GROUP 54A

CHASSIS ELECTRICAL

CONTENTS

Continued on next page

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

⚠ WARNING

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

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

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BATTERY

SERVICE SPECIFICATIONS

M1541000300221

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

ON-VEHICLE SERVICE

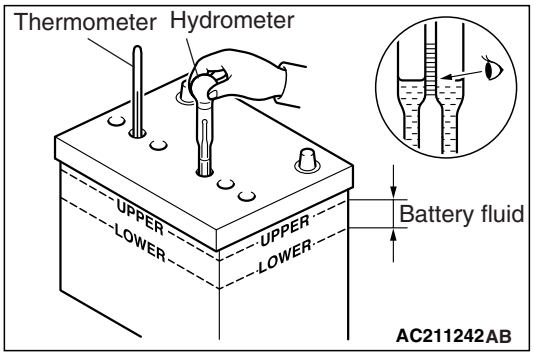
FLUID LEVEL AND SPECIFIC GRAVITY CHECK

M1541001000472

Inspect whether or not the battery fluid is between the UPPER LEVEL and LOWER LEVEL marks.

⚠ 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. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.

   Standard value: 1.220 – 1.290 (20°C)

2. 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) X 0.0007 + Dt

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

   Dt: Actually measured specific gravity

   t: Actually measured temperature

CHARGING

M1541001100844

⚠ 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.**
- **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.**
- **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 type	Capacity (5-hour rate)	Normal charging current	Rapid charging current
75D23L	53 A	5.3 A	53 A

3. Determine when charging is finished.
   - When the specific gravity of the battery electrolyte is constantly within 1.250 – 1.290 for a continuous period of one hour or more.

BATTERY TEST

M1541001200562

BATTERY TESTING PROCEDURE

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 5.
NO : Charge the battery at 5 amps for 10.4 hours. Then re-test.

STEP 5. 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?
YES : The battery is normal.
NO : Replace the battery. Then go to Step 4.

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

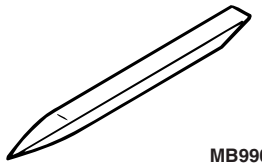
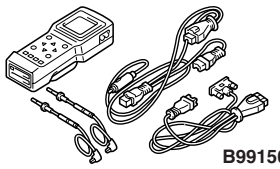
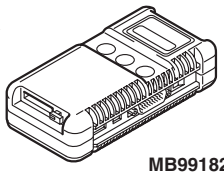
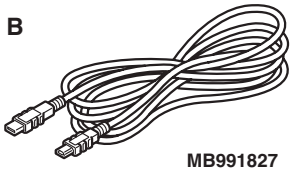
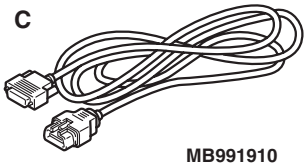
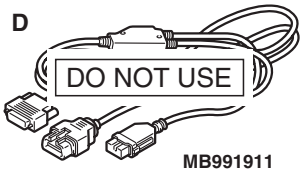
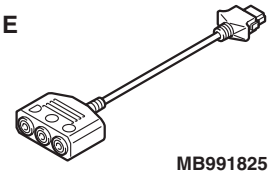
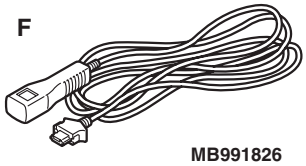
LOAD TEST RATE CHART

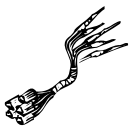
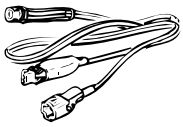
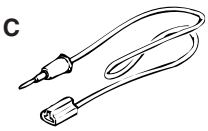
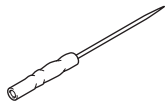
Battery type	**75D23L**
Charging time when fully discharged h (5-amp. rated current charging)	11
Load test (Amps)	275

IGNITION SWITCH

SPECIAL TOOLS

M1543000603409

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of column cover
 B991502	MB991502	M.U.T.-II sub assembly	• Immobilizer system check • Encrypted code registration
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991825 F  MB991826 MB991955	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	M.U.T.-III sub-assembly A: Vehicle communication interface (V.C.I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III measurement adapter F: M.U.T.-III trigger harness	Check for CAN bus line **⚠ CAUTION** **For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.**

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

INTRODUCTION

M1543009901360

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

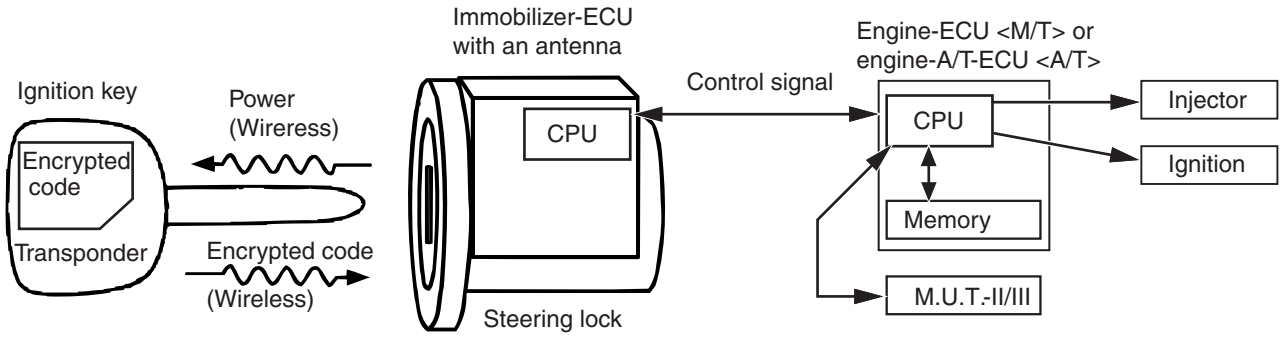
The immobilizer system consists of the ignition key, the immobilizer-ECU with key ring antenna, and the engine-ECU <M/T> or engine-A/T-ECU <A/T>. The ignition key has a built-in transponder. Only the registered ignition key permits the engine to start, therefore, the engine can never be started by means 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 <M/T> or engine-A/T-ECU <A/T> sends a requirement for the encrypted code to the immobilizer-ECU (at this time, the engine is remobilized).
2. When the immobilizer-ECU receives the requirement from the engine-ECU <M/T> or engine-A/T-ECU <A/T>, 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 <M/T> or engine-A/T-ECU <A/T>.

4. If the engine-ECU <M/T> or engine-A/T-ECU <A/T> can not receive the encrypted code, the engine will be immobilized.



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TROUBLESHOOTING

IGNITION KEY REMINDER BUZZER AND DOOR LOCK PREVENTION FUNCTION DIAGNOSIS

M1543000701109

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, SWS Troubleshooting P.54B-33.
- Using SWS monitor: GROUP 54C, SWS Troubleshooting P.54C-21.

IMMOBILIZER SYSTEM DIAGNOSIS

DIAGNOSIS CODE CHART

M1543007100462

⚠ 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.

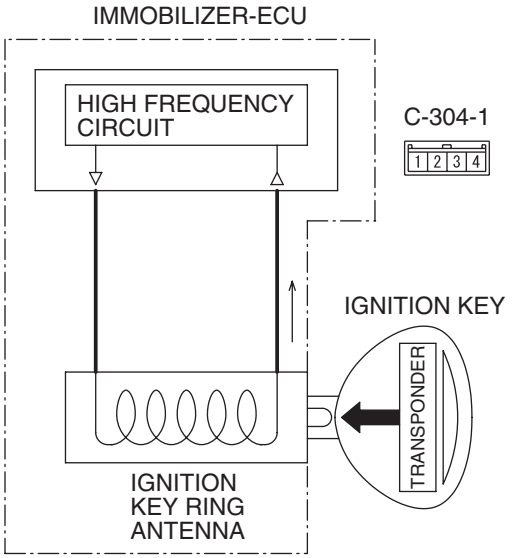
Use the following chart to develop proper diagnostic strategy.

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

DIAGNOSTIC TROUBLE CODE PROCEDURES

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

Ignition Key Ring and Immobilizer-ECU Circuit



AC300911AB

DIAGNOSIS CODE SET CONDITION

- Diagnosis code No.11 may be output 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 output together with MPI system diagnosis code No.P1610.

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.

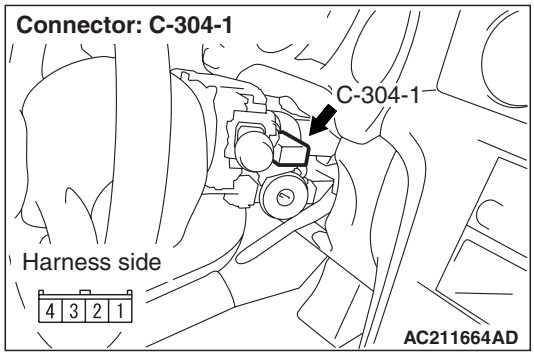
STEP 2. Check that the engine start using the spare ignition key which encrypted code has been registered.

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 the M.U.T.-II/III diagnosis code.

Q: Which diagnosis code is set, code No.11 or 12? the encrypted code has been registered?
Code No.12 is set : Refer toP.54A-12.
Code No.11 is set : Go to Step 4.

STEP 4. Connector check: Immobilizer-ECU connector C-304-1.



Q: Are immobilizer-ECU connector C-304-1 in good condition?
YES : Replace immobilizer-ECU and Then register the password (secret cod) and encrypted code. Retest the system.
NO : Repair or replace the damage component(s).

Code No.12: Encrypted Codes are Not identical or 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.P1610.

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

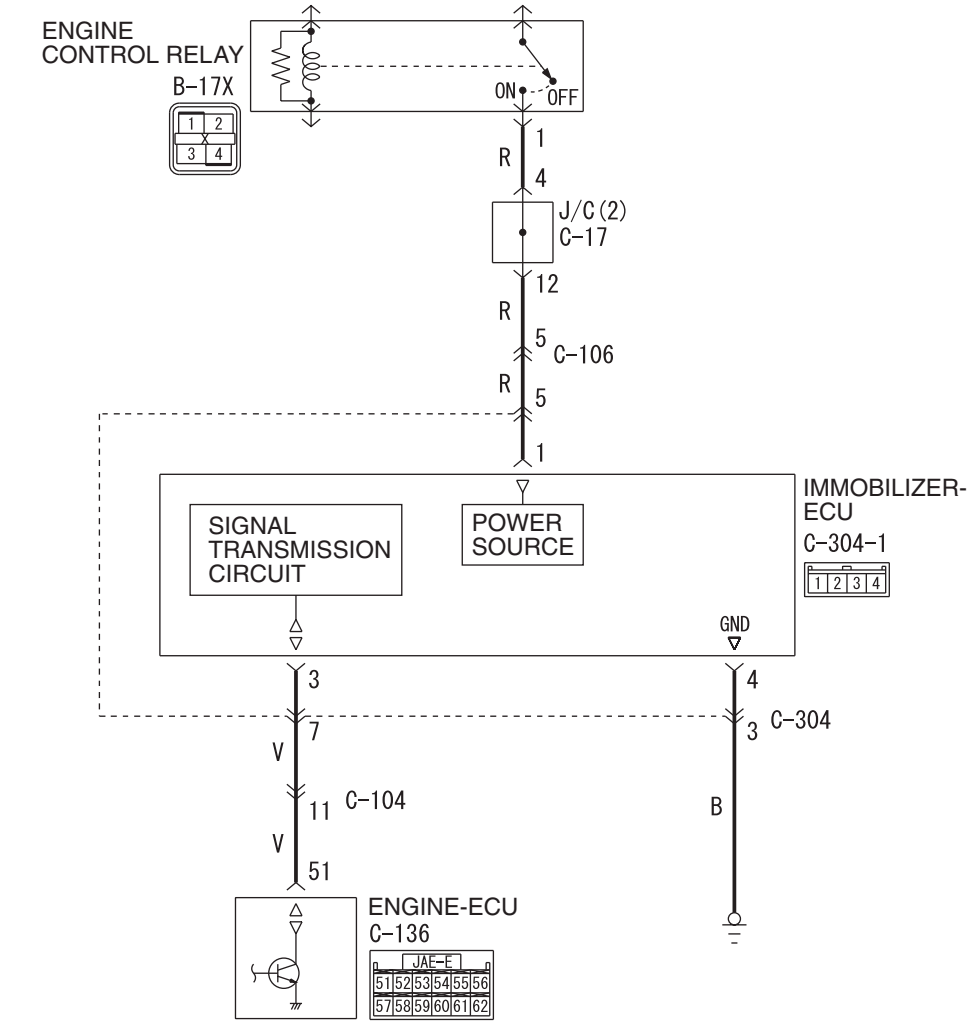
M1543007201150

Symptom	Inspection procedure No.	Reference page
Communication with M.U.T.-II/III is impossible	1	P.54A-13
The ignition key cannot be registered	2	P.54A-20
Engine cranks but does not start	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 <2000>



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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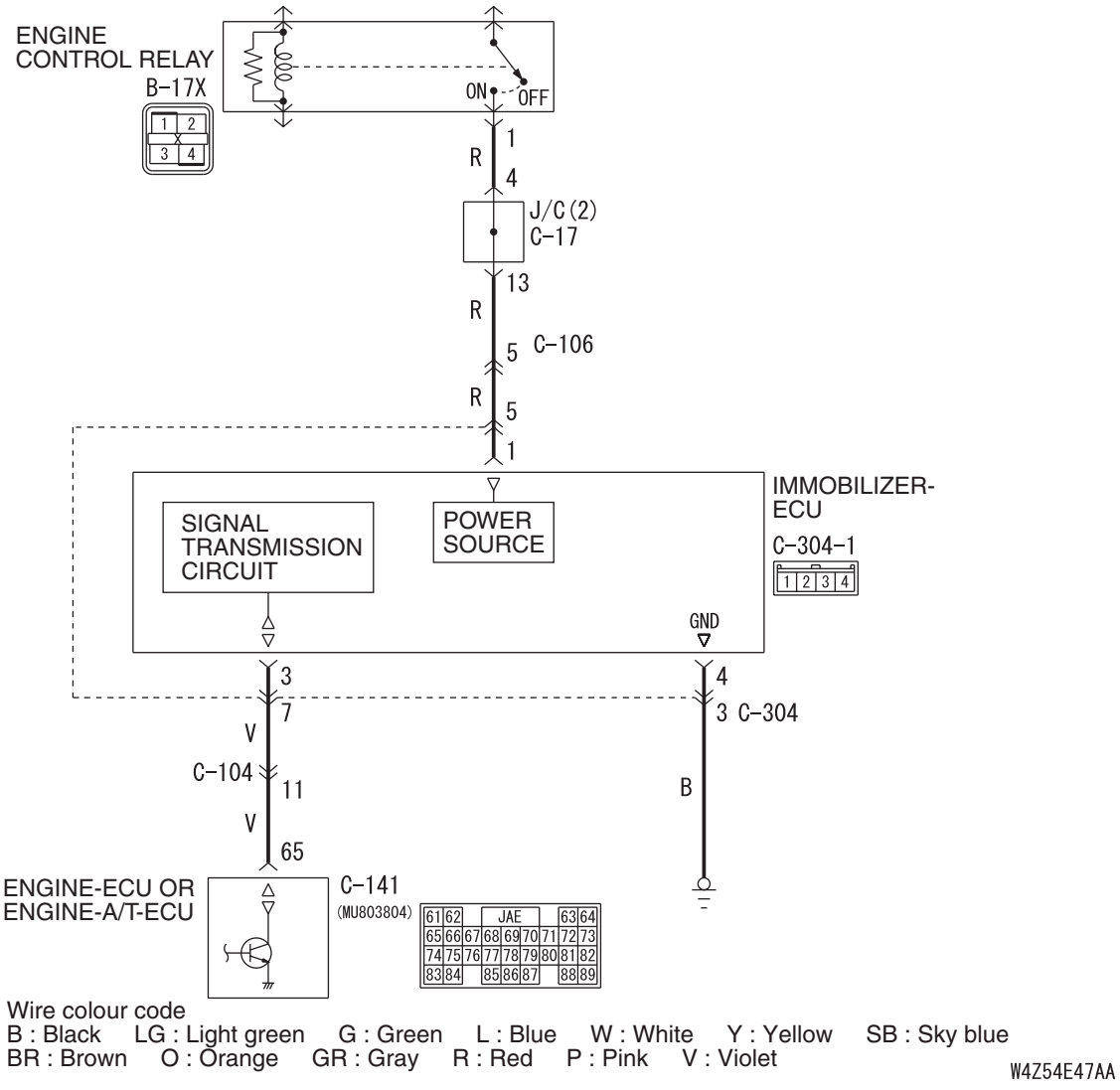
Immobilizer-ECU Power Source, Earth and Engine-ECU or Engine-A/T-ECU Communication Line Circuit <2400>



TECHNICAL DESCRIPTION (COMMENT)

- This malfunction may be caused by a defective immobilizer-ECU, engine-ECU <M/T> or engine-A/T-ECU <A/T>, or a defect in the communication line between the immobilizer-ECU and engine-ECU <M/T> or engine-A/T-ECU <A/T>. If this malfunction appears when the MPI system and M.U.T.-II/III can communicate each other, MPI system diagnosis code No.P1610 <2000> or P0513 <2400> 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 <M/T> or engine-A/T-ECU <A/T> can determined as normal.

NOTE: If this malfunction appears, MPI system diagnosis code No.P1610 <2000> or P0513 <2400> will be output.

TROUBLESHOOTING HINTS

- Malfunction of the immobilizer-ECU
- Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector

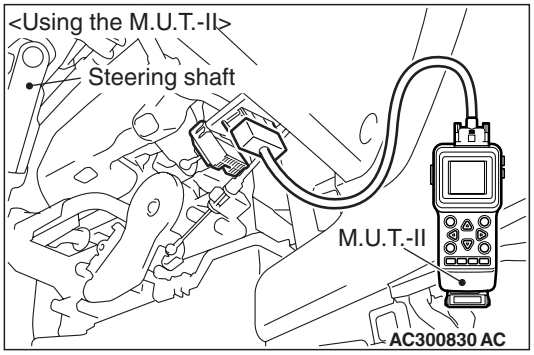
DIAGNOSIS PROCEDURE

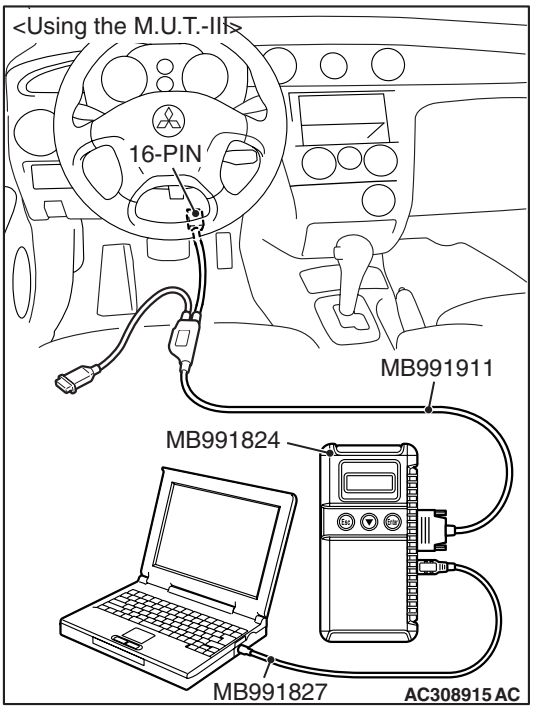
STEP 1. Using the M.U.T.-II/III, read the MPI system diagnosis code.

⚠ CAUTION

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

Use the M.U.T.-II/III to confirm the MPI system DTC.



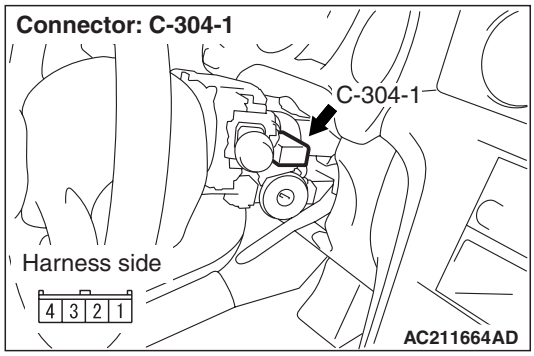


(1) Connect the M.U.T.-II/III to the diagnosis connector.
(2) Turn the ignition switch "ON" to position.
(3) Read the MPI system diagnosis code.

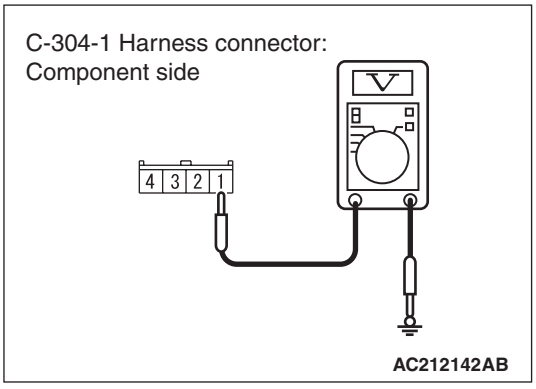
NOTE: If the M.U.T.-II/III cannot communicate with the MPI system, refer to GROUP 13A, MPI Troubleshooting – Symptom Procedures P.13A-182, GROUP 13B, MPI Troubleshooting – Symptom Procedures P.13B-252 or GROUP 13C, MPI Troubleshooting – Symptom Procedures P.13C-282.

Q: Is an MPI system DTC P1610 <2000> or P0513 <2400> output?
YES : Refer to GROUP 13A, MPI Troubleshooting – Inspection Chart P.13A-176, GROUP 13B, MPI Troubleshooting – Inspection Chart P.13C-204 or GROUP 13C, MPI Troubleshooting – Inspection Chart P.13C-204.
NO : Go to Step 2.

STEP 2. Voltage measurement at immobilizer-ECU connector C-304-1.



(1) Disconnect immobilizer-ECU connector C-304-1.
(2) Turn the ignition switch to the "ON" position.

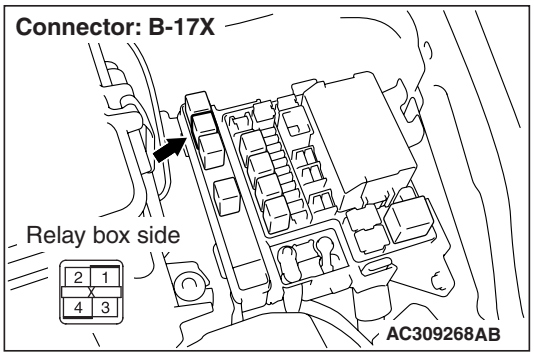


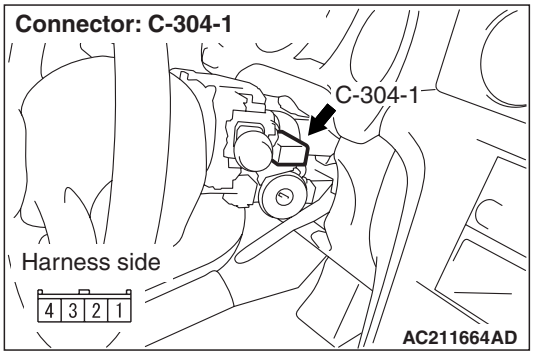
(3) Measure the voltage between terminal 1 and earth.

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-304-1 and engine control relay connector B-17X



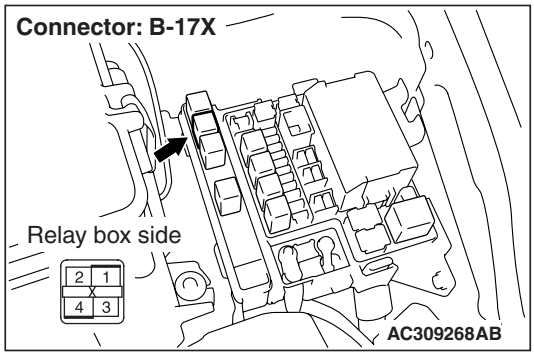


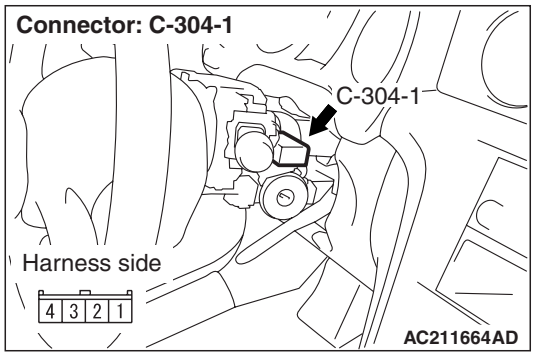
Q: Are immobilizer-ECU connector C-304-1 and engine control relay connector B-17X in good condition?

YES : Go to Step 4.

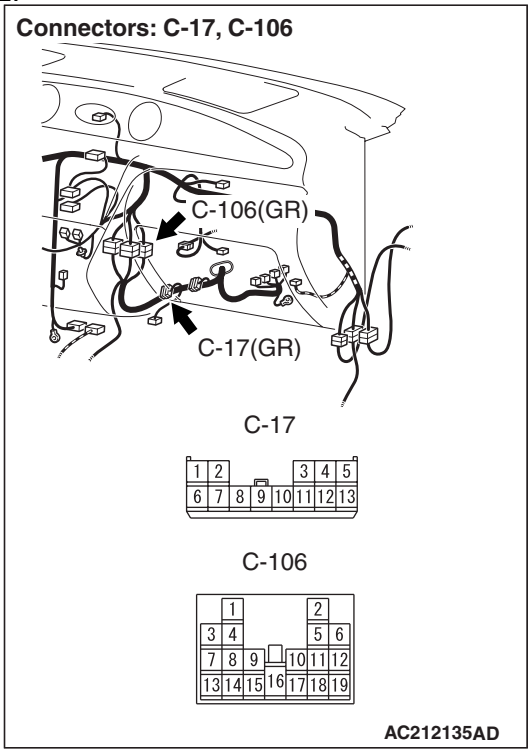
NO : Repair or replace the component(s). Confirm that M.U.T.-II/III communicates normally.

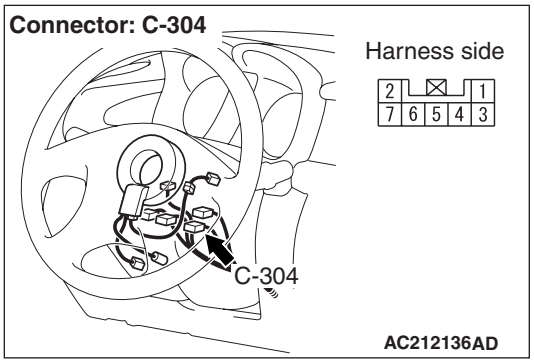
STEP 4. Check the harness wires between immobilizer-ECU connector C-304-1 (terminal 1) and engine control relay connector B-17X (terminal 1).





NOTE:

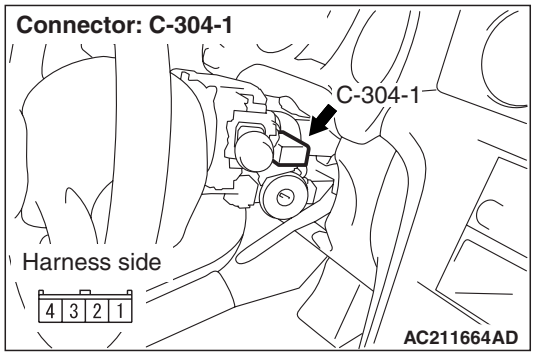




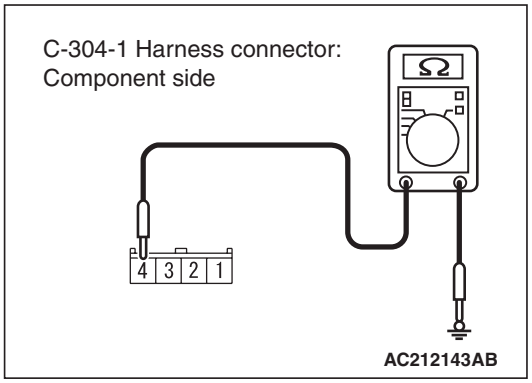
Prior to the wiring harness inspection, check intermediate connector C-106, joint connector C-17 and key reminder switch connector C-304, and repair if necessary.

Q: Are the harness wires between immobilizer-ECU connector C-304-1 (terminal 1) and engine control relay connector B-17X (terminal 1) in good condition?
YES : There is no action to be taken.
NO : Replace the component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 5. Resistance measurement at immobilizer-ECU connector C-304-1.



(1) Disconnect immobilizer-ECU connector C-304-1.

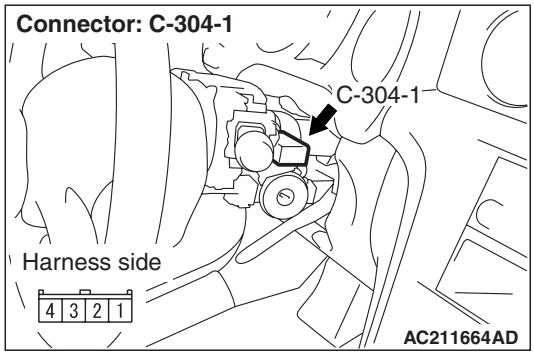


(2) Measure the resistance between terminal 4 and earth.

OK: Continuity (Less than 2 Ω)

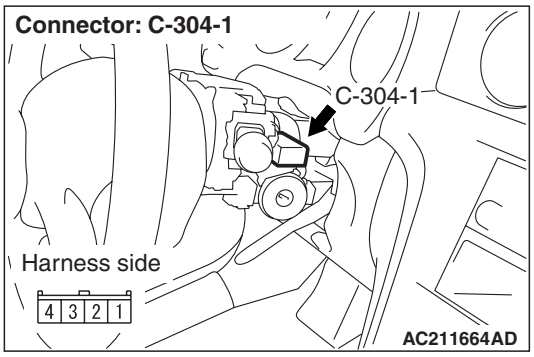
Q: Is the check result normal?
YES : Go to Step 8.
NO : Go to Step 6.

STEP 6. Connector check: immobilizer-ECU connector C-304-1

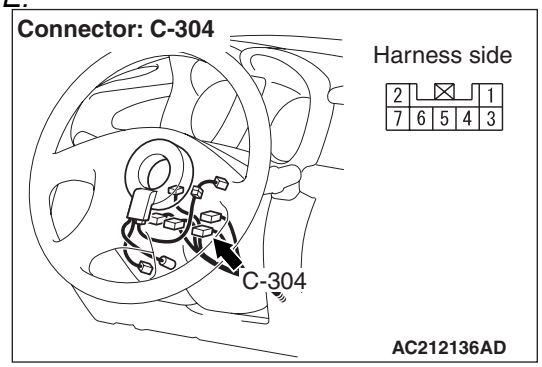


Q: Is immobilizer-ECU connector C-304-1 in good condition?
YES : Go to Step 7.
NO : Repair or replace the component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 7. Check the harness wire between immobilizer-ECU connector C-304-1 (terminal 4) and earth.



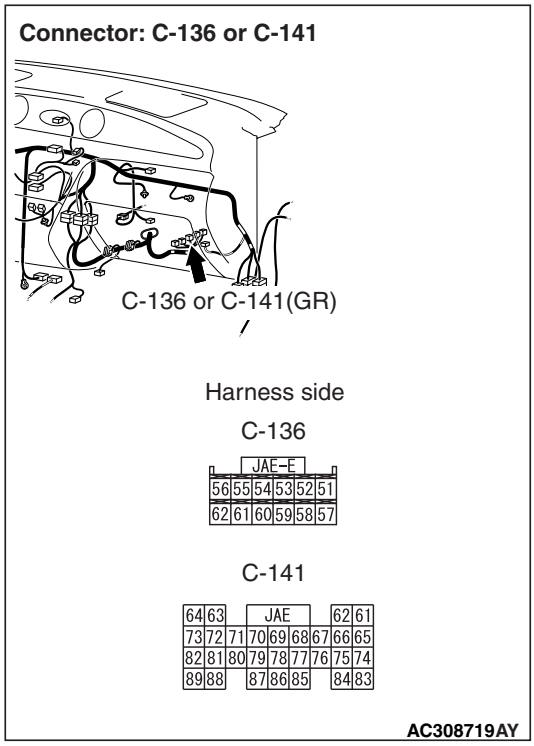
NOTE:

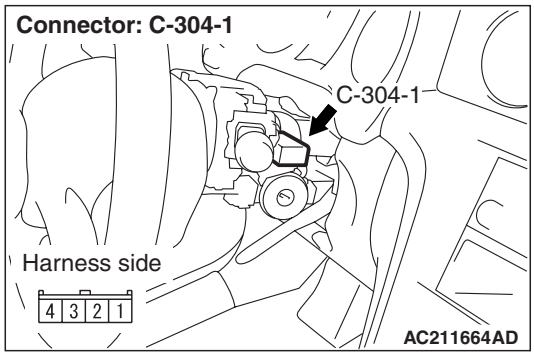


Prior to the wiring harness inspection, check key reminder switch connector C-304, and repair if necessary.

