when the headlamp is turned ON, the rear fog lamp is switched ON and OFF alternatively.

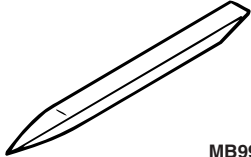
If the headlamp and the rear fog lamp is turned OFF at the same time.

The rear fog lamp is controlled by the Smart Wiring System (SWS). For Troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

SPECIAL TOOL

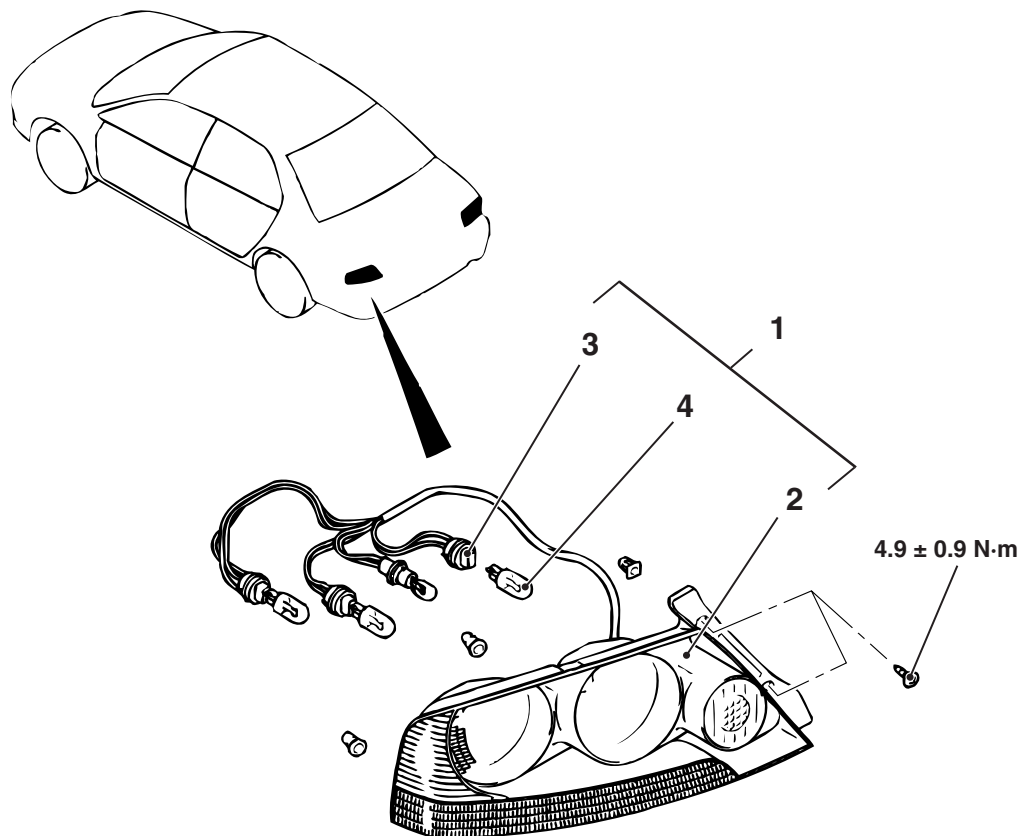
M1542000601176

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of switch panel

REAR FOG LAMP

REMOVAL AND INSTALLATION

M1542009800118



AC310340AB

Removal steps

1. Rear combination lamp assembly
2. Rear combination lamp body

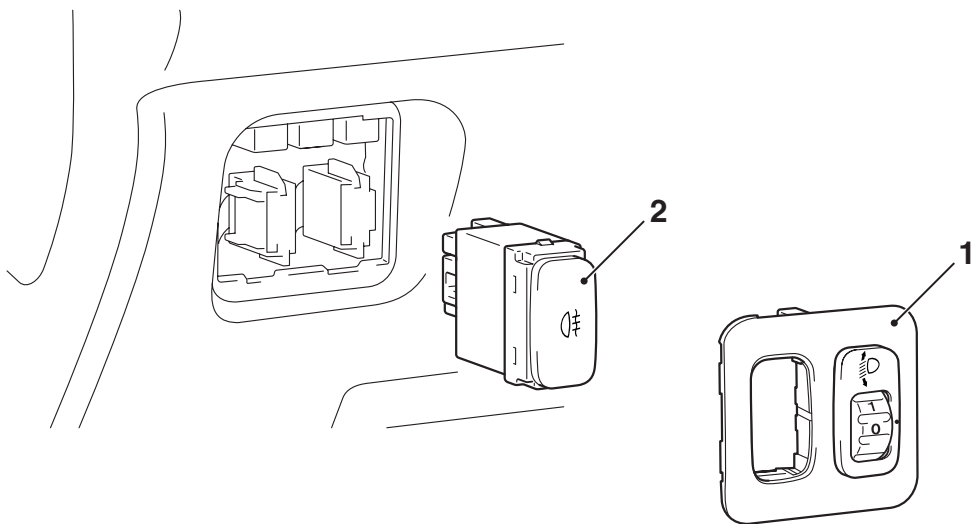
Removal steps (Continued)

3. Rear fog lamp socket
4. Bulb

REAR FOG LAMP SWITCH

REMOVAL AND INSTALATION

M1542014200026



AC310880AB

Removal steps

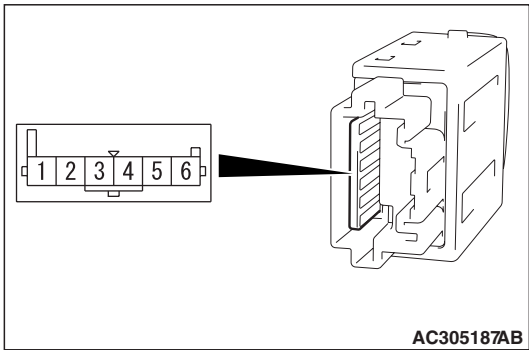
- 1. Switch panel
- 2. Rear fog lamp switch

INSPECTION

M1542011201138

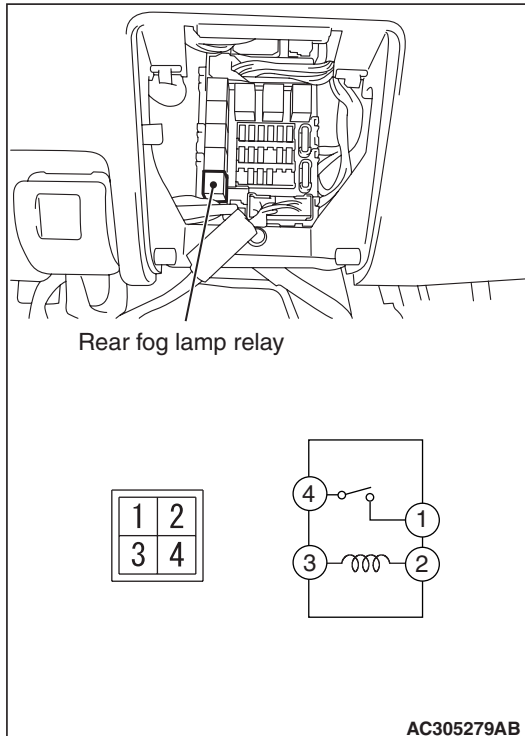
REAR FOG LAMP SWITCH CONTINUITY
CHECK

Switch position	Tester connection	Specified condition
Pressed	5 – 6	Less than 2 ohms
Released	5 – 6	Open circuit



