

# CHASSIS ELECTRICAL

## CONTENTS

<b>BATTERY</b> .....	<b>3</b>	<b>TROUBLESHOOTING</b> .....	<b>14</b>
<b>ON-VEHICLE SERVICE</b> .....	<b>3</b>	<b>ON-VEHICLE SERVICE</b> .....	<b>27</b>
Fluid Level and Specific Gravity Check .....	3	Speedometer Check .....	27
Battery Inspection .....	3	Tachometer Check .....	27
Battery Charging .....	4	Fuel Gauge Simple Check .....	28
Battery Testing Procedure .....	5	Fuel Gauge Unit Check .....	28
<b>IGNITION SWITCH</b> .....	<b>6</b>	Fuel Gauge Unit Float Height .....	28
<b>SPECIAL TOOLS</b> .....	<b>6</b>	Fuel Gauge Unit Resistance .....	28
<b>TROUBLESHOOTING</b> .....	<b>7</b>	Thermistor .....	29
<b>IGNITION SWITCH</b> .....	<b>11</b>	Engine Coolant Temperature Gauge Simple Check .....	29
Ignition Switch Continuity Check .....	12	Engine Coolant Temperature Gauge Unit Check .....	29
Key Reminder Switch, Key Hole Illumination Light Continuity Check .....	12	<b>COMBINATION METERS</b> .....	<b>31</b>
<b>COMBINATION METERS</b> .....	<b>13</b>	Vehicle Speed Sensor Check .....	32
<b>SERVICE SPECIFICATIONS</b> .....	<b>13</b>	Fuel Gauge Check .....	32
<b>SEALANT</b> .....	<b>13</b>	Engine Coolant Temperature Gauge Check .....	32
<b>SPECIAL TOOLS</b> .....	<b>13</b>		

**CONTINUED ON NEXT PAGE**

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

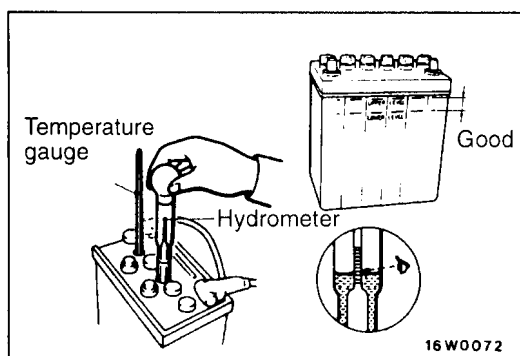
#### WARNING!

- (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) If it is possible that the SRS components are subjected to heat over 93°C baking or drying after painting, remove the SRS components (air bag module and SRS-ECU) beforehand.
- (3) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorised MITSUBISHI dealer.
- (4) 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

Section titles with the asterisk (\*) in the table of contents in each group indicate operations requiring warnings.

<b>CENTRE WARNING DISPLAY</b> .....	<b>34</b>	Taillamp Relay Continuity Check .....	62
<b>SPECIAL TOOLS</b> .....	34	<b>HIGH MOUNTED STOP LAMP</b> .....	<b>63</b>
<b>TROUBLESHOOTING</b> .....	34	<b>INTERIOR LAMP</b> .....	<b>64</b>
<b>CENTRE WARNING DISPLAY</b> .....	40	<b>SPECIAL TOOLS</b> .....	64
Clock Switch Continuity Check .....	40	<b>TROUBLESHOOTING</b> .....	64
<b>HEADLAMP, POSITION LAMP ASSEMBLY AND FRONT TURN SIGNAL LAMP ASSEMBLY</b> .....	<b>41</b>	<b>INTERIOR LAMP</b> .....	69
<b>SERVICE SPECIFICATIONS</b> .....	41	Room Lamp Switch Continuity Check .....	70
<b>SPECIAL TOOLS</b> .....	41	<b>RHEOSTAT</b> .....	<b>71</b>
<b>TROUBLESHOOTING</b> .....	41	<b>HAZARD WARNING LAMP SWITCH</b> .....	<b>72</b>
<b>ON-VEHICLE SERVICE</b> .....	48	<b>HORN</b> .....	<b>73</b>
Headlamp Aiming .....	48	<b>CIGARETTE LIGHTER</b> .....	<b>74</b>
Luminous Intensity Measurement .....	50	<b>ACCESSORY SOCKET</b> .....	<b>75</b>
<b>HEADLAMP, POSITION LAMP ASSEMBLY AND FRONT TURN SIGNAL LAMP ASSEMBLY</b> .....	<b>51</b>	<b>RADIO, TAPE PLAYER AND CD PLAYER</b> .....	<b>76</b>
Column Switch Continuity Check <Lighting Switch and Dimmer/Passing Switch> .....	52	<b>TROUBLESHOOTING</b> .....	76
Column Switch Continuity Check <Turn-Signal Light Switch> .....	52	<b>RADIO WITH TAPE PLAYER AND CD PLAYER</b> .....	98
Hazard Light Switch Continuity Check .....	52	<b>DOOR SPEAKER AND REAR SPEAKER</b> .....	<b>99</b>
Headlamp Relay Continuity Check .....	53	<b>ANTENNA</b> .....	<b>100</b>
Headlamp Bulb Replacement .....	53	<b>REAR WINDOW DEFOGGER</b> .....	<b>102</b>
Position Lamp Bulb Replacement .....	53	<b>ON-VEHICLE SERVICE</b> .....	102
<b>SIDE TURN SIGNAL LAMP</b> .....	<b>54</b>	Printed-heater Line Check .....	102
<b>FOG LAMP</b> .....	<b>55</b>	Printed-heater Line Repair .....	102
<b>SERVICE SPECIFICATIONS</b> .....	55	<b>REAR WINDOW DEFOGGER SWITCH</b> .....	<b>102</b>
<b>SPECIAL TOOLS</b> .....	55	<b>SIMPLIFIED WIRING SYSTEM (SWS)</b> .....	<b>104</b>
<b>TROUBLESHOOTING</b> .....	55	<b>SPECIAL TOOLS</b> .....	104
<b>ON-VEHICLE SERVICE</b> .....	58	<b>TROUBLESHOOTING</b> .....	104
Fog Lamp Aiming .....	58	<b>SIMPLIFIED WIRING SYSTEM (SWS)</b> ...	128
<b>FOG LAMP</b> .....	59		
Fog Lamp Switch Continuity Check .....	60		
Fog Lamp Relay Continuity Check .....	60		
<b>REAR COMBINATION LAMP AND REAR LID LAMP</b> .....	<b>61</b>		



## BATTERY

### ON-VEHICLE SERVICE

#### FLUID LEVEL AND SPECIFIC GRAVITY CHECK

1. Check the battery electrolyte level at regular intervals. Maintain the electrolyte at a level approximately 6 mm above the plate using mineral free water.
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.

$$D_{20} = D_t + 0.0007 (t - 20)$$

**D<sub>20</sub>: Specific gravity of the battery fluid calculated for 20°C.**

**D<sub>t</sub>: Actually measured specific gravity**

**t: Actually measured temperature**

#### BATTERY INSPECTION

Make sure ignition switch is in OFF position and all battery feed accessories are OFF.

1. Disconnect ground cable from battery before disconnecting (+) cable.
2. Remove battery from vehicle.

##### Caution

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

3. Inspect battery carrier for damage caused by loss of acid from battery. If acid damage is present, it will be necessary to clean area with a solution of clean warm water and baking soda. Scrub area with a stiff bristle brush and wipe off with a cloth moistened with ammonia or baking soda in water.
4. Clean top of battery with same solutions as described in step 3
5. Inspect battery case and cover for cracks. If cracks are present, battery must be replaced.
6. Clean the battery post with a suitable battery post cleaning tool.
7. Clean the inside surfaces of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
8. Install the battery in vehicle.
9. Connect (+) and (–) cables to battery in the order of mention.
10. Tighten the clamp nut securely.

**BATTERY CHARGING****Caution**

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

Keep all open flames away from the battery.

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

**CHARGE RATE**

If the battery specific gravity is below 1.220, the battery should be charged as outlined below.

When the battery fluid specific gravity reaches 1.250–1.290 and the constant is maintained for more than an hour, charging should be stopped.

**NOTE**

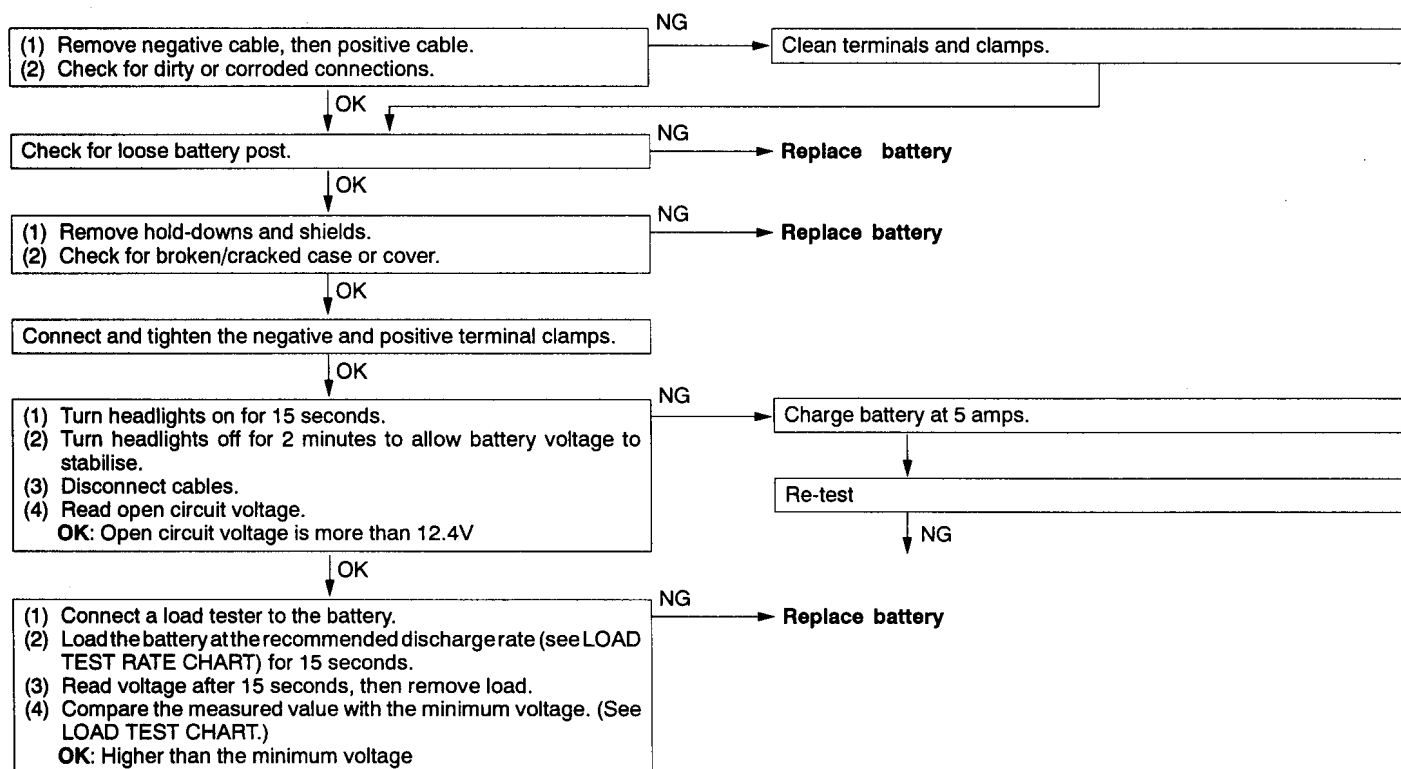
If the battery is charged, the battery should be replaced; do not overcharge

**Charge Rate Chart**

Battery	12V 13 plate, 520 CCA
Slow charging	5 amps 15 hrs.
	10 amps 7.5 hrs.
Fast charging	20 amps 3.75 hrs.
	30 amps 2.5 hrs

## BATTERY TESTING PROCEDURE

### TEST STEP



### LOAD TEST CHART

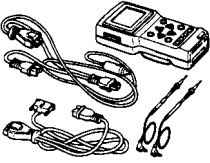
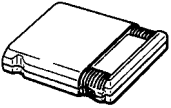
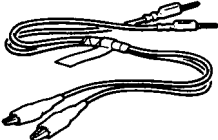
Temperature °C	21 and above	16	10	4	-1	-7	-12	-18
Minimum voltage	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

### LOAD TEST RATE CHART

	China	Except China
Load test (AMPS)	240 amps	←
Cranking rating (0°F)	520 amps	420 amps
Reserve capacity	95 minutes	←
Application	57 NAS	57 HEE

# IGNITION SWITCH

## SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

##### SWS SIMPLIFIED FAULT DIAGNOSIS MODE

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS-ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

##### SWS DIAGNOSIS CODE CLASSIFICATION TABLE

Refer to P.54-107.

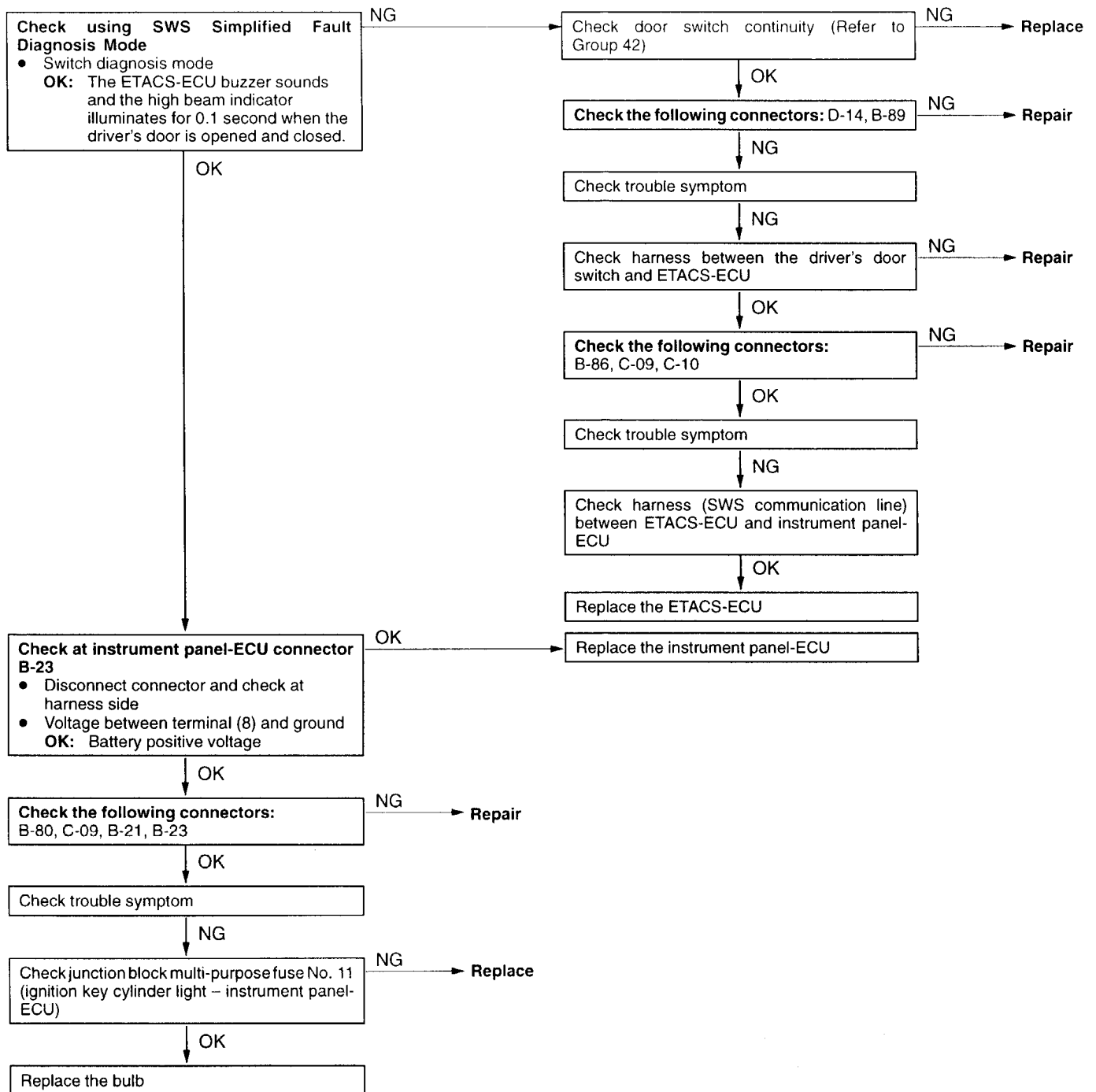
### INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-118)	
Switching to SWS Simplified Fault Diagnosis mode not possible.		
The ignition key cylinder light does not illuminate when the drivers door is opened with the ignition OFF.	1	54-8
The warning buzzer does not sound when the drivers door is opened with the ignition key inserted.	2	54-9
When the warning buzzer is sounding, it does not stop when the ignition key is turned to ACC position.	3	54-10
When the warning buzzer is sounding, turning the ignition key to ST position or removing the key does not stop the buzzer.	4	54-10

# INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

## INSPECTION PROCEDURE 1

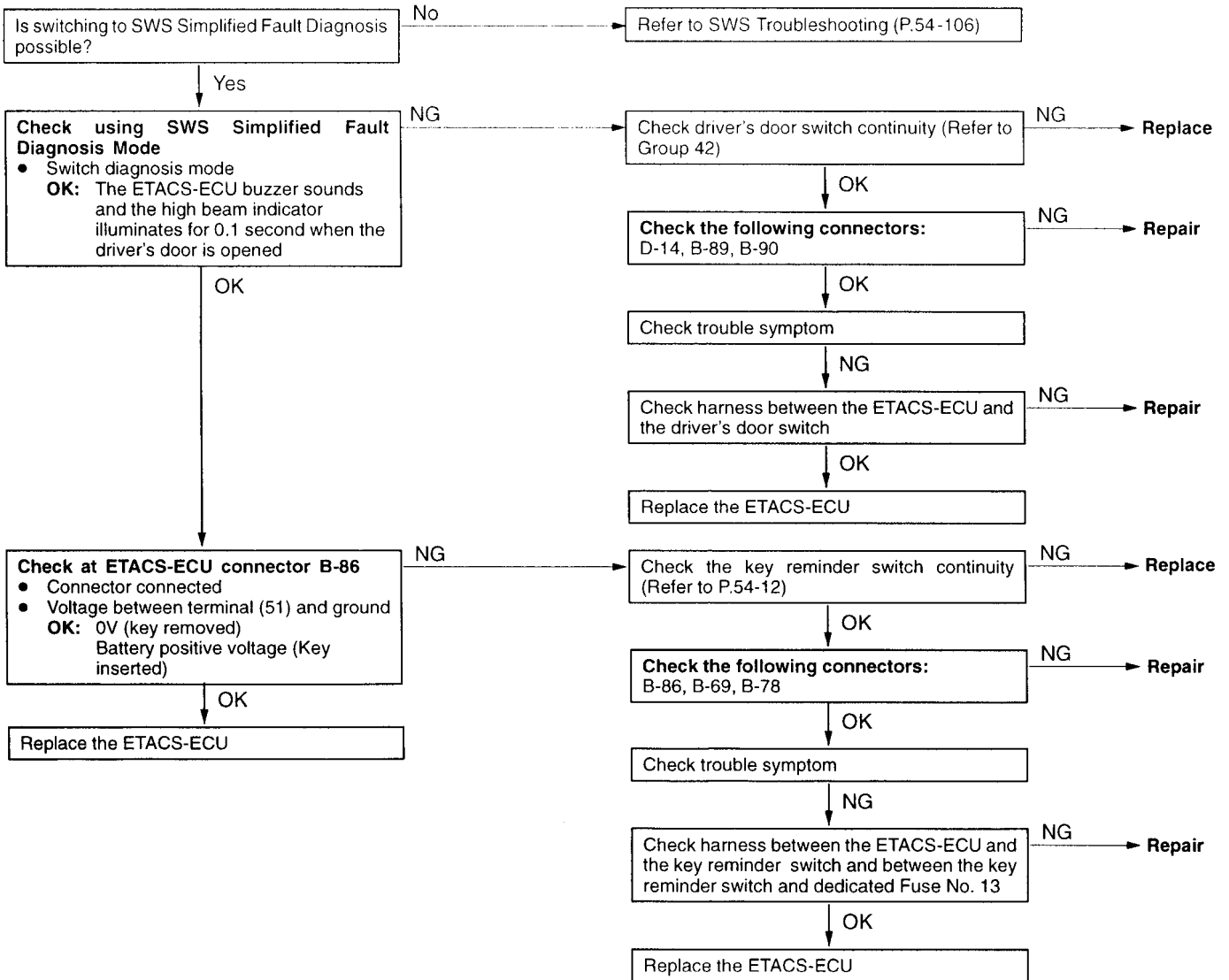
The ignition key cylinder light does not illuminate when the driver's door is opened with the ignition OFF	Probable cause
The door switch input signal circuit, instrument panel-ECU, illumination light circuit or a harness or connector may be defective.	<ul style="list-style-type: none"> <li>• Door switch defective</li> <li>• Harness or connector defective</li> <li>• ETACS-ECU or instrument panel-ECU malfunction</li> <li>• Defective bulb</li> </ul>





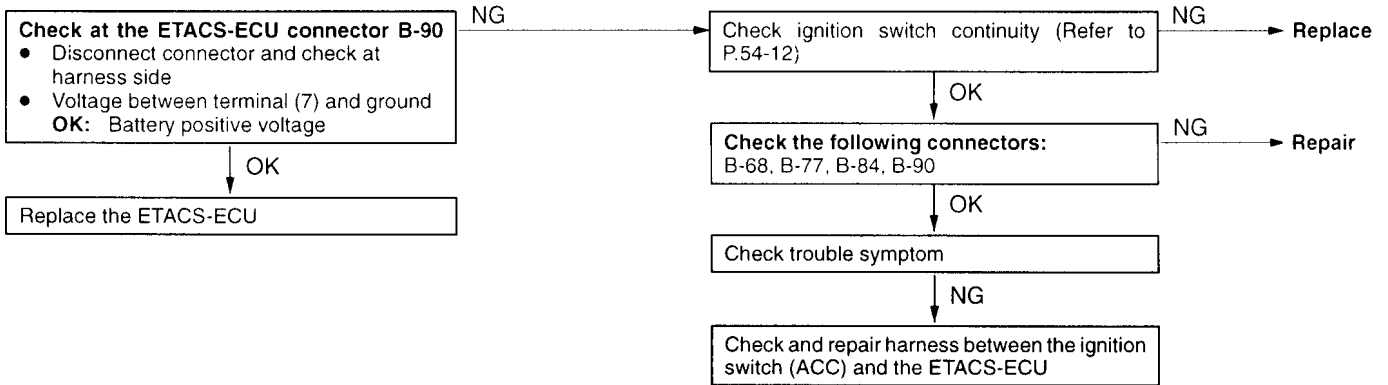
**INSPECTION PROCEDURE 2**

<p><b>The warning buzzer does not sound when the driver's door is opened with the ignition key inserted</b></p>	<p><b>Probable cause</b></p>
<p>The door switch input circuit system or key reminder switch input system may be defective.</p>	<ul style="list-style-type: none"> <li>• Door switch defective</li> <li>• Key reminder switch malfunction</li> <li>• Harness or connector defective</li> <li>• ETACS-ECU (buzzer) malfunction</li> </ul>



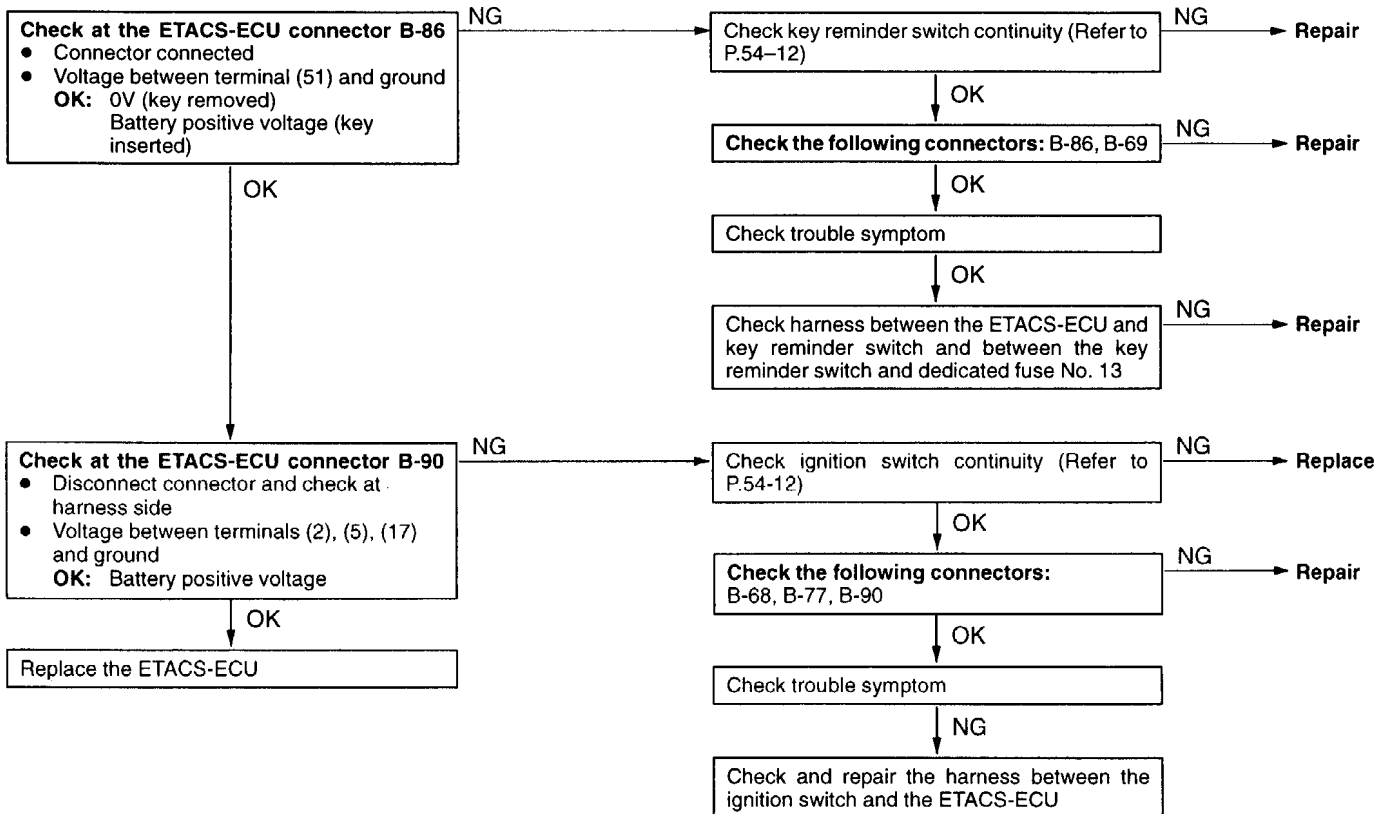
**INSPECTION PROCEDURE 3**

When the warning buzzer is sounding, it does not stop when the ignition key is turned to the ACC position	Probable cause
The ACC input circuit system may be defective	<ul style="list-style-type: none"> <li>• Harness or connector defective</li> <li>• Defective bulb</li> </ul>



