

# CHASSIS ELECTRICAL

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5410900099

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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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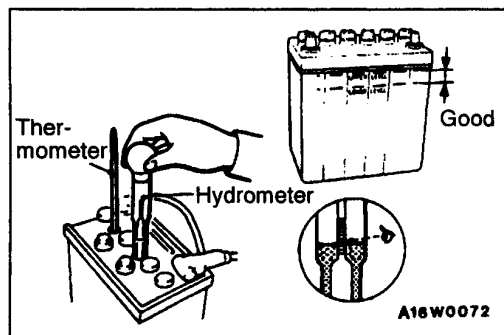
|                                             |           |                                      |                    |
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# BATTERY

54100030028

## SERVICE SPECIFICATION

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



## ON-VEHICLE SERVICE

54100090026

### FLUID LEVEL AND SPECIFIC GRAVITY CHECK

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

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

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

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

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

**Dt:** Actually measured specific gravity

**t:** Actually measured temperature

**CHARGING**

54100110029

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

**Caution**

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

**BATTERY TESTING PROCEDURE**

54100120077

**TEST STEP**

- (1) Turn headlamps on for 15 seconds.  
 (2) Turn headlamps off for 2 minutes to allow battery voltage to stabilize.  
 (3) Disconnect cables.

OK

Read open circuit voltage.  
**OK:** Open circuit voltage is more than 12.4 V

NG

Charge battery at 5 amps. (see LOAD TEST RATE CHART)

OK

Retest

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

NG

Replace battery

OK

Normal

**LOAD TEST RATE CHART**

| Battery type                                                            | 55D23L | 65D23L |
|-------------------------------------------------------------------------|--------|--------|
| Charging time when fully discharged h<br>[5-amp rated current charging] | 10     | 11     |
| Load test (Amps)                                                        | 178    | 210    |

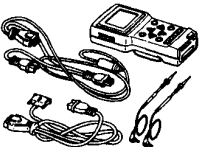
**LOAD TEST CHART**

| 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

54300080092

## SPECIAL TOOL

| Tool                                                                              | Number   | Name                | Use                                                                                                                                                   |
|-----------------------------------------------------------------------------------|----------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | MB991502 | MUT-II sub assembly | <ul style="list-style-type: none"><li>• Immobilizer system check (Diagnosis display using the MUT-II)</li><li>• Registration of the ID code</li></ul> |

## TROUBLESHOOTING

54300690017

### 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

54300700079

### DIAGNOSIS CODES CHECK

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

### ERASING DIAGNOSIS CODES

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

### Caution

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

## INSPECTION CHART FOR DIAGNOSIS CODES

54300710010

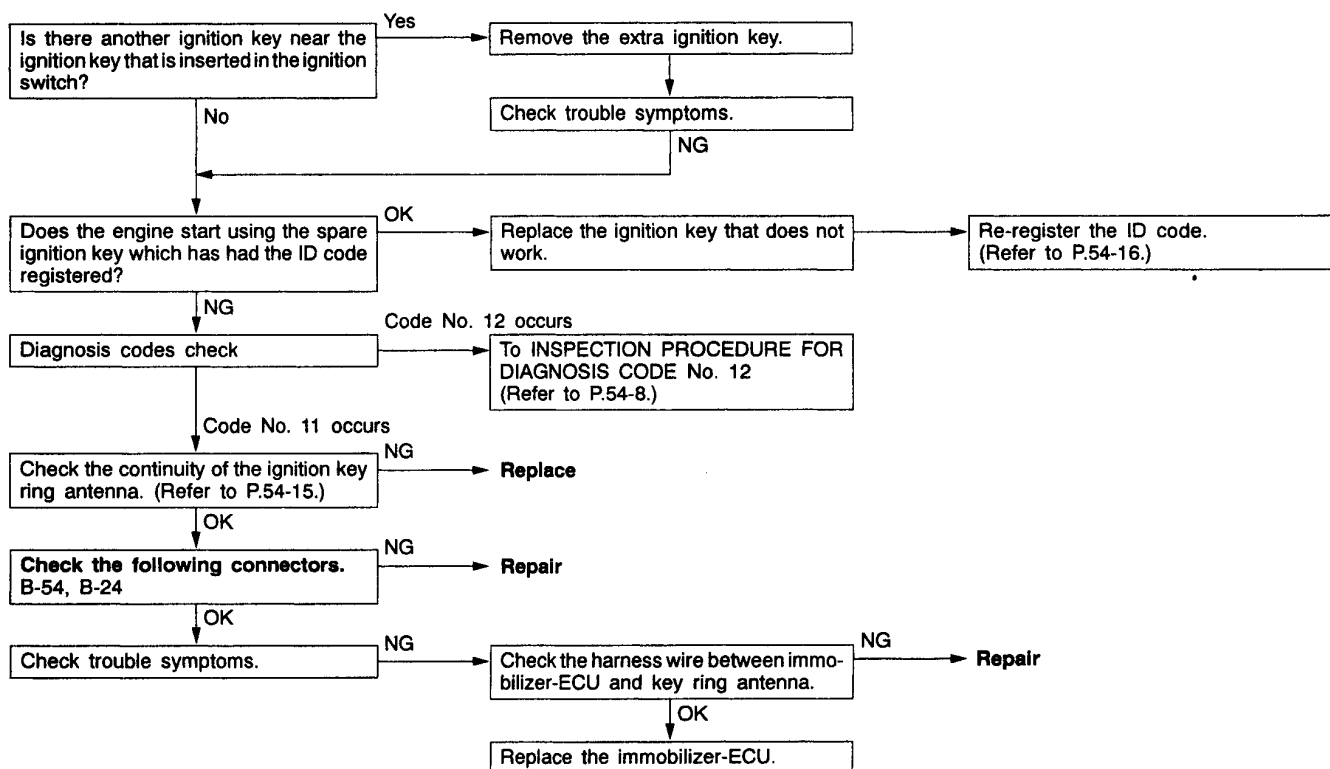
| Diagnosis code No. | Inspection items                                   | Reference page |
|--------------------|----------------------------------------------------|----------------|
| 11                 | Transponder communication system                   | 54-8           |
| 12*                | ID code are not the same or are not registered     | 54-8           |
| 21                 | Communication system between MUT-II and engine-ECU | 54-9           |
| 31                 | EEPROM abnormality inside immobilizer-ECU          | 54-9           |

### NOTE

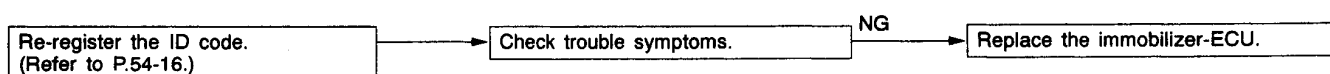
\*: Diagnosis code No. 12 is not recorded.

## INSPECTION PROCEDURE FOR DIAGNOSIS CODES

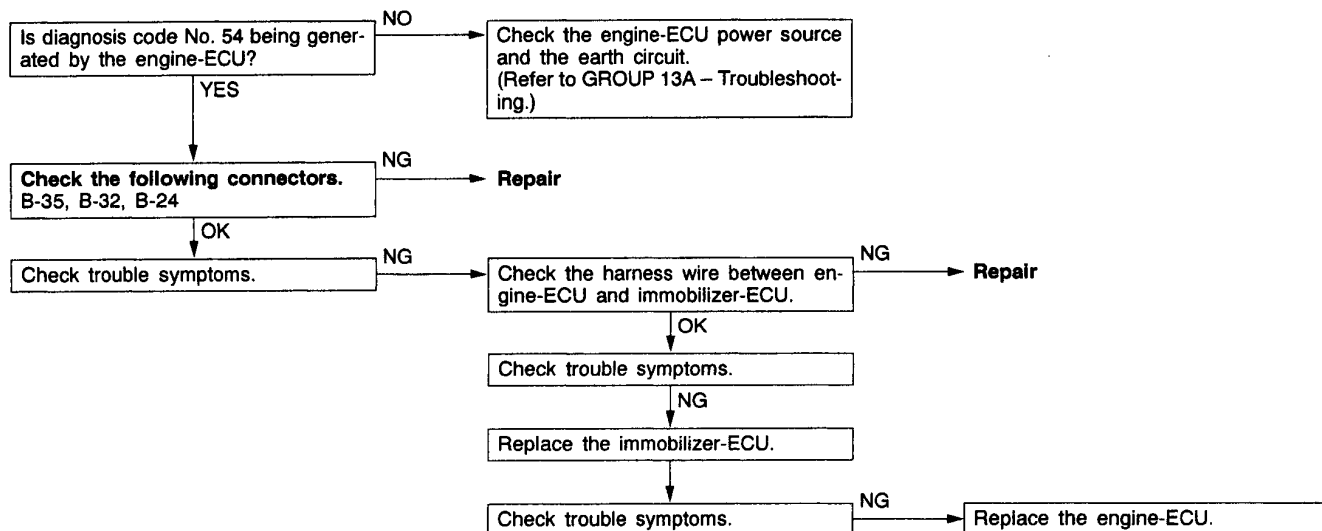
| Code No. 11 Transponder communication system                                                                                                                                                                                                                                                       | Probable cause                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>The ID code of the transponder is not sent to the immobilizer-ECU immediately after the ignition switch is turned to the ON position.</li> <li>When starting the engine, one ignition key's ID code interferes with another ignition key's code.</li> </ul> | <ul style="list-style-type: none"> <li>Radio interference of ID codes</li> <li>Malfunction of the transponder</li> <li>Malfunction of the ignition key ring antenna</li> <li>Malfunction of harness or connector</li> <li>Malfunction of the immobilizer-ECU</li> </ul> |



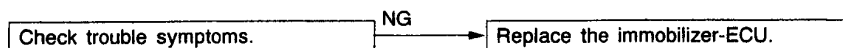
| Code No. 12 ID code are not the same or are not registered                                                                | Probable cause                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The ID code which is sent from the transponder is not the same as the ID code which is registered in the immobilizer-ECU. | <ul style="list-style-type: none"> <li>The ID code in the ignition key being used has not been properly registered.</li> <li>Malfunction of the immobilizer-ECU</li> </ul> |



| 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. | <ul style="list-style-type: none"> <li>• Malfunction of harness or connector</li> <li>• Malfunction of the engine-ECU</li> <li>• Malfunction of the immobilizer-ECU</li> </ul> |



| Code No. 31 EEPROM abnormality inside Immobilizer-ECU              | Probable cause                                                                         |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| No data has been written to the EEPROM inside the immobilizer-ECU. | <ul style="list-style-type: none"> <li>• Malfunction of the immobilizer-ECU</li> </ul> |



## 54-10 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer System

### INSPECTION CHART FOR TROUBLE SYMPTOMS

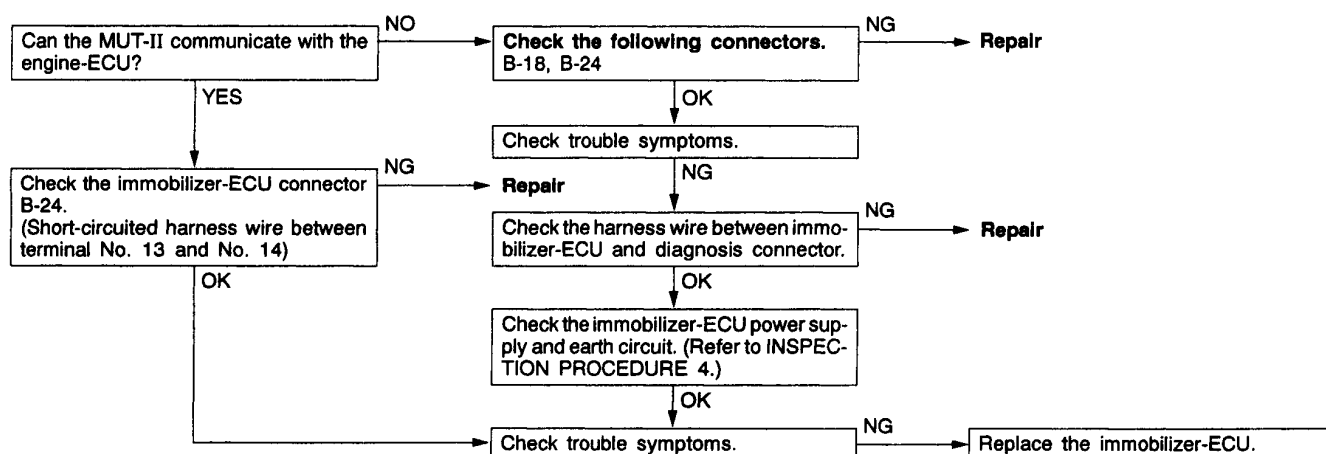
54300720174

| Trouble symptom                                                   | Inspection procedure No. | Reference page |
|-------------------------------------------------------------------|--------------------------|----------------|
| Communication with MUT-II is impossible.                          | 1                        | 54-10          |
| ID code cannot be registered using the MUT-II.                    | 2                        | 54-11          |
| Engine does not start (Cranking but no initial combustion).       | 3                        | 54-11          |
| Malfunction of the immobilizer-ECU power source and earth circuit | 4                        | 54-12          |

### INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

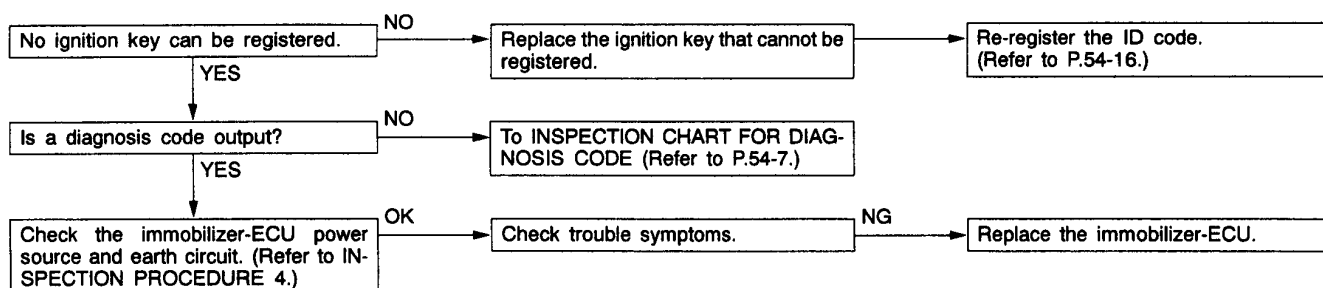
#### Inspection Procedure 1

| 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. | <ul style="list-style-type: none"><li>• Malfunction of the diagnosis line</li><li>• Malfunction of harness or connector</li><li>• Malfunction of the immobilizer-ECU</li></ul> |



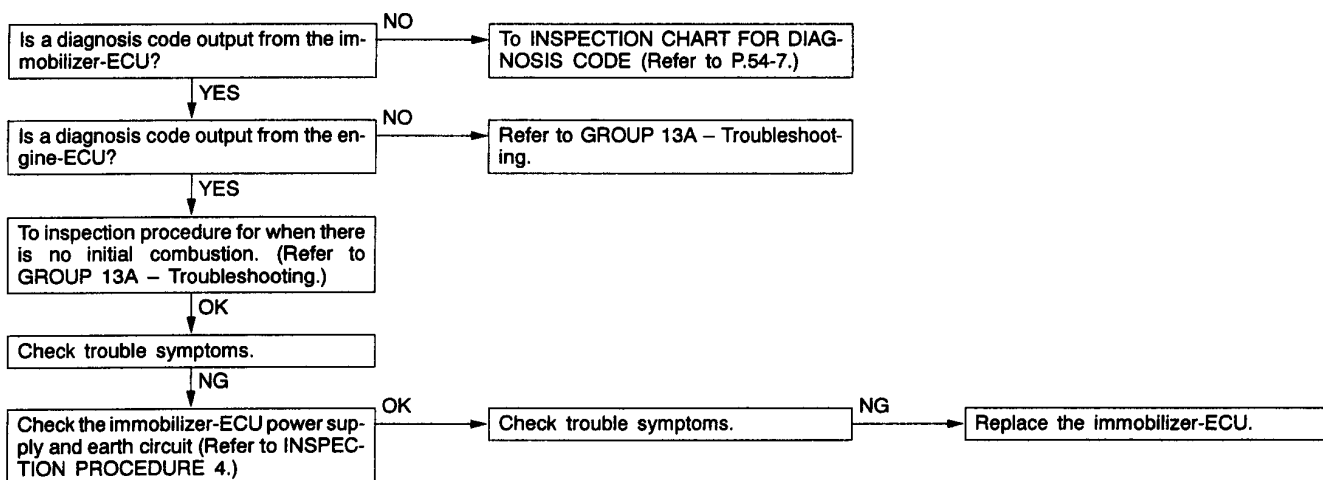
## Inspection Procedure 2

| 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. | <ul style="list-style-type: none"> <li>• Malfunction of the transponder</li> <li>• Malfunction of the ignition key ring antenna</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of the immobilizer-ECU</li> </ul> |



## Inspection Procedure 3

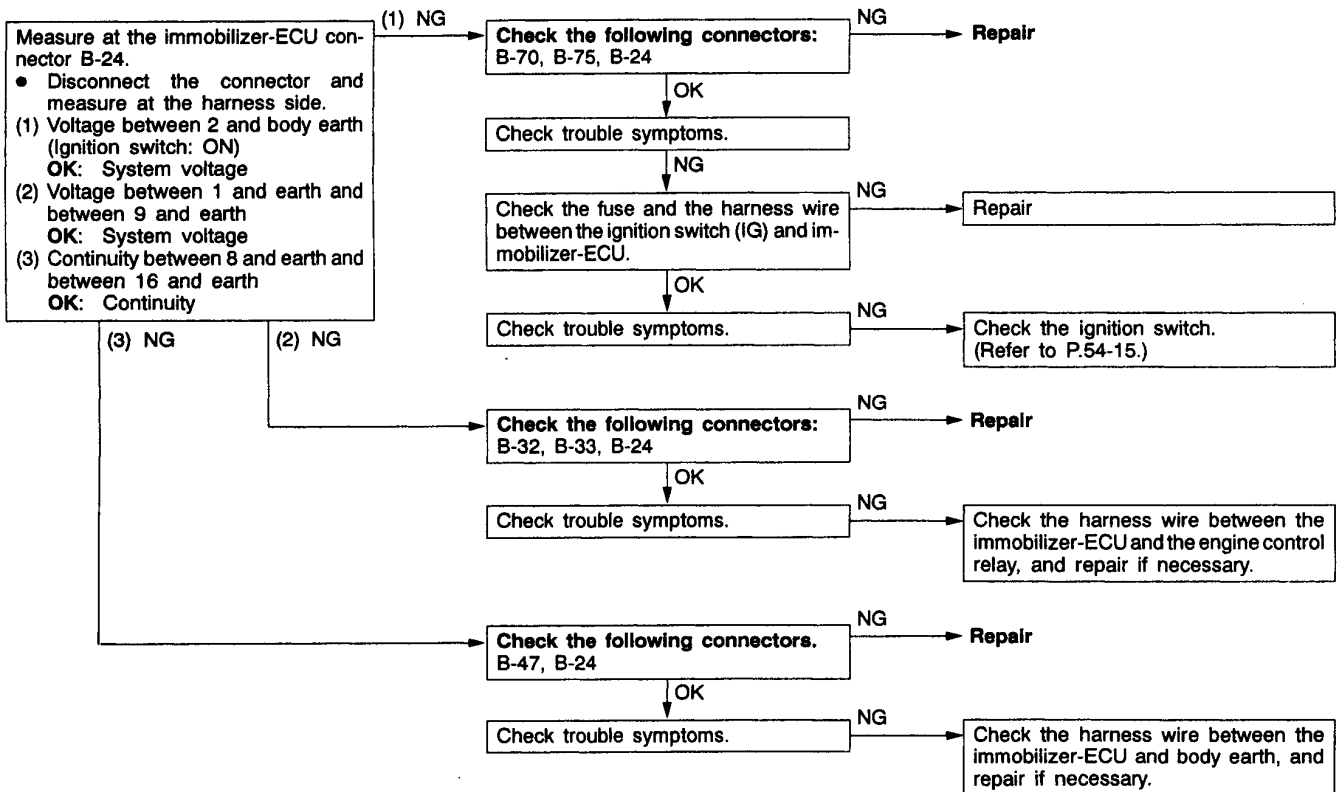
| Engine does not start (cranking but no initial combustion).                                                                                                                                                                                                               | Probable cause                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 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. | <ul style="list-style-type: none"> <li>• Malfunction of the MPI system</li> <li>• Malfunction of the immobilizer-ECU</li> </ul> |



## 54-12 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer System

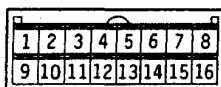
### Inspection Procedure 4

#### Malfunction of the Immobilizer-ECU power supply and earth circuit



# CHECK AT IMMOBILIZER-ECU TERMINAL VOLTAGE CHECK CHART

54300760015



16W0390

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

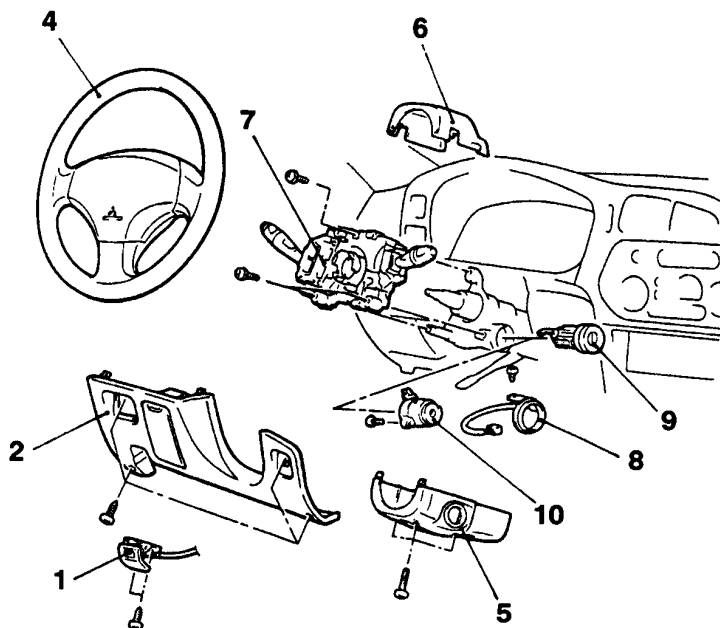
## IGNITION SWITCH AND IMMOBILIZER SYSTEM

54300210107

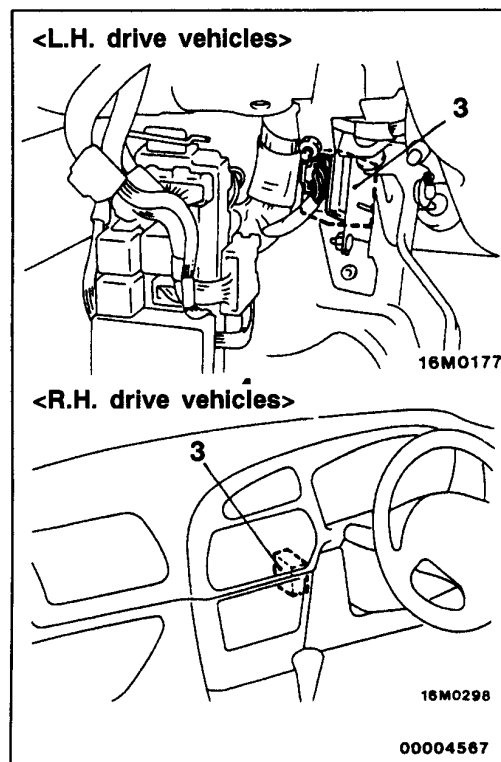
### REMOVAL AND INSTALLATION

**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.



16M0283



00004567

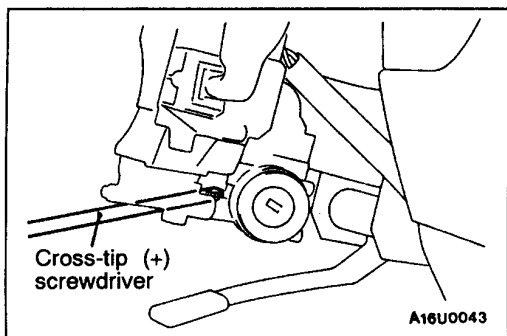
#### Immobilizer-ECU removal steps

1. Hood lock release handle
2. Driver's side lower cover
- Radio and tape player <R.H. drive vehicles> (Refer to P.54-73.)
- Heater control assembly <R.H. drive vehicles> (Refer to GROUP 55.)
3. Immobilizer-ECU