Q: Is the harness wire between immobilizer-ECU connector C-304-1 (terminal 4) and earth in good condition?
YES : There is no action to be taken.
NO : Repair or replace the component(s). Confirm that M.U.T.-II/III communicates normally.

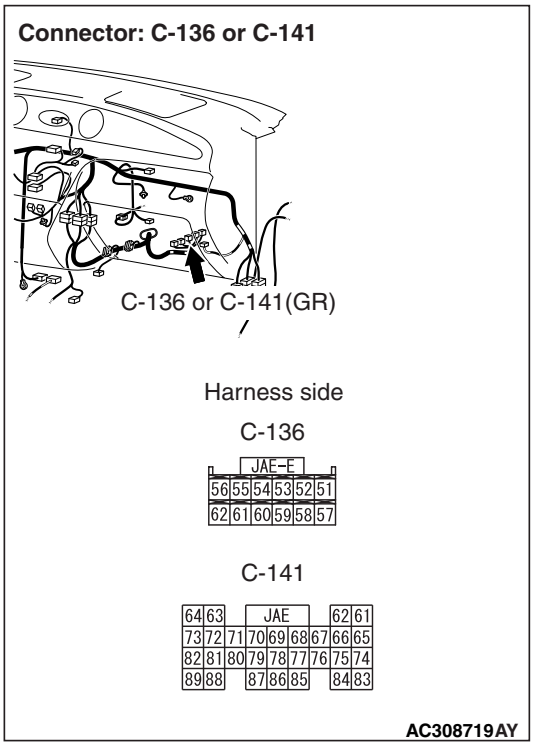
STEP 8. Connector check: immobilizer-ECU connector C-304-1 and engine-ECU <2000> connector C-136 or engine-ECU <2400-M/T>, engine-A/T-ECU <2400-A/T> connector C-141

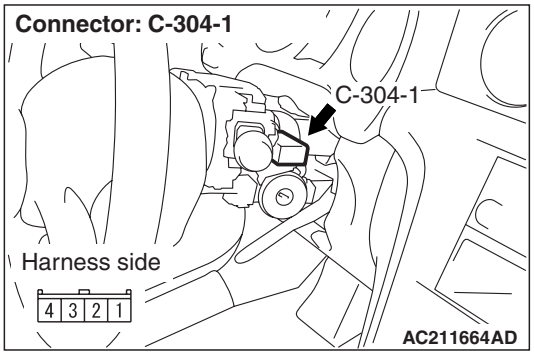




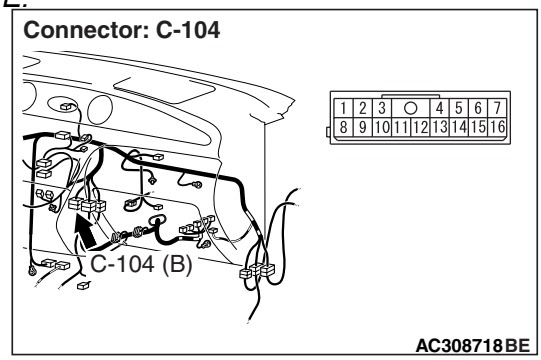
Q: Are immobilizer-ECU connector C-304-1 and engine-ECU <2000> connector C-136 or engine-ECU <2400-M/T>, engine-A/T-ECU <2400-A/T> connector C-141 in good condition?
YES : Go to Step 9.
NO : Repair or replace the component(s). Confirm that M.U.T.-II/III communicates normally.

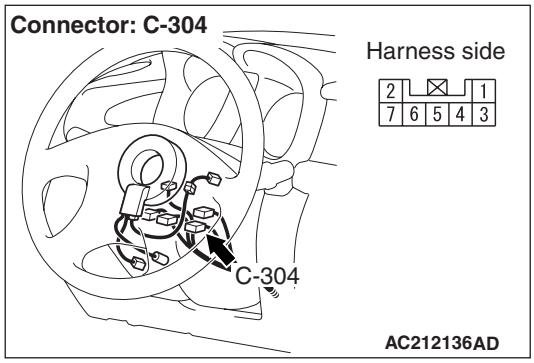
STEP 9. Check the harness wires between immobilizer-ECU connector C-304-1 (terminal 3) and engine-ECU <2000> connector C-136 (terminal 51) or engine-ECU <2400-M/T>, engine-A/T-ECU <2400-A/T> connector C-141 (terminal 65).





NOTE:





Prior to the wiring harness inspection, check key reminder switch connector C-304, intermediate connector C-104, and repair if necessary.

Q: Are the harness wires between immobilizer-ECU connector C-304-1 (terminal 3) and engine-ECU <2000> connector C-136 (terminal 51) or engine-ECU <2400-M/T>, engine-A/T-ECU <2400-A/T> connector C-141 (terminal 65) in good condition?
YES : Go to Step 10.
NO : Repair or replace the component(s). Confirm that M.U.T.-II/III communicates normally.

STEP 10. Replace the immobilizer-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.00-6).
NO : Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

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

Q: Does diagnosis code No.11 reset?
YES : Refer to P.54A-10.
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. (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.00-6).
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-5. 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-10.
MPI system diagnosis code is set : Refer to GROUP 13A, Troubleshooting P.13A-15, GROUP 13B, Troubleshooting P.13B-20 or GROUP 13C, Troubleshooting P.13C-21.
No diagnosis code is set : Go to Step 3.

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-178, GROUP 13B, Troubleshooting – Symptom Chart P.13B-248 or GROUP 13C, Troubleshooting – Symptom Chart P.13C-278. 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.

STEP 4. Retest the system

Q: Is the malfunction eliminated?
YES : The procedure is complete. (If no malfunction 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.00-6.)
NO : Replace the immobilizer-ECU.

DATA LIST REFERENCE TABLE

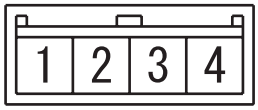
M1543007300347

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

CHECK AT IMMOBILIZER-ECU

M1543007600520

TERMINAL VOLTAGE CHECK



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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 <M/T> or Engine-A/T-ECU <A/T>	-	-
4	Immobilizer-ECU earth	Always	0V

ON-VEHICLE SERVICE

HOW TO REGISTER ENCRYPTED CODE

M1543008100454

⚠ 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 <M/T> or engine-A/T-ECU <A/T> 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 <M/T> or engine-A/T-ECU <A/T> 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.

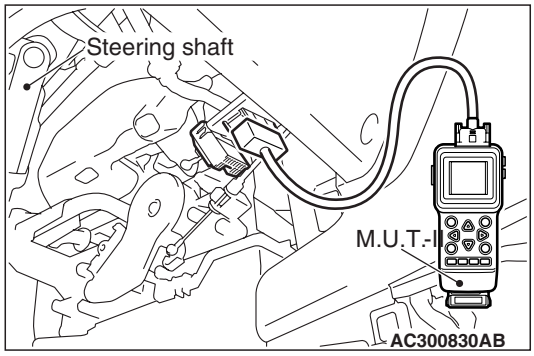
Registration with the M.U.T.-II

⚠ CAUTION

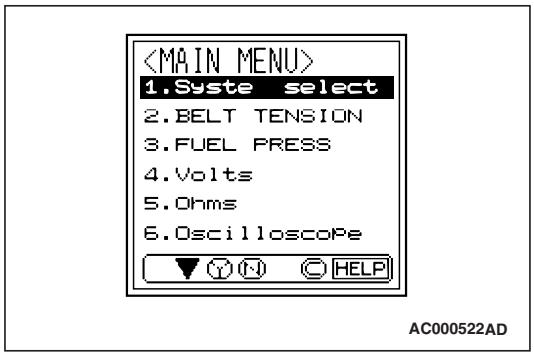
To prevent damage to M.U.T.-II, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-II.

NOTE:

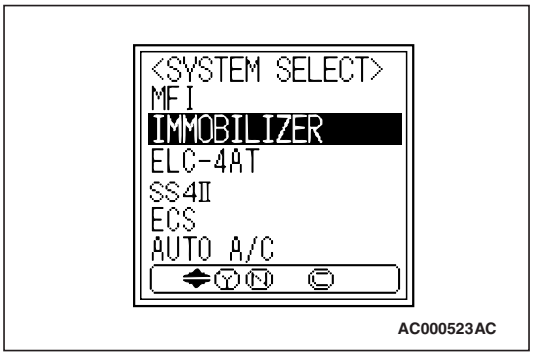
- *Using the key ID register function will cause all key IDs that have been previously registered in the immobilizer-ECU to be erased. All keys need to be registered. Those which have been registered before should be on hand before using this function.*
- *If registering more than one key, do not disconnect 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-9.*



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

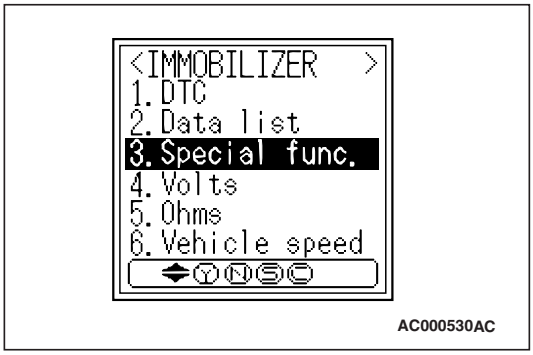


3. At "System Select," press "YES"



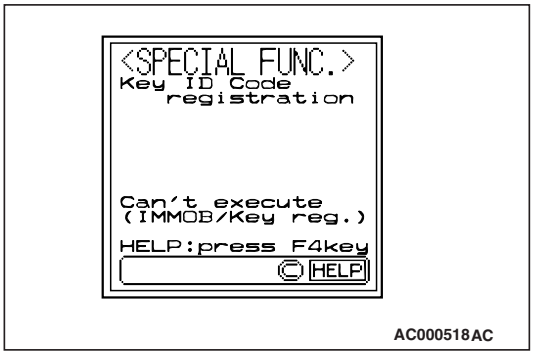
AC000523AC

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

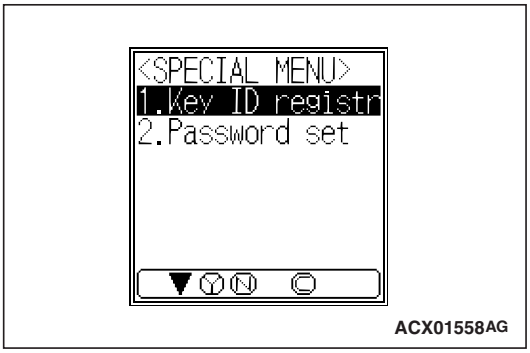


AC000530AC

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-10.)

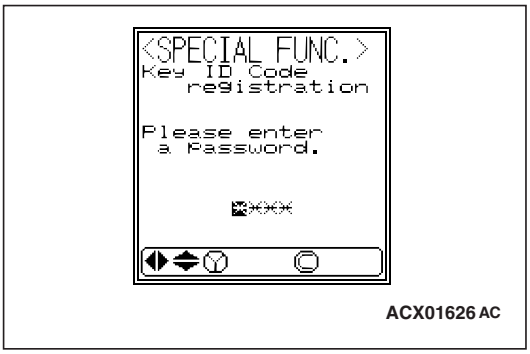


AC000518AC



ACX01558AG

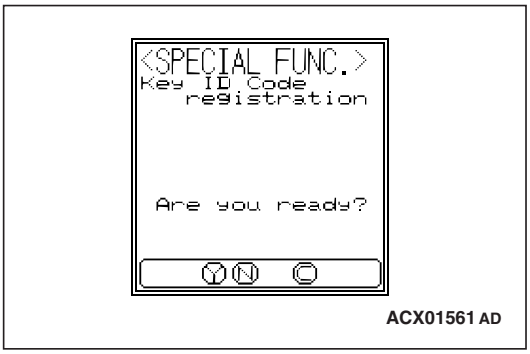
6. Select "key ID register", press "YES".



ACX01626 AC

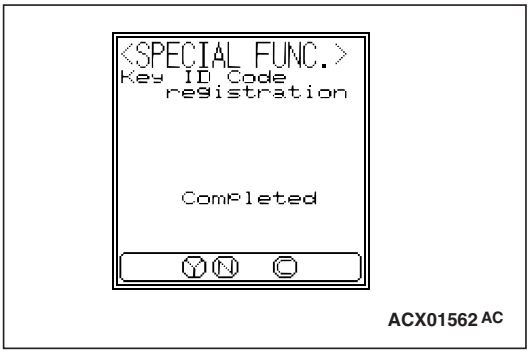
7. Input the password. Use the "UP" and "DOWN" keys to change the current password digit to a value between 0 and 9. Use the "LEFT" and "RIGHT" keys to move to a different password digit. Press the "YES" key to accept the password. If an incorrect password is input five times in a row, this screen is displayed and the immobilizer-ECU switches to unauthorized operation, start-prevention mode.

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



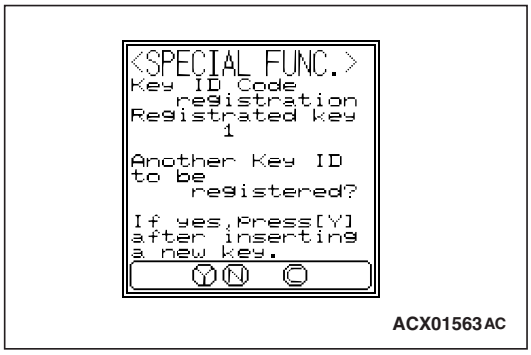
ACX01561 AD

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



ACX01562 AC

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.

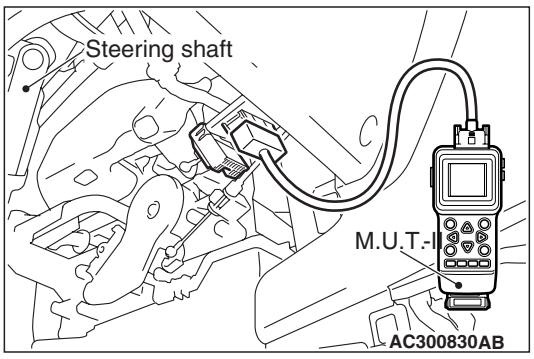
Registration of additional keys with the M.U.T.-II

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

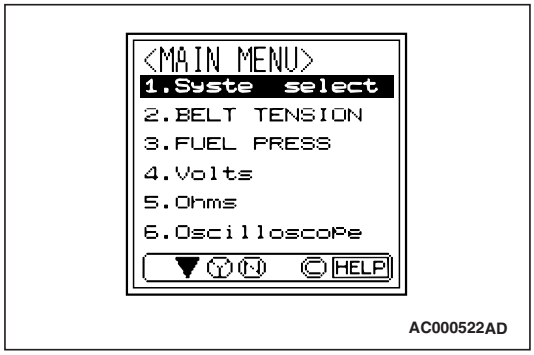
⚠ CAUTION

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.

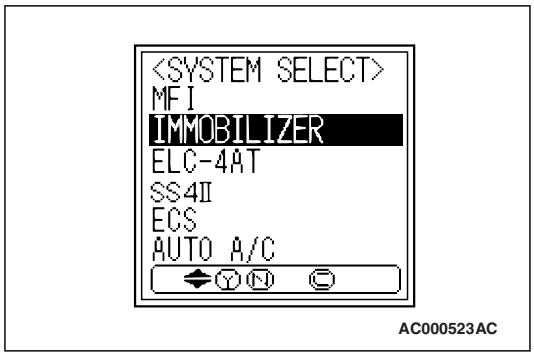
NOTE: To register additional keys with the M.U.T.-II, no registered keys must be lost.



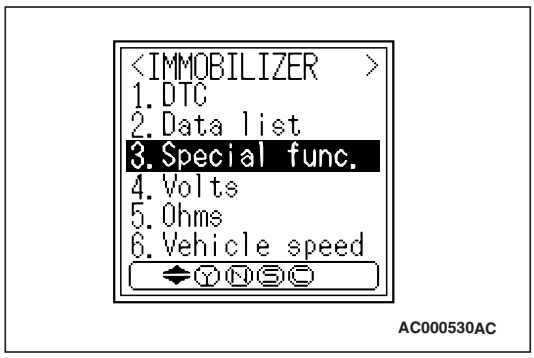
1. Connect M.U.T.-II (MB991502) to the 16-pin diagnosis connector.
2. Turn the ignition switch to "ON" position.



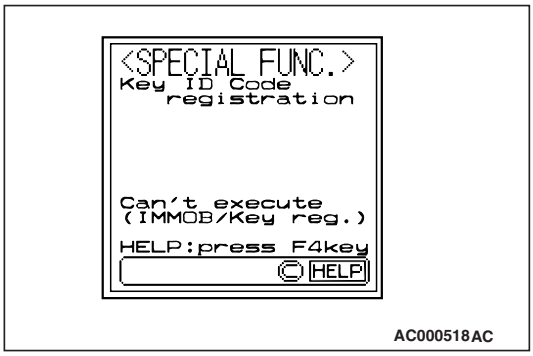
3. At "System Select," press "YES"

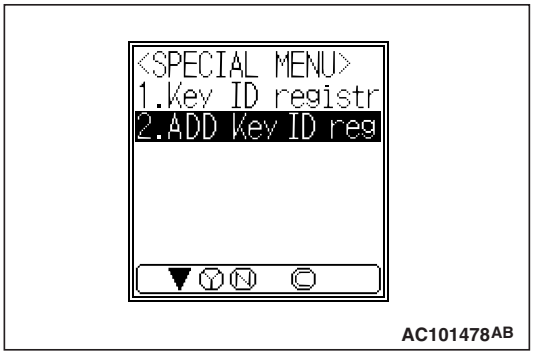


4. Select "Immobilizer," press "YES".

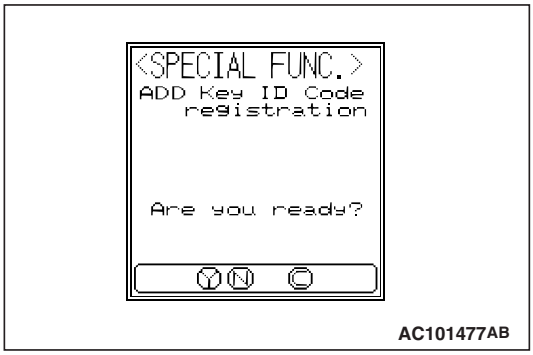


5. Select "Special Func", press "YES". If diagnosis code No.11 exists, "Can't execute" will be displayed. Check for diagnosis code No.11 (Refer to P.54A-10.)

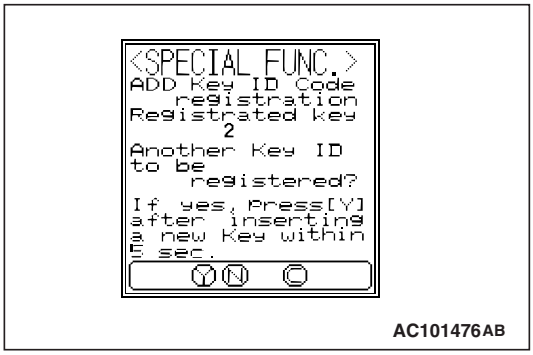




6. Select "Add key ID reg", press "YES".



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

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.

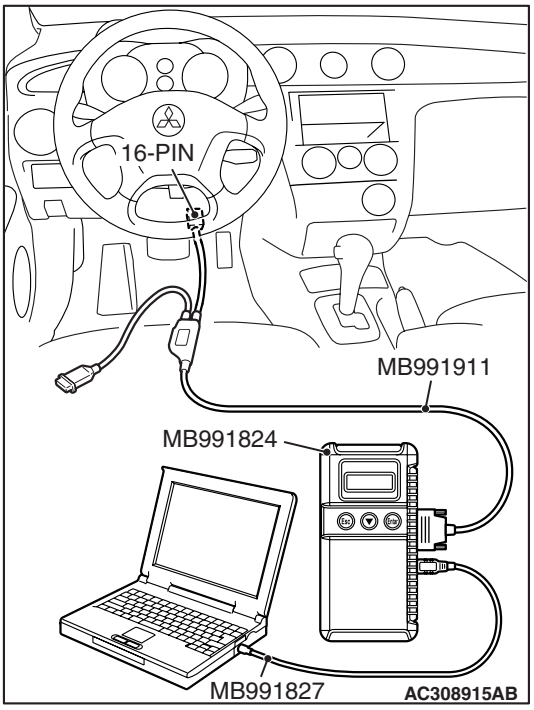
Registration with the M.U.T.-III

⚠ CAUTION

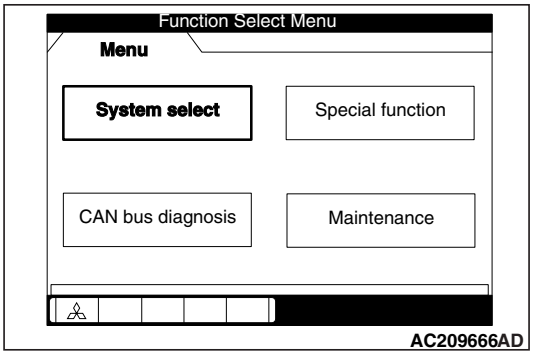
To prevent damage to M.U.T.-III, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting M.U.T.-III.

NOTE:

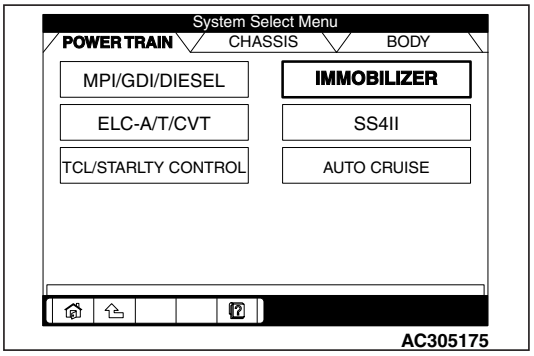
- *Before registration, check that no diagnosis code is set. If a diagnosis code is set, resolve the problem beforehand.*
- *Using the key ID register function will cause all key IDs that have been previously registered in the immobilizer-ECU to be erased. All keys need to be registered. Those which 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-9.*



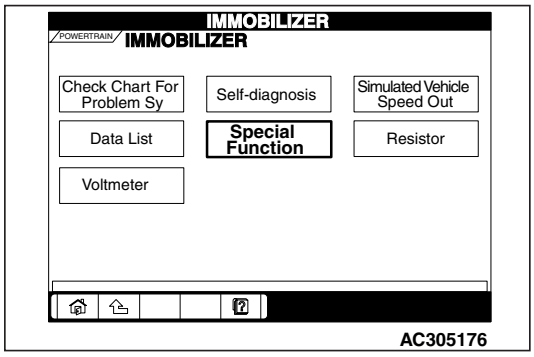
1. Connect the M.U.T.-III to the diagnosis connector (16-pin).
2. Turn the ignition switch to "ON" position.



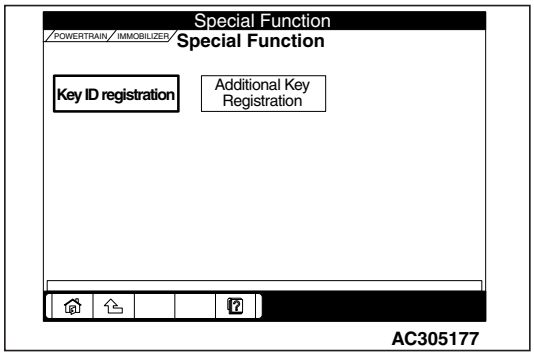
3. Select "System select" from the start-up screen.



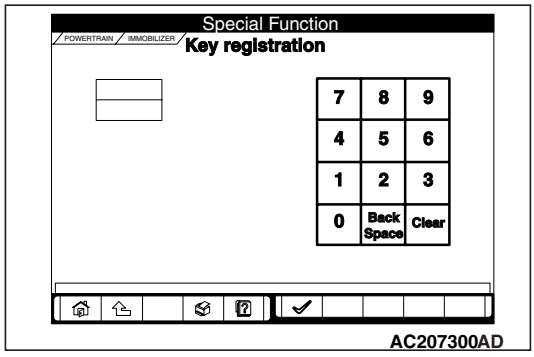
4. Choose "IMMOBILIZER" from the "POWER TRAIN" tab.



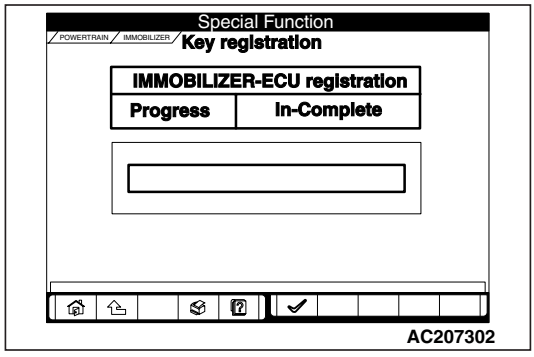
5. Choose "Special Function" from "IMMOBILIZER" screen.



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.

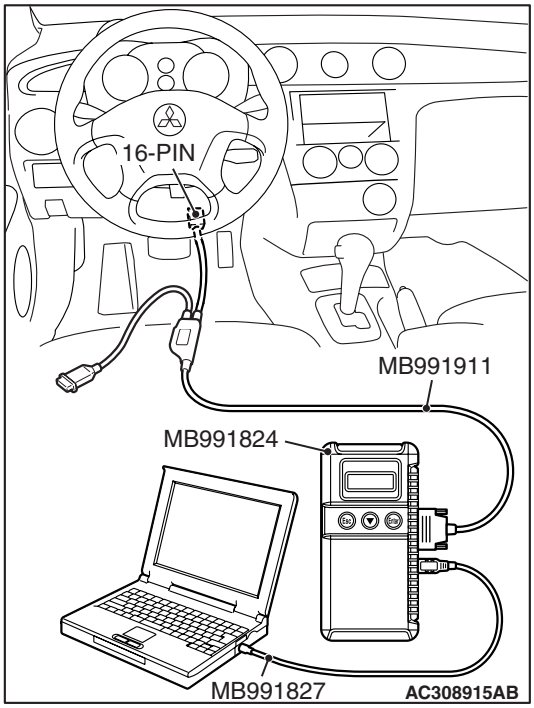
Registration of additional keys with the M.U.T.-III

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.

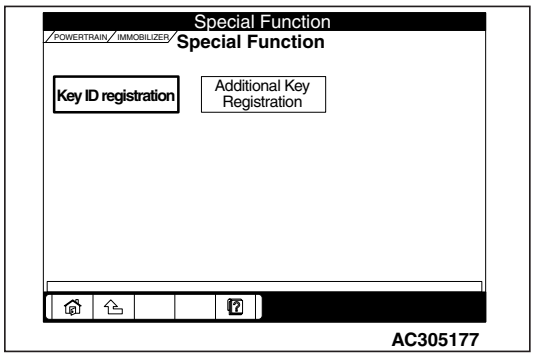
NOTE: To register additional keys with the M.U.T.-III, no registered keys must be lost.



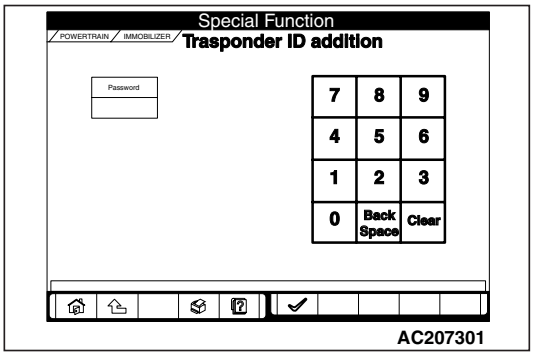
1. Connect M.U.T.-III to the 16-pin diagnosis connector.
2. Turn the ignition switch to "ON" position.

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

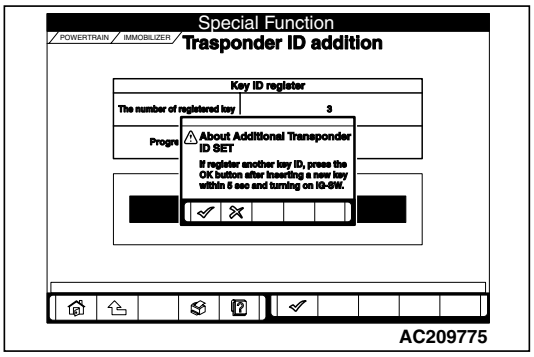
3. Carry out steps 3 to 6 of the sub-section "Registration with M.U.T.-III."



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.

Registration of additional key(s) without using the M.U.T.-III

If the M.U.T.-III is not available, new key(s) can be registered by operating two keys which have been registered to the vehicle (A maximum of eight keys can be registered to one vehicle). Follow the procedure below to register new key(s) to the vehicle.

NOTE: The registered key is the key that allows you to start the engine.

1. Turn "ON" the ignition switch by using the first registered key (key A), and wait for five seconds.
2. Remove the first registered key (key A).
3. Insert the second registered ignition key (key B), and turn it to the ON position.
4. The immobilizer-ECU identifies the new key to accept or reject it, and operates the immobilizer indicator (See the table below).
5. If a new ignition key is registered further, repeat steps 1 to 7 above.

A maximum of eight ignition keys can be registered to one vehicle (If you attempt to register the ninth key, the immobilizer-ECU rejects the key). If any of the following conditions are satisfied, the additional key registration mode will terminate:

- The ignition switch has been on for more than 30 seconds.
- After the ignition key has been turned to the "LOCK" (OFF), the engine control relay is turned off.
- The M.U.T.-III has started communicating with vehicle systems.