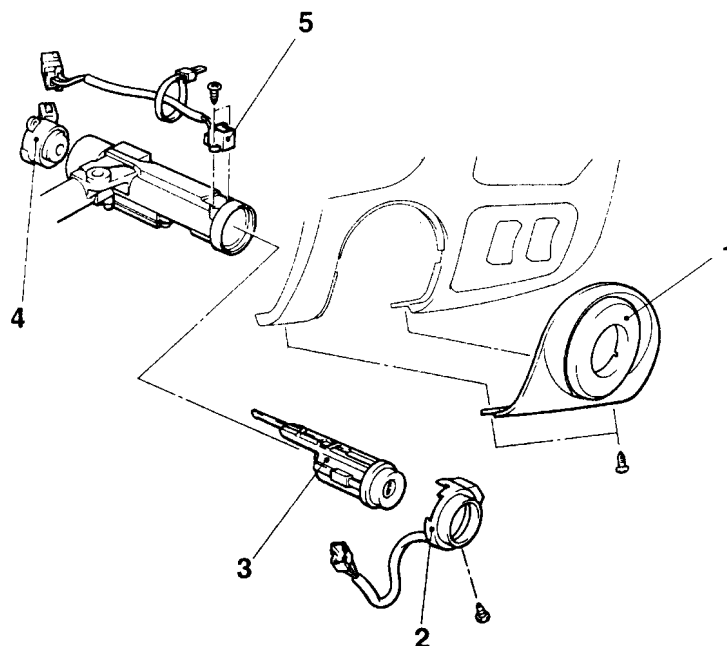
**INSPECTION PROCEDURE 4**

When the buzzer is sounding, turning the ignition key to ST position or removing the ignition key does not stop the buzzer	Probable cause
The ignition switch input system or key reminder input system may be defective.	<ul style="list-style-type: none"> <li>• ETACS-ECU malfunction</li> <li>• Key reminder switch malfunction</li> <li>• Harness or connector defective</li> </ul>



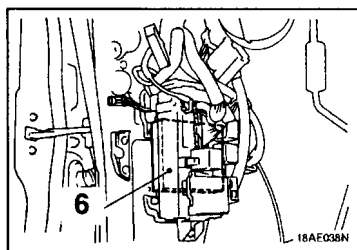
# IGNITION SWITCH

## REMOVAL AND INSTALLATION

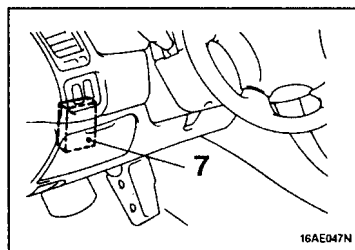


16P0232

16AE048N



16AE038N



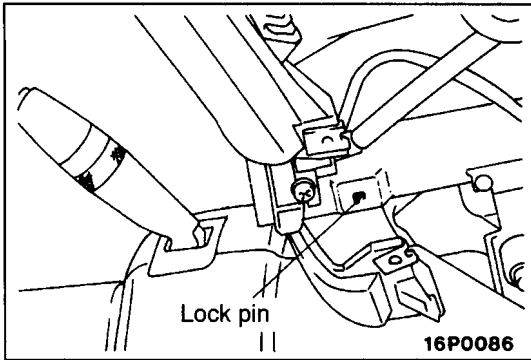
16AE047N

### Steering lock cylinder and ignition switch removal steps

- Instrument lower cover (driver) (Refer to Group 52A – Instrument Panel).
- 1. Key cylinder panel
- 2. Keyhole lighting ring



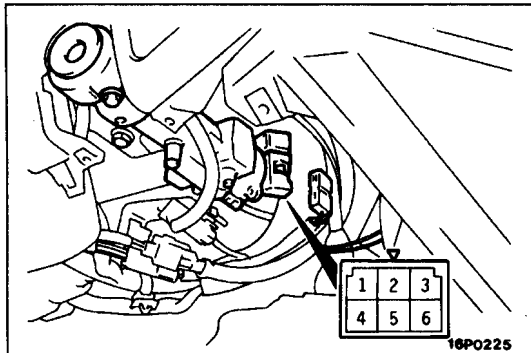
- 3. Steering lock cylinder
- 4. Ignition switch
- 5. Key reminder switch
- 6. ETACS-ECU (Refer to P.54-128)
- 7. Instrument panel ECU (Refer to P.54-128)



**REMOVAL SERVICE POINT**

**◀A▶ STEERING LOCK CYLINDER REMOVAL**

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

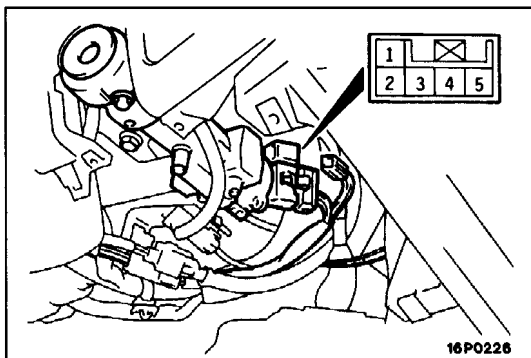


**INSPECTION**

**IGNITION SWITCH CONTINUITY CHECK**

1. Remove the instrument under cover. (Refer to Group 52A-Instrument Panel).
2. Disconnect the wiring connector from the ignition switch and connect an ohmmeter to the switch side connector.
3. Operate the ignition switch and check the continuity.

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



**KEY REMINDER SWITCH, KEY HOLE ILLUMINATION LIGHT CONTINUITY CHECK**

1. Remove the instrument undercover (Refer to Group 52A-Instrument Panel).
2. Disconnect the wiring connector from the key reminder switch and connect an ohmmeter to the switch side connector.
3. Check the continuity when the ignition key is pulled out of and inserted into the steering lock cylinder.

Ignition key	Terminal No.	
	Key reminder switch	
	2	5
Removed	○	○
Inserted		

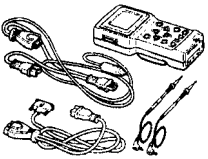

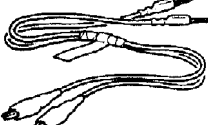
**COMBINATION METERS****SERVICE SPECIFICATIONS**

Items		Standard values
Speedometer indication error km/h	40	40–48
	80	80–92
	120	120–136
	160	160–180
Tachometer indication error r/min	1,000	±100
	3,000	±225
	5,000	±350
	6,000	±400
Fuel gauge unit resistance $\Omega$	Float point "F"	4±1
	Float point "E"	107±1
Fuel gauge unit float height mm	A (Float point "F")	0±3
	B (Float point "E")	144±3
Fuel gauge resistance $\Omega$	Power supply and ground	256±13
	Power supply and fuel gauge	106±5
	Fuel gauge and ground	150±8
Engine coolant temperature gauge unit resistance [at 70°C] $\Omega$		104±13.5

**SEALANT**

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

**SPECIAL TOOLS**

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic testing
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic testing

## **TROUBLESHOOTING**

### **STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING**

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

#### **DIAGNOSIS FUNCTION**

##### **DIAGNOSIS CODES CHECK**

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

##### **SWS SIMPLIFIED FAULT DIAGNOSTIC MODE**

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

##### **SWS DIAGNOSTIC TROUBLE CODE CLASSIFICATION TABLE**

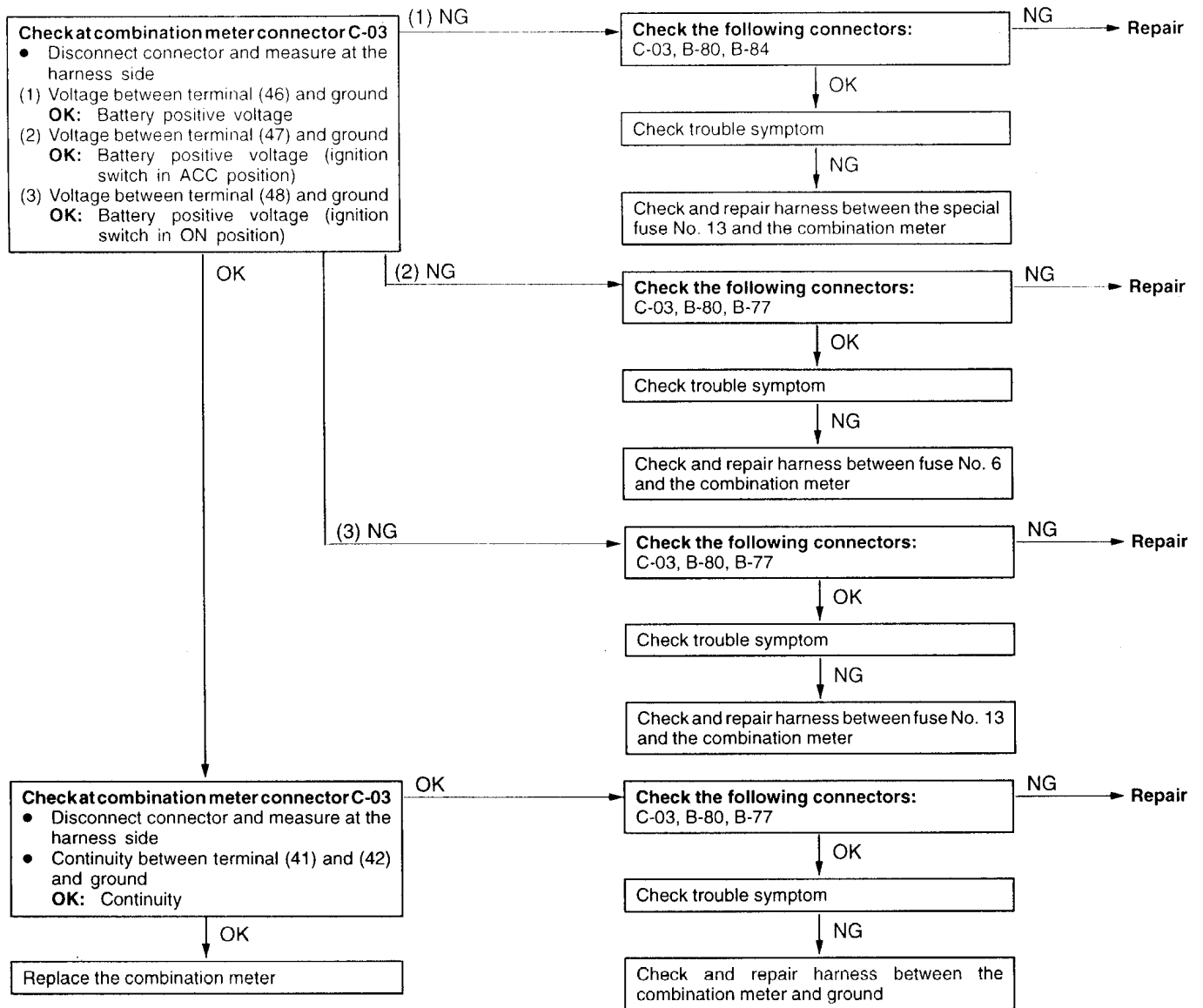
Refer to Simplified Wiring System P.54-107.

**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-104)	
Switching to SWS Simplified Fault Diagnosis mode not possible		
Nothing is displayed on the combination meter when the ignition is switched ON	1	54-16
Speedometer does not operate	2	54-17
Tachometer does not operate	3	54-17
Warning and indicator lamps do not illuminate when the ignition is switched ON (centre display warning lights operate normally)	4	54-18
The shift position indicator lamp does not illuminate	5	54-19
The seat belt warning lamp either does not illuminate or does not go off	6	54-20
The door open warning lamp either does not illuminate or does not go off	7	54-21
The high beam indicator lamp either does not illuminate or does not go off	8	54-22
The brake warning lamp either does not illuminate or does not go off	9	54-23
The check engine lamp either does not illuminate or does not go out	10	54-24
Vehicle speed sensor circuit check	11	54-26

INSPECTION PROCEDURE 1

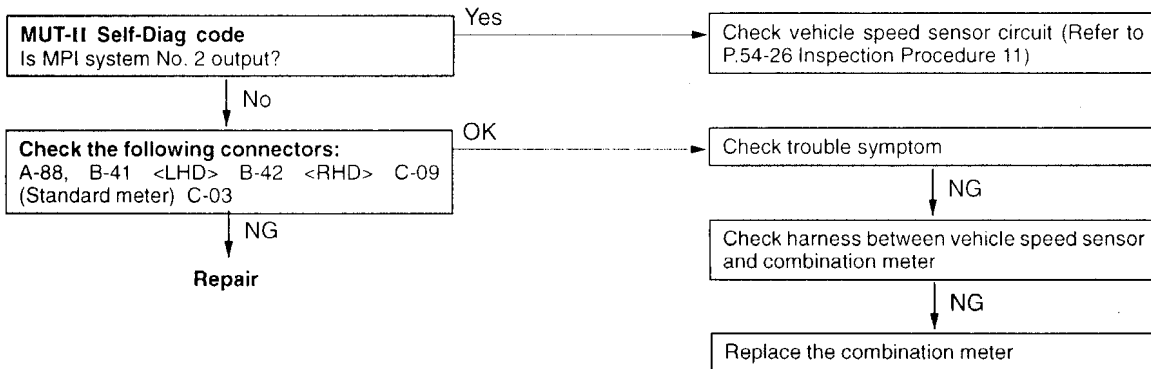
Nothing is displayed on the combination meter when the ignition is switched ON <High Contrast Meter>	Probable cause
The combination meter power or ground circuit(s) may be defective	<ul style="list-style-type: none"> <li>• Harness or connector defective</li> <li>• Combination meter malfunction</li> </ul>





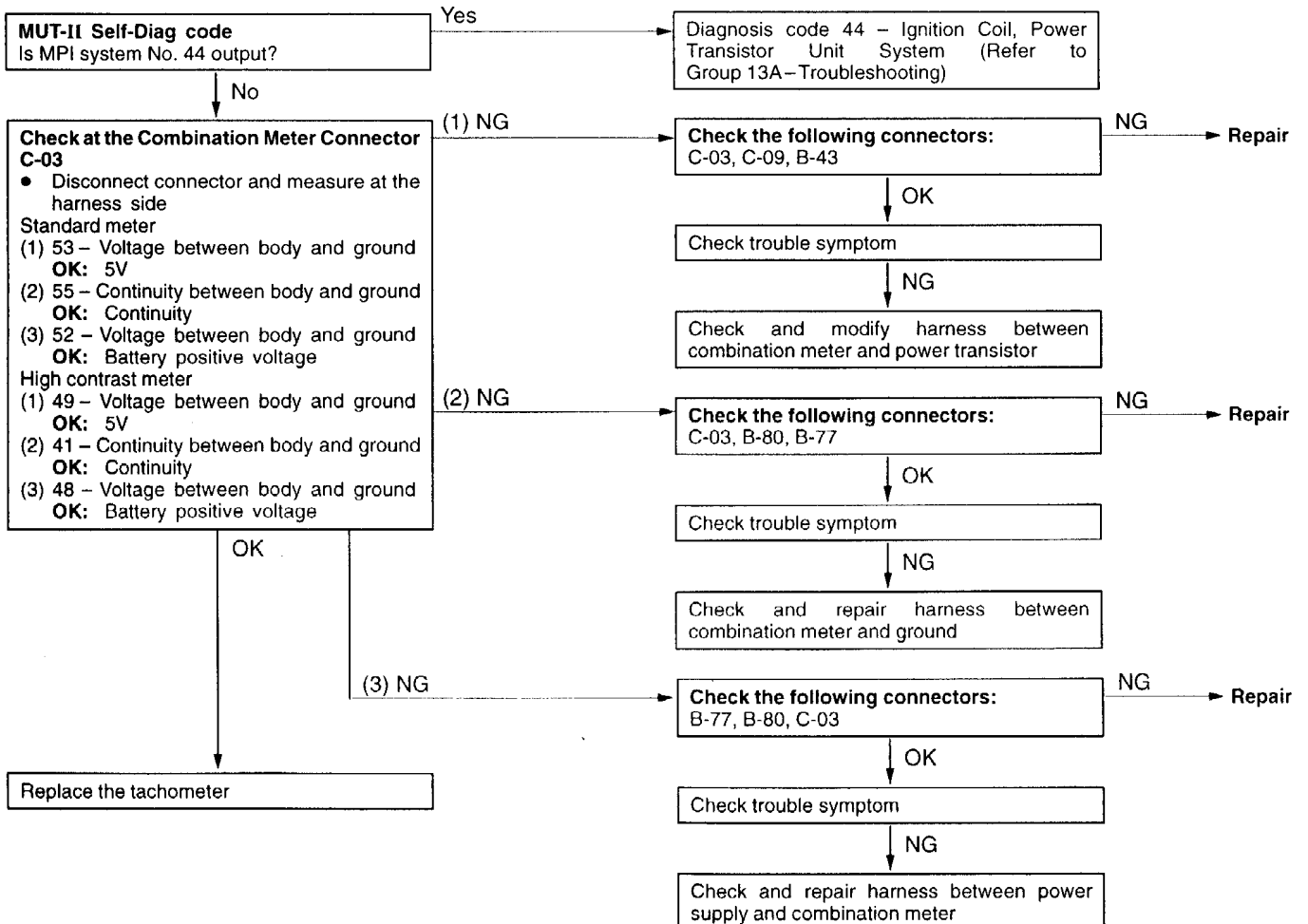
**INSPECTION PROCEDURE 2**

Speedometer does not operate	Probable cause
Vehicle speed sensor input system defective	<ul style="list-style-type: none"> <li>• Vehicle speed sensor defective</li> <li>• Harness or connector defective</li> <li>• Combination meter malfunction</li> </ul>



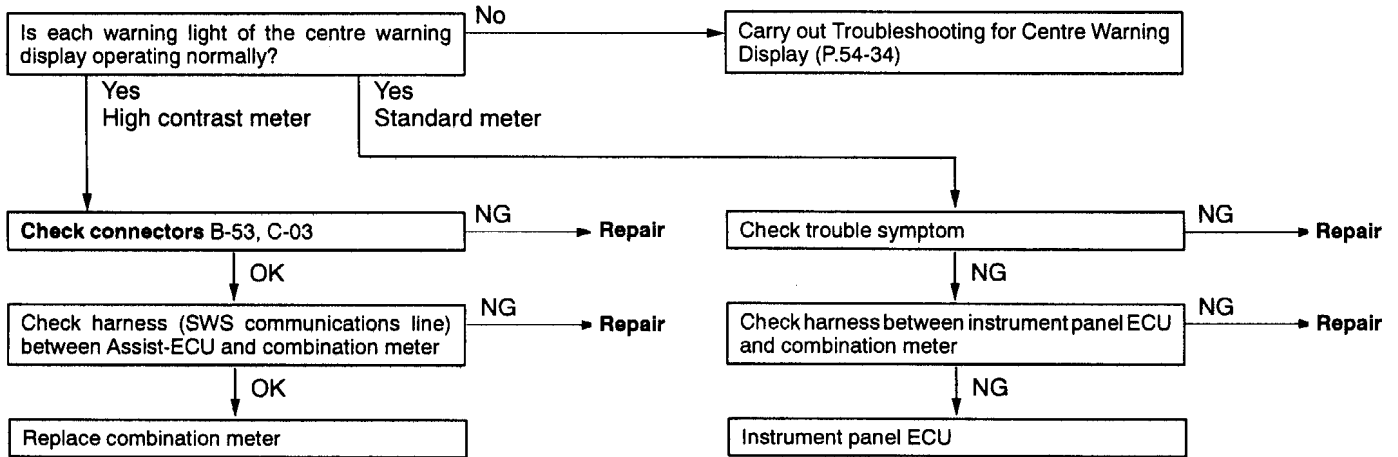
**INSPECTION PROCEDURE 3**

Tachometer does not operate	Probable cause
The problem could be meter power supply failure or earth circuit failure.	<ul style="list-style-type: none"> <li>• Tachometer malfunction</li> <li>• Harness or connector defective</li> </ul>



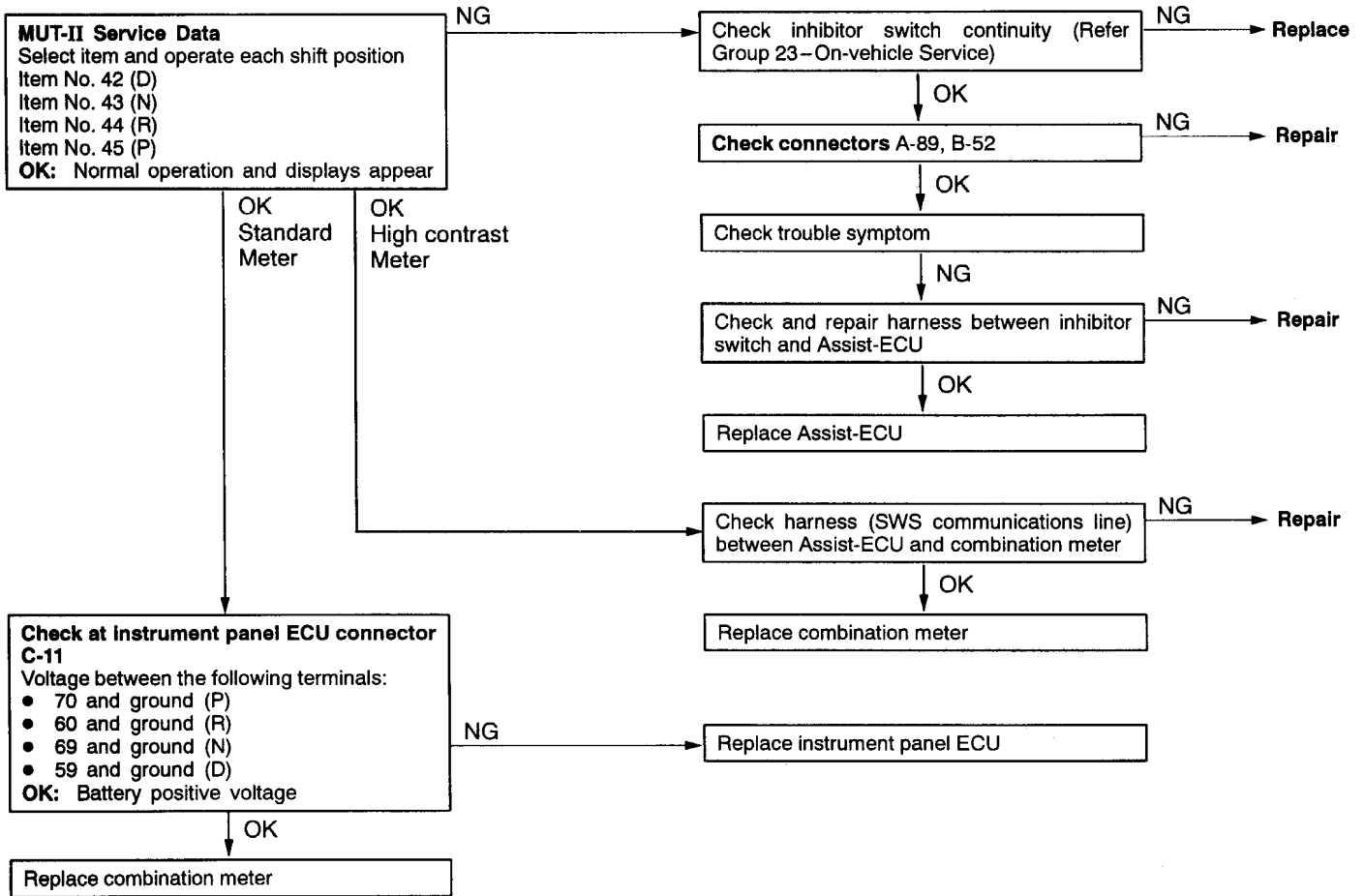
INSPECTION PROCEDURE 4

Warning and indicator lamps do not illuminate when the ignition is switched ON (centre display warning lamps operate normally)	Probable cause
The harness between the Assist-ECU and the combination meter (SWS communication line) or the combination meter itself may be defective	<ul style="list-style-type: none"> <li>● Combination meter malfunction</li> <li>● Harness or connector defective</li> <li>● Assist-ECU malfunction</li> </ul>



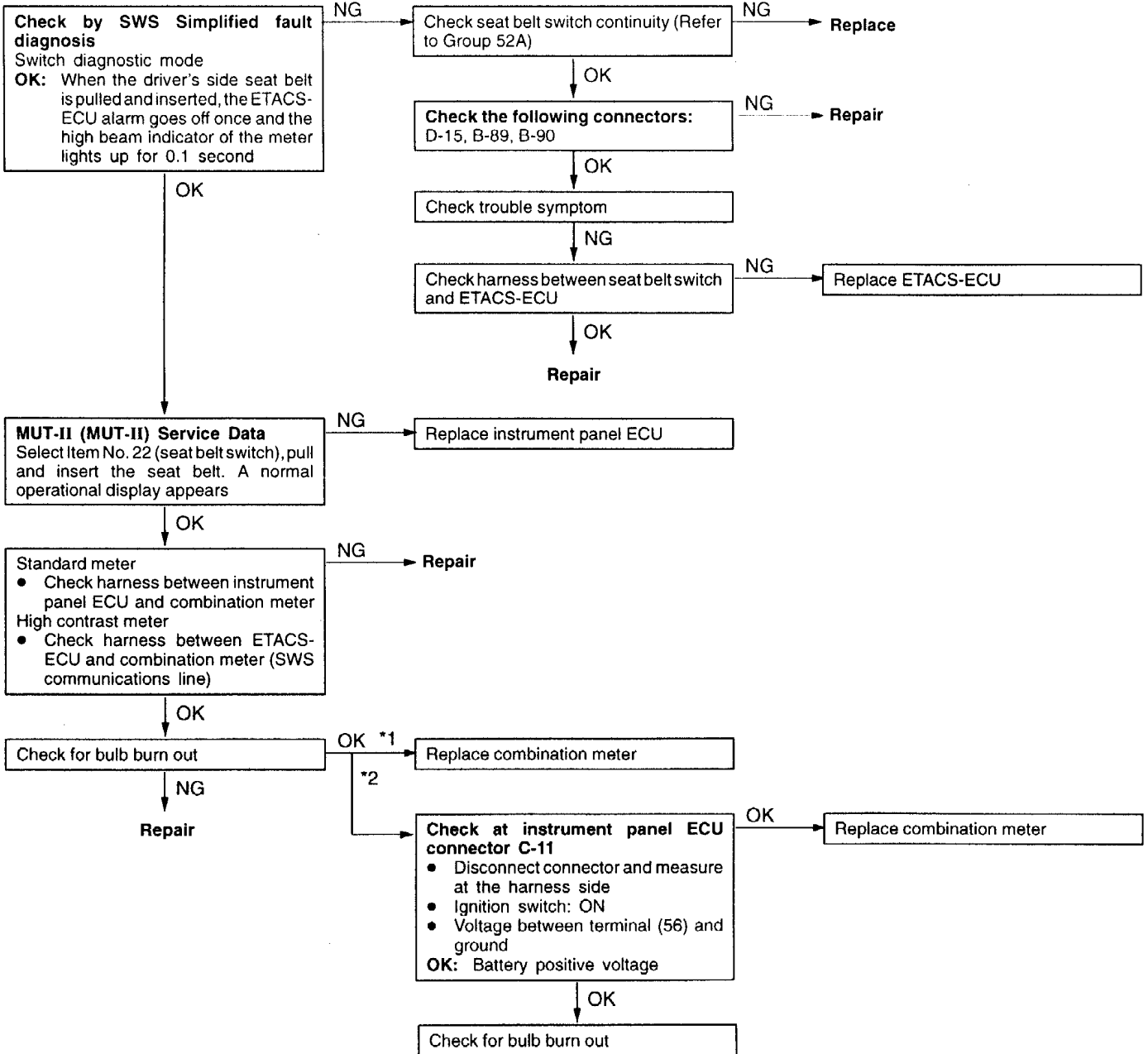
**INSPECTION PROCEDURE 5**

The shift position indicator does not illuminate <A/T>	Probable cause
The problem could either lie in the inhibitor switch input circuit or it may be an indicator input circuit failure.	<ul style="list-style-type: none"> <li>● Inhibitor switch defective</li> <li>● Harness or connector defective</li> <li>● Instrument panel ECU malfunction</li> <li>● Assist-ECU malfunction</li> <li>● Combination meter malfunction</li> </ul>