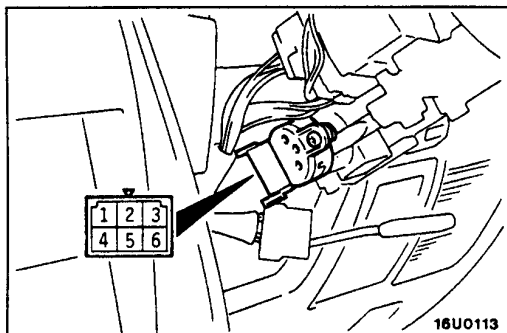
#### Ignition switch and Ignition key ring antenna removal steps

1. Hood lock release handle
2. Driver's side lower cover
4. Steering wheel (Refer to GROUP 37A.)
5. Column cover, lower
6. Column cover, upper
7. Column switch (Refer to GROUP 37A – Steering Wheel and Shaft.)
8. Ignition key ring antenna
9. Steering lock cylinder
10. Ignition switch



**REMOVAL SERVICE POINTS****◀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.

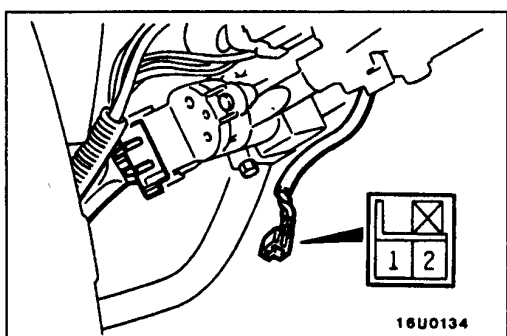
**INSPECTION**

54300220100

**IGNITION SWITCH CONTINUITY CHECK**

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

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

**IGNITION KEY RING ANTENNA CONTINUITY CHECK**

54300930010

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

**ID CODE REGISTRATION METHOD**

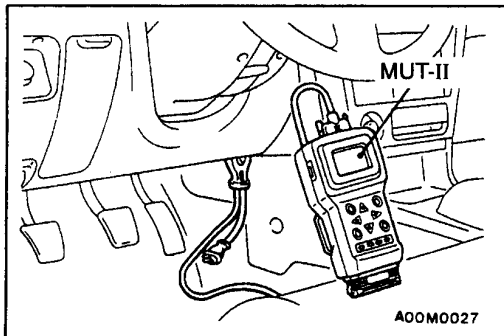
54300810031

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

54300030093

## SERVICE SPECIFICATIONS

| Items                                                                |                                                   | Standard value  |
|----------------------------------------------------------------------|---------------------------------------------------|-----------------|
| Speedometer indication error km/h (mph)                              | 40 (20)                                           | 40–48 (20–25)   |
|                                                                      | 80 (40)                                           | 80–92 (40–47)   |
|                                                                      | 120 (60)                                          | 120–136 (60–69) |
|                                                                      | 160 (80)                                          | 160–180 (80–91) |
|                                                                      | – (100)                                           | – (100–114)     |
| Tachometer indication error r/min                                    | 700                                               | ± 100           |
|                                                                      | 3,000                                             | ± 150           |
|                                                                      | 5,000                                             | ± 200           |
|                                                                      | 6,000                                             | ± 250           |
| Fuel gauge unit resistance $\Omega$                                  | Float point F                                     | 0.9 – 5.1       |
|                                                                      | Float point E                                     | 102.3 – 117.7   |
| Fuel gauge unit float height mm                                      | A (Float point F)                                 | 17.4            |
|                                                                      | B (Float point E)                                 | 130.2           |
| Fuel gauge resistance $\Omega$                                       | Power supply and earth                            | 192±19.2        |
|                                                                      | Power supply and fuel gauge                       | 89±8.9          |
|                                                                      | Fuel gauge and earth                              | 103±10.3        |
| Engine coolant temperature gauge resistance $\Omega$                 | Power supply and earth                            | 187±18.7        |
|                                                                      | Power supply and engine coolant temperature gauge | 90±4.5          |
|                                                                      | Engine coolant temperature gauge and earth        | 247±24.7        |
| Engine coolant temperature gauge unit resistance (at 70 °C) $\Omega$ |                                                   | 104 ± 13.5      |

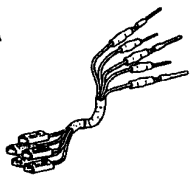
## SEALANT

54300050037

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

## SPECIAL TOOLS

54300060191

| Tool                                                                                                                                                                                                                                                                                                                                                                                                    | Number                                                                                      | Name                                                                                                          | Use                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>A</b></p>  <p><b>B</b></p>  <p><b>C</b></p>  <p><b>D</b></p>  | <p>MB991223</p> <p>A: MB991219</p> <p>B: MB991220</p> <p>C: MB991221</p> <p>D: MB991222</p> | <p>Harness set</p> <p>A: Test harness</p> <p>B: LED harness</p> <p>C: LED harness adapter</p> <p>D: Probe</p> | <p>Fuel gauge simple check</p> <p>A: Connector pin contact pressure check</p> <p>B, C: Power circuit check</p> <p>D: Commercial tester connection</p> |
|                                                                                                                                                                                                                                                                                                                       | MB990784                                                                                    | Ornament remover                                                                                              | Removal of meter bezel                                                                                                                                |

## TROUBLESHOOTING

54300720181

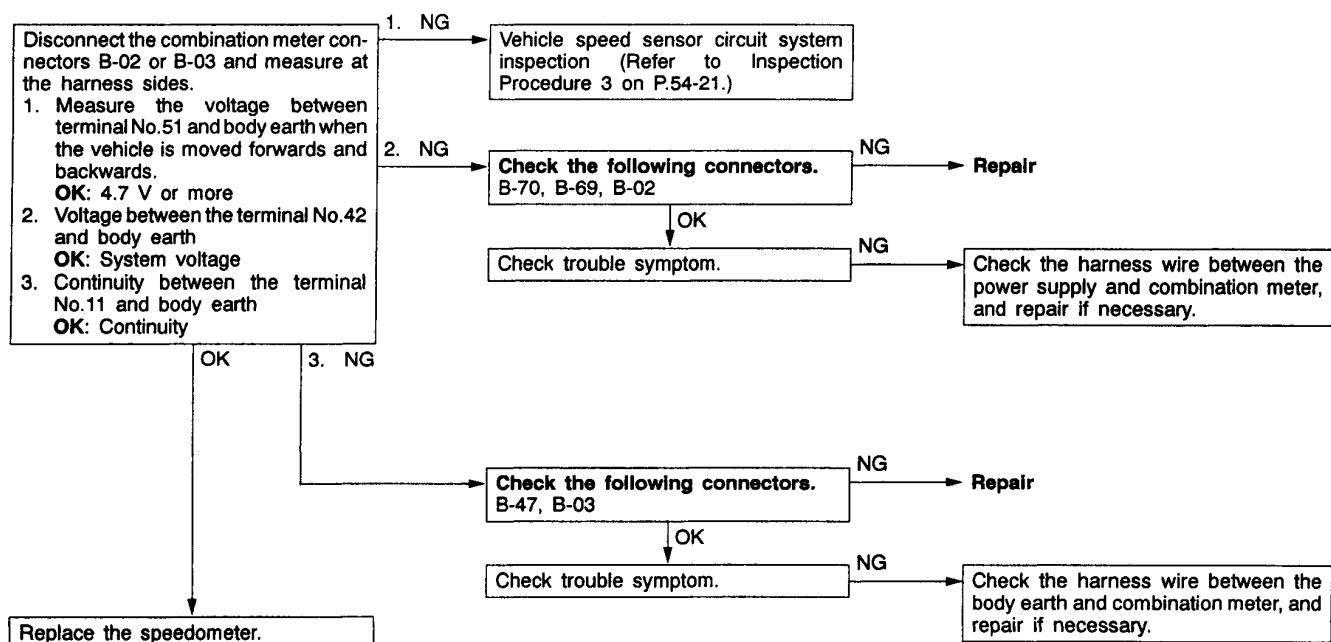
## INSPECTION CHART FOR TROUBLE SYMPTOMS

| Trouble symptom            | Inspection procedure | Reference page |
|----------------------------|----------------------|----------------|
| Speedometer does not work. | 1                    | 54-19          |
| Tachometer does not work.  | 2                    | 54-20          |

## INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

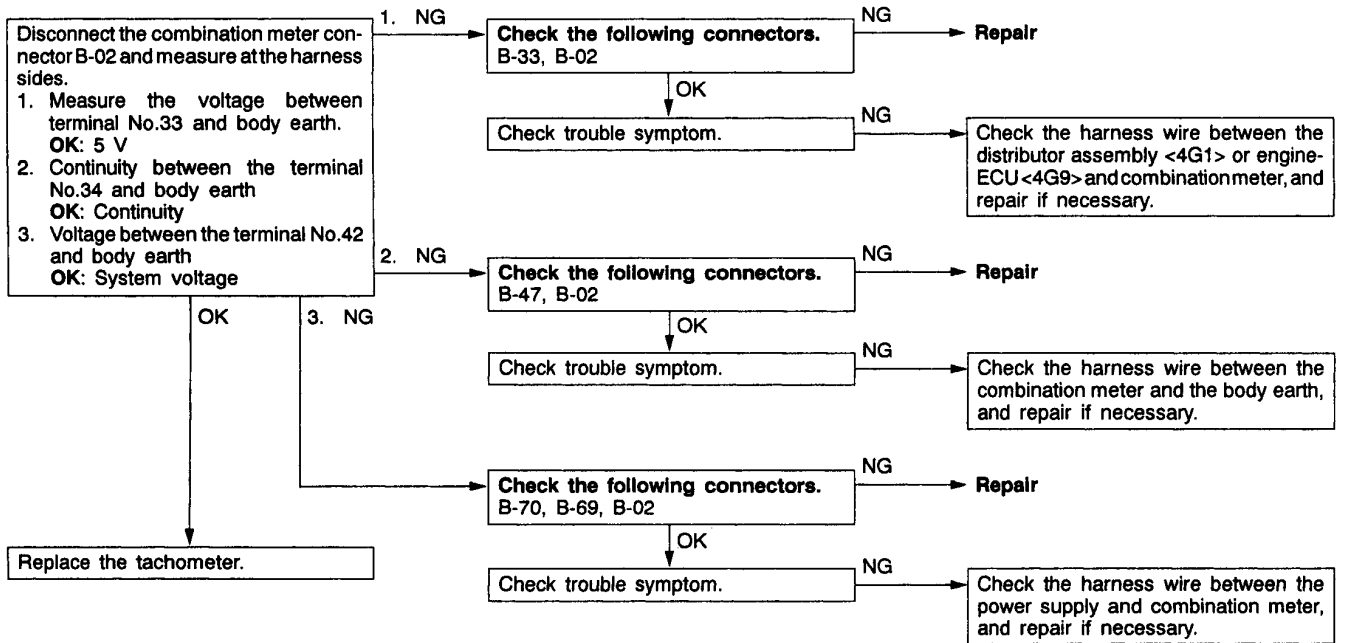
## Inspection Procedure 1

| Speedometer does not work.                                                                                                                                     | Probable cause                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cause may be a defective vehicle speed sensor circuit system or a defective speedometer. Vehicle speed sensor is co-used among the engine-ECU and A/T-ECU. | <ul style="list-style-type: none"> <li>• Malfunction of vehicle speed sensor</li> <li>• Malfunction of speedometer</li> <li>• Malfunction of harness or connector</li> </ul> |



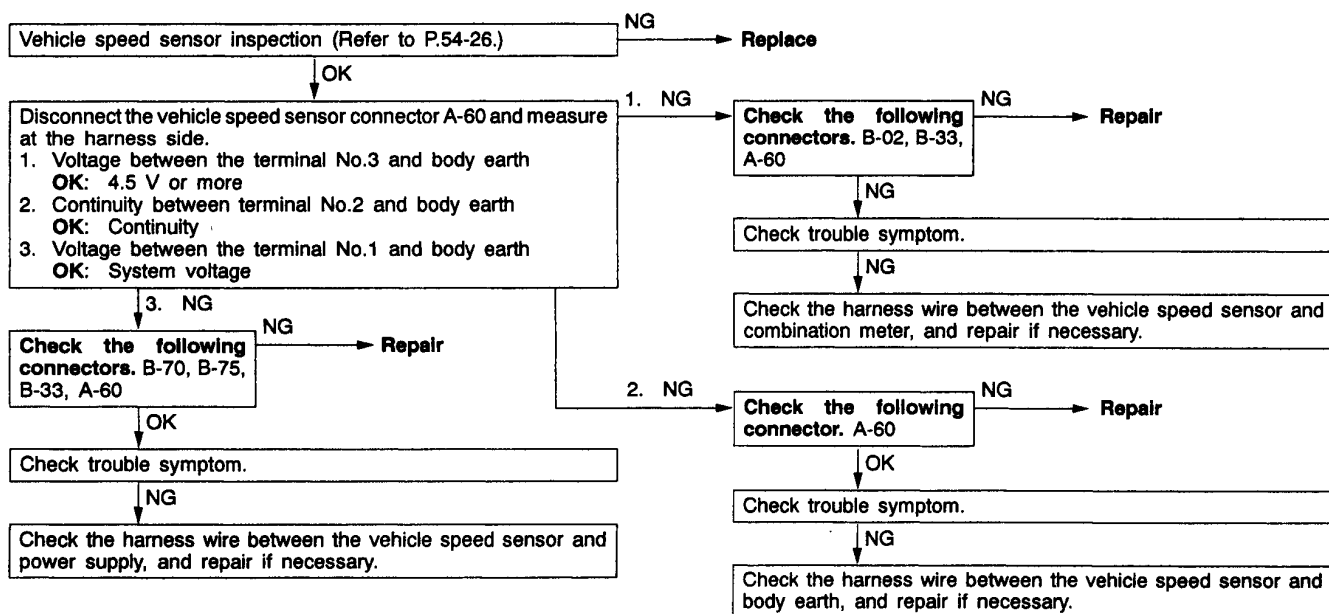
Inspection Procedure 2

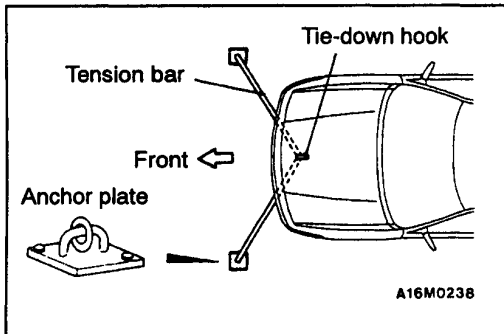
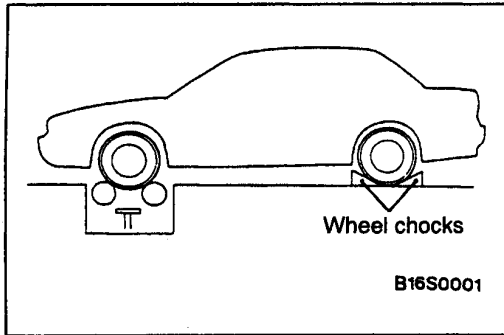
| Tachometer does not work.                                                                                                 | Probable cause                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| The ignition signal may not be input from the engine, or there may be a malfunction in the power supply or earth circuit. | <ul style="list-style-type: none"> <li>Malfunction of tachometer</li> <li>Malfunction of harness or connector</li> </ul> |



## Inspection Procedure 3

## Vehicle speed sensor circuit system inspection





## ON-VEHICLE SERVICE

54300090077

### SPEEDOMETER CHECK

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

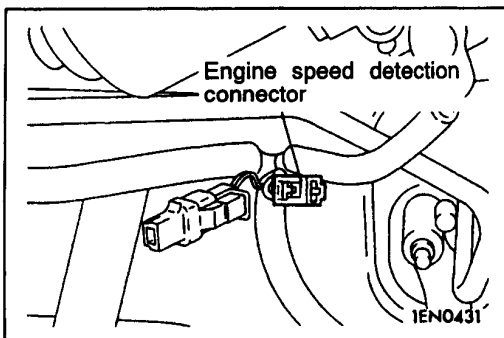
3. To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.
4. To prevent the vehicles from starting, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured firmly.
5.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

#### Caution

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

#### Standard values:

| Standard indication (mph) | km/h | 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

54300100084

1. Insert a paper clip in the engine speed detection connector from the harness side, and attach the engine speedometer.

#### NOTE

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

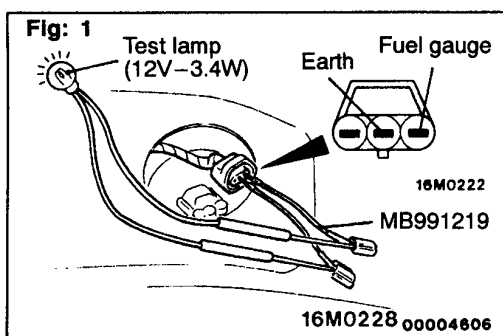
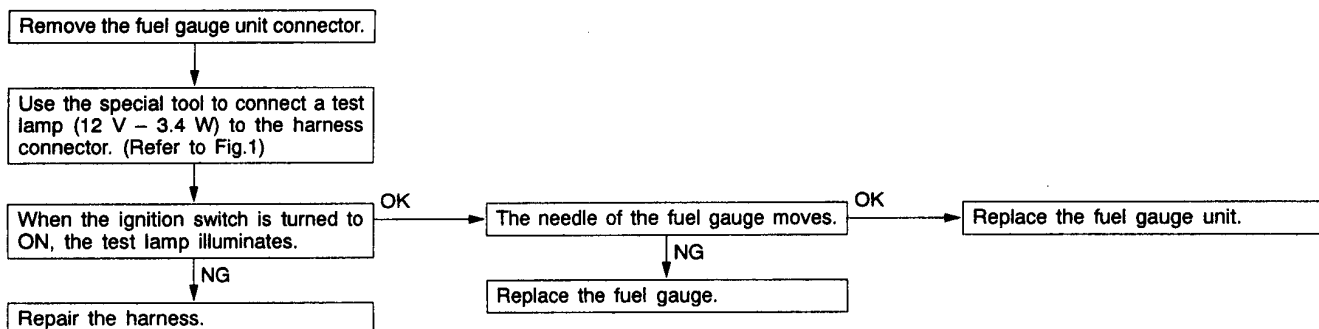
2. Compare the readings of the engine speedometer and the tachometer at every engine speed, and check if the variations are within the standard values.

#### Standard values:

700 r/min :  $\pm 100$  r/min  
 3,000 r/min :  $\pm 150$  r/min  
 5,000 r/min :  $\pm 250$  r/min  
 6,000 r/min :  $\pm 300$  r/min

## FUEL GAUGE SIMPLE CHECK

54300110094



## FUEL GAUGE UNIT CHECK

54300120134

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

## FUEL GAUGE UNIT RESISTANCE

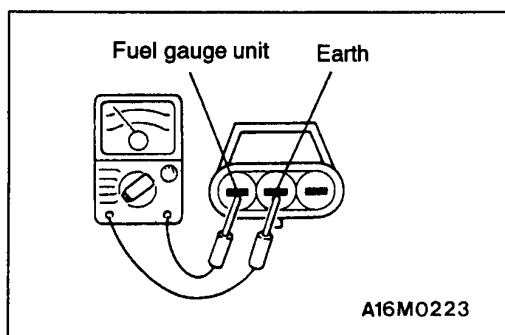
1. Check that resistance value between the fuel gauge terminal and earth terminal is at standard value when fuel gauge unit float is at point F (highest) and point E (lowest).

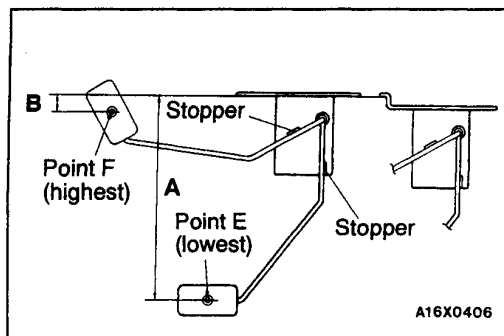
**Standard value:**

**Point F: 0.9 – 5.1  $\Omega$**

**Point E: 102.3 – 117.7  $\Omega$**

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



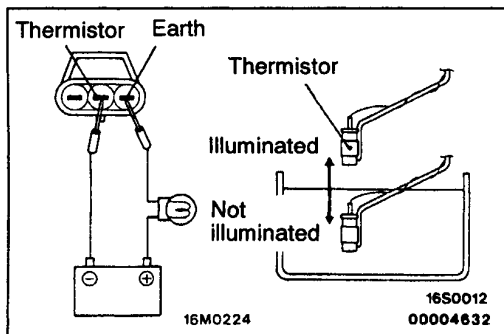
**FUEL GAUGE UNIT FLOAT HEIGHT**

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

**Standard value:**

**A: 17.4 mm**

**B: 130.2 mm**

**THERMISTOR**

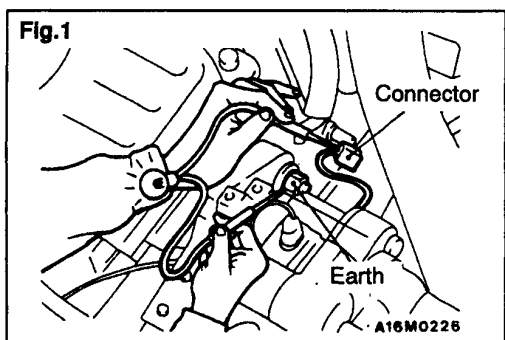
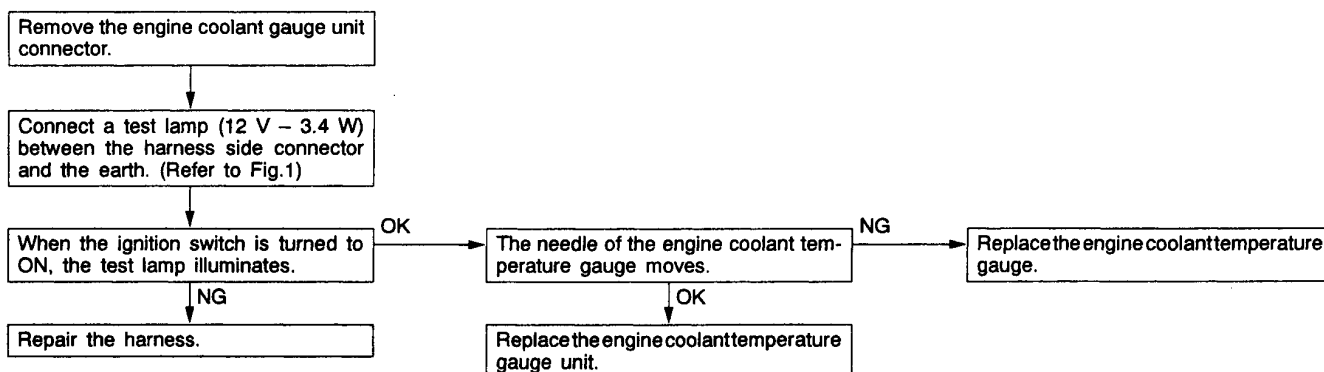
1. Connect fuel gauge unit (thermistor) to battery via test lamp (12 V – 3.4 W). Immerse in water.
2. Condition is good if lamp goes off when the thermistor is immersed in water and goes on when it is taken out of water.

