CHASSIS ELECTRICAL

CONTENTS

54109000211

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

WARNING!

(1) 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).

(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(3) 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-ECU, SRS warning lamp, air bag module, clock spring, side impact sensors 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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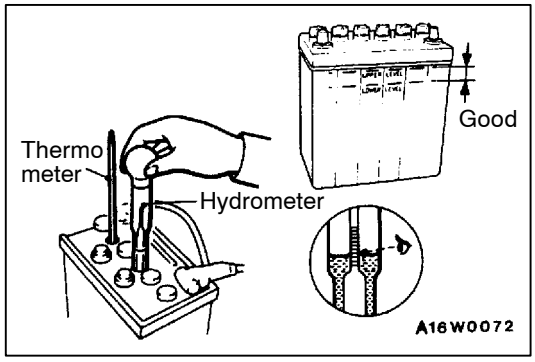
BATTERY

54100030028

SERVICE SPECIFICATION

Item	Specification
Specific gravity of the battery fluid	1.220 - 1.290 [20°C]



ON-VEHICLE SERVICE

54100090026

FLUID LEVEL AND SPECIFIC GRAVITY CHECK

1. Inspect whether or not the battery fluid is between the UPPER LEVEL and LOWER LEVEL marks.
2. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.

   Standard value: 1.220 - 1.290 [20°C]

   The specific gravity of the battery fluid varies with the temperature, so use the following formula to calculate the specific gravity for 20°C. Use the calculated value to determine whether or not the specific gravity is satisfactory.

   D20=Dt+0.0007 (t - 20)

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

   Dt: Actually measured specific gravity

   t: Actually measured temperature

CHARGING

54100110029

1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.
2. The current normally used for charging a battery should be approximately 1/10th of the battery capacity.
3. When performing a quick-charging due to lack of time, etc., the charging current should never exceed the battery capacity as indicated in amperes.
4. Determining if charging is completed.
   (1) If the specific gravity of the battery fluid reaches 1.250 - 1.290 and remains constant for at least one hour.
   (2) If the voltage of each cell reaches 2.5 - 2.8 V and remains constant for at least one hour.

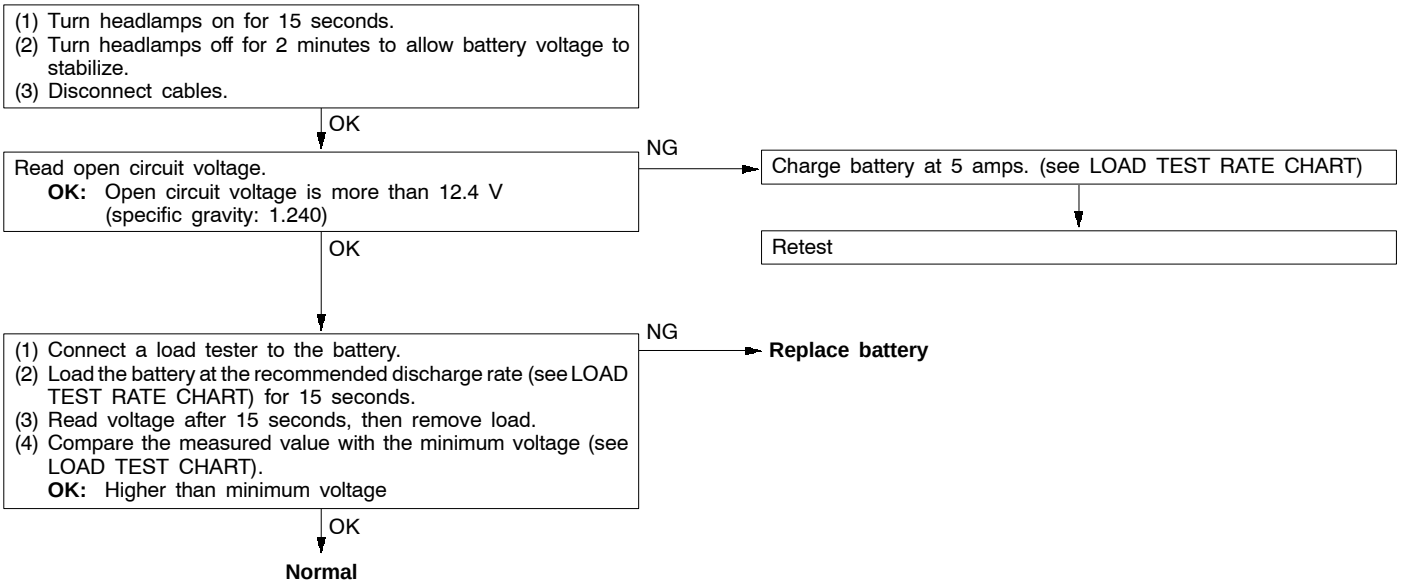
Caution

1. Be careful since the battery fluid level may rise during charging.
2. Keep all sources of fire away while charging because there is a danger of explosion.
3. Be careful not to do anything that could generate sparks while charging.
4. When charging is completed, replace the battery caps, pour clean water over the battery to remove any sulfuric acid and dry.

BATTERY TESTING PROCEDURE

54100120176

TEST STEP



LOAD TEST RATE CHART

Battery type	75D26L	95D31L
Charging time when fully discharged h [5-amp rated current charging]	11	14
Load test (Amps)	260	310

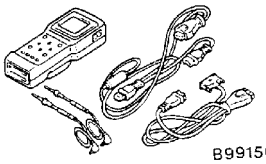
LOAD TEST CHART

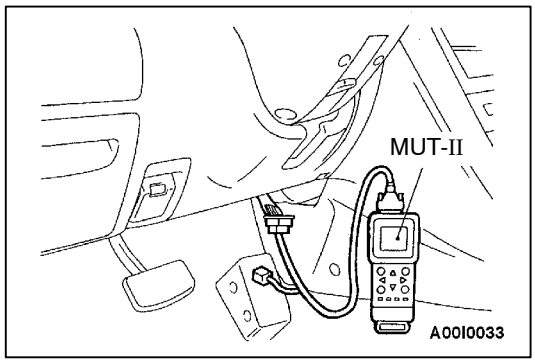
Temperature °C	21 and above	16	10	4	-1	-7	-12	-18
Minimum voltage V	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

IGNITION SWITCH, ETACS-ECU AND IMMOBILIZER SYSTEM

54300060092

SPECIAL TOOL

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	• Immobilizer system check (Diagnosis display using the MUT-II) • Registration of the ID code • ETACS-ECU input signal checking



TROUBLESHOOTING

54300070477

IGNITION SWITCH

DIAGNOSIS FUNCTION

INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

1. Connect the MUT-II to the diagnosis connector.
2. If buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible.	Communication with all systems is not possible.	1	54-8
	Communication with the one-shot pulse input signal only is not possible.	2	54-8
While key hole illumination lamp is illuminated, ignition key is turned to the ON position but key hole illumination lamp does not switch off. (However, it switch off after 10 seconds.)		3	54-8
Key hole illumination lamp remains illuminated.		4	54-9
Even if driver's side door is opened, key hole illumination lamp does not illuminate.		5	54-9

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

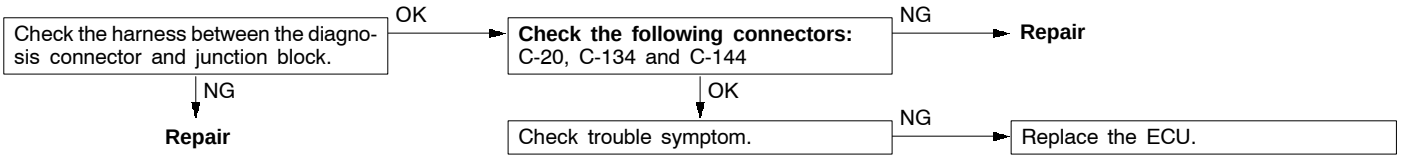
INSPECTION PROCEDURE 1

Communication with MUT-II is not possible. (Communication with all systems is not possible.)	Probable cause
The cause is probably a defect in the power supply system (including earth) for the diagnosis line.	• Malfunction of connector • Malfunction of harness wire

Refer to GROUP 13A - Troubleshooting.

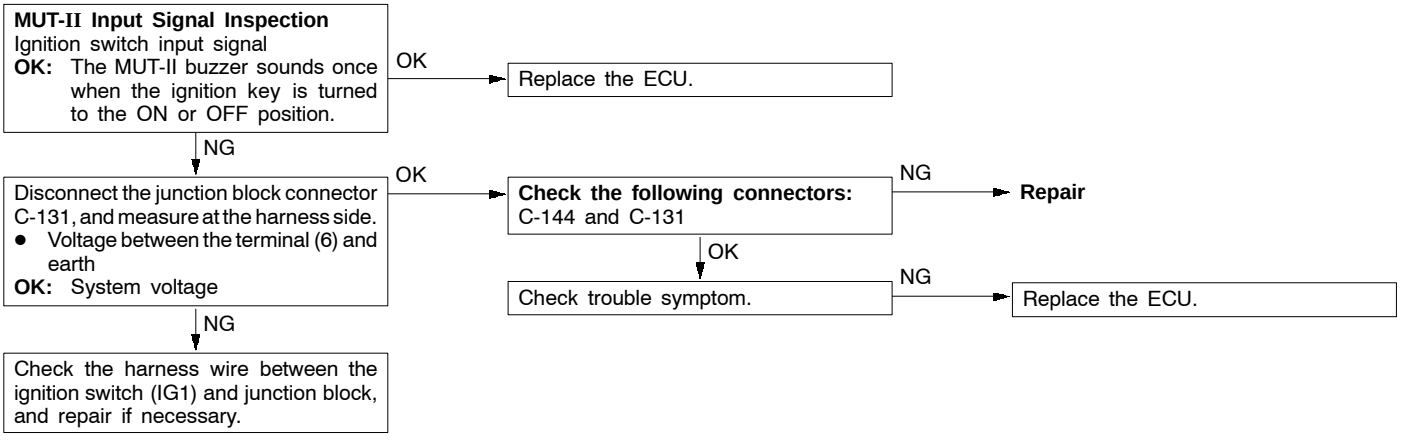
INSPECTION PROCEDURE 2

Communication with MUT-II is not possible. (Communication with the one-shot pulse input signal only is not possible.)	Probable cause
The cause is probably a defective one-shot pulse input signal circuit system of the diagnosis line.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



INSPECTION PROCEDURE 3

While key hole illumination lamp is illuminated, ignition key is turned to the ON position but key hole illumination lamp does not switch off. (However, it switch off after 10 seconds.)	Probable cause
The cause is probably a defective ignition switch input circuit or a defective ECU.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



INSPECTION PROCEDURE 4

Key hole illumination lamp remains illuminated.	Probable cause
The cause is probably a harness short or a defective ECU.	• Malfunction of harness wire • Malfunction of ECU

When the connector C-134 of the junction block (1) is disconnected, does the lamp switch off?
- NO → Check the harness wire between the key reminder switch and junction block, and repair if necessary.
- YES → Replace the ECU.

INSPECTION PROCEDURE 5

Even if driver's side door is opened, key hole illumination lamp does not illuminate.	Probable cause
The cause is probably a defective key hole illumination lamp circuit system or a defective driver's side door switch input circuit system.	• Malfunction of driver's side door switch • Malfunction of bulb • Malfunction of connector • Malfunction of harness wire • Malfunction of ECU

MUT-II Input Signal Inspection
Driver's side door switch input signal
OK: The MUT-II buzzer sounds once when the driver's side door switch is ON.
- NG → Driver's side door switch input circuit system inspection (Refer to Inspection Procedure 6 on P.54-10.)
- OK ↓

Key hole illumination lamp inspection
- NG → **Replace**
- OK ↓

Disconnect the key reminder switch connector C-109, and measure at the harness side.
- Voltage between the terminal (2) and earth

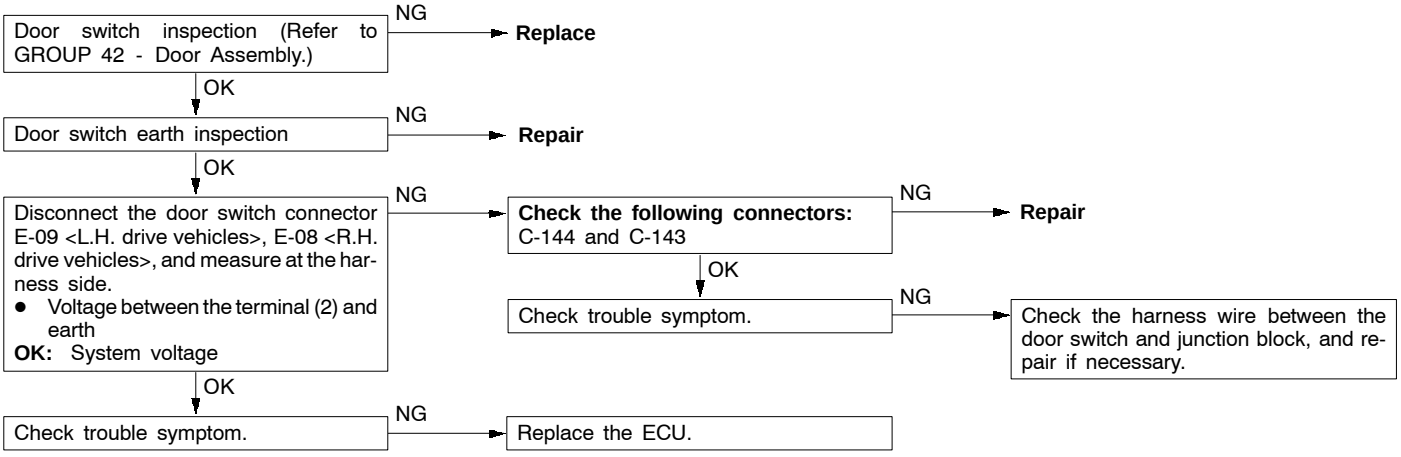
OK: System voltage
- NG → **Check the following connectors:** L.H. drive vehicles: C-66, C-63, C-132, C-141; R.H. drive vehicles: C-62, C-14
  - NG → **Repair**
  - OK ↓ Check trouble symptom.
    - NG → Check the harness wire between the key reminder switch and junction block, and repair if necessary.
      - NG → **Repair**
      - OK ↓ Replace the ECU.
- OK ↓

Check the following connectors: C-109, C-134 and C-144
- NG → **Repair**
- OK ↓

Check trouble symptom.
- NG → Check the harness wire between the key reminder switch and junction block, and repair if necessary.

INSPECTION PROCEDURE 6

Driver's side door switch input circuit system inspection



IMMOBILIZER SYSTEM

Caution
The ID code should always be re-registered when replacing the immobilizer-ECU.

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING

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

DIAGNOSIS FUNCTION

DIAGNOSIS CODES CHECK

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

ERASING DIAGNOSIS CODES

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

Caution
The diagnosis codes which result from disconnecting the battery cables cannot be erased.

INSPECTION CHART FOR DIAGNOSIS CODES

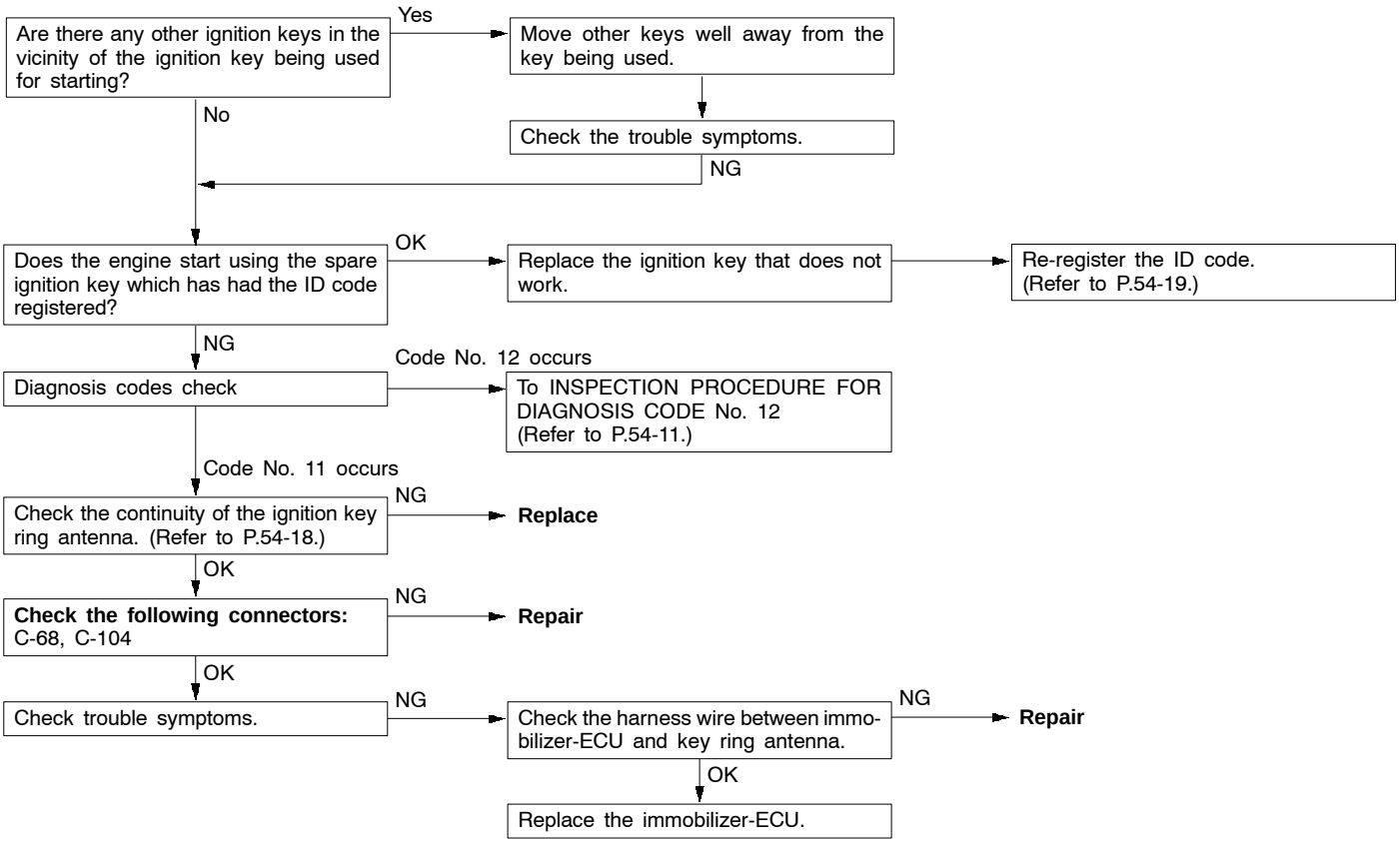
54300710065

Diagnosis code No.	Inspection items	Reference page
11*	Transponder communication system	54-11
12*	ID code are not the same or are not registered	54-11
21	Communication system between immobilizer-ECU and engine-ECU	54-12
31	EEPROM abnormality inside immobilizer-ECU	54-12
32	Ignition switch IG signal circuit system	54-12
33*	Starting prevention system activated due to incorrect operation.	54-13

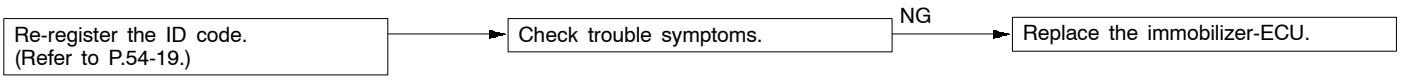
NOTE
*: Diagnosis code No. 11, No. 12 and No.33 are not recorded.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

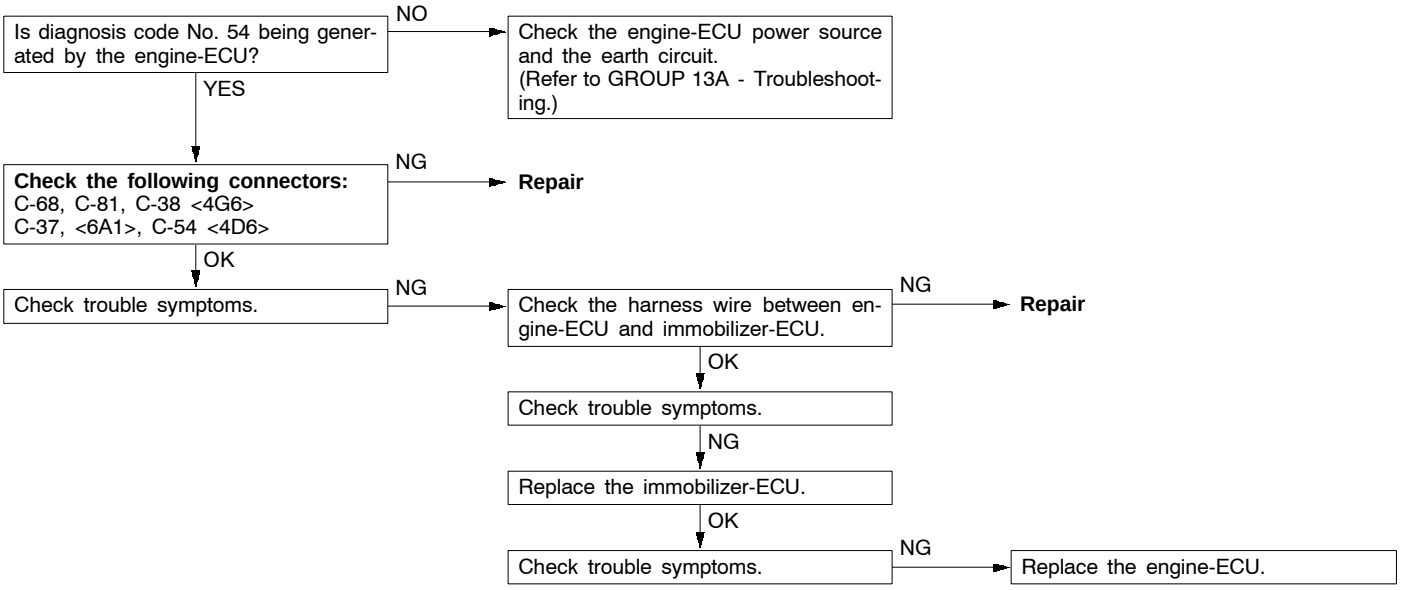
Code No. 11 Transponder communication system	Probable cause
The ID code of the transponder is not sent to the immobilizer-ECU immediately after the ignition switch is turned to the ON position. If the engine is started while several ignition keys are in the vicinity, then interference between the different keys may occur, which will cause this code to be generated.	• Radio interference of ID codes • Malfunction of the transponder • Malfunction of the ignition key ring antenna • Malfunction of harness or connector • Malfunction of the immobilizer-ECU



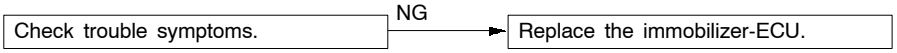
Code No. 12 ID code are not the same or are not registered	Probable cause
The ID code which is sent from the transponder is not the same as the ID code which is registered in the immobilizer-ECU.	• The ID code in the ignition key being used has not been properly registered. • Malfunction of the immobilizer-ECU



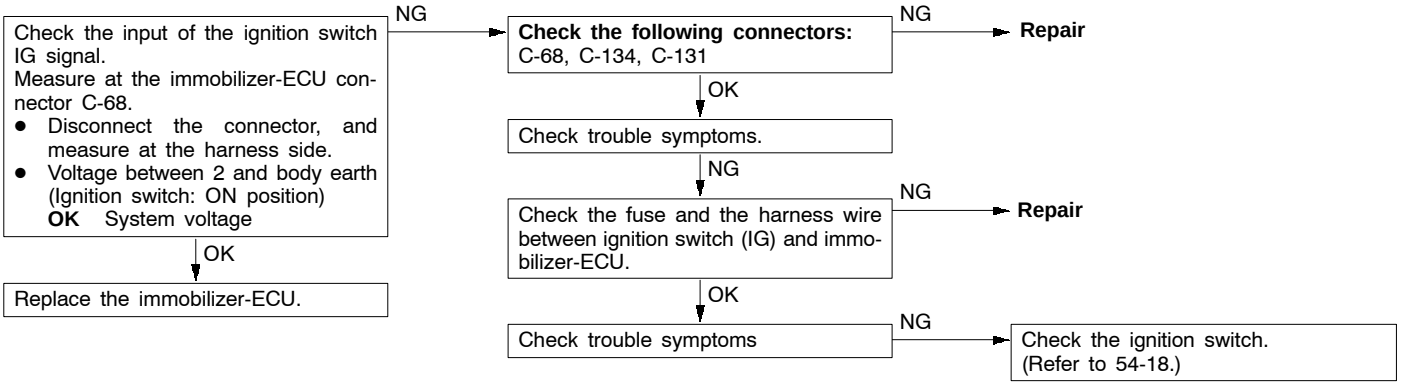
Code No.21 Communication system between immobilizer-ECU and engine-ECU	Probable cause
After the ignition switch is turned to the ON position, the confirmation code is not received from the engine-ECU within the allowable time, or an abnormal code is received.	• Malfunction of harness or connector • Malfunction of the engine-ECU • Malfunction of the immobilizer-ECU



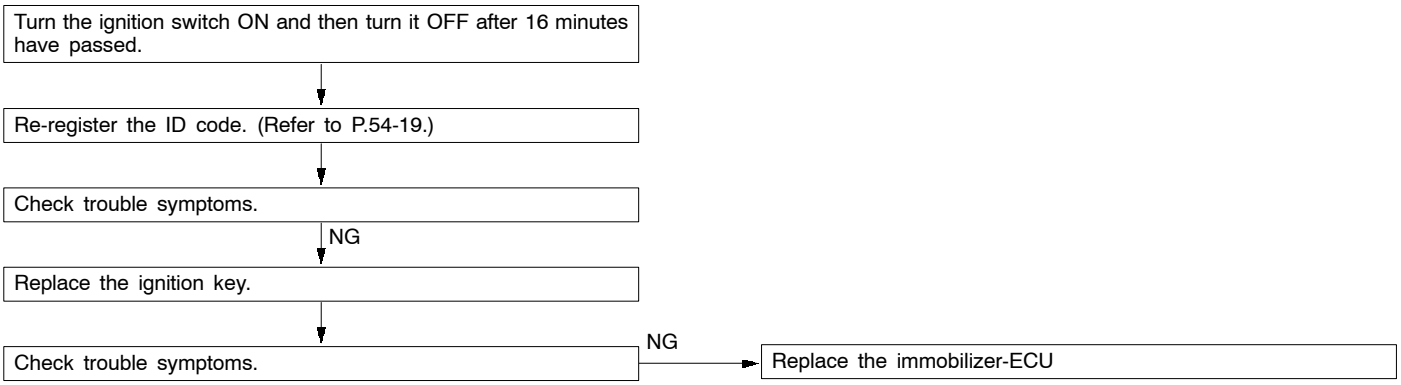
Code No. 31 EEPROM abnormality inside immobilizer-ECU	Probable cause
No data has been written to the EEPROM inside the immobilizer-ECU.	• Malfunction of the immobilizer-ECU



Code No.32 Ignition switch IG signal circuit system	Probable cause
The ignition switch signsl is not being input to the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of the ignition switch • Malfunction of the immobilizer-ECU



Code No.33 Starting prevention system activated due to incorrect operation	Probable cause
If the transponder ID code mismatches five times in succession, this code will be output. This code can be canceled by turning the ignition switch ON, and then turning it OFF after 16 minutes have passed.	• Malfunction of the immobilizer-ECU • Malfunction of the transponder



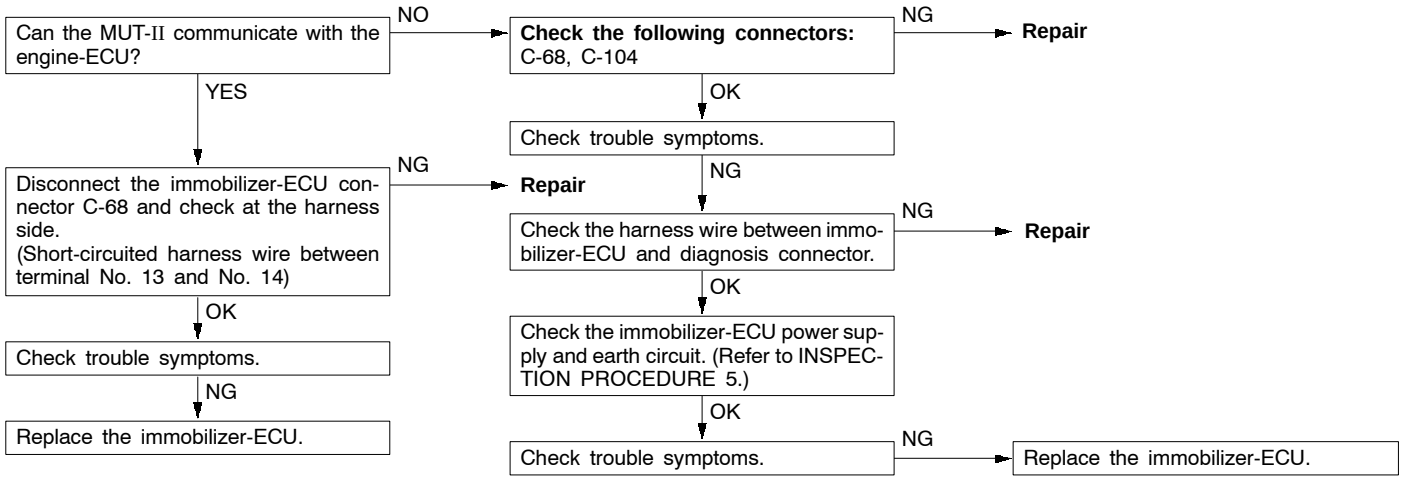
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	1	54-14
Diagnosis code No. 54 has been generated by the engine-ECU.	2	54-14
ID code cannot be registered using the MUT-II.	3	54-15
Engine does not start (Cranking but no initial combustion).	4	54-15
Malfunction of the immobilizer-ECU power source and earth circuit	5	54-16