INSPECTION PROCEDURE 6

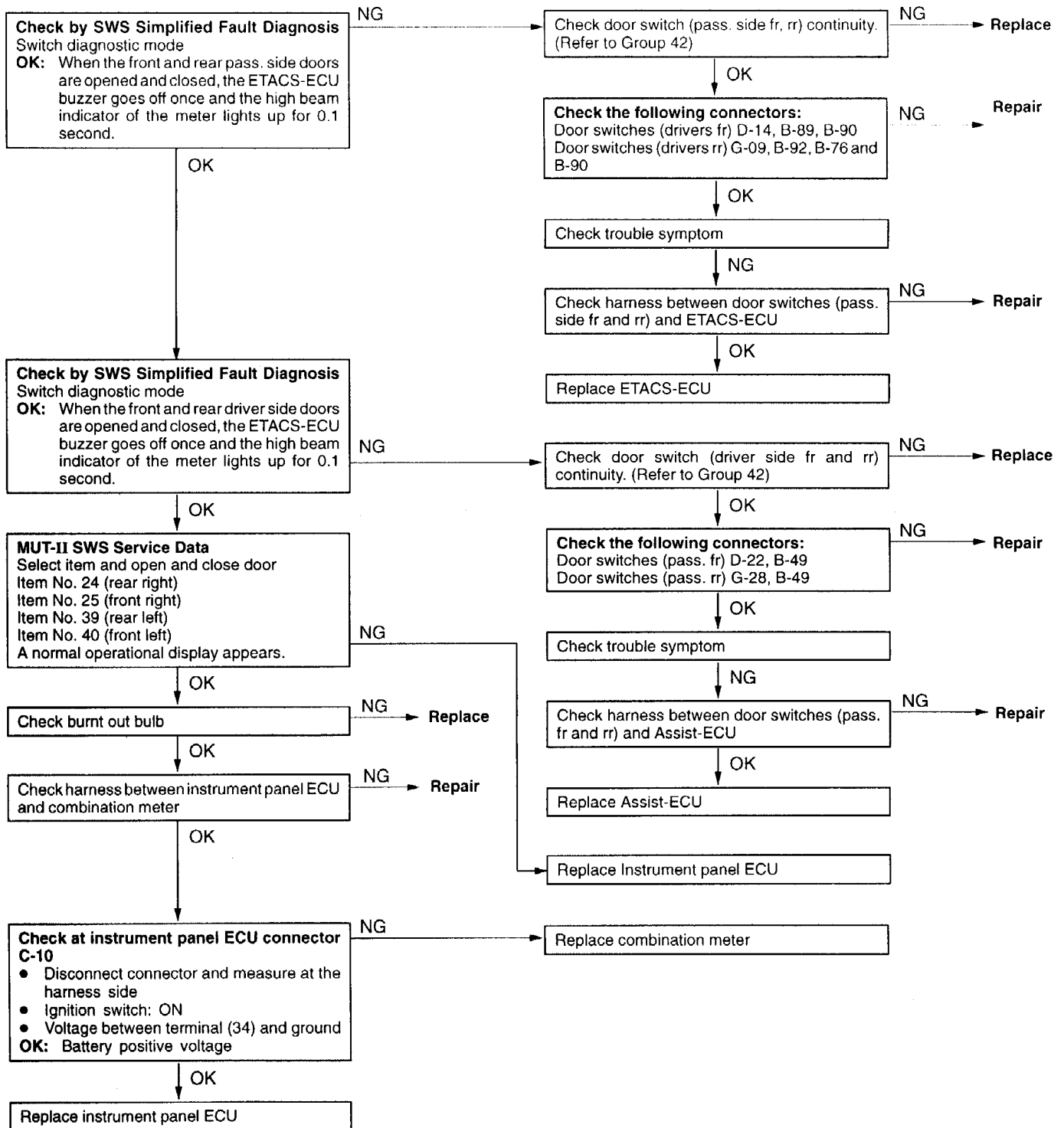
Seat belt warning lamp either does not illuminate or does not go out	Probable cause
The seat belt switch or warning lamp circuit may be defective	<ul style="list-style-type: none"> <li>• Seat belt switch defective</li> <li>• ETACS-ECU or instrument-panel ECU malfunction</li> <li>• Harness or connector defective</li> <li>• Combination meter malfunction</li> </ul>



NOTE:  
 \*1: High contrast meter  
 \*2: Standard meter

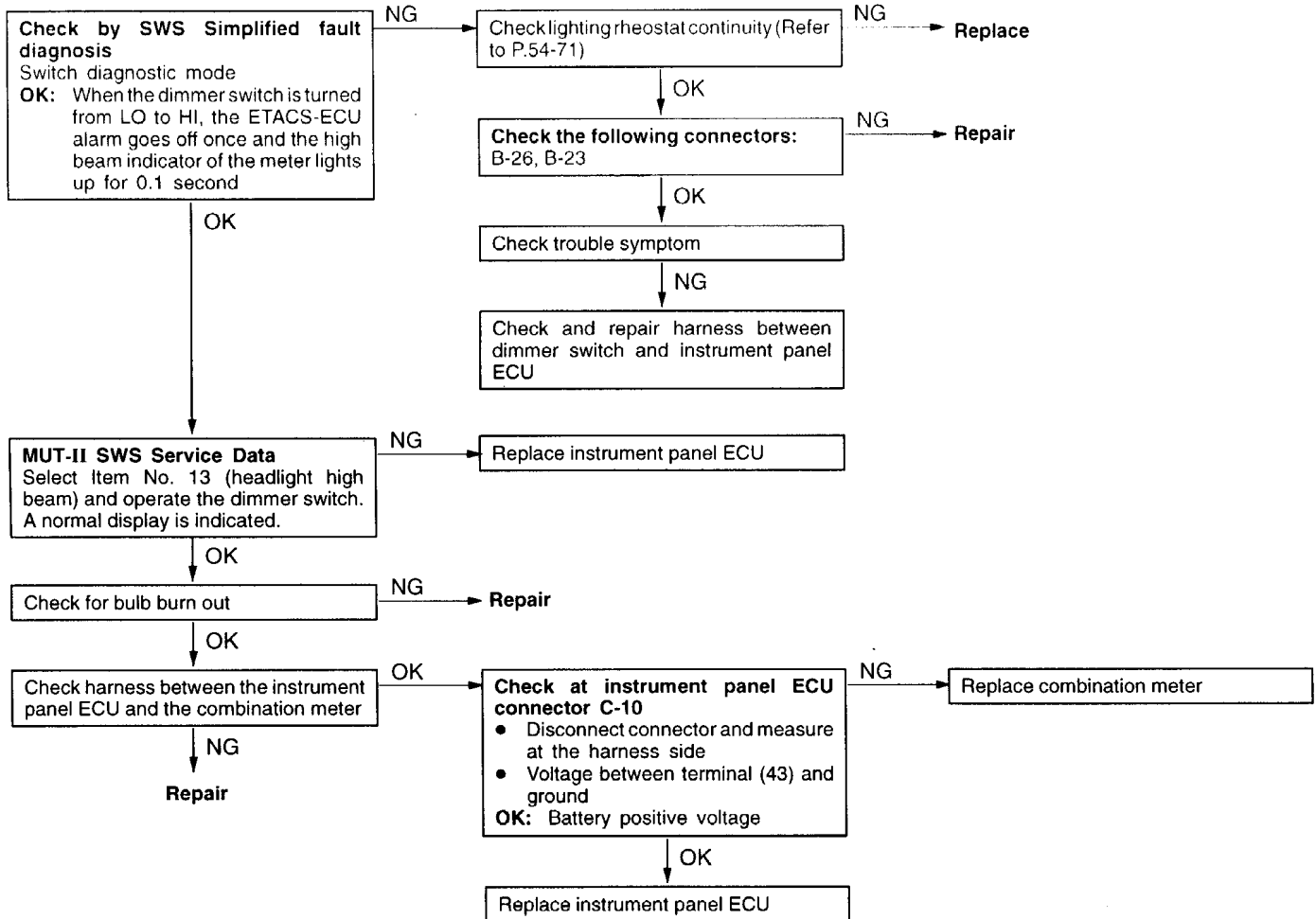
**INSPECTION PROCEDURE 7**

The door open warning lamp either does not illuminate or does not go out	Probable cause
Door switch or warning lamp circuit defective.	<ul style="list-style-type: none"> <li>• Door switch defective</li> <li>• ETACS-ECU or Assist-ECU malfunction</li> <li>• Instrument panel ECU malfunction</li> <li>• Combination meter malfunction</li> <li>• Harness or connector defective</li> </ul>



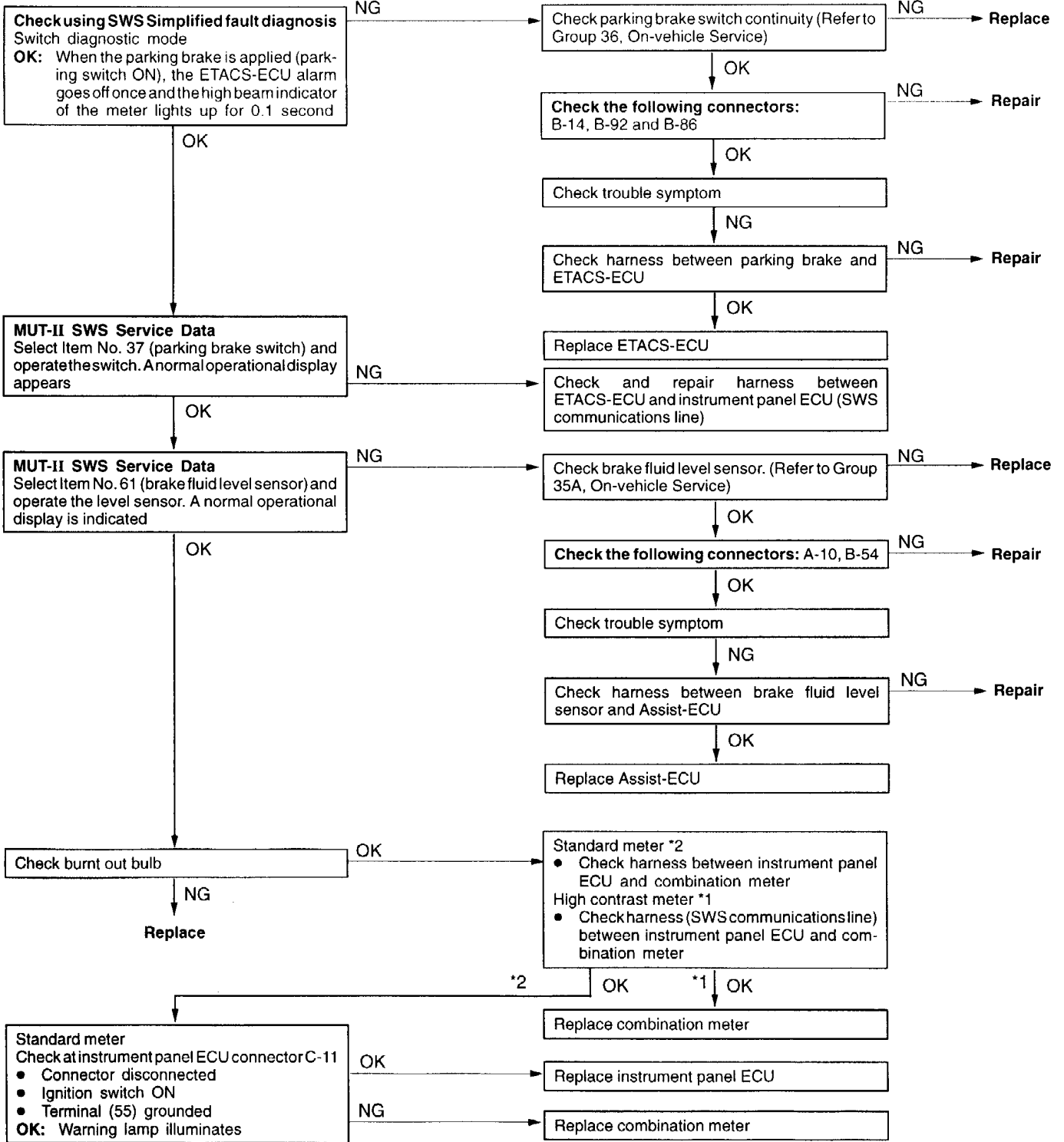
**INSPECTION PROCEDURE 8**

The high beam indicator lamp either does not illuminate or does not go out	Probable cause
The lighting switch (dimmer switch) or indicator lamp circuit may be defective.	<ul style="list-style-type: none"> <li>• Lighting switch (dimmer switch) malfunction</li> <li>• Instrument panel malfunction</li> <li>• Harness or connector defective</li> </ul>



**INSPECTION PROCEDURE 9**

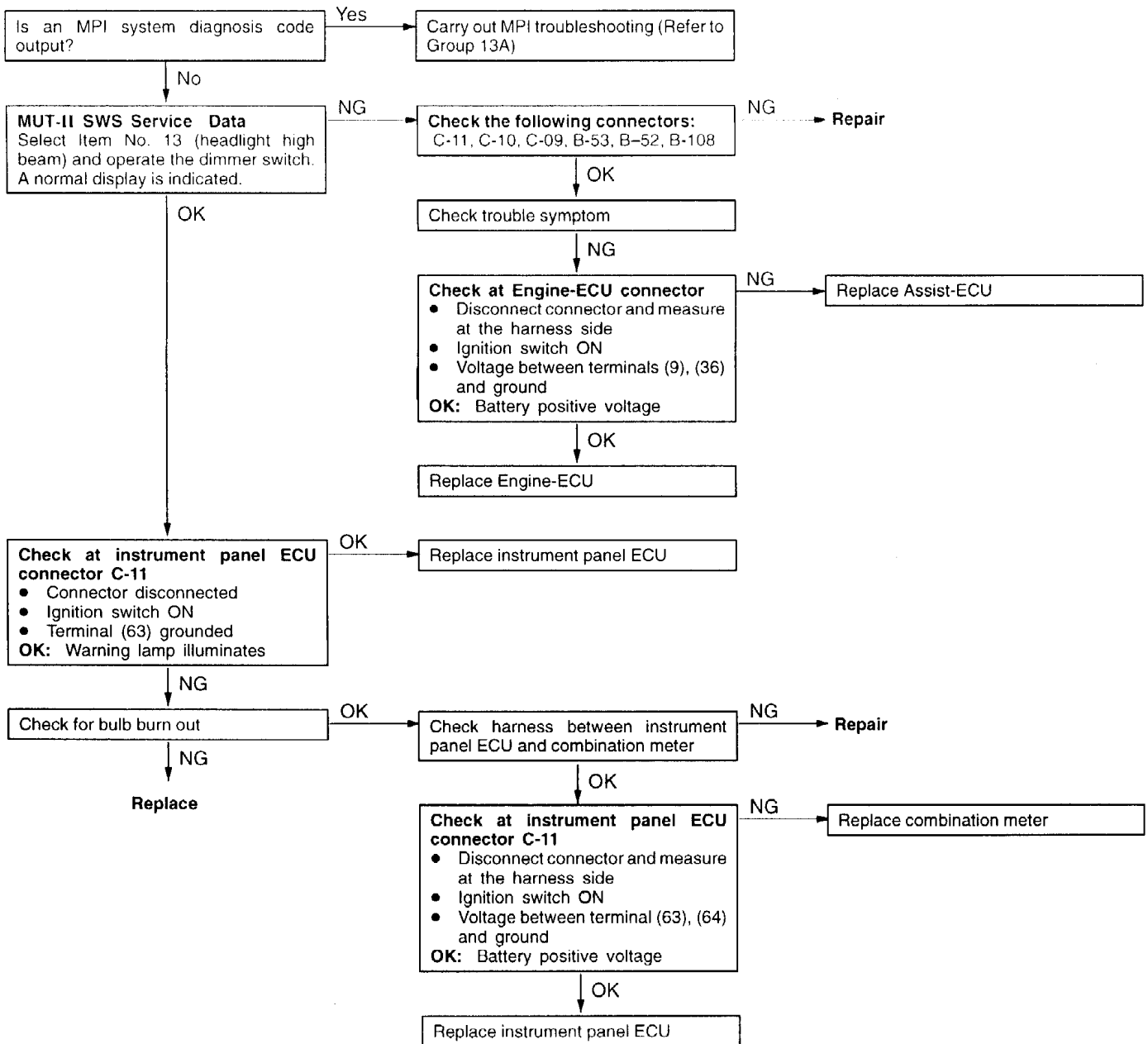
The brake warning lamp either does not illuminate or does not go out	Probable cause
The parking brake switch, the brake fluid level sensor or the warning lamp circuit may be defective	<ul style="list-style-type: none"> <li>• Parking brake switch defective</li> <li>• ETACS-ECU, Assist-ECU or instrument panel ECU malfunction</li> <li>• Harness or connector defective</li> <li>• Brake fluid level defective</li> </ul>



## INSPECTION PROCEDURE 10

The check engine lamp either does not illuminate or does not go out	Probable cause
The Assist-ECU or the warning lamp circuit may be defective	<ul style="list-style-type: none"> <li>● Assist-ECU malfunction</li> <li>● Harness or connector defective</li> </ul>

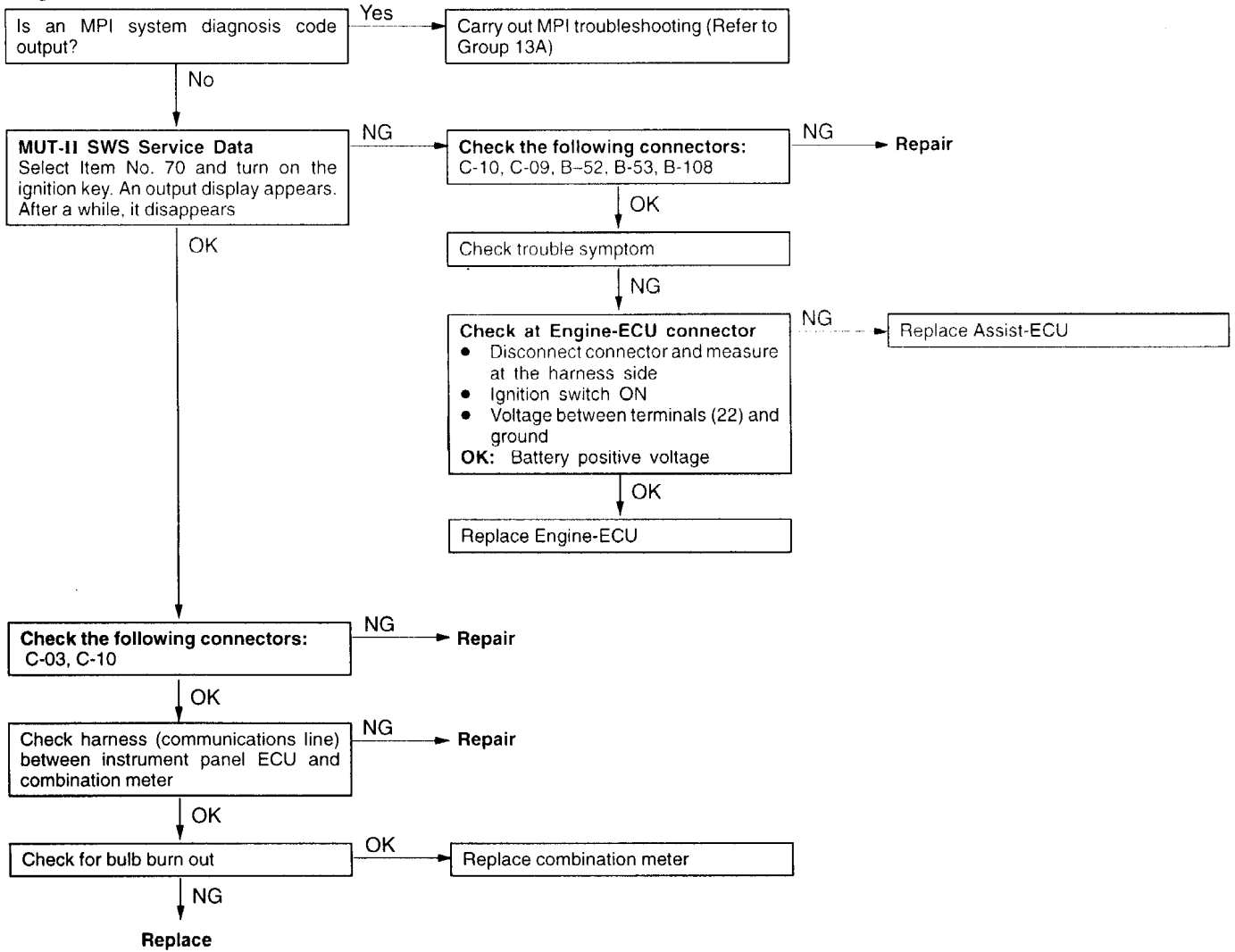
## Standard meter



Continued next page:

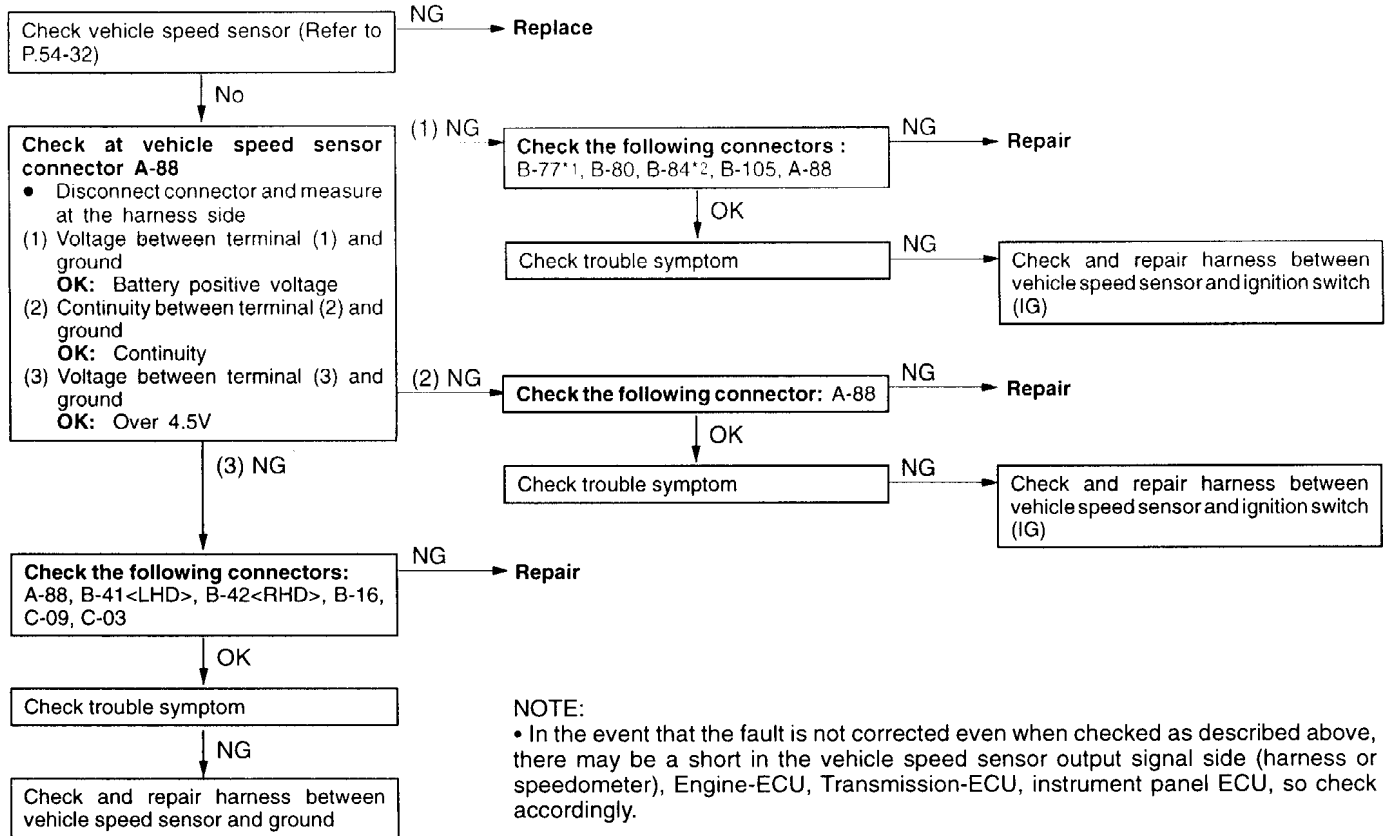


**High contrast meter**



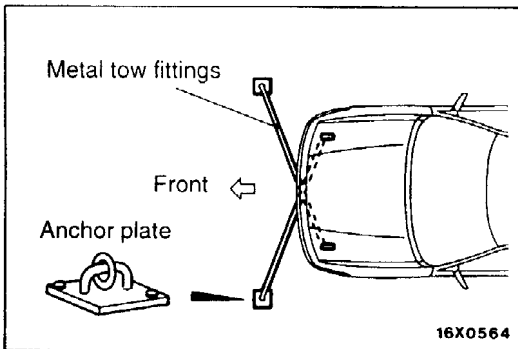
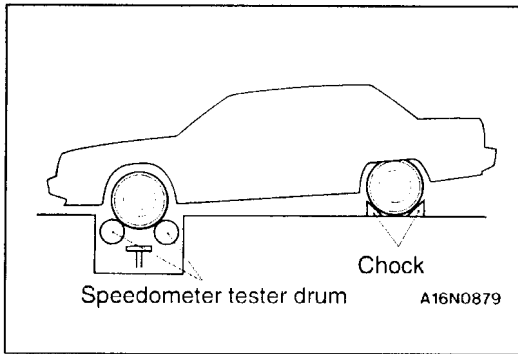
**INSPECTION PROCEDURE 11**

Vehicle speed sensor circuit check	Probable cause
The vehicle speed sensor signal is shared by the speedometer, Engine-ECU, Transmission-ECU and the instrument panel ECU	<ul style="list-style-type: none"> <li>• Harness or connector defective</li> <li>• Combination meter malfunction</li> </ul>



**NOTE:**  
 • In the event that the fault is not corrected even when checked as described above, there may be a short in the vehicle speed sensor output signal side (harness or speedometer), Engine-ECU, Transmission-ECU, instrument panel ECU, so check accordingly.

\*1 High Contrast Meter  
 \*2 Standard Meter



## ON-VEHICLE SERVICE

### SPEEDOMETER CHECK

1. Adjust the pressure of the tyres to the specified value. (Refer to GROUP 31 – On-vehicle Service.)
2. Position the vehicle on a speedometer tester drum.
3. Make sure the parking brake has been applied.

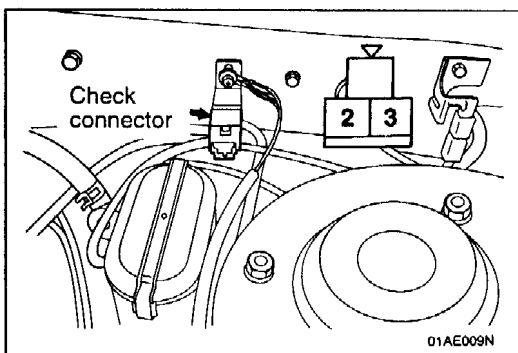
4. Attach metal fittings to the tow hook and the tie-down hook to prevent the front wheels from slipping sideways. Attach both ends to the anchor plate.
5. Securely anchor one end of the chain or a wire and attach the other end to the rear tow hook to prevent the car from jumping forward
6. Take all other necessary precautions.
7. Check if the speedometer indication range is within the standard values.

**Caution**

**Do not increase/decrease speed rapidly while testing.**

**Standard values:**

<b>Standard indication km/h</b>	40	80	120	160
<b>Allowable range km/h</b>	40–48	80–92	120–136	160–180



### TACHOMETER CHECK

1. Disconnect the check connector and insert a paper clip into terminal No.2 and attach the engine speedometer.

**NOTE**

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

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 value:**

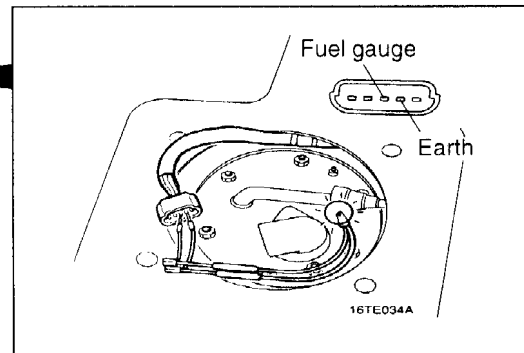
<b>Engine speed rpm</b>	1,000	3,000	5,000	6,000
<b>Indicated variation rpm</b>	+100	+100 -200	+100 -375	+100 -450

**FUEL GAUGE SIMPLE CHECK**

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

Connect a test lamp to the harness side connector.