6. After the registration mode has terminated, the additionally registered key(s) should allow you to start the engine.

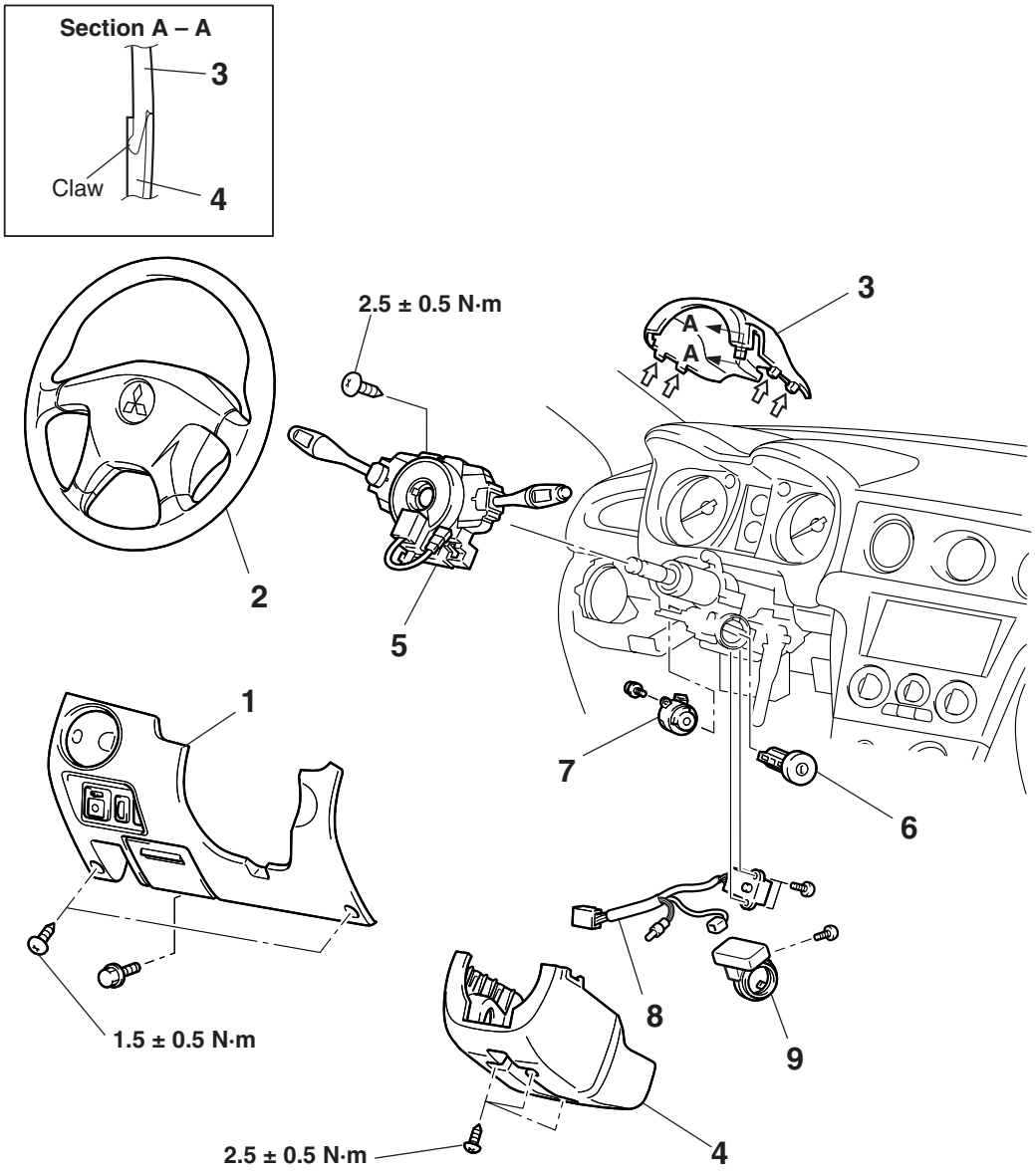
IGNITION SWITCH

REMOVAL AND INSTALLATION

M1543002101244

⚠ WARNING

- ***Before removal of the air bag module, refer to GROUP 52B, SRS Service Precautions (P.52B-4) and Air Bag Module and Clock Spring (P.52B-136).***
- ***When removing and installing the steering wheel, do not let it bump against the air bag module.***



NOTE
⇦: Claw position

AC309269AB

Removal steps

1. Instrument lower panel (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Steering wheel (Refer to GROUP 37A, Steering wheel P.37-15)

Removal steps (Continued)

3. Column cover upper
4. Column cover lower

Removal steps (Continued)

5. Clock spring and column switch assembly (Refer to GROUP 52B, Air bag modules and clock spring P.52B-136)

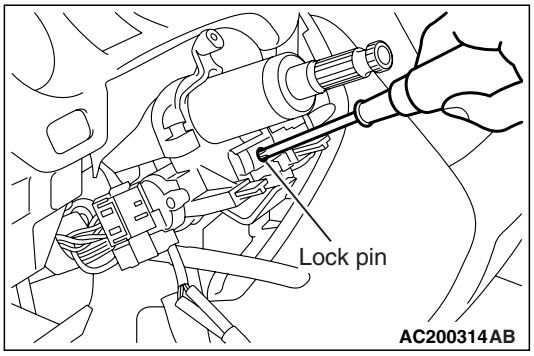
<<A>> 6. Steering lock cylinder
- Ignition switch connector

7. Ignition switch
- Key reminder switch connector

8. Key reminder switch and bulb assembly
9. Immobilizer-ECU

REMOVAL SERVICE POINT

<<A>> STEERING LOCK CYLINDER REMOVAL

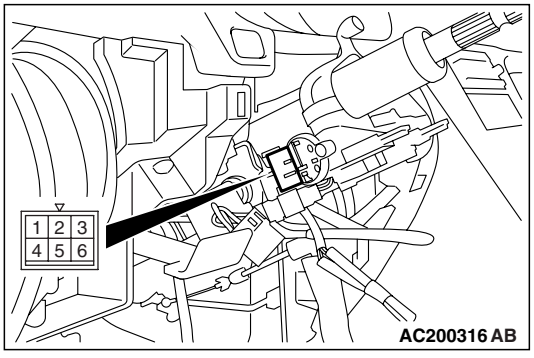


1. Insert the key in the steering lock cylinder and turn it to the "ACC" position.
2. Using a small Phillips head screwdriver, pull the steering lock cylinder toward you.

INSPECTION

M1544009700429

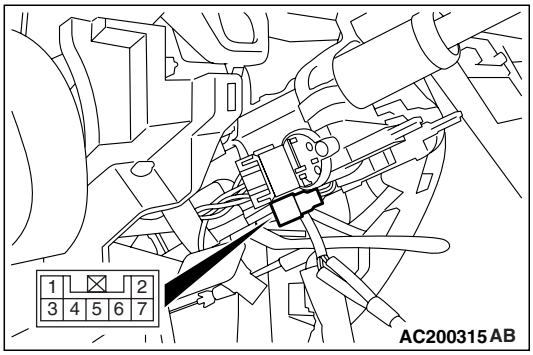
IGNITION SWITCH CONTINUITY CHECK



Disconnect ignition switch connector C-303 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	Continuity (Less than 2 Ω)
"ON"	1 – 2, 1 – 4, 1 – 6, 2 – 4, 2 – 6, 4 – 6	Continuity (Less than 2 Ω)
"START"	1 – 2, 1 – 5, 2 – 5	Continuity (Less than 2 Ω)

KEY REMINDER SWITCH CONTINUITY CHECK



Disconnect key reminder switch connector C-304 without removing the ignition switch and key reminder switch. Then check the continuity.

Status of ignition key	Tester connection	Specified condition
Removed	4 – 6	Continuity (Less than 2 Ω)
Inserted	4 – 6	Open circuit

COMBINATION METER ASSEMBLY

SERVICE SPECIFICATIONS

M1543000300982

Item				Standard value
Speedometer indication tolerance km/h			20	20 – 24
			40	40 – 44
			80	80 – 86
			120	122 – 128
			160	163 – 170
			200	204 – 212
Tachometer indication tolerance r/min			700	700 ± 100
			2,000	2,000 ± 100
			3,000	3,000 ± 150
			4,000	4,000 ± 200
			5,000	5,000 ± 250
			6,250	6,250 ± 150
Fuel gauge unit resistance Ω	2WD		Float position F (highest)	3.0 ± 0.6
			Float position E (lowest)	110 ± 2.5
	4WD	Fuel pump and gauge unit	Float position F (highest)	1.5 ± 0.5
			Float position E (lowest)	55 ± 1.5
		Fuel gauge unit	Float position F (highest)	1.5 ± 0.5
			Float position E (lowest)	55 ± 1.5
Fuel gauge unit float height mm	2WD		Float position F (A)	35.4 ± 2
			Float position E (B)	186.7 ± 2
	4WD	Fuel pump and gauge unit	Float position F (A)	36.7 ± 2
			Float position E (B)	149.6 ± 2
		Fuel gauge unit	Float position F (A)	23.4 ± 2
			Float position E (B)	194.2 ± 2
Engine coolant temperature gauge unit resistance Ω				104 ± 13.5 (at 70°C)

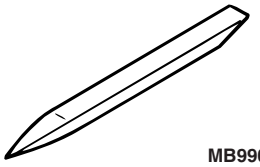
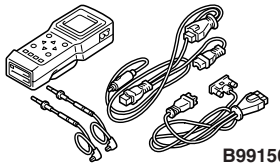
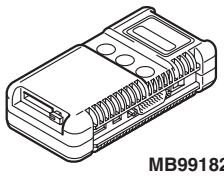
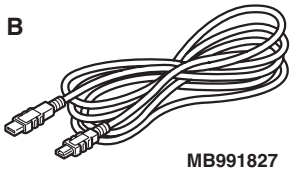
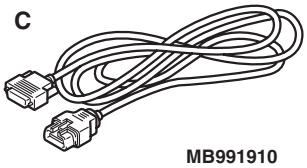
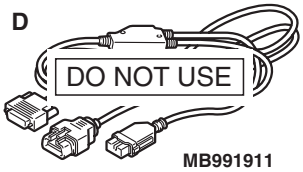
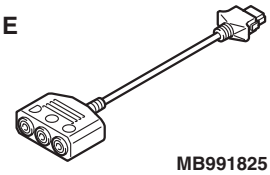
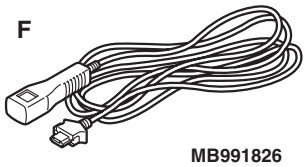
SEALANT

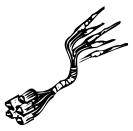
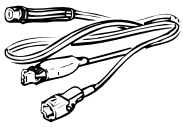
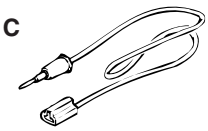
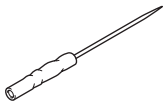
M1543024600039

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

SPECIAL TOOLS

M1543000602945

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of instrument panel driver's side garnish and meter bezel.
 B991502	MB991502	M.U.T.-II sub assembly	Reading MPI system diagnosis code
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991825 F  MB991826 MB991955	MB991955 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991825 F: MB991826	M.U.T.-III sub-assembly A: Vehicle communication interface (V.C.I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III measurement adapter F: M.U.T.-III trigger harness	Check for CAN bus line **⚠ CAUTION** **For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.**

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

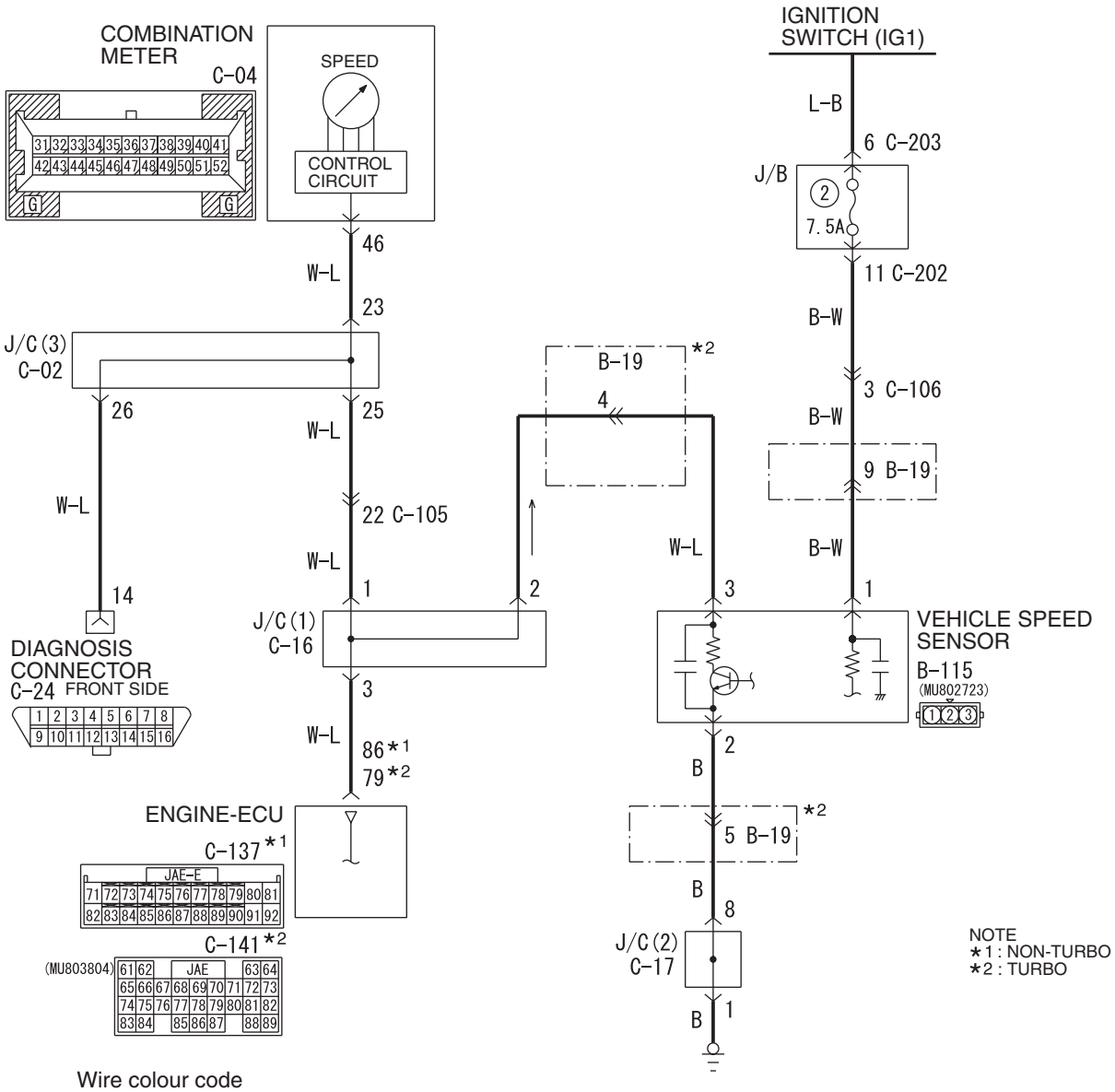
M1543007201547

Symptom	Inspection procedure No.	Reference page
Speedometer does not work (the other meters work) <2000>.	1	P.54A-34
Speedometer does not work (the other meters work) <2400>.	2	P.54A-39
Tachometer does not work (the other meters work).	3	P.54A-43
Fuel gauge does not work (the other meters work).	4	P.54A-45
Engine coolant temperature gauge does not work (the other meters work).	5	P.54A-49
Combination meters does not work (the instruments do not work).	6	P.54A-52

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Speedometer does not work (the other meters work.) <2000>

Speedometer Circuit <2000>



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

W5Z54E044A

TECHNICAL DESCRIPTION (COMMENT)

The engine-ECU and its associated components, the combination meter assembly, the wiring harness, or the connector(s) may be defective.

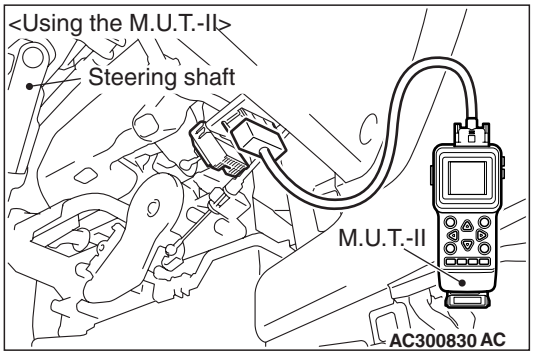
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or termi-

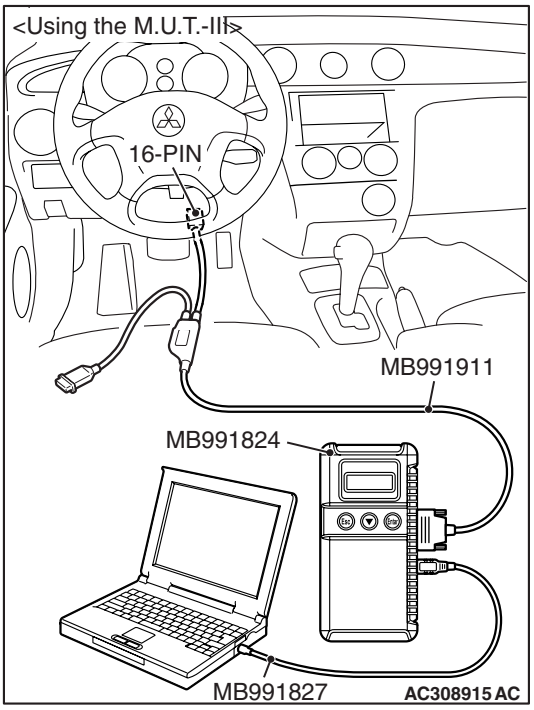
TROUBLESHOOTING HINTS

- Malfunction of the vehicle speed sensor
- Malfunction of the engine-ECU
- Malfunction of the combination meter assembly nals pushed back in the connector.

DIAGNOSIS PROCEDURE

STEP 1. Check the speedometer.

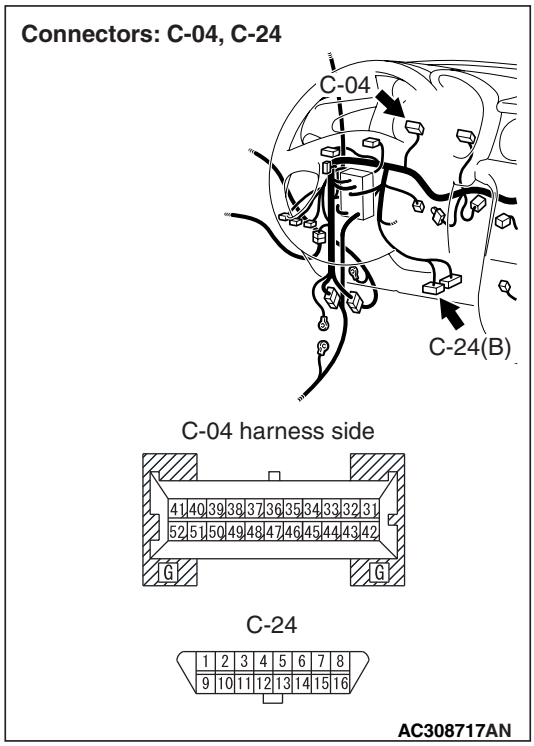




(1) Connect the M.U.T.-II/III to the diagnosis connector.
(2) Use the M.U.T.-II/III to enter simulated vehicle speed.

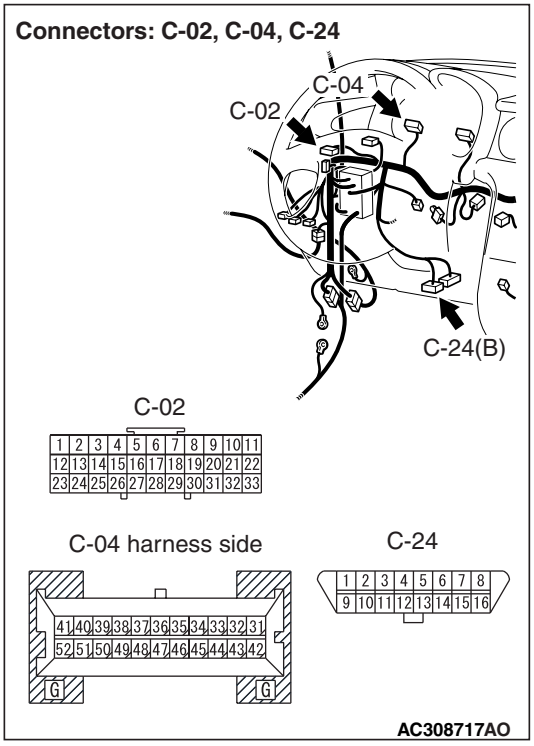
Q: Does the speedometer show that simulated vehicle speed?
YES : Go to Step 5
NO : Go to Step 2

STEP 2. Connector check: Combination meter connector C-04 and diagnosis connector C-24



Q: Is combination meter connector C-04 and diagnosis connector C-24 in good condition?
YES : Go to Step 3
NO : Repair or replace the damage component(s).

STEP 3. Check the wiring harness between combination meter connector C-04 (terminal 46) and diagnosis connector C-24 (terminal 14).



NOTE: Prior to the wiring harness inspection, joint connector C-02, and repair if necessary.

Q: Is the wiring harness between combination meter connector C-04 (terminal 46) and diagnosis connector C-24 (terminal 14) in good condition?
YES : Go to Step 4
NO : Repair or replace the damage component(s).

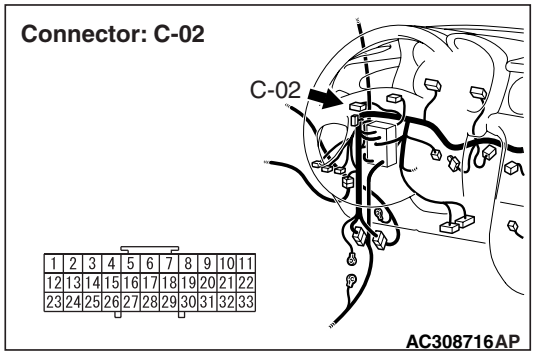
STEP 4. Retest the system.

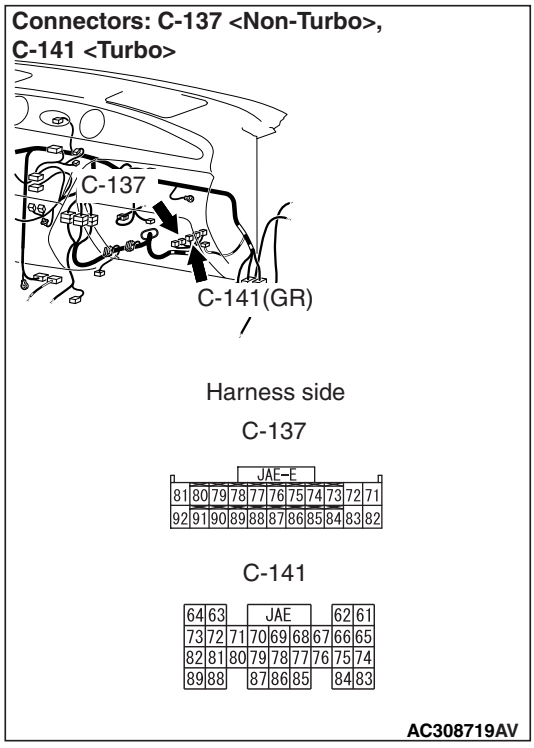
Q: Is the speedometer normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the combination meter assembly.

STEP 5. Check whether the diagnosis code is reset.

Q: Is the MPI-related diagnosis code set?
YES : Refer to GROUP 13A – Troubleshooting P.13A-15, GROUP 13B – Troubleshooting P.13B-20.
NO : Go to Step 6

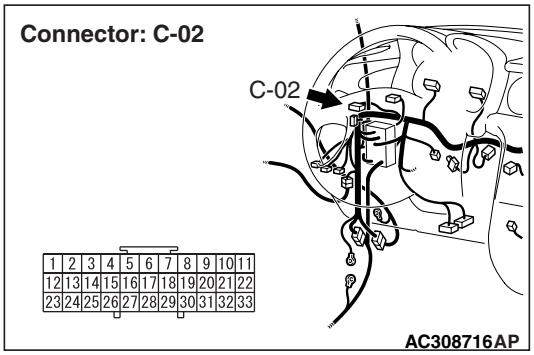
STEP6. Connector check: Joint connector C-02 and engine-ECU <Non-Turbo> connector C-137 or engine-ECU <Turbo> connector C-141

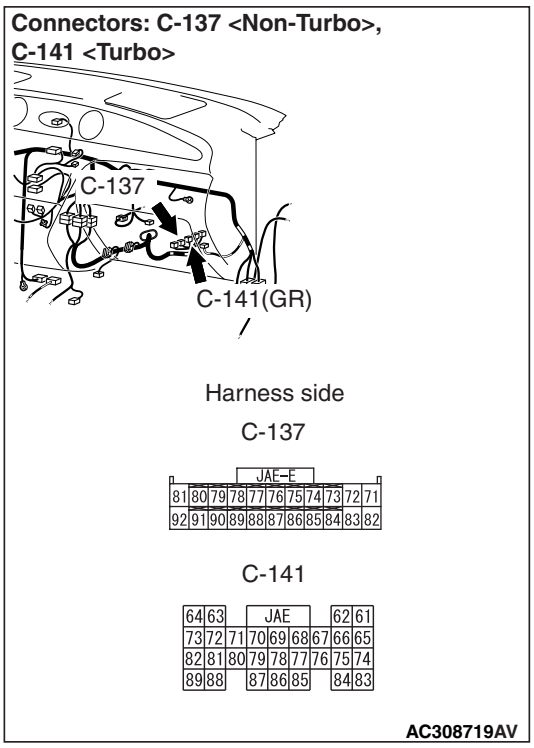




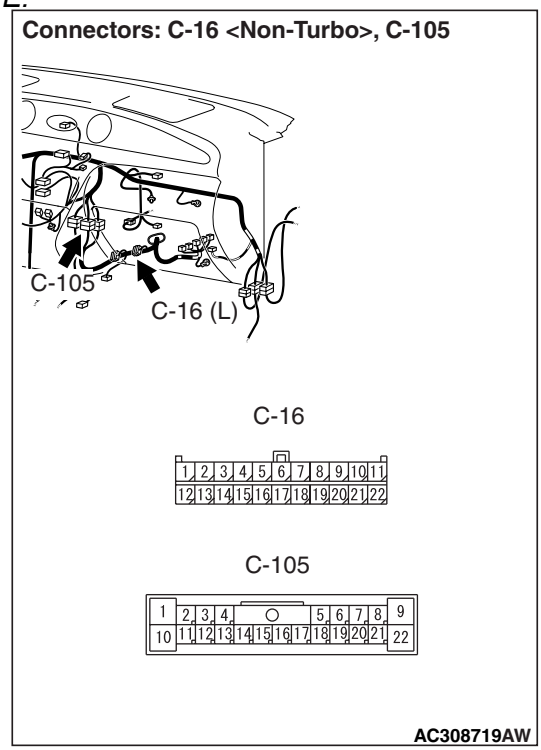
Q: Is joint connector C-02 and engine-ECU <Non-Turbo> connector C-137 or engine-ECU <Turbo> connector C-141 in good condition?
YES : Go to Step 7
NO : Repair or replace the damage component(s).

STEP 7. Check the wiring harness between joint connector C-02 (terminal 25) and engine-ECU <Non-Turbo> connector C-137 (terminal 86) or engine-ECU <Turbo> connector C-141 (terminal 79).





NOTE:



Prior to the wiring harness inspection, check intermediate connectors C-105, joint connectors C-16 <2000> and repair if necessary.

Q: Is the wiring harness between joint connector C-02 (terminal 25) and engine-ECU <2000> connector C-137 (terminal 86) or engine-ECU <2400> connector C-141 (terminal 79) in good condition?
YES : Go to Step 8
NO : Repair or replace the damage component(s).

STEP 8. Retest the system.

Q: Is the speedometer normal?
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.00-6).
NO : Go to Step 9.

STEP 9. Pulse check

Use the M.U.T.-II/III or a voltmeter to check that the vehicle speed signal is received.

System switch	Check conditions
Vehicle speed signal	When the vehicle speed has reached 10 km/h or more

OK: The M.U.T.-II/III sounds or the voltmeter needle fluctuates.

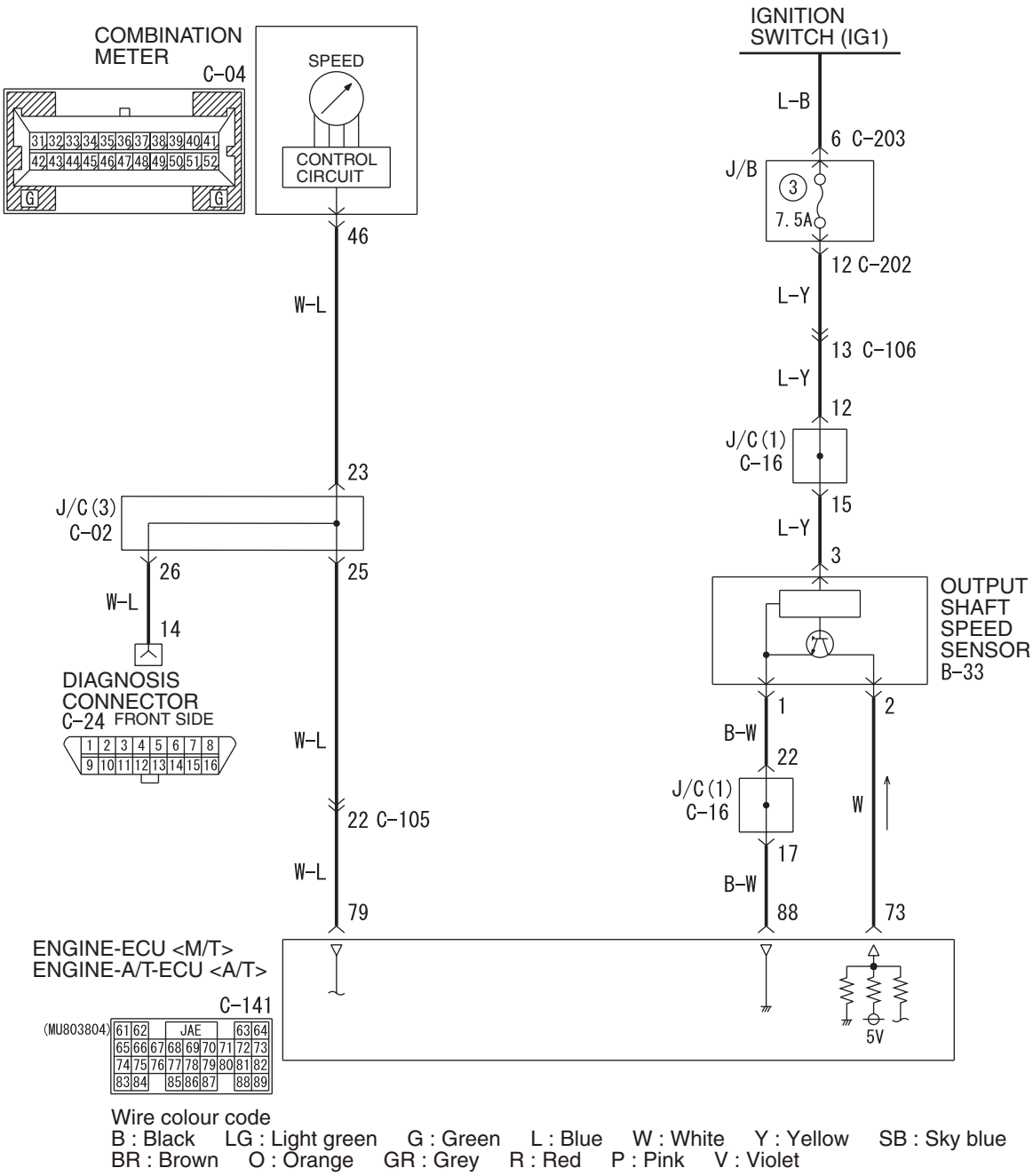
Q: Is the check result normal?

YES : Replace the combination meter assembly.

NO : Replace the engine-ECU.

INSPECTION PROCEDURE 2: Speedometer does not work (the other meters work.) <2400>

Speedometer Circuit <2400>



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

AC606699AB

TECHNICAL DESCRIPTION (COMMENT)

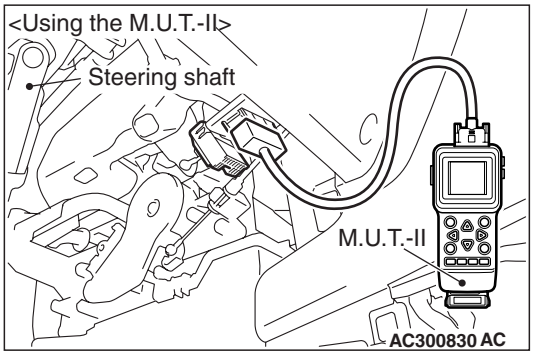
The engine-A/T-ECU and its associated components, the combination meter assembly, the wiring harness, or the connector(s) may be defective.

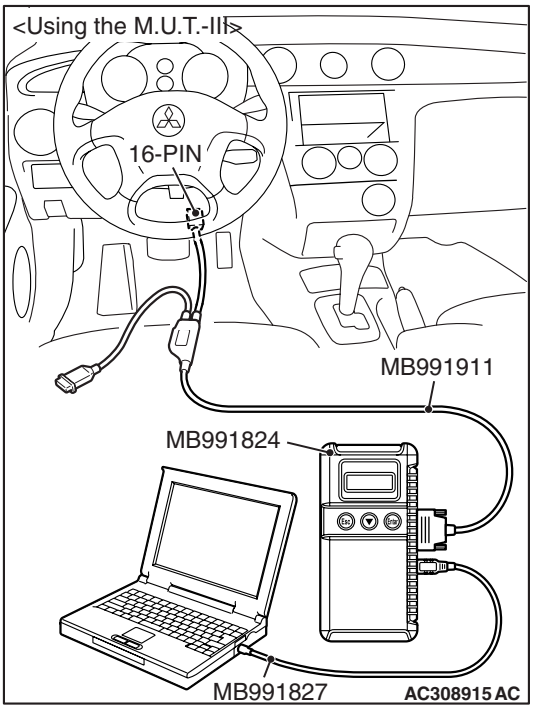
TROUBLESHOOTING HINTS

- Malfunction of the output shaft 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 the speedometer.

