GROUP 54A

CHASSIS ELECTRICAL

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

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

⚠ WARNING

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

NOTE
The SRS includes the following components: SRS air bag control unit, SRS warning lamp, 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

ON-VEHICLE SERVICE

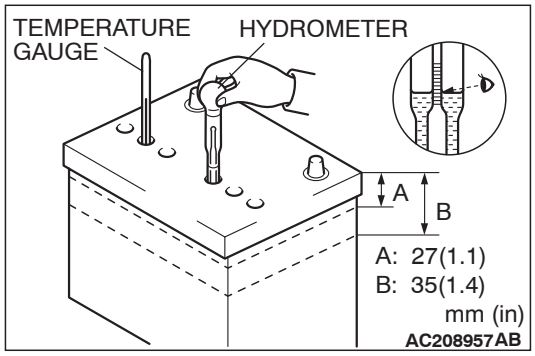
BATTERY CHECK

M1541001000450

⚠ ***WARNING***

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

BATTERY VISUAL INSPECTION (1)



1. Ensure that the battery electrolyte level is between A and B shown in the figure. Add if the level is lower than the specified range.
2. Use a hydrometer and temperature gauge to check the specific gravity of the electrolyte.

   Standard value:
   1.220 – 1.290 [at 20°C]

The specific gravity of electrolyte depends on its temperature. Use the formula below to determine the proper value.

Conversion on centigrade
D_{20}=(t – 20) x 0.0007 + Dt

D_{20} : Specific gravity as if electrolyte temperature is 20°C

D_t : Measured specific gravity

t : Measured temperature

BATTERY VISUAL INSPECTION (2)

Make sure the ignition switch is in "LOCK" (OFF) position and all battery feed accessories are OFF.

1. Disconnect the negative cable from the battery before disconnecting the positive cable.

⚠ ***WARNING***

Care should be taken in the event the battery case is cracked or leaking to protect hands from the electrolyte. A suitable pair of rubber gloves (not the household type) should be worn when removing battery by hand.

2. Remove the battery from the vehicle.
3. Inspect battery carrier for damage caused by loss of acid from the battery. If acid damage is present, it is necessary to clean area with a solution of clean warm water and baking soda. Scrub area with a stiff bristle brush. Wipe clean with a cloth moistened with ammonia or baking soda in water.
4. Clean the battery, especially the top with same solutions as described in step 3.
5. Inspect the battery case and cover for cracks. If cracks are present, battery must be replaced.
6. Clean the battery post with a suitable battery post cleaning tool.

7. Clean the inside surfaces of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
8. Install the battery in the vehicle.
9. Connect the positive and negative cables to the battery in the order of mention.
10. Tighten the clamp nut securely.

BATTERY CHARGING

M1541001100521

⚠ WARNING

When batteries are being charged, an explosive gas forms beneath the cover of each cell. Do not smoke near batteries on charge or which have recently been charged. Do not break live circuits at the terminals of the batteries on charge. A spark will occur where the live circuit is broken. Keep all open flames away from the battery.

Battery electrolyte temperature may temporarily be allowed to rise to 55°C. Increase of electrolyte temperature above 55°C is harmful to the battery, causing deformation of battery cell, decrease in life of battery, etc.

CHARGE RATE

If the test indicator is white, the battery should be charged as outlined below. When the dot appears or when maximum charge shown below is reached, charging should be stopped.

Charge Rate Chart

BATTERY	
Slow charging	5 amps 15 hours
Fast charging	20 amps 3.75 hours

BATTERY TEST

M1541001200528

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 posts 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 RATE CHART

Load test	
Cranking ratio (0°C)	600 amps
Reserve capacity	115 minutes

LOAD TEST CHART

TEMPERATURE °C	**21 AND ABOVE**	**16**	**10**	**4**	**–1**	**–7**	**–12**	**–18**
Minimum voltage	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

IGNITION SWITCH

GENERAL DESCRIPTION

M1543000100535

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.

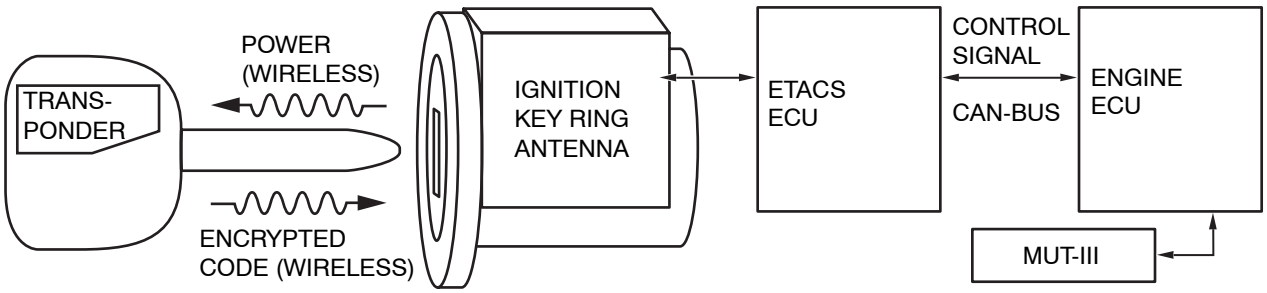
IMMOBILIZER SYSTEM

The IMMOBILIZER system consists of the ignition key, the key ring antenna, ETACS-ECU, and the Engine-ECU. The ignition key has a built-in transponder. The key ring antenna is installed on the steering lock key cylinder. 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 immobilised. If a registered ignition key is lost, all your ignition keys need to be registered again using diagnostic tool MB991958 (MUT-III Sub Assembly) to ensure security (Refer to P.54A-37). An additional ignition key can be registered as follows (only if no ignition keys are lost):

- Using diagnostic tool MB991958 (MUT-III Sub Assembly) (Refer to P.54A-37).
- By operating two ignition keys that have been already registered (Refer to P.54A-37).

OPERATION

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



54DB001A

CAUTION WHEN REPLACING IMMOBILIZER SYSTEM RELATED PARTS

To replace IMMOBILIZER system related parts, refer to the table below. When the ignition key is re-registered with diagnostic tool MB991958, the originally registered ignition key registration information will be lost.

ITEMS	Engine-ECU	ETACS- ECU	IGNITION KEY
When replacing Engine-ECU	-	Replacement is not required	Replacement is not required. All ignition keys re-registration are required.
When rewriting Engine-ECU	-	Replacement is not required	Replacement is not required. Re-registration is not required.
When replacing ETACS-ECU	Replacement not required	-	Replacement is not required. All ignition keys re-registration are required.
When adding new ignition keys (if registered ignition keys are not lost)	Replacement not required	Replacement is not required	Re-register all ignition keys to be registered (including new keys).
When adding new ignition keys (if registered ignition keys are lost)	Replacement not required	Replacement is not required	Re-register all ignition keys.

DOOR LOCK PREVENTION FUNCTION DIAGNOSIS

M1543000701046

The door lock prevention function is controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

IMMOBILIZER SYSTEM DIAGNOSIS

INTRODUCTION TO IMMOBILIZER SYSTEM DIAGNOSIS

M1543009901326

⚠ CAUTION

The encrypted code should always be re-registered when replacing the ETACS-ECU.

The IMMOBILIZER system consists of the ETACS-ECU, Engine-ECU, ignition key and ignition key ring antenna. If the engine cannot be started by using a registered ignition key, one of these components may be defective. If the IMMOBILIZER system has immobilised the engine, MPI system DTC P0513 will be output. In this case, observe the IMMOBILIZER system troubleshooting.

IMMOBILIZER SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1543006900841

Use the following steps to plan your diagnostic strategy.

1. Gather information about the problem from the customer.
2. Verify that the condition as described by the customer exists.
3. Check the vehicle for any IMMOBILIZER system DTCs.
4. If you cannot verify the condition and there are no IMMOBILIZER system DTCs, the malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.
5. If you can verify the condition but there are no IMMOBILIZER system DTCs, or the system cannot communicate with diagnostic tool MB991958, refer to Symptom Chart and find the fault P.54A-18.
6. If there is an IMMOBILIZER system DTC, record the DTC, then erase it from the memory using diagnostic tool MB991958.
7. Recreate the IMMOBILIZER system DTC set conditions to see if the same IMMOBILIZER system DTC will resets.
   (1) If the same IMMOBILIZER system DTC resets, perform the appropriate diagnostic procedure. Refer to Diagnostic Trouble Code Chart P.54A-13.
   (2) If the same IMMOBILIZER system DTC does not reset, the malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/inspection Service Points – How to Cope with Intermittent Malfunctions P.00-14.

DIAGNOSIS FUNCTION

M1543007000443

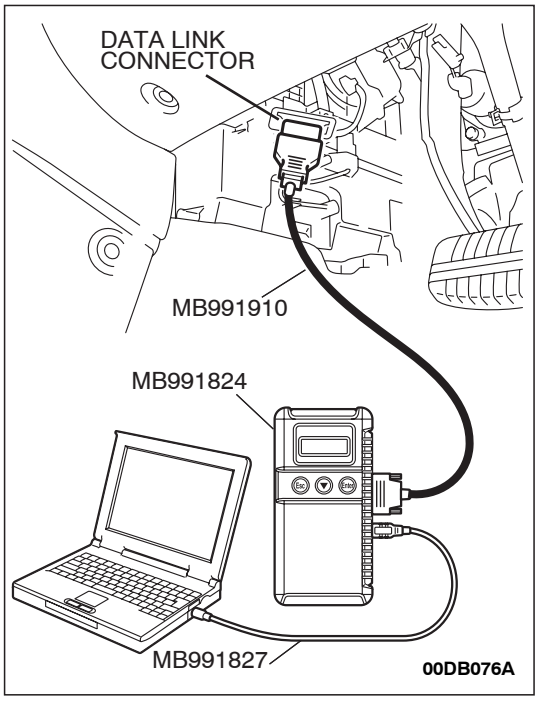
HOW TO CONNECT DIAGNOSTIC TOOL (MUT-III)

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator lamp will be illuminated in a green color.
7. Start the MUT-III system on the personal computer.

   NOTE: Disconnecting the diagnostic tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

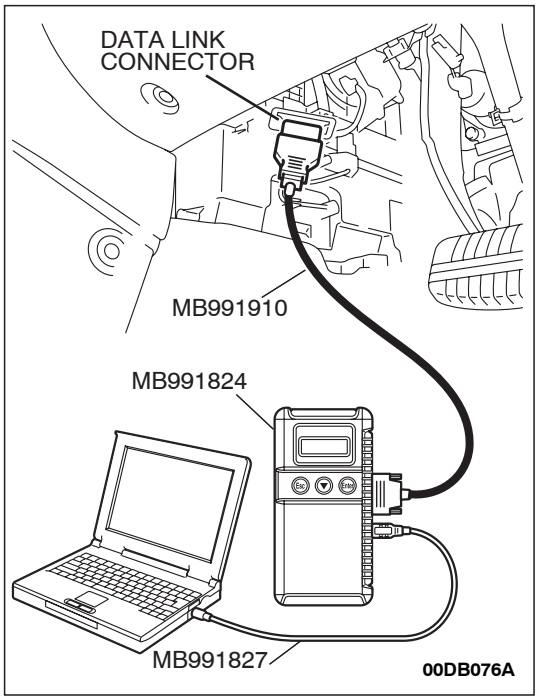
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if diagnostic tool MB991958 does not display.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "IMMOBILIZER" .
6. Select "Self-diagnosis."
7. If a DTC is set, it is shown.
8. Choose "Erase DTCs" to erase the DTC.

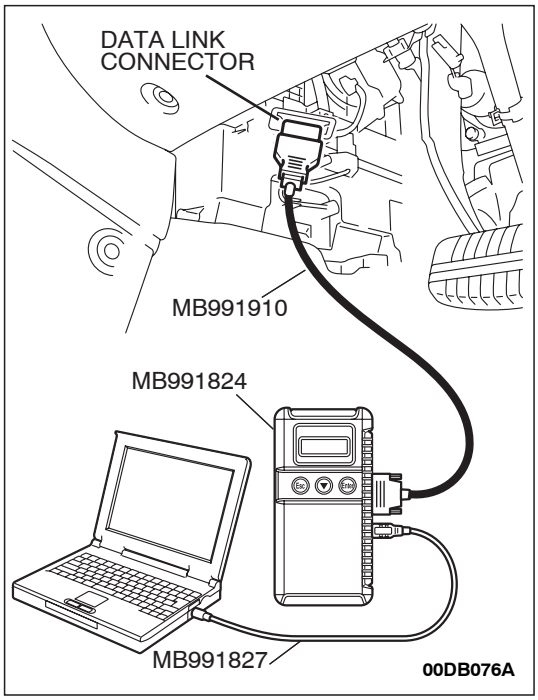
HOW TO READ DATA LIST

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "IMMOBILIZER".
6. Select "Data List."
7. Choose an appropriate item and select the "OK" button.

DIAGNOSTIC TROUBLE CODE CHART

M1543007100439

⚠ CAUTION

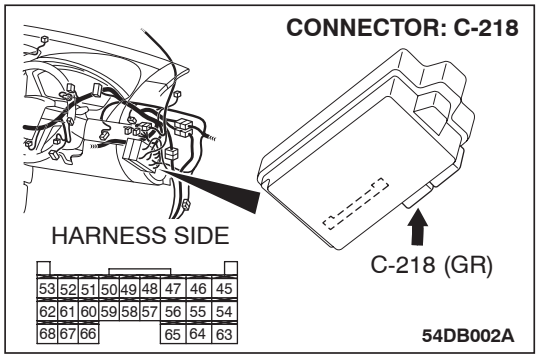
During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

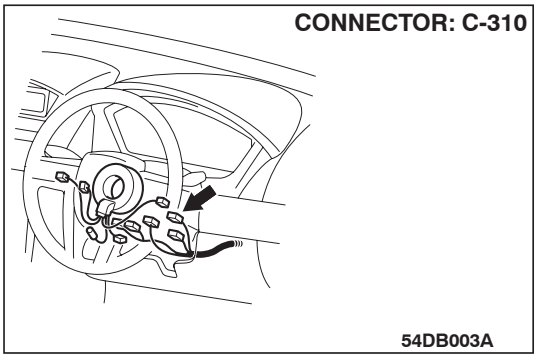
Use the following chart to develop proper diagnostic strategy.

DIAGNOSTIC TROUBLE CODE NO.	DESCRIPTION	REFERENCE PAGE
11	Transponder communication system or radio interference of encrypted code.	P.54A-14
12	Encrypted codes are not the same or not registered.	P.54A-18

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC 11: Transponder Communication System or Radio Interference of Encrypted Code.





CIRCUIT OPERATION

The ignition key is powered by the ignition key ring antenna. The ignition key then sends an encrypted code. The ignition key ring antenna receives the encrypted code, and determines if the ignition key is registered.

DTC SET CONDITION

- DTC 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 ETACS-ECU immediately after the ignition switch is turned to "ON" position.

NOTE: DTC 11 is always output together with MPI system DTC P0513.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Radio interference of the encrypted code
- Malfunction of the transponder
- Malfunction of the ETACS-ECU

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

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-37. Retest the system.

NO : Go to Step 3.

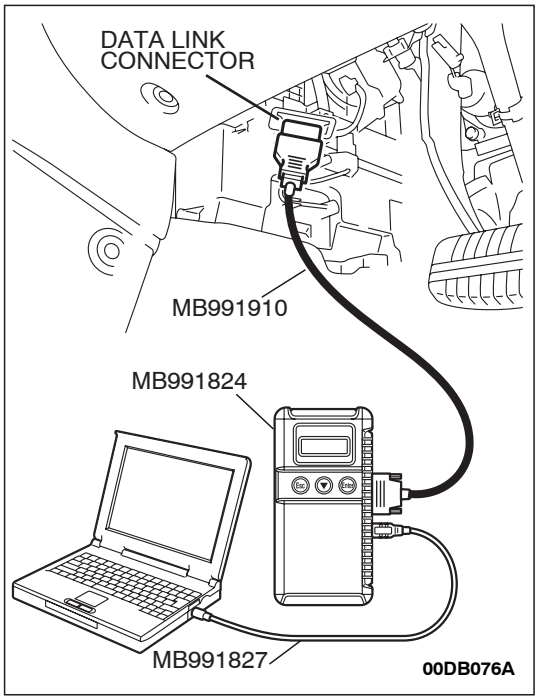
STEP 3. Recheck for diagnosis trouble code.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to the "ON" position.
(3) Use diagnostic tool MB991958 to check IMMOBILIZER system diagnostic trouble codes.
(4) Turn the ignition switch to "LOCK"(OFF) position.
(5) Disconnect diagnostic tool MB991958.

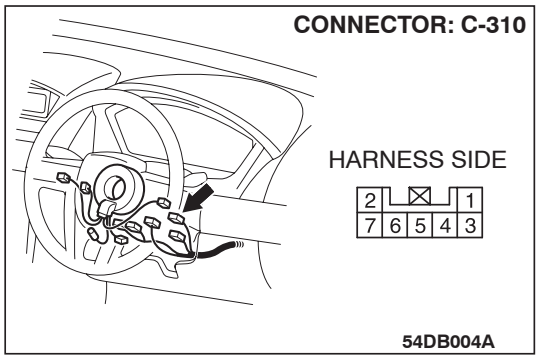
Q: Which DTC is output, DTC 11 or 12?

DTC12 is output : Refer to DTC 12 P.54A-18.

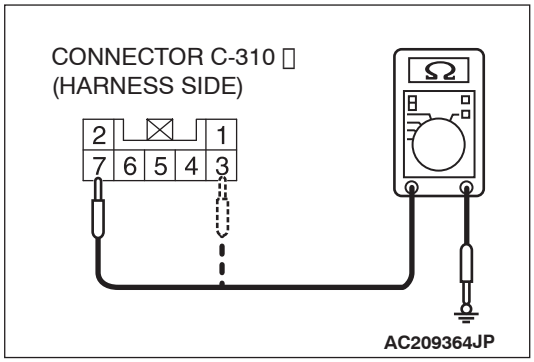
DTC11 is output : Go to Step 4.



STEP 4. Check the ignition key ring antenna.



(1) Disconnect the key reminder switch connector C-310.



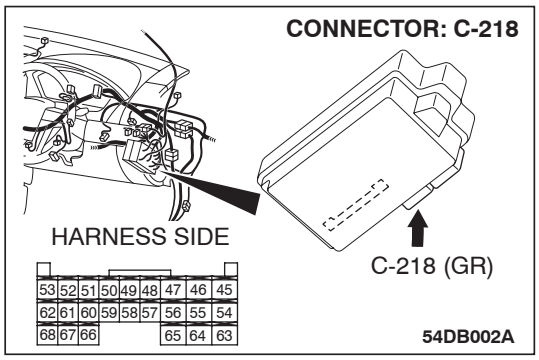
(2) Measure the resistance value between terminal number 3 and terminal number 7 by backprobing.
- The measured value should be 2 ohm or less.

Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the ignition key ring antenna. Retest the system.

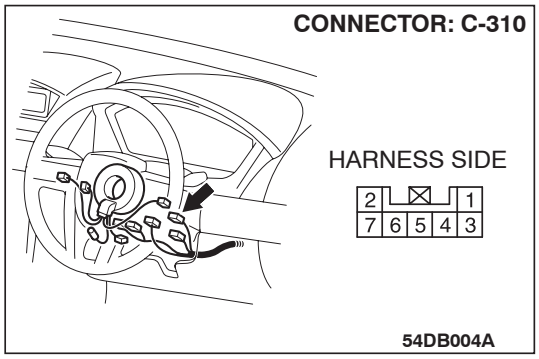
STEP 5. Check ETACS-ECU connector C-218 and key reminder switch connector C-310 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

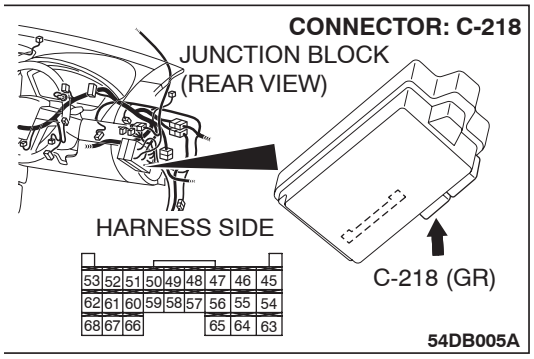


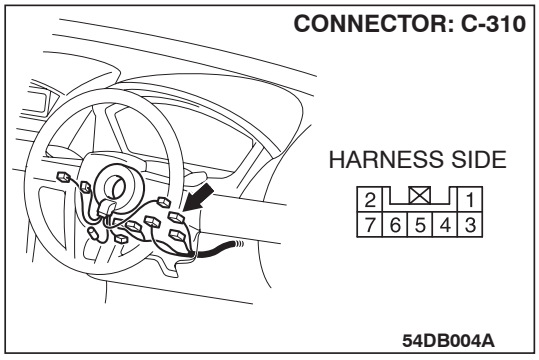
Q: Are ETACS-ECU connector C-218 and key reminder switch connector C-310 in good condition?

YES : Go to Step 6.

NO : Repair or replace the damage component(s). Confirm that diagnostic tool MB991958 communicates normally.







STEP 6. Check the wiring harness between ETACS-ECU connector C-218 (terminal 51 and 52) and key reminder switch connector C-310 (terminal 7 and 3).

Q: Are the wiring harness between ETACS-ECU connector C-218 (terminal 51 and 52) and key reminder switch connector C-310 (terminal 7 and 3) in good condition?

YES : Replace the ETACS-ECU and then register the password (secret code) and encrypted code (Refer to P.54A-37). Retest the system.

NO : Repair or replace the damaged component(s). Confirm that diagnostic tool MB991958 communicates normally.

DTC12: Encrypted Codes are Not the Same or Not Registered.

DTC SET CONDITION

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

NOTE: DTC 12 is always output together with MPI system DTC P0513.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The encrypted code in the ignition key has not been properly registered
- Malfunction of ETACS-ECU

DIAGNOSIS

Was the encrypted code registered?

YES : Replace the ETACS-ECU and then re-register the encrypted code (Refer to P.54A-37).

NO : Register the encrypted code (Refer to P.54A-37).

SYMPTOM CHART

M1543007201105

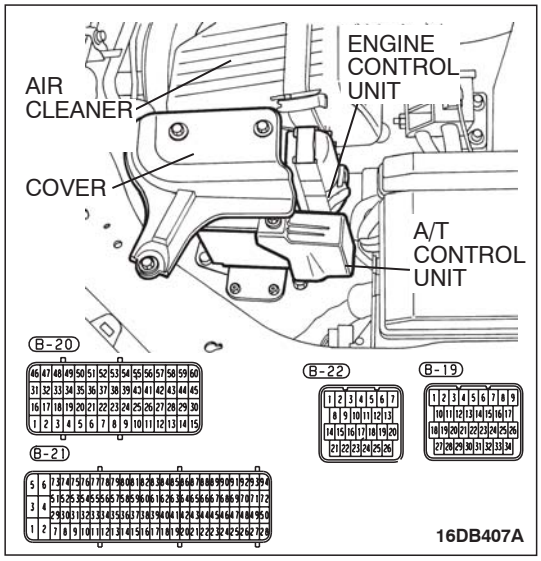
⚠ CAUTION

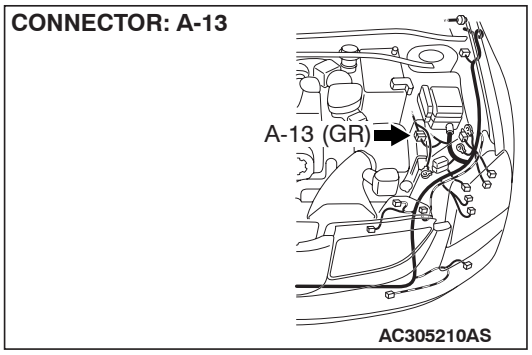
During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

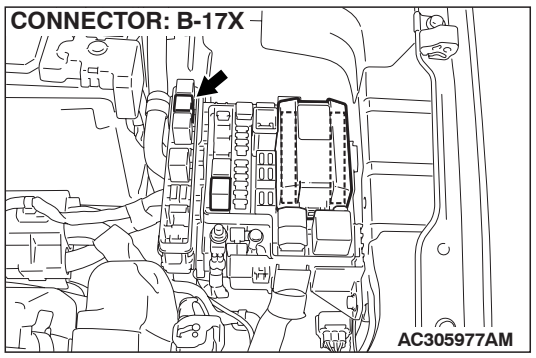
SYMPTOM	INSPECTION PROCEDURE NO.	REFERENCE PAGE
Communication with diagnostic tool MB991958 is impossible.	1	P.54A-19
The ignition key cannot be registered.	2	P.54A-30
Engine cranks, but does not start.	3	P.54A-31

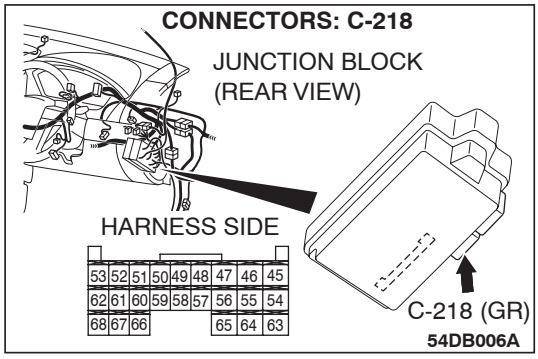
SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Communication with Diagnostic Tool MB991958 is Impossible.









CIRCUIT OPERATION

The ETACS-ECU is energized by the MPI relay when the ignition switch is turned "ON". The Engine-ECU transmits a signal from diagnostic tool MB991958 to the ETACS-ECU as it is. In the same way, a signal from the ETACS-ECU is also transmitted to diagnostic tool MB991958 as it is.

TECHNICAL DESCRIPTION (COMMENT)

- This malfunction may be caused by a defective ETACS-ECU, Engine-ECU, or a defect in the communication line between the ETACS-ECU and Engine-ECU. If this malfunction appears when the MPI system and diagnostic tool MB991958 can communicate each other, MPI system DTC P0513 will reset.
- If the MPI system is normal, the MPI relay can be determined as normal. In addition, if the MPI system and diagnostic tool MB991958 can communicate each other, the circuits between the data link connector and the Engine-ECU can determined as normal.

NOTE: If this malfunction appears, MPI system DTC P0513 will be output.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the ETACS-ECU
- Malfunction of the Engine-ECU
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, read the MPI system diagnostic trouble code.

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting diagnostic tool.

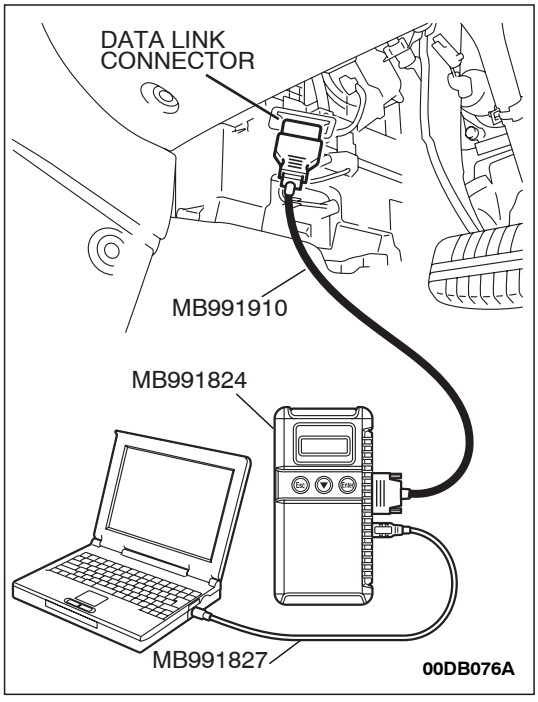
Use diagnostic tool MB991958 to confirm the MPI system DTC.

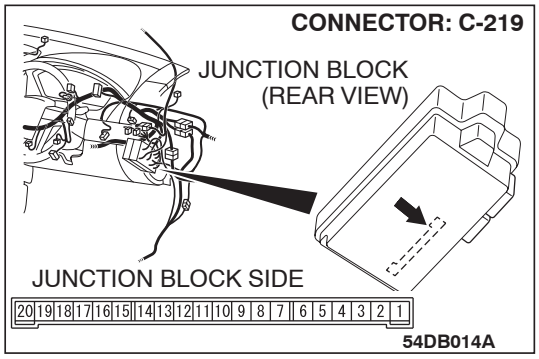
(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch "ON" to position.
(3) Read the MPI system diagnosis code.

NOTE: If the diagnostic tool MB991958 cannot communicate with the MPI system, refer to GROUP 13A, MPI Diagnosis – Symptom Procedures Chart P.13A-21.

Q: Is an MPI system DTC P0513 output?

YES : Refer to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.
NO : Go to Step 2.



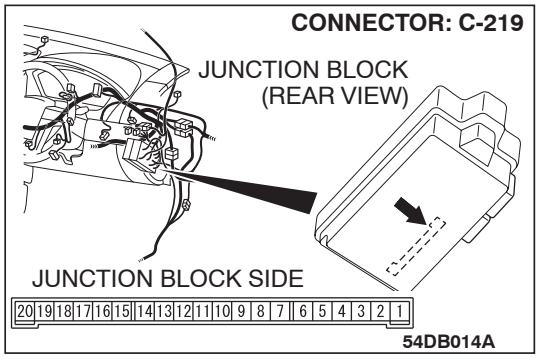


STEP 2. Check ETACS-ECU connector C-219 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is ETACS-ECU connector C-219 in good condition?

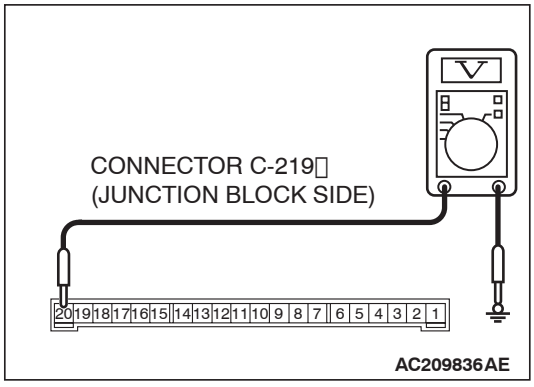
YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If the functions or equipment described in "CIRCUIT OPERATION" work normally, the interior light loaded signal should be normal.



STEP 3. Check the battery line of power supply circuit to the ETACS-ECU. Measure the voltage at ETACS-ECU connector C-219.

(1) Disconnect ETACS-ECU connector C-219 and measure the voltage available at the junction block side of the connector.



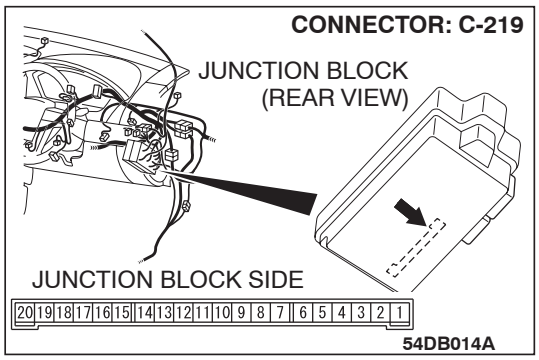
(2) Measure the voltage between terminal 20 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

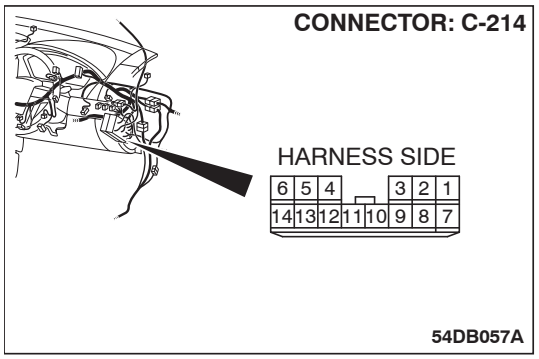
Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 5.

NO : Go to Step 4.

STEP 4. Check the wiring harness between ETACS-ECU connector C-219 (terminal 20) and battery.





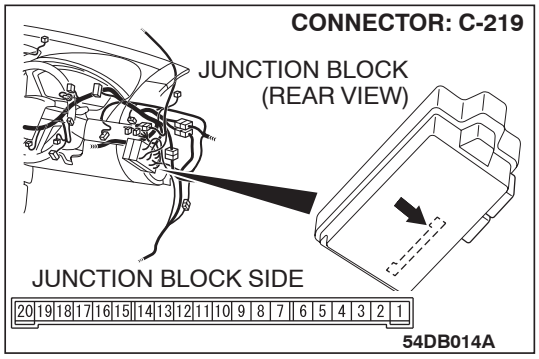
NOTE: Also check junction block connector C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-214 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between ETACS-ECU connector C-219 (terminal 20) and battery in good condition?

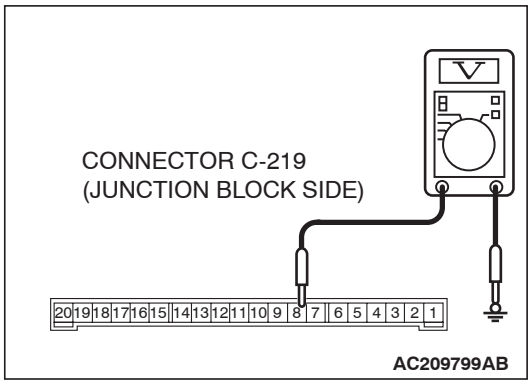
YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. If the functions or equipment described in "CIRCUIT OPERATION" work normally, the interior light loaded signal should be normal.

STEP 5. Check the ignition switch (IG1) line of the power supply circuit to the ETACS-ECU. Measure the voltage at ETACS-ECU connector C-219.



(1) Disconnect ETACS-ECU connector C-219 and measure the voltage available at the junction block side of the connector.
(2) Turn the ignition switch to the "ON" position.

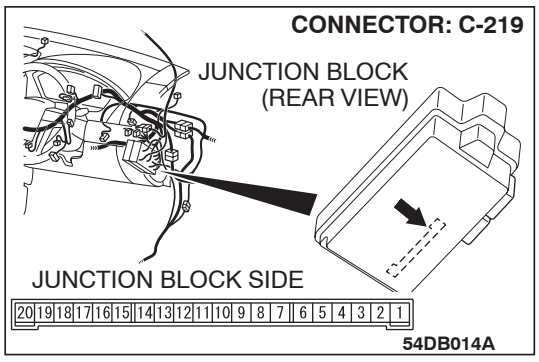


(3) Measure the voltage between terminal 8 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 7.
NO : Go to Step 6.

STEP 6. Check the wiring harness between ETACS-ECU connector C-219 (terminal 8) and the ignition switch (IG1).



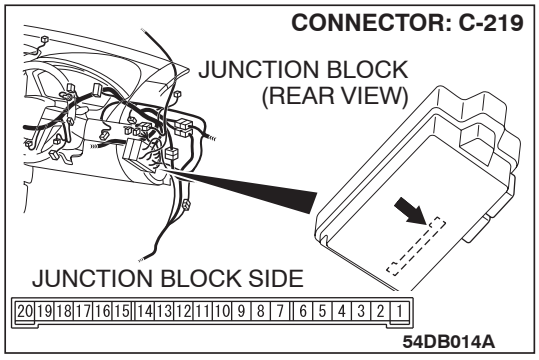
NOTE: Also check junction block connector C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-215 is damaged, repair or replace the damaged component(s) as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between ETACS-ECU connector C-219 (terminal 8) and the ignition switch (IG1) in good condition?

YES : No action is necessary and testing is complete.

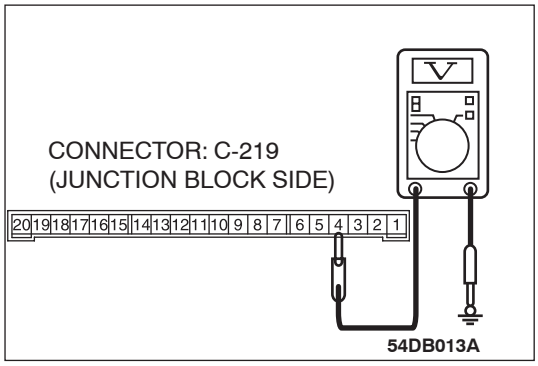
NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. If the functions or equipment described in "CIRCUIT OPERATION" work normally, the interior light loaded signal should be normal.

STEP 7. Check the ignition switch (ACC) line of the power supply circuit to the ETACS-ECU. Measure the voltage at ETACS-ECU connector C-219.



(1) Disconnect ETACS-ECU connector C-219 and measure the voltage available at the junction block side of the connector.

(2) Turn the ignition switch to the "ACC" position.



(3) Measure the voltage between terminal 4 and ground.

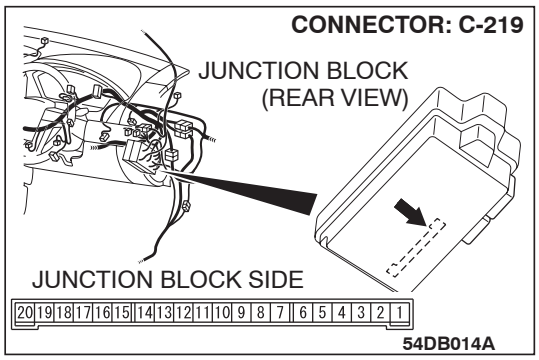
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 9.

NO : Go to Step 8.

STEP 8. Check the wiring harness between ETACS-ECU connector C-219 (terminal 4) and the ignition switch (ACC).



NOTE: Also check junction block connector C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-215 is damaged, repair or replace the damaged component(s) as described in

Q: Is the wiring harness between ETACS-ECU connector C-219 (terminal 18) and ignition switch (ACC) in good condition?

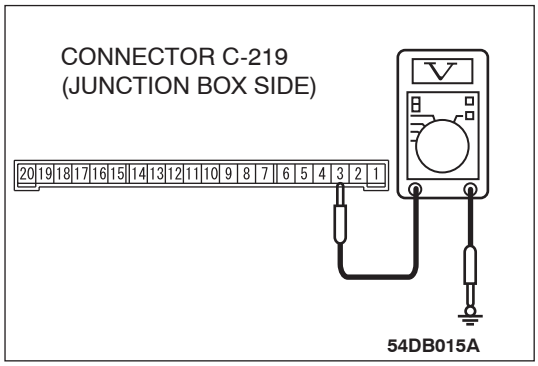
YES : No action is necessary and testing is complete.

NO : The wiring harness may be damaged or the connector(s) may have loose, corroded or damaged terminals, or terminals pushed back in the connector. Repair the wiring harness as necessary. If the functions or equipment described in "CIRCUIT OPERATION" work normally, the interior light loaded signal should be normal.

STEP 9. Measure the resistance at ETACS-ECU connector C-218.

(1) Disconnect ETACS-ECU connector C-219 and measure resistance.

(2) Measure the resistance between terminal 3 and ground.



Q: Is the resistance less than 2 ohms?

YES : Go to Step 11.

NO : Go to Step 10.

STEP 10. Check the wiring harness between ETACS-ECU connector C-219 (terminal 3) and ground.

NOTE: Also check connector C-211, check the wires. If connector C-211 is damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between ETACS-ECU connector C-219 (terminal 3) and ground in good condition?

YES : There is no action to be taken.

NO : Repair the wiring harness. Confirm that diagnostic tool MB991958 communicates normally.

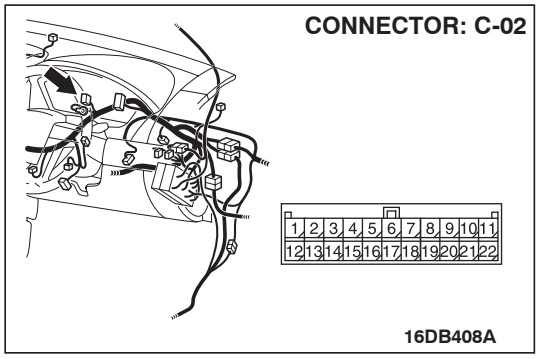
STEP 11. Check the CAN_H line (communication line including the ETACS-ECU) between joint connector (3) and the ETACS-ECU connector for a short to the power supply. Measure the voltage at joint connector (3) C-02.

⚠ CAUTION

A digital multimeter should be used. For details refer to P.54C-4.

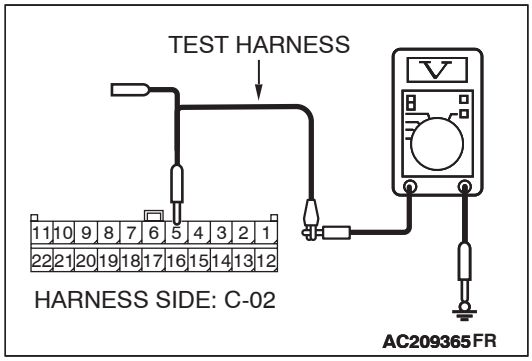
⚠ CAUTION

The test wiring harness should be used. For details refer to P.54C-4.



(1) Disconnect joint connector (3) C-02, and measure the voltage at the wiring harness side of joint connector (3) C-02.

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



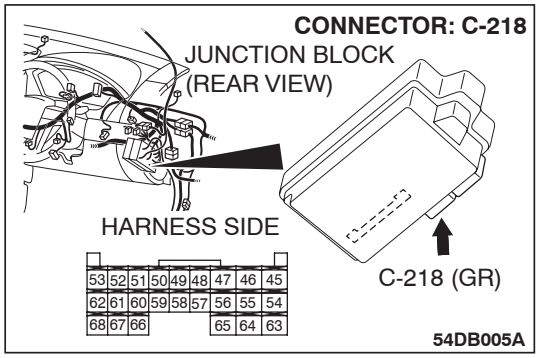
(3) Measure the voltage between joint connector (3) terminal 5 and body ground.

OK: 4.0 V or less

Q: Does the voltage measure 4.0 V or less?

YES : If the voltage measures 4.0 V or less, go to Step 14.

NO : If the voltage measures more than 4.0 V, go to Step 12.



STEP 12. Check ETACS-ECU connector C-218 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

⚠ CAUTION

The strand end of the twisted wire should be within 10 cm (4 inches) from the connector. For details refer to P.54C-4.

Q: Is ETACS-ECU connector C-218 in good condition?

YES : Go to Step 13.

NO : Repair the damaged parts.

STEP 13. Check the CAN_H line (communication line only) between joint connector (3) and ETACS-ECU connector for a short to the power supply. Measure the voltage at joint connector (3) C-02.

⚠ CAUTION

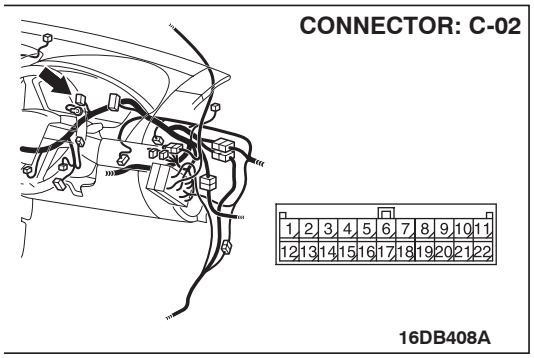
A digital multimeter should be used. For details refer to P.54C-4.

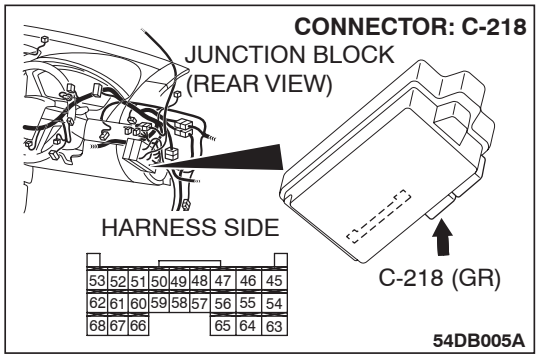
⚠ CAUTION

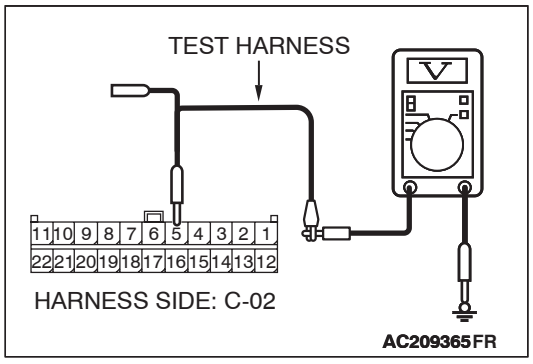
The test wiring harness should be used. For details refer to P.54C-4.

(1) Disconnect joint connector (3) C-02 and ETACS-ECU connector C-218, and measure the voltage at the wiring harness side of joint connector (3) C-02.

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







(3) Measure the voltage between joint connector (3) terminal 5 and body ground.

OK: 1.0 V or less

⚠ CAUTION

Strictly observe the specified wiring harness repair procedure. For details refer to P.54C-5.

Q: Does the voltage measure 1.0 V or less?

YES : If the voltage measures 1.0 V or less, diagnose CAN bus lines thoroughly by referring to P.54C-31 without multi-centre display or P.54C-81 with multi-centre display.

NO : If the voltage measures more than 1.0 V, repair the wiring harness between joint connector (3) and the ETACS-ECU connector.

STEP 14. Replace the ETACS-ECU or Engine-ECU.
Replace the ETACS-ECU or Engine-ECU.

Q: Did the communication with the diagnostic tool become possible after replacing the ETACS-ECU or the Engine-ECU?

YES : Register the password (secret code) and encrypted code P.54A-37.

NO : Replace the Engine-ECU. Then register the password (secret code) and encrypted code (Refer to P.54A-37).

INSPECTION PROCEDURE 2: The Ignition Key cannot be Registered.

TECHNICAL DESCRIPTION (COMMENT)

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

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the ignition key
- Malfunction of ETACS-ECU

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

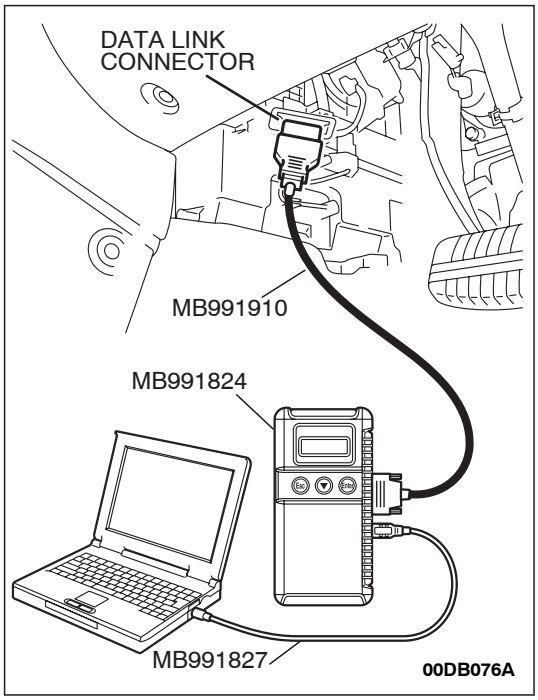
STEP 1. Using diagnostic tool MB991958, read the diagnostic trouble code.

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting diagnostic tool.

Use diagnostic tool MB991958 to check if DTC 11 is set.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch "ON" position.
(3) Read the IMMOBILIZER system diagnostic trouble code.



Q: Does DTC11 reset?

YES : Refer to P.54A-14.
NO : Replace the ignition key that cannot be registered. Then go to Step 2.

STEP 2. Retest the system.

Register the ignition key.

Q: Does registered ignition key function properly?

YES : The procedure is complete.
NO : Replace the ETACS-ECU.

INSPECTION PROCEDURE 3: Engine Cranks, but does not Start.

TECHNICAL DESCRIPTION

If the engine cranks, but does not start, an MPI system problem may exist in addition to a malfunctioning IMMOBILIZER system. The engine will not start if the ignition key has not been properly registered.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of MPI system
- Malfunction of ETACS-ECU system

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Check the battery voltage.

Measure the battery voltage during cranking.

Q: Is the voltage 8 volts or more?

YES : Go to Step 2.
NO : Check the condition of the battery. Refer to P.54A-5.

STEP 2. Using diagnostic tool MB991958, read the diagnostic trouble code.

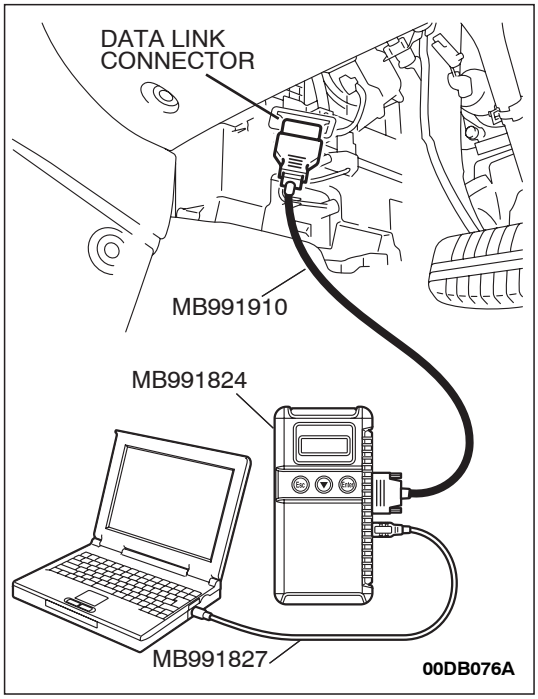
⚠ CAUTION

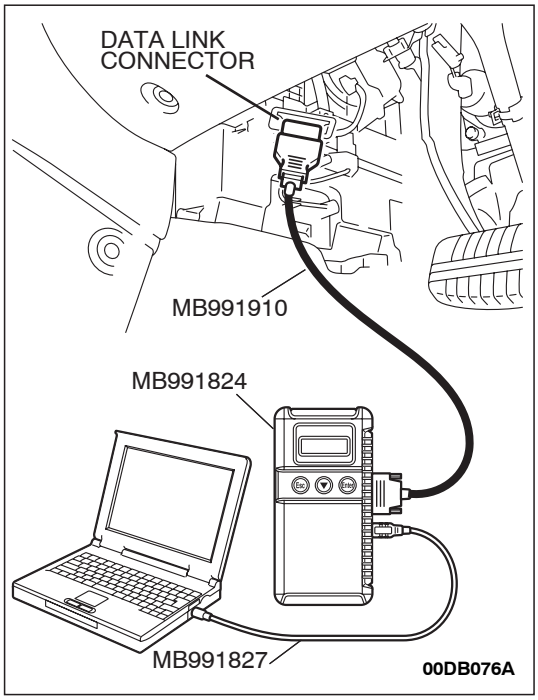
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting diagnostic tool.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch "ON" position.
(3) Read the diagnosis code.

Q: Have any DTCs set?

Yes : Refer to P.54A-13.
No : Go to Step 3.





STEP 3. Using diagnostic tool MB991958, read the MPI system diagnostic trouble code.

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting diagnostic tool.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch "ON" position.
(3) Read the diagnosis code.

Q: Have any MPI system DTCs set?

Yes : Refer to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.
No : Go to Step 4.

STEP 4. Attempt to start the engine.

Q: Does the engine start?

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.00-14).
NO : Refer to GROUP 13A, MPI Diagnosis – Symptom Chart P.13A-21. If the malfunction is not resolved, replace the ETACS-ECU. Then register the password (secret code) and encrypted code. (Refer to P.54A-37.) The engine should now start.

DATA LIST REFERENCE TABLE

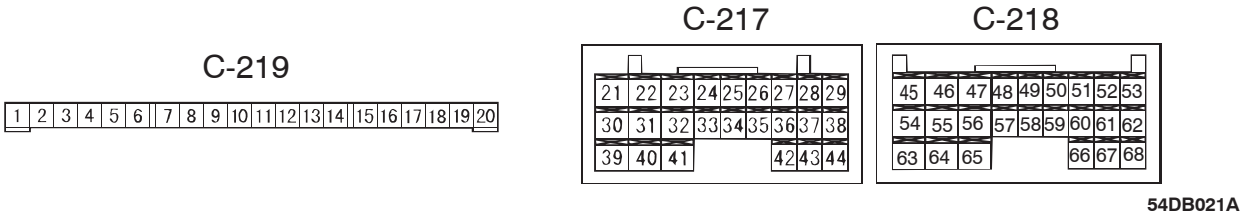
M1543007300325

MUT-III DIAGNOSTIC TOOL DISPLAY	ITEM NO.	INSPECTION ITEM	INSPECTION REQUIREMENT	NORMAL CONDITION
REGD.KEY	01	Key has been registered	-	Number of registered ignition keys

CHECK AT ETACS- ECU

M1543007600508

Terminal Voltage Check



54DB021A

*NOTE: *:The terminal No.1 to 20 connectors cannot be measured as the ETACS-ECU is installed directly on the junction block. Therefore, this information is only for reference.*

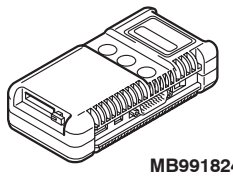
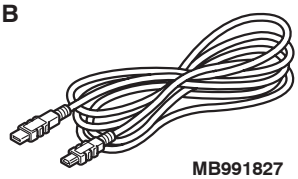
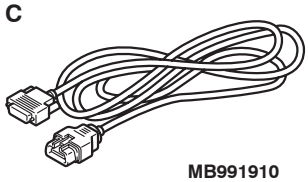
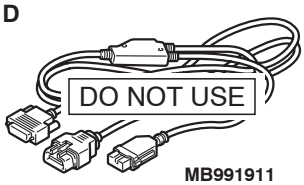
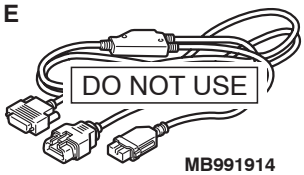
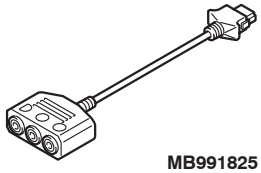
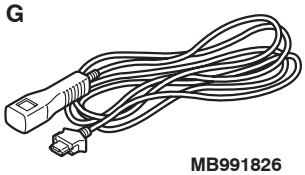
TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION	NORMAL VALUE
1	Output to power window relay	When the power windows can work	Battery positive voltage
2	Battery positive voltage (for central door lock)	Always	Battery positive voltage
3	Ground (for ECU)	Always	0 V
4	Power supply to ignition switch (ACC)	Ignition switch: "ACC"	Battery positive voltage
5	Output to dome light	When dome light is on	2 V or less
6	Power supply to interior light	Always (when interior light shutoff function is not operating)	Battery positive voltage
7	Input from rear door switch (LH)	Rear door switch (LH): ON (rear door (LH) open)	0 V
8	Power supply to ignition switch (IG1)	Ignition switch: "ON"	Battery positive voltage
9	Output to turn-signal light (RH)	When turn-signal light (RH) is on	Battery positive voltage
10	Input from driver’s door switch	Driver's door switch: ON (driver's door open)	0 V
11	Battery power supply for turn-signal light	Always	Battery positive voltage
12	Output to door lock	When door lock actuator is operating (doors and fuel door locked)	Battery positive voltage
13	Output to door unlock (excluding driver's door)	When door lock actuator is operating (doors and fuel door unlocked)	Battery positive voltage
14	Output to turn-signal light (LH)	When turn-signal light (LH) is on	Battery positive voltage
15 – 17	–	–	–
18	Power supply to ignition switch (ACC)	Ignition switch: "ACC"	Battery positive voltage
19	–	–	–
20	Battery power supply (for ECU)	Always	Battery positive voltage

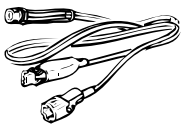
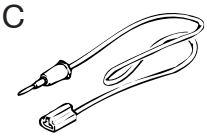
TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION	NORMAL VALUE
21	–	–	–
22	Output to door unlock (for driver's door)	When driver's door lock actuator is operating (doors unlocked)	Battery positive voltage
23, 24	–	–	–
25	Input of door lock key cylinder switch (UNLOCK) signal	Door lock key cylinder switch: UNLOCK	0 V
26 – 28	–	–	–
29	Input of rear door lock actuator (UNLOCK) signal	Rear door lock actuator: UNLOCK	0 V
30	Input of key reminder switch signal	Key reminder switch: ON (when ignition key is removed)	0 V
31	–	–	–
32	Output to trunk latch motor	Trunk switch : OPEN	12V
33	Input of door lock switch (LOCK) signal	Door lock switch (incorporated in power window switch): LOCK	0 V
34	Input of door lock switch (UNLOCK) signal	Door lock switch (incorporated in power window switch): UNLOCK	0 V
35	Input from rear door switch (RH)	Rear door switch (RH): ON (rear door (RH) open)	0 V
36	Input of driver's door lock actuator (UNLOCK) signal	Driver's door lock actuator: UNLOCK	0 V
37	Input from trunk lid latch assembly	Trunk lid latch: ON (trunk open)	0 V
38	Ground (for sensor)	Always	0 V
39 – 40	–	–	–
41	Input from trunk lid switch.	Trunk switch : OPEN	0 V
42	Input of door lock key cylinder switch (LOCK) signal	Door lock key cylinder switch: LOCK	0 V
43	Input of front passenger's door lock actuator (UNLOCK) signal	Front passenger’s door lock actuator: UNLOCK	0 V
44	Output to horn relay	When a horn sounds by the keyless entry horn answerback function	2 V or less
45	Output to data link connector	When DTC sets	0 – 12 V (pulse signal)
		When input check signal is output	0 – 12 V (when input pulse signal is fluctuating)
46	Output to trunk lamp	Trunk lid latch is open	0 V
47	–	–	–
48	Input of fog light switch signal	Fog light switch: ON	0 V
49	Input of hazard warning light switch signal	Hazard warning light switch: ON (When the switch is depressed)	0 V
50	Ground (for sensor)	Always	0 V

TERMINAL NO.	INSPECTION ITEM	INSPECTION CONDITION	NORMAL VALUE
51	Ignition key ring antenna (-)	Always	0 V
52	Ignition key ring antenna (+)	Always	0 V
53	SWS data communication line	Always	0 – 12 V (pulse signal)
54 – 58	–	–	–
59	Input from front passenger's door switch	Front passenger's door switch: ON (front passenger's door open)	0 V
60	Input of signal from variable intermittent wiper control switch	Ignition switch: "ACC," Variable intermittent wiper control switch: "FAST" to "SLOW"	0 → 2.5 V
61	Input of diagnosis indication selection	When diagnostic toool is connected	0 V
62	Output of data request signal	Always	0 – 12 V (pulse signal)
63	Output to ignition key hole illumination light	When ignition key hole illumination light is on	0 V
64 – 65	–	–	–
66	CAN BUS Line (HI)	Ignition "ON"	1V - 4V
67	CAN BUS Line (LOW)	Ignition "ON"	1V - 4V
68	Output for security (theft) indicator (LED)	Door lock key switch (LOCK) and keyless entry switch (LOCK)	–

SPECIAL TOOLS

M1543000601760

TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness	MB991824-KIT *NOTE: G: MB991826 MUT-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.*	Reading diagnostic trouble code **⚠ CAUTION** **MUT-III main harness A (MB991910) should be used. MUT-III main harness B and C should not be used for this vehicle.**

TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A B  C  D MB991223AF	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	General service tool (jumper)	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

ON-VEHICLE SERVICE

HOW TO REGISTER ENCRYPTED CODE

M1543008100670

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ 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, ETACS-ECU, Engine-ECU is replaced, encrypted codes of all the ignition keys must be registered. (A maximum of eight different ignition keys can be registered). Moreover, when the ETACS-ECU has been replaced, you will need to use diagnostic tool MB991958 to register the ETACS-ECU and input the vehicle secret code.

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 approx. 10 seconds, the Engine warning lamp indicator will blink for approx. 30 seconds.

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

POINTS TO NOTE DURING OPERATION

If none of the functions can be used, check the diagnostic trouble codes, and after carrying out any necessary repairs, repeat the operation. If an incorrect password is input five times in a row, the ETACS-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 and left in that position for approximately 16 minutes, "Unauthorized operation, start- prevention mode" will be cancelled.

KEY ID REGISTRATION

All ignition keys can be registered with diagnostic tool MB991958. Additional ignition keys can be registered with diagnostic tool MB991958.

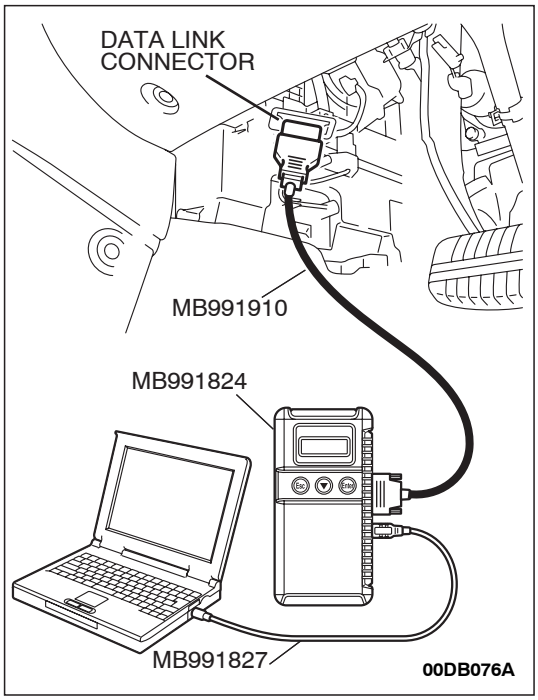
REGISTRATION WITH THE DIAGNOSTIC TOOL

⚠ CAUTION

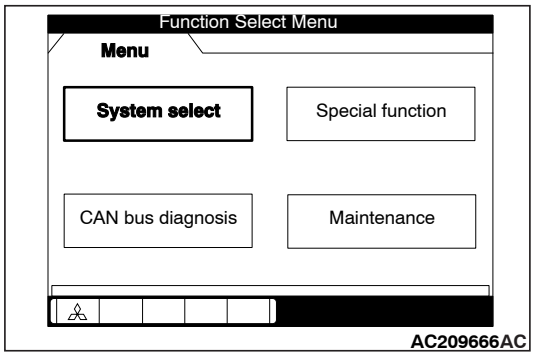
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

NOTE:

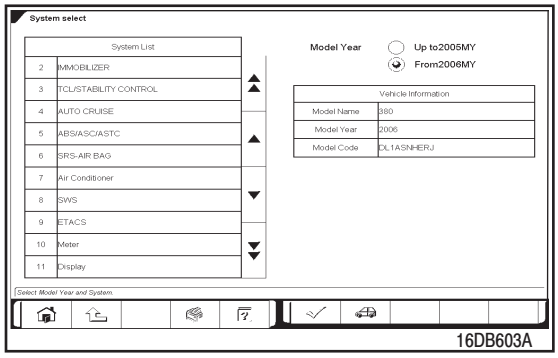
- *Before registration, check that no DTC code is set. If a DTC code is set, resolve the problem beforehand.*
- *Using the key ID register function will cause all key IDs that have been previously registered in the ETACS-ECU to be erased. All keys need to be registered. Those which have been registered before should be on hand before using this function.*
- *If registering more than one key, do not disconnect diagnostic tool MB991958 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-10.*



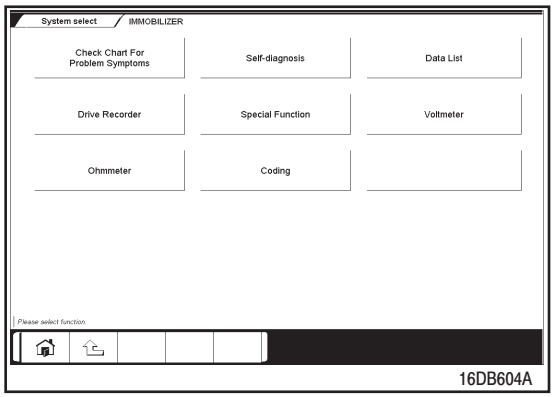
1. Connect the diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.



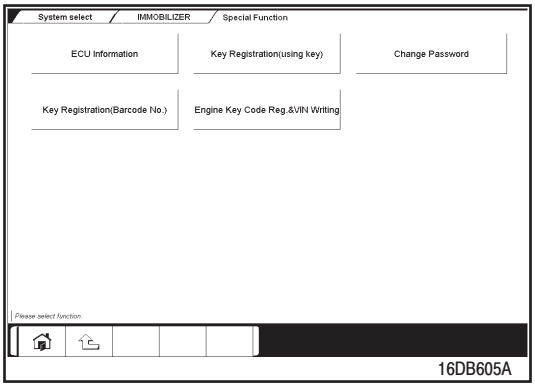
4. Select "System select."



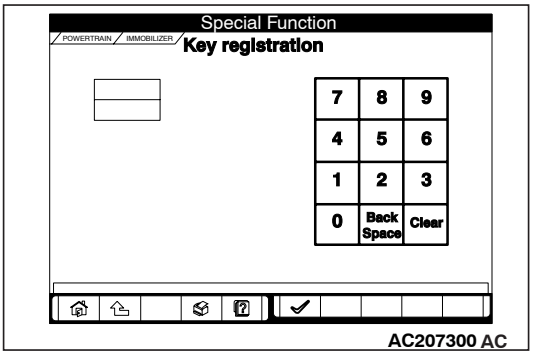
5. Choose "IMMOBILIZER" .



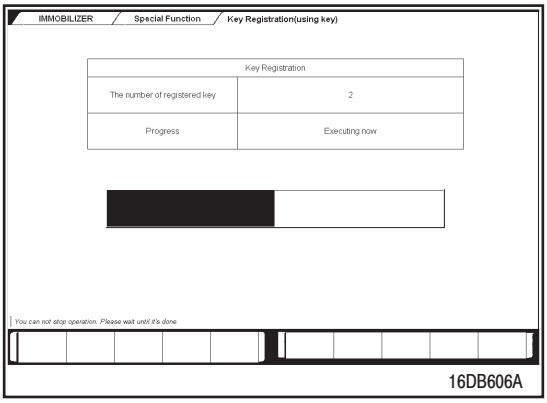
6. Choose "Special Function" from "IMMOBILIZER" screen.



7. Choose "Key registration (using key)" from "Special Function" screen.

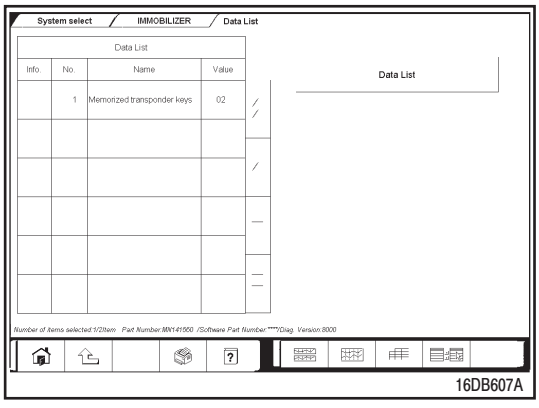


8. Enter the vehicle's password (secret code) on the "Key registration" screen, and then click the check mark icon. Follow the prompts on the screen to insert key(s) into the ignition switch to begin key registration.



9. If the key ID was registered successfully, "Progress" indication will turn active (grey). Then the registration process completes. If the key ID failed to be registered, "In-Complete" indication will turn active (grey).
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. Key ID registration screen will be displayed, then register another key.

    NOTE: A maximum of eight different keys can be registered.
11. The total number of keys registered and memorized can be viewed in the 'IMMOBILIZER" data list.
12. This completes the registration operation. Turn the ignition switch "LOCK" (OFF) and leave it off for approximately ten seconds.
13. Check that the engine can be started with each of the ignition keys.
14. Check that the IMMOBILIZER system DTC and MPI system DTC did not set.
15. If not DTC is shown, terminate the diagnostic tool MB991958.
16. Turn the ignition switch to "LOCK" (OFF) position.
17. Disconnect diagnostic tool MB991958.



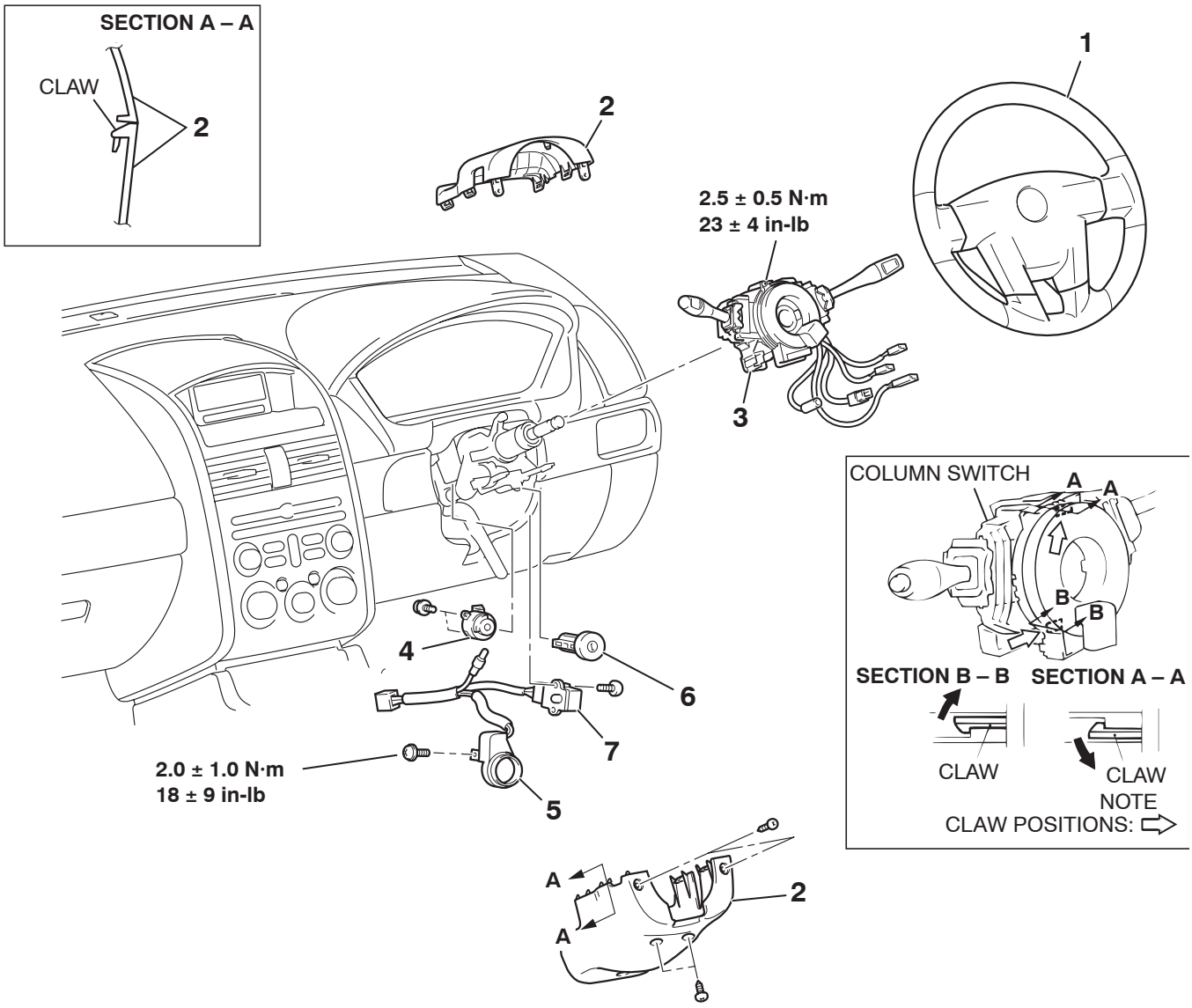
IGNITION SWITCH

REMOVAL AND INSTALLATION

M1543002100456

⚠ WARNING

- ***Before removing the steering wheel, air bag module assembly and clock spring refer to GROUP 52B, Service Precautions (P.52B-16) and Air Bag Module and Clock Spring (P.52B-237).***
- ***When removing and installing the steering wheel, do not let it bump against the air bag module.***


SECTION A – A
CLAW
2
1
2
2.5 ± 0.5 N·m
23 ± 4 in-lb
3
4
6
7
2.0 ± 1.0 N·m
18 ± 9 in-lb
5
A
A
2
COLUMN SWITCH
A
A
B
B
SECTION B – B
SECTION A – A
CLAW
CLAW
NOTE
CLAW POSITIONS:

54DB022A

IGNITION SWITCH REMOVAL STEPS

1. STEERING WHEEL ASSEMBLY (REFER TO GROUP 37, STEERING WHEEL P.37-23.)

<<A>>

2. STEERING COLUMN COVER (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)
3. CLOCK SPRING AND COLUMN SWITCH ASSEMBLY (REFER TO GROUP 52B, AIR BAG MODULE(S) AND CLOCK SPRING P.52B-237.)
4. IGNITION SWITCH
5. KEY RING ANTENNA

IGNITION SWITCH REMOVAL STEPS (Continued)

<<B>>

6. STEERING LOCK CYLINDER
7. KEY REMINDER SWITCH

ETACS- ECU REMOVAL STEPS

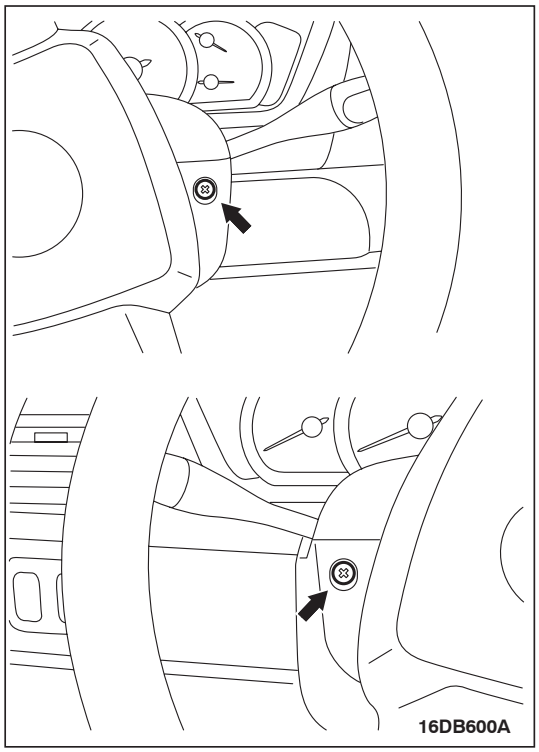
- HOOD LOCK RELEASE HANDLE (REFER TO GROUP 42, HOOD P.42-8.)
- INSTRUMENT LOWER PANEL (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)

8. ETACS- ECU

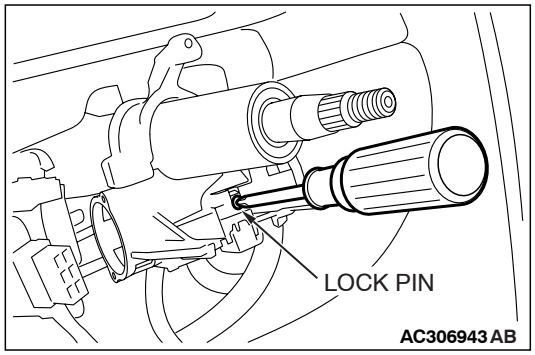
REMOVAL SERVICE POINTS

<<A>> STEERING COLUMN COVER REMOVAL

1. Rotate the steering wheel with a slightly from side-to-side to access and remove the mounting screws.



<<B>> STEERING LOCK CYLINDER REMOVAL

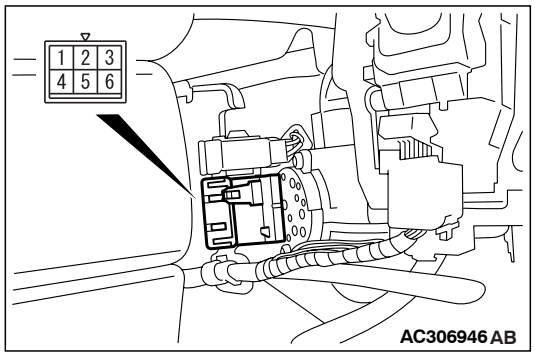


1. Insert the key in the steering lock cylinder and turn it to the "ACC" position.
2. Using a small Phillips head screwdriver, pull the steering lock cylinder toward you.

INSPECTION

M1543019502463

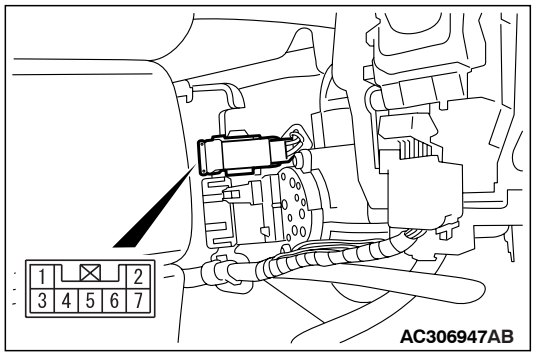
IGNITION SWITCH CONTINUITY CHECK



Disconnect ignition switch connector C-308 without removing the ignition switch and steering lock cylinder. Then check the continuity.

SWITCH POSITION	CONNECT TESTER BETWEEN:	SPECIFIED CONDITION
"LOCK" (OFF)	1-2, 1-4, 1-5, 1-6	Open circuit
"ACC"	1-4, 1-6	Less than 2 ohms
"ON"	1-2, 1-4, 1-5, 1-6	Less than 2 ohms
"START"	1-2, 1-5	Less than 2 ohms

KEY REMINDER SWITCH CHECK



1. Disconnect key reminder switch connector C-310 without removing the key reminder switch and steering lock cylinder.
2. Check for continuity between terminal 4 and terminal 6.

STATUS OF IGNITION KEY	TESTER CONNECTION	SPECIFIED CONDITION
Removed	4-6	Less than 2 ohms
Inserted	4-6	Open circuit

COMBINATION METER ASSEMBLY

GENERAL DESCRIPTION

M1543000100342

Some of the combination meter indications are based on information from ECUs via CAN bus communication. If there is any failure in the meters connected via the CAN bus communication, diagnose the CAN bus communication system. The following instruments, indicator lights and warning lights in the combination meter are controlled by ECUs via CAN bus communication.

ITEM	Instruments, indicator lamps, and warning lamps	ECU sending data via CAN communication
Meter	Tachometer	Engine ECU and Auto Transmission ECU
	Speedometer	
	Engine coolant temperature gauge	
	Odometer	
	Trip Computer	
Indicator lamp	High-beam	ETACS-ECU
	Turn-signal	
	Front fog	
	Door ajar	
	A/T shift position	A/T-ECU
	Auto cruise	Engine-ECU
	TCL	ABS/TCL-ECU <vehicles without ASC>
	TCL OFF	
	TCL/ASC	TCL/ASC-ECU <vehicles with ASC>
	TCL OFF	
Warning lamp	Check Engine warning lamp	Engine ECU
	ABS	ABS-ECU
	SRS	SRS-ECU

COMBINATION METERS DIAGNOSIS

TROUBLESHOOTING STRATEGY

M1543006900681

Use these steps to plan your diagnostic strategy. Follow through with each step to ensure that you have exhausted all possible methods of finding a combination meter fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find and repair the malfunction by following the symptom chart.
4. Verify that the malfunction has been eliminated.

DIAGNOSIS FUNCTION

M1543007000454

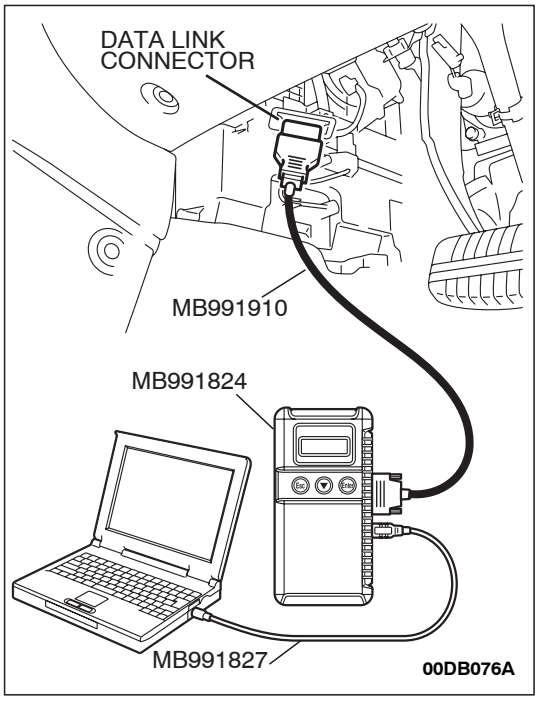
HOW TO CONNECT DIAGNOSTIC TOOL (MUT-III)

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.
7. Start the MUT-III system on the personal computer.