Turn the ignition switch to ON.



Check the condition of the test lamp and the gauge.

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

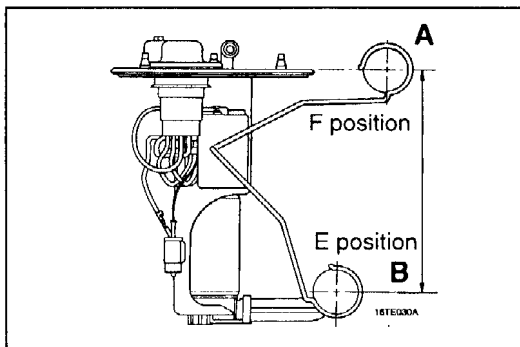
Replace the fuel gauge.

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

Replace the fuel gauge unit.

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

Repair the harness.

**FUEL GAUGE UNIT CHECK**

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

**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:  $0 \pm 3\text{mm}$**

**B:  $144 \pm 3\text{mm}$**

**FUEL GAUGE UNIT RESISTANCE**

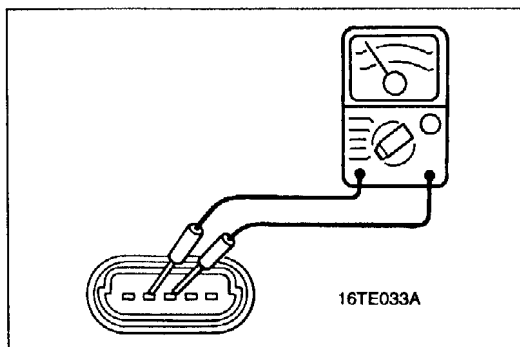
1. Check that resistance value between the fuel gauge terminal and ground terminal is at standard value when fuel gauge unit float is at point F (highest) and point E (lowest).

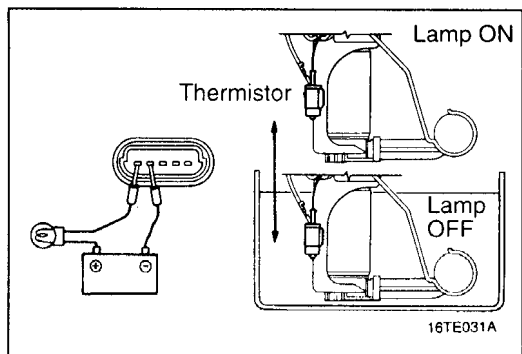
**Standard value:**

**POINT F:  $4 \pm 1 \Omega$**

**POINT E:  $107 \pm 1 \Omega$**

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





**THERMISTOR**

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

**Caution**

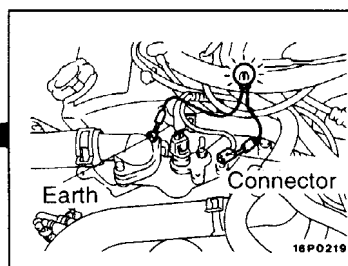
After completing this test, wipe the unit dry and install it in the fuel tank.

**ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK**

Remove the engine coolant gauge unit connector.

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

Turn the ignition switch ON.



Check the condition of the test lamp and the gauge.

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

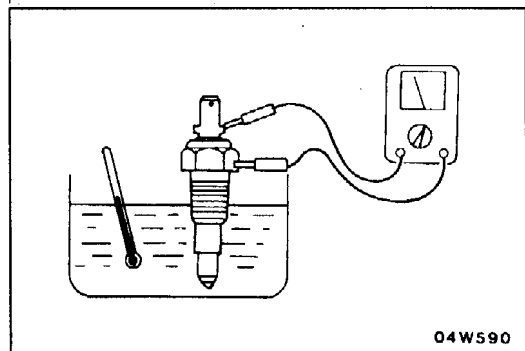
Replace the engine coolant temperature gauge.

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

Replace the engine coolant temperature gauge unit.

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

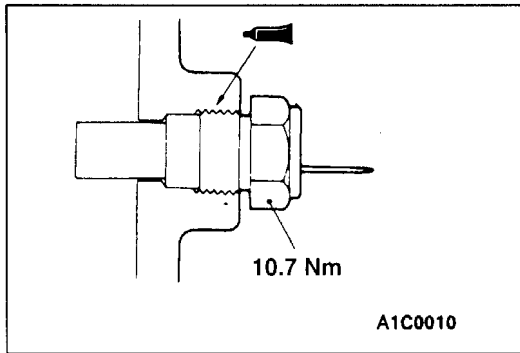
Repair the harness.



**ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK**

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

**Standard value: 104 ± 13.5 Ω**



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

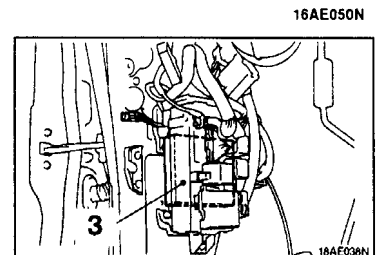
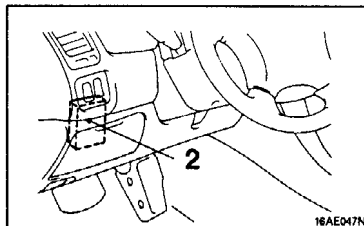
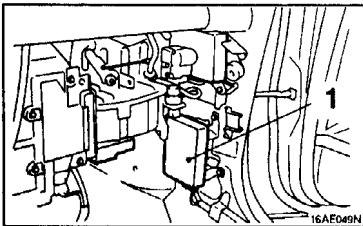
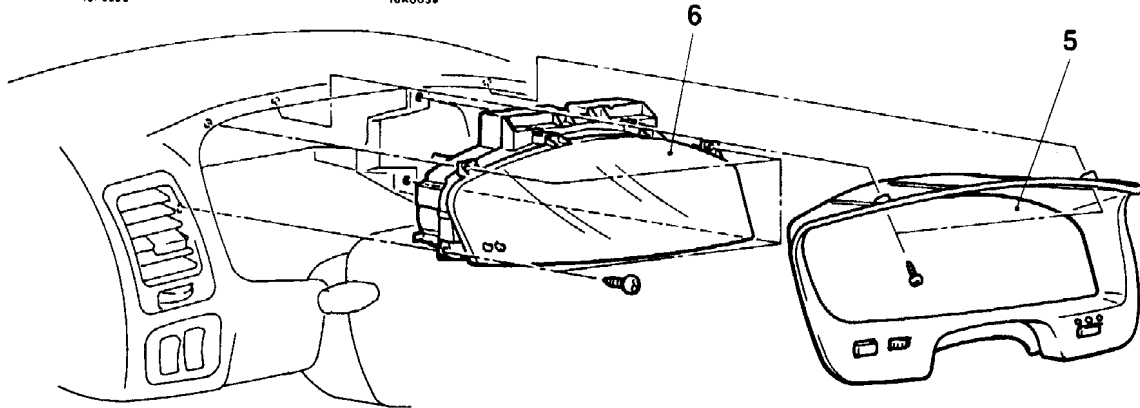
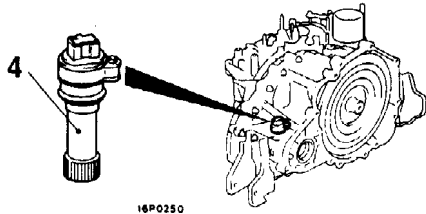
**Specified sealant:**

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

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

# COMBINATION METERS

## REMOVAL AND INSTALLATION



16AE051N

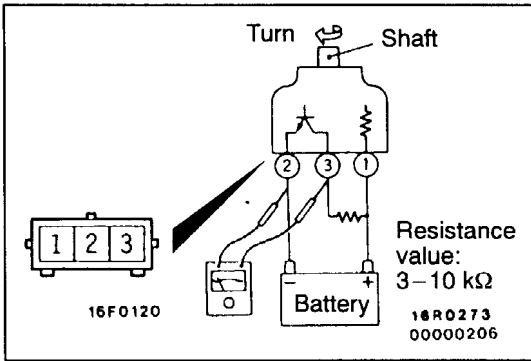
1. Assist-ECU (Refer to P.54-128)
2. Instrument panel ECU (Refer to P.54-132)
3. ETACS-ECU (Refer to P.54-128)

### Vehicle speed sensor removal steps

- Air cleaner assembly (Refer to Group 15)
- 4. Vehicle speed sensor

### Combination meter removal steps

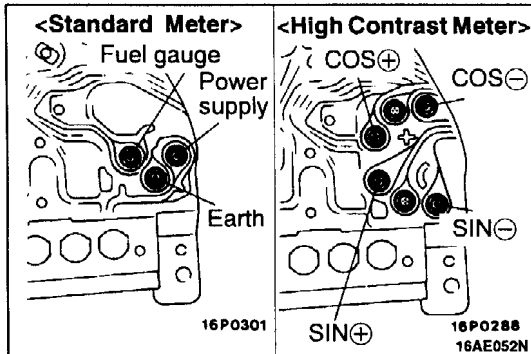
5. Meter bezel
6. Combination meter



**INSPECTION**

**VEHICLE SPEED SENSOR CHECK**

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



**FUEL GAUGE CHECK**

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

**Caution**

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

**Standard value:**

<Standard Meter>

Power supply–Earth: 56.3 Ω

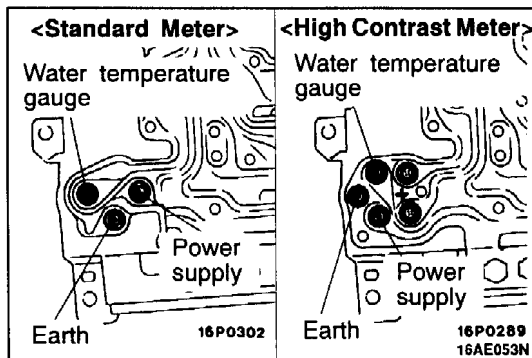
Power supply–Fuel gauge: 106 Ω

Fuel gauge–Earth: 150.3 Ω

<Hi Contrast Meter>

SIN ⊕ -SIN ⊖ 151.8 Ω

COS ⊕ -COS ⊖ 164.2 Ω



**ENGINE COOLANT TEMPERATURE GAUGE CHECK**

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

**Caution**

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

**Standard values:**

<Standard Meter/Hi Contrast Meter>

Power supply–Water temperature gauge:

54 Ω/59 Ω

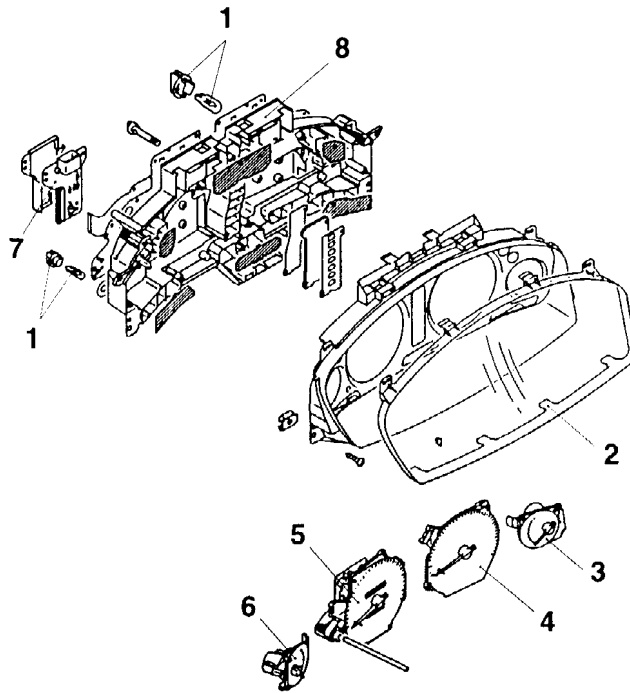
Power supply–Earth: 176.5 Ω

Water temperature gauge–Earth: 230.5 Ω/230.5 Ω



**DISASSEMBLY AND REASSEMBLY**

**Standard meter**

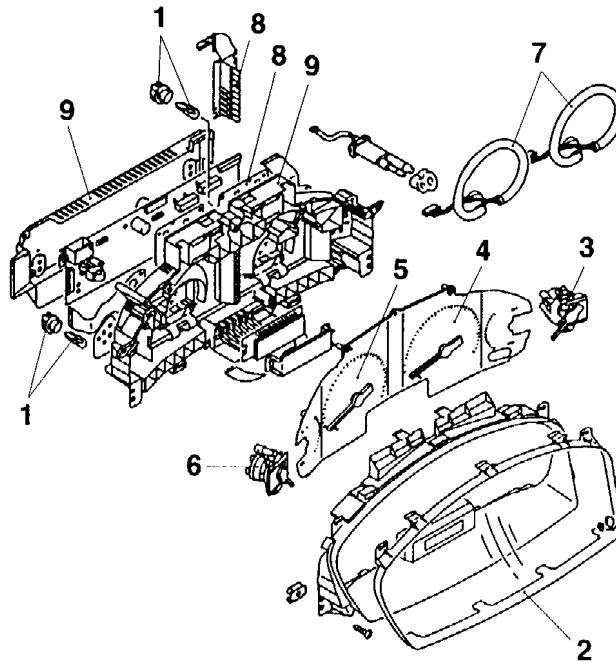


16AE084N

**Disassembly steps**

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1. Bulb, socket                 | 5. Speedometer                      |
| 2. Meter glass and window plate | 6. Engine coolant temperature gauge |
| 3. Fuel gauge                   | 7. Printed-circuit board            |
| 4. Tachometer                   | 8. Meter case                       |

**High contrast meter**





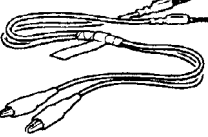
16AE083N

**Disassembly steps**

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1. Bulb, socket                 | 6. Engine coolant temperature gauge |
| 2. Meter glass and window plate | 7. Bulb                             |
| 3. Fuel gauge                   | 8. Printed-circuit board            |
| 4. Tachometer                   | 9. Meter case                       |
| 5. Speedometer                  |                                     |

# CENTRE WARNING DISPLAY

## SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

**SWS SIMPLIFIED FAULT DIAGNOSTIC MODE**

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS-ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

**SWS DIAGNOSTIC TROUBLE CODE CLASSIFICATION TABLE**

Refer to Simplified Wiring System P.54–107.

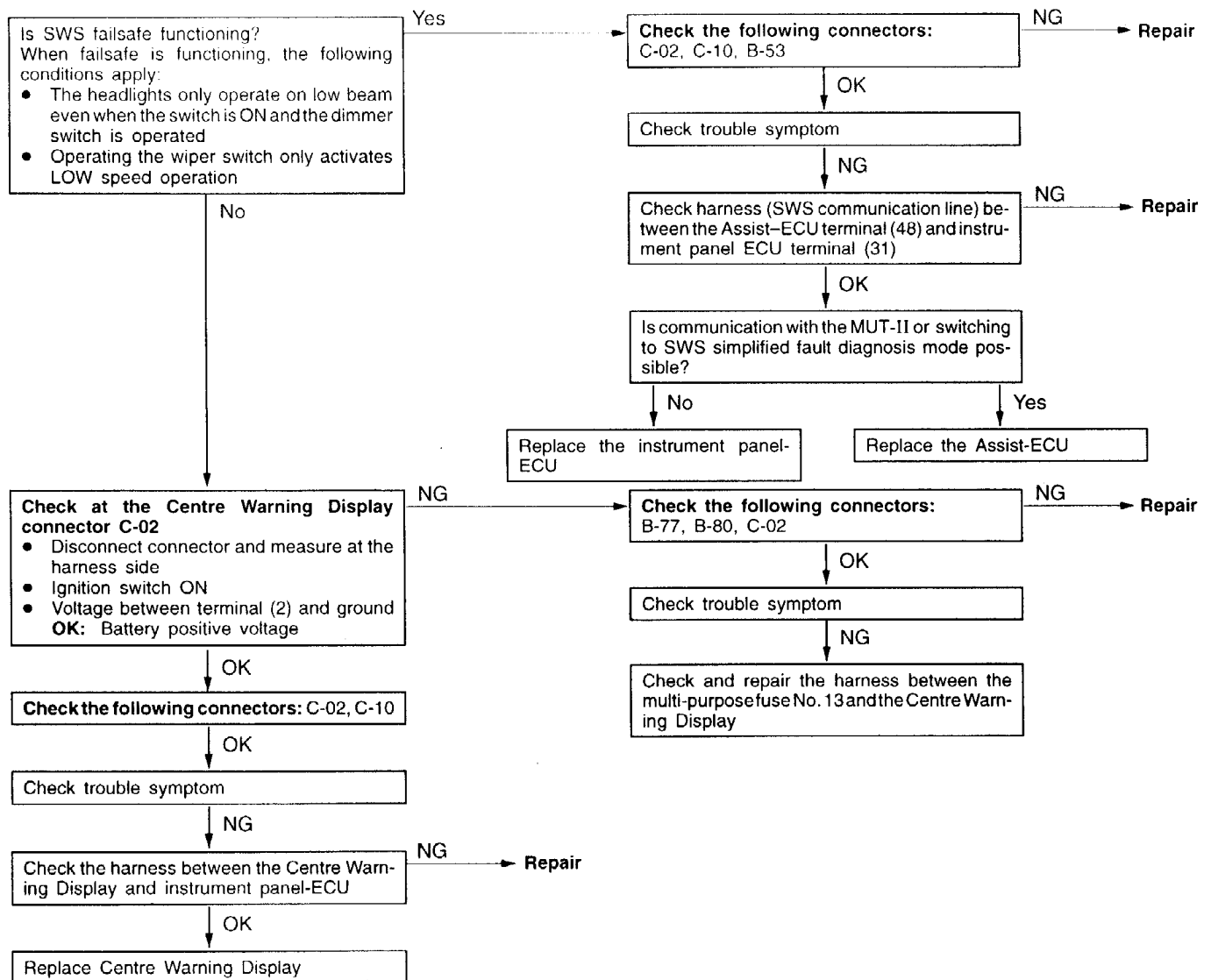
**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-118)	
Switching to SWS Simplified Fault Diagnosis mode not possible		
None of the Centre Warning Display warning lamps illuminate	1	54-36
The charge warning lamp either does not illuminate when the ignition is ON or does not go out after the engine starts (and battery operation is normal)	2	54-37
The engine oil pressure warning lamp either does not illuminate when the ignition is ON or does not go out when the engine starts	3	54-38
The remaining fuel warning lamp either does not illuminate or does not go out	4	54-39

# INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

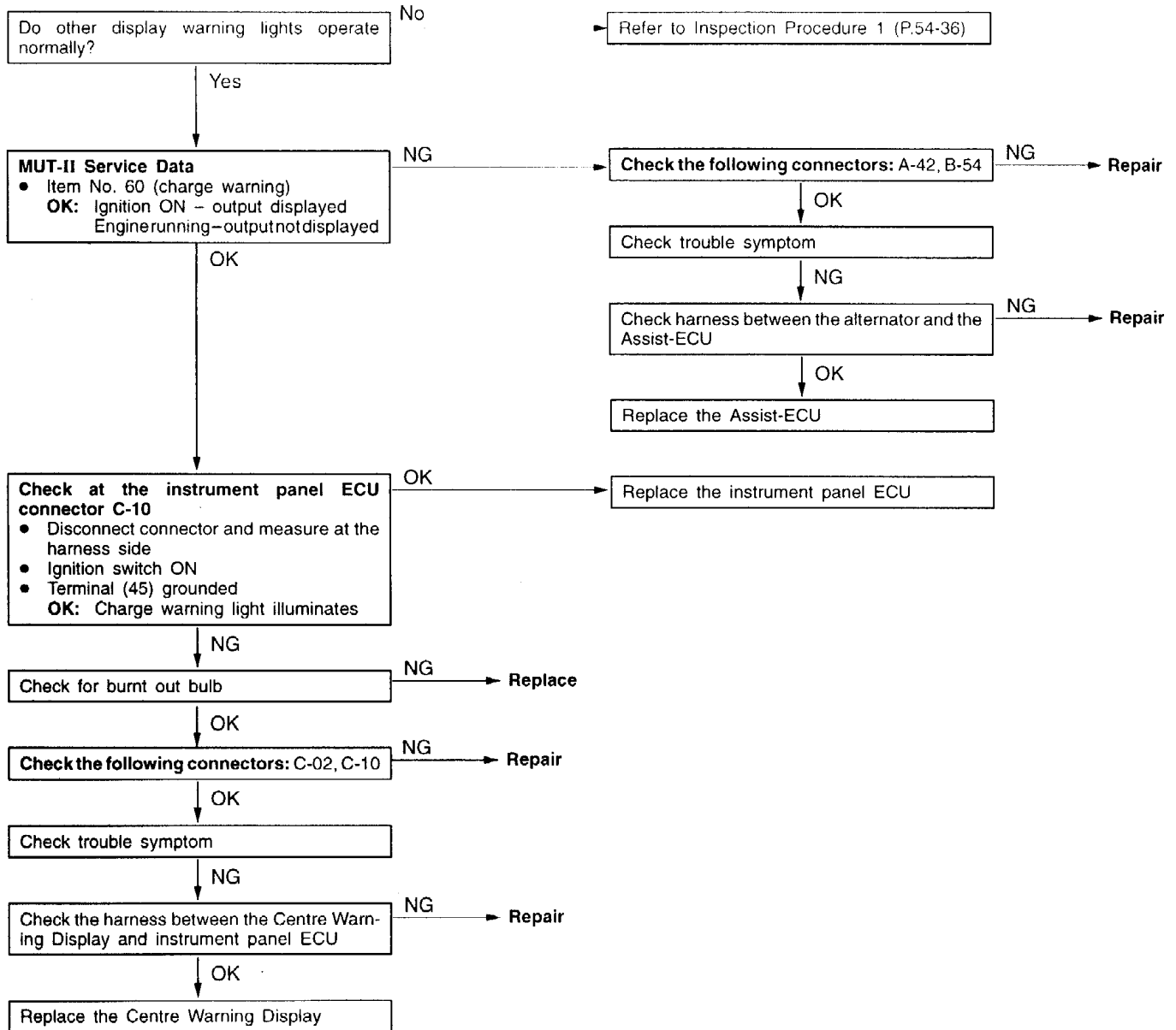
## INSPECTION PROCEDURE 1

None of the Centre Warning Display warning lamps illuminate	Probable cause
<p>The Centre Warning Display warning lamp sensor and switch signals are input to the Assist-ECU. These input signals are sent to the instrument panel-ECU via the SWS communication line and the warning lamps are activated by the instrument panel-ECU.</p> <p>When none of the warning lamps illuminate, the Centre Warning Display power or ground circuit, the Assist-ECU, the instrument panel-ECU or the SWS communication line may be defective.</p>	<ul style="list-style-type: none"> <li>• Centre Message Display malfunction</li> <li>• Assist-ECU malfunction</li> <li>• Instrument panel-ECU malfunction</li> <li>• Harness or connector defective</li> </ul>



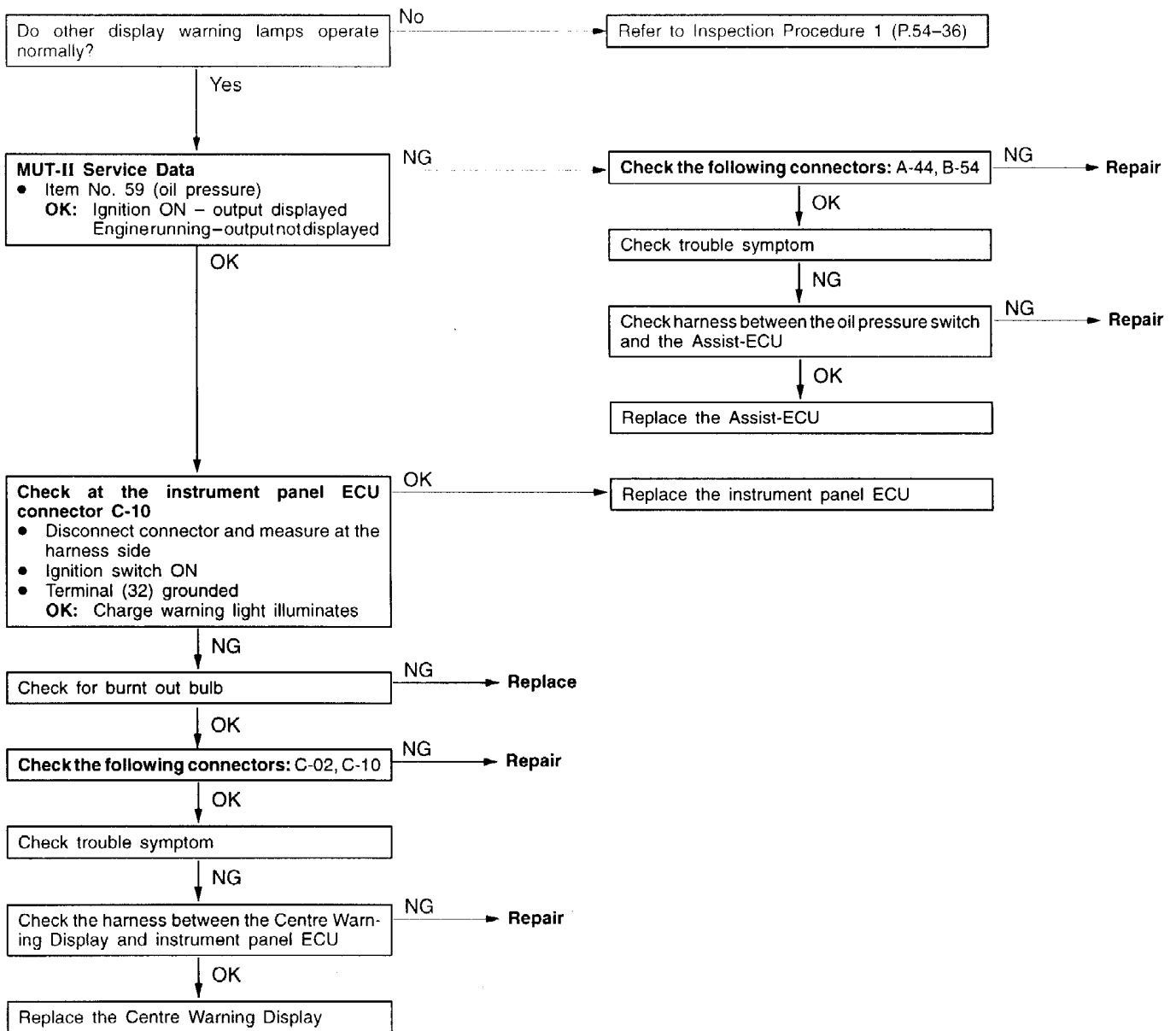
**INSPECTION PROCEDURE 2**

<p><b>The charge warning lamp either does not illuminate when the ignition is ON or does not go out after the engine starts (alternator and battery operation is normal)</b></p>	<p><b>Probable cause</b></p>
<p>The warning lamp circuit or the Centre Warning Display may be defective.</p>	<ul style="list-style-type: none"> <li>● Harness or connector defective</li> <li>● Assist-ECU or instrument panel ECU malfunction</li> <li>● Centre Warning Display malfunction</li> </ul>