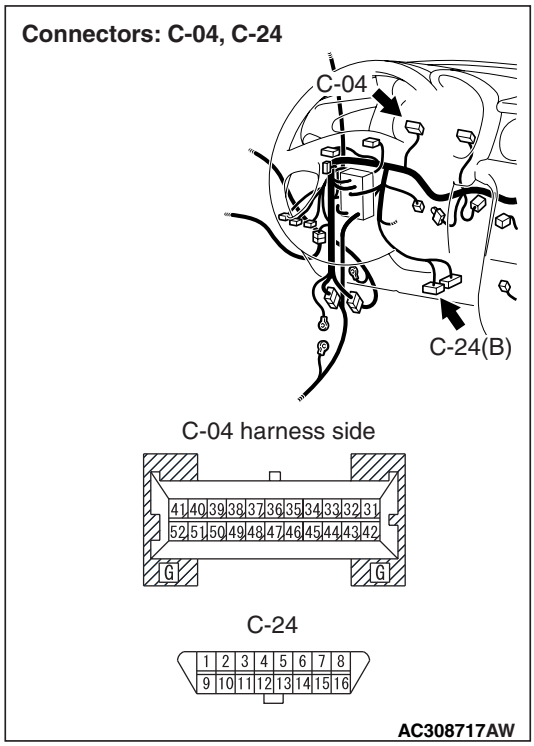




(1) Connect the M.U.T.-II/III to the diagnosis connector.
(2) Use the M.U.T.-II/III to enter simulated vehicle speed.

Q: Does the speedometer show that simulated vehicle speed?
YES : Go to Step 5
NO : Go to Step 2

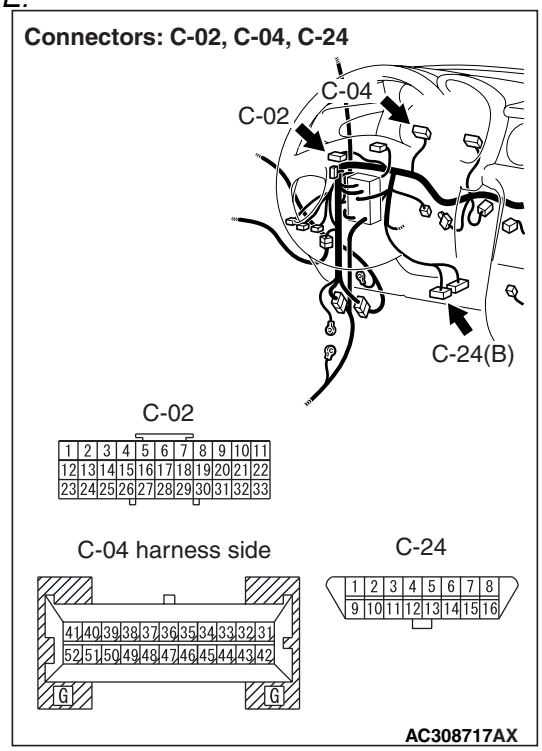
STEP 2. Connector check: Combination meter connector C-04 and diagnosis connector C-24



Q: Is combination meter connector C-04 and diagnosis connector C-24 in good condition?
YES : Go to Step 3
NO : Repair or replace the damage component(s).

STEP 3. Check the wiring harness between combination meter connector C-04 (terminal 46) and diagnosis connector C-24 (terminal 14).

NOTE:



Prior to the wiring harness inspection, joint connector C-02, and repair if necessary.

Q: Is the wiring harness between combination meter connector C-04 (terminal 46) and diagnosis connector C-24 (terminal 14) in good condition?
YES : Go to Step 4
NO : Repair or replace the damage component(s).

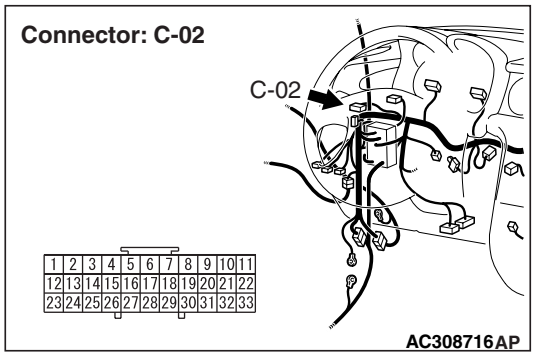
STEP 4. Retest the system.

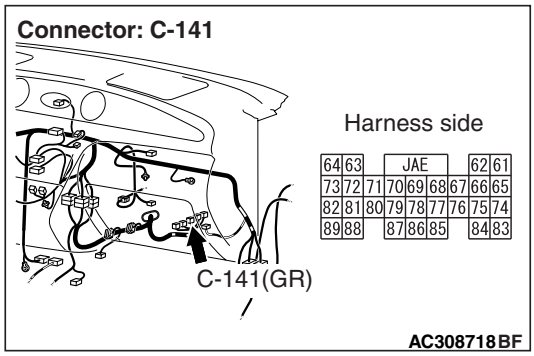
Q: Is the speedometer normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction P.00-6).
NO : Replace the combination meter assembly.

STEP 5. Check whether the diagnosis code is reset.

Q: Is the MPI-related diagnosis code set?
YES : Refer to GROUP 13C – Troubleshooting P.13C-21.
NO : Go to Step 6

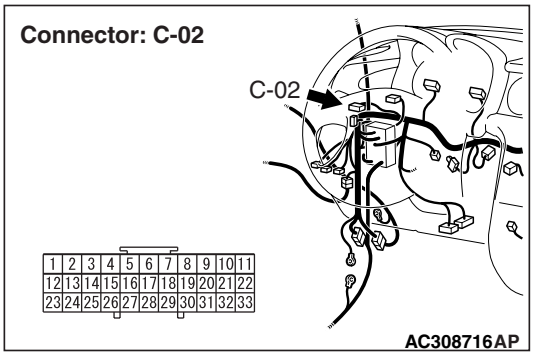
STEP6. Connector check: Joint connector C-02 and engine-A/T-ECU connector C-141

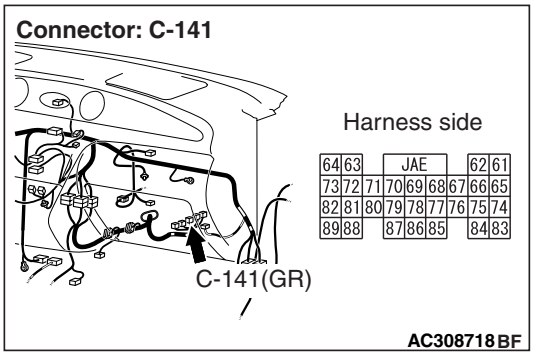




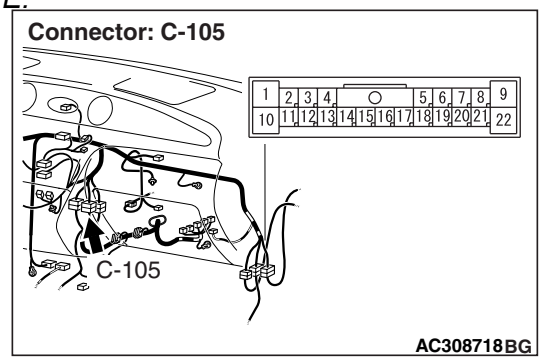
Q: Is joint connector C-02 and engine-A/T-ECU connector C-141 in good condition?
YES : Go to Step 7
NO : Repair or replace the damage component(s).

STEP 7. Check the wiring harness between joint connector C-02 (terminal 25) and engine-ECU connector C-141 (terminal 79) or engine-A/T-ECU connector C-141 (terminal 79).





NOTE:



Prior to the wiring harness inspection, check intermediate connectors C-105 and repair if necessary.

Q: Is the wiring harness between joint connector C-02 (terminal 25) and engine-ECU connector C-141 (terminal 79) or engine-A/T-ECU connector C-141 (terminal 79) in good condition?
YES : . Go to Step 8
NO : . Repair or replace the damage component(s).

STEP 8. Retest the system.

Q: Is the speedometer normal?
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.00-6).
NO : Go to Step 9.

STEP 9. Pulse check

Use the M.U.T.-II/III or a voltmeter to check that the output shaft speed signal is received.

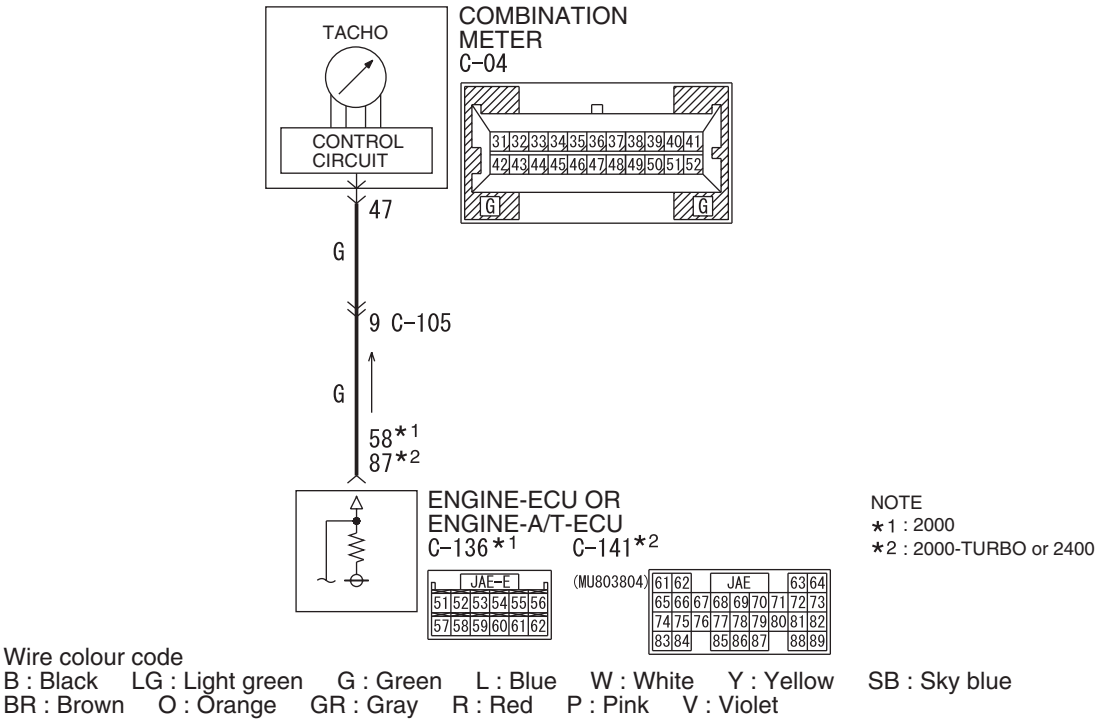
System switch	Check conditions
Output shaft speed signal	When the vehicle speed has reached 10 km/h or more

OK: The M.U.T.-II/III sounds or the voltmeter needle fluctuates.

Q: Is the check result normal?
YES : Replace the combination meter assembly.
NO : Replace the engine-A/T-ECU.

INSPECTION PROCEDURE 3: Tachometer does not work (the other meters work.)

Tachometer Circuit



W5Z54E046A

TECHNICAL DESCRIPTION (COMMENT)

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

TROUBLESHOOTING HINTS

- 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

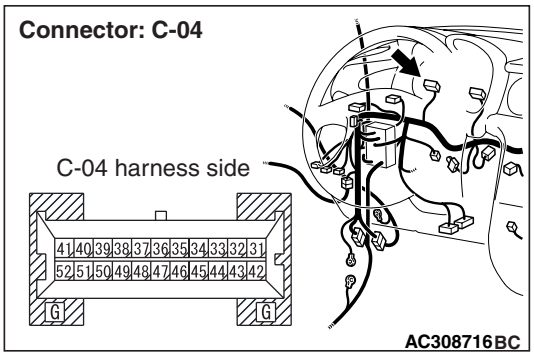
STEP 1. Check whether the diagnosis code is reset.

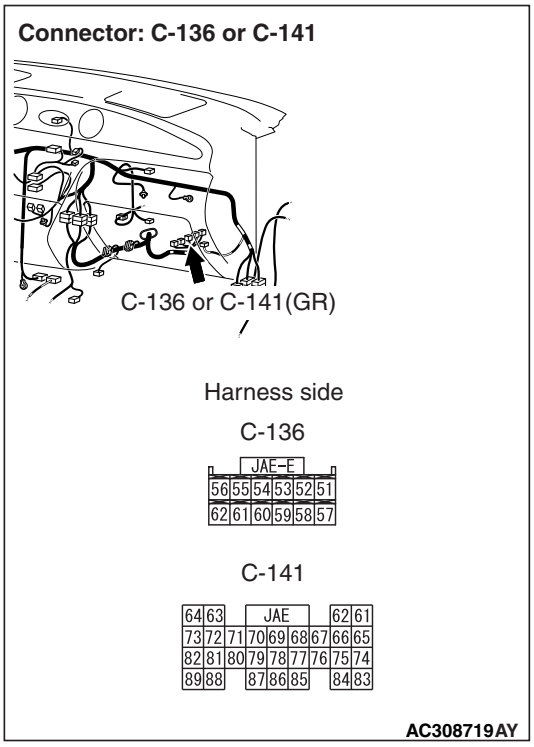
Q: Is the MPI-related diagnosis code set?

Code No.P0300 is set : Refer to GROUP 13A – Troubleshooting P.13A-106, GROUP 13B – Troubleshooting P.13B-128 or GROUP 13C – Troubleshooting P.13C-153.

NO : Go to Step 2

STEP 2. Connector check: Combination meter connector C-04 and engine-ECU connector C-136 or engine-A/T-ECU connector C-141



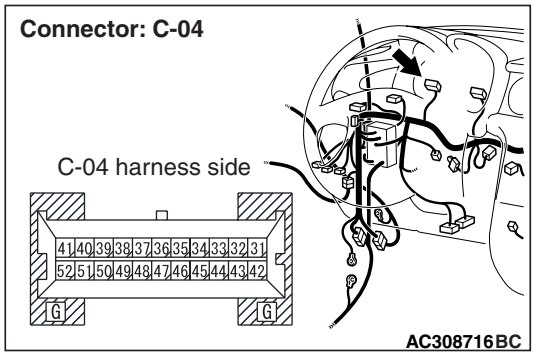


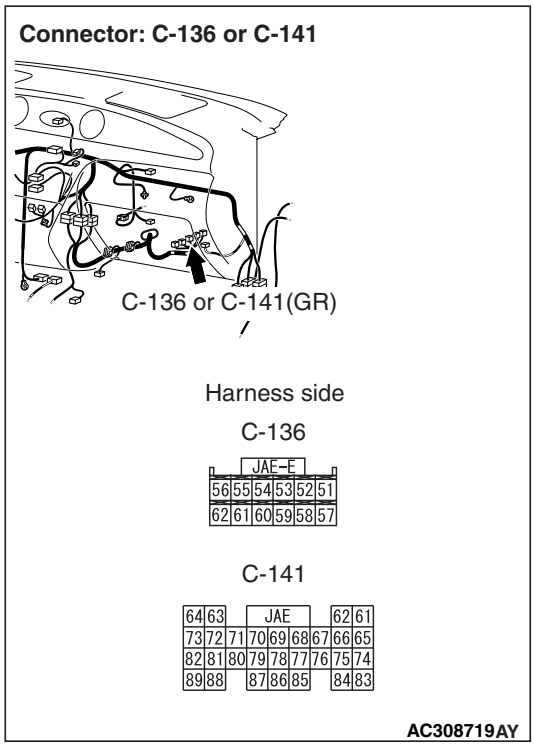
Q: Is combination meter connector C-04 and engine-ECU connector C-136 or engine-A/T-ECU connector C-141 in good condition?
YES : Go to Step 3
NO : Repair or replace the damage component(s).

STEP 3. Retest the system.

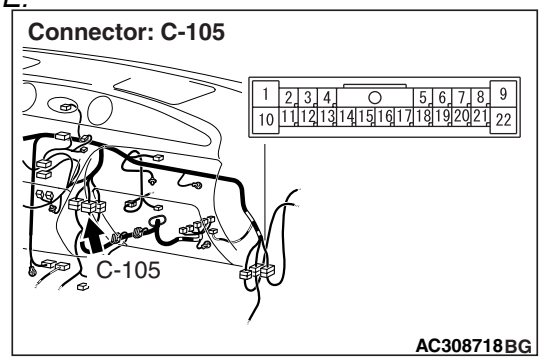
Q: Is the tachometer normal?
YES : Intermittent Malfunction. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction P.00-6).
NO : Go to Step 4

STEP 4. Check the wiring harness between combination meter connector C-04 (terminal 47) and engine-ECU connector C-136 (terminal 58) or engine-A/T-ECU connector C-141 (terminal 87)





NOTE:

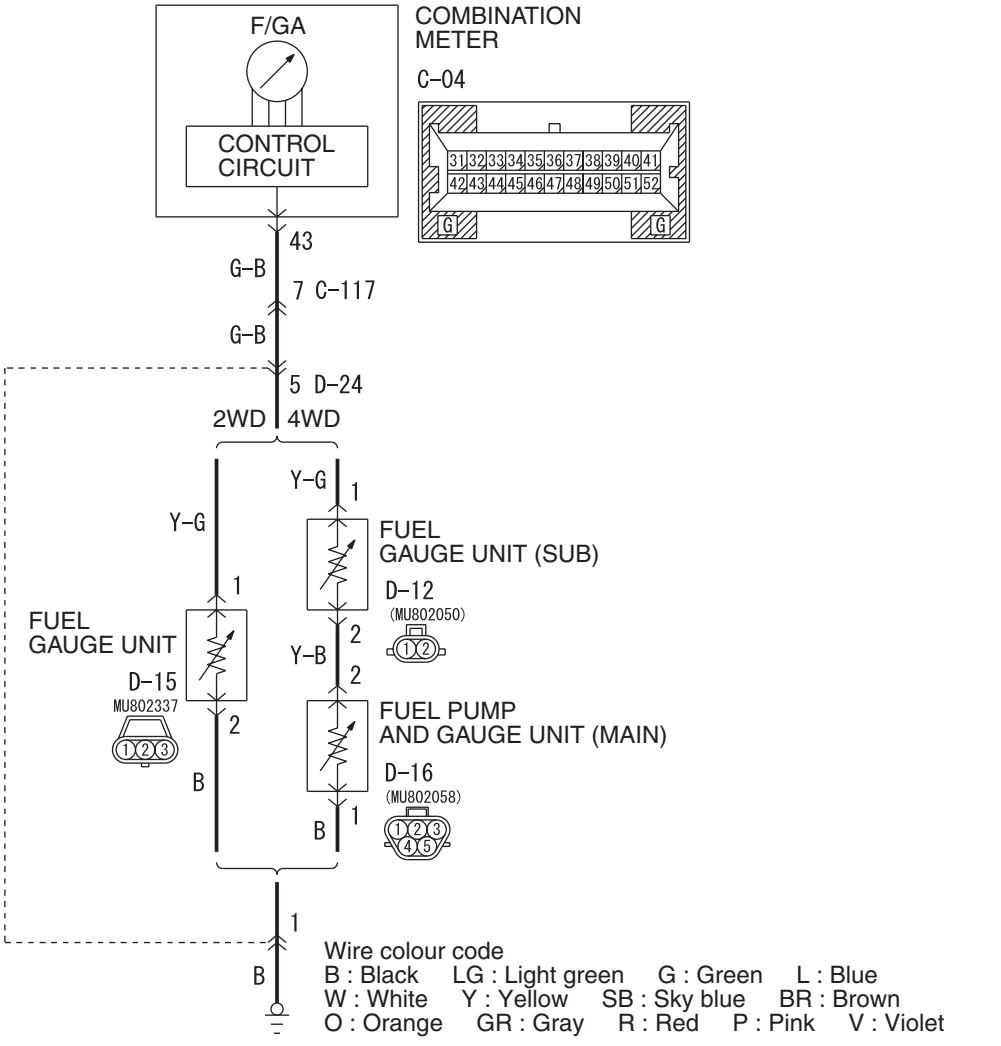


Prior to the wiring harness inspection, check intermediate connector C-105, and repair if necessary.

Q: Is the wiring harness between combination meter connector C-04 (terminal 47) and engine-ECU connector C-136 (terminal 58) or engine-A/T-ECU connector C-141 (terminal 87) in good condition?
YES : Replace the combination meter assembly.
NO : Repair or replace the damage component(s).

INSPECTION PROCEDURE 4: Fuel gauge does not work (the other meters work.)

Fuel Gauge Circuit



W4Z54E53AA

TECHNICAL DESCRIPTION (COMMENT)

If only the fuel gauge does not operate, fuel gauge unit <2WD>, the fuel pump and gauge unit <4WD>, the combination meter, wiring harness or connector(s) may be defective.

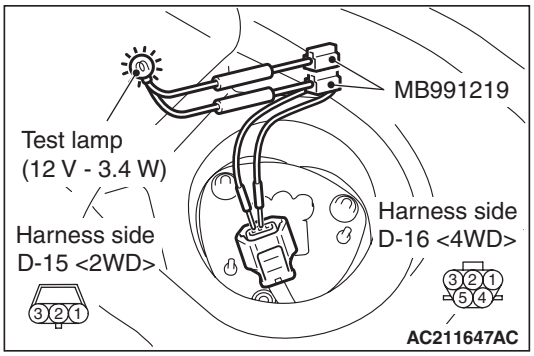
TROUBLESHOOTING HINTS

- 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 fuel gauge circuit.

(1) Disconnect D-15 <2WD> fuel gauge unit connector or D-16 <4WD> fuel pump and gauge unit (main) connector.



(2) Connect a test lamp (12 V – 3.4 W) via test harness (MB991219) between the wiring harness connector terminals 1 and 2.

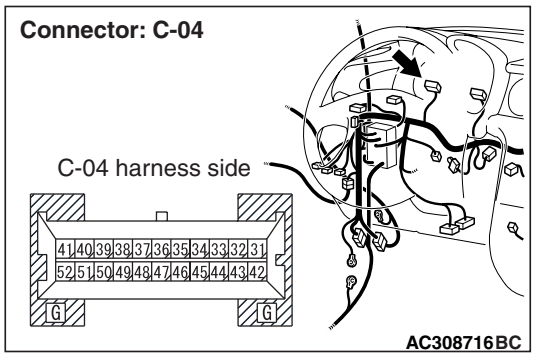
(3) Turn the ignition switch to the "ON" position.

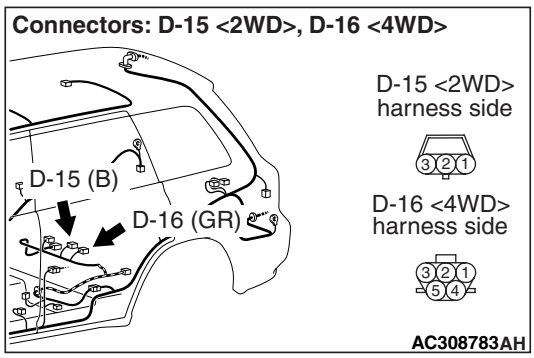
Q: Does the test lamp illuminate?

YES : Go to Step 8.

NO : Go to Step 2.

STEP 2. Connector check: Combination meter connector C-04, fuel gauge unit connector D-15 <2WD> or fuel pump and gauge unit (main) connector D-16 <4WD>



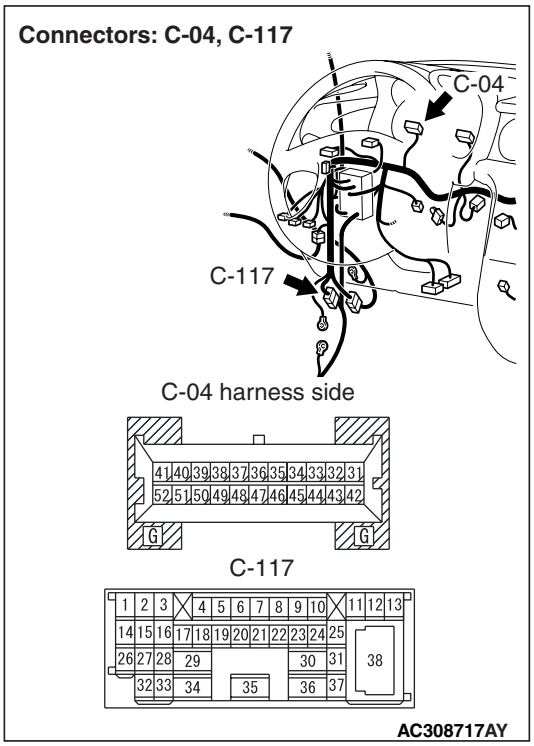


Q: Is combination meter connector C-04, fuel gauge unit connector D-15 <2WD> or fuel pump and gauge unit (main) connector D-16 <4WD> in good condition?

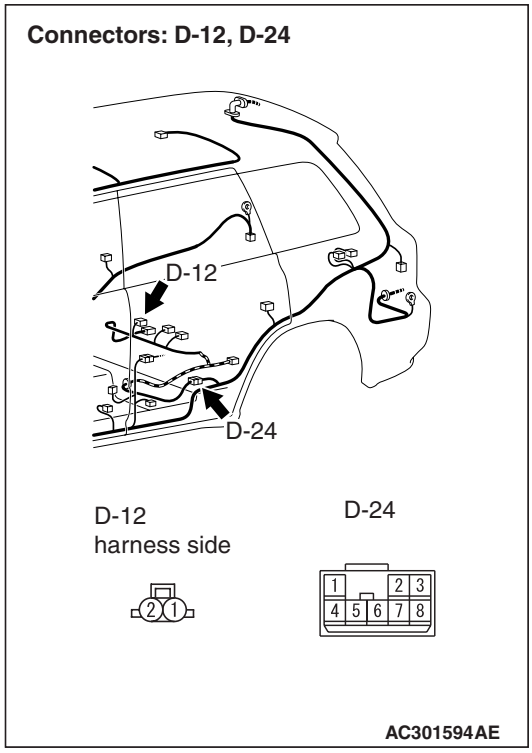
YES : Go to Step 3.

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

STEP 3. Check the wiring harness between combination meter connector C-04 (terminal 43) and fuel gauge unit connector D-15 (terminal 1) <2WD> or fuel pump and gauge unit (main) connector D-16 (terminal 2) <4WD>.



NOTE:



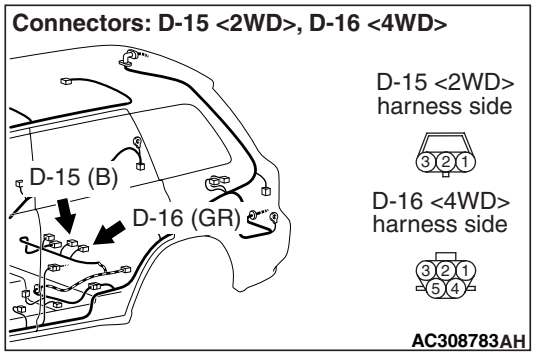
Prior to the wiring harness inspection, check fuel gauge unit (sub) connector D-12, intermediate connector C-117, D-24, and repair if necessary.

Q: Is the wiring harness between combination meter connector C-04 (terminal 43) and fuel gauge unit connector D-15 (terminal 1) <2WD> or fuel pump and gauge unit (main) connector D-16 (terminal 2) <4WD> in good condition?
YES : Go to Step 4.
NO : Repair or replace the damaged component(s). Then go to Step 4.

STEP 4. Retest the system.

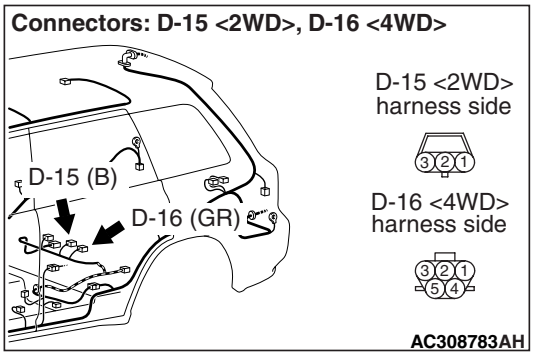
Q: Is the fuel gauge normal?
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction P.00-6).
NO : Go to Step 5.

STEP 5. Connector check: Fuel gauge unit connector D-15 <2WD> or fuel pump and gauge unit (main) D-16 <4WD>

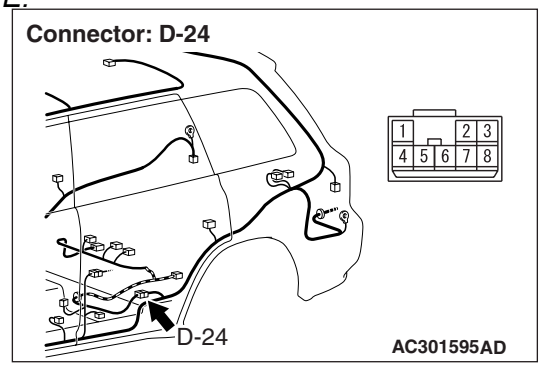


Q: Is fuel gauge unit connector D-15 <2WD> or fuel pump and gauge unit (main) D-16 <4WD> in good condition?
YES : Go to Step 6.
NO : Repair or replace the damaged component(s).

STEP 6. Check the wiring harness between fuel gauge unit connector D-15 (terminal 2) <2WD> and fuel pump and gauge unit connector D-16 (terminal 1) <4WD> and earth.



NOTE:



Prior to the wiring harness inspection, check intermediate connectors D-24, and repair if necessary.

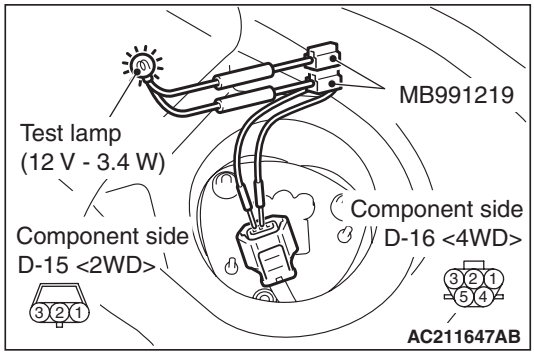
Q: Is the wiring harness between fuel gauge unit connector D-15 (terminal 2) <2WD> and fuel pump and gauge unit connector D-16 (terminal 1) <4WD> and earth in good condition?
YES : Go to Step 7.
NO : Repair or replace the damaged component(s).

STEP 7. Retest the system.

Q: Is the fuel gauge normal?
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.00-6).
NO : Carry out the troubleshooting again.

STEP 8. Check the fuel gauge circuit.

(1) Disconnect D-15 <2WD> fuel gauge unit connector or D-16 <4WD> fuel pump and gauge unit (main) connector.



(2) Connect a test lamp (12 V – 3.4 W) via special tool test harness (MB991219) between the wiring harness connector terminals 1 and 2.
(3) Turn the ignition switch to the "ON" position.

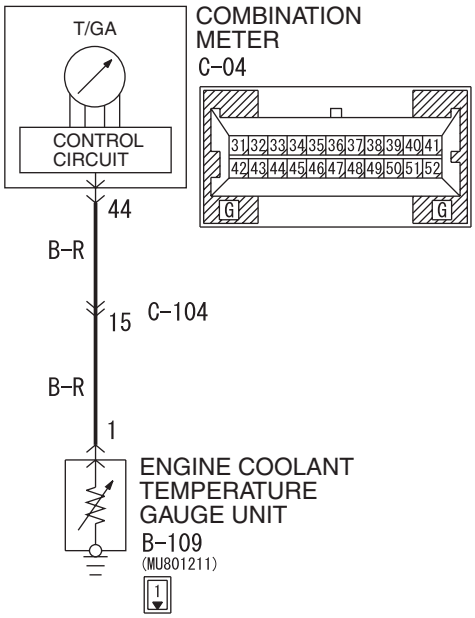
Q: Does the fuel gauge in the combination meter fluctuate about half of it full scale?
YES : Replace the fuel gauge unit.
NO : Go to Step 9.

STEP 9. Retest the system.

Q: Is the fuel gauge normal?
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.00-6).
NO : Replace combination meter.

INSPECTION PROCEDURE 5: Engine Coolant Temperature Gauge does not Work. (the other meters 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

W4Z54E54AA

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.

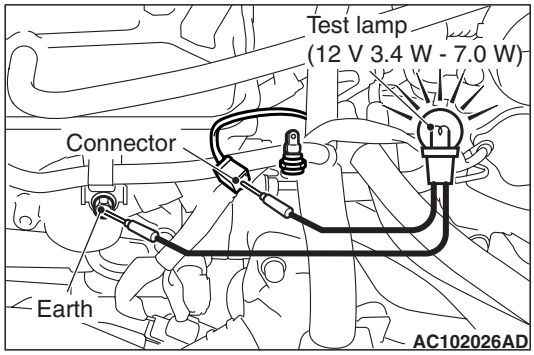
TROUBLESHOOTING HINTS

- 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 engine coolant temperature gauge circuit.

(1) Disconnect the B-109 engine coolant temperature gauge unit connector.



(2) Connect a test lamp (12 V – 3.4 W to 12 V – 7.0 W) to the wiring harness side connector.

