

CHASSIS ELECTRICAL

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54109000082

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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 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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**DOOR MIRROR (ELECTRONIC
CONTROLLED DOOR MIRROR)
..... Refer to GROUP 51**

**SUPPLEMENTAL RESTRAINT SYSTEM
(SRS) Refer to GROUP 52B**

HEATER Refer to GROUP 55

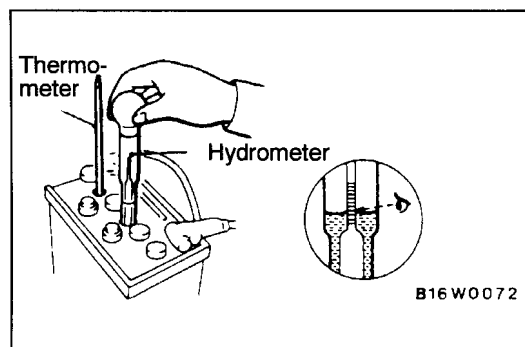
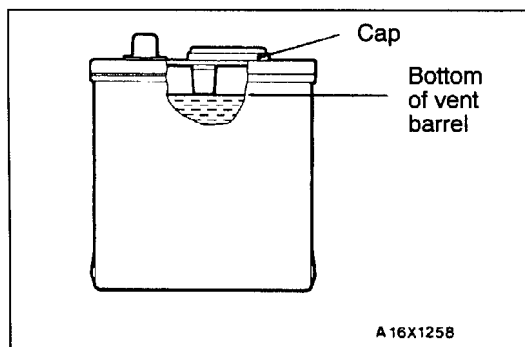
**AIR CONDITIONER
..... Refer to GROUP 55**

BATTERY

54100030035

SERVICE SPECIFICATION

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



ON-VEHICLE SERVICE

54100090033

FLUID LEVEL AND SPECIFIC GRAVITY CHECK

1. The battery has an indicator for visual check. If charging or fluid level is appropriate, the indicator will be green. If not appropriate, it will be white.
2. If necessary, remove the cap to add battery fluid until it reaches the bottom of the vent barrel.
3. 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

54100110067

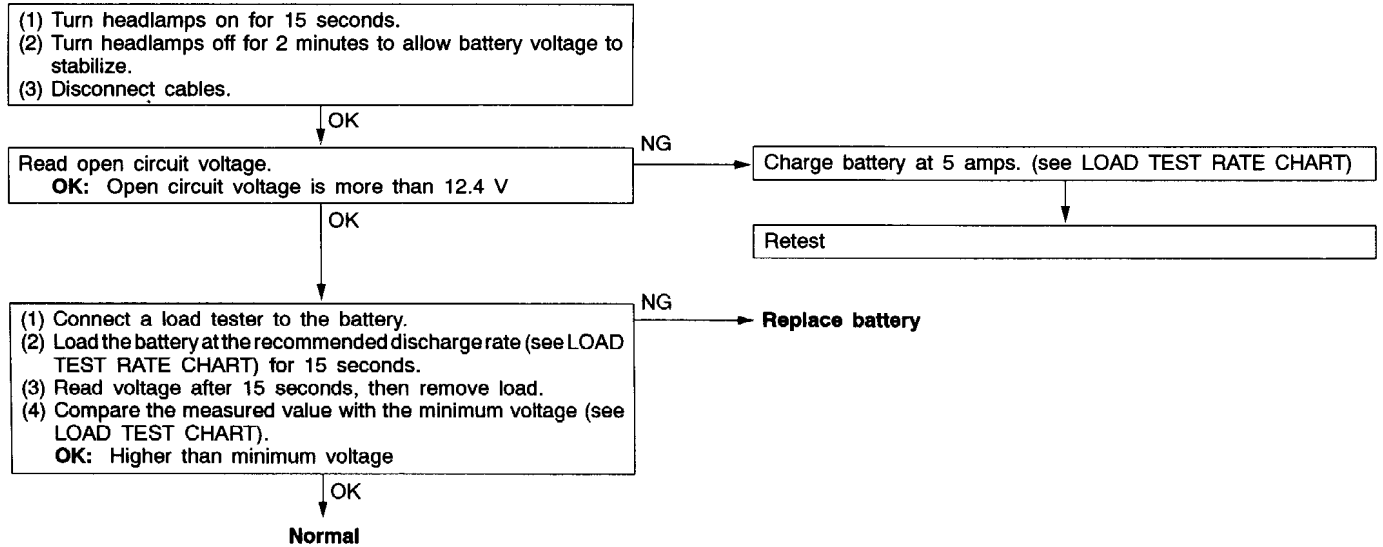
1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.
2. The current normally used to charge a battery should be approximately 1/10th of the battery capacity.
3. When quick charging due to lack of time, etc., the charging 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. Take care 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. Take care 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

54100120060

TEST STEP**LOAD TEST RATE CHART**

Battery type	B.C.I. GROUP 86–90/525
Charging time when fully discharged h [5-amp rated current charging]	15
Load test (Amps)	252

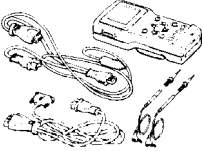
LOAD TEST CHART

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 AND IMMOBILIZER SYSTEM

54300060153

SPECIAL TOOL

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

TROUBLESHOOTING

54300070170

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.

IMMOBILIZER SYSTEM

INSPECTION CHART FOR DIAGNOSIS CODES

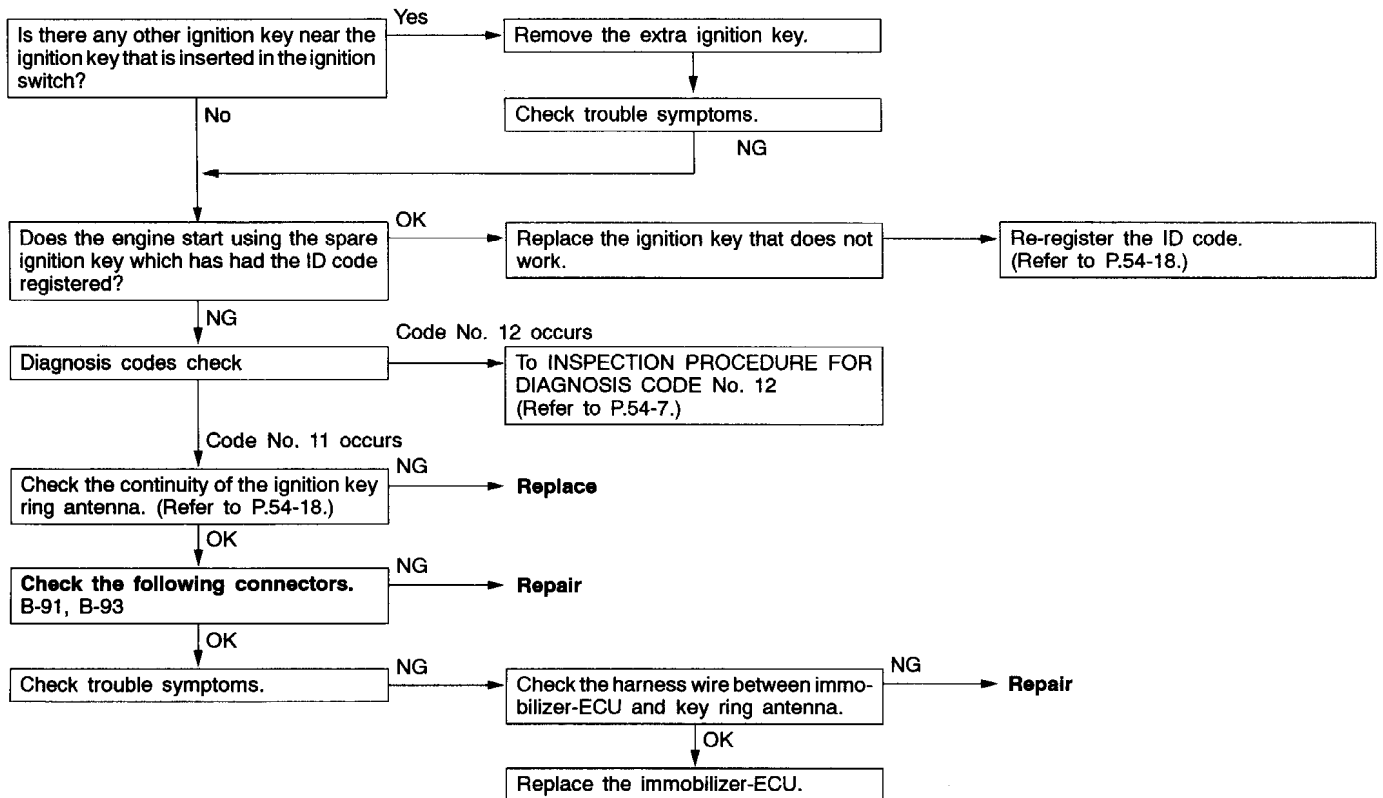
Diagnosis code No.	Inspection items	Reference page
11	Transponder communication system	54-7
12*	ID codes are not the same or are not registered	54-7
21	Communication system between MUT-II and engine-ECU	54-8
31	EEPROM abnormality inside immobilizer-ECU	54-8

NOTE

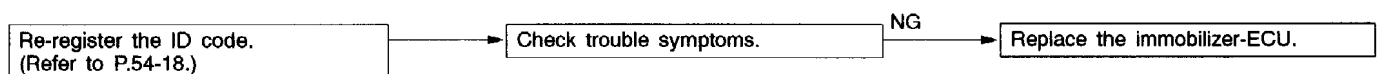
*: Diagnosis code No. 12 is not recorded.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

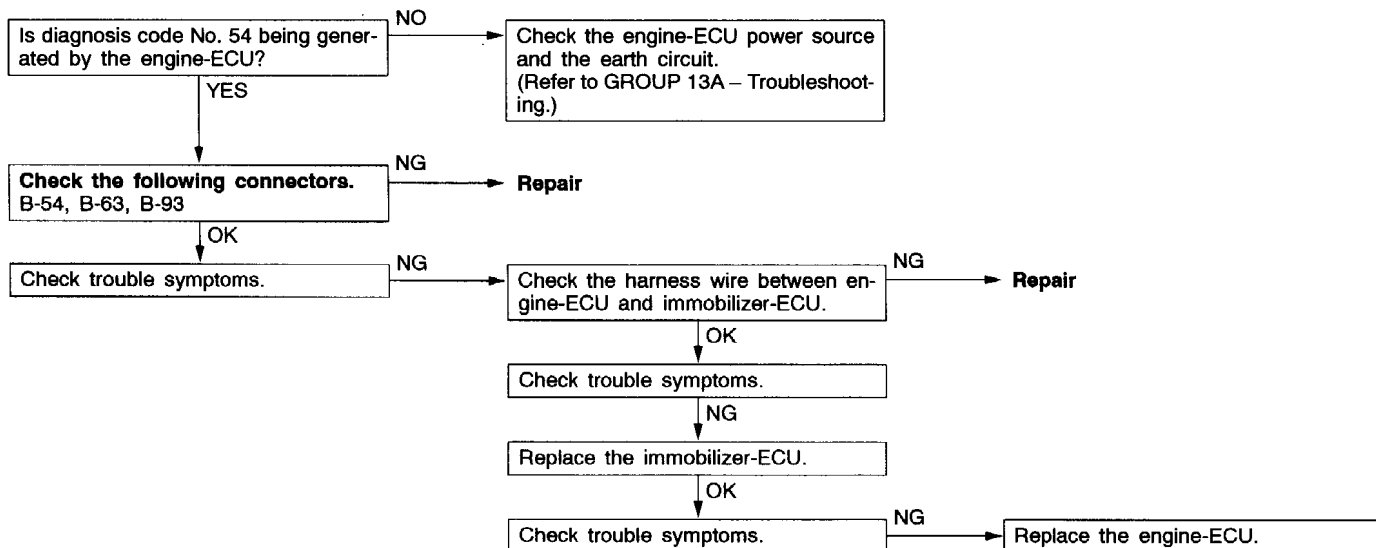
Code No. 11 Transponder communication system	Probable cause
The ID code of the transponder is not sent to the immobilizer-ECU immediately after the ignition key is turned to the ON position. When starting the engine, one ignition key's ID code interferes with another ignition key's code.	- Radio interference with ID codes - Malfunction of the transponder - Malfunction of the ignition key ring antenna - Malfunction of harness or connector - Malfunction of the immobilizer-ECU



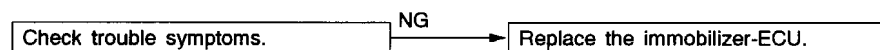
Code No. 12 ID code are not the same or are not registered	Probable cause
The ID code which is sent from the transponder is not the same as the ID code which is registered in the immobilizer-ECU.	- The ID code in the ignition key being used has not been properly registered. - Malfunction of the immobilizer-ECU



Code No. 21 Communication system between MUT-II 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



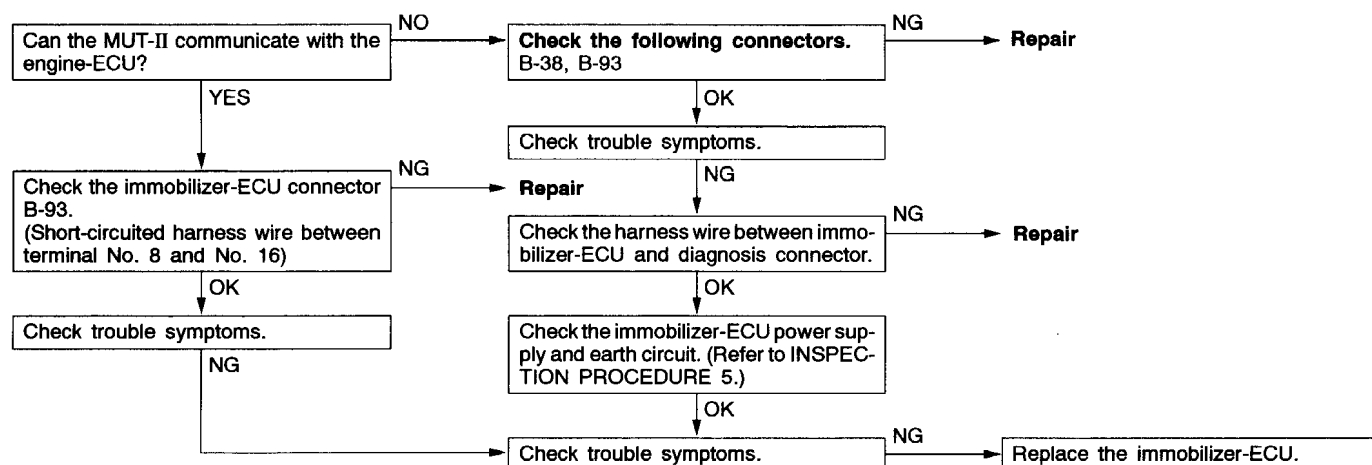
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	1	54-9
ID code cannot be registered using the MUT-II.	2	54-10
Engine does not start (Cranking but no initial combustion).	3	54-10
Malfunction of the immobilizer-ECU power source and earth circuit	4	54-11

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

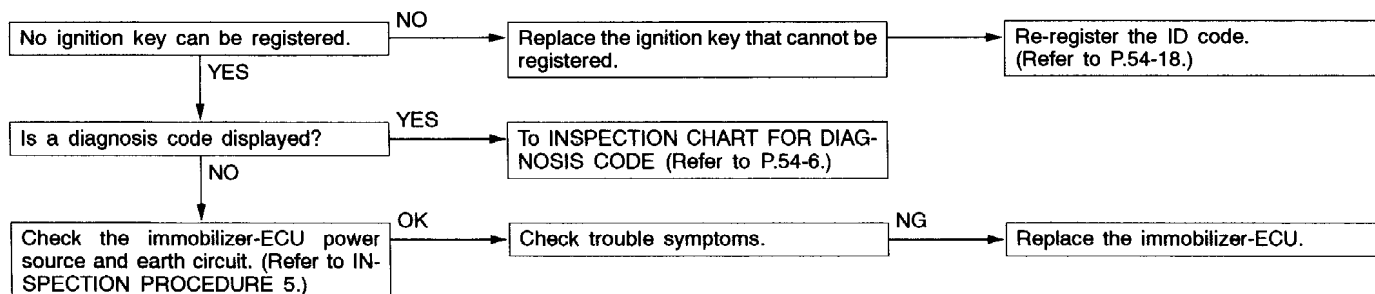
Inspection Procedure 1

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



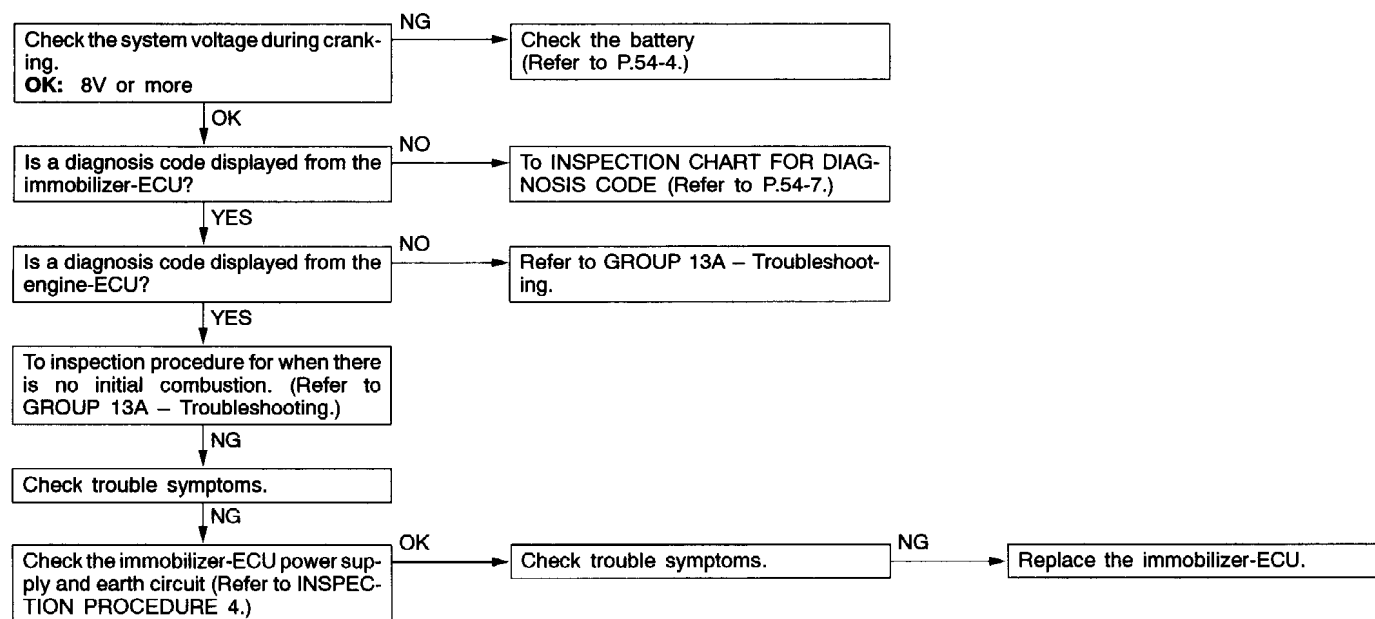
Inspection Procedure 2

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



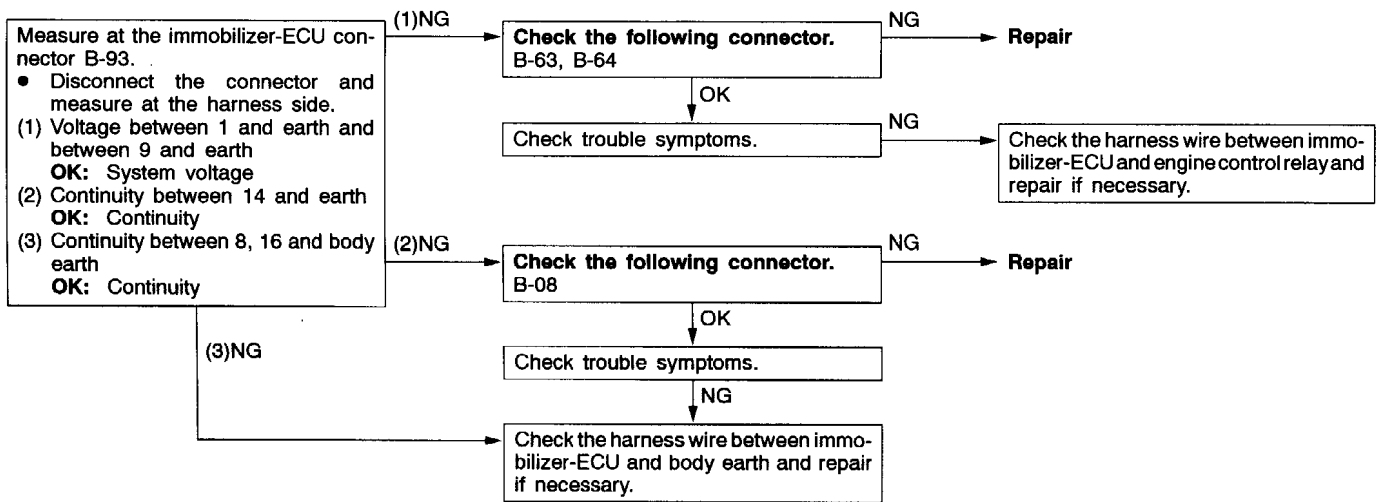
Inspection Procedure 3

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

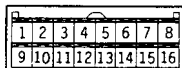


Inspection Procedure 4

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
3	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
5	Immobilizer-ECU earth	Always	0V
10	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
11	Ignition switch-IG	Ignition switch: OFF	0V
		Ignition switch: ON	System voltage
13	Immobilizer-ECU earth	Always	0V

IGNITION KEY CYLINDER ILLUMINATION LAMP 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	54-13
	Communication between the diagnosis connector and ETACS-ECU is not possible.	2	54-13
Ignition key cylinder illumination lamp	While key cylinder illumination lamp is illuminated, ignition key is turned to the ON position but key cylinder illumination lamp does not switch off. (However, it switches off after 10 seconds.)	3	54-13
	Key cylinder illumination lamp remains illuminated.	4	54-14
	Even if driver's side door is opened, key cylinder illumination lamp does not illuminate.	5	54-14

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

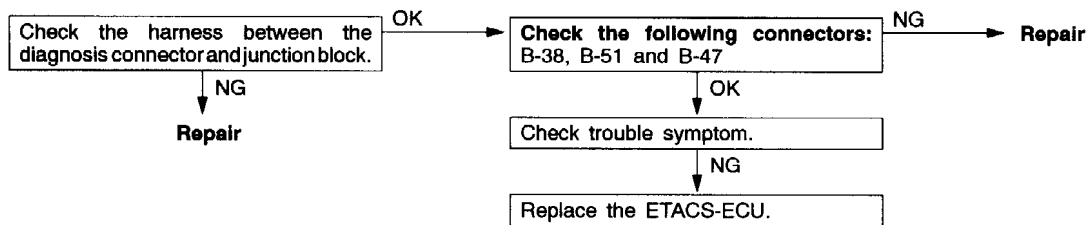
INSPECTION PROCEDURE 1

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

Refer to GROUP 13A – Troubleshooting.

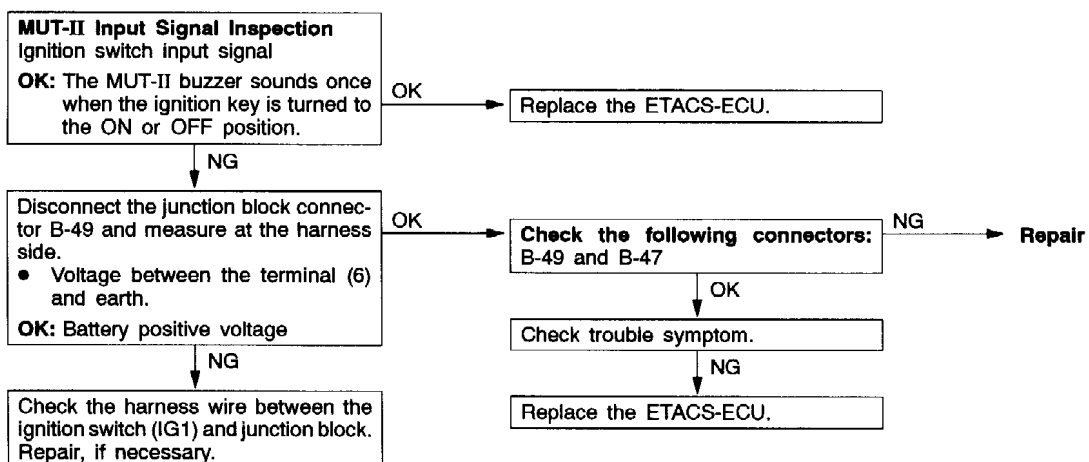
INSPECTION PROCEDURE 2

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



INSPECTION PROCEDURE 3

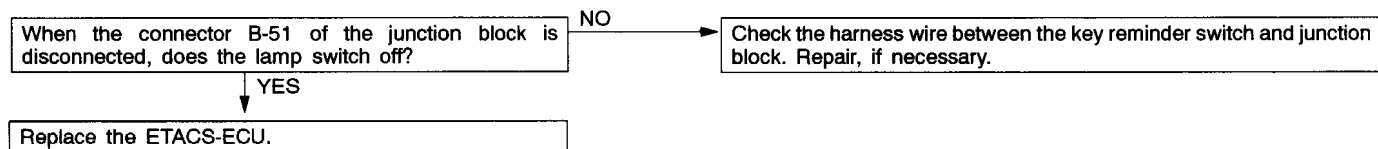
• While key cylinder illumination lamp is illuminated, ignition key is turned to the ON position but key cylinder illumination lamp does not switch off. (However, it switches off after 10 seconds.)	Probable cause
The cause is probably a defective ignition switch input circuit or a defective ETACS-ECU.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