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

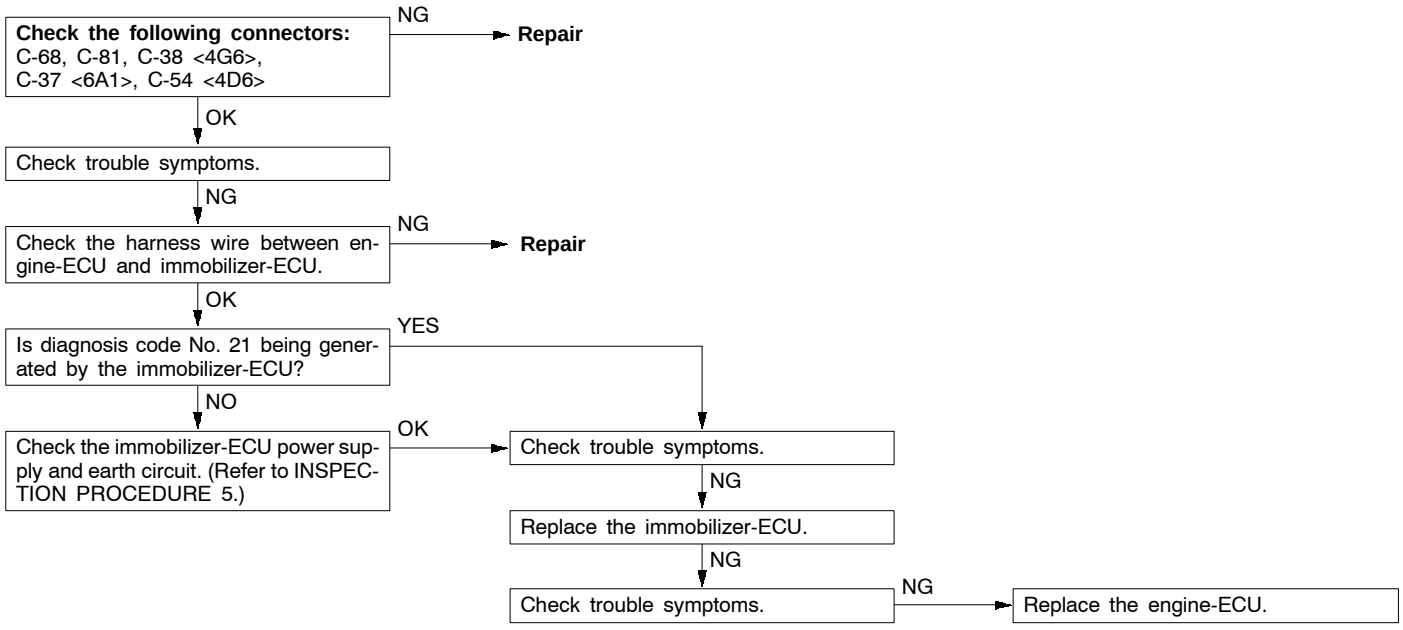
Inspection Procedure 1

Communication with MUT-II is impossible.	Probable cause
The cause is probably that a malfunction of the diagnosis line or the immobilizer-ECU is not functioning.	• Malfunction of the diagnosis line • Malfunction of harness or connector • Malfunction of the immobilizer



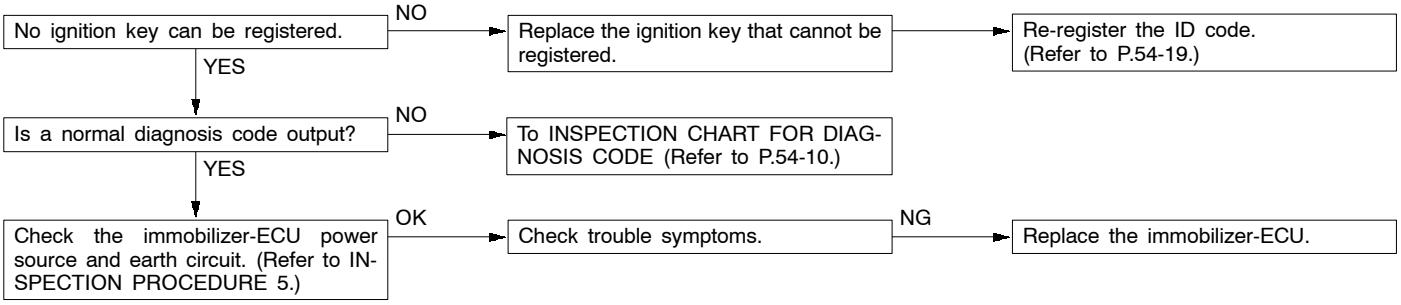
Inspection Procedure 2

Diagnosis code No. 54 has been generated by the engine-ECU.	Probable cause
There is a problem with communication between the engine-ECU and the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of the immobilizer-ECU • Malfunction of the engine-ECU



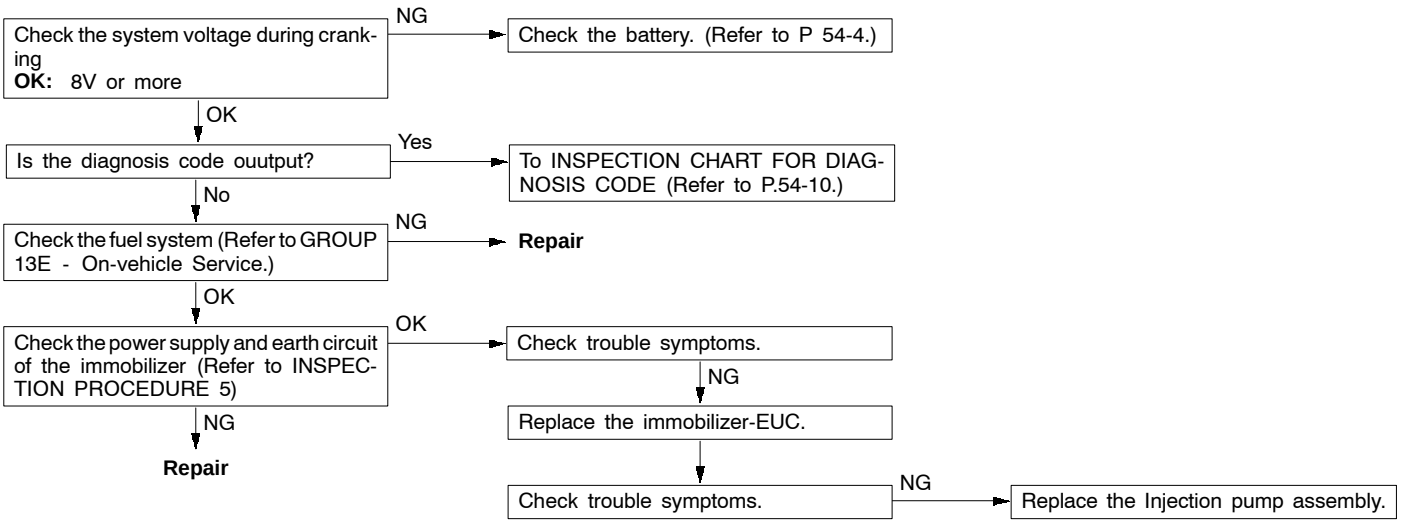
Inspection Procedure 3

ID code cannot be registered using the MUT-II.	Probable cause
The cause is probably that there is no ID code registered in the immobilizer-ECU, or there is a malfunction of the immobilizer-ECU.	• Malfunction of the transponder • Malfunction of the ignition key ring antenna • Malfunction of harness or connector • Malfunction of the immobilizer-ECU



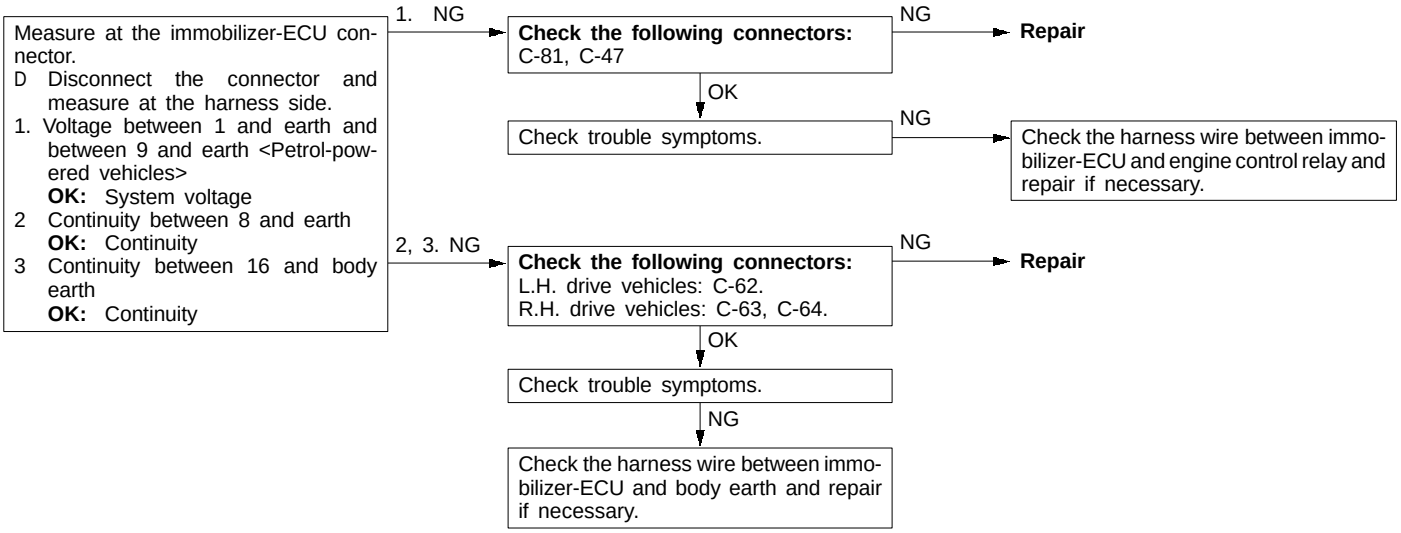
Inspection Procedure 4

Engine does not start (cranking but no initial combustion).	Probable cause
If the fuel injectors are not operating, there might be a problem with the MPI system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.	• Malfunction of the MPI system • Malfunction of the immobilizer-ECU



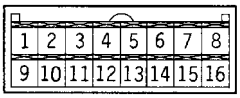
Inspection Procedure 5

Malfunction of the immobilizer-ECU power supply and earth circuit



CHECK AT IMMOBILIZER-ECU

TERMINAL VOLTAGE CHECK CHART



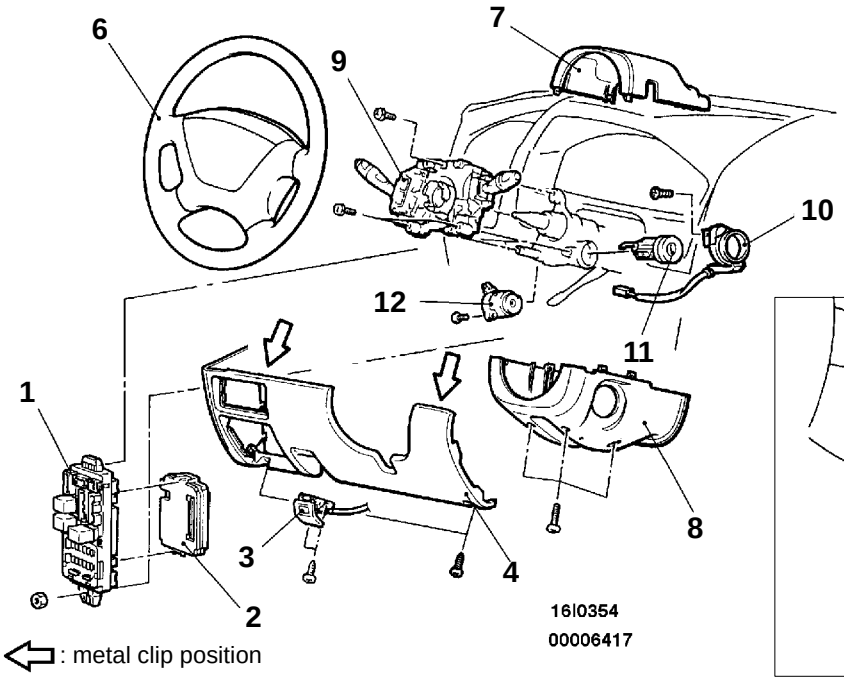
16W0390

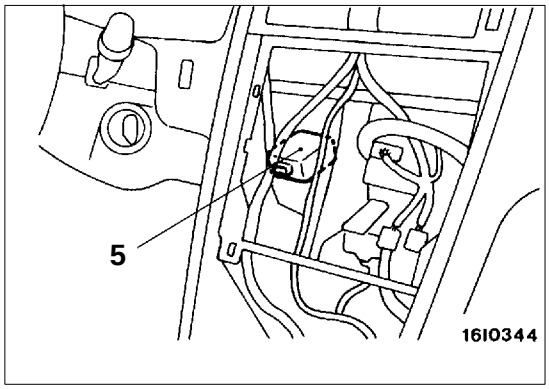
Terminal No.	Signal	Checking requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	Ignition switch-IG	Ignition switch: OFF	0V
		Ignition switch: ON	System voltage
8	Immobilizer-ECU earth	Always	0V
9	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
16	Immobilizer-ECU earth	Always	0V

IGNITION SWITCH, ETACS-ECU AND IMMOBILIZER SYSTEM 54300210220

REMOVAL AND INSTALLATION

Caution: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.





ETACS-ECU removal steps

1. Junction block
2. ETACS-ECU

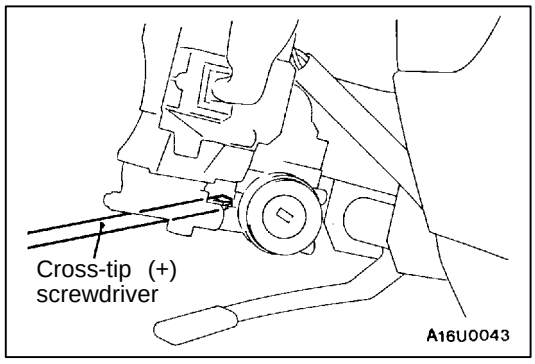
Immobilizer-ECU removal steps

3. Hood lock release handle
4. Instrument under cover (Refer to GROUP 52A - Instrument Panel.)
5. Immobilizer-ECU

A **A** "

Ignition switch and ignition key ring antenna removal steps

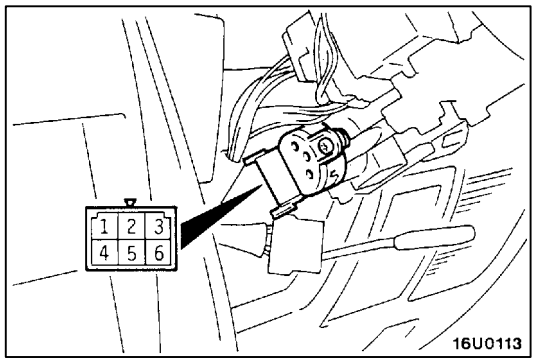
3. Hood lock release handle
4. Instrument under cover (Refer to GROUP 52A - Instrument Panel.)
6. Steering wheel (Refer to GROUP 37A.)
7. Column cover, upper
8. Column cover, lower
9. Column switch (Refer to GROUP 37A - Steering Wheel and Shaft.)
10. Ignition key ring antenna
11. Steering lock cylinder
12. Ignition switch



REMOVAL SERVICE POINTS

A A " STEERING LOCK CYLINDER REMOVAL

1. Insert the key in the steering lock cylinder and turn it to the “ACC” position.
2. Using a cross-tip (+) screwdriver (small) or a similar tool, push the lock pin of the steering lock cylinder inward and then pull the steering lock cylinder toward you.



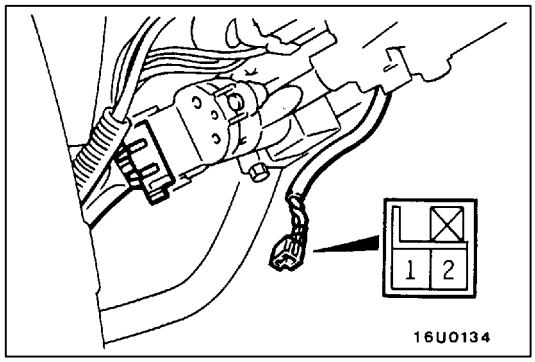
INSPECTION

54300220032

IGNITION SWITCH CONTINUITY CHECK

1. Remove the column cover lower and upper.
2. Disconnect the wiring connector from the ignition switch.
3. Operate the switch, and check the continuity between the terminals.

Ignition key position	Terminal No.					
	1	2	3	4	5	6
LOCK						
ACC	○					○
ON	○	○		○		○
START	○	○	○		○	



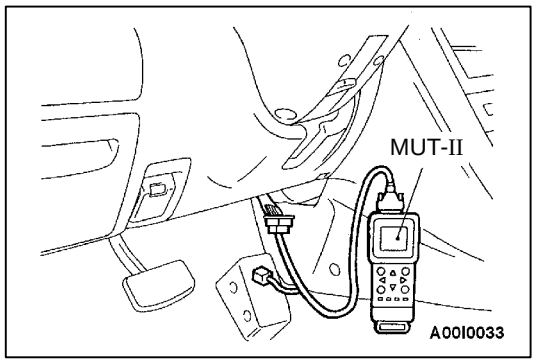
IGNITION KEY RING ANTENNA CONTINUITY CHECK

Use a circuit tester to check the continuity between the terminals.

ID CODE REGISTRATION METHOD 54300810062

If using an ignition key that has just been newly purchased, or if the immobilizer-ECU has been replaced, you will need to register the ID codes for each ignition key being used into the immobilizer-ECU. (A maximum of eight different ID codes can be registered.)
Moreover, when the immobilizer-ECU has been replaced, you will need to use the MUT-II to register the ID number that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

Caution
If registering of the ID codes is carried out all previously-registered codes will be erased. Accordingly, you should have ready all of the ignition keys that have already been registered.



1. Connect the MUT-II to the diagnosis connector.

   Caution
   Connection and disconnection of the MUT-II should always be carried out with the ignition switch in the OFF position.
2. Use the ignition key that is to be registered to turn the ignition switch to the ON position.
3. Use the MUT-II to register the ID code. If you are registering two or more codes, use the next key to be registered to turn the ignition switch to the ON position without disconnecting the MUT-II.
4. Disconnect the MUT-II. This completes the registration operation.

COMBINATION METERS

54300030215

SERVICE SPECIFICATIONS

Items		Standard value
Speedometer indication error km/h(mph)	40 (20)	40 - 48 (20 - 25)
	80 (40)	80 - 92 (40 - 47)
	120 (60)	120 - 136 (60 - 69)
	160 (80)	160 - 180 (80 - 91)
	- (100)	- (100 - 114)
Tachometer indication error r/min	700	±100
	3,000	±150
	5,000	±250
	6,000	±300
Fuel gauge unit resistance Ω	Float point F	4 ± 2
	Float point E	112 ± 7
Fuel gauge unit float height mm	A (Float point F)	28.6
	B (Float point E)	159.9
Fuel gauge resistance Ω	Power supply and earth	111.5
	Power supply and fuel gauge	98.2
	Fuel gauge and earth	101.0
Engine coolant temperature gauge resistance Ω	Power supply and earth	111.5
	Power supply and engine coolant temperature gauge	53.6
	Engine coolant temperature gauge and earth	165.0
Engine coolant temperature gauge unit resistance (at 70°C) Ω		104±13.5

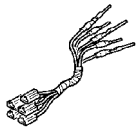
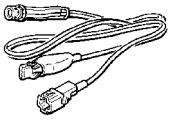
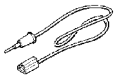
SEALANT

54300050037

Items	Specified sealant	Remark
Engine coolant temperature gauge unit threaded portion	3M Adhesive nut locking No. 4171 or equivalent	Drying sealant

SPECIAL TOOLS

54300060429

Tool	Number	Name	Use
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connector pin contact pressure check B: Power circuit check C: Power circuit check D: Commercial tester connection

TROUBLESHOOTING

5430070471

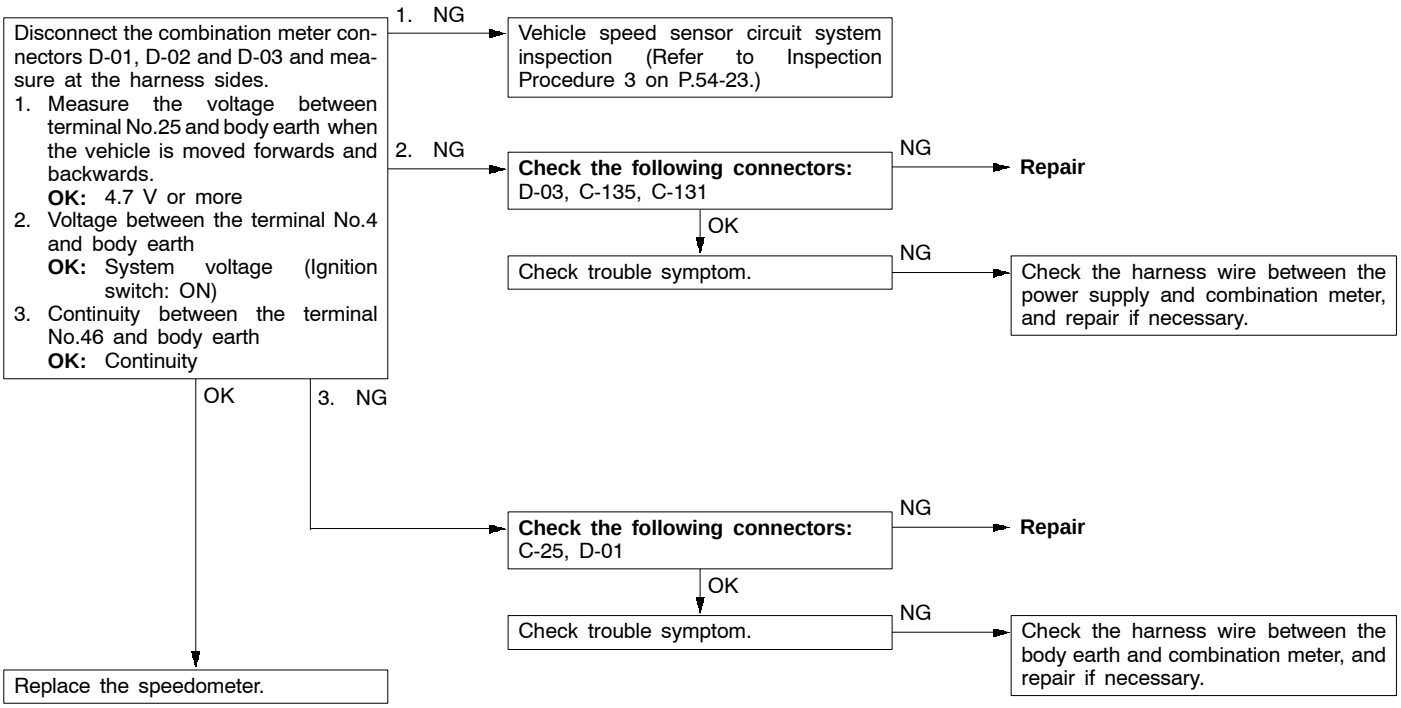
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure	Reference page
Speedometer does not work.	1	54-22
Tachometer does not work.	2	54-23

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

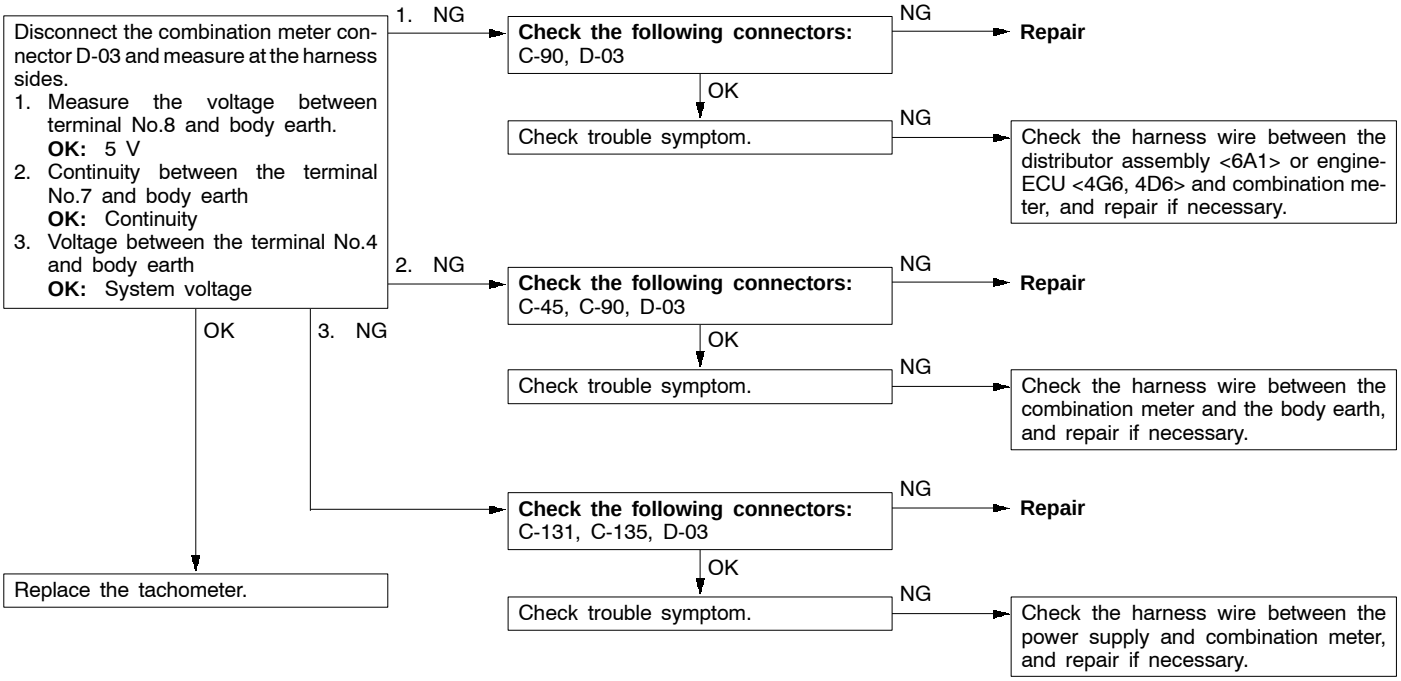
Inspection Procedure 1

Speedometer does not work.	Probable cause
The cause may be a defective vehicle speed sensor circuit system or a defective speedometer. Vehicle speed sensor is also used by the engine-ECU and A/T-ECU.	• Malfunction of vehicle speed sensor • Malfunction of speedometer • Malfunction of harness or connector



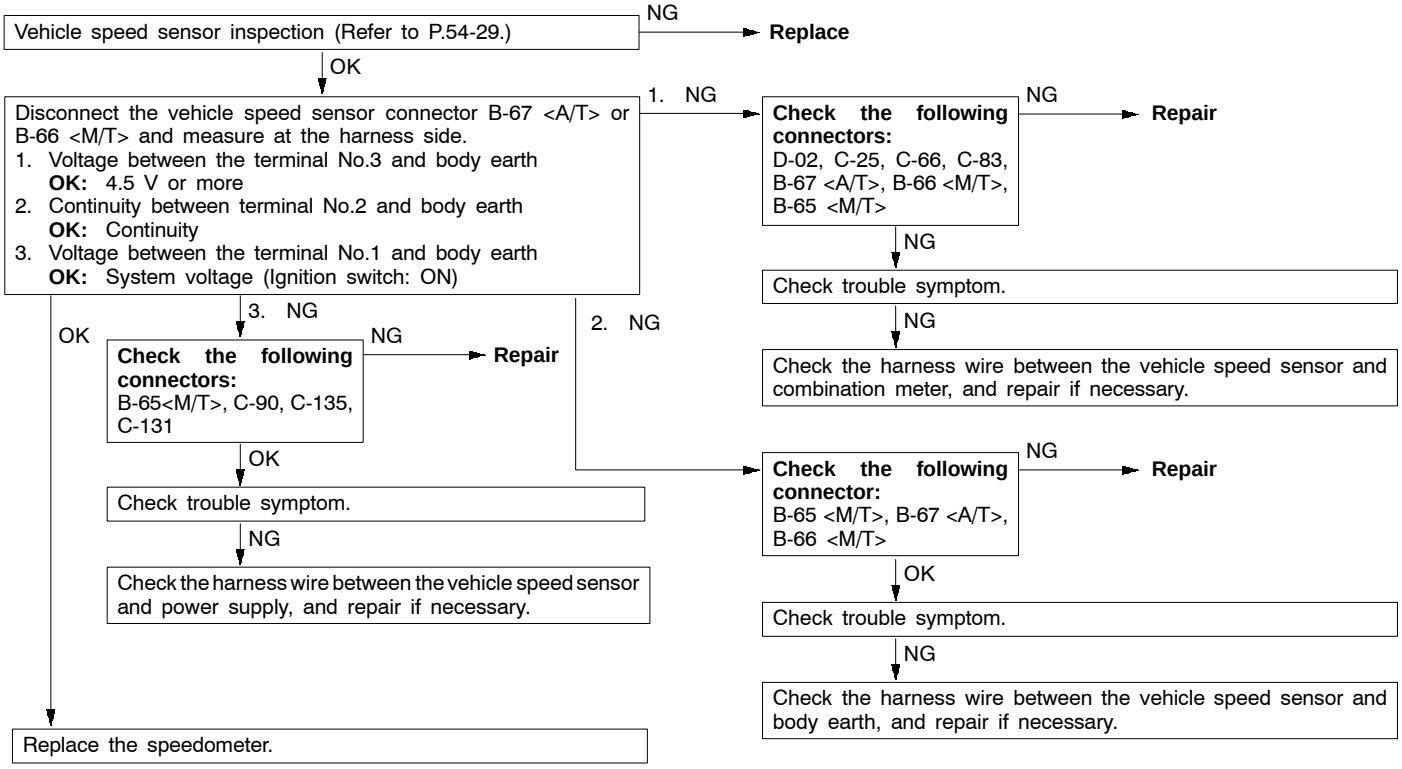
Inspection Procedure 2

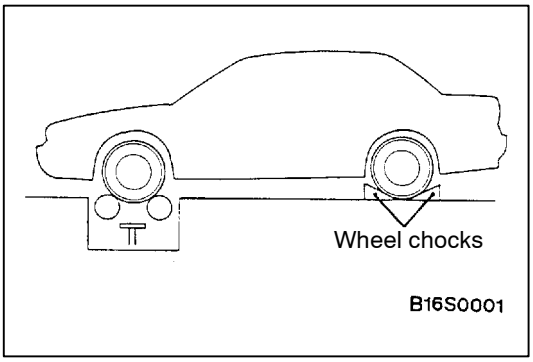
Tachometer does not work.	Probable cause
The ignition signal may not be input from the engine, or there may be a malfunction in the power supply or ground circuit.	• Malfunction of tachometer • Malfunction of harness or connector



Inspection Procedure 3

Vehicle speed sensor circuit system inspection



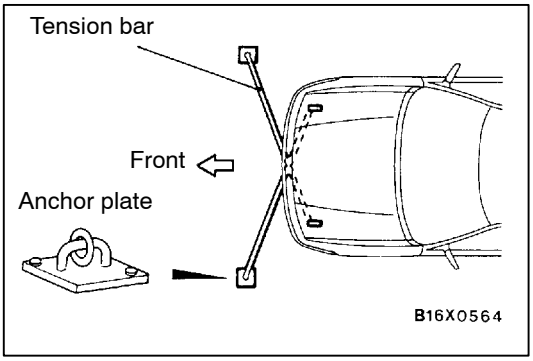


ON-VEHICLE SERVICE

54300090176

SPEEDOMETER CHECK

1. Adjust tire pressure to the specified level.
   (Refer to GROUP 31 – Service Specifications.)
2. Set the vehicle onto a speedometer tester and use wheel chocks to hold the rear wheels.