AC305187AB

REAR FOG LAMP RELAY CHECK



Battery voltage	Tester connection	Specified condition
Not supplied	1 – 4	Open circuit
- Connect terminal 3 to the positive battery terminal - Connect terminal 2 to the negative battery terminal	1 – 4	Less than 2 ohms

SIDE TURN-SIGNAL LAMP

SPECIAL TOOL

M1542000600913

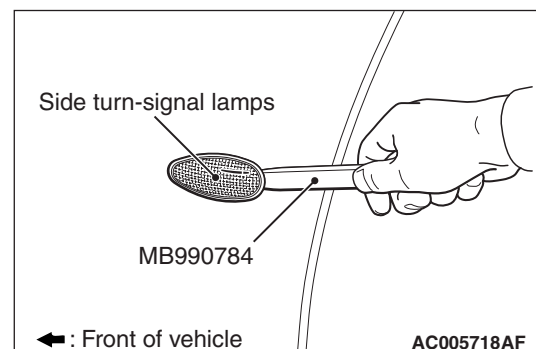
Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of side turn-signal lamp

SIDE TURN-SIGNAL LAMP

REMOVAL AND INSTALLATION

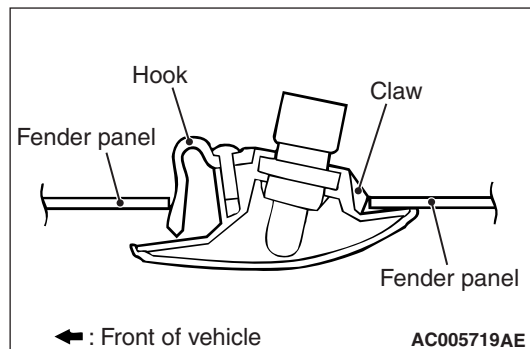
M1542003300201

REMOVAL SERVICE POINT



Use a special tool ornament remover (MB990784), etc. to remove the side turn-signal lamp by pushing the fender forward, bending the hook, and then unclamping the thumb.

INSTALLATION SERVICE POINT



Clamp the thumb on the fender panel the assemble the side turn-signal lamp.

ROOM LAMP

TROUBLESHOOTING

M1542000701634

DIMMER INTERIOR LAMP CONTROL
FUNCTION

The room lamp off is delayed by ETACS-ECU. The lamps off delay time vary according to the conditions. The control details are as follows. The lamp delay off Yes/NO and delay time can be set with the settings (adjustment function). for adjustment methods and adjustment details (post-adjustment operations).

- ADJUSTMENT PROCEDURE
 - Refer to GROUP 54B, SWS On-vehicle service [P.54B-302](#).
- The room lamp lights up if the ignition switch is at the "LOCK" (OFF) position and either of the doors are opened (either of the door switches: ON). At this time, if all doors are closed (all door switches: OFF) then the lamp will gradually dim down to lamps off in about 15 seconds.

NOTE: When the lamps are dimmed and the ignition switch is turned ON or if the door is locked, then the dimming operations stop and the lamps are turned OFF.

- When the ignition switch is at the ON position and one of the doors are opened (one of the door switches: ON) then the room lamp will light up. At this time, if all doors are closed (all door switches: OFF) then the lamps will dim out.
- When the ignition key is pulled out the room lamp lights up and then will dim out in 15 seconds. The lamp will dim out if the ignition key is inserted again and the door is locked while the timer is activated.

The room lamp is controlled by the Smart Wiring System (SWS). For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

INTERIOR LAMP AUTOMATIC
SHUTDOWN FUNCTION

The interior lamp automatic shutdown function, dims out the room lamp and other interior lamps by activating the keep relay built-in the ETACS-ECU when the ignition switch is OFF and the multi-purpose fuse loaded signals built-in the ETACS-ECU is ON and 30 minutes passes. The lamps lights back up if the ignition switch is turned to the ON position or either of the doors is opened (either of the door switches: ON). The function Yes/No feature can be changed with the settings (adjustment function). for adjustment methods and adjustment details (post-adjustment operations).

- ADJUSTMENT PROCEDURE
 - Refer to GROUP 54B, SWS On-vehicle service [P.54B-302](#).

The interior lamp are controlled by the Smart Wiring System (SWS). For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

REAR COMBINATION LAMP

TROUBLESHOOTING

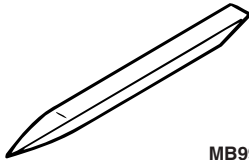
M1542000701322

The lamps setup on the rear combination lamp is controlled in the same manner as the lamps of the headlamp assembly. For details go to the reference. For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

SPECIAL TOOL

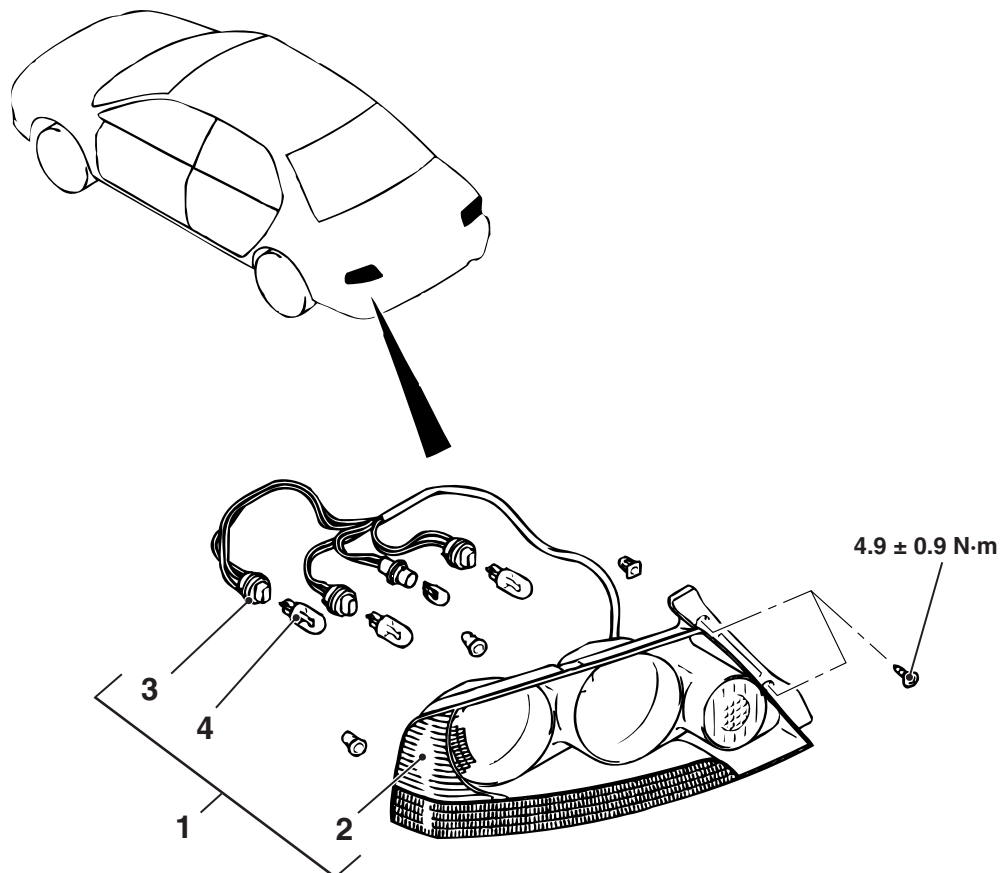
M1542000600924

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of rear combination lamp assembly