54-14 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer System

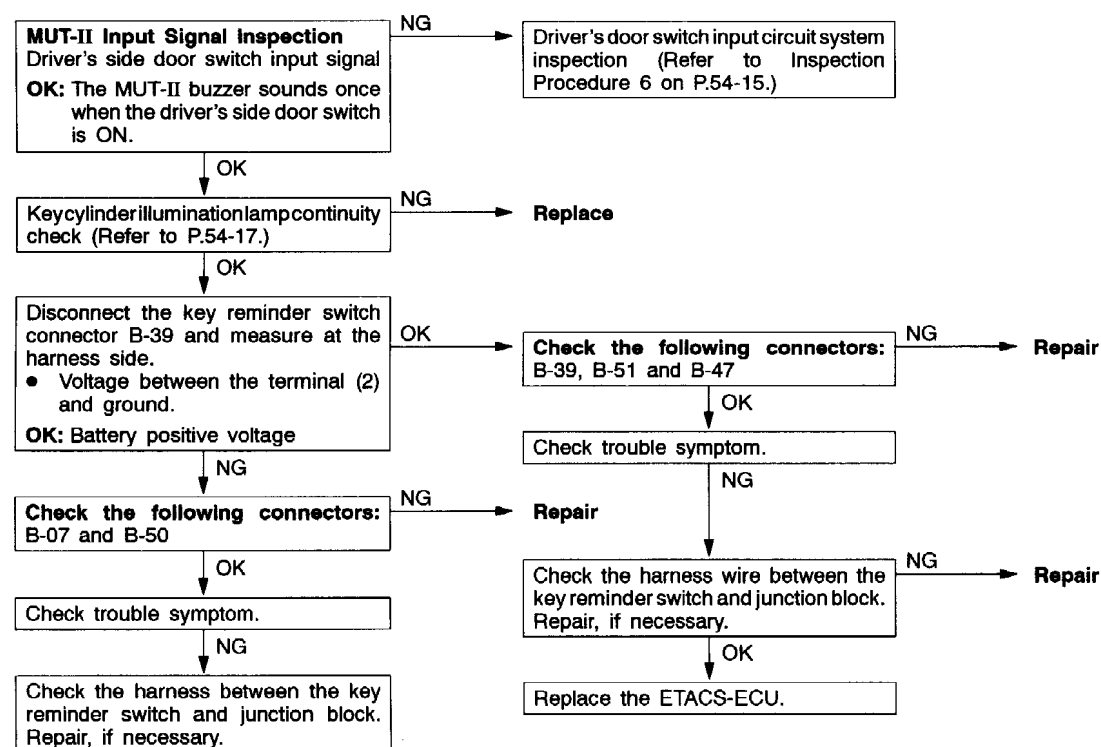
INSPECTION PROCEDURE 4

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



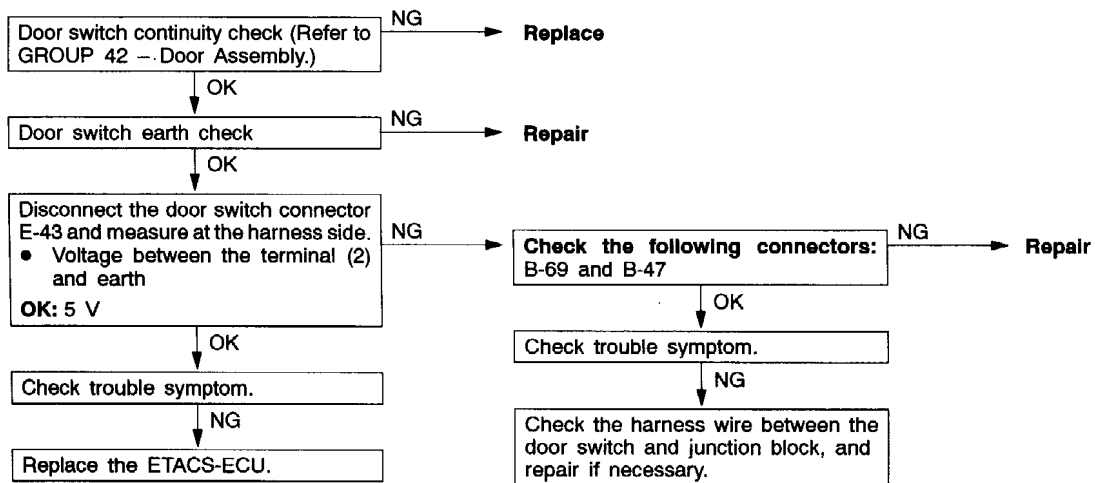
INSPECTION PROCEDURE 5

Even if driver's side door is opened, key cylinder 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 ETACS-ECU



INSPECTION PROCEDURE 6

Driver's side door switch input circuit system check



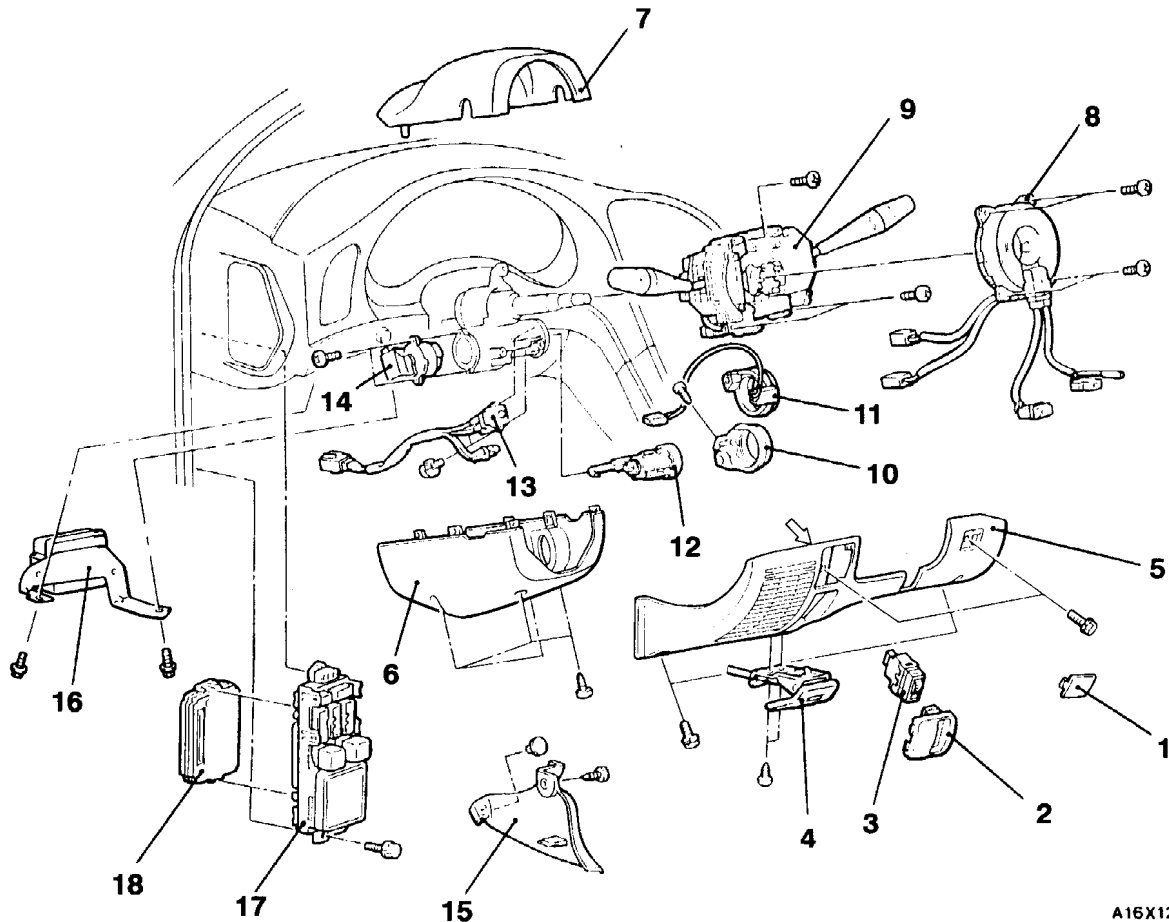
IGNITION SWITCH AND IMMOBILIZER SYSTEM

54300210091

REMOVAL AND INSTALLATION

CAUTION: SRS

Before removal of air bag module and clock spring, refer to GROUP 52B – SRS service Precautions, Air Bag Module and Clock Spring



A16X1283

NOTE

The  mark indicates the sheet metal clip position.

Steering lock cylinder removal steps

- Steering wheel (Refer to GROUP 37A – Steering Wheel and Shaft.)
- 1. Plug
- 2. Headlamp leveling switch panel
- 3. Headlamp leveling switch
- 4. Hood lock release handle
- 5. Instrument under cover
- 6. Column cover lower
- 7. Column cover upper
- 8. Clock spring
- 9. Column switch
- 10. Ignition key illumination ring or ring cover
- 11. Ignition key ring antenna
- 12. Steering lock cylinder

Key reminder switch segment or key cylinder illumination lamp removal steps

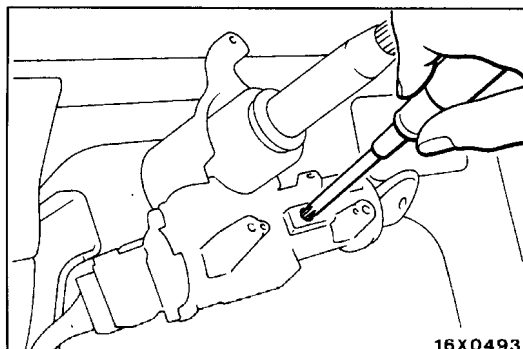
- 6. Column cover lower
- 7. Column cover upper
- 13. Key reminder switch segment or key cylinder illumination lamp

Ignition switch segment removal steps

- 6. Column cover lower
- 7. Column cover upper
- 14. Ignition switch segment

Immobilizer-ECU/ETACS-ECU removal steps

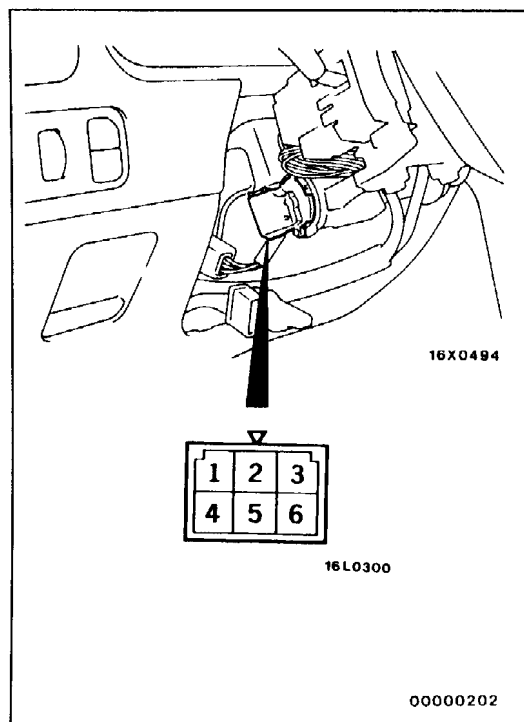
- 15. Cowl side trim (L.H.)
- 16. Immobilizer-ECU
- 17. Junction block
- 18. ETACS-ECU



REMOVAL SERVICE POINT

◀A▶ STEERING LOCK CYLINDER REMOVAL

- (1) Insert the key in the steering lock cylinder and turn it to the "ACC" position.
- (2) Using a 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.



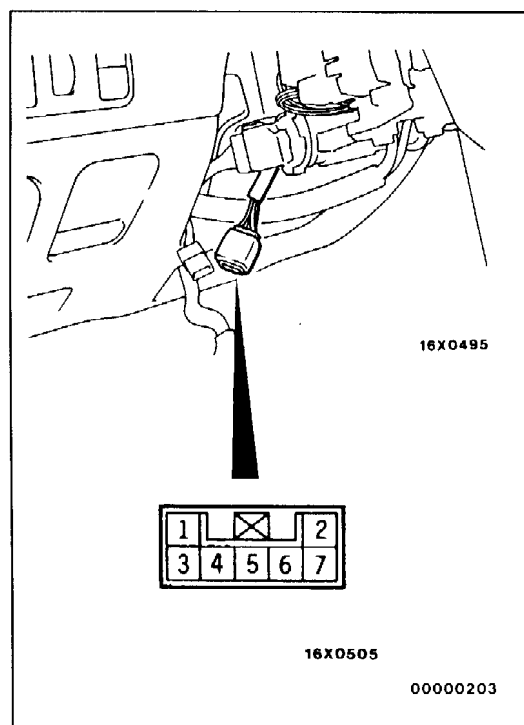
INSPECTION

54300220094

IGNITION SWITCH CONTINUITY CHECK

- (1) Remove the instrument under cover. (Refer to P.54-16)
- (2) Remove the column cover lower and upper.
- (3) Disconnect the wiring connector from the ignition switch and connect an ohmmeter to the switch side connector.
- (4) Operate the ignition switch and check the continuity.

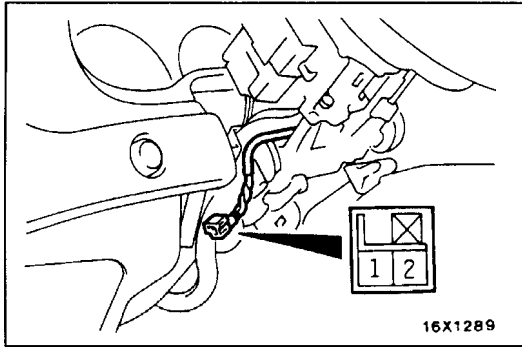
Ignition key position	Terminal No.					
	1	2	3	4	5	6
LOCK						
ACC	○					○
ON	○	○		○		○
START	○	○			○	



KEY REMINDER SWITCH, KEY CYLINDER ILLUMINATION LAMP CONTINUITY CHECK

- (1) Remove the column cover lower and upper.
- (2) Disconnect the wiring connector from the key reminder switch or from the key cylinder illumination lamp and connect an ohmmeter to the switch side connector.
- (3) Check the continuity when the ignition key is pulled out of and inserted into the steering lock cylinder.

Ignition key position	Terminal No.			
	Key reminder switch		Key cylinder illumination lamp	
	4	6	1	2
Removed	○	○	○ — ○	
Inserted			○ — (V) — ○	



IGNITION KEY RING ANTENNA CONTINUITY CHECK

Use an ohmmeter to measure the resistance between the terminals.

ID CODE REGISTRATION METHOD

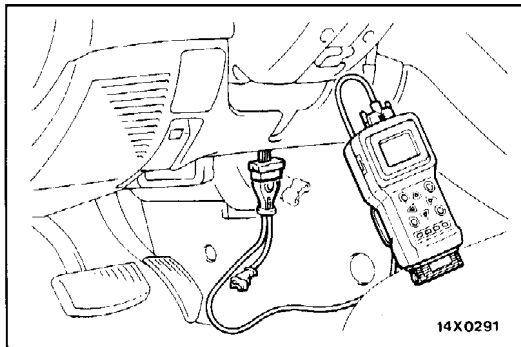
54300810024

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 password 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

Turn the ignition switch off before connecting or disconnecting the MUT-II.

- (2) Check that the diagnosis code No.54 is not displayed for MPI system. If the code is displayed, carry out troubleshooting before proceeding to the next step. (Refer to GROUP 13A – Troubleshooting).
- (3) Use the ignition key that is to be registered to turn the ignition switch to the ON position.
- (4) 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.
- (5) Disconnect the MUT-II. This completes the registration operation.
- (6) Check that the engine can be started by each one of the ignition keys.
- (7) Check that the diagnosis code No.54 is not displayed for MPI system. If the code is displayed, erase it. (Refer to GROUP 13A – Troubleshooting).

COMBINATION METERS

54300030086

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	+225, –100
	5,000	+325, –125
	7,000	+400, –100
Fuel gauge unit resistance Ω	Float point F	2–6
	Float point E	105–119
Fuel gauge unit float height mm	A (Float point F)	26.6
	B (Float point E)	159.9
Fuel gauge resistance Ω	Power supply and earth	219–279
	Power supply and fuel gauge	102–152
	Fuel gauge and earth	112–132
Engine coolant temperature gauge resistance Ω	Power supply and earth	160.9–196.9
	Power supply and engine coolant temperature gauge	51.3–56.7
	Engine coolant temperature gauge and earth	209.9–255.9
Engine coolant temperature gauge unit resistance (at 70°C) Ω		91.5–117.5
Oil pressure gauge resistance Ω		40–44

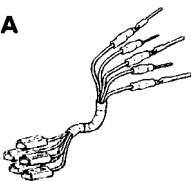
SEALANT

54300050088

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

SPECIAL TOOLS

54300060160

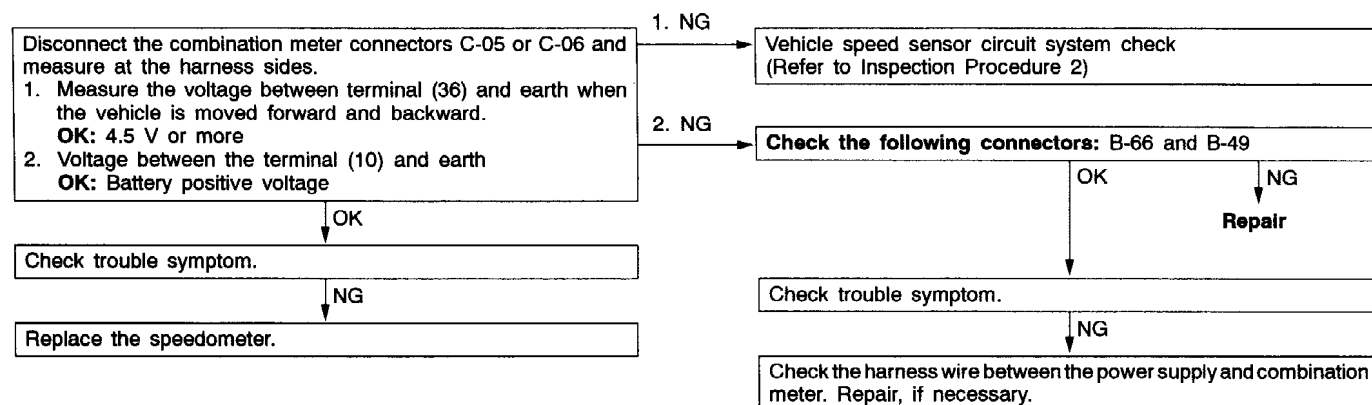
Tool	Number	Name	Use
A 	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Fuel gauge simple check A: Connector pin contact pressure check B, C: Power circuit check D: Commercial tester connection
B 			
C 			
D 			

TROUBLESHOOTING

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

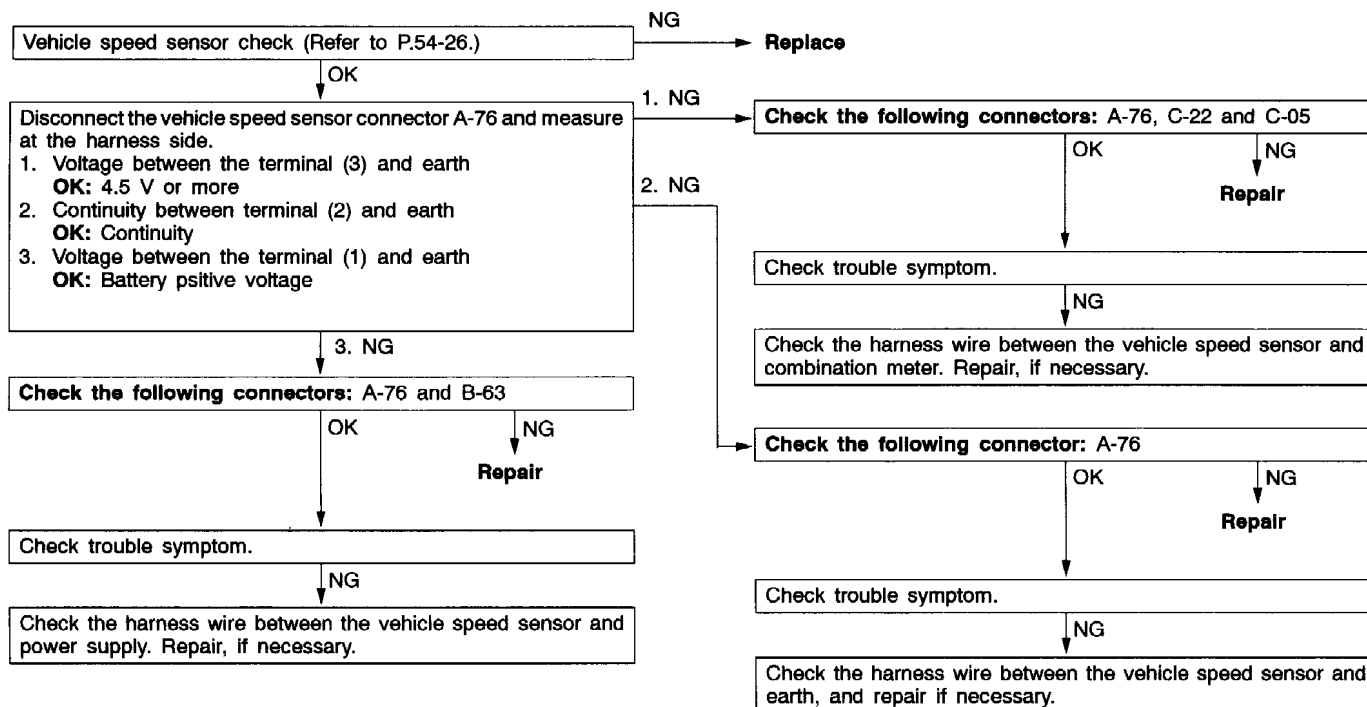
INSPECTION PROCEDURE 1

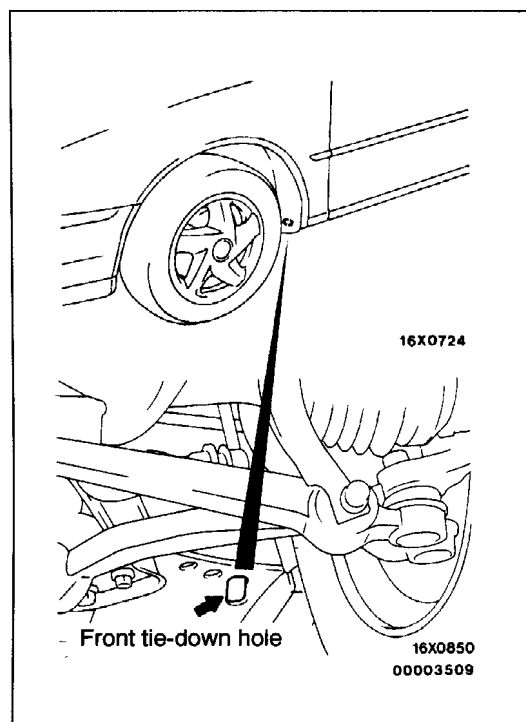
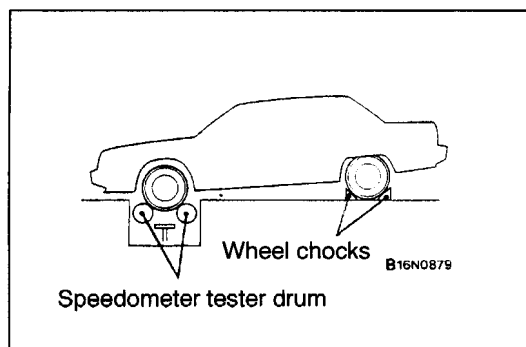
Speedometer does not operate.	Probable cause
The cause is probably a defective vehicle speed sensor circuit system or a defective speedometer.	• Malfunction of vehicle speed sensor • Malfunction of speedometer • Malfunction of harness wire • Malfunction of connector



INSPECTION PROCEDURE 2

Vehicle speed sensor circuit system check





ON-VEHICLE SERVICE

SPEEDOMETER CHECK

54300090060

1. Adjust the pressure of the tires to the specified level. (Refer to GROUP 31 – On-vehicle Service.)
2. Place the vehicle on a speedometer tester drum and use wheel chocks to hold the rear wheels.
3. Apply the parking brake.

4. Attach a chain or wire to the rear tie-down holes. Secure the end of the wire or chain.
5. Take all other necessary precautions.
6. Check if the speedometer indication range is within the standard values.

Caution

Do not operate the clutch suddenly or 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

54300100060

NOTE

For tachometer inspection, use of a fluxmeter-type engine speedometer is recommended. (Because a fluxmeter only needs to be clipped to the high tension cable.)

1. Compare the readings of the engine speedometer and the 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 : +225 r/min, –100 r/min
 5,000 r/min : +325 r/min, –125 r/min
 7,000 r/min : +400 r/min, –100 r/min

FUEL GAUGE SIMPLE CHECK

54300110087

Remove the fuel gauge unit connector.
(Refer to GROUP 13F – Fuel Tank.)

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

Turn the ignition switch to ON.

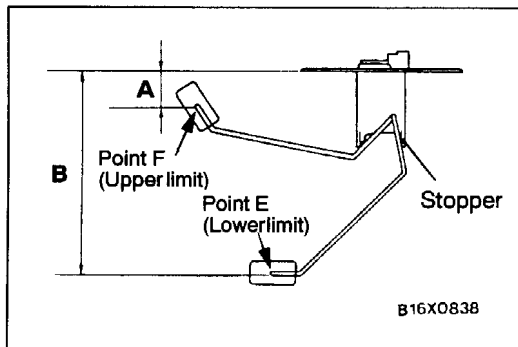
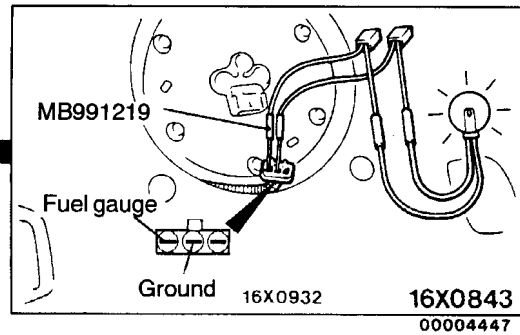
Check the condition of the test lamp and the gauge.

1. Test lamp is illuminated (Gauge needle is not moving)
2. Test lamp is illuminated (Gauge needle is moving)
3. Test lamp is not illuminated (Gauge needle is not moving)

Replace the fuel gauge.

Replace the fuel gauge unit.

Repair the harness.

**FUEL GAUGE UNIT CHECK**

54300120127

To check, remove the fuel gauge unit from the fuel tank.
(Refer to GROUP 13F – Fuel Tank.)

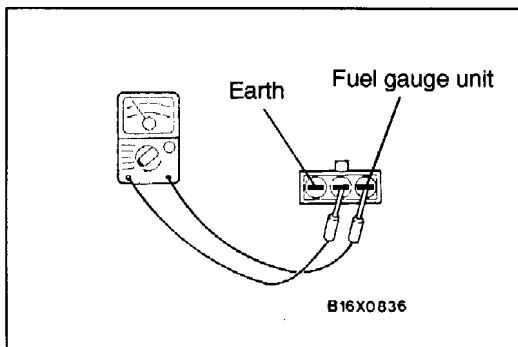
FUEL GAUGE UNIT FLOAT HEIGHT

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

Standard value:

A: 26.6 mm

B: 159.9 mm

**FUEL GAUGE UNIT RESISTANCE**

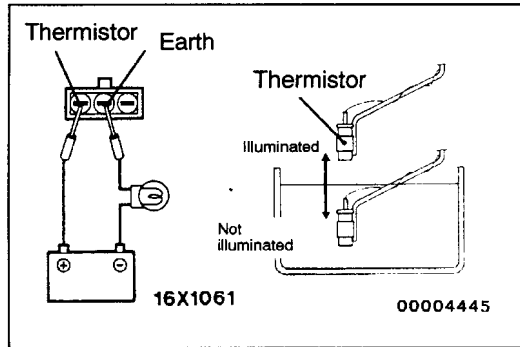
1. Check that resistance value between the fuel gauge terminal and earth terminal is at standard value when the fuel gauge unit float is at point F (highest) and point E (lowest).

Standard value:

POINT F: 2–6 Ω

POINT E: 105–119 Ω

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

**THERMISTOR**

1. Connect fuel gauge unit to battery via test lamp (12V–3.4W). Immerse it in water.
2. The condition is good if lamp goes off when thermistor is in water and lights when it is removed from water.

Caution

Dry the unit, or water will get into the fuel tank.

ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK

54300140093

Remove the engine coolant gauge unit connector.

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

Turn the ignition switch ON.