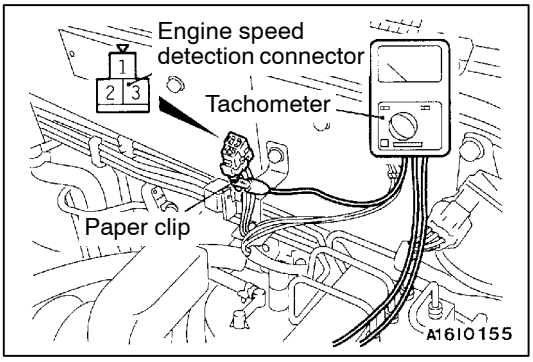


3. To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.
4. To prevent the vehicle from launching, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured firmly.
5. Check if the speedometer indicator range is within the standard values.

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

Standard values:

Standard indication km/h (mph)	Allowable range km/h (mph)
40 (20)	40 - 48 (20 - 25)
80 (40)	80 - 92 (40 - 47)
120 (60)	120 - 136 (60 - 69)
160 (80)	160 - 180 (80 - 91)
- (100)	- (100 - 114)



TACHOMETER CHECK

54300100176

1. Insert a paper clip in the engine speed detection connector from the harness side, and attach an external high quality tachometer.

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

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

   Standard values:
   700 r/min : ±100 r/min
   3,000 r/min : ±150 r/min
   5,000 r/min : ±250 r/min
   6,000 r/min : ±300 r/min

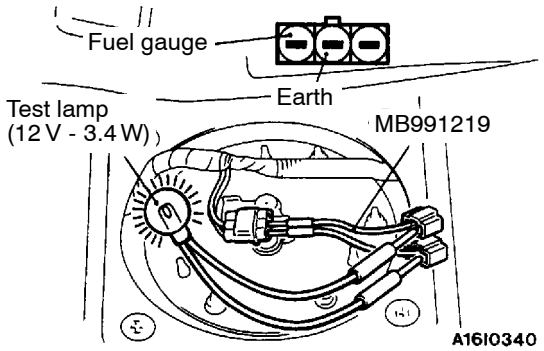
FUEL GAUGE SIMPLE CHECK

54300110179

Remove the fuel gauge unit connector.

↓

Use the special tool to connect a test lamp (12 V - 3.4 W) to the harness connector.



↓

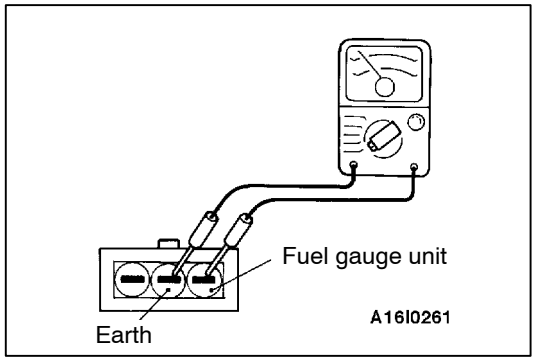
When the ignition switch is turned to ON, the test lamp illuminates.

OK → The needle of the fuel gauge moves.

OK → Replace the fuel gauge unit.

NG → Replace the fuel gauge.

NG → Repair the harness.



FUEL GAUGE UNIT CHECK

54300120240

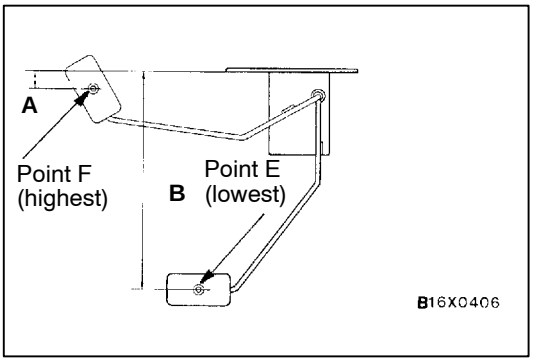
Remove the fuel gauge unit from the fuel tank. (Refer to GROUP 13F.)

FUEL GAUGE UNIT RESISTANCE

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

   Standard value:
   Point F: 4 ± 2 Ω
   Point E: 112 ± 7 Ω

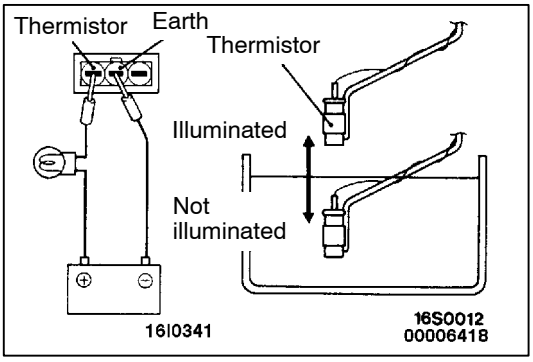
2. Check that resistance value changes smoothly when float moves slowly between point F (highest) and point E (lowest).



FUEL GAUGE UNIT FLOAT HEIGHT

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

Standard value:
A: 28.6 mm
B: 159.9 mm



THERMISTOR

1. Connect fuel gauge unit (thermistor) to battery via test lamp (12 V - 3.4 W). Immerse in water.
2. Condition is good if lamp goes off when the thermistor is immersed in water and comes on when it is taken out of water.

Caution
After finishing this test, wipe the unit dry and install it in the fuel tank.

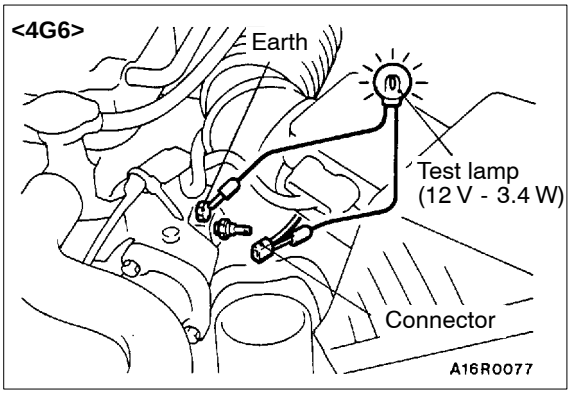
ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK

54300140215

Remove the engine coolant gauge unit connector.

Connect a test lamp (12 V - 3.4 W) between the harness side connector and the earth.

<4G6>



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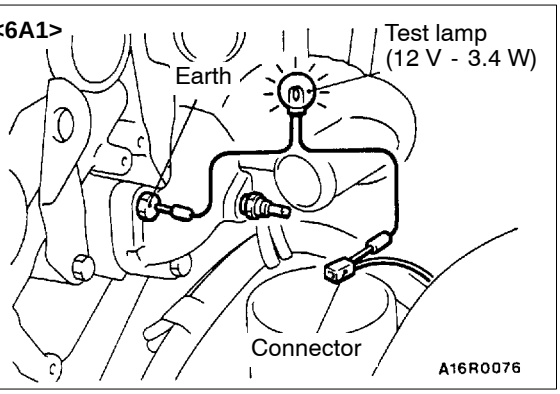

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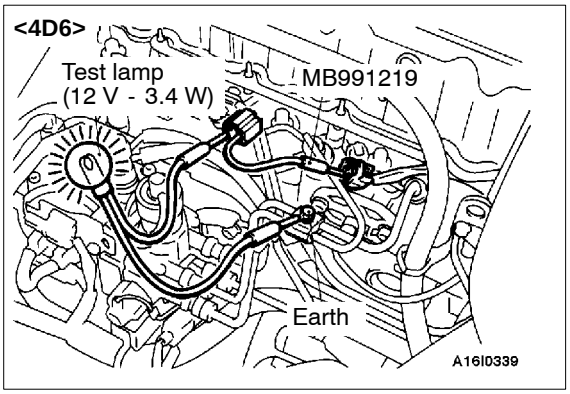


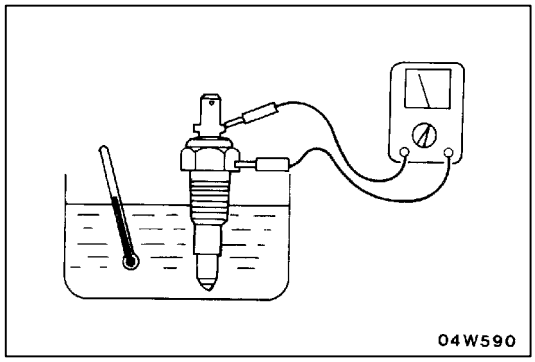
When the ignition switch is turned to "ON", the test lamp illuminates.

OK → The needle of the engine coolant temperature gauge moves.

NG → Replace the engine coolant temperature gauge.

NG → Repair the harness.

OK → Replace the engine coolant temperature gauge unit.

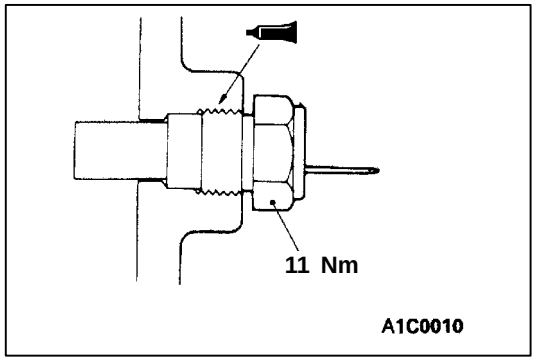


ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

54300150041

1. Bleed the engine coolant.
   (Refer to GROUP 00 – Maintenance Service.)
2. Remove the engine coolant temperature gauge unit.
3. Immerse the unit in 70°C water to measure the resistance.

   Standard value: 104 ± 13.5 Ω



4. After checking, apply the specified adhesive around the thread of engine coolant temperature gauge unit.

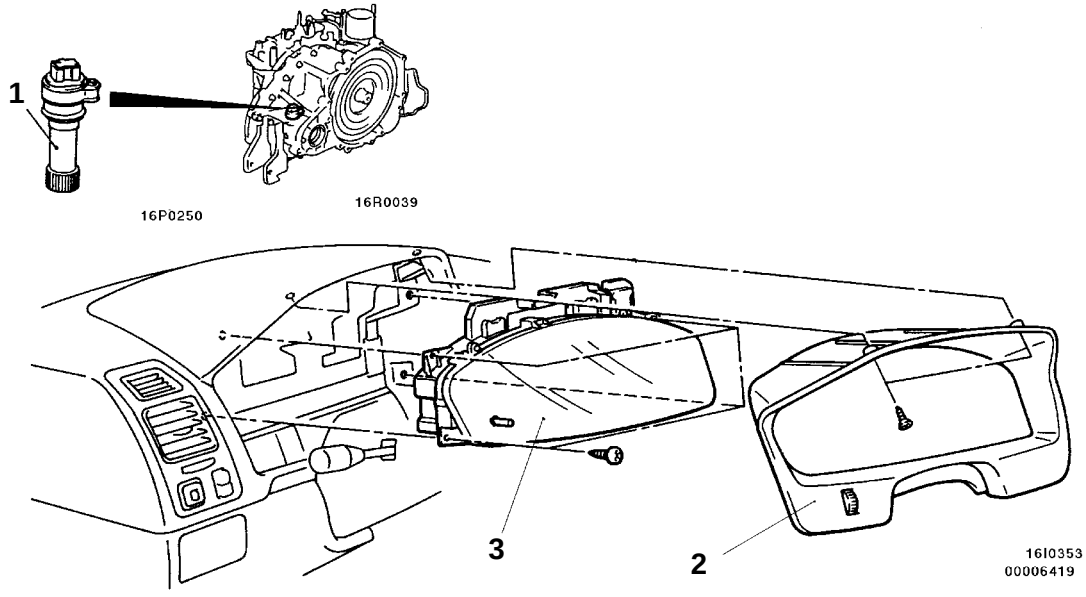
   Specified sealant:
   3M Adhesive Nut Locking No. 4171 or equivalent

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

COMBINATION METERS

54300290200

REMOVAL AND INSTALLATION



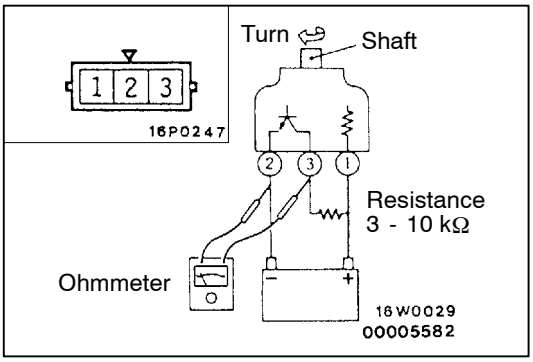
Vehicle speed sensor removal steps

- Air cleaner assembly

1. Vehicle speed sensor

Combination meter removal steps

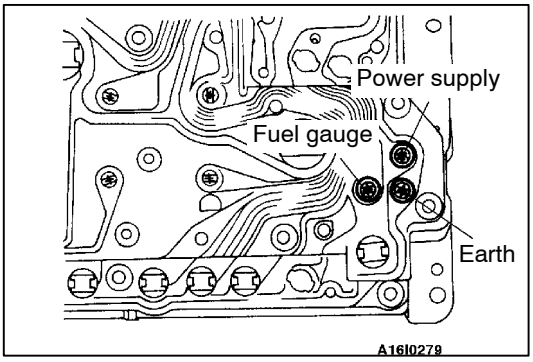
2. Meter bezel
3. Combination meter



INSPECTION 5430060135

VEHICLE SPEED SENSOR CHECK

1. Remove the vehicle speed sensor and connect a 3 - 10 kΩ resistance as shown in the illustration.
2. Turn the shaft of the vehicle speed sensor and check that there is voltage between terminals 2 - 3. (1 turn = 4 pulses)

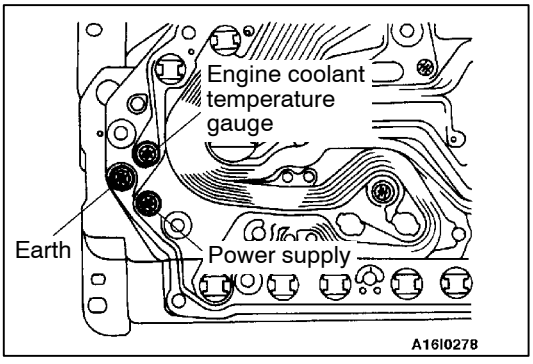


FUEL GAUGE RESISTANCE CHECK 54300300132

1. Remove the power supply tightening screw.
2. Use an ohmmeter to measure the resistance value between the terminals.

Standard value:
Power supply - Earth: 111.5 Ω
Power supply - Fuel gauge: 98.2 Ω
Fuel gauge - Ground: 101.0 Ω

Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.



ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK

1. Remove the power supply tightening screw.
2. Use an ohmmeter to measure the resistance value between the terminals.

Standard value:
Power supply - Earth: 111.5 Ω
Power supply - Engine coolant temperature gauge: 53.6 Ω
Engine coolant temperature gauge - Earth: 165.0 Ω

Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.

HEADLAMP AND FRONT TURN-SIGNAL LAMP

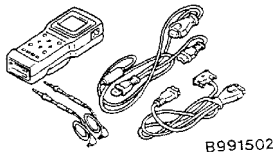
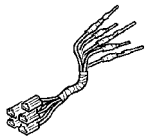
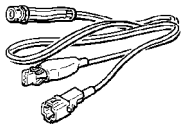
54200300199

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Headlight airming for low beam	Vertical direction	60 mm below horizontal (H)	-
	Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)	-
Headlamp aiming for high beam	Vertical direction	22 mm below horizontal (H)	-
	Horizontal direction	Parallel to direction of vehicle travel	-
Headlamp intensity cd		-	30,000 or more

SPECIAL TOOLS

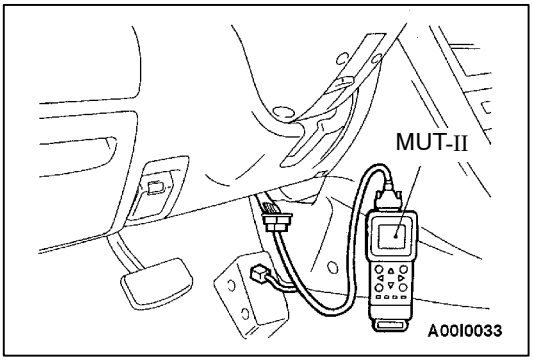
54200060457

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	ETACS-ECU input signal checking
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connector pin contact pressure check B: Power circuit check C: Power circuit check D: Commercial tester connection

TROUBLESHOOTING

54200900063

The special tool (MB991223) should always be used to measure voltages and resistance when carrying out troubleshooting.



DIAGNOSTIC FUNCTION

INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

1. Connect the MUT-II to the diagnosis connector.
2. If a buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.

INSPECTION CHART FOR TROUBLE SYMPTOMS

54200910103

Trouble symptoms	Trouble symptoms	Inspection procedure	Reference page
Communication with MUT-II is impossible. <Vehicles with ETACS-ECU>	Communication with all systems is impossible.	1	54-32
	Communication with one-shot pulse input signal only is impossible.	2	54-32
The lighting monitor buzzer doesn't sound under the following conditions while tail lamps or headlamps illuminate. ● When the ignition switch is turned to OFF and the driver's side door is open.		3	54-32
Headlamp leveling does not occur when the headlamp leveling switch is operated.		5	54-34
The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is at the ON position. However, the headlamps illuminate when the lighting switch is moved to the HEAD position. <Vehicles with daytime running lamp system> ● Lighting switch: OFF ● Passing switch: OFF		6	54-35
The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position. <Vehicles with daytime running lamp system> ● Ignition switch: OFF ● Passing switch: OFF		7	54-36

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

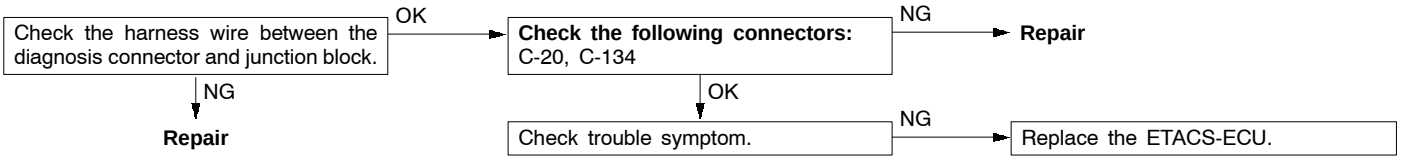
Inspection Procedure 1

Communication with MUT-II is impossible. (Communication with all systems is impossible.)	Probable cause
The cause is probably a defective power supply system (including ground) for the diagnosis line.	• Malfunction of connector • Malfunction of harness wire

Refer to GROUP 13A - Troubleshooting.

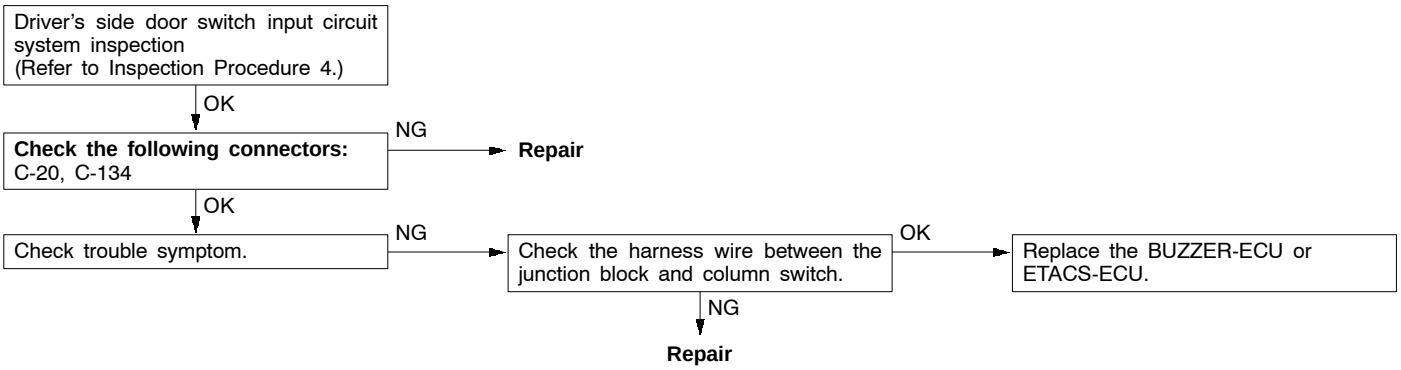
Inspection Procedure 2

Communication with the MUT-II is impossible. (Communication with the one-shot pulse input signal only is impossible.)	Probable cause
The cause is probably a defective one-shot pulse input circuit system of the diagnosis line.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU



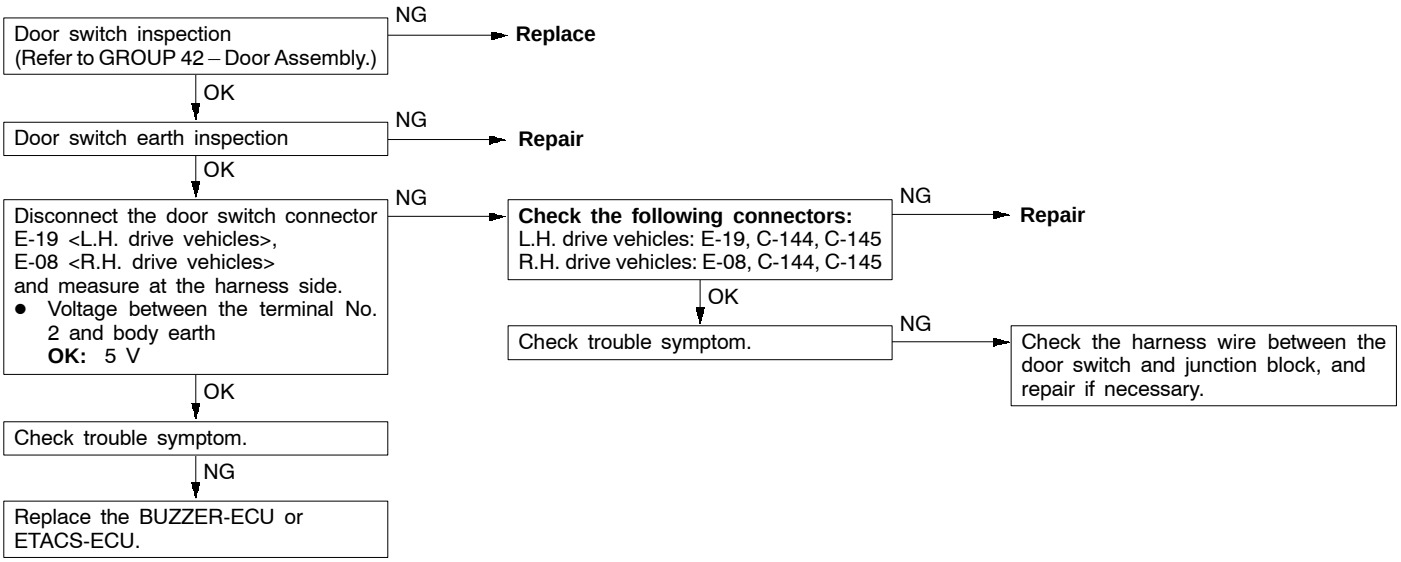
Inspection Procedure 3

The ignition switch is turned to the "OFF" position and the driver's side door is opened while the tail lamps or headlamps are operating, but the lighting monitor buzzer does not sound.	Probable cause
The cause is probably a defective lighting switch input circuit system or a defective driver's side door switch input circuit system.	• Malfunction of driver's side door switch • Malfunction of harness or connector • Malfunction of BUZZER-ECU or ETACS-ECU