   NOTE: Disconnecting the diagnostic tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

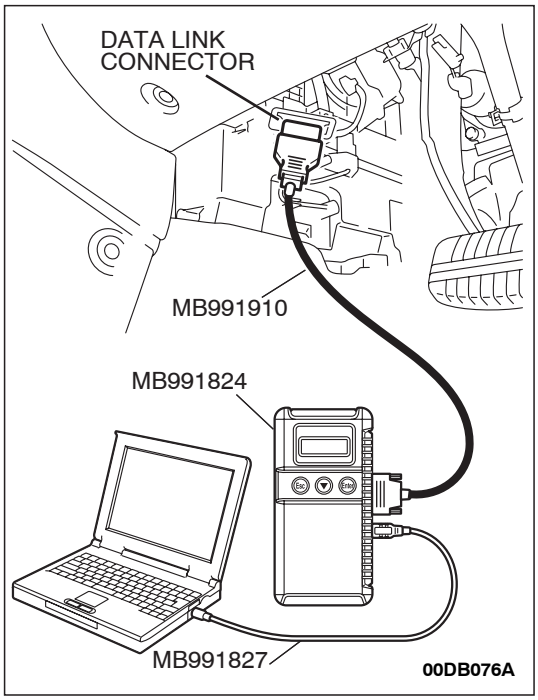
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if diagnostic tool MB991958 does not display.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "Meter" .
6. Select "Diagnostic Trouble Code."
7. If a DTC is set, it is shown.
8. Choose "Erase DTCs" to erase the DTC.

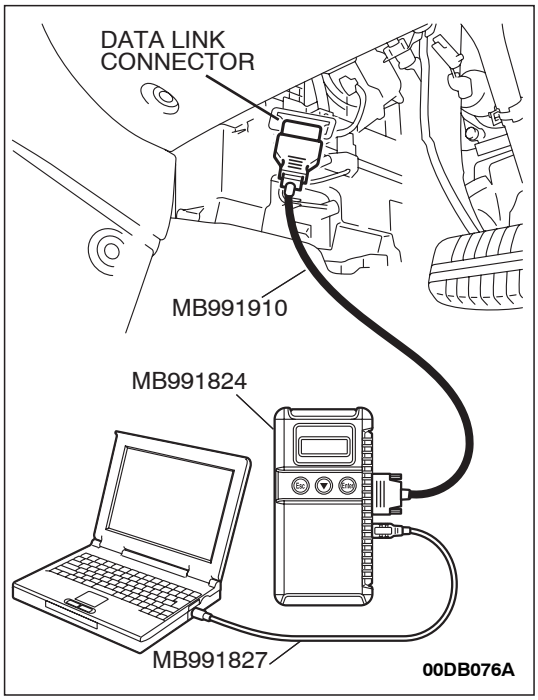
HOW TO DIAGNOSE THE CAN BUS LINES

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "CAN bus diagnosis" from the start-up screen.
4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they matches, go to step 8.
   - If not, go to step 5.
5. Select "view vehicle information" button.
6. Enter the vehicle information and select the "OK" button.
7. When the vehicle information is displayed, confirm again that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they matches, go to step 8.
   - If not, go to step 5.
8. Select the "OK" button.
9. When the optional equipment is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.

DIAGNOSTIC TROUBLE CODE CHART

M1543007100440

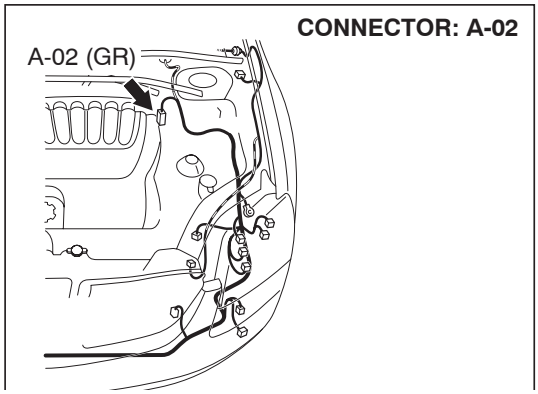
⚠ CAUTION

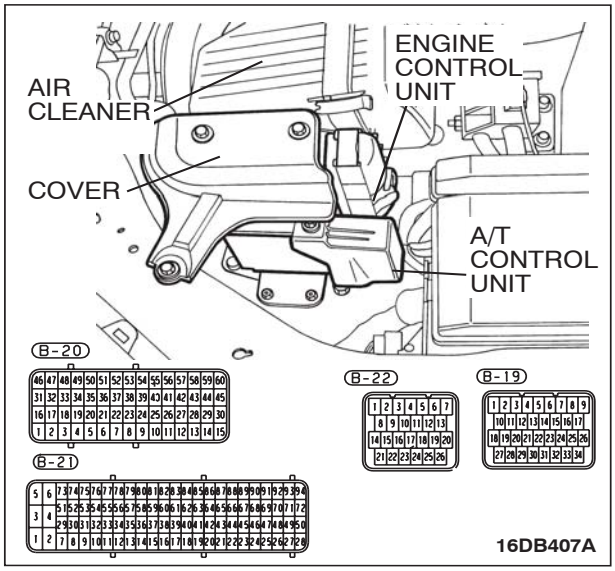
During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

DTC NO.	Diagnostic item	REFERENCE PAGE
U1073	Bus off	P.54A-49
U1100	Engine ECU time-out (related to engine)	P.54A-51
U1101	Auto Transmission ECU time-out (related to A/T)	
U1102	ABS-ECU time-out	P.54A-55
U1109	ETACS-ECU time-out	P.54A-59
U1112	SRS-ECU time-out	P.54A-62
U1120	Failure information on Engine ECU (related to engine)	P.54A-64
U1206	Flag invalid	P.54A-67

DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC U1073: Bus Off





⚠ CAUTION
If DTC U1073 is set in the combination meter, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Some instruments of the combination meter are linked to the CAN bus line. Both the combination meter and the Engine ECU have a terminator resistor.

DTC SET CONDITION
If the combination meter ceases communicating once (i.e. bus off) and then returns to it, the combination meter will not communicate for five minutes immediately after that point. This five minute period is called "Penalty mode." Immediately after the combination meter returns to communication, the DTC is set.

TECHNICAL DESCRIPTION (COMMENT)
The wiring harness or connectors may have loose, corroded, or damage terminals, or terminals pushed back in the connector, or the combination meter may be defective.

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of combination meter.

DIAGNOSIS

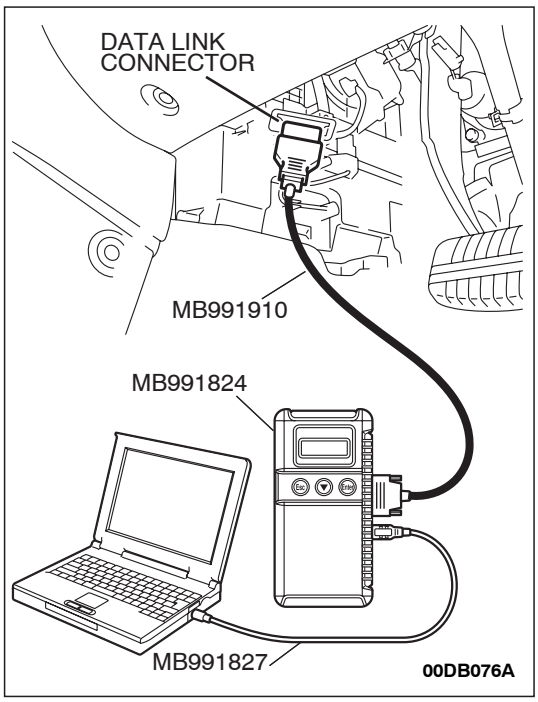
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicles Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-405).

STEP 2. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : An intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.
NO : Replace combination meter.

DTC U1100: Engine ECU Time-out (Related to Engine) DTC U1101: Auto Transmission ECU Time-out (Related to A/T)

⚠ CAUTION
If DTC U1100 or U1101 is set in the combination meter, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-49.

DTC SET CONDITION

U1100
- The combination meter receives engine control system-related signals from the Engine ECU via CAN bus lines. If the display unit can not receives the necessary signals, DTC U1100 will be set.

U1101
- The combination meter receives A/T control system-related signal from the Auto Transmission ECU via CAN bus lines. If the display unit can not receive the necessary signals, DTC U1101 will be set.

TECHNICAL DESCRIPTION (COMMENT)

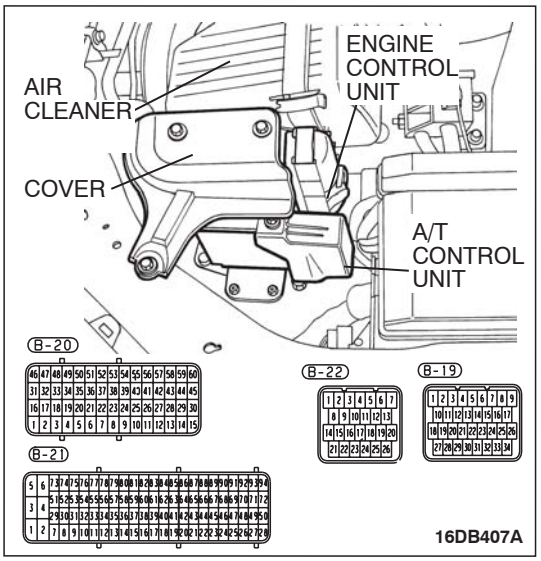
⚠ CAUTION
If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) 017 and 018 may be set on the combination meter (incorporating meter-ECU) after three minutes.

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the Engine ECU and the combination meter, the power supply system to the Engine ECU, the Engine ECU itself, or the combination meter may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the Engine ECU and the combination meter, and the power supply system to the Engine ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of Engine ECU.
- Malfunction of Auto Transmission ECU
- Malfunction of combination meter



DIAGNOSIS

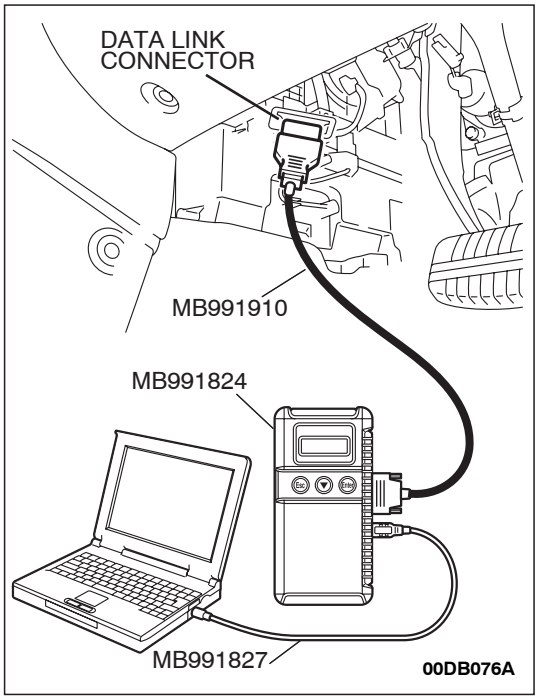
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read the MPI system diagnostic trouble code.

Check if an MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system by referring to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.
Check if a DTC, which relates to CAN communication-linked systems below, is set.
ABS-ECU
- DTC U1100: Engine ECU time-out (related to Engine) <vehicles with TCL>
- DTC U1101: Auto Transmission ECU time-out (related to automatic transmission) <vehicles with TCL>

Multi-centre display
- DTC 011: Engine ECU time-out (related to Engine)
- DTC 012: Auto Transmission ECU time-out (related to A/T)

ETACS-ECU
- DTC 011: Engine ECU time-out (related to Engine)
- DTC 012: Auto Transmission ECU time-out (related to A/T)

A/C-ECU
- DTC U1100: Engine ECU time-out (related to Engine)

Q: Is the DTC set?
YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the Engine ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace Engine ECU and then go to Step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the Engine ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace combination meter and then go to Step 6.

STEP 6. Recheck for diagnostic trouble code.

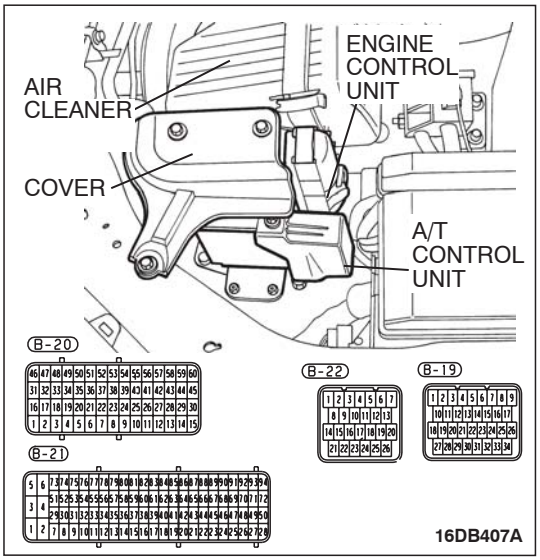
Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : The procedure is complete.

NO : Go to Step 1.



DTC U1102: ABS-ECU Time-out

⚠ CAUTION
If DTC U1102 is set in the combination meter, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-49.

DTC SET CONDITION
The combination meter communicates with the ABS-ECU through CAN bus lines. If it can not receive all the necessary signals from the ABS-ECU, DTC U1102 is set.

TECHNICAL DESCRIPTION (COMMENT)

⚠ CAUTION
If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) U1100, U1101 and U1102 may be set on the combination meter after one minutes.

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the ABS-ECU and the combination meter, the power supply system to the ABS-ECU, the ABS-ECU itself, or the combination meter may be defective.

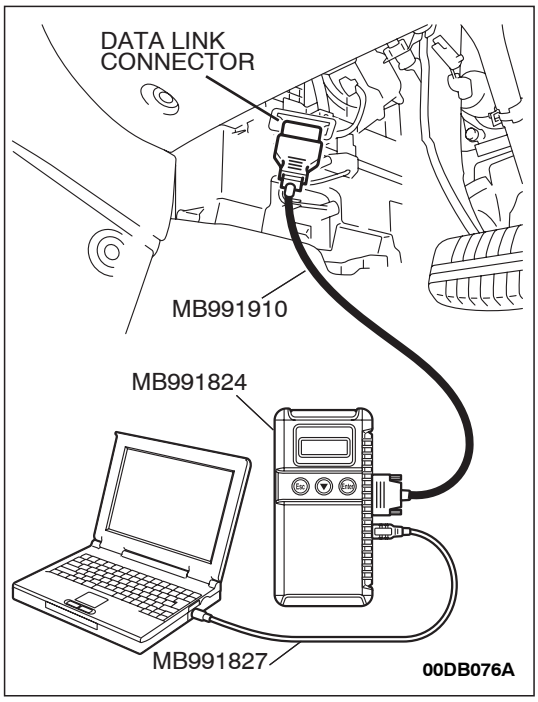
Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the ABS-ECU and the combination meter, and the power supply system to the ABS-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

  NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- Malfunction of ABS-ECU
- Malfunction of combination meter

DIAGNOSIS

Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis – Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read ABS diagnostic trouble code.

Check that the ABS-ECU sets a DTC.

Q: Is the DTC set?

YES : Refer to GROUP 35B, Diagnosis – Diagnostic Trouble Code Chart P.35B-9.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the MPI diagnostic trouble code.

Check if the Engine ECU has set DTC U1102 (ABS-ECU time-out).

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.

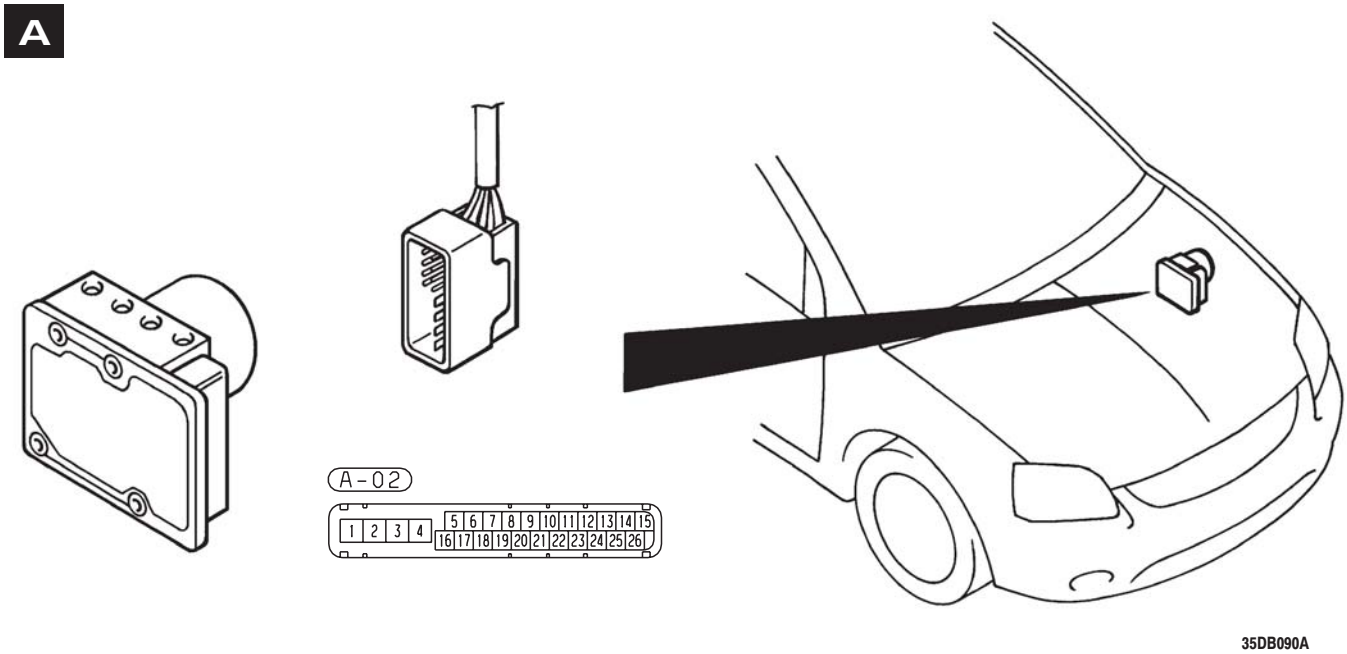
Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the ABS-ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

NO : Replace ABS-ECU and then go to step 6.



STEP 5. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the ABS-ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

NO : Replace combination meter and go to Step 6.

STEP 6. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

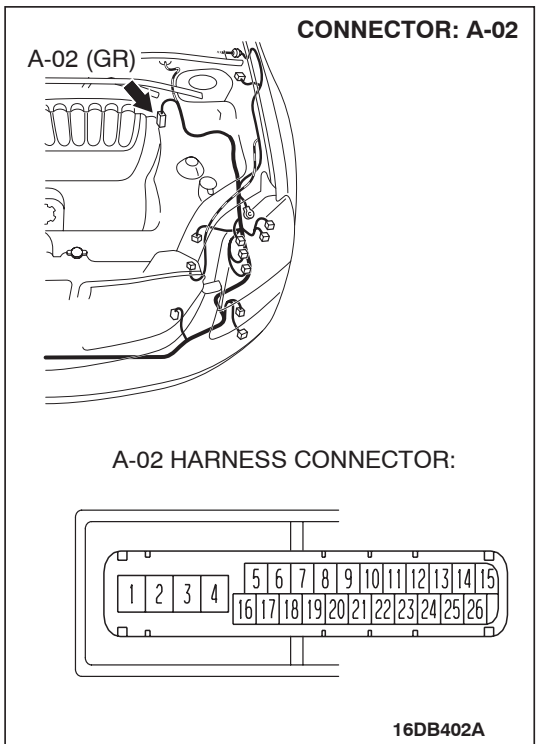
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

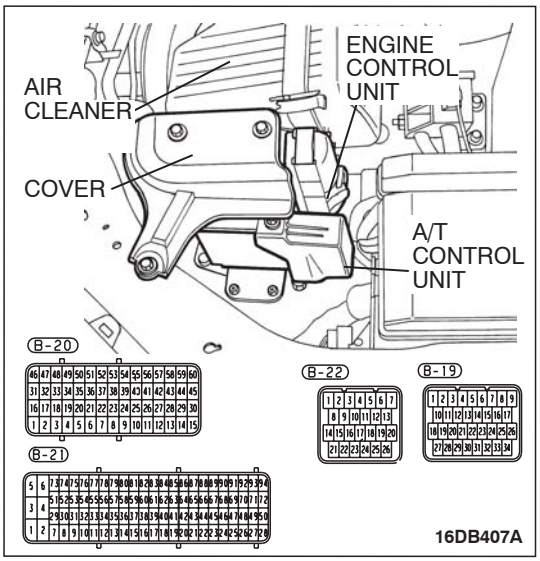
Q: Is the check result satisfactory?

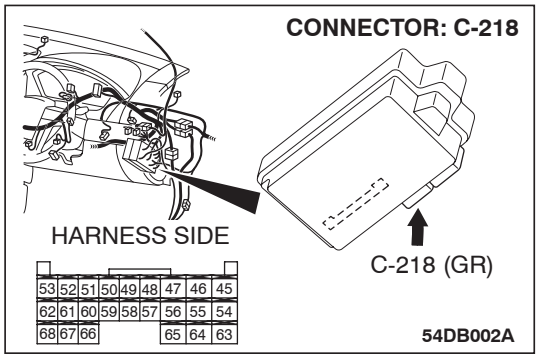
YES : The procedure is complete.

NO : Go to Step 1.

DTC U1109: ETACS-ECU Time-out







⚠ CAUTION
If DTC U1109 is set in the combination meter, diagnose the CAN main bus line.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION

The ETACS-ECU communicates with the combination meter and the Engine ECU via CAN bus line to obtain necessary information. Both the combination meter and the Engine ECU have terminator resistors.

DTC SET CONDITION

The combination meter receives signal from the ETACS-ECU via CAN bus lines. If it can not receive all the necessary signals from the ETACS-ECU, DTC U1109 is set.

TECHNICAL DESCRIPTION (COMMENT)

Current trouble

- Connector(s) or wiring harness in the CAN bus lines between the ETACS-ECU and the combination meter, the power supply system to the ETACS-ECU, the ETACS-ECU itself, or the combination meter may be defective.

Past trouble

- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the ETACS-ECU and the combination meter, and the power supply system to the ETACS-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- Malfunction of ETACS-ECU
- Malfunction of combination meter (incorporating ECU)

DIAGNOSIS

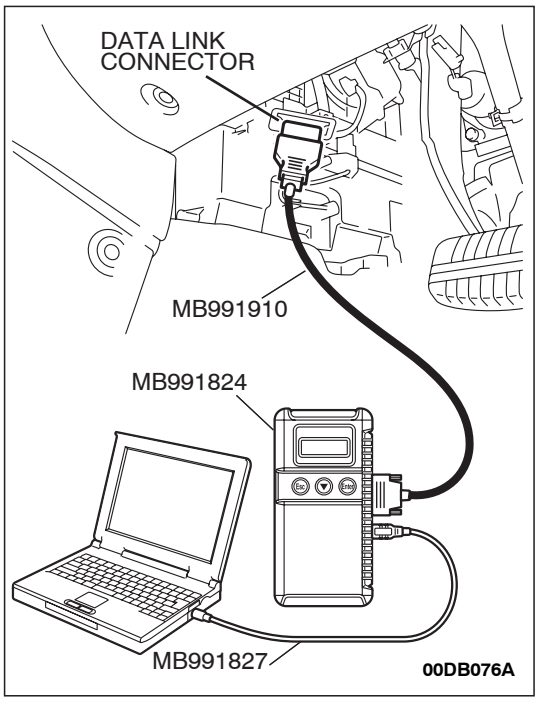
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis – Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 4.

STEP 2. Using diagnostic tool, MB991958, read the ETACS-ECU diagnostic trouble code.

Check that the ETACS-ECU sets a DTC.

Q: Is the DTC set?

YES : Diagnose the SWS system by referring to P.54B-25.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the multi-centre display diagnostic trouble code.

Check if a DTC, which relates to CAN communication-linked systems below, is set.

- Multi-centre display
  DTC 019 (U1109): ETACS-ECU time-out

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the ETACS-ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace ETACS-ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the ETACS-ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace combination meter and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : The procedure is complete.
NO : Go to Step 1.

DTC U1112: SRS-ECU Time-out

⚠ CAUTION
If DTC U1112 is set in the combination meter, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-49.

DTC SET CONDITION
The combination meter communicates with the SRS-ECU through CAN bus lines. If it can not receive all the necessary signals from the SRS-ECU, DTC U1112 is set.

TECHNICAL DESCRIPTION (COMMENT)

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the SRS-ECU and the combination meter, the power supply system to the SRS-ECU, the SRS-ECU itself, or the combination meter may be defective.

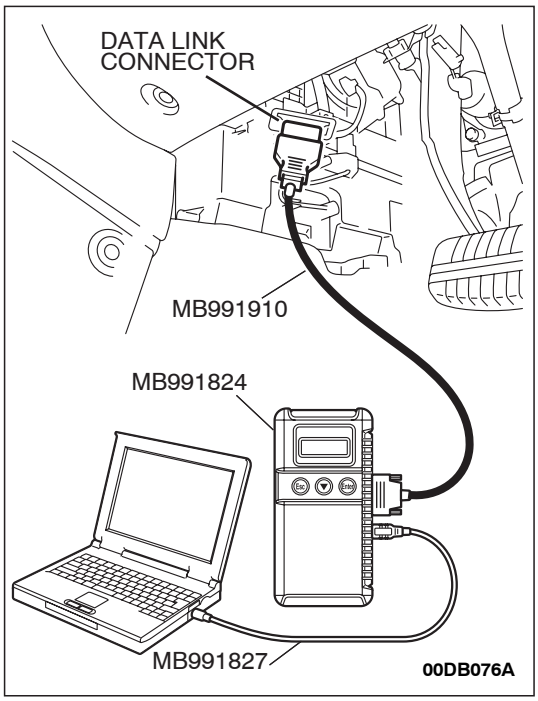
Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the SRS-ECU and the combination meter, and the power supply system to the SRS-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

  NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of SRS-ECU
- Malfunction of combination meter

DIAGNOSIS

Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 4.

STEP 2. Using diagnostic tool MB991958, read SRS diagnostic trouble code.

Check that the SRS-ECU sets a DTC.

Q: Is the DTC set?

YES : Refer to GROUP 52B, Diagnosis-Diagnostic Trouble Code Chart P.52B-21.
NO : Go to Step 3.

STEP 3. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the SRS-ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace SRS-ECU and then go to step 4.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC U1120: Failure Information on Engine ECU (Related to Engine)

⚠ CAUTION
If DTC U1120 is set in the combination meter, diagnose the CAN main bus line.

⚠ CAUTION
If DTC U1120 has been set, SWS related DTC 021 (U1128) is also set. After SWS has been diagnosed, don't forget to erase DTC 021 (U1128).

⚠ CAUTION
The engine control system- related DTC may be set when DTC U1120 is set. (For details refer to GROUP 00, Intersystem Affiliated DTC Reference Table P.00-17.) Diagnose the engine control system first when the engine control system- related DTC is set.

CIRCUIT OPERATION
Refer to P.54A-49.

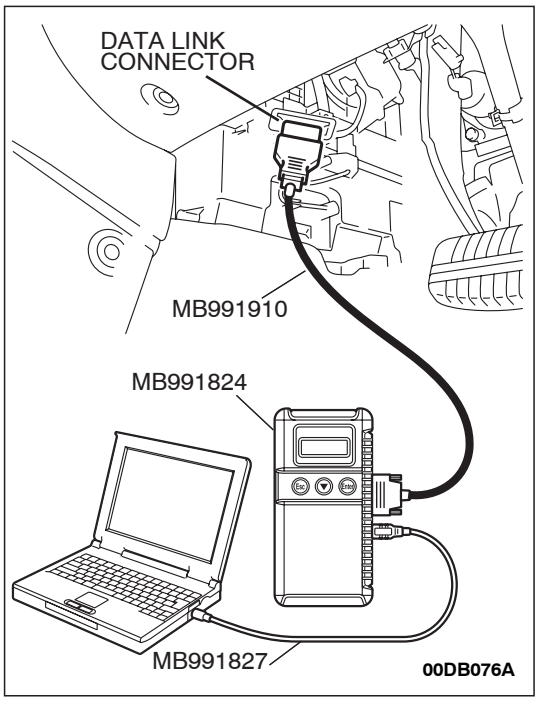
DTC SET CONDITION
The combination meter communicates with the Engine ECU via CAN bus line. If failure information is sent to the Engine ECU, DTC U1120 will be set.

TECHNICAL DESCRIPTION (COMMENT)
Current trouble
- The Engine ECU or the combination meter may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness between the Engine ECU and the combination meter. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- Malfunction of Engine ECU
- Malfunction of combination meter

DIAGNOSIS
Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis – Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read the MPI system diagnostic trouble code.

Check if an MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system by referring to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.

NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.
Check if a DTC, which relates to CAN communication-linked systems below, is set.

- ABS-ECU
  DTC U1120: Failure information on Engine ECU (related to engine) <vehicles with TCL>
- A/T ECU
  DTC U1120: Failure information on Engine ECU (related to engine)
- Multi-centre display
  DTC 020 (U1120): Failure information on Engine ECU (related to engine)
- A/C-ECU
  DTC U1120: Failure information on Engine ECU (related to engine)

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the Engine ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace Engine ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the Engine ECU and the combination meter (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace combination meter and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC U1206: Flag invalid

⚠ CAUTION
If DTC U1206 is set in the combination meter, diagnose the CAN main bus line.

CIRCUIT OPERATION
Refer to P.54A-49.

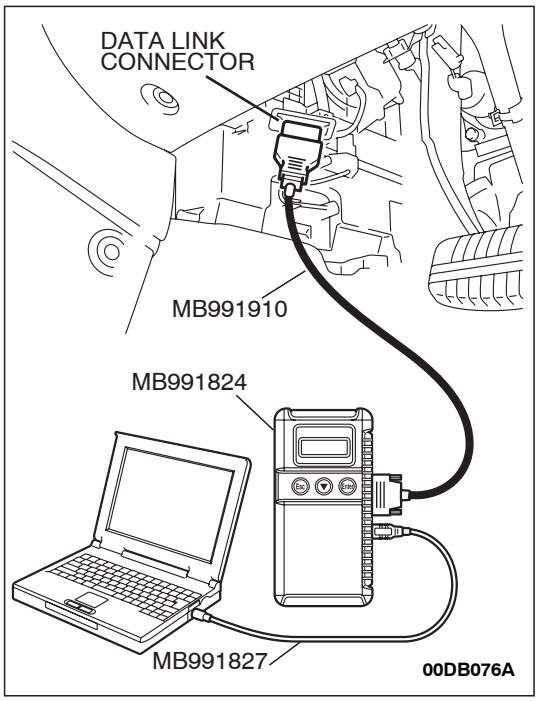
TROUBLE JUDGMENT
When the ignition switch is in the LOCK (OFF) position, the combination meter receives door-open signal or communication standby instruction from the ETACS-ECU and keeps CAN communication. If there is a contradiction between these two signals, DTC U1206 will be set.

COMMENTS ON TROUBLE SYMPTOM
Current trouble
- The door switch system of the ETACS-ECU, the ETACS-ECU, or the combination meter may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness between the ETACS-ECU and the door switch, and the power supply system to the ETACS-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

Possible causes
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of ETACS-ECU
- Malfunction of combination meter
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

DIAGNOSIS
Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 4.

STEP 2. Using diagnostic tool MB991958, read the ETACS-ECU diagnostic trouble code.

Check that the ETACS-ECU sets a DTC.

Q: Is the DTC set?

YES : Diagnose the SWS system by referring to P.54B-25.
NO : Go to Step 3.

STEP 3. Replace the ETACS-ECU and then recheck the DTC.

Replace the ETACS-ECU, and then check that the DTC is not reset.

Q: Is the check result satisfactory?

YES : Go to Step 4.
NO : Replace combination meter and then go to step 4.

STEP 4. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : The procedure is complete.
NO : Go to Step 1.

SYMPTOM CHART

M1543007201116

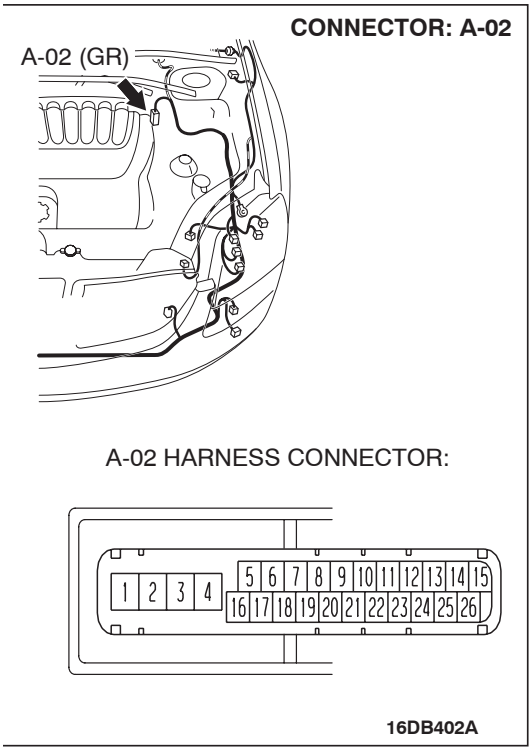
⚠ CAUTION

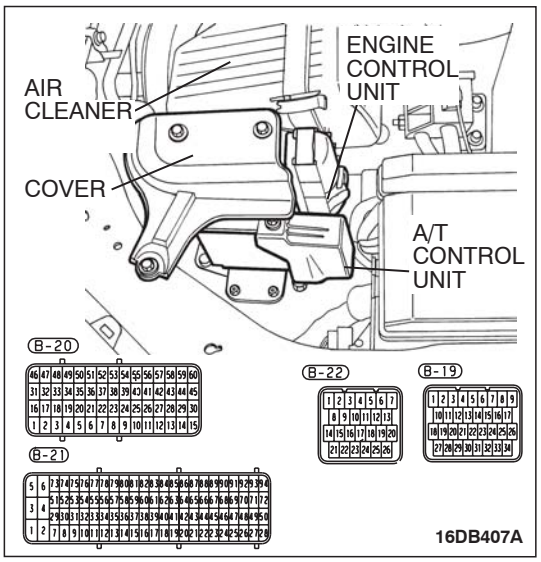
During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Communication with diagnostic tool is not possible.	1	P.54A-70
Power supply circuit.	2	P.54A-72
Odometer and trip meter are not displayed.	3	
All the needle meters do not work.	4	
When the ignition switch is turned to the ON position, the indicator and warning lights do not illuminate.	5	
Speedometer does not work.	6	P.54A-76
The fuel gauge needle moves excessively.	7	
Tachometer does not work.	8	P.54A-79
Fuel Gauge does not work (other meters work).	9	P.54A-81
Engine coolant temperature gauge does not work (other meters work).	10	P.54A-87

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1:Communication With Diagnostic Tool is Not Possible.





CIRCUIT OPERATION

The combination meter is linked to the data link connector via CAN bus line to communicate with the diagnostic tool.

TECHNICAL DESCRIPTION (COMMENT)

If the system does not communicate with diagnostic tool, power supply to data link connector or CAN bus lines may be defective.

TROUBLESHOOTING HINTS

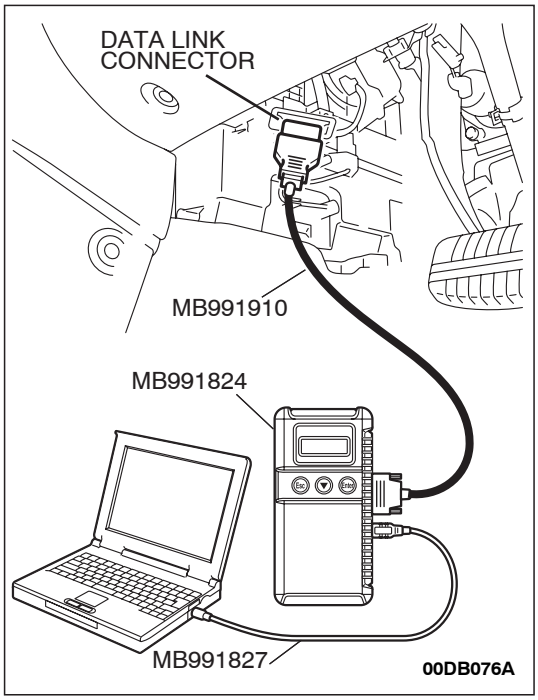
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Check that the Engine ECU communicates with the diagnostic tool.



(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Check if diagnostic tool MB991958 can communicate with the Engine ECU.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Refer to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.

STEP 2. Using diagnostic tool MB991958, diagnose the CAN bus line

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result satisfactory?

YES : Diagnose the power supply circuit. Refer to P.54A-72.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis – Can Bus Diagnostic Chart P.54C-15).

INSPECTION PROCEDURE 2: Power Supply Circuit. INSPECTION PROCEDURE 3: Odometer and trip meter are not displayed. INSPECTION PROCEDURE 4: All the needle meters do not work. INSPECTION PROCEDURE 5: When the ignition switch is turned to the ON position, the indicator and warning lights do not illuminate.

CIRCUIT OPERATION

The combination meter is energized by the battery through ignition switch (IG1).

TECHNICAL DESCRIPTION (COMMENT)

If the odometer and trip meter are not displayed or all meter needles don't move, power supply and ground system to the combination meter, or the combination meter itself may be defective.

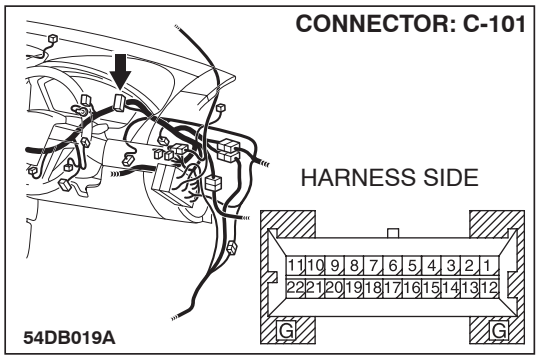
Possible causes

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- 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

Required Special Tool:

- MB991223: Harness set

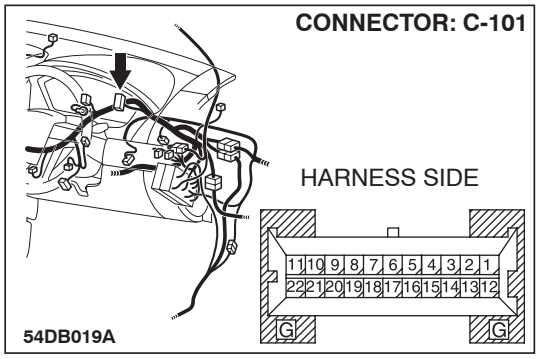


STEP 1. Check combination meter connector C-101 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is combination meter connector C-101 in good condition?

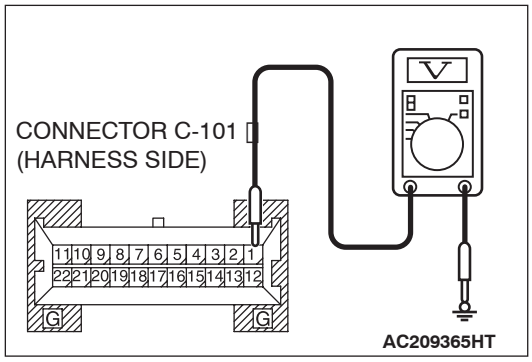
YES : Go to Step 2.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The combination meter works normally.



STEP 2. Measure at combination meter connector C-101 in order to power supply circuit to combination meter (battery power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "LOCK" (OFF) position.



(3) Measure the voltage between terminal 1 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 4.
NO : Go to Step 3.

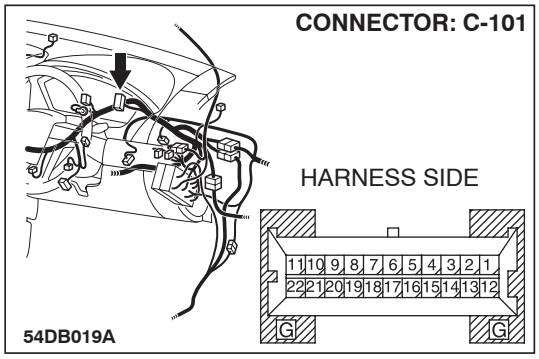
STEP 3. Check the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22.

NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

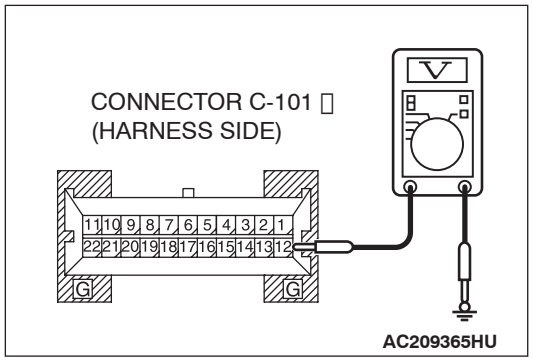
Q: Is the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22 in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter is normally.

STEP 4. Measure the voltage at combination meter connector C-101 in order to power supply circuit to combination meter (IG1 power supply).



(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "ON" position.



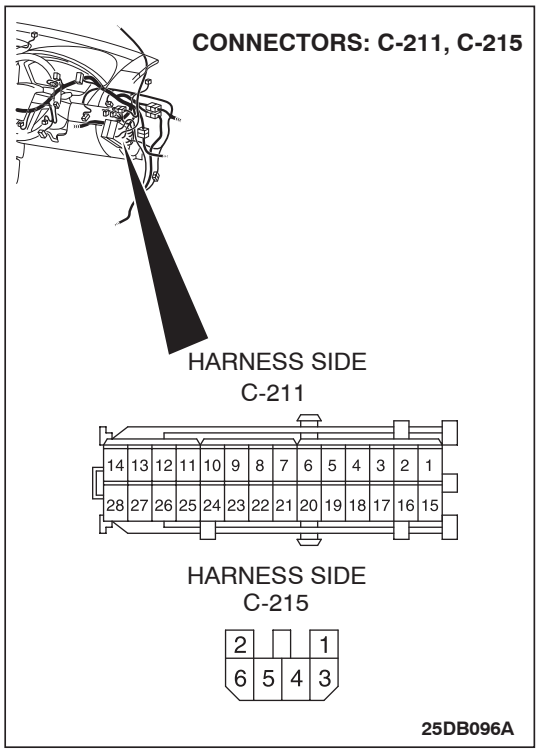
(3) Measure the voltage between terminal 12 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1)

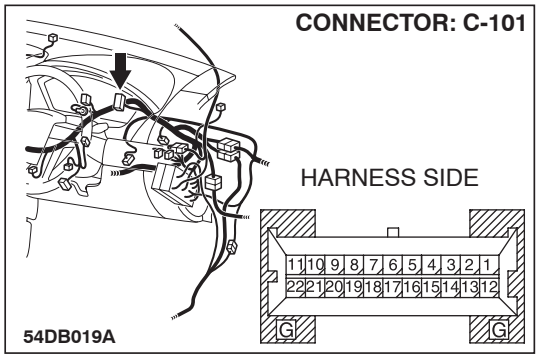
NOTE: Also check junction block connector C-211 and C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If inspecting junction block connector C-211 or C-215 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



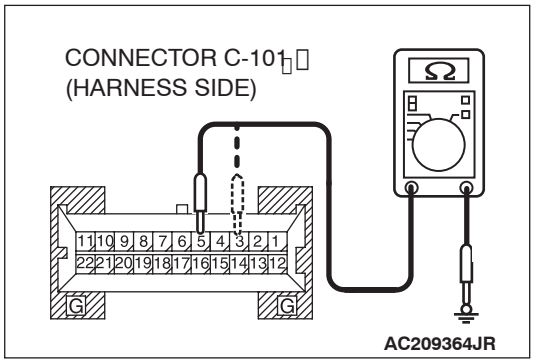
Q: Is the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1) in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter is normally.

STEP 6. Measure the resistance at combination meter connector C-101 in order to the ground circuit to the combination meter.



(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.

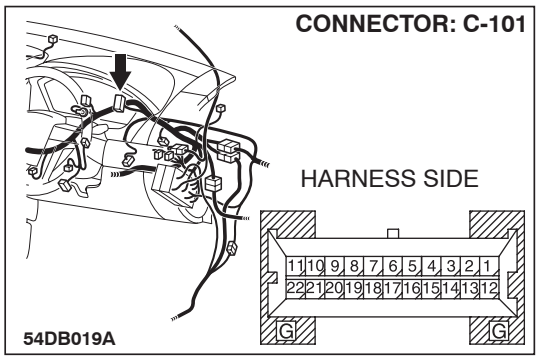


(2) Measure the resistance value between terminal 3, 5 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground.



Q: Is the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground in good condition?

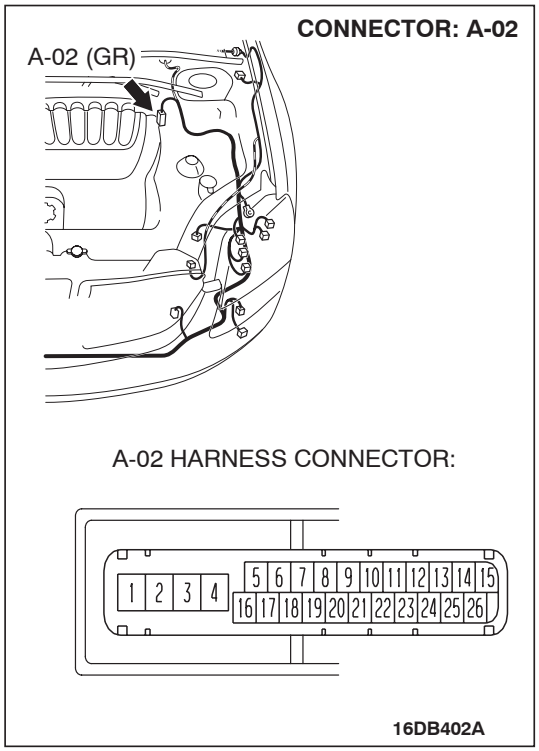
YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter is normally.

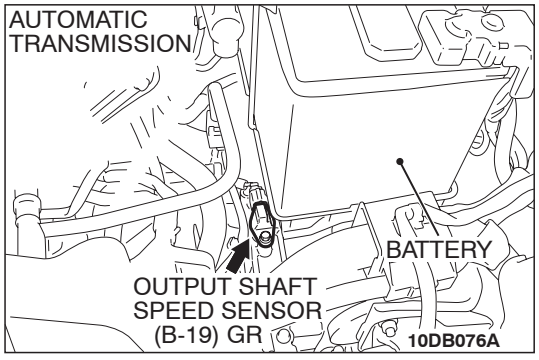
STEP 8. Retest the system.

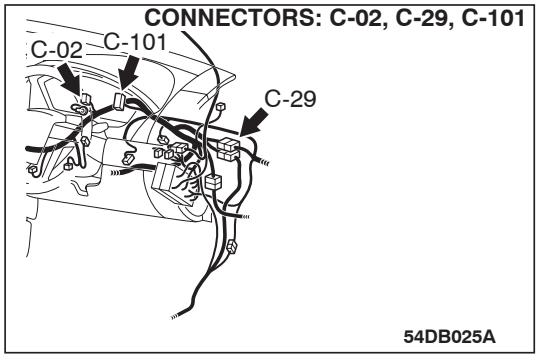
Q: Is the check result satisfactory?

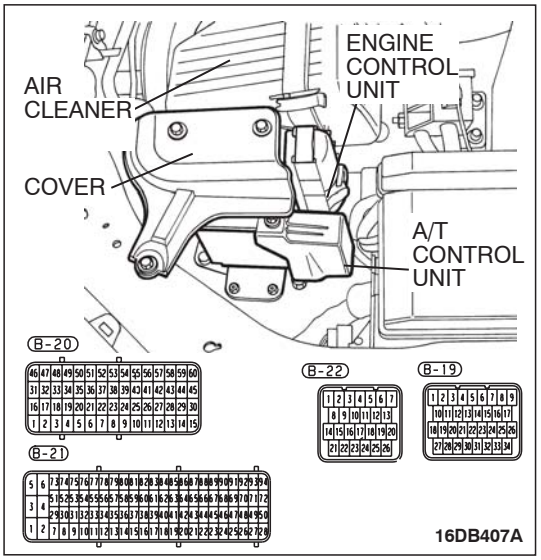
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).
NO : Replace the combination meter.

INSPECTION PROCEDURE 6: Speedometer does not Work. INSPECTION PROCEDURE 7: The Fuel Gauge Needle Moves Excessively.

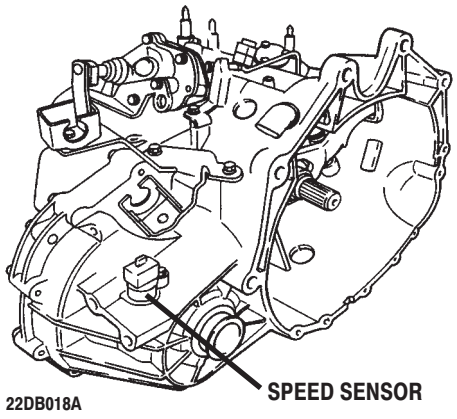








MANUAL TRANSMISSION



⚠ CAUTION

When the battery cable is disconnected or the combination meter is removed, the fuel gauge learned value will be erased. To let the display unit re-learn it, enter the vehicle speed (by driving the vehicle or entering simulated vehicle speed) and then stop the vehicle.

CIRCUIT OPERATION

The output shaft speed sensor sends vehicle signal to the combination meter via the Engine ECU and the CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

If only the speedometer does not operate, the Engine ECU system, the combination meter, the wiring harness or its connector may be defective. Furthermore, incorrect level of fuel is shown on the gauge, because the display unit can not learn the fuel gauge.

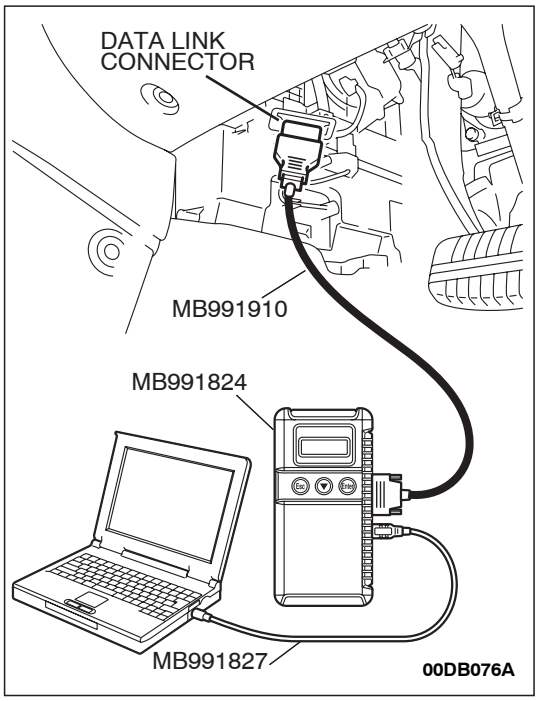
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the combination meter
- Malfunction of the Engine ECU
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 4.

STEP 2. Using diagnostic tool MB991958, read A/T diagnostic trouble code.

Check if an A/T system or Engine (MPI) system DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 23A, Automatic Transmission Diagnosis or GROUP 13A Engine (MPI) – Diagnostic Trouble Code Chart P.23A-34, or refer to Output speed sensor systemP.23A-72. On completion, go to Step 4.

NO : Go to Step 3.

STEP 3. Check the speedometer

Use diagnostic tool MB991958 to enter simulated vehicle speed.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Select "Interactive Diagnosis" from the start-up screen.
(4) Select "System Select."
(5) Choose "Meter" .
(6) Select "Simulated vehicle Speed Output."

OK: The speedometer shows that simulated vehicle speed.

Q: Is the check result satisfactory?

YES : Go to Step 4.

NO : Replace the combination meter, then go to Step 4.

STEP 4. Retest the system.

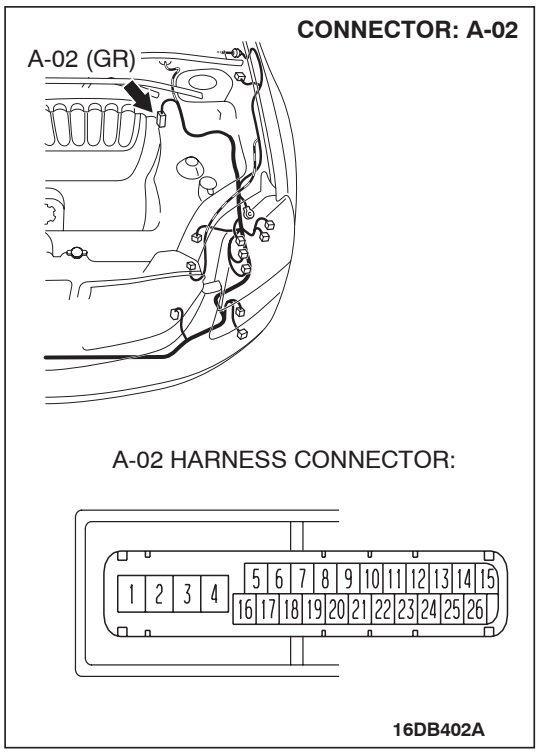
Check that the speedometer works normally.

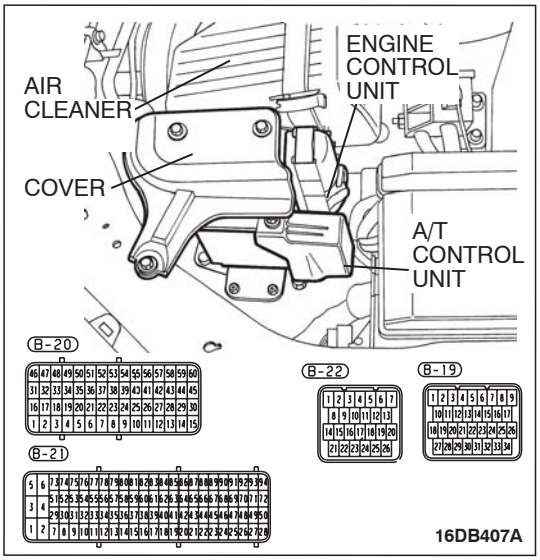
Q: Is the check result satisfactory?

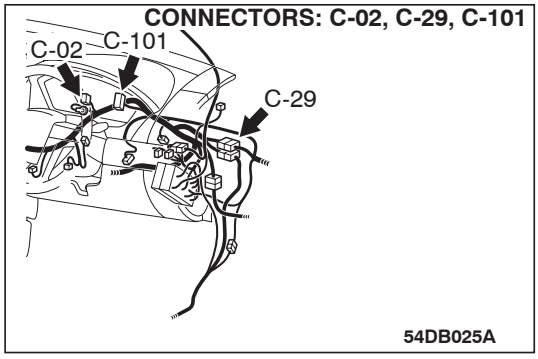
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

NO : Go to step 1.

INSPECTION PROCEDURE 8: Tachometer does not Work.







CIRCUIT OPERATION

The Engine ECU sends ignition signal to the combination meter via CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

If only the tachometer does not operate, the Engine ECU system may not be sending ignition signal, or the combination meter, the wiring harness or its connector may be defective.

TROUBLESHOOTING HINTS

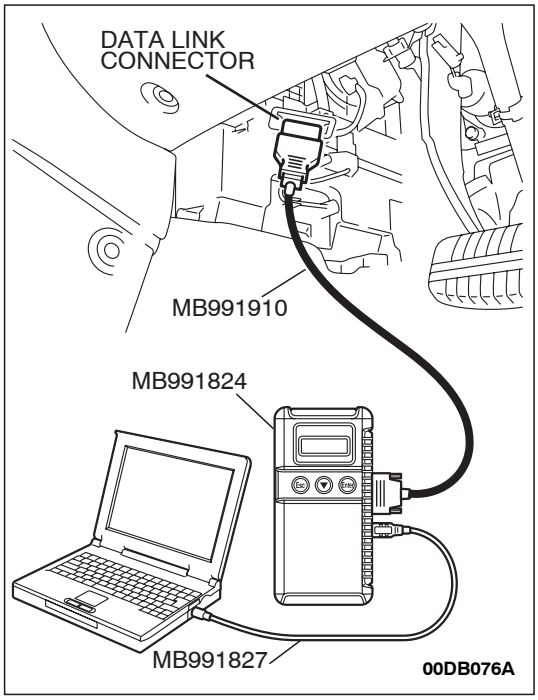
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the combination meter
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable

- MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis, Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 3.

STEP 2. Using diagnostic tool MB991958, read MPI system diagnostic trouble code.

Check if the MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system (Refer to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart . On completion, go to Step 3.
NO : Go to Step 3.

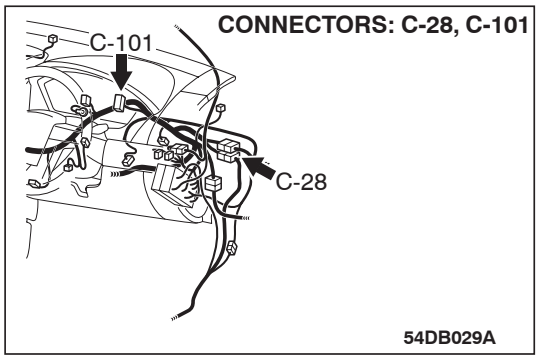
STEP 3. Retest the system.

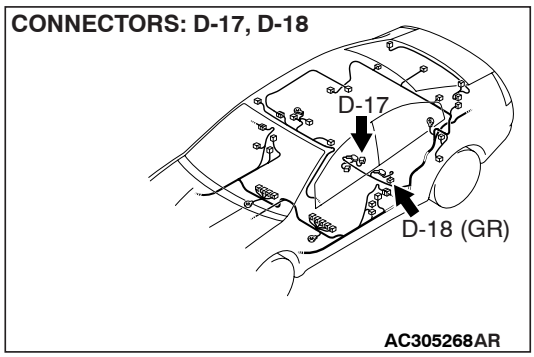
Check that the tachometer works normally.

Q: Is the check result satisfactory?

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.00-14).
NO : Replace the combination meter.

INSPECTION PROCEDURE 9: Fuel Gauge does not work (other meters work).





CIRCUIT OPERATION

- The ignition switch (IG1) circuit is the power supply for the fuel gauge.
- When the float in the fuel level sensor moves, the circuit resistance will change.
- The fuel gauge needle is moved by a change in the circuit current.

TECHNICAL DESCRIPTION (COMMENT)

If only the fuel gauge does not operate, the fuel pump module, the fuel level sensor (sub), the combination meter, wiring harness or connector(s) may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the fuel pump module or fuel level sensor (sub)
- Malfunction of the combination meter
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Check the fuel pump module.

Check to see if the fuel pump module is normal. Refer to P.54A-95.

Q: Is the fuel pump module normal?

YES : Go to Step 2.

NO : Replace the fuel pump module (Refer to GROUP 13B, Fuel Tank P.13B-6). The fuel gauge should now operate normally.

STEP 2. Check the fuel level sensor (sub).

Check to see if the fuel level sensor (sub) is normal. Refer to P.54A-95.

Q: Is the fuel level sensor (sub) normal?

YES : Go to Step 3.

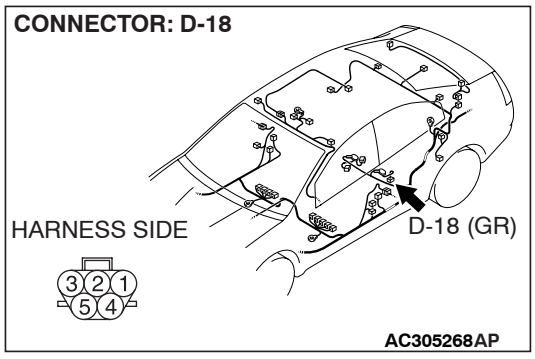
NO : Replace the fuel level sensor (Refer to GROUP 13A, Fuel Tank P.13B-6).

STEP 3. Check fuel pump module connector D-18 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fuel pump module connector D-18 in good condition?

YES : Go to Step 4.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



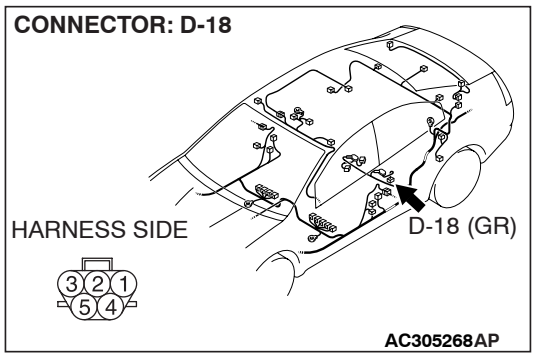
STEP 4. Test at fuel pump module connector D-18 to check the power circuit to the fuel pump module.

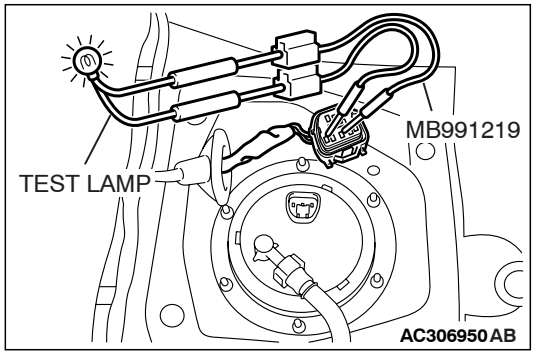
(1) Remove the rear seat (Refer to GROUP 52A, Rear Seat Assembly P.52A-55).
(2) Use special tool MB991219 to connect a test lamp (12 V - 3.4 W) between the wiring harness connector terminals 1 and 2.
(3) Turn the Ignition switch to "ON" position.
(4) Check if the test lamp illuminates.

OK: Illuminates

Q: Is the check result satisfactory?

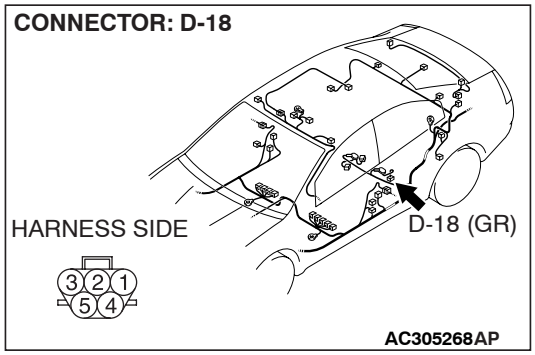
YES : Go to Step 11.
NO : Go to Step 5.

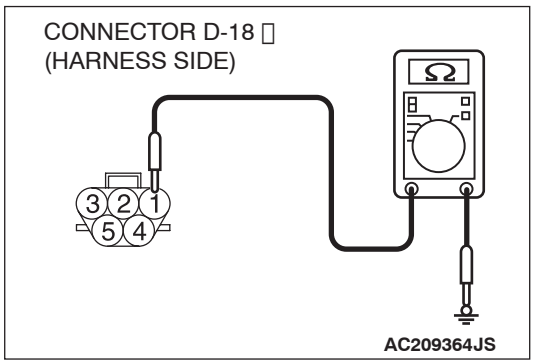




STEP 5. Measure the resistance at fuel pump module connector D-18 to check the ground circuit to the fuel pump module.

(1) Disconnect fuel pump module connector D-18, and measure at the wiring harness side.

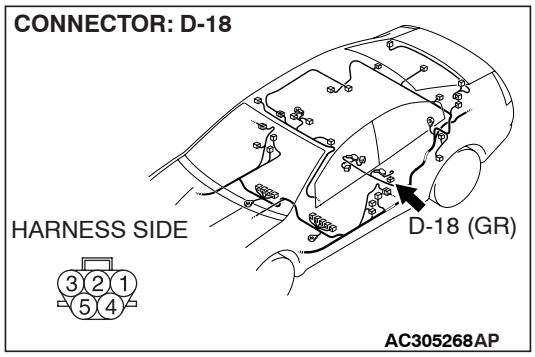




(2) Measure the resistance value between terminal 1 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 7.
NO : Go to Step 6.

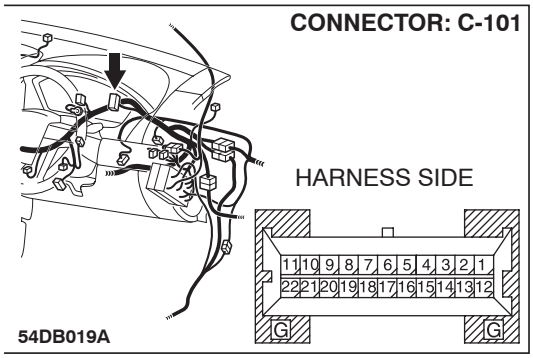


STEP 6. Check the wiring harness between fuel pump module connector D-18 (terminal 1) and ground.

Q: Is the wiring harness between fuel pump module connector D-18 (terminal 1) and ground in good condition?

YES : Go to Step 7.

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

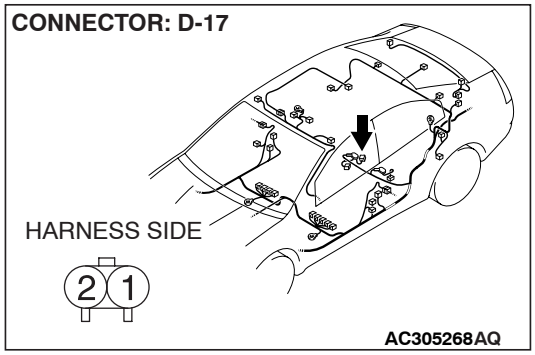


STEP 7. Check combination meter connector C-101 and fuel level sensor (sub) connector D-17 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

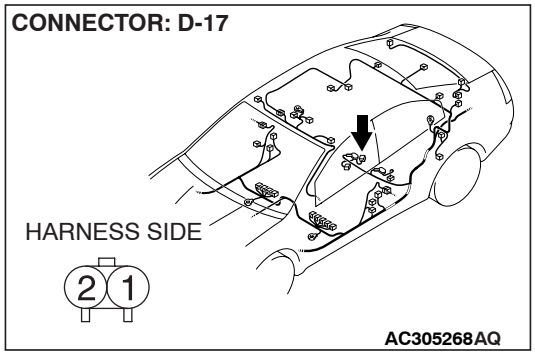
Q: Is combination meter connector C-101 and fuel level sensor (sub) connector D-17 in good condition?

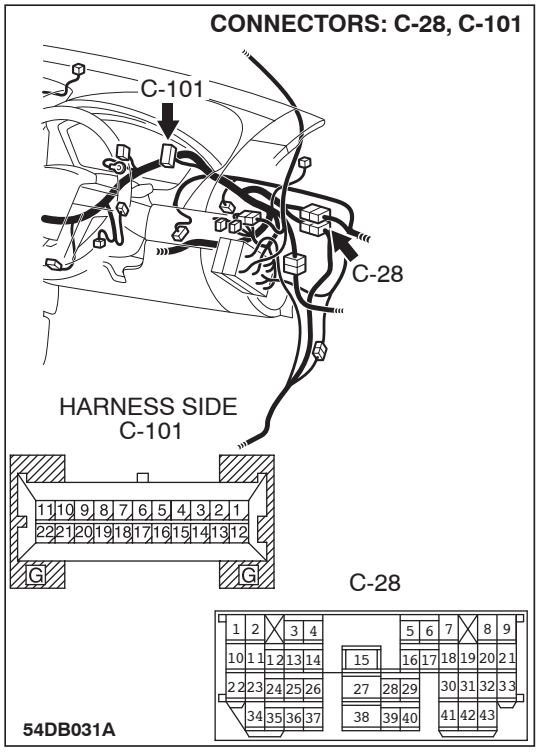
YES : Go to Step 8.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 4.



STEP 8. Check the wiring harness between combination meter connector C-101 (terminal 13) and fuel level sensor (sub) connector D-17 (terminal 2).



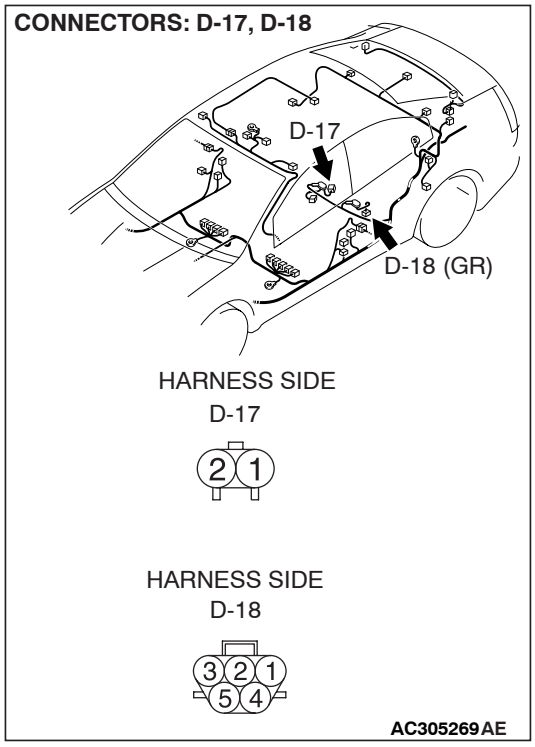


NOTE: Also check intermediate connectors C-28 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-28 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between combination meter connector C-101 (terminal 13) and fuel level sensor (sub) connector D-17 (terminal 2) in good condition?

YES : Go to Step 9.

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

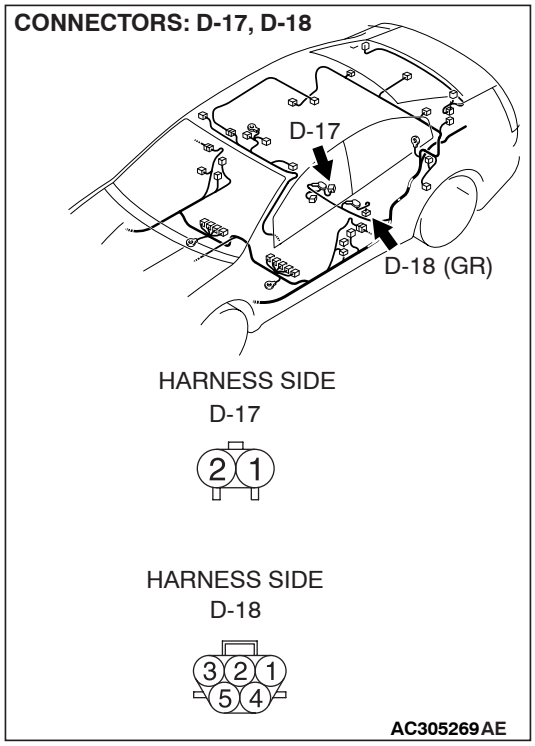


STEP 9. Check fuel pump module connector D-18 and fuel level sensor (sub) connector D-17 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fuel pump module connector D-18 and fuel level sensor (sub) connector D-17 in good condition?

YES : Go to Step 10.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The fuel gauge should now operate normally.



STEP 10. Check the wiring harness between fuel pump module connector D-18 (terminal 2) and fuel level sensor (sub) connector D-17 (terminal 1).

Q: Is the wiring harness between fuel pump module connector D-18 (terminal 2) and fuel level sensor (sub) connector D-17 (terminal 1) in good condition?

YES : Go to Step 11.

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

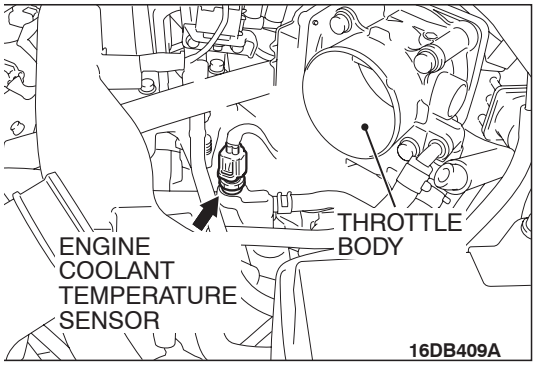
STEP11. Retest the system.
Check that the fuel gauge works normally.

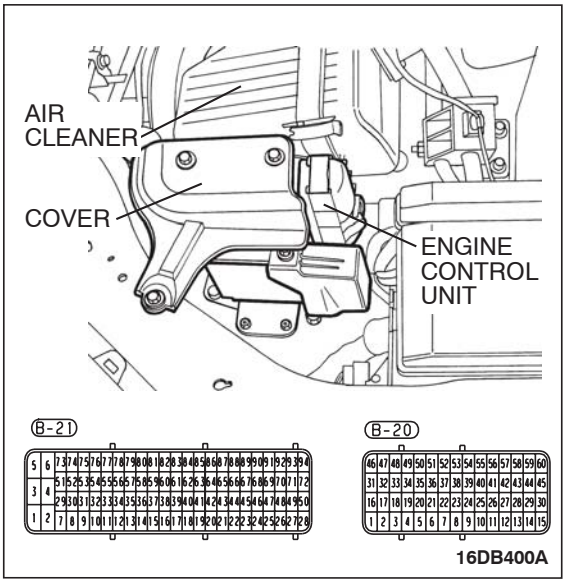
Q: Is the fuel gauge normal?

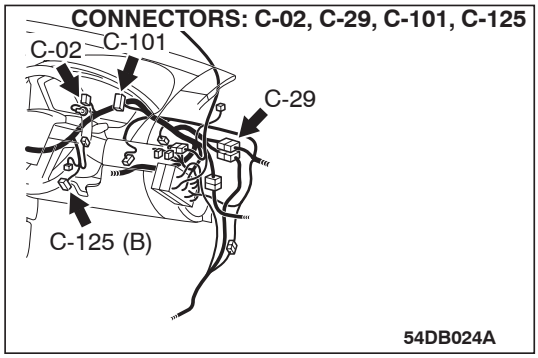
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

NO : Replace the combination meter.

INSPECTION PROCEDURE 10: Engine Coolant Temperature Gauge does not Work (other meters work).







CIRCUIT OPERATION

The engine coolant temperature sensor sends signal to the combination meter via the Engine ECU and the CAN bus line.

TECHNICAL DESCRIPTION (COMMENT)

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

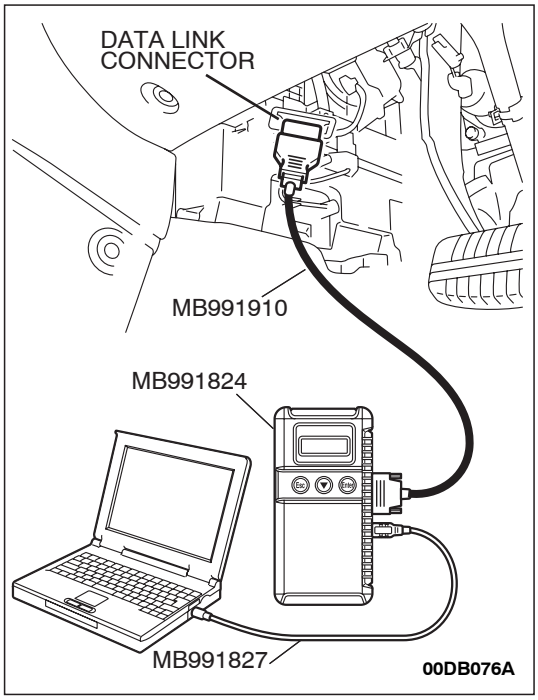
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the Engine ECU
- Malfunction of the combination meter
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991824, diagnose the CAN bus line.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis – Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 3.

STEP 2. Using diagnostic tool MB991958, read MPI diagnostic trouble code.

Check if an MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system by referring to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17. On completion, go to Step 3.
NO : Go to Step 3.

Step 3. Retest the system.
Check to see that the engine coolant temperature gauge operates normally.

Q: Is the check result satisfactory?

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.00-14).

NO : Replace combination meter and then go to step 1.

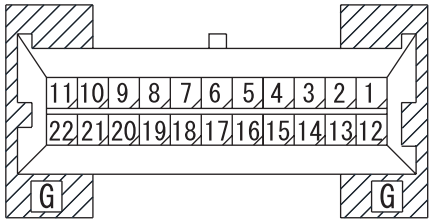
COMBINATION METER TERMINAL CHECK

M1543026700010

Measure the voltage between terminals using a voltmeter.

COMBINATION METER CONNECTOR
COMPONENT SIDE

C-101



AC211750AD

NOTE: The combination meter connector is fixed on the instrument panel directly, so you can not take measurement by backprobing.

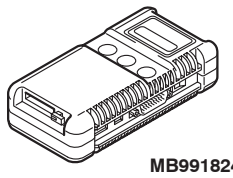
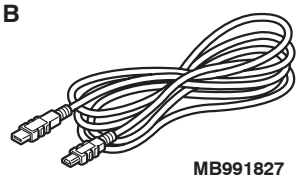
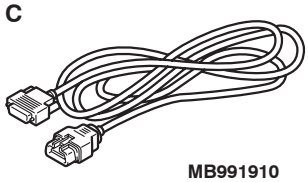
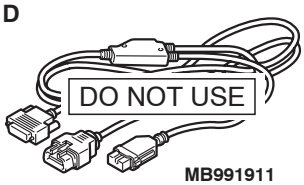
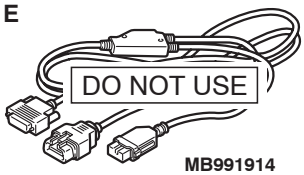
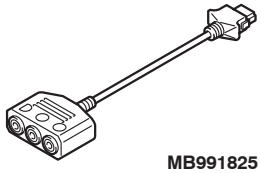
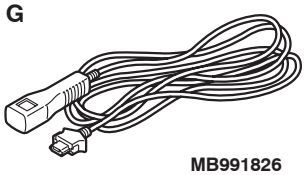
Terminal No.	Check item	Check condition	Normal condition
1	Battery power supply	Always	Battery positive voltage
3	Gauge ground	Always	0 V
5	Ground	Always	0 V
7	Parking brake switch and brake fluid level switch	• Ignition switch: ON or parking brake switch: ON • Ignition switch: ON or brake fluid level switch: ON	-
8	Seat belt switch	Ignition switch: ON or driver's seat belt not fastened	-
9	Engine oil pressure switch	Ignition switch: ON or engine oil pressure switch: ON	-
11	Alternator (charge circuit)	-	-
12	Ignition switch (IG1) power supply	Ignition switch: ON	Battery positive voltage
13	Fuel gauge	Always	-
16	Mode switch	Always	0 V
17	Mode switch (UP)	Always	0 V
18	Mode switch (DOWN)	Always	0 V
21	Illumination (power supply)	Lighting switch: ON	Battery positive voltage
22	Illumination (ground)	Always	0 V

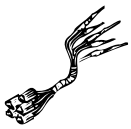
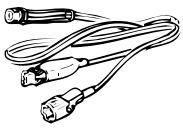
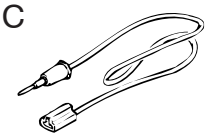
⚠ CAUTION

Never take a measurement at terminals 14 and 15. If you do this, the CAN bus lines will be impaired.

SPECIAL TOOLS

M1543000601771

TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III Sub Assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness	MB991824-KIT *NOTE: G: MB991826 MUT-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.*	• Reading diagnostic trouble code • Estimated vehicle speed sent **⚠ CAUTION** **MUT-III main harness A (MB991910) should be used. MUT-III main harness B and C should not be used for this vehicle.**

TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  B  C  D MB991223AF	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	General service tool (jumper)	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

ON-VEHICLE SERVICE

SPEEDOMETER CHECK

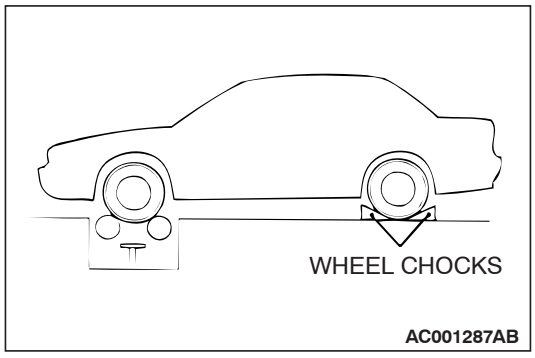
M1543000900445

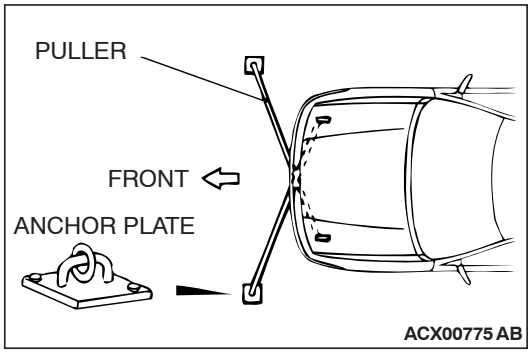
1. Adjust the pressure of tyres to the specified level (Refer to GROUP 31, On-vehicle Service P.31-7).