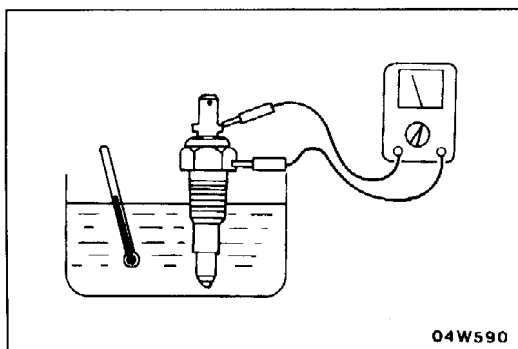
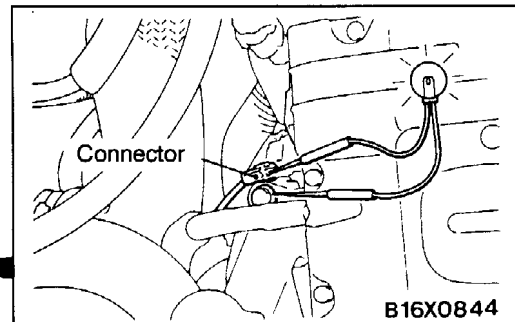
Check the condition of the test lamp and the gauge.

1. Test lamp is illuminated (Gauge needle is not moving)
2. Test lamp is illuminated (Gauge needle is moving)
3. Test lamp is not illuminated (Gauge needle is not moving)

Replace the engine coolant temperature gauge.

Replace the engine coolant temperature gauge unit.

Repair the harness.

**ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK**

54300150126

1. Drain the engine coolant. (Refer to GROUP 14 – On-vehicle Service.)
2. Remove the engine coolant temperature gauge unit.
3. Immerse the unit in 70°C water to measure the resistance.

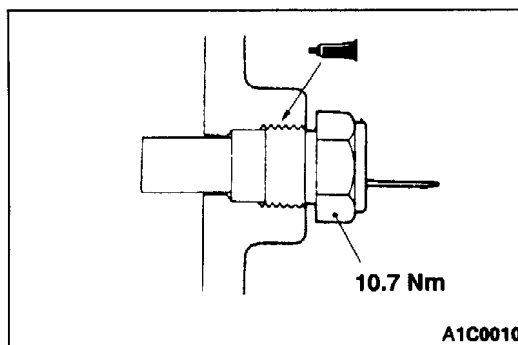
Standard value: 91.5–117.5 Ω

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



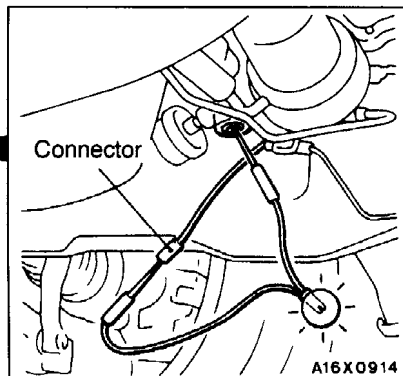
OIL PRESSURE GAUGE SIMPLE CHECK

54300160037

Remove the oil pressure gauge unit connector.

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

Turn the ignition switch ON.



Check the condition of the test lamp and the gauge.

1. Test lamp is illuminated (Gauge needle is not moving)

Replace the oil pressure gauge.

2. Test lamp is illuminated (Gauge needle is moving)

Replace the oil pressure gauge unit.

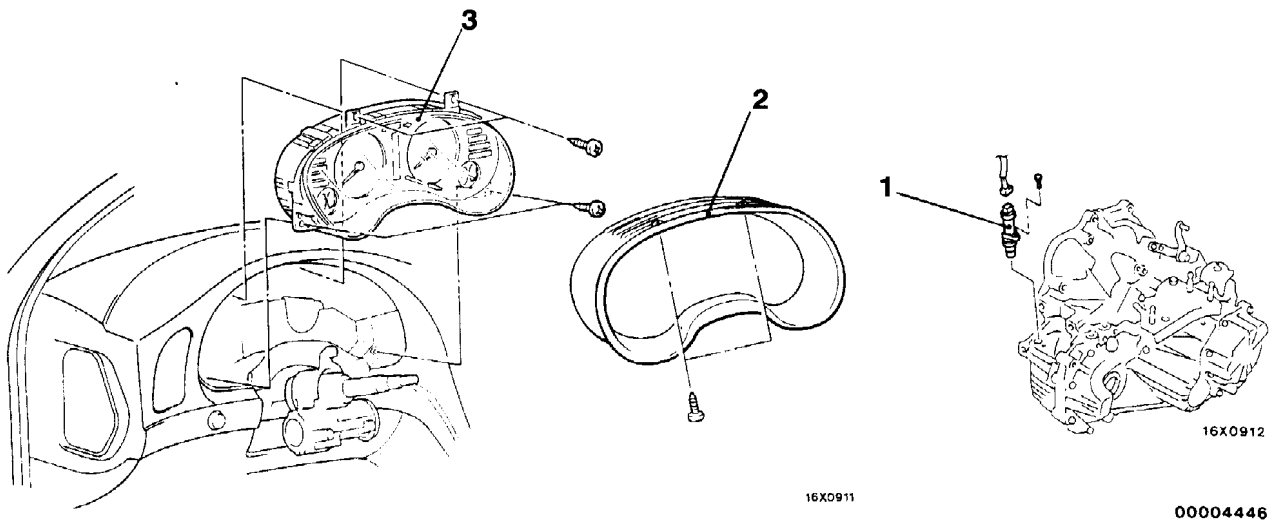
3. Test lamp is not illuminated
(Gauge needle is not moving)

Replace the harness.

COMBINATION METERS

54300290095

REMOVAL AND INSTALLATION

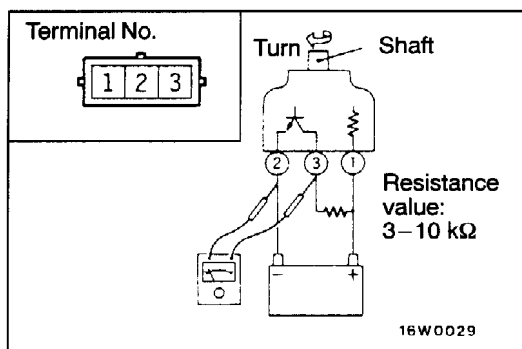


1. Vehicle speed sensor

Removal steps

2. Meter bezel

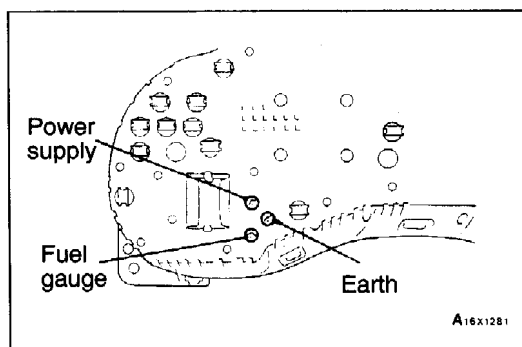
3. Combination meter

**INSPECTION**

54300300064

VEHICLE SPEED SENSOR CHECK

- (1) Remove the vehicle speed sensor and connect a 3–10 k Ω 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)

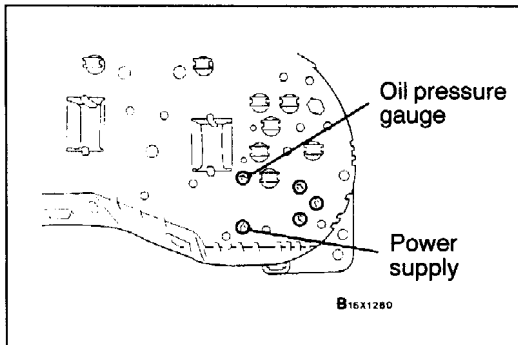
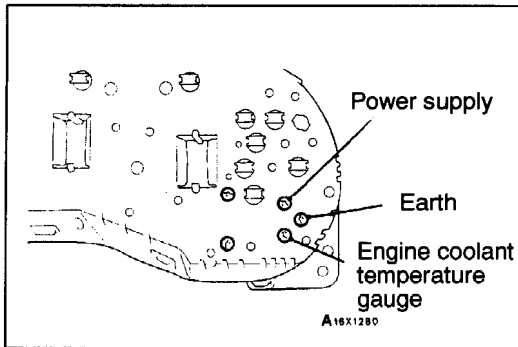
**FUEL GAUGE CHECK**

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

Caution

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

Standard value:Power supply–Earth: 219–279 Ω Power supply–Fuel gauge: 102–152 Ω Fuel gauge–Earth: 112–132 Ω

**ENGINE COOLANT TEMPERATURE GAUGE CHECK**

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

Caution

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

Standard value:

Power supply–Earth: 160.9–196.9 Ω

Power supply–Engine coolant temperature gauge: 51.3–56.7 Ω

Engine coolant temperature gauge–Earth: 209.9–255.9 Ω

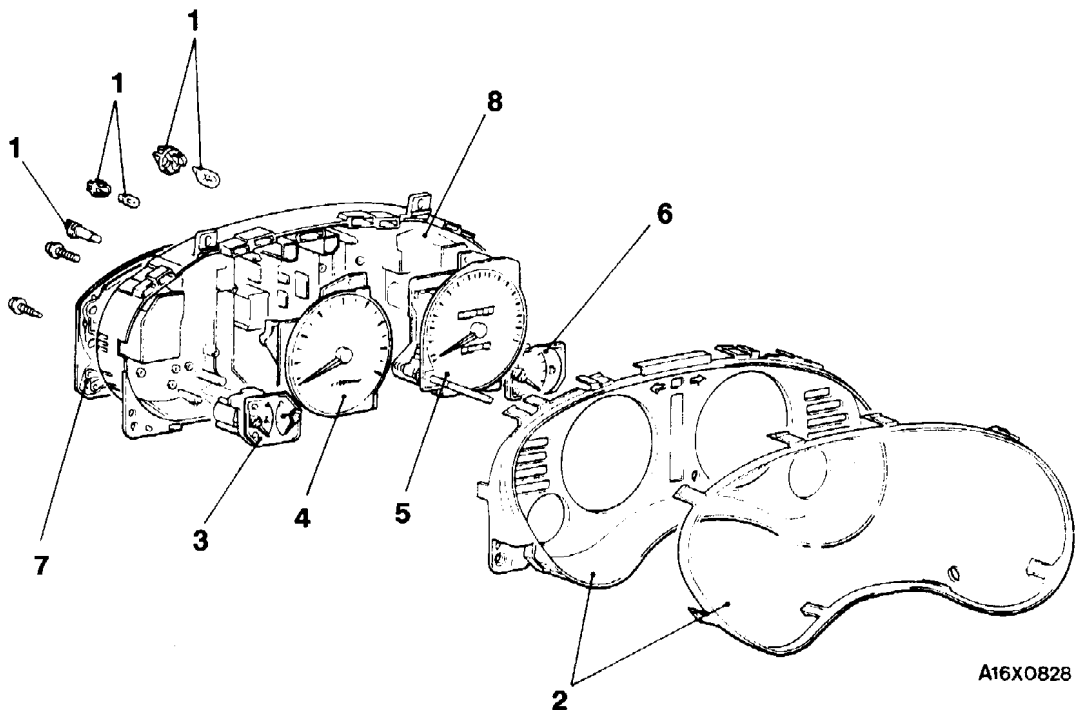
OIL PRESSURE GAUGE CHECK

Use an ohmmeter to measure resistance between terminals.

Standard value: 40–44 Ω

DISASSEMBLY AND REASSEMBLY

54300310067

**Disassembly steps**

1. Bulb, socket
2. Meter glass and window plate
3. Oil pressure gauge/engine coolant temperature gauge
4. Tachometer

5. Speedometer
6. Fuel level gauge
7. Printed-circuit board
8. Meter case

HEADLAMP AND FRONT TURN-SIGNAL LAMP

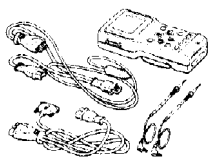
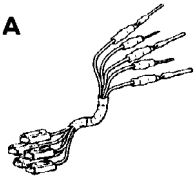
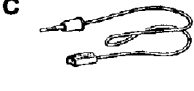
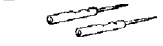
SERVICE SPECIFICATIONS

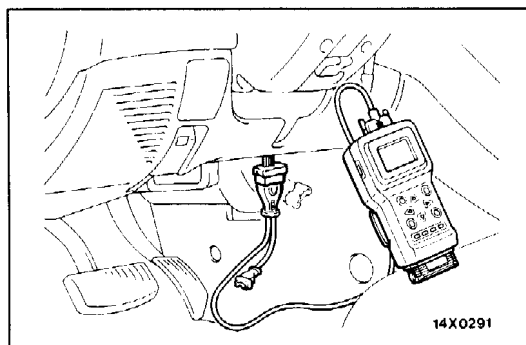
54200030113

Items		Standard value	Limit
Headlamp aiming for low beam	Vertical direction	60 mm below horizontal (H)	–
	Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)	–
Headlamp intensity cd		–	30,000 or more

SPECIAL TOOL

54200060150

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	ETACS-ECU input signal check
A  B  C  D 	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	- Measuring voltage and resistance during troubleshooting - A: Connector pin contact pressure inspection - B, C: Power circuit inspection - D: Commercial tester connection
	MB990784	Ornament remover	Removal of headlamp leveling switch



TROUBLESHOOTING

54200070108

DIAGNOSTIC FUNCTION INPUT SIGNAL INSPECTION POINTS

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

Caution

Always turn the ignition switch off when connecting and disconnecting the MUT-II.

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

Always use the special tool (MB991223) to measure voltage and resistance during troubleshooting.

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptoms		Inspection procedure	Reference page
Communication with MUT-II is not possible.	Communication with all systems is not possible.	1	54-29
	Communication between the diagnosis connector and ETACS-ECU is not possible.	2	54-29
The lighting monitor buzzer doesn't sound under the following condition while the tail lamps or headlamps illuminate. When the driver's door is opened with the ignition key at "OFF".		3	54-30
The angle of the headlamps doesn't change by means of the headlamp leveling switch.		4	54-31
The headlamps doesn't illuminate when the ignition key is at "ON" under the following conditions. However, they illuminate when the key is at "HEAD". <Vehicles with daytime running lamp system> - Lighting switch: OFF - Passing switch: OFF		5	54-32
The headlamps are not switched off when the lighting switch is at "TAIL" under the following conditions. <Vehicles with daytime running lamps> - Ignition switch: OFF - Passing switch: OFF		6	54-33

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

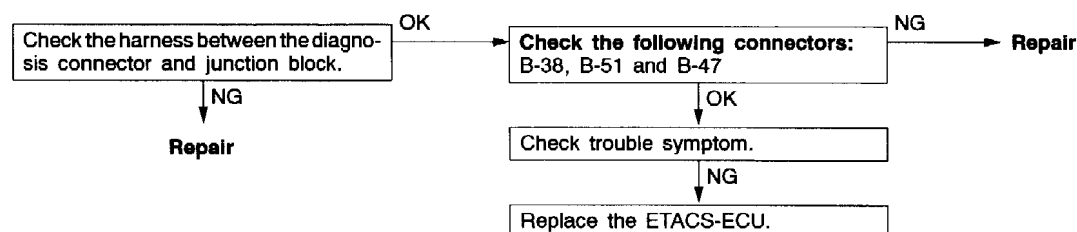
INSPECTION PROCEDURE 1

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

Refer to GROUP 13A – Troubleshooting.

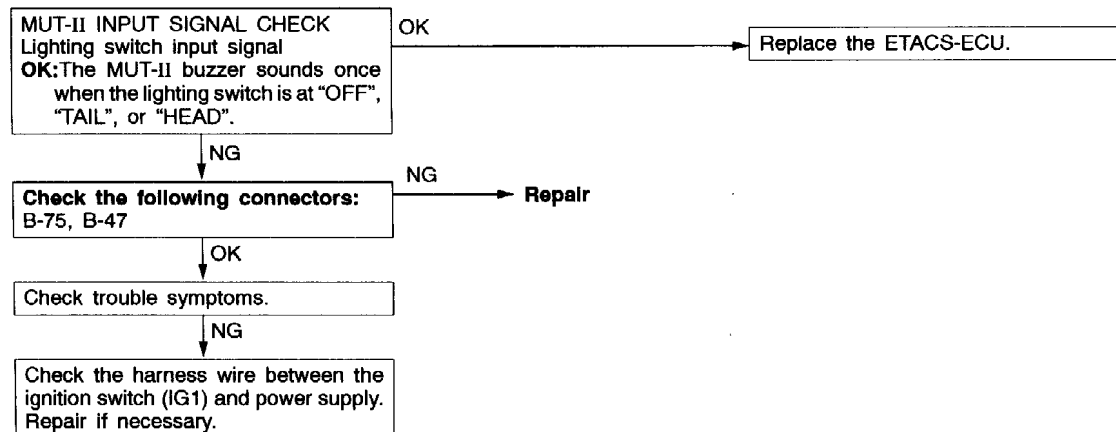
INSPECTION PROCEDURE 2

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



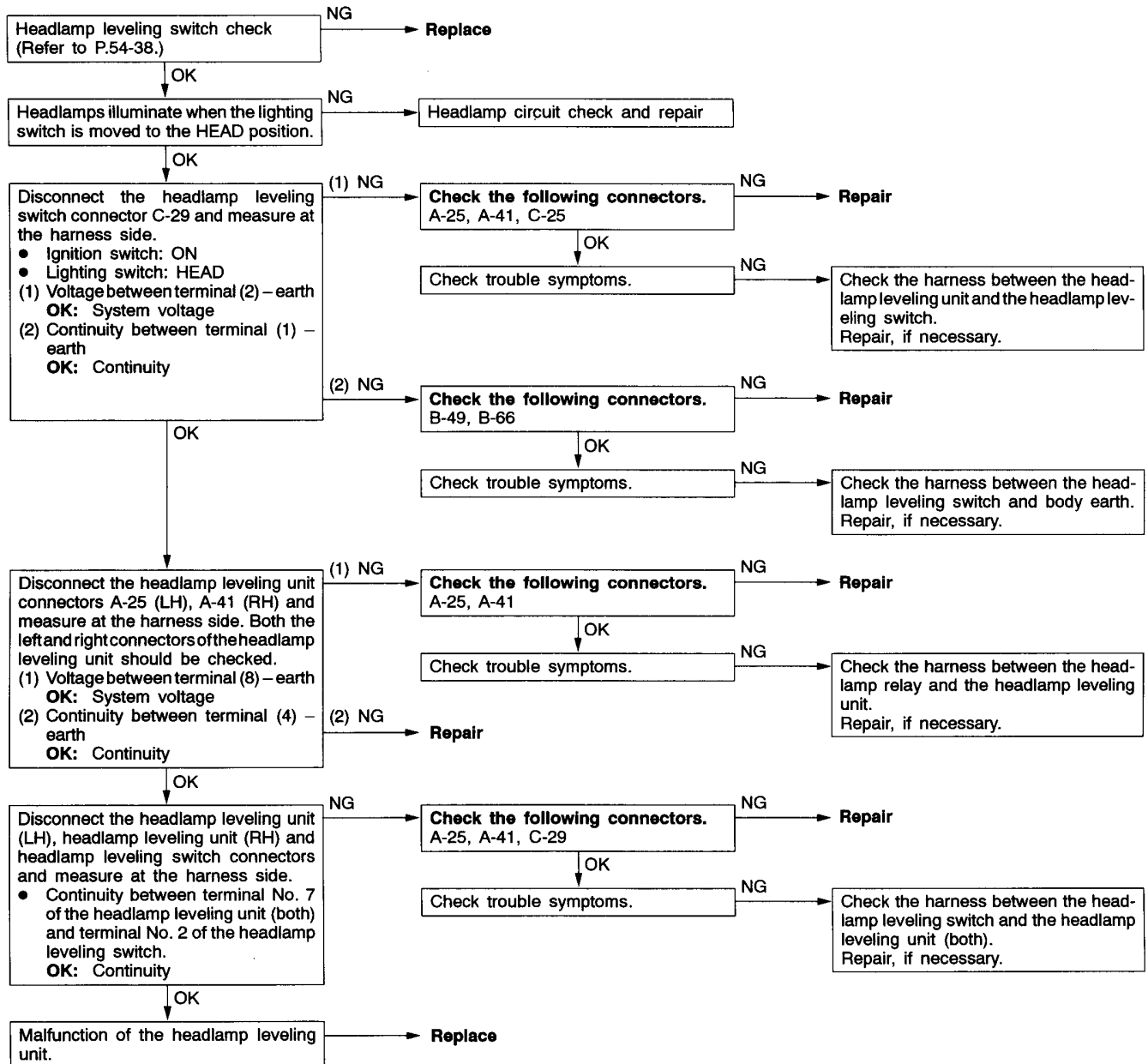
INSPECTION PROCEDURE 3

While the tail lamps or headlamps are illuminated, driver's side door is opened with the ignition key at "OFF", but the lighting monitor buzzer does not sound.	Probable cause
The cause is probably a defective lighting switch input circuit system or a defective ETACS-ECU.	• Malfunction of harness or connector • Malfunction of ETACS-ECU



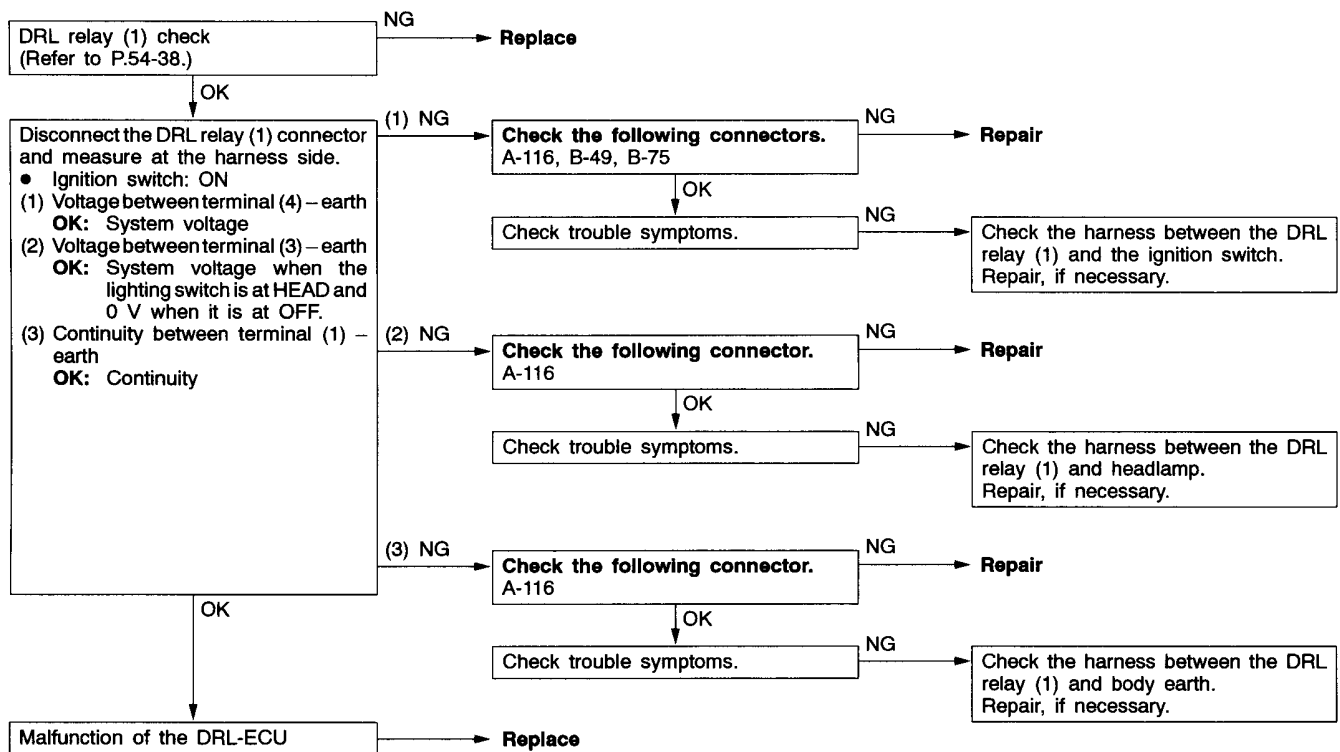
Inspection procedure 4

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 the headlamp leveling switch • Malfunction of connector • Malfunction of harness • Malfunction of the headlamp leveling unit



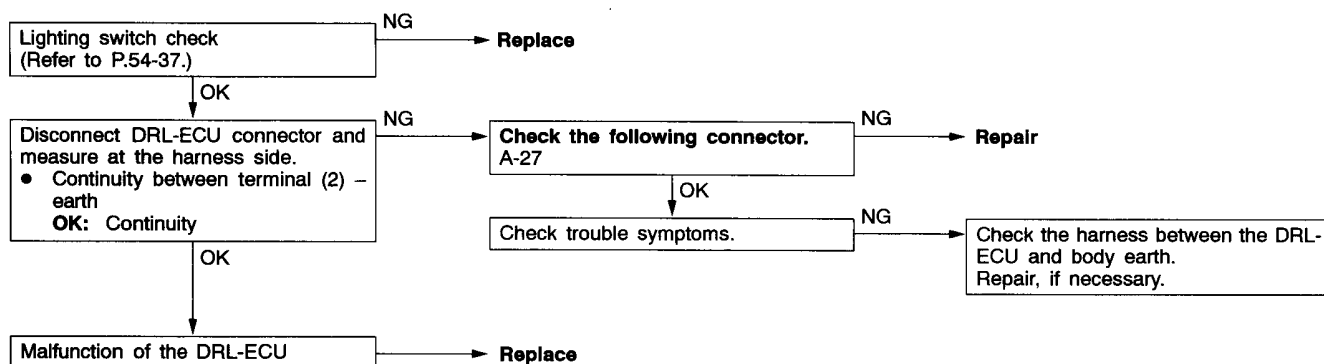
Inspection procedure 5

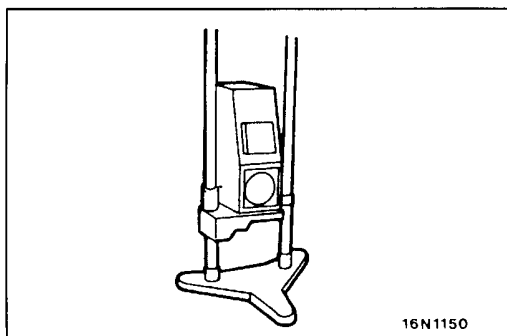
The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is moved to the ON position. However, they illuminate when the lighting switch is moved to the HEAD position. <Vehicles with daytime running lamp> • Lighting switch: OFF • Passing switch: OFF	Probable 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 relay (1) • Malfunction of the DRL-ECU



Inspection procedure 6

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

54200090074

HEADLAMP AIMING

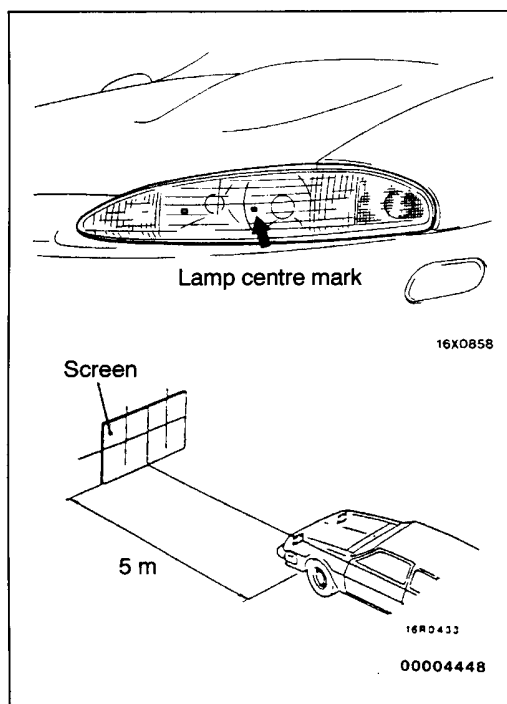
<USING A BEAMSETTING EQUIPMENT>

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.54-35.)