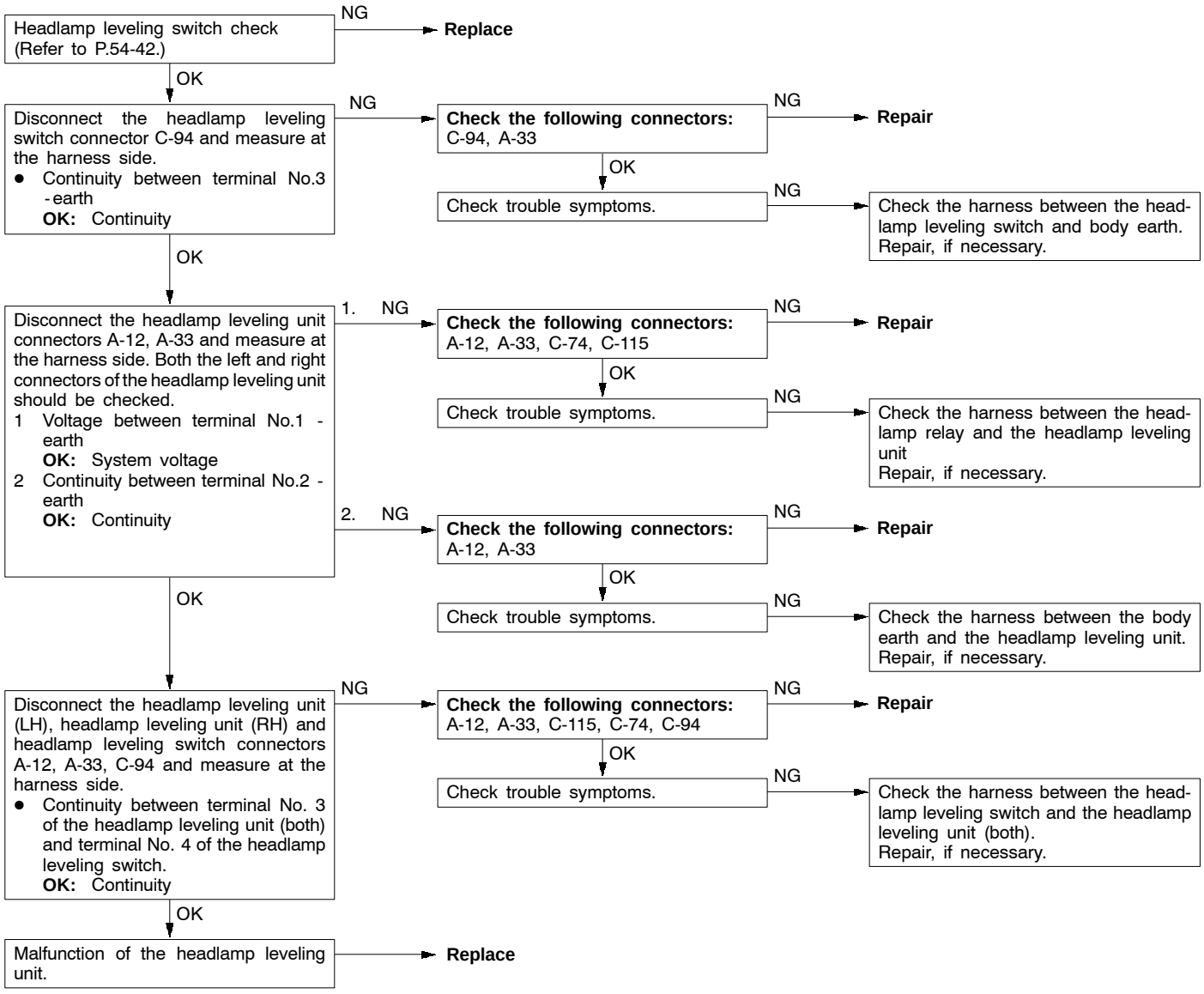
Inspection Procedure 4

Driver's side door switch input circuit system inspection



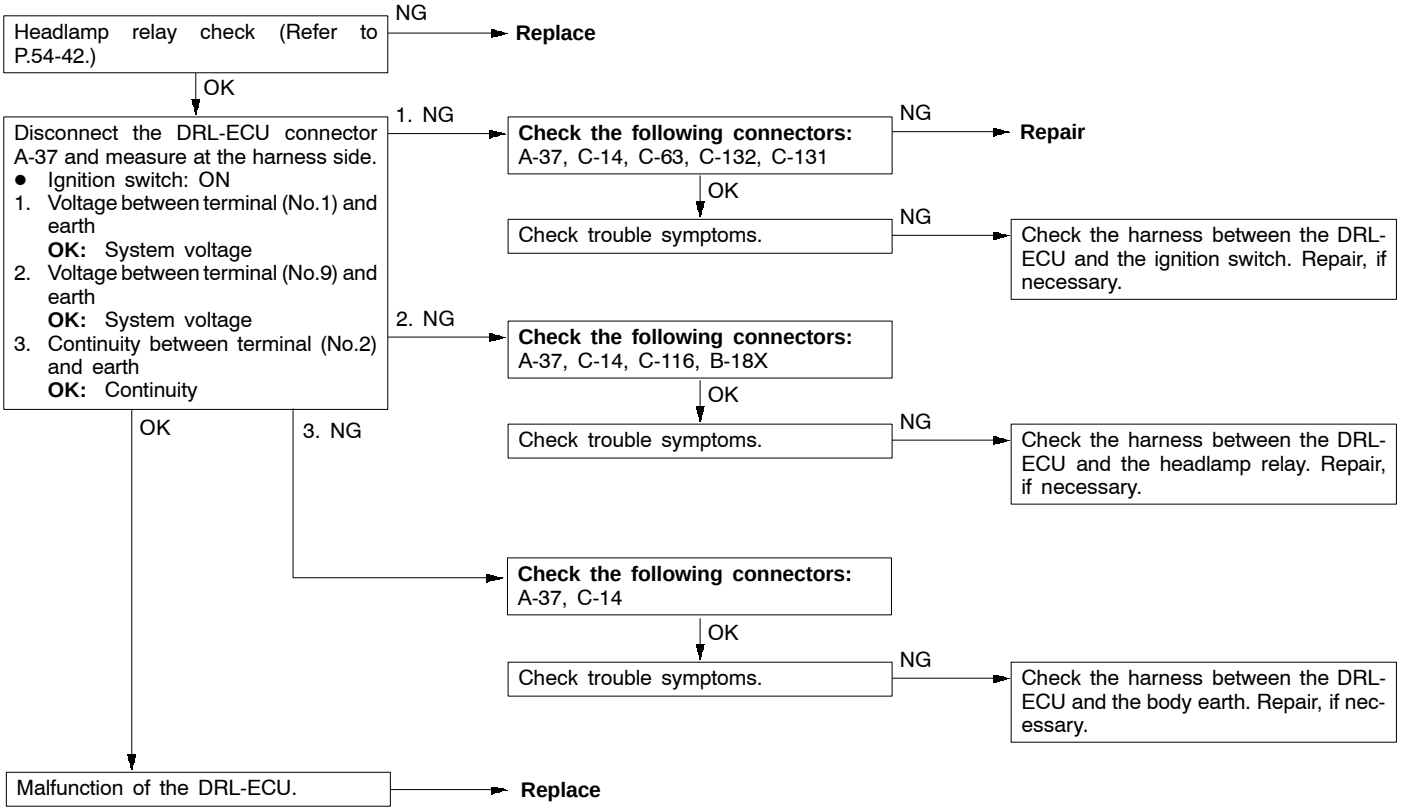
Inspection procedure 5

Headlamp leveling does not occur when the headlamp leveling switch is operated.	Probable cause
The cause is probably a malfunction of the headlamp leveling switch circuit system or a malfunction of the headlamp leveling unit circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.	• Malfunction of fuse • Malfunction of the headlamp leveling switch • Malfunction of connector • Malfunction of harness • Malfunction of the headlamp leveling unit



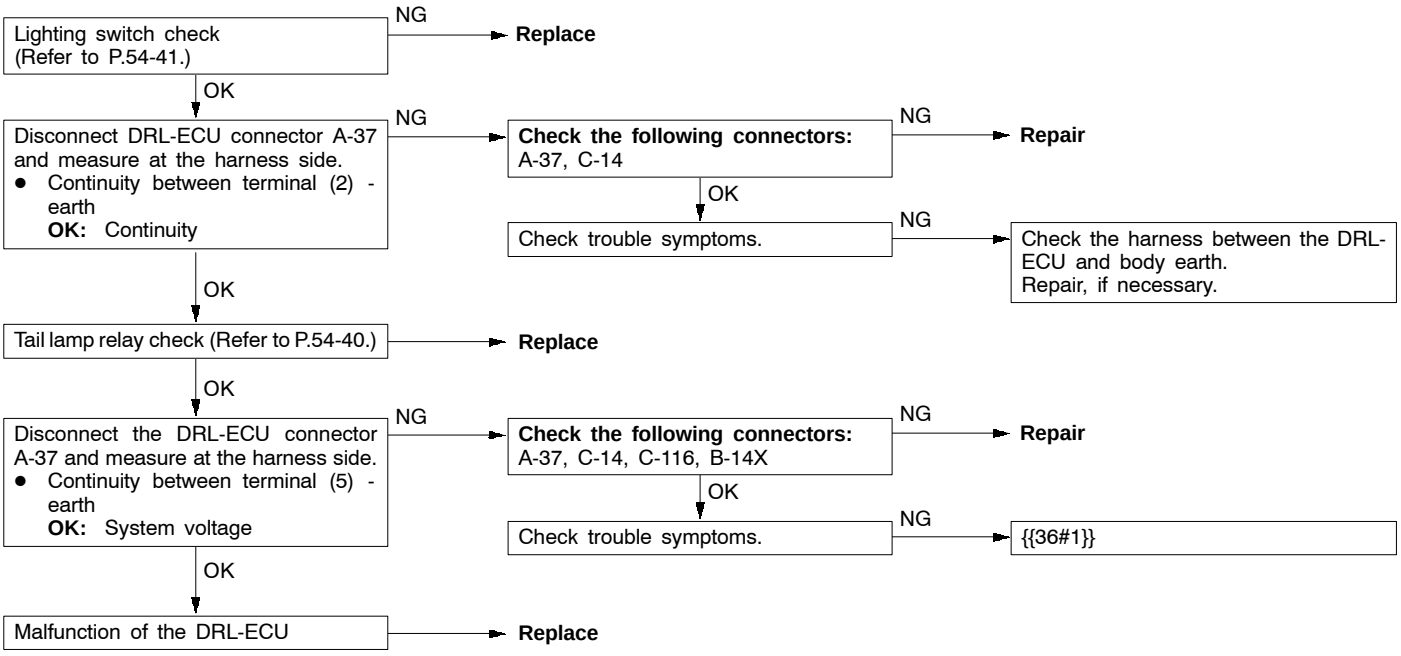
Inspection procedure 6

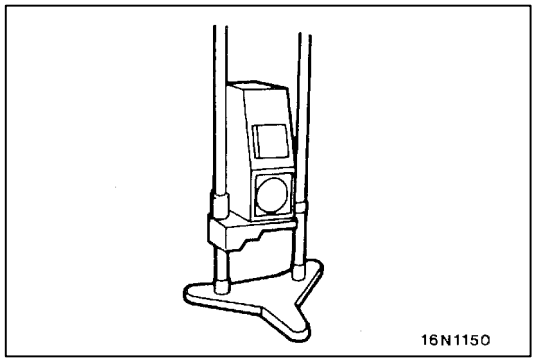
The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is moved to the ON position. However, they illuminate when the lighting switch is moved to the HEAD position. <Vehicles with daytime running lamp> ● **Lighting switch: OFF** ● **Passing switch: OFF**	**Probable cause**
The cause is probably a malfunction of the daytime running lamp control unit (DRL-ECU) circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.	● Malfunction of fuse ● Malfunction of connector ● Malfunction of harness ● Malfunction of the DRL-ECU



Inspection procedure 7

The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position. <Vehicles with daytime running lamp> ● **Ignition switch: OFF** ● **Passing switch: OFF**	**Probable cause**
The cause is probably a malfunction of the daytime running lamp control unit (DRL-ECU) circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.	● Malfunction of fuse ● Malfunction of connector ● Malfunction of harness ● Malfunction of the tail lamp relay ● Malfunction of the DRL-ECU





ON-VEHICLE SERVICE

54200090173

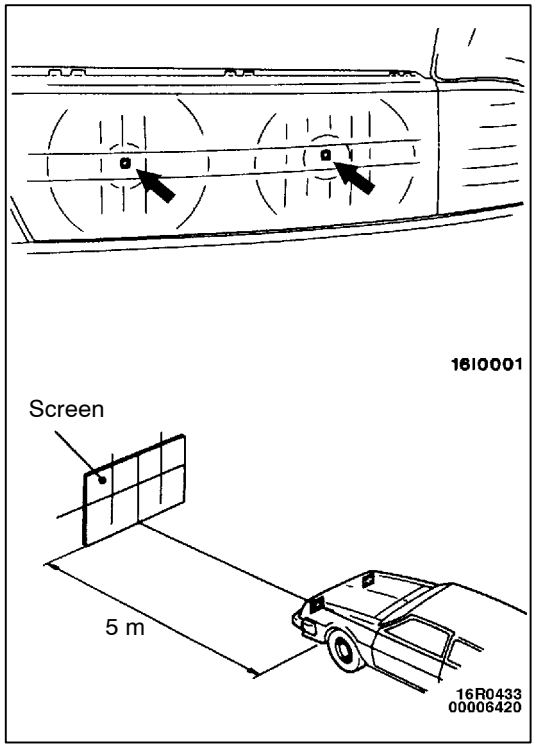
HEADLAMP AIMING

<USING A BEAMSETTING EQUIPMENT>

1. The headlamps should be aimed with the proper beamsetting equipment, and in accordance with the equipment manufacture's instructions.

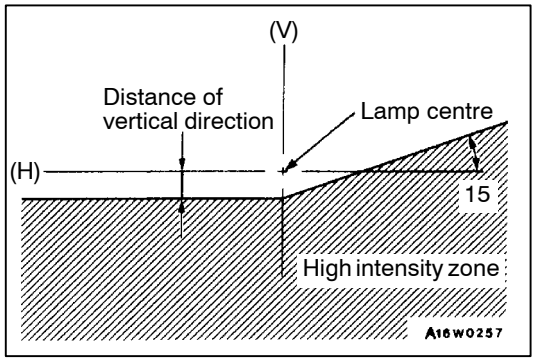
   NOTE
   If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.

2. Alternately turn the adjusting screw to adjust the headlamp aiming. (Refer to P.54-38.)
3. With the engine running at 2,000 r/min. aim the headlamp.



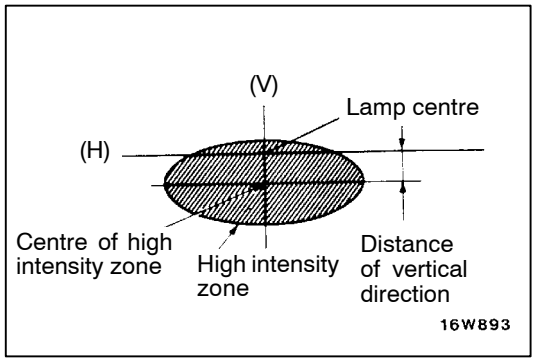
<USING A SCREEN>

1. Inflate the tyres to the specified pressures and there should be no other load in the vehicles other than driver or substituted weight of approximately 75 kg placed in driver's position.
2. Set the distance between the screen and the centre marks of the headlamps as shown in the illustration.



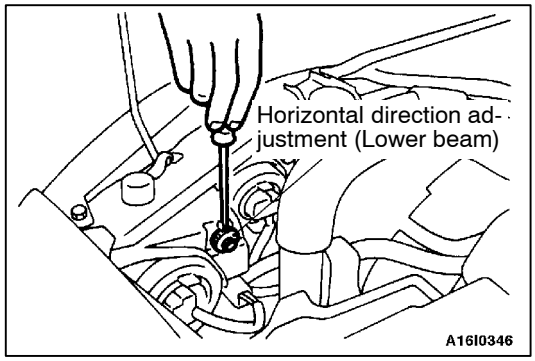
3. Check if the beam shining onto the screen is at the standard value.

   Standard value:
   <For lower beam adjustment>
   (Vertical direction)
   60 mm below horizontal (H)
   (Horizontal direction)
   Position where the 15° sloping section intersects the vertical line (V)



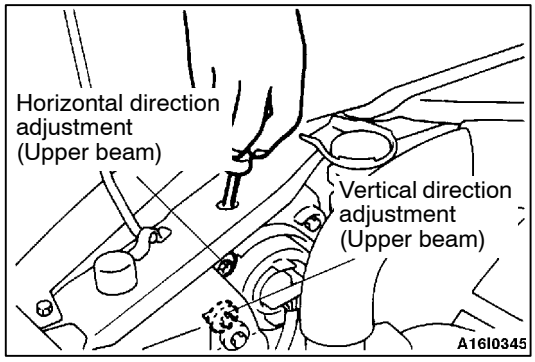
Standard value:
<For upper beam adjustment>
(Vertical direction)
22 mm below horizontal (H)
(Horizontal direction)
Parallel to direction of vehicle travel

Caution
1. When making the aiming adjustment, be sure to mask those lamps which are not being adjusted.
2. When it is difficult, because of outside light, to distinguish the light/dark dividing line, use a curtain, screen or similar material to reduce the effects of the outside light.



4. Alternately turn the adjusting screw to adjust the headlamp aiming.

Caution
Be sure to adjust the aiming adjustment screw in the tightening direction.



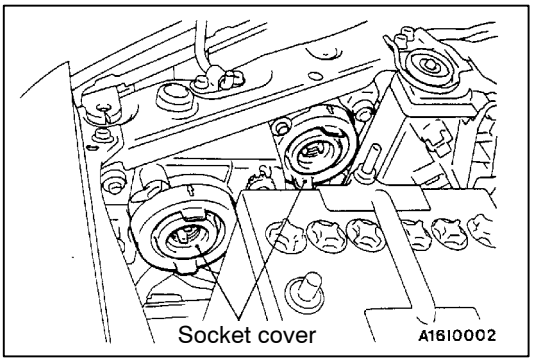
INTENSITY MEASUREMENT 54200100135

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

Limit: 30,000 cd or more

NOTE
1. When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
2. There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
3. If an illuminometer is used to make the measurements, convert its values to photometer values by using the following formula.

$I = Er^2$ Where:
I = intensity (cd)
E = illumination (lux)
r = distance (m) from headlamps to illuminometer

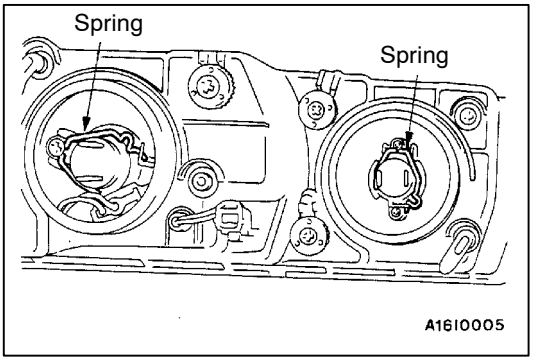


BULB REPLACEMENT

54200130189

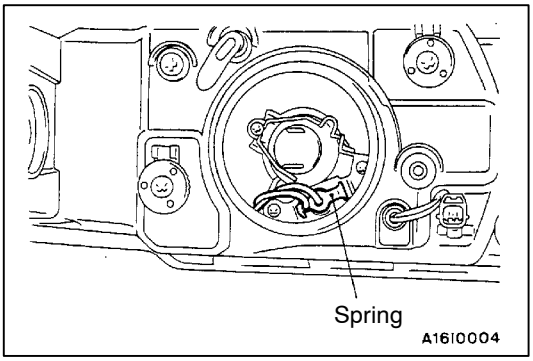
<Headlamp Bulb>

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



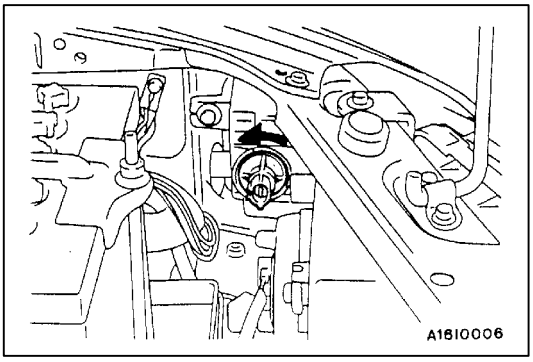
3. Unhook the spring which secures the bulb, and then remove the bulb.

Caution
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.



<Position Lamp Bulb>

1. Disconnect the connector, and then remove the socket cover of headlamp lower beam.
2. Pinch the spring and pull out the position lamp bulb.



<Turn-signal Lamp Bulb>

1. Disconnect the connector.
2. Turn the bulb socket counterclockwise together with the bulb, and remove the bulb.

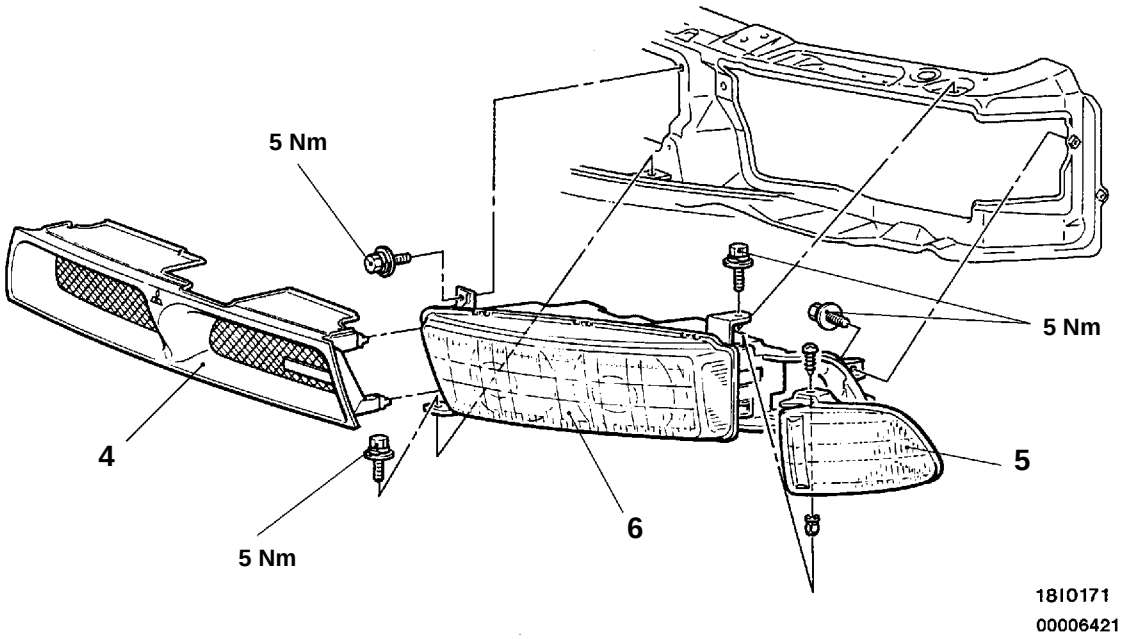
Caution
If the bulb socket is not securely installed, the lens will moisten, or water will get inside the lamp unit, so the bulb socket should be securely installed.

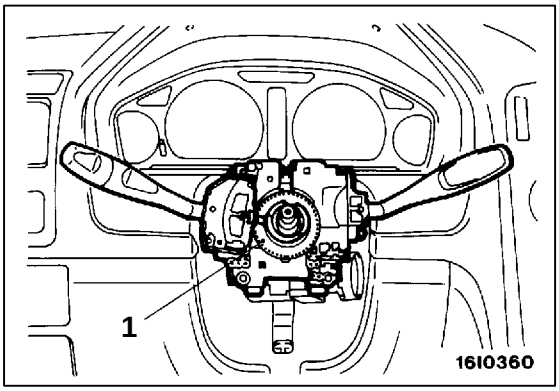
HEADLAMP AND FRONT TURN-SIGNAL LAMP

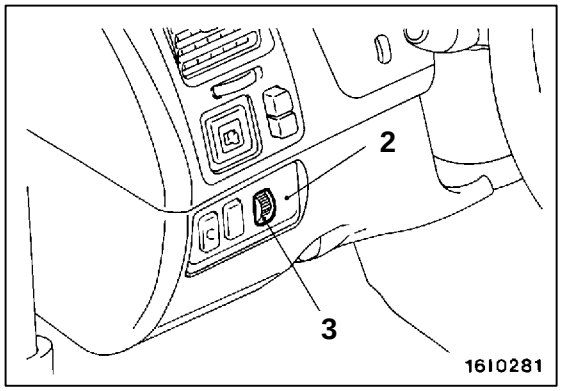
54200240141

REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.







1. Column switch <Lighting switch and dimmer/passing switch> (Refer to GROUP 37A - Steering Wheel and Shaft.)

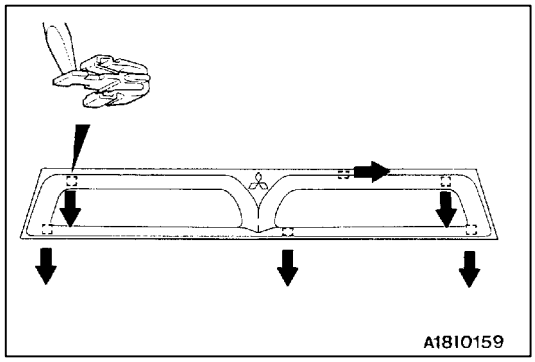
Headlamp leveling switch removal steps

2. Switch bezel
3. Headlamp leveling switch

◀A▶

Headlamp removal steps

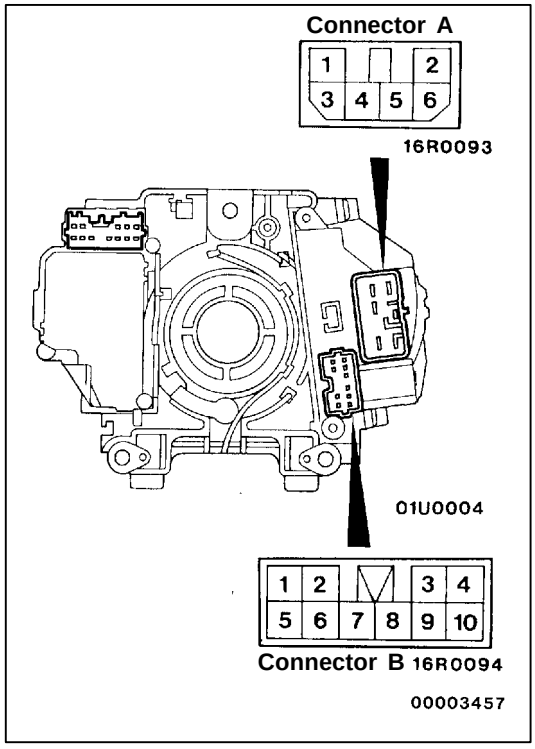
4. Radiator grille
5. Front turn-signal lamp
6. Headlamp



REMOVAL SERVICE POINT

◀A▶ RADIATOR GRILLE REMOVAL

Remove the radiator grille by pushing the tab of the radiator grille clips in the direction of the arrows with a flat-tipped screwdriver, while lightly pulling the radiator grille towards you.



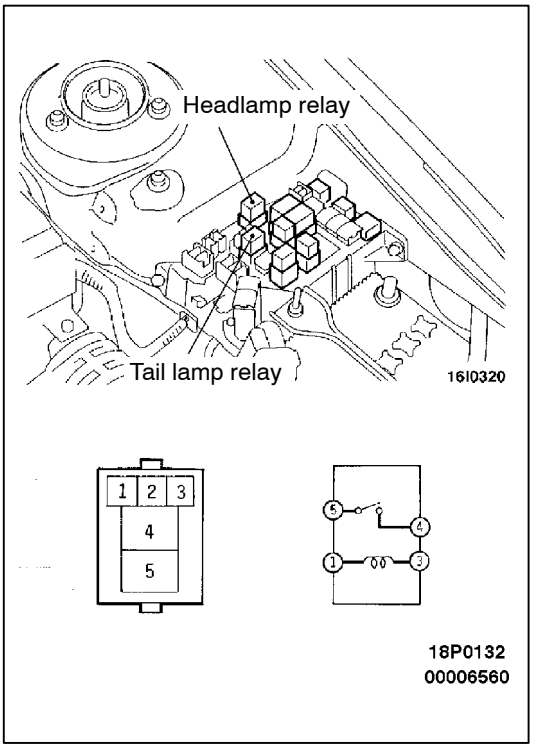
INSPECTION

54200250045

LIGHTING SWITCH, DIMMER/PASSING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK

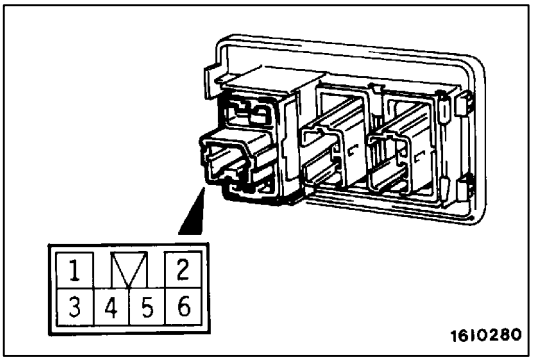
Switch position		Connector A-terminal No.					Connector B-terminal No.					
		1	2	3	4	6	3	5	6	7	8	9
LIGHTING SWITCH	OFF											
	TAIL							○		○		
	HEAD	○						○	○	○		
DIMMER/ PASSING SWITCH	LOWER			○	○							
	UPPER				○	○						
	PASSING	○	○	○	*1 ○	○						
					○	*2 ○						
TURN-SIGNAL LAMP SWITCH	RH										○	○
	OFF											
	LH						○				○	

NOTE
1. *1 indicates continuity when the dimmer switch is in the lower position.
2. *2 indicates continuity when the dimmer switch is in the upper position.



HEADLAMP RELAY AND TAIL LAMP RELAY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Supplied	⊕	⊖	○	○
Not supplied	○	○		

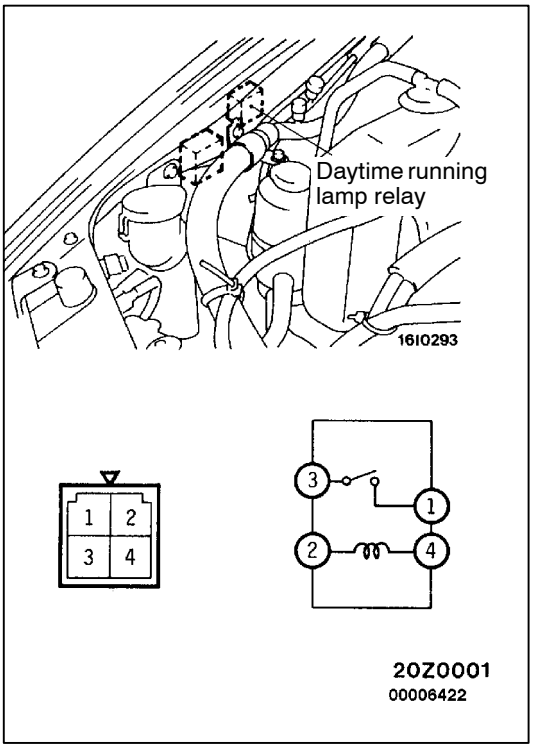


HEADLAMP LEVELING SWITCH CHECK

Check the resistance between the terminals when the headlamp leveling switch is operated.