REAR COMBINATION LAMP

REMOVAL AND INSTALLATION

M1542003900537



AC310881AB

Removal steps

1. Rear combination lamp assembly
2. Rear combination lamp body

Removal steps (Continued)

3. Socket assembly
4. Bulb

HIGH-MOUNTED STOP LAMP

ON-VEHICLE SERVICE

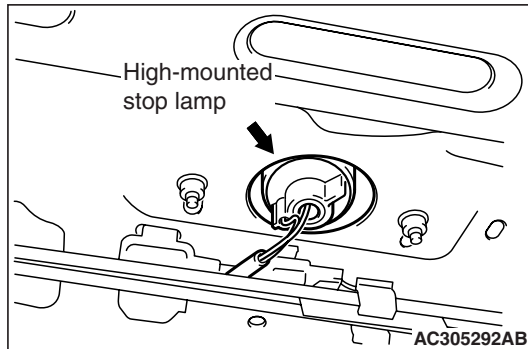
Remove socket from trunk compartment, and replace bulb.

HIGH-MOUNTED STOP LAMP BULB REPLACEMENT <WITH REAR SHELF>

M1542014600013

CAUTION

Do not touch bulb surface bare-handed or with dirty gloves. If dirt is attached on glass surface of the bulb, immediately use alcohol or thinner to remove dirt, and install the bulb after well dried.

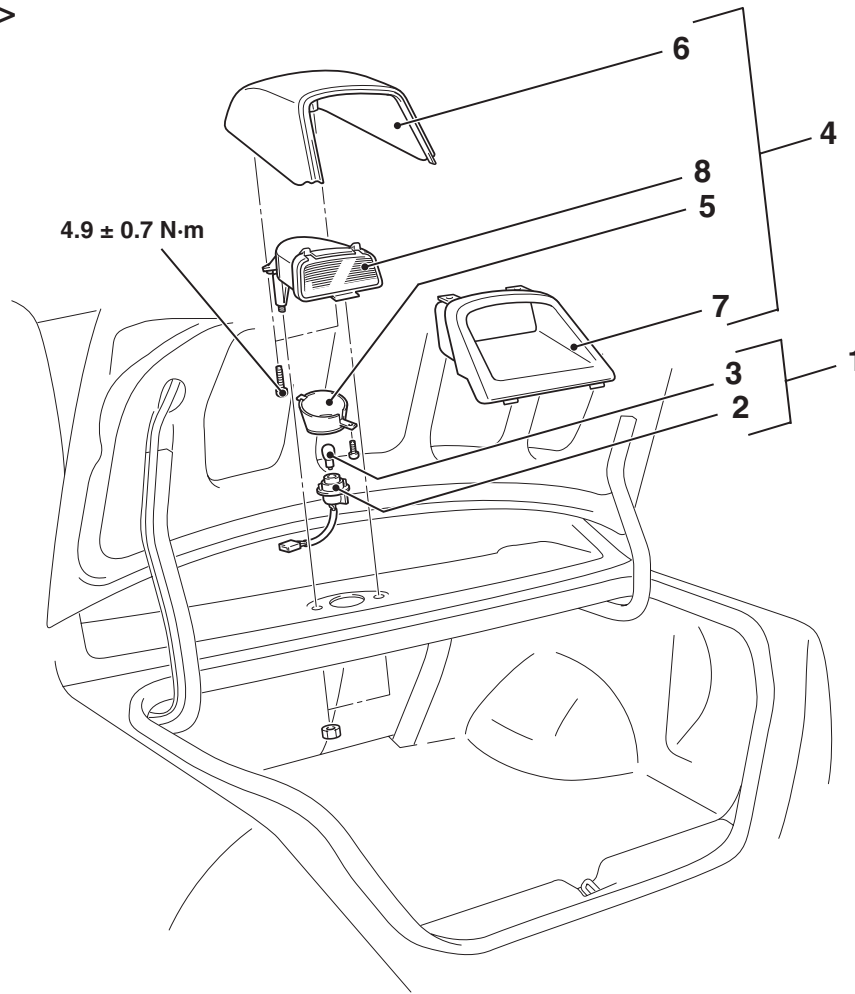


HIGH-MOUNTED STOP LAMP

REMOVAL AND INSTALLATION

M1542005100526

<With rear shelf>



AC305293AB

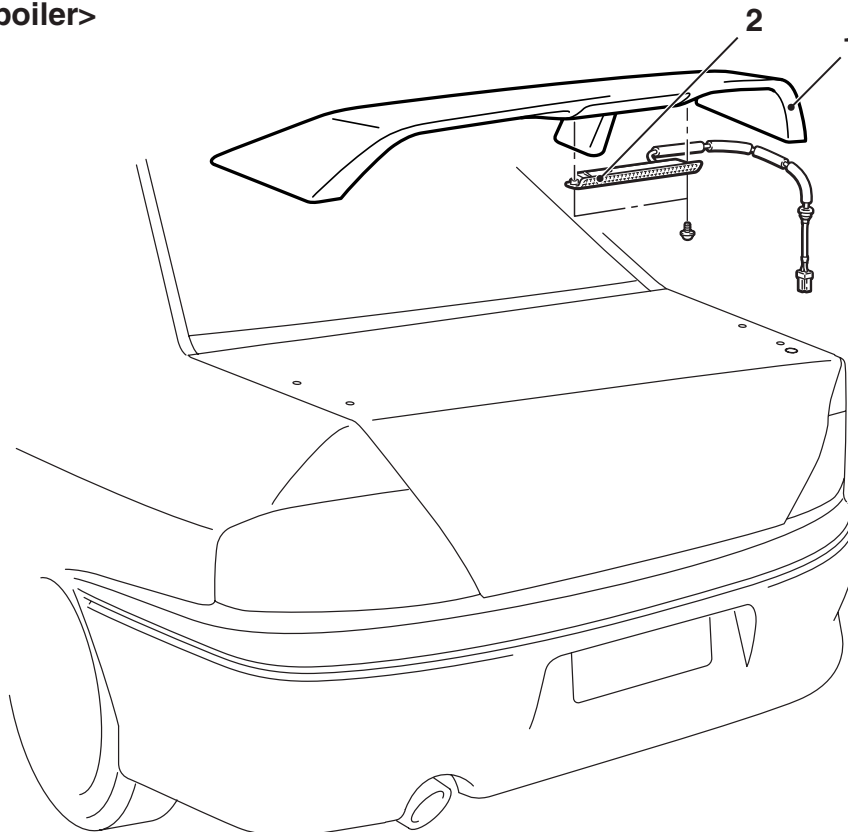
Removal steps

1. Socket assembly
2. Socket
3. Bulb
4. High-mounted stop lamp assembly
5. Socket holder

Removal steps (Continued)