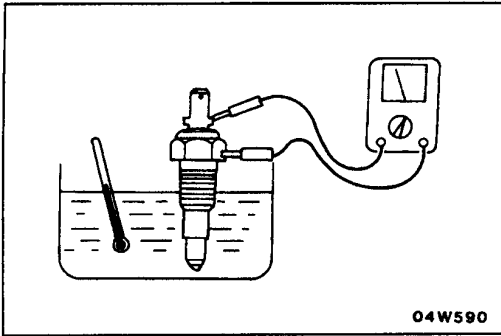
**Caution**

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

**ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK**

54300140109



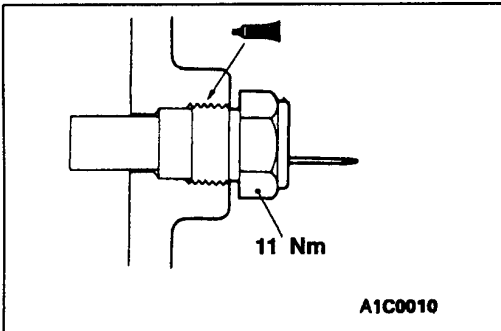


### ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

54300150133

1. Bleed 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:  $104 \pm 13.5 \Omega$**



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

**Specified sealant:**

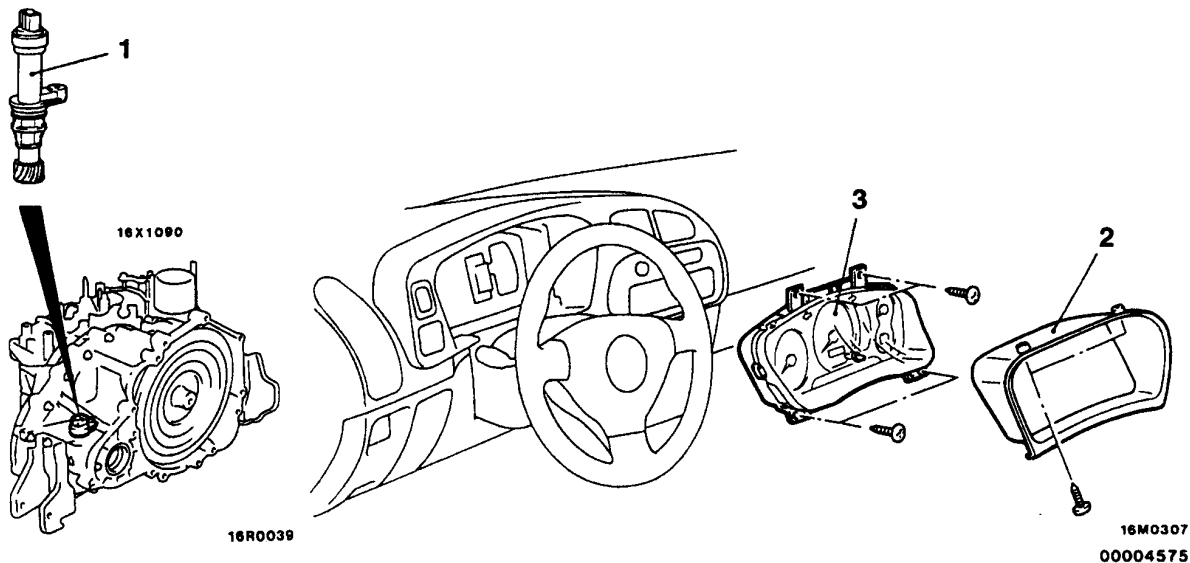
**3M Adhesive Nut Locking No. 4171 or equivalent**

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

## COMBINATION METERS

54300290101

### REMOVAL AND INSTALLATION

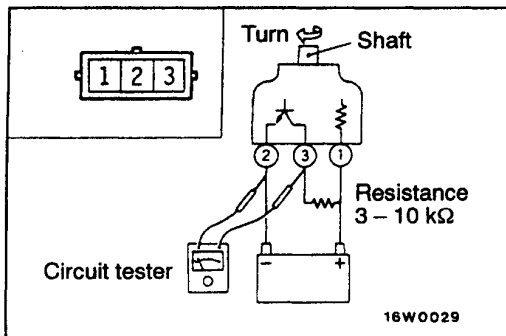


#### Vehicle speed sensor removal steps

- Air Cleaner, Air Intake Hose
- 1. Vehicle speed sensor

#### Combination meter removal steps

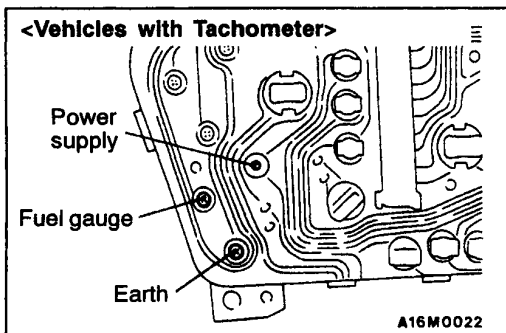
2. Meter bezel
3. Combination meter

**INSPECTION**

54300840067

**VEHICLE SPEED SENSOR CHECK**

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

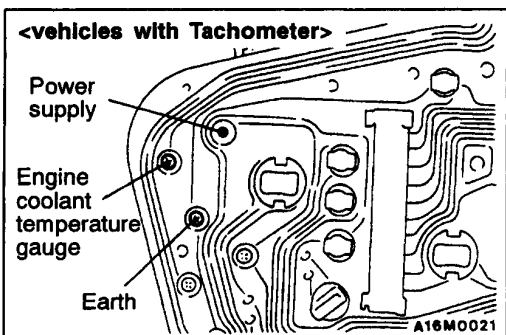
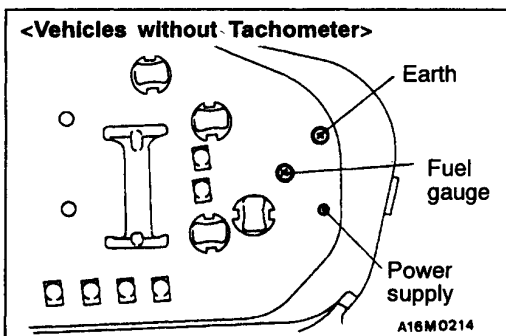
**FUEL GAUGE RESISTANCE CHECK**

54300300071

1. Remove the power supply tightening screw.
2. Use a circuit tester to measure the resistance value between the terminals.

**Standard value:**Power supply – Earth:  $192 \pm 19.2$ Power supply – Fuel gauge:  $89 \pm 8.9$ Fuel gauge – Earth:  $103 \pm 10.3$ **Caution**

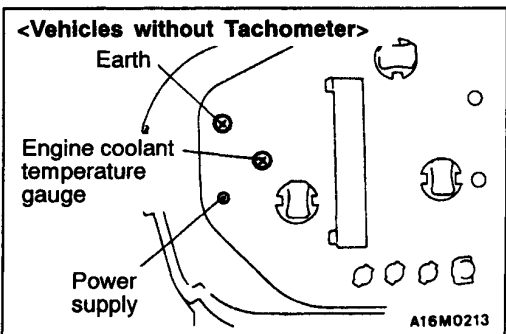
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.

**ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK**

1. Remove the power supply tightening screw.
2. Use a circuit tester to measure the resistance value between the terminals.

**Standard value:**Power supply – Earth:  $187 \pm 18.7$ Power supply – Engine coolant temperature gauge:  $90 \pm 4.5$ Engine coolant temperature gauge – Earth:  $247 \pm 24.7$ **Caution**

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



**HEADLAMP AND FRONT TURN-SIGNAL LAMP**

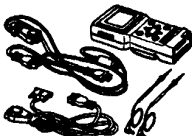
54200030052

**SERVICE SPECIFICATIONS**

| 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 TOOLS**

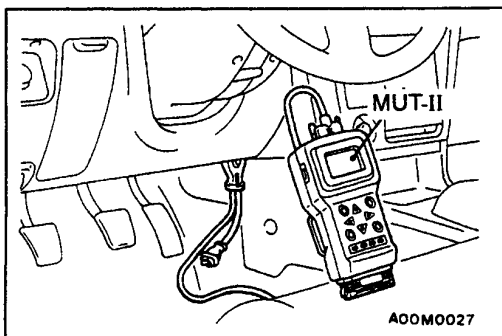
54200060204

| Tool                                                                                                                                                                                                                                                                                                                                                                                        | Number                                                               | Name                                                                                   | Use                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                            | MB991502                                                             | MUT-II sub assembly                                                                    | ETACS-ECU input signal checking                                                                                                                                                        |
| <b>A</b> <br><b>B</b> <br><b>C</b> <br><b>D</b>  | MB991223<br>A: MB991219<br>B: MB991220<br>C: MB991221<br>D: MB991222 | Harness set<br>A: Test harness<br>B: LED harness<br>C: LED harness adapter<br>D: Probe | Making voltage and resistance measurements during troubleshooting<br>A: Connector pin contact pressure inspection<br>B, C: Power circuit inspection<br>D: Commercial tester connection |
|                                                                                                                                                                                                                                                                                                          | MB990784                                                             | Ornament remover                                                                       | Removal of switch garnish                                                                                                                                                              |

## TROUBLESHOOTING

54200900018

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



### DIAGNOSIS FUNCTION

#### INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

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

### INSPECTION CHART FOR TROUBLE SYMPTOMS

54200910011

| Trouble symptoms                                                                                                                                                                                                                                                                                                                                                            |                                                                    | Inspection procedure | Reference page |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------|----------------|
| Communication with MUT-II is impossible. <Vehicles with ETACS-ECU>                                                                                                                                                                                                                                                                                                          | Communication with all systems is impossible.                      | 1                    | 54-29          |
|                                                                                                                                                                                                                                                                                                                                                                             | Communication with one-shot pulse input signal only is impossible. | 2                    | 54-29          |
| The lighting monitor buzzer doesn't sound under the following conditions while tail lamps or headlamps illuminate. <ul style="list-style-type: none"> <li>• When the ignition switch is turned to OFF and the driver's side door is open.</li> </ul>                                                                                                                        |                                                                    | 3                    | 54-29          |
| Headlamp leveling does not occur when the headlamp leveling switch is operated.                                                                                                                                                                                                                                                                                             |                                                                    | 5                    | 54-31          |
| The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is at the ON position. However, the headlamps illuminate when the lighting switch is moved to the HEAD position. <Vehicles with daytime running lamp system> <ul style="list-style-type: none"> <li>• Lighting switch: OFF</li> <li>• Passing switch: OFF</li> </ul> |                                                                    | 6                    | 54-33          |
| The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position. <Vehicles with daytime running lamp system> <ul style="list-style-type: none"> <li>• Ignition switch: OFF</li> <li>• Passing switch: OFF</li> </ul>                                                                                   |                                                                    | 7                    | 54-34          |

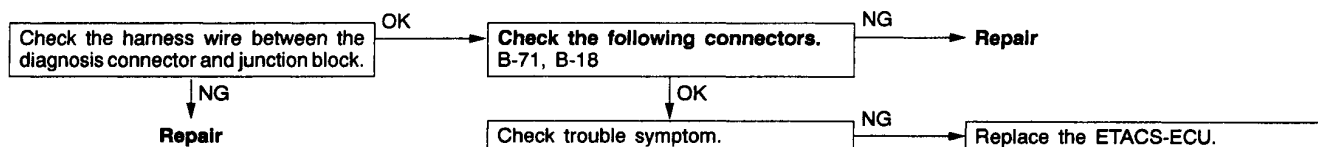
**INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS****Inspection Procedure 1**

|                                                                                                 |                                                                                                                     |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Communication with MUT-II is impossible. (Communication with all systems is impossible.)</b> | <b>Probable cause</b>                                                                                               |
| The cause is probably a defective power supply system (including earth) for the diagnosis line. | <ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness wire</li> </ul> |

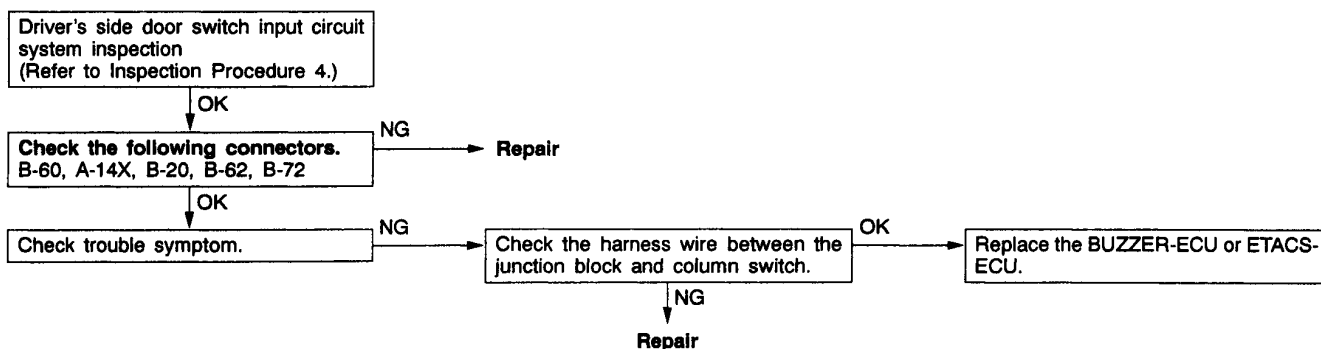
Refer to GROUP 13A – Troubleshooting.

**Inspection Procedure 2**

|                                                                                                                          |                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Communication with MUT-II is impossible. (Communication with the one-shot pulse input signal only is impossible.)</b> | <b>Probable cause</b>                                                                                                                                   |
| The cause is probably a defective one-shot pulse input circuit system of the diagnosis line.                             | <ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness wire</li> <li>• Malfunction of ETACS-ECU</li> </ul> |

**Inspection Procedure 3**

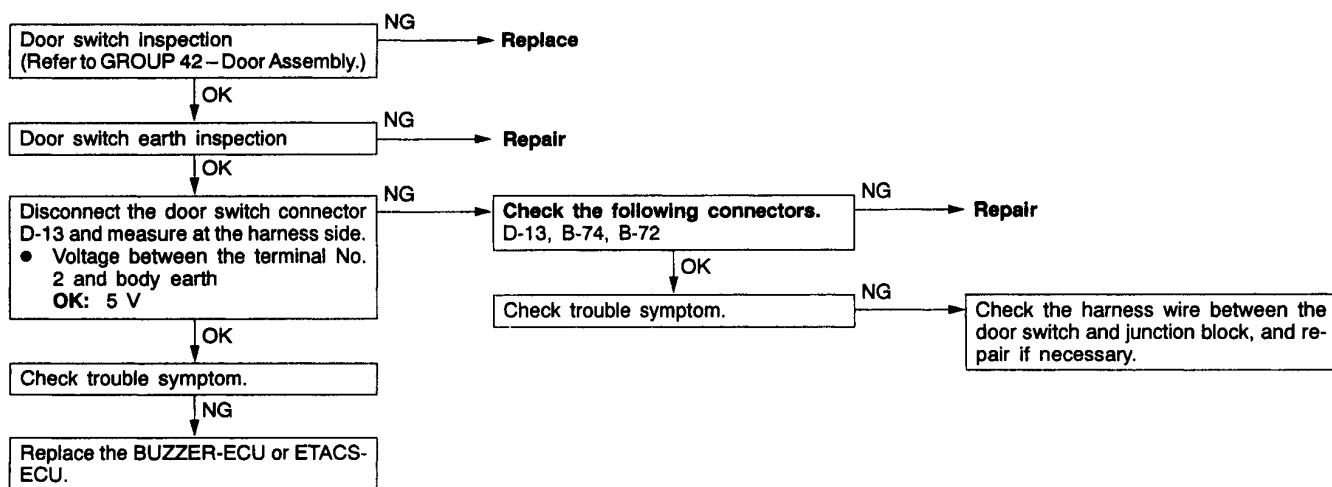
|                                                                                                                                                                                                      |                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The ignition switch is turned to the OFF position and the driver's side door is opened while the tail lamps or headlamps are operating, but the light reminder warning buzzer does not sound.</b> | <b>Probable cause</b>                                                                                                                                                                         |
| The cause is probably a defective lighting switch input circuit system or a defective driver's side door switch input circuit system.                                                                | <ul style="list-style-type: none"> <li>• Malfunction of driver's side door switch</li> <li>• Malfunction of harness or connector</li> <li>• Malfunction of BUZZER-ECU or ETACS-ECU</li> </ul> |



## 54-30 CHASSIS ELECTRICAL – Headlamp and Front Turn-signal Lamp

### Inspection Procedure 4

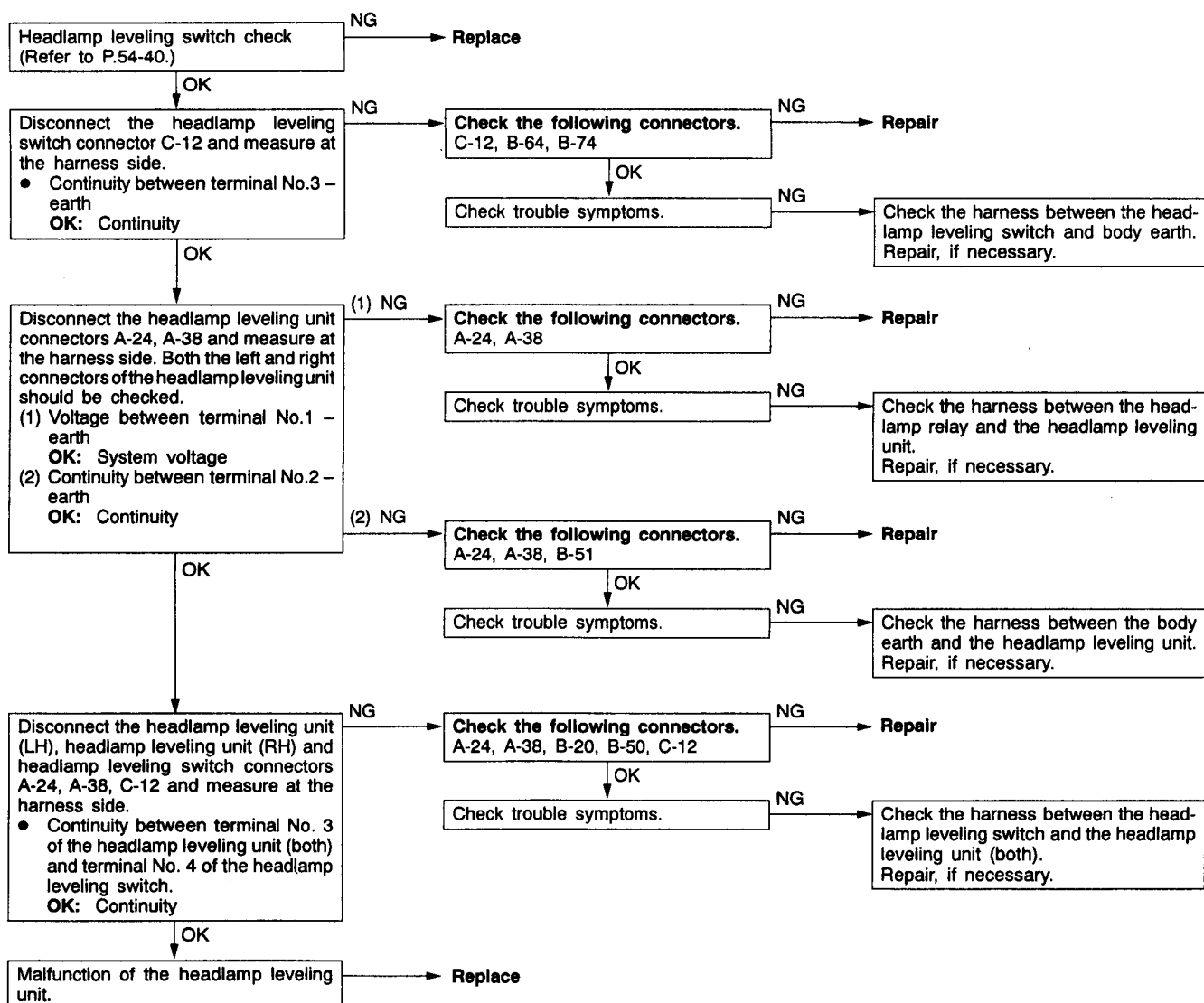
#### Driver's side door switch input circuit system inspection



## Inspection procedure 5

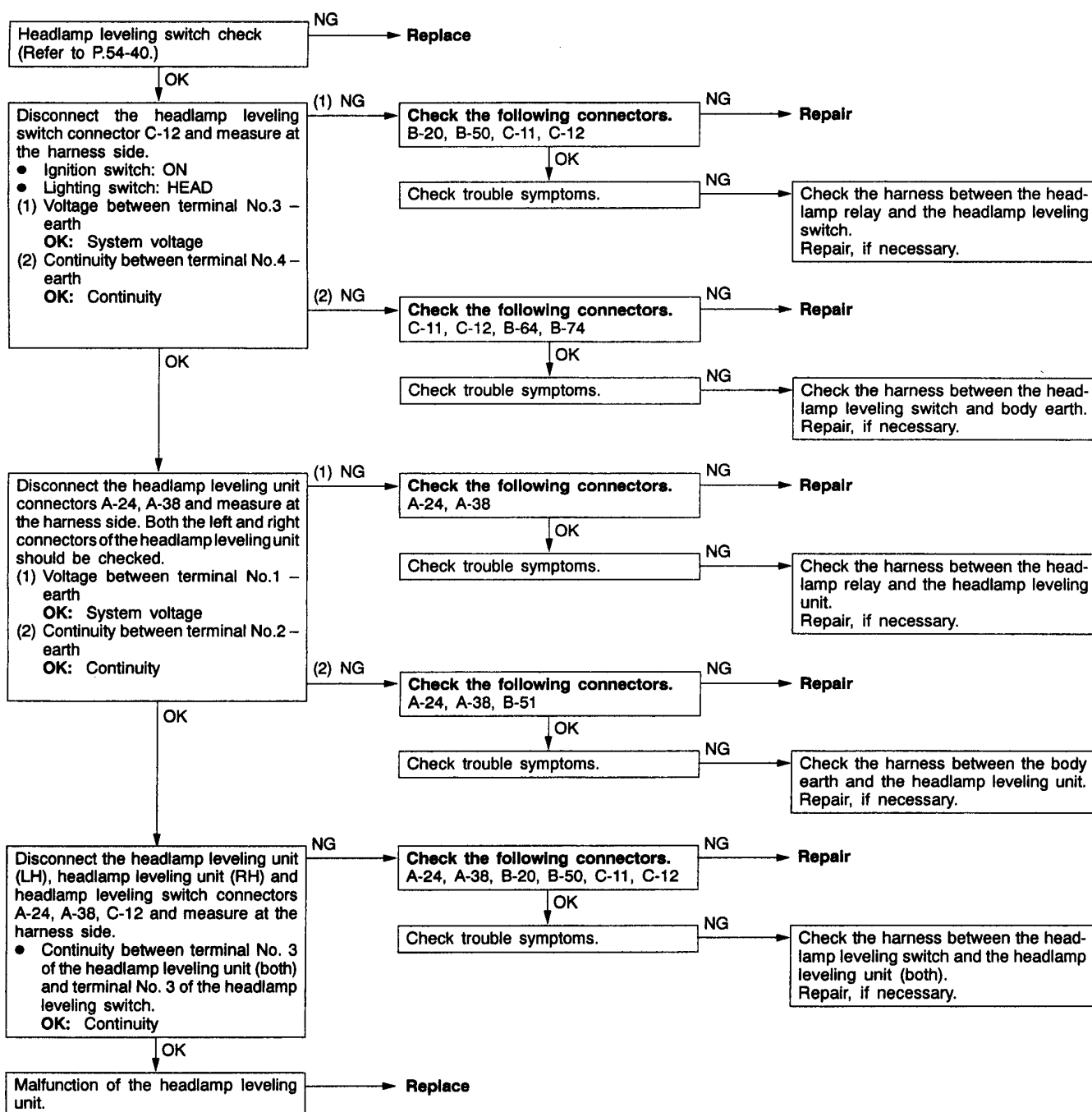
| Headlamp leveling does not occur when the headlamp leveling switch is operated.                                                                                                                                                | Probable cause                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cause is probably a malfunction of the headlamp leveling switch circuit system or a malfunction of the headlamp leveling unit circuit system.<br>If there is a blown fuse, there may also be a short-circuit in a harness. | <ul style="list-style-type: none"> <li>• Malfunction of fuse</li> <li>• Malfunction the headlamp leveling switch</li> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of the headlamp leveling unit</li> </ul> |