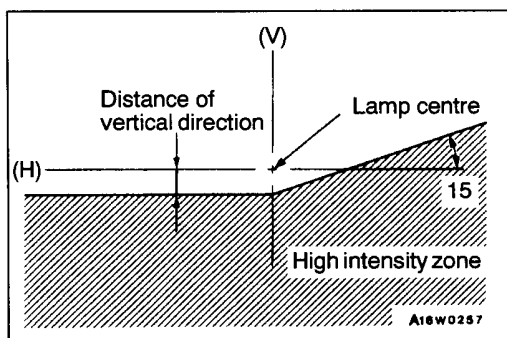


<USING A SCREEN>

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.

NOTE

The lamp centre mark (□ mark) is engraved on the outer lens.



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

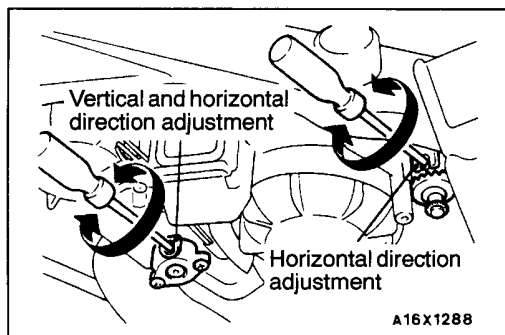
Standard value:

(Vertical direction)

60 mm below horizontal (H)

(Horizontal direction)

Position where the 15° sloping section intersects the vertical line (V)



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

Caution

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

NOTE

The reflections for low beam and high beam have been combined into a single part, so if the low beam adjustment is made, high beam adjustment is not necessary.

INTENSITY MEASUREMENT

54200100050

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

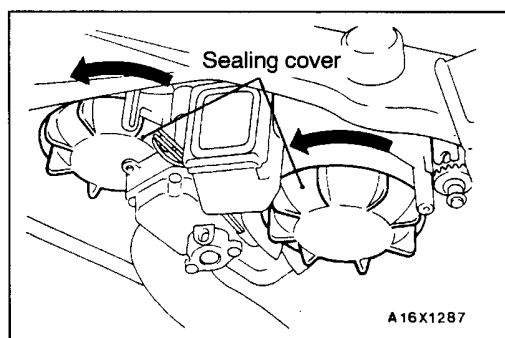
- When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
- There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
- If an illuminometer is used to make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

$I = Er^2$ Where:

I=Intensity (cd)

E=illumination (lux)

r=distance (m) from headlamps to illuminometer

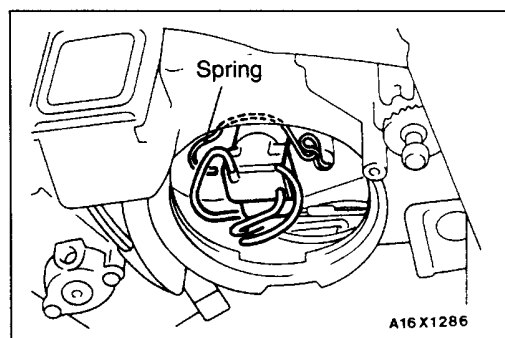


BULB REPLACEMENT

54200130080

<Headlamp Bulb>

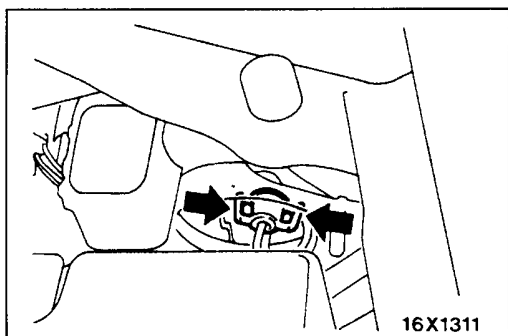
- Remove the sealing cover by turning it anti-clockwise and disconnect the connector.



- 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. Remove the sealing cover by turning it anti-clockwise.
2. Remove the lamp socket by pressing it, then pull out the bulb from the socket.

HEADLAMP AND FRONT TURN-SIGNAL LAMP ASSEMBLY

54200240066

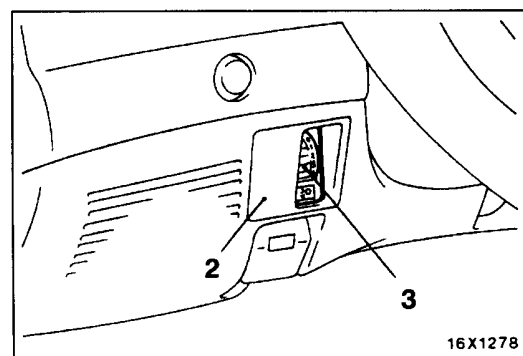
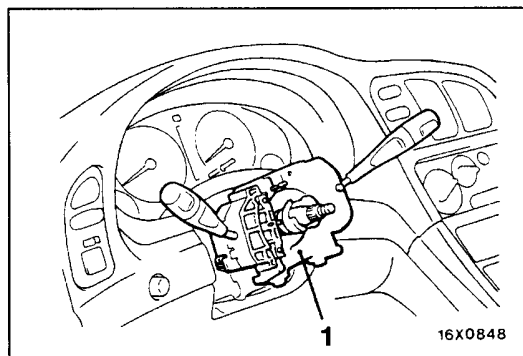
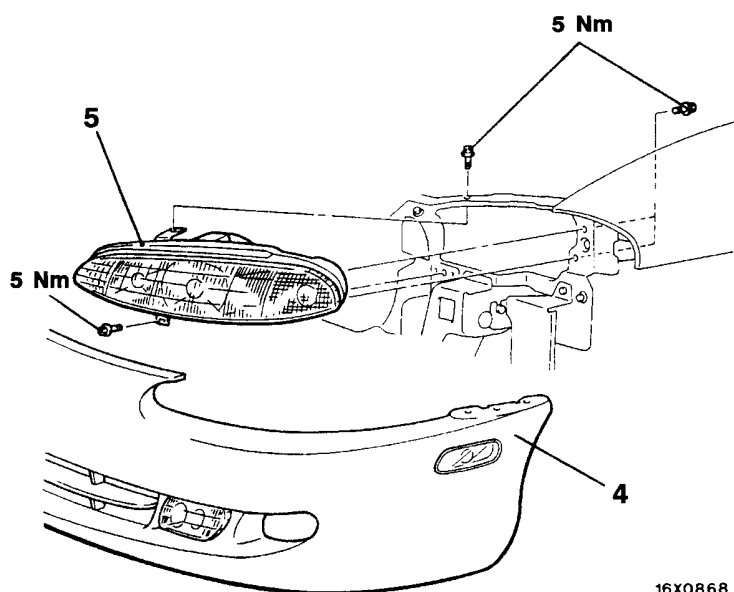
REMOVAL AND INSTALLATION

Caution

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

Pre-removal and Post-Installation Operation

Removal and Installation of Air Cleaner Assembly (When removing the right headlamp)



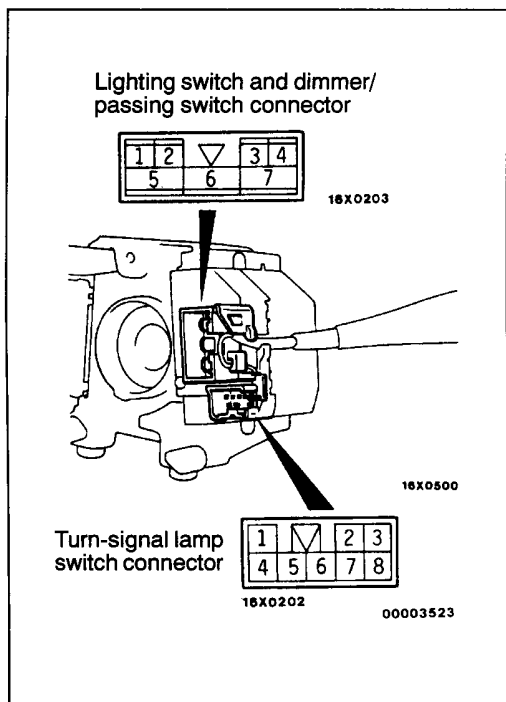
1. Column switch (Refer to GROUP 51 – Windshield Wiper and Washer)

Headlamp leveling switch removal steps

2. Switch panel
3. Headlamp leveling switch

Headlamp and front turn-signal lamp removal steps

4. Front bumper (Refer to GROUP 51)
5. Headlamp, front turn-signal lamp assembly



INSPECTION

54200250021

COLUMN SWITCH CONTINUITY CHECK

<Lighting Switch and Dimmer/Passing Switch>

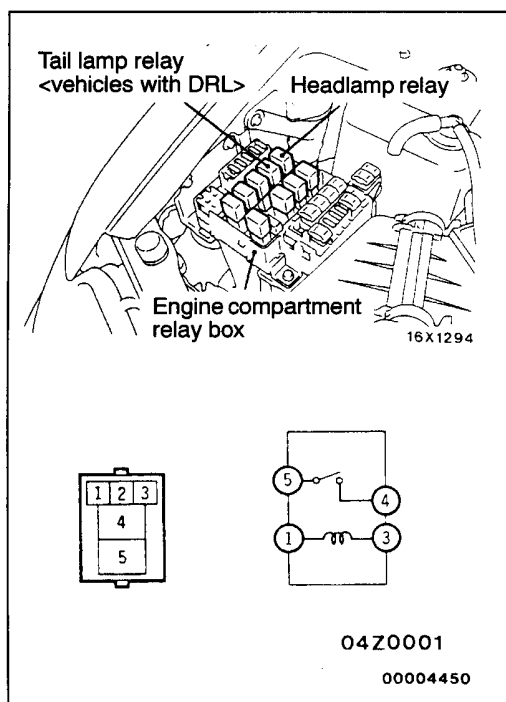
Switch position		Terminal No.						
		1	2	3	4	5	6	7
LIGHTING SWITCH	OFF							
	TAIL		○	○	○			
	HEAD		○	○	○			
DIMMER/ PASSING SWITCH	Low-beam						○	○
	High-beam					○	○	
	PASSING	○	○	○	○	○		

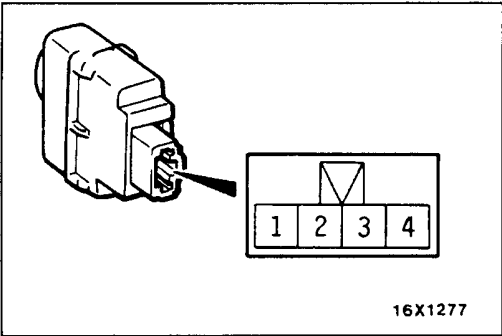
<Turn-signal lamp switch>

Switch position		Terminal No.		
		5	7	8
TURN-SIGNAL LAMP SWITCH	RH	○		○
	OFF			
	LH		○	○

HEADLAMP RELAY AND TAIL LAMP CONTINUITY CHECK

Battery voltage		Terminal No.			
		1	3	4	5
Power is not supplied		○	○		
Power is supplied		⊕	⊖	○	○



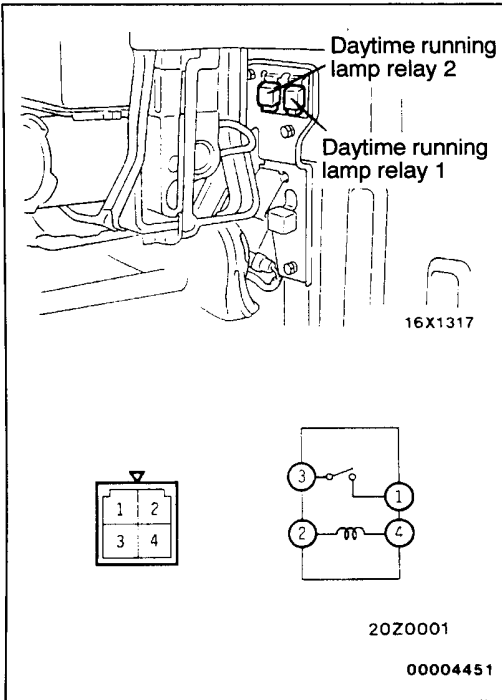


HEADLAMP LEVELING SWITCH CHECK

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 1 and 2 Ω	120	300	620	1,100	2,000



DAYTIME RUNNING LAMP RELAY I AND II CHECK

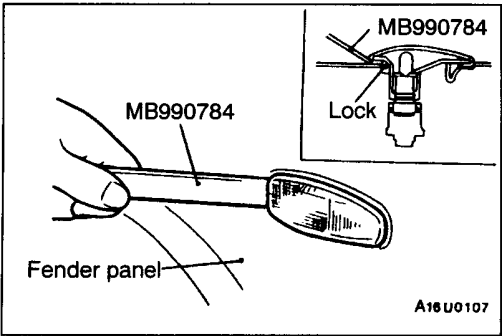
Battery voltage	Terminal No.			
	1	2	3	4
Supplied	○		○	
Not supplied		⊕		⊖

SIDE TURN-SIGNAL LAMP

54200060167

SPECIAL TOOL

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

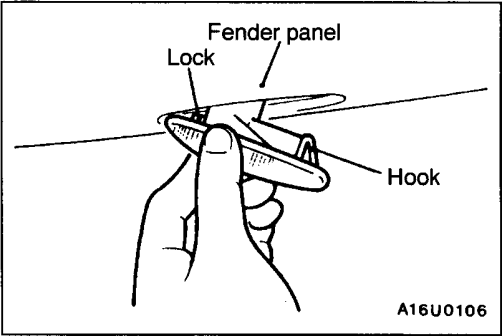


REMOVAL SERVICE POINT

54200330039

◀▶ SIDE TURN-SIGNAL LAMP REMOVAL

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



INSTALLATION SERVICE POINT

▶◀ 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

54200030120

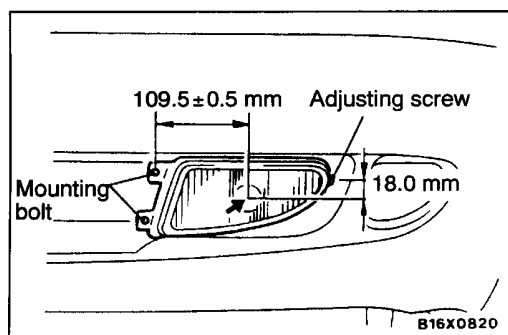
SERVICE SPECIFICATIONS

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

SPECIAL TOOL

54200060174

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



ON-VEHICLE SERVICE

54200110053

FRONT FOG LAMP AIMING

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

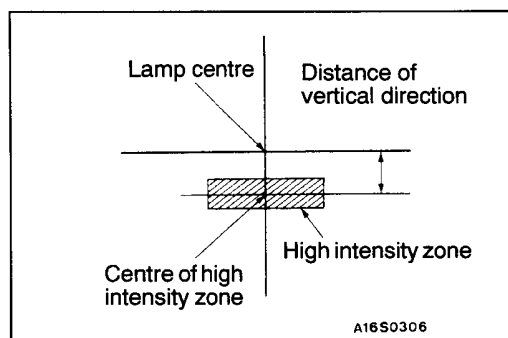
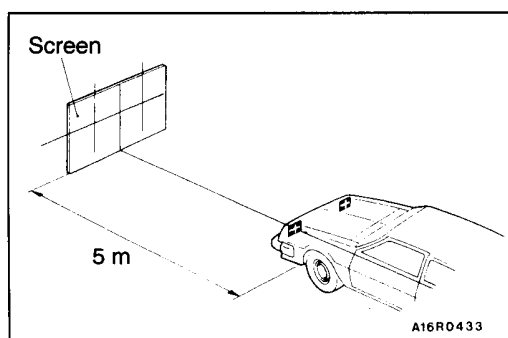
Standard value:

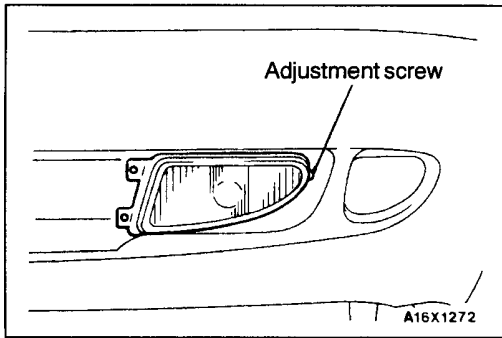
(Vertical direction)

100 mm below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

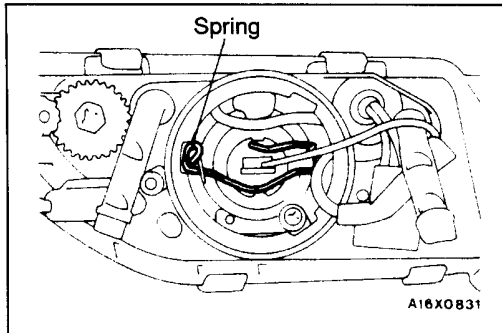


**NOTE**

The horizontal direction is non-adjustable. If the deviation of the lamp 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**

54200130097

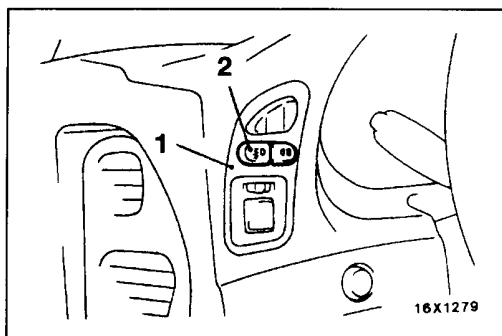
- (1) Remove the fog lamp.
- (2) After the sealing cover removal, remove the bulb attaching spring and pull out the bulb.

Caution

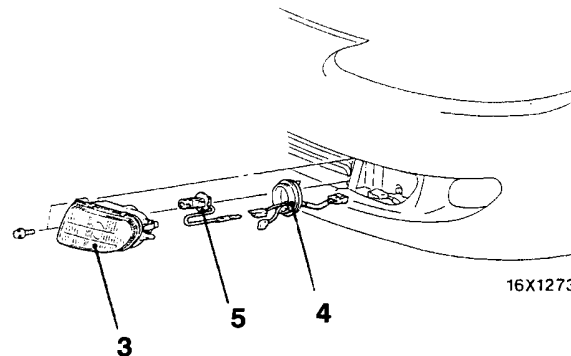
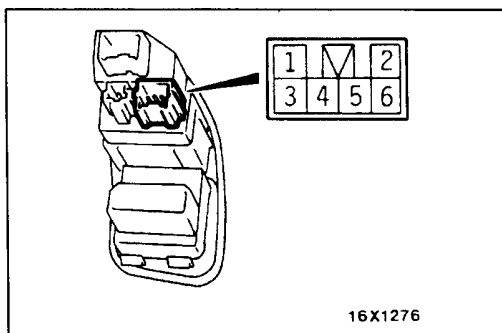
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

FRONT FOG LAMP REMOVAL AND INSTALLATION

54200150062

**Front fog lamp switch removal steps**

1. Instrument panel switch
2. Front fog lamp switch



90004452

Front fog lamp removal steps

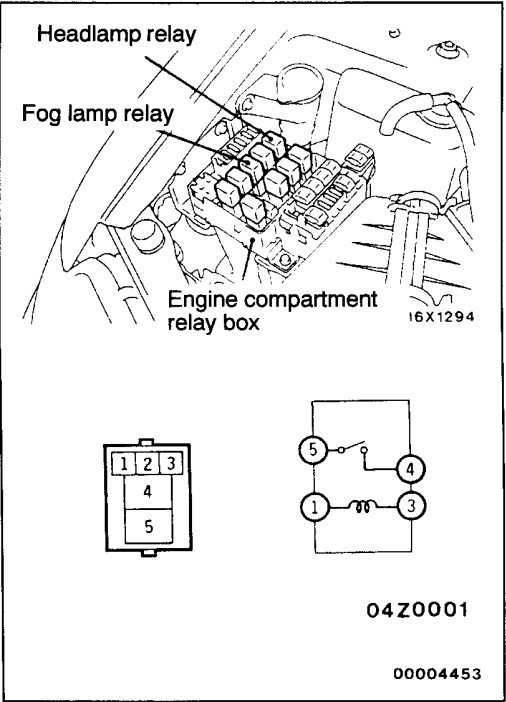
3. Front fog lamp
4. Sealing cover
5. Bulb

INSPECTION

54200160027

FRONT FOG LAMP SWITCH CONTINUITY CHECK

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



FRONT FOG LAMP RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

INSTALLATION SERVICE POINT

◀▶ SEALING COVER INSTALLATION

Install the sealing cover securely.

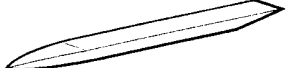
Caution

If the sealing cover is not securely installed, the lens will be out of focus, or water will get inside the lamp unit.

REAR COMBINATION LAMP, BACK-UP LAMP

54200060181

SPECIAL TOOL

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

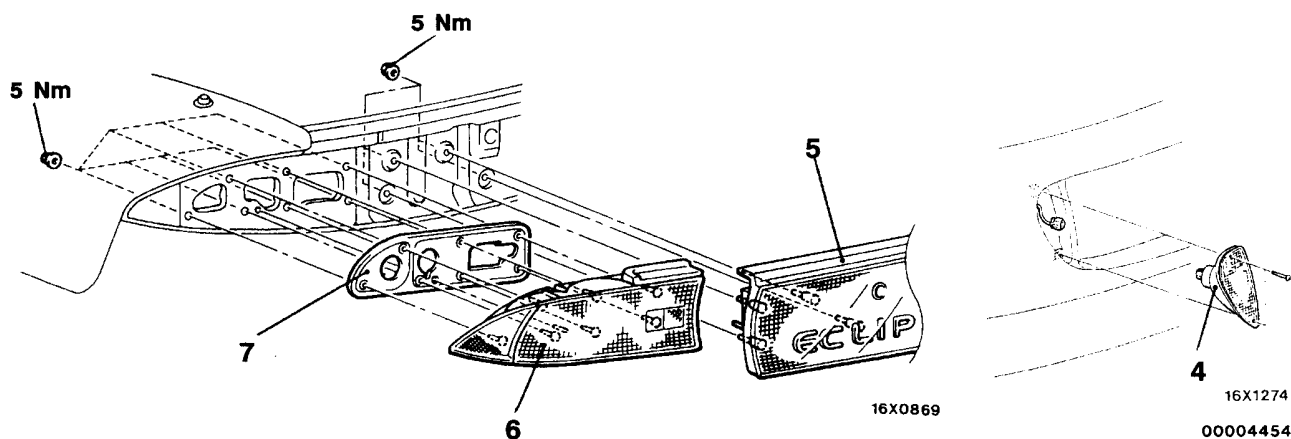
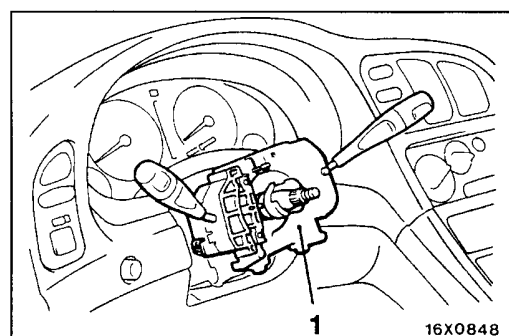
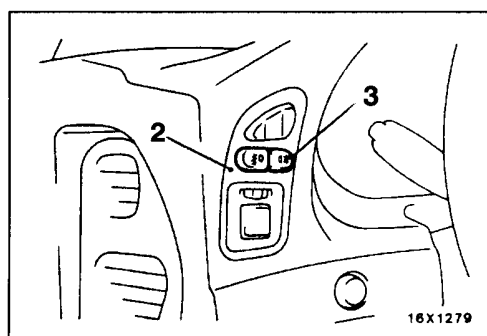
REAR COMBINATION LAMP, BACK-UP LAMP

54200390044

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.



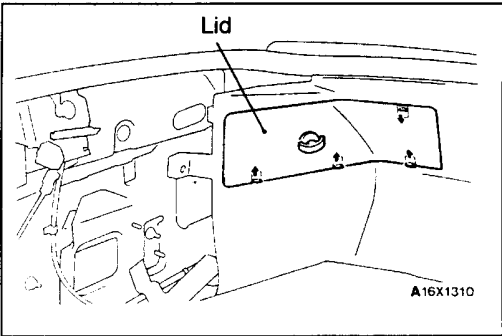
1. Column switch (Refer to GROUP 51 – Windshield Wiper and Washer.)

Rear fog lamp switch removal steps

2. Instrument panel switch
3. Rear fog lamp switch
4. Back-up lamp

Rear combination lamp removal steps

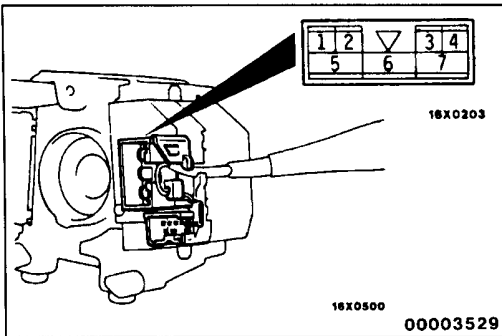
- Rear end trim (Refer to GROUP 52A)
- 5. Rear panel garnish assembly
- 6. Rear combination lamp
- 7. Gasket



REMOVAL SERVICE POINT

◀▶ REAR COMBINATION LAMP REMOVAL

Slide the lock knob of the lid in the direction of the arrow in the illustration to remove the lid, and then remove the rear combination lamp mounting nut.