6. High-mounted stop lamp cover (front)
7. High-mounted stop lamp cover (rear)
8. High-mounted stop lamp body

<With rear spoiler>

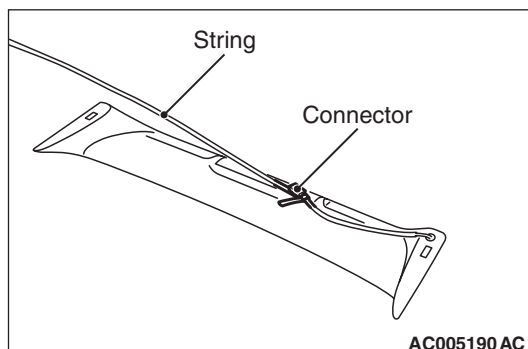


AC310882AB

Removal steps

1. Rear spoiler (Refer to GROUP 51, Rear spoiler P.51-16).
2. High-mounted stop lamp

<<A>>

REMOVAL SERVICE POINT**<<A>> HIGH-MOUNTED STOP LAMP
REMOVAL <WITH REAR SPOILER>**

AC005190AC

Use the following steps to easily route high-mounted stop lamp harness in the event of installation:

⚠ CAUTION

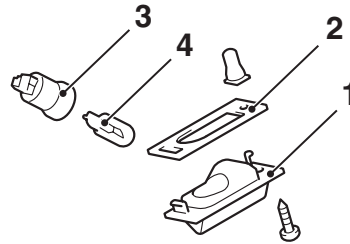
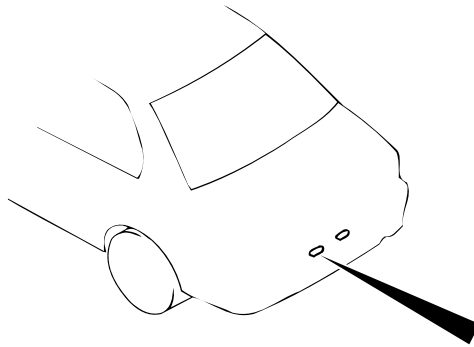
Ensure that the string is tightly tied.

1. Tie a string on the high-mounted stop lamp harness (at the connector side).
2. Carefully pull out the high-mounted stop lamp.

LICENCE PLATE LAMP

REMOVAL AND INSTALLATION

M1542004200456



AC504380AB

Removal steps

1. Licence plate lamp lens
2. Packing

Removal steps (Continued)

3. Socket
4. Licence plate lamp bulb

HAZARD WARNING LAMP SWITCH

TROUBLESHOOTING

M1542000701333

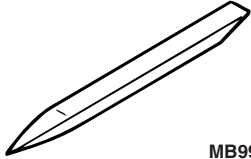
FLASHER TIMER FUNCTION

The hazard warning lamps (flasher timer function) are controlled by the Smart Wiring System (SWS). For troubleshooting, refer to respective Groups below.

- Not using SWS monitor: GROUP 54B, SWS Troubleshooting [P.54B-33](#).
- Using SWS monitor: GROUP 54C, SWS Troubleshooting [P.54C-20](#).

SPECIAL TOOL

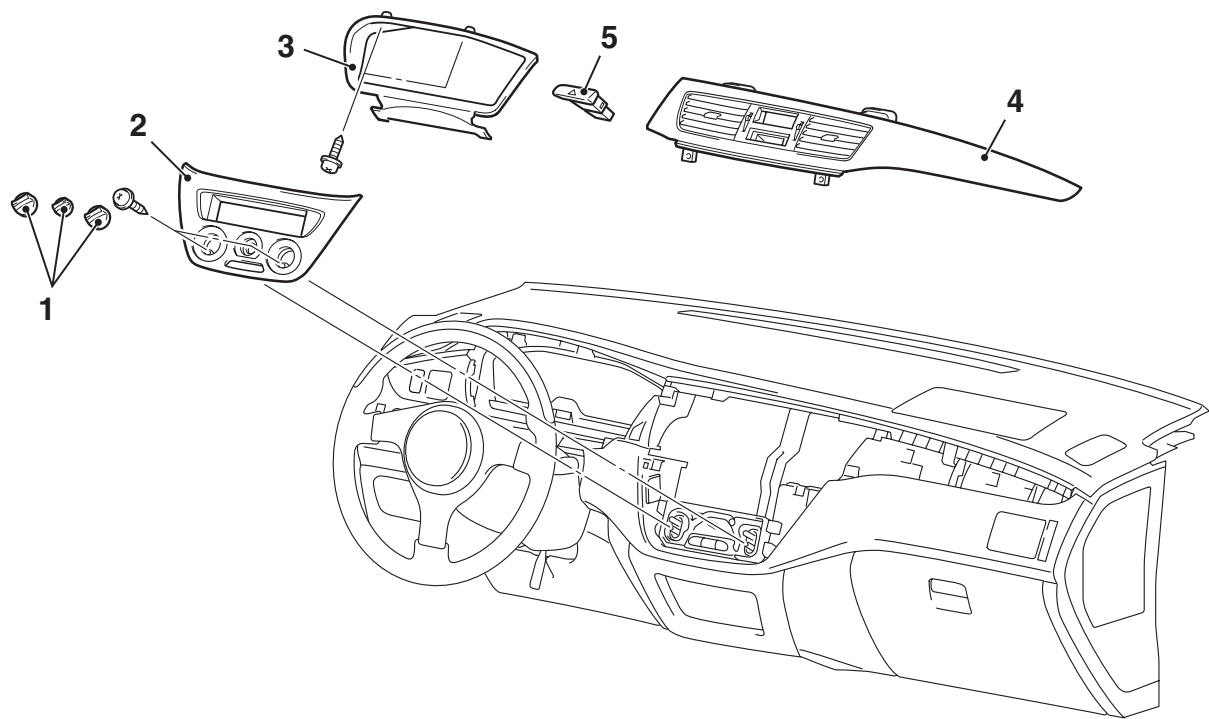
M1542000600935

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of centre panel and centre air outlet panel