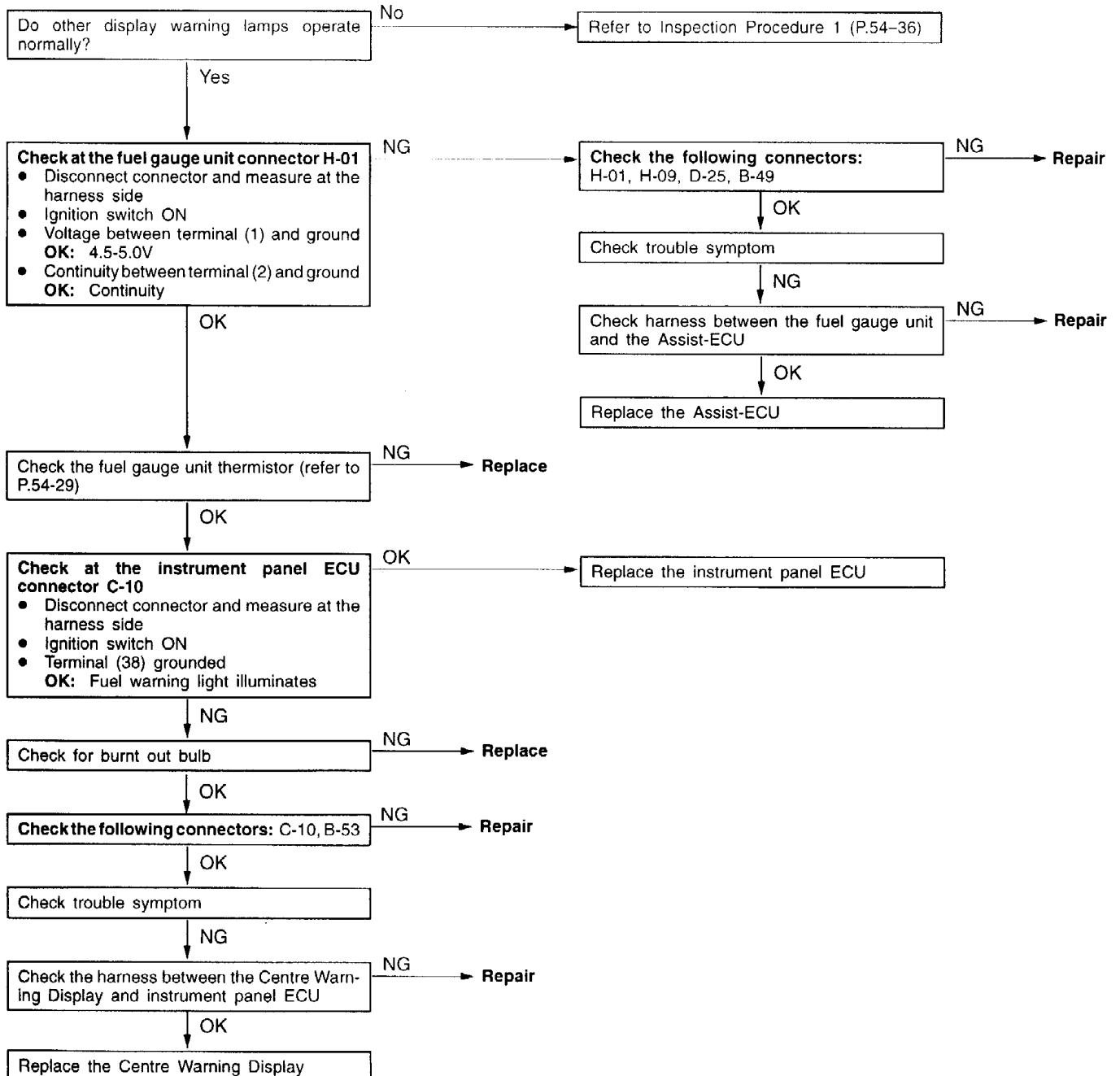
**INSPECTION PROCEDURE 3**

The engine oil pressure warning lamp either does not illuminate when the ignition is ON or does not go out after the engine starts	Probable cause
The oil pressure switch circuit or the Centre Warning display may be defective	<ul style="list-style-type: none"> <li>• Oil pressure switch defective</li> <li>• Assist-ECU or instrument panel ECU malfunction</li> <li>• Harness or connector defective</li> <li>• Centre Warning Display malfunction</li> </ul>



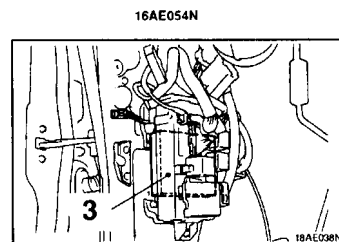
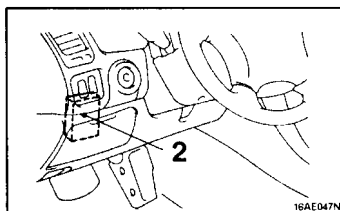
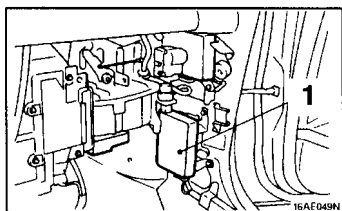
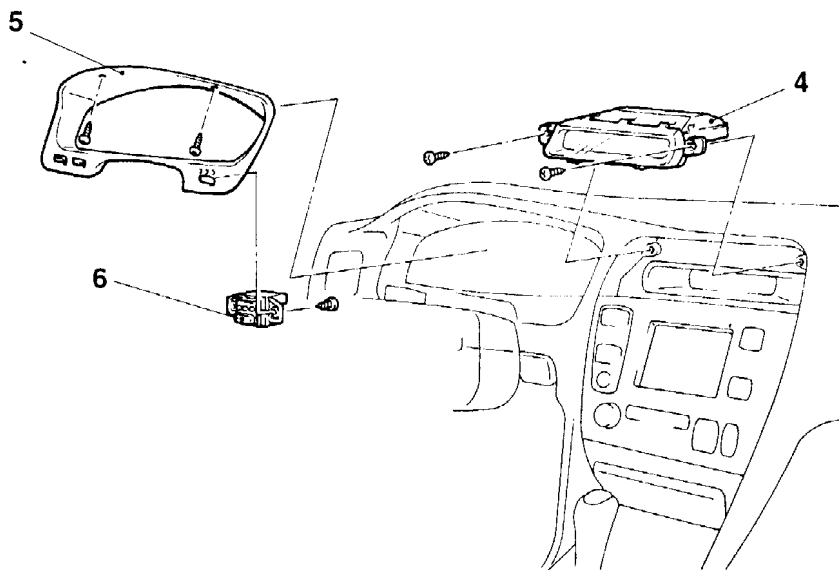
**INSPECTION PROCEDURE 4**

The remaining fuel warning lamp either does not illuminate or does not go out	Probable cause
The oil pressure switch circuit or the Centre Warning display may be defective	<ul style="list-style-type: none"> <li>● Fuel gauge unit defective</li> <li>● Assist-ECU malfunction</li> <li>● Instrument panel malfunction</li> <li>● Harness or connector defective</li> <li>● Centre Warning Display malfunction</li> </ul>



# CENTRE WARNING DISPLAY

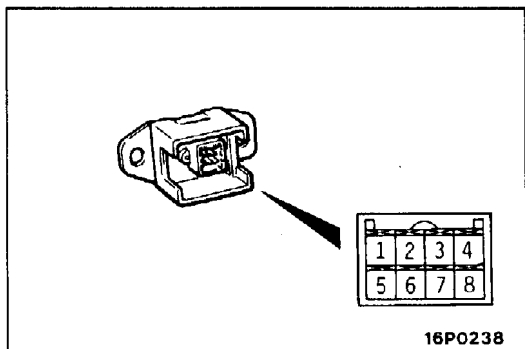
## REMOVAL AND INSTALLATION



1. Assist-ECU (Refer to P.54-128)
2. Instrument panel-ECU (Refer to P.54-128)
3. ETACS-ECU (Refer to P.54-128)

### Centre warning display removal steps

- Centre Air Outlet Assembly. (Refer to Group 52A–Instrument Panel)
- 4. Centre warning display
- 5. Meter bezel
- 6. Clock switch



### INSPECTION

#### CLOCK SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1	2	3	4	5	6	7
SET	○			○			
H			○	○		○—(T)—○	
M		○		○			



# HEADLAMP, POSITION LAMP ASSEMBLY AND FRONT TURN SIGNAL LAMP ASSEMBLY

## SERVICE SPECIFICATIONS

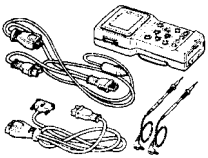

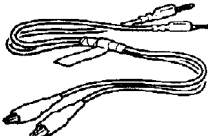
Items		Limit
Headlamp intensity	High-beam cd	18,000 or more
	Low-beam cd	7,000 or more

## HOW TO HANDLE HEADLAMP AND POSITION LAMP ASSEMBLY

Plastic outer lenses are used for the headlamp and position lamp assembly, so pay attention to the following items.

- Do not touch the outer lens surface with a sharp tool.
- Use the specified genuine parts; bulbs.
- Don't apply masking tape to the outer lens surface.

## SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

**SWS SIMPLIFIED FAULT DIAGNOSIS MODE**

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS-ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

**SWS DIAGNOSIS CODE CLASSIFICATION TABLE**

Refer to P.54-107.

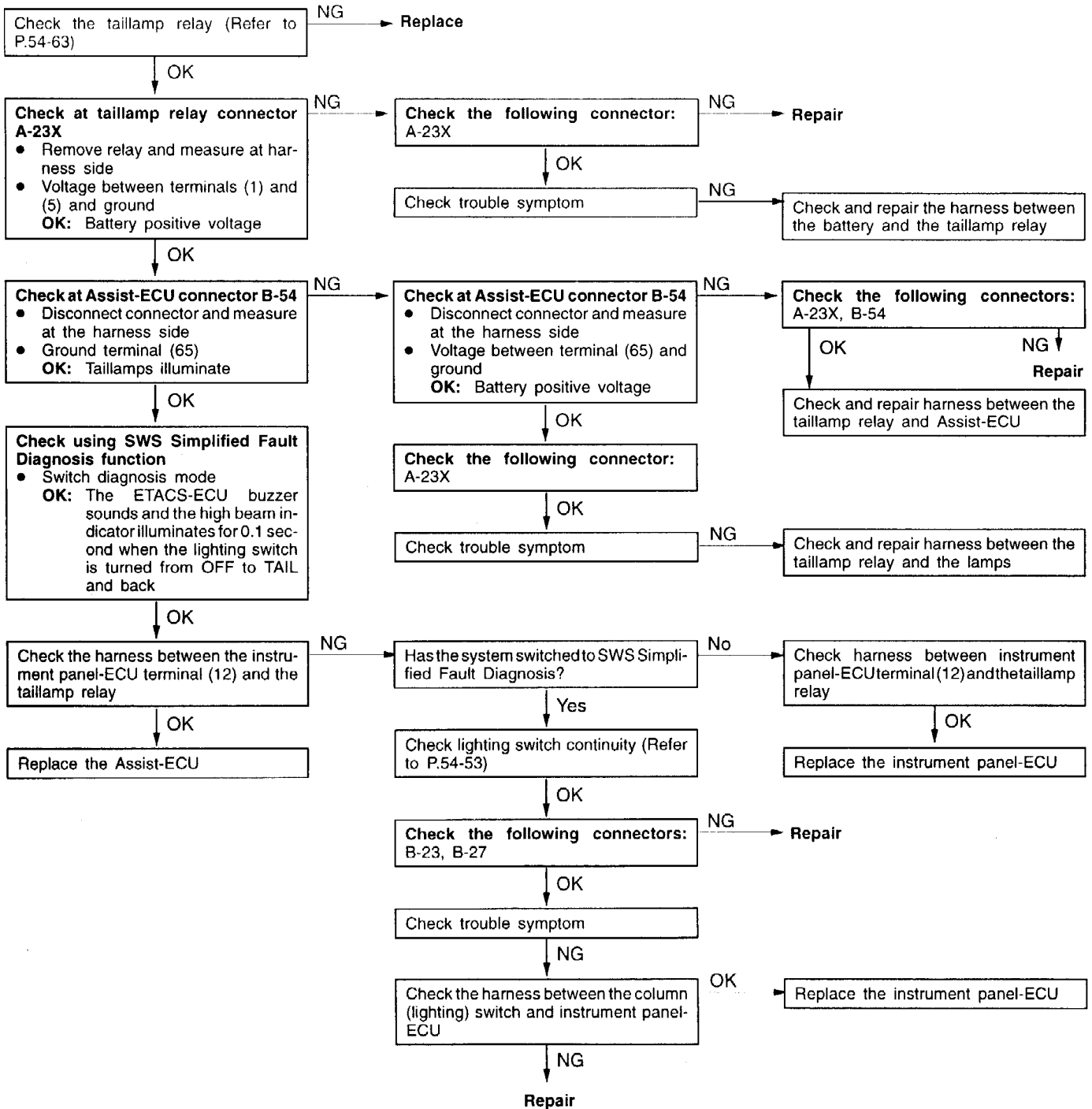
**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-118)	
Switching to SWS Simplified Fault Diagnosis mode not possible		
With the lighting switch in the TAIL position, the tail-lamps, license plate lamps and side markers do not illuminate	1	54-43
With the lighting switch in the HEAD position, the head-lamps (low beam) do not illuminate (dimmer switch is in the low beam position)	2	54-44
With the lighting switch in the HEAD position and the dimmer switch in the high beam position, the high beam does not illuminate (low beam operates normally)	3	54-45
With the lighting switch ON (TAIL or HEAD position) and the ignition switch OFF, the warning buzzer does not sound when the driver's door is opened with the ignition switch OFF	4	54-46
The taillamps and headlamps do not switch off with the lamp switch.	5	54-47
The high beam indicator lamp does not illuminate when high beam is operating	6	54-48

# INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

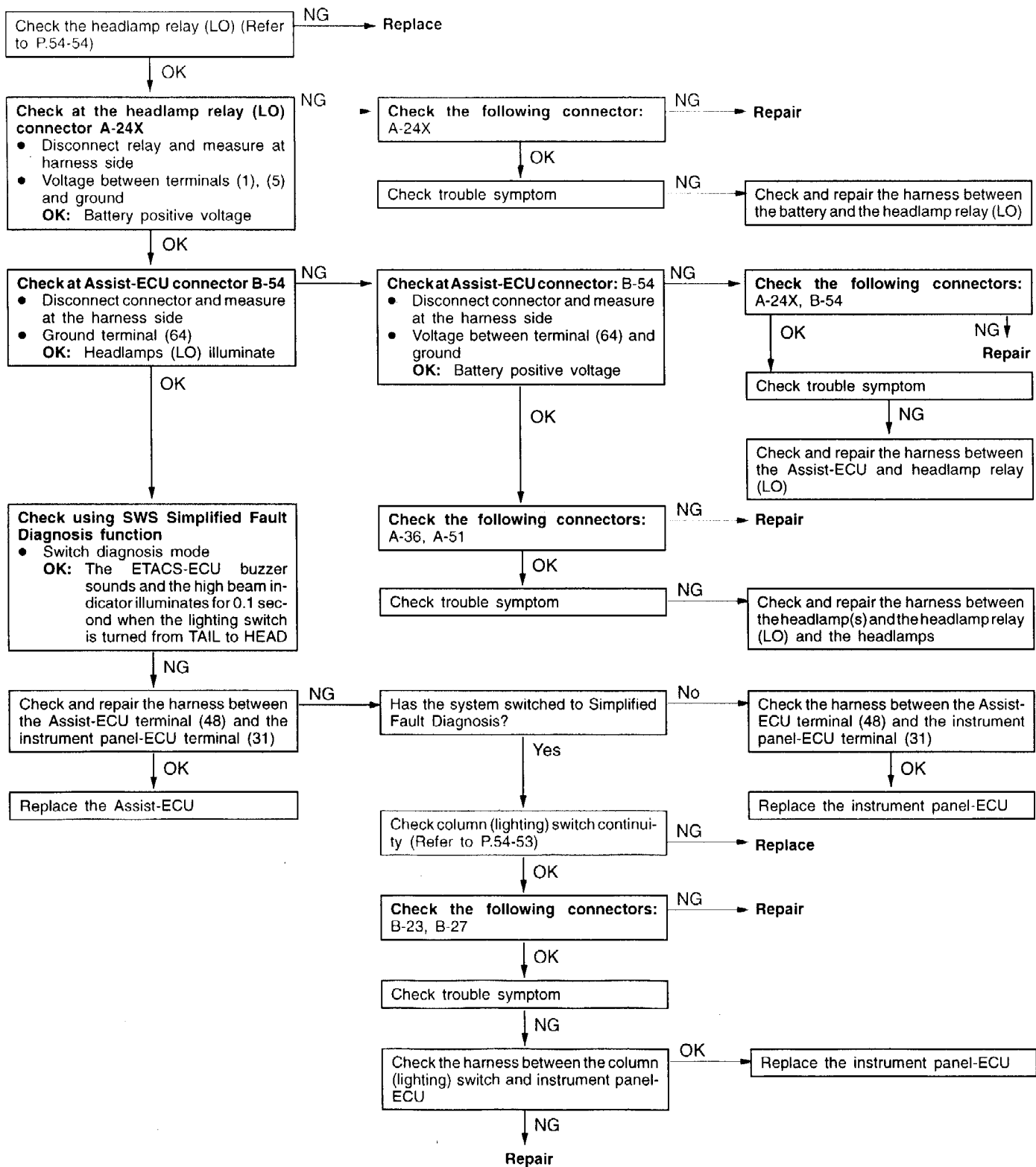
## INSPECTION PROCEDURE 1

With the lighting switch in the TAIL position, the taillamps, license plate lamps and side markers do not illuminate	Probable cause
The lighting switch input circuit, taillamp relay drive circuit or a harness or connector may be defective.	<ul style="list-style-type: none"> <li>• Lighting switch defective</li> <li>• Taillamp relay defective</li> <li>• Assist-ECU malfunction</li> <li>• Instrument panel-ECU malfunction</li> <li>• Harness or connector defective</li> </ul>



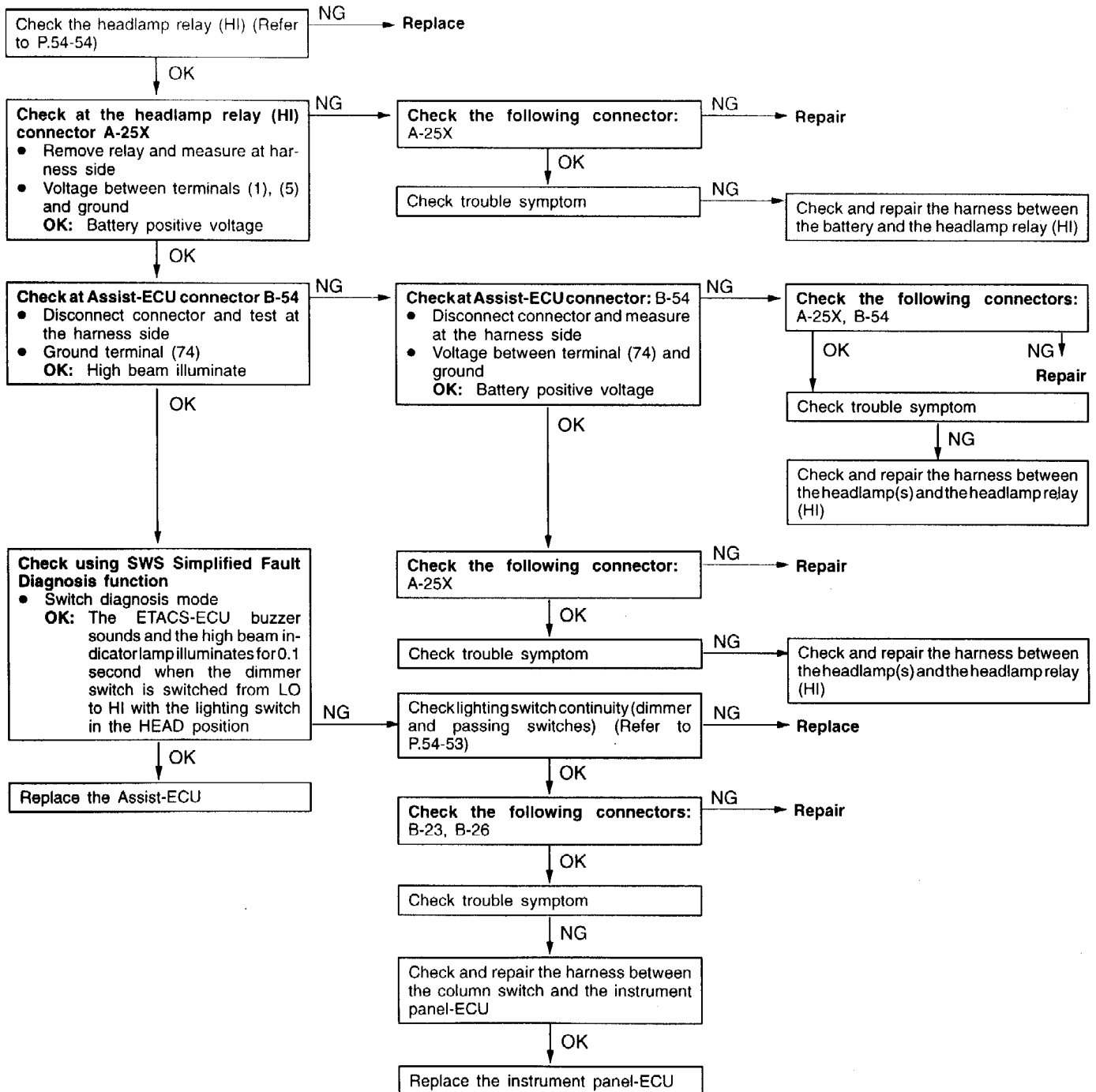
INSPECTION PROCEDURE 2

<p><b>With the lighting switch in the HEAD position, the headlamps (low beam) do not illuminate (dimmer switch is in the low beam position)</b></p>	<p><b>Probable cause</b></p>
<p>Lighting switch input circuit, headlamp relay (LO) drive circuit, a harness or connector may be defective.</p>	<ul style="list-style-type: none"> <li>● Lighting switch defective</li> <li>● Headlamp relay defective</li> <li>● Instrument panel-ECU malfunction</li> <li>● Assist-ECU malfunction</li> <li>● Harness or connector defective</li> </ul>



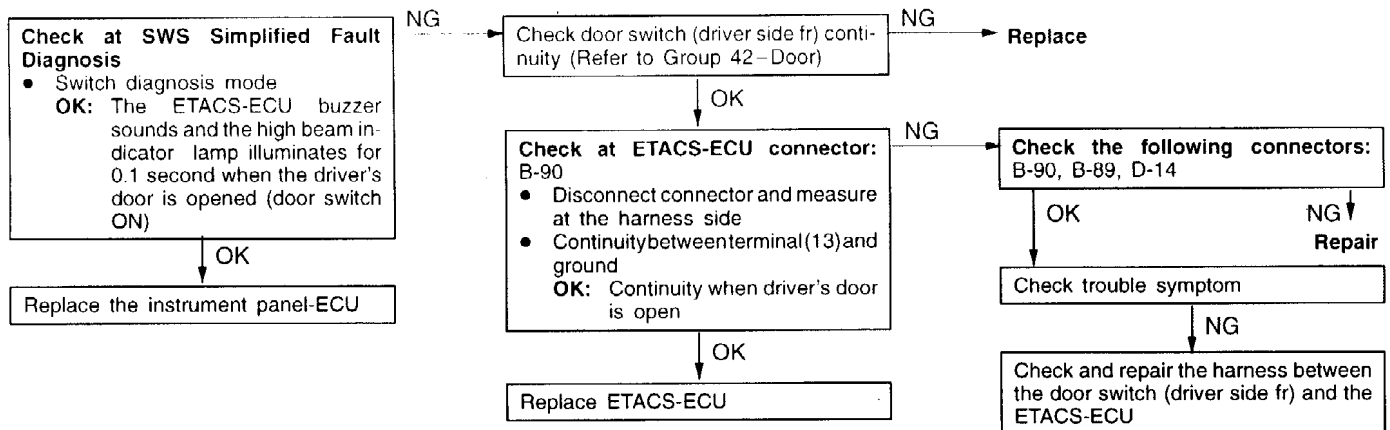
**INSPECTION PROCEDURE 3**

<p><b>With the lighting switch in the HEAD position and the dimmer switch in the high beam position, the high beam does not illuminate (low beam operates normally)</b></p>	<p><b>Probable cause</b></p> <ul style="list-style-type: none"> <li>• Dimmer switch defective</li> <li>• Assist-ECU malfunction</li> <li>• Instrument panel-ECU malfunction</li> <li>• Headlamp relay (HI)</li> <li>• Blown lamp bulb(s)</li> </ul>
<p>Dimmer switch input circuit system, the instrument panel-ECU, Assist-ECU, the harness or a connector may be defective</p>	



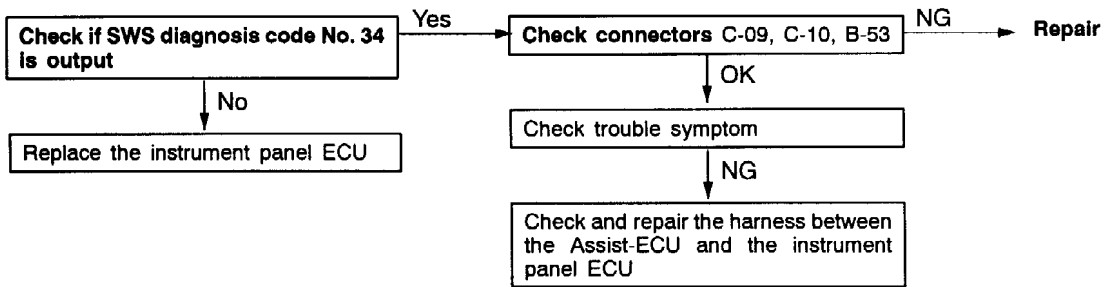
INSPECTION PROCEDURE 4

<p><b>With the lighting switch ON (TAIL or HEAD position) and the ignition switch OFF, the warning buzzer does not sound when the driver's door is opened with the ignition switch OFF</b></p>	<p><b>Probable cause</b></p>
<p>The front left door switch, ETACS-ECU, instrument panel-ECU, the harness or a connector may be defective</p>	<ul style="list-style-type: none"> <li>● Harness or connector defective</li> <li>● ETACS-ECU malfunction</li> <li>● driver side fr door switch defective</li> <li>● Instrument panel-ECU malfunction</li> </ul>



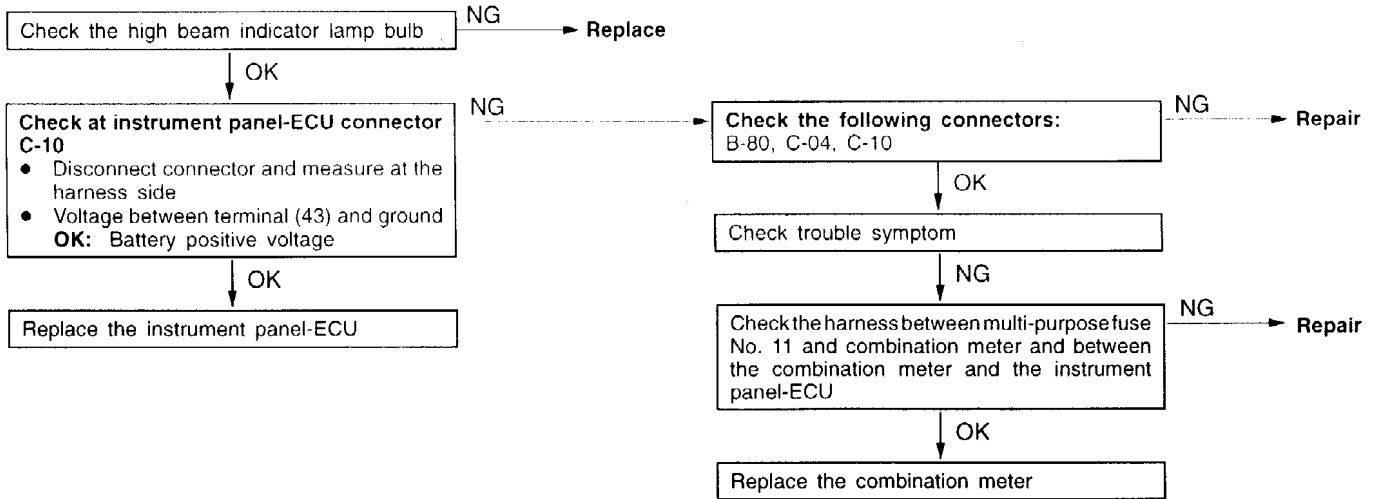
**INSPECTION PROCEDURE 5**

The taillamps and headlamps do not switch off with the lighting switch.	Probable cause
If a communication malfunction between the Assist-ECU and instrument panel ECU exists with the ignition switch ON, the Assist-ECU failsafe maintains a headlamp drive status. Therefore an SWS communication malfunction is indicated	<ul style="list-style-type: none"> <li>● Instrument panel ECU malfunction</li> <li>● Harness or connector defective</li> </ul>



**INSPECTION PROCEDURE 6**

<p><b>The high beam indicator lamp does not illuminate when high beam is operating</b></p> <p>The instrument panel-ECU, the harness or a connector may be defective</p>	<p><b>Probable cause</b></p> <ul style="list-style-type: none"> <li>• Instrument panel-ECU malfunction</li> <li>• Harness or connector defective</li> <li>• High beam indicator bulb blown</li> </ul>
---	---



**ON-VEHICLE SERVICE**

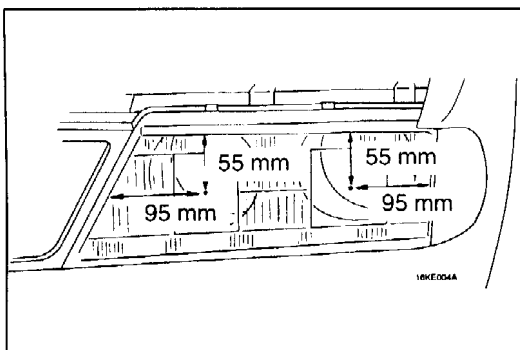
**HEADLAMP AIMING**

**PRE-AIMING INSTRUCTIONS**

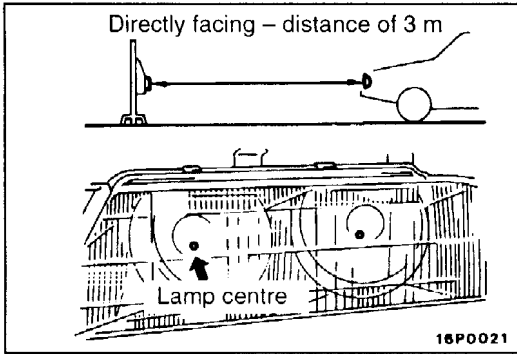
1. Inspect for badly rusted or faulty headlamp assemblies.
  2. These conditions must be corrected before a satisfactory adjustment can be made.
  3. Place vehicle on a level floor.
  4. Bounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
  5. Inspect tyre inflation.
  6. Rock vehicle sideways to allow vehicle to assume its normal position.
  7. If fuel is not full, place a weight in trunk of vehicle to simulate weight of a full tank [0.72kg per litre]
  8. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg placed in driver's position.
- Thoroughly clean headlamp lenses.