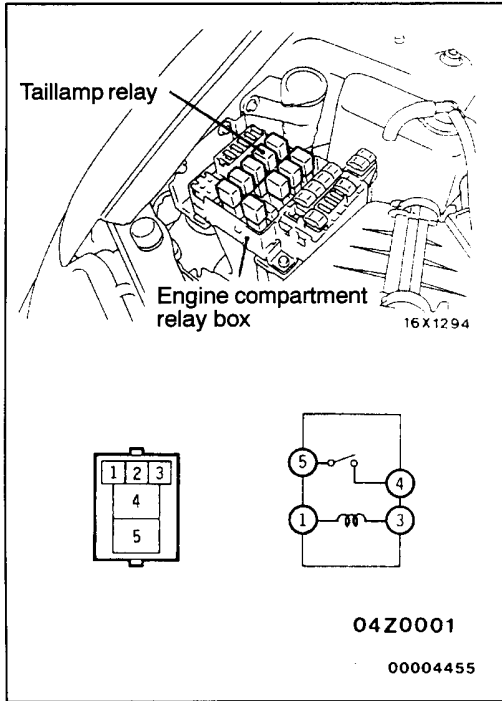
INSPECTION

54200400013

COLUMN SWITCH CONTINUITY CHECK

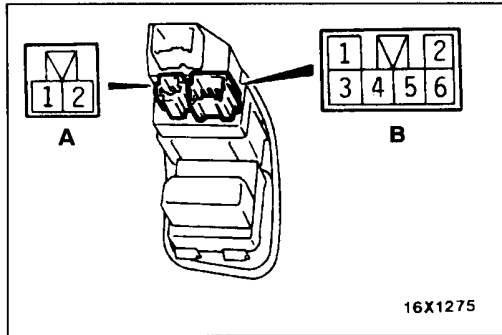
<Lighting switch>

Switch position		Terminal No.		
		2	3	4
LIGHTING SWITCH	OFF			
	TAIL	○	—	○
	HEAD	○	○	○



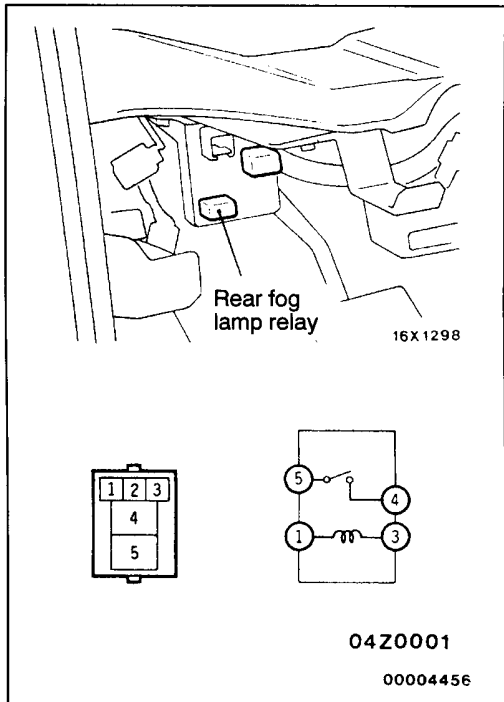
TAILLAMP RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○



REAR FOG LAMP SWITCH CONTINUITY CHECK

Switch position	A connector terminal No.			B connector terminal No.	
	1		3	1	2
OFF	○	ILL	○		
ON	○	ILL	○	○	○



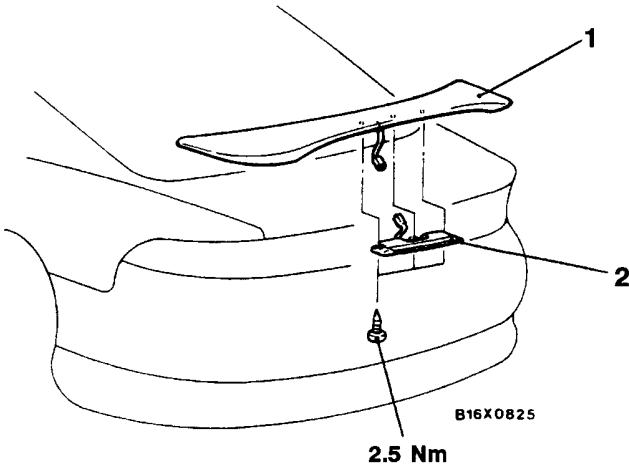
REAR FOG LAMP RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

HIGH-MOUNTED STOP LAMP

54200510075

REMOVAL AND INSTALLATION



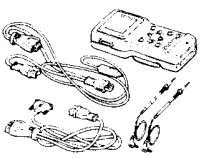
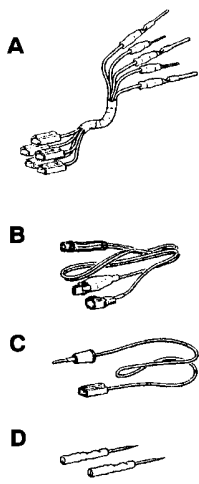
Removal steps

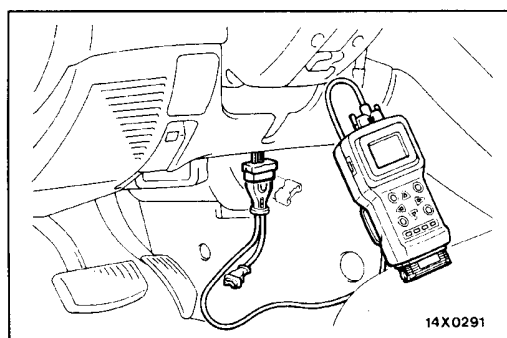
1. Rear spoiler (Refer to GROUP 51
— Aero Parts)
2. High mounted stop lamp

ROOM LAMP

SPECIAL TOOLS

54200060198

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



TROUBLESHOOTING

54200070115

DIAGNOSTIC FUNCTION

INPUT SIGNAL INSPECTION POINTS

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

Caution

Always turn the ignition switch off when connecting and disconnecting the MUT-II.

2. If buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the 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	54-47
	Communication between the diagnosis connector and ETACS-ECU is not possible.	2	54-47
The room lamp and foot lamp do not illuminate when any of the doors is opened. (However, they do when the room lamp switch is in the DOOR position for vehicles without sunroof.)		3	54-48
Even if all doors are closed, the room lamp and foot lamp switch off immediately and do not become dimmed.		4	54-49
While the room lamp and foot lamp are dimmed, the ignition key is turned to the ON position but the room lamp and foot lamp do not switch off. (However, they switch off after dimming.)		5	54-49
Room lamp and foot lamp remain illuminated although all doors are closed. (In vehicles without sunroof, however, they switch off when the room lamp switch is moved from the DOOR position to the OFF position.)		6	54-50

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

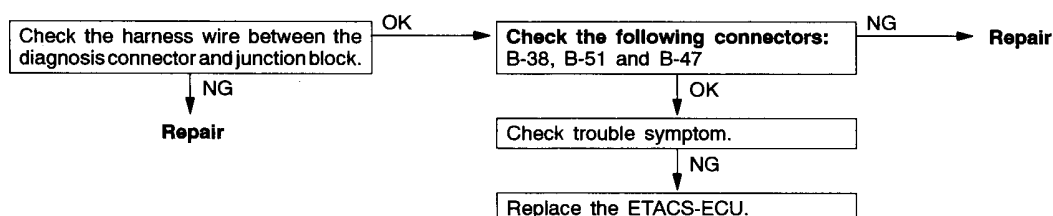
INSPECTION PROCEDURE 1

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 diagnosis connector • Malfunction of harness wire

Refer to GROUP 13A – Troubleshooting.

INSPECTION PROCEDURE 2

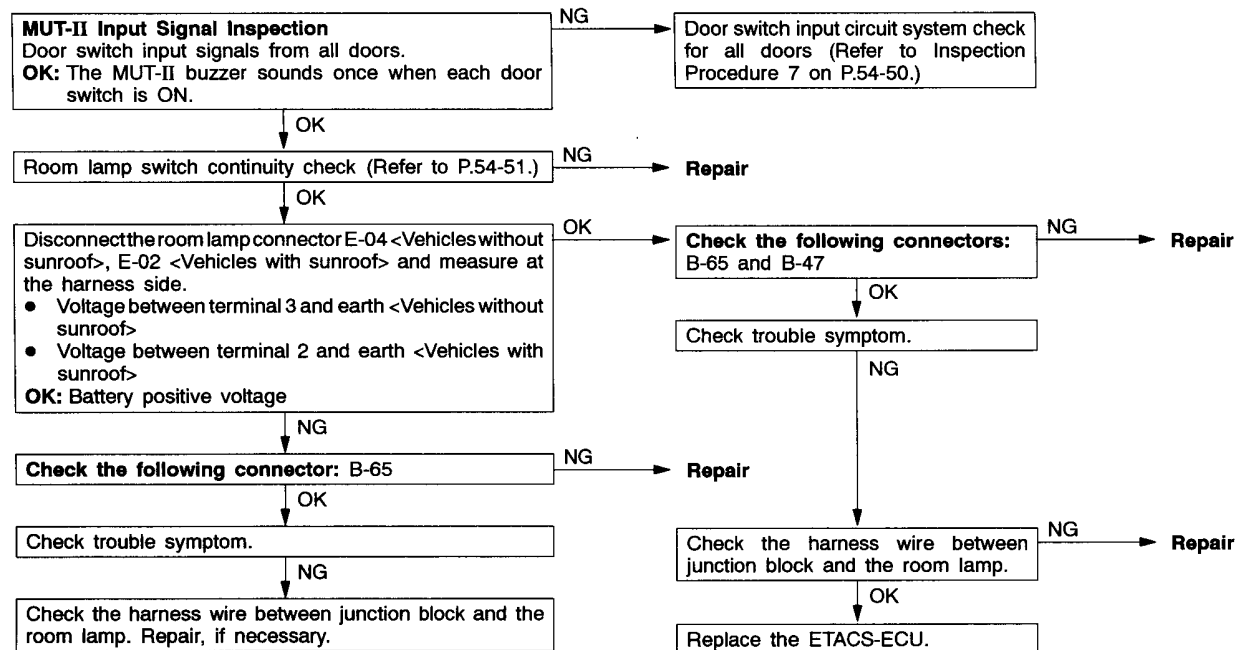
Communication with MUT-II is not possible. (Communication between the diagnosis connector and ETACS-ECU is not possible.)	Probable cause
The cause probably a defect in the power supply system (including earth) for ETACS-ECU or the diagnosis line.	• Malfunction of diagnosis connector • Malfunction of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



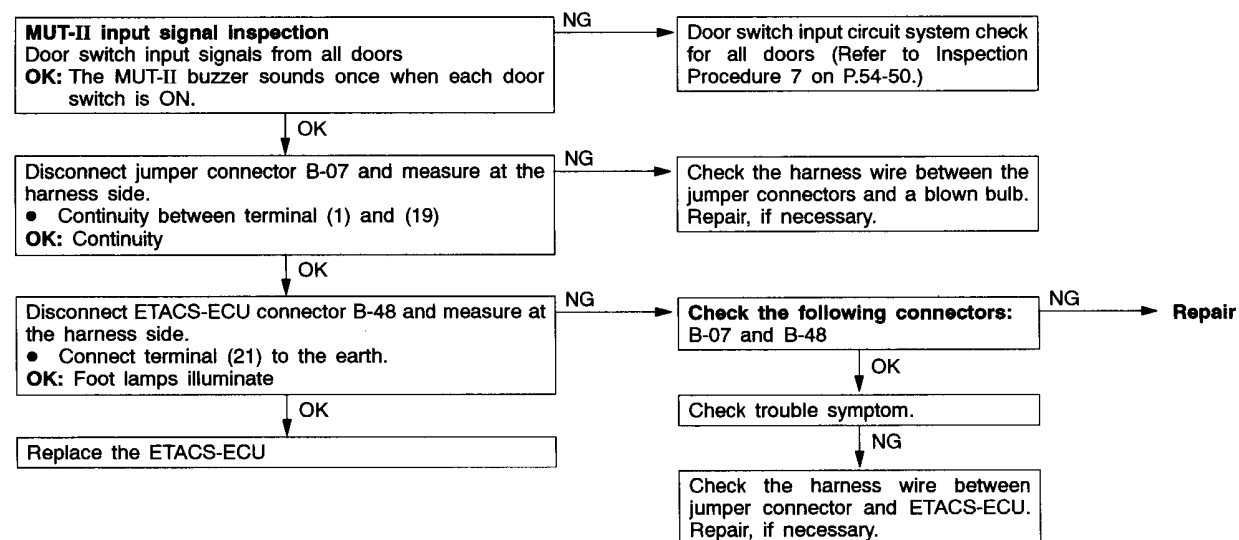
INSPECTION PROCEDURE 3

The room lamp and foot lamp do not illuminate when any of the doors is opened. (However, they do when the room lamp switch is in the DOOR position for vehicles without sunroof.)	Probable cause
The cause is probably defective door switch input circuit systems in all doors a defective room lamp and foot lamp illumination circuit system.	• Malfunction of room lamp • Malfunction of foot lamp • Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU

<Room lamp>

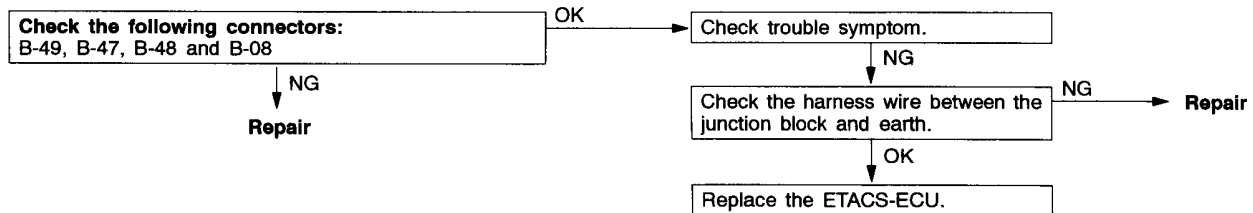


<Foot lamps>



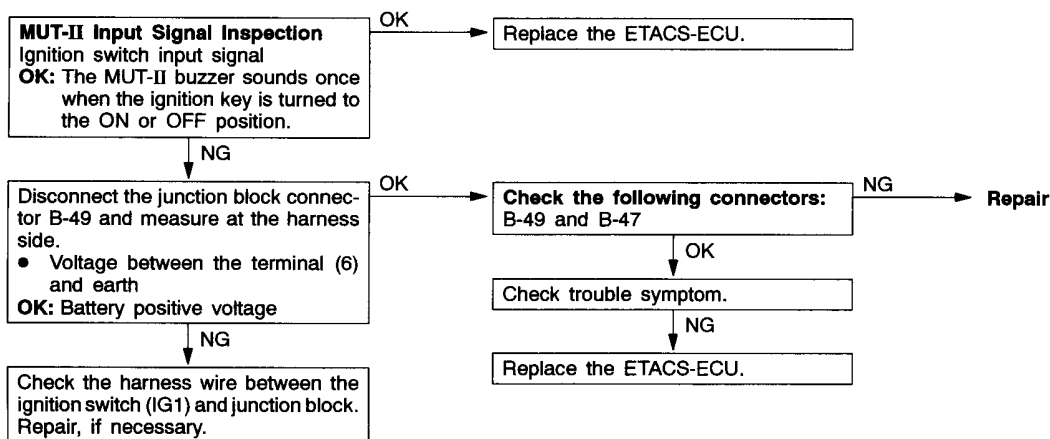
INSPECTION PROCEDURE 4

Even if all doors are closed, the room lamp and foot lamp switch off immediately and do not become dimmed.	Probable cause
The cause is probably a defective earth circuit harness or a defective ETACS-ECU.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU



INSPECTION PROCEDURE 5

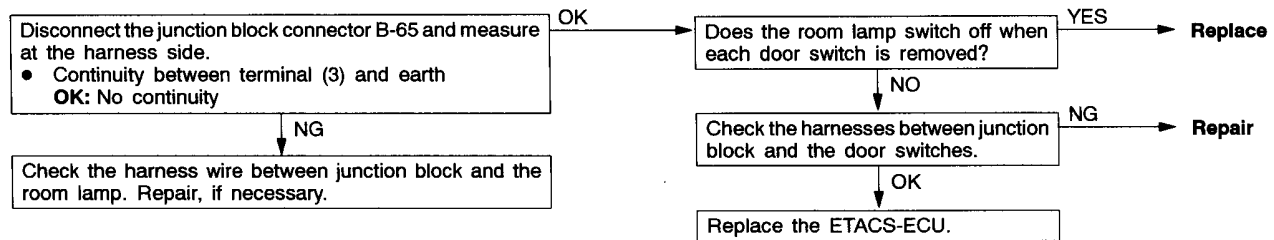
While the room lamp and foot lamp are dimmed, the ignition key is turned to the ON position but the room lamp and foot lamp do not switch off. (However, they switches off after dimming.)	Probable cause
The cause is probably a defective ignition circuit system or a defective ETACS-ECU. In addition, if there is a defective fuse, the indicator lamp mechanism inside the combination meter will also become defective, so the cause might also be a harness short.	• Malfunction of fuse • Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU



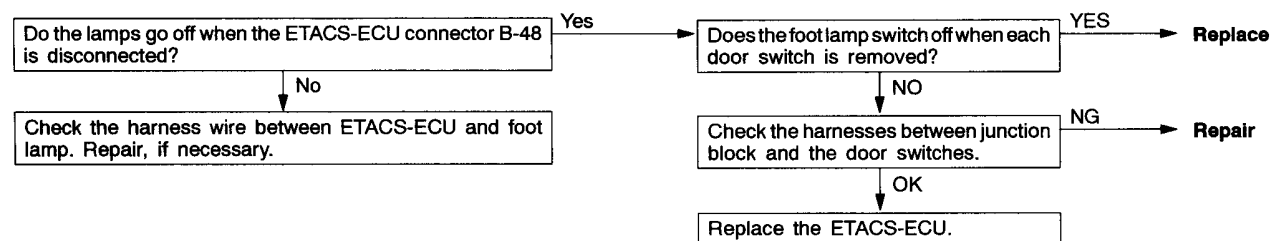
INSPECTION PROCEDURE 6

Room lamp and foot lamp remain illuminated although all doors are closed. (In vehicles without sunroof, however, they switch off when the room lamp switch is moved from the DOOR position to the OFF position.)	Probable cause
The cause is probably a harness short, a defective ETACS-ECU or a defective door switch in one of the doors.	• Malfunction of door switch • Malfunction of ETACS-ECU • Malfunction of harness wire

<Room lamp>

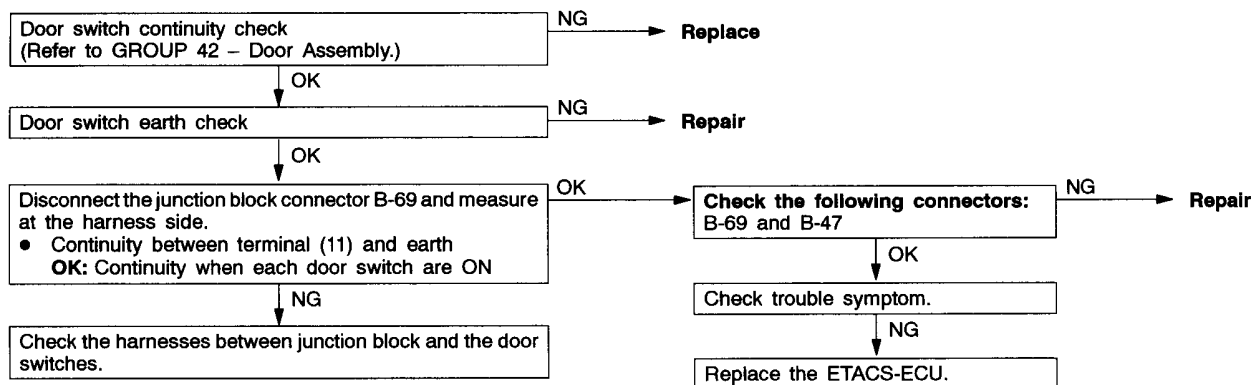


<Foot lamps>



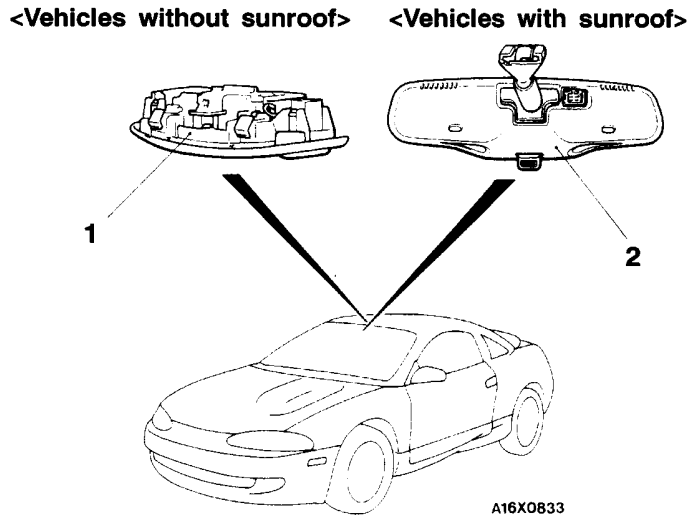
INSPECTION PROCEDURE 7

Door switch input circuit system check for all doors

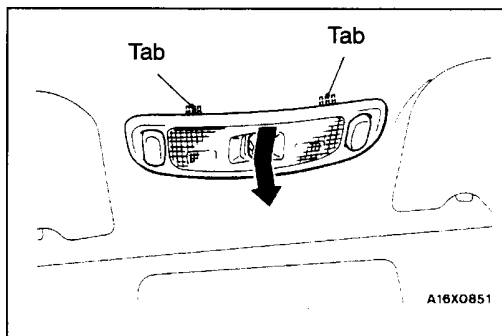


ROOM LAMP

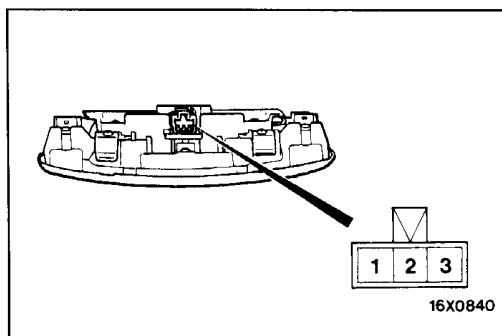
54200630047

REMOVAL AND INSTALLATION**Room lamp removal**

1. Room lamp assembly
2. Inside rear view mirror <Room lamp integrated> (Refer to GROUP 52A – Inside Rear View Mirror)

**REMOVAL SERVICE POINT****ROOM LAMP**

Press and pull the tab downwards to remove the room lamp assembly.

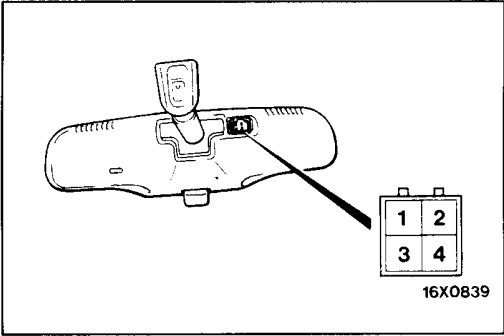
**INSPECTION**

54200640019

ROOM LAMP SWITCH CONTINUITY CHECK

<Vehicles without Sunroof>

Switch position	Terminal No.			
	1	2		3
OFF				
ON	○	—	⦿	○
DOOR		○	⦿	○



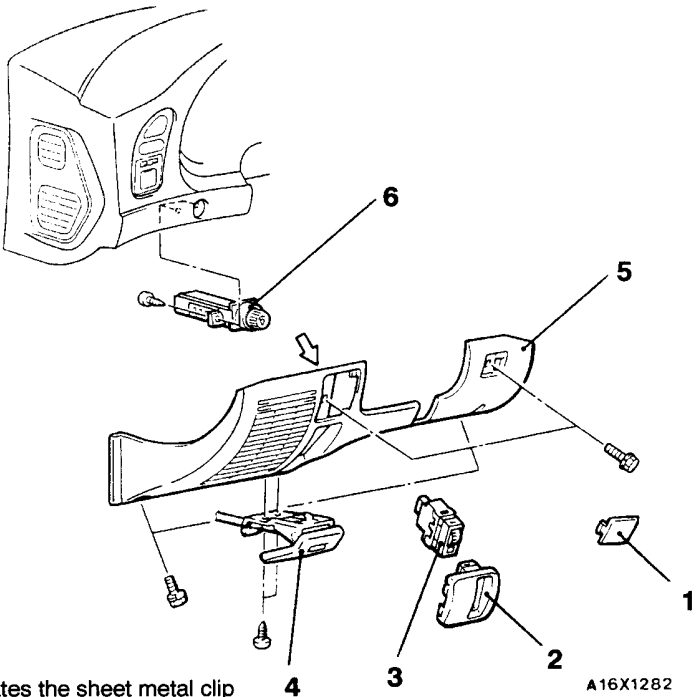
<Vehicles with Sunroof>

Switch position	Terminal No.				
	1		2		3
OFF			○	⊕	○
ON	○	⊕	○		

RHEOSTAT

54200600055

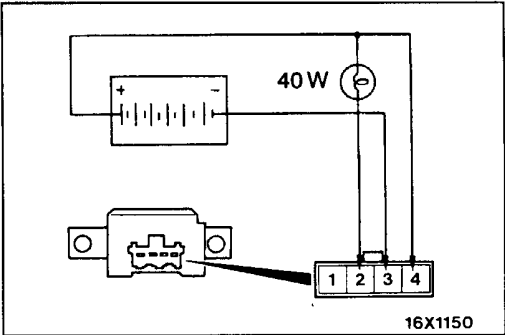
REMOVAL AND INSTALLATION



NOTE
The ⇄ mark indicates the sheet metal clip position.

Removal steps

- 1. Plug
- 2. Headlamp leveling switch panel
- 3. Headlamp leveling switch
- 4. Hood lock release handle
- 5. Instrument under cover
- 6. Rheostat



INSPECTION

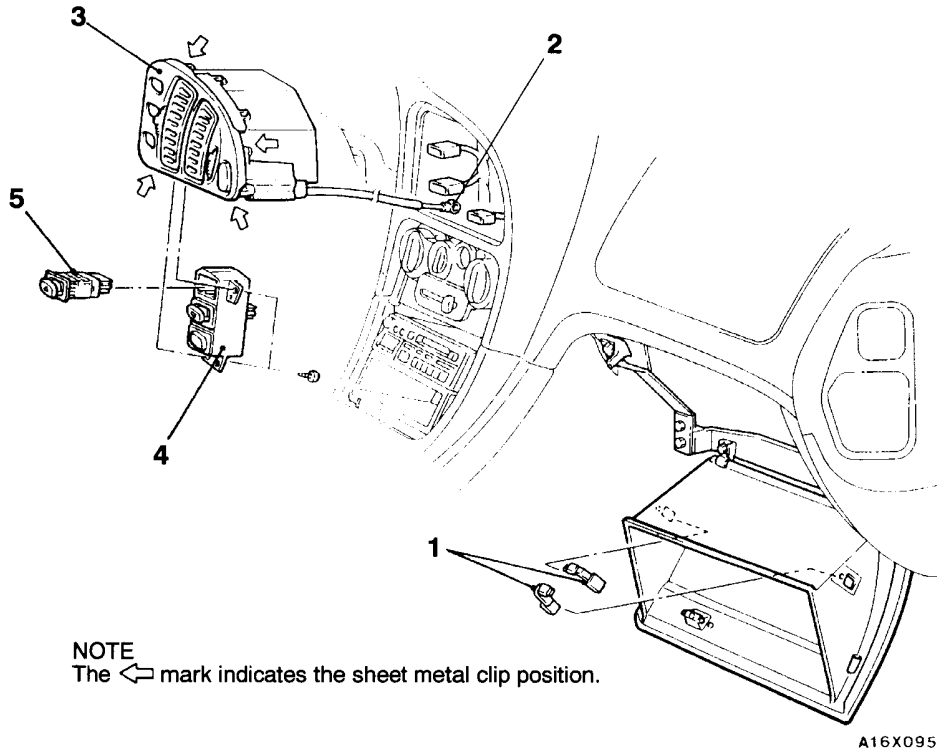
54200610072

- (1) Connect the battery and the test light (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

54200660053

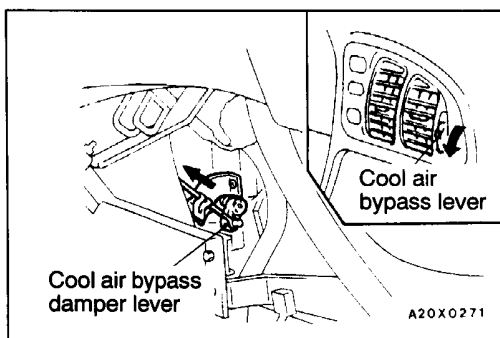
REMOVAL AND INSTALLATION



NOTE
The  mark indicates the sheet metal clip position.