⚠ CAUTION

Do not accelerate or decelerate suddenly during servicing work.

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





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

Standard value:

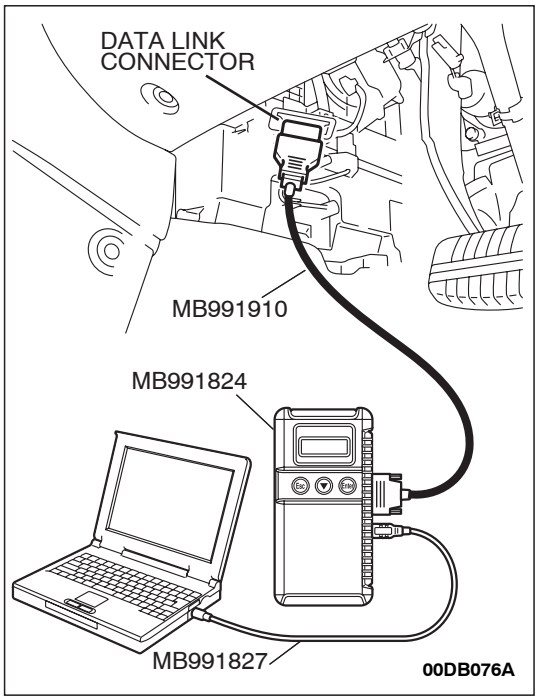
STANDARD INDICATION km/h	TOLERANCE km/h
0	± 1°
20	0 to +4
40	0 to +4
80	+0.5 to +5.5
120	+1.5 to +7.5
160	+2.5 to +9.5
200	+3.5 to +11.5

6. If not within the standard value, check the tyre size. If an incorrect size of tyre is used, replace it and check again. If the tyre size is correct, a defect may be present in components and circuit between the output shaft speed sensor (Automatic transmission) or speed sensor (Manual transmission) and the combination meter. Check the following items.
- output shaft speed sensor (automatic transmission) (refer to GROUP23A, Automatic Transmission Diagnosis P.23A-72).
- vehicle speed sensor (manual transmission (M/T)) refer to GROUP 13A, Multiport fuel injection (refer to P.13A-399).
- combination meter (refer to P.54A-76.)

TACHOMETER CHECK

M1543001000456

Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

1. Connect diagnostic tool MB991958 to the data link connector.
2. A/T select lever: "P" position or Manual gearshift in "NEUTRAL"with handbrake "ON".
3. Turn the ignition switch to "ON" position.
4. Start the engine.
5. Run the engine.
6. Select MPI system data list and take a reading of the engine speed.

   Item 22: CKP SENSOR
7. Compare the engine speed shown in the diagnostic tool with that shown on the tachometer. The engine speeds shown on the tachometer should correspond to the table below.

   NOTE: The following standard value assumes that battery voltage is 13.5 volts.

   Standard value :

Engine speed (r/min)	Tolerance of tachometer r/min (room temperature)
0	± 1°
1,000	1,000 ± 100
2,000	2,000 ± 100
3,000	3,000 ± 100
4,000	4,000 ± 100
5,000	5,000 ± 100
6,000	6,000 ± 100
7,600	7,000 ± 100

⚠ WARNING

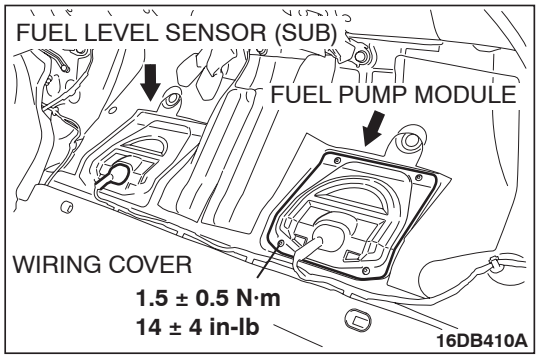
The pointer must not move over full-scale. Maximum full-scale reading shall be 7,600 rpm.

FUEL LEVEL SENSOR CHECK

M1543001300037

1. Remove the rear seat cusion assembly. (Refer to GROUP 52A, Rear Seat Assembly P.52A-55.)
2. Remove hole cover and remove the fuel pump module and fuel level sensor (sub).

Tightening torque: 1.5 ± 0.5 N·m (14 ± 0.5 in-lb)



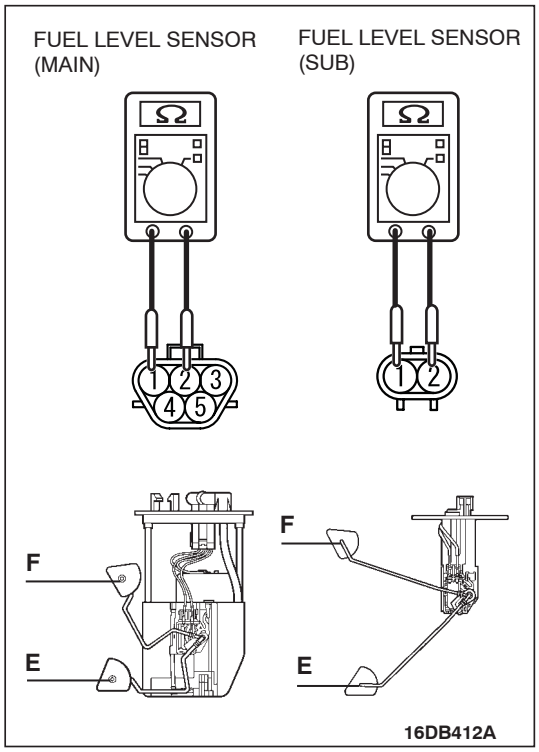
FUEL LEVEL SENSOR RESISTANCE

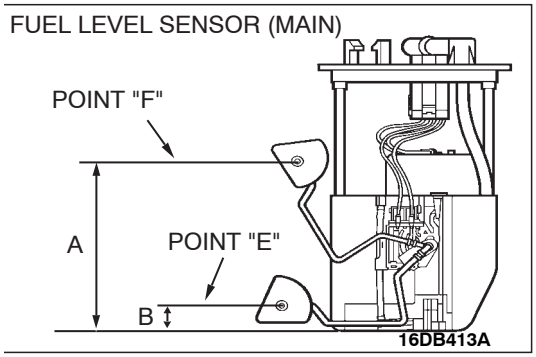
1. Check the resistances between fuel level sensor main terminals 1 and 2 as well as sub terminals 1 and 2 of the fuel pump module, respectively.

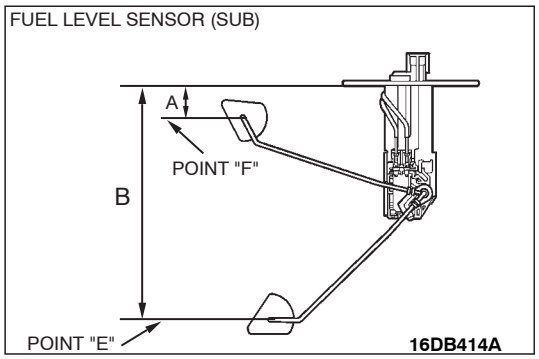
Standard value:

Items		Fuel level sensor (main)	fuel level sensor (sub)
Resistance Ω	Point "F" (highest)	6.5 ± 1	6.5 ± 1
	Point "E" (lowest)	45.1 ± 1	74.9 ± 1

2. Check that resistance value changes smoothly when the float moves slowly between points.
3. If all checks are correct, go to fuel unit height check. If any check is not correct, replace the fuel pump module or fuel level sensor (sub).







FUEL LEVEL SENSOR FLOAT HEIGHT

1. Move the float and measure height A at point "F" (highest) and B at point "E" (lowest).

   Standard value:

Items		Fuel level sensor (main)	Fuel level sensor (sub)
Height mm	A at point "F"	132.8 ± 3.0	24.9 ± 3.0
	B at point "E"	36 ± 3.0	172.7 ± 3.0

2. If any check is not correct, replace the fuel pump module or fuel level sensor (sub).

TRIP COMPUTER

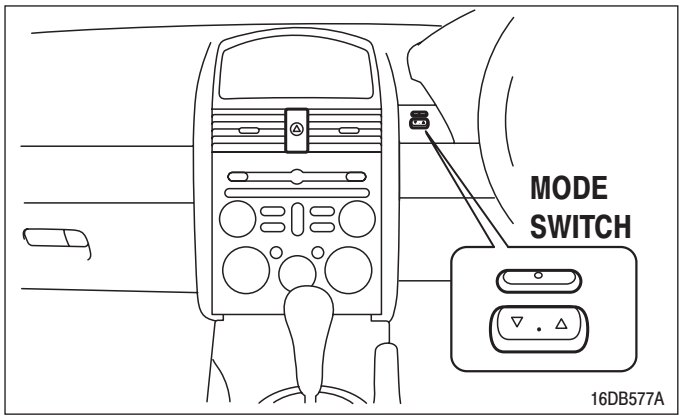
GENERAL DESCRIPTION

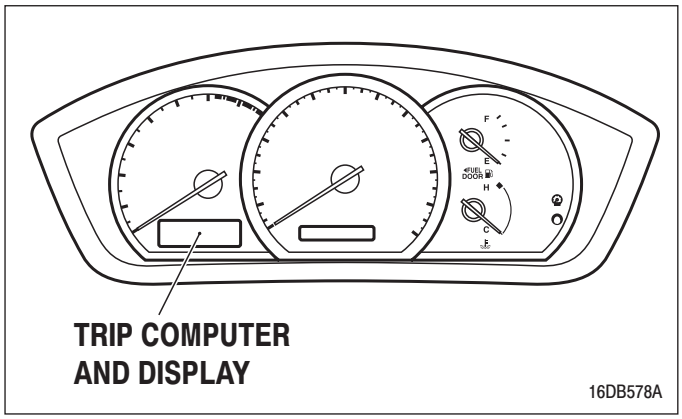
BABBAIDI

The unit will display vehicle date in the "ON" position. The unit will scroll through the system showing current data and will revert to the previously selected mode.
Some of the combination meter indications are based on information from ECUs via CAN bus communication. If there is any failure in the meters connected via the CAN bus communication, diagnose the CAN bus communication system. The following instruments, indicator lights and warning lights in the combination meter are controlled by ECUs via CAN bus communication.
The meter combination does not include a buzzer, but it sends a request to sound buzzer on ETACS via the CAN system.

ITEM	Instruments, indicator lamps, and warning lamps	ECU sending data via CAN communication
Meter	Tachometer	Engine ECU and Auto Transmission ECU
	Speedometer	
	Engine coolant temperature gauge	
	Odometer	
	Trip Computer	
Indicator lamp	High-beam	ETACS-ECU
	Turn-signal	
	Front fog	
	Door ajar	
	A/T shift position	A/T-ECU
	Auto cruise	Engine-ECU
	TCL	ABS/TCL-ECU <vehicles without ASC>
	TCL OFF	
	TCL/ASC	TCL/ASC-ECU <vehicles with ASC>
	TCL OFF	
Warning lamp	Check Engine warning lamp	Engine ECU
	ABS	ABS-ECU
	SRS	SRS-ECU

NOTE: When the mode button is pressed for the first time, the computer returns to the odometer function.





TROUBLESHOOTING STRATEGY

BABDEEDB

Use these steps to plan your diagnostic strategy. Follow through with each step to ensure that you have exhausted all possible methods of finding a combination meter fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find and repair the malfunction by following the symptom chart.
4. Verify that the malfunction has been eliminated.

SERVICE SPECIFICATIONS

BABJGCIC

ITEM	UNITS	RESOLUTION	MININUM	MAXIMUM
Range to empty	km	10	10	1000
Total fuel used	litres	0.1	0	199.9
		1	200	2500
Average fuel consumption	litres/100km	0.1	0.1	99.9
Instantaneous fuel consumption	litres/100km	0.1	0.1	199.9
Time travelled	hh/mm	(00:01) 1 minute	0:00	199:59
Total distance travelled (split resolution)	km	0.1	0	1999.9
		1	2000	9999
Average speed (split resolution)	km/h	0.1	0.0	199.9
		1	200	240
Speed alarm (set speed)	km/h	5	20	195
Rest reminder	h:mm	0:01	0:30	4:00

SERVICE REMINDER (Activation intervals)

RESOLUTION (kms)	MININUM (kms)	MAXIMUM (kms)
1500	1000	2000
15000	14500	15500
30000	29500	30500
45000	44500	45500
60000	59500	60500
75000	74500	75500
90000	89500	90500
105000	104500	105500
120000	119500	120500
135000	134500	135500
150000	149500	150500
165000	164500	165500
180000	179500	180500
195000	194500	195500
210000	209500	210500
>210,000 (every 15,000 km).	500 km before every scheduled service thereafter	500 km after every scheduled service thereafter

DIAGNOSIS FUNCTION

BABCBCFC

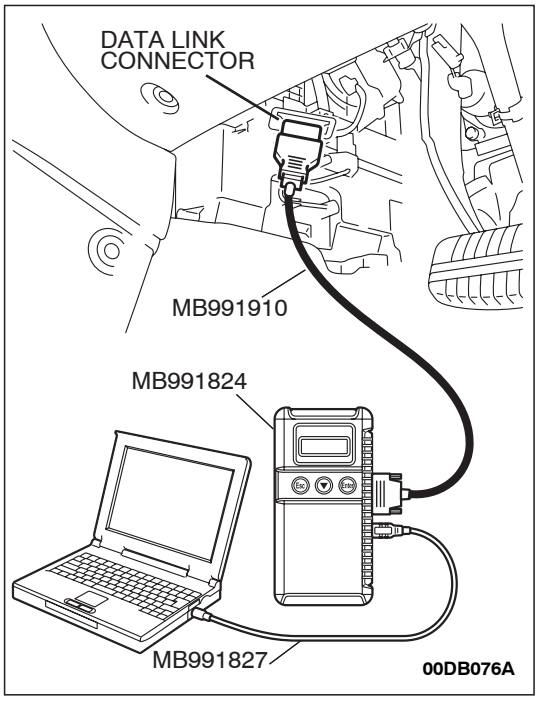
HOW TO CONNECT DIAGNOSTIC TOOL (MUT-III)

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.
7. Start the MUT-III system on the personal computer.

   NOTE: Disconnecting the diagnostic tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

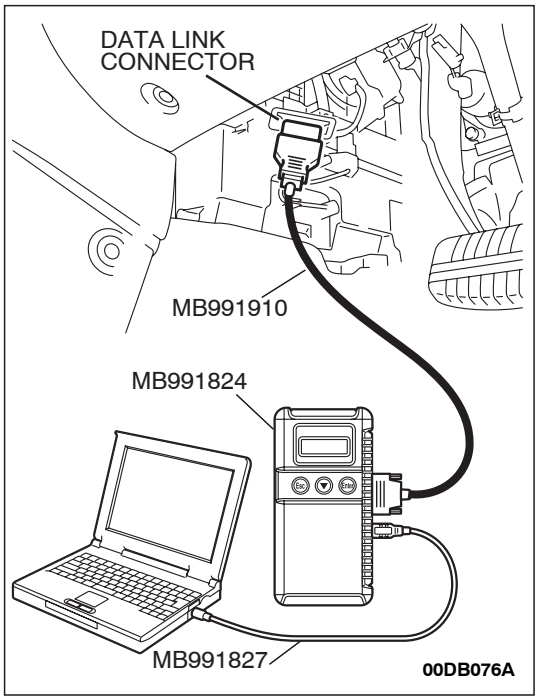
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if diagnostic tool MB991958 does not display.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "Meter" .
6. Select "Diagnostic Trouble Code."
7. If a DTC is set, it is shown.
8. Choose "Erase DTCs" to erase the DTC.

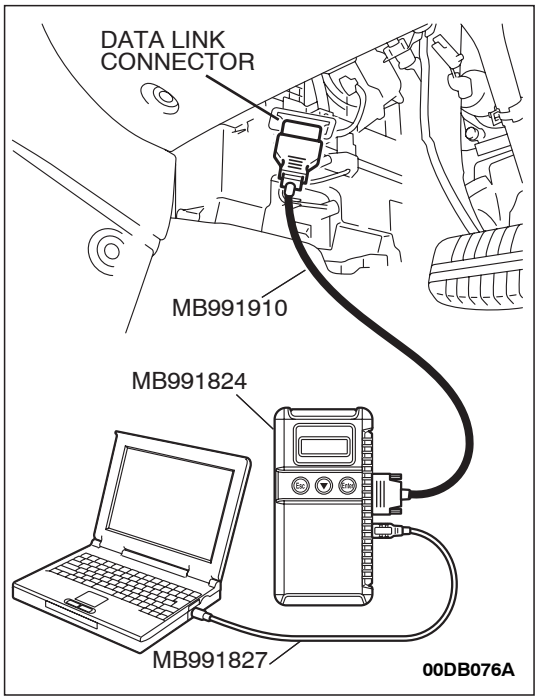
HOW TO DIAGNOSE THE CAN BUS LINES

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "CAN bus diagnosis" from the start-up screen.
4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they matches, go to step 8.
   - If not, go to step 5.
5. Select "view vehicle information" button.
6. Enter the vehicle information and select the "OK" button.
7. When the vehicle information is displayed, confirm again that it matches the vehicle whose CAN bus lines will be diagnosed.
   - If they matches, go to step 8.
   - If not, go to step 5.
8. Select the "OK" button.
9. When the optional equipment is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.

⚠ CAUTION

During diagnosis, a DTC 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 DTC code(s). If DTC code(s) are set, erase them all.

DTC NO.	Diagnostic item	REFERENCE PAGE
U1073	Bus off	P.54A-49
U1100	Engine ECU time-out (related to engine)	P.54A-51
U1101	Auto Transmission ECU time-out (related to A/T)	
U1102	ABS-ECU time-out	P.54A-55
U1109	ETACS-ECU time-out	P.54A-59
U1112	SRS-ECU time-out	P.54A-62
U1120	Failure information on Engine ECU (related to engine)	P.54A-64
U1206	Flag invalid	P.54A-67

TROUBLE SYMPTOM CHECKS

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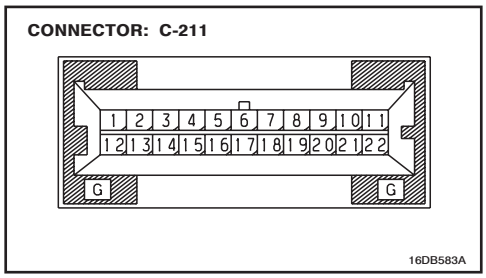


SYMPTOM	INPUT WIRE	CONNECTOR PIN
Meters do not illuminate or function	Battery (+12V)	1
-	-	2
Rheostat does not function	Earth	3
-	-	4
Gauges, trip computer and w/lamps inoperative	Earth	5
-	-	6
Brake warning lamp inoperative or constant	Park brake and brake fluid level switch	7
Seat belt w/lamp inoperative or constant	Seat belt buckle switch	8
Oil w/lamp inoperative or constant	Oil pressure switch	9
-	-	10
Charge w/lamp inoperative or constant	Charge w/light signal (alternator)	11
Gauges and trip computer inoperative	Ignition (12V)	12
Fuel gauge reads "E". Range to empty displays "- - -"	Fuel gauge sender unit	13
Fuel gauge, tachometer, speedometer, temperature gauge, shift select display,,trip computer, cruise, engine, door ajar, indicator/hazard, fog, speed, rest reminder, SRS, ABS, and TCL,	CAN HI	14
	CAN LO	15
Mode select inoperative	Mode select switch	16
Mode select "up" inoperative	Mode "up" switch	17
Mode select "down" inoperative	Mode "down" switch	18
-	-	19
-	-	20
Meters do not illuminate	Illumination (+ve) taillamp relay	21
	Illumination [rheostat output (-ve)]	22

SYMPTOM CHART

BABGIHHH

⚠ CAUTION

During diagnosis, a DTC 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 DTC code(s). If DTC code(s) are set, erase them all.

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Communication with diagnostic tool is not possible.	1	P.54A-70
Power supply circuit.	2	P.54A-72
Odometer and trip meter are not displayed.	3	
All the needle meters do not work.	4	
When the ignition switch is turned to the ON position, the indicator and warning lights do not illuminate.	5	
Speedometer does not work.	6	P.54A-76
The fuel gauge needle moves excessively.	7	
Tachometer does not work.	8	P.54A-79
Fuel Gauge does not work (other meters work).	9	P.54A-81
Engine coolant temperature gauge does not work (other meters work).	10	P.54A-87

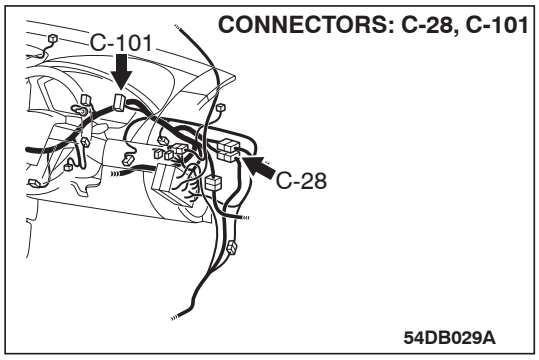
INSPECTION CHART FOR TROUBLE SYMPTOMS

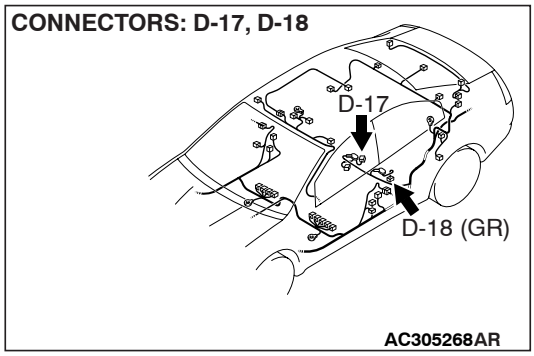
BABEEEBJ

SYMPTOM	INSPECTION PROCEDURE
Range to empty always displays flashing"---"km.	1
Range to empty does not detect refuels	2
Total fuel used does not operate. (increase)	3
Total fuel used displays abnormally low/high value	4
Average fuel always displays "0.1" litres/100 km	5
Average fuel displays abnormally low/high value	6
Instant fuel always displays "0.1" litres/100km	7
Instant fuel displays abnormally low/high result	8
Average fuel always displays "--.-" litres/100 km	9
Instant fuel always displays "--.-" litres/100 km	10
Total distance travelled does not operate (increase)	11
Average fuel always displays "- -. -" km/h	12
Rest reminder does not function	13
Service reminder does not function	14
Speed alarm warning "Beeps" do not trigger	15
Speed alarm cannot be adjusted and/or turned off and/or operating mode cannot be changed	16

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Range to empty always displays flashing "- - -" km (even when fuel tank is full. INSPECTION PROCEDURE 2: Range to empty does not detect refuels (even when > 7 litres)





CIRCUIT OPERATION

- The ignition switch (IG1) circuit is the power supply for the fuel gauge.
- When the float in the fuel level sensor moves, the circuit resistance will change.
- The fuel gauge needle is moved by a change in the circuit current.

TECHNICAL DESCRIPTION (COMMENT)

If only the fuel gauge does not operate, the fuel pump module, the fuel level sensor (sub), the combination meter, wiring harness or connector(s) may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the fuel pump module or fuel level sensor (sub)
- Malfunction of the trip computer/ combination meter
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

STEP 1. Check the fuel pump module.

Check to see if the fuel pump module is normal. Refer to P.54A-95.

Q: Is the fuel pump module normal?

YES : Go to Step 2.

NO : Replace the fuel pump module (Refer to GROUP 13B, Fuel Tank P.13B-6). The fuel gauge should now operate normally.

STEP 2. Check the fuel level sensor (sub).

Check to see if the fuel level sensor (sub) is normal. Refer to P.54A-95.

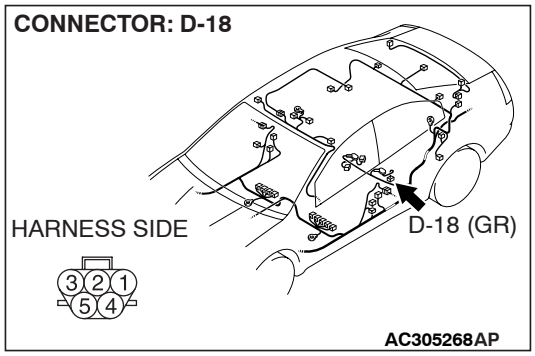
Q: Is the fuel level sensor (sub) normal?

YES : Go to Step 3.

NO : Replace the fuel level sensor (Refer to GROUP 13B, Fuel Tank P.13B-6).

STEP 3. Check fuel pump module connector D-18 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fuel pump module connector D-18 in good condition?



YES : Go to Step 4.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

STEP 4. Test at fuel pump module connector D-18 to check the power circuit to the fuel pump module.

(1) Remove the rear seat (Refer to GROUP 52A, Rear Seat Assembly P.52A-55).

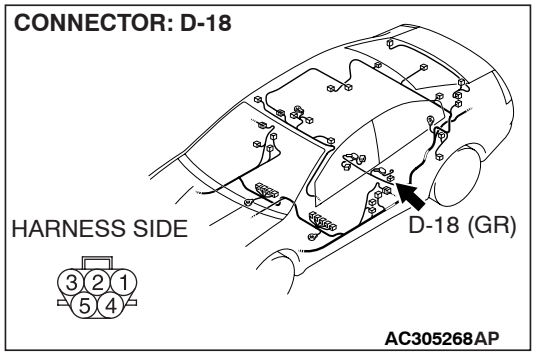
(2) Use special tool MB991219 to connect a test lamp (12 V - 3.4 W) between the wiring harness connector terminals 1 and 2.

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

(4) Check if the test lamp illuminates.

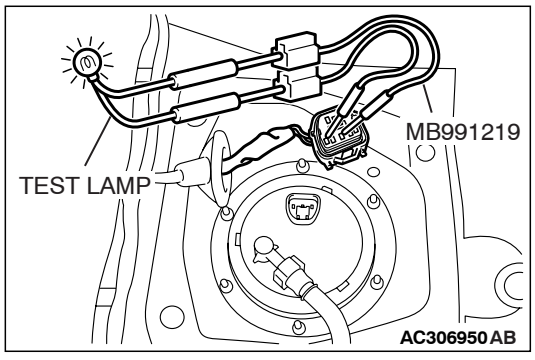
OK: Illuminates

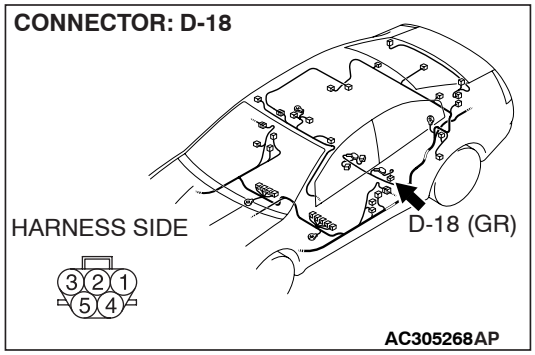
Q: Is the check result satisfactory?



YES : Go to Step 11.

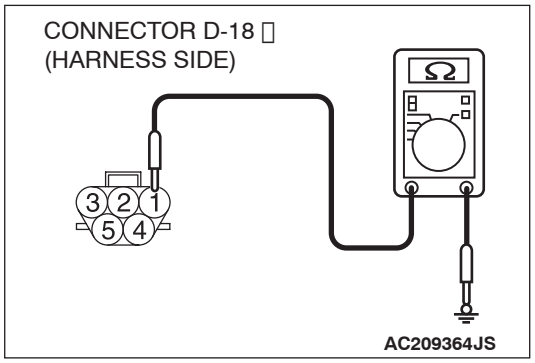
NO : Go to Step 5.





STEP 5. Measure the resistance at fuel pump module connector D-18 to check the ground circuit to the fuel pump module.

(1) Disconnect fuel pump module connector D-18, and measure at the wiring harness side.

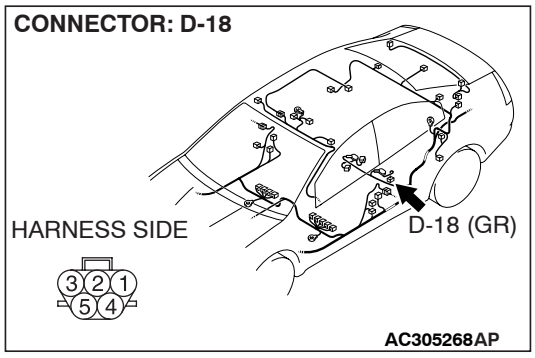


(2) Measure the resistance value between terminal 1 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

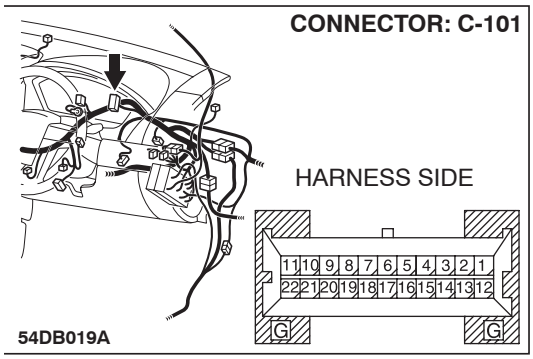
YES : Go to Step 7.
NO : Go to Step 6.

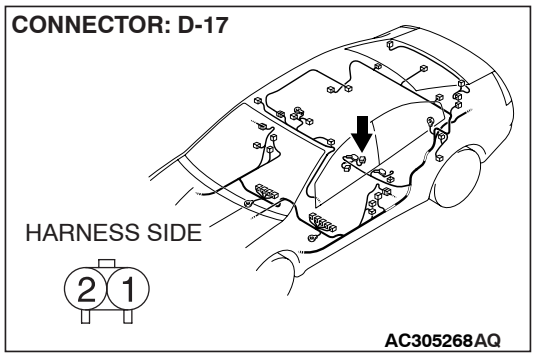
STEP 6. Check the wiring harness between fuel pump module connector D-18 (terminal 1) and ground.



Q: Is the wiring harness between fuel pump module connector D-18 (terminal 1) and ground in good condition?

YES : Go to Step 7.
NO : Repair the wiring harness. The range to empty display should now operate normally.





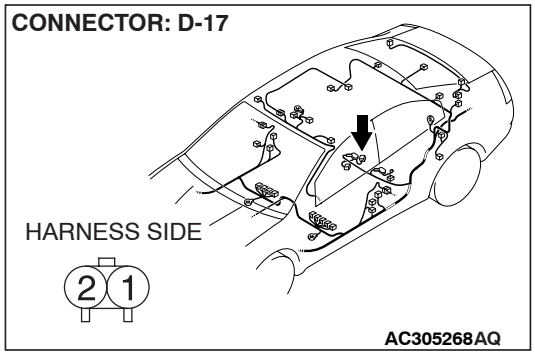
STEP 7. Check combination meter connector C-101 and fuel level sensor (sub) connector D-17 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

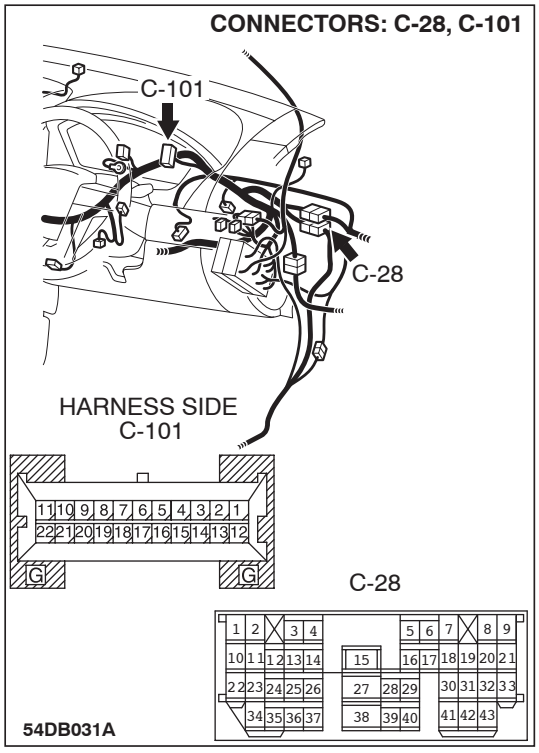
Q: Is combination meter connector C-101 and fuel level sensor (sub) connector D-17 in good condition?

YES : Go to Step 8.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to Step 4.

STEP 8. Check the wiring harness between combination meter connector C-101 (terminal 13) and fuel level sensor (sub) connector D-17 (terminal 2).



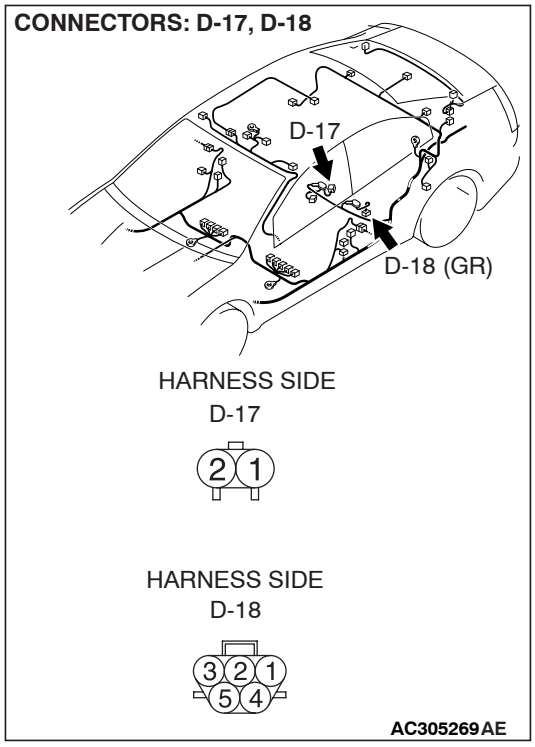


NOTE: Also check intermediate connectors C-28 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-28 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between combination meter connector C-101 (terminal 13) and fuel level sensor (sub) connector D-17 (terminal 2) in good condition?

YES : Go to Step 9.

NO : Repair the wiring harness. The range to empty display should now operate normally.

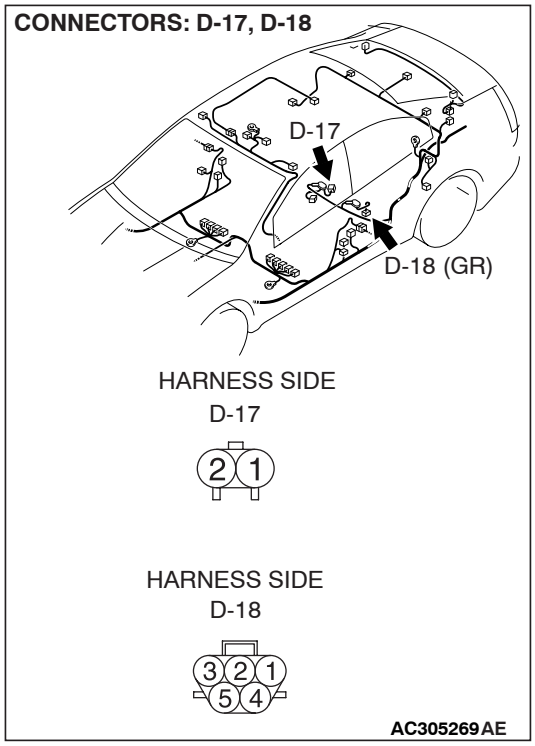


STEP 9. Check fuel pump module connector D-18 and fuel level sensor (sub) connector D-17 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is fuel pump module connector D-18 and fuel level sensor (sub) connector D-17 in good condition?

YES : Go to Step 10.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The range to empty display should now operate normally.



STEP 10. Check the wiring harness between fuel pump module connector D-18 (terminal 2) and fuel level sensor (sub) connector D-17 (terminal 1).

Q: Is the wiring harness between fuel pump module connector D-18 (terminal 2) and fuel level sensor (sub) connector D-17 (terminal 1) in good condition?

YES : Go to Step 11.

NO : Repair the wiring harness. The range to empty display should now operate normally.

STEP11. Retest the system.

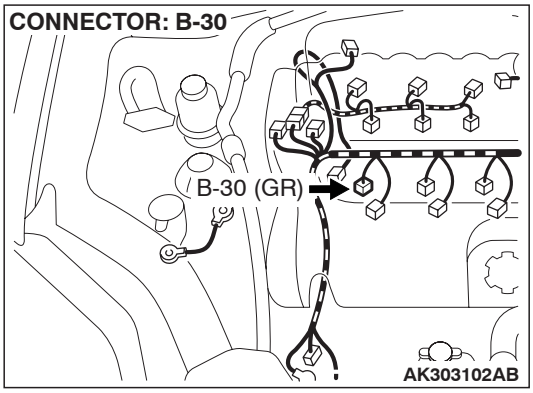
Check that the range to empty display works normally.

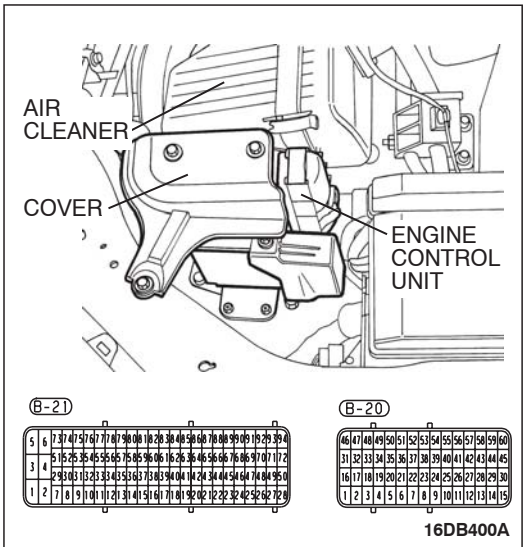
Q: Is the Range to empty display reading normal?

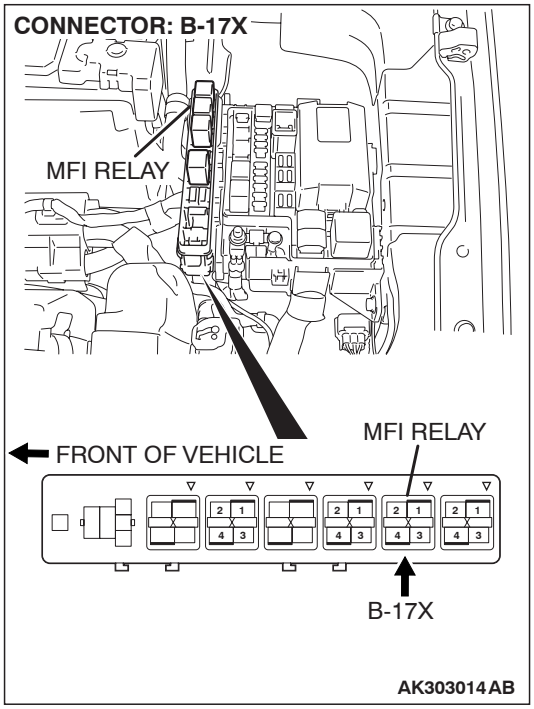
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

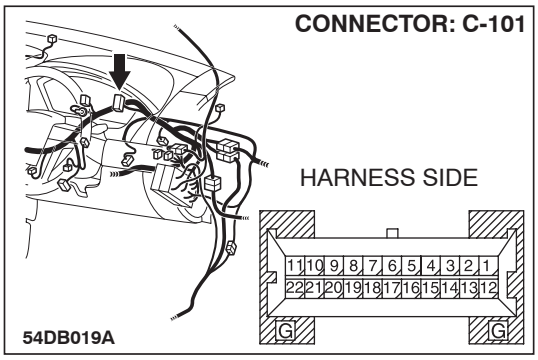
NO : Replace the combination meter.

INSPECTION PROCEDURE 3: Total fuel used does not operate (increase). INSPECTION PROCEDURE 4: Total fuel used diplays abnormally low/high value. INSPECTION PROCEDURE 5: Average fuel always displays "0.1" litres/ 100km. INSPECTION PROCEDURE 6: Average fuel displays abnormally low/high value.INSPECTION PROCEDURE 7: Instant fuel always displays "0.1" litres/ 100km. INJECTOR PROCEDURE 8: Instant fuel displays abnormally low/high result.









CIRCUIT OPERATION

- The injector power is supplied from the MPI relay (terminal No. 4).
- The ENGINE-ECU controls the injectors by turning the power transistor in the ECU "ON" and "OFF".
- The injectors sends a signal to the Engine-ECU which in turn sends a signal to the combination meter via the CAN bus line (every 0.5 of a second).

TECHNICAL DESCRIPTION

- The amount of fuel injected by the injectors is controlled by the amount of continuity time the coil is grounded by the ECU.
- A surge voltage is generated when the injectors are driven and the current flowing to the injector coil is shut off.
- The ENGINE-ECU checks this surge voltage.

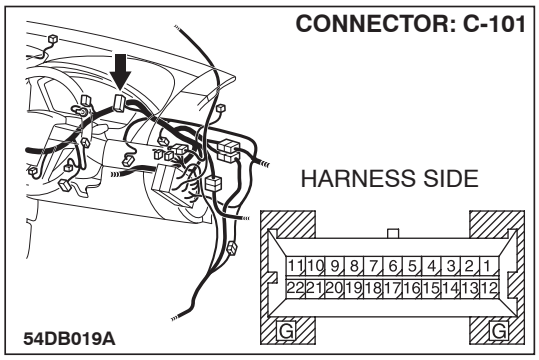
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Injector failure.
- Open or shorted injector circuit, harness damage, or connector damage.
- Engine-ECU failed.
- Combination meter power and ground circuits may be defective.
- Trip computer/Combination meter malfunction.

DIAGNOSIS

Required Special Tools:

- Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: V.C.I.
  - MB991827: USB Cable
  - MB991910: Main Harness A
- MB991658: Test Harness
- MB992044: ENGINE ECU Check Harness

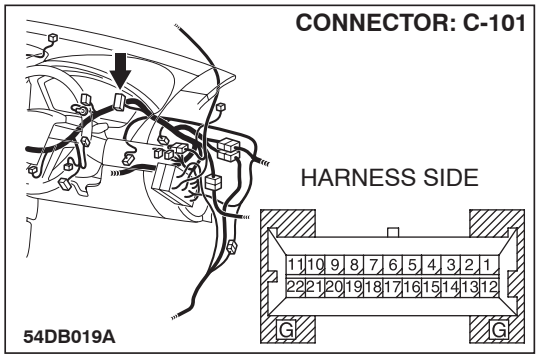


STEP 1. Check combination meter connector C-101 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is combination meter connector C-101 in good condition?

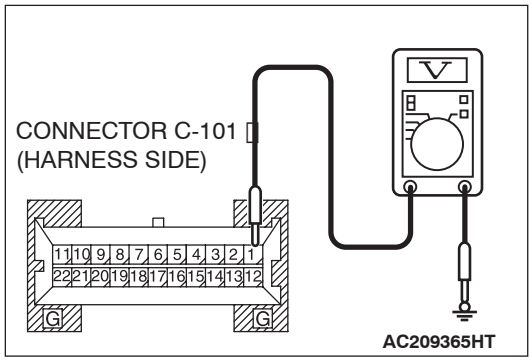
YES : Go to Step 2.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The combination meter works normally.



STEP 2. Measure at combination meter connector C-101 in order to power supply circuit to combination meter (battery power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "LOCK" (OFF) position.



(3) Measure the voltage between terminal 1 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

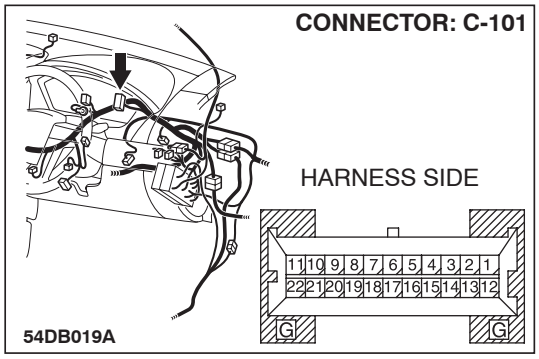
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22.

NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

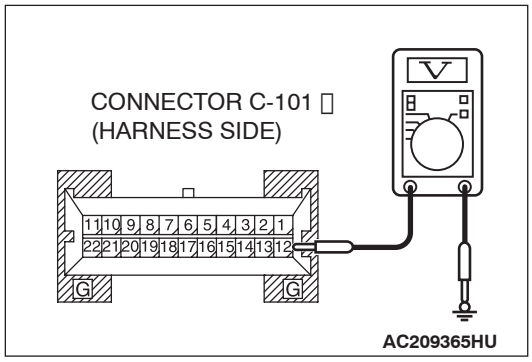
Q: Is the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22 in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter works normally.



STEP 4. Measure the voltage at combination meter connector C-101 in order to power supply circuit to combination meter (IG1 power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "ON" position.



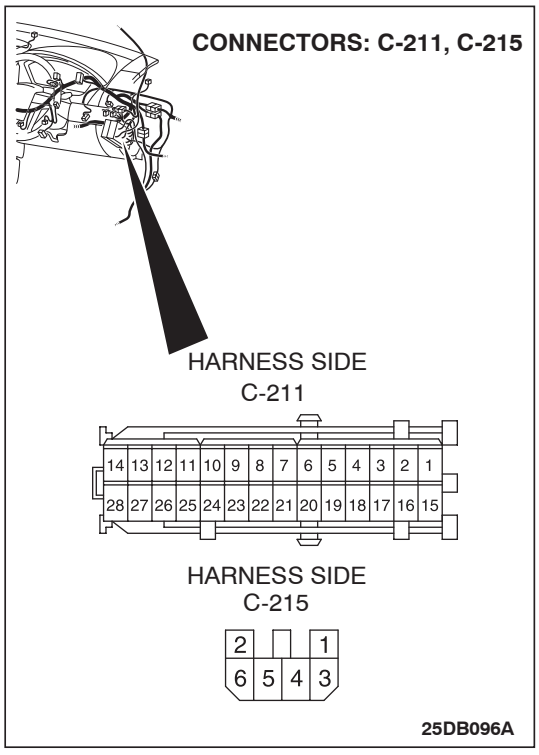
(3) Measure the voltage between terminal 12 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1)

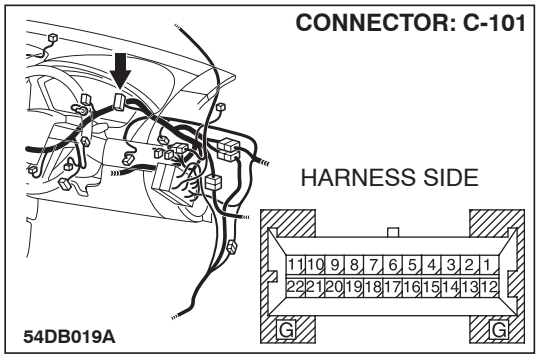
NOTE: Also check junction block connector C-211 and C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If inspecting junction block connector C-211 or C-215 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



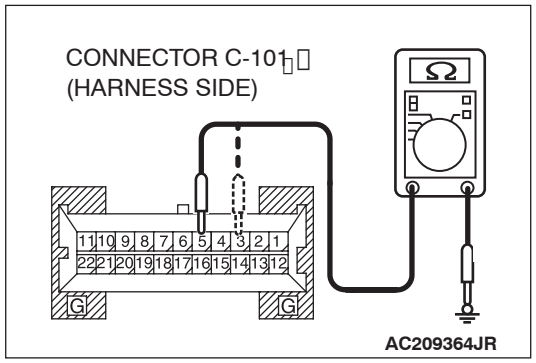
Q: Is the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1) in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter works normally.

STEP 6. Measure the resistance at combination meter connector C-101 in order to the ground circuit to the combination meter.



(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.

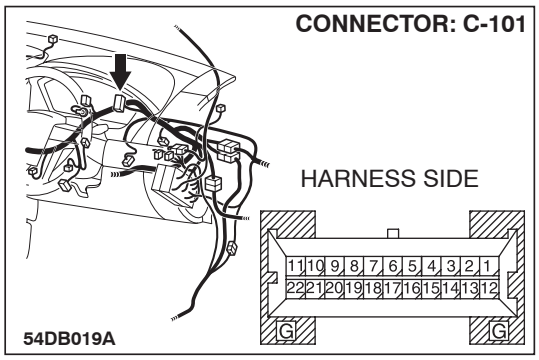


(2) Measure the resistance value between terminal 3, 5 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground.



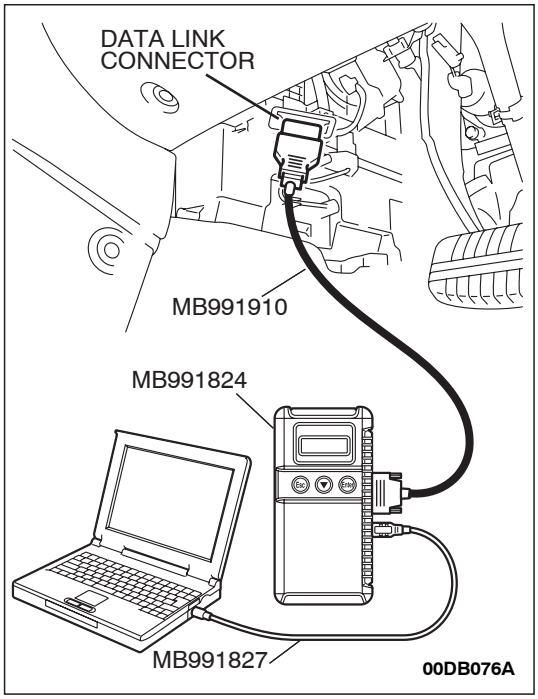
Q: Is the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter works normally.

STEP 8. Retest the system.

Q: Is the check result satisfactory?

YES : Go to Step 9
NO : Replace the combination meter.

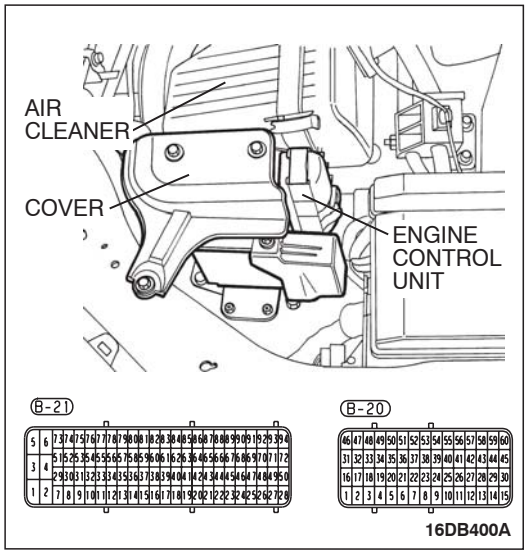


STEP 9. Using diagnostic tool MB991958, diagnose the CAN bus line.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 10.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 12.



STEP 10. Check Engine-ECU connector B-20 and B-21 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the Engine-ECU connectors B-20 and B-21 in good condition?

YES : Go to Step 11.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

STEP11. Using diagnostic tool MB991958, read MPI system diagnostic trouble code.

Check if the MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system (Refer to GROUP 13A, MPI Diagnosis – Diagnostic Trouble Code Chart . On completion, go to Step 12.
NO : Go to Step 12.

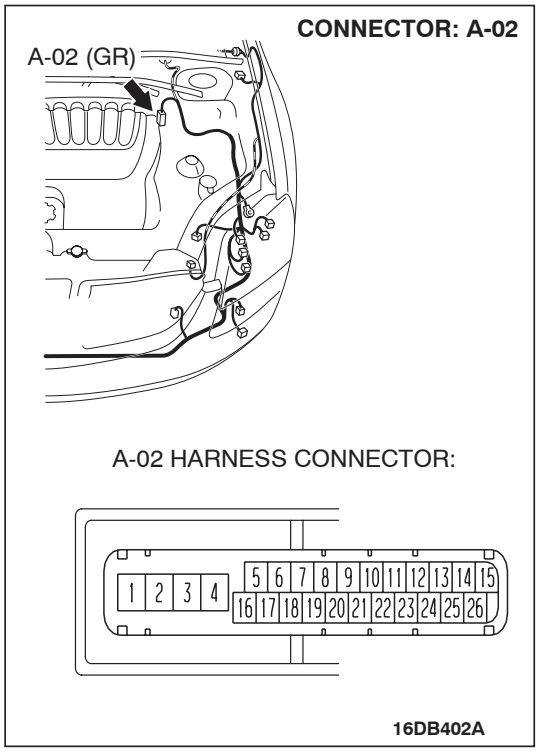
STEP 12. Retest the system.
Check that the function works normally.

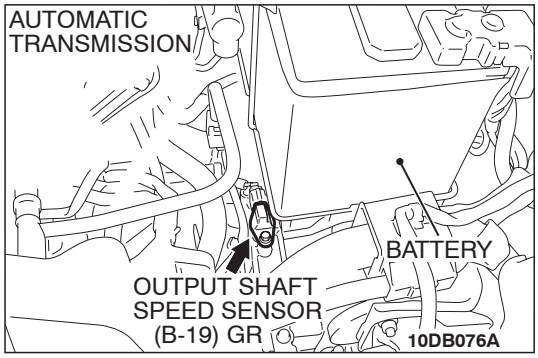
Q: Is the check result satisfactory?

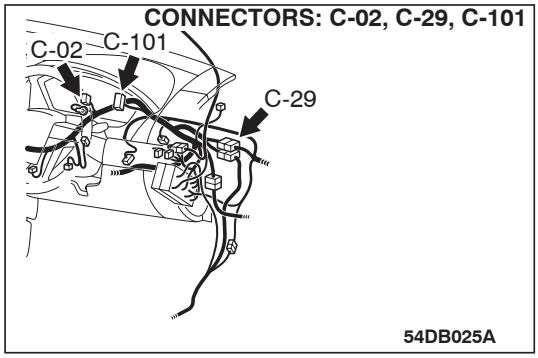
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

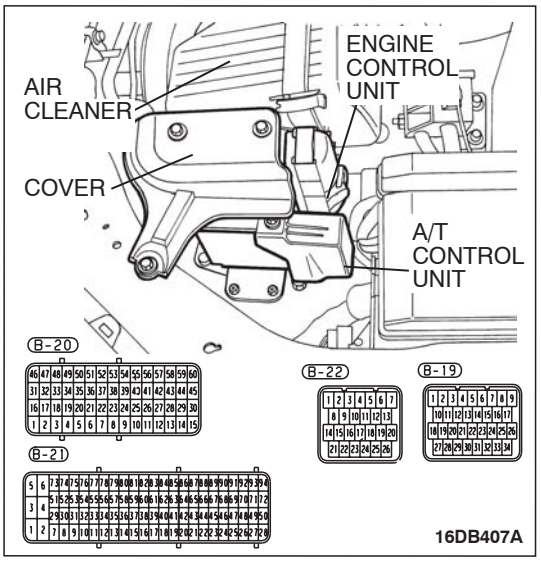
NO : Replace the Engine-ECU.

INSPECTION PROCEDURE 9: Average fuel displays "- - -" litres/100 km. INSPECTION PROCEDURE 10: Instant fuel always displays "--.-" litres/ 100km. INSPECTION PROCEDURE 11: Total distance travelled does not operate (increase). INSPECTION PROCEDURE 12: Average speed always displays "- - . -" km/h. INSPECTION PROCEDURE 13: Rest reminder does not function. INSPECTION PROCEDURE 14: Sevice reminder does not function.

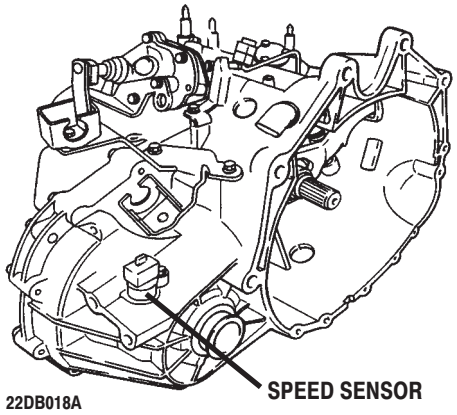








MANUAL TRANSMISSION



⚠ CAUTION

When the battery cable is disconnected or the combination meter is removed, the fuel gauge learned value will be erased. To let the display unit re-learn it, enter the vehicle speed (by driving the vehicle or entering simulated vehicle speed) and then stop the vehicle.

CIRCUIT OPERATION

The output shaft speed sensor (A/T) sends vehicle signal to the combination meter via the A/T-ECU and the CAN bus line (automatic transmission) while the speed sensor (M/T) sends vehicle signal to the combination meter via the ENGINE-ECU and the CAN bus line (manual transmission (M/T)).

TECHNICAL DESCRIPTION (COMMENT)

If only the speedometer does not operate, the Engine ECU system, the combination meter, the wiring harness or its connector may be defective. Furthermore, incorrect level of fuel is shown on the gauge, because the display unit can not learn the fuel gauge.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Speed sensor malfunction
- Malfunction of the trip computer/ combination meter
- Malfunction of the Engine ECU
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

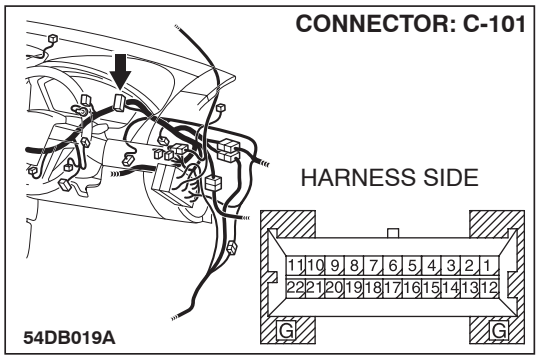
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A (Vehicles with CAN communication system)

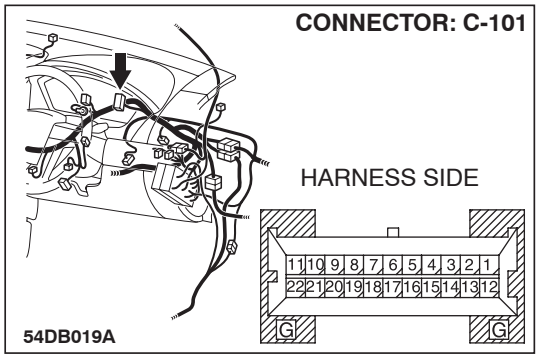
STEP 1. Check combination meter connector C-101 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is combination meter connector C-101 in good condition?

YES : Go to Step 2.

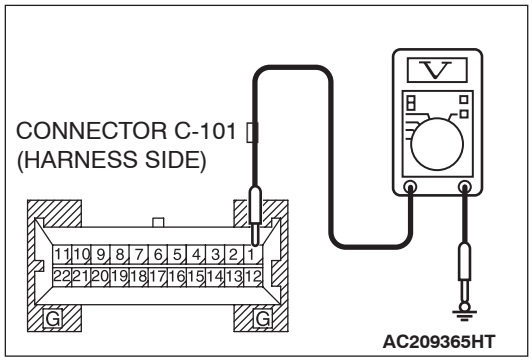
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The combination meter works normally.





STEP 2. Measure at combination meter connector C-101 in order to power supply circuit to combination meter (battery power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "LOCK" (OFF) position.



(3) Measure the voltage between terminal 1 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

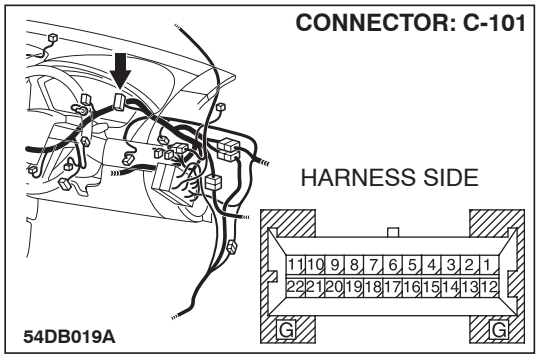
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22.

NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

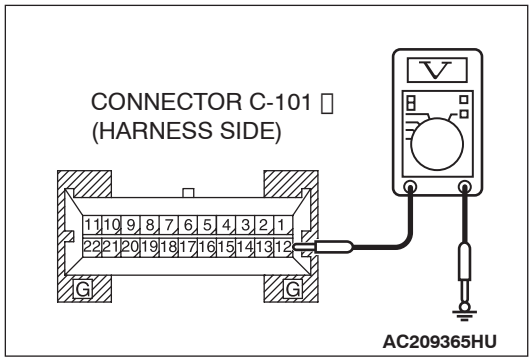
Q: Is the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22 in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter works normally.



STEP 4. Measure the voltage at combination meter connector C-101 in order to power supply circuit to combination meter (IG1 power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "ON" position.



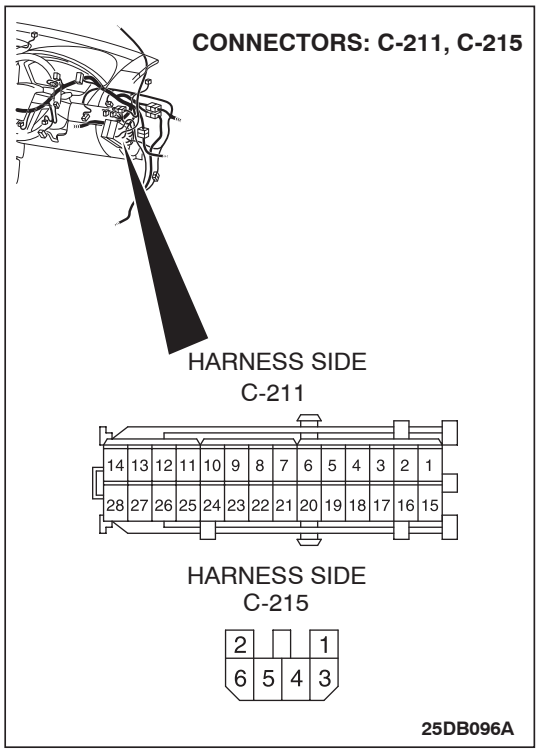
(3) Measure the voltage between terminal 12 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1)

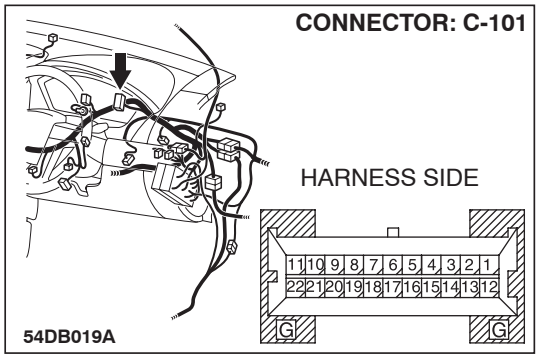
NOTE: Also check junction block connector C-211 and C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If inspecting junction block connector C-211 or C-215 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



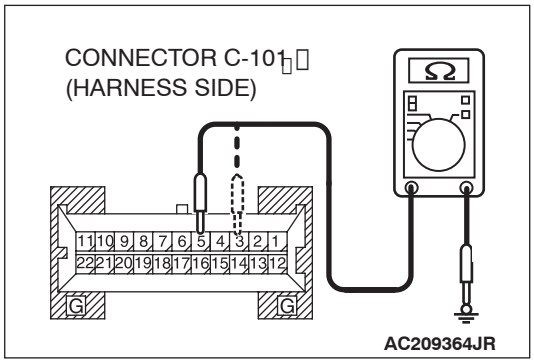
Q: Is the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1) in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the combination meter works normally.

STEP 6. Measure the resistance at combination meter connector C-101 in order to the ground circuit to the combination meter.



(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.

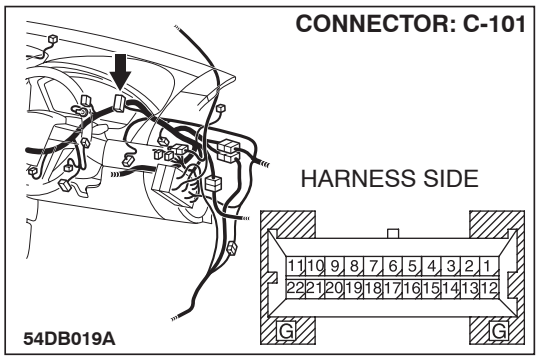


(2) Measure the resistance value between terminal 3, 5 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground.



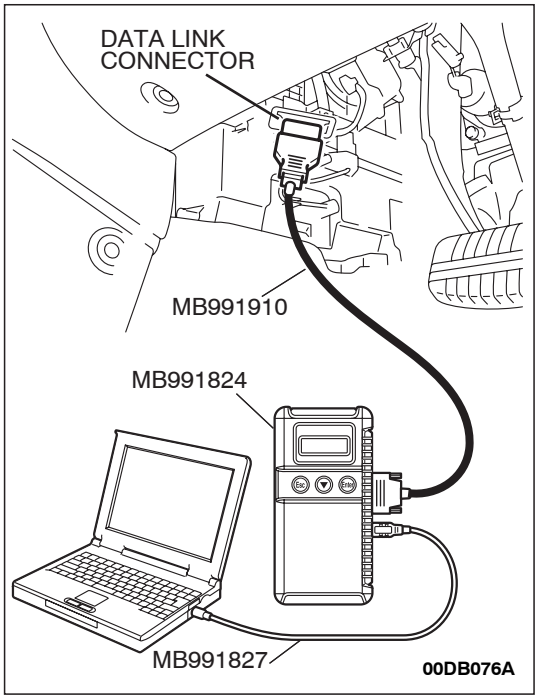
Q: Is the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground in good condition?

YES : Procedure is complete. Retest the system.
NO : Repair the wiring harness. Check that the mode witch and combination meter works normally.

STEP 8. Retest the system.

Q: Is the check result satisfactory?

YES : Go to Step 9
NO : Replace the combination meter.



STEP 9. Using diagnostic tool MB991958, diagnose the CAN bus line.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 10.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 12.

STEP 10. Using diagnostic tool MB991958, read A/T diagnostic trouble code.

Check if an A/T system or Engine (MPI) system DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 23A, Automatic Transmission Diagnosis or GROUP 13A Engine (MPI) – Diagnostic Trouble Code Chart P.23A-34, or refer to Output speed sensor systemP.23A-72. On completion, go to Step 12.
NO : Go to Step 11.

STEP 11. Check the speedometer

Use diagnostic tool MB991958 to enter simulated vehicle speed.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Select "Interactive Diagnosis" from the start-up screen.
(4) Select "System Select."
(5) Choose "Meter" .
(6) Select "Simulated vehicle Speed Output."

OK: The speedometer shows that simulated vehicle speed.

Q: Is the check result satisfactory?

YES : Go to Step 12.
NO : Replace the combination meter, then go to Step 12.

STEP 12. Retest the system.
Check that the speedometer works normally.

Q: Is the check result satisfactory?

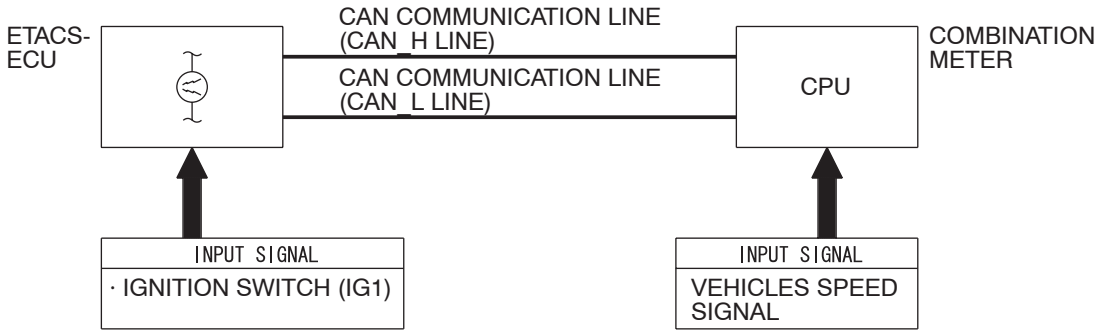
YES : The procedure is complete. (If no malfunctions are found in all steps, an intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points – How to Cope with Intermittent Malfunction P.00-14).

NO : Go to step 1.

INSPECTION PROCEDURE 15: Speed alarm warning "Beeps" do not trigger when set speed is exceeded.

NOTE: This troubleshooting procedure requires the use of diagnostic tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

Speed Alarm Function Circuit



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CIRCUIT OPERATION

The ETACS-ECU controls the speed alarm warning tone alarm, based on the signals from the switches and sensors below.

- Ignition switch (IG1): ON
- Vehicle speed signal exceeding set speed

TECHNICAL DESCRIPTION (COMMENT)

If the speed alarm warning tone alarm does not work, connector(s), wiring harness in the CAN bus lines, the combination meter, the ETACS-ECU or the input signal circuit may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Trouble in input signal system (vehicle speed sensor)
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The combination meter may be defective
- The Engine-ECU, A/T-ECU or ETACS-ECU may be defective

DIAGNOSIS

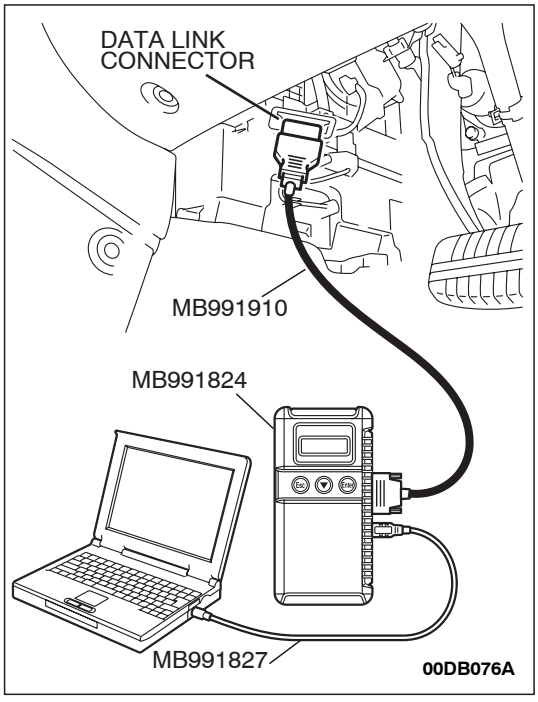
Required Special Tools:

- MB991223: Harness Set
- MB991958: diagnostic tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991910: MUT-III Main Harness A
- MB991813: SWS Monitor Kit
  - MB991806: SWS Monitor Cartridge
  - MB991812: SWS Monitor Harness (For Column-ECU)
  - MB991822: Test Probe Harness

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

⚠ CAUTION

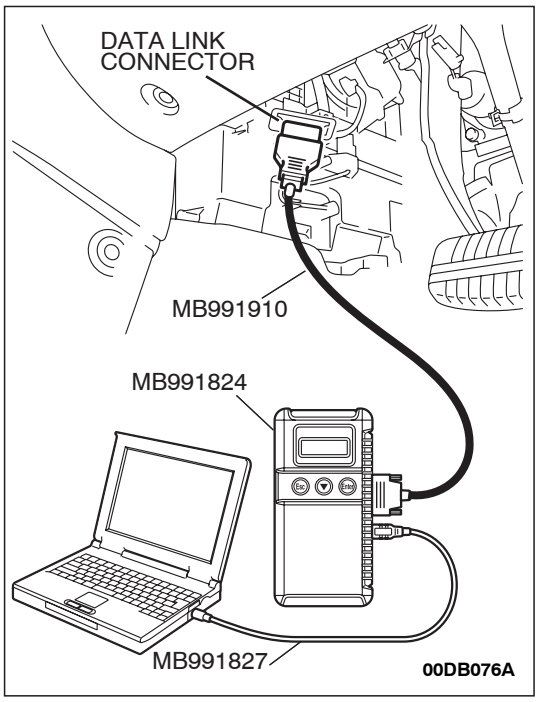
To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



(1) Connect diagnostic tool MB991958. Refer to "How to connect SWS monitor P.54B-13."
(2) Turn the ignition switch to the "ON" position.
(3) Diagnose the CAN bus line.
(4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the CAN bus line found to be normal?

YES : Go to Step 2.
NO : Repair the CAN bus line (Refer to GROUP 54C, Diagnosis P.54C-5).



STEP 2. Using diagnostic tool MB991958, read the combination meter diagnostic trouble code.

Check whether the combination meter-related DTC is set.

(1) Turn the ignition switch to the "ON" position.
(2) Check whether the combination meter-related DTC is set.
(3) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Diagnose the combination meter (Refer to GROUP 54A, Diagnostic trouble code chart P.54A-48).

NO : Go to Step 3.

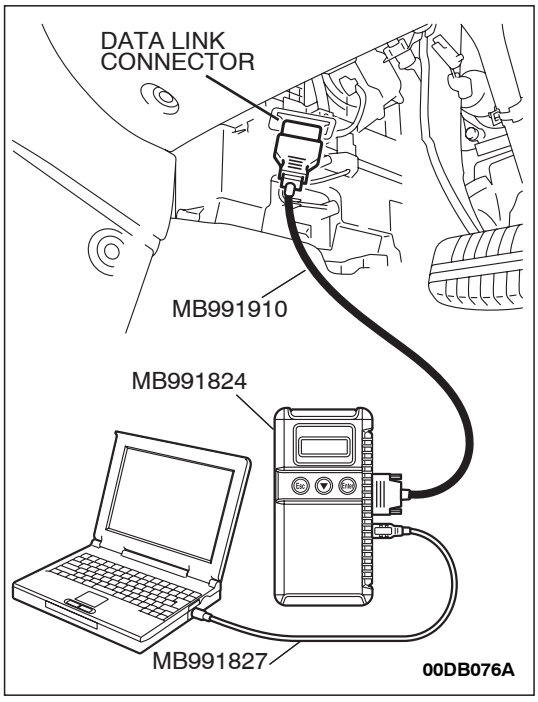
STEP 3. Using diagnostic tool MB991958, read A/T diagnostic trouble code.

Check if an A/T system or Engine (MPI) system DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 23A, Automatic Transmission Diagnosis – Diagnostic Trouble Code Chart P.23A-34, or GROUP 13A Engine (MPI) – Diagnostic Trouble Code Chart P.13A-17, or refer to Output speed sensor systemP.23A-72. On completion, go to Step 4.

NO : Go to Step 4.



STEP 4. Check the speedometer and buzzer function.

Check the input signals from the following switch:

- Ignition switch: ON

Use diagnostic tool MB991958 to enter simulated vehicle speed.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Select "Interactive Diagnosis" from the start-up screen.
(4) Select "System Select."
(5) Choose "Meter" .
(6) Select "Simulated vehicle Speed Output."
(7) Confirm if speed alarm "BEEPS"

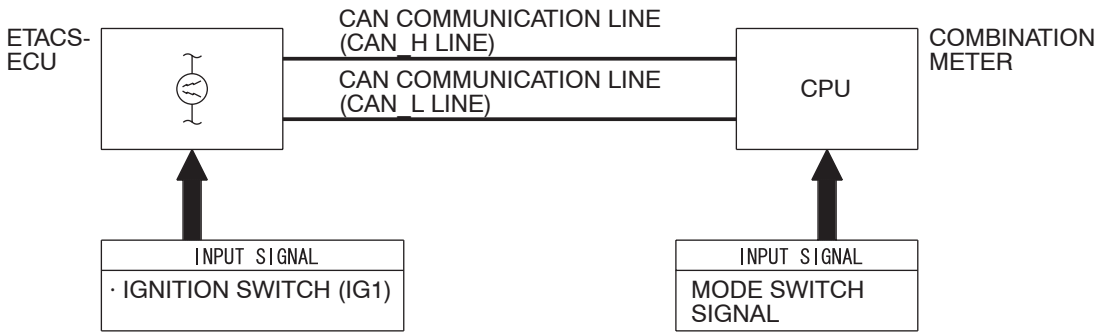
Q: Does speed alarm "BEEP" when set speed is exceeded?

YES : The procedure is complete.
NO : Replace the ETACS-ECU.

INSPECTION PROCEDURE 16: Speed alarm set speed cannot be adjusted and/ or turned off and/ or operating mode cannot be changed.

NOTE: This troubleshooting procedure requires the use of diagnostic tool MB991958 and SWS monitor kit MB991813. For details on how to use the SWS monitor, refer to "How to connect SWS monitor P.54B-13."

Mode Switch Function Circuit



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CIRCUIT OPERATION

The ETACS-ECU controls the speed alarm warning tone alarm, based on the signals from the switches and sensors below.

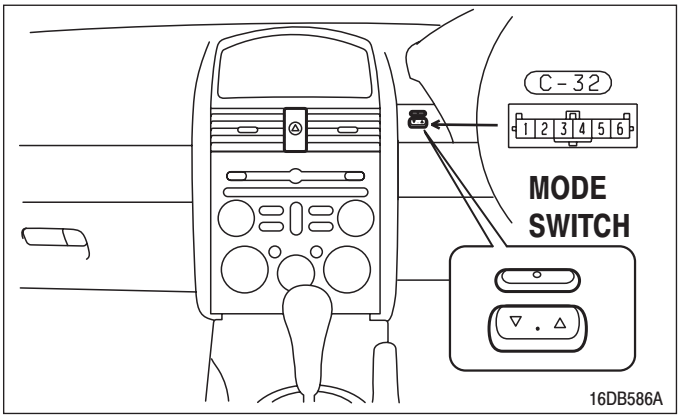
- Ignition switch (IG1): ON
- mode switch signals "MODE", "UP" and "DOWN".

TECHNICAL DESCRIPTION (COMMENT)

If the speed alarm mode switch does not work, connector(s), wiring harness in the mode switch and the combination meter circuits may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Mode switch input signals to the combination meter.
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector
- The trip computer/ combination meter may be defective
- The Engine-ECU, A/T-ECU or ETACS-ECU may be defective



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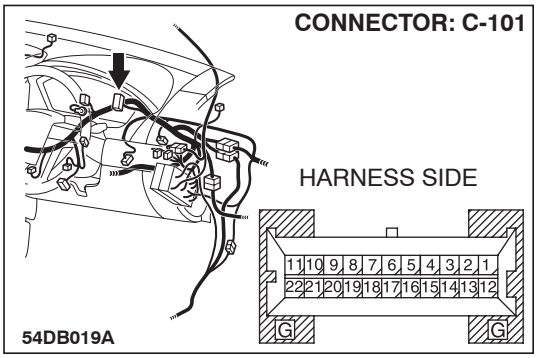

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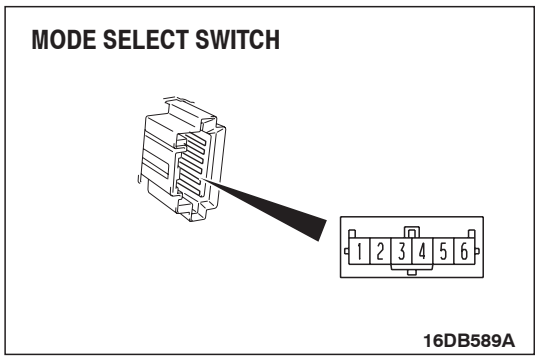
REMOVAL SERVICE POINT

<<A>> MODE SELECT SWITCH REMOVAL

Remove the mode select switch by removing the screws that attach the switch to the cover.

MODE SELECT SWITCH CONTINUITY CHECK

NOTE: If any of the below specifications are not met, replace the mode switch.



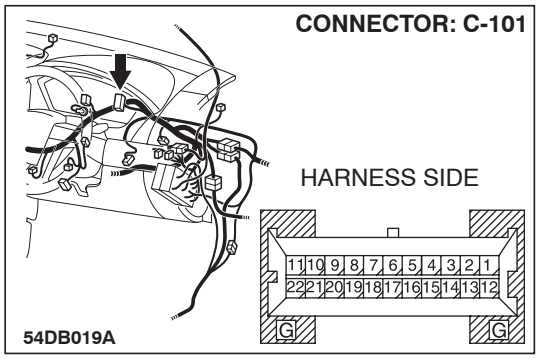
SWITCH POSITION	TESTER CONNECTION	SPECIFIED CONDITION
Mode select "ON" (depress)	1 – 6	Less than 2 ohms
Mode select "OFF" (released)	1 – 6	Open circuit
Mode select "UP" (depress)	2 – 6	Less than 2 ohms
Mode select "UP" (released)	2 – 6	Open circuit
Mode select "DOWN" (depress)	5 – 6	Less than 2 ohms
Mode select "DOWN" (released)	5 – 6	Open circuit

DIAGNOSIS

Required Special Tool:

- MB991223: Harness set

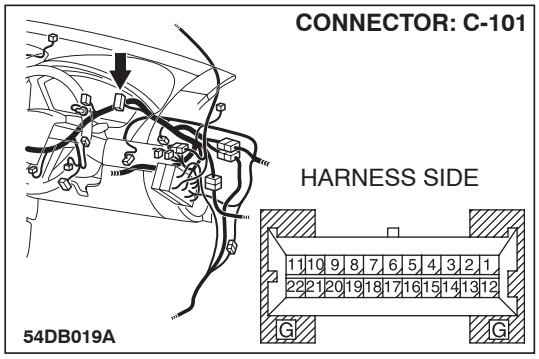
STEP 1. Check combination meter connector C-101 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Is combination meter connector C-101 in good condition?