HAZARD WARNING LAMP SWITCH

REMOVAL AND INSTALLATION

M1542006600546



AC211605AC

Removal steps

- 1. Knob
- 2. Centre panel

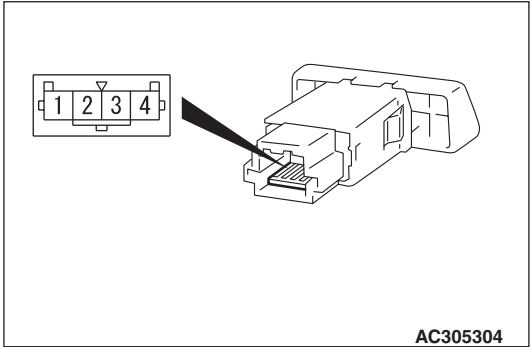
Removal steps (Continued)

- 3. Meter bezel
- 4. Centre air outlet panel
- 5. Hazard warning lamp switch

INSPECTION

M1542011200920

HAZARD WARNING LAMP SWITCH CONTINUITY CHECK

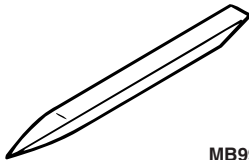


Switch position	Tester connection	Specified condition
Released	1 – 2	Open circuit
Pressed	1 – 2	Less than 2 ohms

COLUMN SWITCH

SPECIAL TOOL

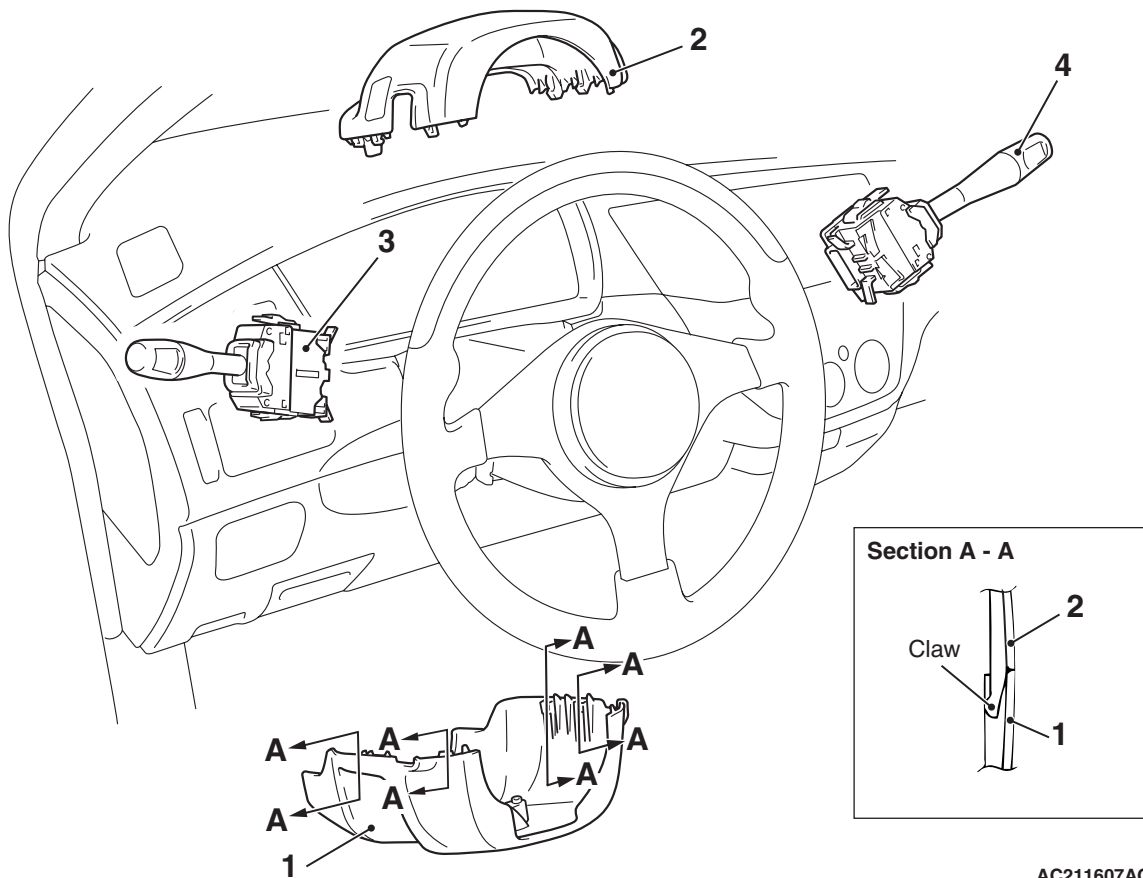
M1542000600946

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of column cover

COLUMN SWITCH

REMOVAL AND INSTALLATION

M1543009100510



AC211607AC

Removal steps

1. Lower column cover
2. Upper column cover

Removal steps (Continued)

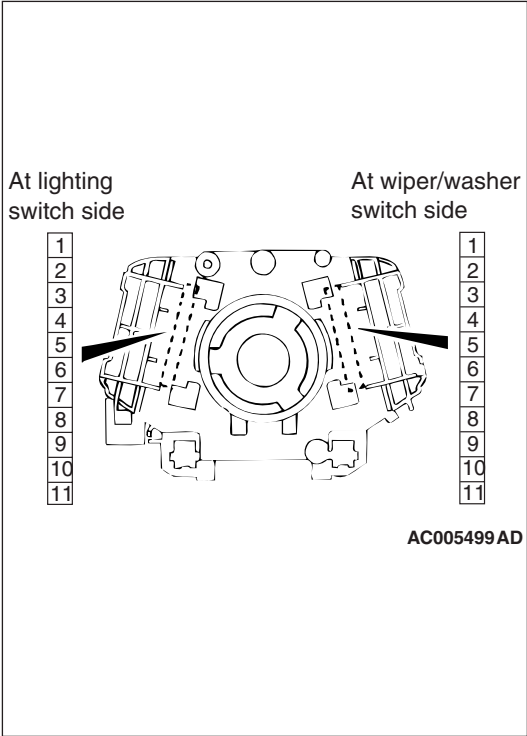
3. Turn-signal and lighting switch
4. Windshield wiper and washer switch

INSPECTION

M1542011201804

COLUMN SWITCH (SWITCH BODY) CONTINUITY CHECK

- 1. Removal the lighting switch and the wiper and washer switch.
- 2. Check that there is continuity between the same terminals [terminals (3) and (11)] of each connector of the column switch body which is still on the steering column.