Removal steps

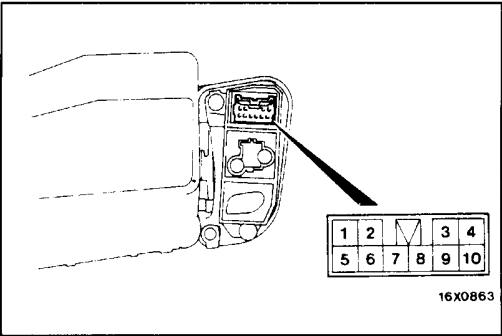
- A◄
1. Stopper
 2. Cool air bypass cable connection
 3. Center air outlet
 4. Holder
 5. Hazard warning lamp switch



INSTALLATION SERVICE POINTS

►A◄ CENTER AIR OUTLET INSTALLATION

- (1) Turn the cool air bypass lever of the center air outlet fully downwards.
- (2) Pull the cool air bypass damper lever on the heater unit side fully toward you, and then attach the cable to the pin of the lever.
- (3) Push the outer cable in the direction of the arrow so that there is no looseness, and then secure it with the clip.

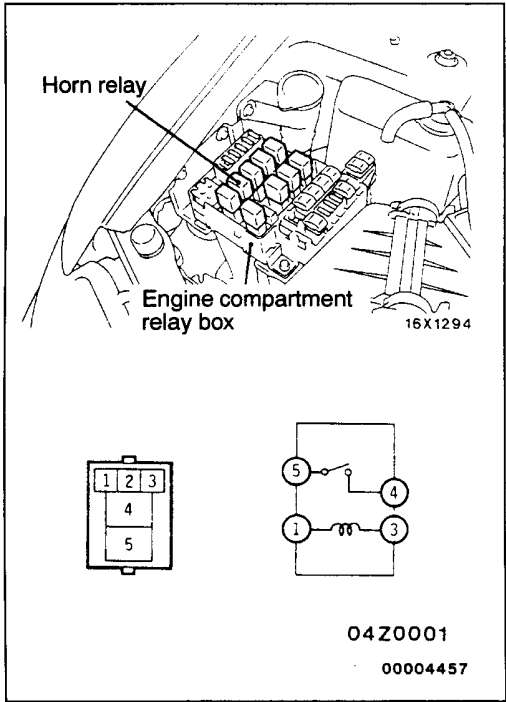


INSPECTION

54200670070

HAZARD WARNING LAMP SWITCH CONTINUITY CHECK

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



HORN

54300650060

INSPECTION

HORN RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

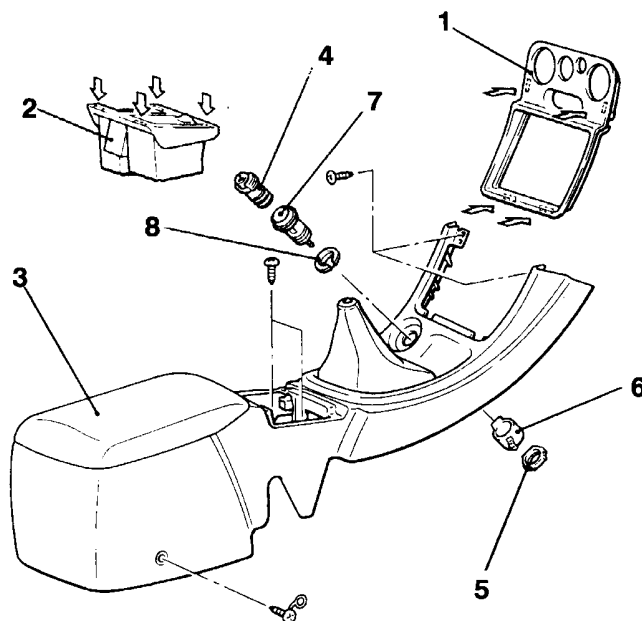
CIGARETTE LIGHTER

54300580066

REMOVAL AND INSTALLATION

CAUTION: SRS

When removing and installing the floor console assembly, do not let it bump against the SRS-ECU.



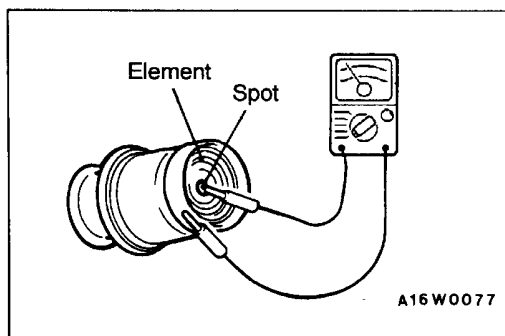
A16X1285

NOTE

The ↩ mark indicates the sheet metal clip position.

Removal steps

- | | |
|------------------------------------|----------------|
| 1. Center console panel | 6. Socket case |
| 2. Ashtray and cup holder assembly | 7. Socket |
| 3. Floor console assembly | 8. Protector |
| 4. Plug | |
| 5. Nut | |


INSPECTION

54300570076

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

RADIO AND TAPE PLAYER

TROUBLESHOOTING

54400070111

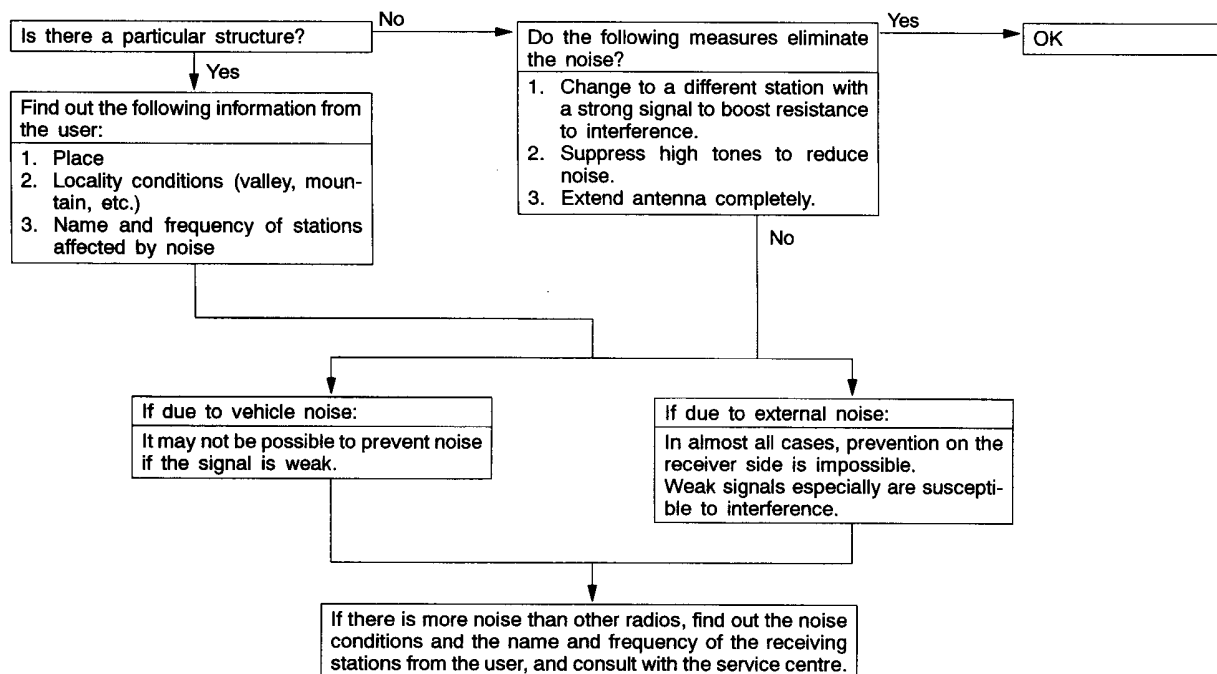
QUICK-REFERENCE TROUBLESHOOTING CHART

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 traveling	A-7
	Noise sometimes appears on FM during traveling.	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
Tape player	Cassette tape will not insert.	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 eject.	C-5
	Uneven revolution. Tape speed is fast or slow.	C-6
	Faulty auto reverse.	C-7
	Tape gets caught in mechanism.	C-8
	Automatic search does not work	C-9

CHART

A. NOISE

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



A-2 Noise appears at certain places when traveling (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

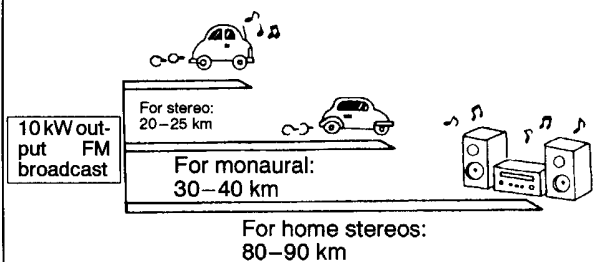
About FM waves:

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

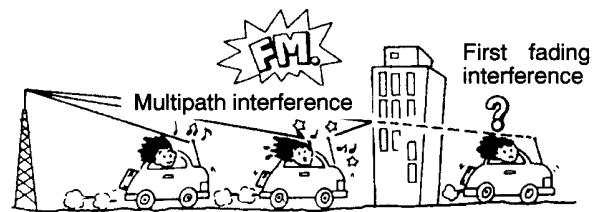
1. The signal becomes weak as the distance from the station's transmission antenna increases. Although this may vary according to the signal strength of the transmitting station and intervening geographical formation or buildings, the area of good reception is approx. 20–25 km for stereo reception, and 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

16A0663

FM Signal Characteristics and Signal Interference

16A0664

00000295

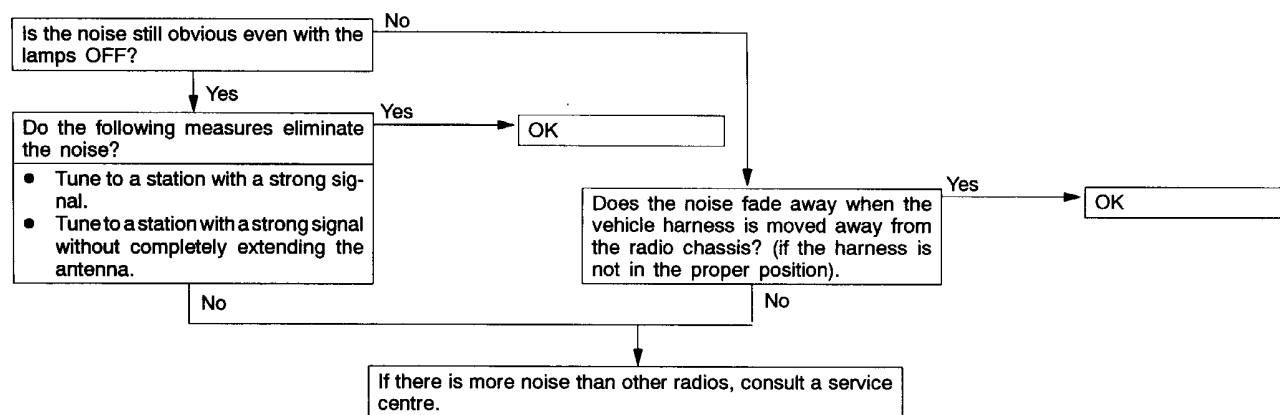
A-3 Mixed with noise, only at night (AM).

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

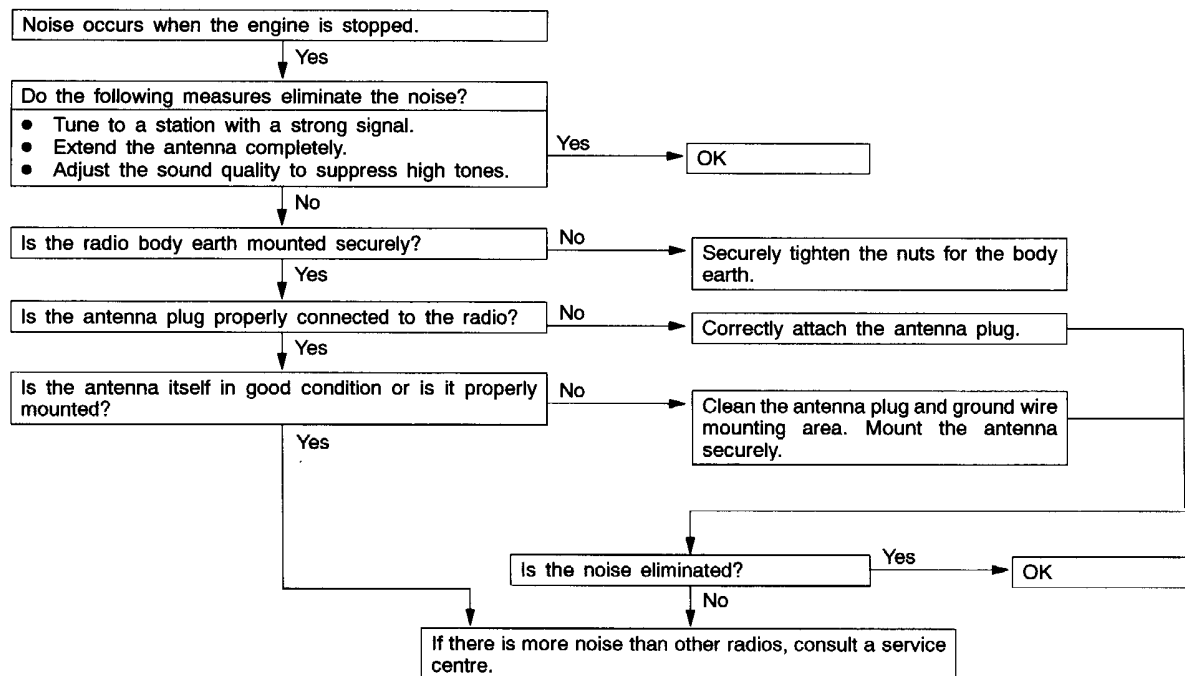
1. Factors due to signal conditions: Due to the fact that long-distance signals are more easily received at night, even stations that are received without problem during the day may experience interference in a general worsening of reception conditions. The weaker a station is the more susceptible it 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.**

(1)



(2)

Noise occurs when the engine is running.



Inspect the vehicle's noise suppressor. (refer to A-6.)

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.

Were conditions such as the following present when noise was received?

- Lightning was flashing. A motorcycle was passing.
- A vehicle passed close by, but it appeared to be a vehicle generating a particularly large amount of noise radiation.
- Passed beneath a power line. Passed under a bridge
- Passed beneath a telephone line.
- Passed close by a signal generator.
- Passed close by some other source of electrical noise.

Yes

No

Continue to check for static; when static is detected, check for the conditions listed above.

Yes

No

If the problem is particularly worse than other radios, consult a service centre.

Noise prevention on the radio side is difficult. If the problem is particularly worse than other radios, consult a service centre.

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. (Refer to Fig. 1 and 2 on P.54-62.) - Check or replace the noise capacitor. (Refer to Fig. 3 on P.54-62.)
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

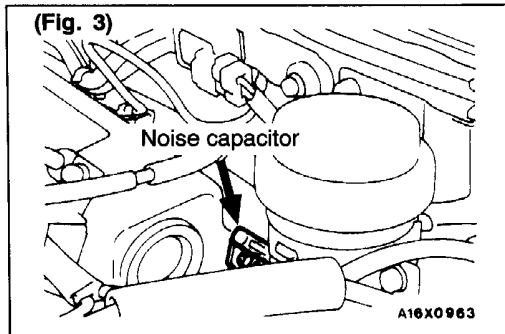
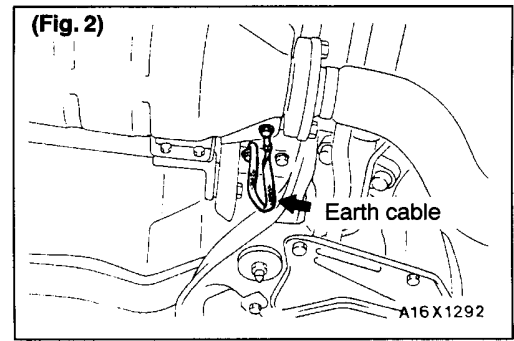
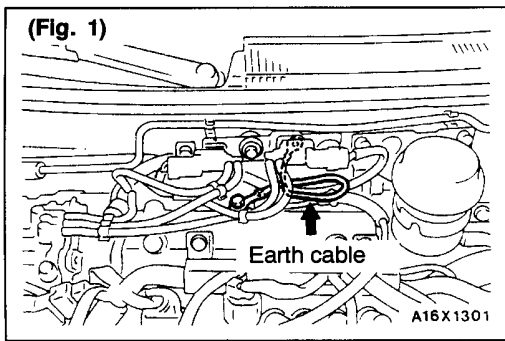
1. **Never connect a high-tension cable to the noise filter, or the filter will be destroyed.**
2. **Do not let any external noise get into the vehicle, or the noise source cannot be identified.**
3. **Prevent noise by suppressing strong sources of noise step by step.**

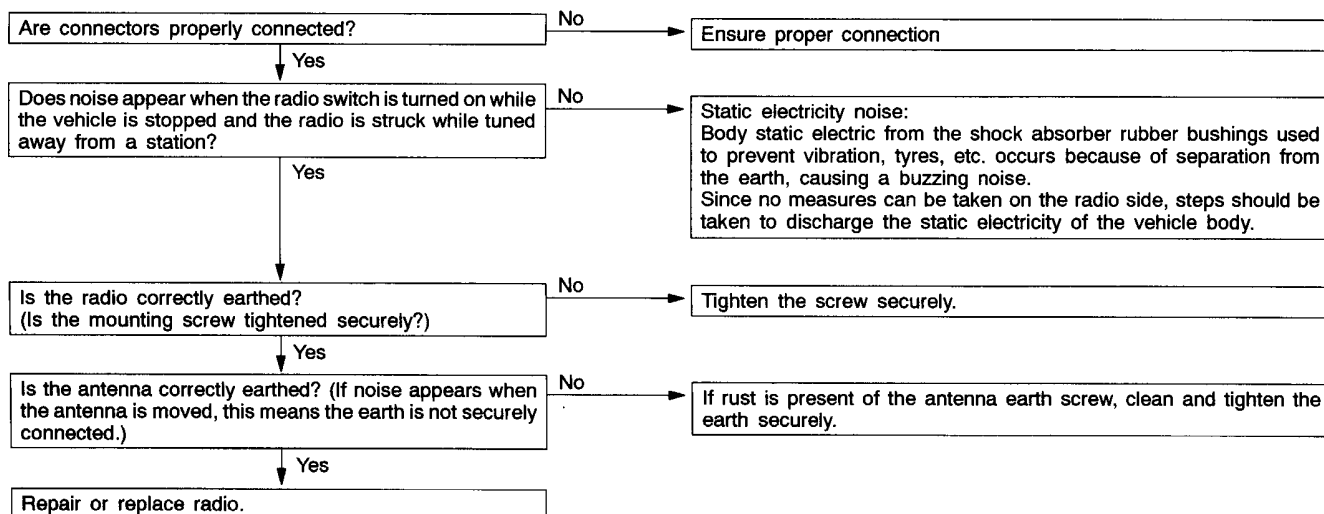
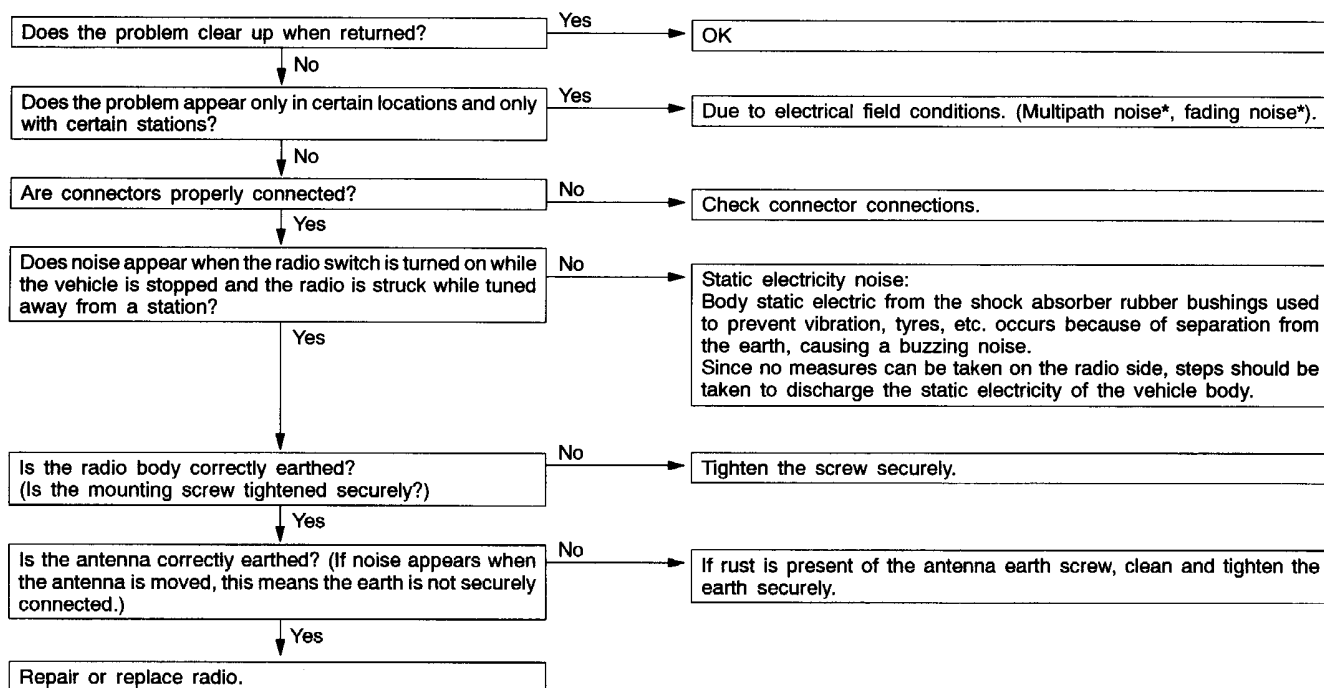
NOTE

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 traveling.**A–8 Noise sometimes appears on FM during traveling.**

* 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).

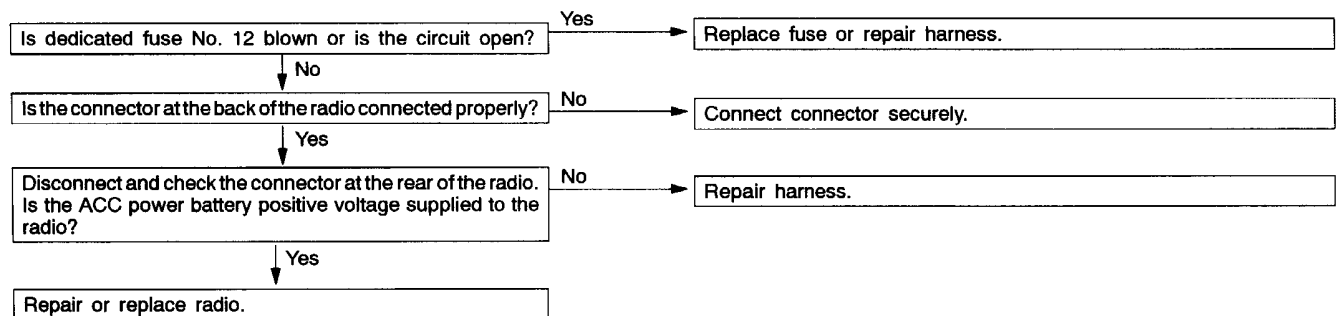
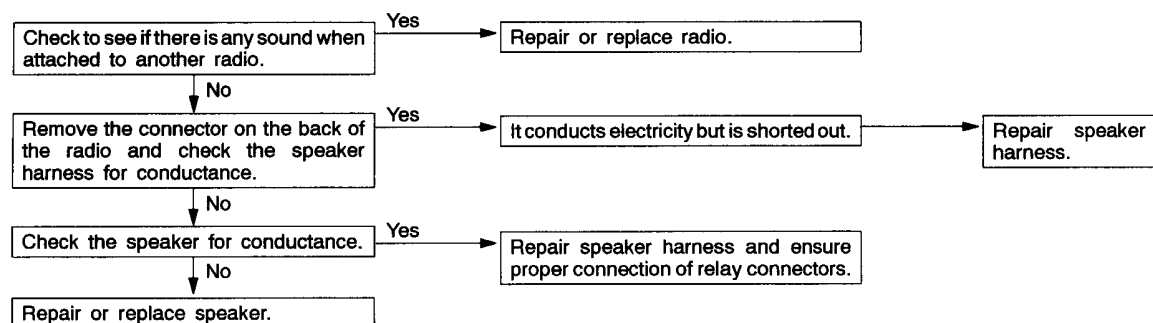
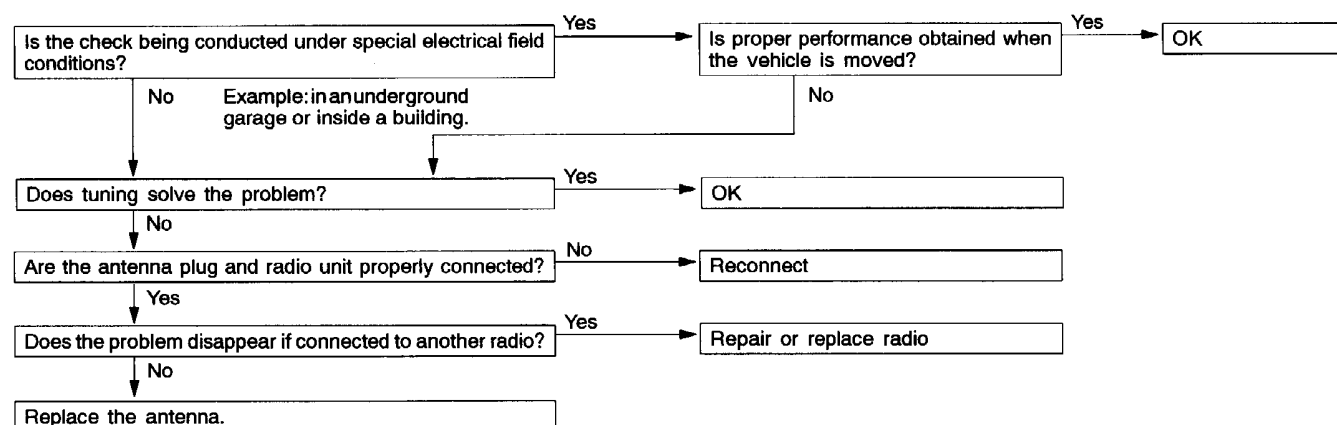
- **Fading noise**
This is a buzzing noise that occurs when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

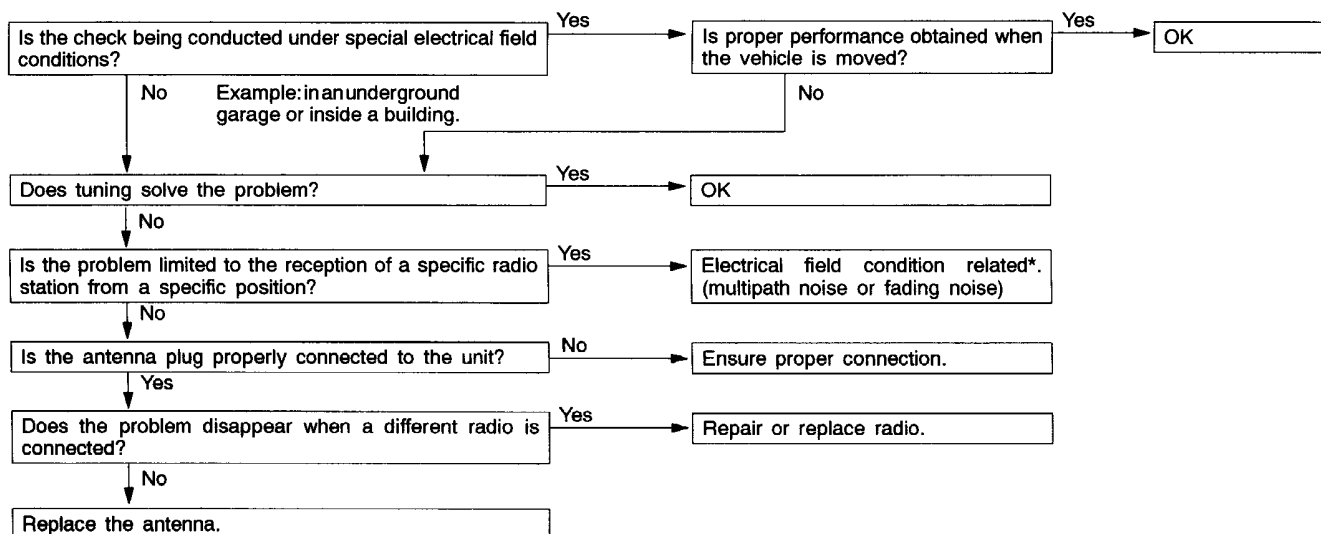
A-9 Ever-present noise.