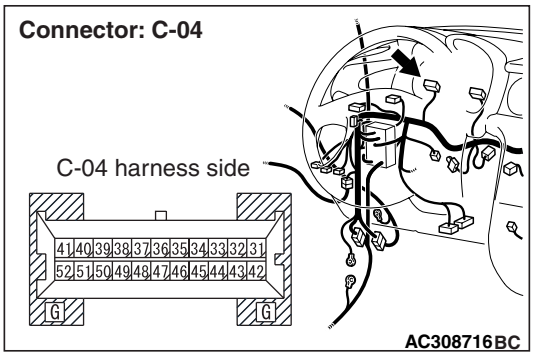
(3) Ignition switch: ON

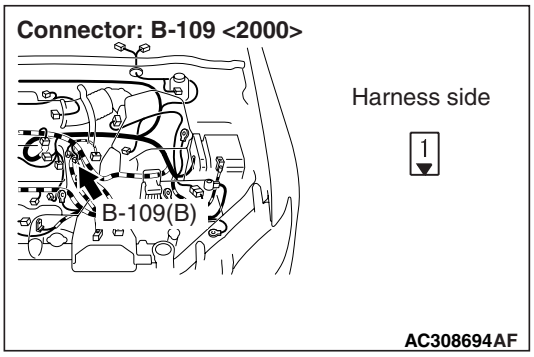
Q: Does the test lamp illuminate?

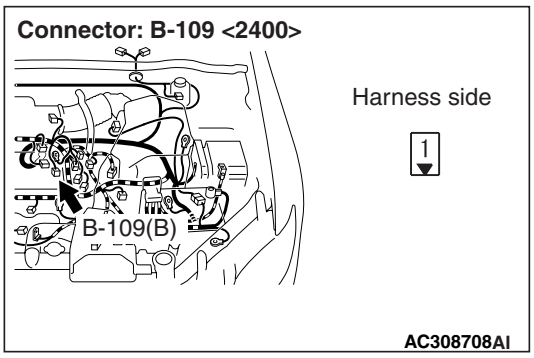
YES : Go to Step 5.

NO : Go to Step 2.

STEP 2. Connector check: Combination meter connector C-04 and engine coolant temperature gauge unit connector B-109





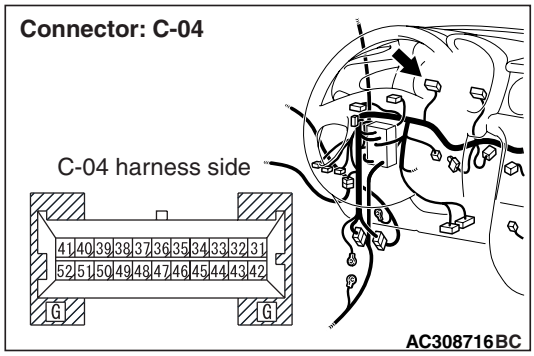


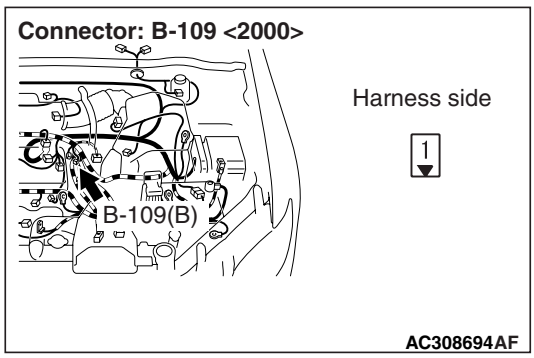
Q: Is combination meter connector C-04 and engine coolant temperature gauge unit connector B-109 in good condition?
YES : Go to Step 3.
NO : Repair or replace the damage component(s).

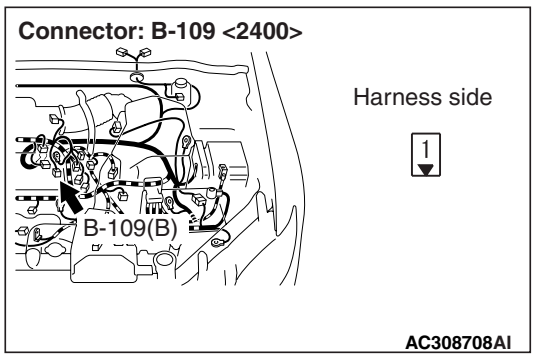
STEP 3. Retest the system.

Q: Is the engine coolant temperature gauge normal?
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.00-6).
NO : Go to Step 4.

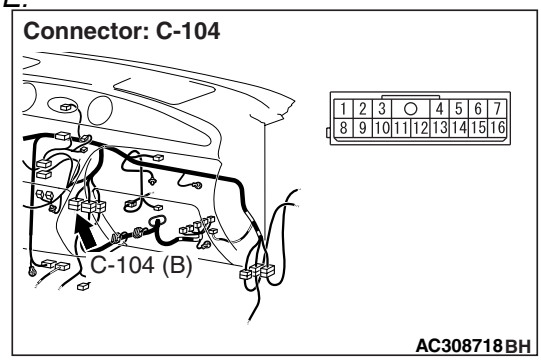
STEP 4. Check the wiring harness between combination meter connector C-04 (terminal 44) and engine coolant temperature gauge unit connector B-109 (terminal 1).







NOTE:

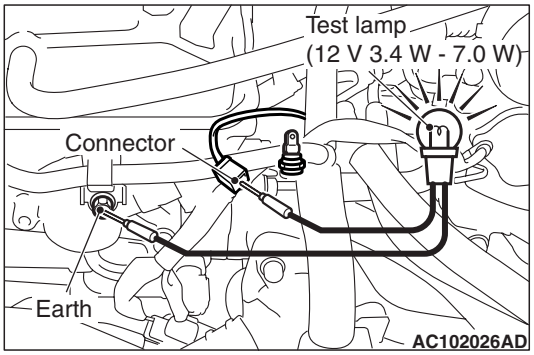


Prior to the wiring harness inspection, check intermediate connectors C-104, and repair if necessary.

Q: Is the wiring harness between combination meter connector C-04 (terminal 44) and engine coolant temperature gauge unit connector B-109 (terminal 1) in good condition?
YES : Go to Step 6.
NO : Repair or replace the damage component(s).

STEP 5. Check the engine coolant temperature gauge circuit.

(1) Disconnect the B-109 engine coolant temperature gauge unit connector.



(2) Connect a test lamp (12 V – 3.4 W to 12 V – 7.0 W) to the wiring harness side connector.
(3) Ignition switch: ON

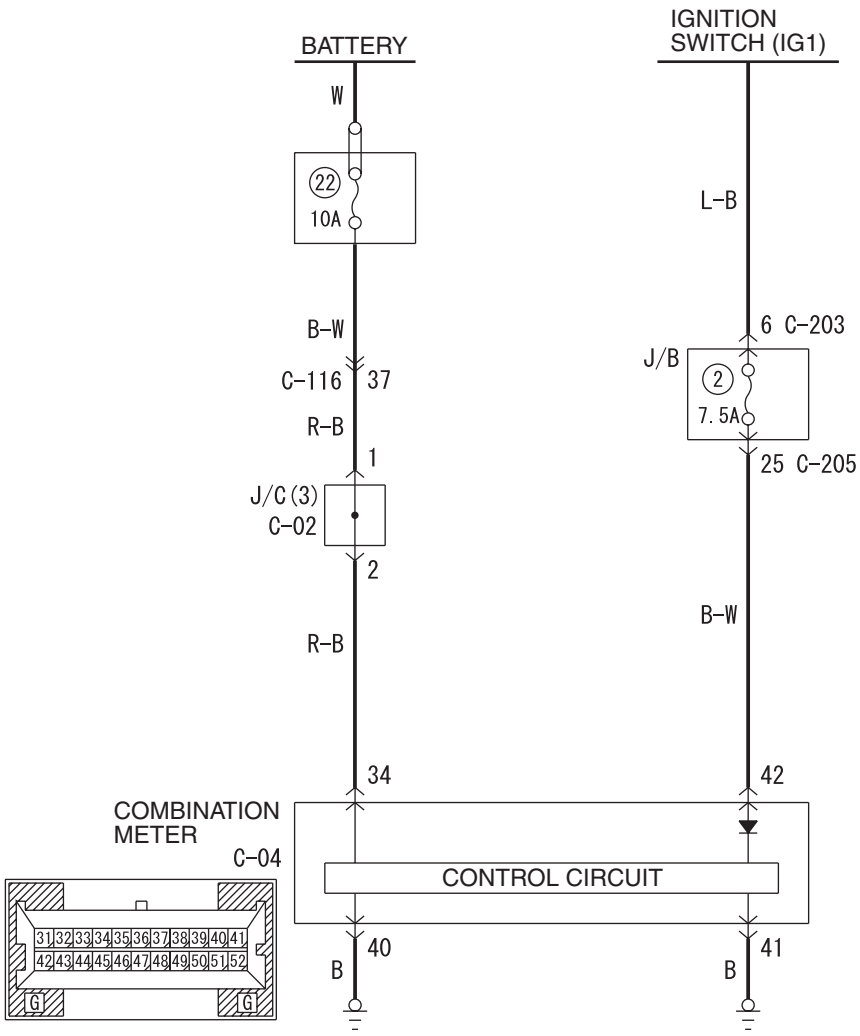
Q: Does the engine coolant temperature gauge in the combination meter fluctuate about half of it full scale?
YES : Replace the engine coolant temperature gauge unit.
NO : Go to Step 6.

STEP 6. Retest the system

Q: Is the engine coolant temperature gauge normal?
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.00-6).
NO : Replace the combination meter.

INSPECTION PROCEDURE 6: Combination meter does not work. (the instruments do not work)

Combination meter does not work. (the instruments do not work)



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

AC606701AB

TECHNICAL DESCRIPTION (COMMENT)

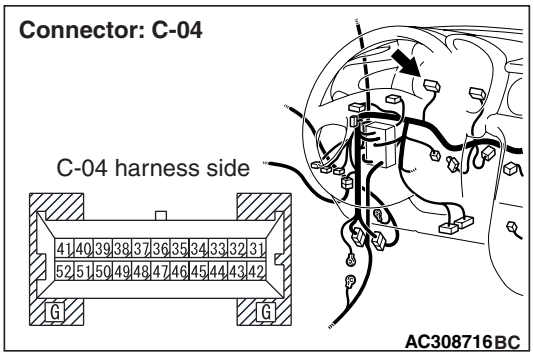
The cause is thought to be malfunction of the power, earth circuitry or combination meter.

TROUBLESHOOTING HINTS

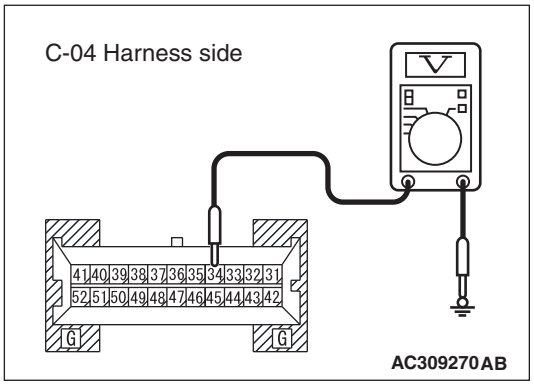
- Malfunction of the combination meter
- Damaged wiring harness or connectors

DIAGNOSIS PROCEDURE

STEP 1. Measure the voltage at combination meter connector C-04 in order to check the battery circuit of power supply system to the combination meter.



(1) Disconnect the combination meter connector C-04 and measure the voltage at combination meter connector C-04 harness side.

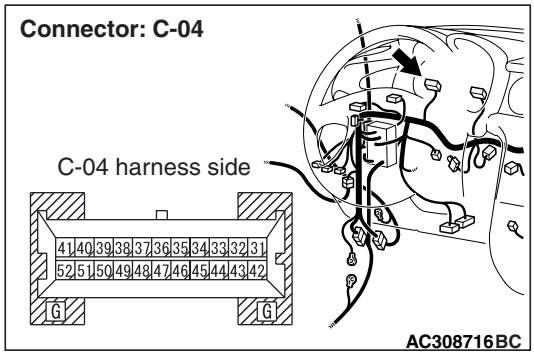


(2) Measure the voltage between terminal 34 and earth.

OK: System voltage

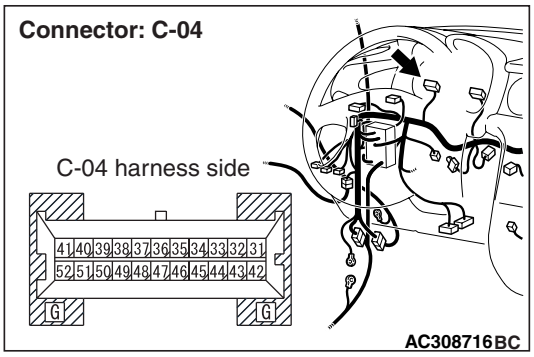
Q: IS the check result normal?
YES : Go to Step 4.
NO : Go to Step 2.

STEP 2. Connector check: Combination meter connector C-04 for damage.

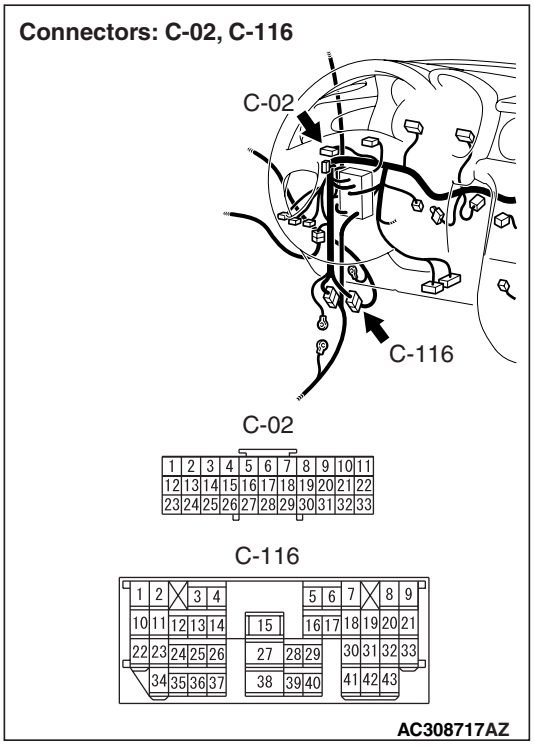


Q: Is combination meter connector C-04 in good condition?
YES : Go to Step 3.
NO : Repair or replace the connector. Check to see that all meters operate.

STEP 3. Check the wiring harness between combination meter connector C-04 (terminal 34) and battery.



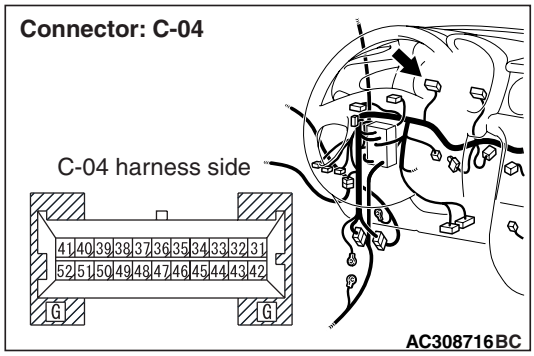
NOTE:



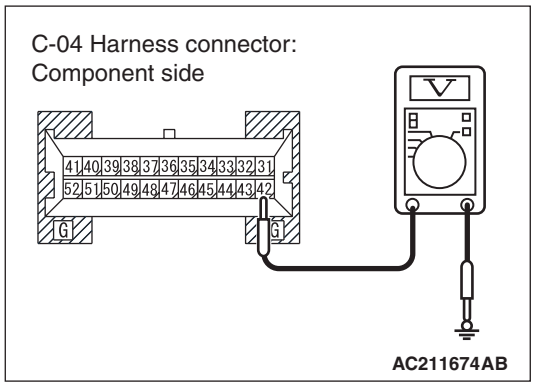
Prior to the wiring harness inspection, check intermediate connectors C-116, junction block connectors C-202 and joint connector C-02, and repair if necessary.

Q: Are the wiring harness between combination meter connector C-04 (terminal 34) and fusible link (1) in good condition?
YES : There is no action to be taken.
NO : Repair or replace the wiring harness. Check to see that all meters operate.

STEP 4. Measure the voltage at combination meter connector C-04 to check the battery circuit of power supply system to the combination meter.



(1) Measure at combination meter connector C-04 without disconnecting the connector.
(2) Turn the ignition switch to “ON” position.

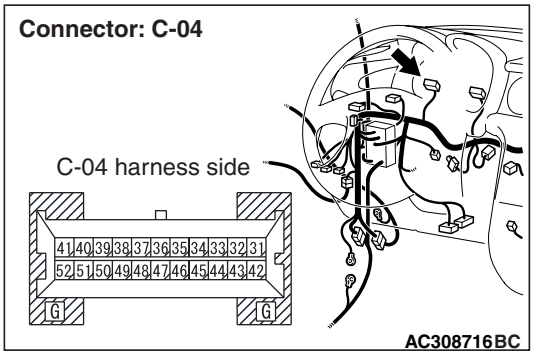


(3) Measure the voltage between terminal 42 and earth.

OK: System voltage

Q: Is the check result normal?
YES : Go to Step 7.
NO : Go to Step 5.

STEP 5. Connector check: combination meter connector C-04

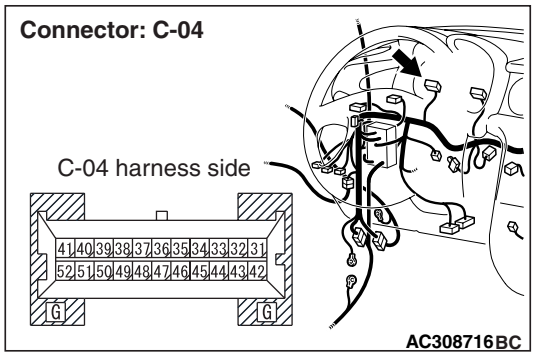


Q: Is combination meter connector C-04 in good condition?

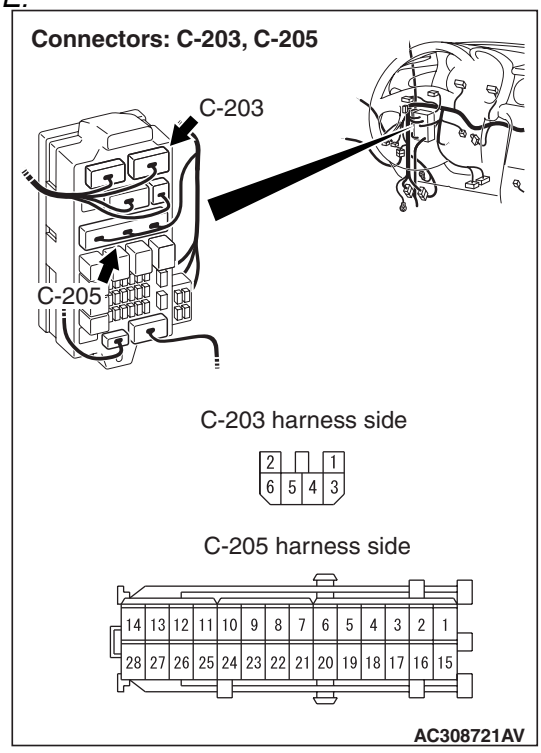
YES : Go to Step 6.

NO : Repair or replace the connector. Check to see that all meters operate.

STEP 6. Check the wiring harness between combination meter connector C-04 (terminal 42) and ignition switch (IG1).



NOTE:



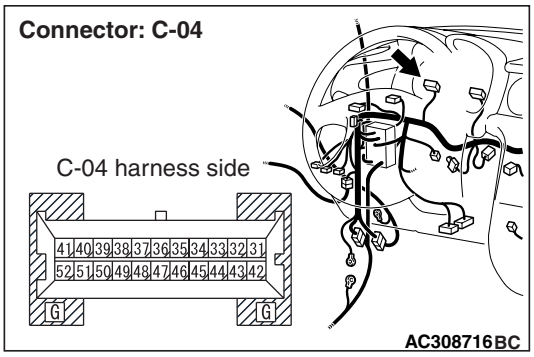
Prior to the wiring harness inspection, check Junction block connectors C-203 and C-205, and repair if necessary.

Q: Are the wiring harness between combination meter connector C-04 (terminal 42) and ignition switch (IG1) in good condition?

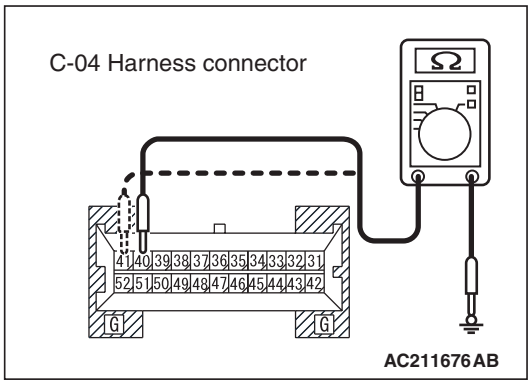
YES : There is no action to be taken.

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

STEP 7. Resistance measurement at combination meter connector C-04 to check the earth circuit to the combination meter.



(1) Disconnect the combination meter connector C-04 and measure the resistance at combination meter connector C-04.



(2) Measure the resistance between terminal 40 and earth.

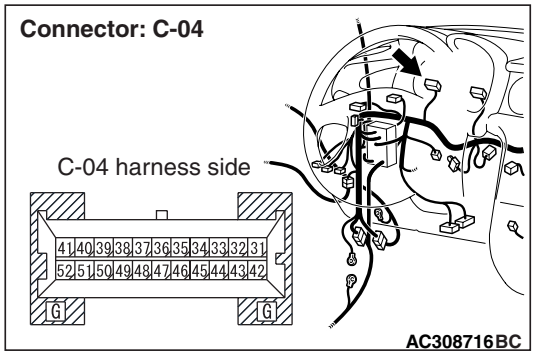
OK: Continuity exists (2 Ω or less)

(3) Measure the resistance between terminal 41 and earth.

OK: Continuity exists (2 Ω or less)

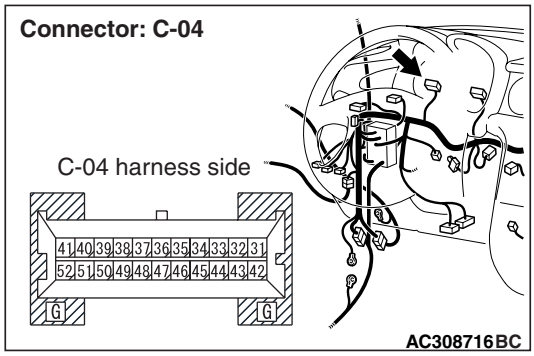
Q: Is the check result normal?
YES : Repair or replace the connector.
NO : Go to Step 8.

STEP 8. Connector check: Combination meter connector C-04 for damage.



Q: Is combination meter connector C-04 in good condition?
YES : Go to Step 9.
NO : Repair or replace the wiring harness. Check to see that all meters operate.

STEP 9. Check the wiring harness between combination meter connector C-04 (terminal 40 and 41) and earth.



Q: Are the wiring harness between combination meter connector C-04 (terminal 40 and 41) and earth in good condition?
YES : This procedure is complete.
NO : Repair or replace the wiring harness. Check to see that all meters operate.

ON-VEHICLE SERVICE

SPEEDOMETER CHECK

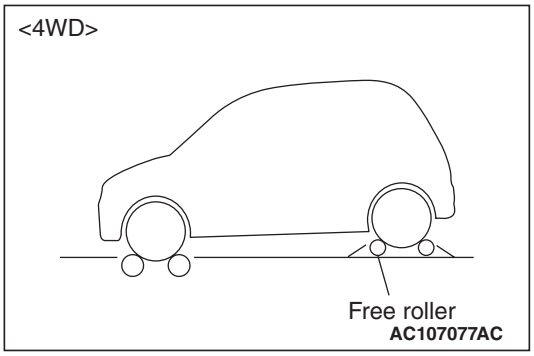
M1543000901039

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

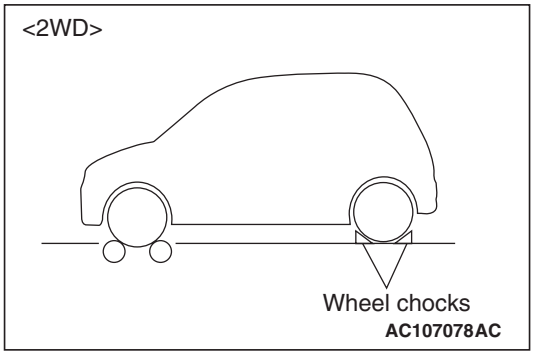
⚠ CAUTION

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

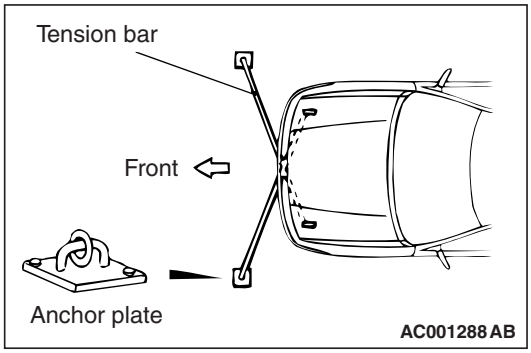
⚠ CAUTION



Set a free-roller on the rear tyre for 4WD.



1. Set the vehicle onto a speedometer tester and use wheel chocks to hold the rear wheels.



2. 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.
3. 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.
4. Check if the speedometer indicator range is within the standard values.

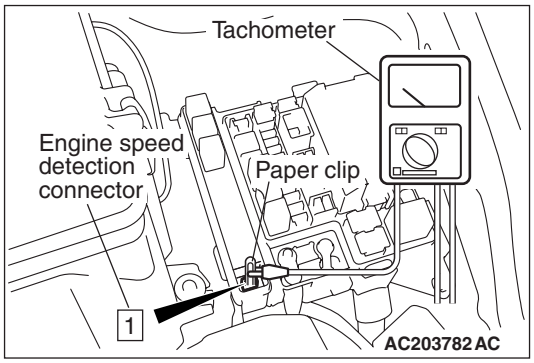
   Standard value:

Standard indicator km/h	Allowance range km/h
20	20 - 24
40	40 - 44
80	80 - 86
120	122 - 128
160	163 - 170
200	204 - 212

5. 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

M1543001000489



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.

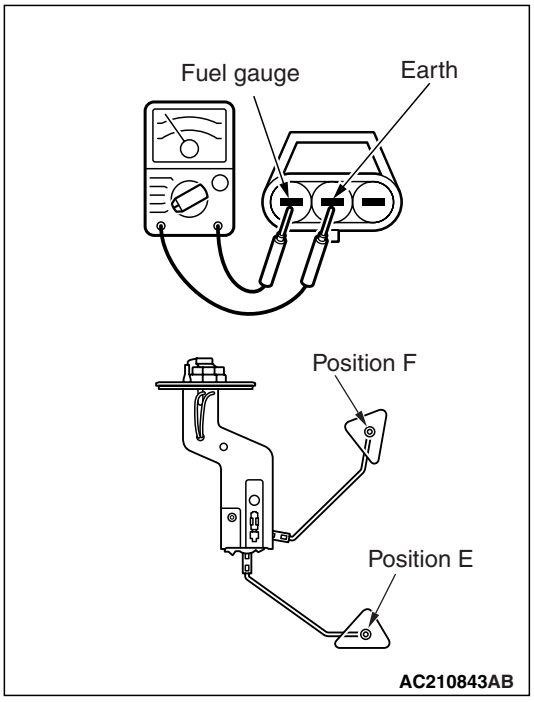
   Standard values:
   - **700 r/min: ±100 r/min**
   - **2,000 r/min: ±100 r/min**
   - **3,000 r/min: ±150 r/min**
   - **4,000 r/min: ±200 r/min**
   - **5,000 r/min: ±250 r/min**
   - **6,250 r/min: ±150 r/min**

FUEL GAUGE UNIT CHECK <2WD>

M1543001200751

Remove the fuel pump module and the remove the fuel gauge unit. (Refer to GROUP 13C, Fuel Tank P.13D-8.)

FUEL GAUGE UNIT RESISTANCE

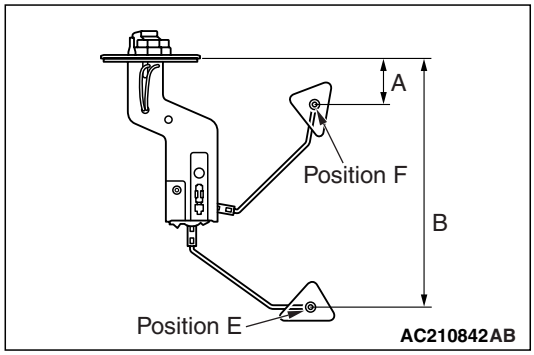


1. Check that resistance value between the fuel gauge terminal and earth terminal is at the standard value when the fuel gauge unit float is between position "F" (highest) and position "E" (lowest).

   Standard value:
   - **Float position "F": 3.0 ± 0.6 Ω**
   - **Float position "E": 110 ± 2.5 Ω**

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 gauge unit float height check. If any check is not correct, replace the fuel gauge unit.

FUEL GAUGE UNIT FLOAT HEIGHT



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 value:
   - **Position F (A): 35.4 mm ± 2 mm**
   - **Position E (B): 186.7 mm ± 2 mm**

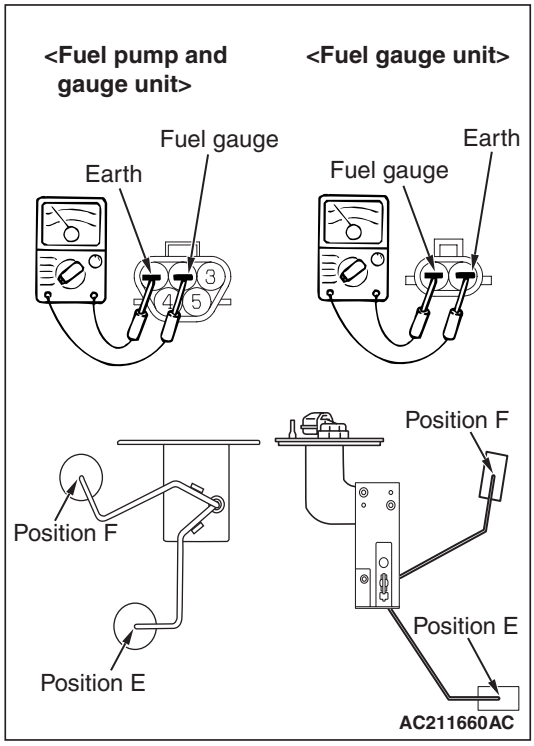
2. If all checks are correct, go to fuel gauge unit float height check. If any check is not correct, replace the fuel gauge unit.

FUEL GAUGE UNIT CHECK <4WD>

M1543001200580

Remove the fuel pump module and the remove the fuel gauge unit. (Refer to GROUP 13C, Fuel Tank P.13D-8 <2000> or P.13D-12 <2400>.)

FUEL GAUGE UNIT RESISTANCE

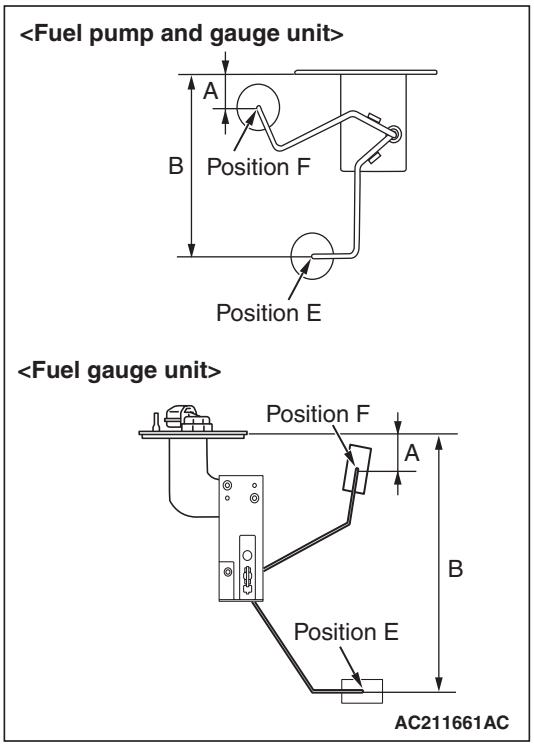


1. Check that resistance value between the fuel gauge terminal and earth terminal is at the standard value when the fuel gauge unit float is between position "F" (highest) and position "E" (lowest).

   Standard value:
   - **Float position "F": 1.5 ± 0.5 Ω**
   - **Float position "E": 55 ± 1.5 Ω**

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 gauge unit float height check. If any check is not correct, replace the fuel gauge unit.