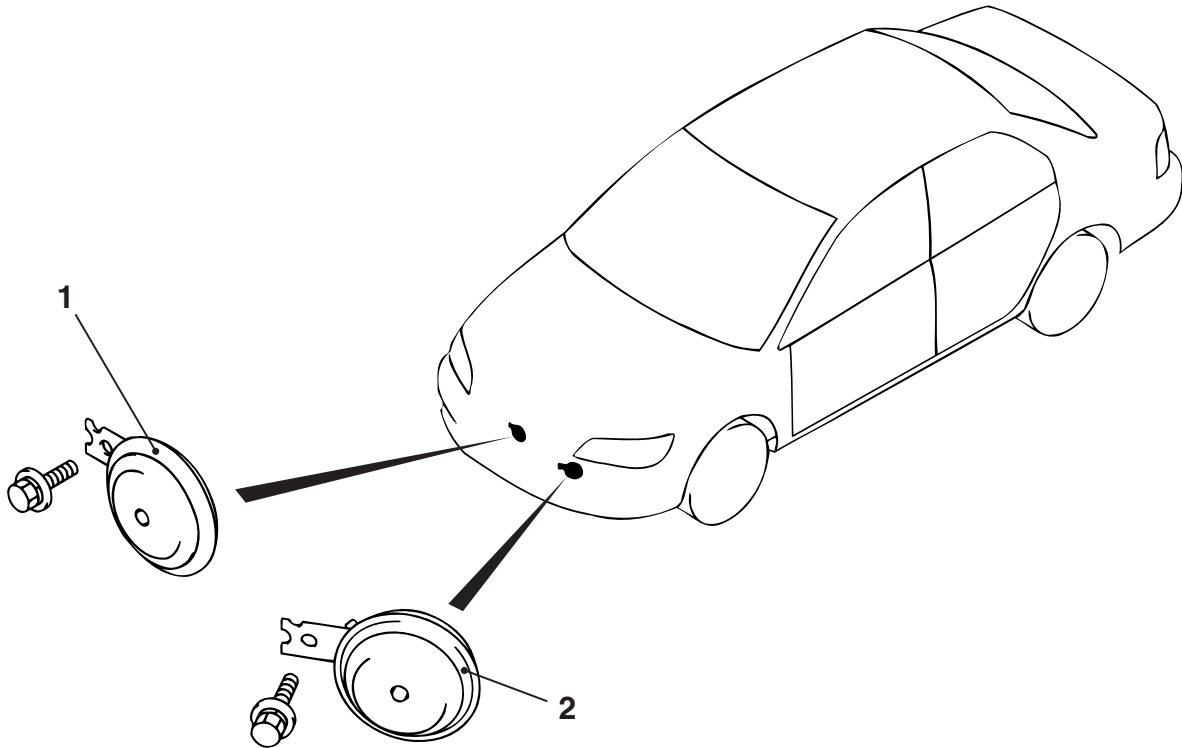


Column switch body	Tester connection	Specified condition
Lighting switch side connector, Wiper and washer switch side connector	3 – 3, 4 – 4, 5 – 5, 6 – 6, 7 – 7, 8 – 8, 9 – 9, 10 – 10, 11 – 11	Less than 2 ohms

HORN

REMOVAL AND INSTALLATION

M1543007900479



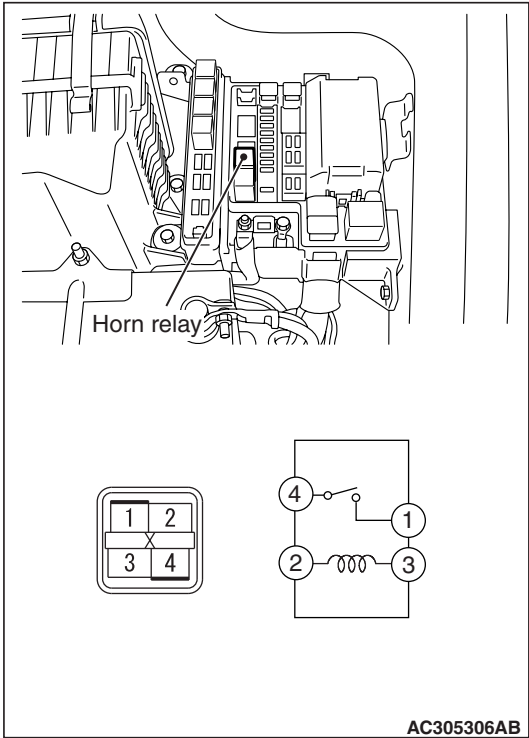
AC211783AC

Removal Steps

1. Horn <LO>
2. Horn <HI>

HORN RELAY CONTINUITY CHECK

M1543019502418



Battery voltage	Tester connection	Specified condition
Not applied	1 – 4	Open circuit
- Connect terminal 2 to the positive battery terminal - Connect terminal 3 to the negative battery terminal	1 – 4	Less than 2 ohms

CLOCK

SPECIAL TOOL

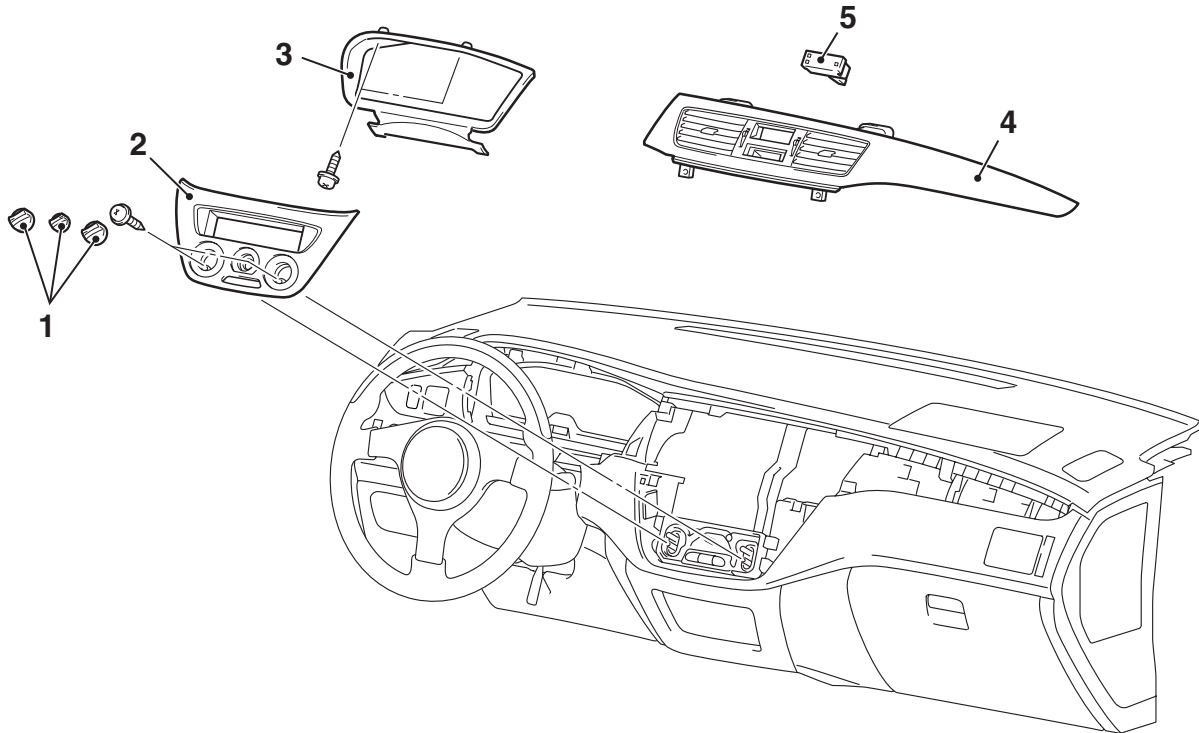
M1543000601663

Tool	Number	Name	Use
MB990784	MB990784	Ornament remover	Removal of centre panel and centre air outlet panel