**HIGH BEAM ADJUSTMENT**

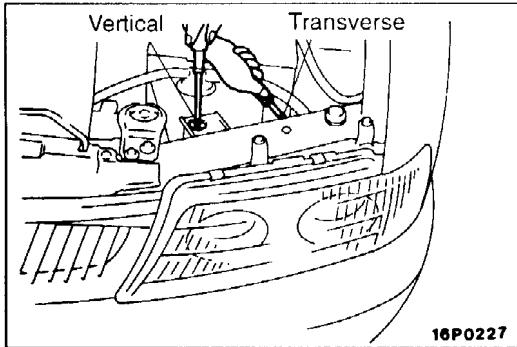
1. Calculate the centre of both the high and low beam lamps as shown in the illustration and mark with a marking pen or similar.



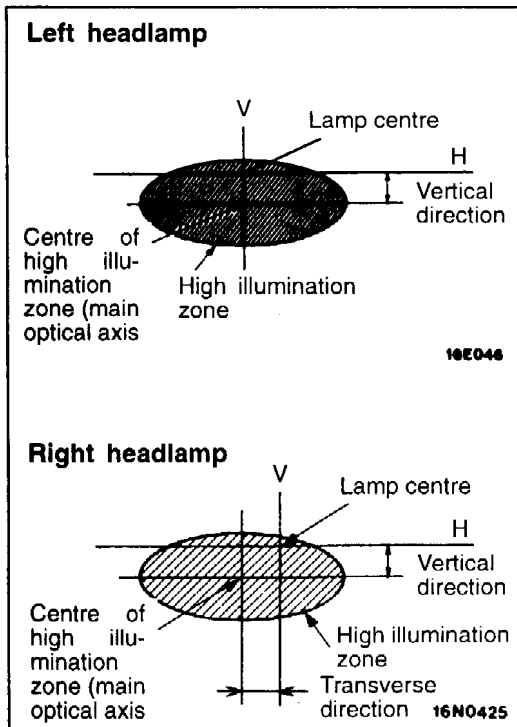




2. Set the beam so that the centre of the tester focusing lens meets the lamp centre with a distance of 3 m in between.



3. Turn the adjusting screw until the deviation of the main optical axis falls within the standard values.



**Standard Values**

<b>Vertical direction</b>	25' (22 mm) downward from horizontal line H
<b>Transverse direction</b>	Left headlamp parallel to advancing direction
	Right headlamp 15' (13 mm) to left of vertical line V

**NOTE**

1. Remove the connector and adjust an unadjusted lamp while it is not lit. Be sure not to deviate the optical axis when connecting the connector. When you must cover the lens surface with a shade, the lamp must not be lit for more than three minutes.
2. Do not mask the outer lens surface with tape, etc.

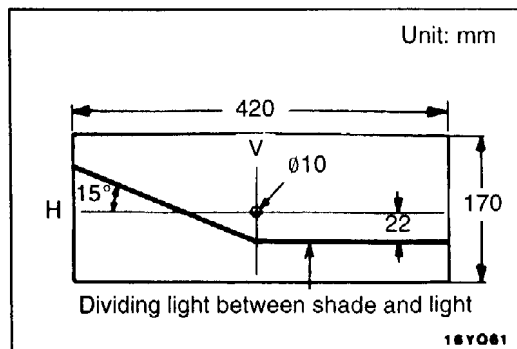
**LOW BEAM ADJUSTMENTS**

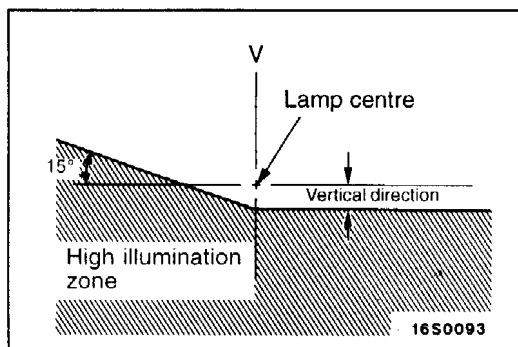
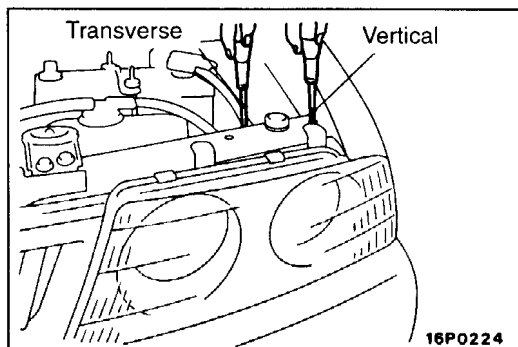
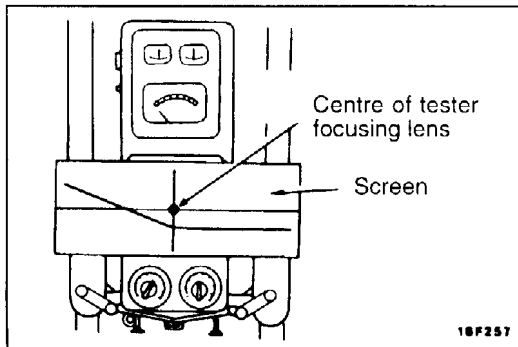
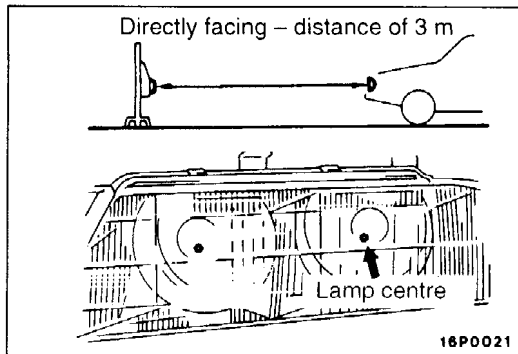
1. Prepare an adjustment screen as shown.

**NOTE**

Use thick white paper for the adjustment screen.

2. Draw in the line that divides the light and shade.





- Set the tester and the lamp in such a way that the centre of the tester focusing lens meets the lamp centre with a distance of 3 m in between.

## NOTE

Refer to step 1 of the high beam adjustment procedure to calculate the lamp centre.

- Match the centre hole of the adjustment screen to the centre of the tester focusing lens and attach the screen with tape.

- Turn the adjusting screw until the deviation of the high illumination zone on the adjustment screen is within the standard values (dividing line between light and shade).

## Standard Values

Vertical	25' (22 mm) downward from horizontal line H
Transverse	Point at which 15° start up portion intersects perpendicular line V

## NOTE

- Remove the connector and adjust an unadjusted lamp while it is not lit. Be sure not to deviate the optical axis when connecting the connector. When you must cover the lens surface with a shade, the lamp must not be lit for more than three minutes.
- Do not mask the outer lens surface with tape, etc.

## LUMINOUS INTENSITY MEASUREMENT

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

## Limit:

**High-beam: 18,000 cd or more**

**Low-beam: 7,000 cd or more**

## NOTE

- When measuring the luminous intensity of headlamp, keep the engine at 2,000 rpm and have the battery charged.
- If there are specific regulations for luminous intensity of headlamps in the region where the vehicle is operated, make sure that the intensity conforms to the requirements of such regulations.

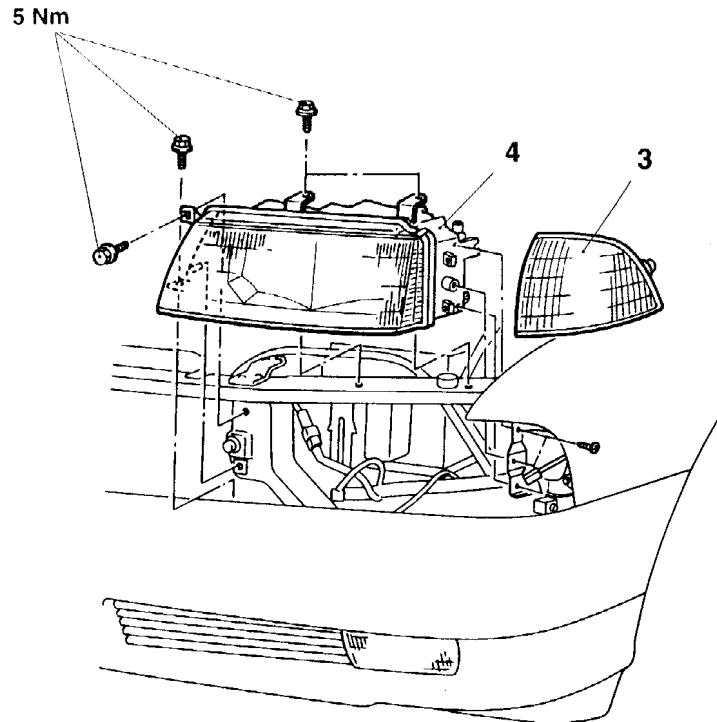
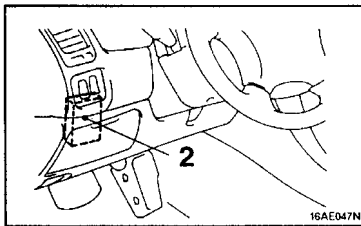
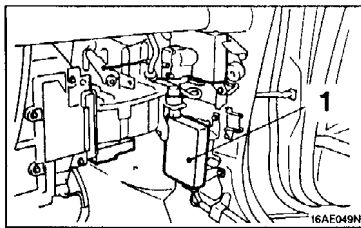
# HEADLAMP, POSITION LAMP ASSEMBLY AND FRONT TURN SIGNAL LAMP ASSEMBLY

## REMOVAL AND INSTALLATION

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

### Pre-removal and Post-installation Operation

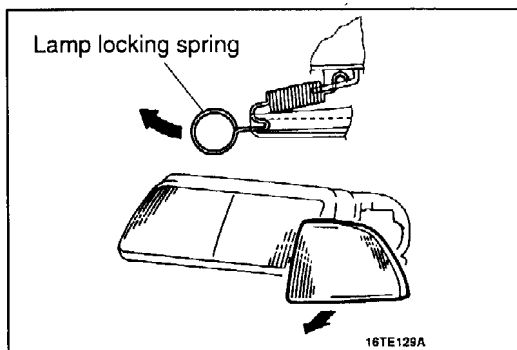
- Removal and Installation of Battery (When replacing only left side headlamp)
- Radiator Grille Removal and Installation (Refer to Group 51–Garnishes and Grilles)



1. Assist-ECU
  2. Instrument panel-ECU
- Headlamp, position lamp and front turn signal lamp removal steps**

4. Headlamp assembly  
For removal and installation of column switch assembly Refer to GROUP 37A – Steering Wheel

◀▶ 3. Front turn signal lamp assembly



## REMOVAL SERVICE POINT

### ◀▶ FRONT TURN SIGNAL LAMP ASSEMBLY REMOVAL

1. Remove the lamp locking spring.
2. Pull the lamp assembly forward and out.

**INSPECTION**

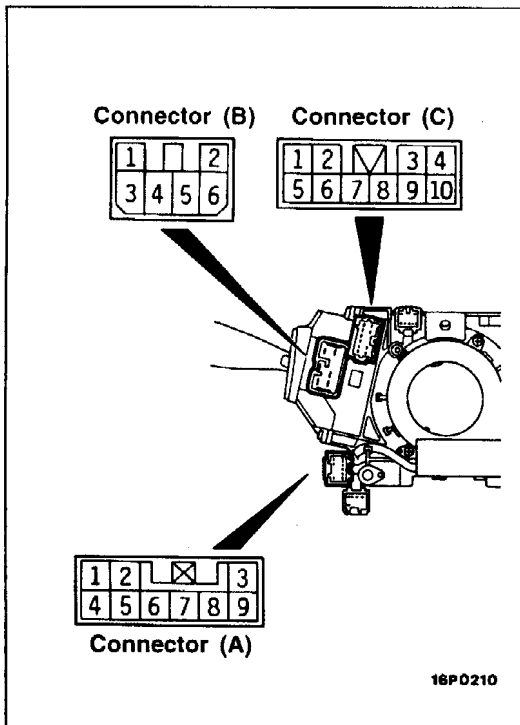
Refer to GROUP 51 – Windshield Wiper and Washer for removal and installation of the column switch.

**Caution**

Before removal of air bag module and clock spring, refer to the followings:

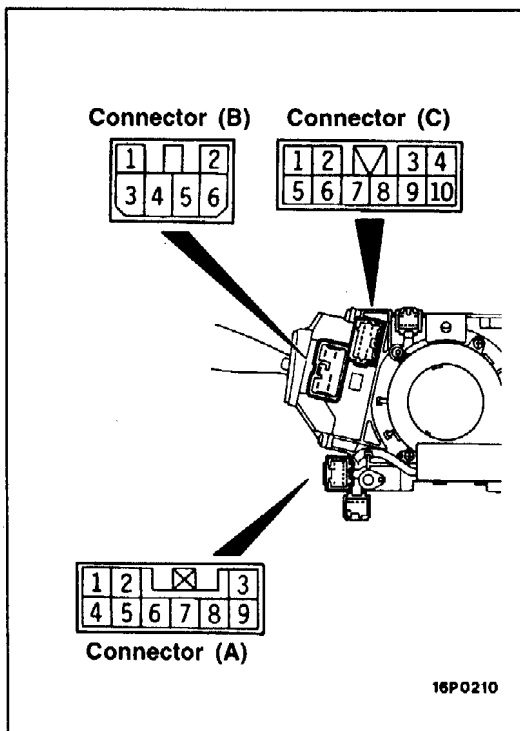
GROUP 52B – SRS Service Precautions

GROUP 52B – Air Bag Module and Clock Spring



**COLUMN SWITCH CONTINUITY CHECK <Lighting Switch and Dimmer/Passing Switch>**

Switch position		Connector (A) terminal No.				Connector (B) terminal No.							
		2	5	8	9	1	2	3	4	6			
OFF													
Lighting Switch	Position taillamp		○	○									
	Headlamp	○	○	○									
Dimmer Switch	Low-beam								○	○			
	High-beam										○	○	
	PASSING												
	At low beam					○	○			○	○		
	At high beam					○	○				○	○	

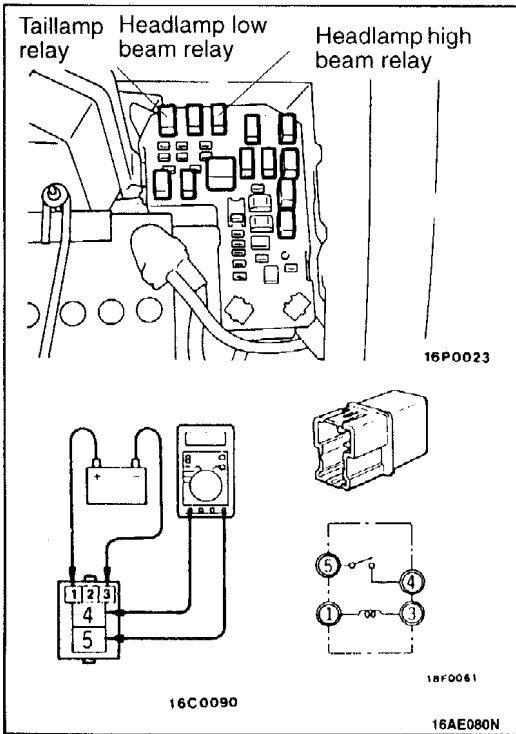


**COLUMN SWITCH CONTINUITY CHECK <Turn-signal light switch>**

Switch position		Connector (C) terminal No.		
		5	7	8
Turn signal lamp switch	LH	○	○	○
	OFF			
	RH		○	○

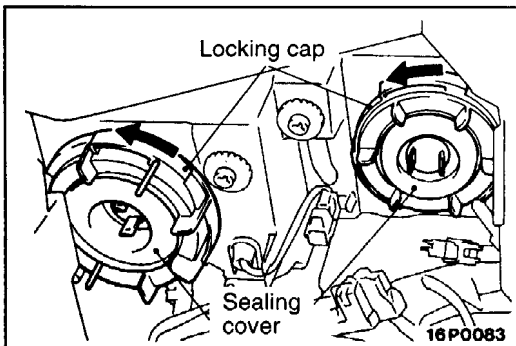
**HAZARD LIGHT SWITCH CONTINUITY CHECK**

Refer to P.54-72.



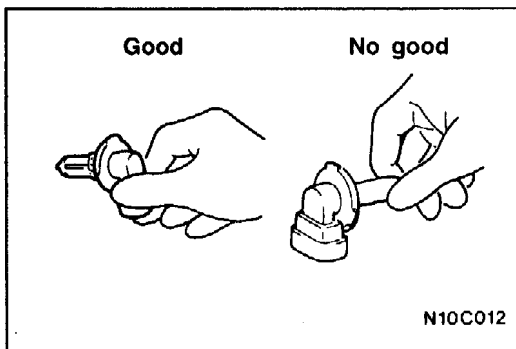
**HEADLAMP RELAY CONTINUITY CHECK**

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



**HEADLAMP BULB REPLACEMENT**

1. Remove the sealing cover by turning it counterclockwise.

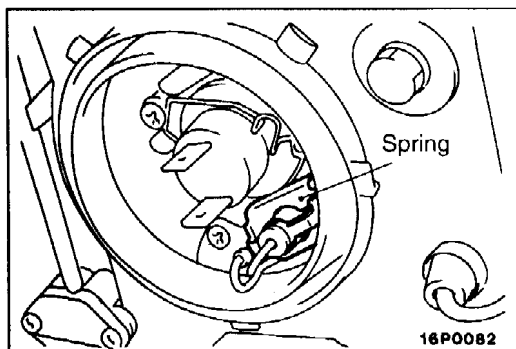


2. Detach the bulb fitting spring, and then remove the bulb.

**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.**

3. Install the sealing cover securely after the bulb replacement.  
If the sealing cover is not securely installed, the lens will be out of focus, or water will get inside the lamp unit, so the cover should be securely installed.

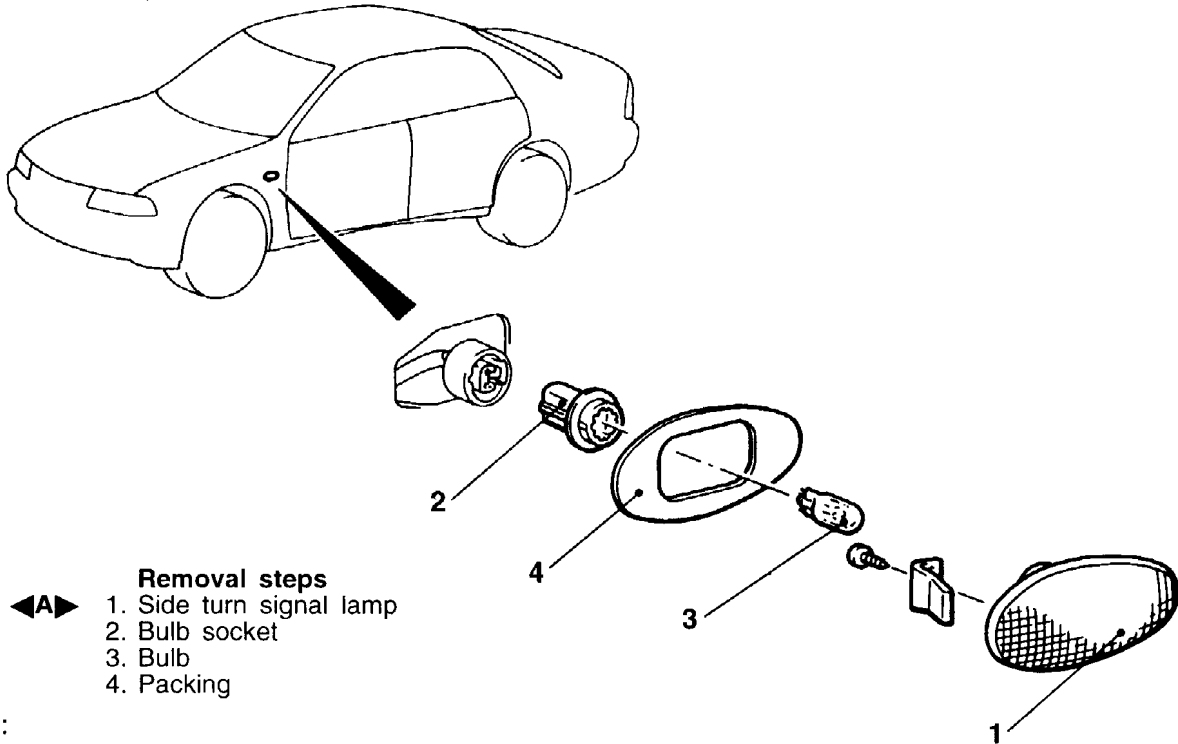


**POSITION LAMP BULB REPLACEMENT**

1. Disconnect the connector and remove the sealing cover of the headlamp low beam.
2. Lift the spring and pull out the position lamp bulb.

# SIDE TURN SIGNAL LAMP

## REMOVAL AND INSTALLATION

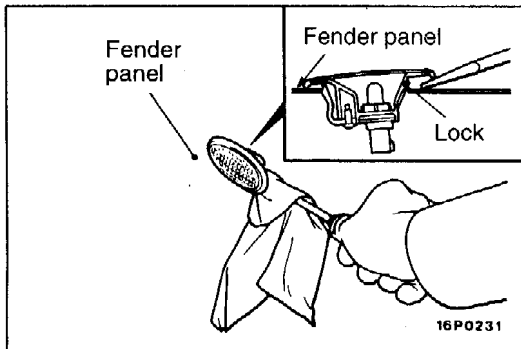


- ◀A▶ Removal steps**
1. Side turn signal lamp
  2. Bulb socket
  3. Bulb
  4. Packing

**NOTE:**

Refer to Group 37A - Steering Wheel and Shaft, for removal and installation of the column switch assembly (lighting switch).

18 P 0108



### REMOVAL SERVICE POINT

**◀A▶ SIDE TURN SIGNAL LAMP REMOVAL**

With a flat-bladed screwdriver, remove the lock from the fender panel and take out the side turn signal lamp.

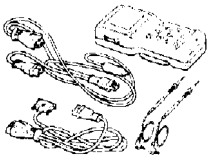

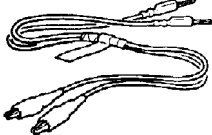
16P0231

## FOG LAMP

### SERVICE SPECIFICATIONS

Items		Standard value
Fog lamp aiming	Vertical direction	47mm below horizontal (H)
	Horizontal direction	35mm to left of vertical line (V)

### SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

**SWS SIMPLIFIED FAULT DIAGNOSTIC MODE**

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS-ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

**SWS DIAGNOSIS CODE CLASSIFICATION TABLE**

Refer to Simplified Wiring System P.54-107.