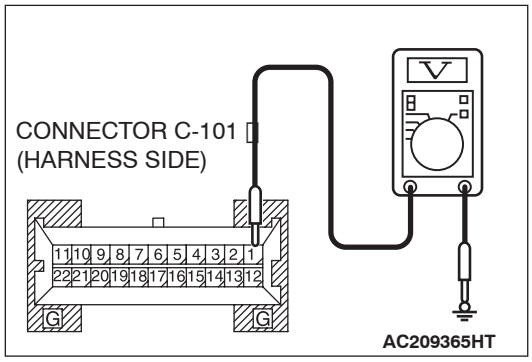
YES : Go to Step 2.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The mode switch and combination meter works normally.



STEP 2. Measure at combination meter connector C-101 in order to power supply circuit to combination meter (battery power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "LOCK" (OFF) position.



(3) Measure the voltage between terminal 1 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

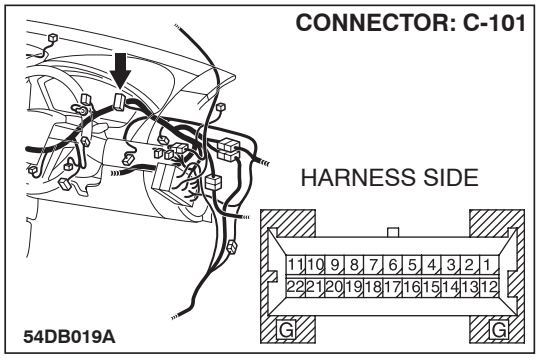
YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22.

NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

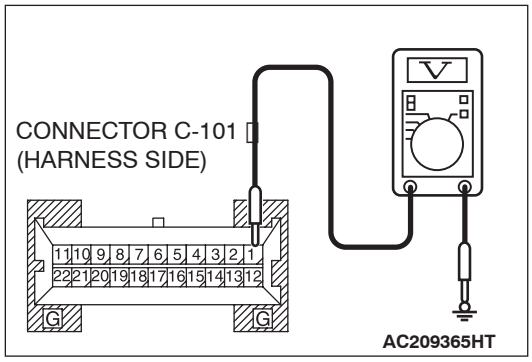
Q: Is the wiring harness between combination meter connector C-101 (terminal 1) and the fuse No.22 in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the mode switch and combination meter works normally.



STEP 4. Measure the voltage at combination meter connector C-101 in order to power supply circuit to combination meter (IG1 power supply).

(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.
(2) Turn the ignition switch to "ON" position.



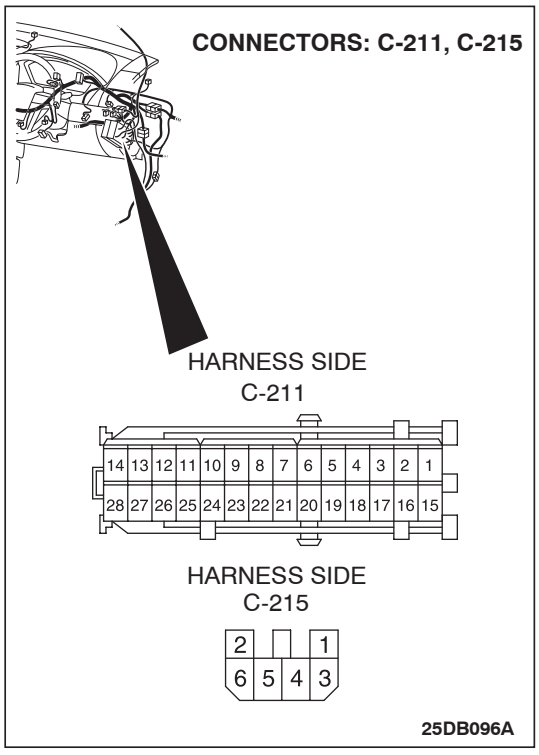
(3) Measure the voltage between terminal 12 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Check the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1)

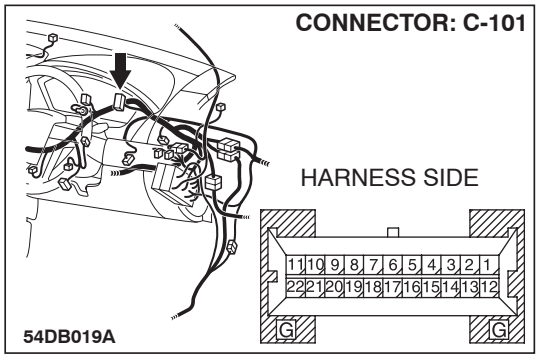
NOTE: Also check junction block connector C-211 and C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If inspecting junction block connector C-211 or C-215 is damaged, repair or replace. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.



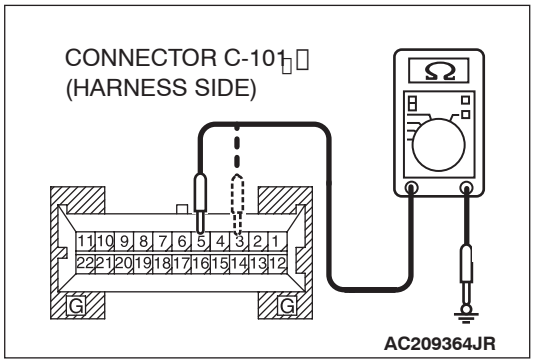
Q: Is the wiring harness between combination meter connector C-101 (terminal 12) and the ignition switch (IG1) in good condition?

YES : Retest the system.
NO : Repair the wiring harness. Check that the mode switch and combination meter works normally.

STEP 6. Measure the resistance at combination meter connector C-101 in order to the ground circuit to the combination meter.



(1) Disconnect combination meter connector C-101, and measure at the wiring harness side.

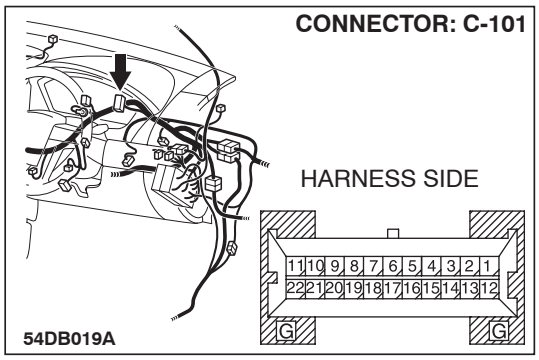


(2) Measure the resistance value between terminal 3, 5 and ground.
- The resistance should be 2 ohms or less.

Q: Is the measured resistance 2 ohms or less?

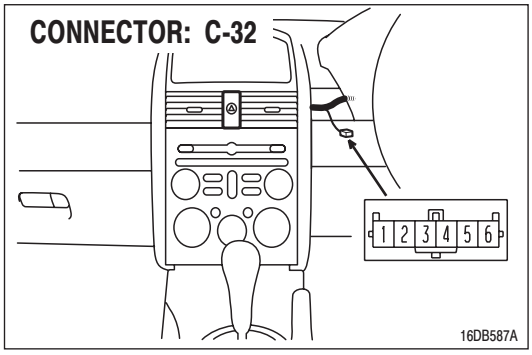
YES : Go to Step 8.
NO : Go to Step 7.

STEP 7. Check the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground.



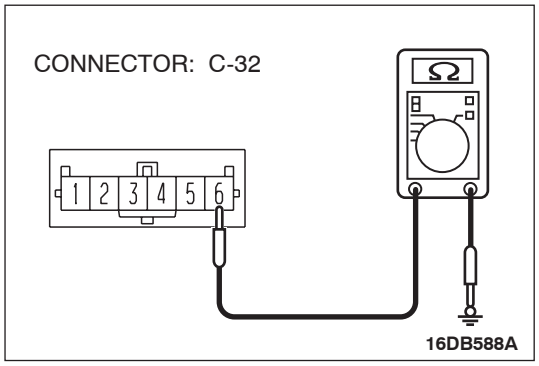
Q: Is the wiring harness between combination meter connector C-101 (terminal 3 and 5) and ground in good condition?

YES : Procedure is complete. Retest the system.
NO : Repair the wiring harness. Check that the mode witch and combination meter works normally.



STEP 8. Measure the resistance at MODE switch connector C-32 to the ground circuit .

(1) Disconnect the mode switch connector C-32.



(2) Measure resistance between terminal 6 and ground.
- The measured value should be 2 ohm or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 9.

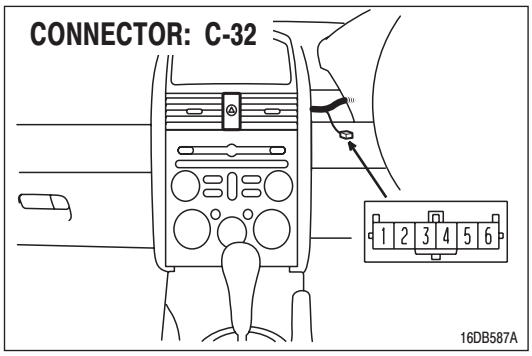
NO : Repair the earth circuit and check mode switch operation.

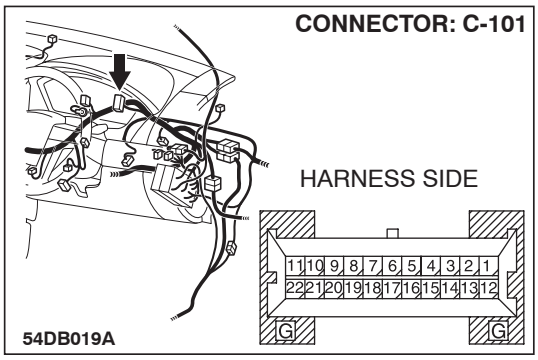
STEP 9. Check the wiring harness and terminals between combination meter connector C-101 (terminal 16) and the mode switch connector C-32 (terminal 1)

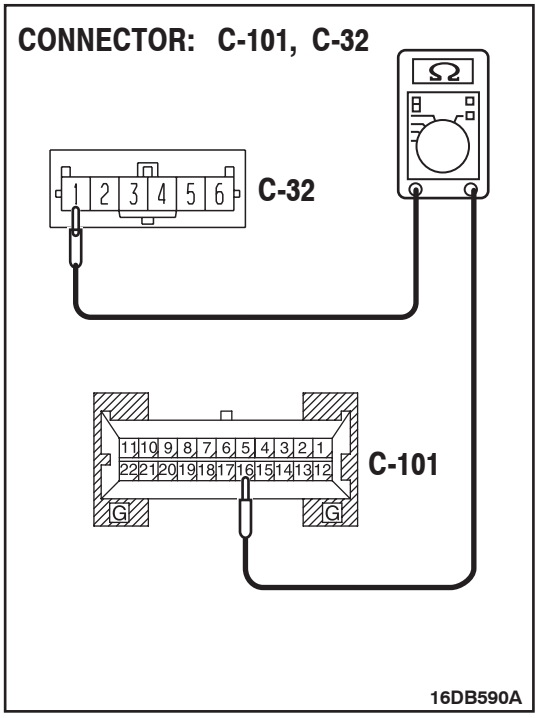
Q: Is the wiring harness between combination meter connector C-101 (terminal 16) and the mode switch connector C-32 (terminal 1) in good condition?

YES : Go to Step 10.

NO : Repair the wiring harness. Check that the mode switch functions normally.







STEP 10. Measure the resistance between the combination meter connector C-101 (terminal 16) and the mode switch connector C-32 (terminal 1).

(1) Disconnect the combination meter connector C-101 and the mode switch connector C-32.

(2) Measure resistance between combination meter C-101 (terminal 16) and mode switch connector C-32 (terminal 1).
- The measured value should be 2 ohm or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 11.

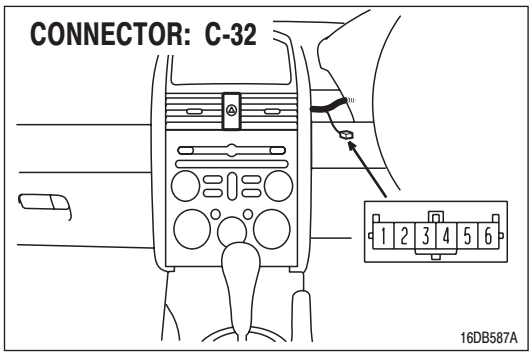
NO : Repair the wiring circuit and check the mode switch operation.

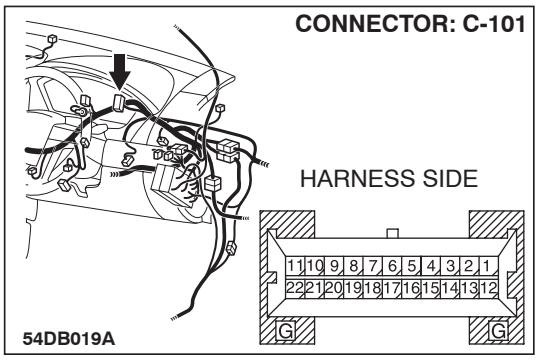
STEP 11. Check the wiring harness and terminals between combination meter connector C-101 (terminal 17) and the mode switch connector C-32 (terminal 2)

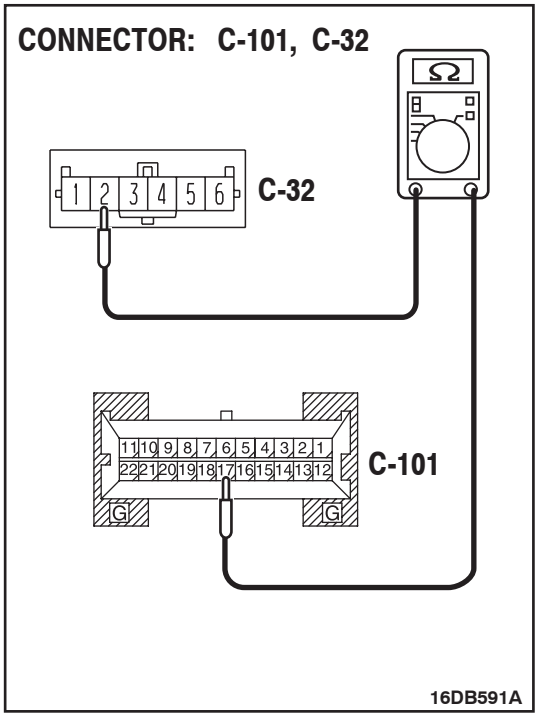
Q: Is the wiring harness between combination meter connector C-101 (terminal 17) and the mode switch connector C-32 (terminal 2) in good condition?

YES : Go to Step 12.

NO : Repair the wiring harness. Check that the mode switch functions normally.







STEP 12. Measure the resistance between the combination meter connector C-101 (terminal 17) and the mode switch connector C-32 (terminal 2).

(1) Disconnect the combination meter connector C-101 and the mode switch connector C-32.

(2) Measure resistance between combination meter C-101 (terminal 17) and mode switch connector C-32 (terminal 2).
- The measured value should be 2 ohm or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 13.

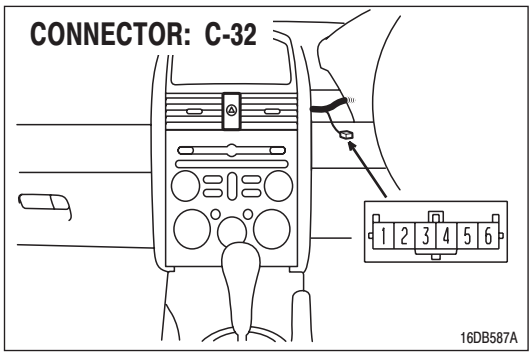
NO : Repair the wiring circuit and check the mode switch operation.

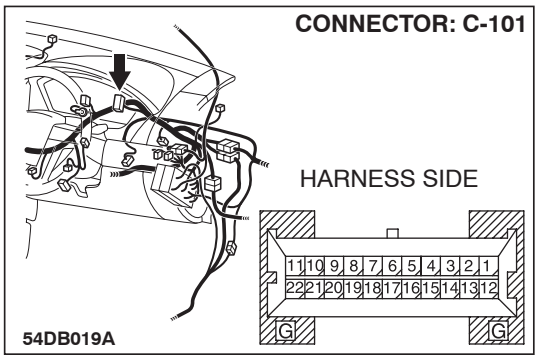
STEP 13. Check the wiring harness and terminals between combination meter connector C-101 (terminal 18) and the mode switch connector C-32 (terminal 5)

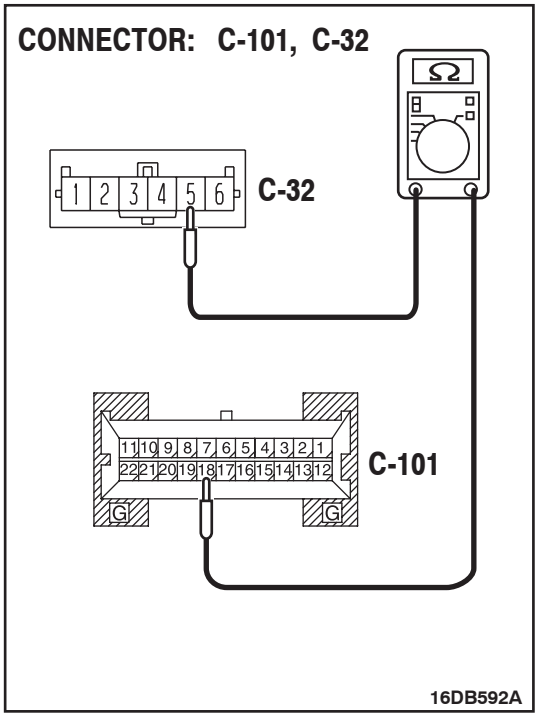
Q: Is the wiring harness between combination meter connector C-101 (terminal 18) and the mode switch connector C-32 (terminal 5) in good condition?

YES : Go to Step 14.

NO : Repair the wiring harness. Check that the mode switch functions normally.







STEP 14. Measure the resistance between the combination meter connector C-101 (terminal 18) and the mode switch connector C-32 (terminal 5).

(1) Disconnect the combination meter connector C-101 and the mode switch connector C-32.

(2) Measure resistance between combination meter C-101 (terminal 18) and mode switch connector C-32 (terminal 5).
- The measured value should be 2 ohm or less.

Q: Is the measured resistance 2 ohms or less?

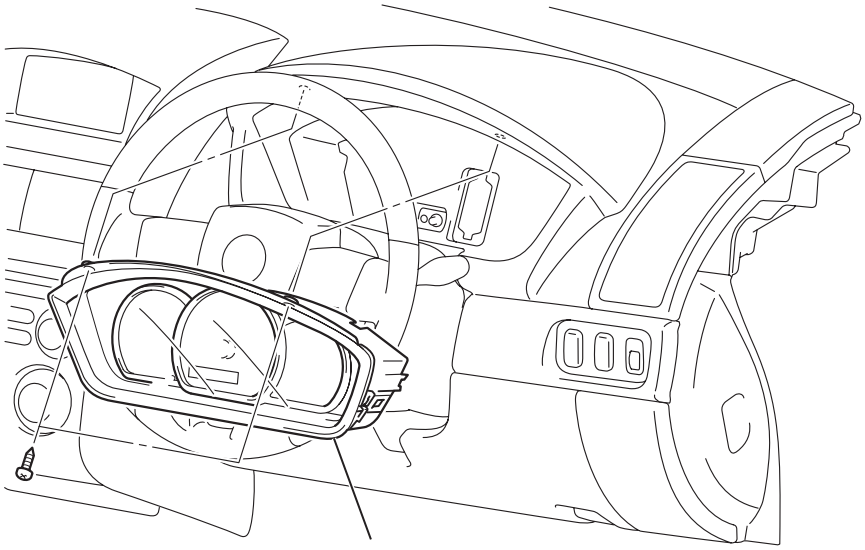
YES : Replace combination meter and retest mode switch function.

NO : Repair the wiring circuit and check the mode switch operation.

COMBINATION METER ASSEMBLY

REMOVAL AND INSTALLATION

M1543021300073



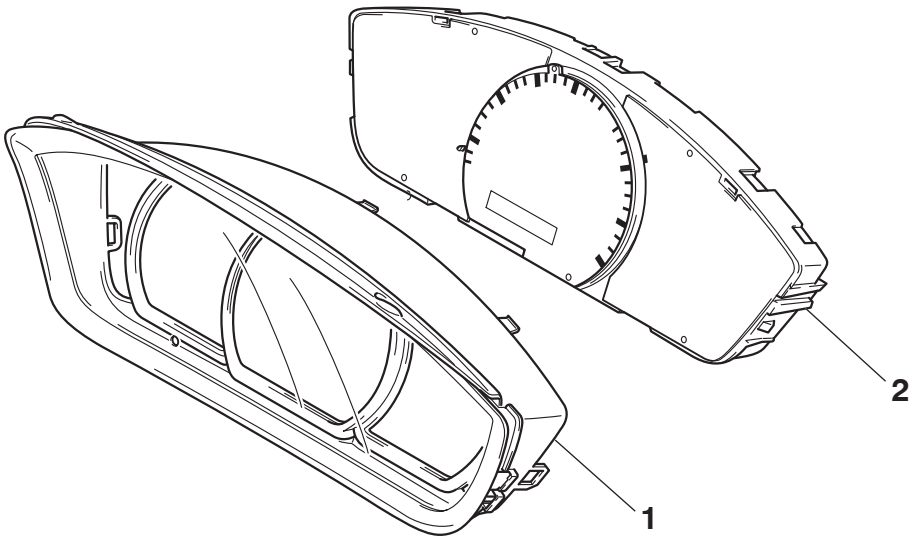
COMBINATION METER

NOTE:
THE COMBINATION METER CONNECTOR IS FIXED IN THE INSTRUMENT PANEL.

54DB032A

DISASSEMBLY AND ASSEMBLY

M1543003100352



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DISASSEMBLY STEPS

1. WINDOW PLATE
2. METER ASSEMBLY

HEADLAMP AND POSITION LAMP ASSEMBLY

HEADLAMP DIAGNOSIS

M1542010500768

The headlamps are controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis – Symptom Chart P.54B-57.

ON-VEHICLE SERVICE

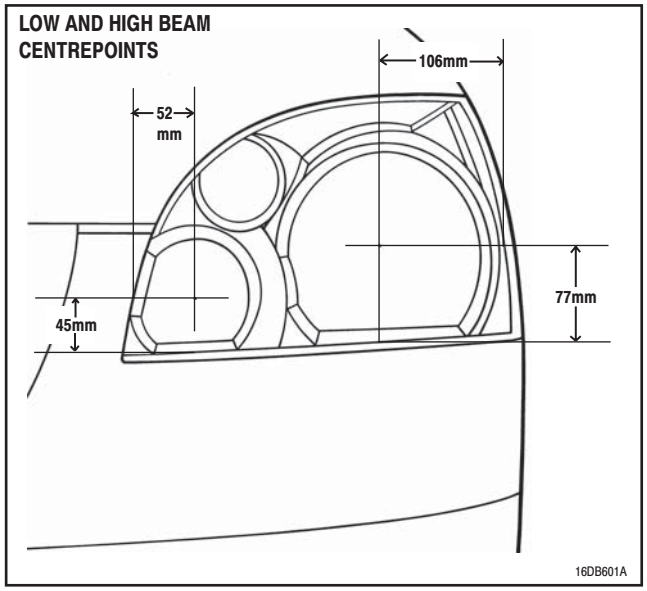
HEADLAMP AIMING

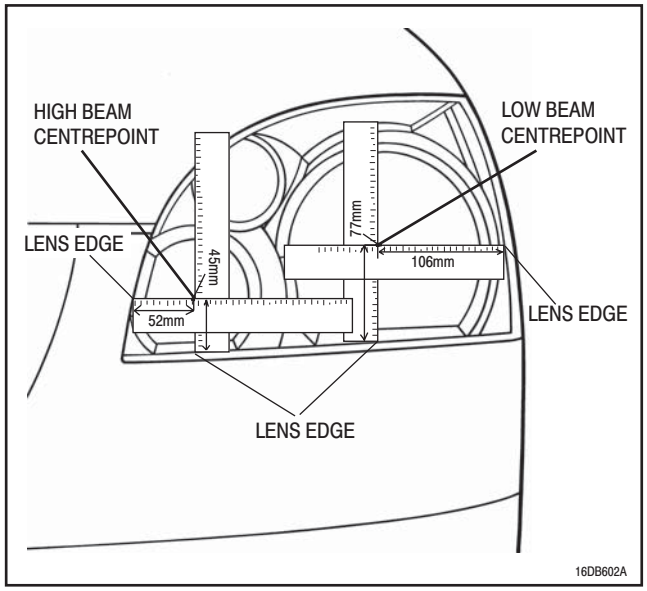
M1542000900549

PRE-AIMING INSTRUCTIONS

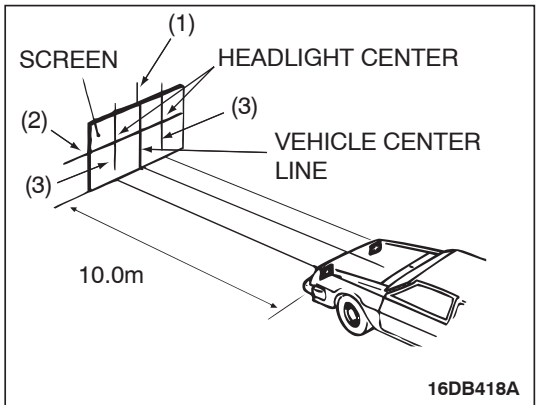
1. Inspect for badly rusted or faulty headlamp assemblies.
2. Inspect tyre inflation, and adjust if it is necessary.
3. If the fuel tank is not full, place a weight in the trunk of the vehicle to simulate weight of a full tank [0.8 kg per Litre].
4. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg placed in driver's position.
5. Thoroughly clean headlamp lenses.
6. Measure centre of low beam or high beam separately using 2 straight rulers, 1 vertically and 1 horizontally as shown below (do not bend rulers). Using the edge of the lens as a guide and the given measurements shown in the illustration, the centre points will be within specification.

   NOTE: Where the lens is curved, do not the bend ruler around as it will give you an incorrect centrepoint. By using a straight ruler and using your eye to align the edge of the ruler and the edge of the lens is the recommended method.





7. Place the vehicle on a level floor, perpendicular to a flat screen 10.0 m away from the bulb centre-marks on the headlamp lens that you have measured and marked.



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. Set the distance between the screen and the bulb centre marks of the headlamp 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-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.
    (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.

    NOTE: ***Reference values***

    a. Low Beam - 678mm (H4)bulb
    b. High Beam- 652mm (H7)bulb

HEADLAMP ADJUSTMENT

NOTE: When adjusting headlamp, disconnect the other headlamp harness.

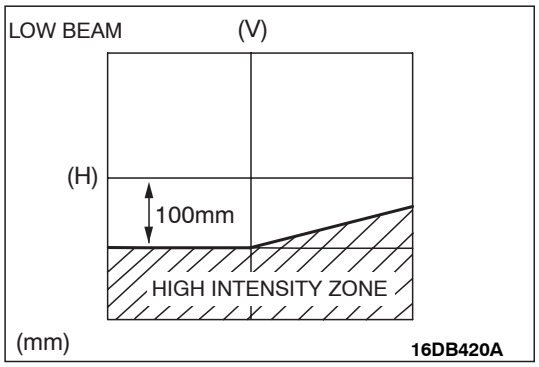
⚠ CAUTION

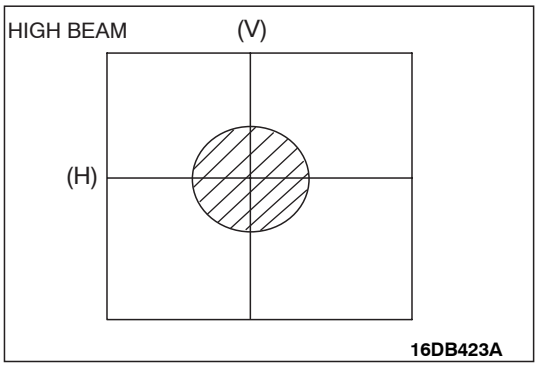
Do not cover a headlamp for more than three minutes to prevent the plastic headlamp lens deformation.

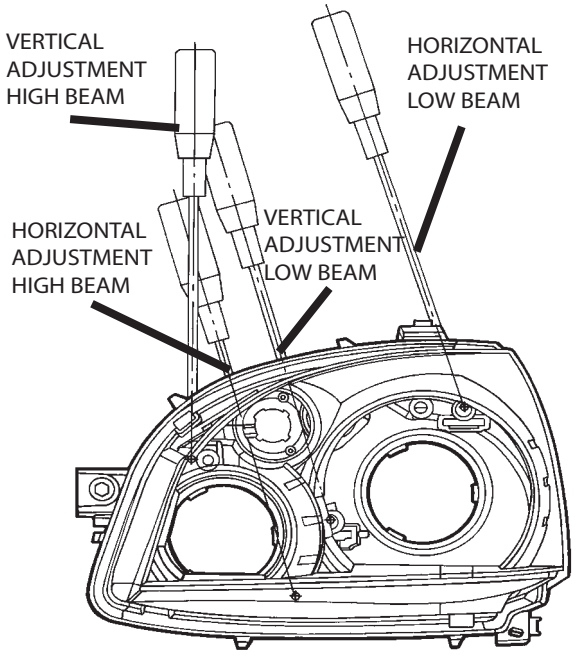
- **LOW BEAM**

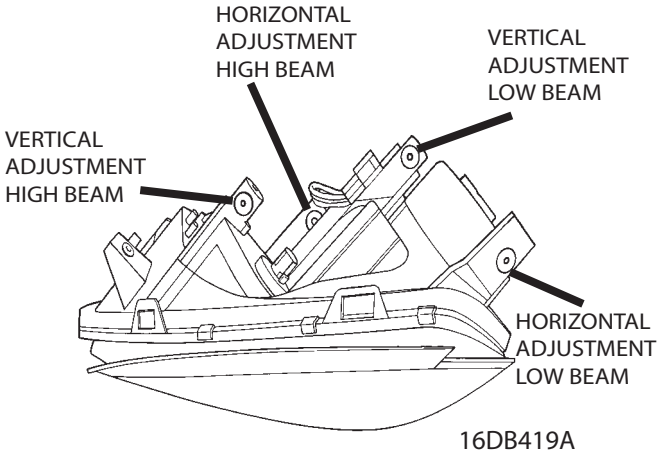
1. The low beam headlamp will project on the scree, the upper edge of the beam (cut-off).
2. Turn the adjusting screws to achieve the specified low-beam cut-off location on the aiming screen.

- **HIGH BEAM**
  - Cover larger reflector (Low beam)
  - Adjust reflector to get hot spot at intersection of Line 2 and headlamp centre line.
  - Turn the adjusting screws to achieve the specified high-beam cut-off location on the aiming screen.









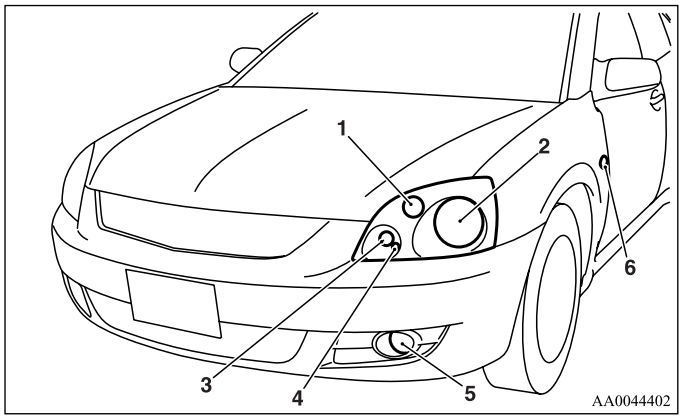
LUMINOUS INTENSITY MEASUREMENT

M1542001000486

- Measure the luminous intensity of headlamps with a photometer in accordance with the instruction manual prepared by the manufacturer of the photometer and make sure that the luminous intensity is within the following limit.

Limit:: High beam: 18,000 cd or more
Low beam: 7,000 cd or more

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.

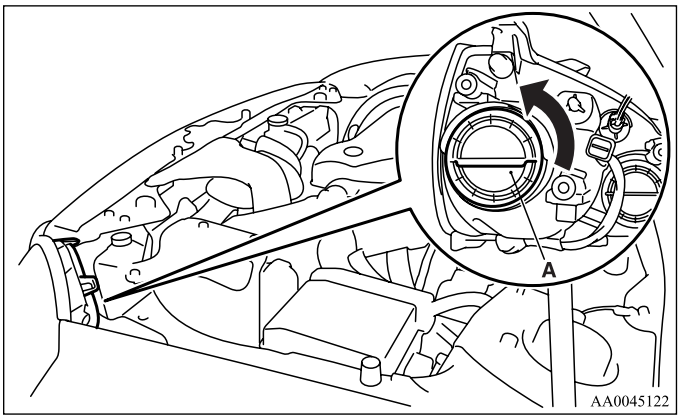


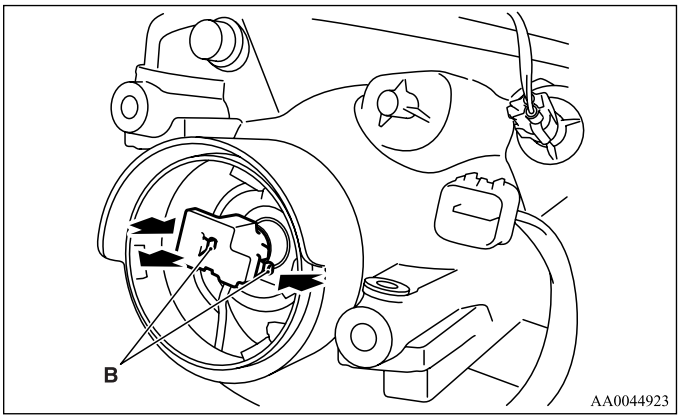
1. Front turn-signal lamps
2. Headlamps, high/low beam
3. Headlamps, high beam
4. Position/Park lamps
5. Front fog lamps
6. Side turn-signal lamps

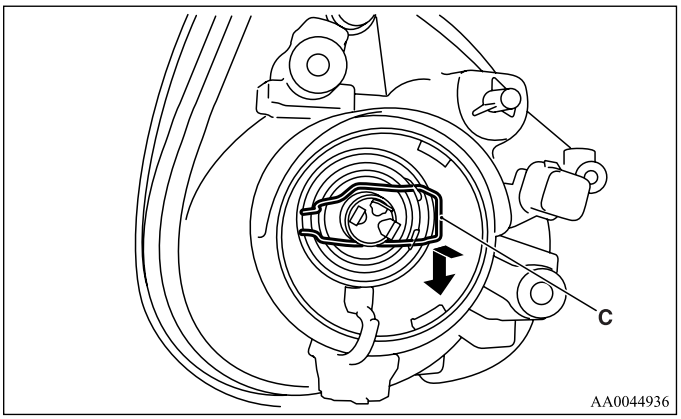
BULB REPLACEMENT

M1542001300711

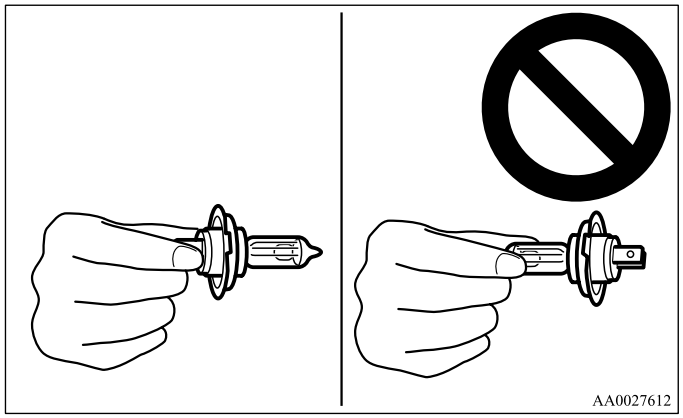
Headlamp (High/Low Beam)







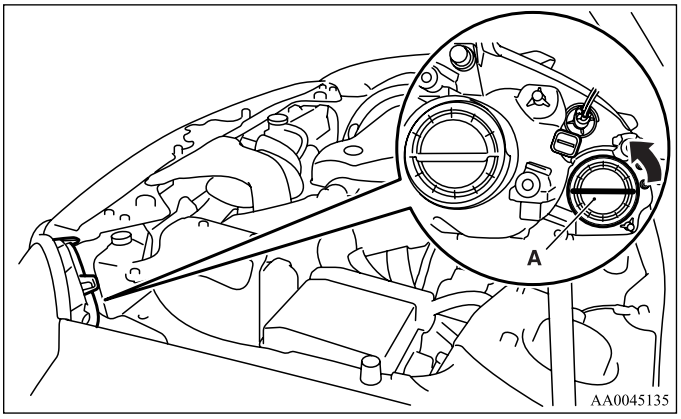
1. Turn the cap (A) anticlockwise and remove it.
2. While pressing the indicated points (B) on the sides of the socket, pull out the socket.
3. Unhook the spring (C), which secures the bulb, and remove the bulb.

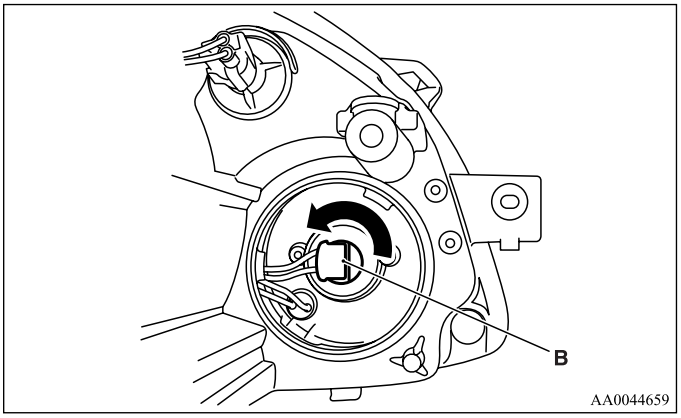


⚠ CAUTION

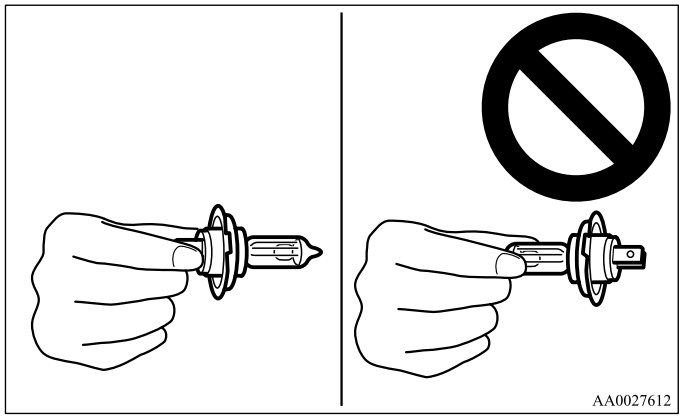
- **Handle halogen lamp with care. The gas inside halogen lamp bulb is highly pressurised, so dropping, knocking, or scratching a halogen lamp bulb can cause it to shatter.**
- **Never hold the halogen lamp bulb with a bare hand, dirty glove, etc. The oil from your hand could cause the bulb to break the next time the headlamps are operated. If the glass surface is dirty, it must be cleaned with alcohol, paint thinner, etc., and refit it after drying it thoroughly.**

Headlamp Bulb (High Beam)





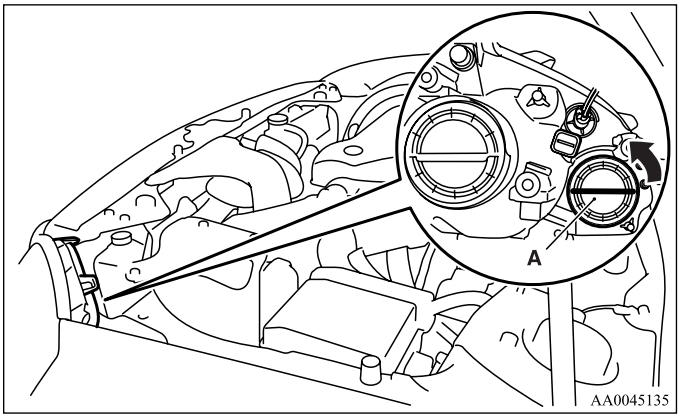
1. Turn the cap (A) anticlockwise and remove it.
2. Turn the bulb socket (B) anticlockwise to remove it. Remove the bulb from the socket by pulling it out.
3. Connect the headlamp bulb to the socket by pushing in and install bulb socket to the headlamp by twisting clockwise.

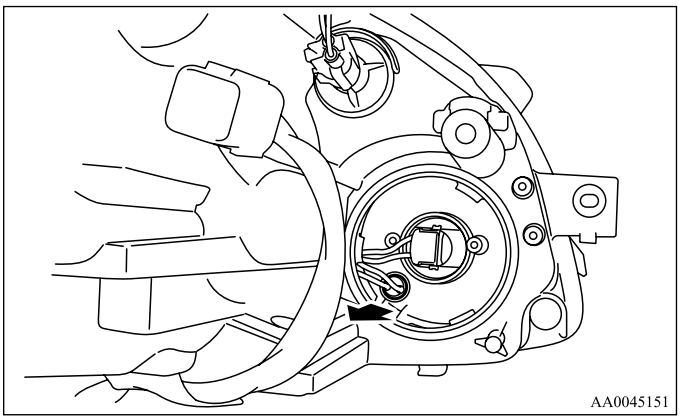


⚠ CAUTION

- **Handle halogen lamp with care. The gas inside halogen lamp bulb is highly pressurised, so dropping, knocking, or scratching a halogen lamp bulb can cause it to shatter.**
- **Never hold the halogen lamp bulb with a bare hand, dirty glove, etc. The oil from your hand could cause the bulb to break the next time the headlamps are operated. If the glass surface is dirty, it must be cleaned with alcohol, paint thinner, etc., and refit it after drying it thoroughly.**

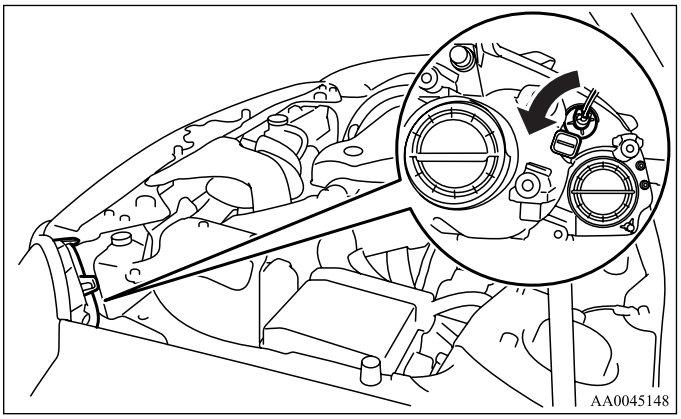
Position/Park Lamp Bulb





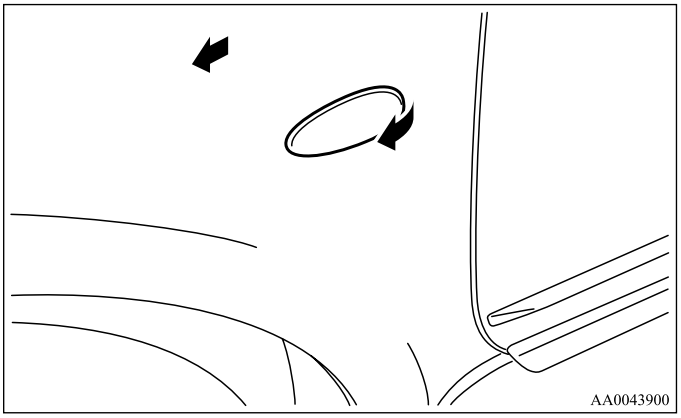
1. Turn the cap (A) anticlockwise and remove it.
2. Pull out the socket. Remove the bulb from the socket by pulling it out
3. When replacing bulb, push bulb into socket then push in socket to headlamp.
4. Install cap (A) by twisting it clockwise.

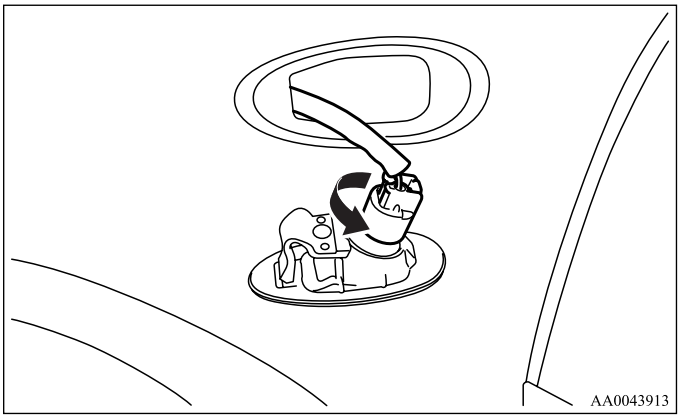
Front turn-signal lamps



1. Turn the bulb socket anticlockwise to remove it. Remove the bulb from the socket by turning it anticlockwise while pressing in.
2. When replacing bulb, turn clockwise while pushing in socket. Turn socket clockwise to fit to headlamp.

Side turn-signal lamps





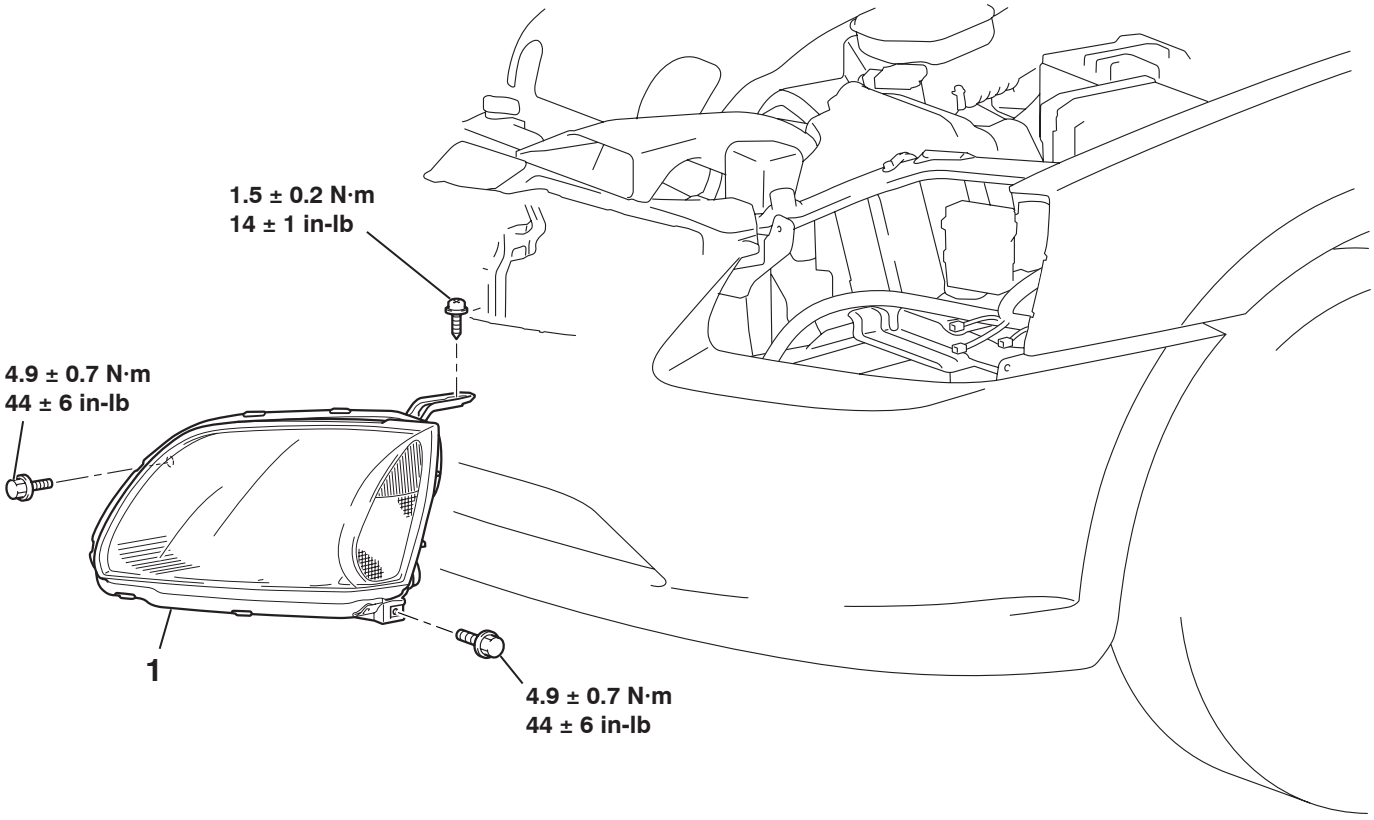
1. Remove the lamp housing by levering it towards the front of the vehicle.
2. Remove the socket and bulb assembly together by turning it anticlockwise, and then remove the bulb by pulling it out.
3. Replace bulb by pushing into socket, then turning socket clockwise in lamp.

HEADLAMP AND FRONT COMBINATION LAMP

REMOVAL AND INSTALLATION

M1542002700358

Post-installation operation
- Headlamp aiming adjustment (Refer to P.54A-143).



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HEADLAMP REMOVAL STEPS
- RADIATOR GRILL (REFER TO GROUP 51, RADIATOR GRILL P.51-6.)

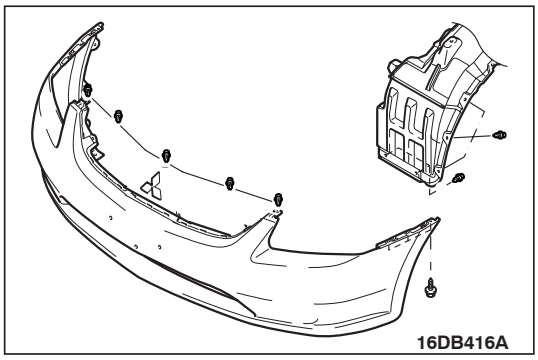
HEADLAMP REMOVAL STEPS
- SPLASH SHIELD MOUNTING CLIPS, FRONT BUMPER UNDER COVER, RUBBER NUT, LICENSE PLATE GARNISH (REFER TO GROUP 51, FRONT BUMPER P.51-2.)

<<A>> 1. HEADLAMP ASSEMBLY

REMOVAL SERVICE POINT

<<A>> HEADLAIGHT ASSEMBLY REMOVAL

Remove the front bumper mounting screw and clip.



FOG LAMP

FOG LAMP DIAGNOSIS

M1542000701366

The fog lamps are controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

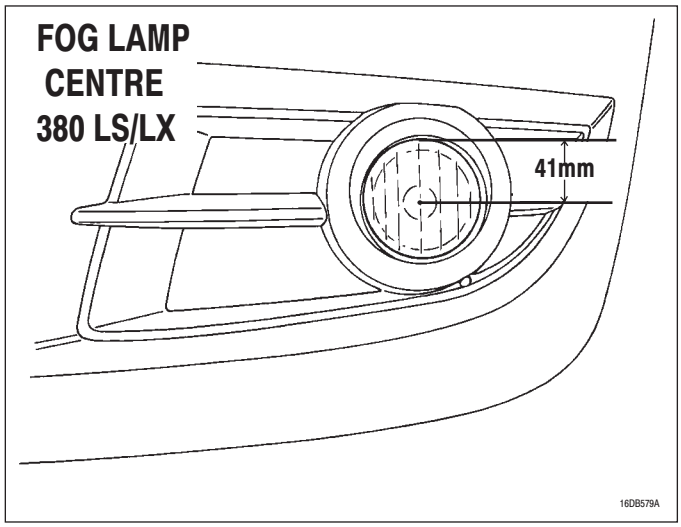
ON-VEHICLE SERVICE

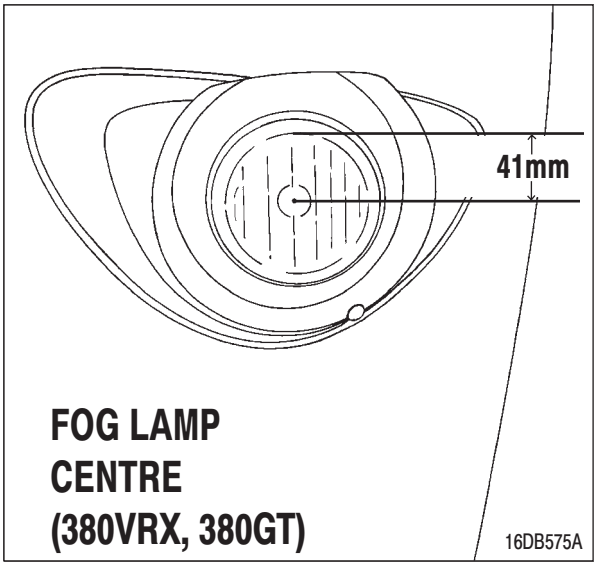
FOG LAMP AIMING

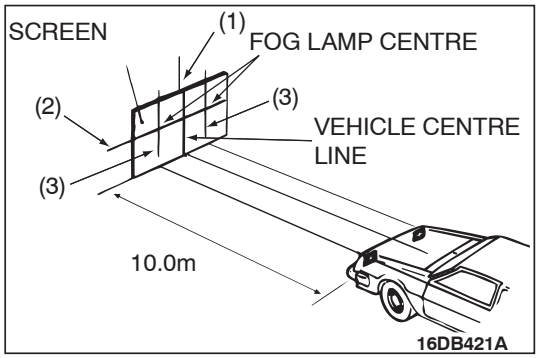
M1542001100472

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 the fuel tank is not full, place a weight in the trunk 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 70 kg (150 pounds) placed in driver's position.
6. Thoroughly clean the fog lamp lenses.
7. Measure centre of fog lamp lens, 41mm from anywhere of the outer edge of the lens as shown in the illustration below.
8. Place the vehicle on a level floor, perpendicular to a flat screen 10.0 meters away from the bulb centre-marks on the foglamp lens that you have measured and marked.
9. Rock the vehicle sideways to allow the vehicle to assume its normal position.
10. Bounce the front suspension through three (3) oscillations by applying the body weight to the hood or bumper.







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

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

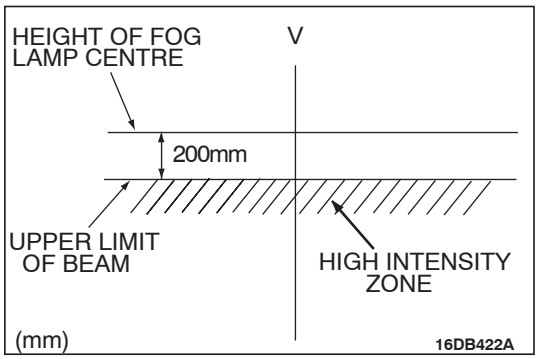
    (1) Position a vertical tape or mark so that it is aligned with the vehicle centre line.

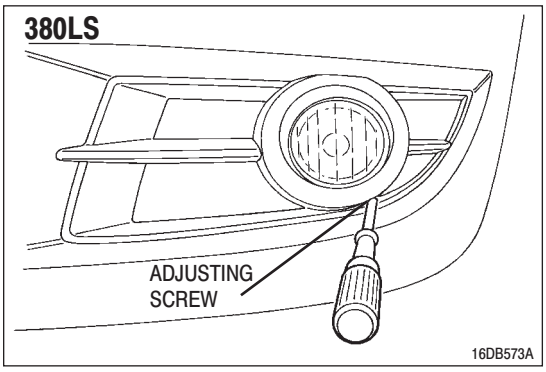
    (2) Measure the distance from the centre of the fog lamp lens to the floor. Transfer the measurement to the screen. Horizontal tape or mark on the screen is for reference of vertical adjustment.

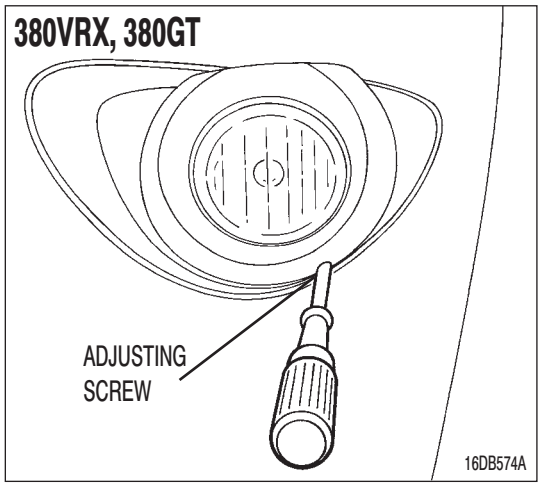
    (3) Measure the distance from the centre line of the vehicle to the centre of each fog lamp. Transfer the measurement to the screen. Vertical tape or mark on the screen is for reference to the centre line of each fog lamp.

FOG LAMP ADJUSTMENT

1. Turn the adjusting screw to achieve the specified cut-off location at the aiming screen.



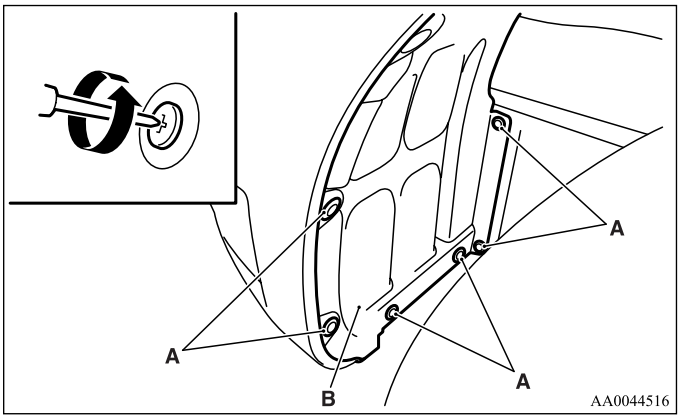




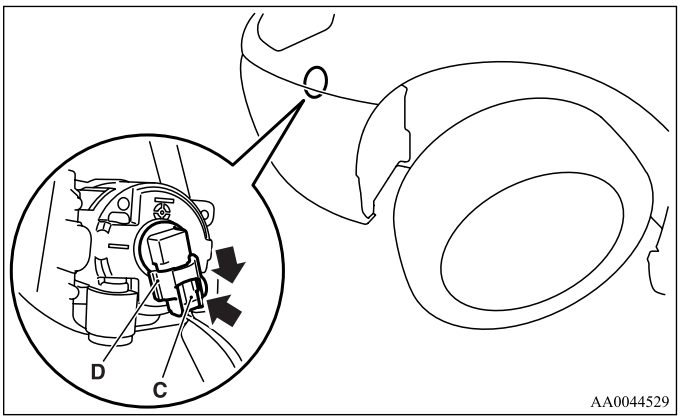
NOTE: The horizontal direction is non-adjustable. If deviation of the light beam axis exceeds the standard value, check that the mounting location or some other points are not faulty.

BULB REPLACEMENT

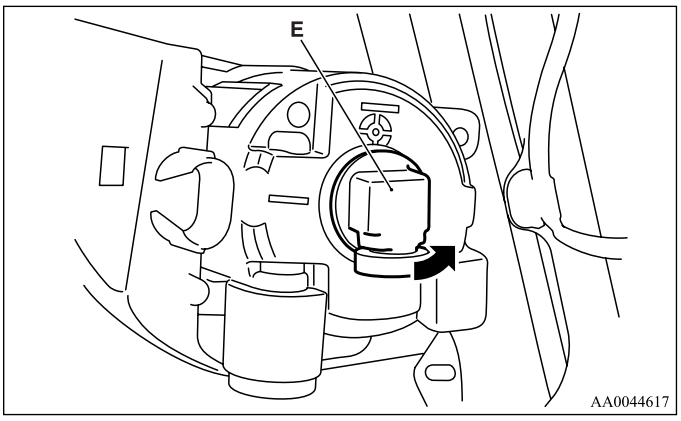
M1542001300692



1. Remove the splash shield mounting 6 clips (A), then remove the splash shield cover (B).



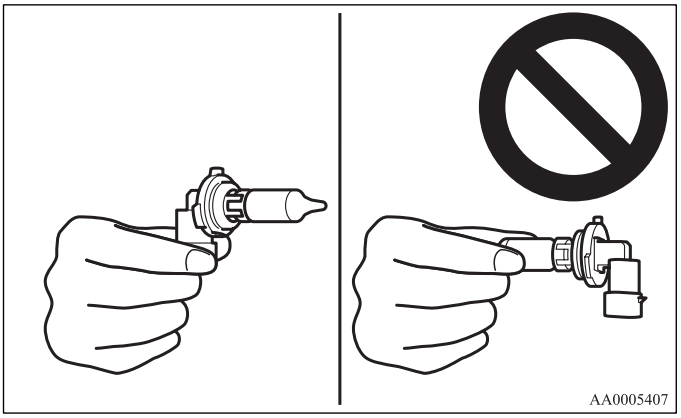
2. Depress the tab (C) on the harness connector and pull the harness connector (D) to remove it.



3. Remove the entire socket and bulb assembly (E) by turning it anticlockwise.
4. Remove the fog lamp bulb from the connector.
5. Replace the bulb, and then install the socket and bulb assembly by turning it clockwise.

⚠ CAUTION

- **Handle halogen lamp with care. The gas inside halogen lamp bulb is highly pressurised, so dropping, knocking, or scratching a halogen lamp bulb can cause it to shatter.**
- **Never hold the halogen lamp bulb with a bare hand, dirty glove, etc. The oil from your hand could cause the bulb to break the next time the headlamps are operated. If the glass surface is dirty, it must be cleaned with alcohol, paint thinner, etc., and refit it after drying it thoroughly.**

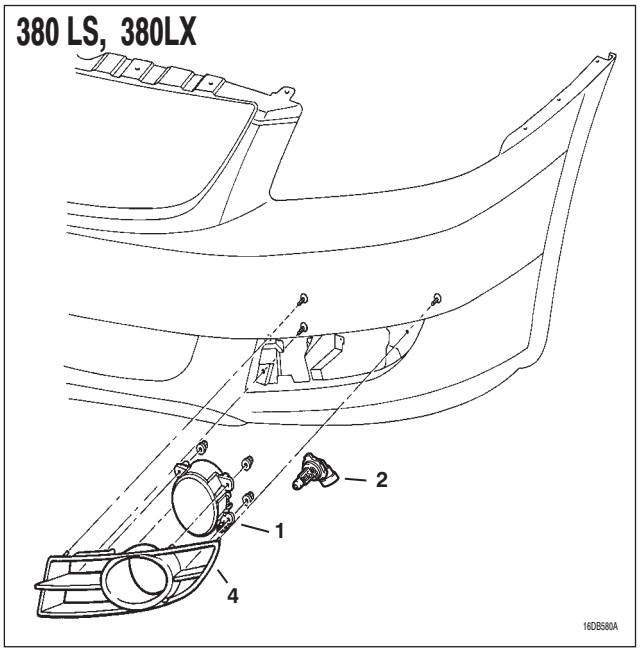


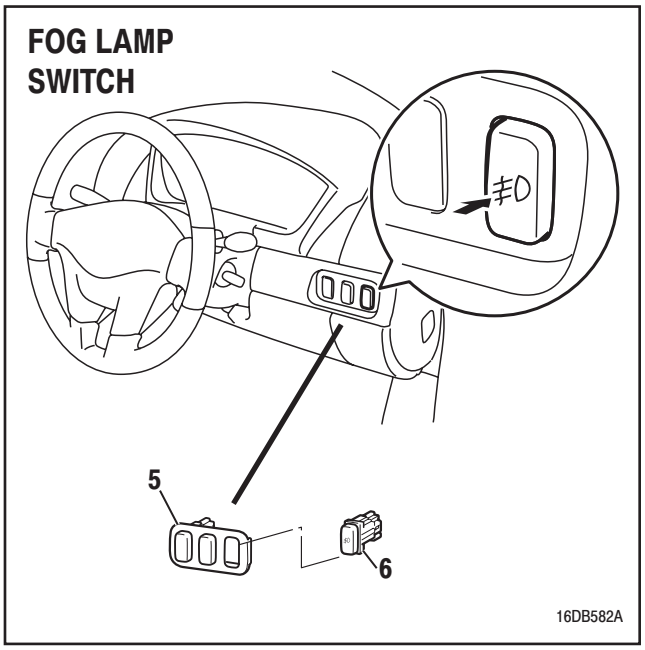
FOG LAMP

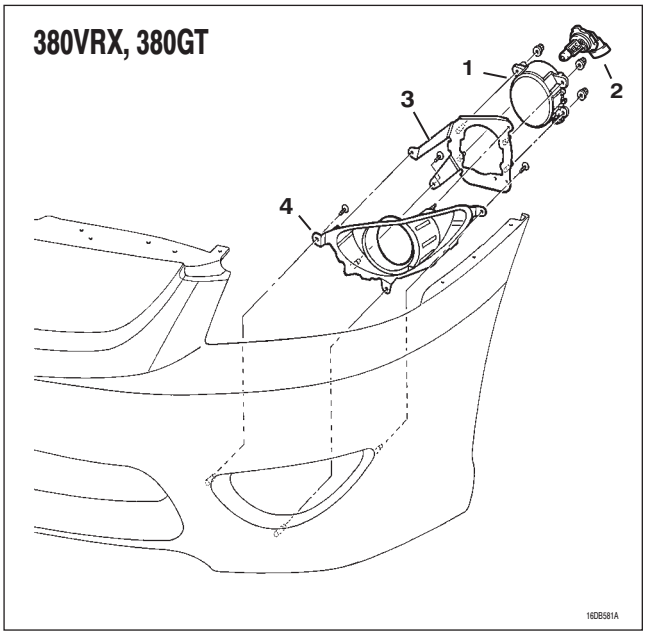
REMOVAL AND INSTALLATION

M1542001500492

Post-installation operation
Fog light aiming (Refer to P.54A-155).







FOG LAMP REMOVAL STEPS

- FRONT BUMPER UNDER COVER (REFER TO GROUP 51, FRONT BUMPER ASSEMBLY P.51-2.)

1. FOG LAMP ASSEMBLY
2. BULB

3 FOG LAMP ASSSEMBLY BRACKET

4 FOG LAMP COVER/BEZEL

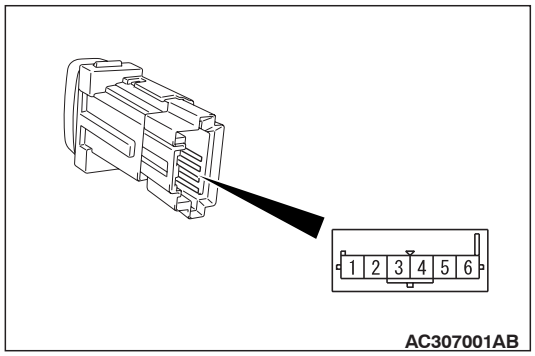
FOG LAMP SWITCH REMOVAL STEPS

5. SWITCH PANEL ASSEMBLY
6. FOG LAMP SWITCH

INSPECTION

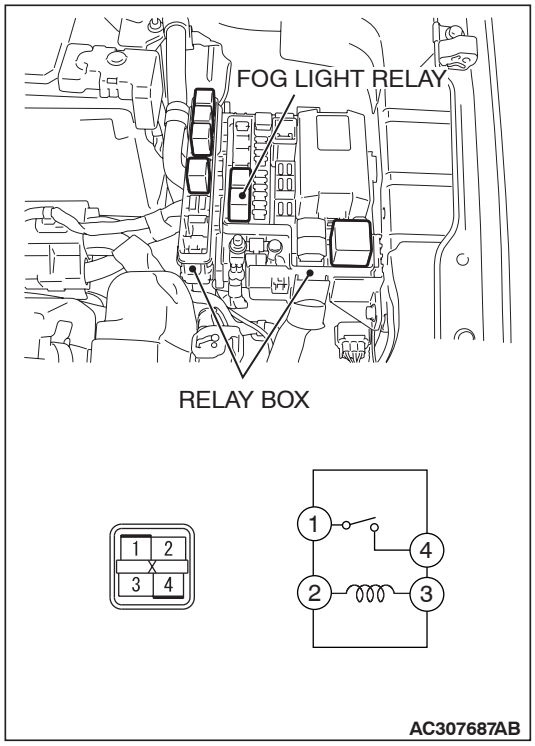
M1543019502485

FOG LAMP SWITCH CONTINUITY CHECK



SWITCH POSITION	TESTER CONNECTION	SPECIFIED CONDITION
Pressed	1-2	Less than 2 ohms
Released	1-2	Open circuit

FOG LAMP RELAY CHECK



BATTERY VOLTAGE	TESTER CONNECTION	SPECIFIED CONDITION
Not supplied	1-4	Open circuit
• Connect terminal 2 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	1-4	Less than 2 ohms

REAR COMBINATION LAMP

DIAGNOSIS

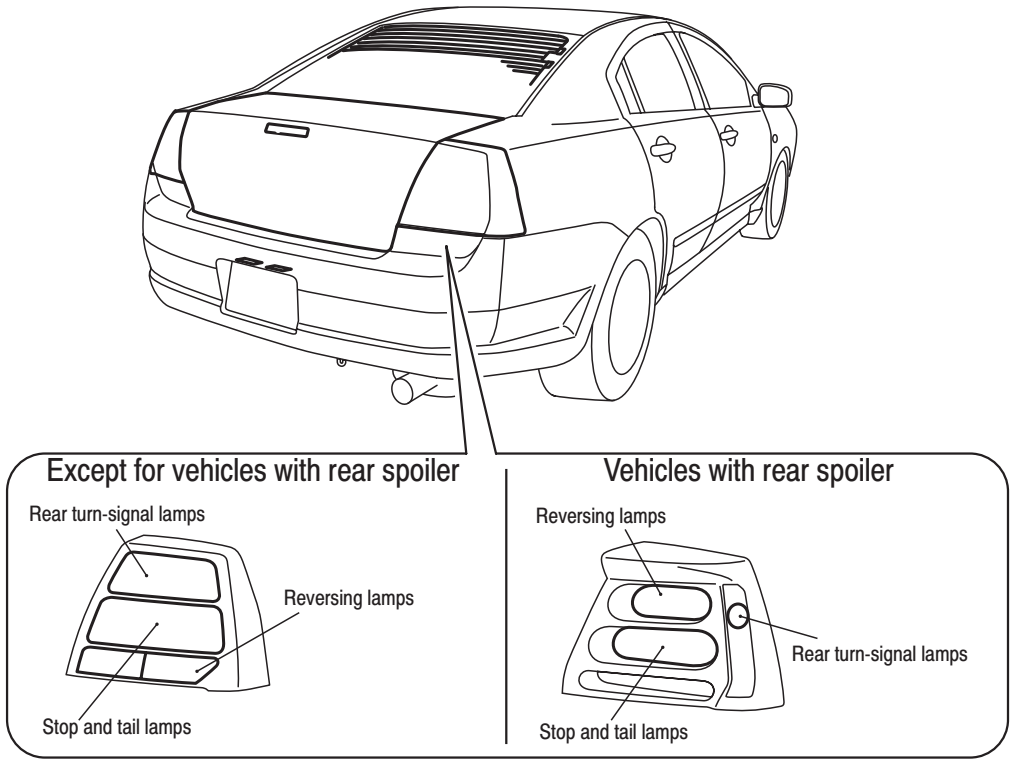
M1542000701377

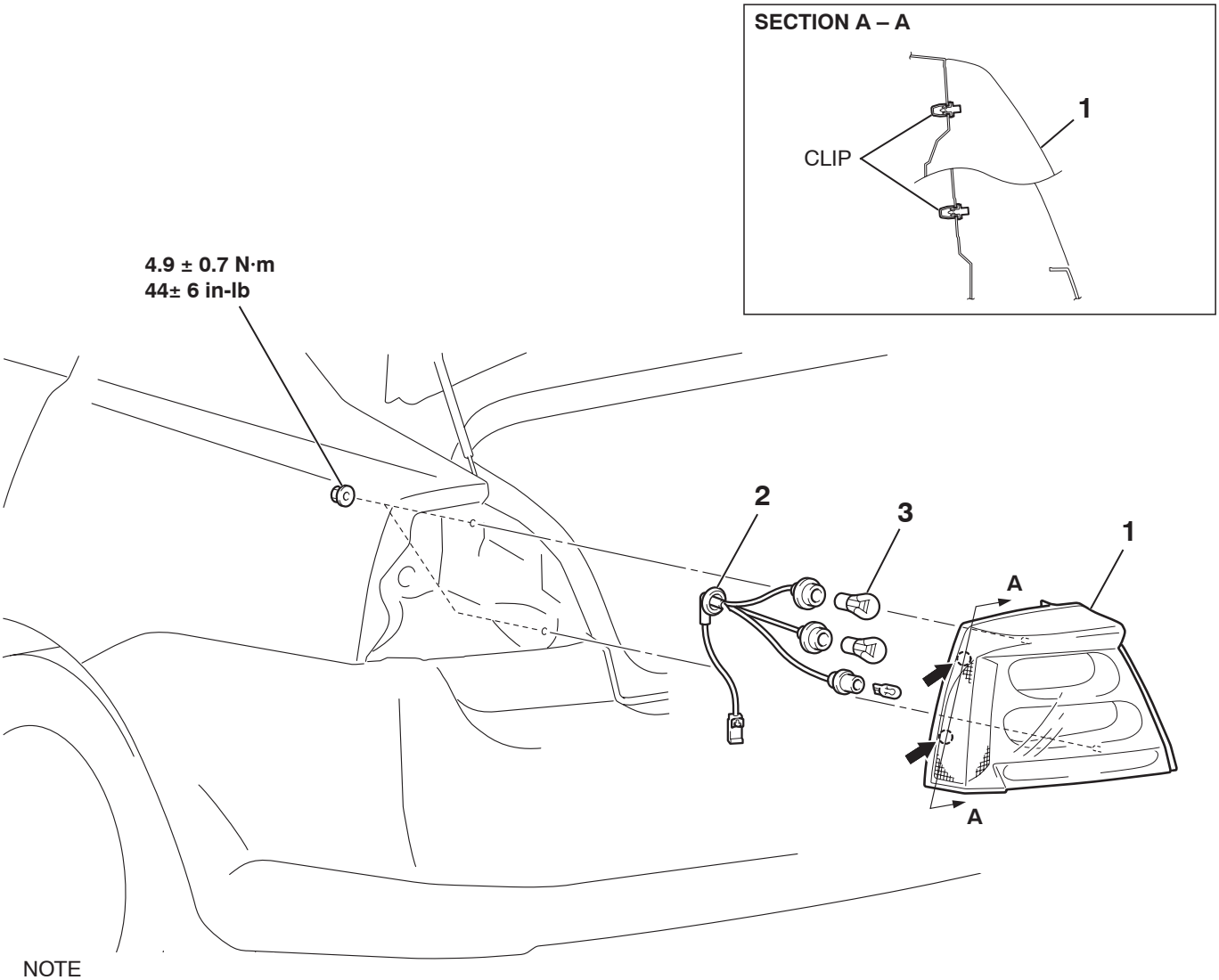
The taillights and turn-signal lights are controlled by the Simplified Wiring System (SWS). For trouble-shooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

REAR COMBINATION LAMP

REMOVAL AND INSTALLATION

M1542003900463





NOTE
◀ : CLIP POSITION

16DB524A

REMOVAL STEPS

- TRUNK ROOM FLOOR BOARD, REAR END TRIMS (REFER TO GROUP 52A, TRIM P.52A-11.)

1. REAR COMBINATION LAMP

REMOVAL STEPS (Continued)

2. SOCKET ASSEMBLY
3. BULB

DOME LAMP

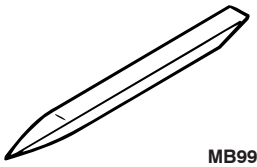
DIAGNOSIS

M1542000701388

The dome lamp is controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

SPECIAL TOOLS

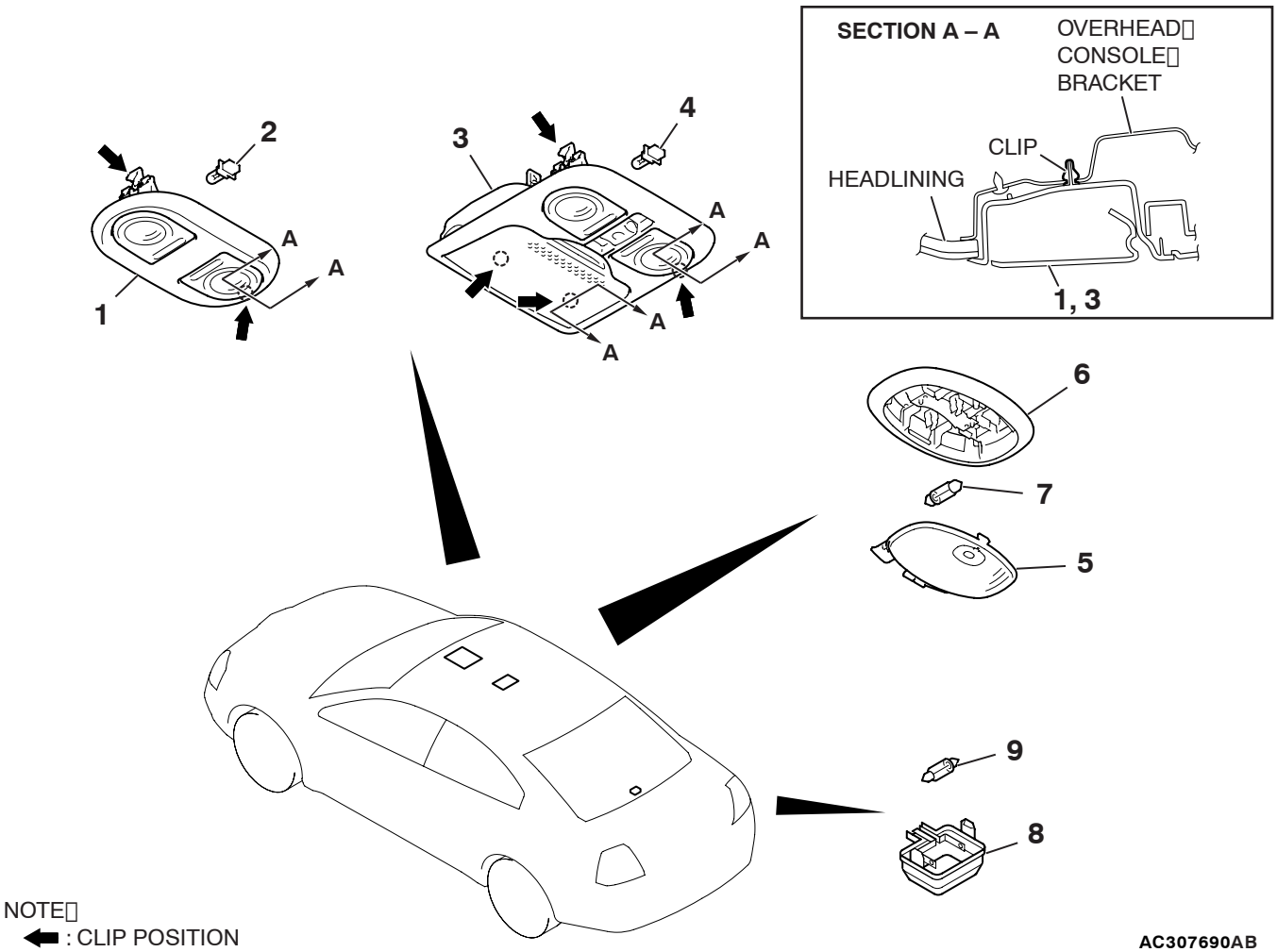
M1542000601024

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB990784	MB990784 Ornament remover	General service tool	Removal of map light, cover etc.