CLOCK

REMOVAL AND INSTALLATION

M1543005900309



AC211606AC

Removal steps

1. Knob
2. Centre panel
3. Meter bezel

Removal steps (Continued)

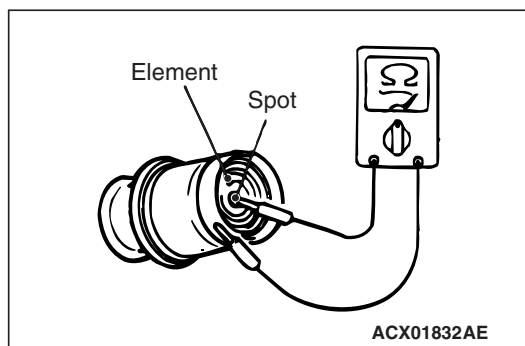
4. Centre air outlet panel
5. Clock

CIGARETTE LIGHTER

INSPECTION

CIGARETTE LIGHTER CHECK

M1543005700242



ACX01832AE

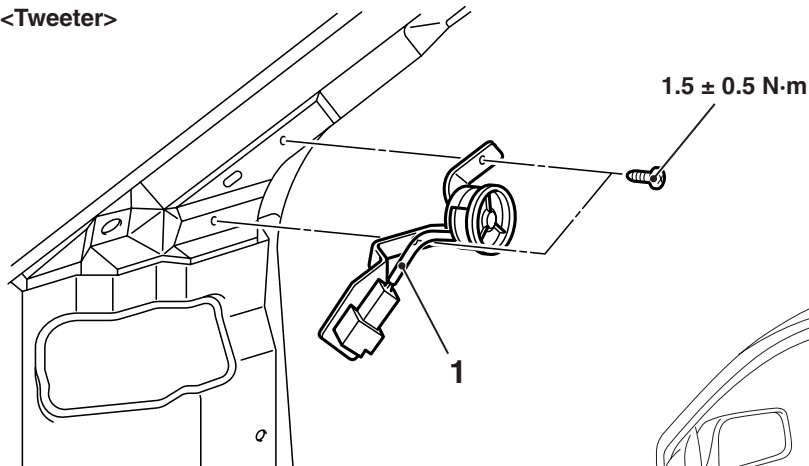
- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using an ohmmeter, check that the element resistance value is 1.7 ohms.