## &lt;Hatchback&gt;



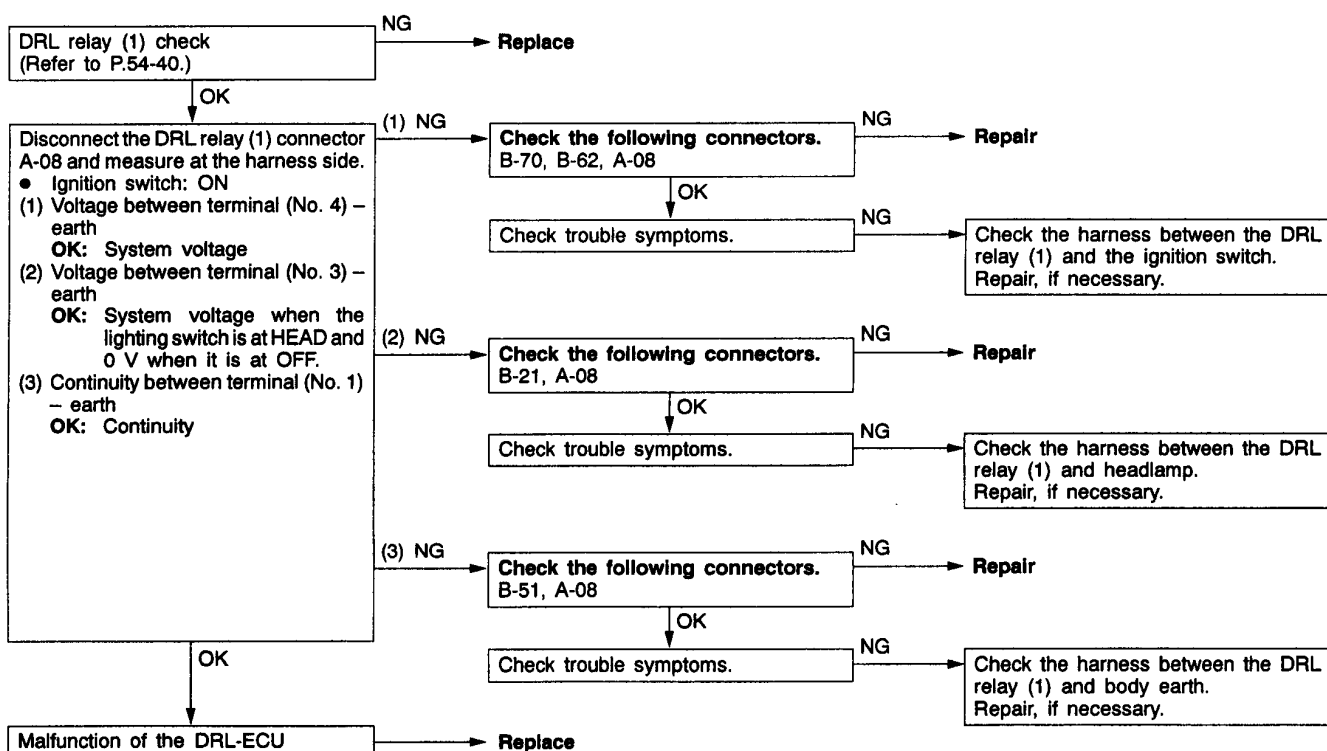
## 54-32 CHASSIS ELECTRICAL – Headlamp and Front Turn-signal Lamp

### <Sedan>



## Inspection procedure 6

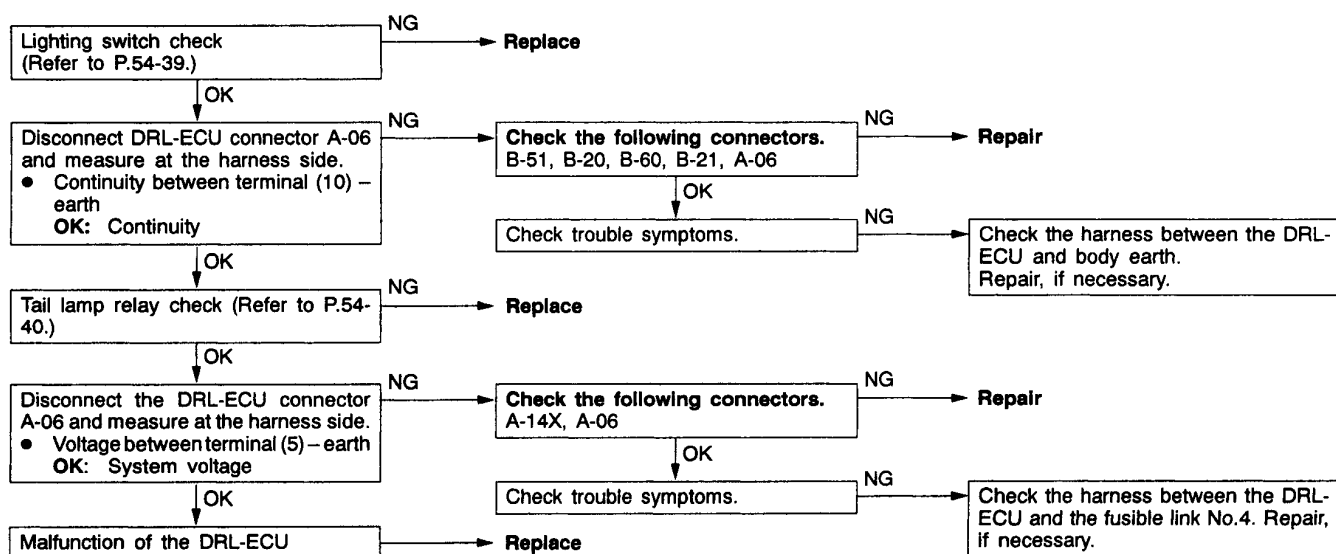
|                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>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.</p> <p>&lt;Vehicles with daytime running lamp&gt;</p> <ul style="list-style-type: none"> <li>● Lighting switch: OFF</li> <li>● Passing switch: OFF</li> </ul> | <p><b>Probable cause</b></p>                                                                                                                                                                                                    |
| <p>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.</p>                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>● Malfunction of fuse</li> <li>● Malfunction of connector</li> <li>● Malfunction of harness</li> <li>● Malfunction of the DRL relay (1)</li> <li>● Malfunction of the DRL-ECU</li> </ul> |

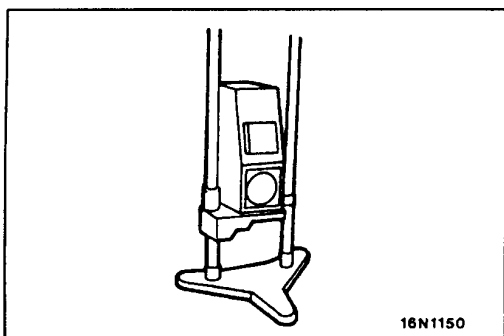


## 54-34 CHASSIS ELECTRICAL – Headlamp and Front Turn-signal Lamp

### Inspection procedure 7

|                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>The headlamps do not switch off when the vehicle is in the following condition and the lighting switch is moved to the TAIL position.</b></p> <p><b>&lt;Vehicles with daytime running lamp&gt;</b></p> <ul style="list-style-type: none"> <li>● Ignition switch: OFF</li> <li>● Passing switch: OFF</li> </ul> | <p><b>Probable cause</b></p>                                                                                                                                                                                                      |
| <p>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.</p>                                                                                                                              | <ul style="list-style-type: none"> <li>● Malfunction of fuse</li> <li>● Malfunction of connector</li> <li>● Malfunction of harness</li> <li>● Malfunction of the tail lamp relay</li> <li>● Malfunction of the DRL-ECU</li> </ul> |





## ON-VEHICLE SERVICE

54200090081

### 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.

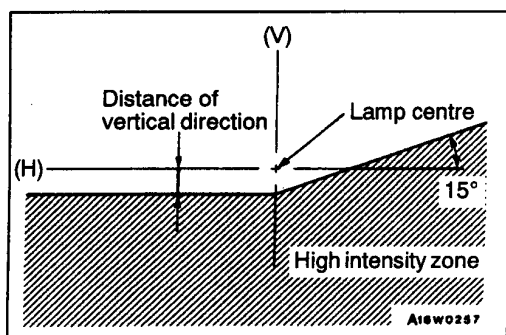
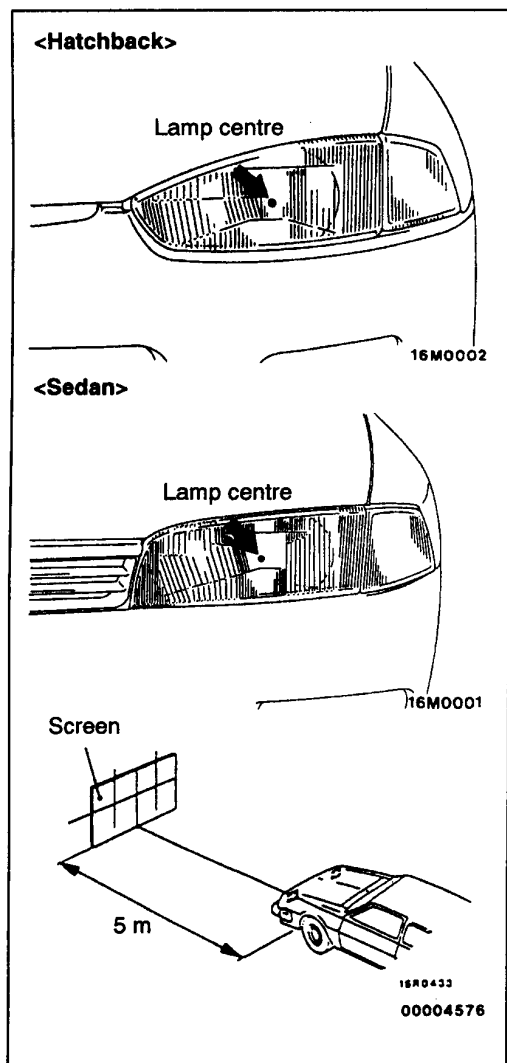
#### NOTE

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.54-36.)

#### <USING A SCREEN>

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

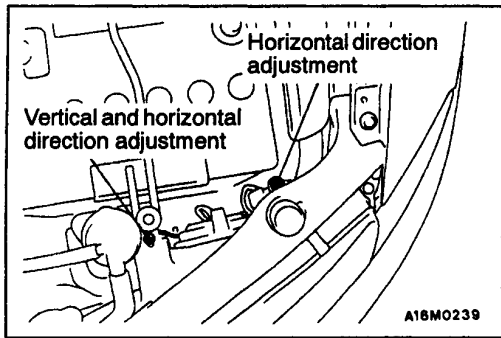


3. Check if the beam shining onto the screen is at the standard value.

#### Standard value:

(Vertical direction)  
60 mm below horizontal (H)

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



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

**Caution**

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

**INTENSITY MEASUREMENT**

54200100067

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

**Limit: 30,000 cd or more**

**NOTE**

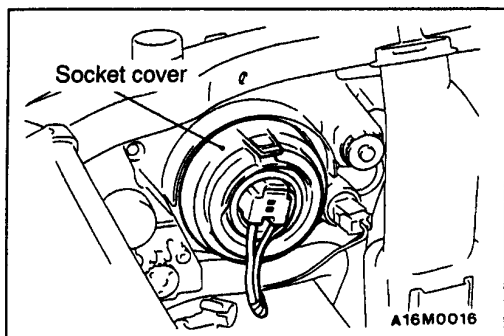
1. When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
2. There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
3. If an illuminometer is used to make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

$I = Er^2$  Where:

$I$  = intensity (cd)

$E$  = illumination (lux)

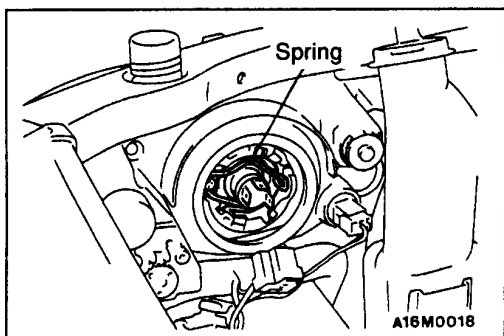
$r$  = distance (m) from headlamps to illuminometer

**BULB REPLACEMENT**

54200130103

**<Headlamp Bulb>**

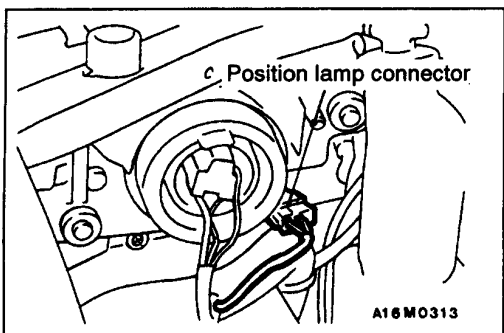
1. Disconnect the connector.
2. Remove the socket cover.



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

**Caution**

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

**<Position Lamp Bulb>**

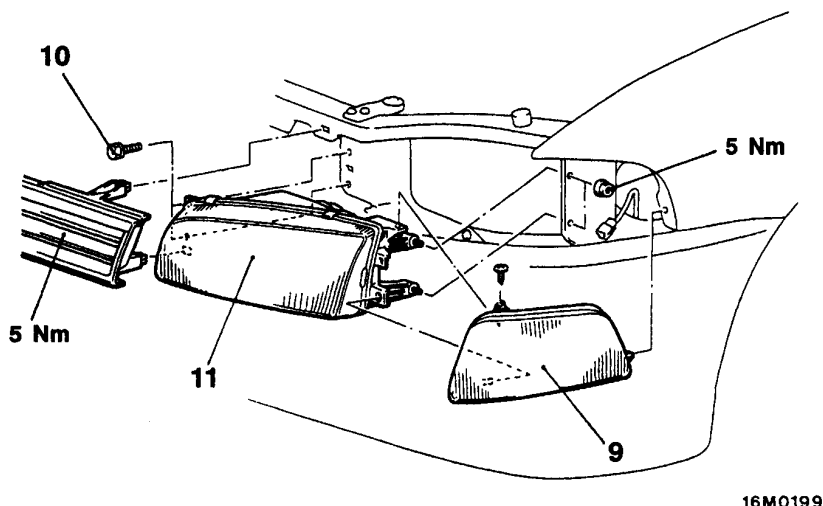
1. Disconnect the connector.
2. Remove the lamp socket by turning it anti-clockwise, then pull out the bulb from the socket.

# HEADLAMP AND FRONT TURN-SIGNAL LAMP

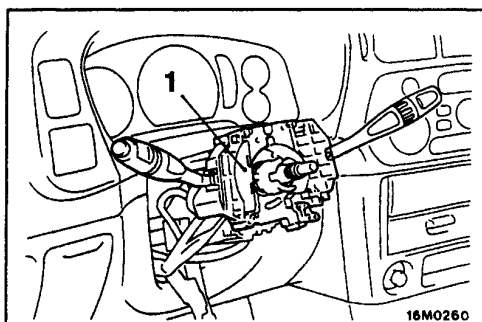
## REMOVAL AND INSTALLATION

### CAUTION: SRS

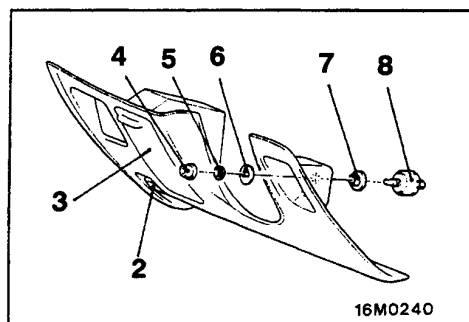
Before removal of air bag module and clock spring, refer to GROUP 52B – SRS Service Precautions and Air Bag Module and Clock Spring.



16M0199



16M0260



16M0240

00004577

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

### Headlamp leveling switch removal steps

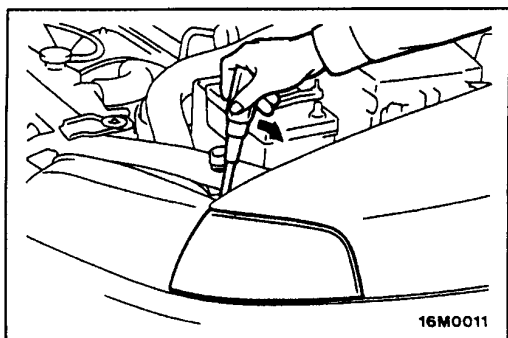
2. Hood lock release handle
3. Driver's side lower trim
4. Knob



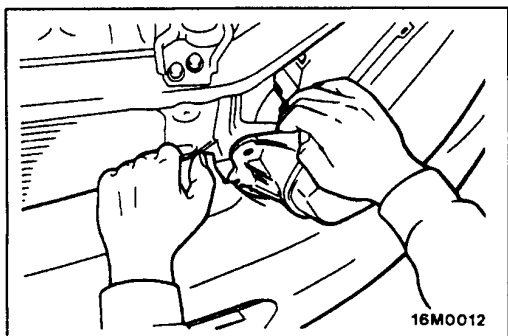
5. Nut
6. Plate
7. Spacer
8. Headlamp leveling switch

### Headlamp removal steps

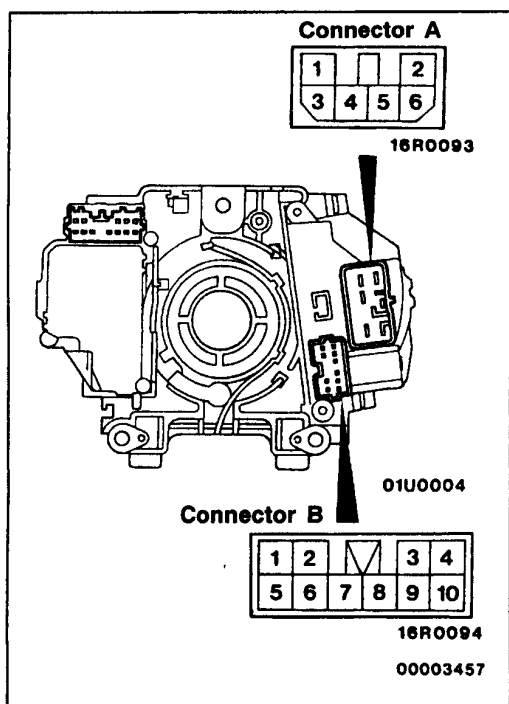
9. Front turn-signal lamp
10. Radiator grille <Sedan>  
(Refer to GROUP 51.)
11. Headlamp

**REMOVAL SERVICE POINT****◀A▶ FRONT TURN-SIGNAL LAMP REMOVAL**

Pry a screwdriver into the shown direction to remove the front turn-signal lamp forwards.

**◀B▶ HEADLAMP REMOVAL <HATCHBACK>**

After removing the inside of the headlamp while pulling the bumper towards you as shown in the illustration, remove the outside, and then remove the headlamp.

**INSPECTION**

54200800042

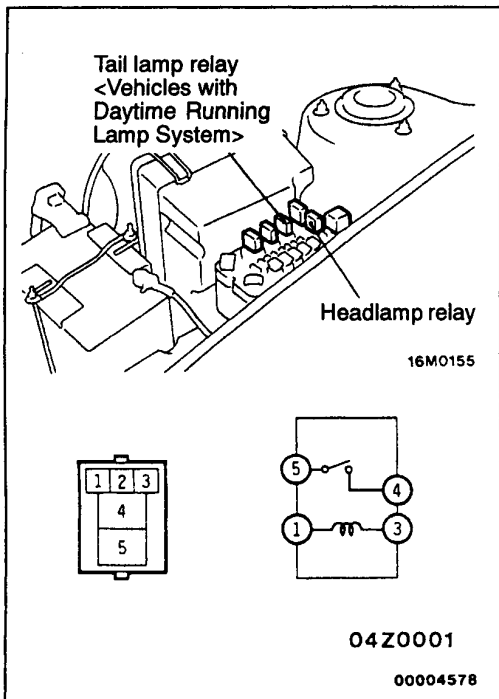
**LIGHTING SWITCH, DIMMER/PASSING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK**

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

**NOTE**

- \*1 indicates continuity when the dimmer switch in the lower beam position.
- \*2 indicates continuity when the dimmer switch in the upper beam position.

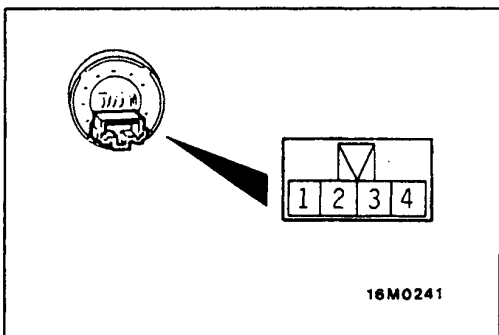
## 54-40 CHASSIS ELECTRICAL – Headlamp and Front Turn-signal Lamp



### HEADLAMP RELAY AND TAIL LAMP RELAY CHECK

54200820086

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

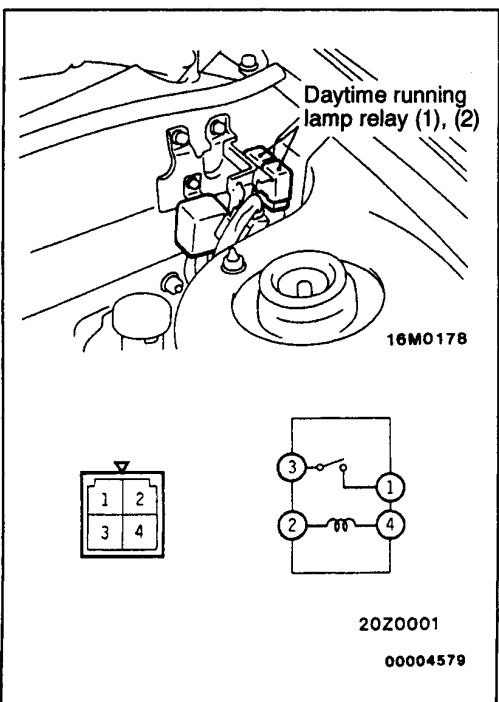


### HEADLAMP LEVELING SWITCH CHECK

54200810021

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

| Switch position                                      | 0   | 1   | 2   | 3     | 4     |
|------------------------------------------------------|-----|-----|-----|-------|-------|
| Resistance measurement between terminal No.3 and 4 Ω | 120 | 300 | 620 | 1,100 | 2,000 |



### DAYTIME RUNNING LAMP RELAY (1) AND (2) CHECK

54200830027

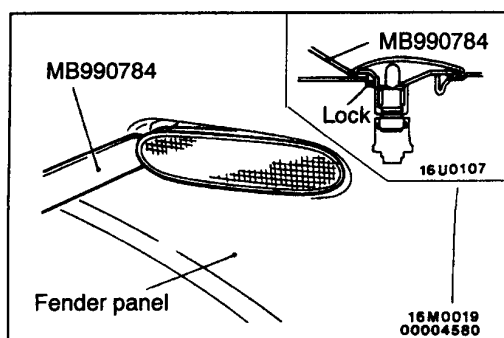
| Battery voltage | Terminal No. |   |   |   |
|-----------------|--------------|---|---|---|
|                 | 1            | 2 | 3 | 4 |
| Supplied        | ○            | ⊕ | ○ | ⊖ |
| Not supplied    |              | ○ |   | ○ |

**SIDE TURN-SIGNAL LAMP**

54200060105

**SPECIAL TOOL**

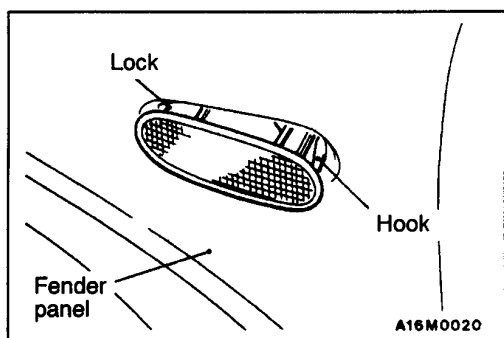
| Tool                                                                              | Number   | Name             | Use                              |
|-----------------------------------------------------------------------------------|----------|------------------|----------------------------------|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

**SIDE TURN-SIGNAL LAMP**

54200330046

**REMOVAL**

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

**INSTALLATION**

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

# FRONT FOG LAMP

54200030069

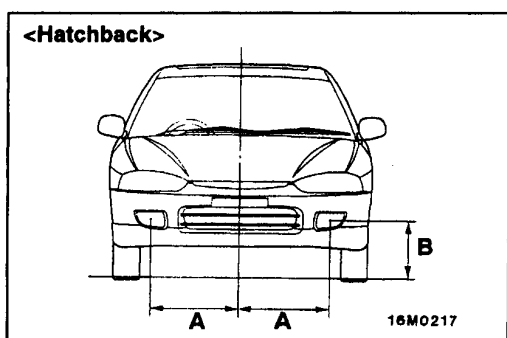
## SERVICE SPECIFICATIONS

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

## SPECIAL TOOL

54200060211

| Tool                                                                              | Number   | Name             | Use                     |
|-----------------------------------------------------------------------------------|----------|------------------|-------------------------|
|  | MB990784 | Ornament remover | Fog lamp switch removal |



## ON-VEHICLE SERVICE

54200110060

### FRONT FOG LAMP AIMING

1. Remove the fog lamp bezel.
2. Measure the centre of the fog lamps, as shown in the illustration.

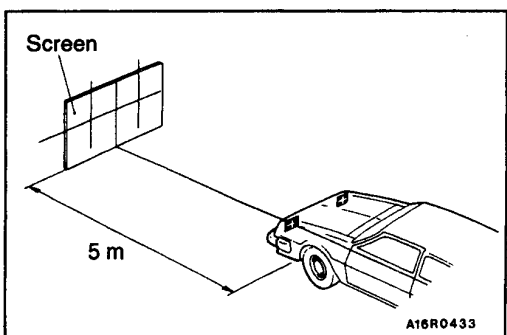
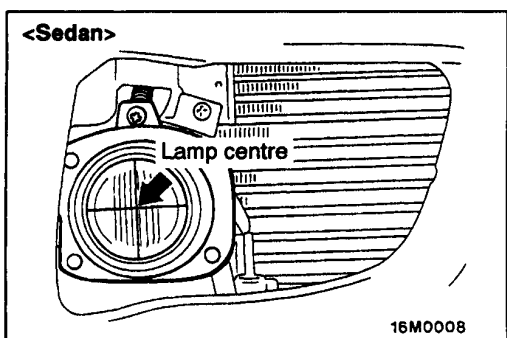
#### NOTE

Measure the centre of the fog lamp as shown.