DOME LAMP

REMOVAL AND INSTALLATION

M1542006300028



MAPLIGHT ASSEMBLY REMOVAL STEPS
1. MAP LAMP ASSEMBLY
2. BULB

OVERHEAD CONSOLE ASSEMBLY REMOVAL STEPS
3. OVERHEAD COSOLE ASSEMBLY
4. BULB

<<A>>

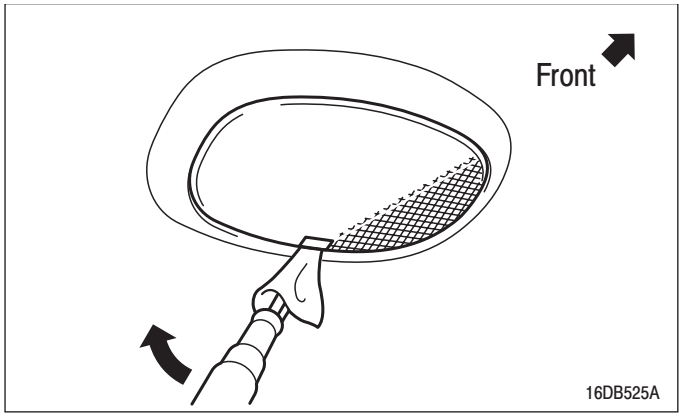
REAR DOME LAMP ASSEMBLY REMOVAL STEPS
5. COVER
6. REAR DOME LAMP
7. BULB

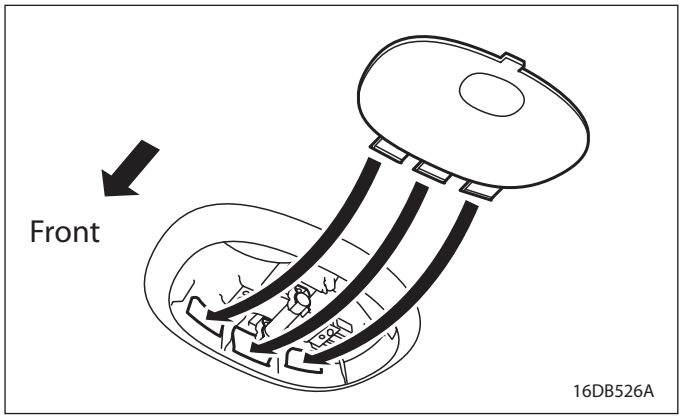
TRUNK LAMP REMOVAL STEPS
8. TRUNK LAMP
9. BULB

REMOVAL SERVICE POINT

<<A>> COVER REMOVAL

Insert a straight blade (flat) screwdriver into the lens and pry gently to remove it.





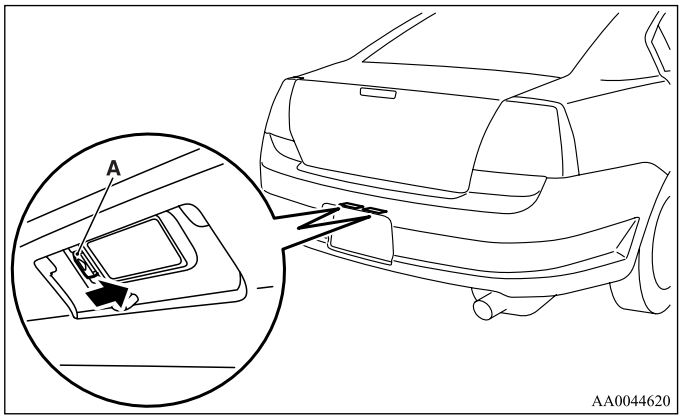
- When fitting cover, ensure you insert the 3 lugs in first then clip in cover.

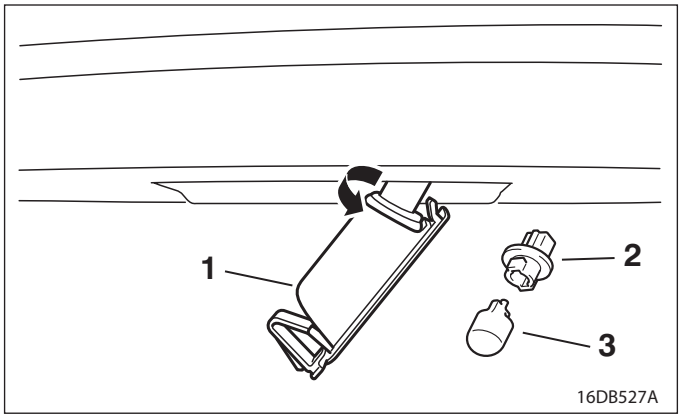
LICENSE PLATE LAMPS

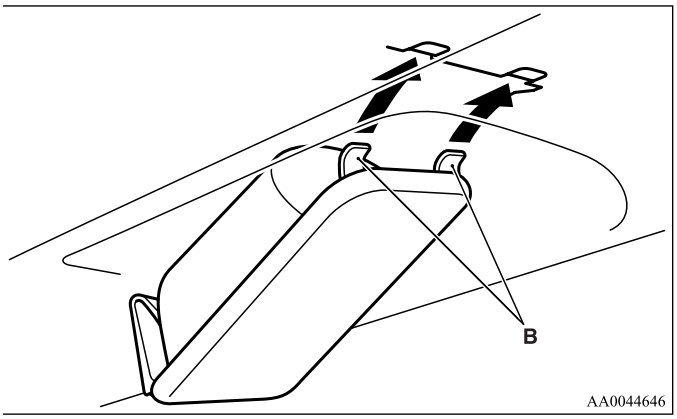
REMOVAL AND INSTALLATION

M1542004200207

- While pushing the tab (A) in the direction of the arrow, remove the lamp assembly.
- Remove the socket by turning it anticlockwise, and then remove the bulb by pulling out.
- When mounting the lamp unit, put the hooks (B) on the right side of the lamp unit into the body first.







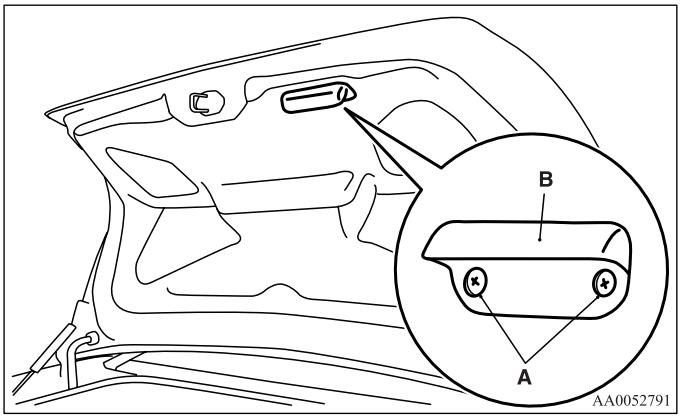
REMOVAL STEPS

1. LICENSE PLATE LAMP ASSEMBLY
2. SOCKET
3. BULB

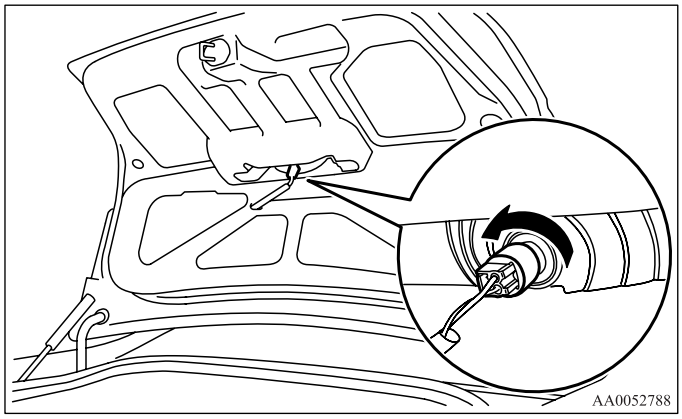
HIGH-MOUNTED STOPLIGHT

REMOVAL AND INSTALLATION

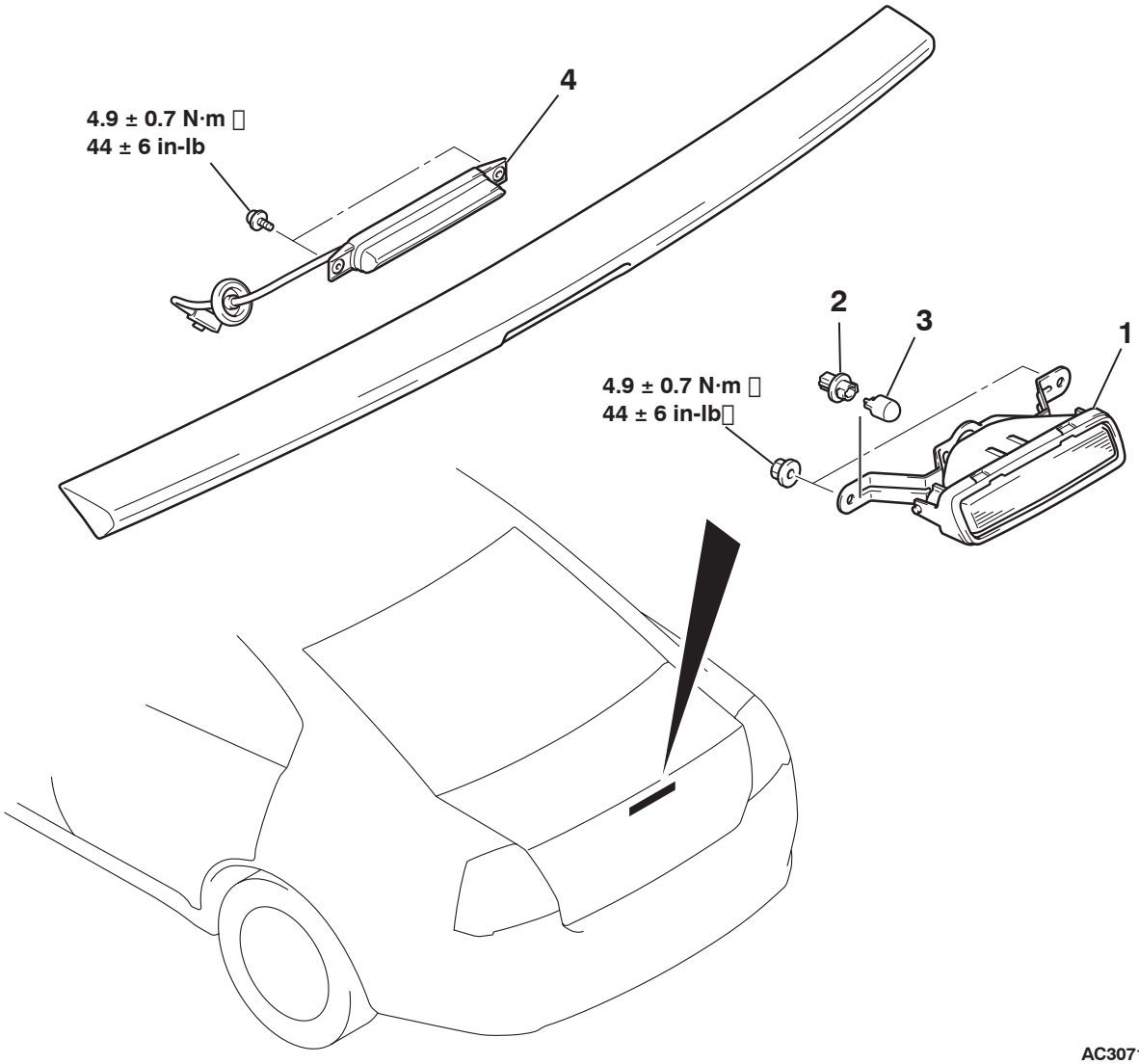
M1542005100463



1. On vehicles fitted with trim cover, remove the trim cover using a flat screwdriver and prying the 13 clips. Remove the screws (A), and remove trunk lid grip handle (B).



2. Remove the socket assembly and bulb together by turning it anticlockwise. Then remove the bulb by pulling it out.



HIGH- MOUNTED STOPLIGHT <WITH TRUNK LID TYPE>
REMOVAL STEP

1. HIGH-MOUNTED STOPLIGHT <WITH TRUNK LID TYPE>
2. SOCKET <WITH TRUNK LID TYPE>
3. BULB <WITH TRUNK LID TYPE>

HIGH- MOUNTED STOPLIGHT <WITH REAR SPOILER TYPE>
REMOVAL STEP

- REAR SPOILER ASSEMBLY (REFER TO GROUP 51, REAR SPOILER P.51-11.)

4. HIGH-MOUNTED STOPLIGHT <WITH REAR SPOILER TYPE>

HAZARD WARNING LIGHT SWITCH

HAZARD WARNING LIGHT DIAGNOSIS

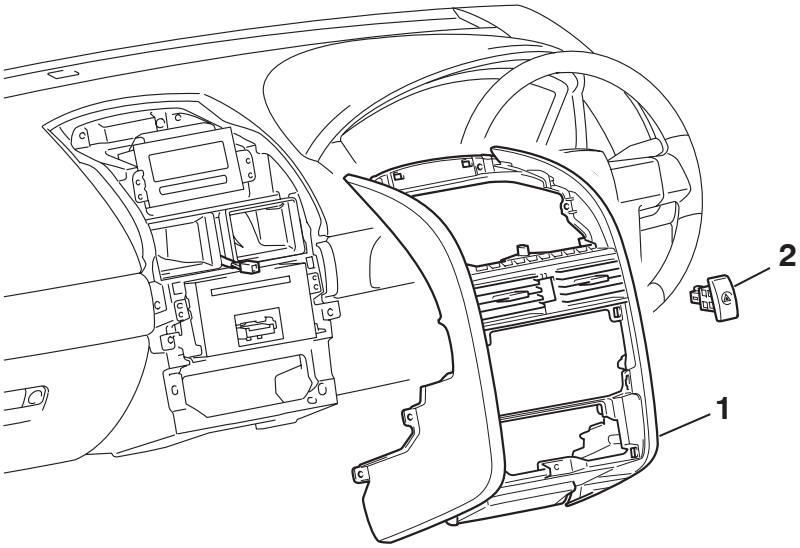
M1542000701399

The hazard warning lights are controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

HAZARD WARNING LIGHT SWITCH

REMOVAL AND INSTALLATION

M1542006600450



54DB035A

HAZARD WARNING LIGHT SWITCH REMOVAL STEPS

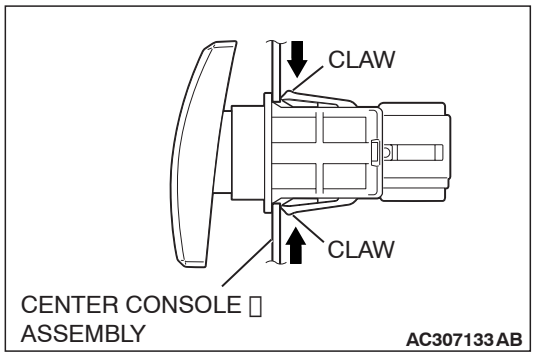
- GLOVEBOX ASSEMBLY, INSTRUMENT PANEL PARCEL BOX (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)
- HOOD LOCK RELEASE HANDLE (REFER TO GROUP 42, HOOD P.42-8.)
- INSTRUMEN LOWER PANEL, INSTURMENT CENTER PANEL ASSEMBLY, CONSOLE METER HOOD (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)

1. CENTER CONSOLE ASSEMBLY (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)

<<A>> 2. HAZARD WARNING LIGHT SWITCH

REMOVAL SERVICE POINT

<<A>> HAZARD WARNING LIGHT SWITCH REMOVAL

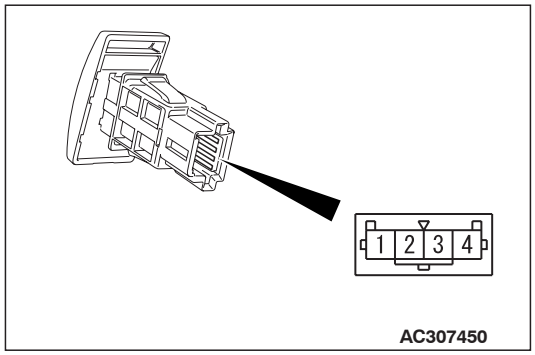


Remove the hazard warning light by pushing the claw toward the arrow in the illustration.

INSPECTION

M1543019502504

HAZARD WARNING LIGHT SWITCH CONTINUITY CHECK

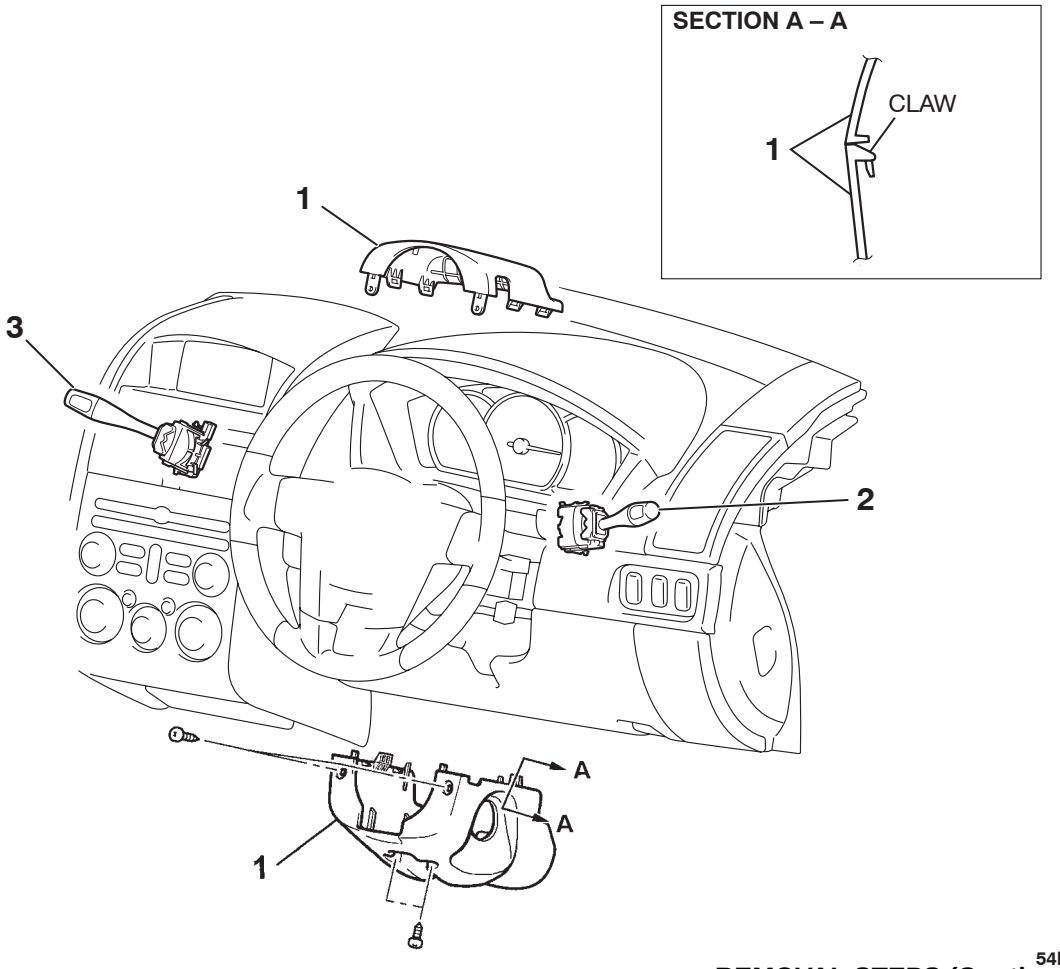


SWITCH POSITION	TESTER CONNECTION	SPECIFIED CONDITION
Pressed	1 – 2	Less than 2 ohms
Released	1 – 2	Open circuit

COLUMN SWITCH

REMOVAL AND INSTALLATION

M1543009100457



54DB036A

REMOVAL STEPS

<<A>> 1. STEERING COLUMN COVER (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)

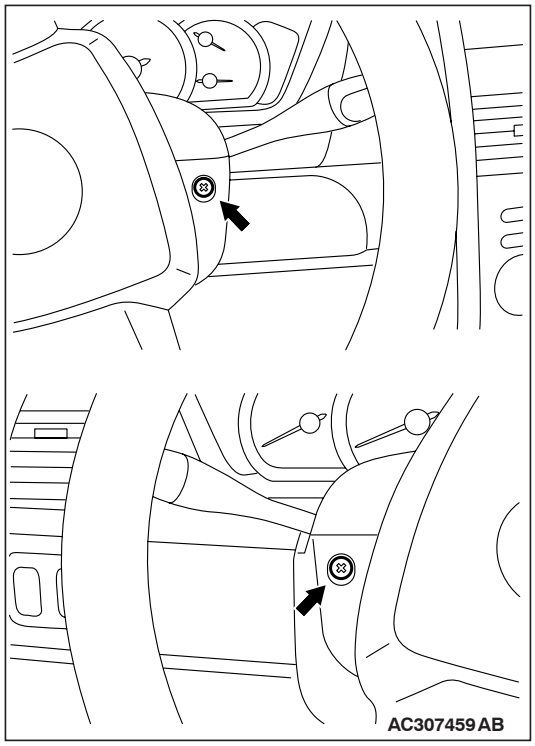
<<B>> • COLUMN SWITCH CONNECTOR

REMOVAL STEPS (Continued)

2. TURN-SIGNAL LAMP AND LIGHTING SWITCH
3. WINDSHIELD WIPER AND WINDSHIELD WASHER SWITCH

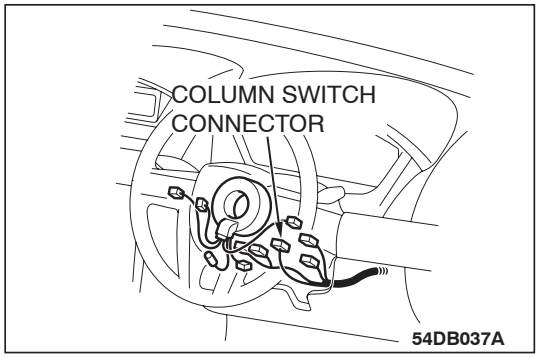
REMOVAL SERVICE POINT

<<A>> STEERING COLUMN UPPER COVER/STEERING COLUMN LOWER COVER REMOVAL



1. Rotate the steering wheel with a slightly side-to-side to access and remove the mounting screws.

<<B>> COLUMN SWITCH CONNECTOR REMOVAL



HORN

DIAGNOSIS <VEHICLE WITH KEYLESS ENTRY SYSTEM>

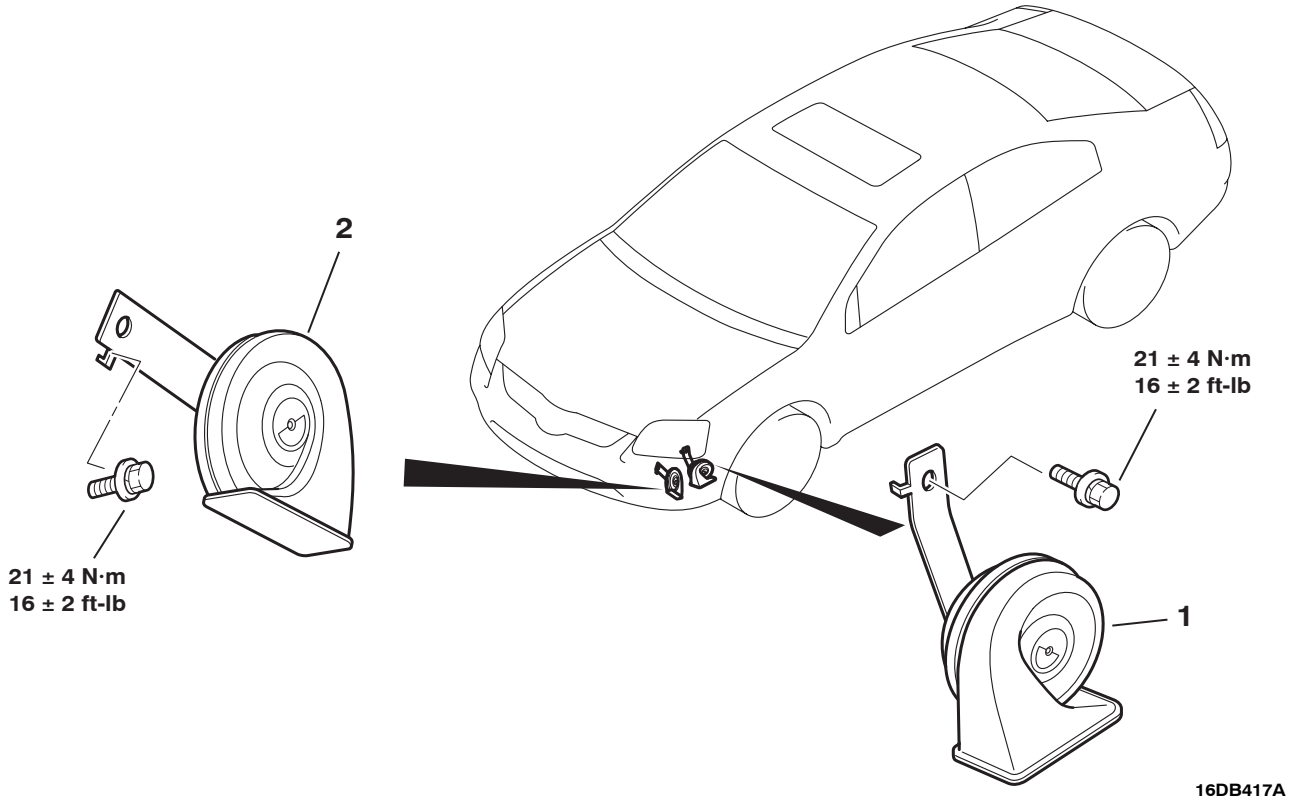
M1543000701057

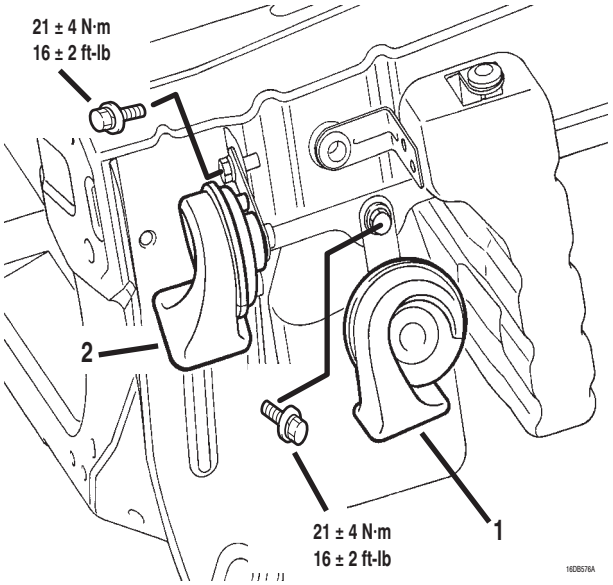
The keyless entry system horn answerback are controlled by the Simplified Wiring System (SWS). For troubleshooting, refer to GROUP 54B, SWS Diagnosis P.54B-57.

HORN

REMOVAL AND INSTALLATION

M1543007900491





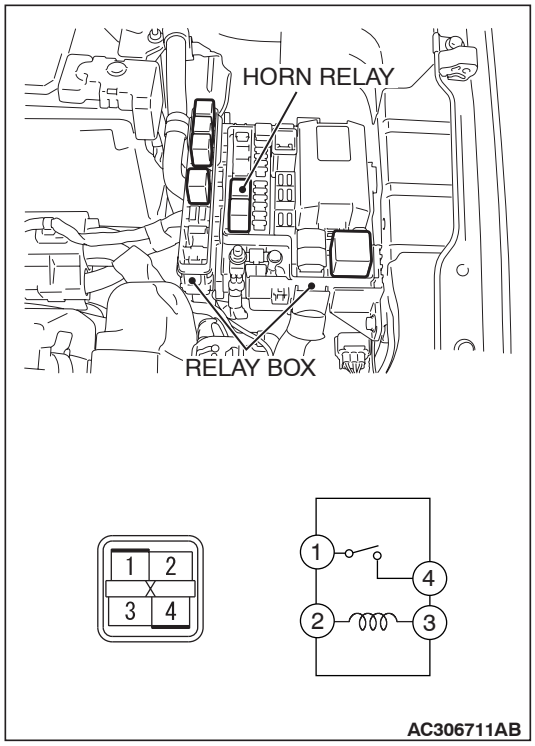
REMOVAL STEPS

1. HORN (LOW)
2. HORN (HIGH)

INSPECTION

M1543019502526

HORN RELAY CONTINUITY CHECK

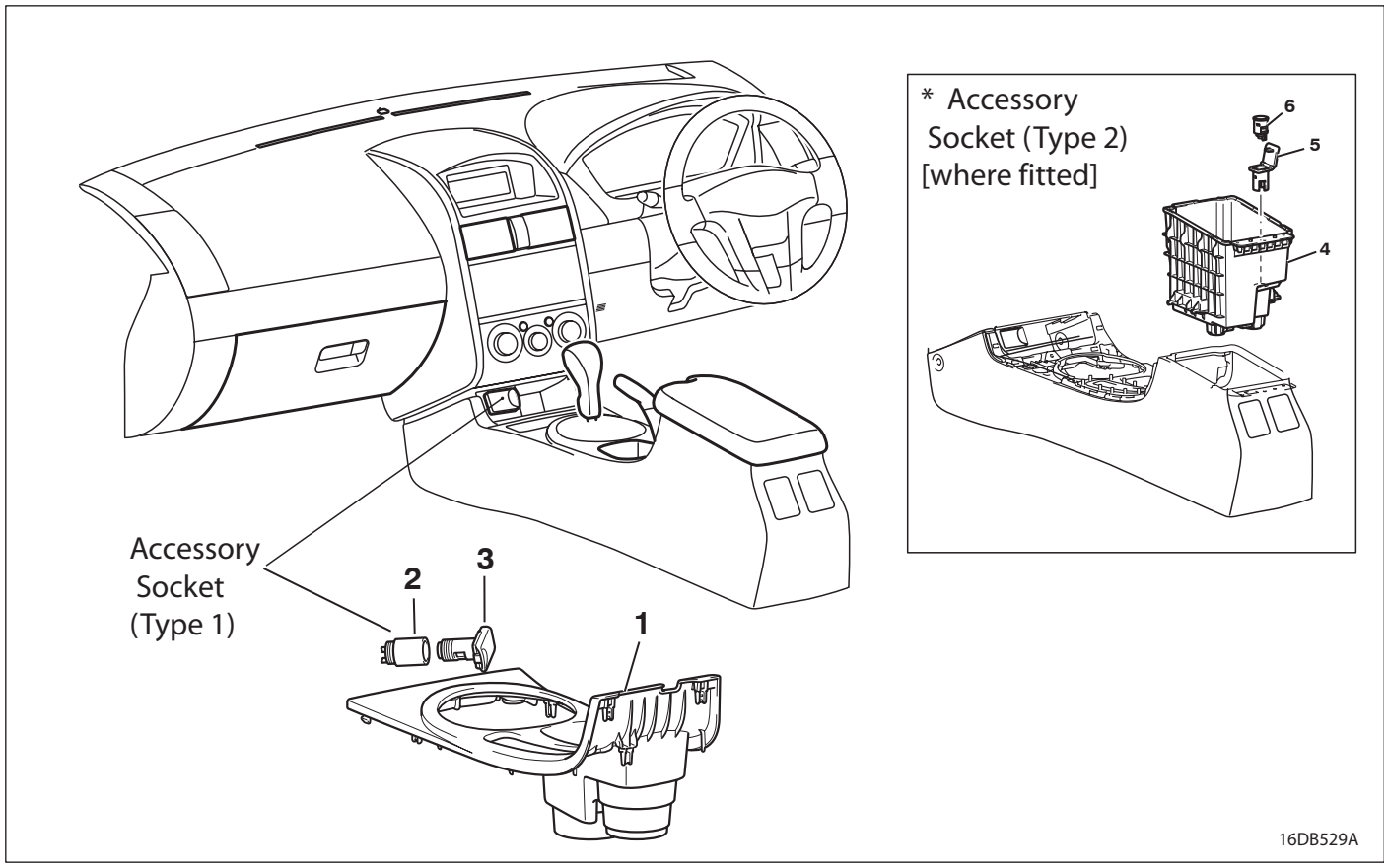


BATTERY VOLTAGE	TESTER CONNECTION	SPECIFIED CONDITION
Not applied	1-4	Open circuit
• Connect terminal 2 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	1-4	Less than 2 ohms

ACCESSORY SOCKET

REMOVAL AND INSTALLATION

M1543008900267



REMOVAL STEPS

1. GEARSHIFT LEVER PANEL
2. ACCESSORY SOCKET (ACC) Type 1
3. ACCESSORY SOCKET COVER
- FRONT BOX, PLATE, FLOOR CONSOLE ASSEMBLY (REFER TO GROUP 52A, FLOOR CONSOLE ASSEMBLY P.52A-10.)

4 INNER BOX

5 *ACCESSORY SOCKET (TYPE 2) [WHERE FITTED] (B+)

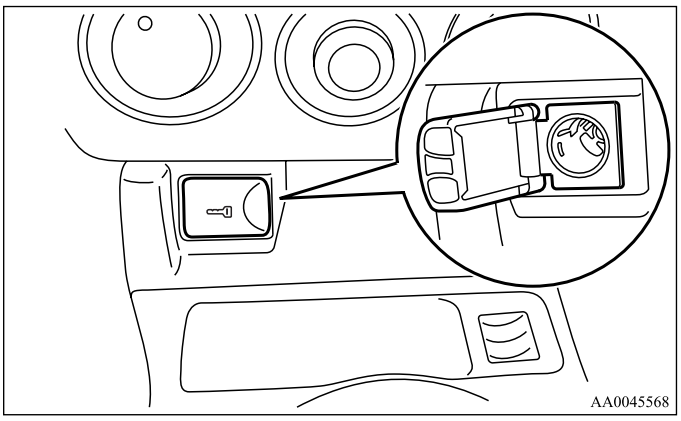
6 *ACCESSORY SOCKET COVER [WHERE FITTED]

⚠ CAUTION

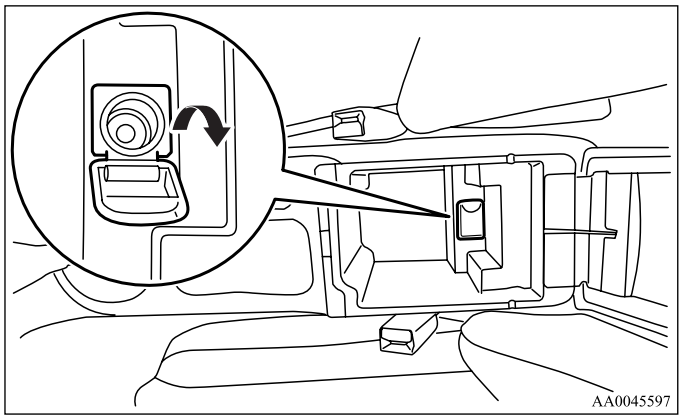
- **When you connect an electrical device, make sure it is rated at 12V and its electrical capacity does not exceed 120W. When using both sockets at the same time, make sure the total power consumption of the electrical accessories does not exceed 120W at 12V.**
- **When the accessory socket is not in use, be sure to close the cap, because the socket might become clogged by foreign material and be short-circuited.**

NOTE:

- *Long use of the electric appliance without running the engine may run down the battery. Especially avoid using it with the cigarette lighter.*



- **TYPE 1:** The accessory socket can be used while the ignition switch is "ON" or "ACC" positions.

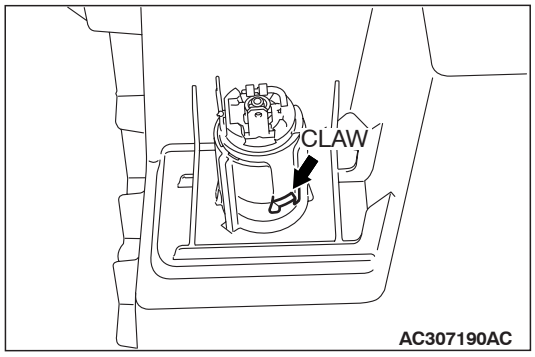


- ****TYPE 2 [Where fitted]:** The accessory socket can be used while the ignition switch is on ALL positions.

REMOVAL SERVICE POINT

<<A>> ACCESSORY SOCKET REMOVAL

Disengage the claw shown in the illustration and remove the accessory socket.



RADIO WITH CD PLAYER

GENERAL DESCRIPTION

M1544000100099

<Vehicles without CD changer>

- Radio and CD player
- Shows textual information regarding audio system operation on the audio unit.

<Vehicles with CD changer>

- Radio, CD player and CD changer
- Shows graphical information regarding audio system operation on the type multi-centre display.

RADIO WITH CD PLAYER, SPEAKER AND ANTENNA DIAGNOSIS

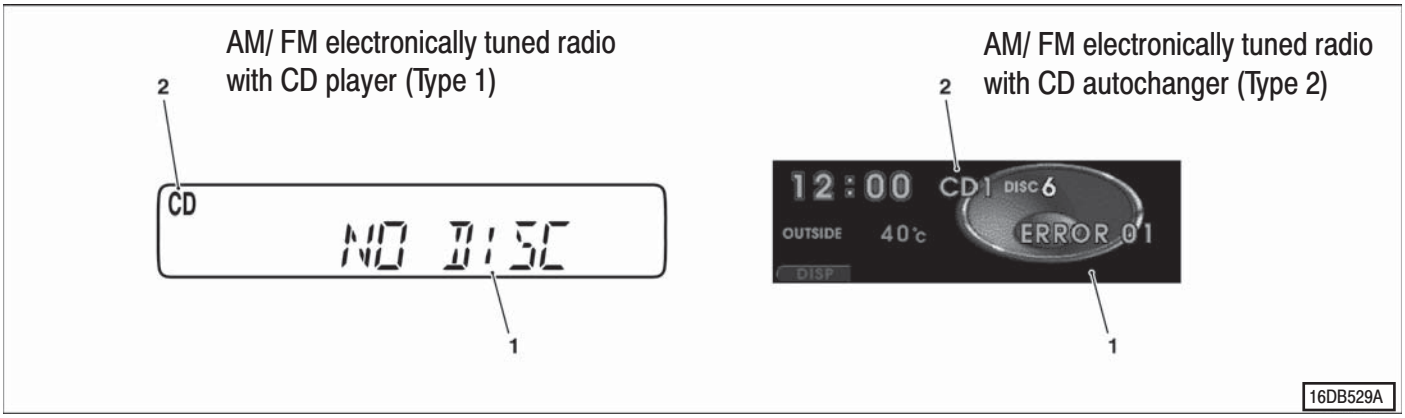
INTRODUCTION TO AUDIO SYSTEM DIAGNOSIS

M1544004700101

The diagnosis for symptoms such as noise being emitted, no sound being played, or sound coming only out of one speaker (or set of speakers) is provided.

AUDIO ERROR CODES

If the radio and CD player or radio, CD player and CD changer detects any malfunction in itself or the inserted CD, the error codes below will be shown on the audio unit (type 1) or multi-centre display (type 2)



- ***If an error code (1) and a faulty player (2) appear in the frequency display, take action in accordance with the table shown below.***

ERROR CODES		CAUSE	CAUSE OF TROUBLE AND ITS SOLUTION
TYPE (1)	TYPE (2)		
NO DISC	-	No disc inside	Insert disc.
E01 E02	ERROR 01 ERROR 02	Faulty disc (most likely)	Insert several other discs. If the error code appears only with certain disc(s), the problem may be due to scratch(es) and/or dirt on the disc(s). Refrain from using any damaged disc(s). If the error code appears with all discs, the problem may be due to condensation or dirt inside the the equipment. Wait several hours and try again. If the error code still appears with all discs, please have the equipment inspected by an authorised Mitsubishi Motors dealer.
E E03	ERROR ERROR 03	Connection error Mechanical error (Faulty equipment) most likely	Have the equipment inspected by an authorised Mitsubishi Motors dealer. This error code will be shown if the radio and CD player or radio, CD player and CD changer are not connected to their related components correctly. Check the connectors and wiring harness for open or short circuit. This error codes will be shown if there is any internal mechanical or electrical problem in the radio and CD player or radio, CD player and CD changer. Replace the radio and CD player or radio, CD player and CD changer, and check that no error codes are shown.
E HOT	ERROR HOT	Player or changer is excessively hot inside. (Playback is temporarily disabled).	Allow equipment to cool off. When the temperature retuns to normal, the error code will disappear and playback will automatically resume.

AUDIO SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1544004800379

Use these steps to plan your diagnostic strategy. Follow through with each step to ensure that you have exhausted all possible methods of finding an audio system fault.

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

TROUBLE SYMPTOM CHART

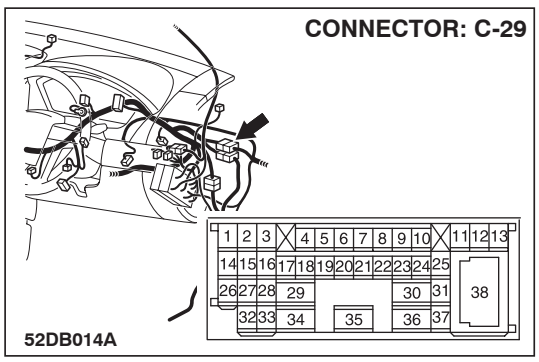
M1544004900428

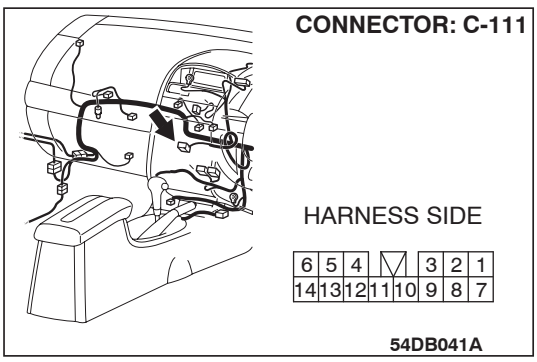
SYMPTOM		INSPECTION PROCEDURE	REFERENCE PAGE
When power switch is turned "ON," no power is available.		1	P.54A-178
Remote controlled radio switch	When remote controlled radio power switch is turned "ON," no power is available. But radio, CD player and CD changer power switch is available. <vehicles with audio amplifier>	2	P.54A-183
	The system does not recognize the remote controlled radio switch (RH) only. <vehicles with audio amplifier>	3	P.54A-191
	The system does not recognize the remote controlled radio switch (LH) only. <vehicles with audio amplifier>	4	P.54A-193

SYMPTOM		INSPECTION PROCEDURE	REFERENCE PAGE
No sound from one speaker.		5	P.54A-195
Noise	Noise is present while moving (AM).	6	P.54A-207
	Noise is present while moving (FM).	7	P.54A-207
	Sound mixed with noise, only at night (AM).	10	P.54A-208
	Noise is overpowering both AM and FM.	11	P.54A-209
	Excessive noise on AM and FM.	12	P.54A-210
	Noise is detected with engine running.	13	P.54A-210
	Noise appears during vibration or shocks.	14	P.54A-211
	Noise is present wile moving (FM) .	15	P.54A-213
	Constant noise.	16	P.54A-214
Radio	No reception (AM).	17	P.54A-215
	Poor reception.	18	P.54A-216
	Distortion on AM and/or FM.	19	P.54A-218
	Distortion on FM only.	20	P.54A-219
	Auto select function inoperative, too few automatic stations are selected.	21	P.54A-219
	Preset stations are erased.	22	P.54A-221
CD player, CD auto changer	CD can not be inserted.	23	P.54A-223
	No sound (CD only).	24	P.54A-224
	CD sound skips.	25	P.54A-224
	Sound quality is poor.	26	P.54A-225
	CD cannot be ejected.	27	P.54A-226

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: When Power Switch is Turned "ON," no Power is Available.





CIRCUIT OPERATION

Power is supplied to the radio and CD player or radio, CD player and CD changer when the ignition switch is in the "ACC" position or "ON" position. When the ignition is switched on, the radio and CD player or radio, CD player and CD changer will return to the previous state when the ignition was switch off at the last time.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a faulty radio and CD player or radio, CD player and CD changer power supply circuit .

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Damaged wiring harness or connector.
- Malfunction of the radio and CD player or radio, CD player and CD changer.

DIAGNOSIS

Required Special Tool:

- MB991223: Harness set

STEP 1. Check to see that the radio and CD player or radio, CD player and CD changer is energized when the power switch is turned ON.

(1) Turn the ignition switch to "ACC" position.
(2) Turn ON the radio and CD player or radio, CD player and CD changer power switch.

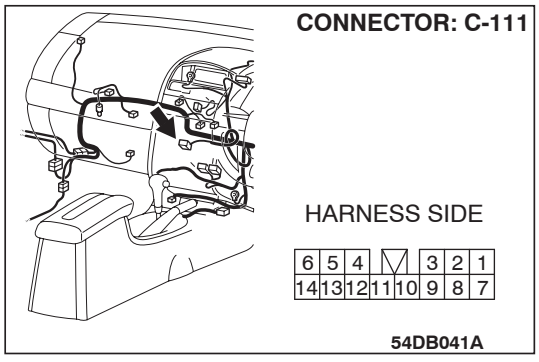
Q: Is the radio and CD player or radio, CD player and CD changer energized when the power switch is turned ON?

YES : Go to Step 2.
NO : Go to Step 5.

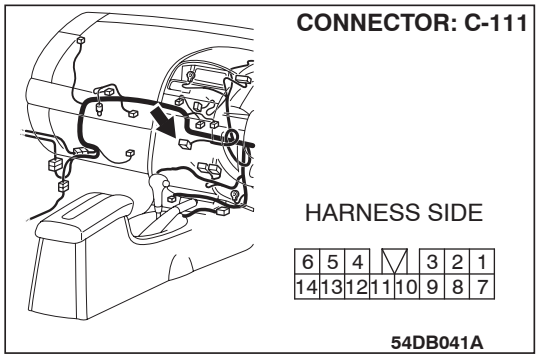
STEP 2. Check radio and CD player or radio, CD player and CD changer connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

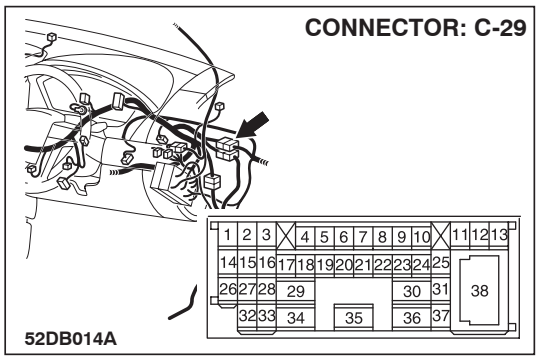
Q: Are radio and CD player or radio, CD player and CD changer connector C-111 in good condition?

YES : Go to Step 3.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.



STEP 3. Check the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 10) and the ignition switch (ACC).





NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 10) and ignition switch (ACC) in good condition?

YES : Go to Step 4.

NO : Repair the wiring harness. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

STEP 4. Check the installation condition of the radio and CD player or radio, CD player and CD changer.

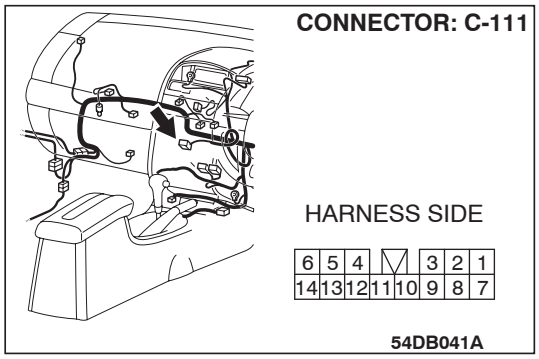
NOTE: The radio and CD player or radio, CD player and CD changer are grounded to the deck crossmember directly.

Q: Are the radio and CD player or radio, CD player and CD changer installed correctly?

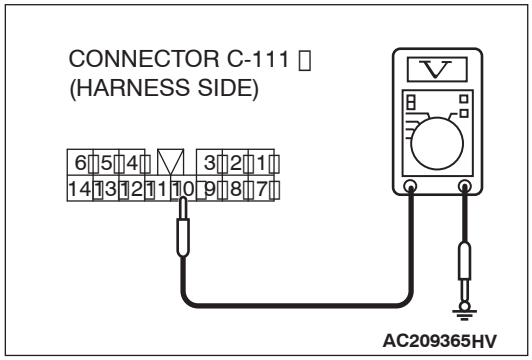
YES : Repair or replace the radio and CD player or radio, CD player and CD changer. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

NO : Install the radio and CD player or radio, CD player and CD changer properly. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

STEP 5. Measure at radio and CD player or radio, CD player and CD changer connector C-111 in order to check the battery circuit of power supply system to the radio and CD player or radio, CD player and CD changer (ignition switch ACC).



(1) Disconnect radio and CD player or radio, CD player and CD changer connector C-111, and measure at the wiring harness side.
(2) Turn the ignition switch to "ACC" position.

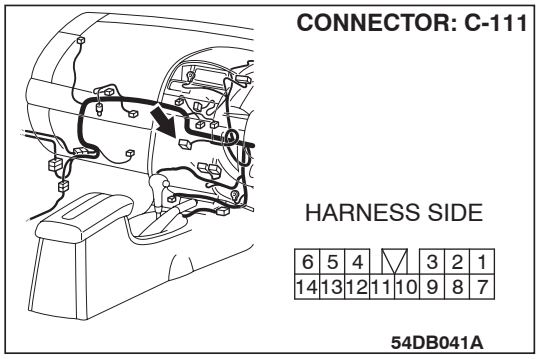


(3) Measure the voltage between terminal 10 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Go to Step 8.
NO : Go to Step 6.

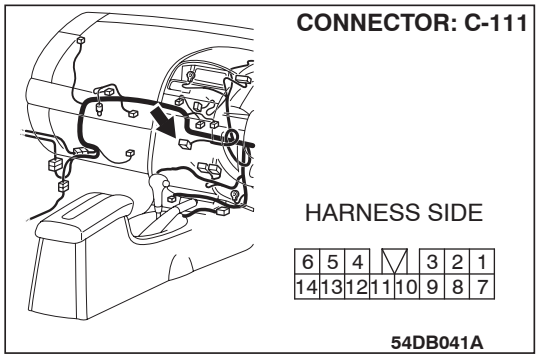
STEP 6. Check radio and CD player or radio, CD player and CD changer connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

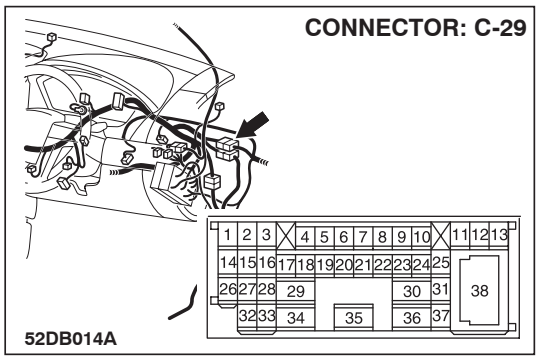


Q: Are radio and CD player or radio, CD player and CD changer connector C-111 in good condition?

YES : Go to Step 7.
NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

STEP 7. Check the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 10) and ignition switch (ACC).





NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 10) and ignition switch (ACC) in good condition?

YES : There is no action to be taken.

NO : Repair the wiring harness. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

STEP 8. Check the installation condition of the radio and CD player or radio, CD player and CD changer.

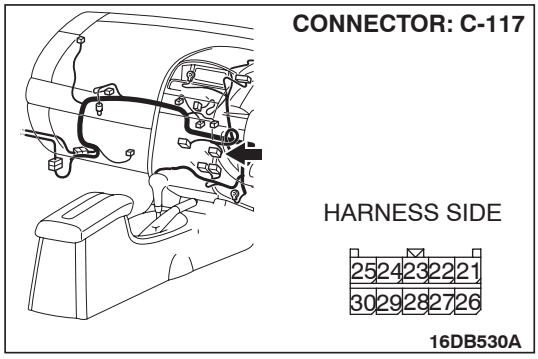
NOTE: The radio and CD player or radio, CD player and CD changer are grounded to the deck crossmember directly.

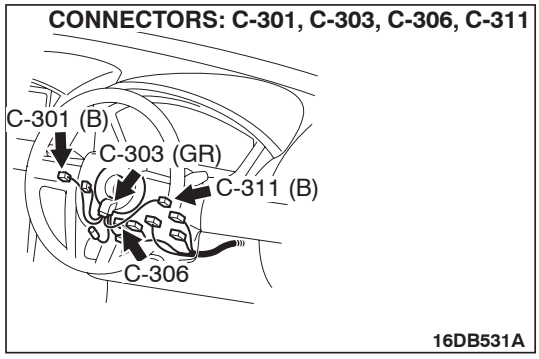
Q: Are the radio and CD player or radio, CD player and CD changer installed correctly?

YES : Replace the radio and CD player or radio, CD player and CD changer. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

NO : Install the radio and CD player or radio, CD player and CD changer properly. If the power switch is turned on, the radio and CD player or radio, CD player and CD changer should operate normally.

INSPECTION PROCEDURE 2: When Remote Controlled Radio Power Switch is Turned "ON," no Power is Available. But Radio, CD Player and CD Changer Power Switch is Available.





CIRCUIT OPERATION

- If the remote controlled radio switch is operated, the output voltage will change. The radio, CD player and CD changer operates according to the change on the voltage. You can switch on the audio unit, control the mode and volume by the remote controlled radio switch (RH). You can select a CD track and pre-set radio station, and tune it by the remote controlled radio switch (LH).

  NOTE: You can switch on the audio unit by the remote controlled switch, but can not switch it off.

TECHNICAL DESCRIPTION (COMMENT)

If the system does not recognise the remote controlled radio switches (RH), the clock spring or the radio, CD player and CD changer may be defective.

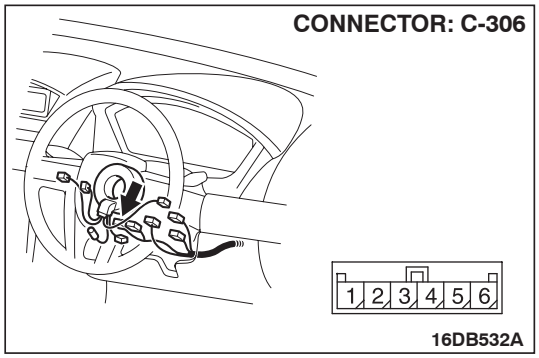
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the remote controlled radio switch (RH)
- Malfunction of the radio, CD player and CD changer
- Malfunction of the clock spring
- Damaged wiring harness or connectors

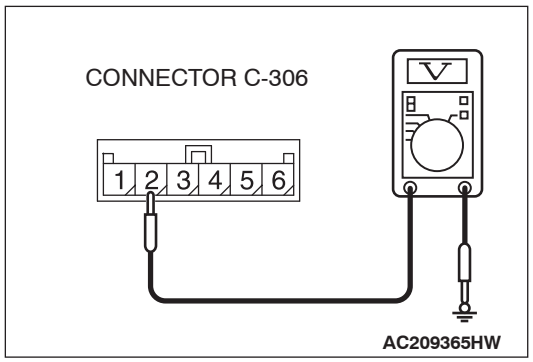
DIAGNOSIS

Required Special Tool:
- MB991223: Harness set

STEP 1. Measure the voltage at remote controlled radio switch power supply circuit at the clock spring connector C-306.



(1) Disconnect the clock spring connector C-306.
(2) Turn the ignition switch to "ON" position.



(3) Measure the voltage between clock spring connector C-306 (radio, CD player and CD changer side) terminal 2 and ground.
   - The measured value should be approximately 5 volts.

Q: Is the measured voltage approximately 5 volts?

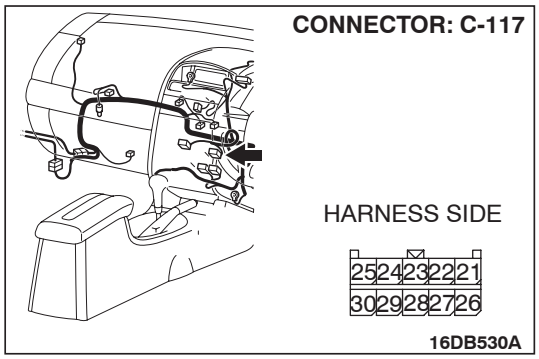
YES : Go to Step 4.
NO : Go to Step 2.

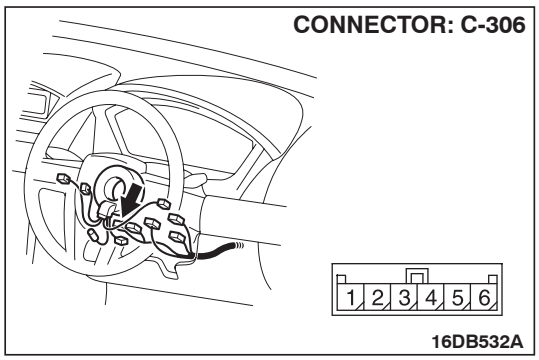
STEP 2. Check radio, CD player and CD changer connector C-117 and clock spring connector C-306 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are radio, CD player and CD changer connector C-117 and clock spring connector C-306 in good condition?

YES : Go to Step 3.

NO : Repair or replace the damaged component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The remote controlled radio switch should work normally.



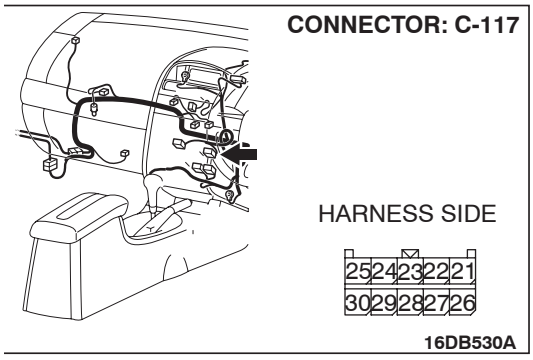


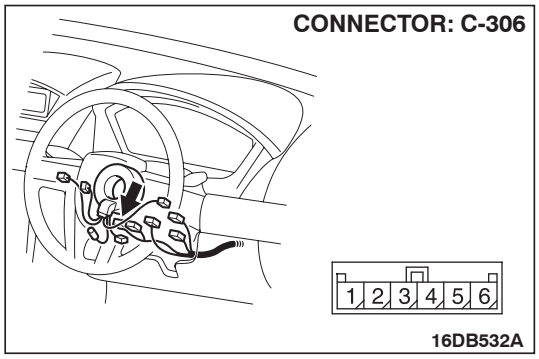
STEP 3. Check the wiring harness between radio, CD player and CD changer connector C-117 (terminal 30) and clock spring connector C-306 (terminal 2).

Q: Is the wiring harness between radio, CD player and CD changer connector C-117 (terminal 30) and clock spring connector C-306 (terminal 2) in good condition?

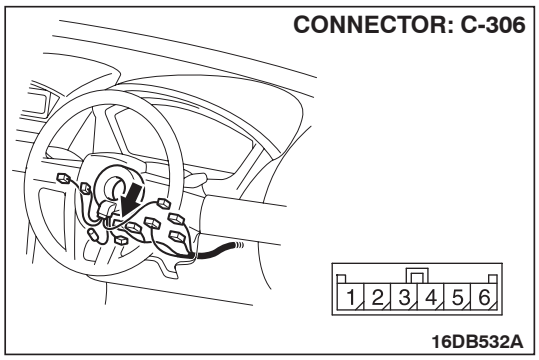
YES : Go to Step 4.

NO : Repair the wiring harness. The remote controlled radio switch should work normally.

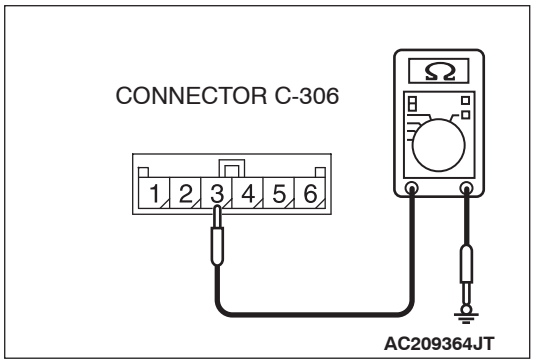




STEP 4. Measure the resistance at remote controlled radio switch ground circuit to the clock spring connector C-306.



(1) Disconnect the clock spring connector C-306.

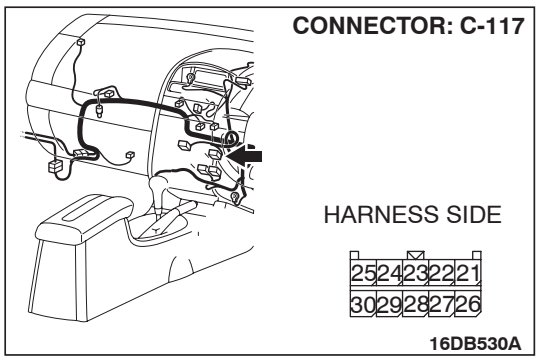


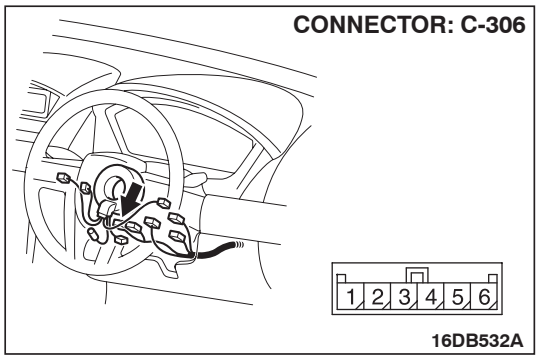
(2) Measure resistance between terminal 3 and ground.
- The measured value should be 2 ohm or less.

Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 7.
NO : Go to Step 5.

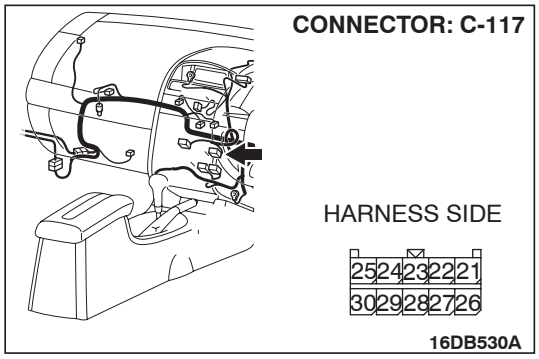
STEP 5. Check radio, CD player and CD changer connector C-117 and clock spring connector C-306 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

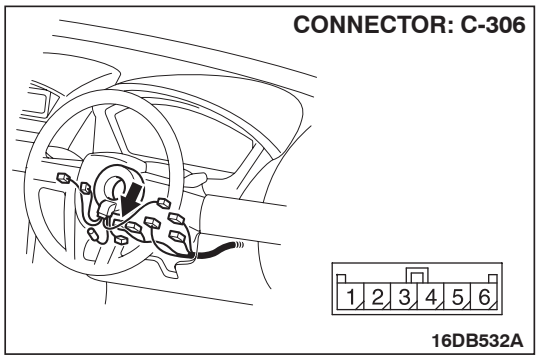




Q: Are radio, CD player and CD changer connector C-117 and clock spring connector C-306 in good condition?

YES : Go to Step 6.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The remote controlled radio switch should work normally.



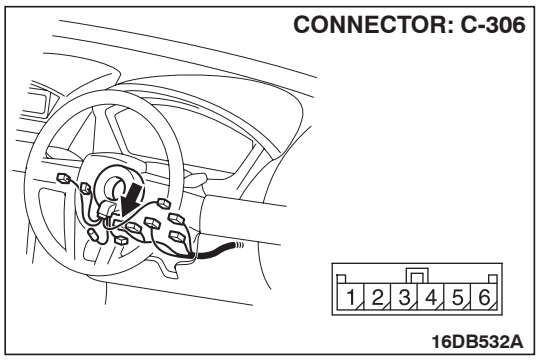


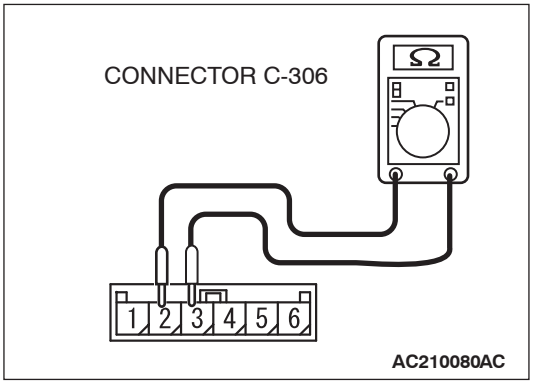
STEP 6. Check the wiring harness between radio, CD player and CD changer connector C-117 (terminal 25) and clock spring connector C-306 (terminal 3).

Q: Is the wiring harness between radio, CD player and CD changer connector C-117 (terminal 25) and clock spring connector C-306 (terminal 3) in good condition?

YES : Go to Step 7.

NO : Repair the wiring harness. The remote controlled radio switch should work normally.





STEP 7. Measure the resistance between the clock spring connector C-306 terminals.

(1) Disconnect the clock spring connector C-306.

(2) Measure the resistance between clock spring connector C-306 (clock spring side) terminals 2 and 3. Operate the right and left remote controlled radio switches, and check that the table below is satisfied.

SWITCH POSITION	MEASUREMENT VALUE (RH SIDE SWITCH)
No push	Approximately 24.0 kΩ
Upper	Approximately 5.3 kΩ
Center	Less than 2 ohms
Lower	Approximately 9.2 kΩ

NOTE: When checking the right remote controlled radio switch, do not operate the left remote controlled radio switch.

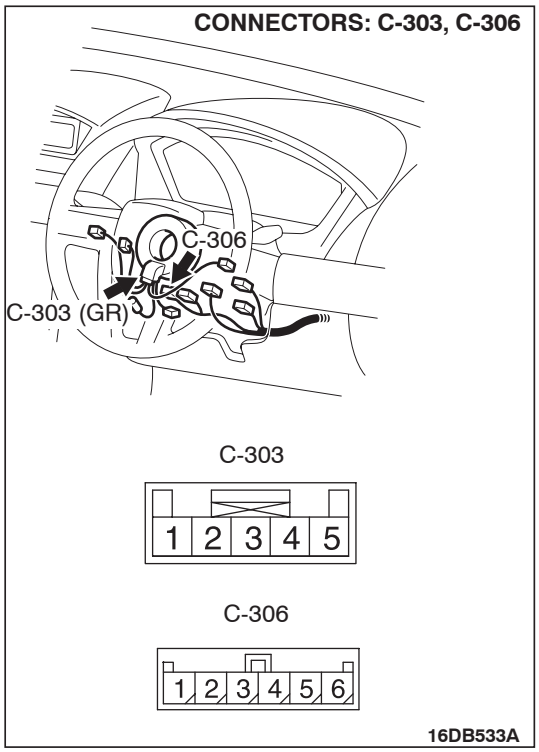
Q: Is the resistance between terminals 2 and 3 normal?

YES : This malfunction is intermittent. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points-How to Cope with Intermittent Malfunction P.00-14.

NO : Go to Step 8.

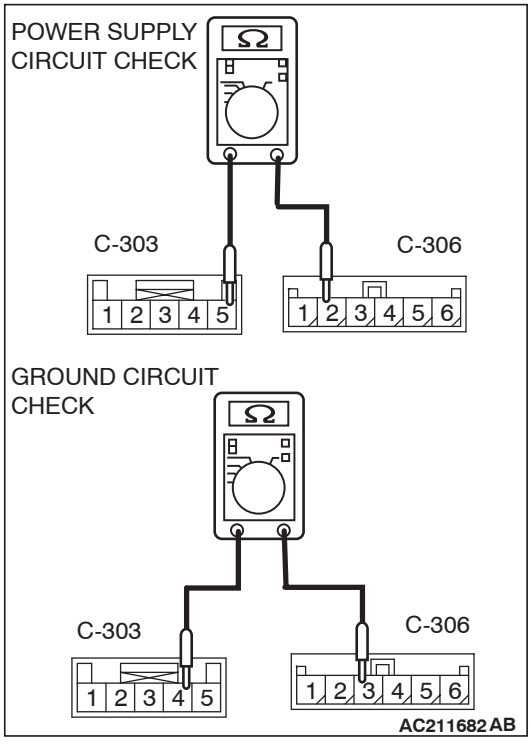
STEP 8. Measure the resistance at clock spring terminal.

(1) Remove the clock spring (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring P.52B-237).



(2) Measure the resistance at clock spring connectors C-303 and C-306.

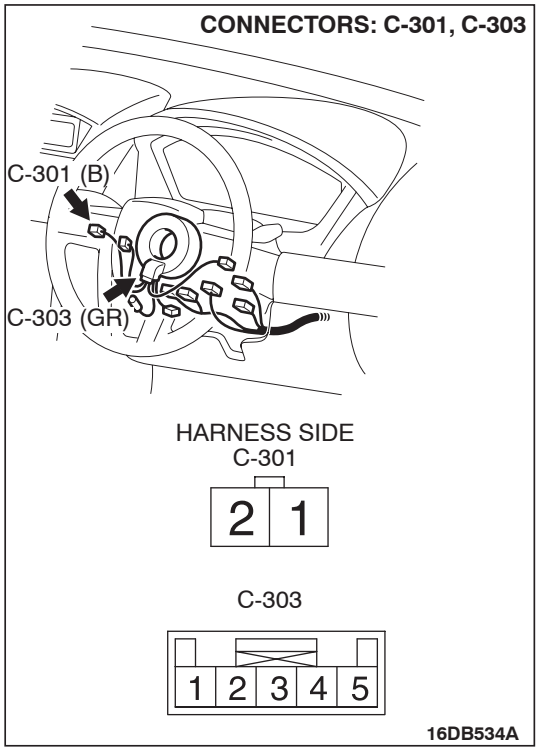
CIRCUIT TO BE MEASURED	CONNECTOR (TERMINAL) TO BE CHECKED	SPECIFIED CONDITION
Power supply circuit	C-303 (terminal 5) – C-306 (terminal 2)	Less than 2 ohms
Ground circuit	C-303 (terminal 4) – C-306 (terminal 3)	less than 2 ohms



Q: Is the measured resistance 2 ohms or less?

YES : Go to Step 9.

NO : Replace the clock spring.

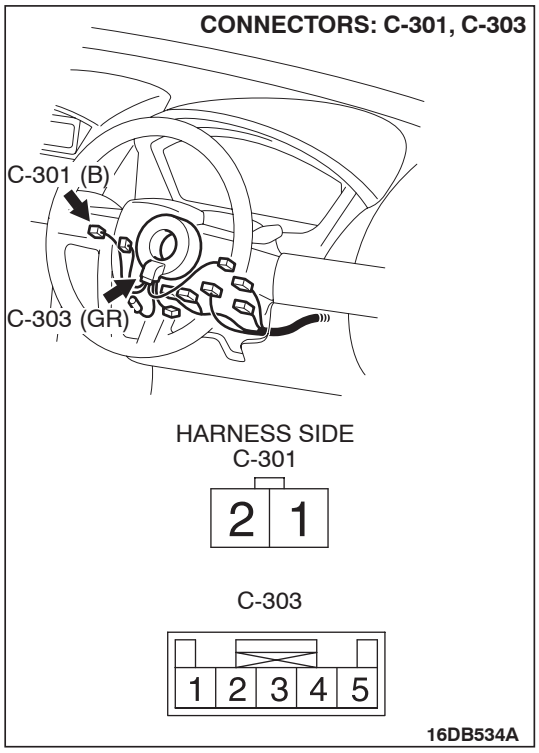


STEP 9. Check the clock spring connector C-303 and remote controlled radio switch (RH) connector C-301 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are clock spring connector C-303 and remote controlled radio switch (RH) connector C-301 in good condition?

YES : Go to step 10.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The remote controlled radio switch should work normally.

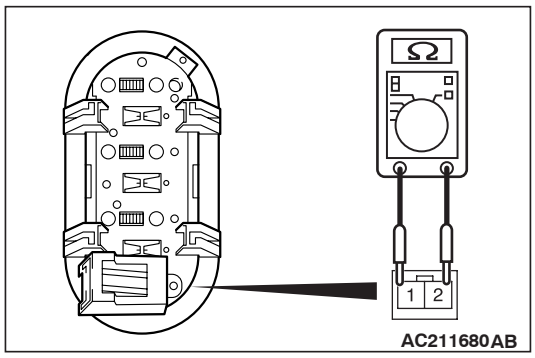


STEP 10. Check the wiring harness between clock spring connector C-303 (terminals 4 and 5) and remote controlled radio switch (RH) connector C-301 (terminals 1 and 2).

Q: Is the wiring harness between clock spring connector C-303 (terminals 4 and 5) and remote controlled radio switch (RH) connector C-301 (terminals 1 and 2) in good condition?

YES : Go to Step 11.

NO : Repair the wiring harness. The remote controlled radio switch should work normally.



STEP 11. Measure the resistance at remote controlled radio switch (RH).

(1) Remove the airbag module assembly (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring P.52B-237).
(2) Measure the resistance by operating the remote controlled radio switch (RH) in each position.

SWITCH POSITION	MEASUREMENT VALUE
No push	Approximately 24.0 kΩ
Upper	Approximately 6.8 kΩ
Center	Less than 2 ohms
Lower	Approximately 15.0 kΩ

Q: Are the resistance at the right remote controlled radio switch normal?

YES : Replace the radio, CD player and CD changer.
NO : Replace the remote controlled radio switch (RH).

INSPECTION PROCEDURE 3: The system does not recognize the remote controlled radio switch (RH) only.

CIRCUIT OPERATION

Refer to Inspection Procedure 2 P.54A-183.

TECHNICAL DESCRIPTION (COMMENT)

Refer to Inspection Procedure 2 P.54A-183.

TROUBLESHOOTING HINTS

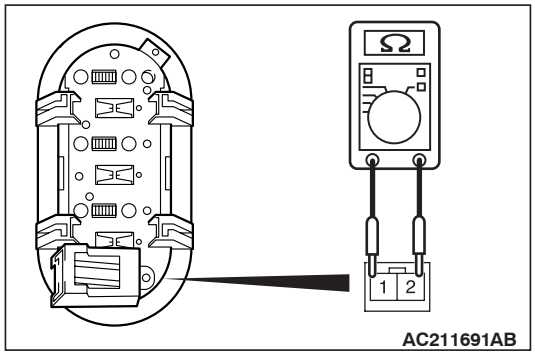
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

Refer to Inspection Procedure 2 P.54A-183.

DIAGNOSIS

Required Special Tool:

- MB991223: Harness set



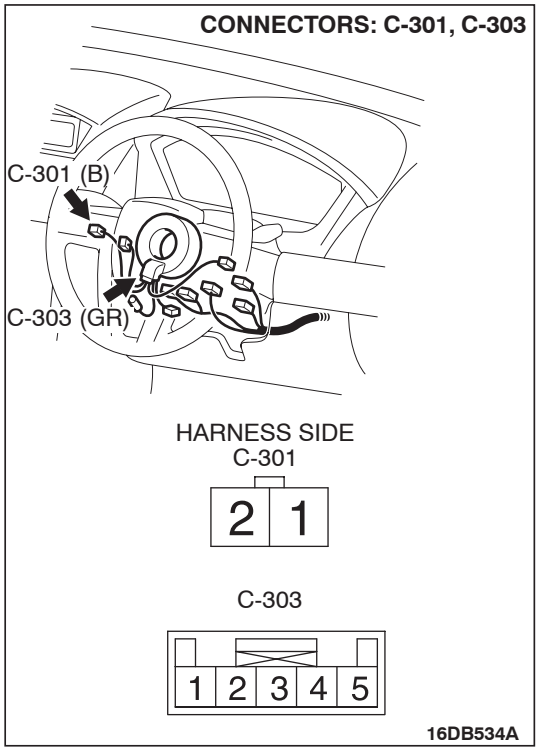
STEP 1. Measure the resistance at remote controlled radio switch (RH).

(1) Remove the airbag module assembly (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring P.52B-237).
(2) Measure the resistance by operating the remote controlled radio switch (RH) in each position.

SWITCH POSITION	MEASUREMENT VALUE
No push	Approximately 24.0 kΩ
Upper	Approximately 6.8 kΩ
Center	Less than 2 ohms
Lower	Approximately 15.0 kΩ

Q: Are the resistance at the right remote controlled radio switch normal?

YES : Go to Step 2.
NO : Replace the remote controlled radio switch (RH).

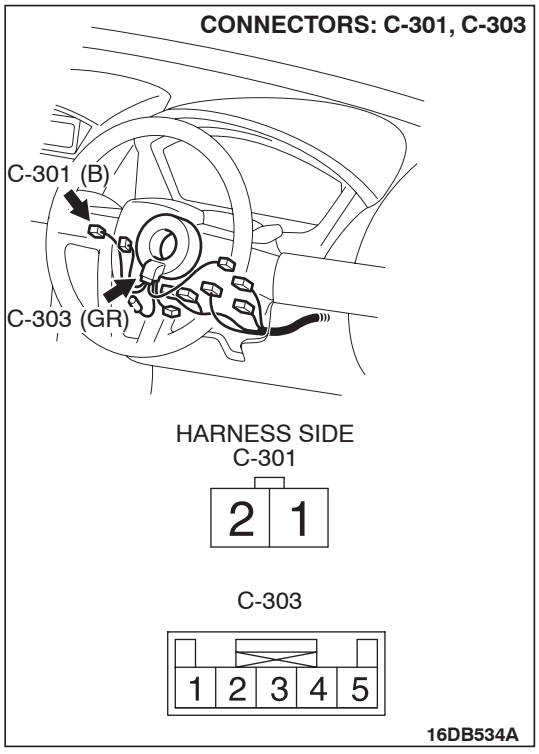


STEP 2. Check the remote controlled radio switch (RH) connector C-301 and clock spring connector C-303 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is remote controlled radio switch (RH) connector C-301 and clock spring connector C-303 in good condition?

YES : Go to Step 3.

NO : Repair or replace it. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The remote controlled radio switch (RH) should work normally.



STEP 3. Check the wiring harness between remote controlled radio switch (RH) connector C-301 (terminals1 and 2) and clock spring connector C-303 (terminals 4 and 5).

Q: Are the wiring harness between remote controlled radio switch (RH) connector C-301 (terminals 1 and 2) and clock spring connector C-303 (terminals 4 and 5) in good condition?

YES : The procedure is complete.

NO : Repair the wiring harness. The remote controlled radio switch (RH) should work normally.

INSPECTION PROCEDURE 4: The system does not recognize the remote controlled radio switch (LH) only.

CIRCUIT OPERATION

Refer to Inspection Procedure 2 P.54A-183.

TECHNICAL DESCRIPTION (COMMENT)

Refer to Inspection Procedure 2 P.54A-183.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

Refer to Inspection Procedure 2 P.54A-183.

DIAGNOSIS

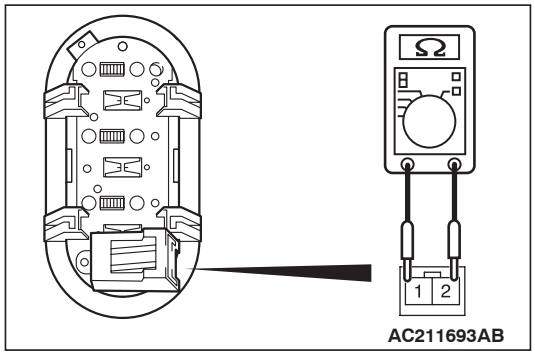
Required Special Tool:

- MB991223: Harness set

STEP 1. Measure the resistance at remote controlled radio switch (LH).

(1) Remove the airbag module assembly (Refer to GROUP 52B, Air Bag Module(s) and Clock Spring P.52B-237).

(2) Measure the resistance by operating the remote controlled radio switch (LH) in each position.



SWITCH POSITION	MEASUREMENT VALUE
No push	Open circuit
Upper	Approximately 1.2 kΩ
Center	Approximately 470 Ω
Lower	Approximately 3.3 kΩ

Q: Is the resistance at the left remote controlled radio switch normal?

YES : Go to Step 2.

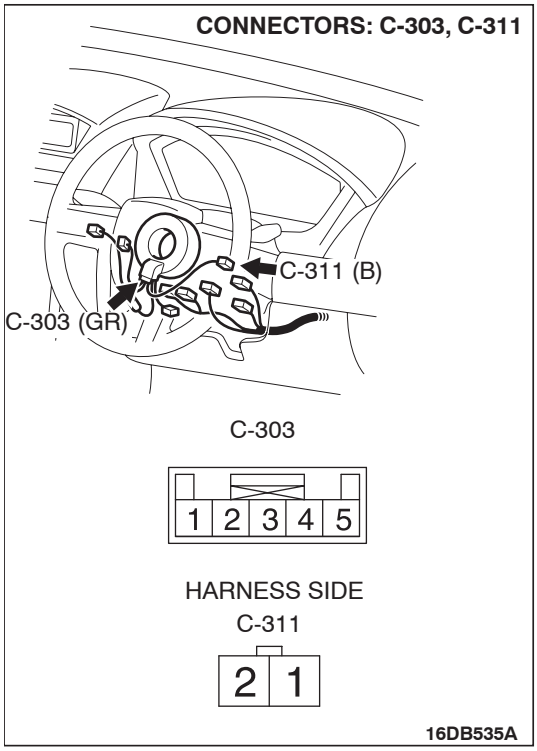
NO : Replace the remote controlled radio switch (LH).