FUEL GAUGE UNIT FLOAT HEIGHT



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 value <Fuel pump and gauge unit>:
   - **Float position A: 36.7 mm**
   - **Float position B: 149.6 ± 2 mm**

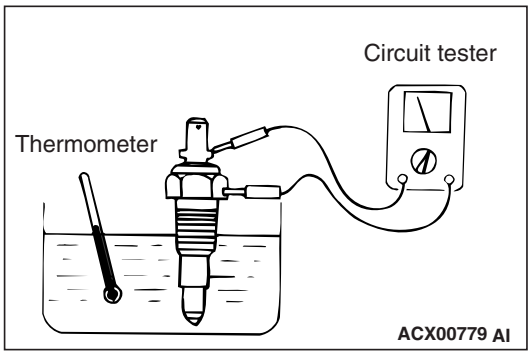
   Standard value <Fuel gauge unit>:
   - **Float position A: 23.4 ± 2 mm**
   - **Float position B: 194.2 ± 2mm**

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

ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

M1543001500439

1. Drain the engine coolant. (Refer to GROUP 14- On-vehicle Service P.14-17.)
2. Remove the engine coolant temperature gauge unit.

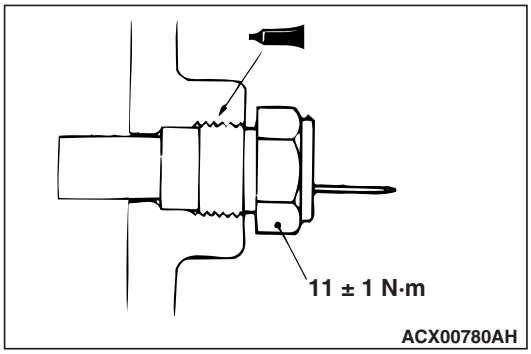


3. Put engine coolant temperature gauge unit into the hot water in specified temperature, and ensure that basic resistance is within standard value.

   Standard value: 104 ± 13.5 Ω (at 70°C)

   Reference value

Temperature (°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.

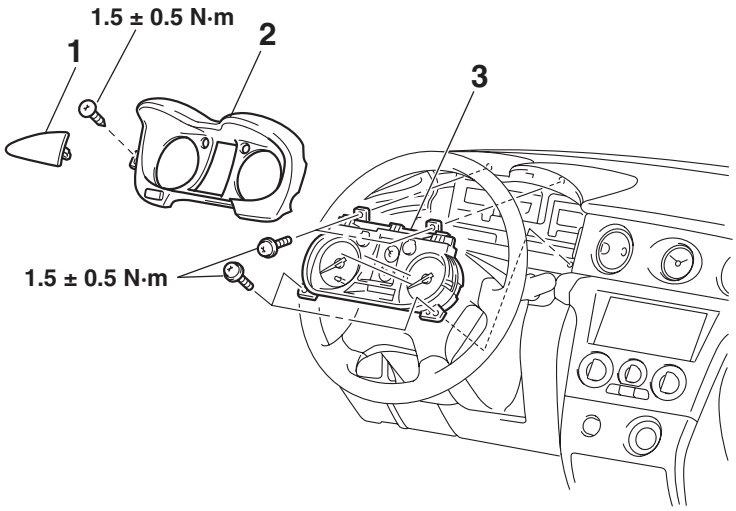
   Semi-drying sealant: 3M 1215 or equivalent

5. Add engine coolant. (Refer to GROUP 14 - On-vehicle Service P.14-17.)

COMBINATION METER ASSEMBLY

REMOVAL AND INSTALLATION

M1543021300147



AC211662AB

Removal steps

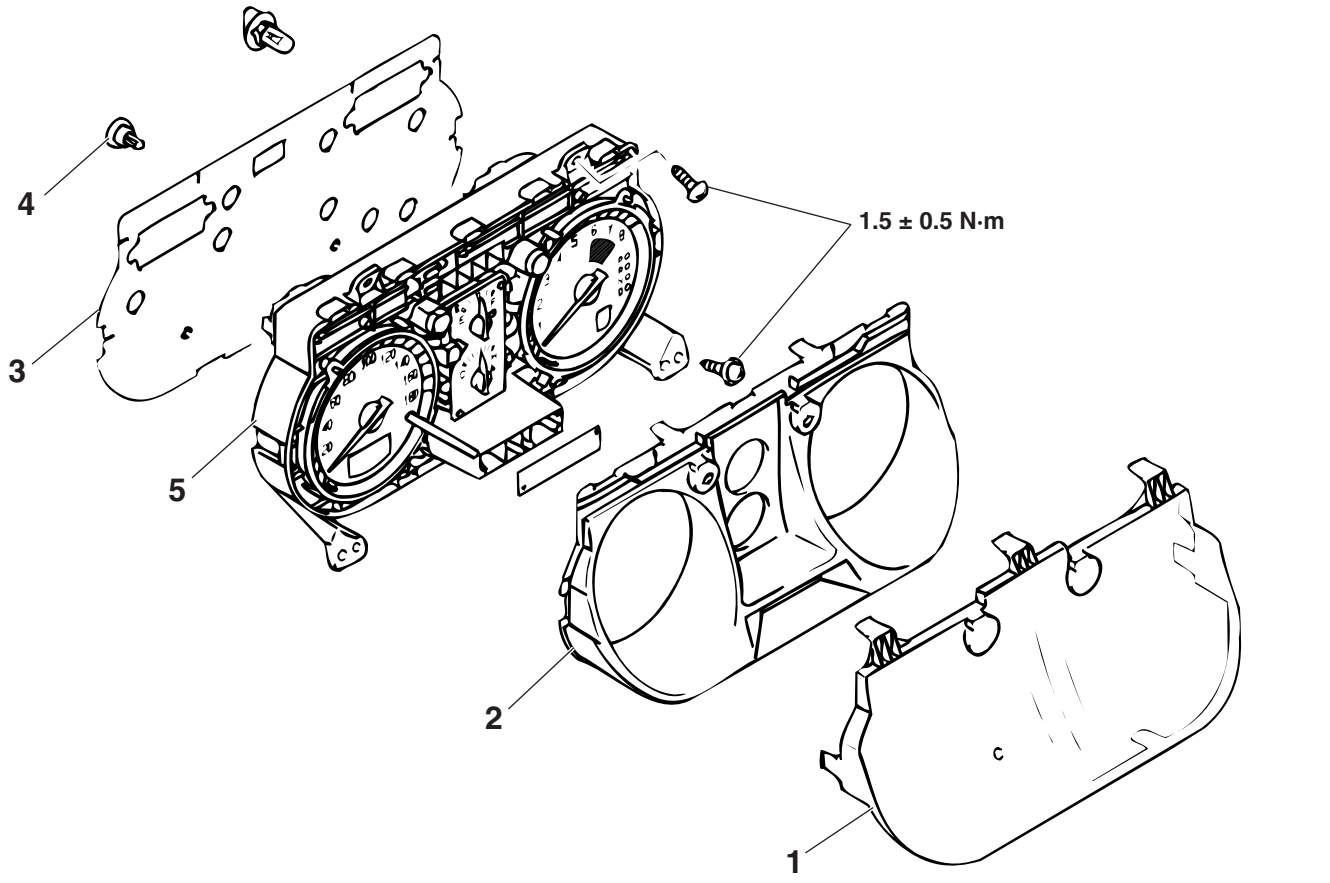
1. Instrument panel driver's side garnish (Refer to GROUP 52A, Instrument panel P.52A-2)

Removal steps (Continued)

2. Meter bezel (Refer to GROUP 52A, Instrument panel P.52A-2)
3. Combination meter assembly

DISASSEMBLY AND REASSEMBLY

M1543003100374



AC211663AB

Disassembly steps

1. Meter glass
2. Meter panel
3. Circuit board cover

Disassembly steps (Continued)

4. Bulb
5. Combination meter assembly

HEADLAMP

SERVICE SPECIFICATIONS

M1542000301131

Item			Standard value	Limit
Headlamp aiming	Low-beam	Vertical direction	Within 0.57°below horizontal (H)	The headlamp beam should tilt downwards by 0.17° or more.
		Horizontal direction	Position at which the stat up point of 15° is crossed with vertical line (V)	–
	High-beam	Vertical direction	High-intensity zone centre should be within 0.42° below horizontal (H)	The headlamp beam should tilt downwards by 0.09° or more.
		Horizontal direction	High-intensity zone centre should be along the vertical line (V).	The vertical headlamp beam range should be within 1°.
Measurement of headlamp luminous intensity cd			30,000 cd or more	Measurement of headlamp luminous intensity cd

TROUBLESHOOTING

M1542000701430

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 Diagnosis P.54B-33.
- Using SWS monitor: GROUP 54C, SWS Diagnosis P.54C-21.

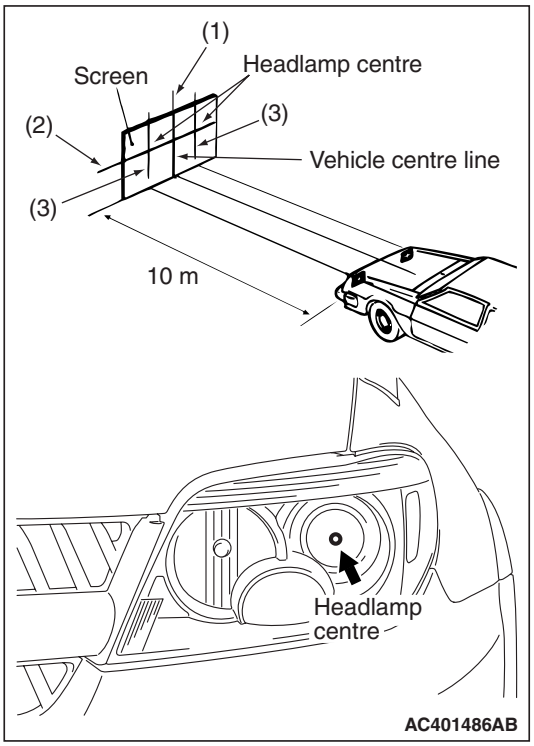
ON-VEHICLE SERVICE

HEADLAMP AIMING

M1542000901177

PRE-AIMING INSTRUCTIONS <LOW BEAM>

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. Put the headlamp levelling switch in "0" position.
7. Thoroughly clean the headlamp lenses.
8. Place the vehicle on a level floor, perpendicular to a flat screen 10 m away from the bulb centre-marks on the headlamp lens.
9. Rock vehicle sideways to allow vehicle to assume its normal position.
10. Bounce the front suspension through three (3) oscillations by applying the body weight to hood or bumper.



11.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.

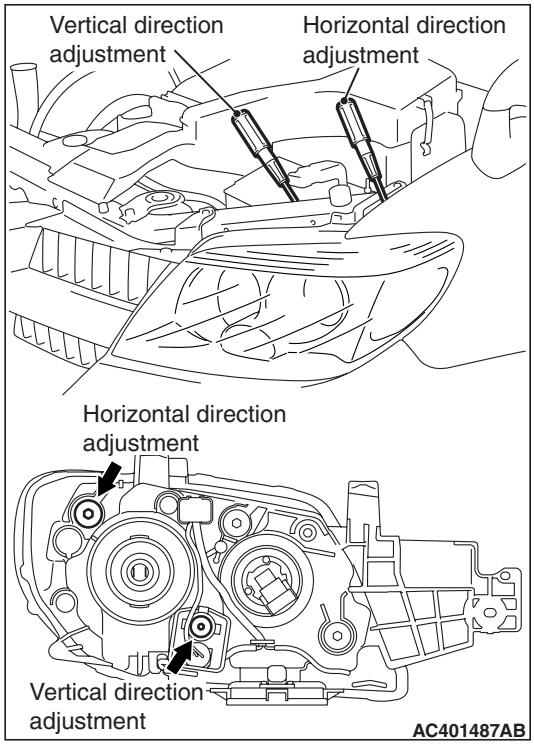
   NOTE: Height from the floor to the centre of the headlamps (Reference value): 840 mm
   (3) Measure the distance from the centre line of the vehicle to the centre of each headlamp. Transfer the measurement to the screen. Vertical tape or mark on the screen with reference to the centre line of each headlamp bulb.

HEADLAMP ADJUSTMENT <LOW BEAM>

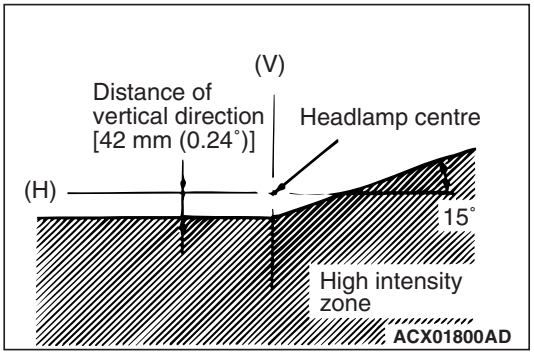
⚠ CAUTION

- **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.

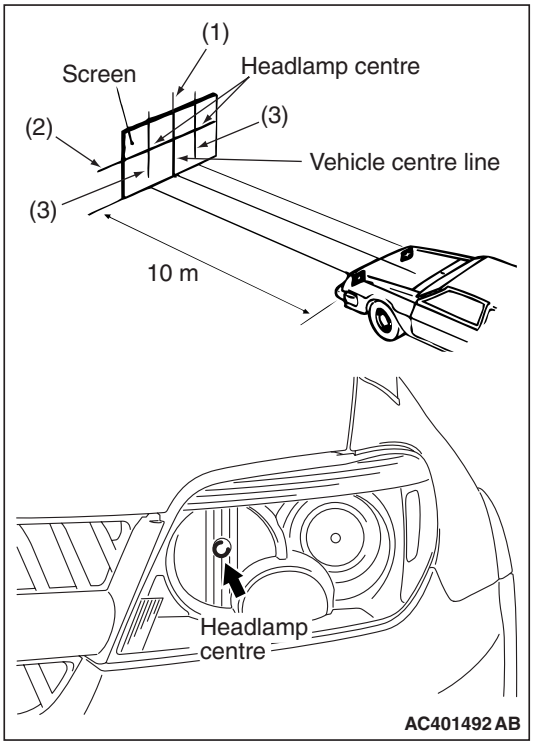


Standard value:
Vertical direction: 0.57° below horizontal (H)
Horizontal direction: Position at which the stat up point of 15° is crossed with vertical line (V)

Limit:
Vertical direction: The headlamp beam should tilt downwards by 0.17° or more.

PRE-AIMING INSTRUCTIONS <HIGH BEAM>

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 (3) oscillations by applying the body weight to hood or bumper.



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

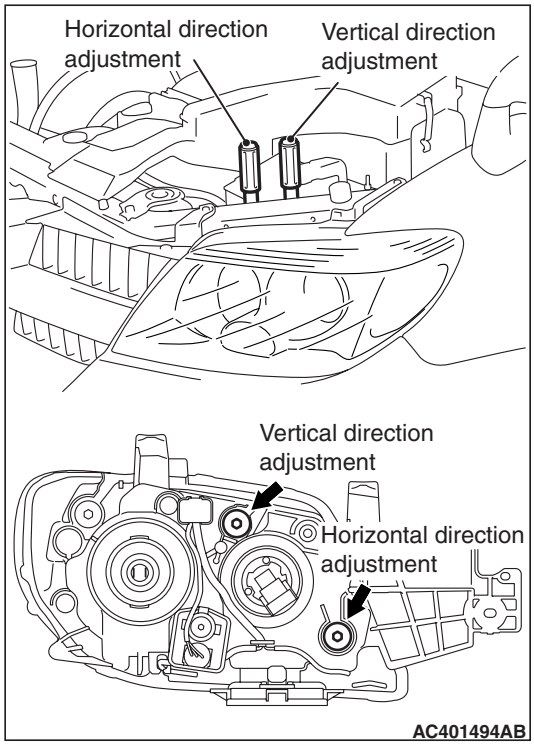
    (3) Measure the distance from the centre line of the vehicle to the centre of each headlamp. Transfer the measurement to the screen. Vertical tape or mark on the screen with reference to the centre line of each headlamp bulb.

HEADLAMP ADJUSTMENT <HIGH BEAM>

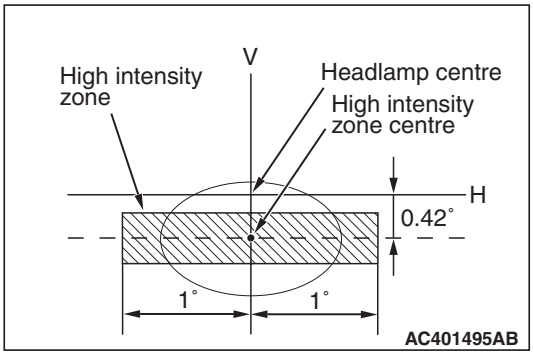
⚠ CAUTION

- **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 high-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 high-beam cut-off location on the aiming screen.



Standard value:
Vertical direction: 0.42° below horizontal (H)
Horizontal direction: High-intensity zone centre should be along the vertical line (V).

Limit:
Vertical direction: 0.09° from the standard value
Horizontal direction: The vertical headlamp beam range should be within 1°.

LUMINOUS INTENSITY MEASUREMENT

M1542001000505

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.

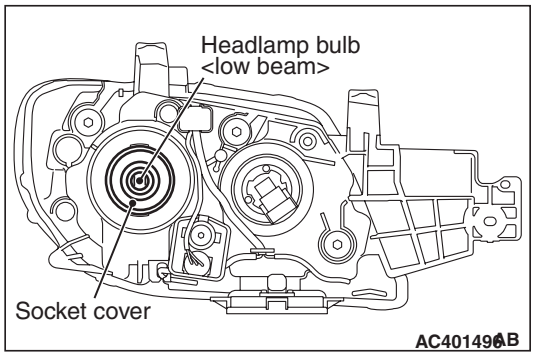
$I = E \times r^2$:

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

BULB REPLACEMENT

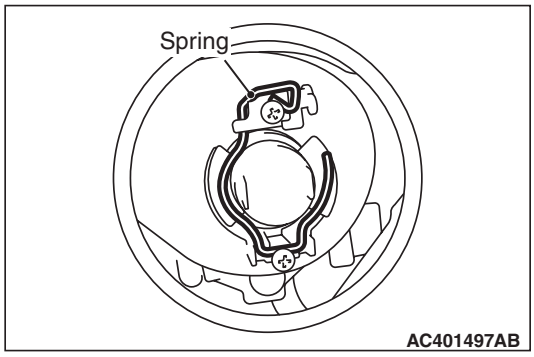
M1542001300993

HEADLAMP BULB <LOW BEAM>



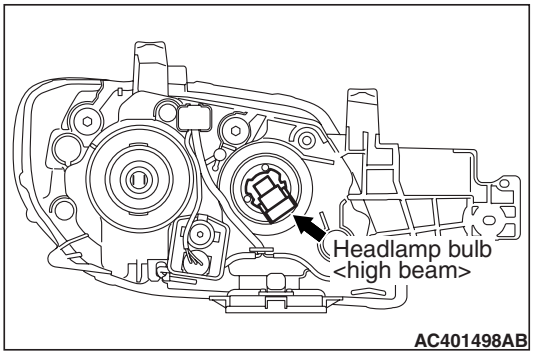
⚠ CAUTION
Do not touch the surface of the bulb with hands or dirty gloves as the bulb may pop after a short time. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

1. Disconnect the connector.
2. Remove the socket cover.



3. Release the bulb securing spring, and remove the bulb.
4. Replace the valve, and connect the connector securely.

HEADLAMP BULB <HIGH BEAM>



⚠ CAUTION

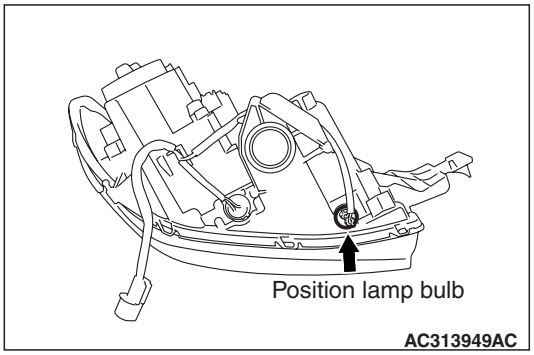
Do not touch the surface of the bulb with hands or dirty gloves as the bulb may pop after a short time. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

1. Disconnect the connector.
2. Twist the socket to withdraw the bulb.
3. Replace the valve, and connect the connector securely.

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.

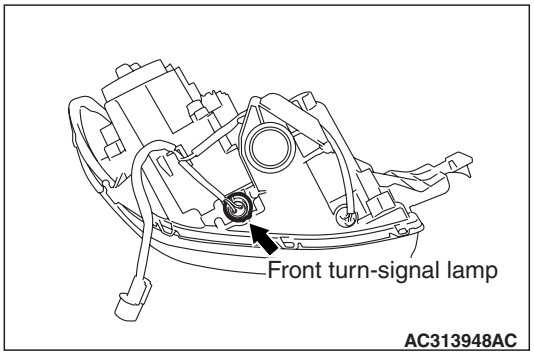


1. Twist the socket to withdraw the bulb.
2. Replace the valve, and connect the connector securely.

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.



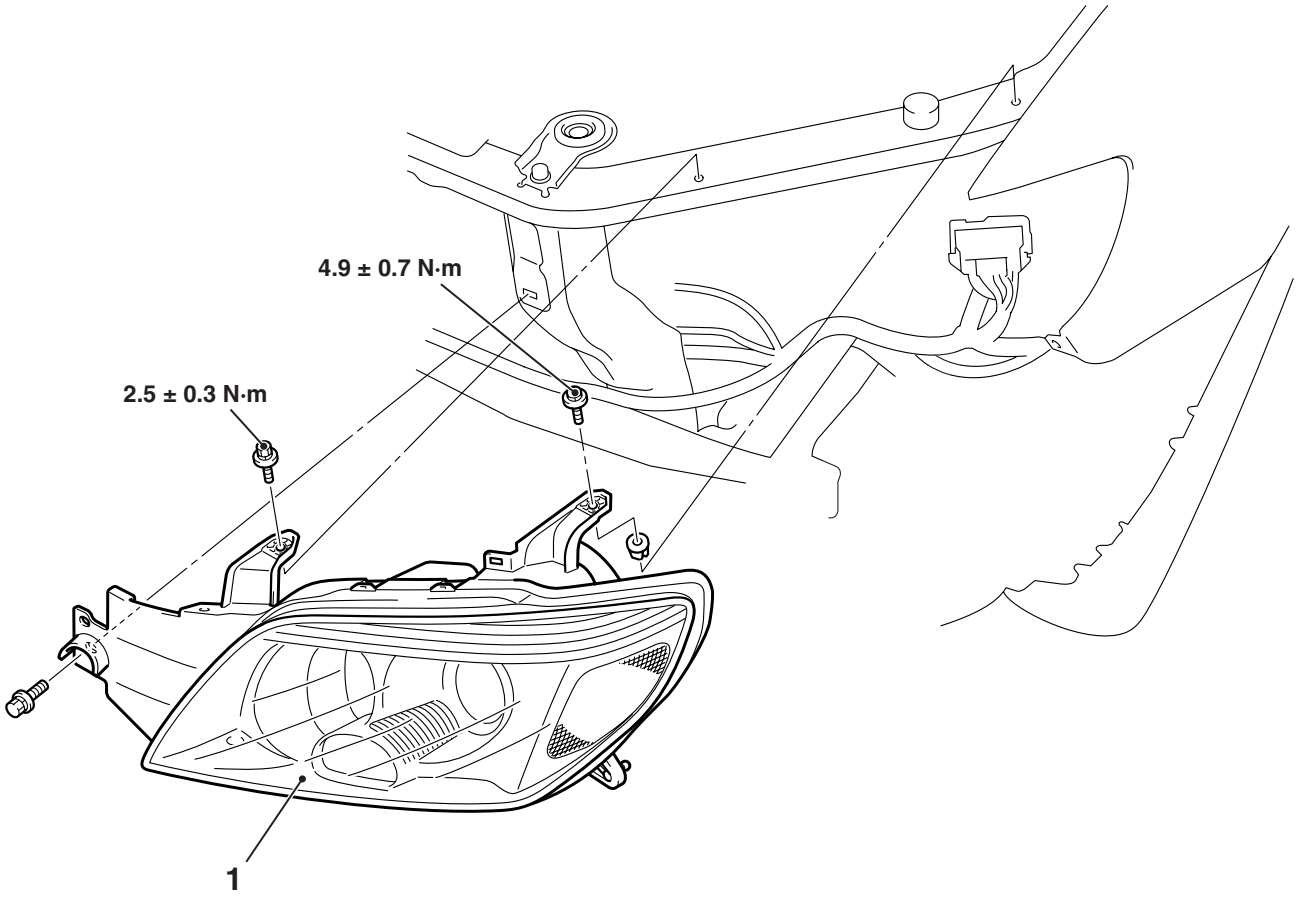
1. Twist the socket to withdraw the bulb.
2. Replace the valve, and connect the connector securely.

HEADLAMP

REMOVAL AND INSTALLATION

M1542001800396

Post-installation Operation
Headlamp Aiming Adjustment (Refer to P.54A-62.)



AC401503AB

Removal steps

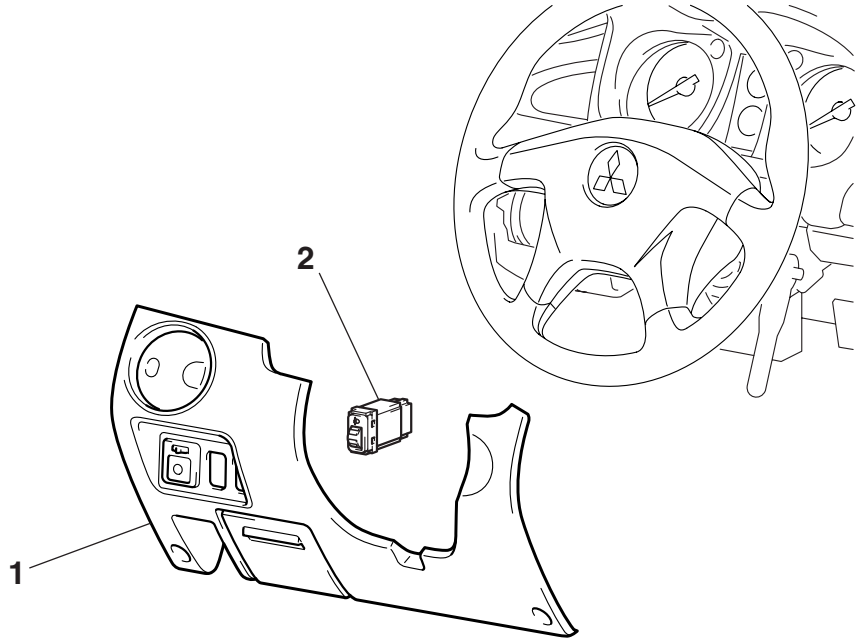
- Front bumper assembly (Refer to GROUP 51, Front Bumper Assembly P.51-3.)

1. Headlamp assembly

HEADLAMP LEVELING SWITCH

REMOVAL AND INSTALLATION

M1542013700200



AC210845AE

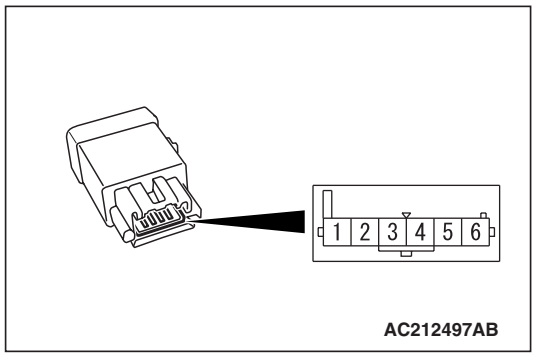
Removal steps

1. Instrument lower panel (Refer to GROUP 52A, Instrument panel assembly P.52A-2)
2. Headlamp leveling switch

INSPECTION

M1542011200997

HEAD LAMP LEVELING SWITCH RESISTANCE CHECK



Terminal No.	Switch position	Resistance
4 - 6	0	750 ohms
	1	1,050 ohms
	2	1,410 ohms
	3	1,710 ohms
	4	2,010 ohms
5 - 6	0, 1, 2, 3, 4	2,830 ohms

FOG LAMP

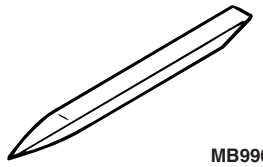
SERVICE SPECIFICATIONS

M1542000300439

Item	Standard value
Fog lamp aiming (vertical direction)	Within 45 mm (0.86°) to 75 mm (1.44°) below the vertical centre line ahead of fog lamp.

SPECIAL TOOL

M1542000601035

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of instrument panel driver's side garnish, meter bezel and fog lamp switch

TROUBLESHOOTING

M1542000701441

When the front fog lamp switch is turned to ON with the tail lamp or the headlamp on (the tail lamp switch or the headlamp switch is ON), the fog lamp relay turns on, and the fog lamps will illuminate.
If the tail lamps or the headlamps are turned off with the lighting switch OFF while the fog lamps are on, the front fog lamps turn off at the same time to prevent unattended operation.
If the tail lamps are turned off by the headlamp automatic shutdown function, the fog lamps turn off at the same time. However, if the tail lamps illuminate again, the fog lamps do not.
The front fog lamps 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-21.

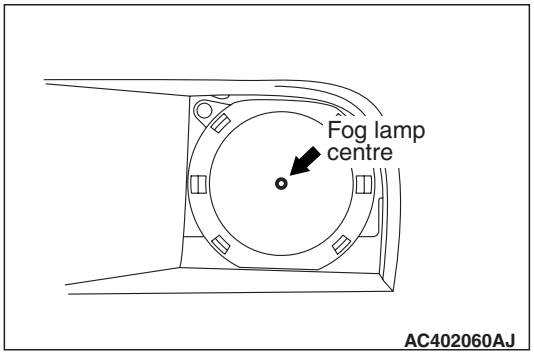
ON-VEHICLE SERVICE

FOG LAMP AIMING

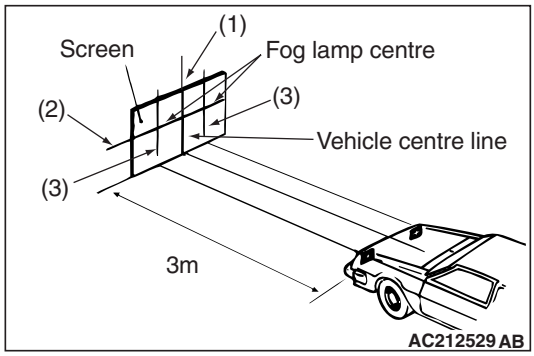
M1542001100933

PRE-AIMING INSTRUCTIONS

1. Inspect for badly rusted or faulty fog lamp assemblies.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Inspect tyre inflation, and adjust if necessary.
4. If fuel tank is not full, place a weight in the 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 fog lamp lenses.
7. Place the vehicle on a level floor, perpendicular to a flat screen 3 m away from the bulb centre-marks on the fog lamp lens.
8. Rock the vehicle sideways to allow the vehicle to assume its normal position.
9. Bounce the front suspension through three (3) oscillations by applying the body weight to the hood or bumper.

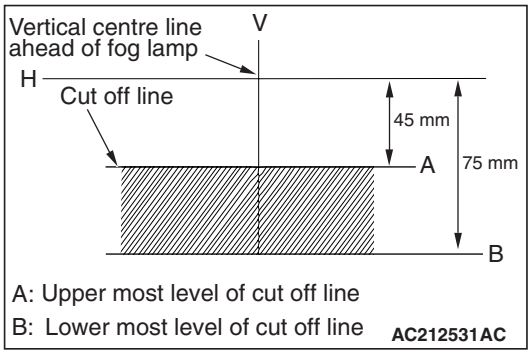


10.Measure the centre of the fog lamps as shown in the illustration.