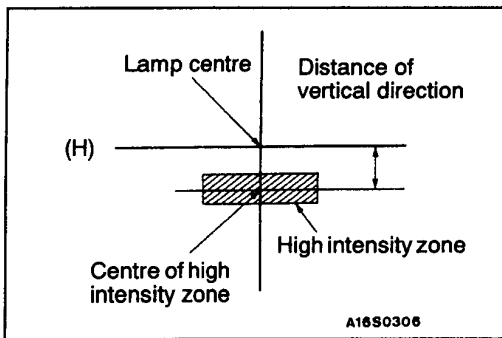
**<Hatchback>**

A: 572.5 mm (from the centre of the vehicle body)

B: 360 mm



3. Set the distance between the screen and the centre of the fog lamps as shown in the illustration.
4. 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.
5. With the engine running at 2,000 r/min, aim the fog lamp.



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

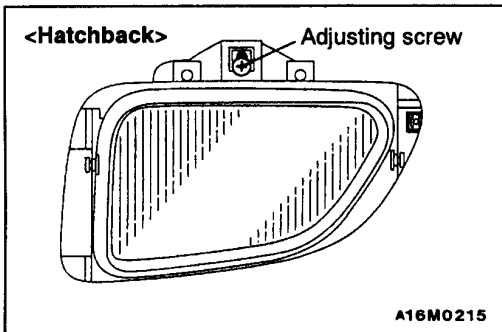
**Standard value:**

(Vertical direction)

100 mm below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

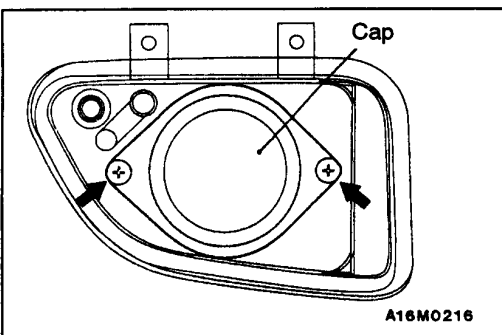
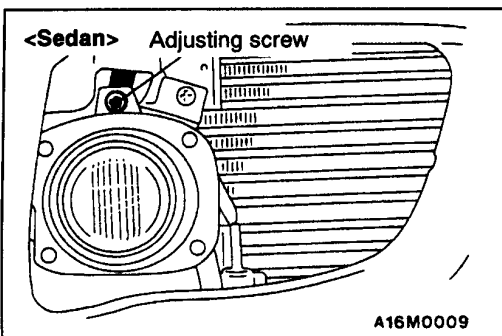


**NOTE**

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

**Caution**

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



**BULB REPLACEMENT**

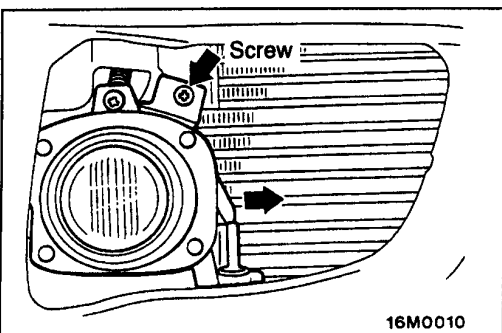
54200130110

**<Hatchback>**

1. Remove the fog lamp. (Refer to P.54-45.)
2. Remove the cap and pull out the bulb.

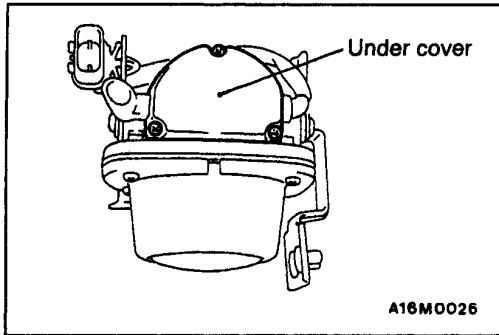
**Caution**

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.

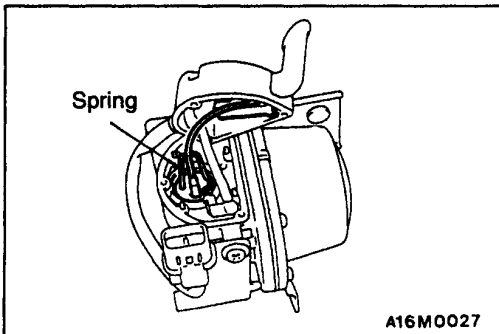


**<Sedan>**

1. Remove the fog lamp bezel.
2. Remove the fog lamp unit fixing screw, and push the lamp unit in the shown direction to remove it.



3. Remove the fog lamp under cover.



4. Unhook the spring which secures the bulb and then remove the bulb.

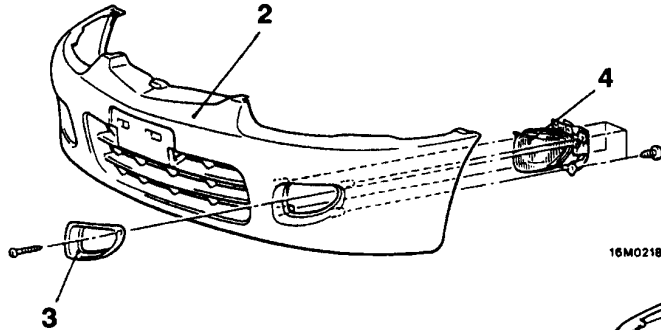
**Caution**

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

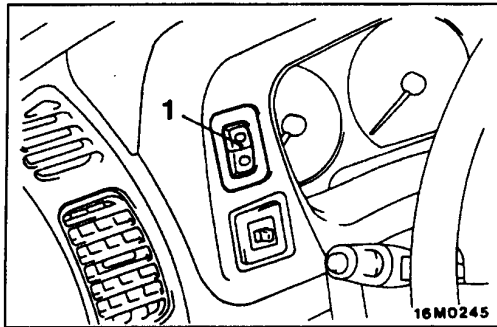
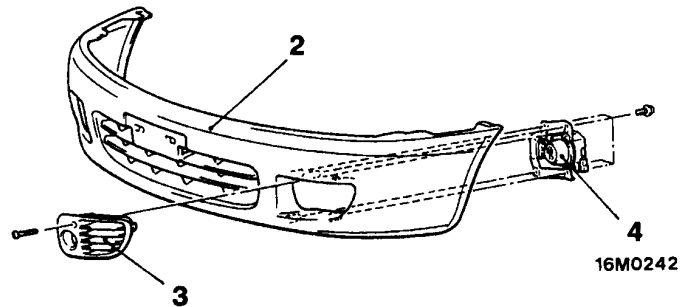
54200150079

## FRONT FOG LAMP REMOVAL AND INSTALLATION

&lt;Hatchback&gt;



&lt;Sedan&gt;

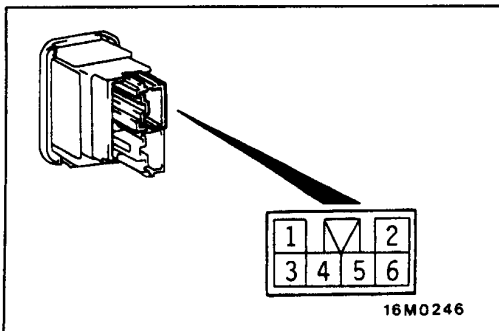


1. Front fog lamp switch

**Front fog lamp removal steps**

2. Front bumper  
(Refer to GROUP 51.)
3. Fog lamp bezel
4. Front fog lamp assembly

00004581

**INSPECTION**

54200740047

**FRONT FOG LAMP SWITCH CONTINUITY CHECK**

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

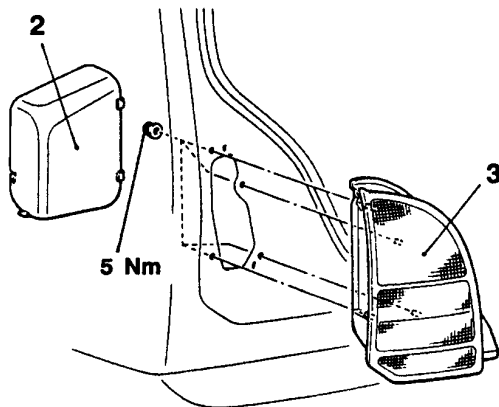
# REAR COMBINATION LAMP

54200390051

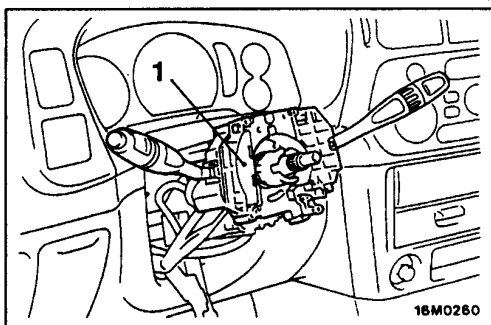
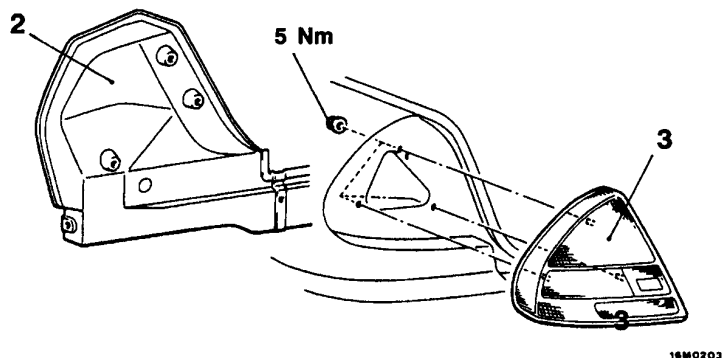
## REMOVAL AND INSTALLATION

**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.

&lt;Hatchback&gt;



&lt;Sedan&gt;



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

### Rear combination lamp removal steps

2. Lamp lid <Hatchback> or Rear end trim <Sedan>  
(Refer to GROUP 52A – Trim.)
3. Rear combination lamp

## INSPECTION

54200760050

### LIGHTING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK

Refer to P.54-39.

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

54200760087

Refer to P.54-40.

# REAR FOG LAMP

54200060228

## SPECIAL TOOL

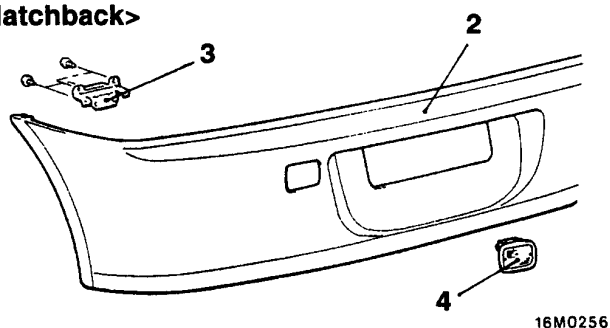
| Tool                                                                              | Number   | Name             | Use                     |
|-----------------------------------------------------------------------------------|----------|------------------|-------------------------|
|  | MB990784 | Ornament remover | Fog lamp switch removal |

## REAR FOG LAMP

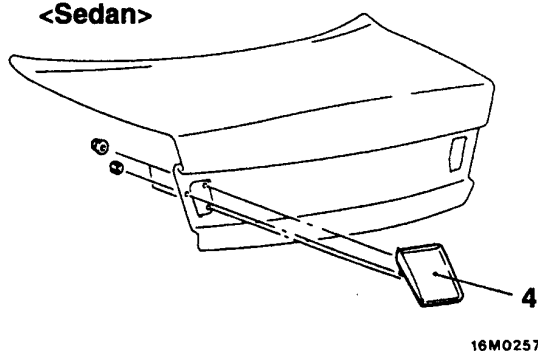
54200150086

### REMOVAL AND INSTALLATION

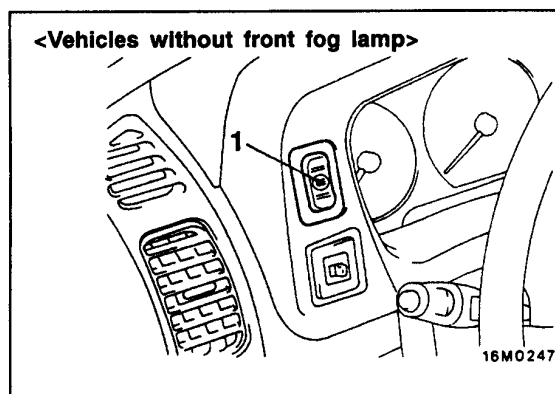
&lt;Hatchback&gt;



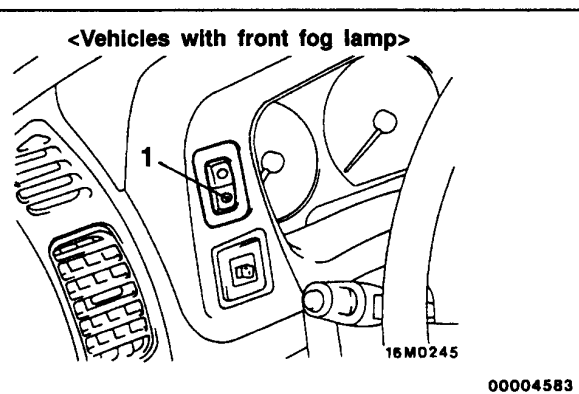
&lt;Sedan&gt;



&lt;Vehicles without front fog lamp&gt;



&lt;Vehicles with front fog lamp&gt;



00004583

1. Rear fog lamp switch

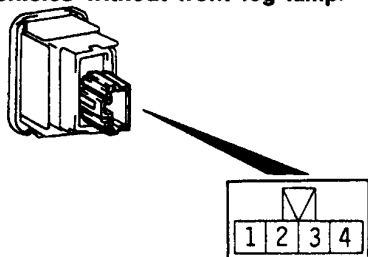
### Rear fog lamp removal steps <Hatchback>

2. Rear bumper (Refer to GROUP 51.)
3. Fog lamp bracket
4. Rear fog lamp

### <Sedan>

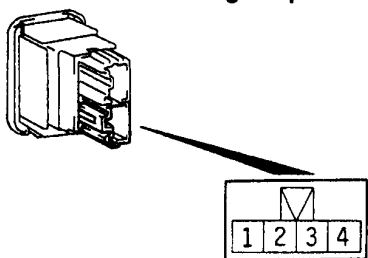
4. Rear fog lamp

&lt;Vehicles without front fog lamp&gt;



16M0248

&lt;Vehicles with front fog lamp&gt;



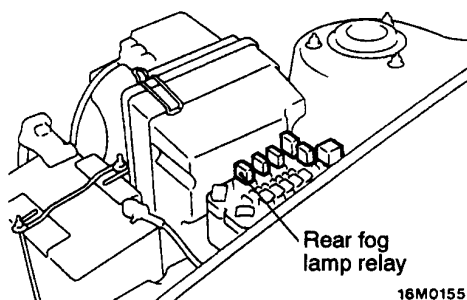
16M0249

**INSPECTION****REAR FOG LAMP SWITCH CHECK**

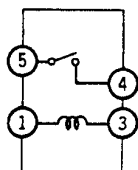
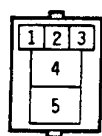
| Switch position | Terminal No. |   |   |          |
|-----------------|--------------|---|---|----------|
|                 | 1            | 2 | 3 | 4        |
| OFF             |              |   | ○ | ILL<br>○ |
| ON              | ○            | ○ | ○ | ILL<br>○ |

**REAR FOG LAMP RELAY CHECK**

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

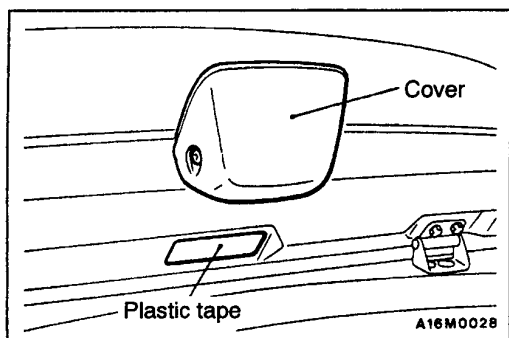


16M0155



04Z0001

00004584



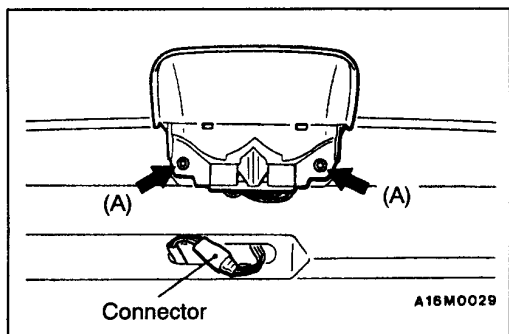
## HIGH-MOUNTED STOP LAMP

54200510099

### REMOVAL SERVICE POINT

#### HIGH-MOUNTED STOP LAMP REMOVAL <Hatchback>

1. Remove the high-mounted stop lamp cover.
2. Remove the plastic tape.
3. Disconnect the high-mounted stop lamp connector.
4. Remove the two bolts (A) and then remove the high-mounted stop lamp.



**RHEOSTAT**

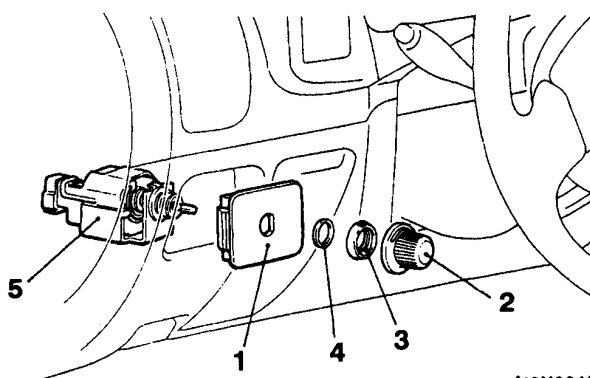
54200060235

**SPECIAL TOOL**

| Tool                                                                              | Number   | Name             | Use                       |
|-----------------------------------------------------------------------------------|----------|------------------|---------------------------|
|  | MB990784 | Ornament remover | Removal of switch garnish |

**RHEOSTAT**

5420060062

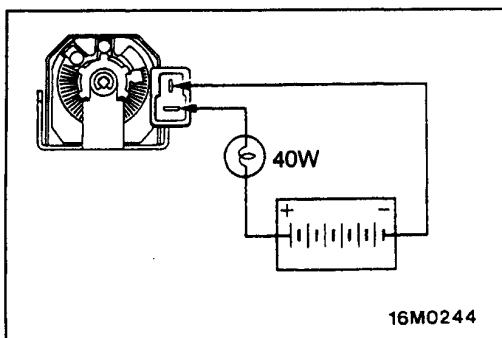
**REMOVAL AND INSTALLATION**

A16M0243

**Removal steps**

1. Switch garnish
2. Knob
3. Ring nut

4. Plate
5. Rheostat



16M0244

**INSPECTION**

54200610089

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

HAZARD WARNING LAMP SWITCH

54200060242

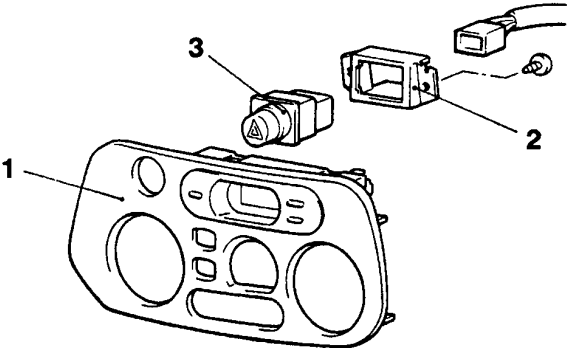
SPECIAL TOOL

| Tool                                                                              | Number   | Name             | Use                          |
|-----------------------------------------------------------------------------------|----------|------------------|------------------------------|
|  | MB990784 | Ornament remover | Heater control panel removal |

HAZARD WARNING LAMP SWITCH

54200660060

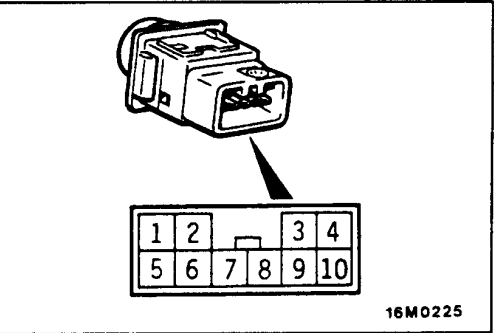
REMOVAL AND INSTALLATION



A16M0284

Removal steps

1. Heater control panel
2. Switch holder
3. Hazard warning lamp switch



16M0225

INSPECTION

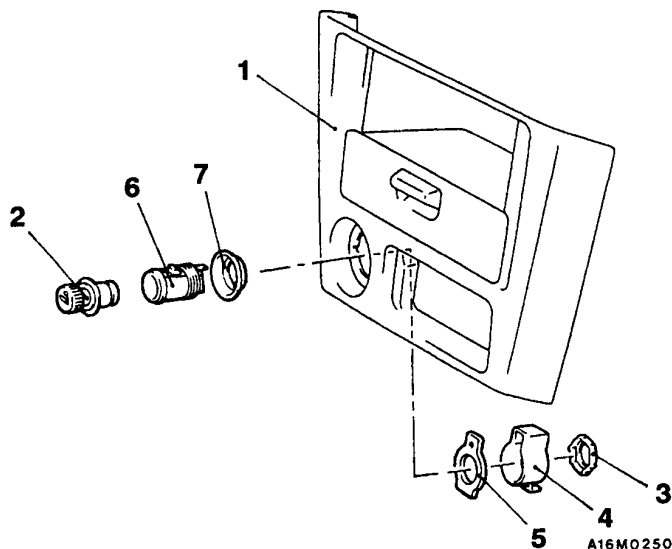
54200670087

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

# CIGARETTE LIGHTER

54300560073

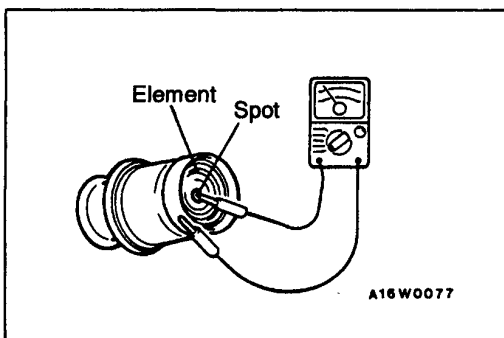
## REMOVAL AND INSTALLATION



### Removal steps

1. Audio panel
2. Plug
3. Fixing ring
4. Socket case

5. Socket washer
6. Socket
7. Protector



### INSPECTION

54300570083

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

# CLOCK

54300060184

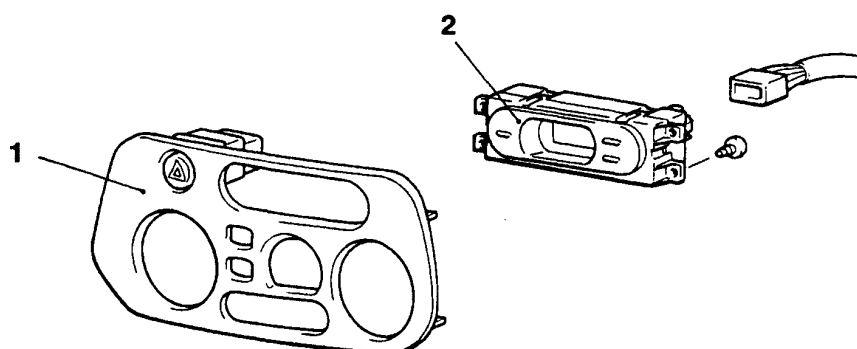
## SPECIAL TOOL

| Tool                                                                              | Number   | Name             | Use                          |
|-----------------------------------------------------------------------------------|----------|------------------|------------------------------|
|  | MB990784 | Ornament remover | Heater control panel removal |