Standard value:

Resistance measurement terminal No.	Switch position				
	0	1	2	3	4
Between 3 and 4 Ω	1,235	1,114	977	862	747
Between 4 and 6 Ω	548	669	806	921	1,036
Between 3 and 6 Ω	1,003				



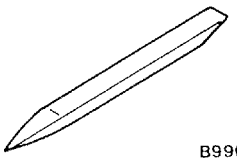
DAYTIME RUNNING LAMP RELAY CHECK

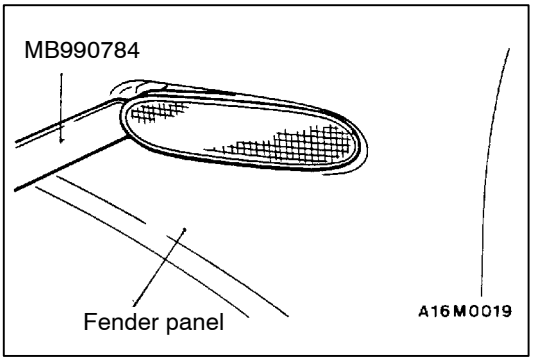
Battery voltage	Terminal No.			
	1	2	3	4
Supplied	○	⊕	○	⊖
Not supplied		○		○

SIDE TURN-SIGNAL LAMP

54200060105

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of side turn-signal lamp

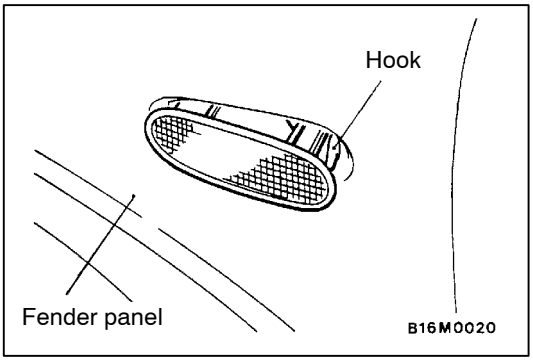


REMOVAL SERVICE POINT

54200330091

◀A▶ SIDE TURN-SIGNAL LAMP REMOVAL

Use a special tool to remove the lock from the fender panel, and then remove the side turn-signal lamp.



INSTALLATION SERVICE POINT

▶A◀ SIDE TURN-SIGNAL LAMP INSTALLATION

1. Fit the lock into the fender panel.
2. Push the side turn-signal lamp into the fender, and secure it with the hook.

FRONT FOG LAMP

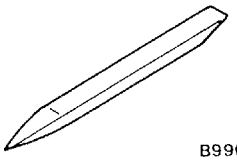
54200030069

SERVICE SPECIFICATIONS

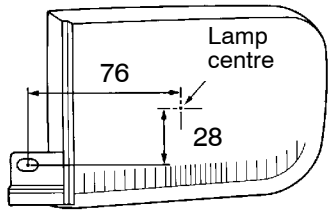
Items		Standard value
Front fog lamp aiming	Vertical direction	100 mm below horizontal (H)
	Horizontal direction	Parallel to direction of vehicle travel

SPECIAL TOOL

54200060464

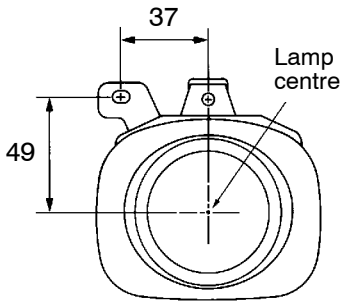
Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of switch garnish

Parabola type Unit: mm



16I0029

Projector type



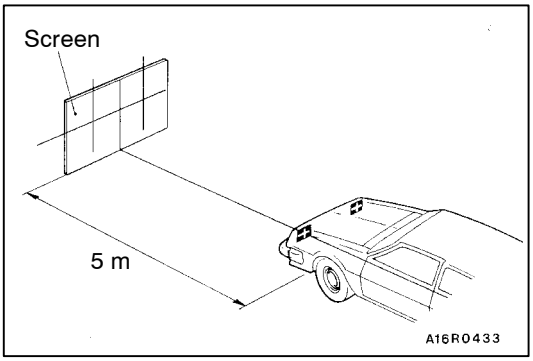
16I0039
00006423

ON-VEHICLE SERVICE

54200110138

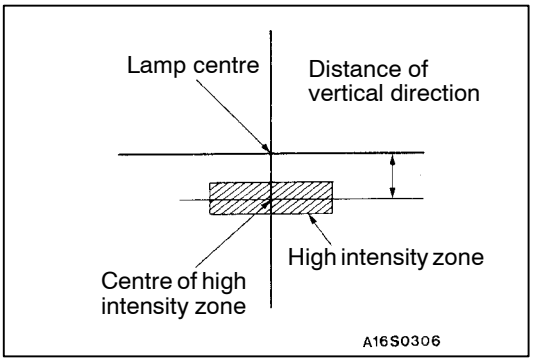
FRONT FOG LAMP AIMING

1. Measure the centre of the fog lamps, as shown in the illustration.



A16R0433

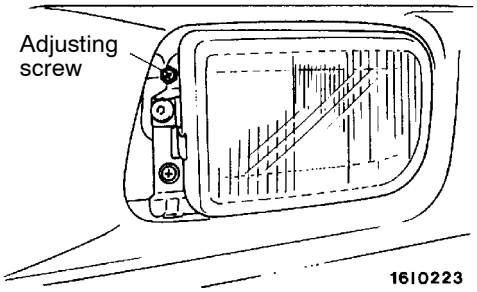
2. Set the distance between the screen and the centre of the fog lamps as shown in the illustration.
3. Inflate the tyres to the specified pressures and there should be no other load in the vehicles other than driver or substituted weight of approximately 75 kg placed in the driver's position.
4. With the engine running at 2,000 r/min, aim the fog lamp.



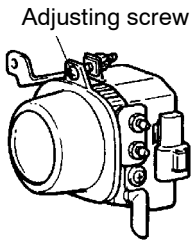
5 Check if the beam shining onto the screen is at the standard value.

Standard value:
(Vertical direction)
100 mm below horizontal (H)
(Horizontal direction)
Parallel to direction of vehicle travel

Parabola type



Projector type



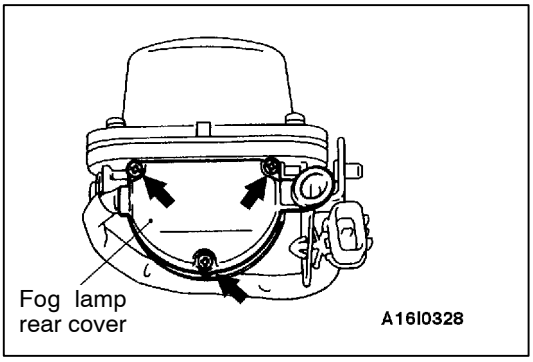
NOTE
The horizontal direction is non-adjustable. If the deviation of the light beam axis exceeds the standard value, check to be sure that the mounting location or some other point is not defective.

Caution
When making the aiming adjustment, be sure to mask those lamps which are not being adjusted.

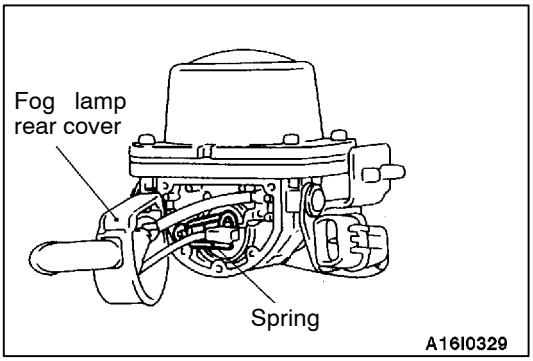
BULB REPLACEMENT

54200130196

1. Remove the fog lamp bezel.
2. Remove the fog lamp unit.



3. Undo the fog lamp rear cover.
4. Unhook the spring which secures the bulb and then remove the bulb.

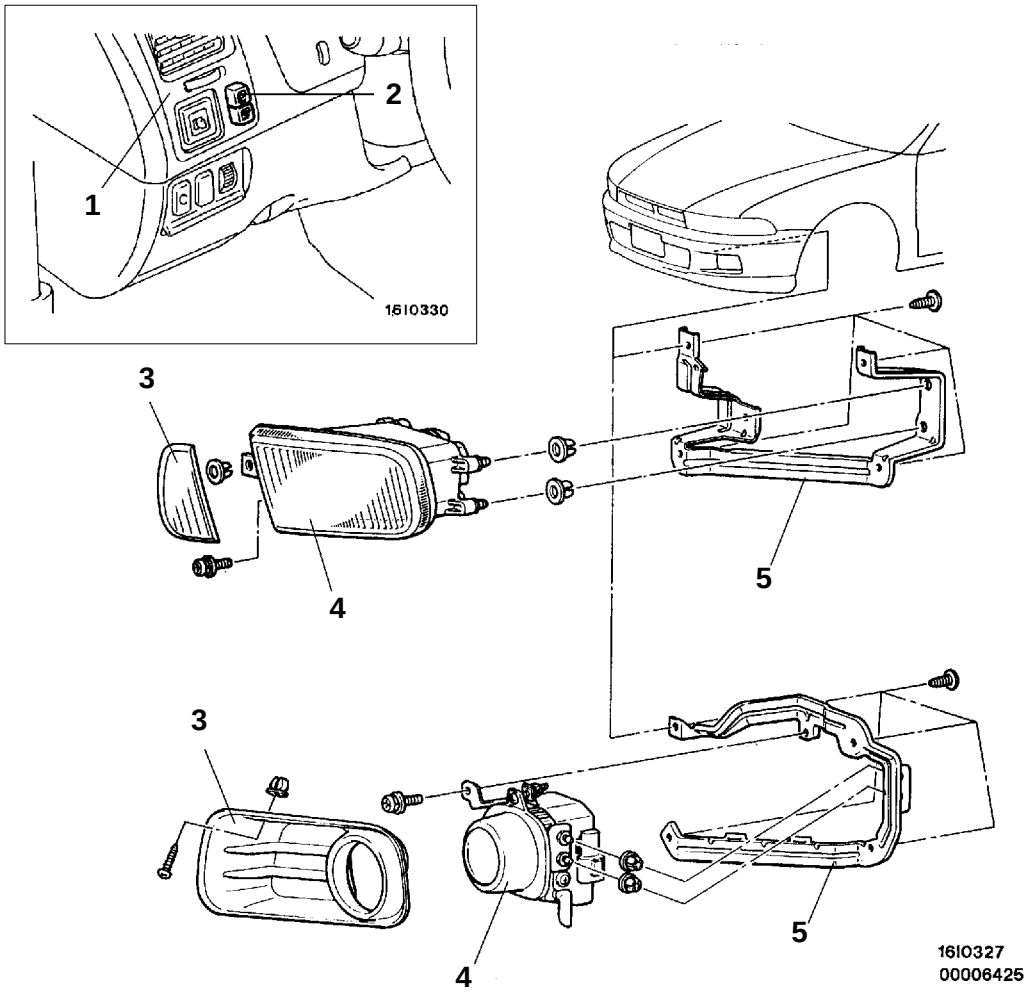


Caution
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

FRONT FOG LAMP

54200150161

REMOVAL AND INSTALLATION



Front fog lamp switch removal steps

1. Side air outlet
2. Front fog lamp switch

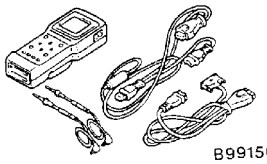
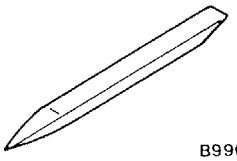
Front fog lamp removal steps

3. Fog lamp bezel
4. Fog lamp
- Front bumper (Refer to GROUP 51.)
5. Fog lamp bracket

REAR COMBINATION LAMP

54200060471

SPECIAL TOOLS

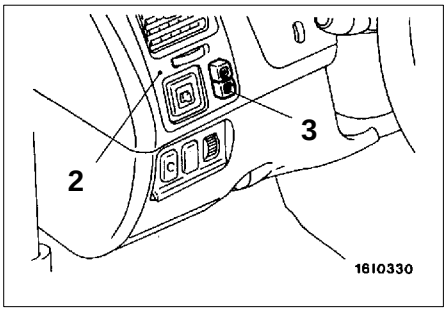
Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	ETACS-ECU input signal checking
 B990784	MB990784	Ornament remover	Removal of side air outlet (L.H.)

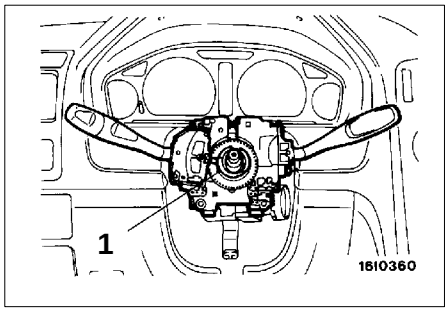
REAR COMBINATION LAMP

54200450094

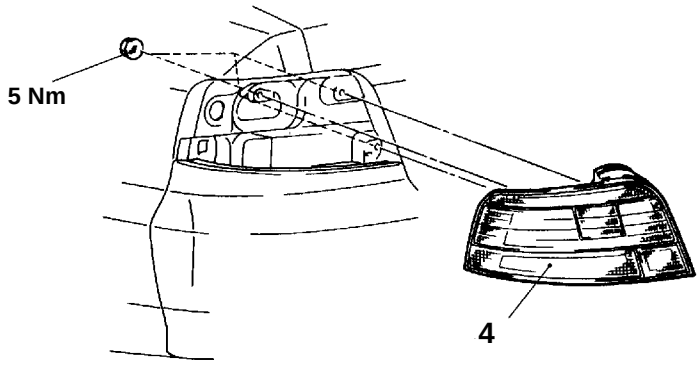
REMOVAL AND INSTALLATION

Caution: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B - SRS Service Precautions and Air Bag Module and Clock Spring.

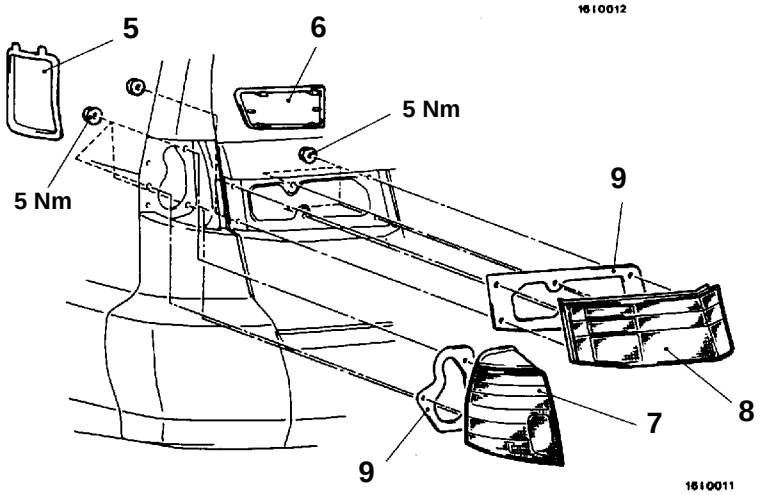




<Sedan>



<Wagon>



00006426

1. Column switch <Lighting switch and turn-signal lamp switch> (Refer to GROUP 37A - Steering Wheel and Shaft.)

◀A▶

Rear fog lamp switch removal steps

2. Side air outlet
3. Rear fog lamp switch

Rear combination lamp removal steps <Sedan>

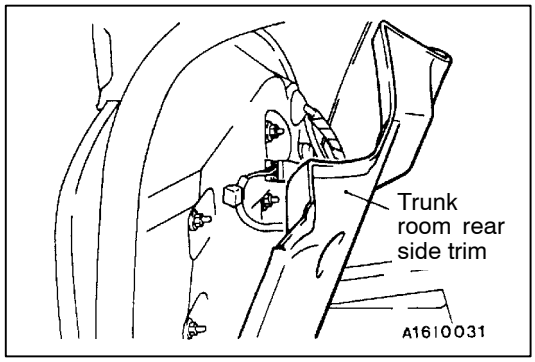
- Rear end side trim (L.H.)
- Side box (L.H.)

4. Rear combination lamp

Rear combination lamp removal steps <Wagon>

5. Maintenance lid
6. Tailgate lamp lid
7. Rear combination lamp
- Tail gate waterproof film (Refer to GROUP 42.)

8. Tailgate lamp
9. Packing



REMOVAL SERVICE POINT

◀A▶ REAR COMBINATION LAMP REMOVAL <SEDAN>

1. Turn up the trunk room rear side trim as shown in the figure, and remove the mounting nut and disconnect the connector.
2. Remove the rear combination lamp.

INSPECTION

54200460035

LIGHTING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK

Refer to P.54-41.

TAIL LAMP RELAY CHECK <Vehicles with Daytime Running Lamp System>

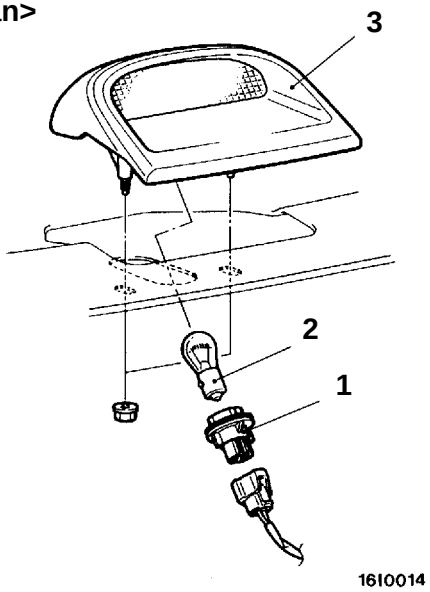
Refer to P.54-42.

HIGH MOUNTED STOP LAMP

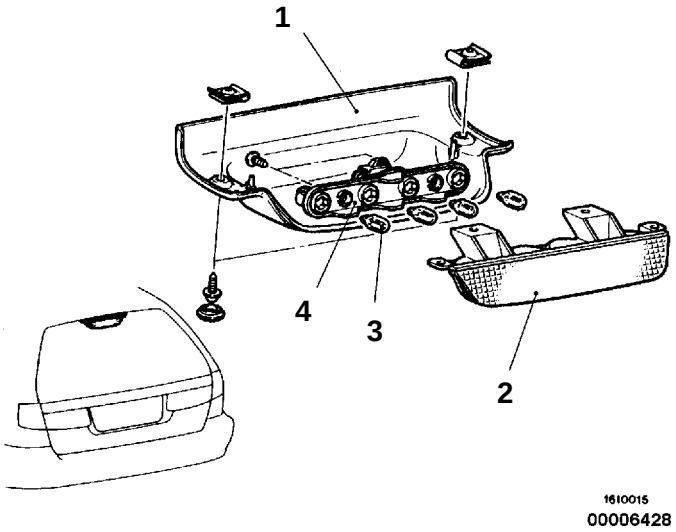
54200510204

REMOVAL AND INSTALLATION

<Sedan>



<Wagon>



Removal steps <Sedan>

1. Socket assembly
2. Bulb
3. High mounted stop lamp

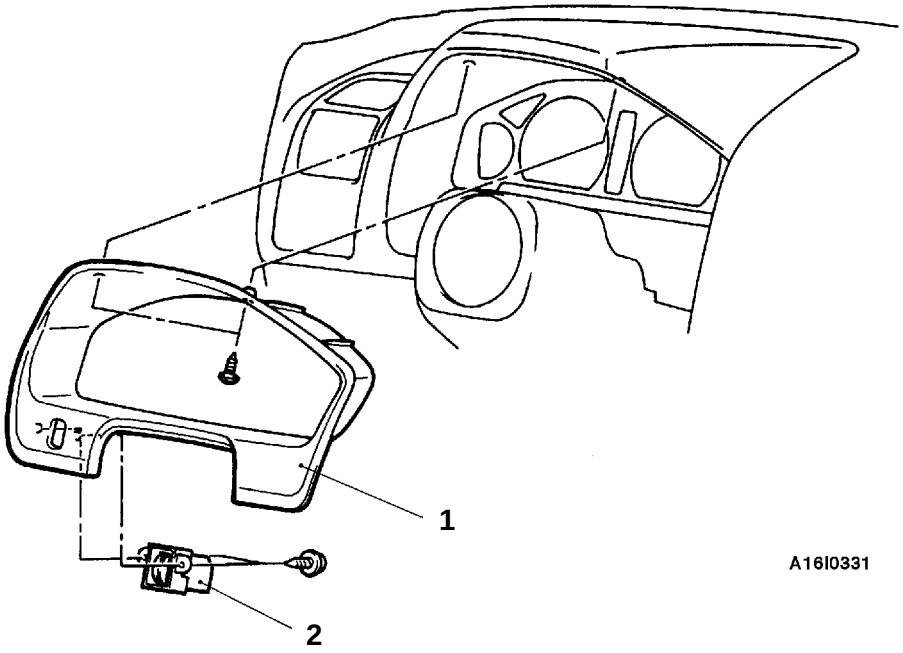
Removal steps <Wagon>

1. Cover
2. Lamp unit
3. Bulb
4. Socket assembly

RHEOSTAT

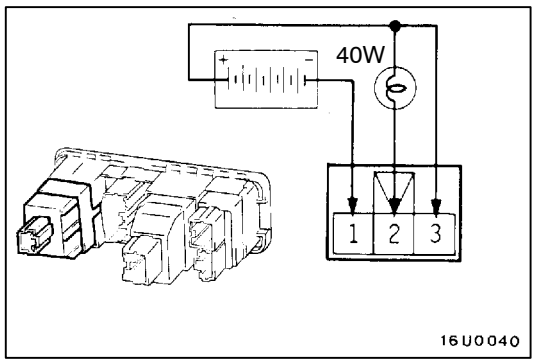
54200600093

REMOVAL AND INSTALLATION



Removal steps

1. Meter bezel assembly
2. Rheostat



INSPECTION

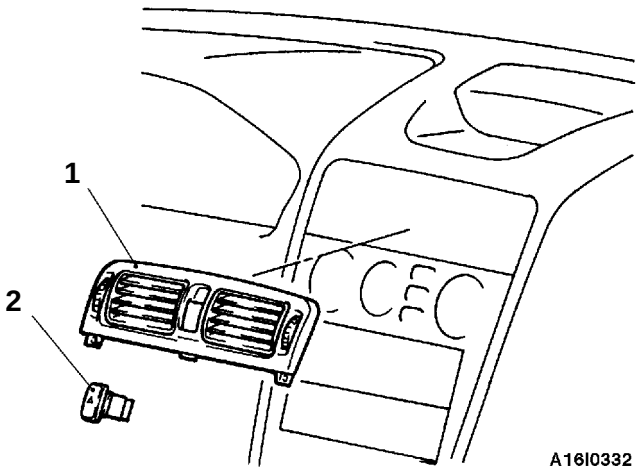
54200610034

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

HAZARD WARNING LAMP SWITCH

54200660121

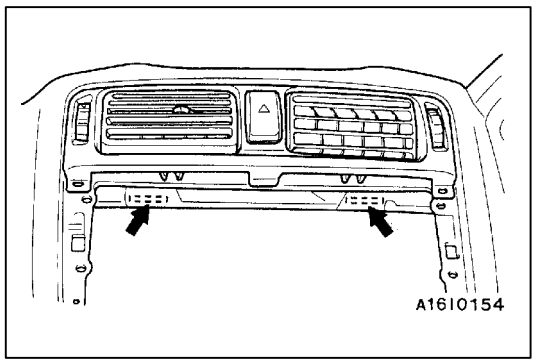
REMOVAL AND INSTALLATION



Removal steps

- Center console panel (Refer to GROUP 52A.)
- A/C-ECU or heater control panel (Refer to GROUP 55.)

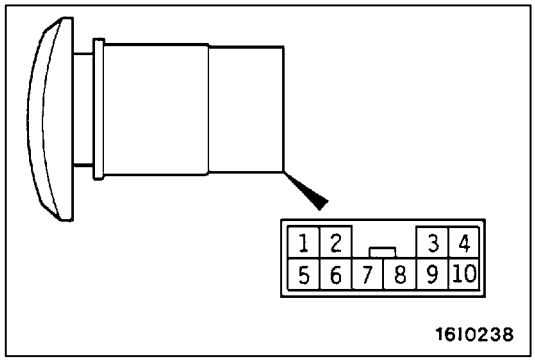
◀A▶ 1. Center outlet assembly
2. Hazard warning lamp switch



REMOVAL SERVICE POINT

◀A▶ CENTER OUTLET ASSEMBLY REMOVAL

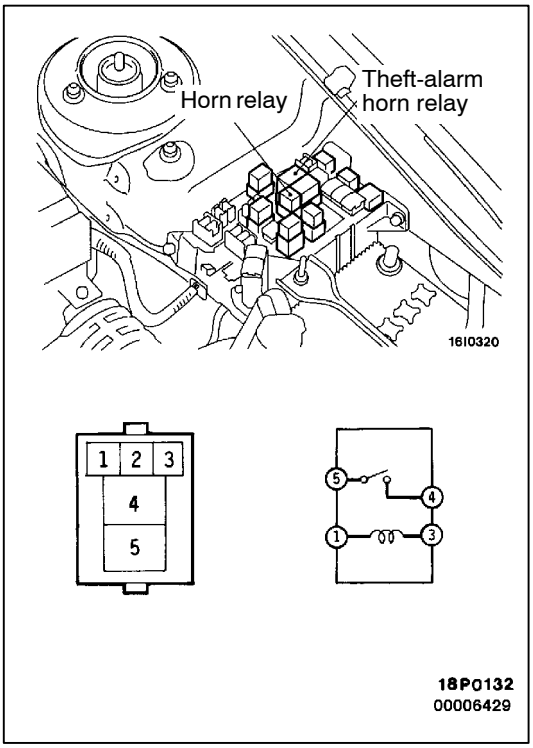
Press the tabs indicated in the illustration, and pull the center outlet assembly to remove it.



INSPECTION

54200670155

Switch position	Terminal No.									
	1	2	3	4	5	6	7	9	-	10
OFF					○		○	○	ILL	○
ON	○	○	○	○	○	○		○	ILL	○

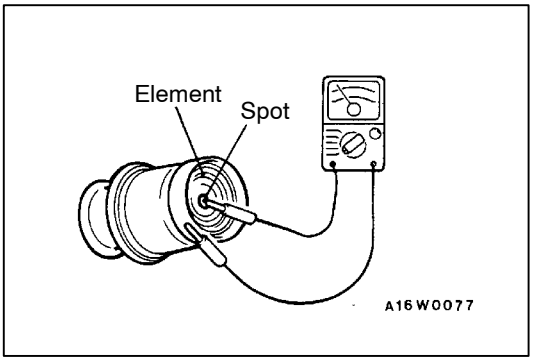


HORN

54300800038

INSPECTION

Switch position	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○



CIGARETTE LIGHTER

54300570083

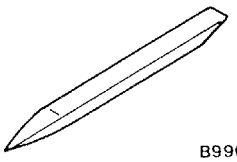
INSPECTION

- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using a circuit tester, check the continuity of the element.

CLOCK

54300060436

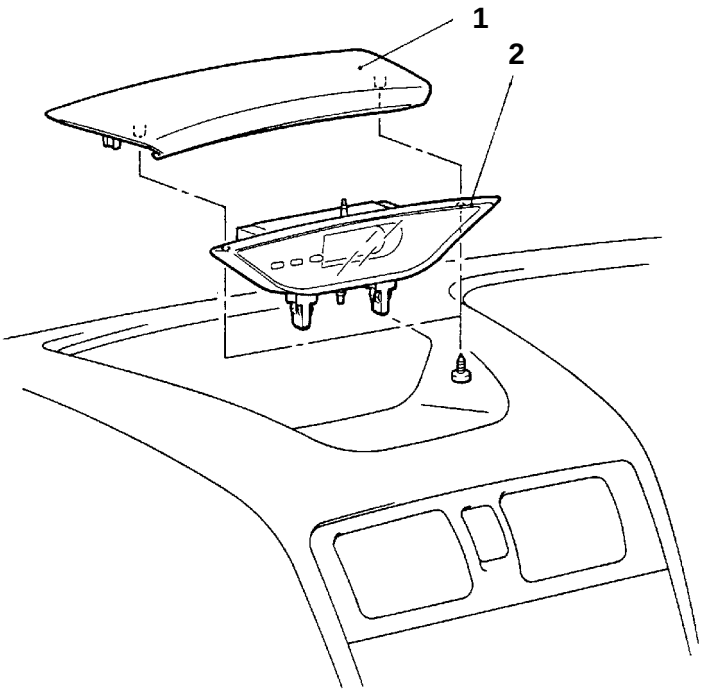
SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of center display bezel

CLOCK

54300590072

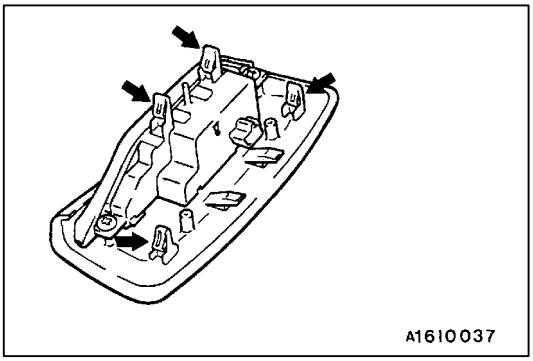
REMOVAL AND INSTALLATION



A1610038

Removal steps

◀A▶ 1. Center display bezel
◀A▶ 2. Clock



A1610037

REMOVAL SERVICE POINT

◀A▶ CENTER DISPLAY BEZEL/CLOCK REMOVAL

Use the special tool (MB990784) to pry up the tabs indicated in the illustration, and remove the center display bezel and the clock.