STEP 2. Check the radio switch (LH) connector C-311 and clock spring connector C-303 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is remote controlled radio switch (LH) connector C-311 and clock spring connector C-303 in good condition?

YES : Go to Step 3.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The remote controlled radio switch (LH) should work normally.

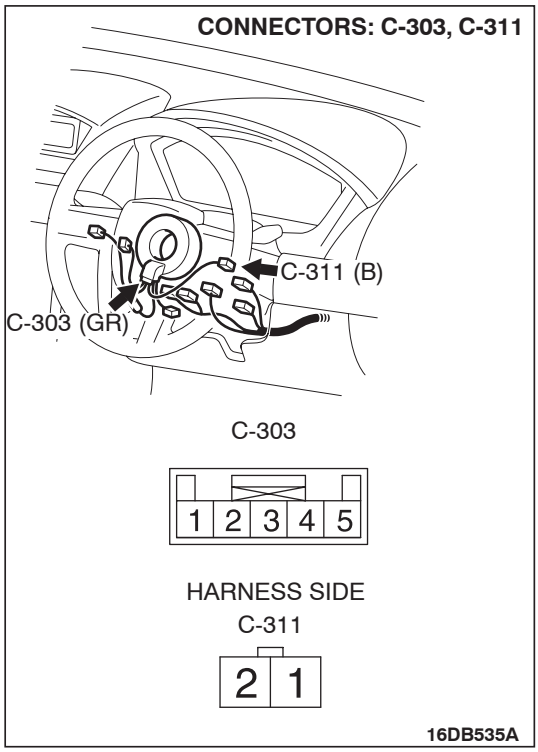


STEP 3. Check the wiring harness between remote controlled radio switch connector C-311 (terminals1 and 2) and clock spring connector C-303 (terminals 4 and 5).

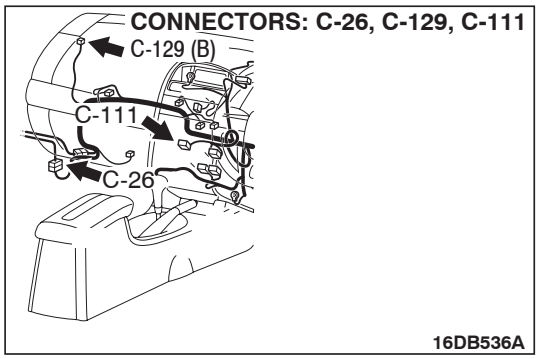
Q: Are the wiring harness between remote controlled radio switch connector C-311 (terminals 1 and 2) and clock spring connector C-303 (terminals 4 and 5) in good condition?

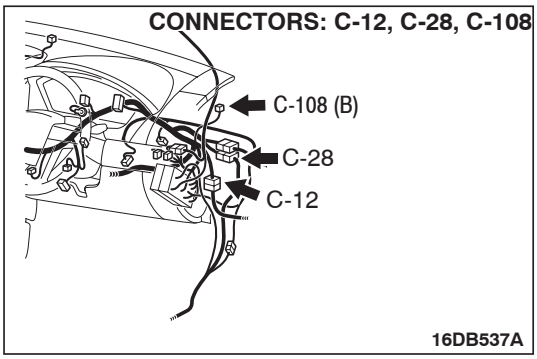
YES : No action to be taken.

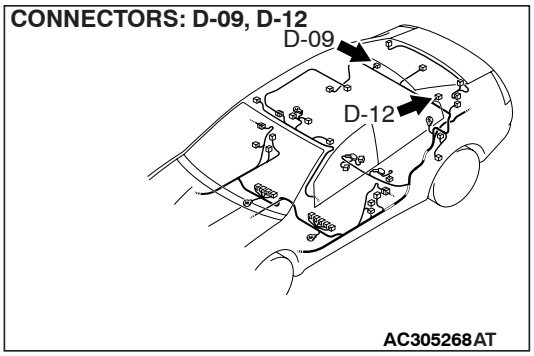
NO : Repair the wiring harness. The remote controlled radio switch (LH) should work normally.

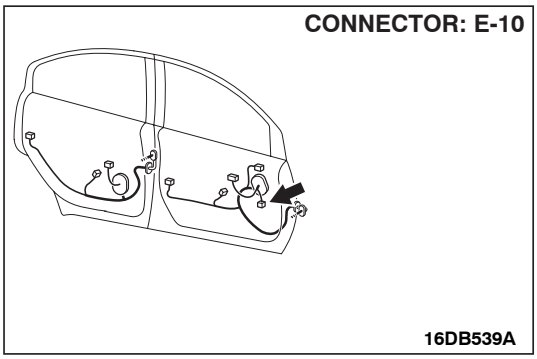


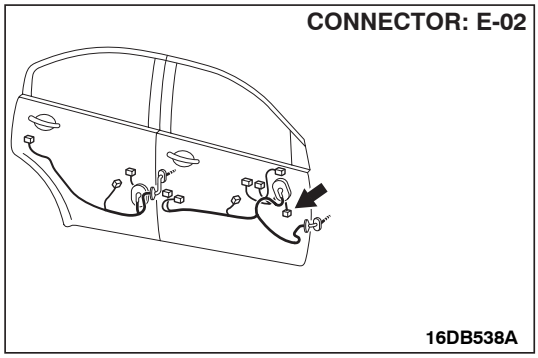
INSPECTION PROCEDURE 5: No Sound from One Speaker.











CIRCUIT OPERATION

The speakers sound according to audio signal output from the radio and CD player.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a faulty speaker circuit system.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the speaker.
- Damaged wiring harness or connector.
- Malfunction of the radio and CD player.

DIAGNOSIS

STEP 1. Check which speaker has no sound on the vehicles with audio amplifier.

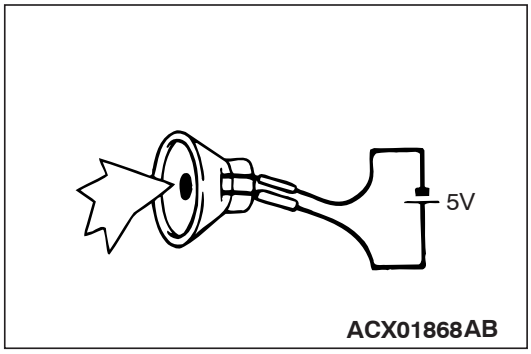
Determine which speaker does not sound.

Q: Which speaker does not sound?

Tweeter (RH) : Go to Step 2.
Tweeter (LH) : Go to Step 5.
Front door speaker (LH) : Go to Step 8.
Front door speaker (RH) : Go to Step 11.
Rear speaker (LH) : Go to Step 14.
Rear speaker (RH) : Go to Step 17.

STEP 2. Check the tweeter (RH).

(1) Remove the tweeter (RH). Refer to P.54A-232.
(2) Check that the tweeter (RH) generates noise when a five-volt voltage is applied on the tweeter (RH) terminal.



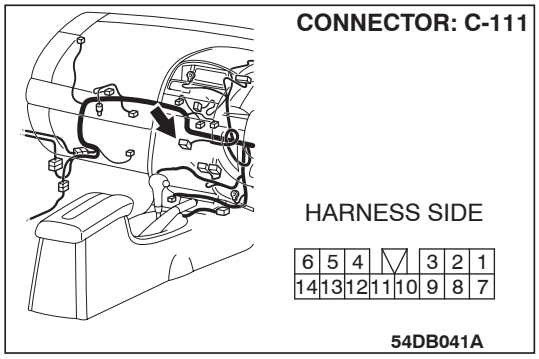
Q: Is the tweeter (RH) generating noise?

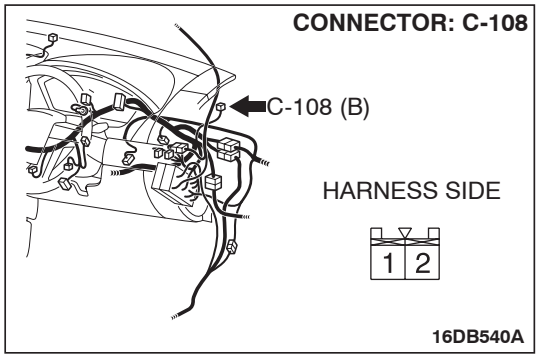
YES : Go to Step 3.
NO : Replace the tweeter (RH). The tweeter (RH) should sound.

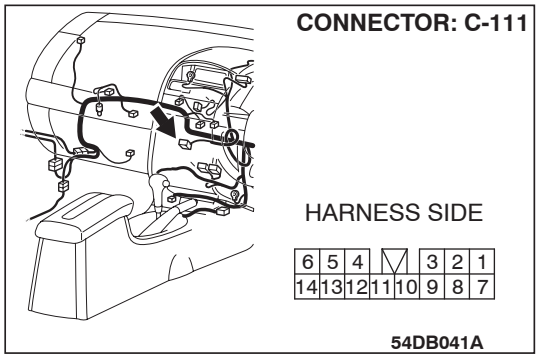
STEP 3. Check tweeter (RH) connector C-108 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

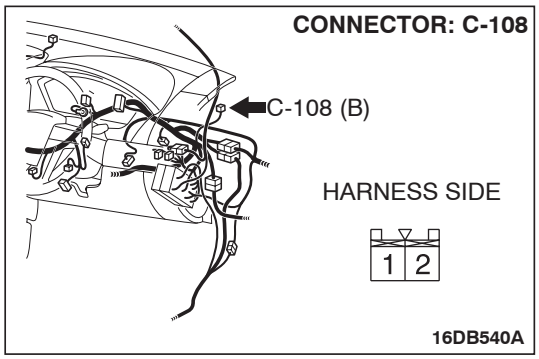
Q: Are harness connectors C-108 and C-111 in good condition?

YES : Go to Step 4.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The tweeter (RH) should sound.







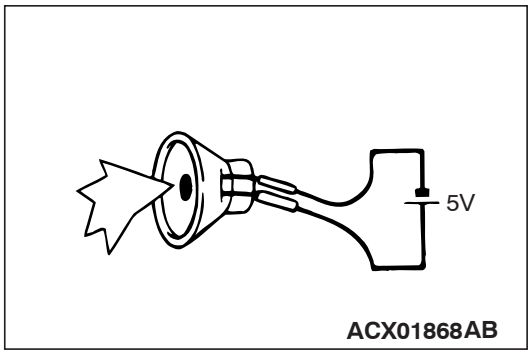


STEP 4. Check the wiring harness between tweeter (RH) connector C-108 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 6 and 14).

Q: Is the wiring harness between tweeter (RH) connector C-108 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 6 and 14) in good condition?

YES : The procedure is complete.

NO : Repair the wiring harness. The tweeter (RH) should sound.



STEP 5. Check the tweeter (LH).

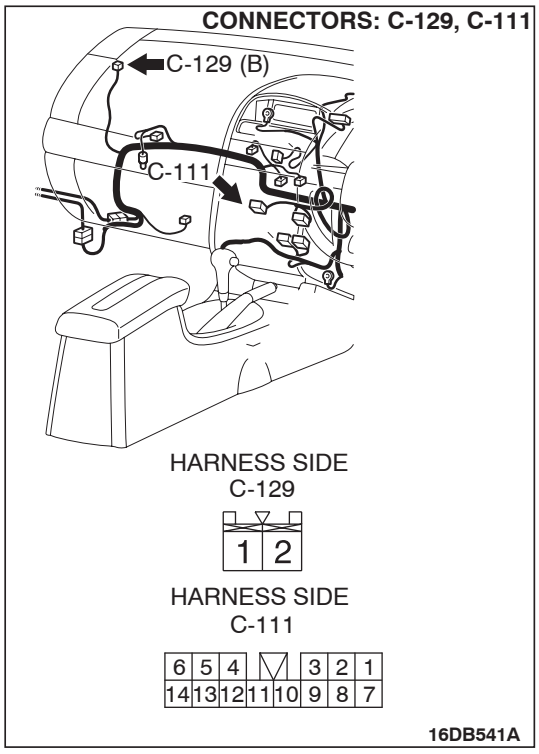
(1) Remove the tweeter (LH). Refer to P.54A-232.

(2) Check that the tweeter (LH) generates noise when a five-volt voltage is applied on the tweeter (LH) terminal.

Q: Is the tweeter (LH) generating noise?

YES : Go to Step 6.

NO : Replace the tweeter (LH). The tweeter (LH) should sound.

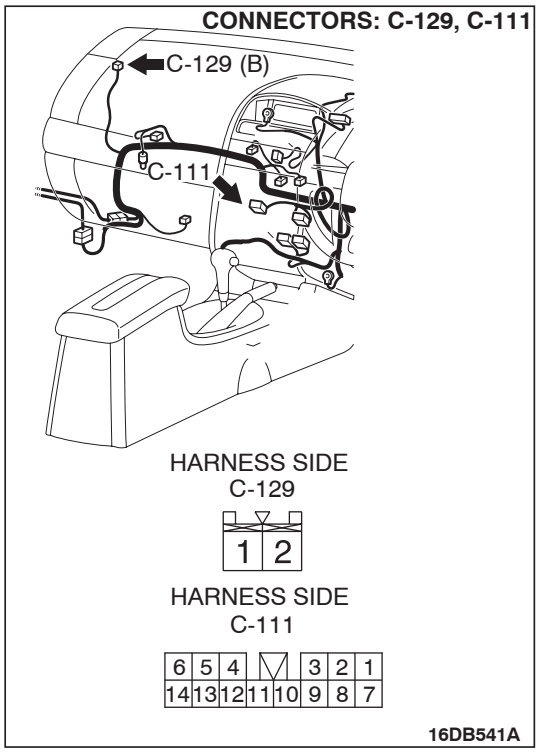


STEP 6. Check tweeter (LH) connector C-129 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are harness connectors C-129 and C-111 in good condition?

YES : Go to Step 7.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The tweeter (LH) should sound.

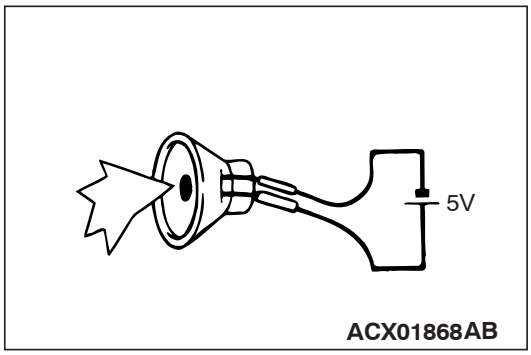


STEP 7. Check the wiring harness between tweeter (LH) connector C-129 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 5 and 13).

Q: Is the wiring harness between tweeter (LH) connector C-129 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 5 and 13) in good condition?

YES : The procedure is complete.

NO : Repair the wiring harness. The tweeter (LH) should sound.



STEP 8. Check the front door speaker (LH).

(1) Remove the front door speaker (LH). Refer to P.54A-232.
(2) Check that the front door speaker (LH) generates noise when a five-volt voltage is applied on the front door speaker (LH) terminal.

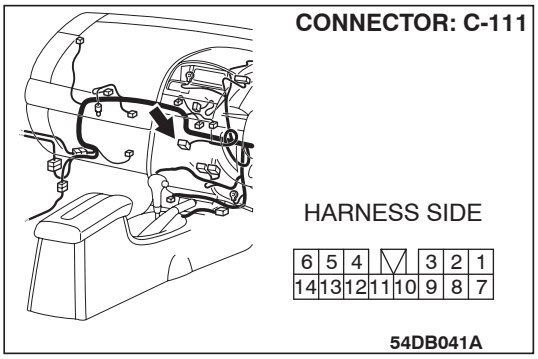
Q: Is the front door speaker (LH) generating noise?

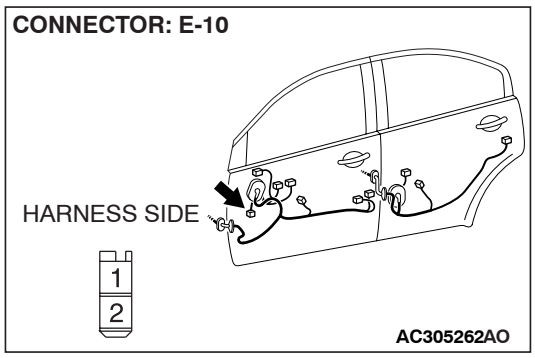
YES : Go to Step 9.
NO : Replace the front door speaker (LH). The front door speaker (LH) should sound.

STEP 9. Check front door speaker (LH) connector E-10 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

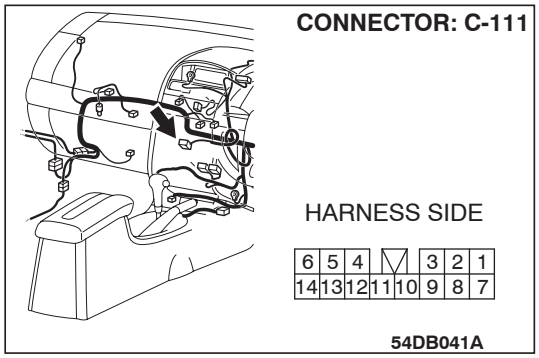
Q: Are harness connectors E-10 and C-111 in good condition?

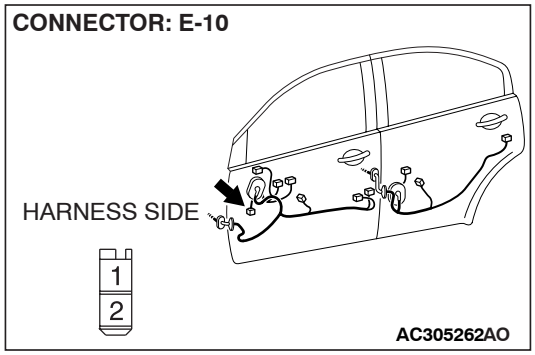
YES : Go to Step 10.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The front door speaker (LH) should sound.

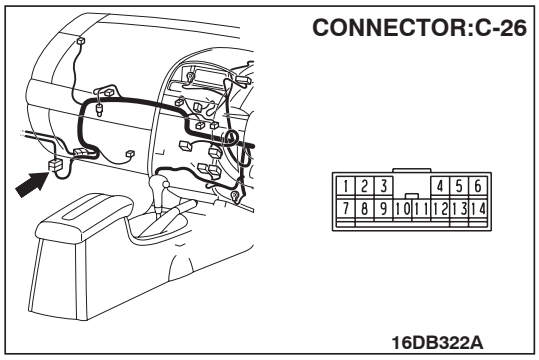




STEP 10. Check the wiring harness between front door speaker (LH) connector E-10 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 5 and 13).







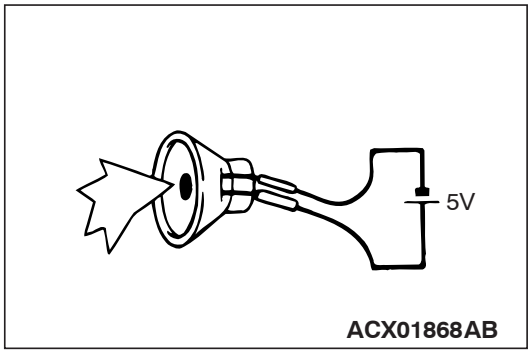
NOTE: Also check intermediate connector C-26 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-26 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between front door speaker (LH) connector E-10 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 5 and 13) in good condition?

YES : The procedure is complete.
NO : Repair the wiring harness. The front door speaker (LH) should sound.

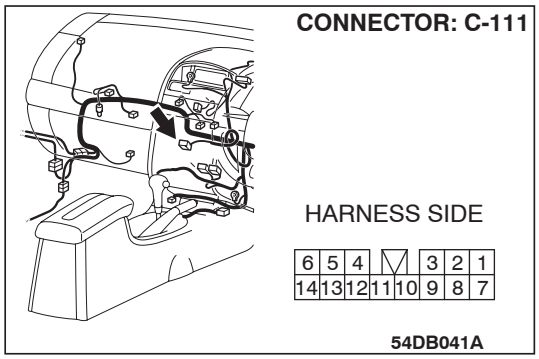
STEP 11. Check the front door speaker (RH).

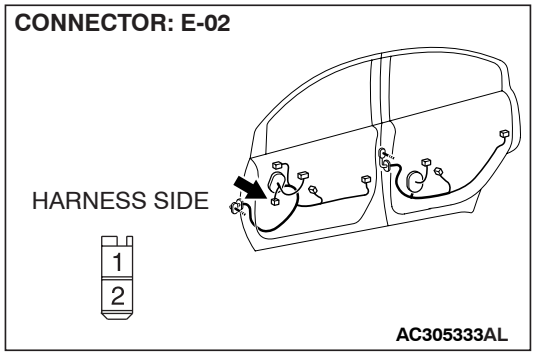
(1) Remove the front door speaker (RH). Refer to P.54A-232.
(2) Check that the front door speaker (RH) generates noise when a five-volt voltage is applied on the front door speaker (RH) terminal.



Q: Is the front door speaker (RH) generating noise?

YES : Go to Step 12.
NO : Replace the front door speaker (RH). The front door speaker (RH) should sound.





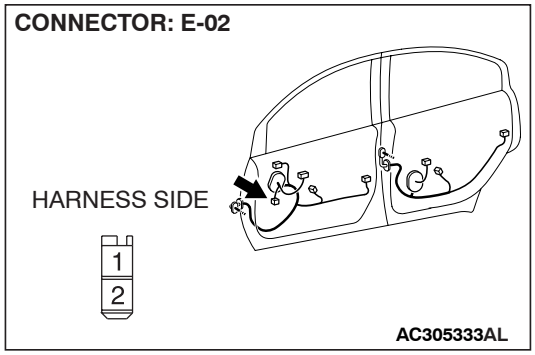
STEP 12. Check front door speaker (RH) connector E-02 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

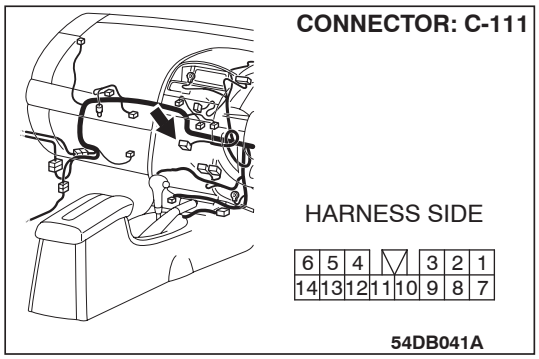
Q: Are harness connectors E-02 and C-111 in good condition?

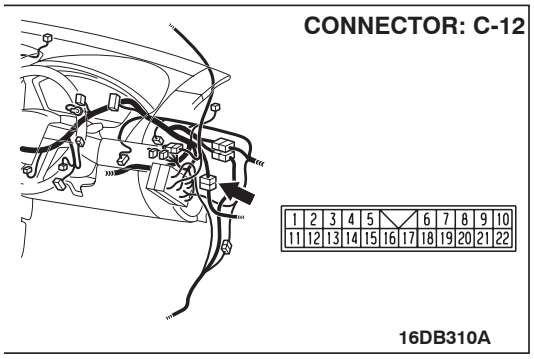
YES : Go to Step 13.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The front door speaker (RH) should sound.

STEP 13. Check the wiring harness between front door speaker (RH) connector E-02 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 6 and 14).





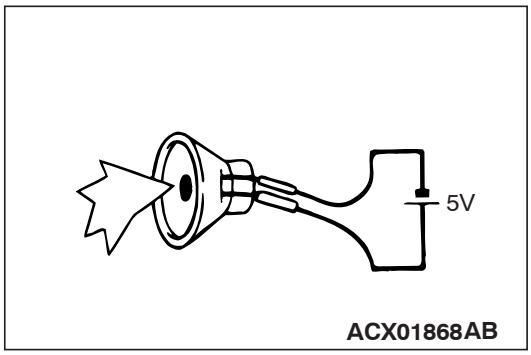


NOTE: Also check intermediate connector C-12 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-12 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between front door speaker (RH) connector E-02 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 6 and 14) in good condition?

YES : The procedure is complete.

NO : Repair the wiring harness. The front door speaker (RH) should sound.



STEP 14. Check the rear speaker (LH).

(1) Remove the rear speaker (LH). Refer to P.54A-232.
(2) Check that the rear speaker (LH) generates noise when a five-volt voltage is applied on the rear speaker (LH) terminal.

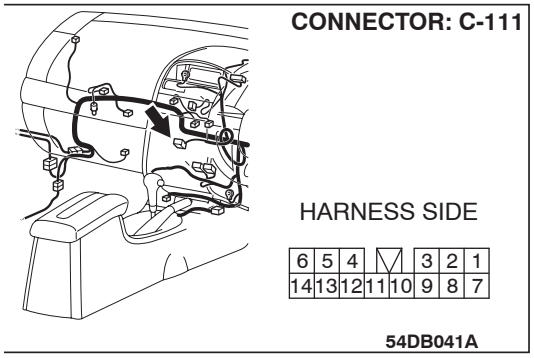
Q: Is the rear speaker (LH) generating noise?

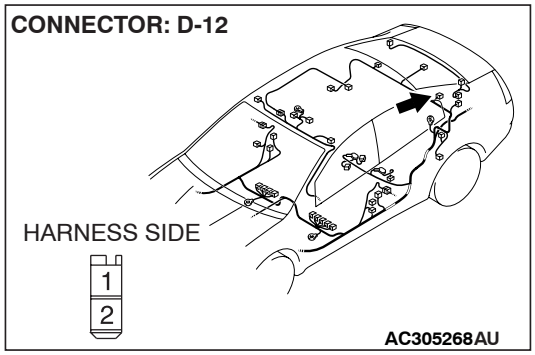
YES : Go to Step 15.
NO : Replace the rear speaker (LH). The rear speaker (LH) should sound.

STEP 15. Check rear speaker (LH) connector D-12 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

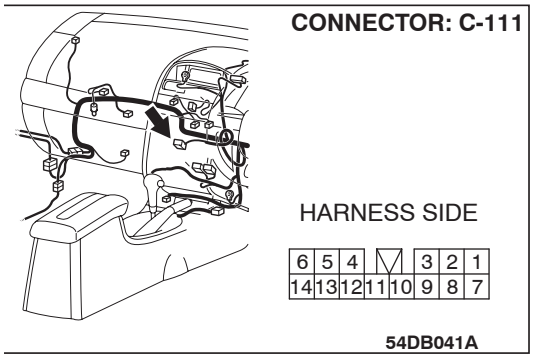
Q: Are harness connectors D-12 and C-111 in good condition?

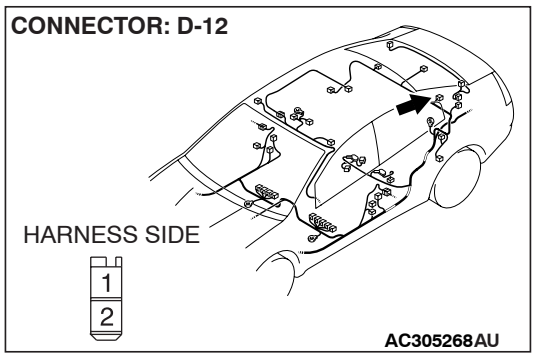
YES : Go to Step 16.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The rear speaker (LH) should sound.

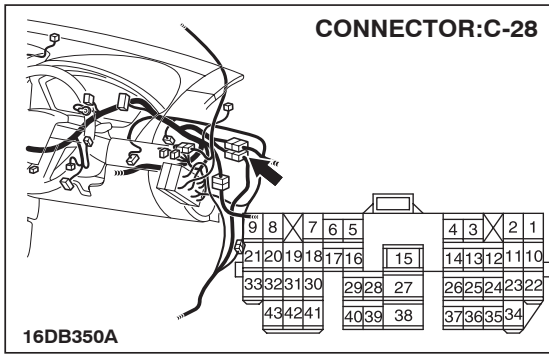




STEP 16. Check the wiring harness between rear speaker (LH) connector D-12 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 2 and 8).







NOTE: Also check intermediate connector C-28 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-28 is damaged, repair or replace the connectors as described in GROUP 00E, Harness Connector Inspection P.00E-2.

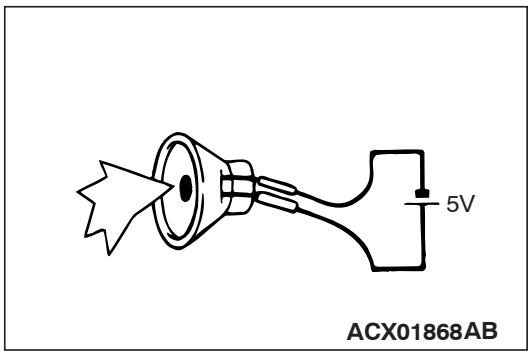
Q: Is the wiring harness between the rear speaker (LH) connector D-12 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 2 and 8) in good condition?

YES : Replace the radio and CD player. The rear speaker (LH) should sound.

NO : Repair the wiring harness. The rear speaker (LH) should sound.

STEP 17. Check the rear speaker (RH).

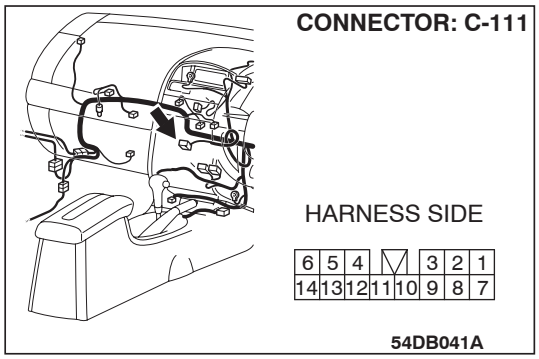
(1) Remove the rear speaker (RH). Refer to P.54A-232.
(2) Check that the rear speaker (RH) generates noise when a five-volt voltage is applied on the rear speaker (RH) terminal.

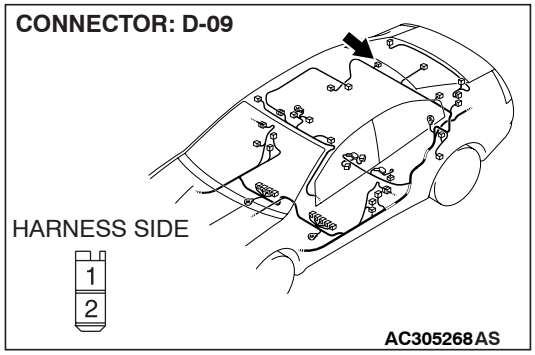


Q: Is the rear speaker (RH) generating noise?

YES : Go to Step 18.

NO : Replace the rear speaker (RH). The rear speaker (RH) should sound.





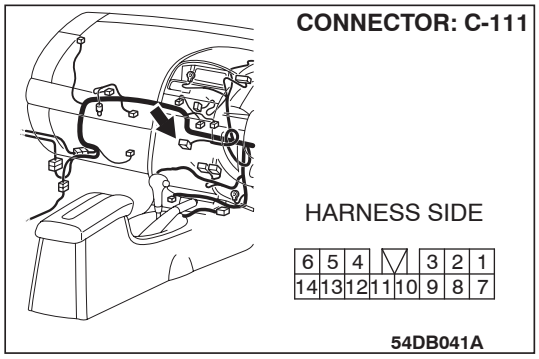
STEP 18. Check rear speaker (RH) connector D-09 and radio and CD player connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

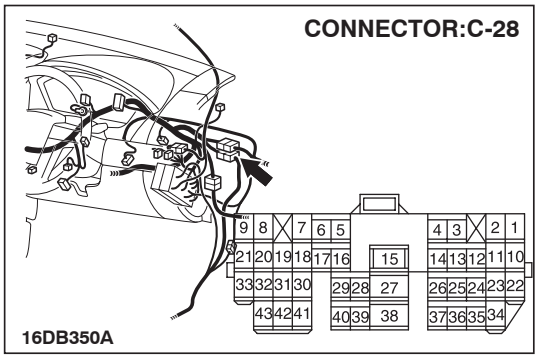
Q: Are harness connectors D-09 and C-111 in good condition?

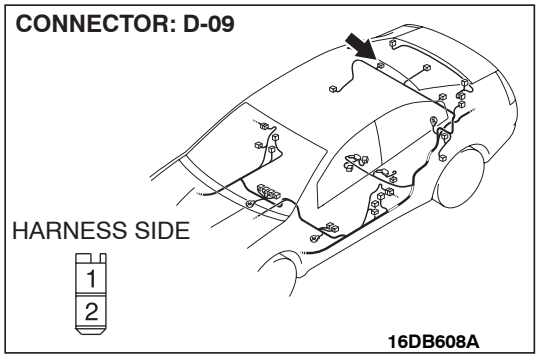
YES : Go to Step 19.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The rear speaker (RH) should sound.

STEP 19. Check the wiring harness between rear speaker (RH) connector D-09 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 1 and 7).







NOTE: Also check intermediate connector C-28 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-28 is damaged, repair or replace the connectors as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between rear speaker (RH) connector D-09 (terminals 1 and 2) and radio and CD player connector C-111 (terminals 1 and 7) in good condition?

YES : Replace the radio and CD player. The rear speaker (RH) should sound.

NO : Repair the wiring harness. The rear speaker (RH) should sound.

INSPECTION PROCEDURE 6: Noise is Present while Moving (AM).

STEP 1. Ask the driver about the noise.

(1) Find out the following information from the owner.
(2) Place where the noise occurs.
(3) Locality conditions (valley, mountain, etc).
(4) Name and frequency of stations affected by noise.

Q: What type of noise is detected, vehicle noise or external noise?

Vehicle noise : It may not be possible to prevent noise if the signal is weak. Go to step 2.

External noise : In almost all cases, prevention on the receiver side is next to impossible when the signal is weak. Go to Step 4.

STEP 2. Ask the driver about the location where the noise occurs.

Q: Does the noise occur when entering or near a particular structure (building, tunnel, mountain, etc)?

YES : Go to Step 3.
NO : Go to Step 4.

STEP 3. Check if the noise can be eliminated by adjusting the radio.

(1) Adjust the radio as follows.
(2) Change to a different station with a stronger signal. This will boost the systems resistance to outside interference.
(3) Suppress high tones to reduce noise.

Q: Has the noise been eliminated?

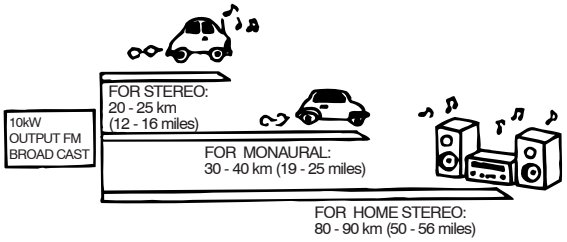
YES : The noise has now been eliminated. Inform the customer that it is normal to hear noise while receiving a weak station.
NO : Go to Step 4.

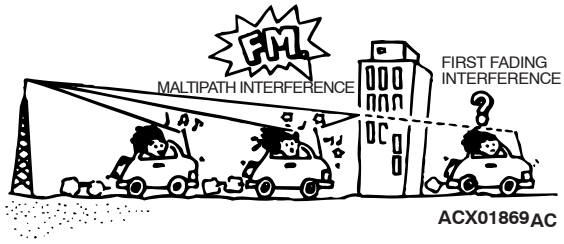
STEP 4. Check for the noise.

Q: Does noise still exist?

YES : If there is still more noise than on other similar radio's find out the type of noise. Ask the owner for the name and frequency of the affected stations, and consult with the radio manufacturer service centre.
NO : System is operating normally.

INSPECTION PROCEDURE 7: Noise is Present while Moving (FM).





DIAGNOSIS

NOTE: FM waves have the same properties as light, and can be deflected and blocked. FM signal reception is severely degraded in the shadow of obstructions such as buildings or mountains. An FM receiver will then only receive a reflected signal.

1. The signal becomes weak as the distance from the station's transmission antenna increases. The signal strength received depends on the signal strength of the transmitting station and intervening obstructions such as buildings and hills. Generally speaking, the area of good reception is approximately 20 – 25 km for stereo reception, and 30 – 40 km for monaural reception.
2. The signal will becomes weak when an area of shadow from the transmitting antenna (places where there are obstructions such as mountains or buildings between the station transmitter and the vehicle), and noise will appear. <This is called first fading, and gives a steady buzzing noise.>

3. If a direct signal hits the antenna at the same time as a signal reflected by obstructions such as mountains or buildings, interference of the two signals will generate noise. When moving, noise will appear each time the vehicle's antenna passes through this kind of obstructed area. The strength and interval of the noise varies according to the signal strength and the conditions of deflection. <This is called multipath noise, and is a repetitive buzzing.>
4. Since FM stereo transmission and reception has a weaker field than monaural, it is often accompanied by a hissing noise.

After taking measures to prevent the noise, check that no noise occurs.

5. Change to a different station with a stronger wave to boost resistance to interference.
6. Suppress high tones to reduce noise.
7. Does vehicle have an antenna which extend? If not eliminate this step.

If there is noise, the following causes can be considered.

8. If due to vehicle noise: It may not be possible to prevent noise if the signal is weak.
9. If due to external noise: In almost all cases, prevention on the receiver side is not possible. Weak signals especially are susceptible to interference.

If there is more noise than on radios in other vehicles, find out the noise condition and the name and frequency of the receiving stations from the owner, and consult with the radio manufacturer's service centre.

INSPECTION PROCEDURE 8: Sound mixed with Noise, Only at Night (AM).

The following can be considered as possible causes of noise appearing only at night.

1. It is significantly easier to receive long-distance signals at night. This means that even stations that are received without a problem during the day may experience problems at night. Remember that the weaker station is more susceptible to interference. The appearance of a beat sound may occur in the evening. A beat sound is created when two signals close in frequency interfere with each other. A common sign of this type of interference is a repetitious high-pitched sound that may over power the desired radio station. This sound is generated not only by sound signals but electrical waves as well.
2. The changing system may also be a source of noise. When diagnosing radio noise, do not over look the possibility of a problem with the vehicles alternator.

DIAGNOSIS

STEP 1. Check the vehicles lighting system.

Q: Does the noise disappear when the vehicles headlamps are turned "OFF"?
YES : Go to Step 2.
NO : Go to Step 3.

STEP 2. Check that the following actions disappear the noise.
Tune to a station with a stronger signal.

Q: Is there more noise than on radio in other vehicles?
YES : Consult the radio manufacturer's service centre.
NO : Check that there is no noise.

STEP 3. Check that the noise fades away when the vehicle harness is moved away from the radio (if the harness is not in the proper position).

Q: Does the noise fade away when the vehicle harness is moved any from the radio (If the harness is not in the proper position)?
YES : Consult the radio manufacturer's service centre.
NO : If there is more noise than other radios, consult the radio manufacturer's service centre.

INSPECTION PROCEDURE 9: Noise is Overpowering both AM and FM.

DIAGNOSIS

STEP 1. Verify that the noise occur when the engine is stopped or the engine is running.

Q: Does noise occur when the engine is stopped or the engine is running?
When the engine is stopped : Go to Step 2.
When the engine is running : Check the vehicle's noise suppressor. (Refer to Inspection Procedure 13 P.54A-210).

STEP 2. Verify that the following actions disappear the noise.
(1) Tune to a station with a stronger wave.
(2) Adjust the sound quality to suppress high tones.

Q: Is the noise eliminated?
YES : Consult the radio manufacturer's service centre.
NO : Go to Step 3.

STEP 3. Verify that the radio is correctly grounded

Q: Is the radio correctly grounded?
YES : Go to Step 4.
NO : Consult the radio manufacturer's service centre.

STEP 4. Check the connection of the antenna plug and radio and CD player or radio, CD player and CD changer.

Q: Is the antenna plug thoroughly connected to the radio and CD player or radio, CD player and CD changer?
YES : Go to Step 6.
NO : Go to Step 5.

STEP 5. Verify that the noise is eliminated when the antenna plug is properly attached.

Q: Is the noise eliminated?
YES : Consult the radio manufacturer's service centre.
NO : Go to Step 6.

STEP 6. Verify that the antenna is in good condition and is it properly mounted.

Q: Is the antenna in good condition and is it properly mounted?
YES : Consult the radio manufacturer's service centre.
NO : Go to Step 7.

STEP 7. Clean the antenna plug and ground wire mounting area. Mount the antenna securely.

NOTE: Noise encountered during FM reception only due to differences in FM and AM system, FM is not as susceptible as AM to interference from engines, power lines, lighting, etc. On the other hand, due to the characteristics of FM waves, there are sometimes cases of noise or distortion which are generated by typical noise interference (first fading and multipath). (Refer to Inspection Procedure 9 P.54A-207.) <Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>

NOTE: Furthermore, the amount of interference will be comparatively less for vehicles equipped with a diversity antenna system. If there is an equivalent amount of distortion in vehicles or radios of the same type, then differences will be because of differences in antenna systems, and this should be explained to the user.*

NOTE: Diversity antenna system: A system where two types of antenna (glass main antenna and glass sub antenna) are equipped and the antenna that provides the best reception car be selected.*

Q: Is the antenna in good condition?
YES : Consult the radio manufacturer's service centre.
NO : Clean or repair it. Check the noise is eliminated. If the noise is not eliminated, consult the radio manufacturer's service centre.

INSPECTION PROCEDURE 10: Excessive Noise on AM and FM.

DIAGNOSIS

Radio reception can be affected by Radio Frequency (RF) emissions from a variety of sources. The disturbance is even greater if the station is weak or poorly tuned. FM reception is not as sensitive to disturbances as AM. AM reception is sensitive to electrical disturbances such as power lines, lightening and other types of similar electrical phenomena.

STEP 1. Check if the customer heard the noise under any of the following conditions.

- A motorcycle was passing.
- Lighting was flashing.
- Passed beneath a power line.
- Passed beneath a telephone line.
- Passed by a signal generator.
- Passed by any other sources of electrical noise.
- Passed under a bridge or through a tunnel.

Q: Did the noise occur during any of the circumstances listed above?
YES : The observed noise is normal.
NO : Go to Step 2.

STEP 2. Compare the customers radio to another identical model.

Operate the radio in a vehicle with a known good audio system of the same type as the customer's.

Q: Is there more noise on the customers radio?
YES : Check all power and ground connections. If all connections are in good condition, consult the radio manufacturers service centre.
NO : The observed noise is normal.

INSPECTION PROCEDURE 11: Noise is Detected with Engine Running.

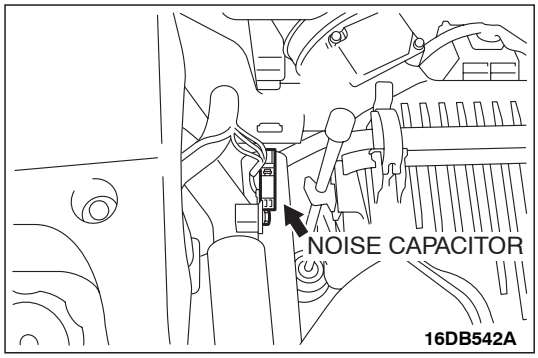
DIAGNOSIS

⚠ CAUTION

- **Never connect a noise filter to the high tension cable (spark plug wire). Spark plug wires incorporate resistors which have the effect of suppressing noise. If a spark plug wire is found to be causing noise, it must be replaced.**
- **Confirm that the noise is not from an external source.**
- **Noise prevention should be performed by suppressing strong sources of noise first.**

NOTE: Voltage surges can be induced in the electrical system by the collapse of a field (i.e. When power is removed from the coil in an A/C compressor clutch). This induced voltage surge will radiate a Radio Frequency (RF) signal that is picked up by the audio unit. In the case of the compressor clutch a "pop" will be heard through the speakers. The capacitor, installed on this vehicle, will store the excess voltage and prevent the production of RF noise. This is because the capacitor will charge and discharge as the voltage fluctuates. This has the effect of "attracting" noise and bleeding it to ground without interfering with the normal flow of current through the system.

DESCRIPTION OF NOISE	CONDITIONS	CAUSE	SOLUTION
AM, FM: ignition noise (popping, snapping, cracking, buzzing)	• Increasing the engine speed causes the alternator whine to speed up and the volume to decrease. • Disappears when the ignition switch turned to "ACC", and engine is off.	• Electrical interference from the spark plugs. • Engine noise.	• Check or replace the ground cable. • Check or replace spark plug wires. • Check or replace the noise capacitor.
Other electrical components	–	• Noise may intensify due to ageing electrical components.	• Repair or replace the electrical components.
Static electricity (cracking, crinkling)	Noise disappears when the vehicle is completely stopped.	• Noise occurs when parts or wiring move and contact vehicle body.	• Return parts or wiring to their proper position.
Static electricity (cracking, crinkling)	• Various noises are produced depending on the body part of the vehicle.	• This may be due to the recent removal of the front hood, bumpers, exhaust pipe and muffler, suspension, etc.	• Properly ground parts. • Properly ground all body parts.



INSPECTION PROCEDURE 12: Noise Appears During Vibration or Shocks.

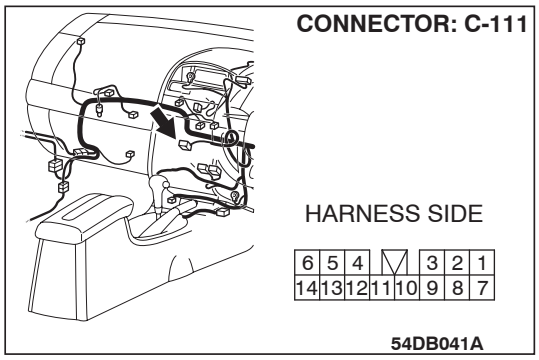
DIAGNOSIS

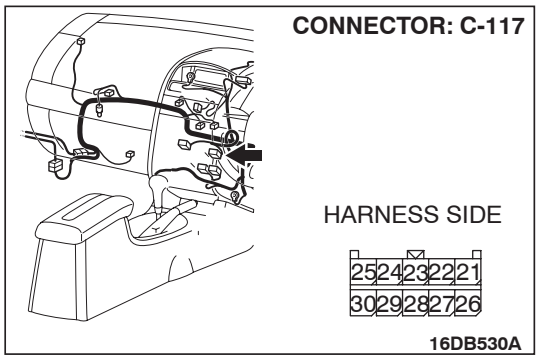
STEP 1. Check the fit of antenna feeder cable.

Q: Is the antenna feeder cable fitted securely?

YES : Go to Step 2.

NO : Ensure that the antenna base and the radio and CD player or radio, CD player and CD changer are fitted securely. Check that there is no noise.





STEP 2. Check radio and CD player connector or radio, CD player and CD changer connector C- 111 and C-117 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80

Q: Are radio and CD player connector or radio, CD player and CD changer connector C- 111 and C-117 in good condition?

YES : Go to Step 3.
NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Check that there is no noise.

STEP 3. Check that noise appears when the radio switch is turned on while the vehicle is stopped and the radio is tapped while tuned away from a station.

NOTE: Body static electricity from the shock absorber rubber bushings used to prevent vibration, tyres, etc. occurs because of separation from the ground, causing a buzzing noise. Since no measures can be taken to discharge the static electricity of the vehicle body. Check that there is no noise.

Q: Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is tapped while tuned away from a station?

YES : Go to Step 4.
NO : It may be static electricity noise.

STEP 4. Verify that the radio is correctly grounded.

Q: Is the radio correctly grounded?

YES : Go to Step 5.
NO : Check that there is no noise.

STEP 5. Check by replacing radio and CD player or radio, CD player and CD changer.

Q: Do the other radio and CD player or radio, CD player and CD changer work normally?

YES : Either repair or replace the original radio and CD player or radio, CD player and CD changer. Check that there is no noise.

NO : Either repair or replace the antenna assembly. Check that there is no noise.

INSPECTION PROCEDURE 13: Noise is Present While Moving (FM).

DIAGNOSIS

STEP 1. Check the radio after adjusting it.

Q: Readjust the radio. Is the noise eliminated?

YES : Check that there is no noise.

NO : Go to Step 2.

STEP 2. Check with several broad casting.

NOTE: Multipath noise and fading noise: Because of the frequency of FM waves in extremely high, it is highly susceptible to effects from geological formations and buildings. These effects disrupt the broadcast signal and obstruct reception in several ways.

- *Multipath noise*
  This describes the echo that occurs when the broadcast signal is reflected by a large obstruction and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing).
- *Fading noise*
  This is a buzzing noise that occurs when the broadcast signal is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

Q: Is the problem station or location specific?

YES : The effect of an electrical field condition (multipath noise, fading noise) could be the cause. Check that there is not noise.

NO : Go to Step 3.

STEP 3. Check that noise appears when the radio switch is turned on while the vehicle is stopped.

NOTE: Body static electricity from the shock absorber rubber bushings used to prevent vibration, tyres, etc. occurs because of separation from the ground, causing a buzzing noise. There is no measures to discharge the static electricity of the vehicle body. Check that there is no noise.

Q: Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is tapped while tuned away from a station?

YES : Go to Step 4.
NO : It may be static electricity noise.

STEP 4. Verify that the radio is correctly grounded.

Q: Is the radio correctly grounded?

YES : Go to Step 5.
NO : Check that there is no noise.

STEP 5. Check by replacing radio and CD player or radio, CD player and CD changer.

Q: Do the other radio and CD player or radio, CD player and CD changer work normally?

YES : Either repair or replace the original radio and CD player or radio, CD player and CD changer. Check that there is no noise.
NO : Either repair or replace the antenna assembly. Check that there is no noise.

INSPECTIONPROCEDURE 14: Constant Noise.

DIAGNOSIS

Use the Symptom Chart to diagnose the possible cause(s) of the noise. Noise is often created by the following factors:

- Travelling conditions of the vehicle
- Terrain of area travelled through
- Surrounding buildings
- Signal conditions
- Time period

If there are still problems with noise, even after performing inspection procedures 8 to 15, obtain information on the factors listed above. Determine whether the problem occurs on AM or FM, the station names, frequencies, etc. and contact the radio manufacturer's service centre.

INSPECTION PROCEDURE 15: No reception (AM).

DIAGNOSIS

STEP 1. Check to see if inspections are taking place is an area exposed to special electric fields.

Q: Are inspections taking place under special electric field conditions? (underground garage, inside a building, etc.)?

YES : Go to Step 2.
NO : Go to Step 3.

STEP 2. Move the vehicle and check the radio.
Move the vehicle to a good reception area that is not exposed to special electric fields.

Q: Is reception of the strongest radio frequency possible within the area?

YES : There is no action to be taken.
NO : Go to Step 3.

STEP 3. Tune the radio, and then check it.

Q: Did the sensitivity improve after tuning?

YES : There is no action to be taken.
NO : Go to Step 4.

STEP 4. Check the connection of the antenna plug and radio and CD player or radio, CD player and CD changer.

Q: Is the antenna plug thoroughly connected to the radio and CD player or radio, CD player and CD changer?

YES : Go to Step 5.
NO : Thoroughly connect the antenna plug and the radio and CD player or radio, CD player and CD changer. The radio should sound normally.

STEP 5. Check by replacing radio and CD player or radio, CD player and CD changer.

Q: Do the other radio and CD player or radio, CD player and CD changer work normally?

YES : Either repair or replace the original radio and CD player or radio, CD player and CD changer. The radio should sound normally.
NO : Either repair or replace the antenna assembly. The radio should sound normally.

INSPECTION PROCEDURE 16: Poor Reception.

DIAGNOSIS

STEP 1. Check to see if inspections are taking place is an area exposed to special electric fields.

Q: Are inspections taking place under special electric field conditions? (underground garage, inside a building, etc.)?

YES : Go to Step 2.
NO : Go to Step 3.

STEP 2. Move the vehicle and check the radio.

Move the vehicle to a good reception area that is not exposed to special electric fields.

Q: Is reception of the strongest radio frequency possible within the area?

YES : Check that a poor reception is resolved.
NO : Go to Step 3.

STEP 3. Tune the radio, and then check it.

Q: Did the sensitivity improve after tuning?

YES : Check that a poor reception is resolved.
NO : Go to Step 4.

STEP 4. Check with several broadcasting stations.

NOTE: Two types of noise are addressed in this procedure, multipath and fading noise. The frequency of FM waves is extremely high. This makes them susceptible to effects from geological formations and buildings. These effects disrupt the broadcast signal and obstruct reception in many ways.

- *Multipath noise is the echo that occurs when the broadcast signal is reflected by a large obstruction and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing).*
- *A fading or buzzing noise may occur when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates within a narrow range.*

Q: Is the abnormality in reception generated only within a certain range?

YES : Check that a poor reception is resolved.
NO : Go to Step 5.

STEP 5. Check the connection of the antenna plug and radio and CD player or radio, CD player and CD changer.

Q: Is the antenna plug thoroughly connected to the radio and CD player or radio, CD player and CD changer?

YES : Go to Step 6.
NO : Thoroughly connect the antenna plug and the radio and CD player or radio, CD player and CD changer. Check that a poor reception is resolved.

STEP 6. Check by replacing radio and CD player or radio, CD player and CD changer.

Q: Do the other radio and CD player or radio, CD player and CD changer work normally?

YES : Either repair or replace the original radio and CD player or radio, CD player and CD changer. Check that a poor reception is resolved.
NO : Either repair or replace the antenna assembly. Check that a poor reception is resolved.

INSPECTION PROCEDURE 17: Distortion on AM and/or FM.

DIAGNOSIS

STEP 1. Check the level of distortion.

Q: How much distortion is there?

Occasional distortion : Go to Step 2.
Constant distortion : Go to Step 3.

STEP 2. Check the location of the distortion.

Q: Is there distortion when the vehicle is near the radio station?

YES : The antenna is receiving too strong a signal.
NO : Go to Step 3.

STEP 3. Check the wires at each speaker.

Q: Are the speaker wires contacting the paper speaker cone?

YES : Move the speaker wires away from the paper speaker cone. The speaker should now be free of distortion.
NO : Go to Step 4.

STEP 4. Remove the speakers, and check the paper cone for foreign material or damage.

Q: Is there foreign material or damage on the paper cone of the speaker?

YES : Repair or replace the speakers. The speaker should now be free of distortion.
NO : Go to Step 5.

STEP 5. Check for distortion with the speaker installed.

Q: Does a distortion occur?

YES : Install the speaker securely. The speaker should now be free of distortion.
NO : Repair or replace the radio and CD player or radio, CD player and CD changer. The speaker should now be free of distortion.

INSPECTION PROCEDURE 18: Distortion on FM Only.

DIAGNOSIS

STEP 1. Check that the distortion is present when the radio is tuned to another station.

Q: Does the distortion persist when the radio is tuned to another station?

YES : Go to Step 2.
NO : The signal from that station is too weak.

STEP 2. Relocate the reception area and check the radio.

Q: When relocating the reception area does the distortion increase or decrease?

YES : The cause may be multipath or fading noise. Multipath noise is the echo that occurs when the broadcast signal is reflected by a large obstruction and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing). A fading or buzzing noise may occur when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates within a narrow range.
NO : Replace the radio and CD player or radio, CD player and CD changer. Check that a distortion is resolved.

INSPECTION PROCEDURE 19: Auto Select Function Inoperative, too Few Automatic Stations are Selected.

DIAGNOSIS

STEP 1. Check the number of radio stations.

Q: Are there sufficient numbers of radio stations within the area?

YES : Go to Step 2.
NO : Go to Step 3.

STEP 2. Check the distance from the transmission antenna.

Q: Is there a transmission antenna within a range of 3.2 kilometres?

YES : Go to Step 4.
NO : Go to Step 3.

STEP 3. Check if there are not that many radio stations and when there is no transmission antenna in the vicinity.
Execute automatic selection and check to see that the strongest radio frequency is receivable within the area.

Q: Is reception of the strongest radio frequency possible within the area?

YES : There is no action to be taken.
NO : Go to Step 4.

STEP 4. Check to see if inspections are taking place is an area exposed to special electric fields.

Q: Are inspections taking place under special electric field conditions (underground garage, inside a building, etc.)?

YES : Go to Step 5.
NO : Go to Step 6.

STEP 5. Relocate and check.
Automatically receive in a good reception area that is not exposed to special electric fields.

Q: Is reception of the strongest radio frequency possible within the area?

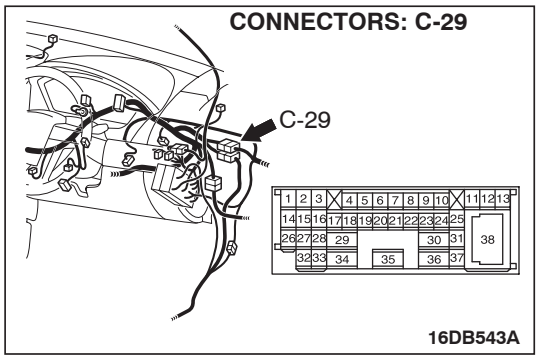
YES : There is no action to be taken.
NO : Go to Step 6.

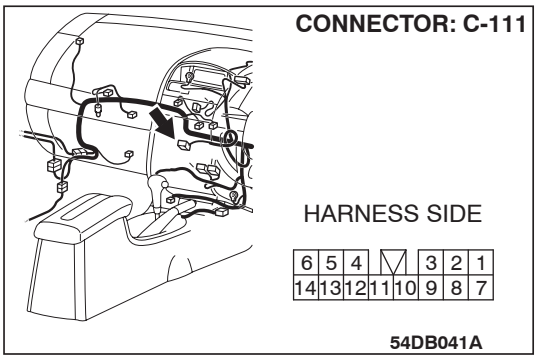
STEP 6. Check the connection of the antenna feeder cable and radio and CD player or radio, CD player and CD changer.

Q: Is the antenna feeder cable thoroughly connected to the radio and CD player or radio, CD player and CD changer?

YES : Repair or replace the radio and CD player or radio, CD player and CD changer. The auto-select function should operate normally.
NO : Thoroughly connect the antenna feeder cable and the radio and CD player or radio, CD player and CD changer. The auto-select function should operate normally.

INSPECTION PROCEDURE 20: Preset Stations are Erased.





CIRCUIT OPERATION

Power is continuously supplied to the radio and CD player or radio, CD player and CD changer.

TECHNICAL DESCRIPTION (COMMENT)

The cause is probably a faulty radio and CD player or radio, CD player and CD changer memory backup power supply system circuit.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Damaged wiring harness or connector.
- Malfunction of the radio and CD player or radio, CD player and CD changer.

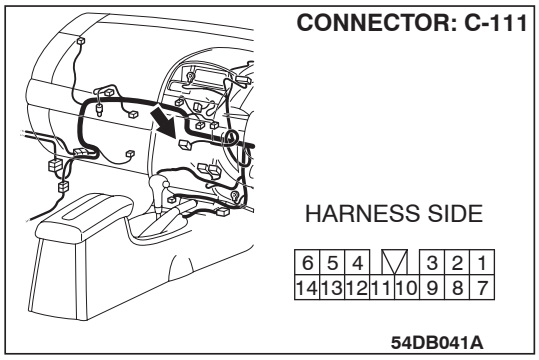
DIAGNOSIS

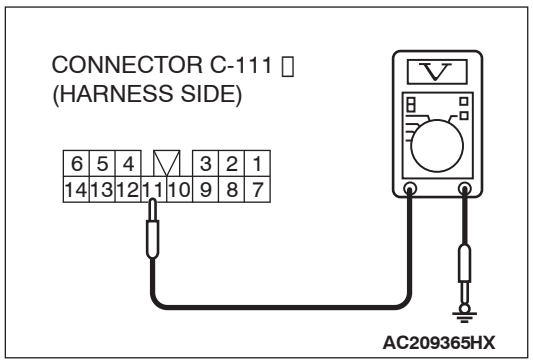
Required Special Tool:

- MB991223: Harness set

STEP 1. Measure at radio and CD player or radio, CD player and CD changer connector C-111 in order to check the power supply circuit to the radio and CD player or radio, CD player and CD changer (through the battery).

(1) Disconnect radio and CD player or radio, CD player and CD changer connector C-111, and measure at the wiring harness side.





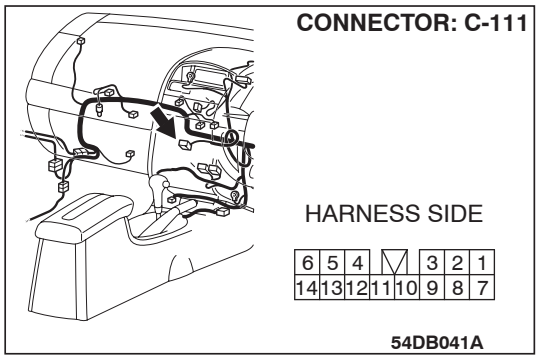
(2) Measure the voltage between terminal number 11 and ground.
- The voltage should measure approximately 12 volts (battery positive voltage).

Q: Is the measured voltage approximately 12 volts (battery positive voltage)?

YES : Either repair or replace the radio and CD player or radio, CD player and CD changer. Check that a memory is retained.

NO : Go to Step 2.

STEP 2. Check radio and CD player or radio, CD player and CD changer connector C-111 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

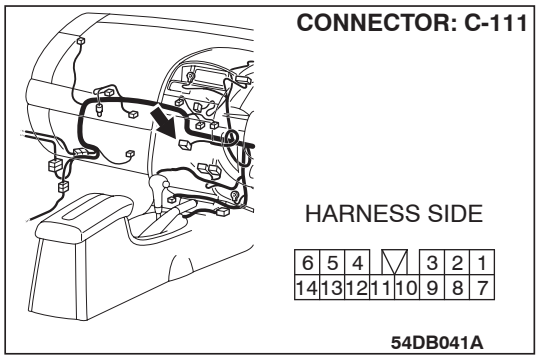


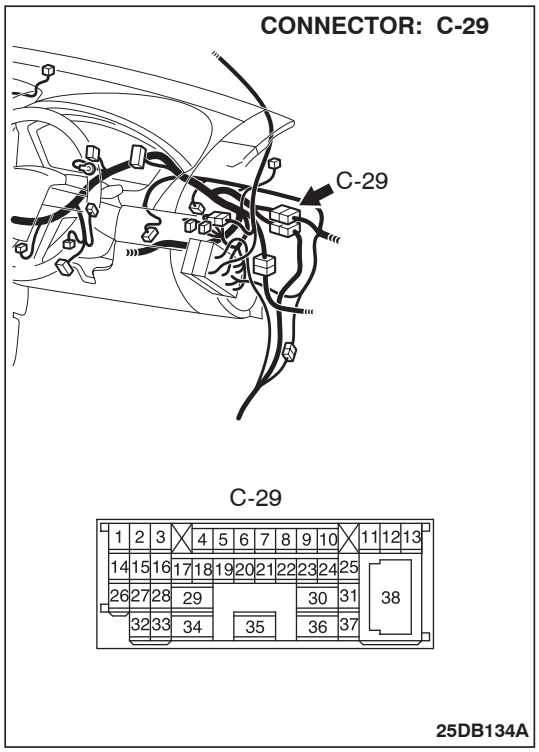
Q: Is radio and CD player or radio, CD player and CD changer connector C-111 in good condition?

YES : Go to Step 3.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Check that a memory is retained.

STEP 3. Check the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 11) and the battery.





NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the connector as described in GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between radio and CD player or radio, CD player and CD changer connector C-111 (terminal 11) and the battery in good condition?

YES : Repair or replace the radio and CD player or radio, CD player and CD changer. Check that a memory is retained.

NO : Repair the wiring harness. Check that a memory is retained.

INSPECTION PROCEDURE 21: CD can not be Inserted.

DIAGNOSIS

STEP 1. Check that a CD has been already loaded.

Q: Has a CD been already loaded?

YES : Take out the CD (If the CD can not be ejected, refer to INSPECTION PROCEDURE 27 P.54A-226). Check that a CD can be inserted.

NO : Go to Step 2.

STEP 2. Check how a CD is inserted.

Ensure that the ignition switch is at 'ACC' or 'ON'.

NOTE: If you try to load a CD when the ignition switch is at the positions other than 'ACC' or 'ON,' the CD will not be inserted completely and then rejected.

Q: If you try to load the CD, does the CD stops halfway and then rejected?

YES : Refer to INSPECTION PROCEDURE 27 P.54A-226.

NO : Go to Step 3.

STEP 3. Check after the CD is loaded.

NOTE: Even though the CD is loaded, 'E01' [vehicles without multi-centre display (type 1)] or 'ERROR 01' [vehicles with multi-centre display (type 2)] sometimes displayed with the CD rejected because of vibration/shock or dew on the CD face or optical lens.

Q: Though the CD is inserted completely, is 'E01' [vehicles without multi-centre display (type 1)] or 'ERROR 01' [vehicles with multi-centre display (type 2)] displayed and the CD ejected?

YES : Go to Step 4.

NO : There is no action to be taken.

STEP 4. Check the CD.

Check the CD for the conditions below:

- Is the CD loaded with its label facing down?
- Is the recorded face dirty or scratched?
- Is there dew on the recorded face?

Q: Is the CD in good condition?

YES : Go to Step 5.

NO : The original CD is defective. Check that a CD can be inserted.

STEP 5. Check again using a normal CD, which is not dirty or scratched.

- Load another normal CD.
- Check that the CD player recognizes and play the CD.

Q: When you substitute another normal CD, is the CD loaded correctly?

YES : The original CD is defective. Check that a CD can be inserted.

NO : Replace or repair the CD player. Check that a CD can be inserted.

INSPECTION PROCEDURE 22: No Sound (CD Only).

DIAGNOSIS

STEP 1. Check again using another CD, which is not dirty or scratched.

Q: When you substitute another normal CD, is the CD played normally?

YES : The original CD is defective. The CD player should sound normally.

NO : Go to Step 2.

STEP 2. Check power supply to the CD player when the ignition switch is at "ACC" or "ON" position.

Q: Is the radio and CD player energized when the ignition switch is turned to the "ACC" or "ON" position?

YES : Replace the radio and CD player or radio, CD player and CD changer. The CD player should sound normally.

NO : Check the memory backup power supply circuit. Refer to Inspection Procedure 1 P.54A-178.

INSPECTION PROCEDURE 23: CD Sound Skips.

DIAGNOSIS

STEP 1. Check the state in which the sound on the CD jumps.

Q: Does the sound jump when the car is parked?

YES : Go to Step 2.

NO : Go to Step 4.

STEP 2. Check the surface of the CD.

Q: Are there any scratches or soiling on the CD?

YES : The CD is defective if there are any scratches. Clean the CD surface if it is dirty. Check that a CD sound skip is resolved.

NO : Go to Step 3.

STEP 3. Check when replacing with a CD that can be played normally without any scratches or soiling.

Q: Does the CD play normally when replaced with a CD that is not scratched or dirty and can play normally?

YES : Defective CD used. Check that a CD sound skip is resolved.

NO : Go to Step 4.

STEP 4. Check by tapping the radio and CD player or radio, CD player and CD changer.

NOTE: Check by using a known-good CD which is free from scratches, dirt or any other abnormality.

Q: Does the sound jump when tapping the radio and CD player or radio, CD player and CD changer?

YES : Securely mount the radio and CD player or radio, CD player and CD changer. Check that a CD sound skip is resolved.

NO : Either replace the audio system or take the following measures if a servicing shop is nearby.

1. Investigate in detail the conditions when the sound jumps while driving the car.
2. Describe these conditions to the service shop for consultation.
3. Either replace the radio and CD player or radio, CD player and CD changer according to the instructions of the service shop.

Check that a CD sound skip is resolved.

INSPECTION PROCEDURE 24: Sound Quality is Poor.

DIAGNOSIS

Check to see that the CD can be played normally and that it is free of any scratches or soiling.

Replace with better sound quality CD.

Q: Is the sound quality better replacing the CD with a clean CD without any scratches that can be played?

YES : The CD is defective. The sound quality should return to normal.

NO : Replace the audio. The sound quality should return to normal.

INSPECTION PROCEDURE 25: CD cannot be Ejected.

DIAGNOSIS

Check the power of ignition switch "ACC".

Q: Does the radio and CD player or radio, CD player and CD changer power turn ON when the ignition switch is in the "ACC" or "ON" position?

YES : Either replace the radio and CD player or radio, CD player and CD changer. Check that a CD can be ejected normally.

NO : Check the memory backup power supply circuit. Refer to Inspection Procedure 1 P.54A-178.

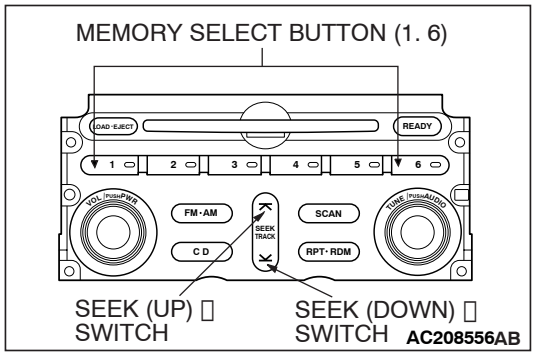
ON-VEHICLE SERVICE

SPEAKER TEST [Vehicles only with multi-centre display- (type 2)]

M1544005400318

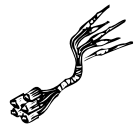
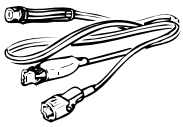
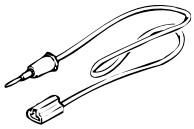
Operate the radio panel switches to test the speakers. The multi-centre display shows which speaker is sounding. Enter the speaker test mode according to the following steps:

1. Turn the ignition switch to "ACC" position and switch off the audio.
2. Press the following buttons in that order within 60 seconds from step (1).
   (1) Memory select "1" button
   (2) "SEEK" switch (down side)
   (3) "SEEK" switch (up side)
   (4) Memory select "6" button
3. Check that the speaker, which is displayed on the multi-centre display, sounds (If the memory select "6" button is pressed, the speaker will be changed).
4. If a button other than the memory select "6" button and "EJECT" button (CD) is pressed, or the ignition switch is turned to "LOCK" (OFF) position, you will exit from the speaker test mode.



SPECIAL TOOL

M1544000600395

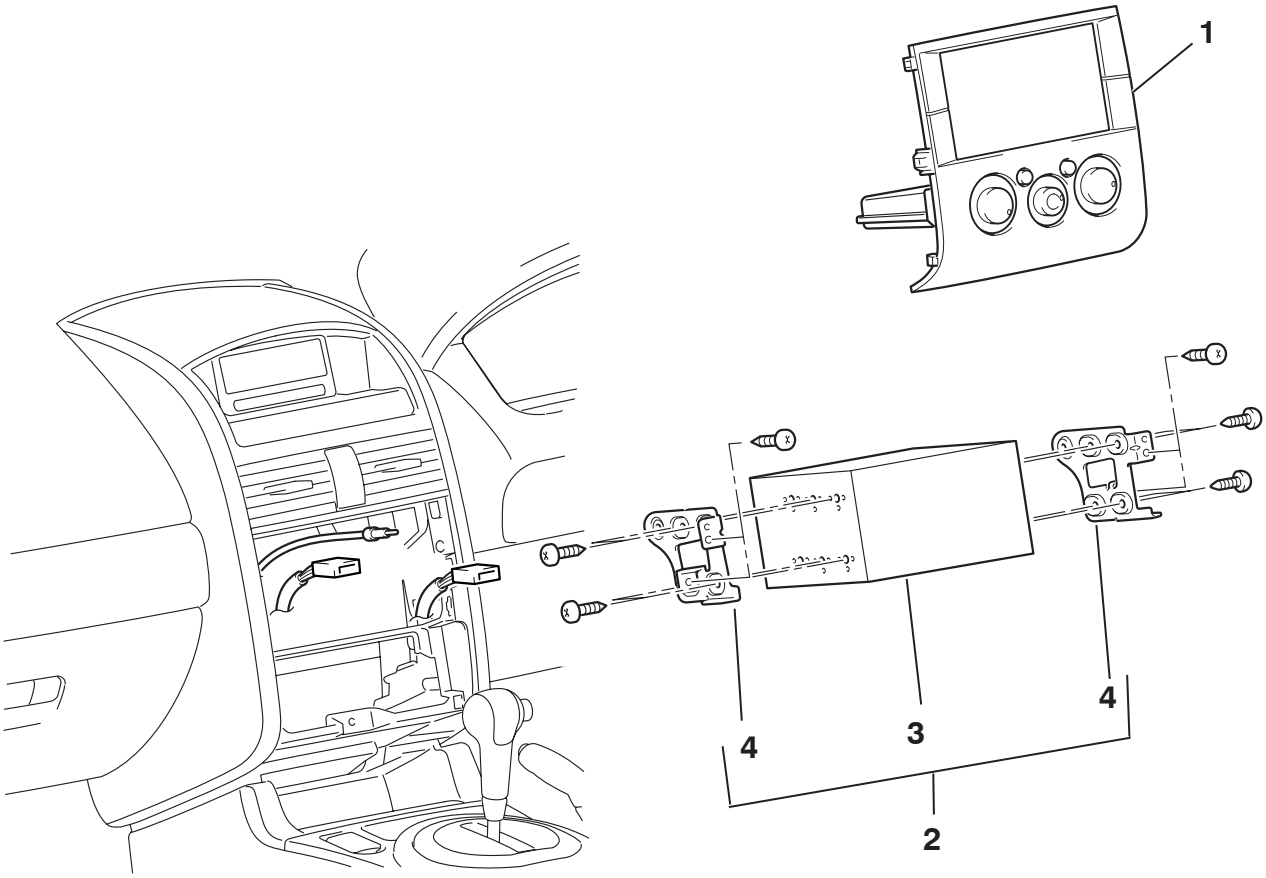
TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  B  C  D MB991223AC	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	General service tool (jumper)	Making voltage and resistance measurements during troubleshooting A: Connect pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

RADIO WITH CD PLAYER

REMOVAL AND INSTALLATION

M1544010900029

<RADIO AND CD PLAYER (Type 1)>



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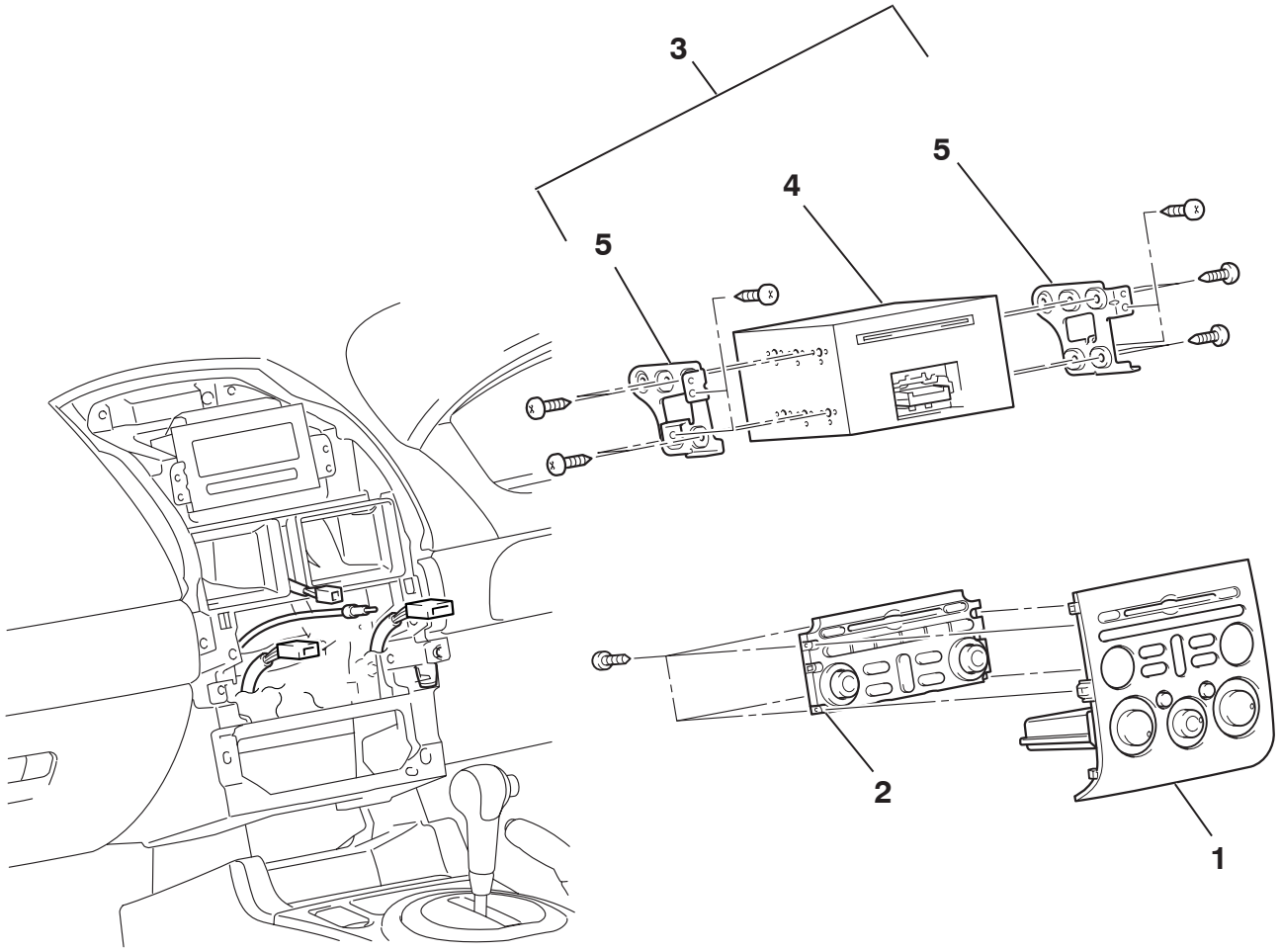
RADIO REMOVAL STEPS

1. INSTURMENT CENTER PANEL ASSEMBLY (REFER TO GROUP 52A, INSTRUMENT PANEL P.52A-4.)
2. RADIO AND CD PLAYER ASSEMBLY

RADIO REMOVAL STEPS (Continued)

3. RADIO AND CD PLAYER
4. AUDIO EQUIP BRACKET

<RADIO, CD PLAYER AND CD CHANGER (Type 2)>



16DB545A

RADIO REMOVAL STEPS

1. INSTURMENT CENTER PANEL ASSEMBLY (REFER TO GROUP 52A, INSTRUMENT PANEL P.52A-4.)
2. RADIO PANEL

RADIO REMOVAL STEPS (Continued)

3. RADIO, CD PLAYER AND CD CHANGER ASSEMBLY
4. RADIO, CD PLAYER AND CD CHANGER
5. AUDIO EQUIP BRACKET

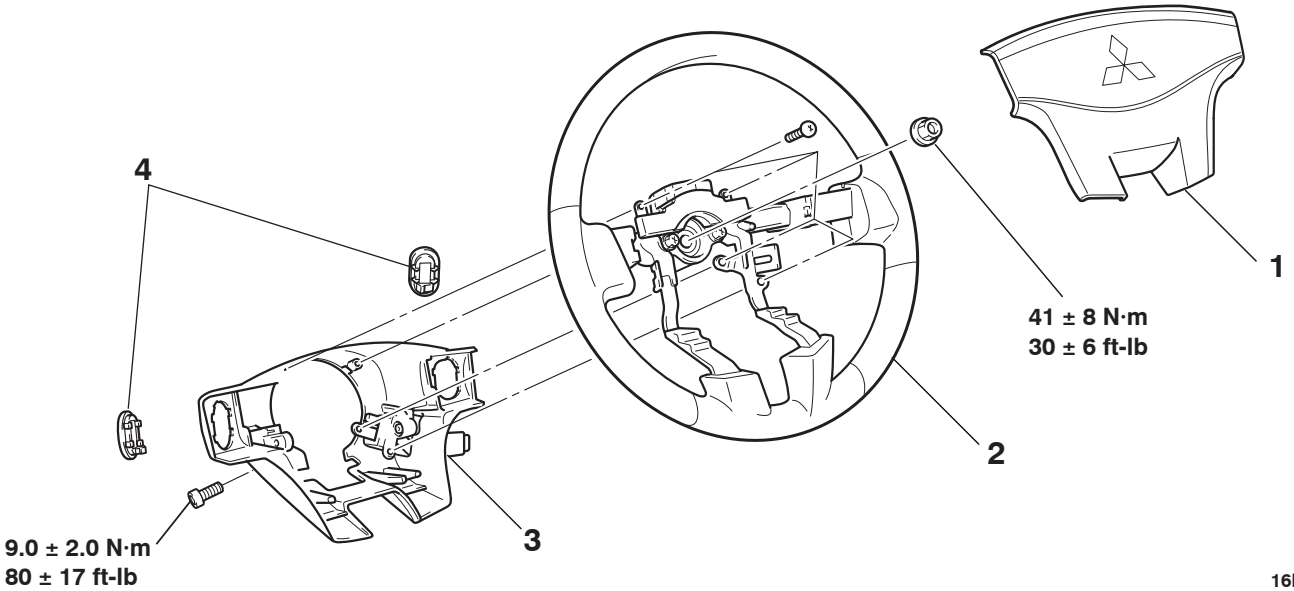
REMOTE CONTROLLED RADIO SWITCH

REMOVAL AND INSTALLATION

M1544010100153

⚠ WARNING

- ***Before removing the air bag module, refer to GROUP 52B, Service Precautions P.52B-16 and Air Bag Module and Clock Spring P.52B-237.***
- ***When removing and installing the steering wheel, do not let it bump against the air bag module.***



16DB546A

REMOVAL STEP

1. AIR BAG MODULE ASSEMBLY (REFER TO GROUP 52B, AIR BAG MODULE(S) AND CLOCK SPRING P.52B-237.)
2. STEERING WHEEL ASSEMBLY (REFER TO GROUP 37A, STEERING WHEEL P.37-23.)