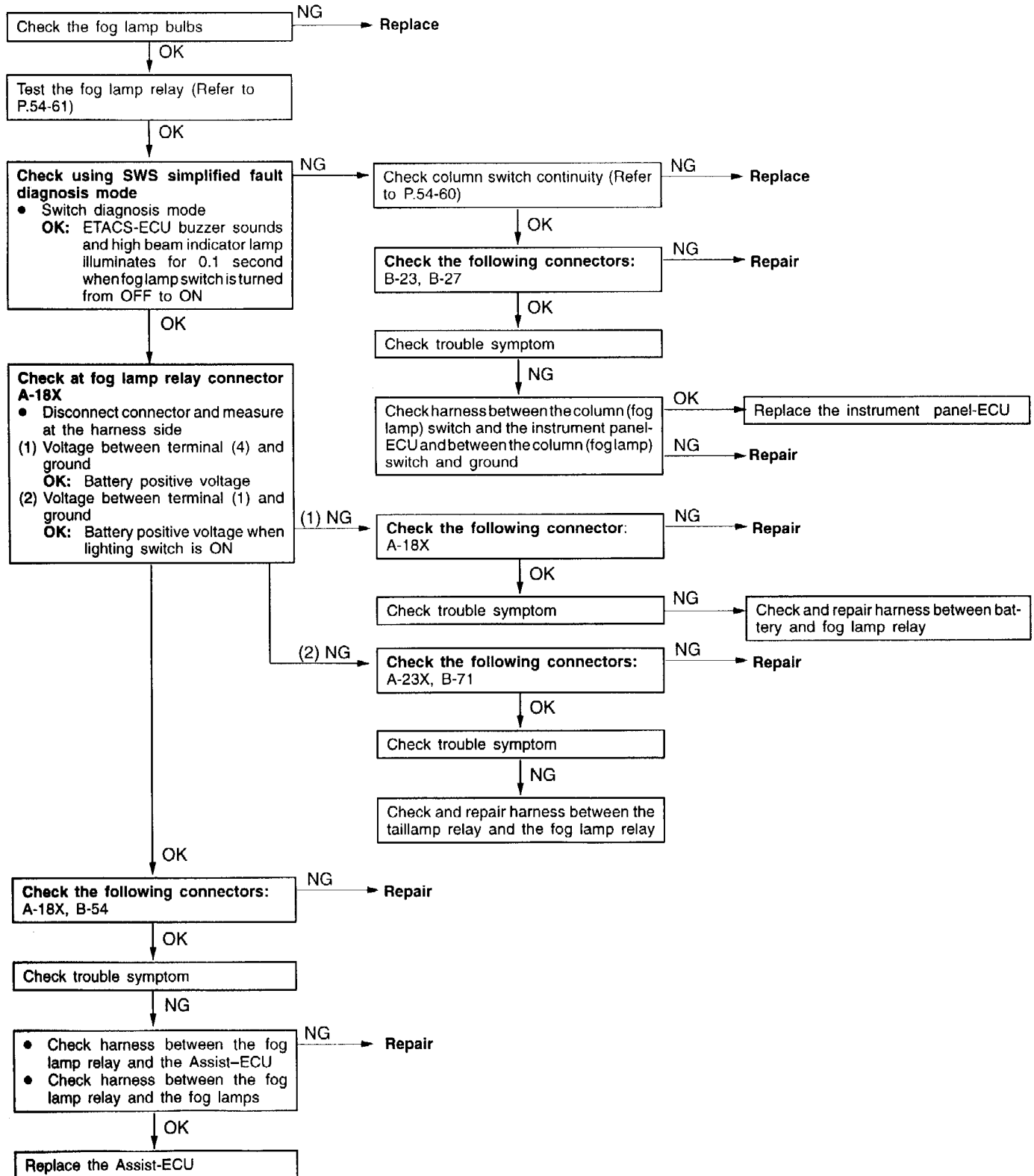
**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-104)	
Switching to SWS Simplified Fault Diagnosis mode not possible		
Fog lamp does not operate normally (taillamps and headlamps operate normally)	1	54-57



**INSPECTION PROCEDURE 1**

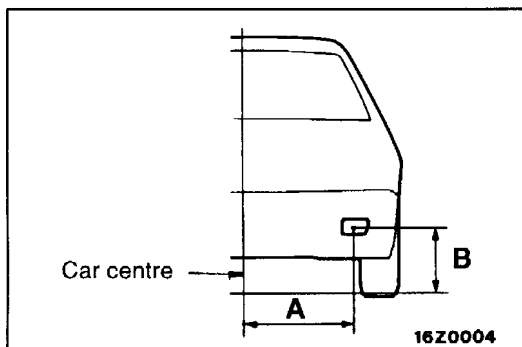
Fog lamp does not operate normally (taillamps and headlamps operate normally)	Probable cause
The fog lamp switch input circuit, relay drive circuit harness or connector may be defective.	<ul style="list-style-type: none"> <li>● Fog lamp bulbs blown</li> <li>● Fog lamp switch defective</li> <li>● Fog lamp relay defective</li> <li>● Harness or connector defective</li> <li>● Instrument panel-ECU malfunction</li> <li>● Assist-ECU malfunction</li> </ul>



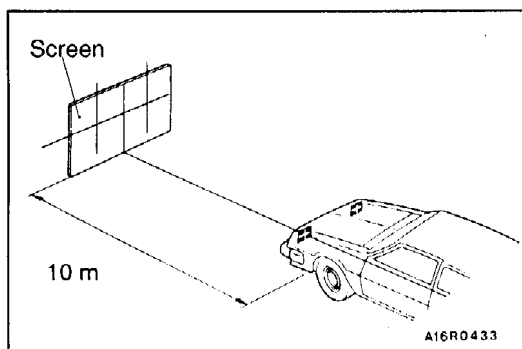
## ON-VEHICLE SERVICE

### FOG LAMP AIMING

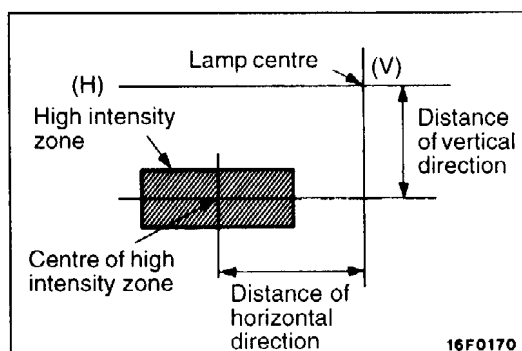
1. Inspect for badly rusted or faulty fog lamp.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Place vehicle on a level floor.
4. Bounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
5. Inspect tyre inflation.
6. Rock vehicle sideways to allow vehicle to assume its normal position.
7. If fuel tank is not full, place a weight in trunk of vehicle to simulate weight of a full tank [0.72kg per litre].
8. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg placed in driver's position.  
Thoroughly clean fog lamp lenses.



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



10. Set the distance between the screen and the centre of the fog lamps as shown in the illustration.



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

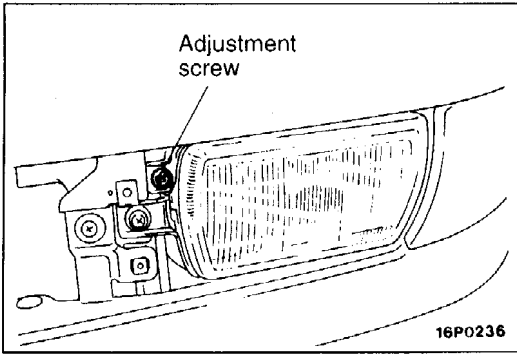
#### Standard value:

(Vertical direction)

47mm below horizontal (H)

(Horizontal direction)

35mm to left of vertical line (V)

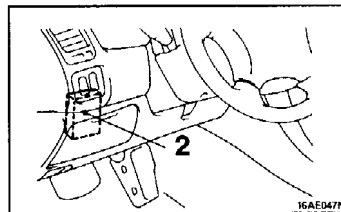
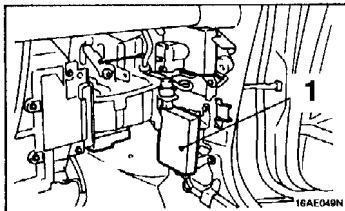
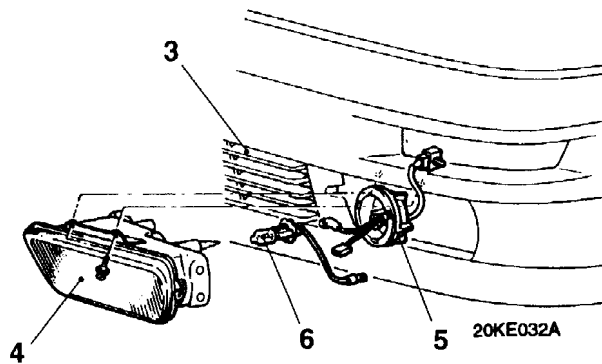


**NOTE**

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

**FOG LAMP**

**REMOVAL AND INSTALLATION**



16AE130E

1. Assist-ECU (Refer to P.54-128)
2. Instrument panel-ECU (Refer to P.54-128)

**Fog lamp switch removal steps**

- Column switch (Refer to Group 51 Windshield Wiper and Washer)

**Fog lamp removal steps**

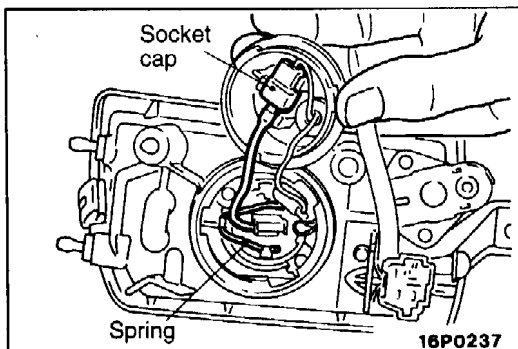
3. Under grille
4. Fog lamp
5. Sealing cover
6. Bulb

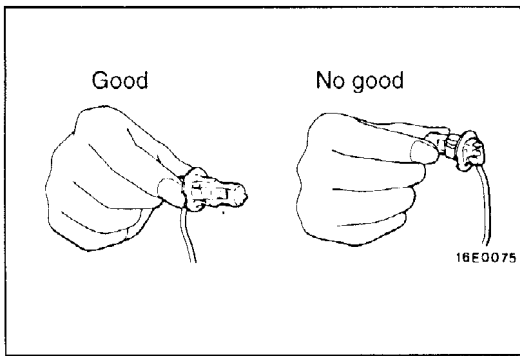


**REMOVAL SERVICE POINT**

**◀A▶ BULB REMOVAL**

1. Remove the bulb socket cap.
2. Remove the bulb attachment spring and pull out the bulb.





**Caution**

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

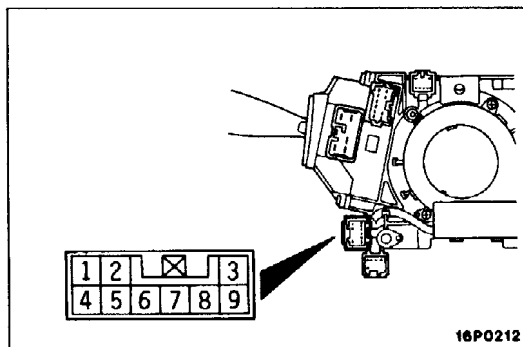
**INSTALLATION SERVICE POINT**

▶A◀ **SEALING COVER INSTALLATION**

Install the sealing cover securely.

**Caution**

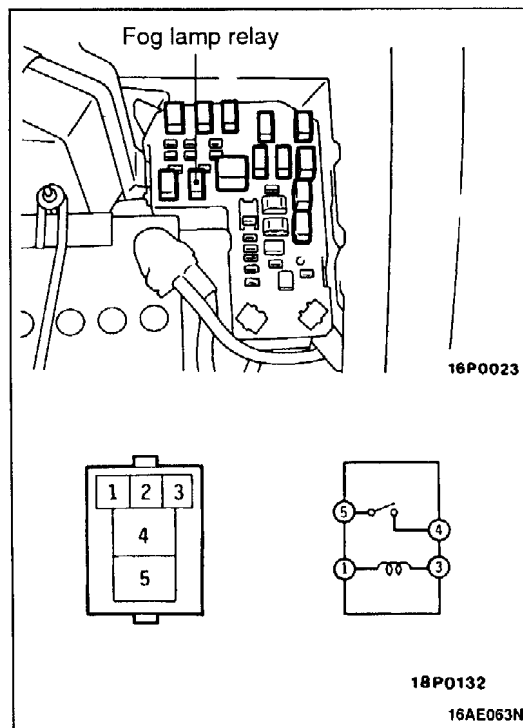
If the sealing cover is not securely installed, the lens will be out of focus, or water will get inside the lamp unit, so the sealing cover should be securely installed.



**INSPECTION**

**FOG LAMP SWITCH CONTINUITY CHECK**

Switch position		Terminal No.	
		3	7
Fog lamp switch	OFF		
	ON	○ — ○	○ — ○



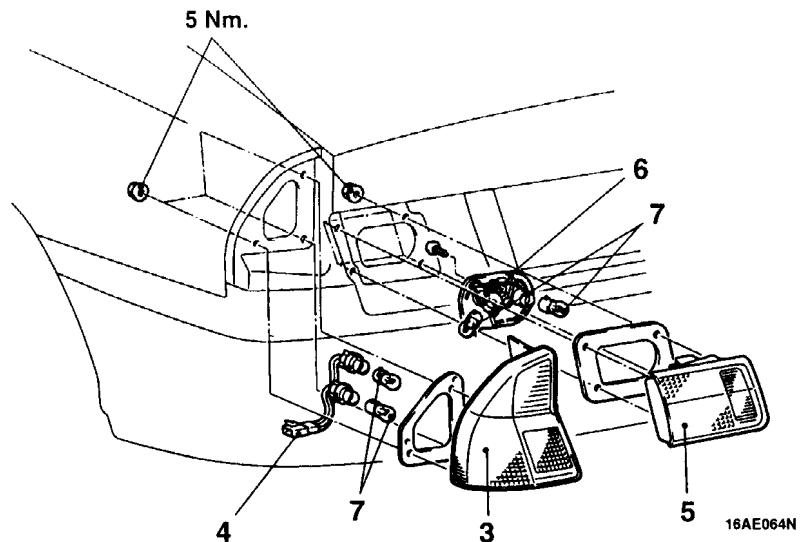
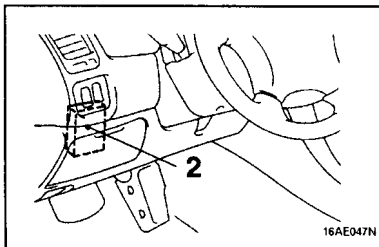
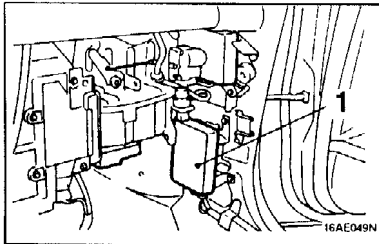
**FOG LAMP RELAY CONTINUITY CHECK**

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

# REAR COMBINATION LAMP AND REAR LID LAMP

## REMOVAL AND INSTALLATION

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



16AE065N

1. Assist-ECU (Refer to P.54-128)
2. Instrument panel-ECU (Refer to P.54-128)

### Rear combination lamp removal steps

- Trunk rear side trim (Refer to Group 52A)
- 3. Rear combination lamp
- 4. Socket holder/bulb assembly

### Rear lid lamp removal steps

- Trunk rear trim (Refer to Group 52A–Trims)
- 5. Rear lid lamp
- 6. Socket assembly
- 7. Bulb

### Column switch removal

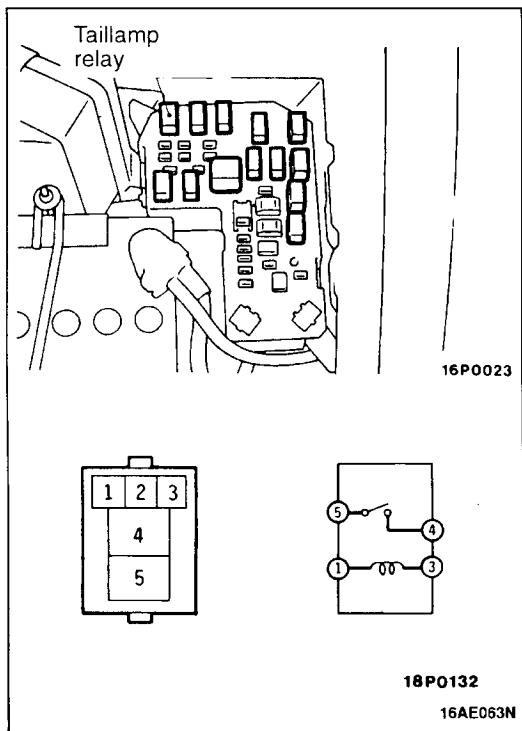
- Column switch <Lighting switch> (Refer to GROUP 51 – Windshield Wiper and Washer)

## INSPECTION

### FOG LAMP SWITCH CONTINUITY CHECK

Refer to P.54-60.

# 54-62 CHASSIS ELECTRICAL – Rear Combination Lamp and Rear Lid Lamp

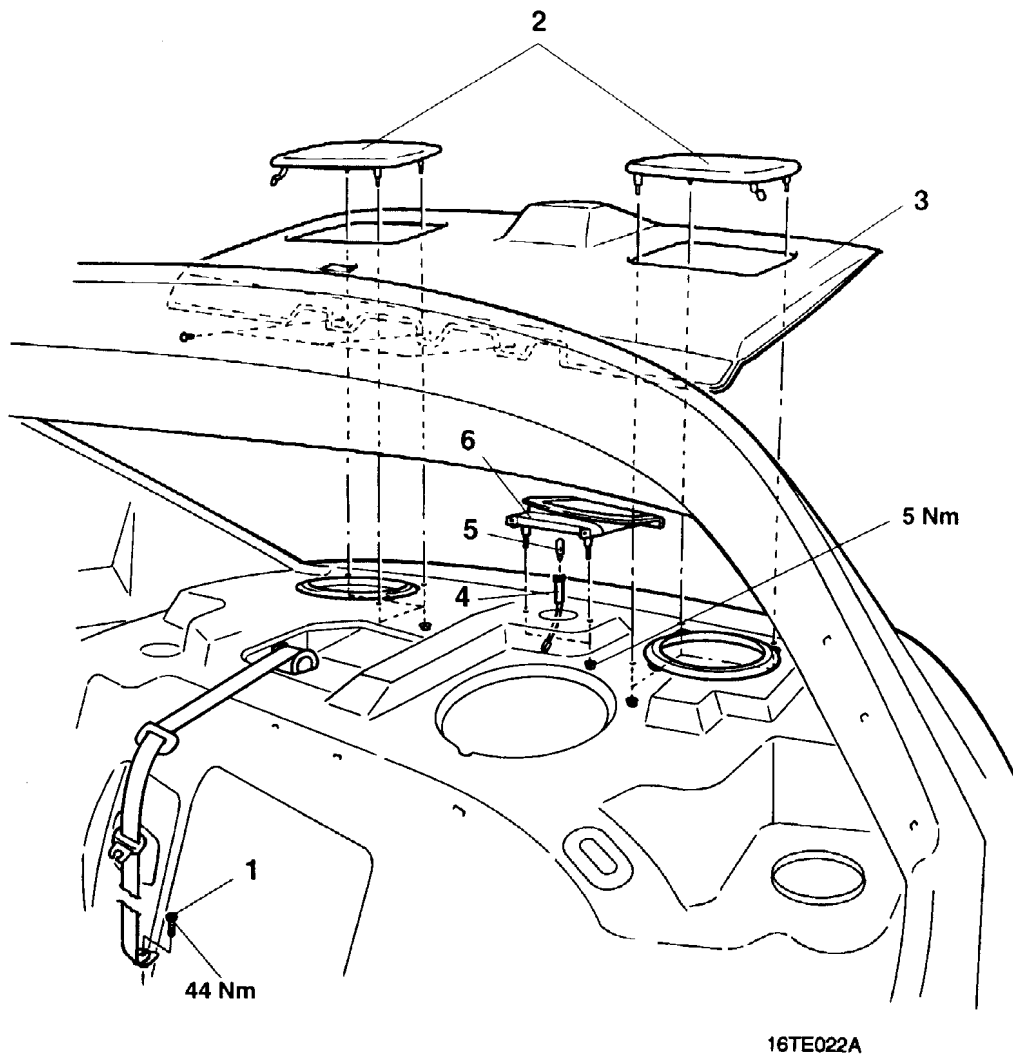


## TAILLAMP RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	+	-	○	○

# HIGH MOUNTED STOP LAMP

## REMOVAL AND INSTALLATION



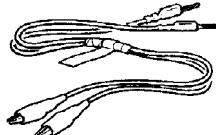


### Removal steps

- Rear shelf trim removal (Refer to Group 52 – Trims)
- 1. Centre seatbelt retaining bolt
- 2. Speaker mesh
- 3. Rear shelf trim
- 4. Socket assembly
- 5. Bulb
- 6. High mounted stop lamp

## INTERIOR LAMP

### SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLE SHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.



**SWS SIMPLIFIED FAULT DIAGNOSTIC MODE**

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS-ECU specification
- Switch input signals for each ECU
- Diagnosis code output

Refer to P.54-104 for details of the SWS Simplified Fault Diagnosis Mode.

**SWS DIAGNOSIS CODE CLASSIFICATION TABLE**

Refer to Simplified Wiring System P.54-107.

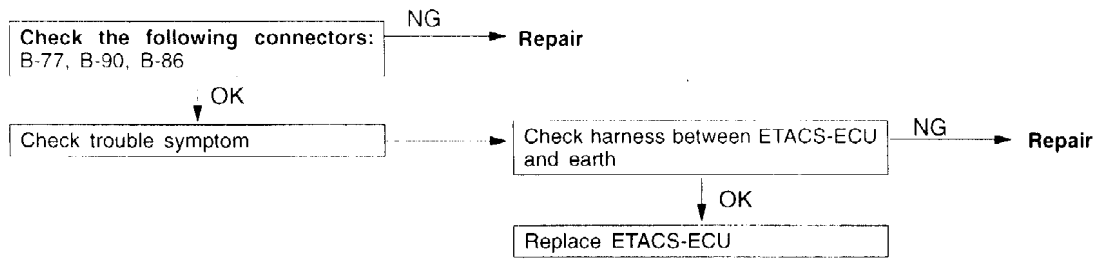
**INSPECTION CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	Refer to SWS Troubleshooting (P.54-104)	
Switching to SWS Simplified Fault Diagnosis mode not possible		
When all doors are closed with the interior lamp in the Door position, the lamp intensity does not reduce (75%) and the lamp does not fade out	1	54-66
With the ignition switch OFF and one of the doors open, the interior lamp does not come on 100%	2	54-67
If the ignition is turned ON when the interior lamp is at reduced intensity or during fade out, the interior lamp does not go out	3	54-68

# INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

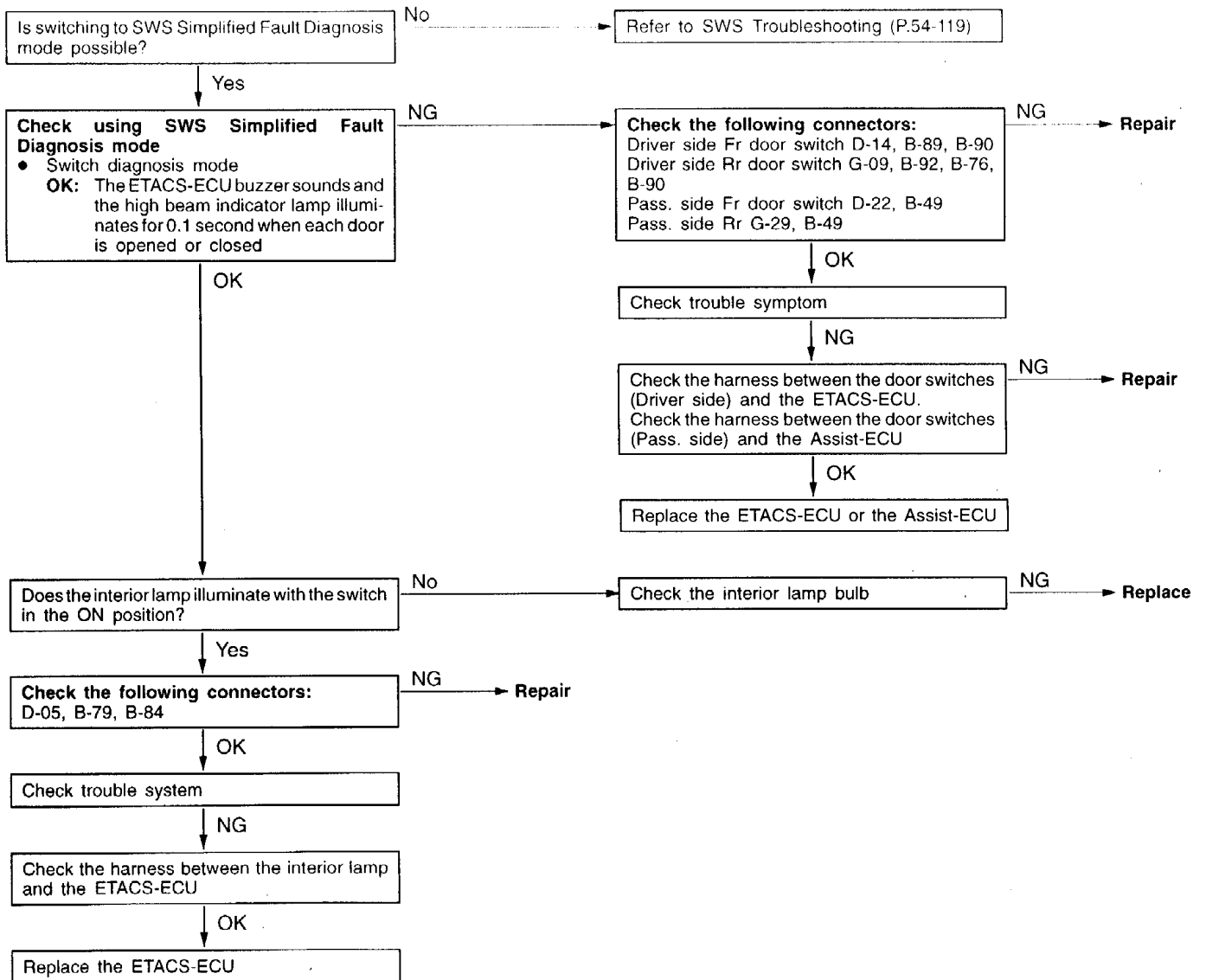
## INSPECTION PROCEDURE 1

<p><b>When all doors are closed with the interior lamp in the DOOR position, the lamp intensity does not reduce (75%) and the lamp does not fade out</b></p>	<p><b>Probable cause</b></p>
<p>The ETACS-ECU ground circuit or the ETACS-ECU may be defective.</p>	<ul style="list-style-type: none"> <li>• Harness or connector defective</li> <li>• ETACS-ECU malfunction</li> </ul>



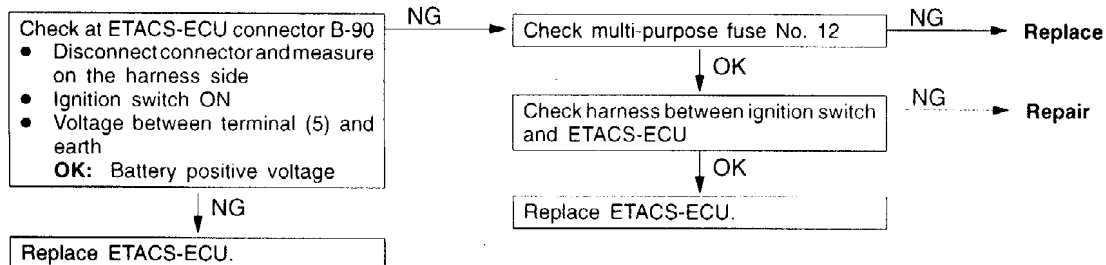
**INSPECTION PROCEDURE 2**

With the ignition switch OFF and one of the doors open, the interior lamp does not come on (100%)	Probable cause
The door switch input circuit or the interior lamp lighting circuit may be defective	<ul style="list-style-type: none"> <li>• Overhead lamp defective</li> <li>• Harness or connector may be defective</li> <li>• ETACS-ECU malfunction (driver side door system)</li> <li>• Assist-ECU malfunction (pass. side door system)</li> </ul>



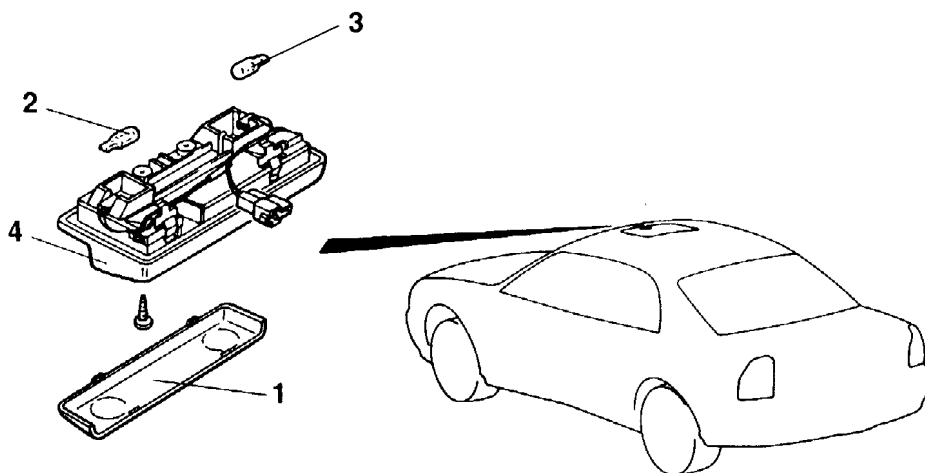
**INSPECTION PROCEDURE 3**

If the ignition switch is turned ON when the interior lamp is at reduced intensity or during fade-out, the interior lamp does not go out	Probable cause
The ignition circuit system or the ETACS-ECU may be defective. In the case of fuse failure, combination meter indicator-related items may also be defective.	<ul style="list-style-type: none"> <li>● Fuse defective</li> <li>● Harness or connector defective</li> <li>● ETACS-ECU malfunction</li> </ul>



# INTERIOR LAMP

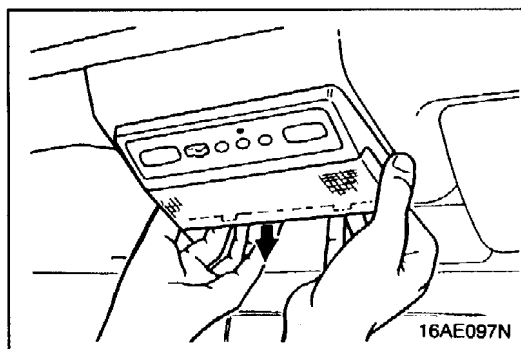
## REMOVAL AND INSTALLATION <Vehicles With Sunroof>



16AE099N

### Removal steps

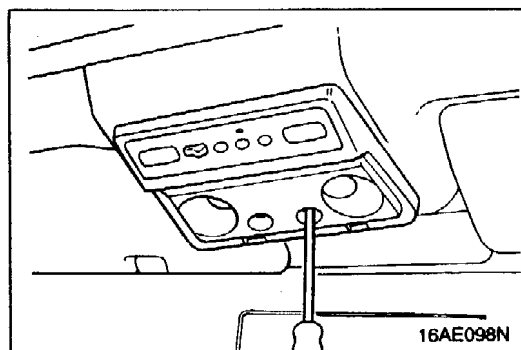
- ◀A▶ 1. Room lamp lens
- 2. Room lamp bulb
- 3. Room lamp bulb
- ◀B▶ 4. Room lamp body



### REMOVAL SERVICE POINTS

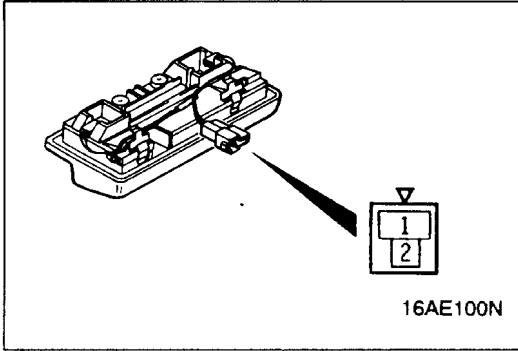
#### ◀A▶ ROOM LAMP LENS REMOVAL

To remove, press the room lamp tab while pulling downwards.