RADIO AND TAPE PLAYER

54400070227

TROUBLESHOOTING

QUICK-REFERENCE TROUBLESHOOTING CHART

Items	Problem symptom	Relevant chart
Noise	Noise appears at certain places when travelling (AM).	A-1
	Noise appears at certain places when travelling (FM).	A-2
	Mixed with noise, only at night (AM).	A-3
	Broadcasts can be heard but both AM and FM have a lot of noise.	A-4
	There is more noise either on AM or on FM.	A-5
	There is noise when starting the engine.	A-6
	Some noise appears when there is vibration or shocks during travelling.	A-7
	Noise sometimes appears on FM during travelling.	A-8
	Ever-present noise.	A-9
Radio	When switch is set to ON, no power is available.	B-1
	No sound from one speaker.	B-2
	There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.	B-3
	Insufficient sensitivity.	B-4
	Distortion on AM or on both AM and FM.	B-5
	Distortion on FM only.	B-6
	Too few automatic select stations.	B-7
	Insufficient memory (preset stations are erased).	B-8

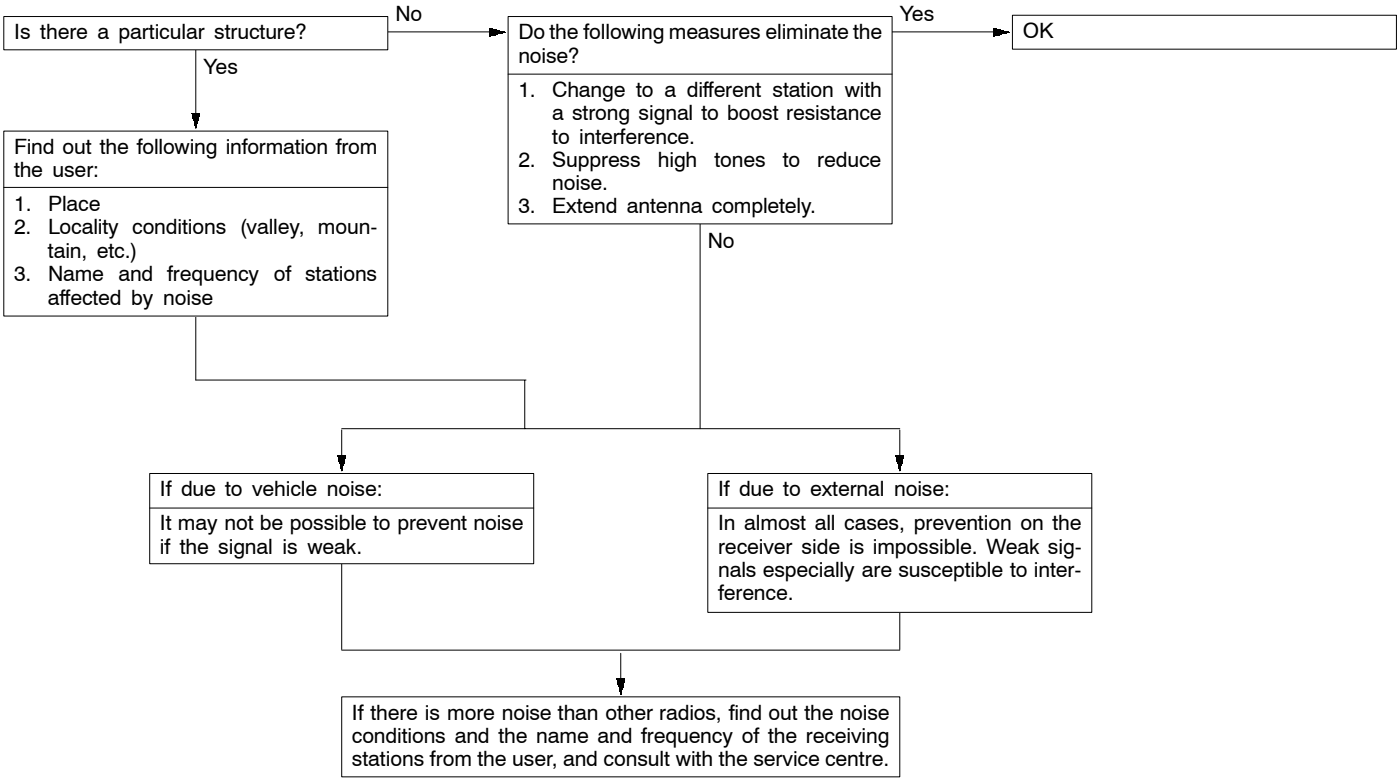
NOTE
Refer to problem symptoms of AM radio for MW radio.

Items	Problem symptom	Relevant chart
Tape player	Cassette tape will not be inserted.	C-1
	No sound.	C-2
	No sound from one speaker.	C-3
	Sound quality is poor, or sound is weak.	C-4
	Cassette tape will not be ejected.	C-5
	Uneven revolution. Tape speed is fast or slow.	C-6
	Faulty auto reverse.	C-7
	Tape gets caught in mechanism.	C-8
Motor antenna	Motor antenna won't extend or retract.	D-1
	Motor antenna extends and retracts but does not receive.	D-2

CHART

A. NOISE

A-1 Noise appears at certain places when travelling (AM).



A-2 Noise appears at certain places when travelling (FM).

Do the following measures eliminate the noise?
- Change to a different station with a strong signal to boost resistance to interference.
- Suppress high tones to reduce noise.
- Extend antenna completely.

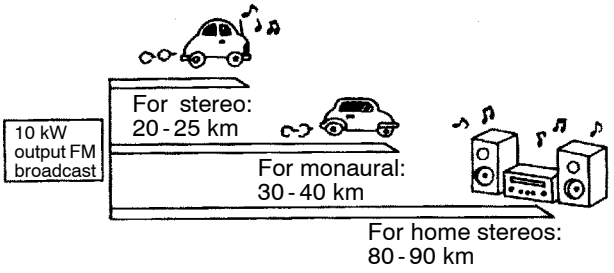
Yes → OK

No → If there is more noise than other radios, find out the noise conditions and the name and frequency of the receiving stations from the user, and consult with the service centre.

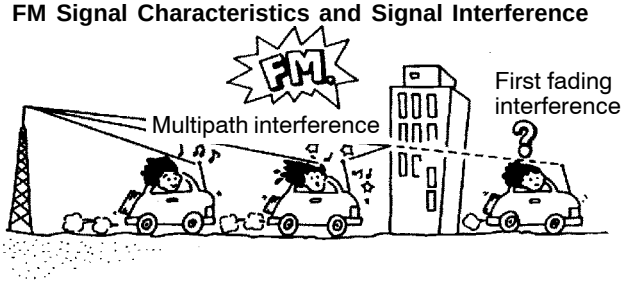
NOTE
About FM waves:
FM waves have the same properties as light, and can be deflected and blocked. Wave reception is not possible in the shadow of obstructions such as buildings or mountains.

1. The signal becomes weak as the distance from the station's transmission antenna increases. Although this may vary according to the signal strength of the transmitting station and intervening geographical formation or buildings, the area of good reception is approx. 20 - 25 km for stereo reception, and 30 - 40 km for monaural reception.
2. The signal becomes weak when an area of shadow from the transmitting antenna (places where there are obstructions such as mountains or buildings between the antenna and the car), 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. During travelling, 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 repetitious buzzing.>
4. Since FM stereo transmission and reception has a weaker field than monaural, it is often accompanied by a hissing noise.

FM Broadcast Good Reception Areas



FM Signal Characteristics and Signal Interference

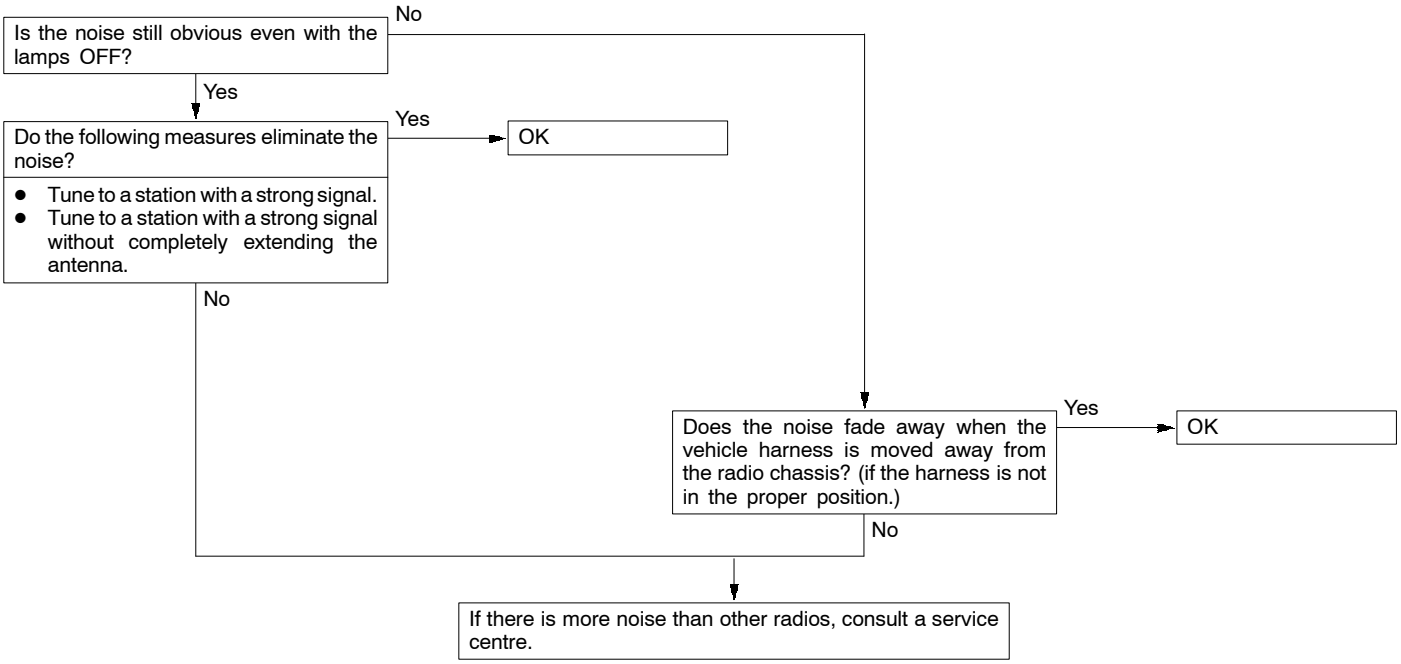


16W0268

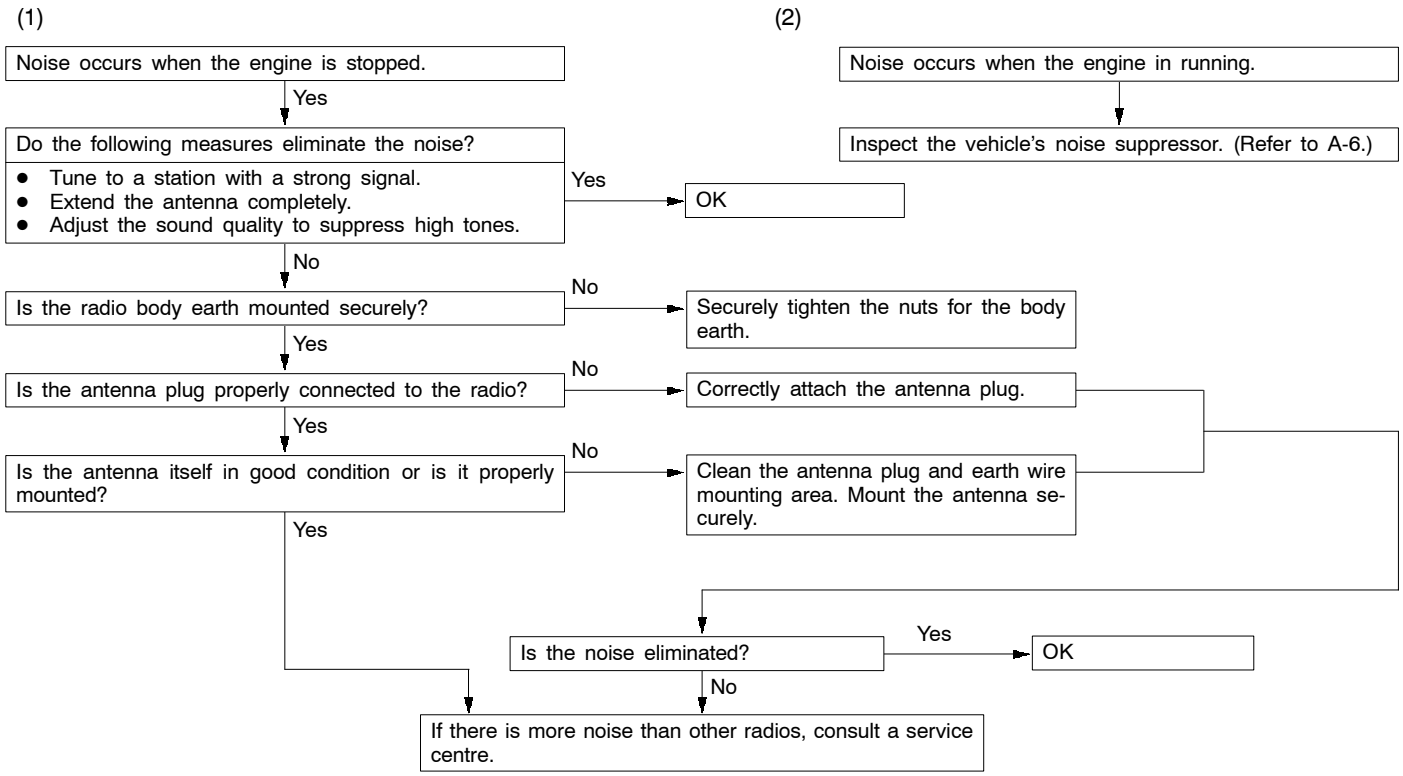
A-3 Mixed with noise, only at night (AM).

The following factors can be considered as possible causes of noise appearing at night.

1. Factors due to signal conditions: Due to the fact that long-distance signals are more easily received at night, even stations that are received without problem during the day may experience interference in a general worsening of reception conditions. The weaker a station is the more susceptible it is to interference, and a change to a different station or the appearance of a beating sound* may occur. Beat sound*: Two signals close in frequency interfere with each other, creating a repetitious high-pitched sound. This sound is generated not only by sound signals but by electrical waves as well.
2. Factors due to vehicle noise: Alternator noise may be a cause.



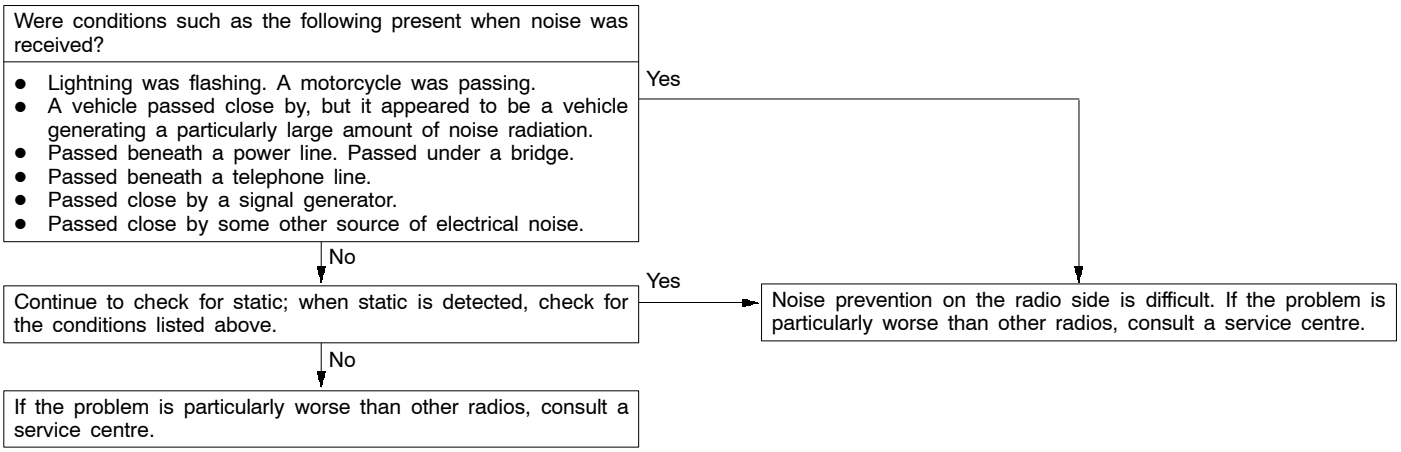
A-4 Broadcasts can be heard but both AM and FM have a lot of noise.



NOTE
About noise encountered during FM reception only. Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2.)
<Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>

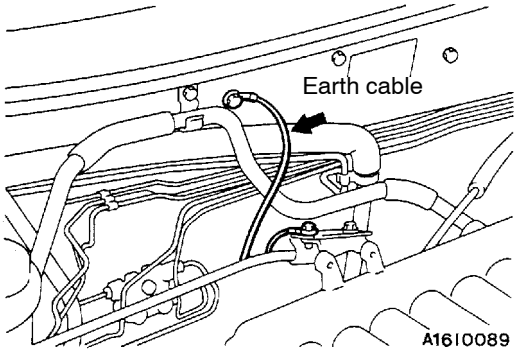
A-5 There is more noise either on AM or on FM.

1. There is much noise only on AM.
   Due to differences in AM and FM systems, AM is more susceptible to noise interference.



2. There is much noise only on FM.
   Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2) <Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>

A-6 There is noise when starting the engine.

Noise type Sounds are in parentheses ( ).	Conditions	Cause	Remedy
AM, FM: Ignition noise (Popping, snapping, cracking, buzzing)	● Increasing the engine speed causing the popping sound to speed up, and volume decreases. ● Disappears when the ignition switch is turned to ACC.	● Mainly due to the spark plugs. ● Due to the engine noise.	● Check or replace the earth cable.  ● Check or replace the noise capacitor.
Other electrical components	-	Noise may appear as electrical components become older.	Repair or replace electrical components.
Static electricity (Cracking, crinkling)	● Disappears when the vehicle is completely stopped. ● Severe when the clutch is engaged.	Occurs when parts or wiring move for some reason and contact metal parts of the body.	Return parts or wiring to their proper position.
	● Various noises are produced depending on the body part of the vehicle.	Due to detachment from the body of the front hood, bumpers, exhaust pipe and muffler, suspension, etc.	Tighten the mounting bolts securely. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly earthed.

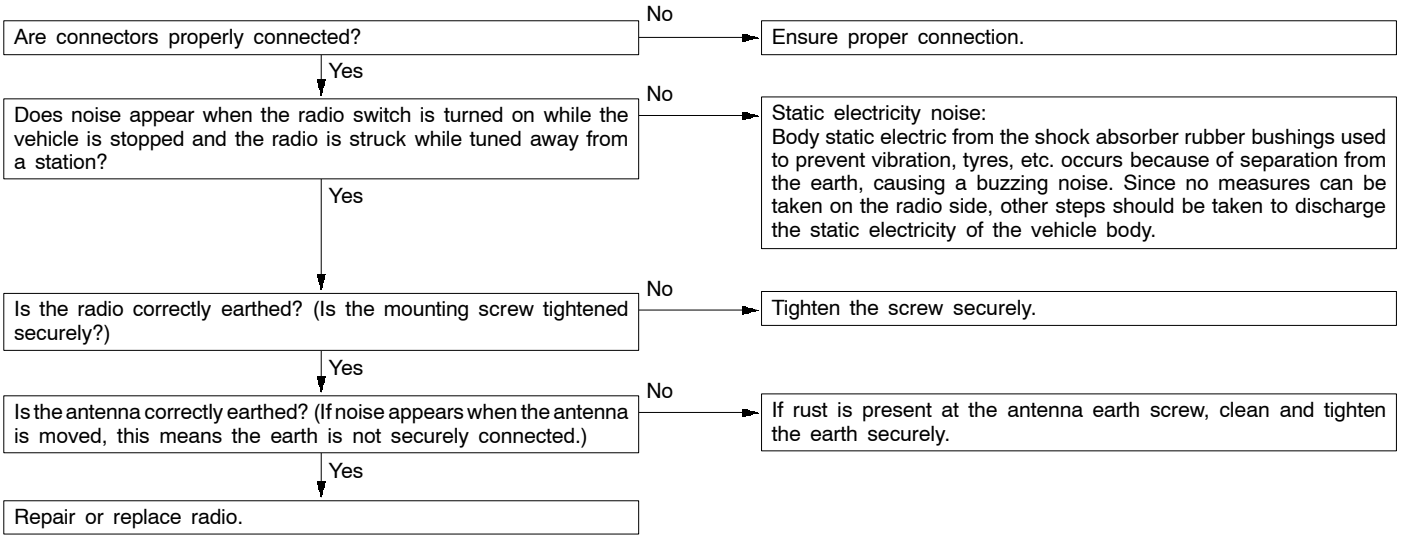
Caution

1. **Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.**
2. **Check that there is no external noise. Since failure caused by this may result in misdiagnosis due to inability to identify the noise source, this operation must be performed.**
3. **Noise prevention should be performed by suppressing strong sources of noise step by step.**

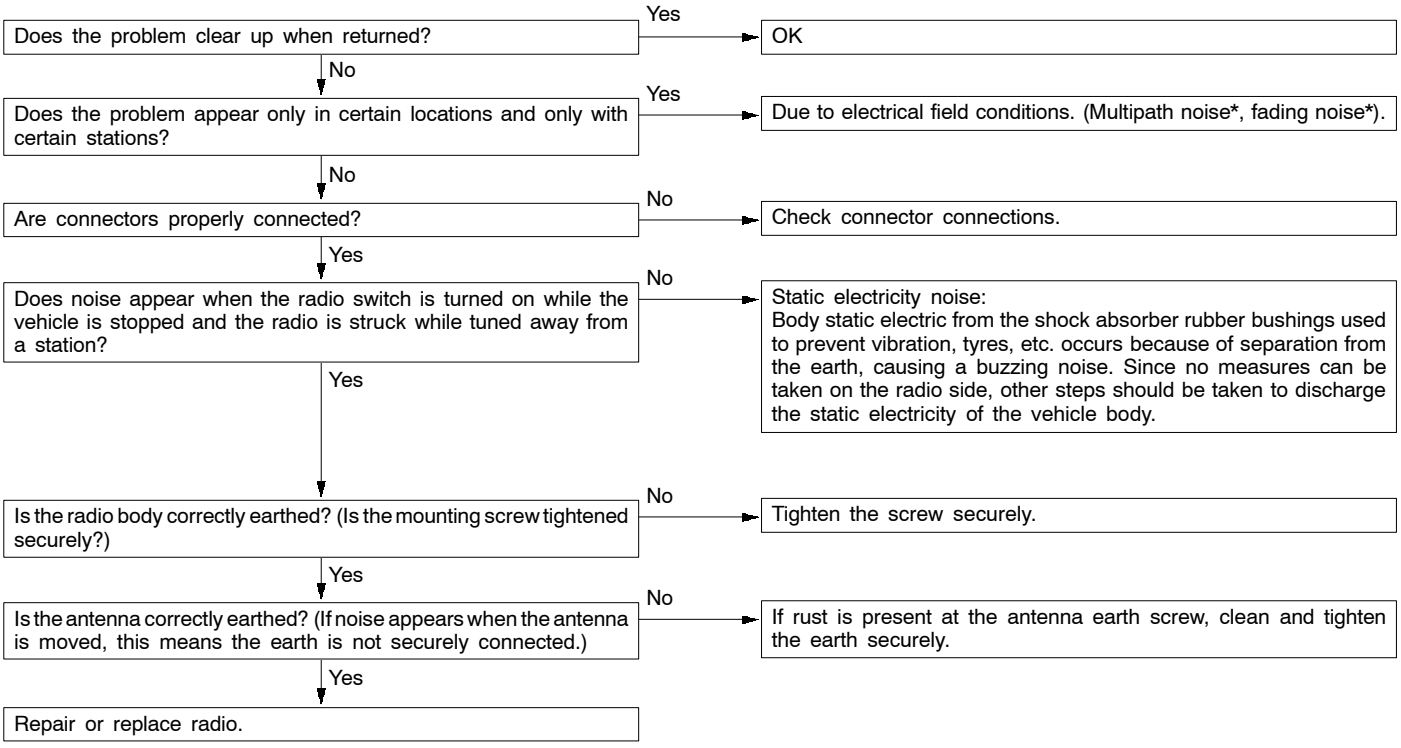
NOTE

1. Capacitor
   The capacitor does not pass D.C. current, but as the number of waves increases when it passes A.C. current, impedance (resistance against A.C.) decreases, and current flow is facilitated. A noise suppressing condenser which takes advantage of this property is inserted between the power line for the noise source and the earth. This suppresses noise by earthing the noise component (A.C. or pulse signal) to the body of the vehicle.
2. Coil
   The coil passes D.C. current, but impedance rises as the number of waves increases relative to the A.C. current. A noise suppressing coil which takes advantage of this property is inserted into the power line for the noise source, and works by preventing the noise component from flowing or radiating out of the line.

A-7 Some noise appears when there is vibration or shocks during travelling.



A-8 Noise sometimes appears on FM during travelling.



* About multipath noise and fading noise
Because the frequency of FM waves is 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 beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

A-9 Ever-present noise.