SPEAKER

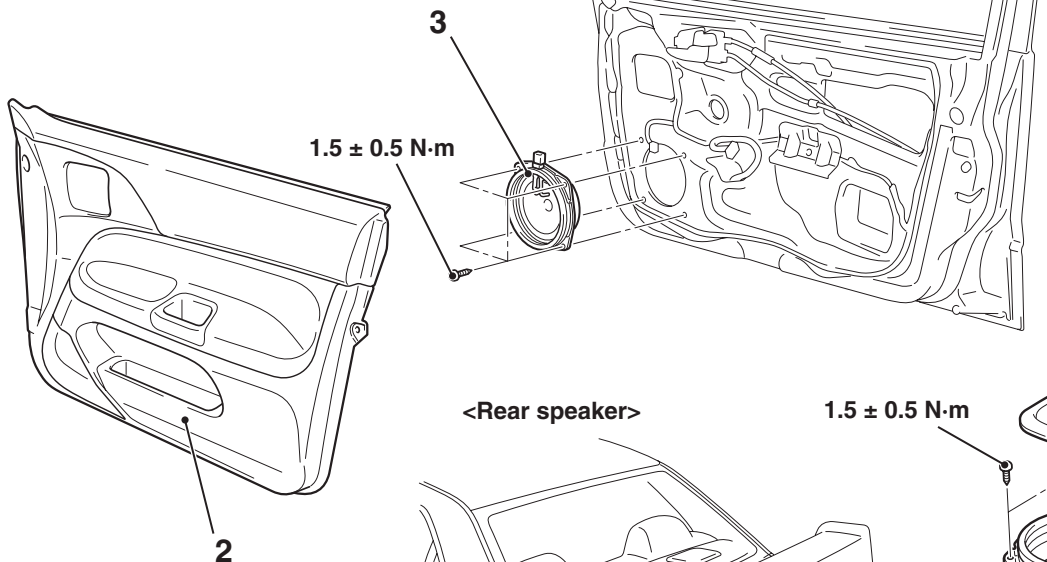
REMOVAL AND INSTALLATION

M1544002600573

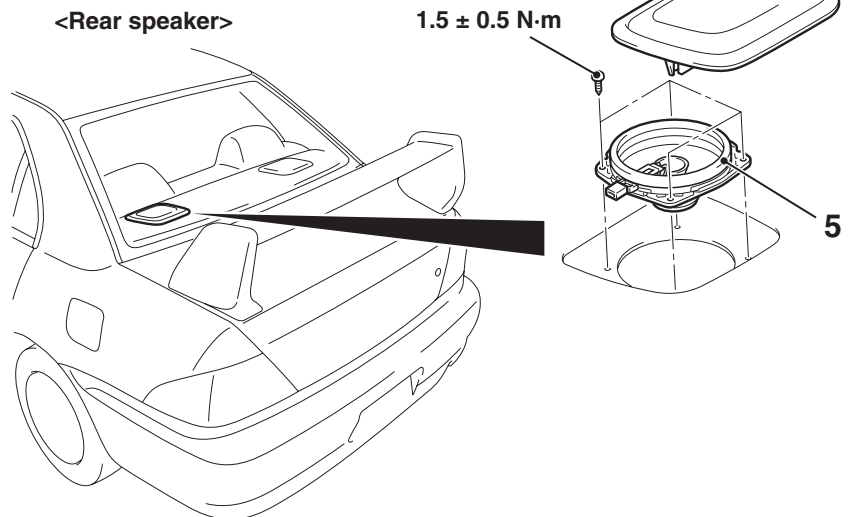
<Tweeter>



<Front speaker>



<Rear speaker>



AC211402AC

Tweeter removal steps

- Front pillar trim (Refer to GROUP 52A, Trims [P.52A-10](#)).
1. Tweeter

Front speaker removal steps

2. Front door trim (Refer to GROUP 52A, Door trim [P.52A-12](#)).
3. Front speaker

Rear speaker removal steps

4. Rear speaker garnish
5. Rear speaker

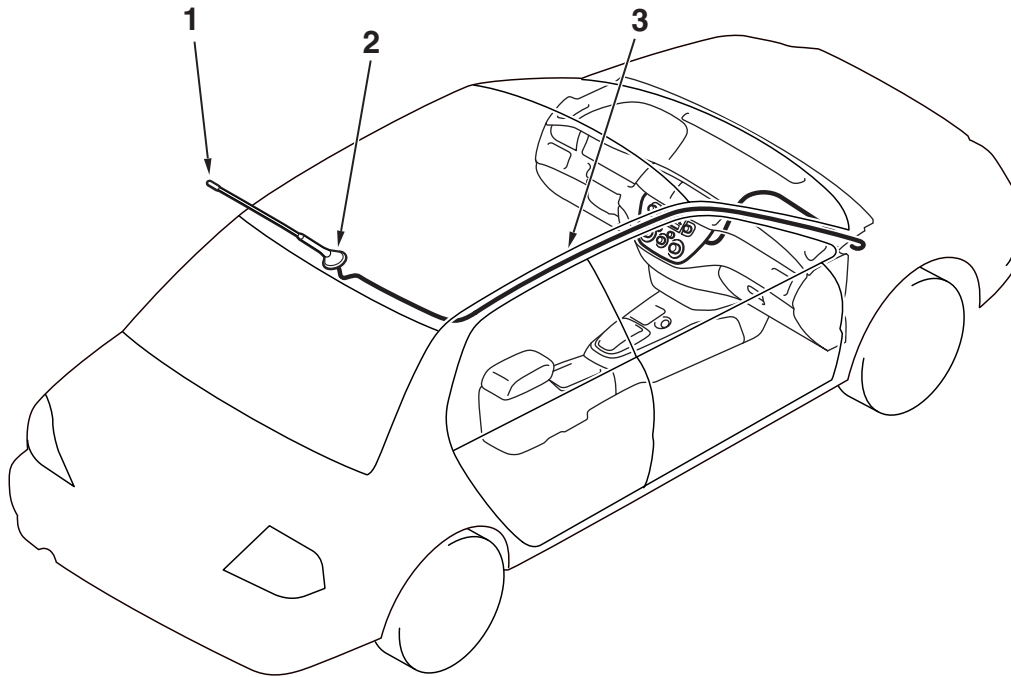
ANTENNA

REMOVAL AND INSTALLATION

M1544002900648

Pre-removal and Post-installation Operation

- Front pillar trim, Rear pillar trim, Centre pillar trim lower, Centre pillar trim upper (Refer to GROUP 52A, Trims [P.52A-10](#)).
- Headlining Removal and Installation (Refer to GROUP 52A, Headlining [P.52A-17](#)).



AC005156AD

1. Roof antenna pole

Antenna feeder cable removal steps

2. Roof antenna base
 - Instrument panel assembly (Refer to GROUP 52A, Instrument panel assembly [P.52A-2](#)).
3. Antenna feeder cable

REAR WINDOW DEFOGGER

GENERAL INFORMATION

M1543000100319

Rear Defogger operation

The defogger relay turns ON if the defogger switch built-in the A/C-ECU is turned ON when the ignition switch is in the "ON" position. When the defogger relay turns ON, power is supplied to the defogger and the defogger is activated. The defogger comes with a timer function that causes the defogger switch to automatically turn OFF in about 11 minutes after the defogger switch is turned ON.

TROUBLESHOOTING

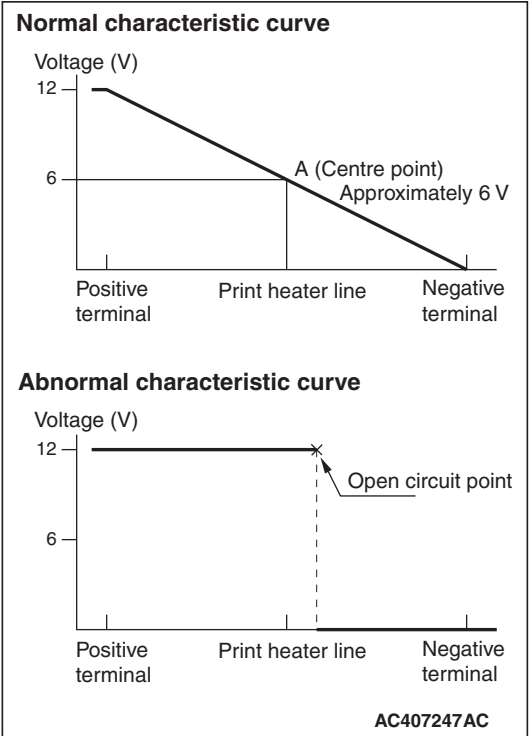
M1543000701552

The rear window defogger is controlled by the A/C-ECU. For troubleshooting, refer to GROUP 55-Troubleshooting [P.55-29](#).

ON-VEHICLE SERVICE

PRINTED HEATER LINES CHECK

M1543001800311



1. Run engine at 2,000 r/min. Check heater element with battery at full.
2. Turn "ON" rear window defogger switch. Measure heater element voltage with circuit tester at rear window glass centre A. Condition is good if it indicates about six volts.
3. If 12 volts is indicated at A, there is a break in the negative terminals from A. Move test bar slowly to negative terminal to detect where voltage changes suddenly (0 volts).
4. If 0 volts is indicated at A, there is a break in the positive terminals from A. Defect where the voltage changes suddenly (12 volts) in the same method described above.

REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION

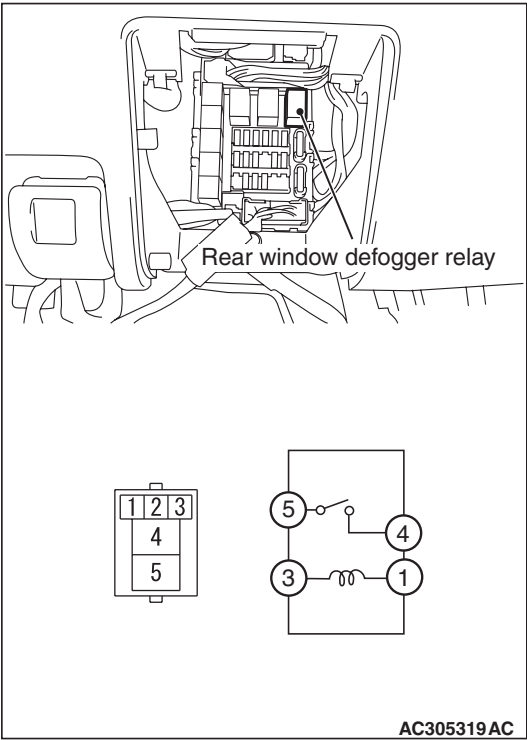
M1543006200314

Refer to GROUP 55, Heater Control Assembly and A/C Switch [P.55-108](#).

INSPECTION

M1543019502816

DEFOGGER RELAY CHECK



AC305319AC

Battery voltage	Tester connection	Specified condition
Not supplied	4 – 5	Open circuit
• Connect terminal 3 to the positive battery terminal • Connect terminal 1 to the negative battery terminal	4 – 5	Less than 2 ohms