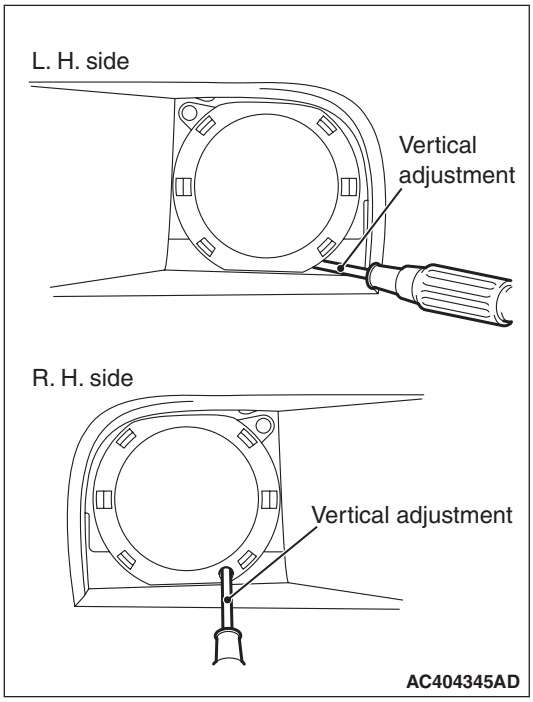
11.Four lines of adhesive tape (or equivalent markings) are required on screen or wall:
(1) Position a vertical tape or mark so that it is aligned with the vehicle centre line.
(2) Measure the distance from the centre of the fog lamp lens to the floor. Transfer the measurement to the screen. Horizontal tape or mark on the screen is for reference of vertical adjustment.
(3) Measure the distance from the centre line of the vehicle to the centre of each fog lamp. Transfer the measurement to the screen. Vertical tape or mark on the screen is for reference to the centre line of each fog lamp.

FOG LAMP ADJUSTMENT



1. Check if the beam shining onto the screen is at the standard value.

Standard value: Fog lamp cut off line (Vertical direction): Within 45 mm (0.86°) to 75 mm (1.44°) below the vertical centre line ahead of fog lamp.



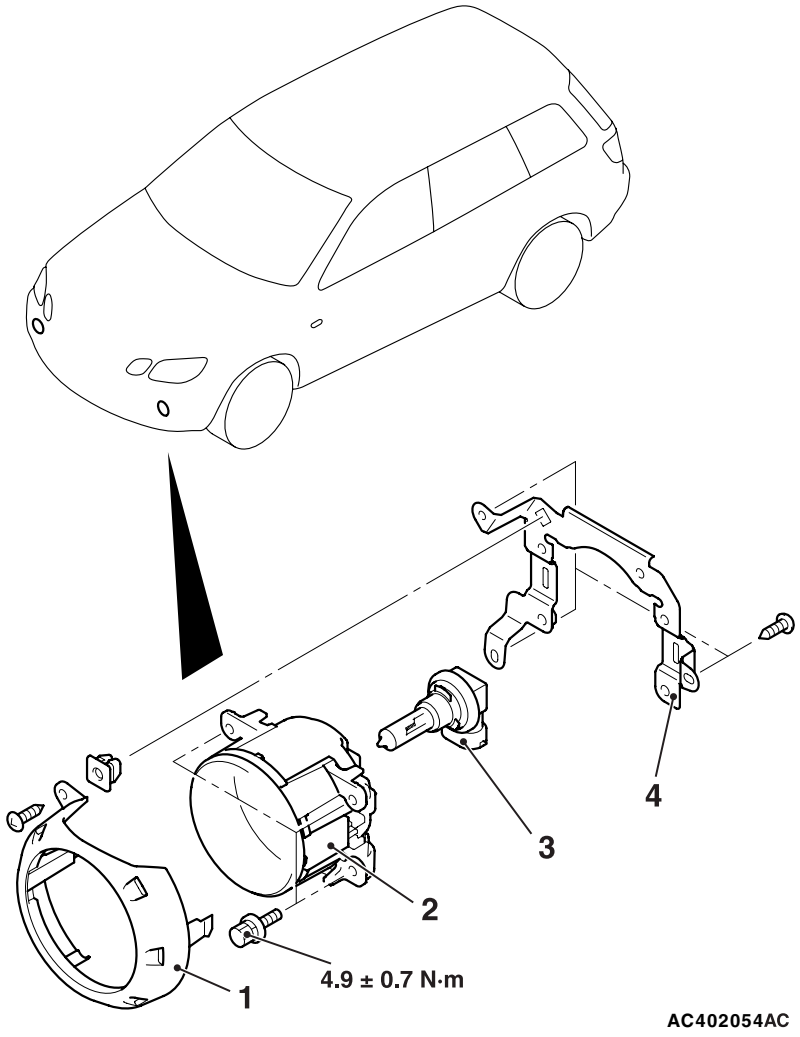
2. If it is not within the standard value range, adjust by turning the adjusting screw.

NOTE: The horizontal direction is non-adjustable. If deviation of the lamp beam axis exceeds the standard value, check that the mounting location or some other points are not faulty.

FOG LAMP

REMOVAL AND INSTALLATION

M1542001500997



AC402054AC

Removal steps

1. Fog lamp cover
2. Fog lamp

<<**A**>> 3. Fog lamp bulb

Removal steps (Continued)

- Front bumper (Refer to 51, Front bumper P.51-3).

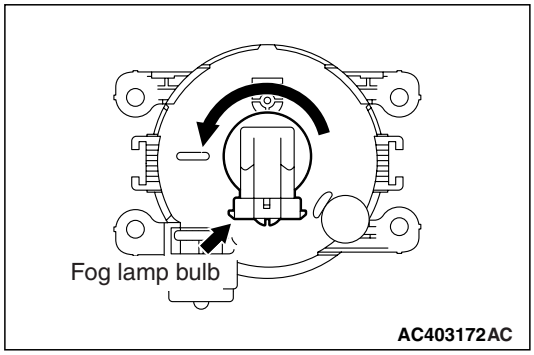
4. Fog lamp bracket

REMOVAL SERVICE POINT

<<A>> FOG LAMP BULB REMOVAL

⚠ CAUTION

- **Use the specified genuine part when replacing the bulb.**
- **Do not touch the glass portion of bulb with bare hand or dirty gloves. Should the glass portion be spoiled, remove the soil as soon as possible using alcohol or thinner and let it dry before mounting.**

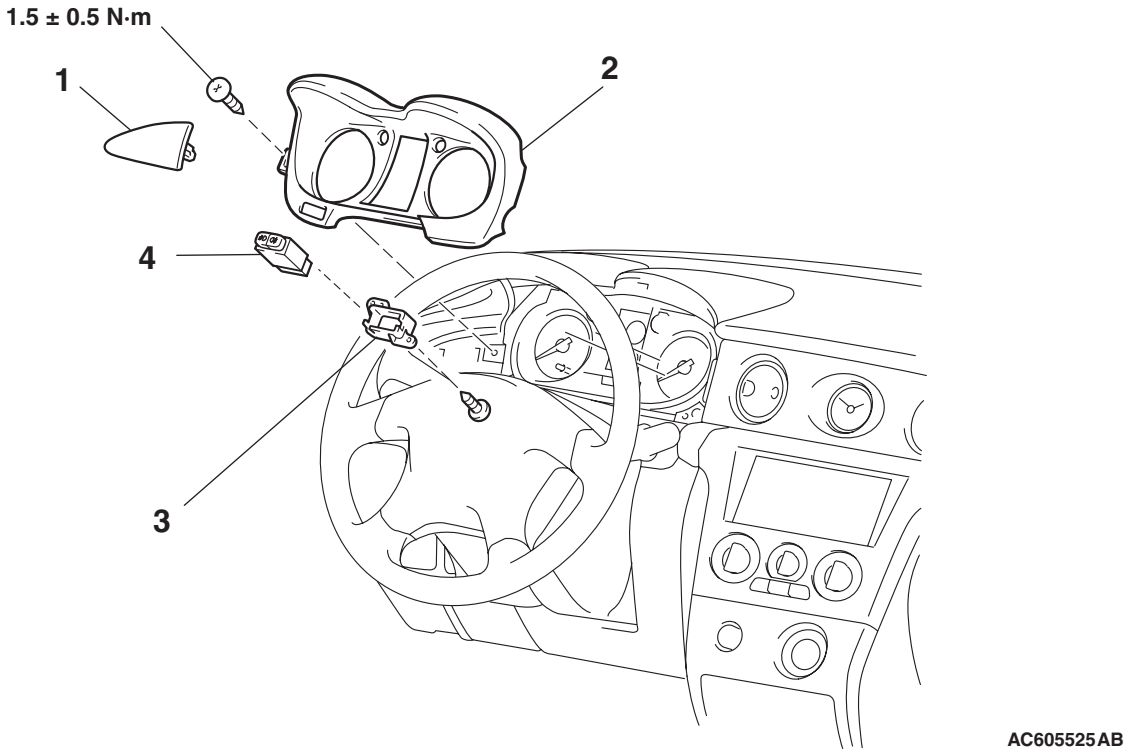


Turn the fog lamp bulb left to remove it.

FOG LAMP SWITCH

REMOVAL AND INSTALLATION

M1542013900130



Removal steps

1. Instrument panel driver's side garnish (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Meter bezel (Refer to GROUP 52A, Instrument panel P.52A-2)

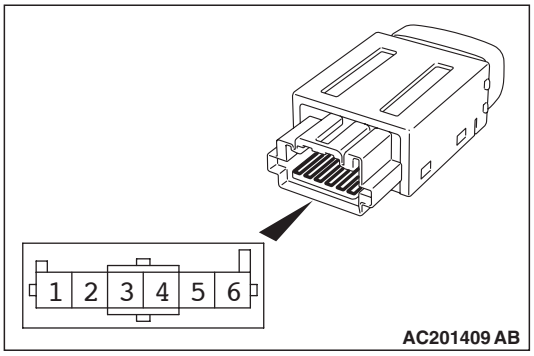
Removal steps (Continued)

3. Fog lamp switch bracket
4. Fog lamp switch

INSPECTION

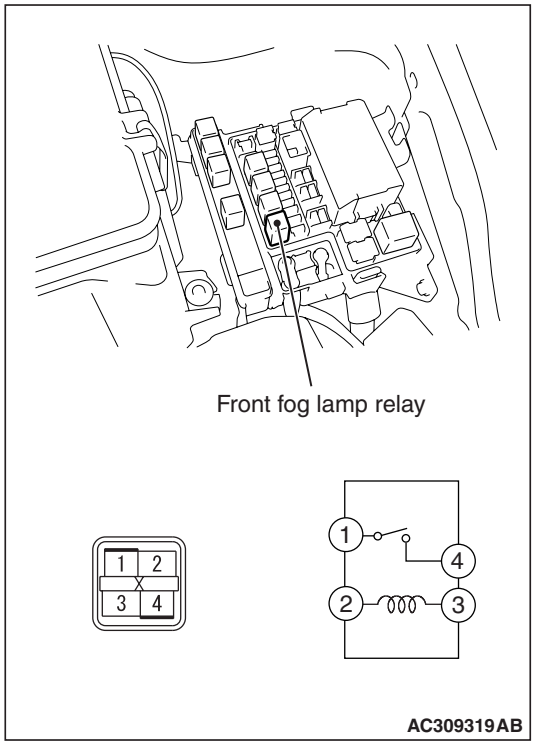
M1542011202885

FRONT FOG LAMP SWITCH CONTINUITY CHECK



Switch position	Tester connection	Specified condition
Pressed	5 – 6	Continuity exists (2 Ω or less)
Released	5 – 6	Open circuit

FRONT 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	Continuity exists (2 Ω or less)

REAR FOG LAMP

TROUBLESHOOTING

M1542000701452

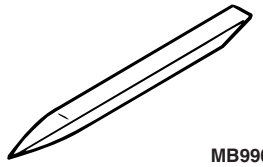
If the rear fog lamp switch is turned ON when the headlamp or the front fog lamp is turned ON, the rear fog lamp is switched ON and OFF alternatively.
If the headlamp and the front fog lamp, the rear fog lamp is turned OFF at the same time.

The fog lamps 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-21.

SPECIAL TOOL

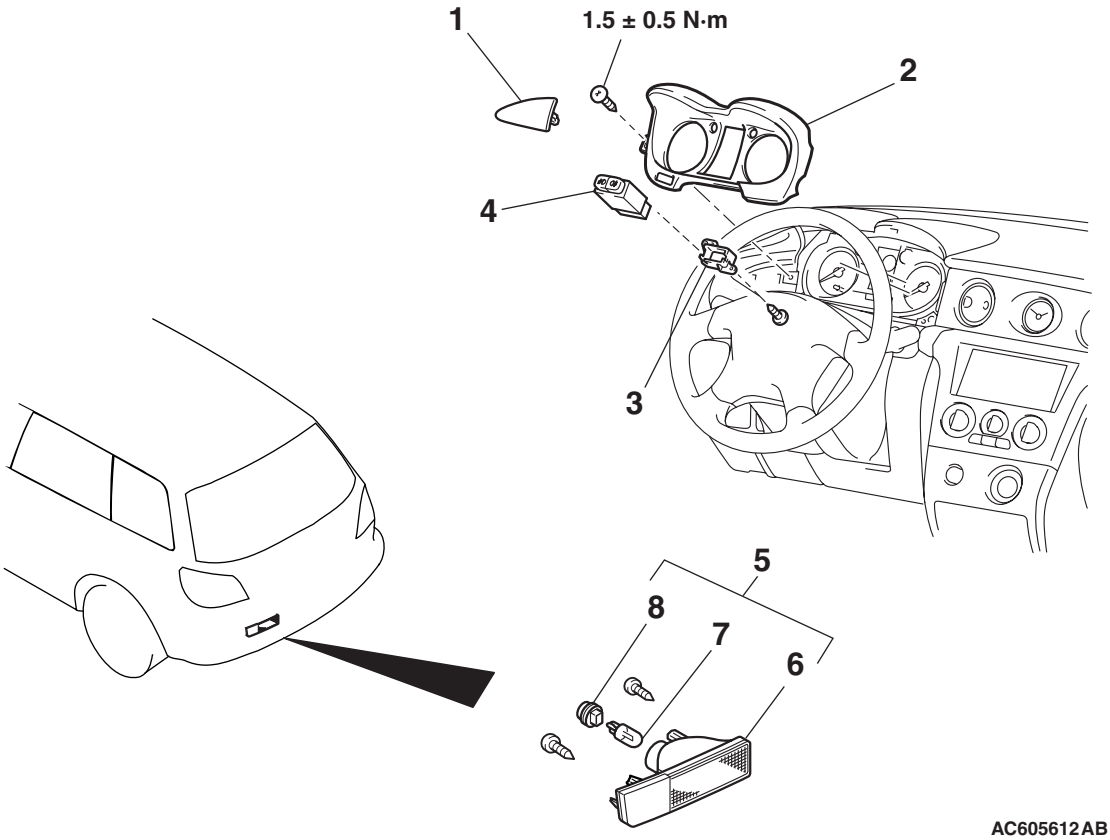
M1542000601046

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of instrument panel driver's side garnish, meter bezel and fog lamp switch

REAR FOG LAMP

REMOVAL AND INSTALLATION

M1542009800163



AC605612AB

Rear fog lamp switch removal steps

1. Instrument panel driver's side garnish (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Meter bezel (Refer to GROUP 52A, Instrument panel P.52A-2)
3. Fog lamp switch bracket
4. Fog lamp switch

Rear fog lamp removal steps

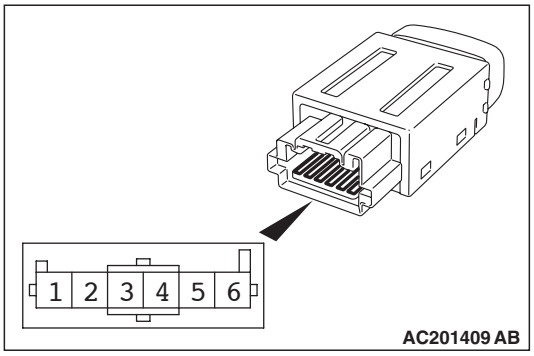
- Rear bumper (Refer to GROUP 51, Rear bumper P.51-6.)

5. Rear fog lamp assembly
6. Rear fog lamp body and lens
7. Socket
8. Bulb

INSPECTION

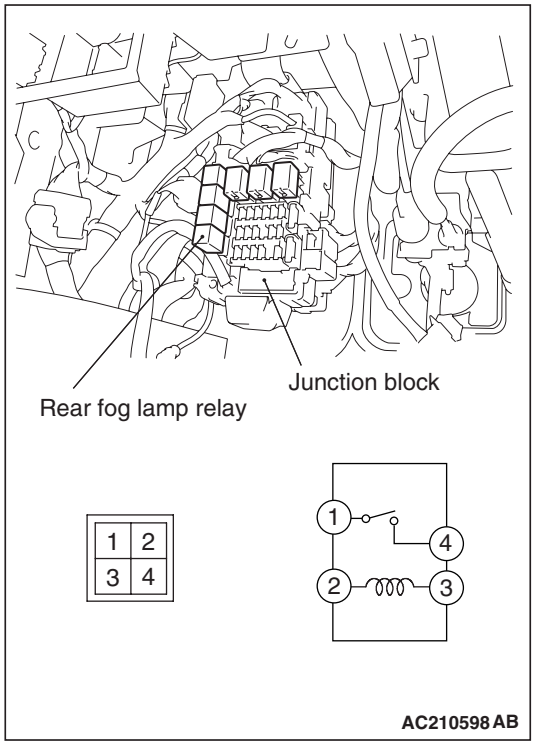
M1542007700085

REAR FOG LAMP SWITCH CONTINUITY CHECK



Switch position	Tester connection	Specified condition
Pressed	1 – 2	Continuity exists (2 Ω or less)
Released	1 – 2	Open circuit

REAR FOG LAMP RELAY CHECK

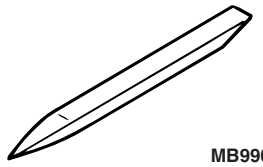


Battery voltage	Tester connection	Specified condition
Not supplied	1 – 4	Open circuit
• Connect terminal 3 to the positive battery terminal • Connect terminal 2 to the negative battery terminal	1 – 4	Continuity exists (2 Ω or less)

SIDE TURN-SIGNAL LAMP

SPECIAL TOOL

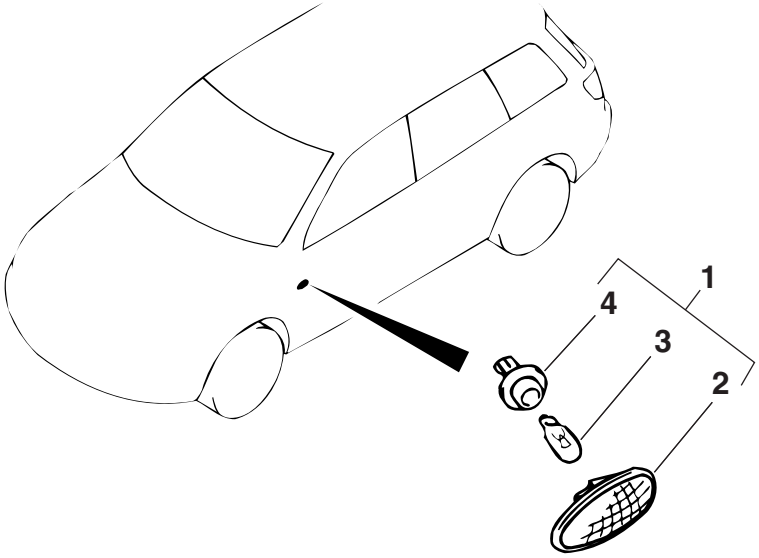
M1542000601057

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

SIDE TURN-SIGNAL LAMP

REMOVAL AND INSTALLATION

M1542003300171



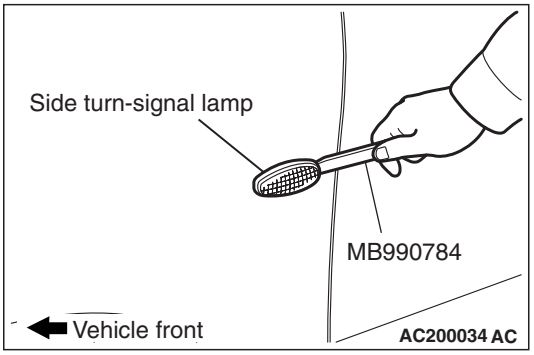
AC203309 AD

Removal steps

<<**A**>> >>**A**<< 1. Side turn-signal lamp assembly
2. Side turn-signal lamp
3. Bulb
4. Socket

REMOVAL SERVICE POINT

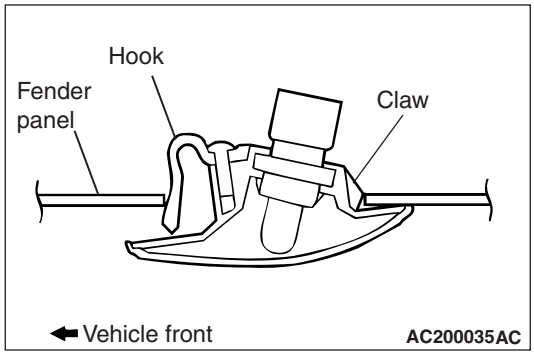
<<A>> SIDE TURN-SIGNAL LAMP REMOVAL



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

INSTALLATION SERVICE POINT

>>A<< SIDE TURN-SIGNAL LAMP INSTALLATION



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

ROOM LAMP

TROUBLESHOOTING

M1542000701463

Room lamp delay shutdown 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
  - Not using SWS monitor: GROUP 54B, Troubleshooting P.54B-265.
  - Using SWS monitor: GROUP 54C, Troubleshooting P.54C-6.
- 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-21.

Interior lamp automatic cut function <vehicles with keyless entry system>

The interior lamp automatic cut 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
  - Not using SWS monitor: GROUP 54B, Troubleshooting P.54B-265.
  - Using SWS monitor: GROUP 54C, Troubleshooting P.54C-6.

The head 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-21.

REAR COMBINATION LAMP

REAR COMBINATION LAMP DIAGNOSIS

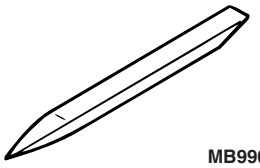
M1542000701474

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-21.

SPECIAL TOOL

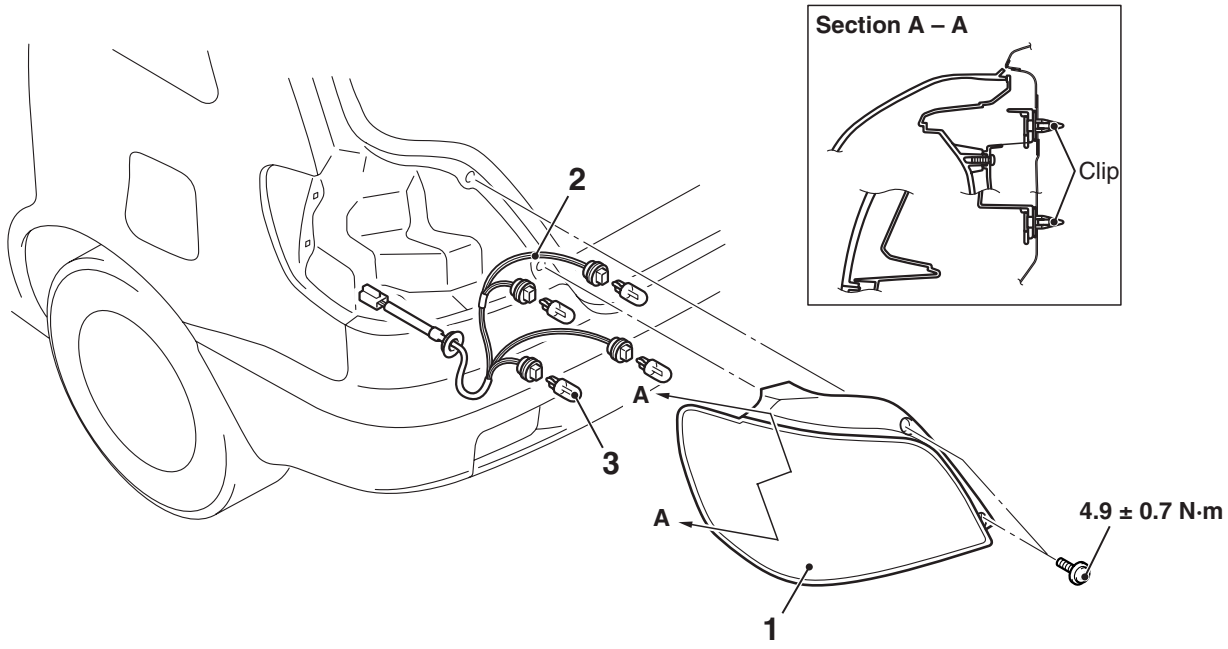
M1542000601068

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

REAR COMBINATION LAMP

REMOVAL AND INSTALLATION

M1542003900708



AC401504 AB

Removal steps

- Ventilation cap (Refer to GROUP 52A, Trims P.52A-10.)
- Rear combination lamp connector connection

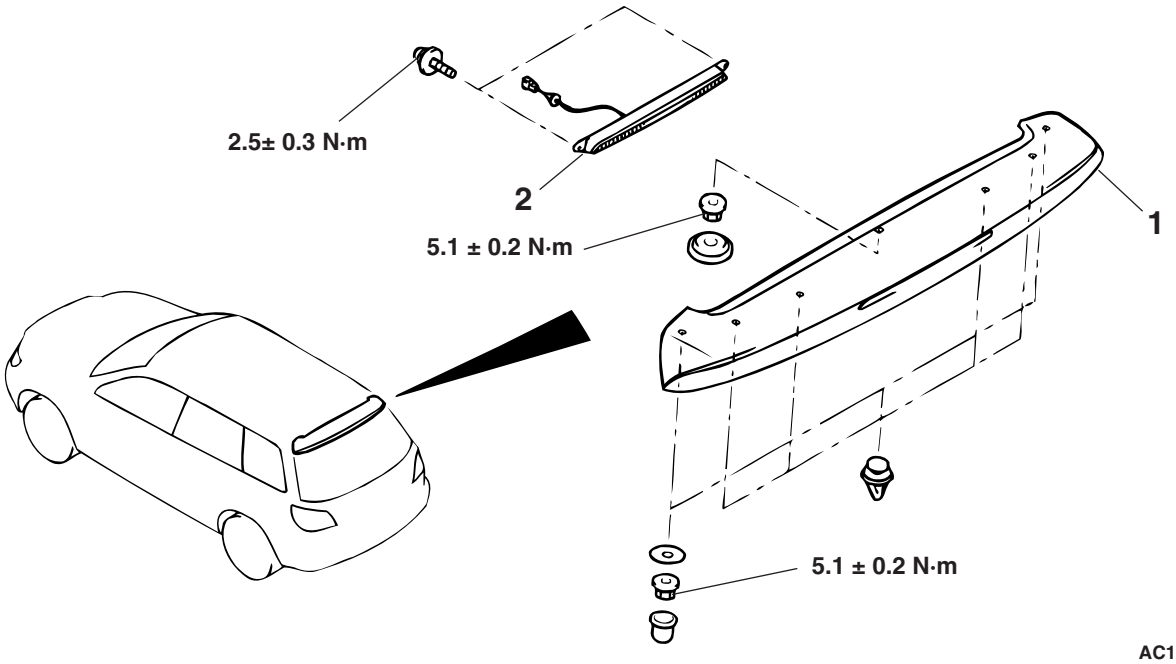
Removal steps (Continued)

1. Rear combination lamp
2. Harness assembly
3. Bulb

HIGH-MOUNTED STOP LAMP

REMOVAL AND INSTALLATION

M1542005100496



AC100674AF

Removal steps

- Tailgate upper trim (Refer to GROUP 52A, Tailgate trim P.52A-17.)
- High-mounted stop lamp connector connection

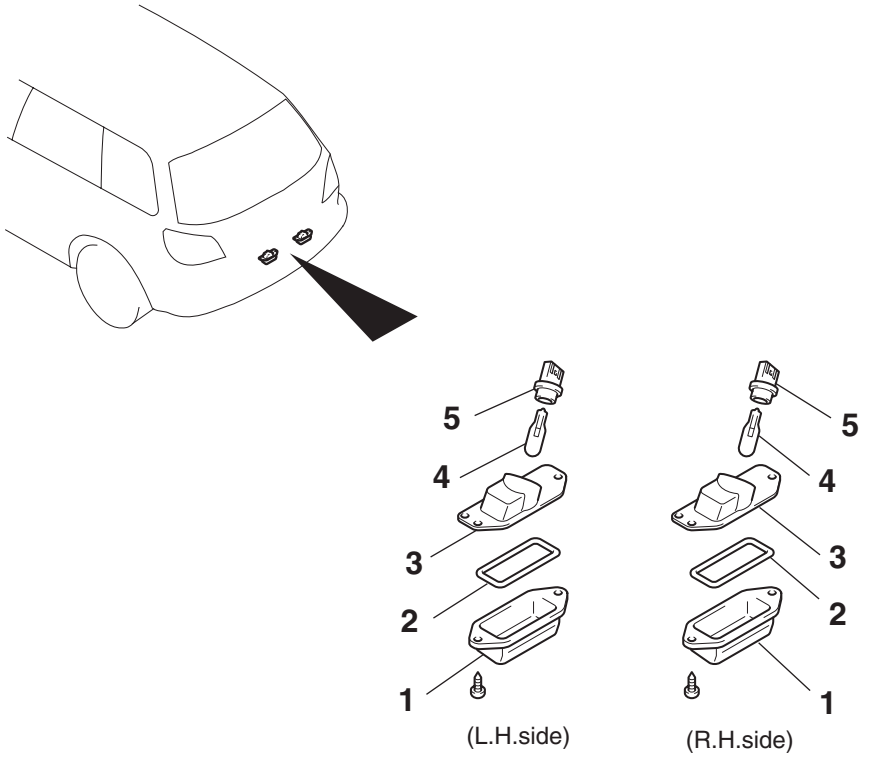
Removal steps (Continued)

1. Spoiler
2. High-mounted stop lamp

LICENCE PLATE LAMP

REMOVAL AND INSTALLATION

M1542004200230



AC300488AB

Removal steps

1. Licence plate lamp lens
2. Packing
3. Licence plate lamp body

Removal steps (Continued)

4. Licence plate lamp bulb
5. Socket assembly

HAZARD WARNING LAMP SWITCH

TROUBLESHOOTING

M1542000701485

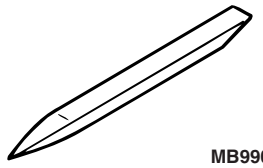
FLASHER TIMER FUNCTION

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-21.