## CLOCK

54300590041

### REMOVAL AND INSTALLATION



A16M0285

#### Removal steps

1. Heater control panel
2. Clock

# RADIO AND TAPE PLAYER

54400060033

## SPECIAL TOOL

| Tool                                                                              | Number   | Name             | Use                 |
|-----------------------------------------------------------------------------------|----------|------------------|---------------------|
|  | MB990784 | Ornament remover | Audio panel removal |

## TROUBLESHOOTING

54400070128

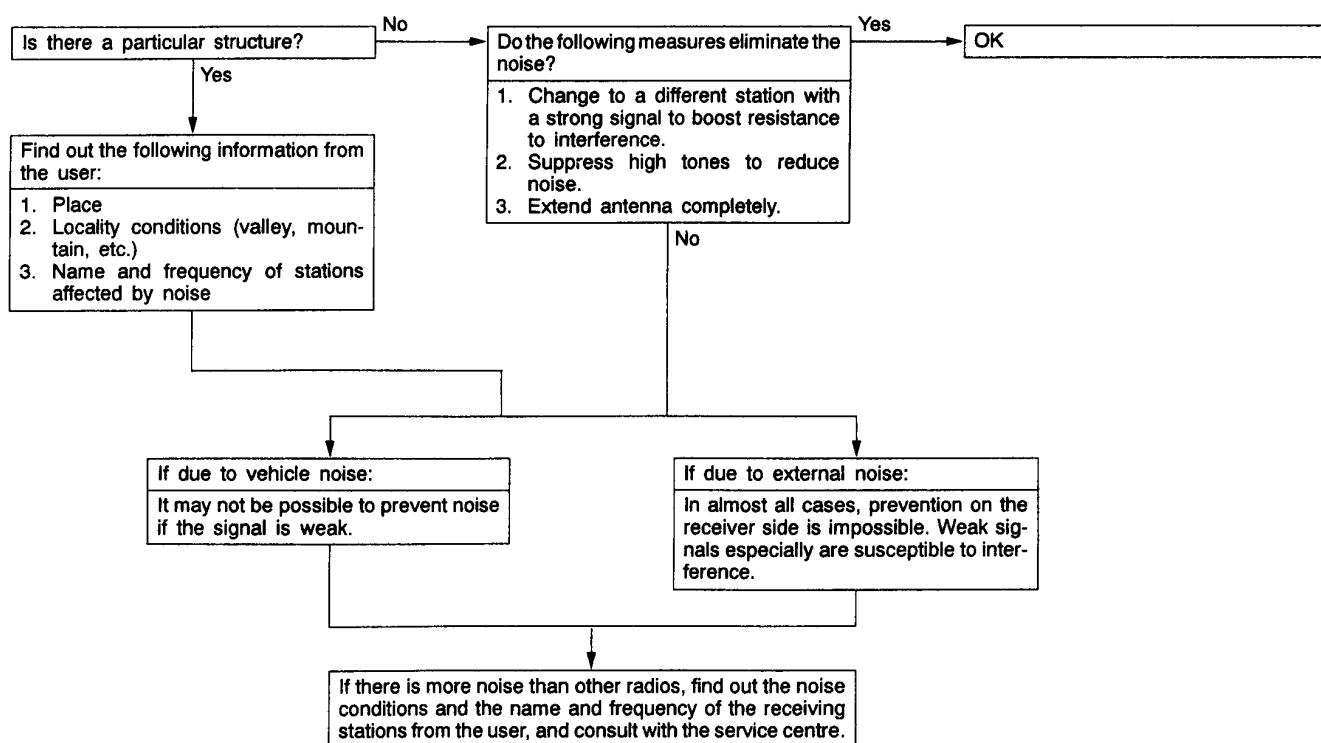
### QUICK-REFERENCE TROUBLESHOOTING CHART

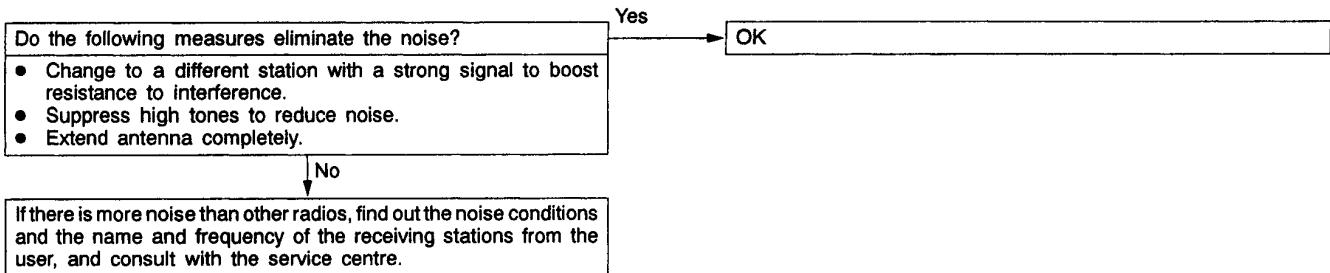
| Items | Problem symptom                                                                              | Relevant chart |
|-------|----------------------------------------------------------------------------------------------|----------------|
| Noise | Noise appears at certain places when travelling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

#### NOTE

Refer to problem symptoms of AM radio for MW radio.

| Items       | Problem symptom                                | Relevant chart |
|-------------|------------------------------------------------|----------------|
| Tape player | Cassette tape will not be inserted.            | C-1            |
|             | No sound.                                      | C-2            |
|             | No sound from one speaker.                     | C-3            |
|             | Sound quality is poor, or sound is weak.       | C-4            |
|             | Cassette tape will not be ejected.             | C-5            |
|             | Uneven revolution. Tape speed is fast or slow. | C-6            |
|             | Faulty auto reverse.                           | C-7            |
|             | Tape gets caught in mechanism.                 | C-8            |

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

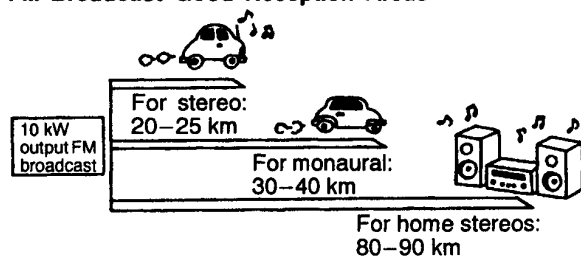
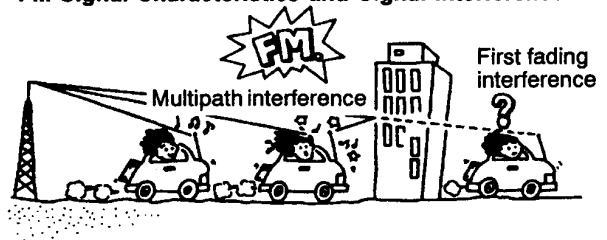
**A-2 Noise appears at certain places when travelling (FM).****NOTE**

About FM waves:

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

1. The signal becomes weak as the distance from the station's transmission antenna increases. Although this may vary according to the signal strength of the transmitting station and intervening geographical formation or buildings, the area of good reception is approx. 20–25 km for stereo reception, and 30–40 km for monaural reception.
2. The signal becomes weak when an area of shadow from the transmitting antenna (places where there are obstructions such as mountains or buildings between the antenna and the car), and noise will appear. <This is called first fading, and gives a steady buzzing noise.>

3. If a direct signal hits the antenna at the same time as a signal reflected by obstructions such as mountains or buildings, interference of the two signals will generate noise. During travelling, noise will appear each time the vehicle's antenna passes through this kind of obstructed area. The strength and interval of the noise varies according to the signal strength and the conditions of deflection. <This is called multipath noise, and is a repetitious buzzing.>
4. Since FM stereo transmission and reception has a weaker field than monaural, it is often accompanied by a hissing noise.

**FM Broadcast Good Reception Areas****FM Signal Characteristics and Signal Interference**

16W0268

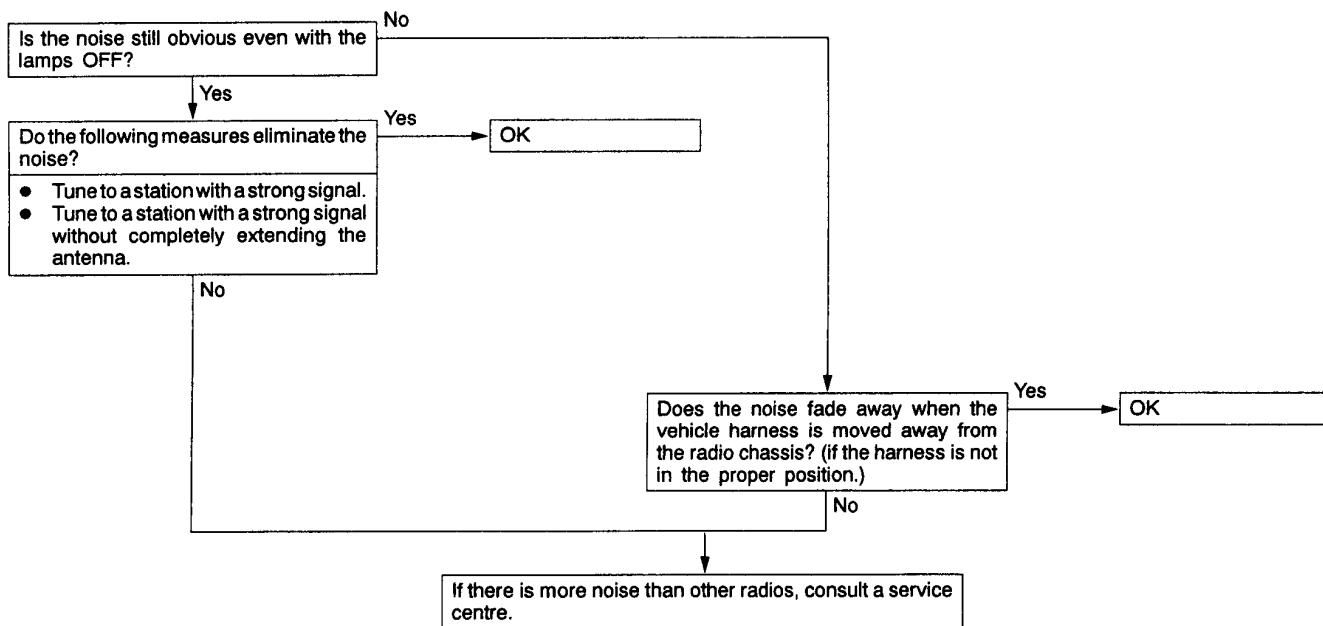
**A-3 Mixed with noise, only at night (AM).**

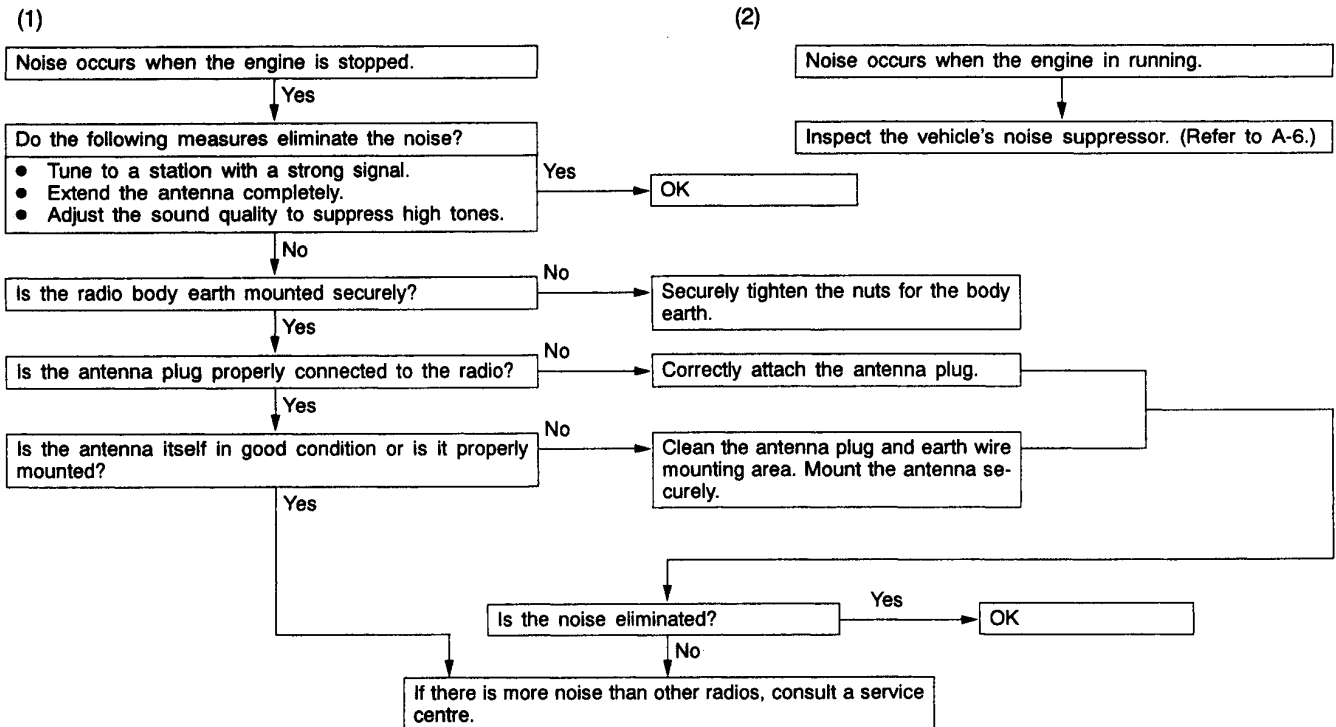
The following factors can be considered as possible causes of noise appearing at night.

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

and a change to a different station or the appearance of a beating sound\* may occur. Beat sound\*: Two signals close in frequency interfere with each other, creating a repetitious high-pitched sound. This sound is generated not only by sound signals but by electrical waves as well.

2. Factors due to vehicle noise: Alternator noise may be a cause.



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

About noise encountered during FM reception only. Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics

of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2.)  
<Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>

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

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

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<br>Sounds are in parentheses ( ).                  | Conditions                                                                                                                                                                                                | Cause                                                                                                              | Remedy                                                                                                                                                                           |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AM, FM: Ignition noise (Popping, snapping, cracking, buzzing) | <ul style="list-style-type: none"> <li>Increasing the engine speed causing the popping sound to speed up, and volume decreases.</li> <li>Disappears when the ignition switch is turned to ACC.</li> </ul> | <ul style="list-style-type: none"> <li>Mainly due to the spark plugs.</li> <li>Due to the engine noise.</li> </ul> | <ul style="list-style-type: none"> <li>Check or replace the earth cable. (Refer to Fig. 1 on P.54-61.)</li> <li>Check or replace the noise capacitor.</li> </ul>                 |
| Other electrical components                                   | —                                                                                                                                                                                                         | Noise may appear as electrical components become older.                                                            | Repair or replace electrical components.                                                                                                                                         |
| Static electricity (Cracking, crinkling)                      | <ul style="list-style-type: none"> <li>Disappears when the vehicle is completely stopped.</li> <li>Severe when the clutch is engaged.</li> </ul>                                                          | Occurs when parts or wiring move for some reason and contact metal parts of the body.                              | Return parts or wiring to their proper position.                                                                                                                                 |
|                                                               | <ul style="list-style-type: none"> <li>Various noises are produced depending on the body part of the vehicle.</li> </ul>                                                                                  | Due to detachment from the body of the front hood, bumpers, exhaust pipe and muffler, suspension, etc.             | Tighten the mounting bolts securely. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly earthed. |

**Caution**

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

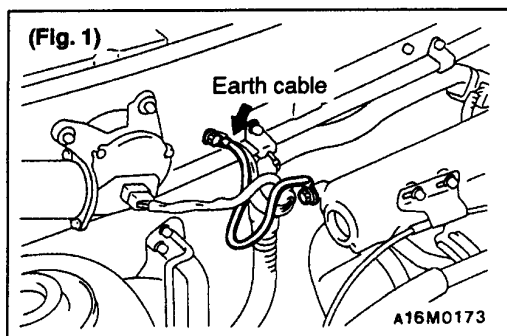
**NOTE**

1. Capacitor  
The capacitor does not pass D.C. current, but as the number of waves increases when it

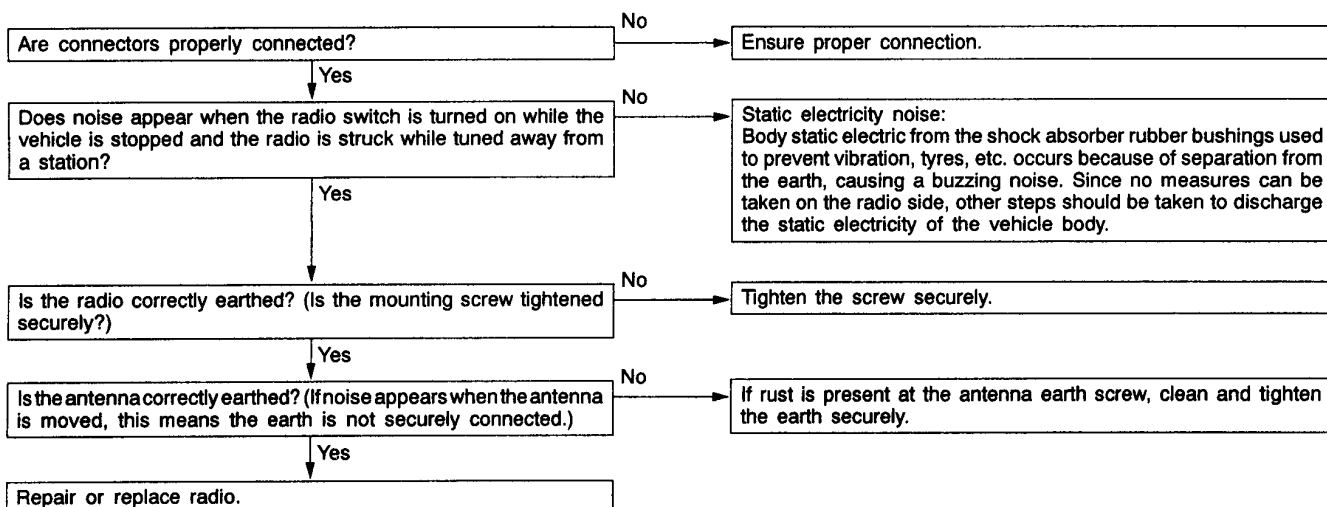
passes A.C. current, impedance (resistance against A.C.) decreases, and current flow is facilitated. A noise suppressing condenser which takes advantage of this property is inserted between the power line for the noise source and the earth. This suppresses noise by earthing the noise component (A.C. or pulse signal) to the body of the vehicle.

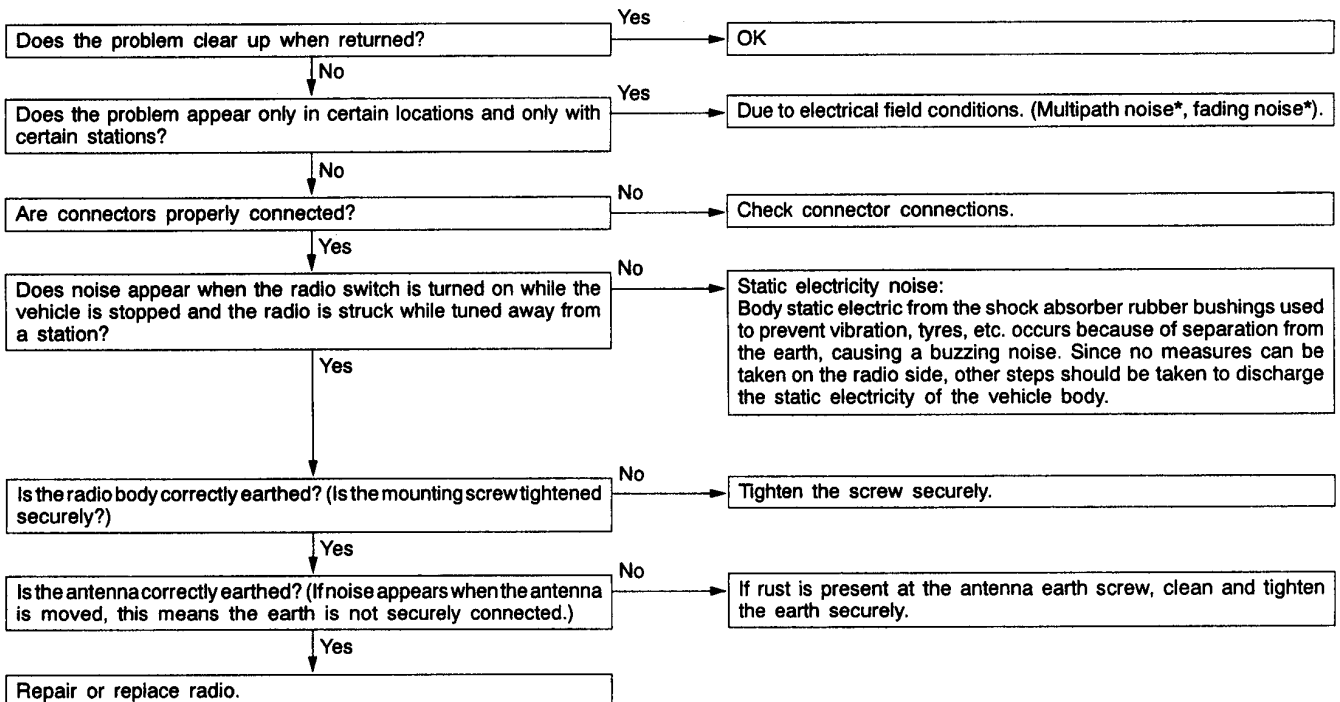
## 2. Coil

The coil passes D.C. current, but impedance rises as the number of waves increases relative to the A.C. current. A noise suppressing coil which takes advantage of this property is inserted into the power line for the noise source, and works by preventing the noise component from flowing or radiating out of the line.



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



**A-8 Noise sometimes appears on FM during travelling.**

\* About multipath noise and fading noise  
Because the frequency of FM waves is extremely high, it is highly susceptible to effects from geological formations and buildings. These effects disrupt the broadcast signal and obstruct reception in several ways.

- Multipath noise  
This describes the echo that occurs when the broadcast signal is reflected by a large

obstruction and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing).