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

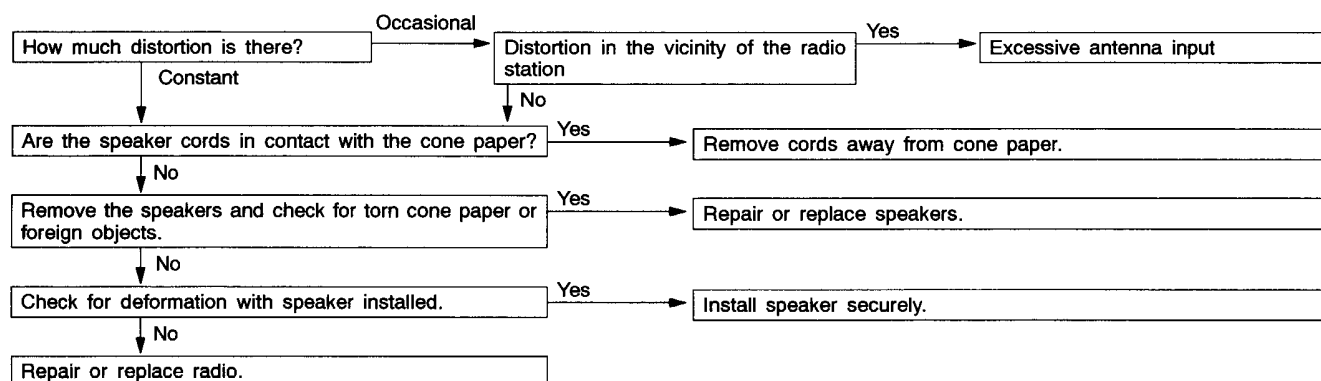
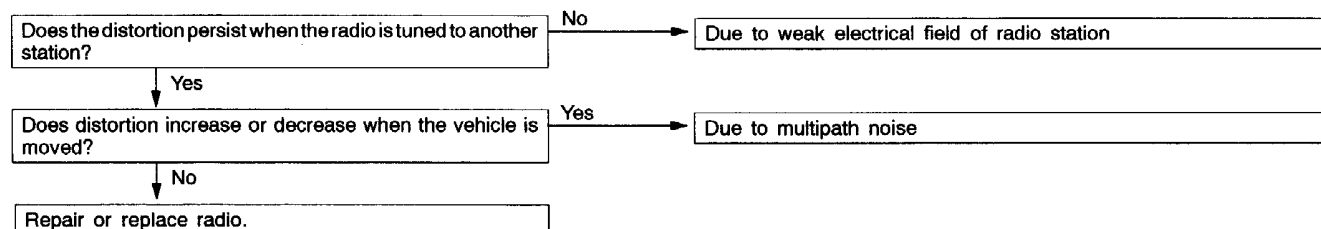
- Traveling conditions of the vehicle
- Terrain of area traveled through
- Surrounding buildings
- Signal conditions
- Time period

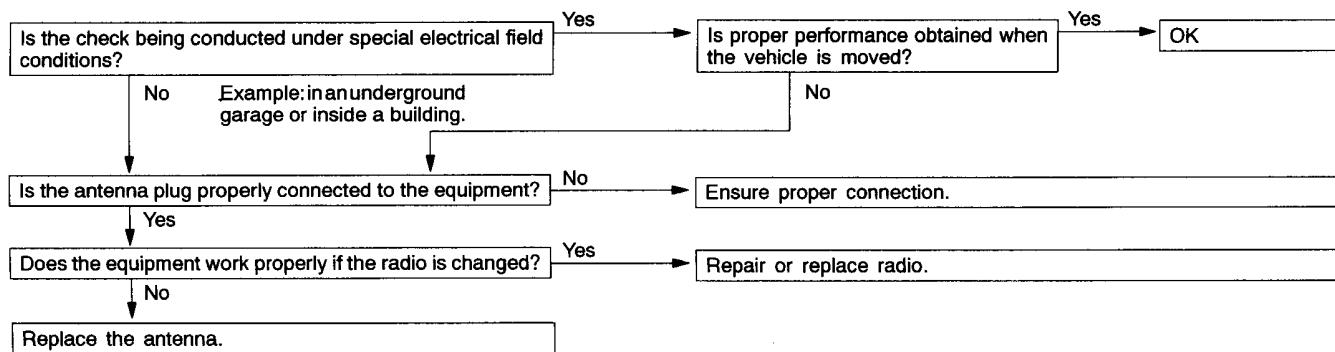
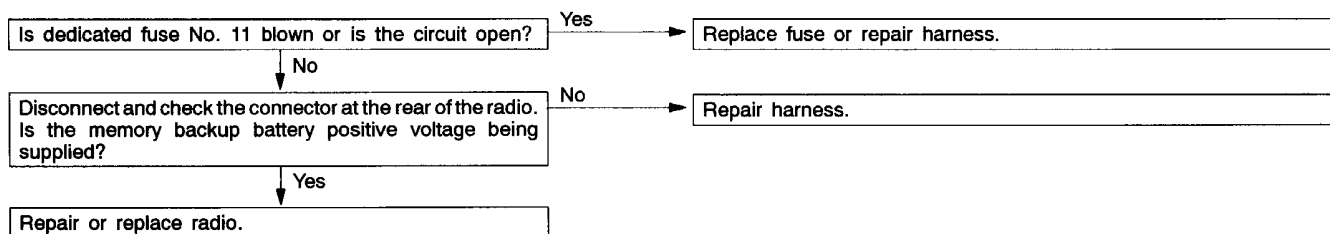
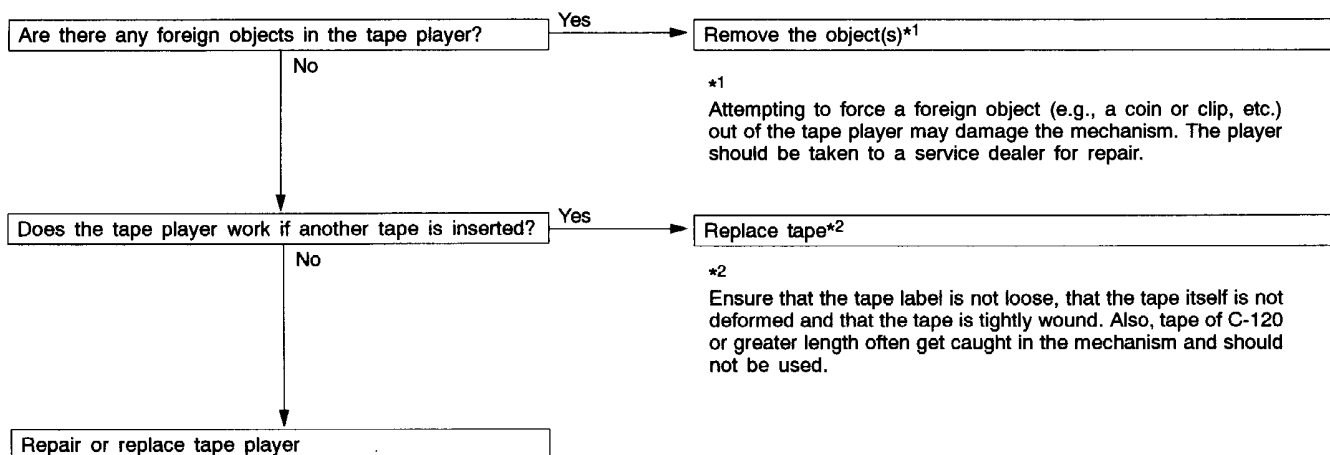
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

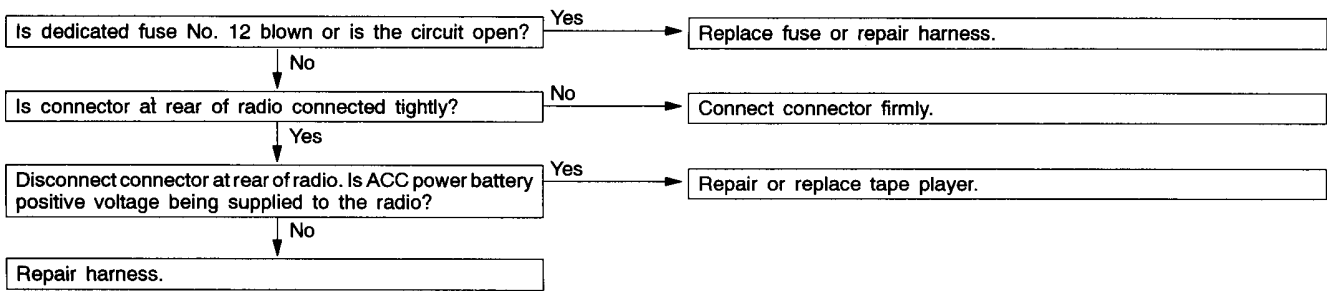
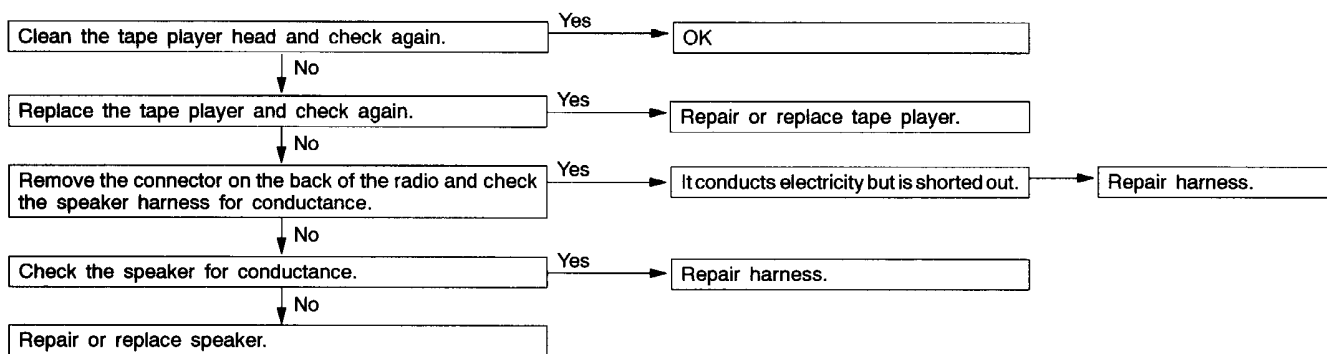
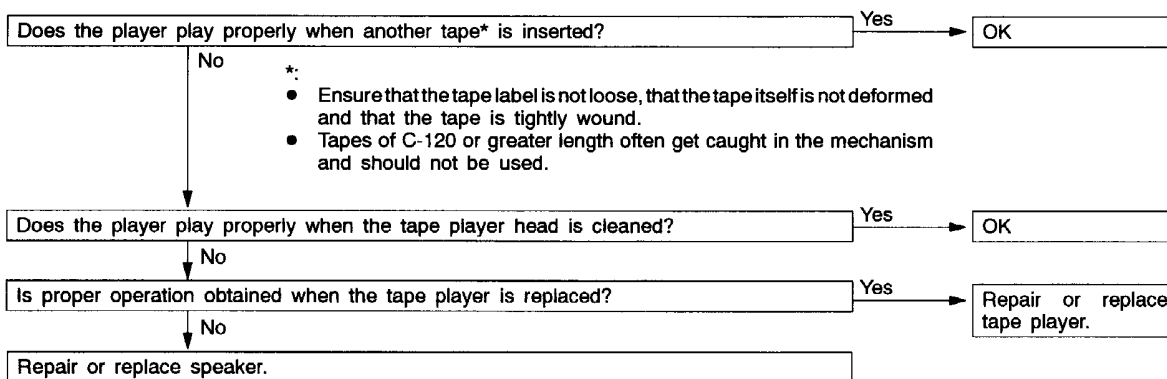
B. RADIO**B-1 No power is supplied when the switch is set to ON.****B-2 No sound from one speaker.****B-3 There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.**

B–4 Insufficient sensitivity.

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

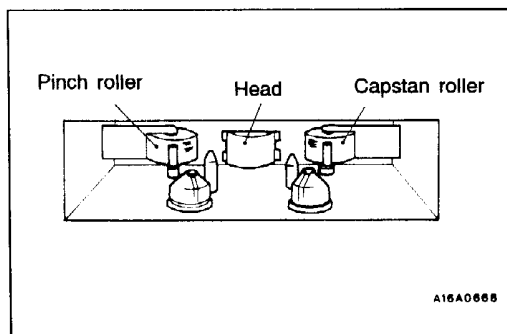
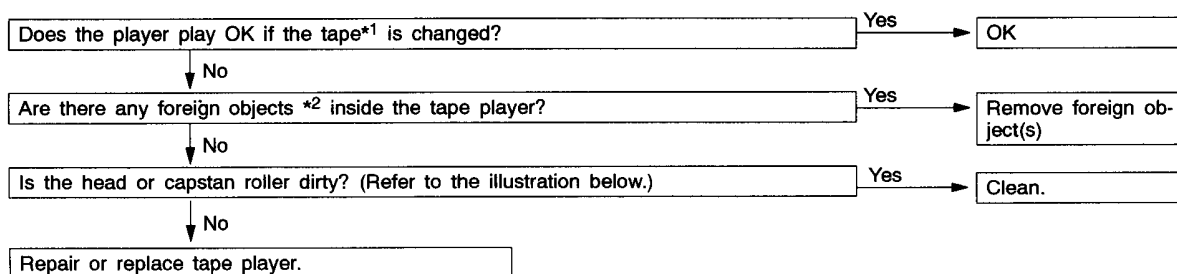
B–5 Distortion on AM or on both AM and FM.**B–6 Distortion on FM only**

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.**

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 eject.**

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

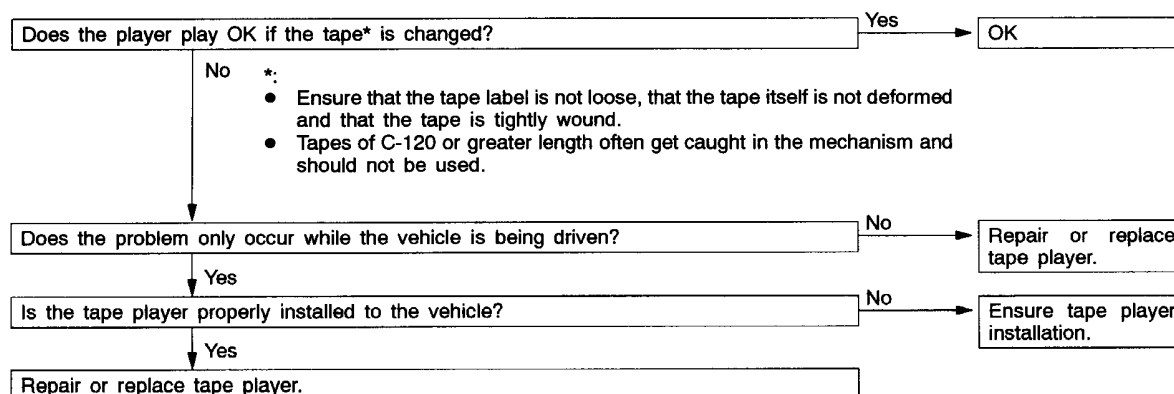
also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.

C-6 Uneven revolution. Tape speed is fast or slow.*¹

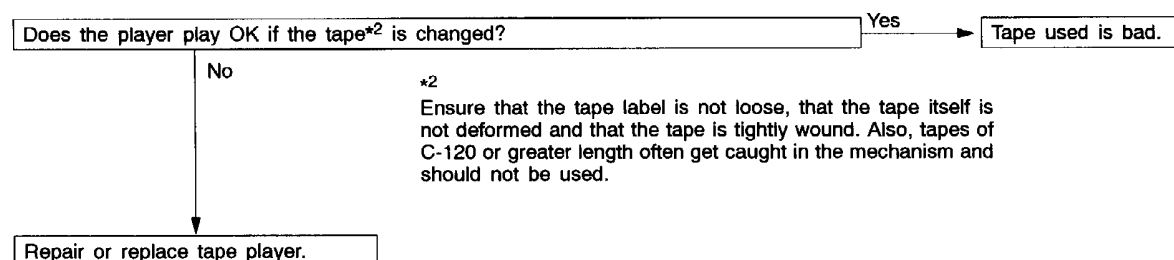
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

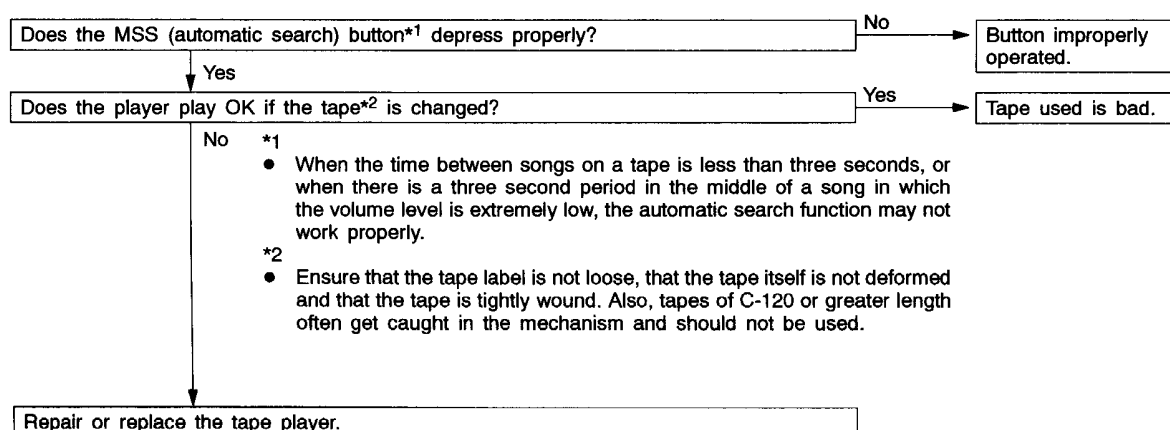
*²

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.

C-7 Faulty auto reverse.**C-8 Tape gets caught in mechanism*¹.***¹

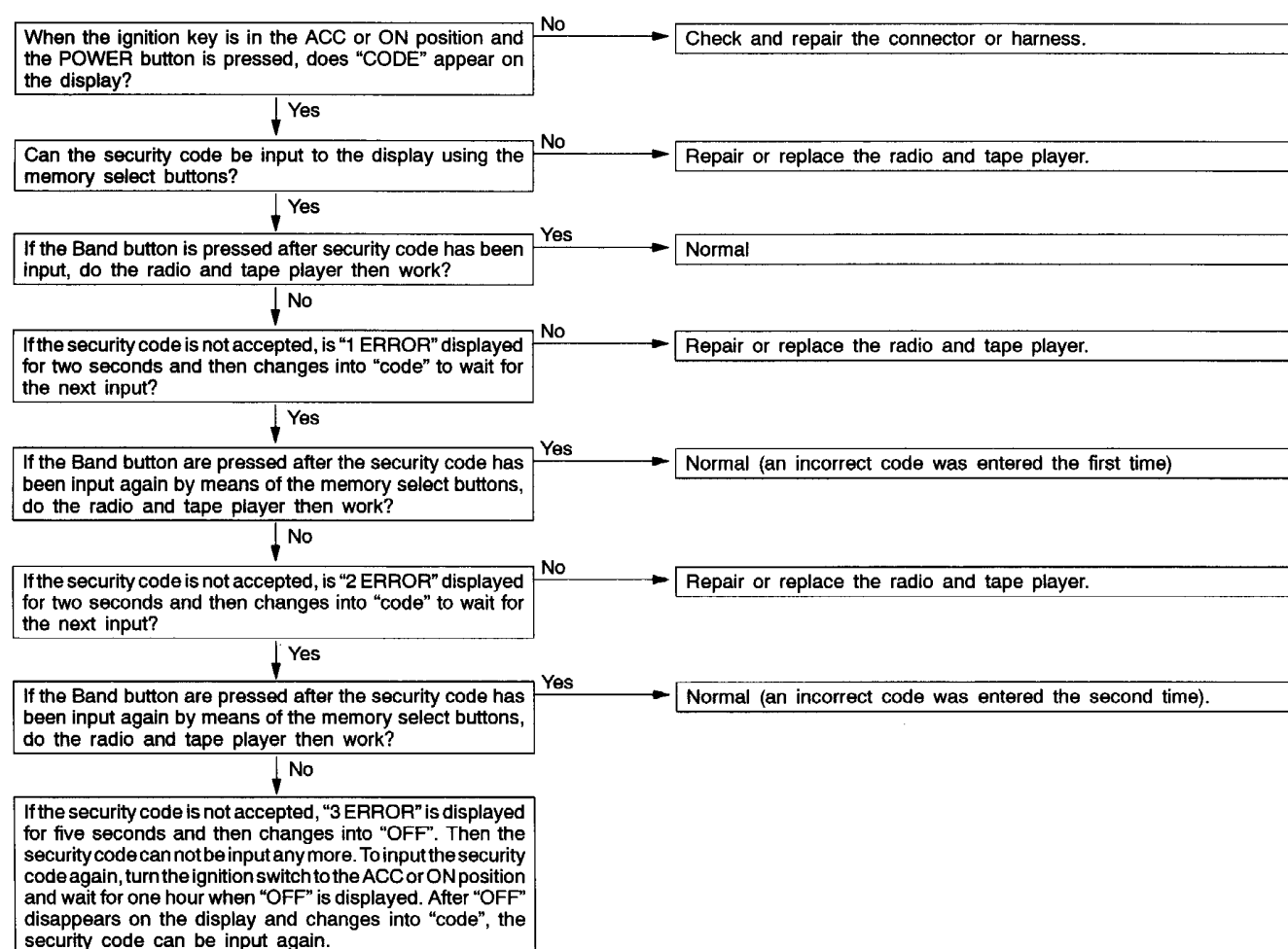
When the tape is caught in the mechanism, the case may not eject. When this occurs, do not try to force the tape out as this may damage the tape player mechanism. Take the cassette to a service dealer for repair.



C-9 Automatic search does not work**RADIO AND TAPE PLAYER WITH ANTI-THEFT SYSTEM**

- After the power supply to the radio and tape player has been interrupted for an hour or more, the anti-theft system will prevent the radio and

tape player from working, even if the power supply is restored. Problems with the anti-theft system can be found using the flow chart below.

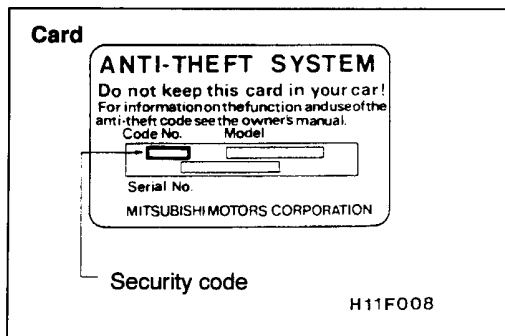


PROCEDURE FOR INPUT OF SECURITY CODE FOR RADIO AND TAPE PLAYER WITH ANTI-THEFT SYSTEM

The radio and tape player does not operate in the following states.

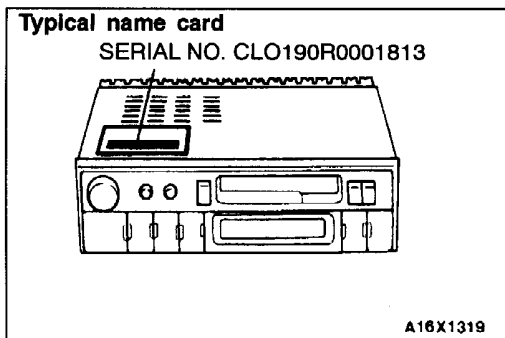
- (1) Power supply to the radio and tape player has been suspended more than an hour continuously by removing the cable from the battery terminal or disconnecting the harness connectors.
- (2) The power supply to the radio and tape player has been suspended for more than an hour owing to blown fuse or discharged battery.
- (3) The radio and tape player has been replaced.

If the radio and tape player does not operate for these causes, input the security code by the following procedure to operate it.



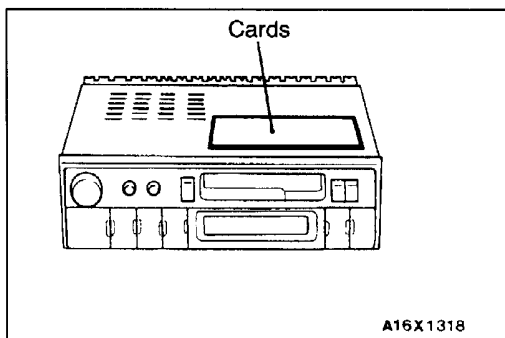
1. Using any of the following methods, confirm the security code.

- (1) Read the security code indicated on the cards retained by the car.



- (2) If the security code is unknown owing to the user's loss of the cards.

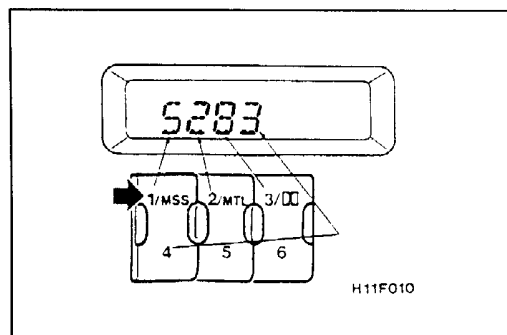
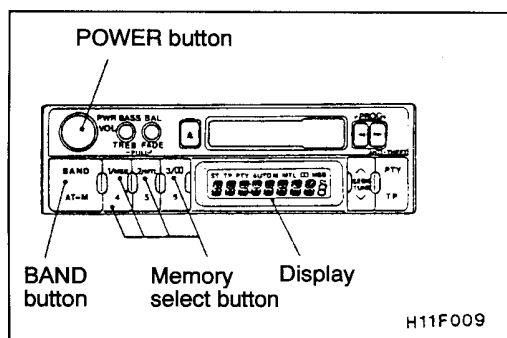
1. Remove the radio and tape player, refer to P.54-72.
2. Read the serial No. stamped on the radio and tape player.
3. Look up the security code (anti-theft code table) corresponding in the serial number, or make inquiries to the authorized Mitsubishi dealer.



- (3) When the radio and tape player is replaced. Read the security code on the cards attached to the upper surface of the replacement radio and tape player.

NOTE

Deliver the cards (two) to the user.



2. Return the power supply from the battery to the normal condition.
3. Turn the ignition key to the "ACC" or "ON" position.
4. Press the POWER button, and "CODE" will be shown on the display.