<<A>>

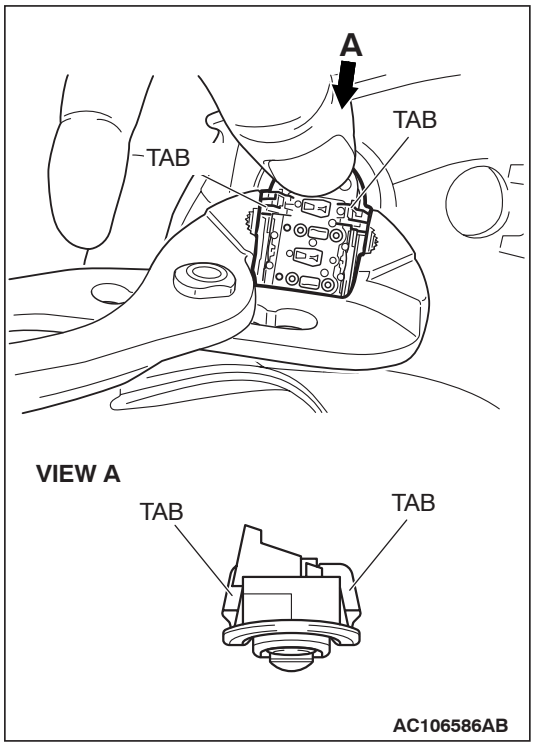
REMOVAL STEP (Continued)

3. LOWER COVER CAP
4. REMOTE CONTROLLED RADIO SWITCH

REMOVAL SERVICE POINT

<<A>> REMOTE CONTROLLED RADIO SWITCH REMOVAL

Use a tool to hold the tabs on the remote controlled radio switch, and push out the switch by your finger.

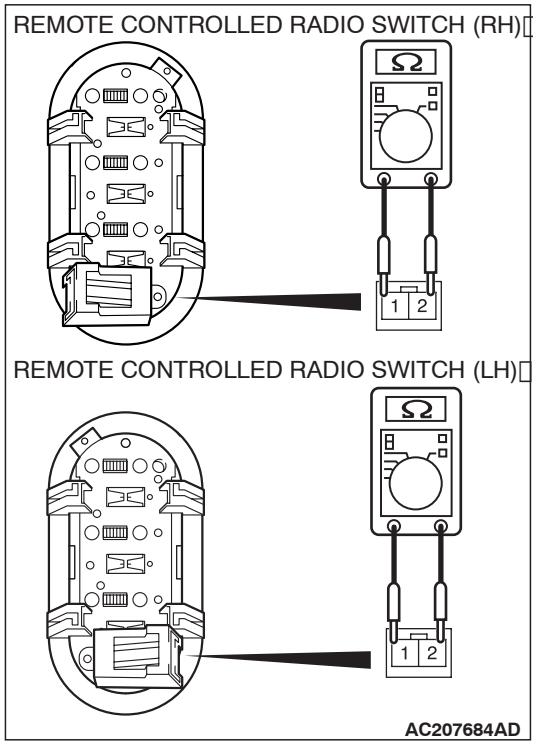


INSPECTION

M1544009700236

REMOTE CONTROLLED RADIO SWITCH CONTINUITY CHECK

Use an ohmmeter to measure the resistance value between the terminal.



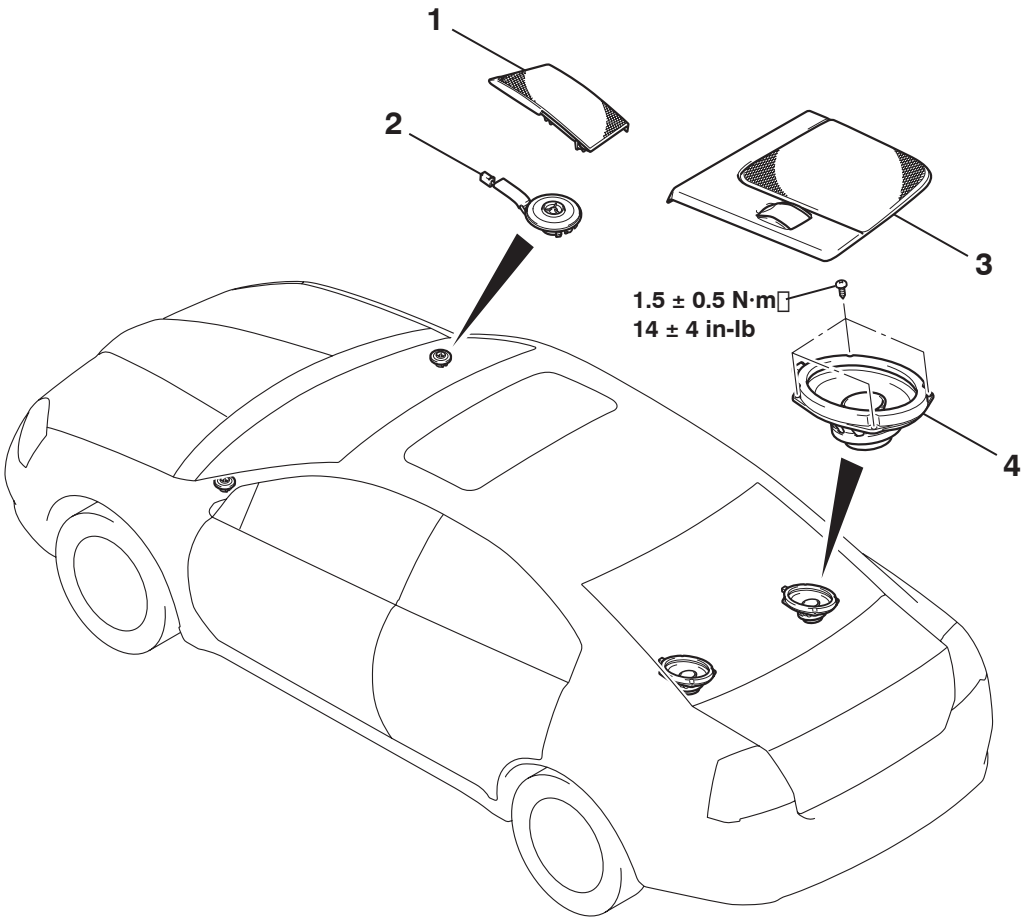
SWITCH POSITION	MEASUREMENT VALUE (RH)	MEASUREMENT VALUE (LH)
No push	Approximately 24.0 kΩ	Open circuit
Upper	Approximately 6.8 kΩ	Approximately 1.2 kΩ
Center	Less than 2 ohms	Approximately 470 kΩ
Lower	Approximately 15.0 kΩ	Approximately 3.3 kΩ

SPEAKER

REMOVAL AND INSTALLATION

M1544002600476

<TWEETER/REAR SPEAKER>



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TWEETER REMOVAL STEPS

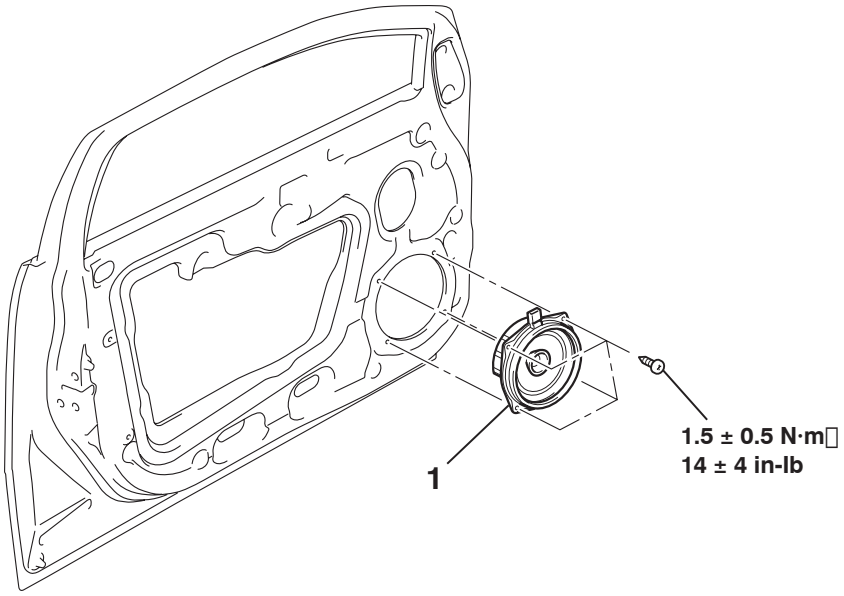
- FRONT DOOR OPENING TRIM, FRONT PILLAR TRIM (REFER TO GROUP 52A, TRIMS P.52A-11.)

1. FRONT SPEAKER GARNISH
2. TWEETER

REAR SPEAKER REMOVAL STEPS

3. REAR SHELF SPEAKER GARNISH (REFER TO GROUP 52A, TRIMS P.52A-11.)
4. REAR SPEAKER

<FRONT DOOR SPEAKER>



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FRONT DOOR SPEAKER REMOVAL STEPS

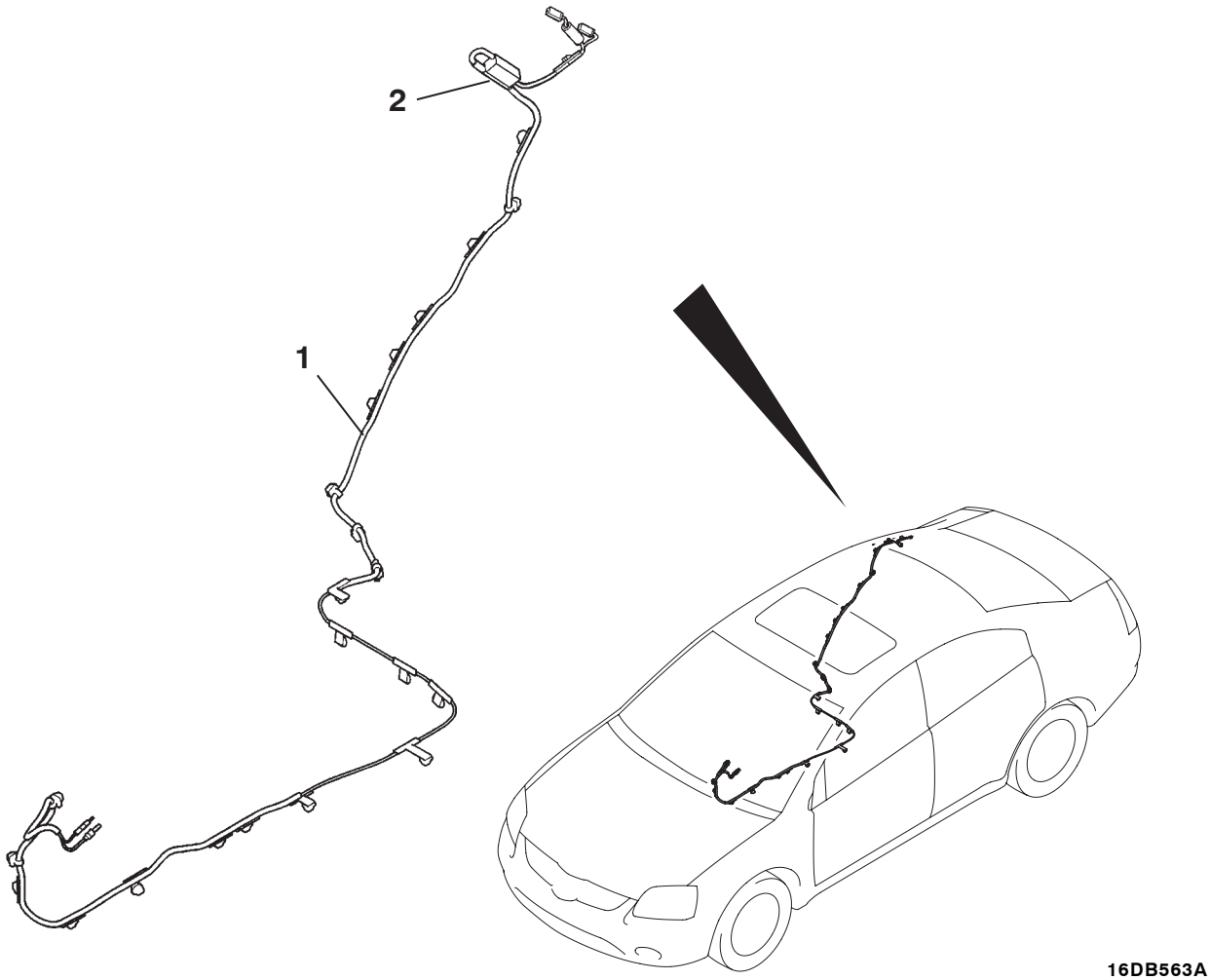
- FRONT DOOR TRIM ASSEMBLY (REFER TO GROUP 52A, DOOR TRIM P.52A-14.)

1. FRONT DOOR SPEAKER

ANTENNA

REMOVAL AND INSTALLATION

M1544002900712



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REMOVAL STEPS

- REAR SEAT CUSHION ASSEMBLY (GROUP 52A, REAR SEAT ASSEMBLY P.52A-55.)
- REAR SCUFF PLATE, FRONT DOOR OPENING TRIM (CENTER PILLAR SIDE), REAR DOOR OPENING TRIM (CENTER PILLAR SIDE), FRONT SCUFF PLATE (REFER TO GROUP 52A, TRIMS P.52A-11.)
- FRONT SEAT BELT UPPER AND LOWER CONNECTION (REFER TO GROUP 52A, FRONT SEAT BELT P.52A-58.)
- CENTER PILLAR TRIM LOWER, COWL SIDE TRIM (REFER TO GROUP 52A, TRIMS P.52A-11.)

REMOVAL STEPS (Continued)

- GEARSHIFT LEVER PANEL, FRONT BOX, FLOOR CONSOLE ASSEMBLY (REFER TO GROUP 52A, FLOOR CONSOLE ASSEMBLY P.52A-10.)
- FRONT SEAT ASSEMBLY (REFER TO GROUP 52A, FRONT SEAT ASSEMBLY P.52A-21.)
- FOOT REST
- FLOOR CARPET
- RADIO AND CD PLAYER OR RADIO, CD PLAYER AND CD CHANGER (REFER TO P.54A-228.)
- REAR SEATBACK ASSEMBLY (REFER TO GROUP 52A, REAR SEAT ASSEMBLY P.52A-55.)

REMOVAL STEPS (Continued)

- REAR DOOR OPENING TRIM (REAR PILLAR SIDE), REAR PILLAR TRIM, REAR SHELF SPEAKER GARNISH, REAR SHELF TRIM (REFER TO GROUP 52A, TRIMS P.52A-11.)

1. ANTENNA FEEDER CABLE (REAR PILLAR SIDE)
2. ANTENNA FEEDER CABLE WITH AMPLIFIER

DEFOGGER

GENERAL DESCRIPTION

M1543000100353

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 17 minutes after the defogger switch is turned ON.

DEFOGGER DIAGNOSIS

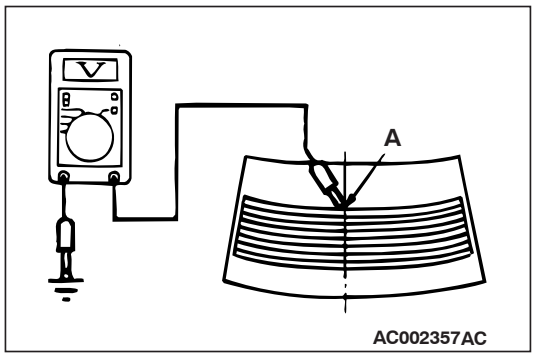
M1543000701068

The defogger is controlled by the A/C-ECU. For troubleshooting, refer to GROUP 55, Auto A/C Diagnosis – Symptom Chart P.55-68 .

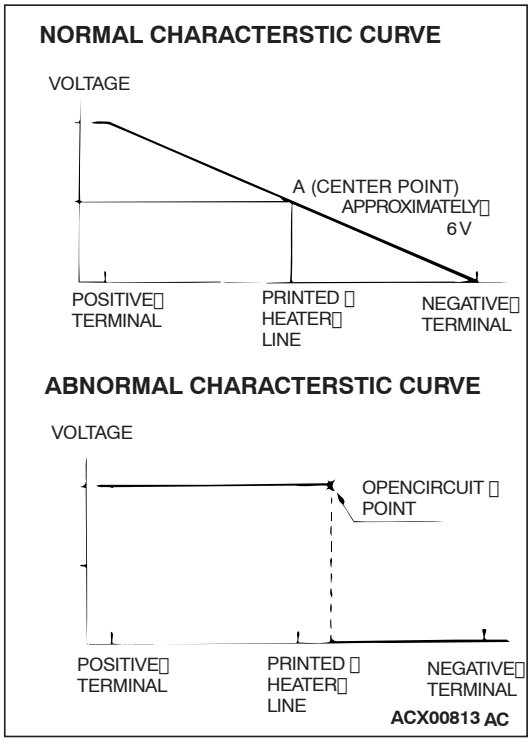
ON-VEHICLE SERVICE

PRINTED-HEATER LINES CHECK

M1543001800333



1. Run the engine at 2,000 r/min. Check the heater element with the battery at full.
2. Turn "ON" the rear window defogger switch. Measure the heater element voltage with an ohmmeter at the rear window glass centre A. Condition is good if it indicates about 6 V.



3. If 12 V is indicated at A, there is a break in the negative terminals from A. Move the test probe slowly to the negative terminal to detect where voltage changes suddenly (0V).
4. If 0 V is indicated at A, there is a break in the positive terminals from A. Defect where the voltage changes suddenly (12 V) in the same method described above.

REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION

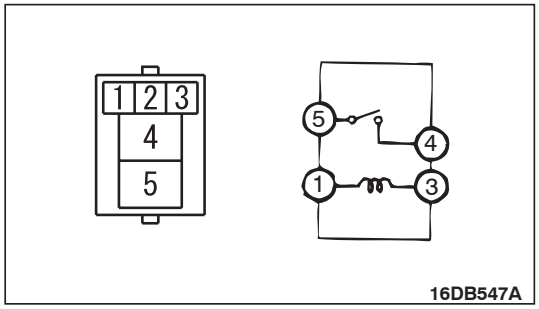
M1543006200325

Refer to GROUP 55, Heater Control Assembly and A/C Switch P.55-150.

INSPECTION

M1543019502537

DEFOGGER RELAY CONTINUITY CHECK



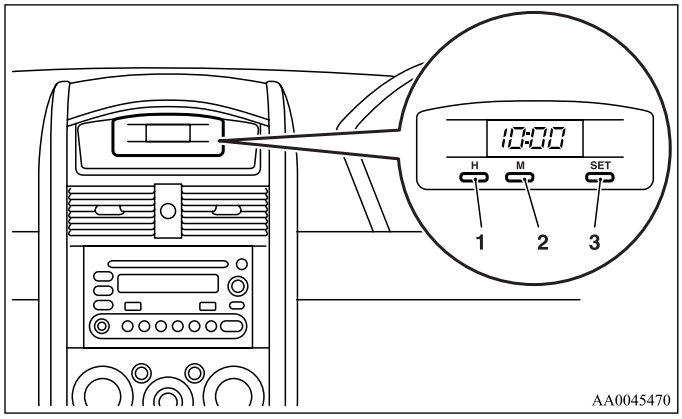
BATTERY VOLTAGE	CONNECT TESTER BETWEEN:	SPECIFIED CONDITION
Not applied	4-5	Open Circuit
• Connect terminal 1 to the positive battery terminal • Connect terminal 3 to the negative battery terminal	4-5	Less than 2 ohms

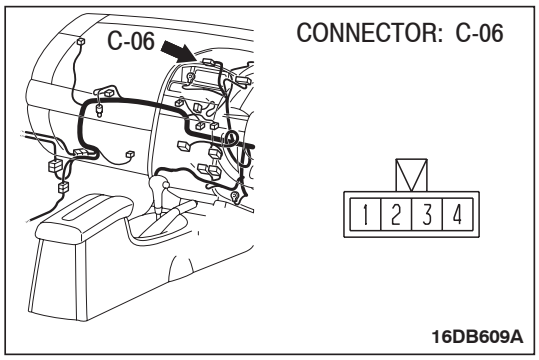
CLOCK DISPLAY

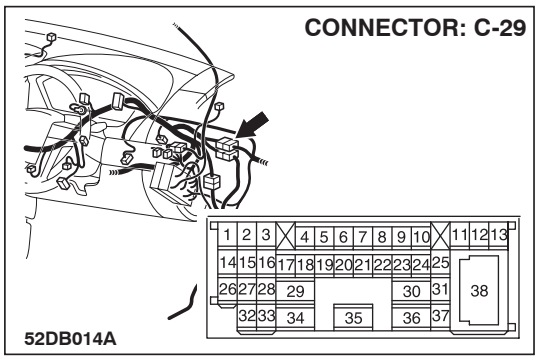
GENERAL DESCRIPTION

Clock operation

- The clock has battery power supplied to terminal 4 from the relay box (fuse 22) via the intermediate connector (C-29), to memorize clock settings and the ground circuit is to terminal 3 of the clock. The clock too has accessory power supplied to terminal 3 from (fuse 23) in the relay box via intermediate connector (C-29), therefore clock will be displayed on "ACC" and "ON" positions. The clock illumination is only active when the park or headlamps are turned to the "ON" position. Power is supplied to terminal 4 of the clock (C-06) from the tail lamp relay in the relay box, via the (fuse 20) and the junction block.
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80







Clock display diagnosis

- Clock display malfunction.
- Clock display not memorizing settings.
- Clock display illumination malfunction.

TECHNICAL DESCRIPTION (COMMENT)

The ground circuit, the battery circuit, the ignition switch (ACC) circuit or the headlamp switch circuit is suspected to be open or defective.

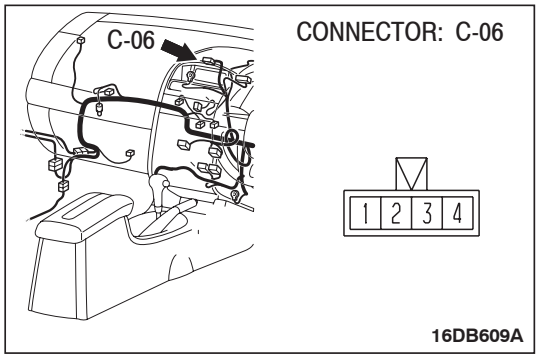
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the clock display unit
- Damaged wiring harness and connectors

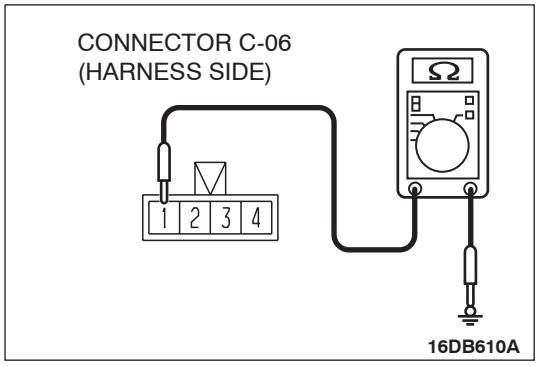
DIAGNOSIS

Required Special Tool:
- MB991223: Harness Set

STEP 1. Check the clock display unit ground circuit. Measure the resistance at the clock display unit connector C-06.



(1) Disconnect the clock display unit connector C-06 and measure at the harness side.

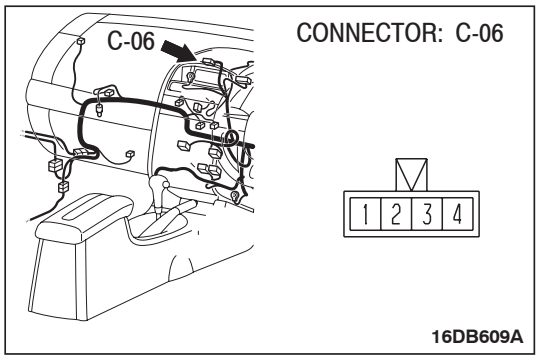


(2) Measure the resistance between terminal 1 and ground.
- The measured value should be 2 ohm or less.

Q: Does the measured resistance value correspond with this range?

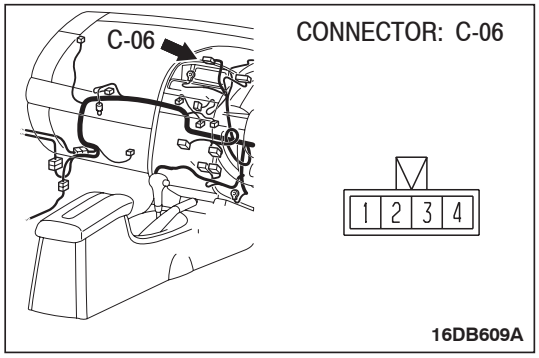
YES : Go to Step 4.
NO : Go to Step 2.

STEP 2. Check the clock display unit connector C-06 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Is the clock display unit connector C-06 in good condition?

YES : Go to Step 3.
NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

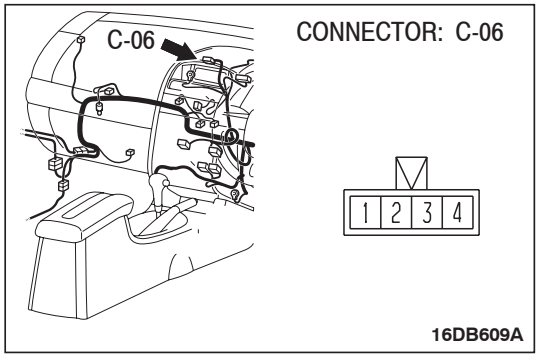


STEP 3. Check the wiring harness between clock display unit connector C-06 (terminal 1) and ground.

Q: Is the wiring harness between multi-centre display unit connector C-06 (terminal 1) and ground in good condition?

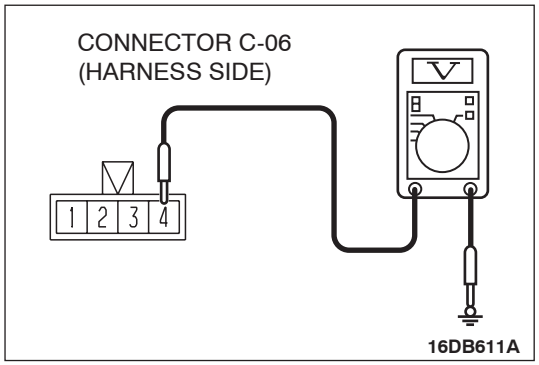
YES : There is no action to be taken.

NO : Repair the wiring harness. The multi-centre display unit should work normally.



STEP 4. Check the clock display unit power supply circuit (battery). Measure the voltage at the multi-centre display unit connector C-06.

(1) Disconnect the multi-centre display unit connector C-06 and measure at the harness side.



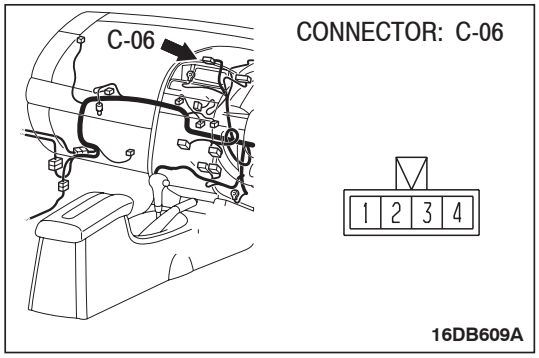
(2) Measure the voltage between terminal 4 and ground.

- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Go to Step 7.

NO : Go to Step 5.



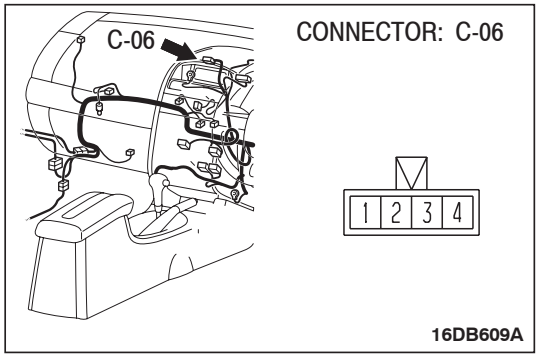
STEP 5. Check clock display unit connector C-06 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

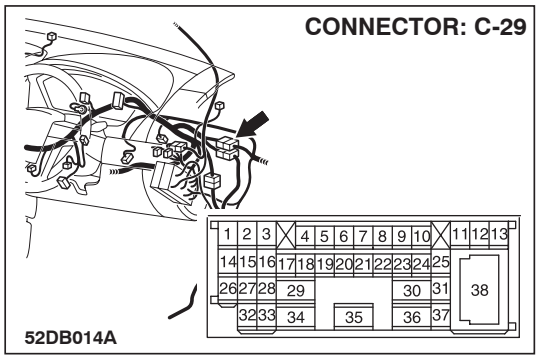
Q: Is clock display unit connector C-06 in good condition?

YES : Go to Step 6.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The multi-centre display unit should work normally.

STEP 6. Check the wiring harness between C-06 (terminal 4) and battery.





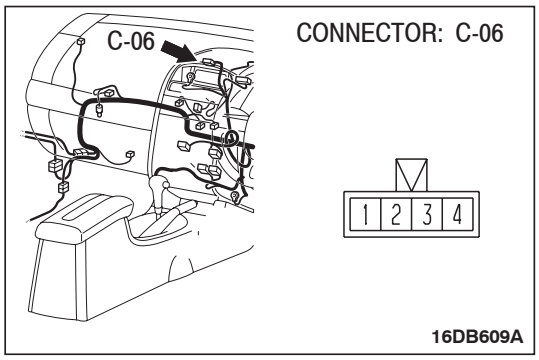
NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

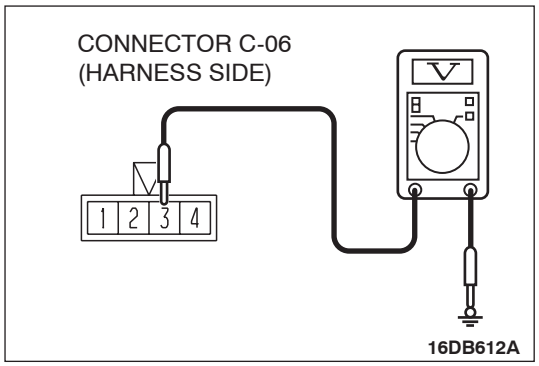
Q: Is the wiring harness between C-06 and battery in good condition?

YES : There is no action to be taken.
NO : Repair the wiring harness. The clock display unit should work normally.

STEP 7. Check the clock display unit power supply circuit [ignition switch (ACC)]. Measure the voltage at the clock display unit connector C-06.

(1) Disconnect the clock display unit connector C-06 and measure at the harness side.
(2) Turn the ignition switch to "ACC" position.

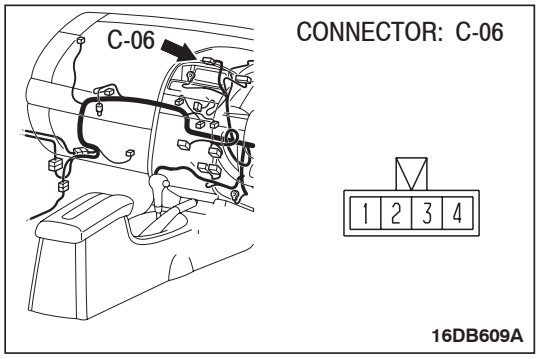




(3) Measure the voltage between terminal 3 and ground by backprobing.
- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Go to Step 10.
NO : Go to Step 8.

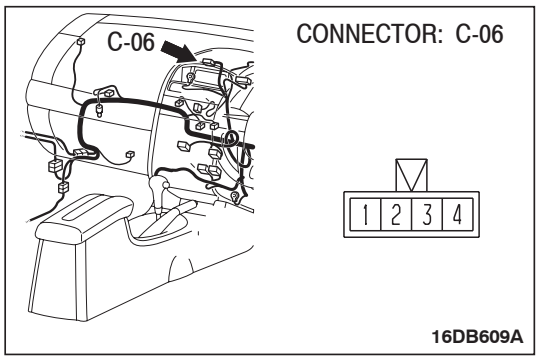


STEP 8. Check clock display unit connector C-06 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

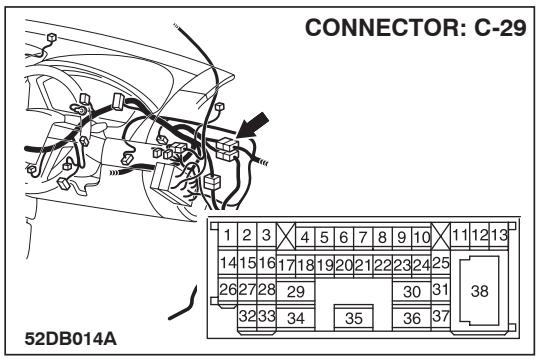
Q: Is clock display unit connector C-06 in good condition?

YES : Go to Step 9.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The clock display unit should work normally.



STEP 9. Check the wiring harness between C-06 (terminal 3) and ignition switch (ACC).



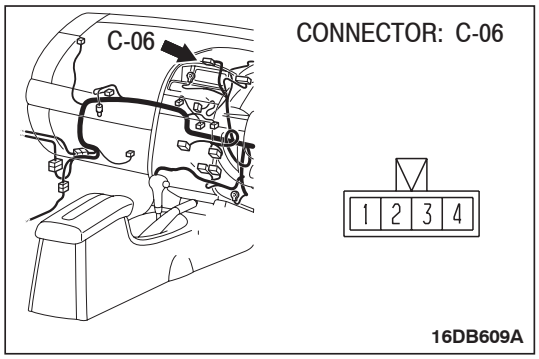
NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between C-06 (terminal 3) and ignition switch (ACC) in good condition?

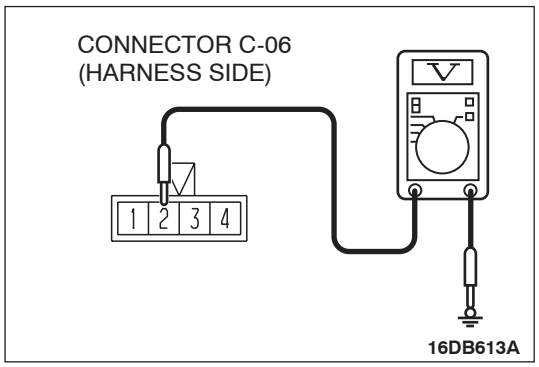
YES : There is no action to be taken.

NO : Repair the wiring harness. The clock display unit should work normally.

STEP 10. Check the clock display unit illumination power supply circuit [headlamp switch (park, low or high)]. Measure the voltage at the clock display unit connector C-06.



(1) Disconnect the clock display unit connector C-06 and measure at the harness side.
(2) Turn the headlamp switch to "ON" position.

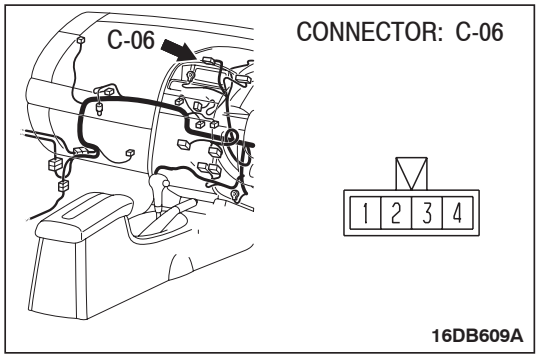


(3) Measure the voltage between terminal 2 and ground.
- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Replace the clock display unit . The multi-centre display unit should work normally.
NO : Go to Step 11.

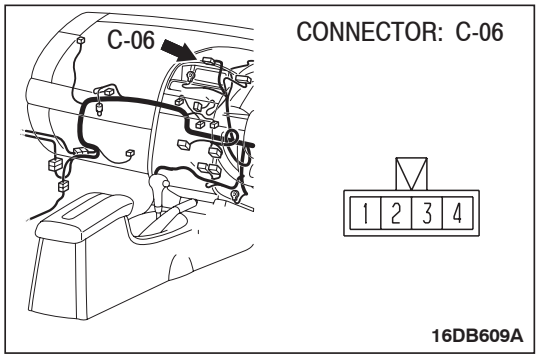
STEP 11. Check the clock display unit connector C-06 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Is clock display unit connector C-06 in good condition?

YES : Go to Step 12.
NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The clock display unit should work normally.

STEP 12. Check the wiring harness between clock display unit connector C-06 (terminal 2) and tail lamp relay and (fuse No.20) at relay box.



NOTE: Also check junction block connector C-211 and C-214 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-211 or C-214 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

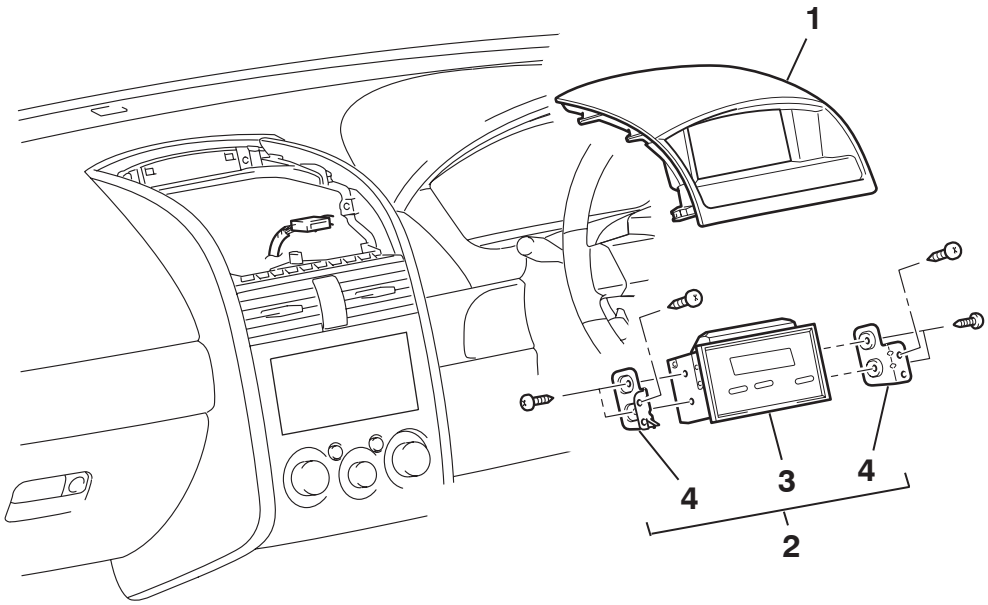
Q: Is the wiring harness between multi-centre display unit connector C-06 (terminal 2) and tail lamp relay and (fuse No.20) at relay box in good condition?

YES : The procedure is complete.

NO : Repair the wiring harness. The clock display unit should work normally.

CLOCK DISPLAY

REMOVAL AND INSTALLATION



16DB614A

REMOVAL STEPS

1. CONSOLE METER HOOD (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)
2. CLOCK DISPLAY ASSEMBLY

REMOVAL STEPS (Continued)

3. CLOCK DISPLAY
4. CLOCK DISPLAY BRACKET

MULTI-CENTER DISPLAY

GENERAL DESCRIPTION

M1543000100364

The multi-centre display can show a message based on information, which is obtained via CAN bus communication. In addition, the multi-centre display offers a service mode function (self-diagnosis), overwrite (customise) function of the ETACS and multi-centre display setting.

Graphical display function of multi-centre display

- Digital clock display (incorporating clock)
- Calendar display
- Audio system operation display (communicating with radio, CD player and CD changer)
- Speaker test display (communicating with radio, CD player and CD changer)
- Outside air temperature display (communicating with the A/C-ECU via CAN bus)
- Road surface freeze warning display (communicating with the A/C-ECU via CAN bus)
- A/C operation display (communicating with the A/C ECU via CAN bus)

Precautions during service

Diagnosis tips concerning the entire system

- Check that relevant wiring harness connectors are engaged correctly. If a failure is found, repair the connectors and check the trouble symptom again.
- If the wiring harness connectors are engaged correctly, check the wiring harness. If the wiring harness is in good condition, replace relevant components.

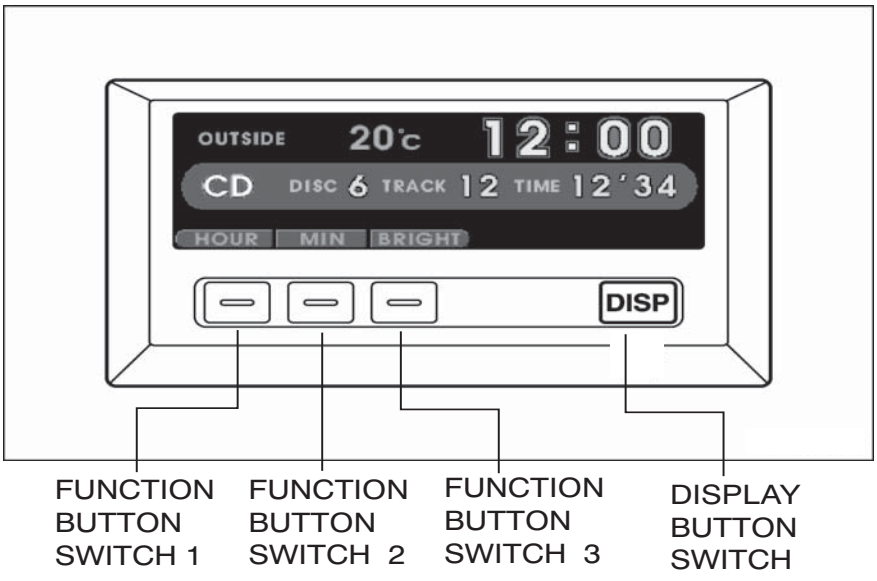
  NOTE: If a system communication (CAN communication) related failure is suspected, diagnose the CAN communication system.

Diagnosis tips when only specific function(s) is defective

- Check that the wiring harness connectors related to the specific function are engaged correctly. If a failure is found, repair the connectors and check the trouble symptom again.
- If the wiring harness connectors are engaged correctly, check the wiring harness. If the wiring harness is in good condition, replace relevant components, which controls that function.

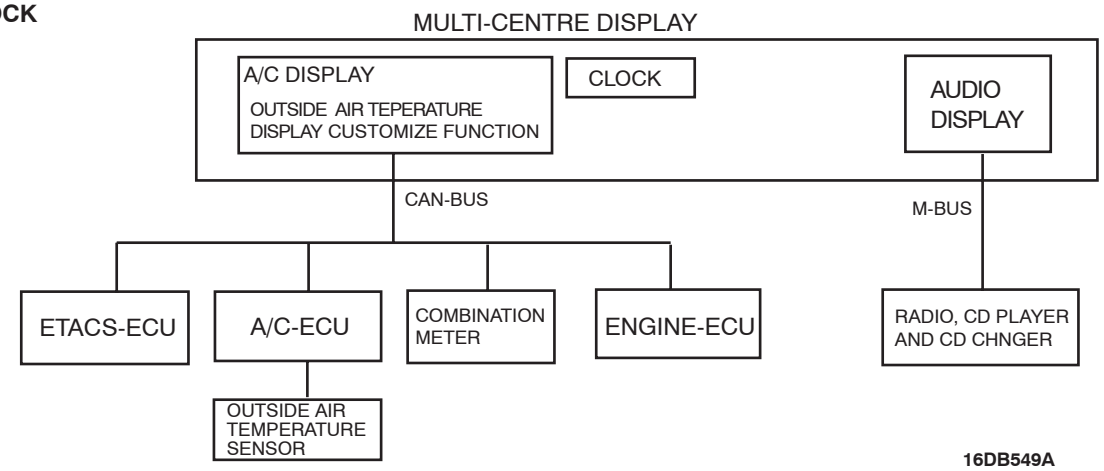
MULTI-CENTER DISPLAY SYSTEM

MULTI-CENTRE DISPLAY



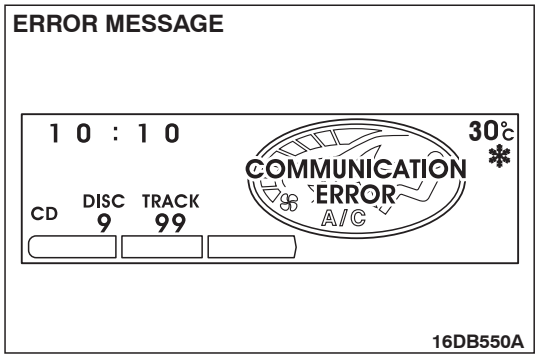
16DB548A

SYSTEM BLOCK



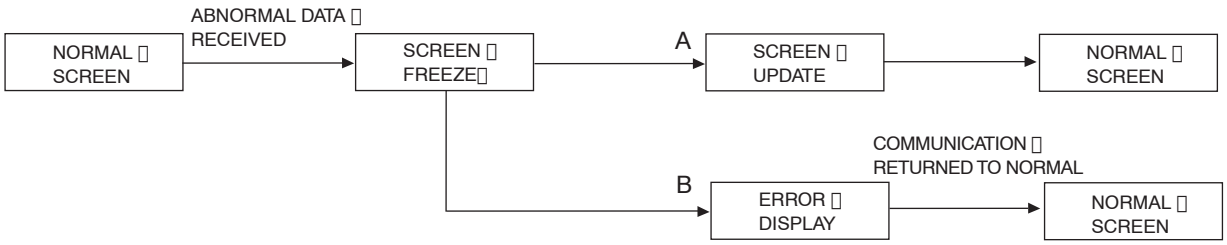
Communication error processing

ERROR MESSAGE



The multi-centre display unit communicates with specific units via CAN and M bus lines. If an abnormality occurs (such as communication cancellation, interruption or out-of-range data), the screen will be frozen for some time. If a correct signal is received within specific period after that, the screen will be updated. If not, "COMMUNICATION ERROR" will be displayed on the screen. This screen indicates a failure in the multi-centre display unit itself, communication error with relevant units, components or sensor. In this case, you can pinpoint a trouble spot according to the CAN communication DTC code chart.

PROCESSING COMMUNICATION ERROR



NOTE:
A: NORMAL SIGNAL IS RECEIVED WITHIN 60 SECONDS (CAN-BUS)
NORMAL SIGNAL IS RECEIVED WITHIN 60 SECONDS (M-BUS)

B: NORMAL SIGNAL HAS NOT BEEN RECEIVED FOR 60 OR MORE SECONDS (CAN-BUS)
NORMAL SIGNAL HAS NOT BEEN RECEIVED FOR 30 OR MORE SECONDS (M-BUS)

AC306650AB

FAILURE DIAGNOSIS SERVICE MODE FUNCTION

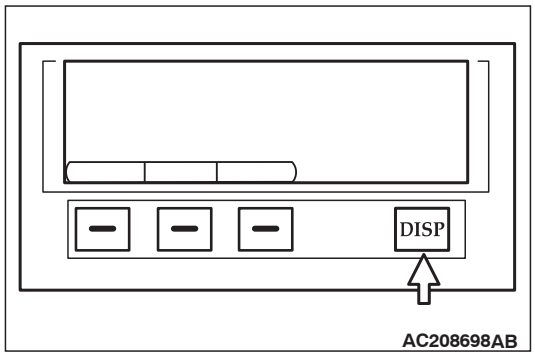
The multi-centre display unit with the following functions for the failure diagnosis service.

⚠ CAUTION

The "Compass check" mode will be displayed on the multi-centre display but will not be accessible due to not being available on vehicle.

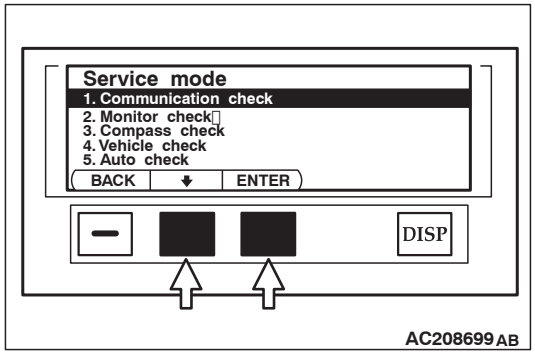
Service mode function		CONTENTS
Service function	Communication check	The multi-centre display checks communication conditions below, and shows the check result on the screen. Turn the ignition switch to the ON position before using this function. • M bus communication condition between the multi-centre display unit and the audio system • Communication condition between the multi-centre display unit and relevant units (such as ETACS-ECU)
	Monitor check	Checks whether the screen display functions.
	Compass check *(not available)*	-
	Vehicle check	Displays current vehicle conditions below • Displays the current condition of the lighting switch. • Displays the current position of the ignition switch. • Displays the current voltage of the battery
	Auto check	Checks the following items automatically. • Communication check • Monitor check • Vehicle check

Starting up the service mode

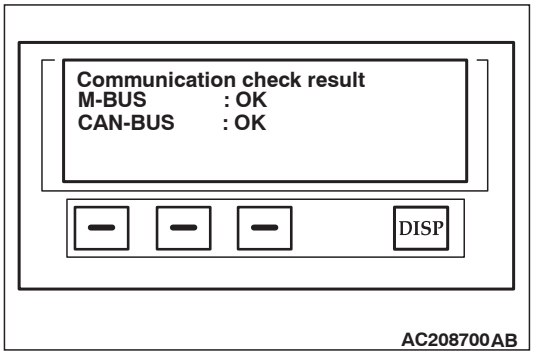


1. ignition switch "LOCK" (OFF) position.
2. Turn the ignition switch to the "ACC" position while depressing the "DISP" button on the multi-centre display unit. After approximately 5 seconds, the service mode start-up screen is displayed.

Communication check



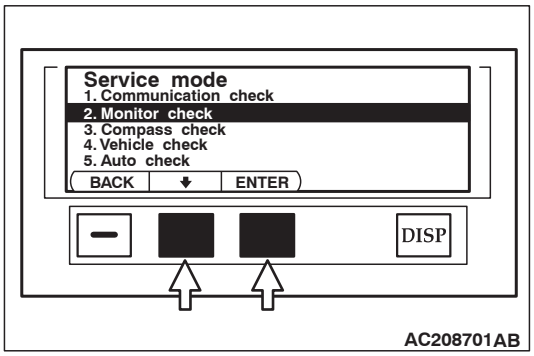
1. Activate the service mode start-up screen.
2. ignition switch "ON" position.
3. Choose "communication check mode" by pressing the function button switch 2.
4. Execute "ENTER" by pressing the function button switch 3.



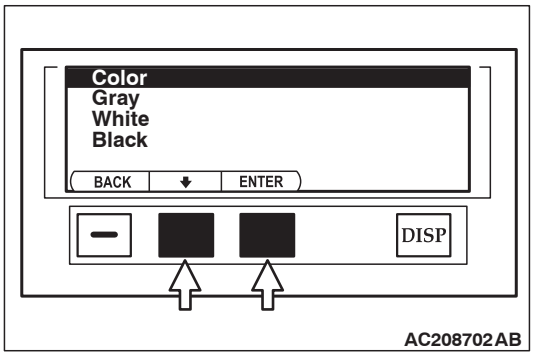
5. The multi-centre display checks the communication conditions and displays the check result.

CHECK ITEM	DISPLAY	CONTENT OR CONDITION
M bus and CAN bus communications	• OK • NG	OK: – NG: Open circuit, or communication error caused by failure in relevant unit(s)

Monitor check



1. Choose "Monitor check" from the service mode start-up screen by pressing function button switch 2, and then execute "ENTER" by pressing function button switch 3.



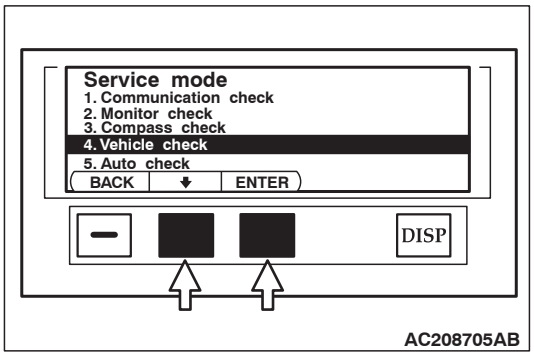
2. Choose a color by function button switch 2, and then execute "ENTER" by function button switch 3. You can check the chosen color on the screen.

Compass check

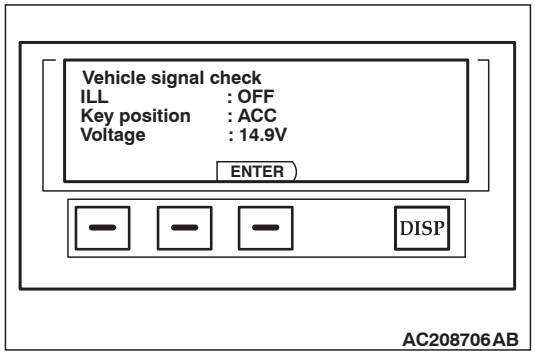
⚠ CAUTION

The "Compass check" mode will be displayed on the multi-centre display but will not be accessible due to not being available on vehicle.

Vehicle check



1. Choose "vehicle check" from the service mode start-up screen by pressing function button switch 2, and then execute a check by pressing function button switch 3.



2. The multi-centre display performs check and displays the check result. Operate the lighting switch or the ignition switch. Check whether the multi-centre display screen corresponds to that operation.

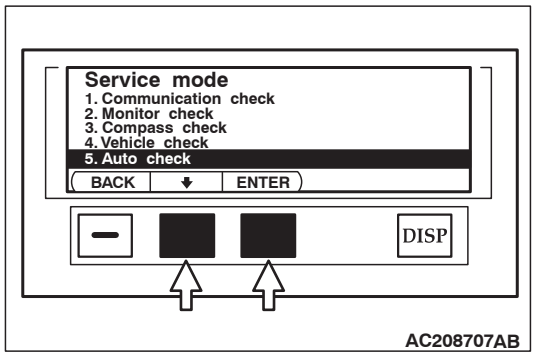
CHECK ITEM	DISPLAY	CONTENT OR CONDITION
Illumination	ILL: ON	If the lighting switch is ON
	ILL: OFF	If the lighting switch is OFF
ignition switch position	• IG • ACC	Displays the current position of the ignition switch.
Battery positive voltage	Displays the voltage.	

⚠ CAUTION

The "Compass check" mode will be displayed on the multi-centre display but will not be accessible due to not being available on vehicle.

Auto check

1. Activate the service mode start-up screen.
2. Turn the ignition switch to "ON" position.
3. Choose "Auto check" by pressing function button switch 2.
4. Execute "ENTER" by pressing the function button switch 3.
5. The multi-centre display unit checks the communication condition, and then shows the check results of "Communication check", "Monitor check" and "Vehicle check". Then the multi-centre display ceases CAN communication in approximately seven seconds.



Release of service mode

Move from the check result screen to the service mode start-up screen by pressing "ENTER" above function button switch 3. If you press "BACK" above function button switch 1 during processing, the checks will be cancelled and the screen returns to service mode start-up screen.

Fail-safe function of the multi-centre display unit

If abnormal power supply voltage or abnormally high temperature is detected in the multi-centre display unit, a fail-safe function will be activated to protect the unit, and then blank the screen.

Fail-safe function is activated when:

Power supply voltage is abnormal

- Excessively low voltage: Power supply voltage remains 9 volts or less for approximately 10 seconds.
- Excessively high voltage: Power supply voltage remains 17 volts or more for approximately 10 seconds.

Abnormally high temperature is detected in the unit.

- Internal temperature remains 95°C for 60 seconds.

If an abnormal voltage or temperature is detected, the multi-centre display unit will sound its buzzer to indicate this and activate a message to blank the screen in approximately seven seconds.

NOTE: The unit blanks the screen immediately when the power supply voltage reaches 18 volts.

Fail-safe function is deactivated when:

Power supply voltage is abnormal

- The fail-safe function will be deactivated if the power supply voltage remains 10 volts or more for approximately five seconds, or the ignition switch is turned to the "LOCK" (OFF) position.
- The fail-safe function will be deactivated if the power supply voltage remains 17 volts or less for approximately five seconds or more, or the ignition switch is turned to the "LOCK" (OFF) position.

Abnormally high temperature is detected in the unit.

- The fail-safe function will be deactivated if its internal temperature has reduced to 85°C or less, or the ignition switch is turned to the "LOCK" (OFF) position.

DIAGNOSIS FUNCTION

M1543007000465

ON-BOARD DIAGNOSTICS

The multi-centre display monitors its input/output signals (some signals all the time and others under specified conditions). When an irregular signal is initially monitored, the multi-centre display decides that a malfunction has occurred and records the occurrence as a diagnostic trouble code. There are 9 diagnostic items. The diagnostic results can be read with a diagnostic tool MB991958 (MUT-III sub assembly). Diagnostic trouble codes are kept in memory by direct battery feed. The codes are retained in memory even if the ignition switch is in the "LOCK" (OFF) position. Diagnostic trouble codes will, however, be erased when a battery terminal or the multi-centre display connector is disconnected. In addition, the diagnostic trouble code can also be erased by diagnostic tool MB991958 (MUT-III sub assembly).

NOTE: If a connector or sensor is disconnected when the ignition switch is in the "ON" position, a diagnostic trouble code is stored in memory. In this case, erase the DTC using the diagnostic tool.

NOTE: The 9 diagnostic items are displayed in numeric order.

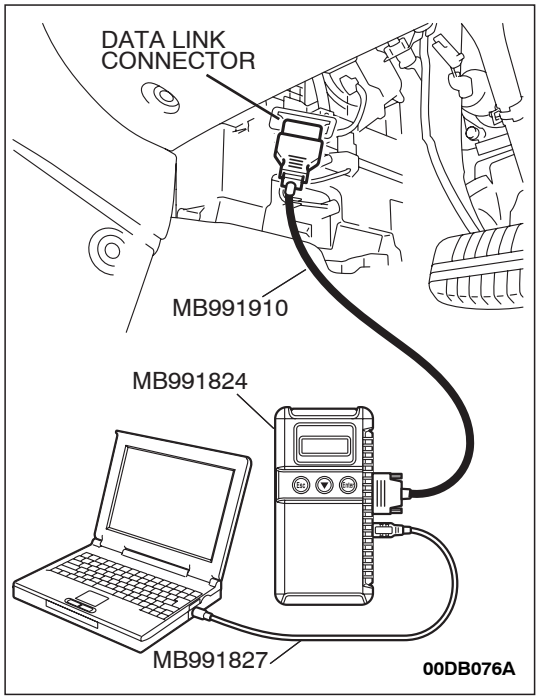
HOW TO CONNECT DIAGNOSTIC TOOL (MUT-III)

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.



1. Ensure that the ignition switch is at the "LOCK" (OFF) position.
2. Start up the personal computer.
3. Connect special tool MB991827 to special tool MB991824 and the personal computer.
4. Connect special tool MB991910 to special tool MB991824.
5. Connect special tool MB991910 to the data link connector.
6. Turn the power switch of special tool MB991824 to the "ON" position.

   NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.
7. Start the MUT-III system on the personal computer.

   NOTE: Disconnecting the diagnostic tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

HOW TO READ AND ERASE DIAGNOSTIC TROUBLE CODES

Required Special Tools:

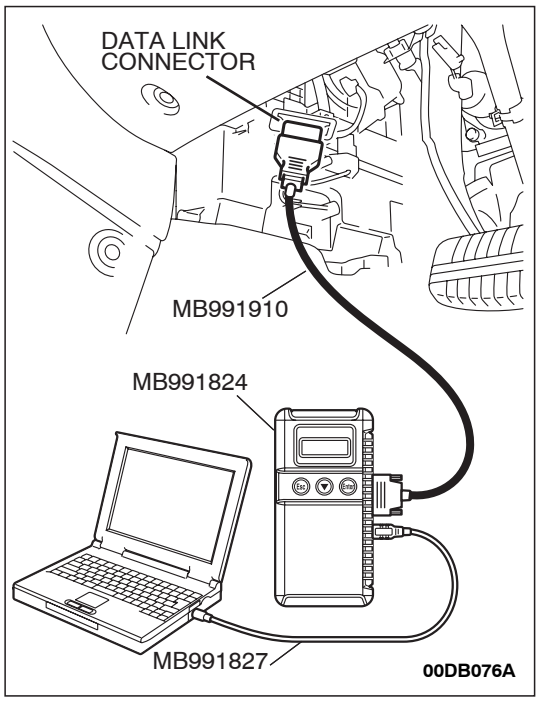
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

⚠ CAUTION

To prevent damage to diagnostic tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting diagnostic tool MB991958.

NOTE: If the battery voltage is low, diagnostic trouble codes will not be set. Check the battery if diagnostic tool MB991958 does not display.

1. Connect diagnostic tool MB991958 to the data link connector.
2. Turn the ignition switch to "ON" position.
3. Select "Interactive Diagnosis" from the start-up screen.
4. Select "System select."
5. Choose "Display" .
6. Select "Diagnostic Trouble Code."
7. If a DTC is set, it is shown.
8. Choose "Erase DTCs" to erase the DTC.



DIAGNOSTIC TROUBLE CODE CHART

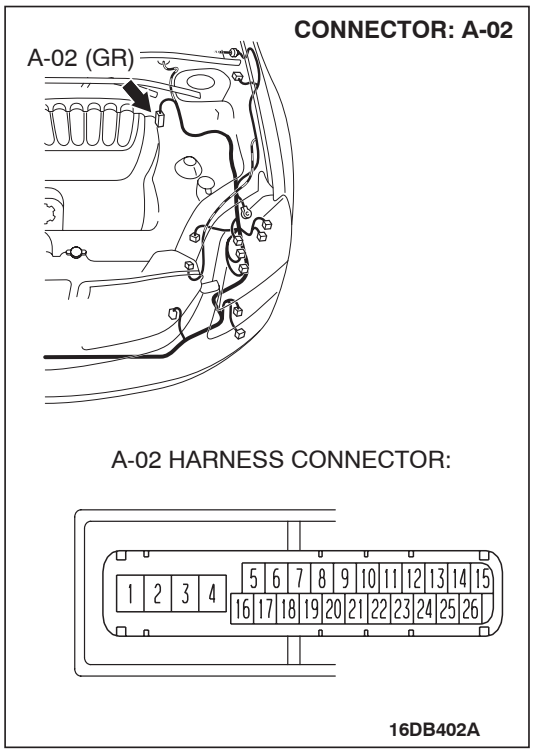
M1545001100039

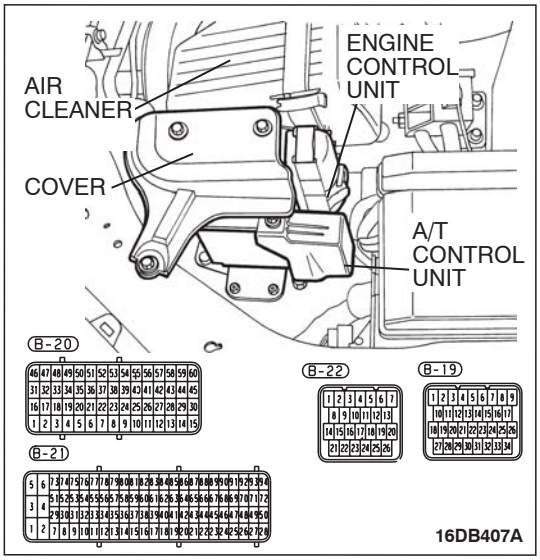
NOTE: During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

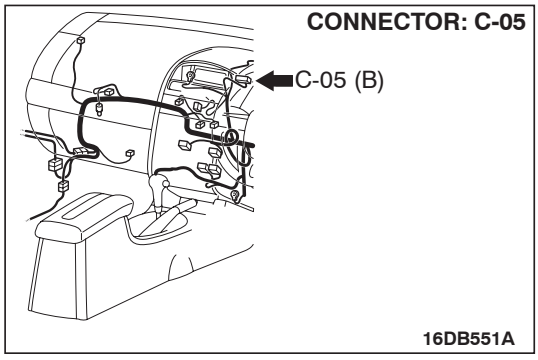
DTC NO.	DIAGNOSTIC ITEM	REFERENCE PAGE
010 (U1073)	Bus off	P.54A-255
011 (U1100)	Engine ECU time-out	P.54A-257
012 (U1101)	A/T-ECU time-out	P.54A-260
013 (U1110)	A/C-ECU time-out	P.54A-264
014 (U1108)	Combination meter time-out	P.54A-268
019 (U1109)	ETACS-ECU time-out	P.54A-271
020 (U1120)	Failures information on Engine ECU	P.54A-275
021 (U1128)	Failures information on combination meter	P.54A-278
022 (U1130)	Failures information on A/C-ECU	P.54A-281

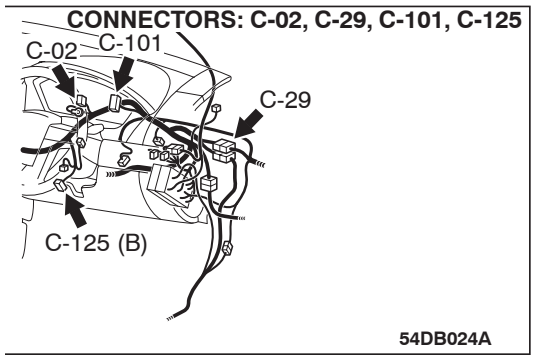
DIAGNOSTIC TROUBLE CODE PROCEDURES

DTC 010 (U1073): Bus Off









⚠ CAUTION

If DTC 010 (U1073) is set in the multi-centre display, always diagnose the CAN bus lines.

⚠ CAUTION

Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION

The multi-centre display unit is linked to CAN communication lines to communicate with the combination meter and the Engine ECU, both of which have a terminator resistor.

DTC SET CONDITION

If the multi-centre display ceases communicating once (i.e. bus off) and then returns to it, the multi-centre display will not communicate for three minutes immediately after that point. This three-minute period is called "Penalty mode." Immediately after the multi-centre display returns to communication, the DTC is set.

TECHNICAL DESCRIPTION (COMMENT)

The CAN bus line wiring harness, connector(s), or the multi-centre display unit may be defective.

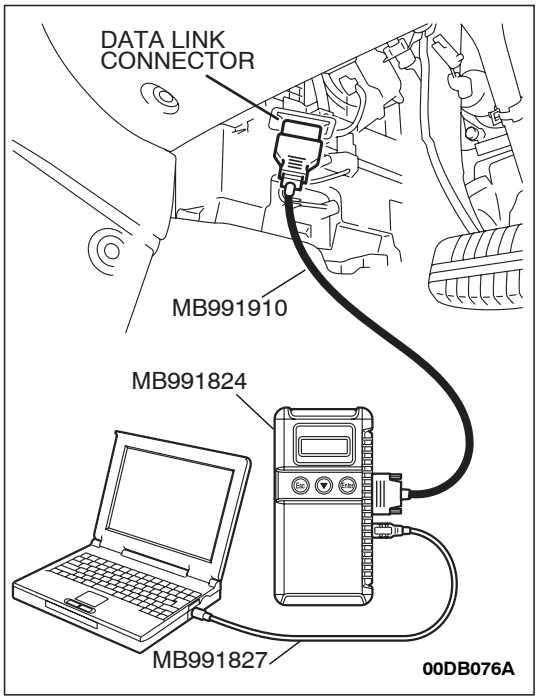
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of multi-centre display unit

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to step 3.

STEP 2. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : Intermittent malfunction is suspected. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.

NO : Replace combination meter and then go to step 3.

STEP 3. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC 011 (U1100): Engine ECU Time-out

⚠ CAUTION
If DTC 011 is set in the multi-centre display, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-255.

DTC SET CONDITION

DTC 011 (U1100)
- The multi-centre display unit receives engine control system-related signals from the Engine-ECU via CAN bus lines. If the display unit can not receives the necessary signals, DTC 011 (U1100) will be set.

TECHNICAL DESCRIPTION (COMMENT)

⚠ CAUTION
If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) 013 (U1110) and 014 (U1108) may be set on the combination meter (incorporating meter-ECU) after three minutes.

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the Engine ECU and the multi-centre display unit, the power supply system to the display unit, the display unit itself, or the Engine ECU may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the Engine ECU and the multi-centre display unit, and the power supply system to the Engine ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

  NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of Engine ECU.
- Malfunction of multi-centre display unit

DIAGNOSIS

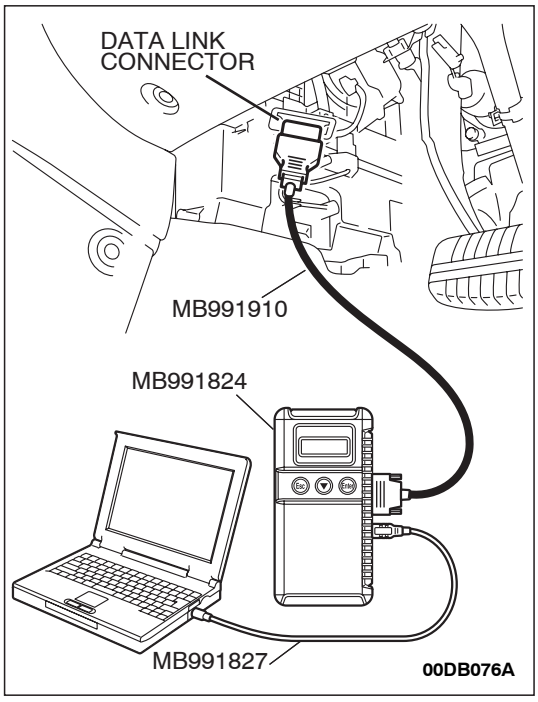
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read MPI diagnostic trouble code

Check if an MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system by referring to GROUP 13A, Diagnosis – Diagnostic Trouble Code Chart P.13A-17.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.
Check if a DTC, which relates to CAN communication-linked systems below, is set.
ABS-ECU
- DTC U1100: Engine ECU time-out <vehicles with TCL>

Combination meter
- DTC 011 (U1100): Engine-ECU time-out

ETACS-ECU
- DTC 011 (U1100): Engine-ECU time-out

A/C-ECU
- DTC U1100: Engine-ECU time-out

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the Engine ECU and the middle-grade multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace Engine ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the Engine ECU and the middle-grade multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC 012 (U1101): A/T ECU Time-out

⚠ CAUTION
If DTC 012 (U1101) is set in the multi-centre display, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-255.

DTC SET CONDITION

DTC 012 (U1101)
- The multi-centre display unit receives A/T control system-related signals from the A/T-ECU via CAN bus lines. If the display unit can not receive the necessary signals, DTC 012 (U1101) will be set.

TECHNICAL DESCRIPTION (COMMENT)

⚠ CAUTION
If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) 013 (U1110) and 014 (U1108) may be set on the combination meter (incorporating meter-ECU) after three minutes.

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the A/T-ECU and the multi-centre display unit, the power supply system to the display unit, the display unit itself, or the A/T-ECU may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the A/T-ECU and the multi-centre display unit, and the power supply system to the A/T-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

  NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of A/T-ECU.
- Malfunction of multi-centre display unit

DIAGNOSIS

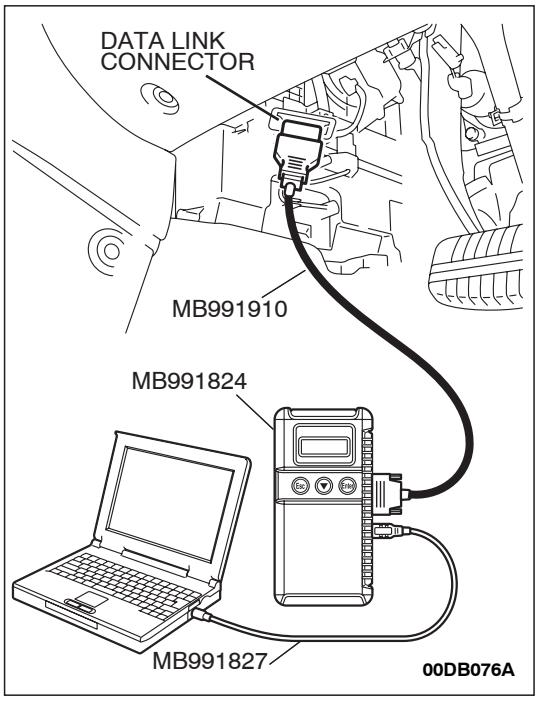
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read A/T diagnostic trouble code

Check if an A/T system DTC is set.

Q: Is the DTC set?

YES : Diagnose the A/T system by referring to GROUP 23A, Diagnosis – Diagnostic Trouble Code Chart P.23A-34.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.
Check if a DTC, which relates to CAN communication-linked systems below, is set.
ABS-ECU
- DTC U1101: A/T-ECU time-out <vehicles with TCL>

Combination meter
- DTC 012 (U1101): A/T-ECU time-out

ETACS-ECU
- DTC 012 (U1101): A/T-ECU time-out

Q: Is the DTC set?
YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the A/T-ECU and the middle-grade multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace A/T-ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the A/T-ECU and the middle-grade multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

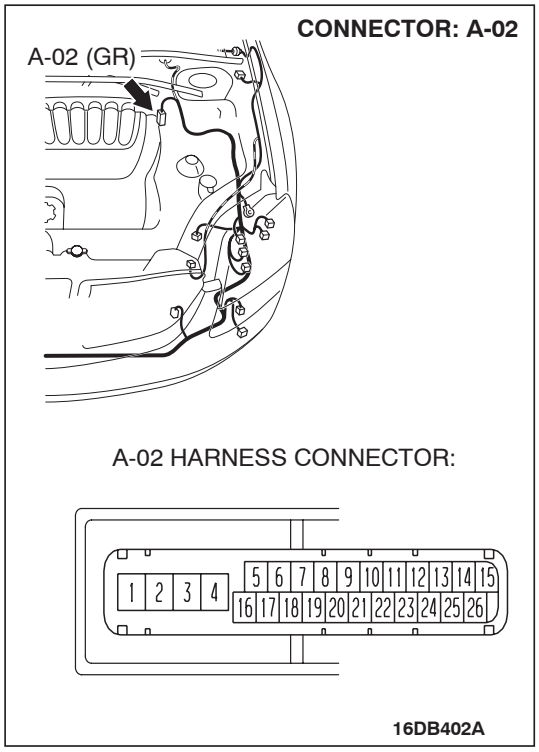
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

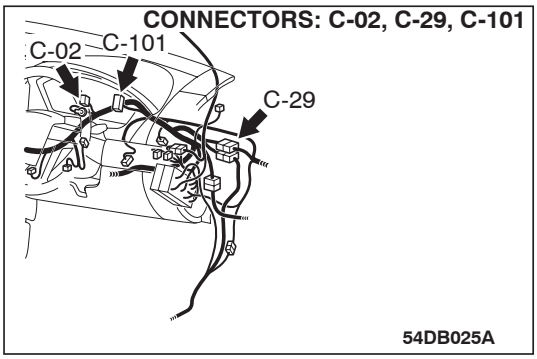
Q: Is the check result satisfactory?

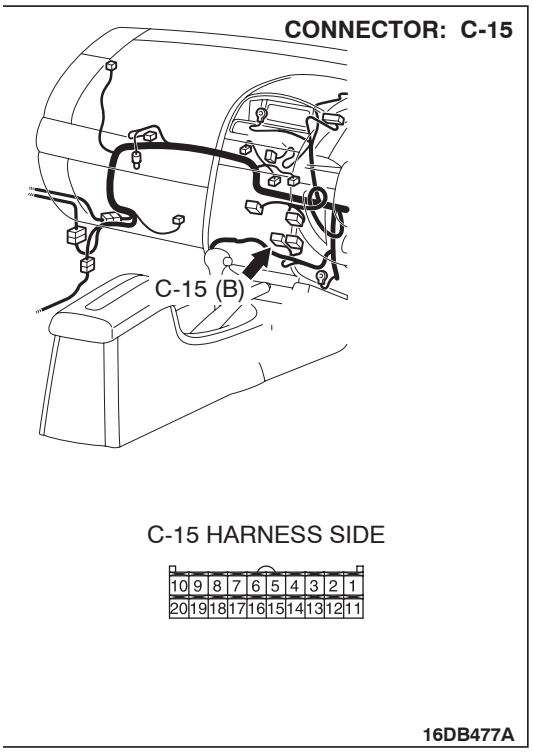
YES : The procedure is complete.

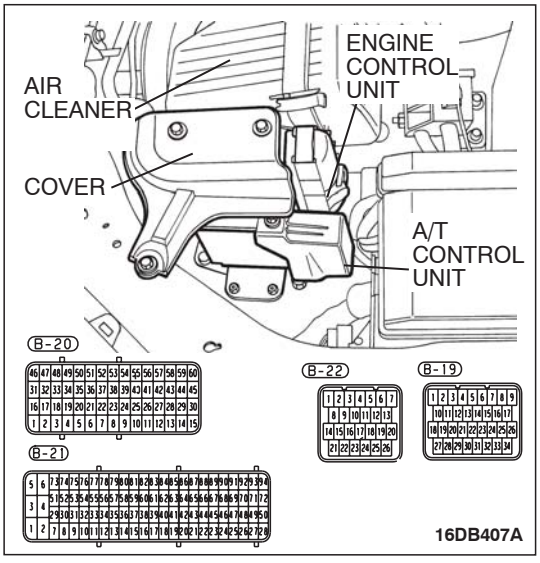
NO : Go to Step 1.

DTC 013 (U1110): A/C-ECU Time-out









⚠ CAUTION

If DTC 013 (U1110) is set in the multi-centre display, always diagnose the CAN bus lines.

⚠ CAUTION

Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION

The multi-centre display unit communicates with the A/C-ECU via CAN bus lines.

DTC SET CONDITION

When the multi-centre display unit can not receives necessary signals from the A/C-ECU via CAN bus lines. If the display unit can not receives the necessary A/C-ECU signals, DTC 013 (U1110) will be set.

TECHNICAL DESCRIPTION (COMMENT)

⚠ CAUTION

If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) 011, 012 and 014 (U1108) may be set to the combination meter (incorporating meter-ECU) after three minutes.

Current trouble

- Connector(s) or wiring harness in the CAN bus lines between the A/C-ECU and the multi-centre display unit, the power supply system to the display unit, the display unit itself, or the A/C-ECU may be defective.

Past trouble

- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the A/C-ECU and the multi-centre display unit , and the power supply system to the A/C-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

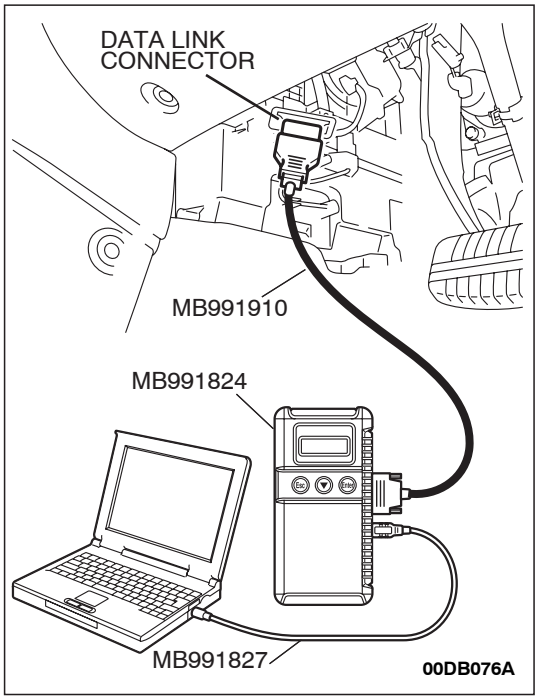
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of A/C-ECU
- Malfunction of multi-centre display unit

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read the A/C diagnostic trouble code

Check if an A/C system DTC is set.