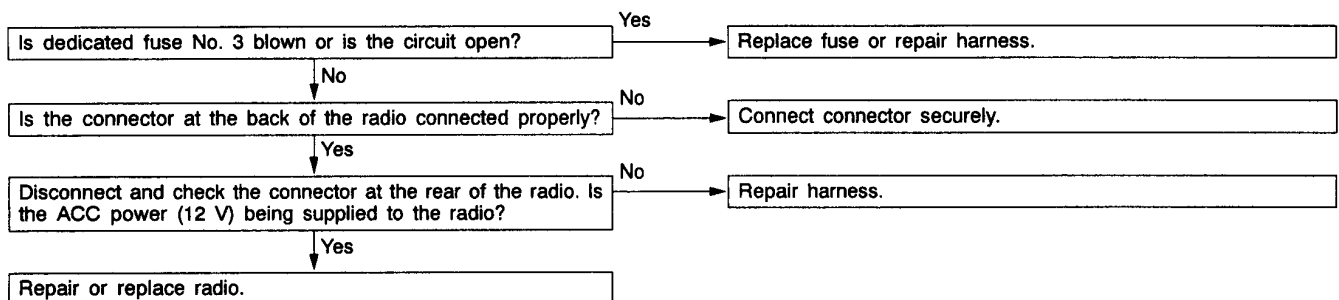
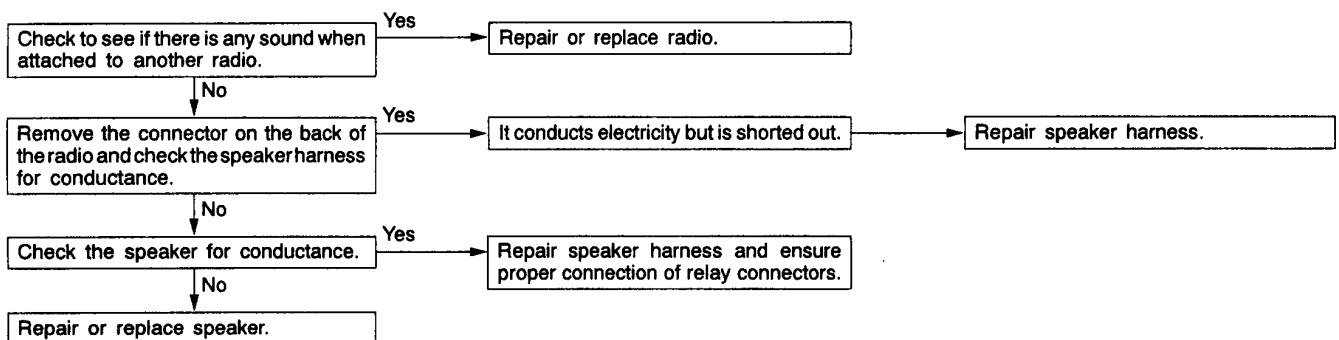
- Fading noise  
This is a buzzing noise that occurs when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

**A-9 Ever-present noise.**

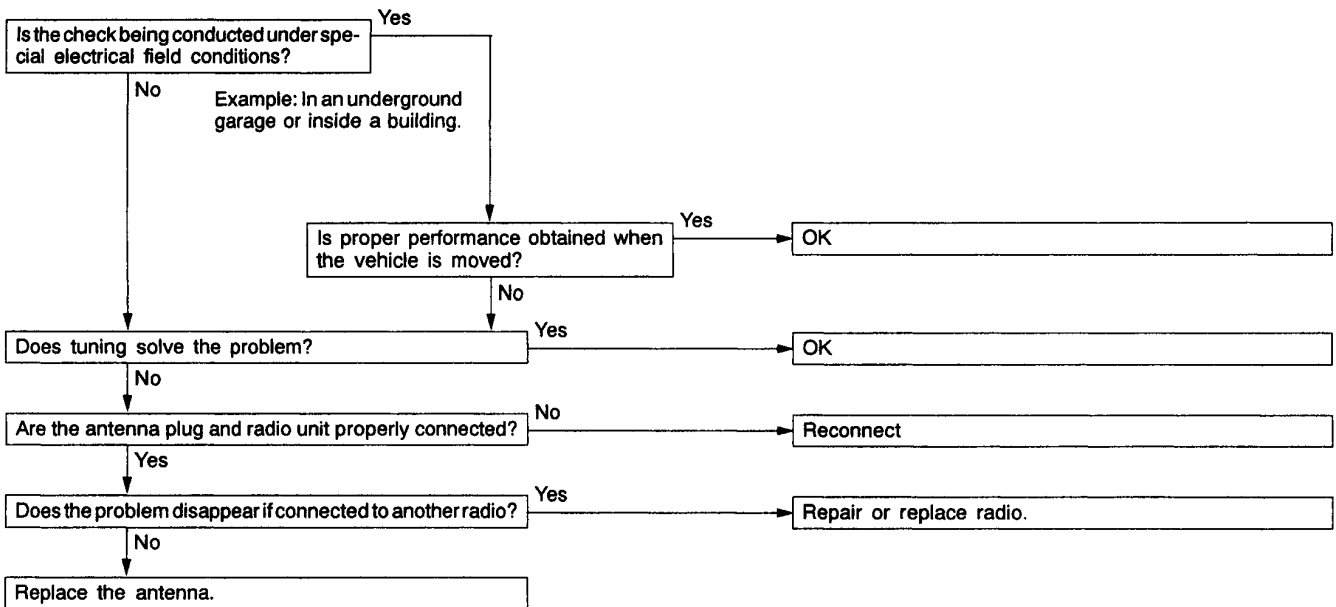
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

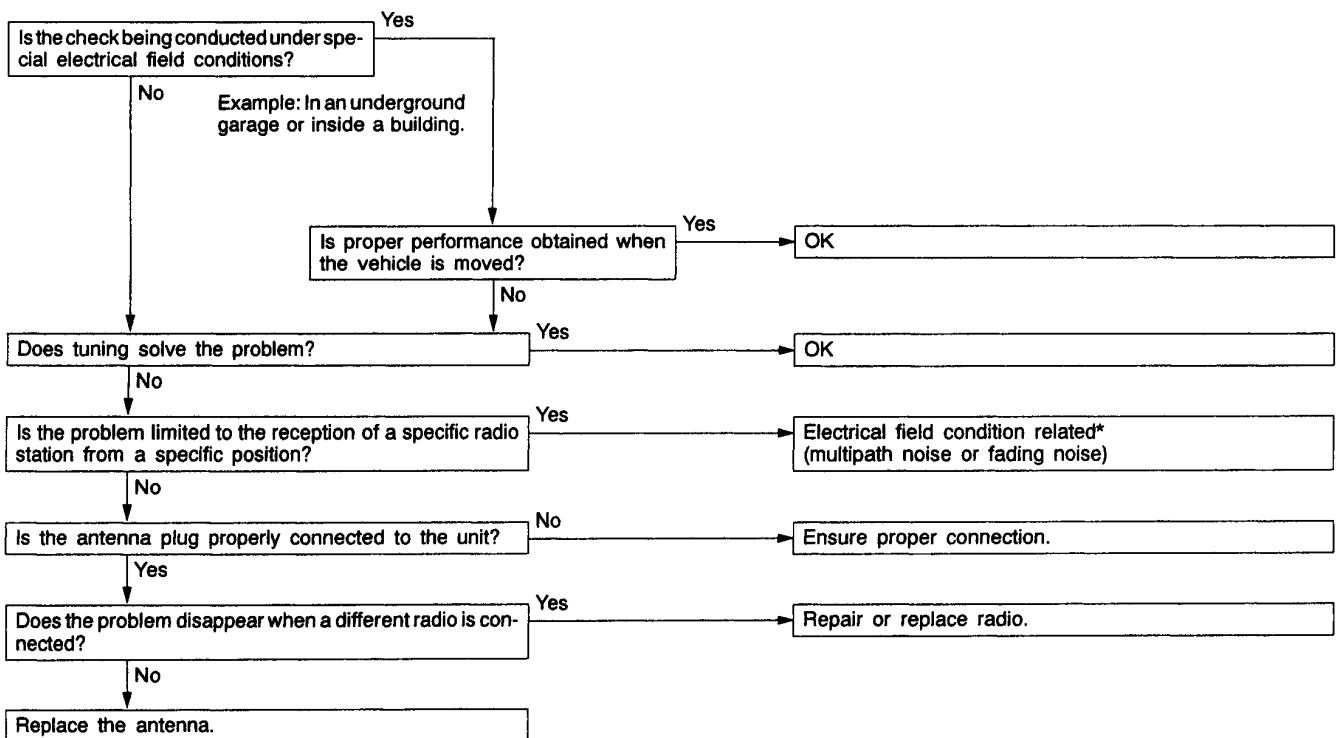
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

**B. RADIO****B-1 No power is supplied when the switch is set to ON.****B-2 No sound from one speaker.**

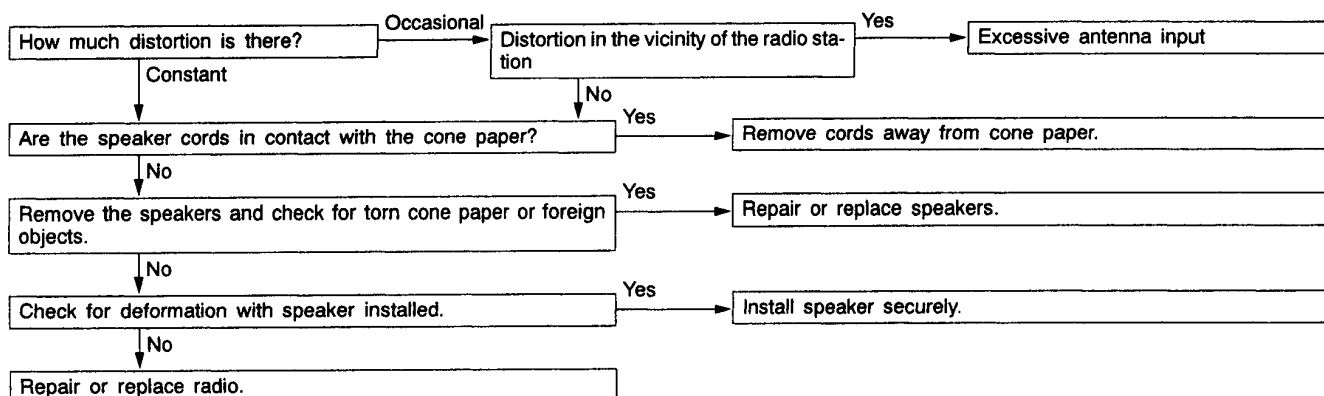
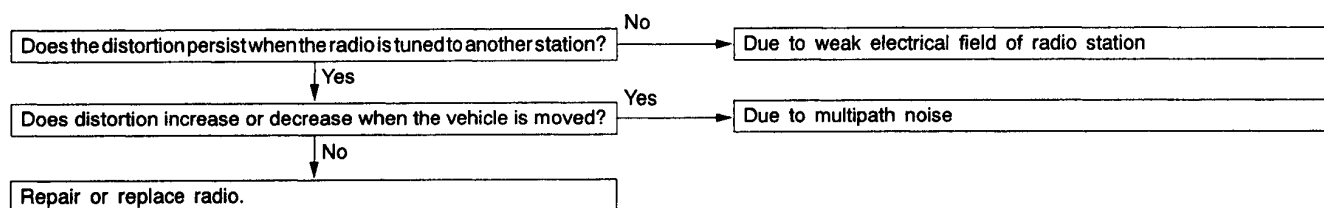
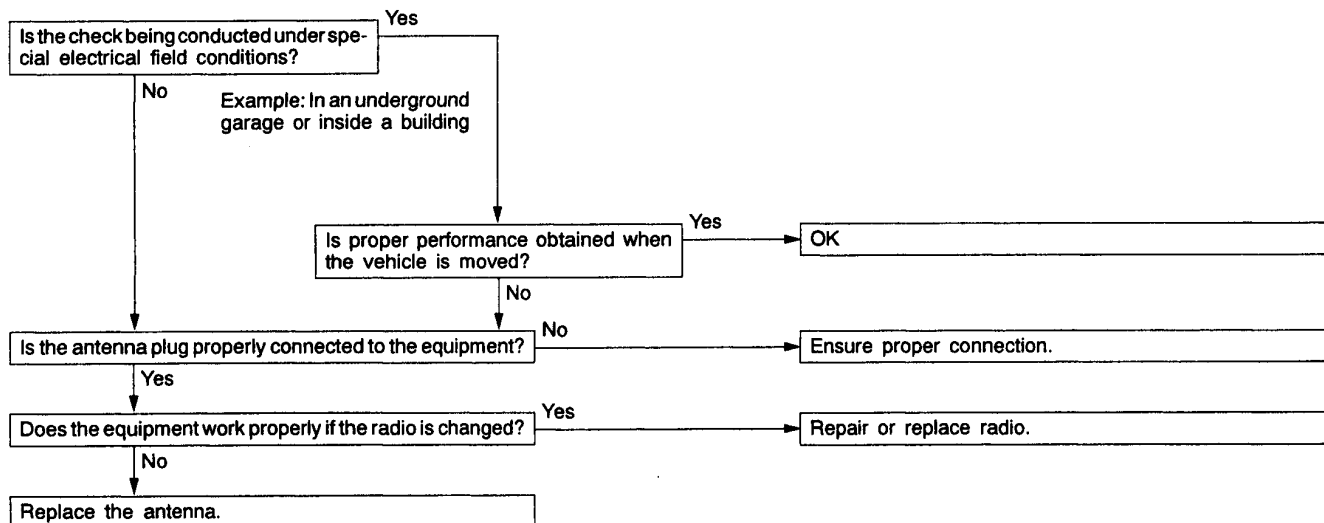
### B-3 There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.

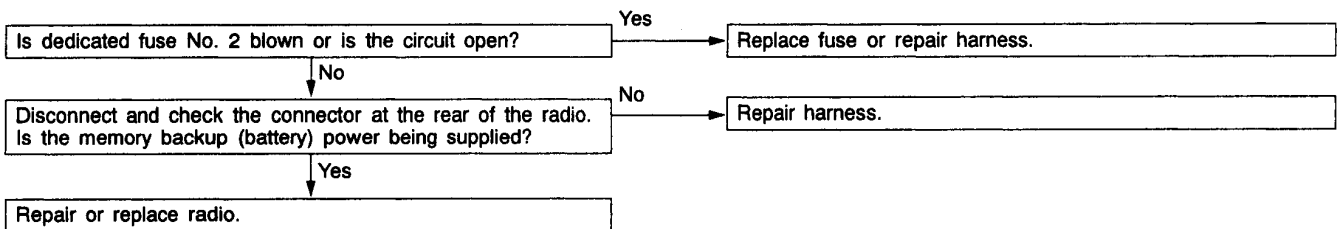
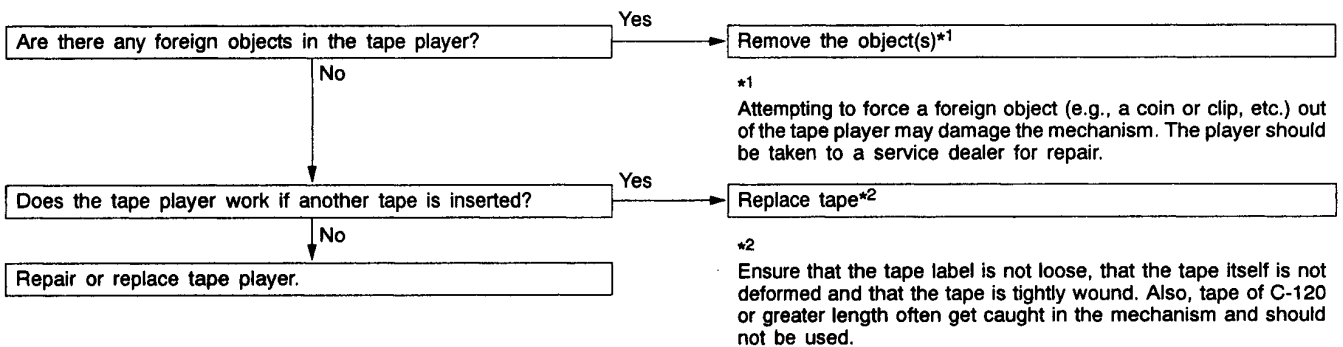
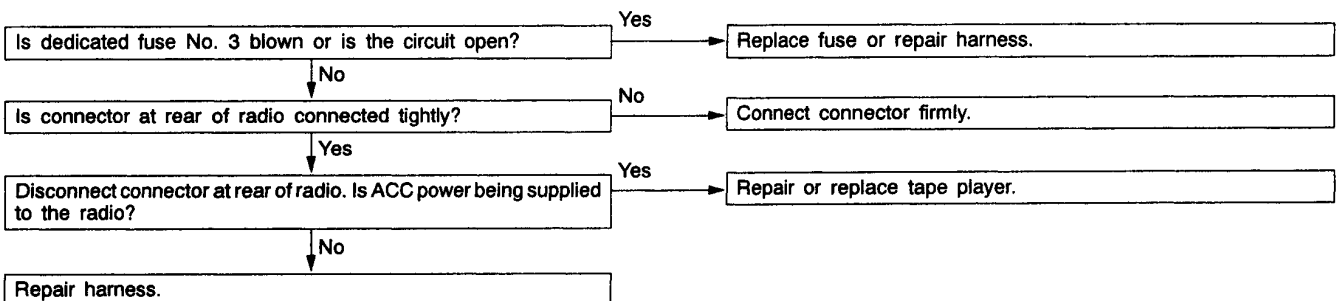


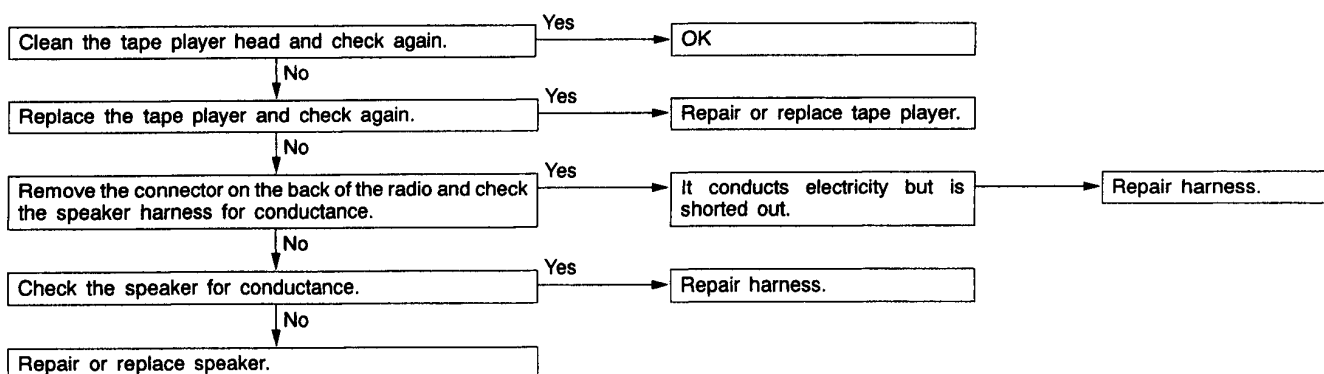
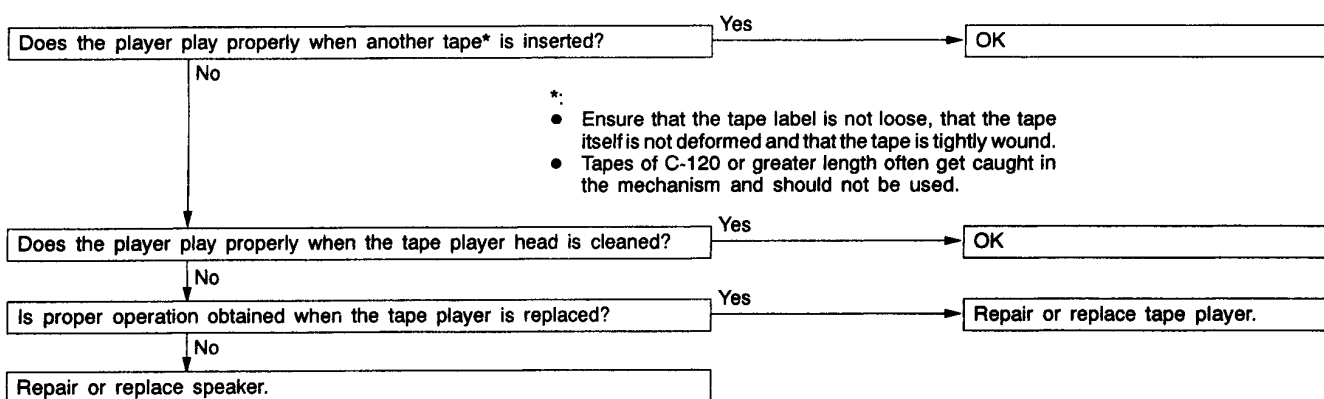
### B-4 Insufficient sensitivity.



\* For multipath noise and fading noise problems, refer to P. 54-55.

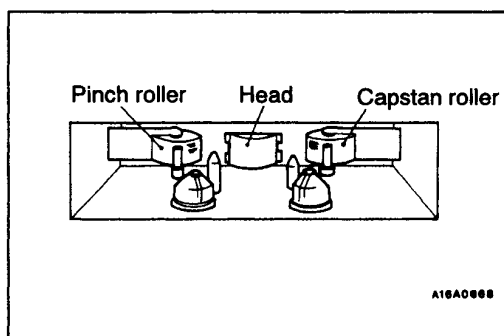
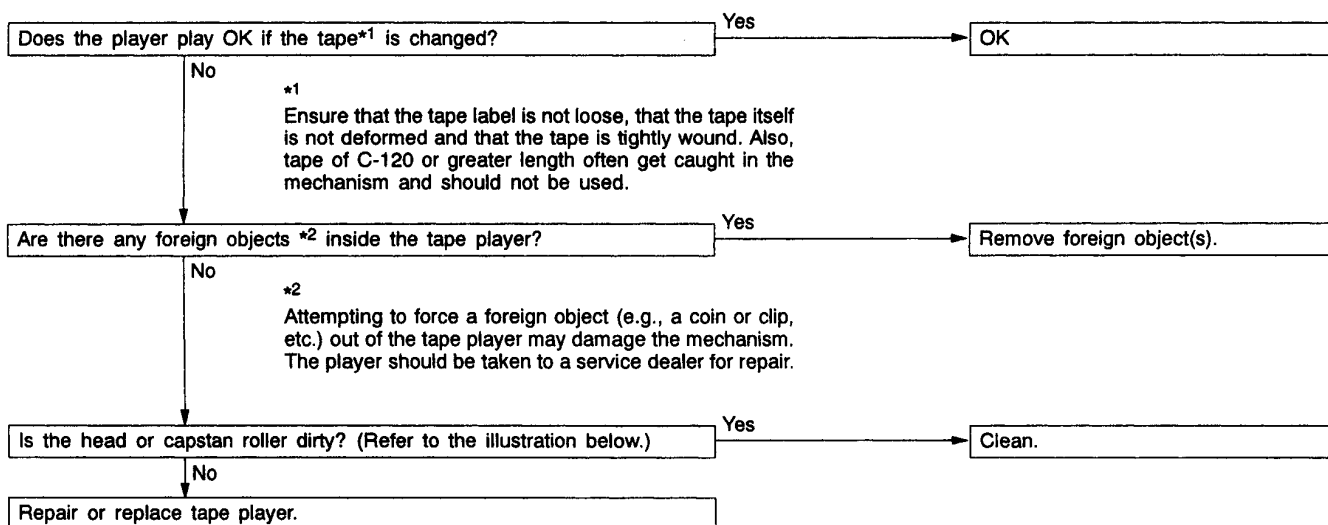
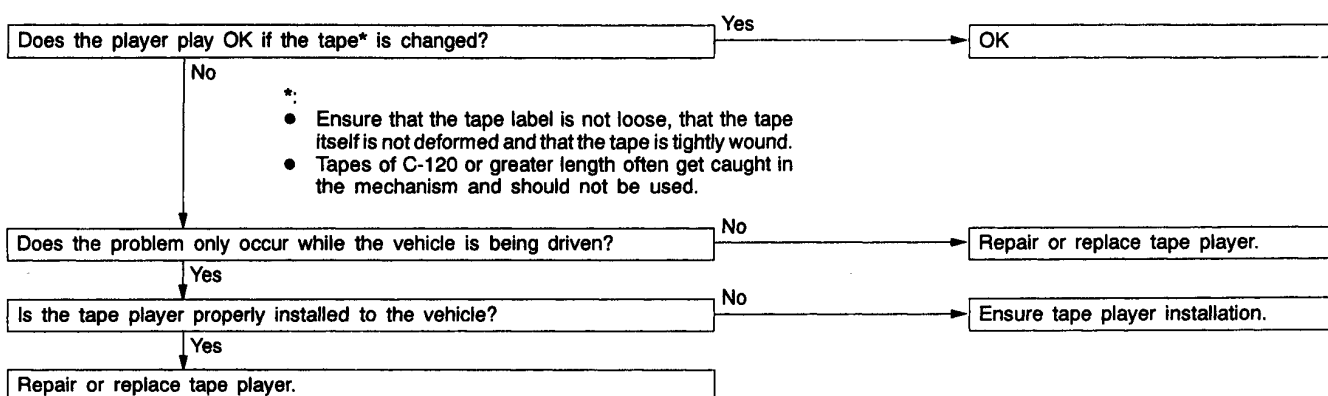
**B-5 Distortion on AM or on both AM and FM.****B-6 Distortion on FM only****B-7 Too few automatic select stations.**

**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 be ejected.**

The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are

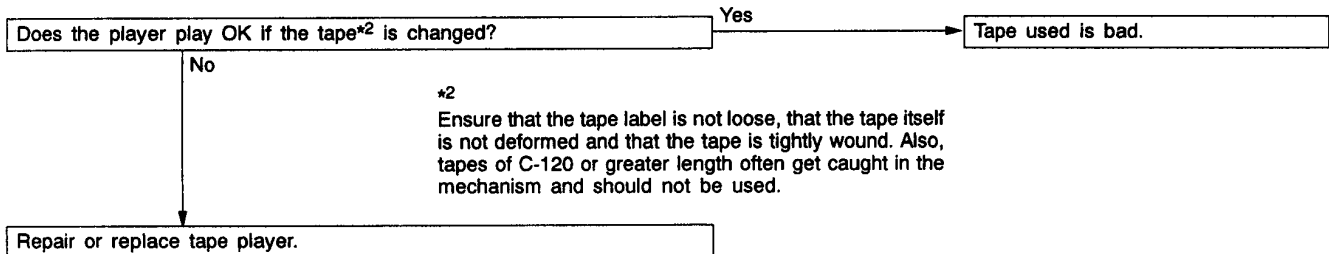
also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.