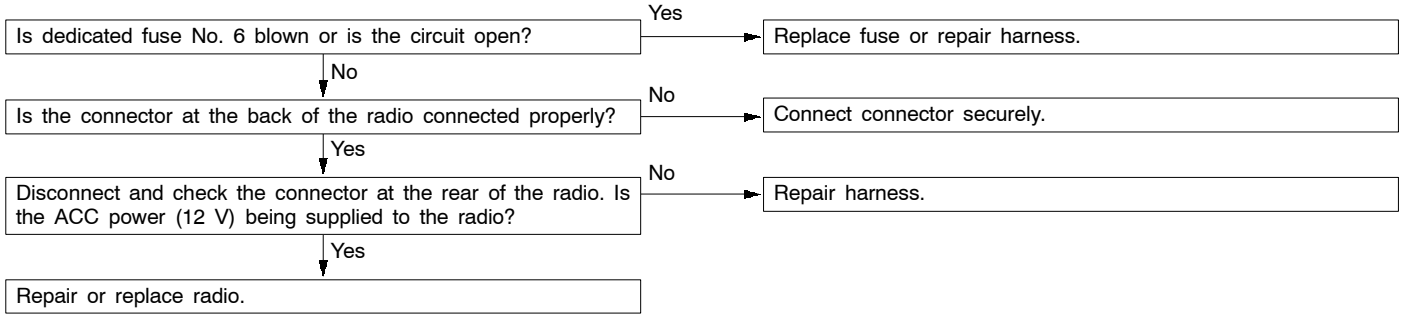
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

- Travelling conditions of the vehicle
- Terrain of area travelled through
- Surrounding buildings
- Signal conditions
- Time period

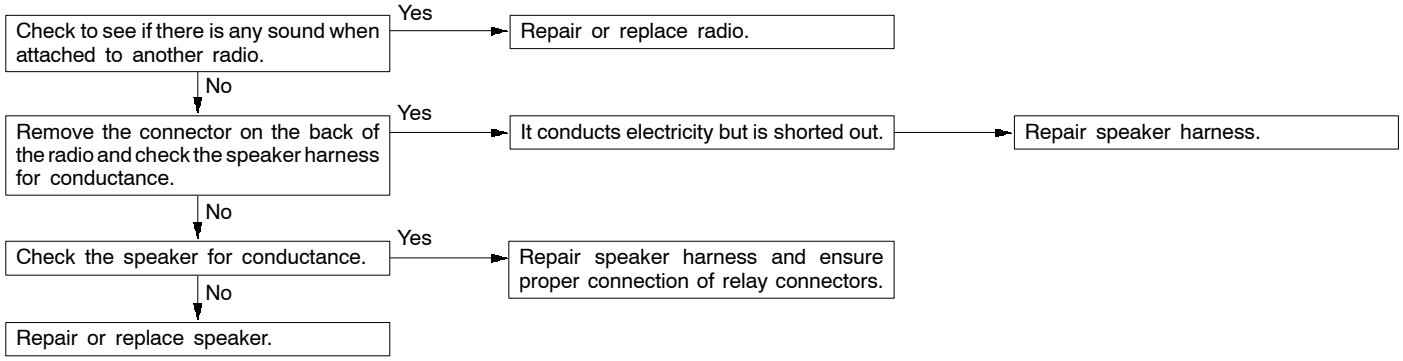
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

B. RADIO

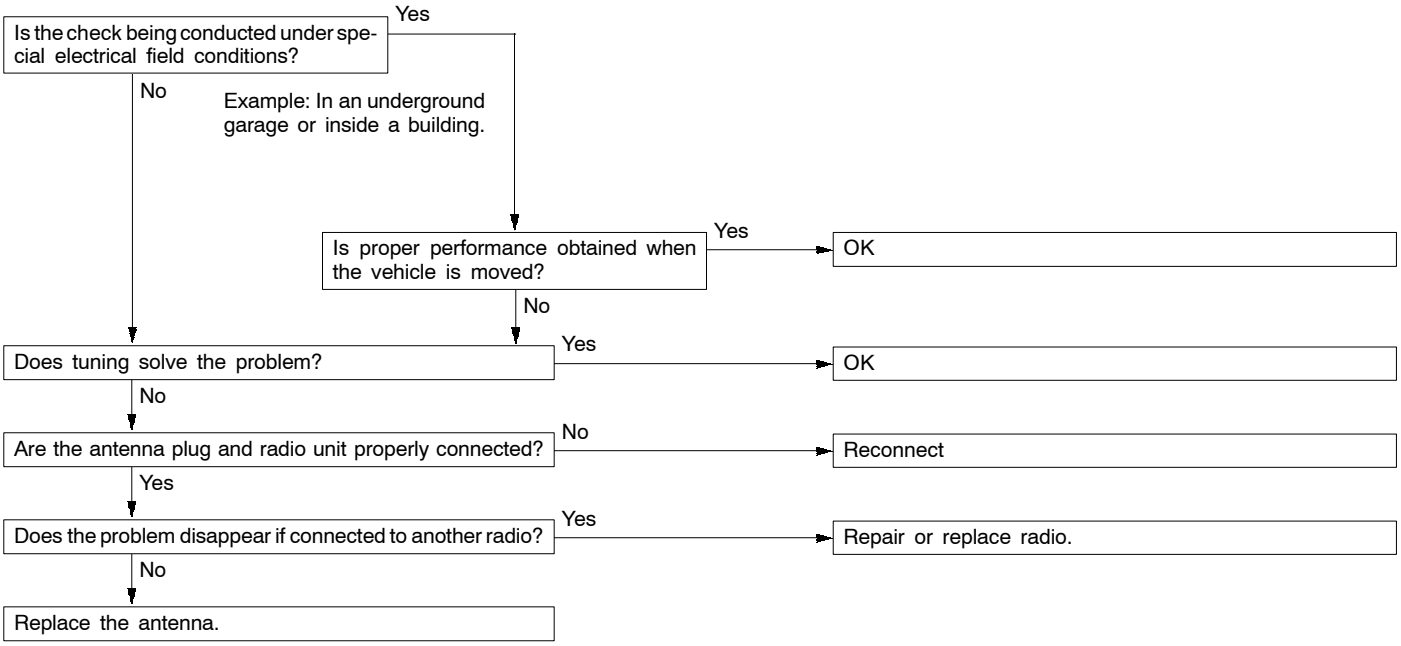
B-1 No power is supplied when the switch is set to ON.



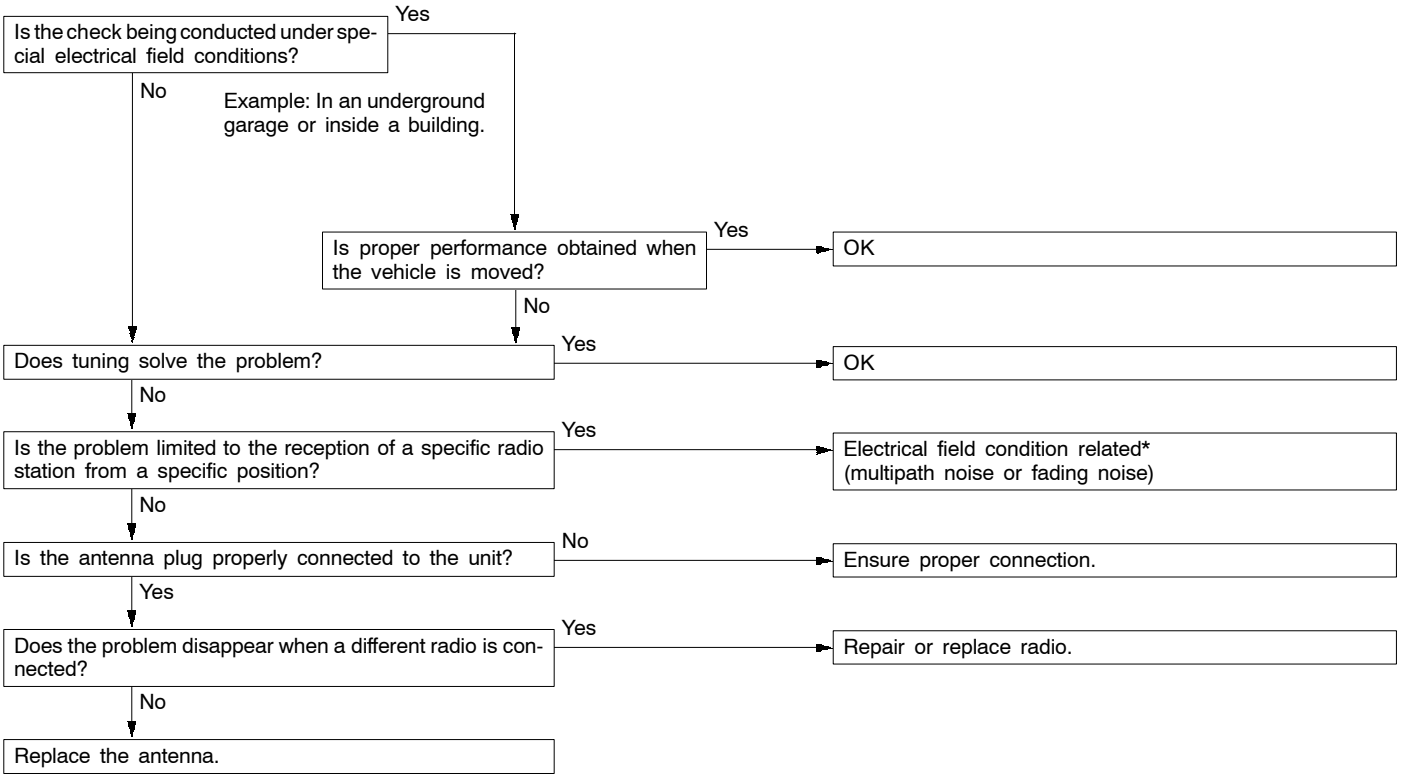
B-2 No sound from one speaker.



B-3 There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.

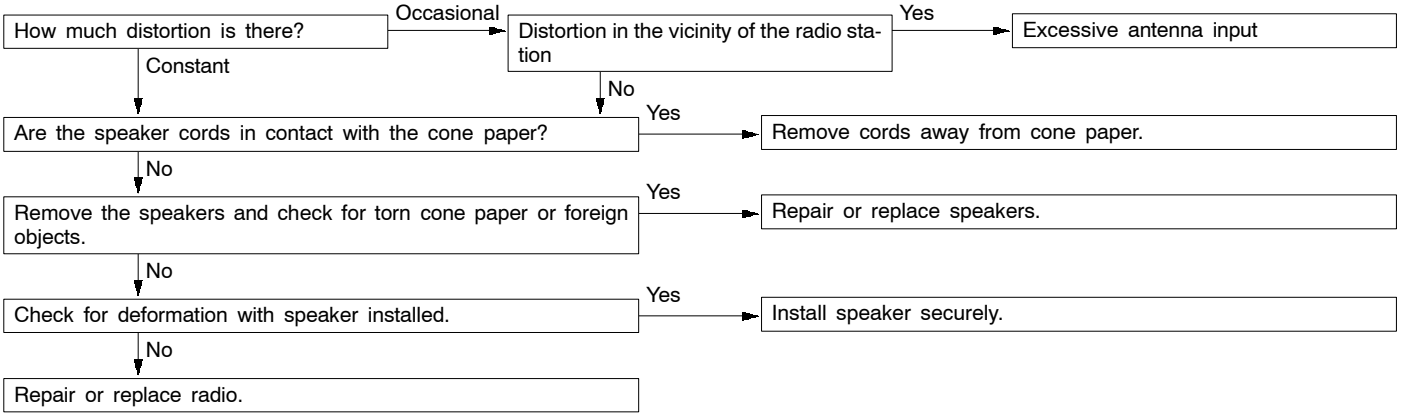


B-4 Insufficient sensitivity.

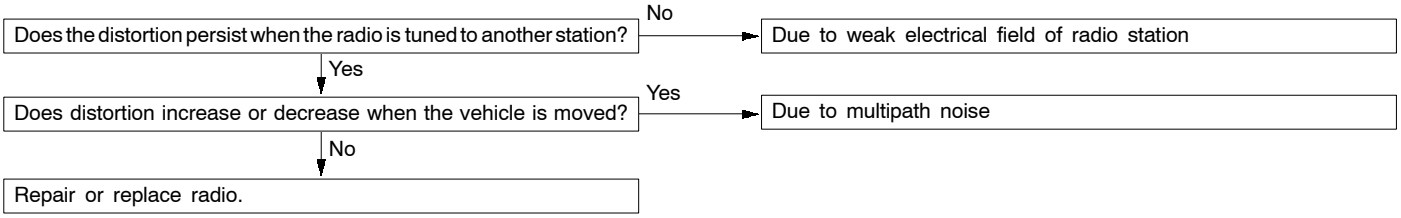


* For multipath noise and fading noise problems, refer to P. 54-63.

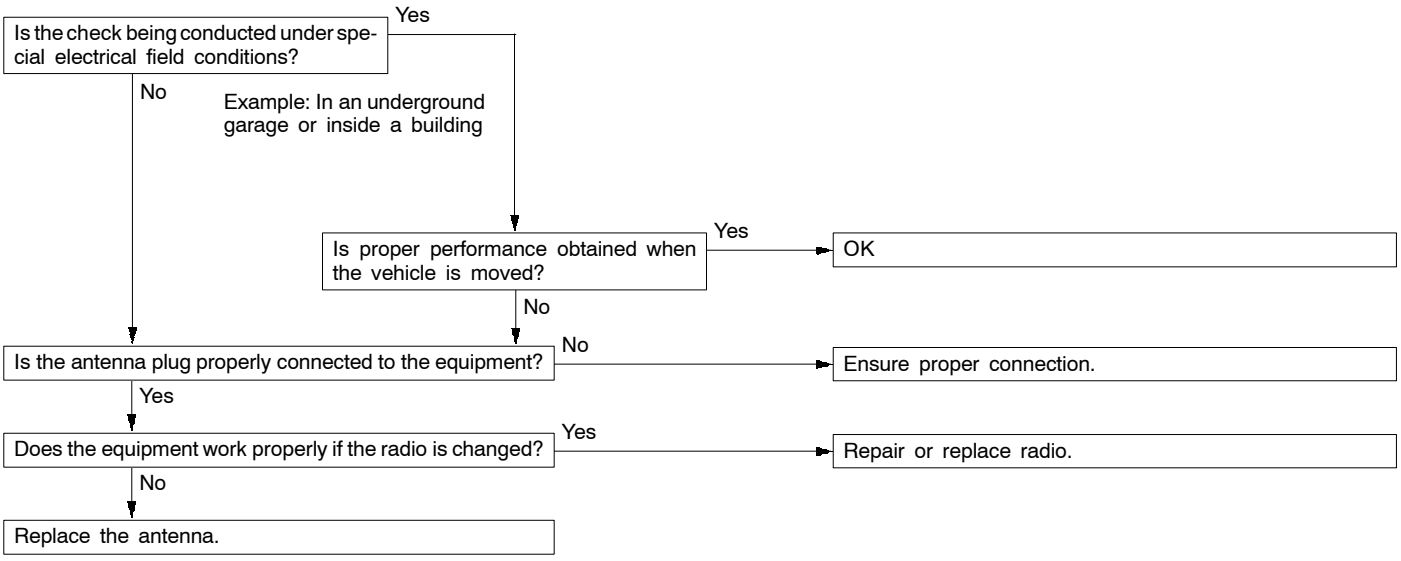
B-5 Distortion on AM or on both AM and FM.



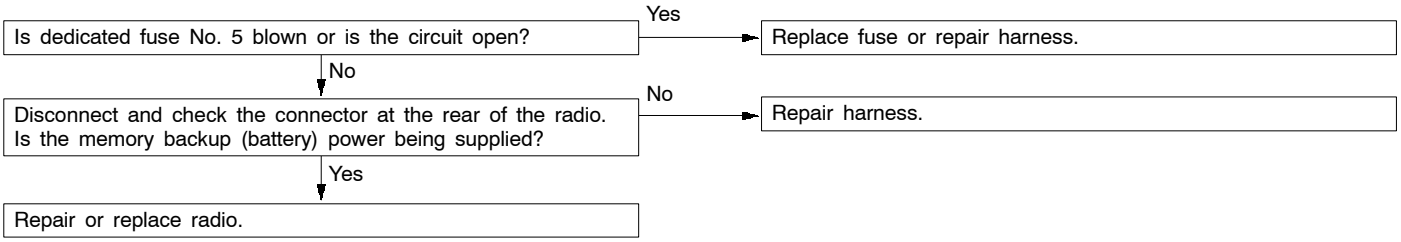
B-6 Distortion on FM only



B-7 Too few automatic select stations.

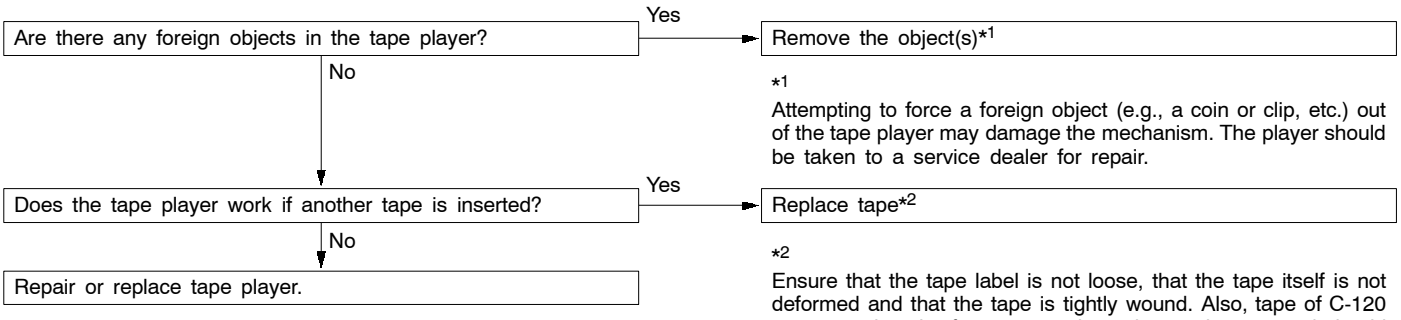


B-8 Insufficient memory (preset stations are erased).



C. TAPE PLAYER

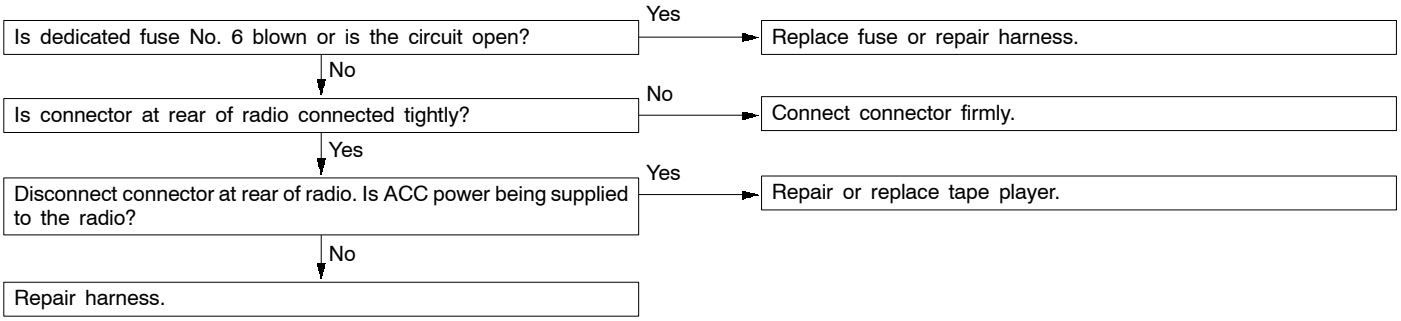
C-1 Cassette tape will not be inserted.



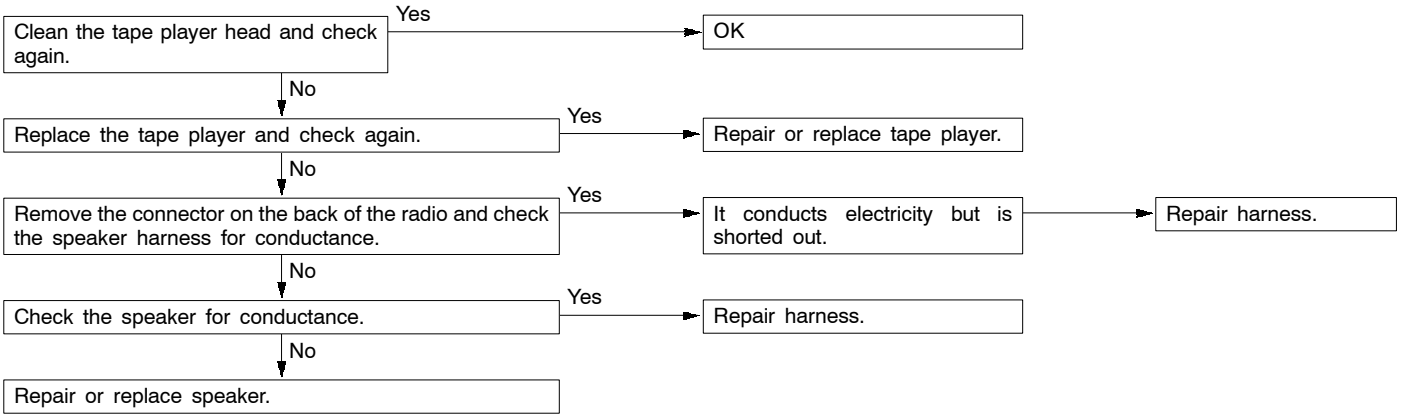
*1
Attempting to force a foreign object (e.g., a coin or clip, etc.) out of the tape player may damage the mechanism. The player should be taken to a service dealer for repair.

*2
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

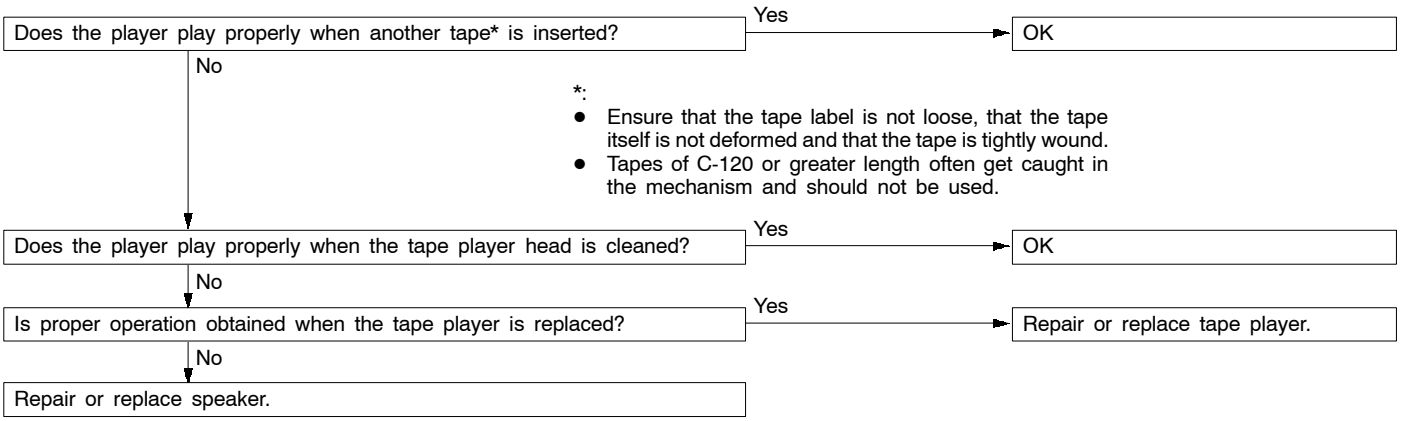
C-2 No sound (even after a tape has been inserted).



C-3 No sound from one speaker.



C-4 Sound quality is poor, or sound is weak.



C-5 Cassette tape will not be ejected.

The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.

C-6 Uneven revolution. Tape speed is fast or slow.

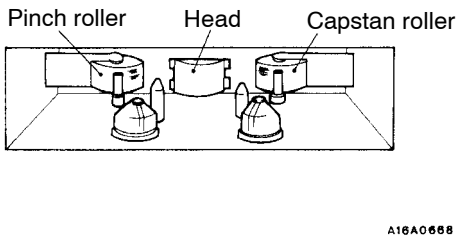
Does the player play OK if the tape*1 is changed?
- Yes → OK
- No

*1
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

Are there any foreign objects *2 inside the tape player?
- Yes → Remove foreign object(s).
- No

*2
Attempting to force a foreign object (e.g., a coin or clip, etc.) out of the tape player may damage the mechanism. The player should be taken to a service dealer for repair.

Is the head or capstan roller diry?
- Yes → Clean.



- No

Repair or replace tape player.

C-7 Faulty auto reverse.

Does the player play OK if the tape* is changed?
- Yes → OK
- No

*:
- Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound.
- Tapes of C-120 or greater length often get caught in the mechanism and should not be used.

Does the problem only occur while the vehicle is being driven?
- No → Repair or replace tape player.
- Yes

Is the tape player properly installed to the vehicle?
- No → Ensure tape player installation.
- Yes

Repair or replace tape player.

C-8 Tape gets caught in mechanism*1.

*1
When the tape is caught in the mechanism, the case may not eject. When this occurs, do not try to force the tape out as this may damage the tape player mechanism. Take the cassette to a service dealer for repair.

Does the player play OK if the tape*2 is changed?
- Yes → Tape used is bad.
- No → Repair or replace tape player.

*2
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tapes of C-120 or greater length often get caught in the mechanism and should not be used.

D. MOTOR ANTENNA

D-1 Motor antenna won't extend or retract.

Clean and polish the surface of the antenna rod.

Is the radio power switch ON?
- No → Switch it ON.
- Yes ↓

Is voltage (approx. 12 V) emitted to the radio's motor antenna terminal?
- No → Repair or replace the radio.
- Yes ↓

Is the antenna bent?
- Yes → Repair the bend, or replace the antenna mast.
- No ↓

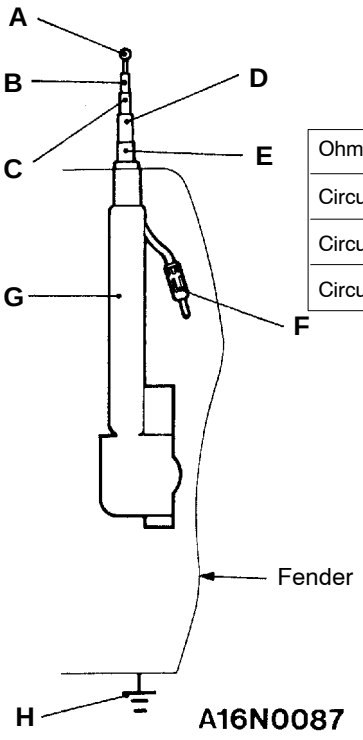
Is the antenna relay OK?
- No → Replace the antenna relay.
- Yes ↓

Is the motor OK?
- No → Replace the motor.
- Yes ↓

Repair the harness.

D-2 Motor antenna extends and retracts but does not receive.

Is the antenna itself OK?



Ohmmeter measurement locations	Result
Circuits from F to A, B, C, D and E	Continuity
Circuit between G and H	Continuity
Circuits from H to A, B, C, D and E	No continuity

No → Repair or replace it.

Yes

Is operation normal when a new antenna assembly is directly installed to the radio?

No → Refer to B "Radio trouble-shooting".

Yes

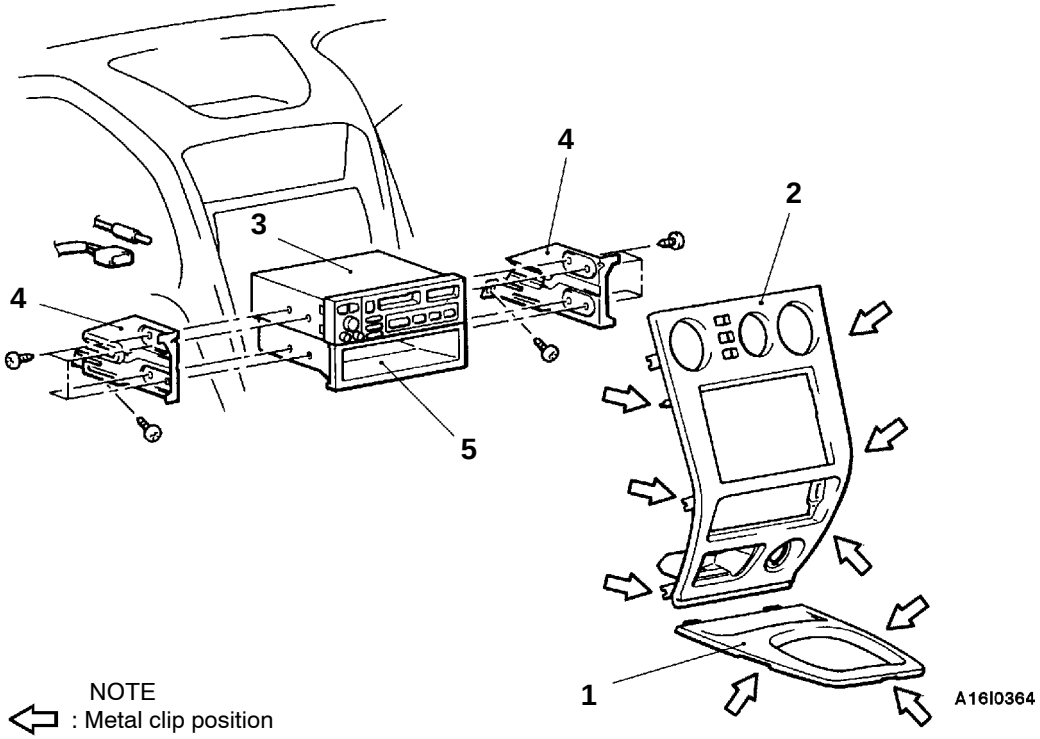
Replace the feeder cable.