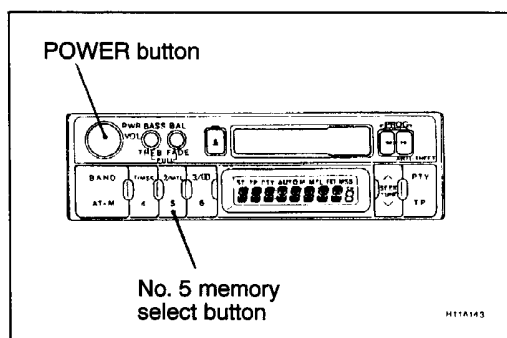
5. Press No. 1 through No. 4 memory select button to set the four-digit security code indicated on the card. Everytime each digit key is pressed, the figure changes as follows:

0 → 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 0

6. Press the BAND button, and a beep will be heard and the audio system will be in the operating condition.
7. If the security codes do not match, "1 ERROR" is shown on the display. In a few seconds, it will change to "CODE". So repeat the steps 5 and 6.

NOTE

- (1) If a mistake is made during input of the security code, the anti-theft system will allow up to three attempts to enter the correct code.
- (2) The second error is displayed as "2 ERROR". When the third error is made, "3 ERROR" is displayed and then the display changes to "OFF". If this should occur, the unit will not operate.
- (3) If "OFF" is displayed, the security code can not be input any more. To input the security code again, turn the ignition switch to the ACC or ON position and wait for one hour when "OFF" is displayed. After "OFF" disappears on the display and changes into "code", the security code can be input again.



5-minute operation mode

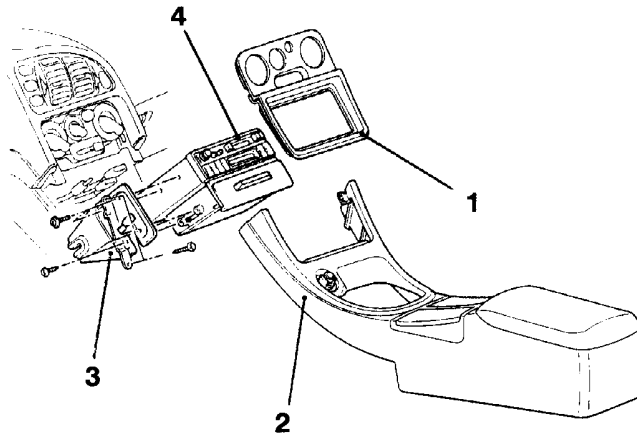
To facilitate replacement or check, the radio and tape player can be operated for five minutes without inputting the security code.

1. Press the POWER button and No.5 memory select button together to operate the radio and tape player.
2. After 5 minutes, "CODE" is displayed to indicate that the security code can be input again.

RADIO AND TAPE PLAYER REMOVAL AND INSTALLATION

54400140034

Caution: SRS
When removing and installing the floor console assembly, do not let it bump against the SRS-ECU.



A16X1315

Removal steps

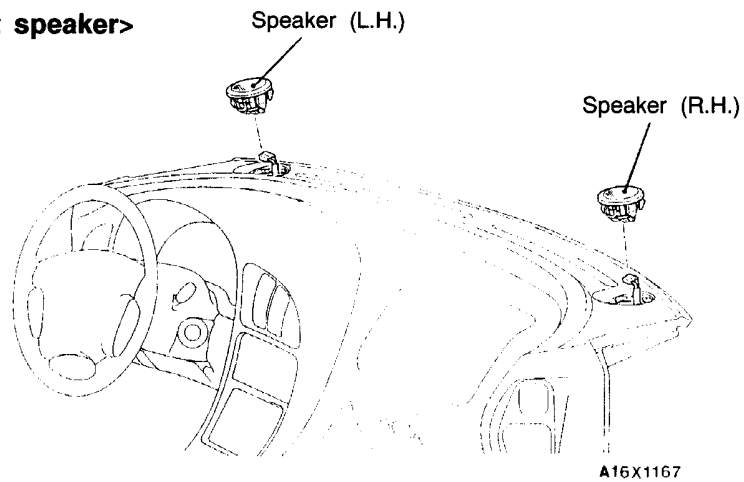
1. Center console panel
2. Floor console assembly
3. Radio bracket
4. Radio or radio with tape player

SPEAKER

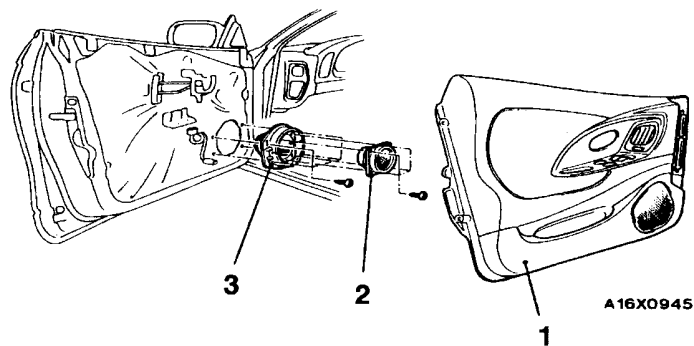
54400280112

REMOVAL AND INSTALLATION

<Front speaker>



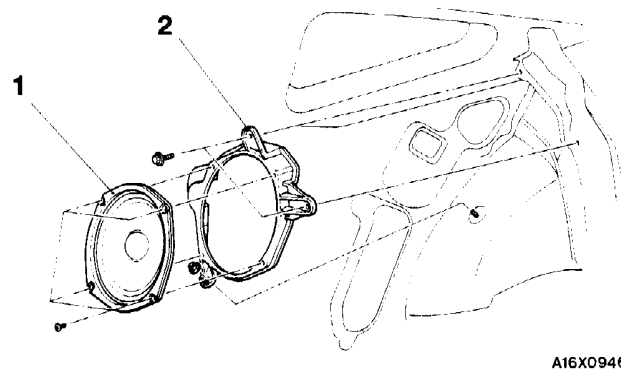
<Door speaker>



Removal steps

1. Door trim (Refer to GROUP 42)
2. Speaker
3. Speaker bracket

<Rear speaker>



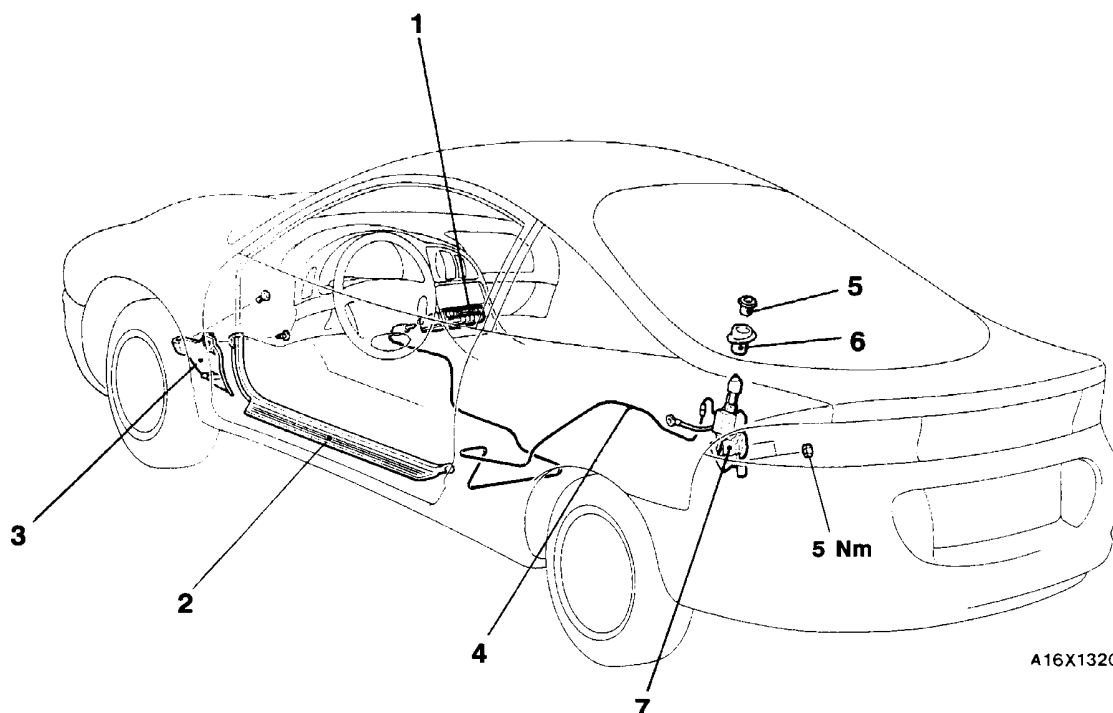
Removal steps

- Quarter trim (Refer to GROUP 52A)
- 1. Speaker
- 2. Speaker bracket

ANTENNA

54400290081

REMOVAL AND INSTALLATION



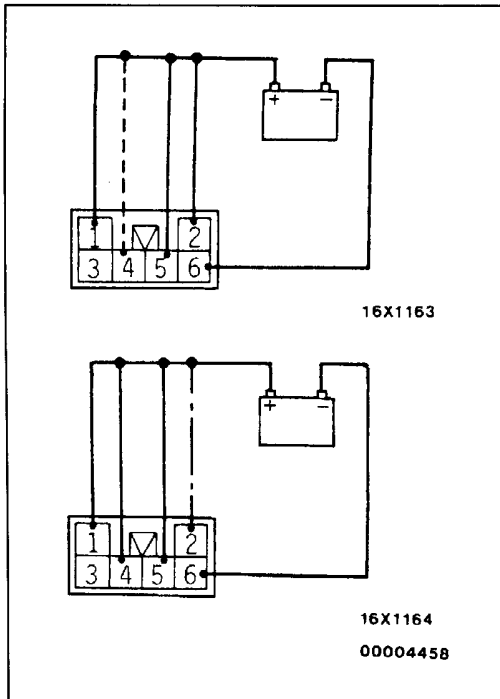
Antenna feeder cable removal steps

- Front seat (Refer to GROUP 52A)
- Console box (Refer to GROUP 52A)
- 1. Radio with tape playe (Refer to P. 54-72.)
- Rear end trim and quarter trim (Refer to GROUP 52A)
- 2. Front scuff plate (Refer to GROUP 52A)
- 3. Cowl side trim (Refer to GROUP 52A)

- Rear seat cushion (Refer to GROUP 52A)
- 4. Antenna feeder cable

Motor antenna assembly removal steps

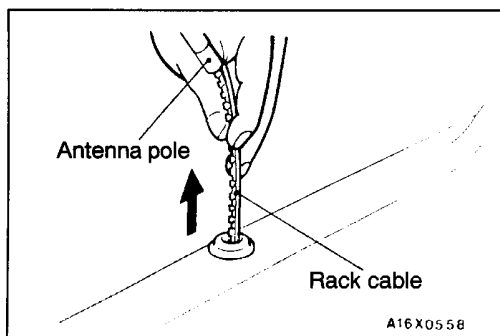
- Rear end trim and quarter trim (Refer to GROUP 52A)
- 5. Ring nut
- 6. Base
- 7. Motor antenna assembly

**INSPECTION**

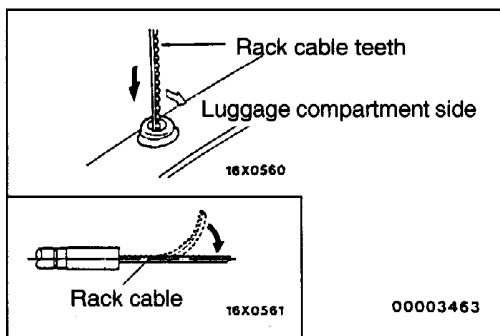
54400300036

MOTOR ANTENNA ASSEMBLY CHECK

1. Connect the circuit as indicated by the solid lines.
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.
4. Check that the motor antenna extends when the connection indicated by the one-point-dotted line is made.
5. Check that the motor antenna retracts fully when the connection indicated by the one-point-dotted line is removed.

**ANTENNA POLE REPLACEMENT**

- (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.

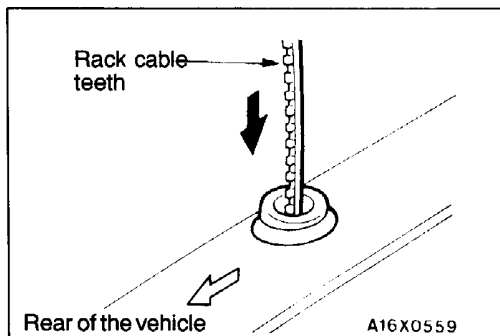


- (3) Draw out the antenna pole to the maximum extension.

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.

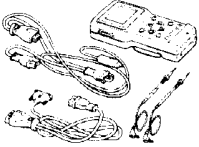
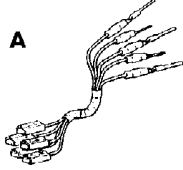
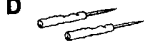


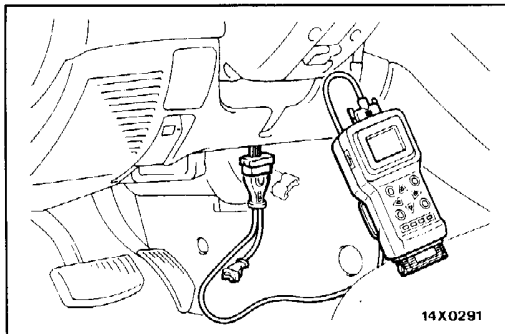
- (5) Turn the rack cable teeth towards the rear of the vehicle (right 90°) so that the rack cable meshes with the motor gear.
- (6) If the rack cable pulls out with no resistance when it is lightly pulled, then the cable is not meshed with the motor gear, so check that there are no bends in the end 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

54300060177

SPECIAL TOOLS

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



TROUBLESHOOTING

54300070187

DIAGNOSTIC FUNCTION

INPUT SIGNAL INSPECTION POINTS

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

Caution

Always turn the ignition switch off when connecting and disconnecting the MUT-II.

2. If buzzer of the MUT-II sounds once when a switch is operated (ON/OFF), the 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	54-77
	Communication between the diagnosis connector and ETACS-ECU is not possible.	2	54-77
Even if defogger switch is ON, defogger does not operate.		3	54-78

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

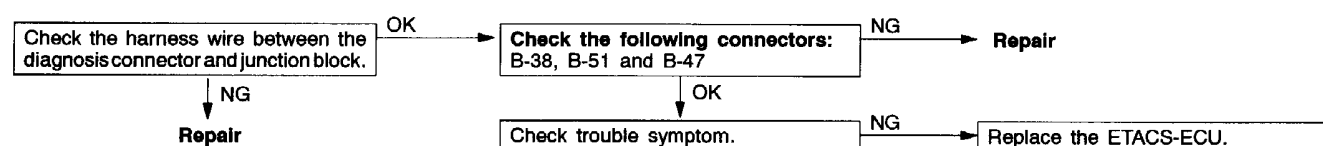
INSPECTION PROCEDURE 1

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 diagnosis connector • Malfunction of harness wire

Refer to GROUP 13A – Troubleshooting.

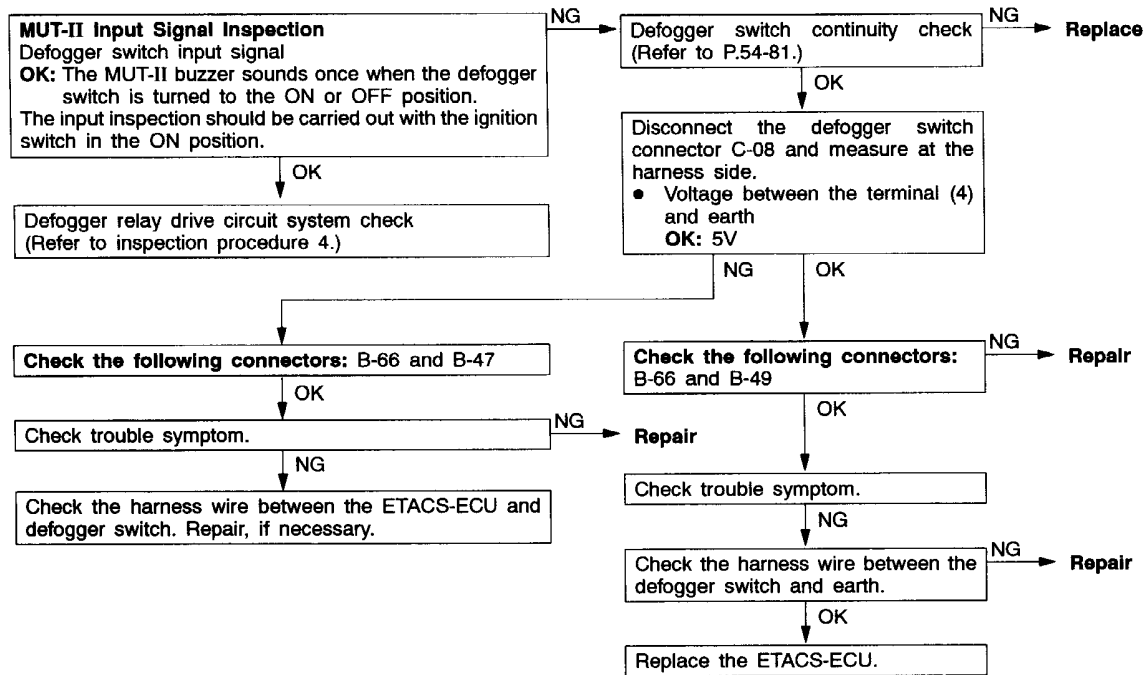
INSPECTION PROCEDURE 2

Communication with MUT-II is not possible. (Communication between the diagnosis connector and ETACS-ECU is not possible.)	Probable cause
[Comment] The cause is probably a defect in the power supply system (including earth) for ETACS-ECU or the diagnosis line.	• Malfunction of diagnosis connector • Malfunction of harness • Malfunction of ETACS-ECU



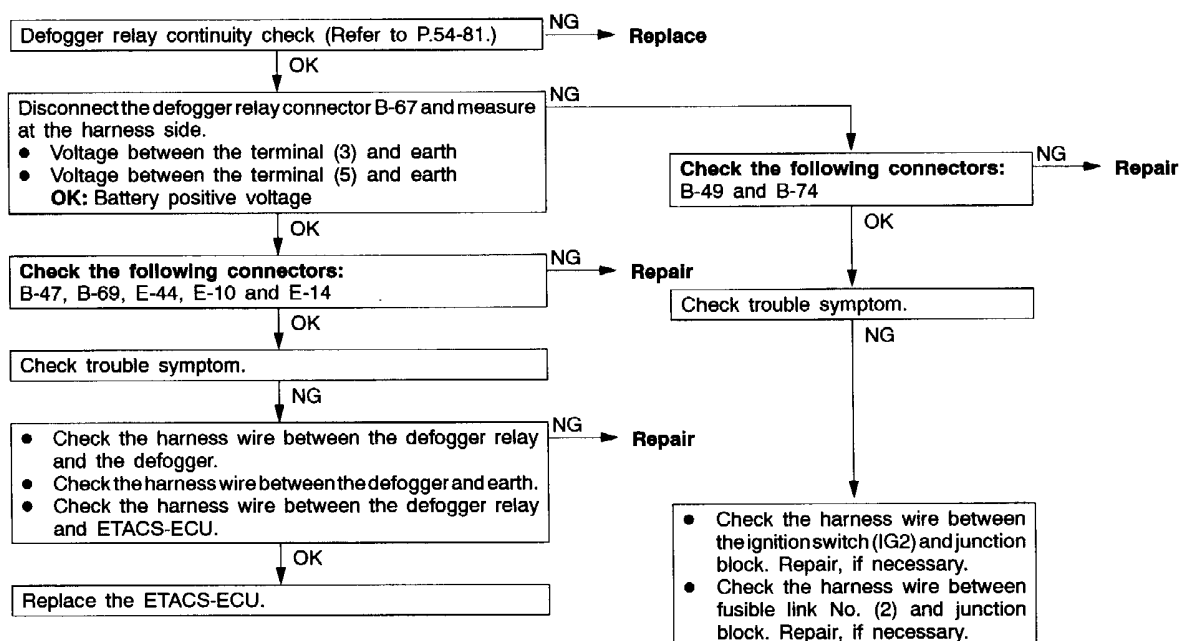
INSPECTION PROCEDURE 3

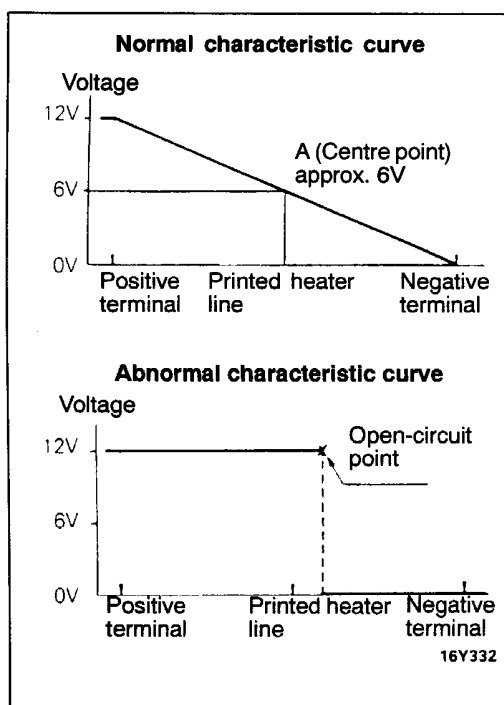
Even if defogger switch is ON, defogger does not operate.	Probable cause
The cause is probably a defective defogger switch circuit system or a defective defogger relay drive circuit system. In addition, if there is a defective fuse, the cause might also be a harness short.	• Malfunction of fuse • Malfunction of defogger switch • Malfunction of defogger relay • Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU



INSPECTION PROCEDURE 4

Defogger relay drive circuit system check





ON-VEHICLE SERVICE

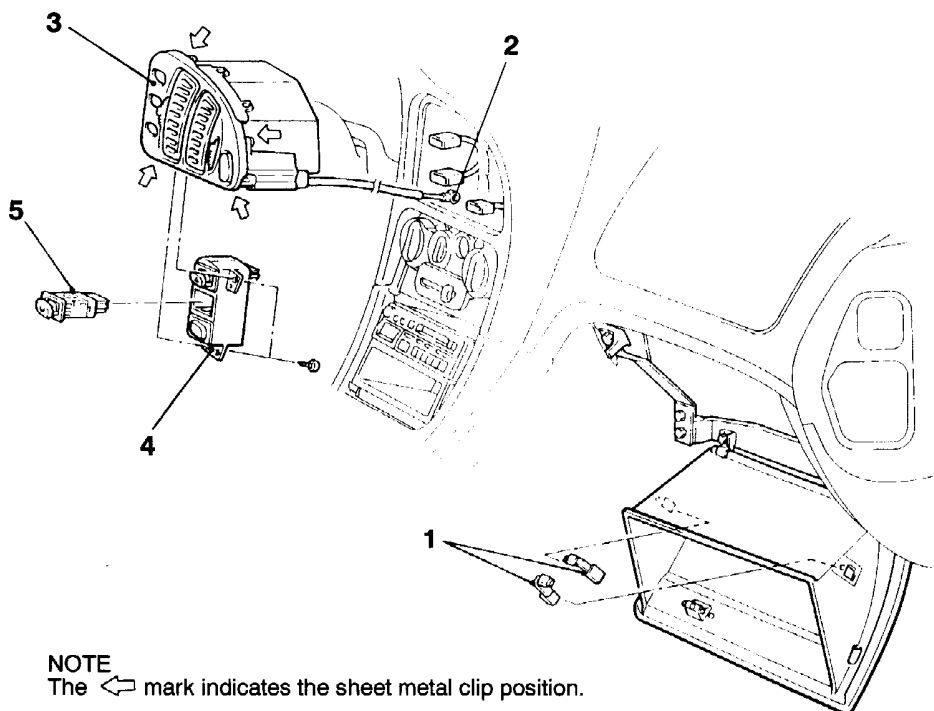
PRINTED-HEATER LINE CHECK

54300180064

- (1) Run engine at 2,000 rpm. Check heater element with battery at full.
- (2) Turn ON rear window defogger switch. Measure heater element voltage with voltmeter at rear window glass centre A.
Condition good if indicating about 6V.
- (3) If battery positive voltage 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 0V is indicated at A, there is a break in the positive terminals from A. Detect where the voltage changes suddenly (battery positive voltage) with the same method described.

REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION

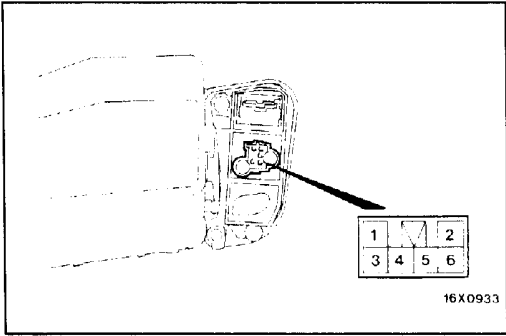
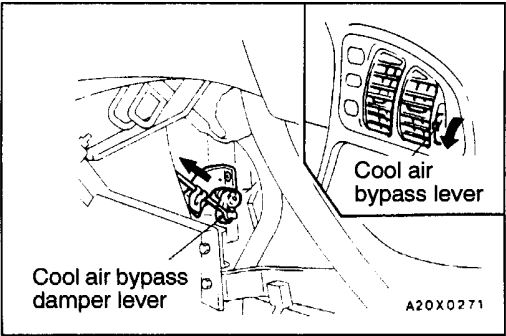


A16X0951

Removal steps

1. Stopper
2. Cool air bypass cable connection
3. Center air outlet assembly
4. Holder
5. Rear window defogger switch





INSTALLATION SERVICE POINT

►A◄ CENTER AIR OUTLET ASSEMBLY INSTALLATION

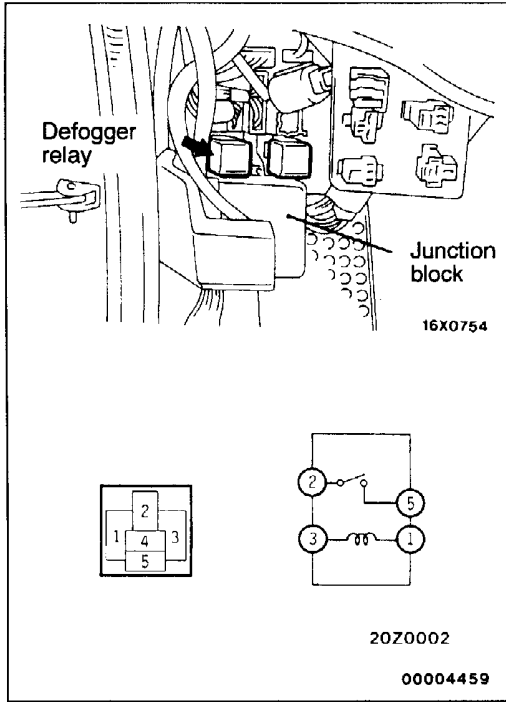
- (1) Turn the cool air bypass lever of the center air outlet assembly fully downwards.
- (2) Pull the cool air bypass damper lever on the heater unit side fully towards you, and then attach the cable to the pin of the lever.
- (3) Push the outer cable in the direction of the arrow so that there is no looseness, and then secure it with the clip.

INSPECTION

54300630026

DEFOGGER SWITCH CONTINUITY CHECK

Switch position	Terminal No.					
	1		3	4	2	6
OFF	○	IND	○		○	ILL
ON	○	IND	○	○	○	ILL



DEFOGGER RELAY CONTINUITY CHECK

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