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

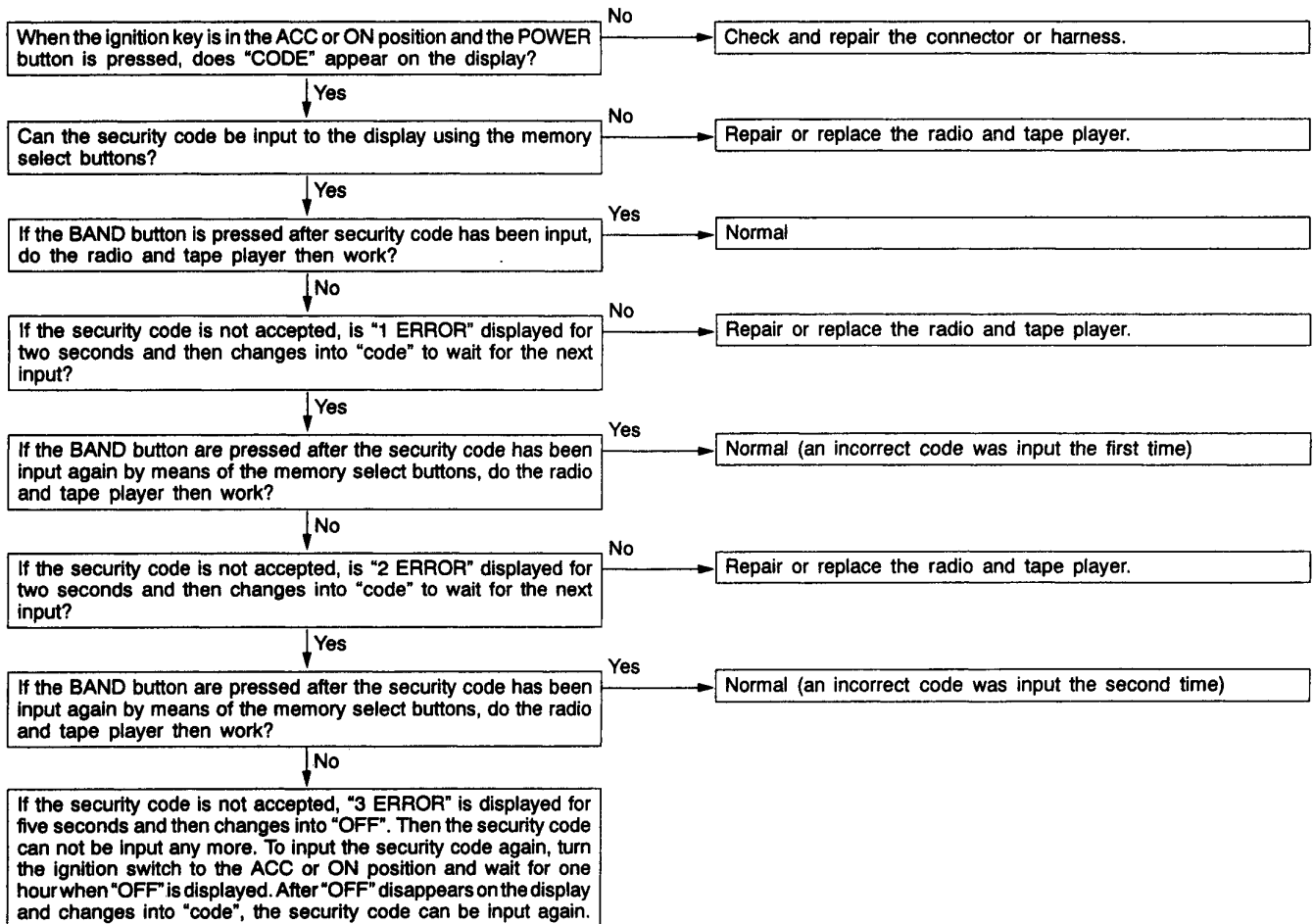


## RADIO AND TAPE PLAYER WITH ANTI-THEFT SYSTEM

54400430032

- 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. Problem with the anti-theft system can be found using the flow chart below.



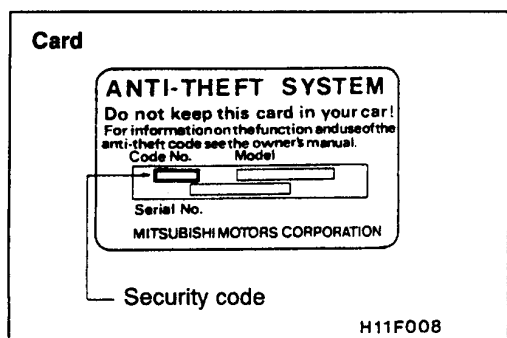
### PROCEDURE FOR INPUT OF SECURITY CODE FOR RADIO AND TAPE PLAYER WITH ANTI-THEFT SYSTEM

54400440035

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

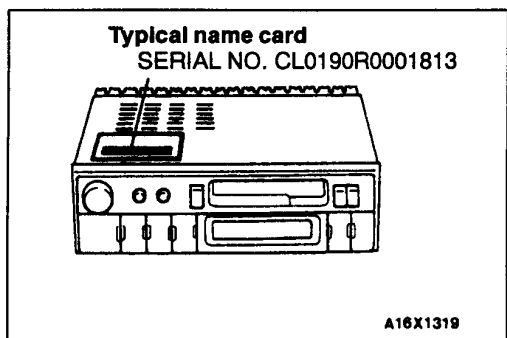
- Power supply to the radio and tape player has been suspended for more than an hour continuously by removing the cable from the battery terminal for disconnecting the harness connectors.
- The power supply to the radio and tape player has been suspended for more than an hour owing to blown fuse or discharged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

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



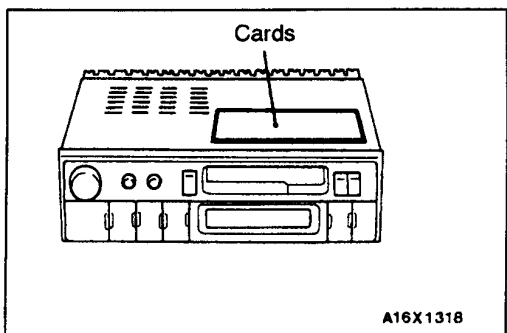
1. Using any of the following methods, confirm the security code.

- (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 card:

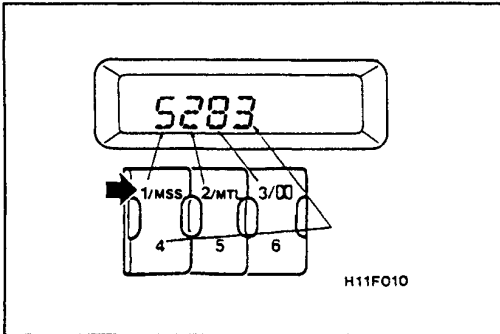
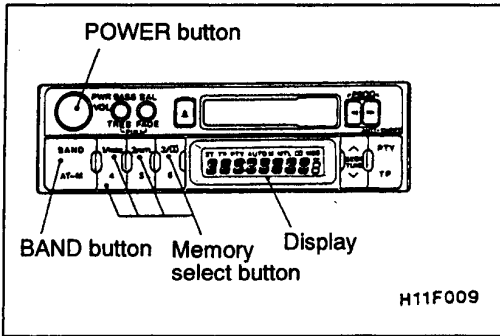
- a. Remove the radio and tape player, referring to P.54-73.
- b. Read the serial No. stamped on the radio and tape player.
- c. Look up the security code (anti-theft code table) corresponding to the serial number, or ask the authorized Mitsubishi dealer.



- (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 two cards to the user.

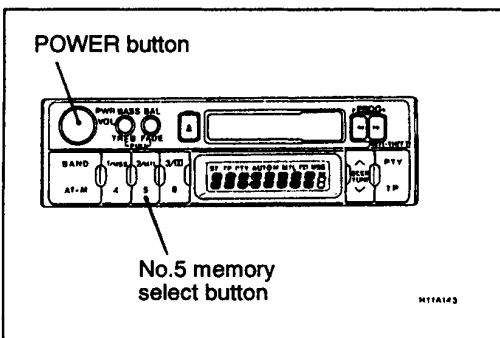


2. Return the power supply from the battery to the normal condition.
3. Turn the ignition key to the "ACC" or "ON" position.
4. Press the POWER button, and "CODE" will be displayed.

5. Press No.1 through No.4 memory select button to set the four-digit security code shown on the card. Every time each digit key is pressed, the figure changes as follows: 0→1→2.....9→0
6. Press the BAND button, and a beep will be heard and the radio and tape player will work.
7. If the security code is not accepted, "1 ERROR" is displayed. In a few minutes, it will change to "CODE". Then repeat the steps 5 and 6.

#### NOTE

- (1) If an incorrect security code is input, the anti-theft system will allow three attempts at most to input 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 work any more.
- (3) 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.



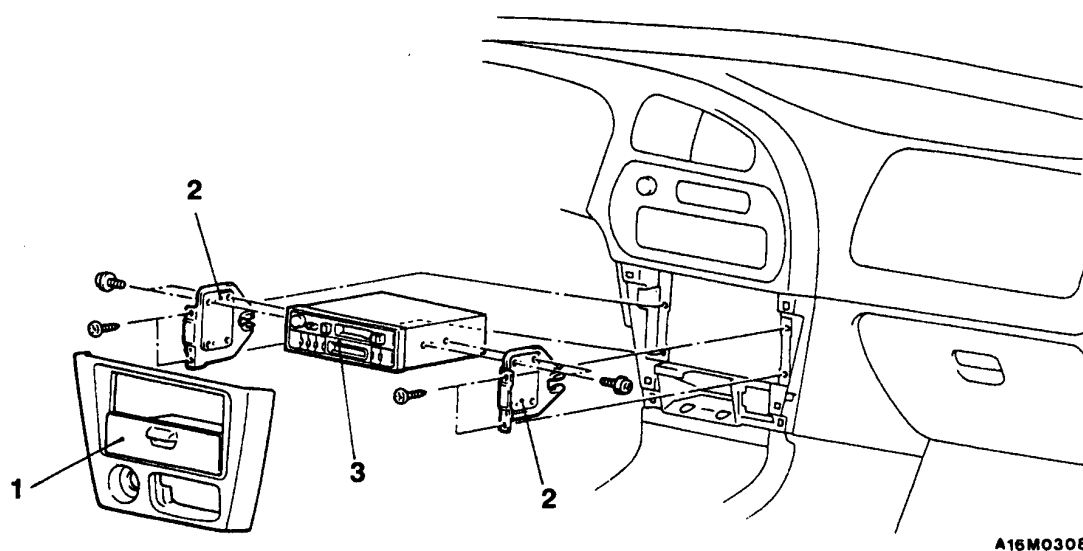
#### 5-minute operation mode

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. In five minutes the unit will not be able to work, and "CODE" will be displayed to indicate that the security code can be input again.

**RADIO AND TAPE PLAYER**

54400140041

**REMOVAL AND INSTALLATION****Removal steps**

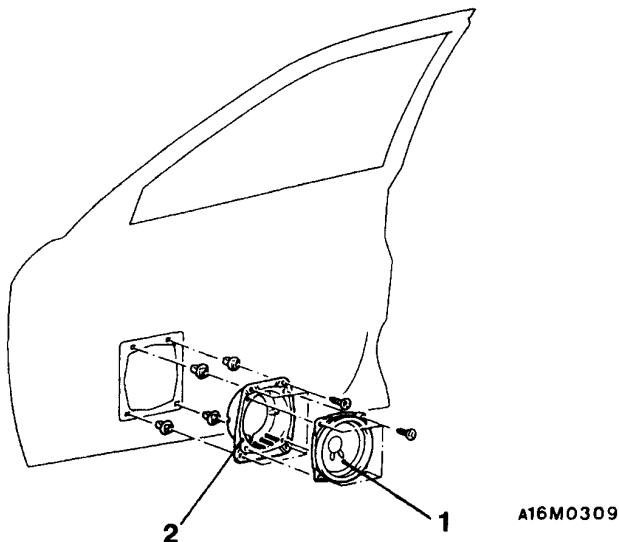
1. Audio panel
2. Radio bracket
3. Radio and tape player

# SPEAKER

54400260143

## REMOVAL AND INSTALLATION

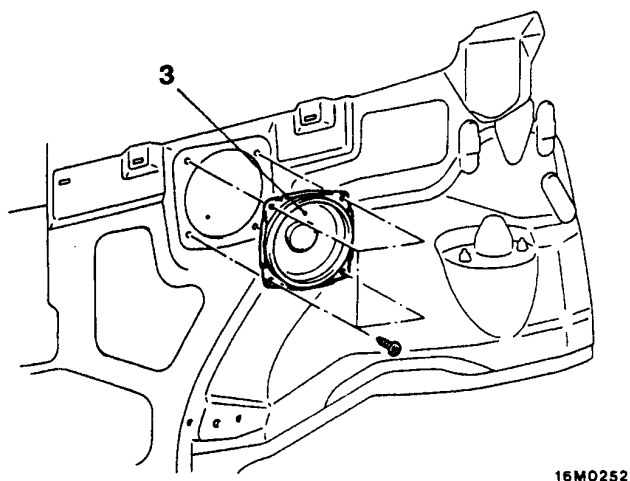
### <FRONT SPEAKER>



#### Removal steps

- Front door trim (Refer to GROUP 42.)
- 1. Front speaker
- 2. Speaker cover

### <REAR SPEAKER – HATCHBACK>

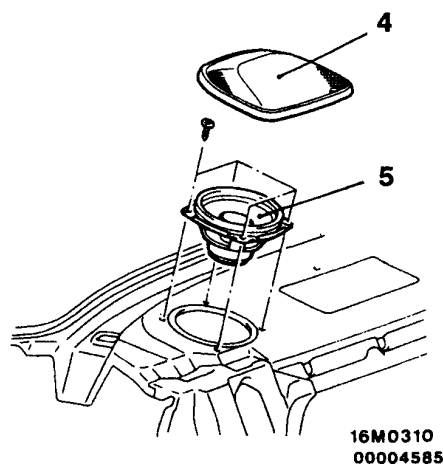


#### Removal steps

##### <Hatchback>

- Quarter trim (Refer to GROUP 52A – Trims.)
- 3. Rear speaker

### <REAR SPEAKER – SEDAN>



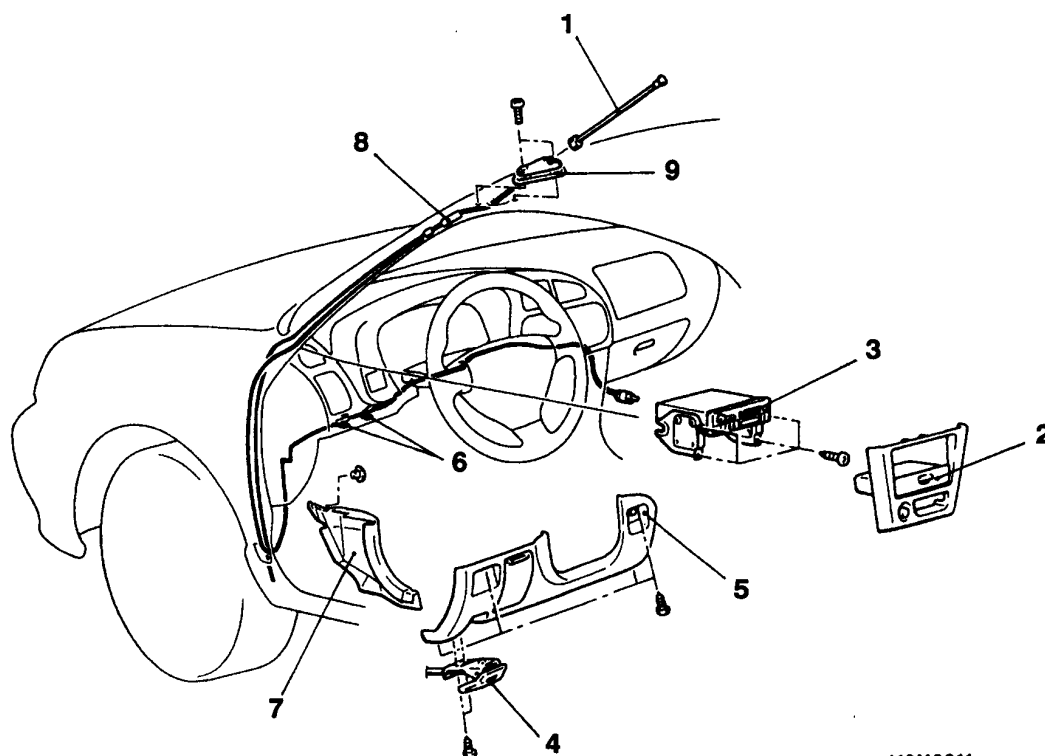
##### <Sedan>

- 4. Rear speaker garnish
- 5. Rear speaker

# ANTENNA

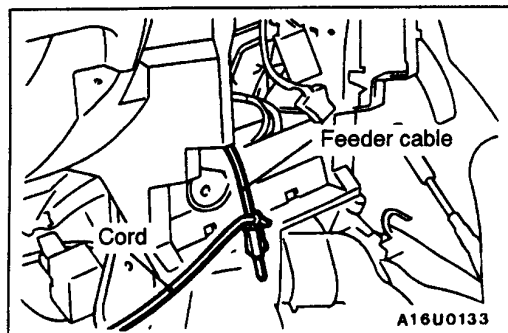
54400290098

## REMOVAL AND INSTALLATION



### Removal steps

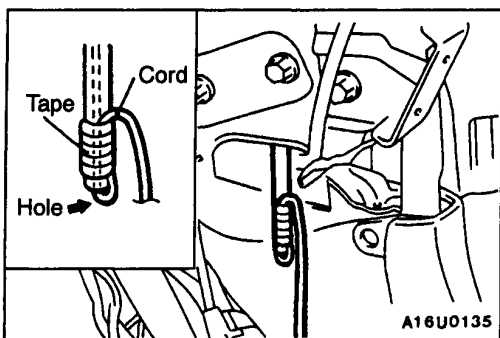
1. Antenna rod
2. Audio panel
3. Radio and tape player assembly
4. Hood lock release handle
5. Driver side lower cover
6. Clip
7. Cowl side trim
8. Antenna assembly
9. Antenna base gasket



### REMOVAL SERVICE POINT

#### ◀A▶ ANTENNA BASE REMOVAL

1. Tie a cord to the end of the feeder cable.

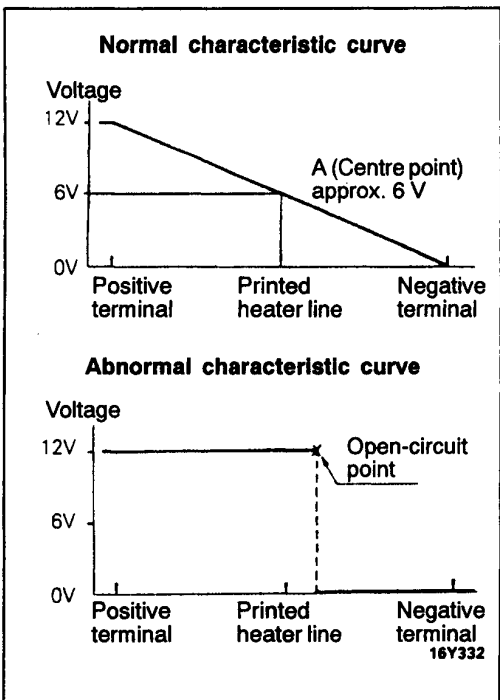


2. Pull out the antenna base until the end of the drain pipe can be seen.
3. Pass the cord through the hole in the end of the drain pipe and wrap it with vinyl tape.

**Caution**

**Wrap it securely so that the cord will not come off.**

4. Pull out the antenna base little by little to remove it.



## REAR WINDOW DEFOGGER

54300180033

### ON-VEHICLE SERVICE

#### PRINTED-HEATER LINE CHECK

1. Run engine at 2,000 r/min. Check heater element with battery at full.
2. Turn ON rear window defogger switch. Measure heater element voltage with circuit tester at rear window glass centre A.

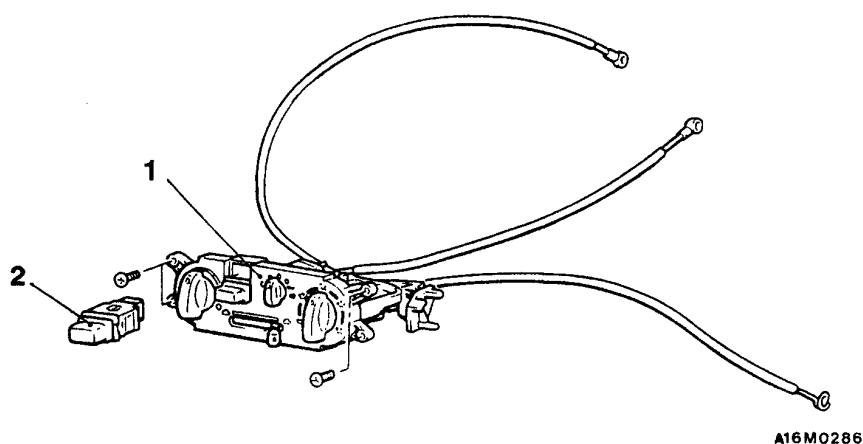
Condition is good if it indicates about 6V.

3. If 12 V is indicated at A, there is a break in the negative terminals from A.  
Move test bar slowly to negative terminal to detect where voltage changes suddenly (0V).
4. If 0 V is indicated at A, there is a break in the positive terminals from A. Defect where the voltage changes suddenly (12 V) in the same method described above.

## REAR WINDOW DEFOGGER SWITCH

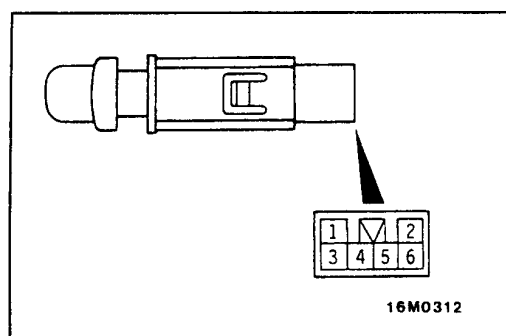
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## REMOVAL AND INSTALLATION



## Removal steps

1. Heater control assembly  
(Refer to GROUP 55.)
2. Rear window defogger switch

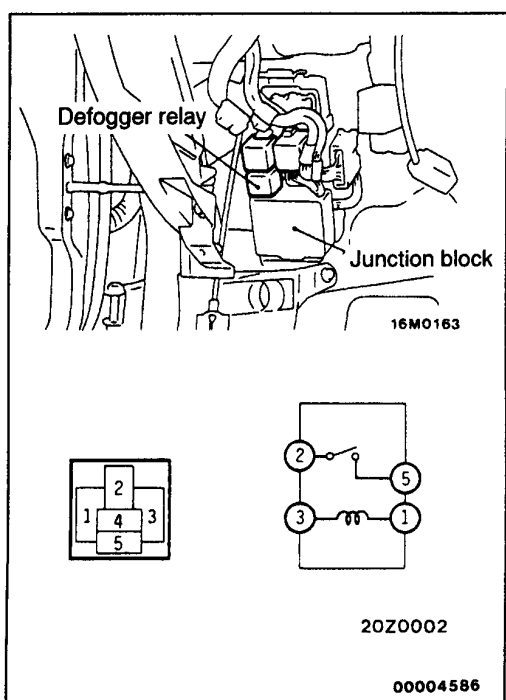


## INSPECTION

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## DEFOGGER SWITCH CONTINUITY CHECK

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



## REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

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