SPECIAL TOOL

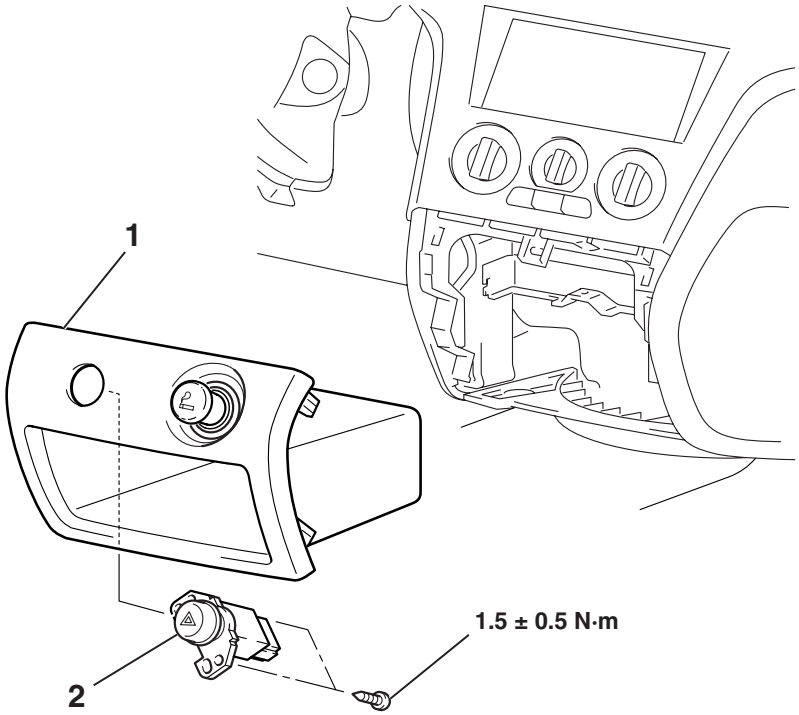
M1542000601079

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of centre lower panel assembly

HAZARD WARNING LAMP SWITCH

REMOVAL AND INSTALLATION

M1542006600870



AC301773AB

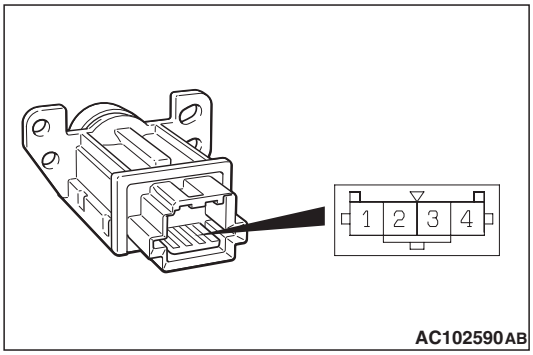
Removal steps

1. Center lower panel assembly (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Hazard warning lamp switch

INSPECTION

M1542011202896

HAZARD WARNING LAMP SWITCH CONTINUITY CHECK

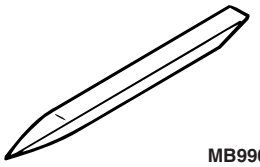


Switch position	Tester connection	Specified condition
Released	1 – 2	Open circuit
Pressed	1 – 2	Continuity exists (2 Ω or less)

COLUMN SWITCH

SPECIAL TOOL

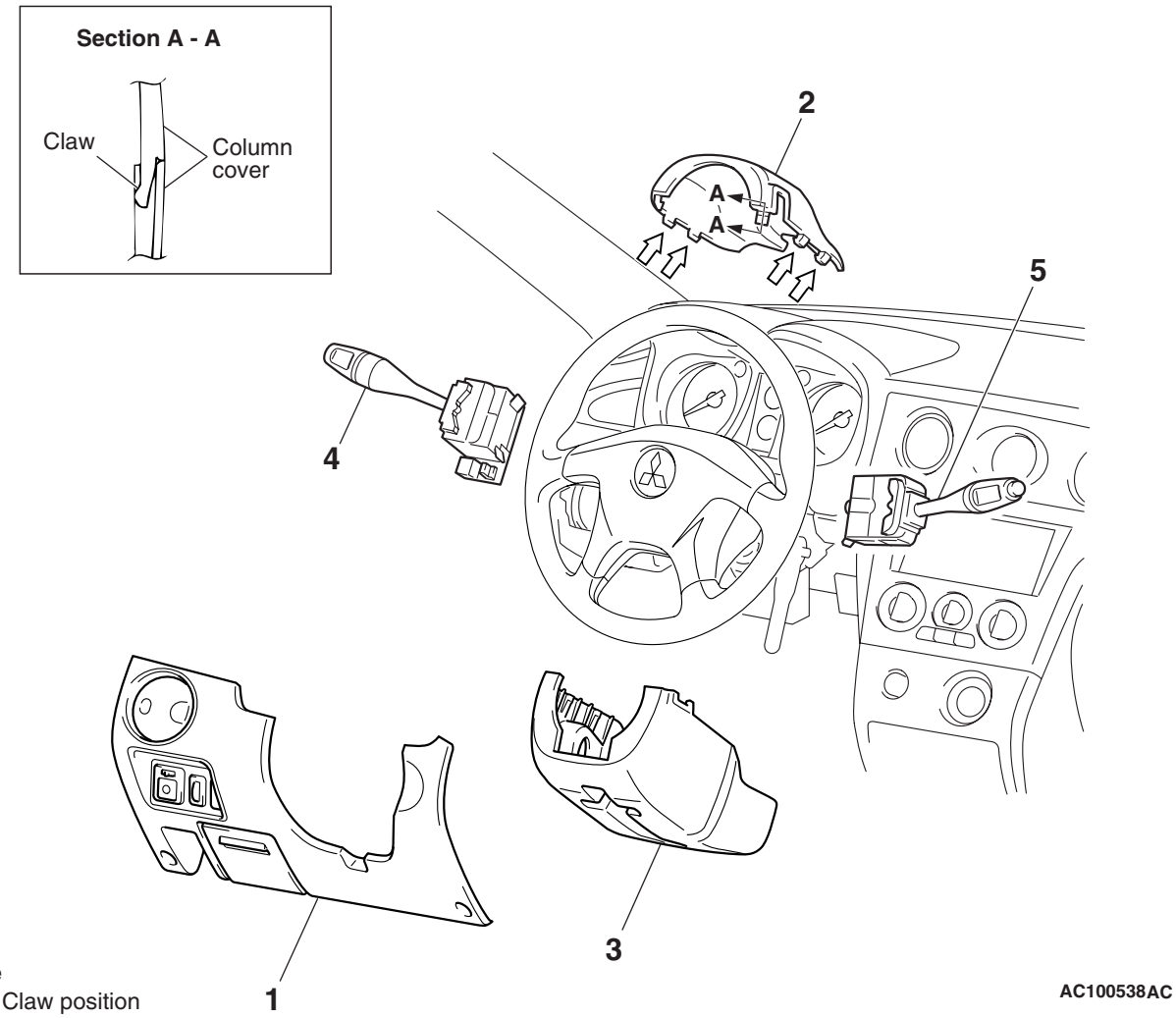
M1542000601080

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

COLUMN SWITCH

REMOVAL AND INSTALLATION

M1543009100792



Removal steps

1. Instrument lower panel (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Column cover upper

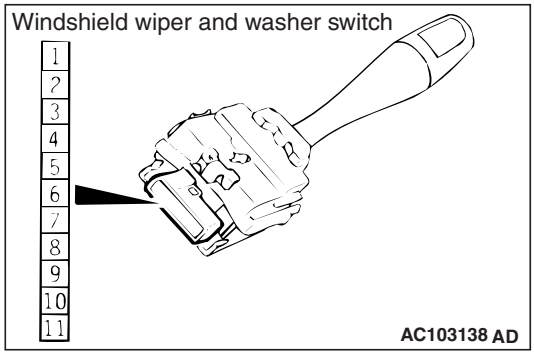
Removal steps (Continued)

3. Column cover lower
4. Turn-signal and lighting switch
5. Windshield wiper and washer switch

INSPECTION

M1542011202874

WINDSHIELD WIPER AND WASHER SWITCH CHECK



Switch position	Tester condition	Specified condition
OFF	4 – 6, 5 – 6, 6 – 7, 6 – 8, 6 – 9, 6 – 10, 6 – 11	Open circuit
Windshield mist wiper switch	6 – 11	Continuity exists (2 Ω or less)
Windshield intermittent wiper switch	6 – 10	Continuity exists (2 Ω or less)
Windshield low-speed wiper switch	6 – 9	Continuity exists (2 Ω or less)
Windshield high-speed wiper switch	6 – 8	Continuity exists (2 Ω or less)
Windshield washer switch	6 – 7	Continuity exists (2 Ω or less)
Rear wiper switch	4 – 6	Continuity exists (2 Ω or less)
Rear washer switch	5 – 6	Continuity exists (2 Ω or less)

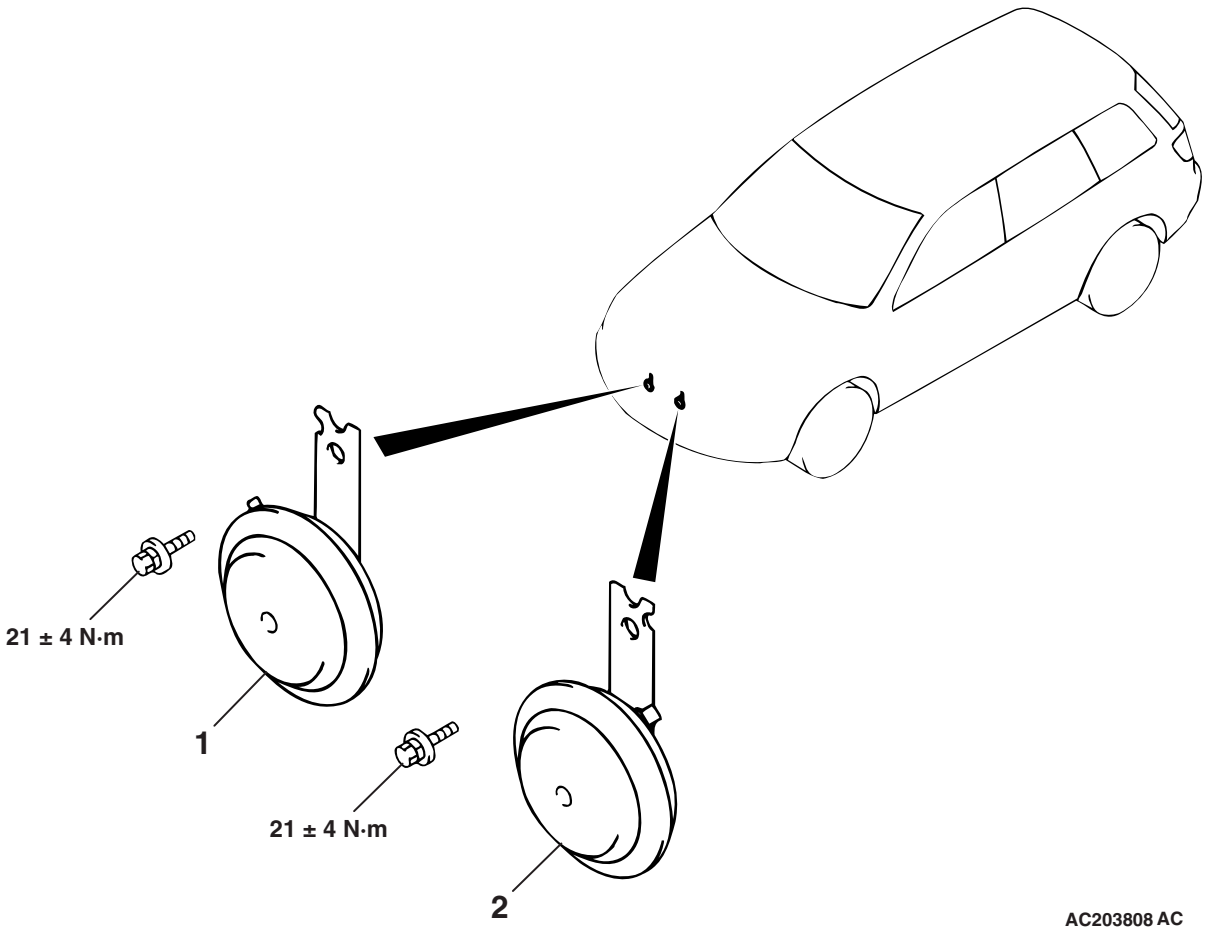
NOTE:

- *Measure intermittent volume switch resistance value between terminals 3 and 6. The measured resistance should change smoothly from approximately 0 ohm ("FAST" position) to 1 kiloohm ("SLOW" position)*
- *On L.H.drive vehicles, integrated column ECU does not allow turn-signal and lighting switch continuity test. For inspection and diagnosis, refer to the respective Group below.*
  - *Not using SWS monitor: GROUP 54B, SWS Troubleshooting P.54B-33.*
  - *Using SWS monitor: GROUP 54C, SWS Troubleshooting P.54C-21.*

HORN

REMOVAL AND INSTALLATION

M1543007900457



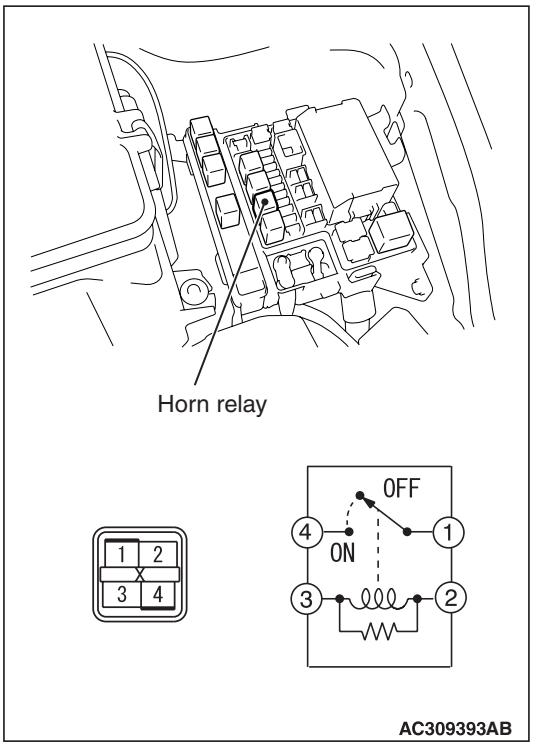
Removal Steps

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

INSPECTION

M1543006500092

HORN RELAY CONTINUITY CHECK

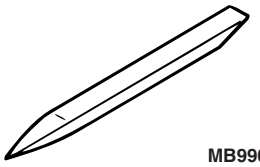


Battery voltage	Tester connection	Specified condition
Not applied	1 – 4	Open circuit
• Connect terminal 2 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	1 – 4	Continuity exists (2 Ω or less)

CLOCK

SPECIAL TOOL

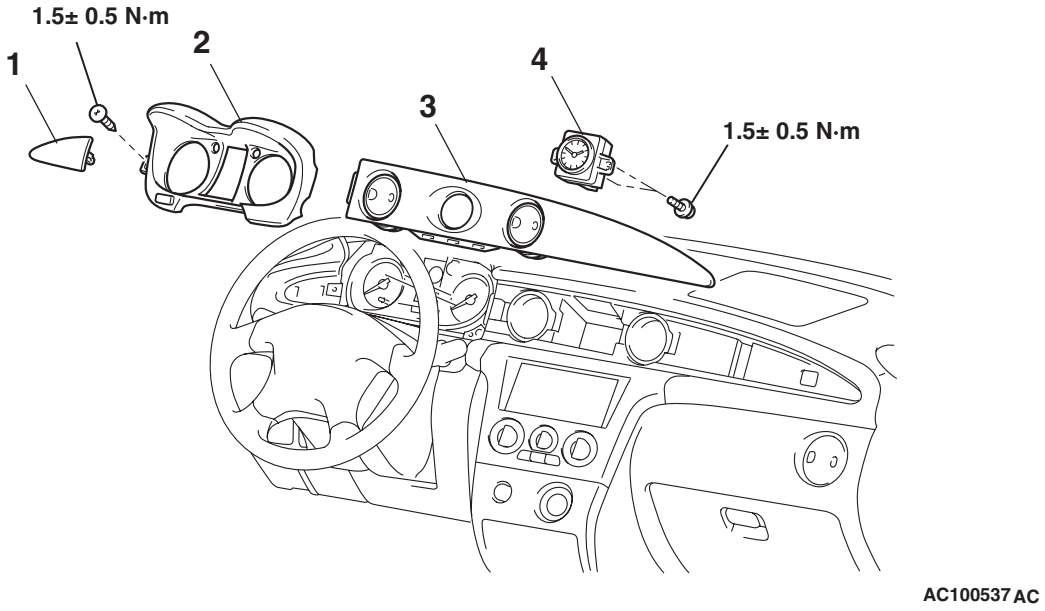
M1543000601919

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of instrument panel garnish, meter bezel and instrumental panel centre clock panel

CLOCK

REMOVAL AND INSTALLATION

M1543005900417



AC100537 AC

Removal steps

1. Instrument panel driver's side garnish (Refer to GROUP 52A, Instrument panel P.52A-2)
2. Meter bezel (Refer to GROUP 52A, Instrument panel P.52A-2)

Removal steps (Continued)

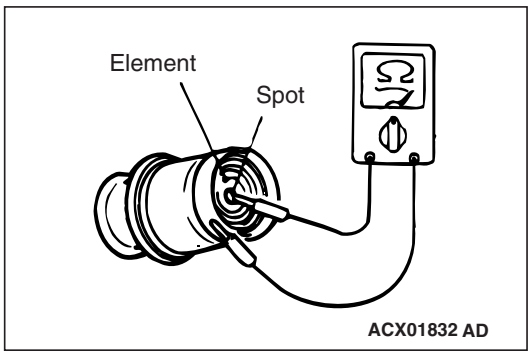
3. Instrument panel clock garnish (Refer to GROUP 52A, Instrument panel P.52A-2)
4. Clock

CIGARETTE LIGHTER

INSPECTION

M1543005700349

CIGARETTE LAMPER CHECK

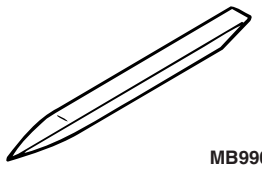


- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using an ohmmeter, check that the element resistance value is 1.7 Ω.

ACCESSORY SOCKET

SPECIAL TOOL

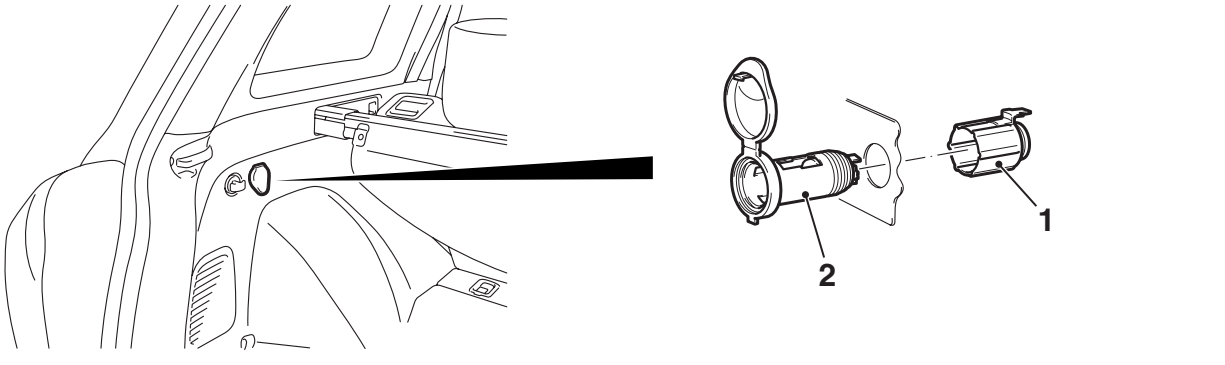
M1543000601920

Tool	Number	Name	Use
 MB990784	MB990784	Ornament remover	Removal of centre lower panel or quarter trim lower

ACCESSORY SOCKET

REMOVAL AND INSTALLATION

M1543008900472



Removal Steps

- Quarter trim lower (LH) (Refer to GROUP 52A, TrimP.52A-10).

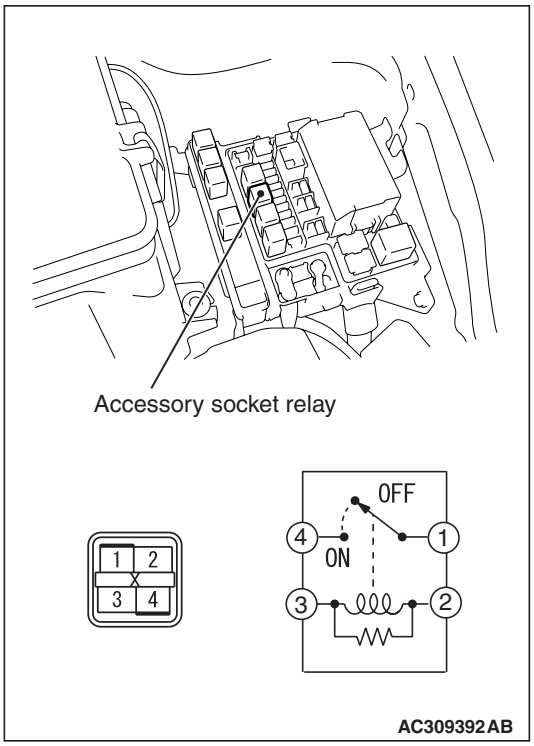
Removal Steps (Continued)

1. Socket case
2. Accessory socket

INSPECTION

M1543009000290

ACCESSORY SOCKET RELAY CONTINUITY CHECK

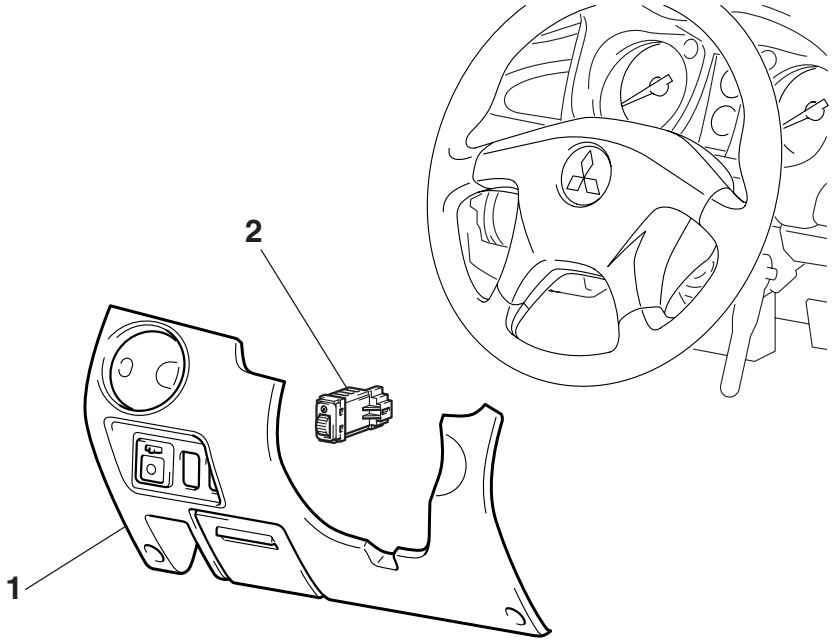


Battery voltage	Tester connection	Specified condition
Not applied	1 – 4	Open circuit
• Connect terminal 2 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	1 – 4	Continuity exists (2 Ω or less)

RHEOSTAT

REMOVAL AND INSTALLATION

M1542006000425



AC210844AB

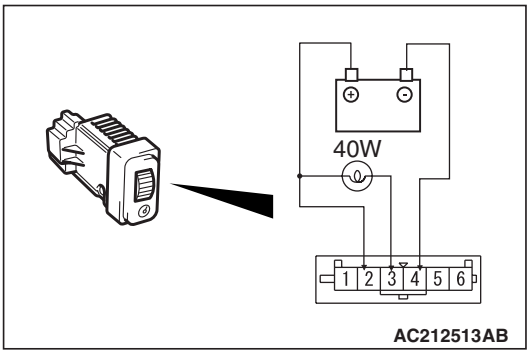
Removal steps

1. Instrument lower panel (Refer to GROUP 52A,Instrument panel assembly P.52A-2)
2. Rheostat

INSPECTION

M1542006100239

RHEOSTAT RESISTANCE CHECK

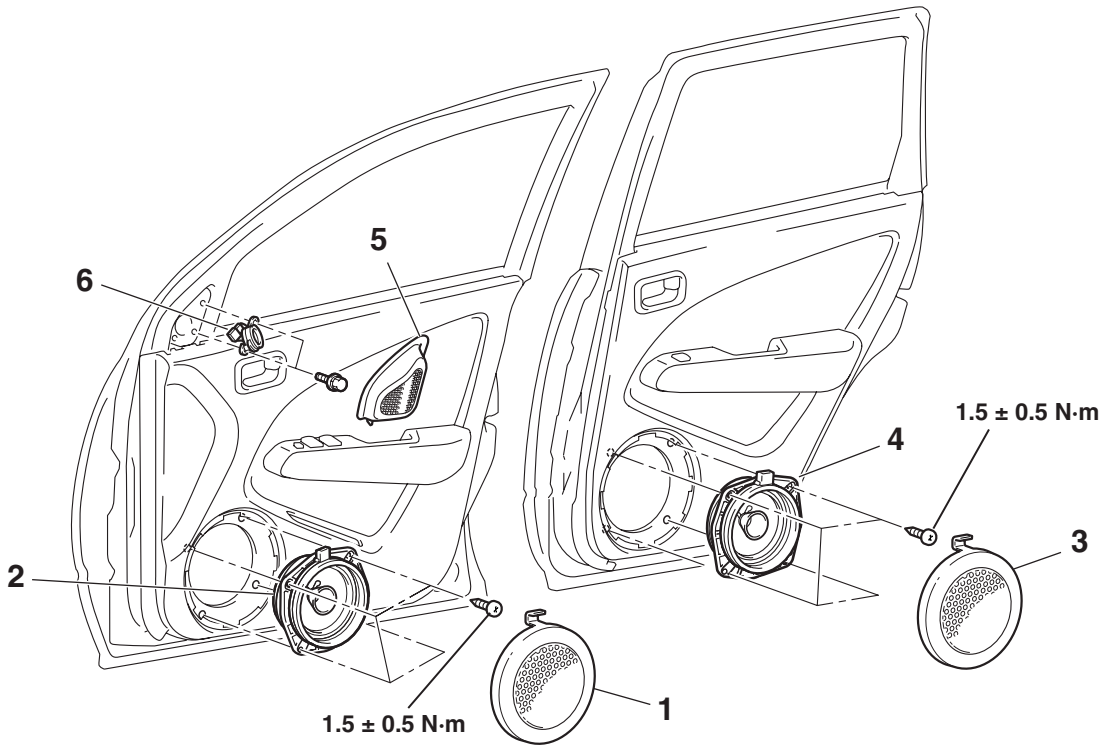


1. Connect the battery and the test bulb (40 W) as shown in the illumination.
2. Operate the rheostat, and if brightness changes smoothly without switching off, rheostat function is normal.

SPEAKER

REMOVAL AND INSTALLATION

M1544002600517



AC102825 AD

Front door speaker removal steps

1. Front door speaker garnish
2. Front door speaker

Rear door speaker removal steps

3. Rear door speaker garnish
4. Rear door speaker

Tweeter removal steps

5. Delta cover (Refer to GROUP 51, Door Mirror P.51-65.)
6. Tweeter

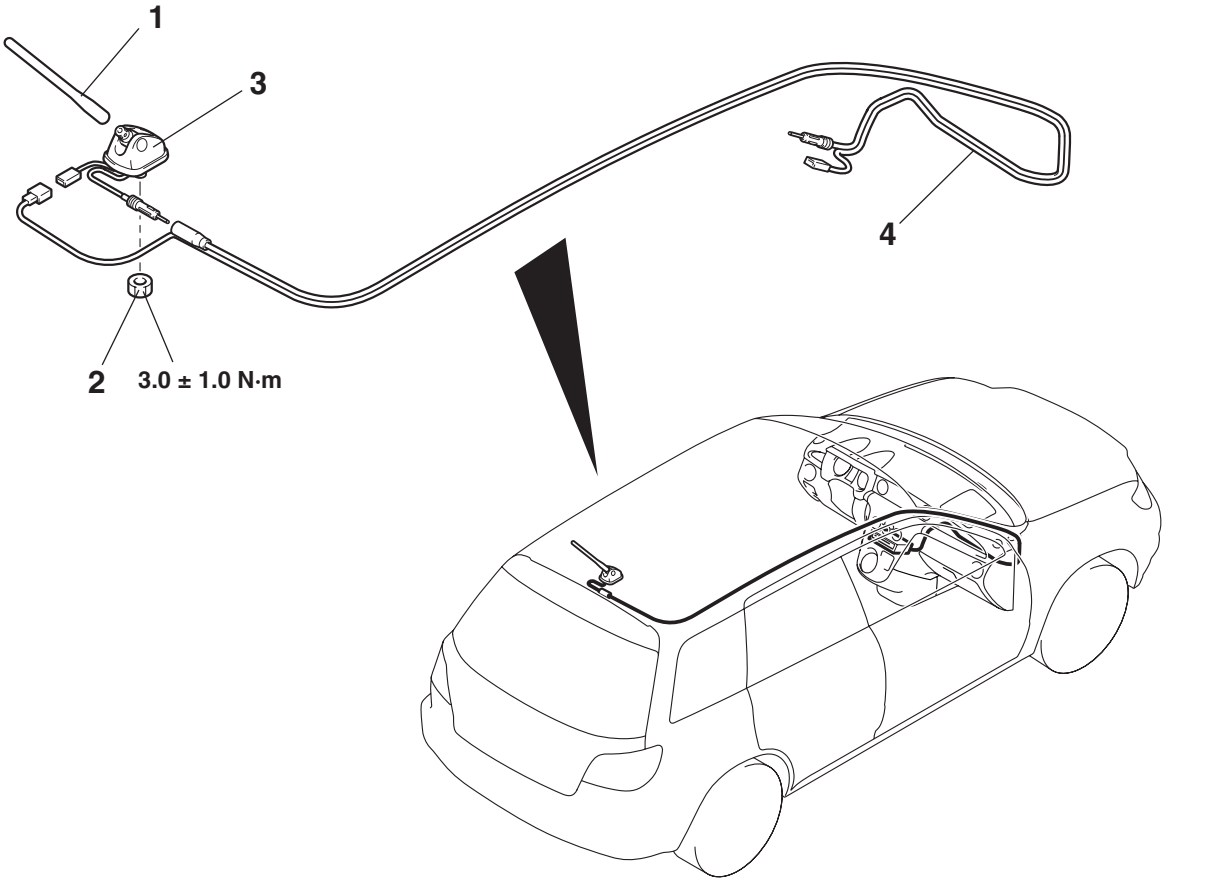
ANTENNA

ANTENNA

REMOVAL AND INSTALLATION

M1544002900927

Pre-removal and Post-installation Operation
- Front pillar trim, Quarter trim upper, Quarter trim lower, Center pillar trim lower, Center pillar trim upper (Refer to GROUP 52A, Trim P.52A-10.)
- Assist Grip, Headlining (Refer to GROUP 52A, Headlining P.52A-19.)
- Instrument Panel Removal and Installation (Refer to GROUP 52A, Instrument Panel P.52A-2)



AC300925AB

Removal steps
1. Rod assembly
2. Antenna nut

Removal steps (Continued)
3. Base
4. Antenna feeder assembly

REAR WINDOW DEFOGGER

GENERAL INFORMATION

M1543000100397

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 (manual A/C) or about 20 minutes (automatic A/C) after the defogger switch is turned ON.

TROUBLESHOOTING

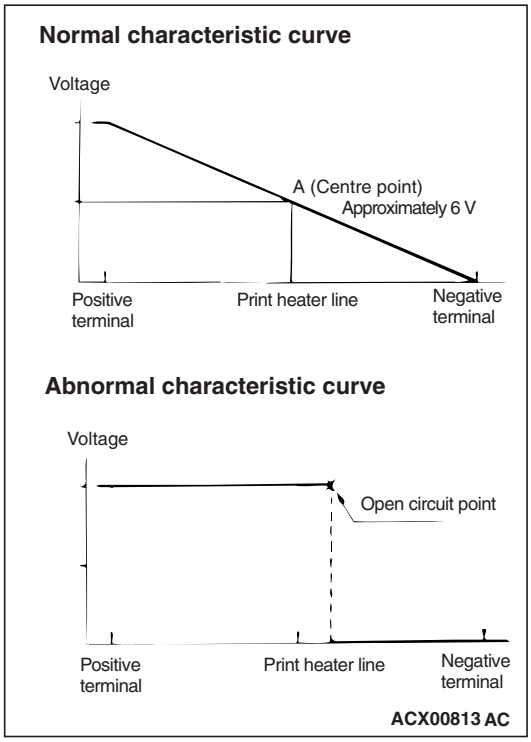
M1543000701110

The rear window defogger is controlled by the A/C-ECU. For troubleshooting, refer to GROUP 55A, Troubleshooting P.55A-5 or GROUP 55B, Troubleshooting P.55B-23.

ON-VEHICLE SERVICE

PRINTED HEATER LINES CHECK

M1543001800399



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 volt).
4. If 0 volt 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

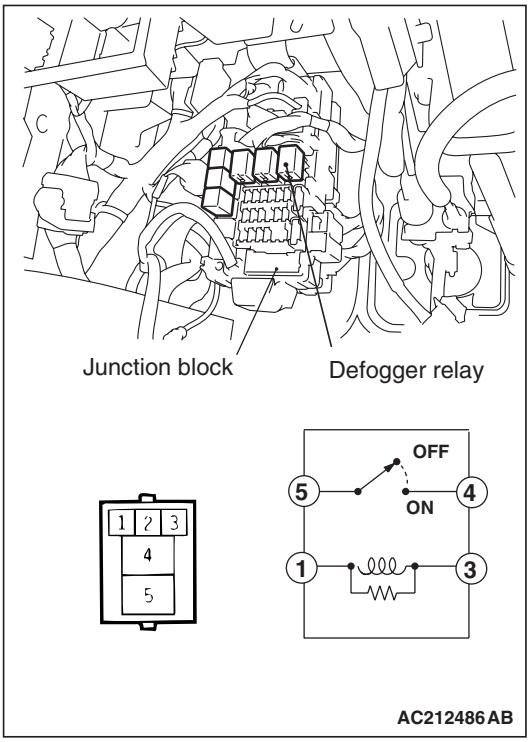
M1543006200347

Refer to GROUP 55A, Heater Control Assembly and Blower Switch Assembly P.55A-58.

INSPECTION

M1543019504715

DEFOGGER RELAY CHECK



Battery voltage	Tester connection	Specified condition
Not supplied	4 – 5	Open circuit
• Connect terminal 1 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	4 – 5	Continuity exists (2 Ω or less)