Q: Is the DTC set?

YES : Diagnose the A/C system by referring to GROUP 55, Auto A/C Diagnostic Trouble Code Chart P.55-9.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code.

Check if a DTC, which relates to CAN communication-linked systems below, is set.

Engine ECU
- DTC U1110: A/C-ECU time-out

ETACS-ECU
- DTC 013 (U1110): A/C-ECU time-out

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the A/C-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace A/C-ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the A/C-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace the multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : the procedure is complete.
NO : Go to Step 1.

DTC 014 (U1108): Combination Meter Time-out

⚠ CAUTION
If DTC 014 (U1108) is set in the multi-centre display, always diagnose the CAN bus lines.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION
Refer to P.54A-255.

DTC SET CONDITION
The multi-centre display unit receives signals from the combination meter via CAN bus lines. If the display unit can not receive the necessary combination meter signals, DTC 014 (U1108) will be set.

TECHNICAL DESCRIPTION (COMMENT)

⚠ CAUTION
If the ignition switch is turned to the ON position without starting the engine, DTC (past trouble) 011 (U1100), 012 (U1101) and 013 (U1110) may be set to the combination meter (incorporating meter-ECU) after three minutes.

Current trouble
- Connector(s) or wiring harness in the CAN bus lines between the combination meter and the multi-centre display unit , the power supply system to the display unit, the display unit itself, or the combination meter may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the combination meter and the multi-centre display unit , the power supply system to the display unit. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of combination meter
- Malfunction of multi-centre display unit

DIAGNOSIS

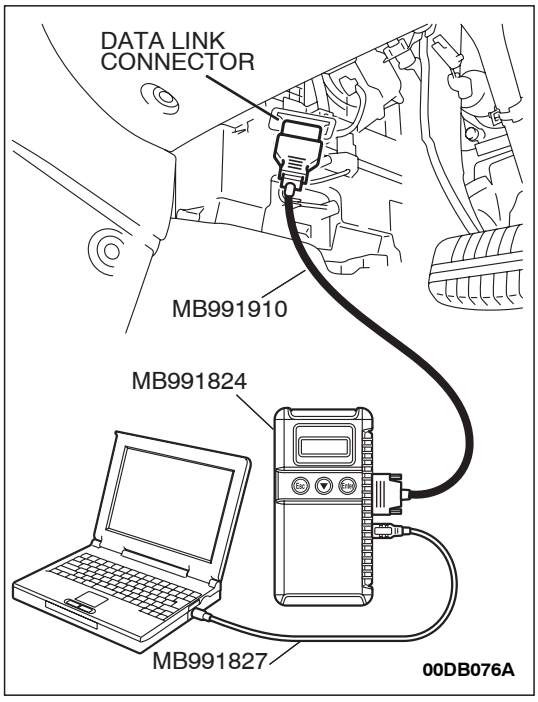
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go Step 5.

STEP 2. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.

Check if a DTC, which relates to CAN communication-linked systems below, is set.

Engine ECU

- DTC U1108: Combination meter time-out

ETACS-ECU

- DTC 014 (U1108): Combination meter time-out

Q: Is the DTC set?

YES : Go to Step 3.
NO : Go to Step 4.

STEP 3. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the combination meter and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).

NO : Replace multi-centre display unit and then go to step 5.

STEP 4. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the combination meter and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).

NO : Replace multi-centre display unit and then go to step 5.

STEP 5. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

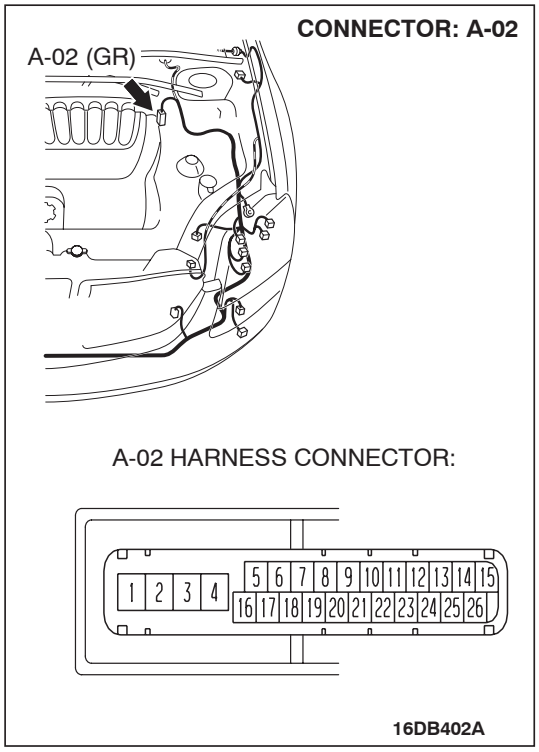
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

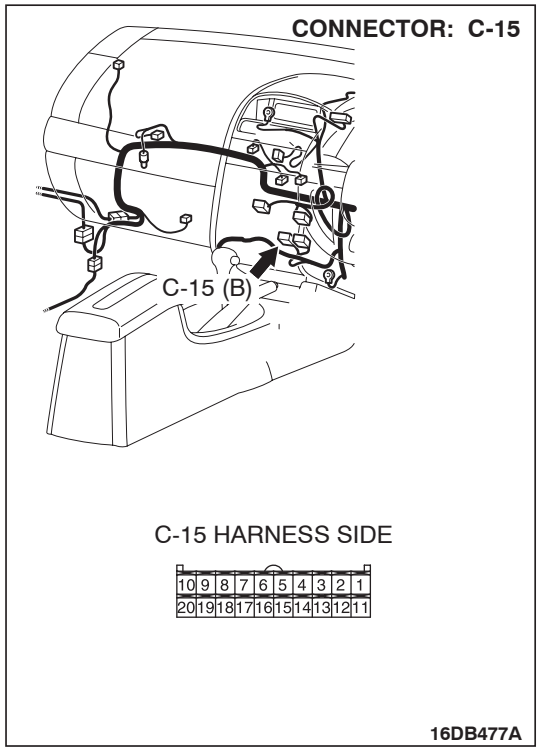
Q: Is the check result satisfactory?

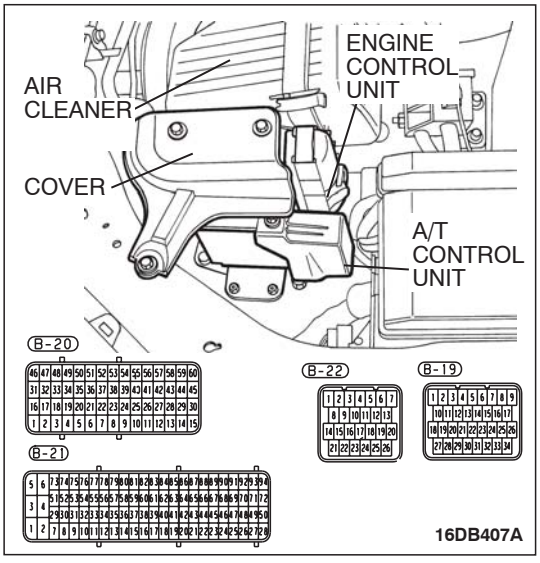
YES : The procedure is complete.

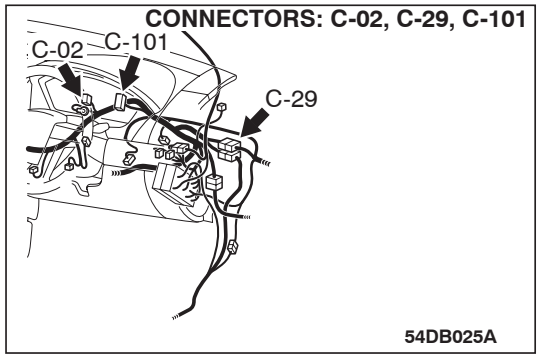
NO : Go to Step 1.

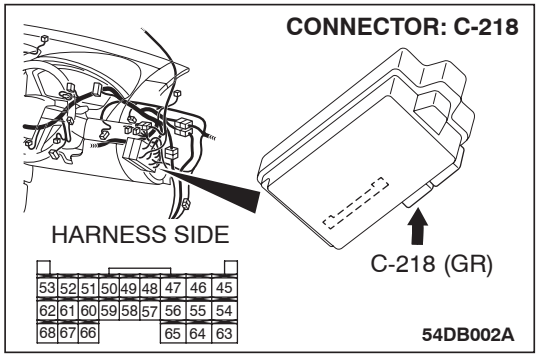
DTC 019 (U1109): ETACS-ECU Time-out











⚠ CAUTION
If DTC 019 (U1109) is set in the ETACS-ECU, diagnose the CAN main bus line.

⚠ CAUTION
Whenever the ECU is replaced, ensure that the communication circuit is normal.

CIRCUIT OPERATION

The multi-centre display unit is linked to CAN communication lines to communicate with the combination meter and the Engine ECU, both of which have a terminator resistor.

DTC SET CONDITION

The multi-centre display unit communicates with the ETACS-ECU via CAN bus lines. If it can not receive all the necessary signals from the ETACS-ECU, DTC 019 (U1109) is set.

TECHNICAL DESCRIPTION (COMMENT)

Current trouble

- Connector(s) or wiring harness in the CAN bus lines between the ETACS-ECU and the multi-centre display unit , the power supply system to the display unit, the display unit itself, or the ETACS-ECU may be defective.

Past trouble

- Carry out diagnosis with particular emphasis on connector(s) or wiring harness in the CAN bus lines between the ETACS-ECU and the multi-centre display unit , and the power supply system to the ETACS-ECU. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

  NOTE: For a past trouble, you may not find it by the MUT-III CAN bus diagnostics even if there is any failure in CAN bus lines. In this case, refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14.) and check the CAN bus lines. You can narrow down the possible cause of the trouble by referring to the DTC, which is set regarding the CAN communication-linked ECUs (Refer to GROUP 54C, CAN bus line Diagnostics Flow P.54C-6).

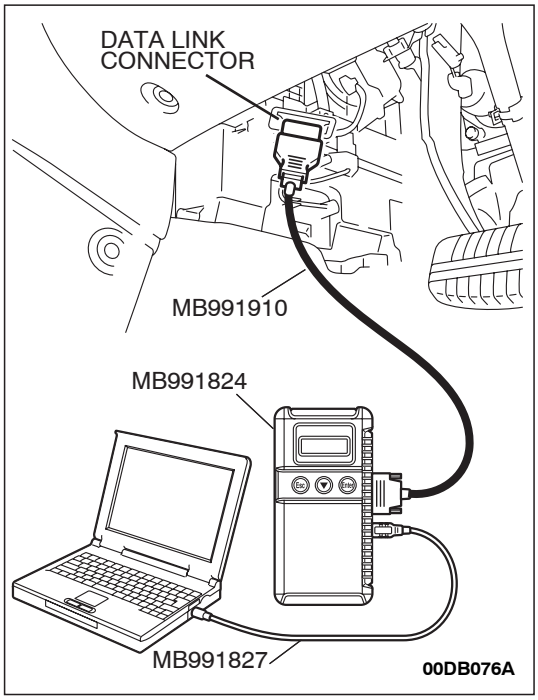
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of ETACS-ECU
- Malfunction of multi-centre display unit

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.
(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines. (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read ETACS-ECU diagnostic trouble code

Check that the ETACS-ECU sets a DTC.

Q: Is the DTC set?

YES : Diagnose the SWS system by referring to GROUP 54B, SWS Diagnosis – Diagnostic Trouble Code Chart P.54B-25.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code.

Check if a DTC, which relates to CAN communication-linked systems below, is set.
Combination meter
- DTC 019 (U1109): ETACS-ECU time-out

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the ETACS-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).

NO : Replace ETACS-ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the CAN bus lines between the ETACS-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).

NO : Replace multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : The procedure is complete.

NO : Go to Step 1.

DTC 020 (U1120): Failures Information on Engine ECU

⚠ CAUTION
If DTC 20 is set in the multi-centre display, always diagnose the CAN bus lines.

CIRCUIT OPERATION
Refer to P.54A-255.

DTC SET CONDITION
The multi-centre display unit communicates with the Engine ECU via CAN bus lines. If failure information is sent to the multi-centre display unit , DTC 20 will be set.

TECHNICAL DESCRIPTION (COMMENT)
Current trouble
- The Engine ECU or the multi-centre display unit may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness between the Engine ECU and the vehicle speed sensor. For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of Engine ECU
- Malfunction of multi-centre display unit

DIAGNOSIS

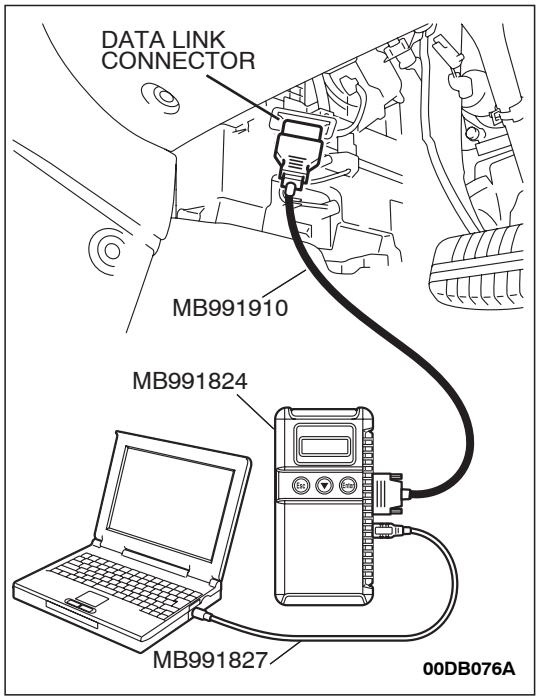
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read MPI system diagnostic trouble code.

Check if an MPI system DTC is set.

Q: Is the DTC set?

YES : Diagnose the MPI system by referring to GROUP13A, MPI Diagnosis – Diagnostic Trouble Code Chart P.13A-17.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.
Check if a DTC, which relates to CAN communication-linked systems below, is set.
ABS-ECU
- DTC U1120: Failure information on Engine ECU (related to engine) <vehicles with TCL>

Combination meter
- DTC 020 (U1120): Failure information on Engine ECU (related to engine)

A/C-ECU
- DTC U1120: Failure information on Engine ECU (related to engine)

Q: Is the DTC set?
YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the Engine ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace Engine ECU and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the Engine ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC 021 (U1128): Failures Information on Combination Meter

⚠ CAUTION
If DTC 021 (U1128) is set in the multi-centre display, always diagnose the CAN bus lines.

CIRCUIT OPERATION
Refer to P.54A-255.

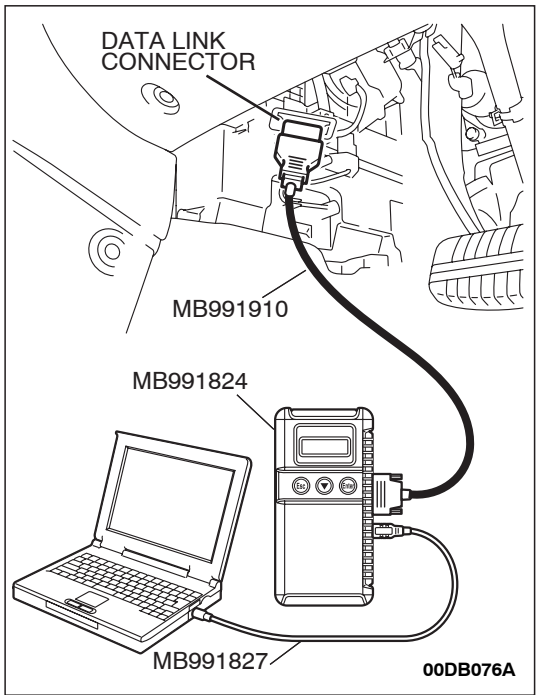
DTC SET CONDITION
The multi-centre display unit communicates with the combination meter via CAN bus lines. If failure information is sent to the combination meter, DTC 021 (U1128) will be set.

TECHNICAL DESCRIPTION (COMMENT)
Current trouble
- The combination meter or the multi-centre display unit may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness between the combination meter and the multi-centre display unit . For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of combination meter
- Malfunction of multi-centre display unit

DIAGNOSIS
Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 6.

STEP 2. Using diagnostic tool MB991958, read combination meter diagnostic trouble code.

Check that the combination meter sets a DTC.

Q: Is the DTC set?

YES : Diagnose the SWS system by referring to GROUP 54B, SWS Diagnosis – Diagnostic Trouble Code Chart P.54B-25.
NO : Go to Step 3.

STEP 3. Using diagnostic tool MB991958, read the diagnostic trouble code related to the other system.

Check if a DTC, which relates to CAN communication-linked systems below, is set.

ETACS-ECU

- DTC 021 (U1128): Information on failures in combination meter via CAN communication

Q: Is the DTC set?

YES : Go to Step 4.
NO : Go to Step 5.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition Switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the combination meter and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace combination meter and then go to step 6.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition Switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the combination meter and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace multi-centre display unit and then go to step 6.

STEP 6. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition Switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?
YES : The procedure is complete.
NO : Go to Step 1.

DTC 022 (U1130): Failures Information on A/C-ECU

⚠ CAUTION
If DTC 022 (U1130) is set in the multi-centre display, always diagnose the CAN bus lines.

CIRCUIT OPERATION
Refer to P.54A-264.

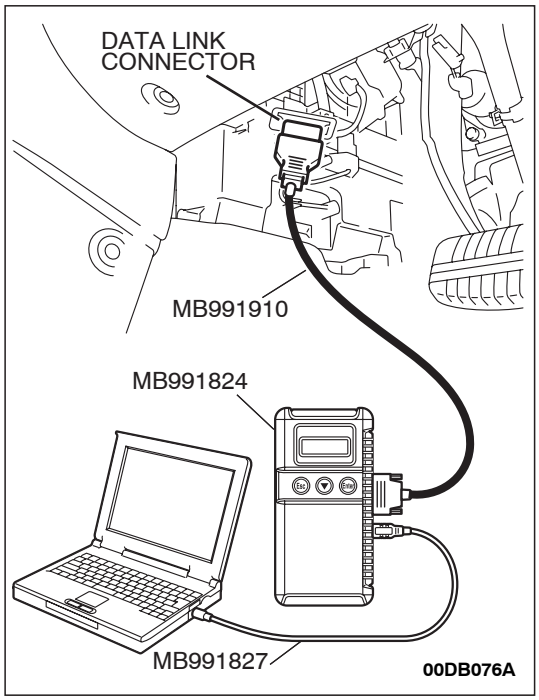
DTC SET CONDITION
The multi-centre display unit communicates with the A/C-ECU via CAN bus lines. If the A/C-ECU sends failure information, DTC 022 (U1130) will be set.

TECHNICAL DESCRIPTION (COMMENT)
Current trouble
- The A/C-ECU or the multi-centre display unit may be defective.

Past trouble
- Carry out diagnosis with particular emphasis on connector(s) or wiring harness between the A/C-ECU and the multi-centre display unit . For diagnosis procedures, refer to "How to cope with past trouble" (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-14).

TROUBLESHOOTING HINTS
- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.
- Malfunction of A/C-ECU
- Malfunction of ambient temperature sensor
- Malfunction of multi-centre display unit

DIAGNOSIS
Required Special Tools:
- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line.

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). On completion, go to Step 5.

STEP 2. Using diagnostic tool MB991958, read A/C-ECU diagnostic trouble code.

Check if an A/C-ECU DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 55A, Auto A/C Diagnostic Trouble Code Chart P.55-9 and then Go to Step 3.
NO : Go to Step 4.

STEP 3. Recheck for diagnostic trouble code.

Recheck if the DTC is set.

1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the A/C-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).
NO : Replace A/C-ECU and then go to step 4.

STEP 4. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

YES : A poor connection, open circuit or other intermittent malfunction is present in the lines between the A/C-ECU and the multi-centre display unit (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction P.00-14).

NO : Replace multi-centre display unit and then go to step 5.

STEP 5. Recheck for diagnostic trouble code.
Recheck if the DTC is set.
1. Erase the DTC.
2. Turn the ignition switch to "ON" position.
3. Check if the DTC is set.

Q: Is the check result satisfactory?

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.00-14).

NO : Go to Step 1.

DIAGNOSIS

M1543007201127

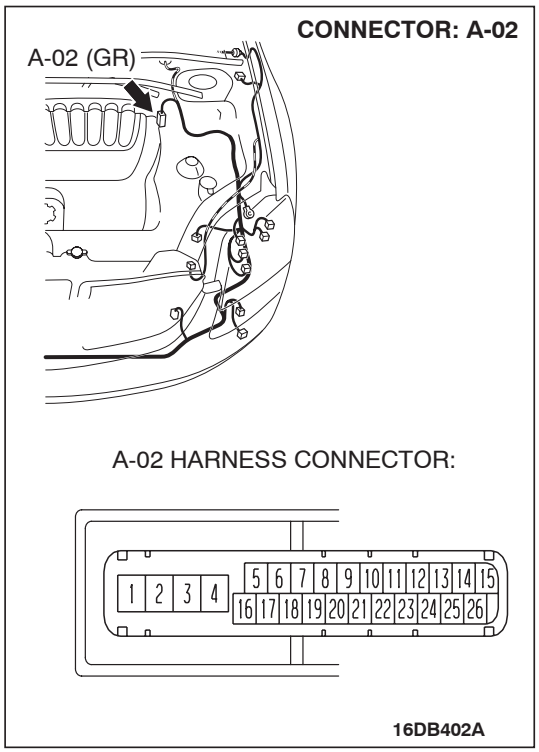
SYMPTOM CHART

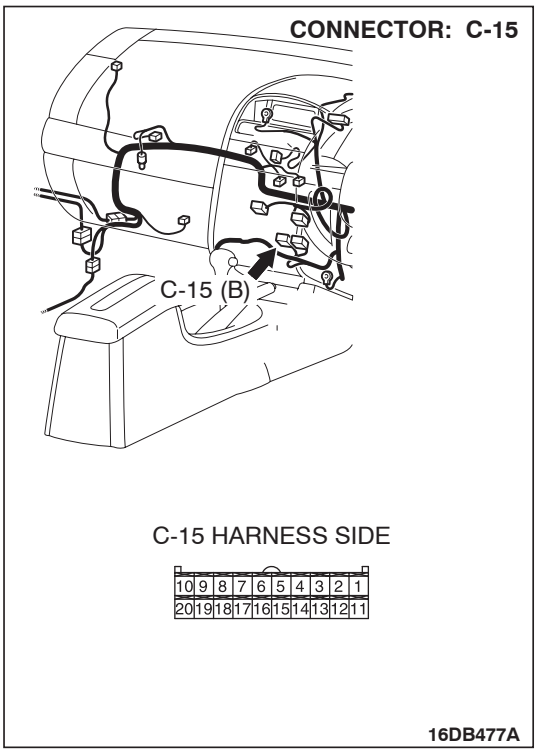
⚠ CAUTION
During diagnosis, a DTC code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for DTC code(s). If DTC code(s) are set, erase them all.

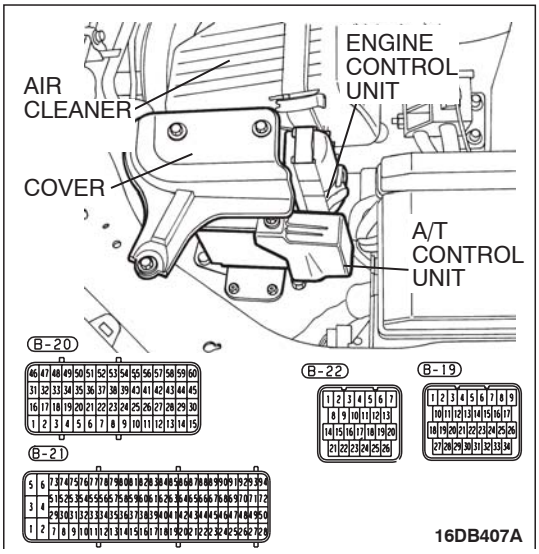
SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Communication with diagnostic tool is not possible.	1	P.54A-284
The multi-centre display does not show any information.	2	P.54A-286
The A/C display shows "COMMUNICATION ERROR", and then can not proceed to next screen.	3	P.54A-293
The ambient air temperature display shows "COM ERROR" or "––deg°C	4	P.54A-295
On the audio screen, "COMMUNICATION ERROR" can not proceed to next screen.	5	P.54A-298

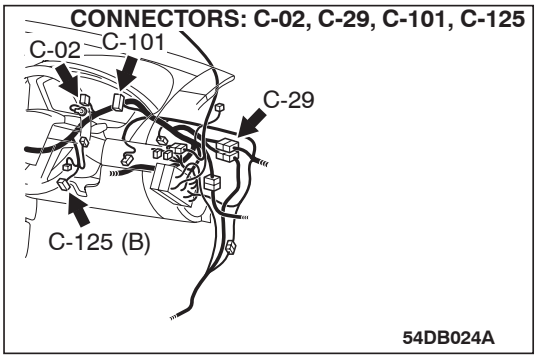
SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1:Communication With Diagnostic Tool Is Not Possible.









CIRCUIT OPERATION

The multi-centre display unit is linked to CAN communication lines to communicate with the combination meter and the Engine ECU, both of which have a terminator resistor.

TECHNICAL DESCRIPTION (COMMENT)

If the system does not communicate with the diagnostic tool, power supply to the data link connector or CAN bus lines may be defective.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

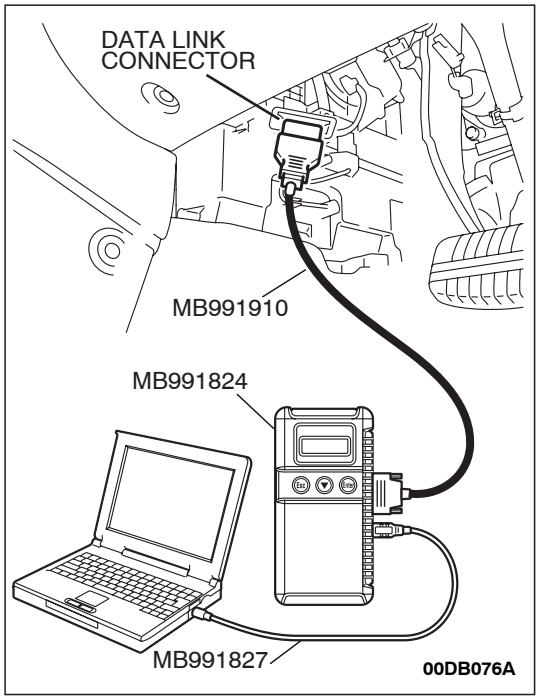
Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

STEP 1. Check that the Engine ECU communicates with the diagnostic tool.

Check if diagnostic tool MB991958I can communicate with the multi-centre display.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Check if diagnostic tool MB991958 can communicate with the Engine ECU.



Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Refer to GROUP 13A, MPI Diagnostic Trouble Code Chart P.13A-17.

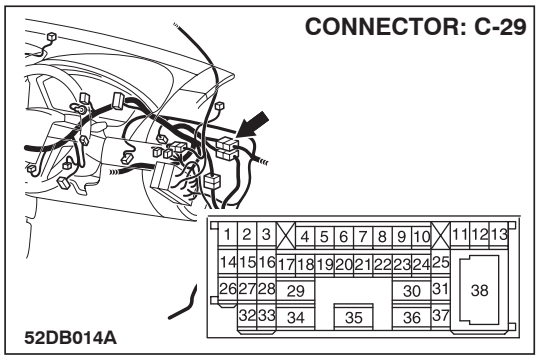
STEP 2. Using diagnostic tool MB991958, diagnose the CAN bus line

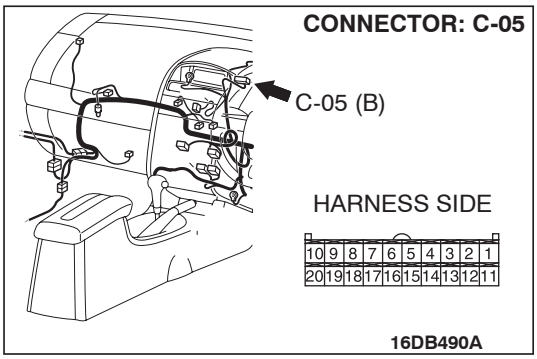
Use diagnostic tool MB991958 to diagnose the CAN bus lines.

Q: Is the check result satisfactory?

YES : Diagnose the power supply circuit. Refer to P.54A-72.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15).

INSPECTION PROCEDURE 2: The multi-centre display does not Show any Information.





CIRCUIT OPERATION

The multi-centre display unit is energized by the battery through the ignition switch (ACC) and (IG1).

TECHNICAL DESCRIPTION (COMMENT)

The ground circuit, the battery circuit, the ignition switch (ACC) circuit or the ignition switch (IG1) circuit is suspected to be open or defective.

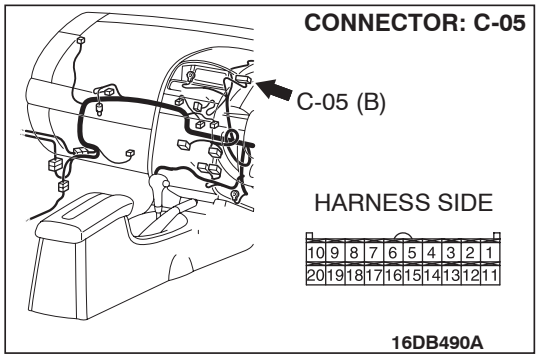
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of the multi-centre display unit
- Damaged wiring harness and connectors

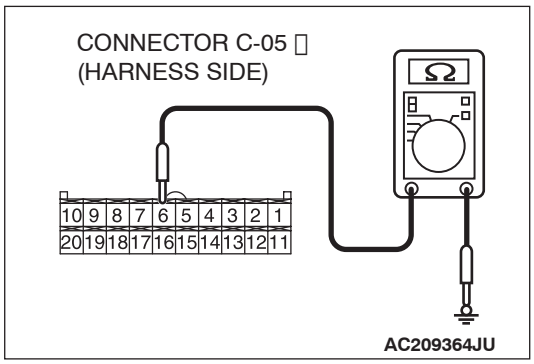
DIAGNOSIS

Required Special Tool:
- MB991223: Harness Set

STEP 1. Check the multi-centre display unit ground circuit. Measure the resistance at the multi-centre display unit connector C-05.



(1) Disconnect the multi-centre display unit connector C-05 and measure at the harness side.

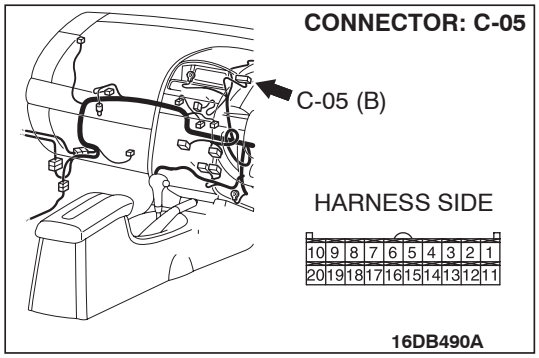


(2) Measure the resistance between terminal 6 and ground.
- The measured value should be 2 ohm or less.

Q: Does the measured resistance value correspond with this range?

YES : Go to Step 4.
NO : Go to Step 2.

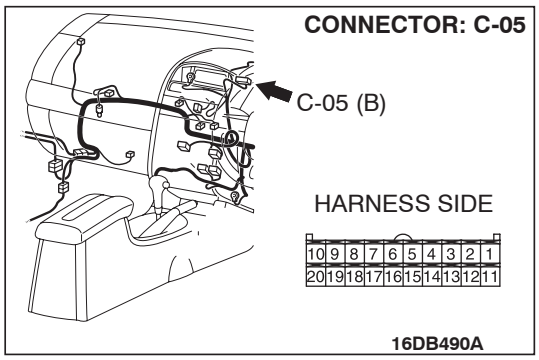
STEP 2. Check the multi-centre display unit connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.



Q: Is the multi-centre display unit connector C-05 in good condition?

YES : Go to Step 3.
NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

STEP 3. Check the wiring harness between multi-centre display unit connector C-05 (terminal 6) and ground.



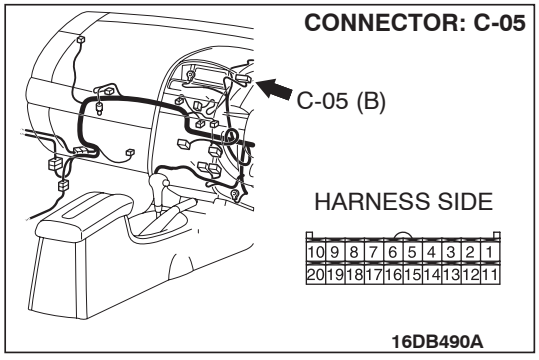
Q: Is the wiring harness between multi-centre display unit connector C-05 (terminal 6) and ground in good condition?

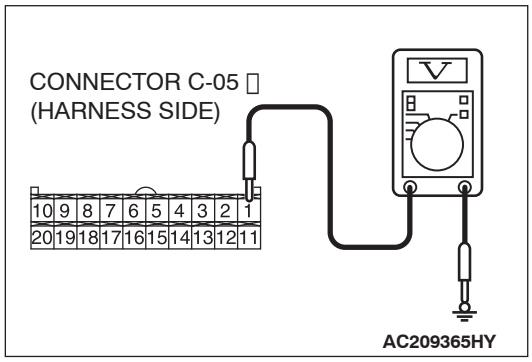
YES : There is no action to be taken.

NO : Repair the wiring harness. The multi-centre display unit should work normally.

STEP 4. Check the multi-centre display unit power supply circuit (battery). Measure the voltage at the multi-centre display unit connector C-05.

(1) Disconnect the multi-centre display unit connector C-05 and measure at the harness side.





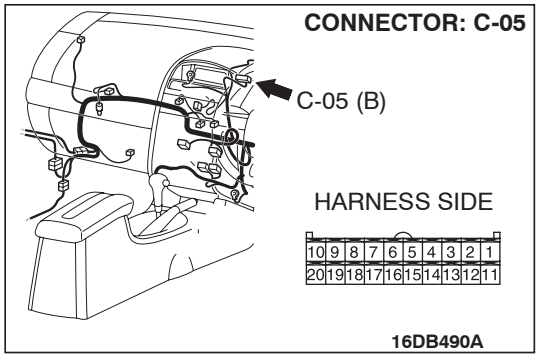
(2) Measure the voltage between terminal 1 and ground.
- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Go to Step 7.

NO : Go to Step 5.

STEP 5. Check multi-centre display unit connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

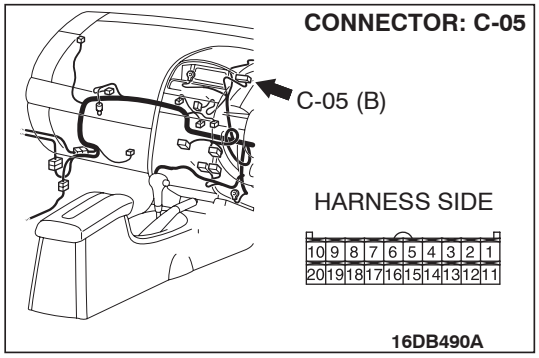


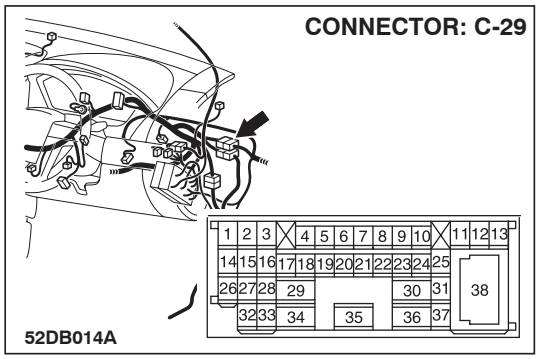
Q: Is multi-centre display unit connector C-05 in good condition?

YES : Go to Step 6.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The multi-centre display unit should work normally.

STEP 6. Check the wiring harness between C-05 (terminal 1) and battery.





NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between C-05 and battery in good condition?

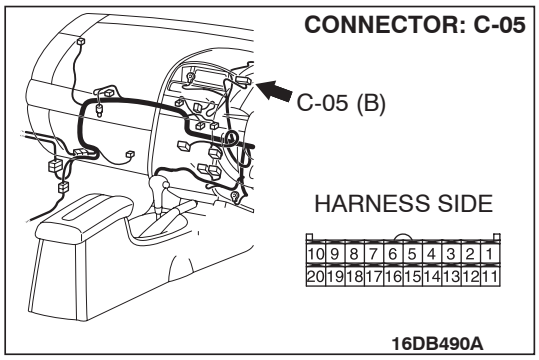
YES : There is no action to be taken.

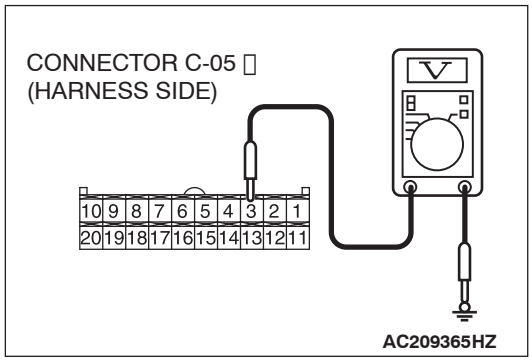
NO : Repair the wiring harness. The multi-centre display unit should work normally.

STEP 7. Check the multi-centre display unit power supply circuit [ignition switch (ACC)]. Measure the voltage at the multi-centre display unit connector C-05.

(1) Disconnect the multi-centre display unit connector C-05 and measure at the harness side.

(2) Turn the ignition switch to "ACC" position.





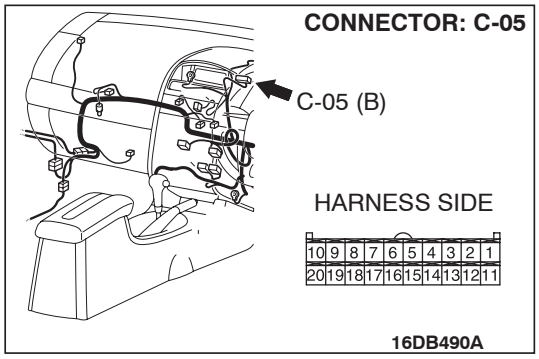
(3) Measure the voltage between terminal 3 and ground by backprobing.

- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Go to Step 10.

NO : Go to Step 8.

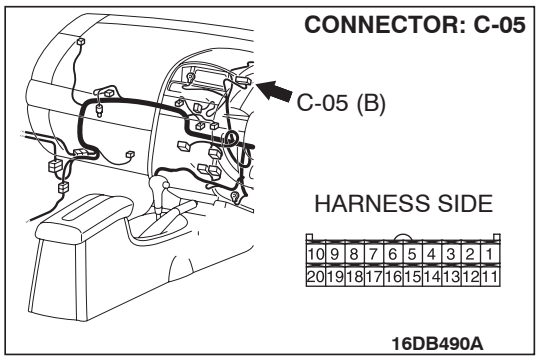


STEP 8. Check multi-centre display unit connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

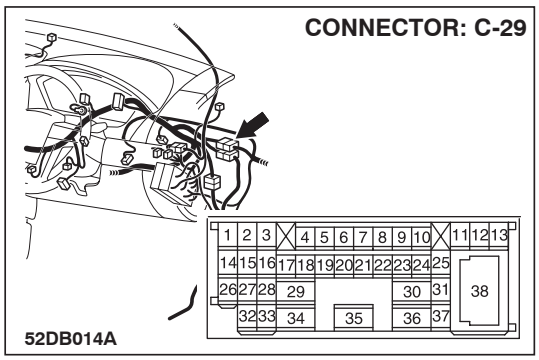
Q: Is multi-centre display unit connector C-05 in good condition?

YES : Go to Step 9.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The multi-centre display unit should work normally.



STEP 9. Check the wiring harness between C-05 (terminal 3) and ignition switch (ACC).



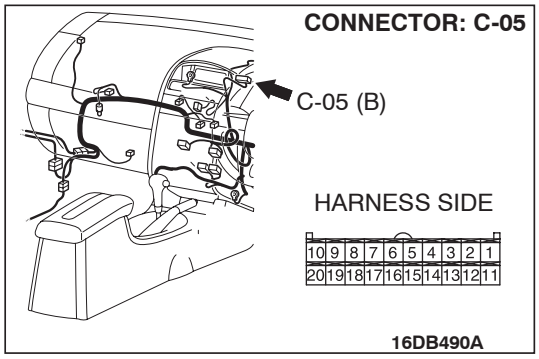
NOTE: Also check intermediate connector C-29 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If intermediate connector C-29 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

Q: Is the wiring harness between C-05 (terminal 3) and ignition switch (ACC) in good condition?

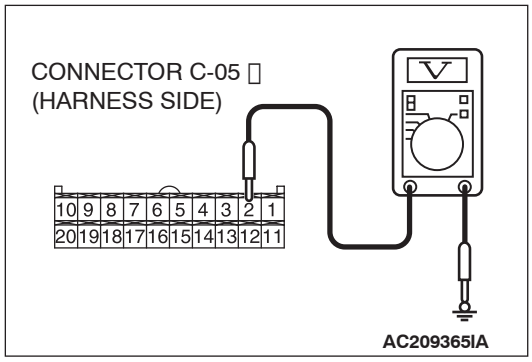
YES : There is no action to be taken.

NO : Repair the wiring harness. The multi-centre display unit should work normally.

STEP 10. Check the multi-centre display unit power supply circuit [ignition switch (IG1)]. Measure the voltage at the multi-centre display unit connector C-05.



(1) Disconnect the multi-centre display unit connector C-05 and measure at the harness side.
(2) Turn the ignition switch to "ON" position.



(3) Measure the voltage between terminal 2 and ground.
- The measured value should be approximately 12 volts (battery positive voltage).

Q: Does the measured voltage correspond with this range?

YES : Replace the multi-centre display unit . The multi-centre display unit should work normally.

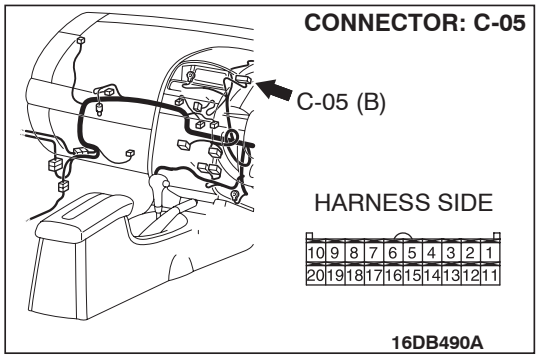
NO : Go to Step 11.

STEP 11. Check the multi-centre display unit connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

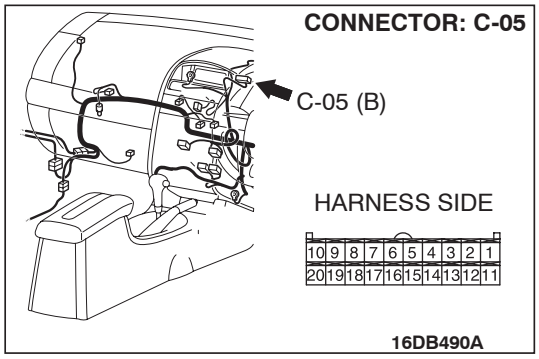
Q: Is multi-centre display unit connector C-05 in good condition?

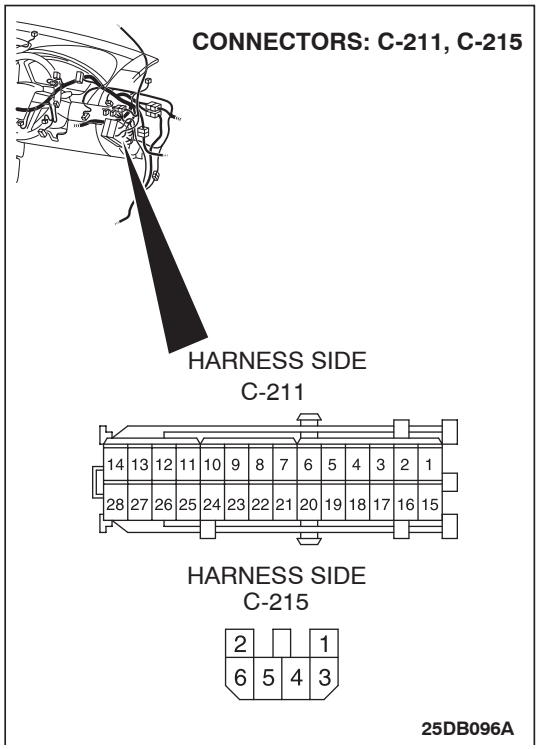
YES : Go to Step 12.

NO : Repair or replace the connector. Refer to GROUP 00E, Harness Connector Inspection P.00E-2. The multi-centre display unit should work normally.



STEP 12. Check the wiring harness between multi-centre display unit connector C-05 (terminal 2) and ignition switch (IG1).





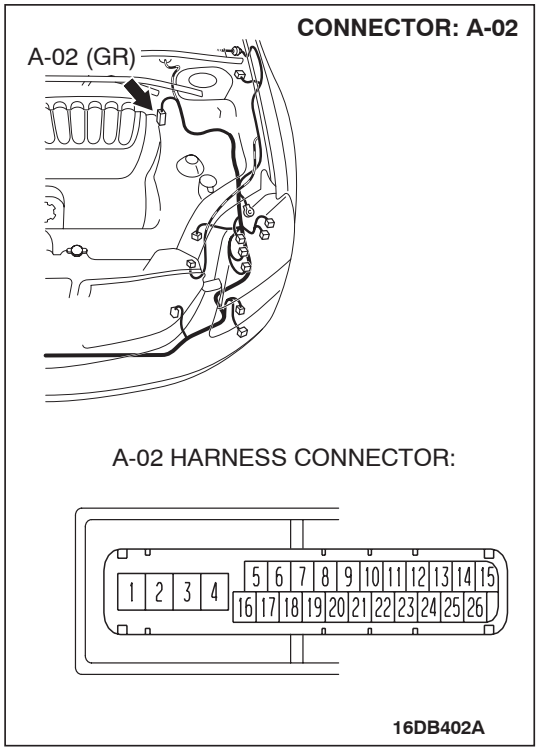
NOTE: Also check junction block connector C-211 and C-215 for loose, corroded, or damaged terminals, or terminals pushed back in the connector. If junction block connector C-211 or C-215 is damaged, repair or replace the wiring harness. Refer to GROUP 00E, Harness Connector Inspection P.00E-2.

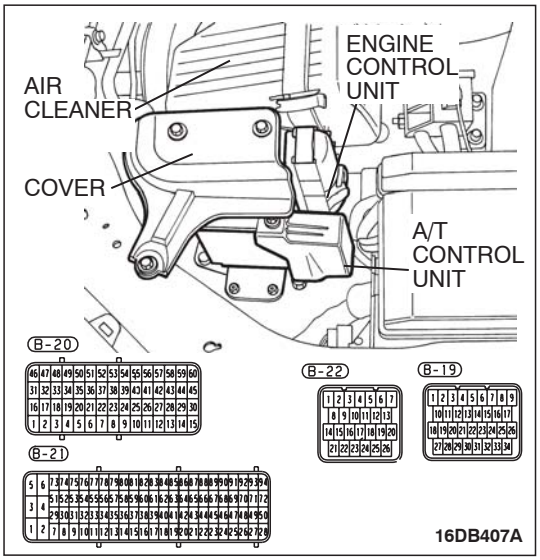
Q: Is the wiring harness between multi-centre display unit connector C-05 (terminal 2) and ignition switch (IG1) in good condition?

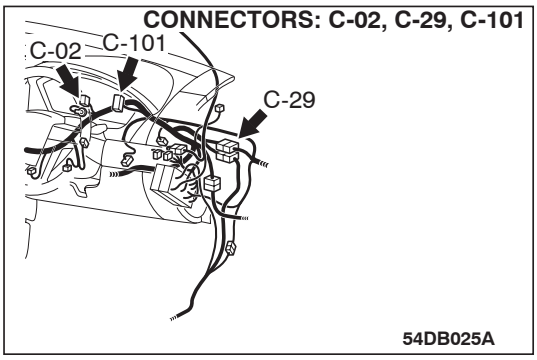
YES : The procedure is complete.

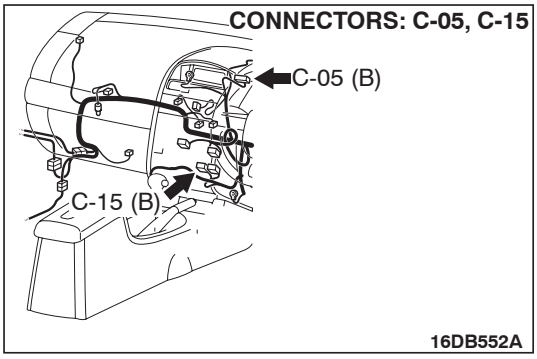
NO : Repair the wiring harness. The multi-centre display unit should work normally.

INSPECTION PROCEDURE 3: The A/C Display Shows "COMMUNICATION ERROR", and then can not Proceed to Next Screen.









CIRCUIT OPERATION

The multi-centre display unit receives information on current A/C operation condition from the A/C-ECU via CAN bus lines.

TECHNICAL DESCRIPTION (COMMENT)

The multi-centre display unit will show "COMMUNICATION ERROR" message if it has received abnormal data from the A/C-ECU via CAN communication for 60 seconds or more. Then the A/C operation screen, which is based on the last normal information, continues to be shown. If the communication returns to normal, "COMMUNICATION ERROR" message will disappear and the A/C operation screen will return to normal.

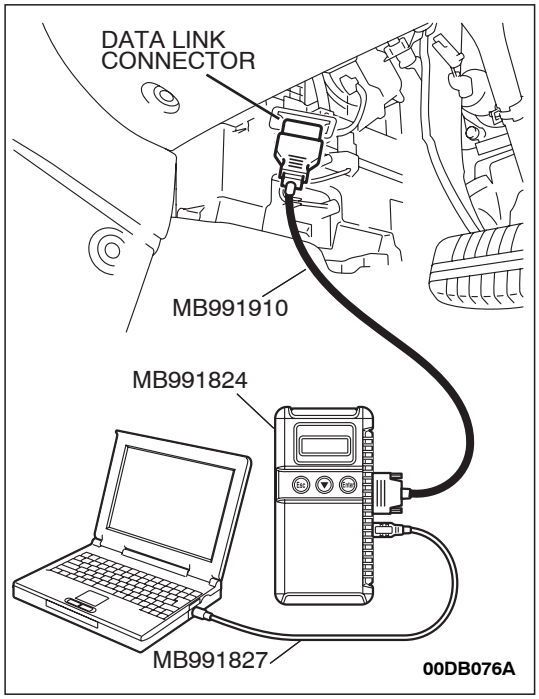
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of multi-centre display unit
- Malfunction of A/C-ECU
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)



STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). After diagnosing the CAN bus lines, go to Step 3.

STEP 2. Using diagnostic tool MB991958, read A/C diagnostic trouble code.

Check if an A/C system DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 55A, Auto A/C Diagnostic Trouble Code Chart P.55-9 and then go to Step 3 .

NO : Replace multi-centre display unit and then go to Step 3.

STEP 3. Retest the system

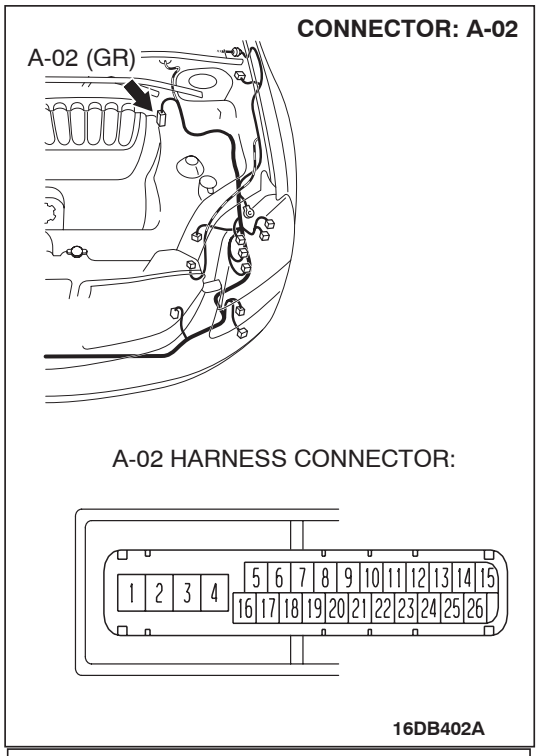
Check if the A/C operation screen is displayed normally.

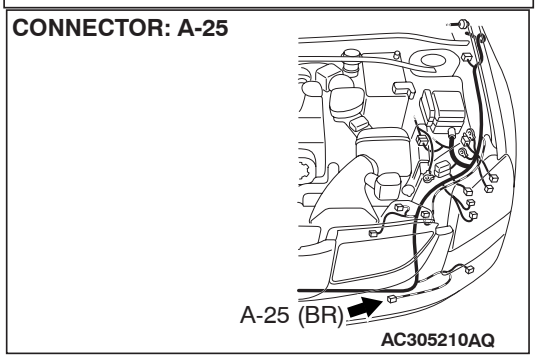
Q: Is the check result satisfactory?

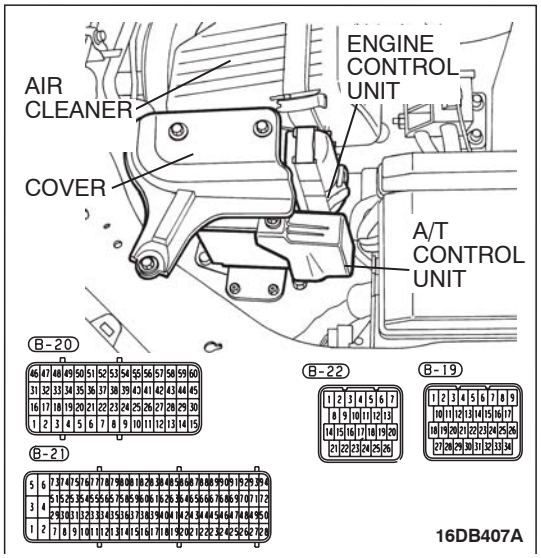
YES : The procedure is complete.

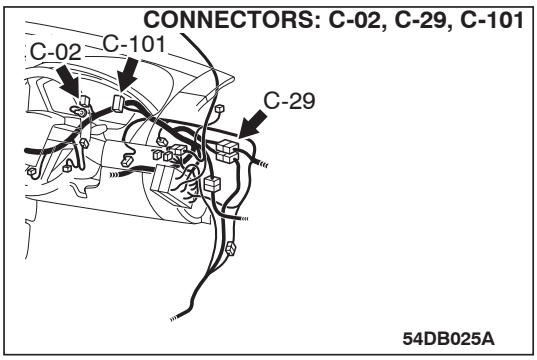
NO : Go to Step 1.

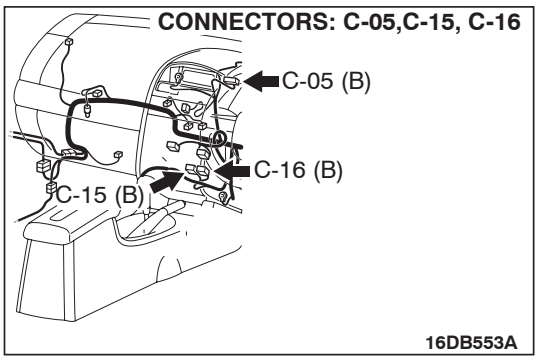
INSPECTION PROCEDURE 4: The Ambient Air Temperature Display Shows "COM ERROR" or "−−deg°C"











CIRCUIT OPERATION

The A/C-ECU receives information on ambient air temperature from the ambient air temperature sensor. Then the information is sent to the multi-centre display unit via CAN communication.

TECHNICAL DESCRIPTION (COMMENT)

If the A/C-ECU has not informed an ambient air temperature via the CAN communication for 60 seconds or more, "COM ERROR" appears on the screen. If the multi-centre display unit can not receive correct information from the ambient air temperature sensor at all, "––°C" will be shown.

TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of multi-centre display unit
- Malfunction of A/C-ECU
- Malfunction of Ambient air temperature sensor.
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991958: Diagnostic Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness A (Vehicles with CAN communication system)

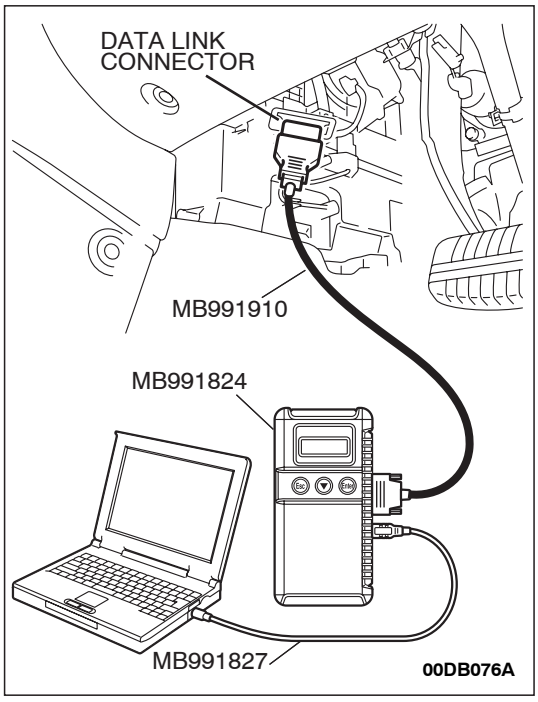
STEP 1. Using diagnostic tool MB991958, diagnose the CAN bus line

Use diagnostic tool MB991958 to diagnose the CAN bus lines.

(1) Connect diagnostic tool MB991958 to the data link connector.
(2) Turn the ignition switch to "ON" position.
(3) Diagnose the CAN bus line.

Q: Is the check result satisfactory?

YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis-Can Bus Diagnostic Chart P.54C-15). After diagnosing the CAN bus lines, go to Step 3.



STEP 2. Using diagnostic tool MB991958, read A/C diagnostic trouble code.

Check if an A/C system DTC is set.

Q: Is the DTC set?

YES : Refer to GROUP 55A, Auto A/C Diagnostic Trouble Code Chart P.55-9 and then go to Step 3 .
NO : Replace multi-centre display unit and then go to Step 3.

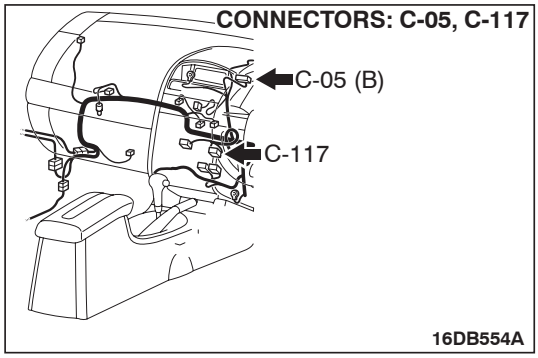
STEP 3. Retest the system

Check if the ambient air temperature operation screen is displayed normally.

Q: Is the check result satisfactory?

YES : The procedure is complete.
NO : Go to Step 1.

INSPECTION PROCEDURE 5: On the Audio Screen, "COMMUNICATION ERROR" can not Proceed to Next Screen.



CIRCUIT OPERATION

The multi-centre display unit receives information from the radio, CD player and CD changer via M bus communication to display the audio system operation condition.

TECHNICAL DESCRIPTION (COMMENT)

The audio system operation screen will be frozen if the multi-centre display have received abnormal data from the radio, CD player and CD changer via M-bus communication within 30 seconds. If the abnormal data is received further 30 seconds from that point, a message "COMMUNICATION ERROR" will be displayed.

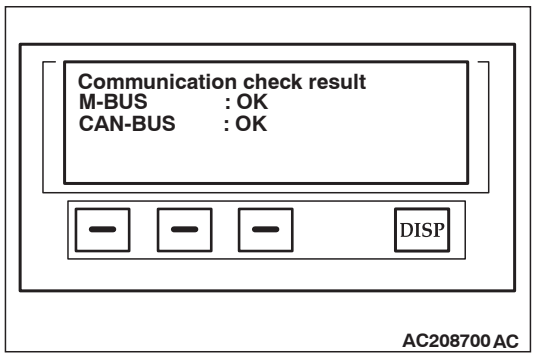
TROUBLESHOOTING HINTS

- Refer to circuit diagrams GROUP-90
- Refer to configuration diagrams GROUP-80
- Malfunction of multi-centre display unit
- Malfunction of radio, CD player and CD changer
- The wiring harness or connectors may have loose, corroded, or damaged terminals, or terminals pushed back in the connector.

DIAGNOSIS

Required Special Tools:

- MB991223: Harness Set

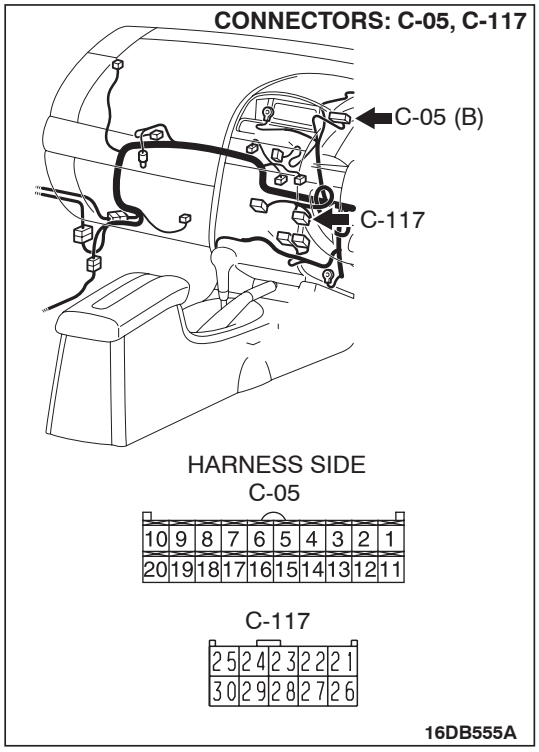


STEP 1. Check the communication condition by self-diagnostic function.

1.Start up the service mode to check the communication condition (Refer to P.54A-246).

Q: Is "NG" displayed as the check results for M-bus communication?

YES : Go to Step 2.
NO : Go to Step 4.

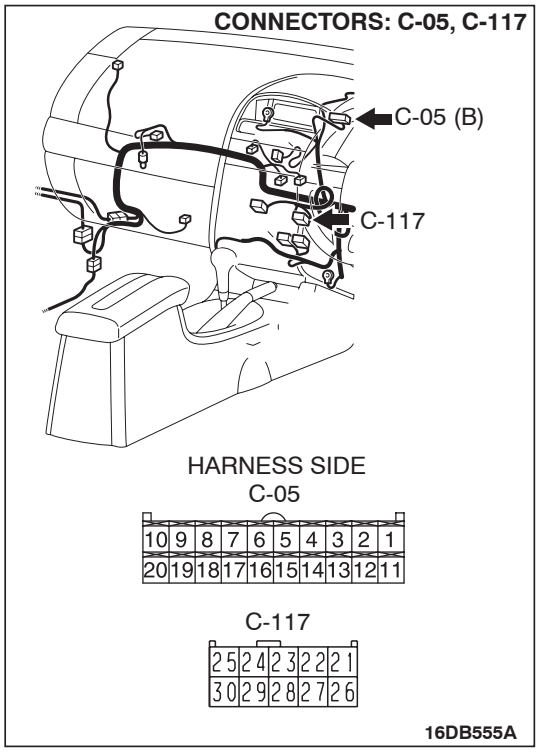


STEP 2. Check radio, CD player and CD changer connector C-117 and multi-centre display unit connector C-05 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Is radio, CD player and CD changer connector C-117 and multi-centre display unit connector C-05 in good condition?

YES : Go to Step 3.

NO : Repair or replace the component(s). Refer to GROUP 00E, Harness Connector Inspection P.00E-2. Then go to step 1.

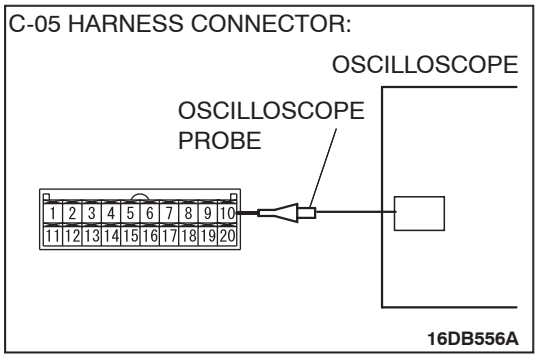


STEP 3. Check the wiring harness between radio, CD player and CD changer connector C-117 (terminal 46, 42, 41 and 47) and multi-centre display unit connector C-05 (terminal 7, 8, 9 and 10).

Q: Is the wiring harness between radio, CD player and CD changer connector C-117 (terminal 26, 22, 21 and 27) and multi-centre display unit connector C-05 (terminal 7, 9, 8 and 10) in good condition?

YES : Go to Step 4.

NO : Repair the wiring harness and then go to step 1.



STEP 4.Using the oscilloscope, check the M BUS line.

(1) Connect the multi-centre display unit connector C-05 and radio, CD player and CD changer connector C-117.
(2) Connect the oscilloscope probe to terminal 10 of the multi-centre display unit connector by backprobing.
(3) Turn the ignition switch to “ACC” position.
(4) Operate each of the radio, CD player and CD changer switches.

Q: Is a wave pattern displayed?

YES : Intermittent malfunction (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent malfunction P.00-14.
NO : Replace multi-centre display unit and then go to Step 6.

STEP 5. Retest the system

Confirm that the audio operation screen is displayed normally.

Q: Is the check result satisfactory?

YES : The procedure is complete.
NO : Replace radio, CD player and CD changer and then go to step 6.

STEP 6. Retest the system

Confirm that the audio operation screen is displayed normally.

Q: Is the check result satisfactory?

YES : The procedure is complete.
NO : Go to step 1.

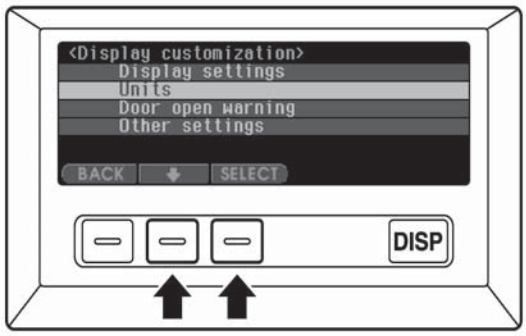
ON-VEHICLE SERVICE

AMBIENT AIR TEMPERATURE UNIT CUSTOMIZATION

M1543017800020

When you press the function button switch on the multi-centre display, the measurement unit, which is used for the ambient air temperature display, can be changed from centigrade to Fahrenheit, or vice versa.

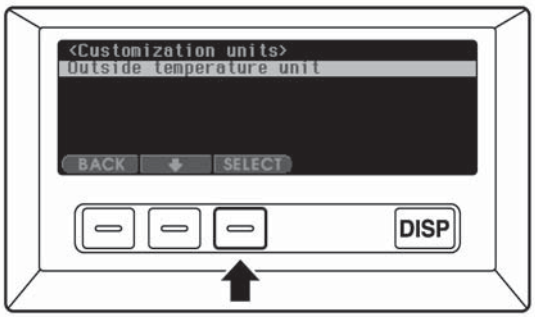
1. Call up "Display customization" screen, and choose "Units" by pressing function button switch 2. Then press function button switch 3 (SELECT).



16DB557A

2. Ensure that "Outside temperature unit" is chosen from the "Customization units" screen, and then press function button switch 3 (SELECT).
3. By pressing the function button switch 2, you can select the unit you wish (°C to °F). Then press function button switch 3 (SELECT).

NOTE: If you reconnect the battery cables, the display returns to the default unit (°C).



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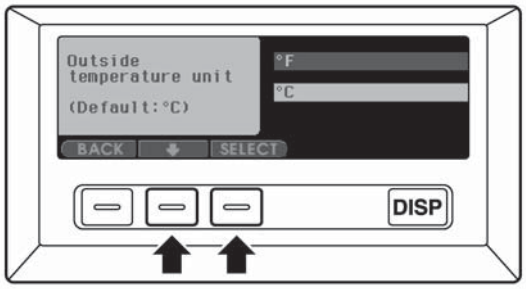

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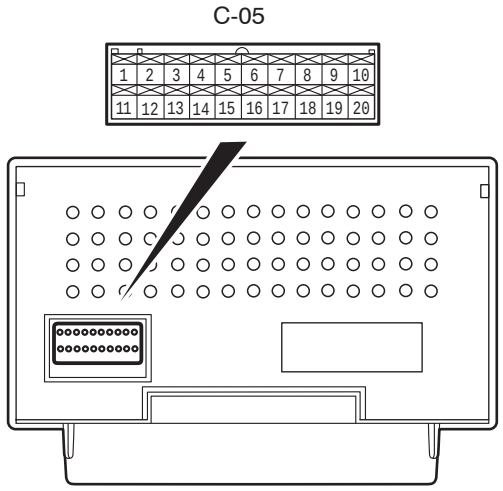
CHECK AT MULTI-CENTRE DISPLAY UNIT TERMINAL

M1543007600519

<MULTI-CENTRE DISPLAY>

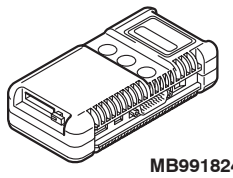
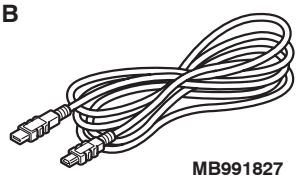
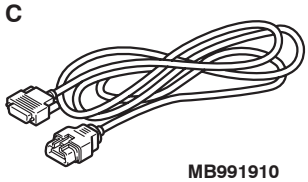
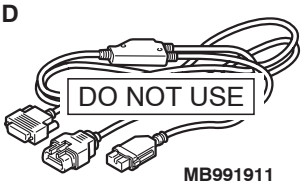
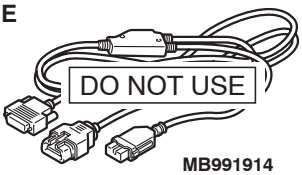
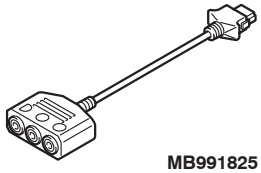
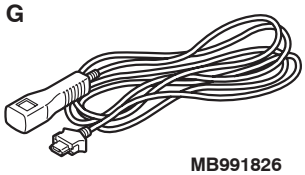


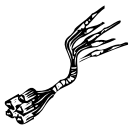
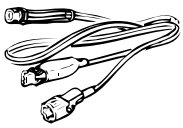
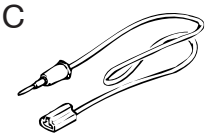
TERMINAL NO.	INPUT/ OUTPUT	SIGNAL SYMBOL	TERMINAL VOLTAGE (V)	HARNESS DISCREPANCY		FAILURE SYMPTOM DUE TO HARNESS DISCREPANCY
1	Input	Battery (Battery power supply)	Battery positive voltage	Open circuit	–	Screen is not displayed. All operations are not possible.
				–	Short circuit	Fuse is blown.
2	Input	Ignition switch (IG1)	Battery positive voltage	Open circuit	–	Screen is not displayed. All operations are not possible.
				–	Short circuit	Fuse is blown.
3	Input	Ignition switch (ACC)	Battery positive voltage	Open circuit	–	Screen is not displayed. All operations are not possible.
				–	Short circuit	Fuse is blown.
4	Input	ILL + (lighting switch)	Hi: Battery positive voltage Lo: 0 – 1	Open circuit	Short circuit	Not lighted.
5	Output	ILL - (illumination light control signal)	0.4	Open circuit	Short circuit	display brightness control is not possible.
6	–	GND	0	Open circuit	–	Screen is not displayed.
7	Input/output	SB3	–	–	–	–
8	Input/output	M-DATA (Audio)(M-BUS data signal)	• Hi: 4 – 5 • Lo: 0 – 1	Open circuit	Short circuit	Multi-centre display • Frozen screen (screen does not change) • "Communication Error" indication

TERMINAL NO.	INPUT/ OUTPUT	SIGNAL SYMBOL	TERMINAL VOLTAGE (V)	HARNESS DISCREPANCY		FAILURE SYMPTOM DUE TO HARNESS DISCREPANCY
9	Input/output	M-CLOCK (A/C) (M-BUS clock signal)	• Hi: 4 – 5 • Lo: 0 – 1	Open circuit	Short circuit	Multi-centre display • Frozen screen (screen does not change) • "Communication Error" indication
10	Input/output	M-BUSY (Audio)	• Hi: 5 • Lo: 0 – 1	Open circuit	Short circuit	Multi-centre display • Frozen screen (screen does not change) • "Communication Error" indication
11	No connection					
14 – 20	No connection					

SPECIAL TOOLS

M1543000601782

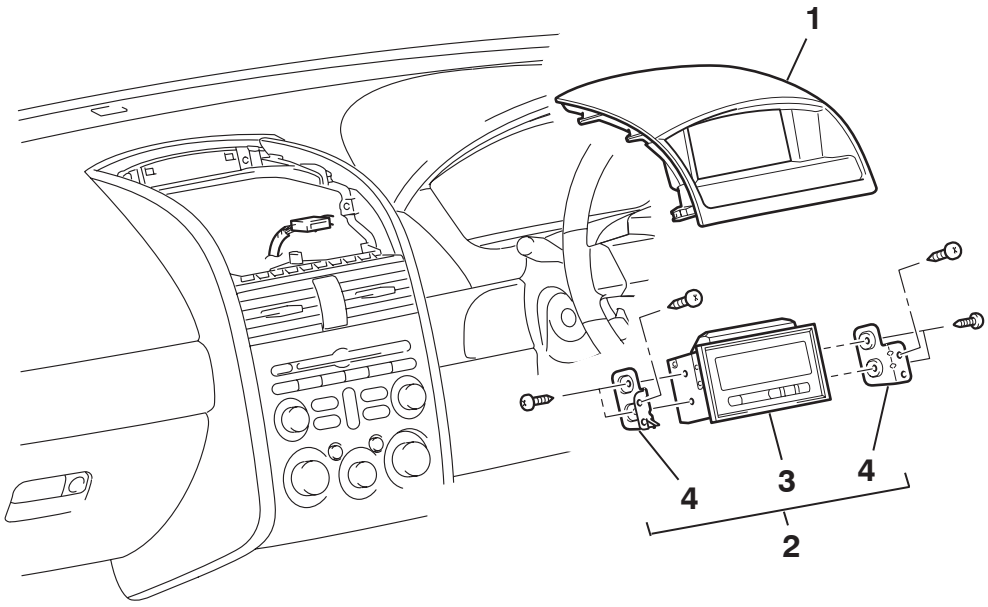
TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for daimler chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness	MB991824-KIT *NOTE: G: MB991826 MUT-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.*	Reading diagnostic trouble code **⚠ CAUTION** **MUT-III main harness A (MB991910) should be used. MUT-III main harness B and C should not be used for this vehicle.**

TOOL	TOOL NUMBER AND NAME	REPLACED BY MILLER TOOL NUMBER	APPLICATION
A  B  C  D MB991223AF	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	General service tool (jumper)	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

MULTI-CENTER DISPLAY

REMOVAL AND INSTALLATION

M1543013600121



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REMOVAL STEPS

1. CONSOLE METER HOOD (REFER TO GROUP 52A, INSTRUMENT PANEL ASSEMBLY P.52A-4.)
2. MULTI-CENTER DISPLAY ASSEMBLY

REMOVAL STEPS (Continued)

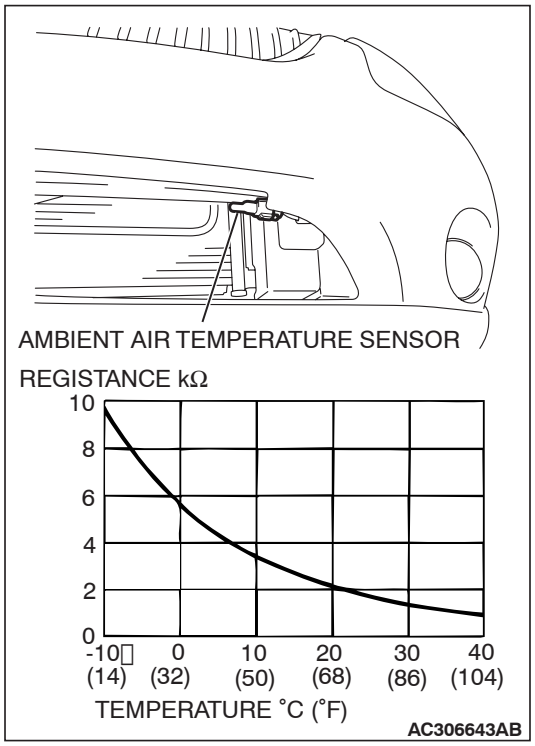
3. MULTI-CENTER DISPLAY
4. MULTI-CENTER DISPLAY BRACKET

AMBIENT TEMPERATURE SENSOR

INSPECTION

M1543019502623

AMBIENT AIR TEMPERATURE SENSOR CHECK



The ambient air temperature sensor should be checked in situ. Once the sensor is removed, it is rendered unserviceable. Measure the resistance between the sensor terminals under at least two temperatures. The resistance values should meet the values shown.

NOTE: The temperature should be within the shown range.

PANIC ALARM

REMOVAL AND INSTALLATION

M1547002600011

Panic alarm system component parts

- Head light assembly (refer to P.54A-153).
- Horn (refer to P.54A-172).

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1541001600076

ITEM	SPECIFICATION
Air bag module torx screw	9.0 ± 2.0N·m (80 ± 17 in-lb)
Antenna amplifier mounting bolts	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Choke coil mounting bolts	9.0 ± 2.0 N·m (80 ± 17 in-lb)
Clock spring and column swith assembly mounting screw	2.5 ± 0.5 N·m (23 ± 4 in-lb)
Fog light assembly mounting screw	2.5 ± 0.3 N·m (22 ± 3 ft-lb)
Headlamp assembly mounting bolts	4.9 ± 0.7 N·m (44 ± 6 in-lb)
Headlamp assembly mounting screw	1.5 ± 0.2 N·m (14 ± 1 in-lb)
High-mounted stoplight mounting bolts or nuts	4.9 ± 0.7 N·m (44 ± 6 in-lb)
Hole cover mounting screw	1.5 ± 0.5 N·m (14 ± 0.5 in-lb)
Horn monting bolts	21 ± 4 N·m (16 ± 2 in-lb)
ETACS-ECU mounting nut	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Key ring antenna mounting screw	2.0 ± 1.0 N·m (18 ± 9 in-lb)
Rear combination light mounting nut	4.9 ± 0.7 N·m (44 ± 6 in-lb)
Rear speaker mounting screw	1.5 ± 0.5 N·m (14 ± 4 in-lb)
Steering wheel mounting nuts	41 ± 8 N·m (30 ± 6 ft-lb)

SERVICE SPECIFICATIONS

M1541000300210

<BATTERY>

ITEM	STANDARD VALUE
Specific gravity of battery electrolyte [at 20°C (68°F)]	1.220 – 1.290

<COMBINATION METER>

ITEM			TOLERANCE VALUE
Speedometer indication error (km/h)		0	±1°
		20	0 to +4
		40	0 to +4
		80	+0.5 to +7.5
		120	+1.5 to +7.5
		160	+2.5 to +9.5
		200	+3.5 to +11.5
Tachometer indication error r/min		0	± 1°
		1,000	1,000 ± 100
		2,000	2,000 ± 100
		3,000	3,000 ± 100
		4,000	4,000 ± 100
		5,000	5,000 ± 100
		6,000	6,000 ± 100
		7,600	7,600 ± 100
Fuel level sensor resistance Ω	Fuel level sensor (main)	Point "F" (highest)	6.5 ± 1.0
		Point "E" (lowest)	45.1 ± 1.0
	Fuel level sensor (sub)	Point "F" (highest)	6.5 ± 1.0
		Point "E" (lowest)	74.9 ± 1.0
Fuel level sensor float height mm (in)	Fuel level sensor (main)	A at point "F"	132.8 ± 3.0
		B at point "E"	36 ± 3.0
	Fuel level sensor (sub)	A at point "F"	24.9 ± 3.0
		B at point "E"	172.7 ± 3.0