RADIO AND TAPE PLAYER

54400140126

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Ashtray and Sunglasses Pocket Removal and Installation



NOTE
⇦ : Metal clip position

Removal steps

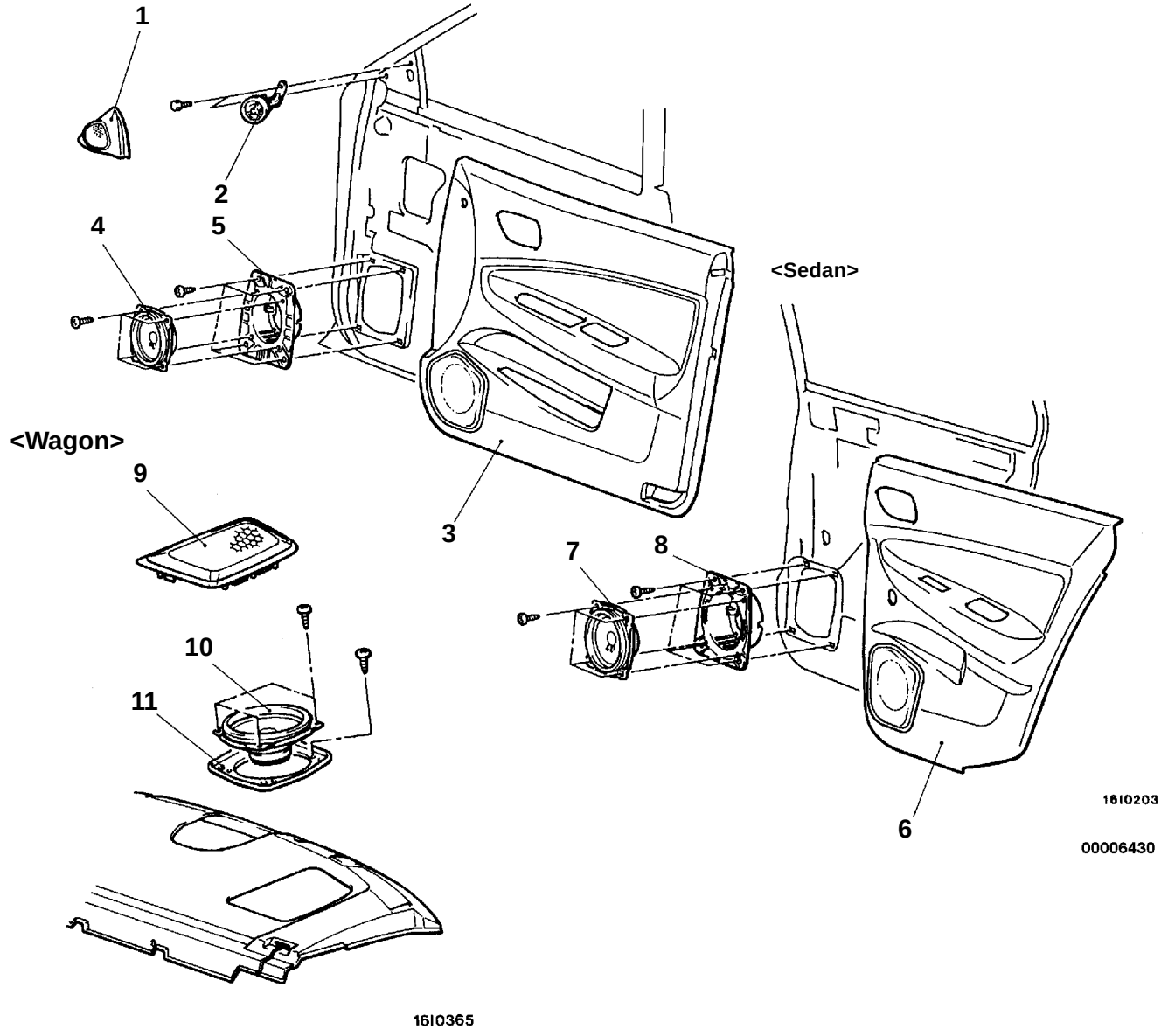
1. Floor console panel
2. Centre console panel assembly
3. Radio and tape player
4. Radio bracket
5. Box

SPEAKER

54400260266

REMOVAL AND INSTALLATION

<Sedan, Wagon>



Speaker (front door) removal steps

1. Tweeter cover
   <Vehicles with 6 speakers>
2. Tweeter
   <Vehicles with 6 speakers>
3. Front door trim
   (Refer to GROUP 42.)
4. Speaker
5. Speaker cover

Speaker (rear door) removal steps

6. Rear door trim
   (Refer to GROUP 42.)
7. Speaker
8. Speaker cover

Speaker (rear shelf) removal steps

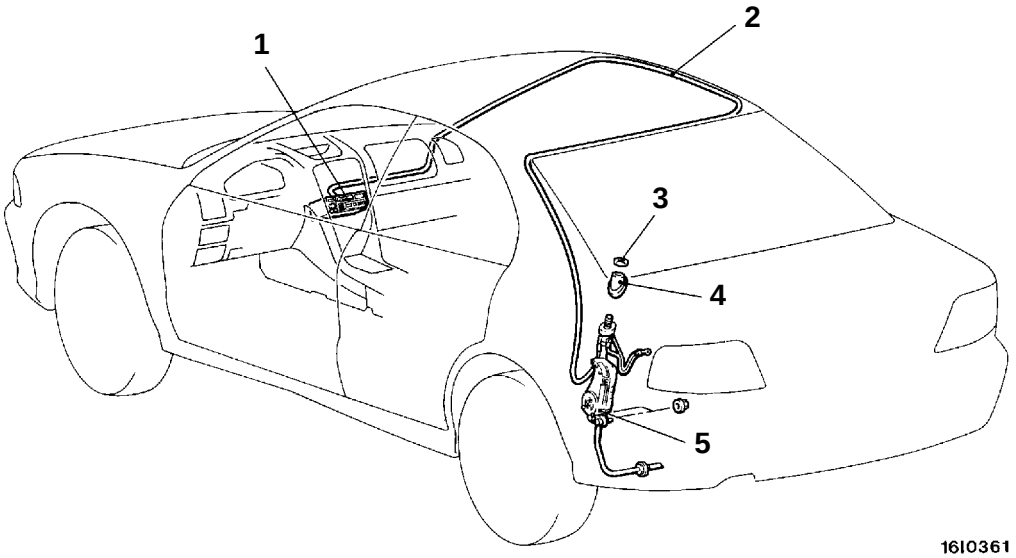
9. Speaker garnish
10. Speaker
11. Speaker bracket

ANTENNA

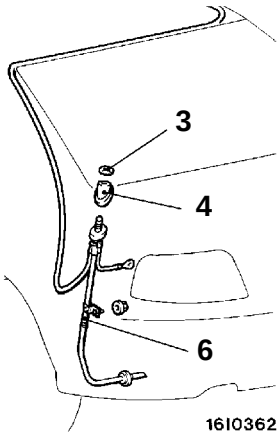
54400290180

REMOVAL AND INSTALLATION

<Sedan - Vehicles with motor antenna>



<Sedan - Vehicles with pole antenna>



00006431

Antenna feeder cable removal steps

1. Radio and tape player
- Instrument panel (Refer to GROUP 52A.)
- Front pillar trim (Refer to GROUP 52A.)
- Centre pillar trim (Refer to GROUP 52A.)
- Rear pillar trim (Refer to GROUP 52A.)
- Headlining

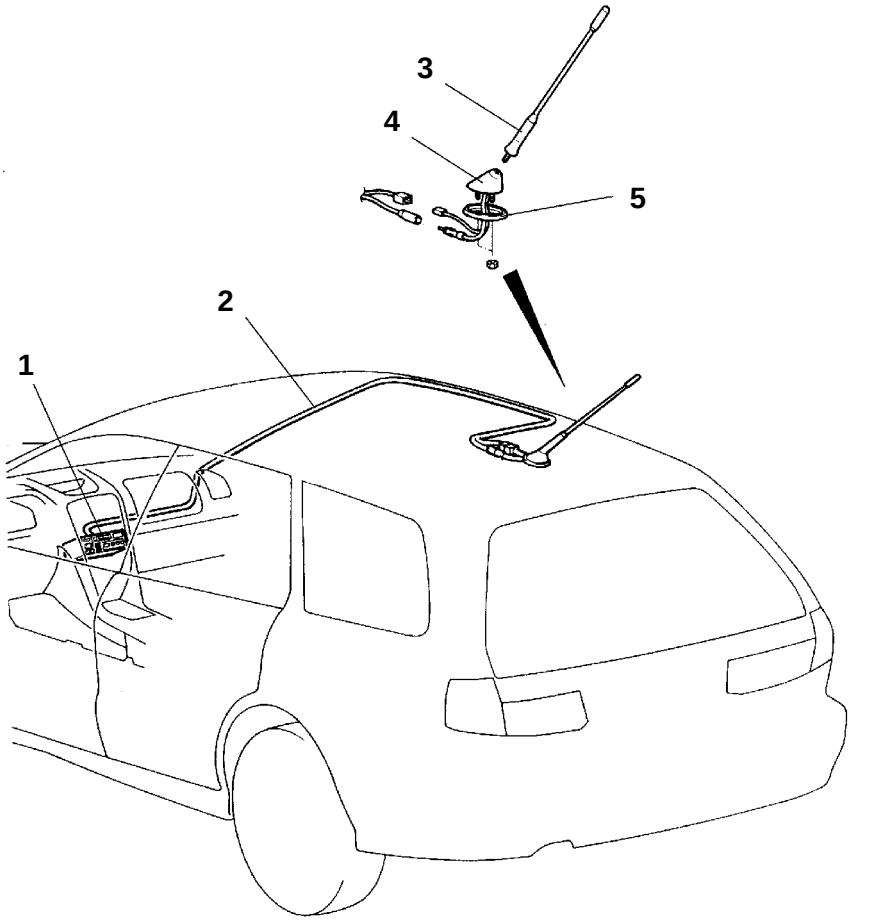
2. Antenna feeder cable

Motor antenna or pole antenna removal steps

- Trunk side trim (L.H.) (Refer to GROUP 52A.)

3. Ring nut
4. Base
5. Motor antenna
6. Pole antenna

<Wagon>



Antenna feeder cable removal steps

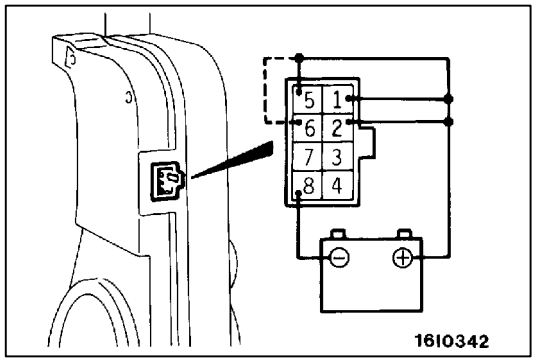
1. Radio and tape player
- Instrument panel
- Front pillar trim (Refer to GROUP 52A.)
- Centre pillar trim (Refer to GROUP 52A.)
- Quarter upper trim (Refer to GROUP 52A.)
- Headlining

2. Antenna feeder cable

Antenna (rear roof) removal steps

3. Rod assembly
- Headlining

4. Cover
5. Packing

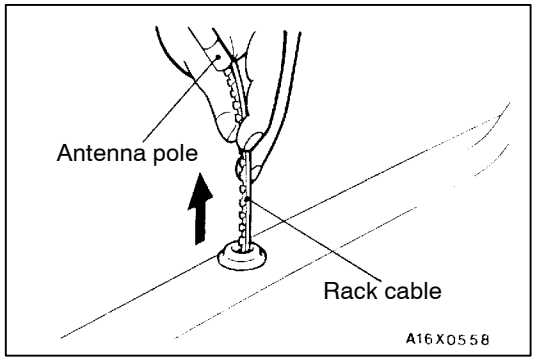


INSPECTION

54400360072

MOTOR ANTENNA ASSEMBLY CHECK

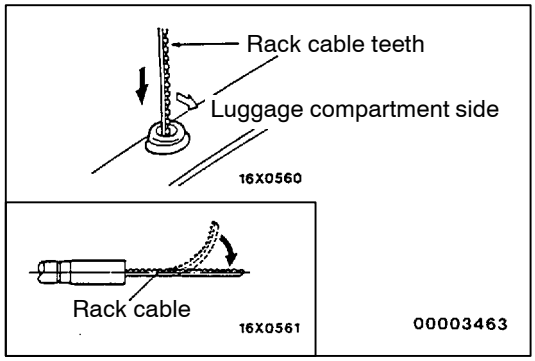
1. Connect the circuit as indicated by the solid lines in the illustration.
2. Check that the motor antenna extends when the connection indicated by the broken line is made.
3. Check that the motor antenna retracts fully when the connection indicated by the broken line is removed.



ANTENNA POLE REPLACEMENT

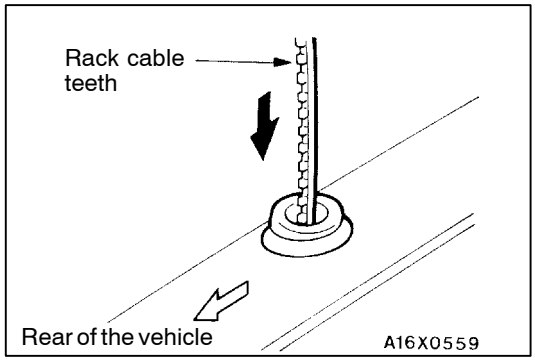
54400090032

1. Remove the ring nut.
2. After turning the ignition switch to ACC or ON, turn the radio switch to ON to raise the antenna pole, and remove it, together with the rack cable.



3. Draw out the antenna pole to the maximum extension.

   NOTE
   If there is a bend in the motor end of the rack cable, remove the bend.
4. Insert the rack cable into the motor assembly with the rack cable teeth facing the luggage compartment side.



5. Turn the rack cable teeth towards the rear of the vehicle (right 90°) so that the rack cable meshes with the motor gear.
6. If the rack cable pulls out with no resistance when it is lightly pulled, then the cable is not meshed with the motor gear, so check that there are no bends in the end of the rack cable, and then repeat steps 4 and 5 above.
7. Set the antenna pole vertically and turn the radio switch OFF to wind up the rack cable. Insert the antenna to the motor antenna side to align it with the wound-up rack cable.
8. After tightening the ring nut, check the movement of the antenna by turning the radio switch ON and OFF.

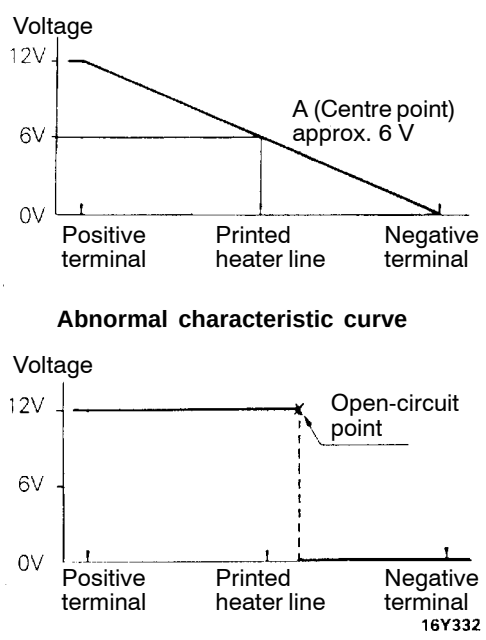
REAR WINDOW DEFOGGER

54300720488

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOM

Trouble symptom	Reference page
Rear window defogger does not operate. <Vehicles with automatic A/C>	Refer to GROUP 55.

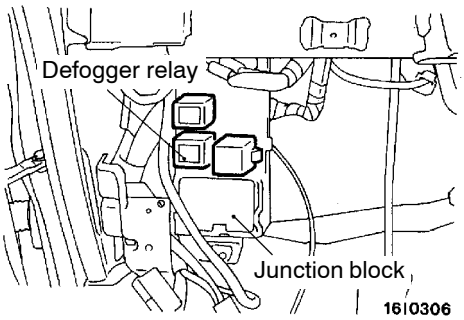


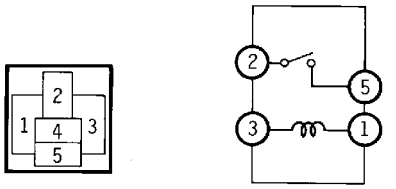
ON-VEHICLE SERVICE

54300180033

PRINTED-HEATER LINE CHECK

1. Run engine at 2,000 r/min. Check heater element with battery at full.
2. Turn ON rear window defogger switch. Measure heater element voltage with circuit tester at rear window glass centre A.
   Condition is good if it indicates about 6V.
3. If 12 V is indicated at A, there is a break in the negative terminals from A.
   Move test bar slowly to negative terminal to detect where voltage changes suddenly (0V).
4. If 0 V is indicated at A, there is a break in the positive terminals from A. Detect where the voltage changes suddenly (12 V) in the same method described above.





20Z0002
00006432

REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

54300680168

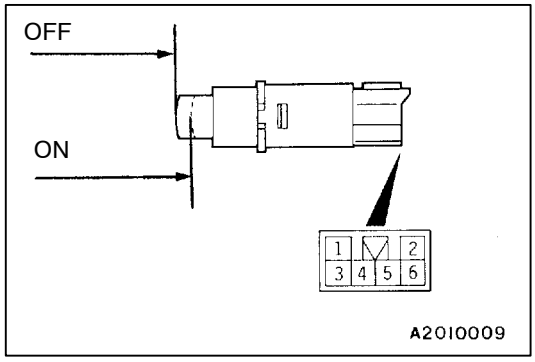
Battery voltage	Terminal No.			
	1	2	3	5
Power is not supplied	○		○	
Power is supplied	⊕		⊖	
		○		○

REAR WINDOW DEFOGGER SWITCH <VEHICLES WITH MANUAL A/C>

54300620115

REMOVAL AND INSTALLATION

Refer to GROUP 55 - Heater Control Assembly, A/C Switch and Inside/Outside Air Changeover Switch.



INSPECTION

54300670097

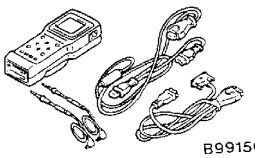
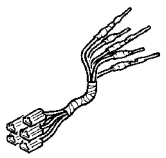
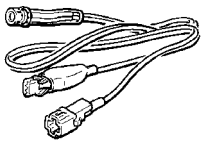
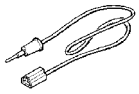
DEFOGGER SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1		3	2	4		5
OFF		ILL					
ON		ILL				IND	

THEFT-ALARM SYSTEM

54700060070

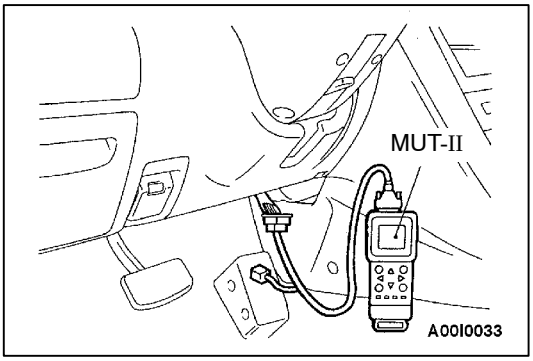
SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	ETACS-ECU input signal checking
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurements during troubleshooting A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

TROUBLESHOOTING

5420070066

The special tool (MB991223) should always be used to measure voltages and resistance when carrying out troubleshooting.



DIAGNOSTIC FUNCTION

54700130030

INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

1. Connect the MUT-II to the diagnosis connector.
2. If a buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the ETACS-ECU input signal for that switch circuit system is normal.

INSPECTION CHART FOR TROUBLE SYMPTOMS

54700150074

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible. <Vehicles with ETACS-ECU>	Communication with all system is not possible.	1	54-80
	Communication with one-shot pulse input signal only is not possible.	2	54-80
Arming/disarming relationship	The system is not armed. (The security indicator lamp does not illuminate, and the alarm does not function.)	3	54-81
	The arming procedures are followed, but the security indicator lamp does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)	4	54-82
	The alarm sounds in error when, the system is armed, a door or the tailgate is unlocked by using the key.	-	54-83

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

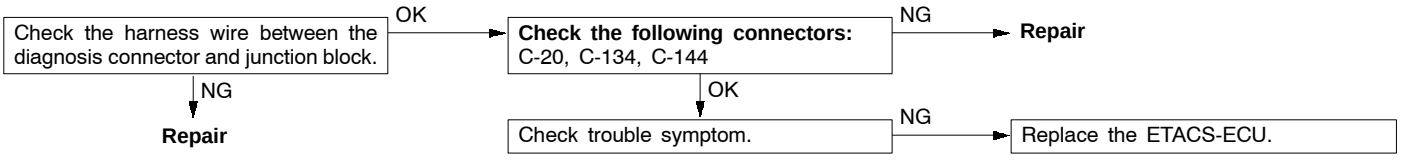
INSPECTION PROCEDURE 1

Communication with MUT-II is not possible. (Communication with all system is not possible.)	Probable cause
The cause is probably a defect in the power supply system (including earth) for the diagnosis line.	• Malfunction of connector • Malfunction of harness wire

Refer to GROUP 13A - Troubleshooting

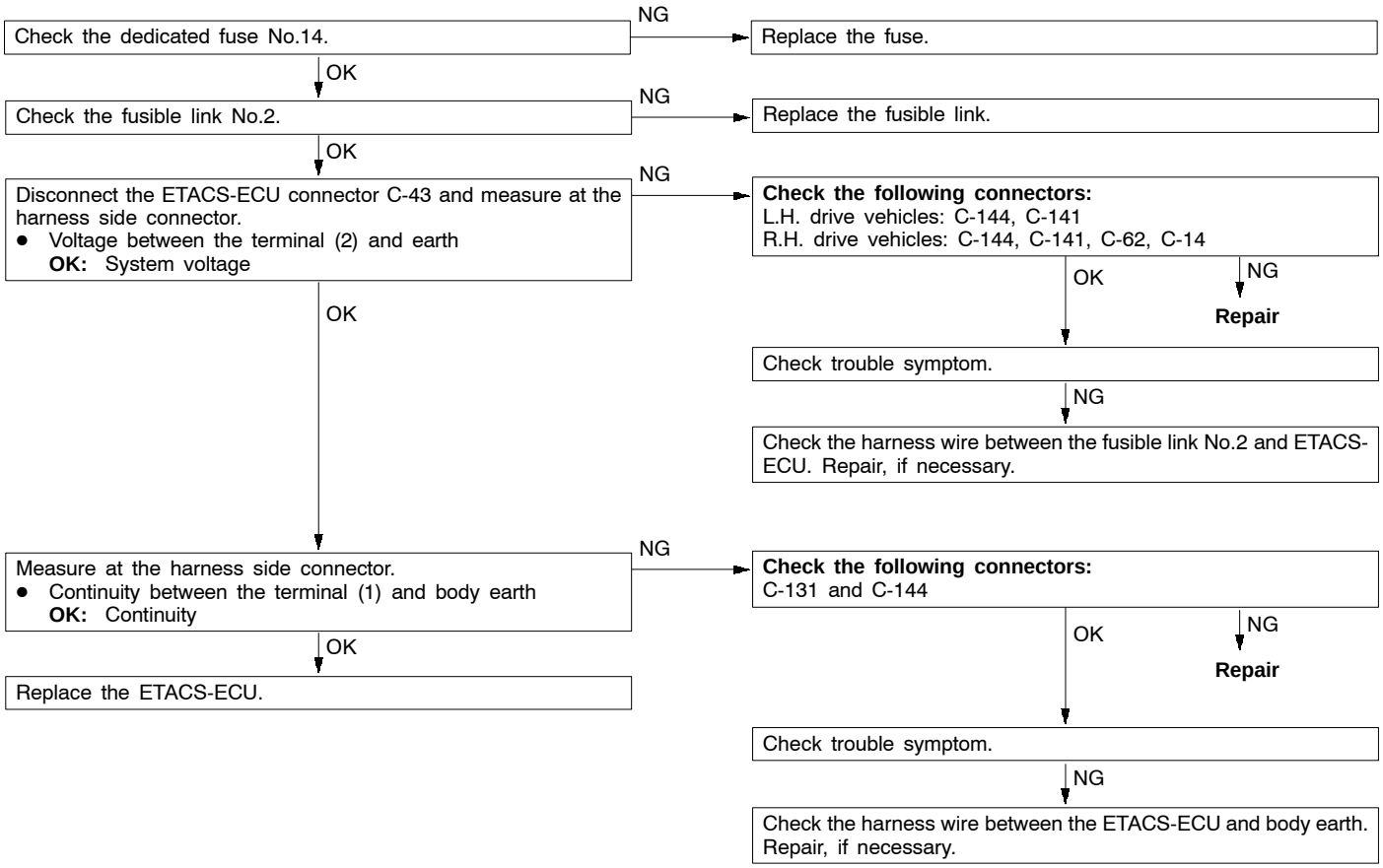
INSPECTION PROCEDURE 2

Communication with MUT-II is not possible. (Communication with one-shot pulse input signal only is not possible.)	Probable cause
The cause is probably a defective one-shot pulse input signal circuit system of the diagnosis line.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



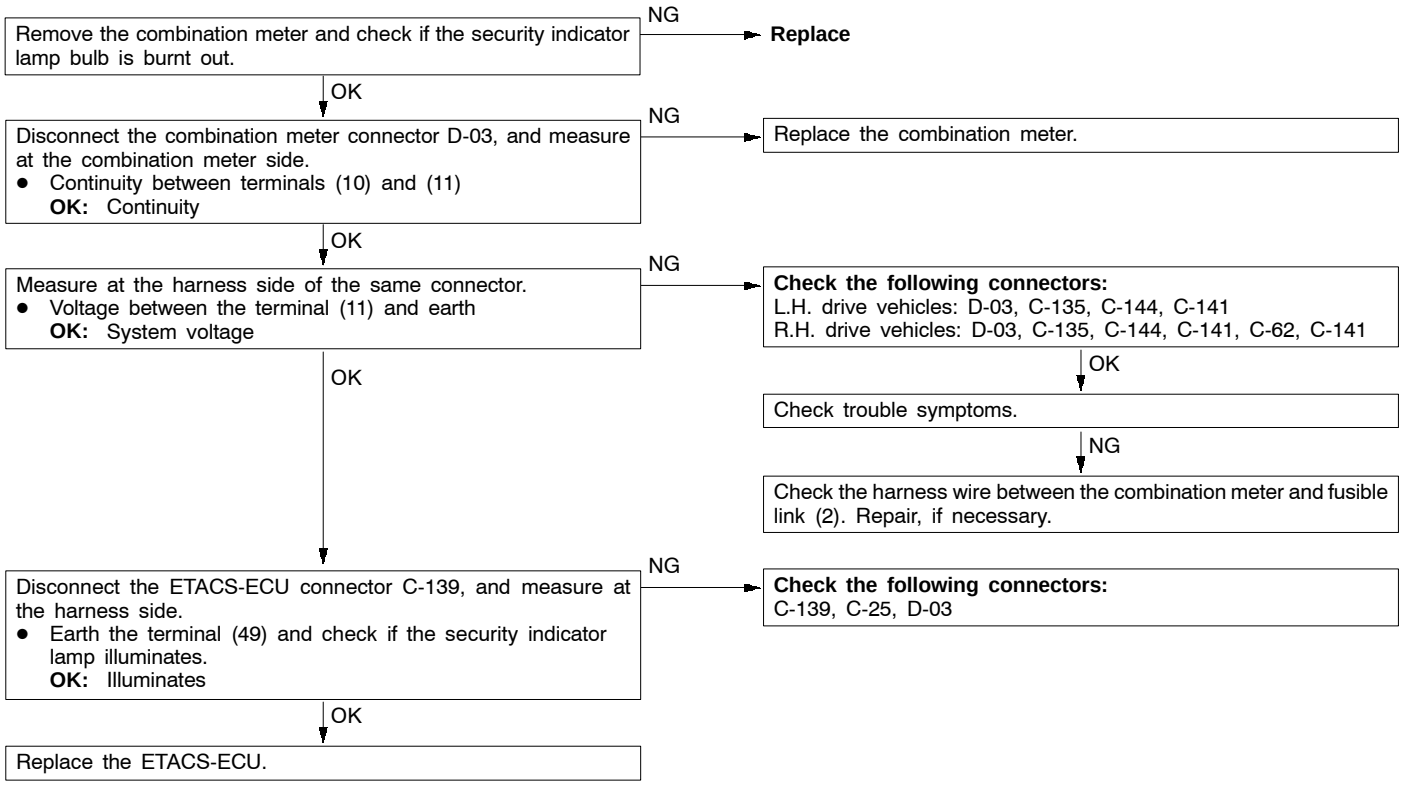
INSPECTION PROCEDURE 3

The system is not armed. (The security indicator lamp does not illuminate, and the alarm does not function.)



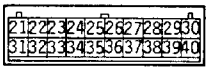
INSPECTION PROCEDURE 4

The arming procedures are followed, but the security indicator lamp does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)



MEASUREMENT AT ECU TERMINALS

16X0965



16X0966 00003598

Terminal No.	Item	Check condition		Normal value
1	Earth	-		-
2	ECU power supply	At all times		System voltage
7	Ignition switch (ACC)	ON		System voltage
		OFF		0 V
11	Ignition switch (IG1)	ON		System voltage
		OFF		0 V
13,19	Front door switch (L.H.)	Door open		0 V
		Door closed		5 V
17	Key reminder switch	Ignition switch	ON (Removed)	0 V
			OFF (Inserted)	5 V
28	Keyless entry receiver-ECU	Receiver output signal	ON	0 V
			OFF	5 V
29	Theft-alarm horn relay	ON		0 V
		OFF		System voltage
33	Front door lock actuator switch (R.H.)	Lock		5 V
		Unlock		0 V
34		Lock		0 V
		Unlock		5 V
35	Front door lock actuator switch (L.H.)	Lock		5 V
		Unlock		0 V
36		Lock		0 V
		Unlock		5 V
41	Rear door lock actuator switch (R.H.)	Lock		5 V
		Unlock		0 V
42		Lock		0 V
		Unlock		5 V
43	Trunk lid latch switch <Sedan>	ON		0 V
		OFF		5 V

Terminal No.	Item	Check condition	Normal value
44	Trunk lid lock key cylinder switch <Sedan>	ON	0 V
		OFF	5 V
45	Tailgate lock actuator <Wagon>	Lock	5 V
		Unlock	0 V
46		Lock	0 V
		Unlock	5 V
47	Door lock key cylinder switch	Unlock	0 V
		Neutral	5 V
48		Lock	0 V
		Neutral	5 V
49	Combination meter (Security indicator lamp)	ON	0 V
		OFF	System voltage
50	Front door switch (R.H.)	ON	0 V
		OFF	5 V
51	Hood switch	ON	0 V
		OFF	5 V