#### ◀B▶ ROOM LAMP BODY REMOVAL

To remove, undo the two screws in the room lamp body and pull the lamp downwards.



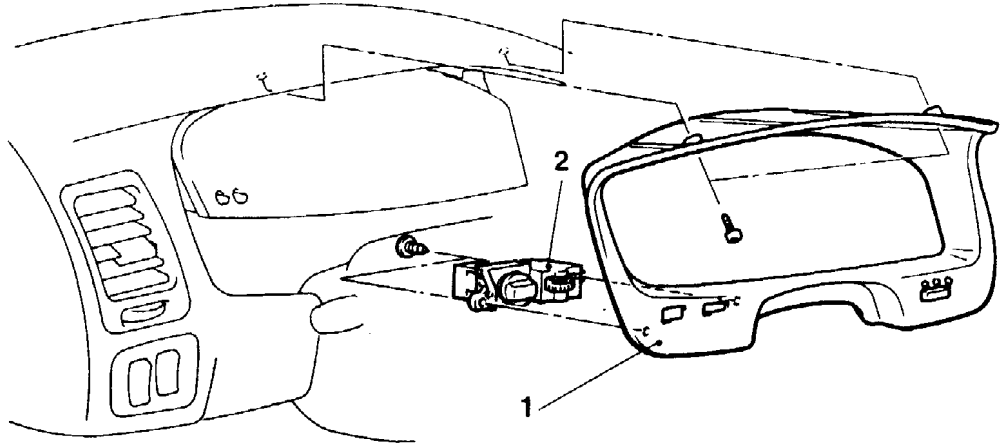
**INSPECTION**

**ROOM LAMP SWITCH CONTINUITY CHECK**

Switch position	Terminal No.		
	1		2
OFF			
ON	○	○ — Body earth	
DOOR	○	○ —	○

# RHEOSTAT

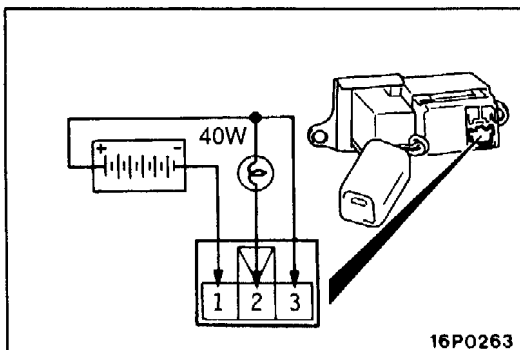
## REMOVAL AND INSTALLATION



16AE066N

### Removal steps

1. Meter bezel
2. Rheostat

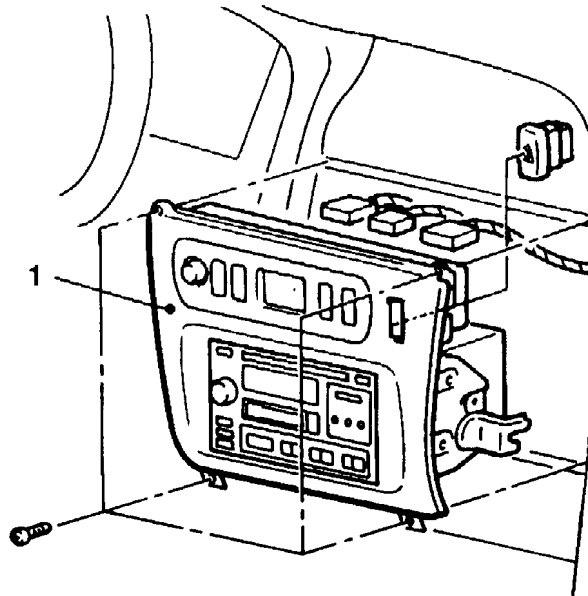


### INSPECTION

1. Connect a battery and test lamp (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

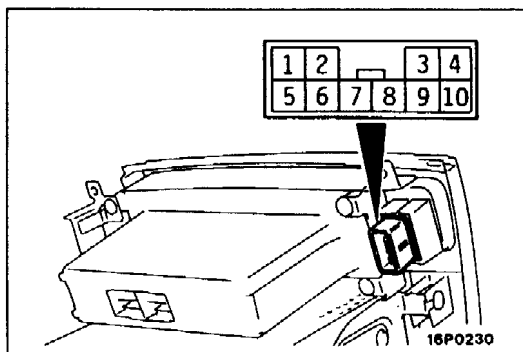
## REMOVAL AND INSTALLATION



16AE067N

### Removal steps

- Floor console assembly (Refer to Group 52A – Floor console)
- Centre air outlet assembly (Refer to Group 52A – Instrument panel)
- Ashtray (Refer to P.54-75)
- 1. Air conditioner control panel assembly

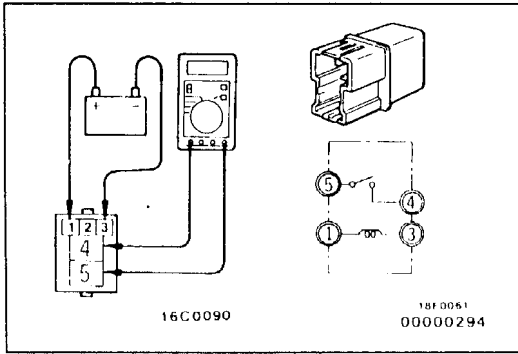


### INSPECTION

#### HAZARD WARNING LAMP SWITCH CONTINUITY CHECK

Switch position	Terminal No.										
	1	2	3	4	5	6	7	8	9	10	
OFF					○	—	○	○	○	ILL	○
ON	○	○	○	○	○	○			○	ILL	○





## HORN

### INSPECTION

#### HORN RELAY CONTINUITY CHECK

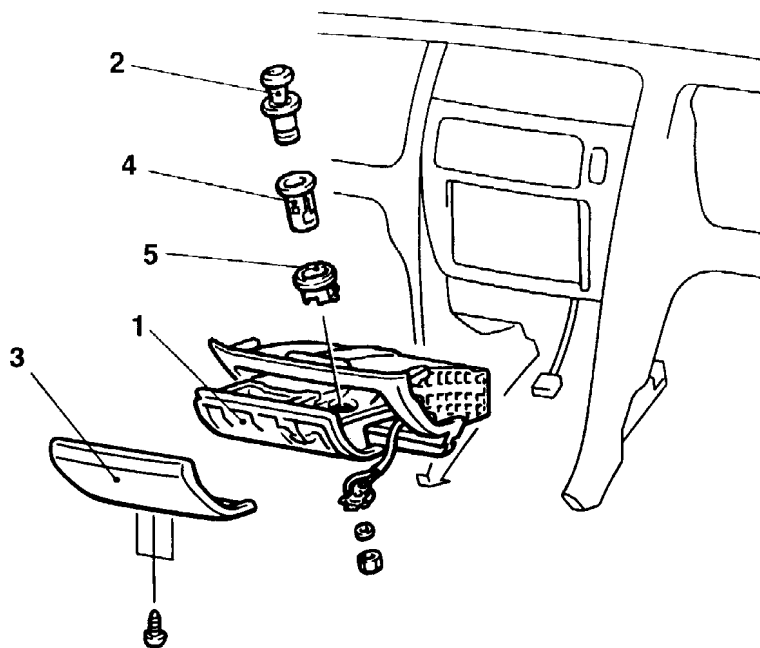
Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

## CIGARETTE LIGHTER

### REMOVAL AND INSTALLATION

**Pre-removal and Post-installation procedures**

- Floor Console Assembly Removal and Installation (Refer to Group 52A–Floor Console)

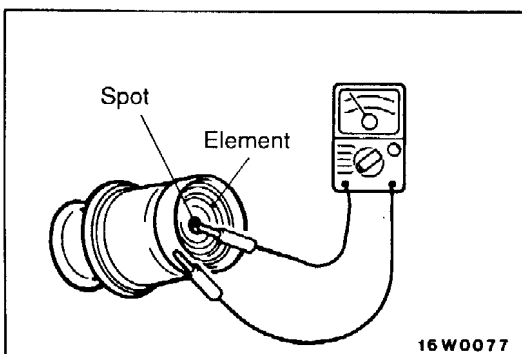


16AE068N

#### Removal steps

1. Ashtray
2. Plug
3. Ashtray cover

4. Protector
5. Socket assembly

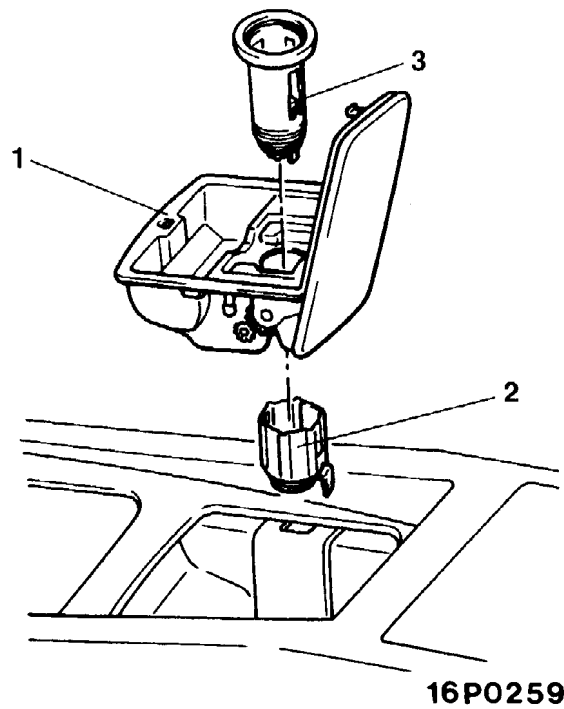


#### INSPECTION

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

#### CAUTIONS FOR USE OF THE CIGARETTE LIGHTER SOCKET AS AUXILIARY POWER SOURCE

1. It is recommended that only the lighter be inserted in the socket.  
Using “plug-in” type accessories in the cigarette lighter socket may damage the socket and result in poor retention of the lighter.
2. “Plug-in” accessories should only be used in the accessory socket provided.

**ACCESSORY SOCKET****REMOVAL AND INSTALLATION**

16P0259

**Removal steps**

1. Coin tray assembly
2. Socket
3. Socket assembly

## RADIO, TAPE PLAYER AND CD PLAYER TROUBLESHOOTING

### QUICK-REFERENCE TROUBLESHOOTING CHART

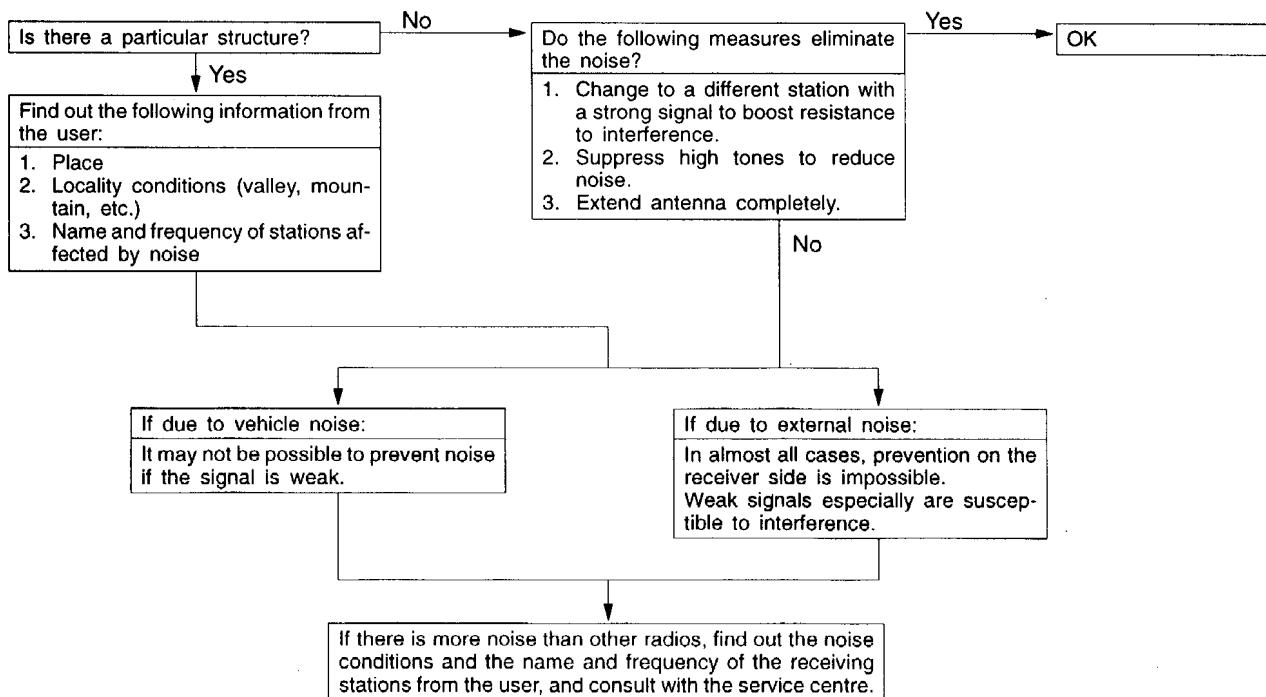
Items	Problem symptom	Relevant chart
Noise	Noise appears at certain places when travelling (AM).	A-1
	Noise appears at certain places when travelling (FM).	A-2
	Mixed with noise, only at night (AM).	A-3
	Broadcasts can be heard but both AM and FM have a lot of noise	A-4
	There is more noise either on AM or on FM.	A-5
	There is noise when starting the engine.	A-6
	Some noise appears when there is vibration or shocks during travelling	A-7
	Noise sometimes appears on FM during travelling.	A-8
	Ever-present noise.	A-9
Radio	When switch is set to ON, no power is available.	B-1
	No sound from one speaker.	B-2
	There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.	B-3
	Insufficient sensitivity.	B-4
	Distortion on AM or on both AM and FM.	B-5
	Distortion on FM only.	B-6
	Too few automatic select stations.	B-7
	Insufficient memory (preset stations are erased).	B-8
Tape player	Cassette tape will not insert.	C-1
	No sound.	C-2
	No sound from one channel.	C-3
	Sound quality is poor, or sound is weak.	C-4
	Cassette tape will not eject.	C-5
	Uneven revolution. Tape speed is fast or slow.	C-6
	Faulty auto reverse.	C-7
	Tape gets caught in mechanism.	C-8
	Automatic search does not work	C-9

Items	Problem symptom	Relevant chart
CD player	CD will not be accepted.	D-1
	No sound.	D-2
	CD sound skips.	D-3
	Sound quality is poor.	D-4
	CD will not be ejected.	D-5
	No sound from one channel.	D-6
Motor antenna	Motor antenna won't extend or retract.	E-1
	Motor antenna extends and retracts but does not receive.	E-2

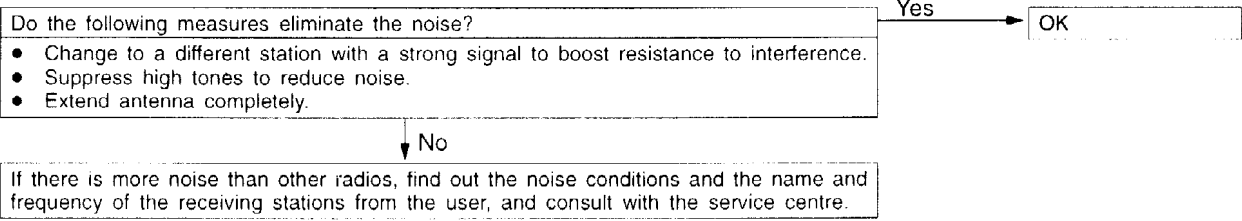
**CHART**

**A. NOISE**

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



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



**NOTE**

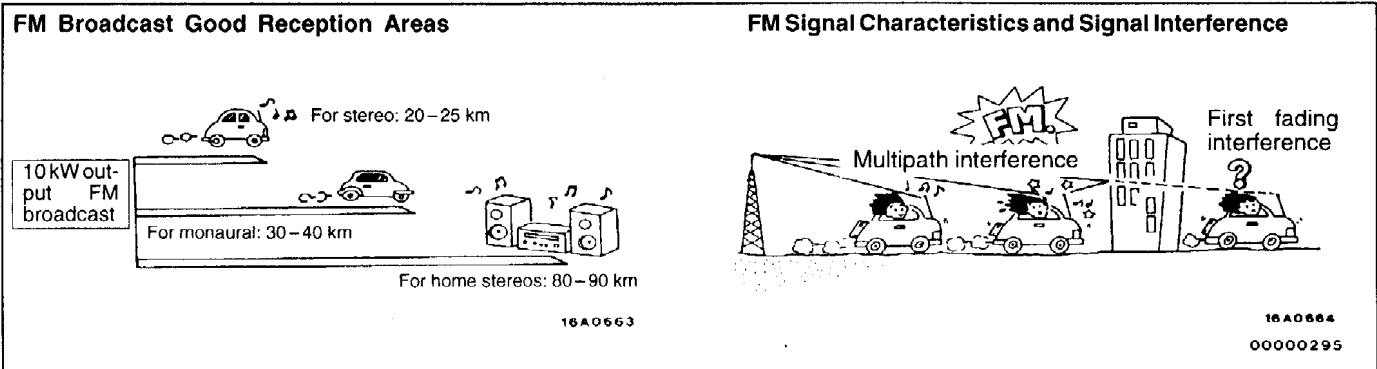
About FM waves:

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.



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

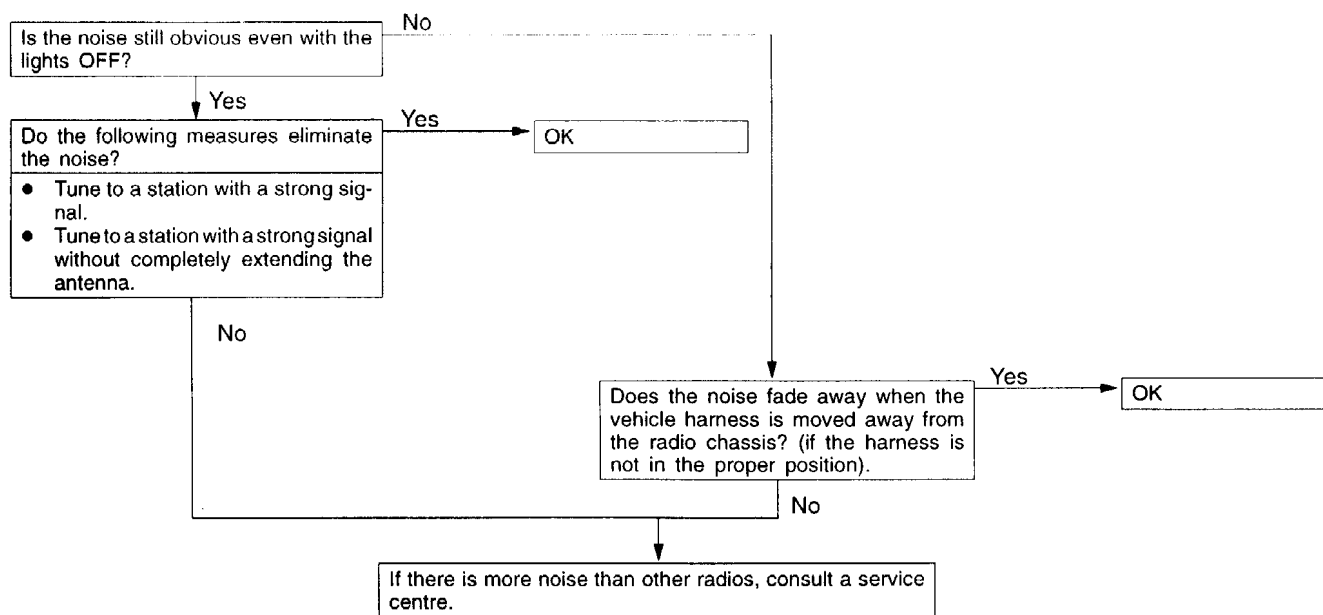
The following factors can be considered as possible causes of noise appearing at night.

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

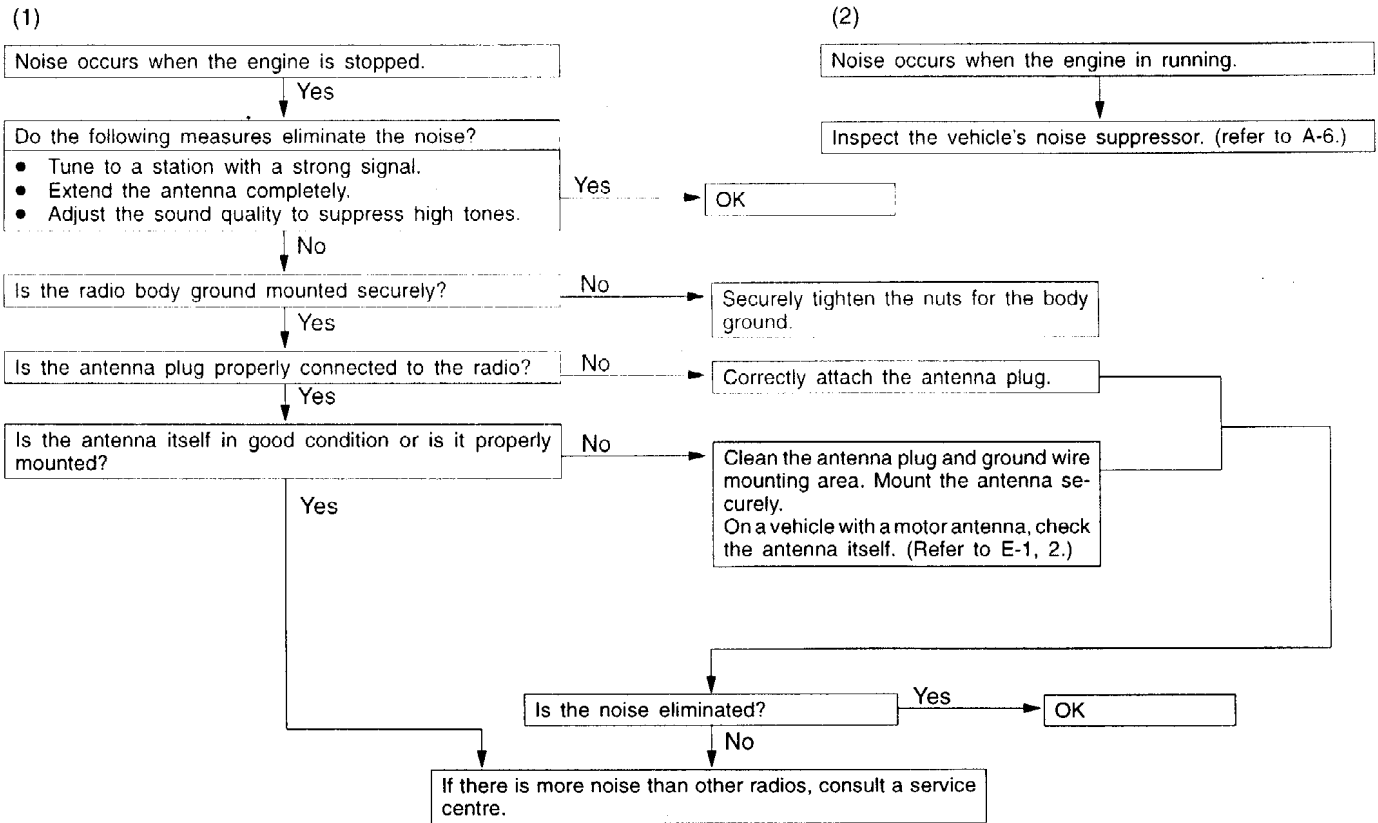
and a change to a different station or the appearance of a beating sound\* may occur.

Beat sound\*: Two signals close in frequency interfere with each other, creating a repetitious high-pitched sound. This sound is generated not only by sound signals but by electrical waves as well.

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



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



**NOTE**

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

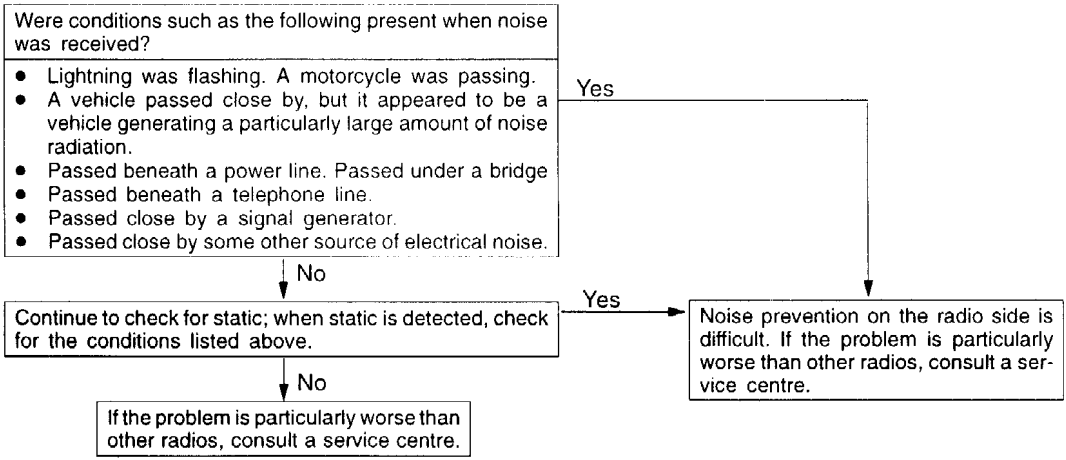
of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2.)

<Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>



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

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



2. There is much noise only on FM  
 Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distor-

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

A-6		There is noise when starting the engine.		
Noise type Sounds are in parentheses ( ).	Conditions	Cause	Inspection or replacement (Noise-preventive part)	
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>	Ground cable	Check or replace the ground cable.
			Noise capacitor	Check or replace the noise capacitor.
Other electrical components	–	Noise may appear as electrical components become older.	Repair or replace electrical components.	
Static electricity (Cracking, Crinkling)	<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.	Ground parts by bonding. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly grounded.	

**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 due 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.**

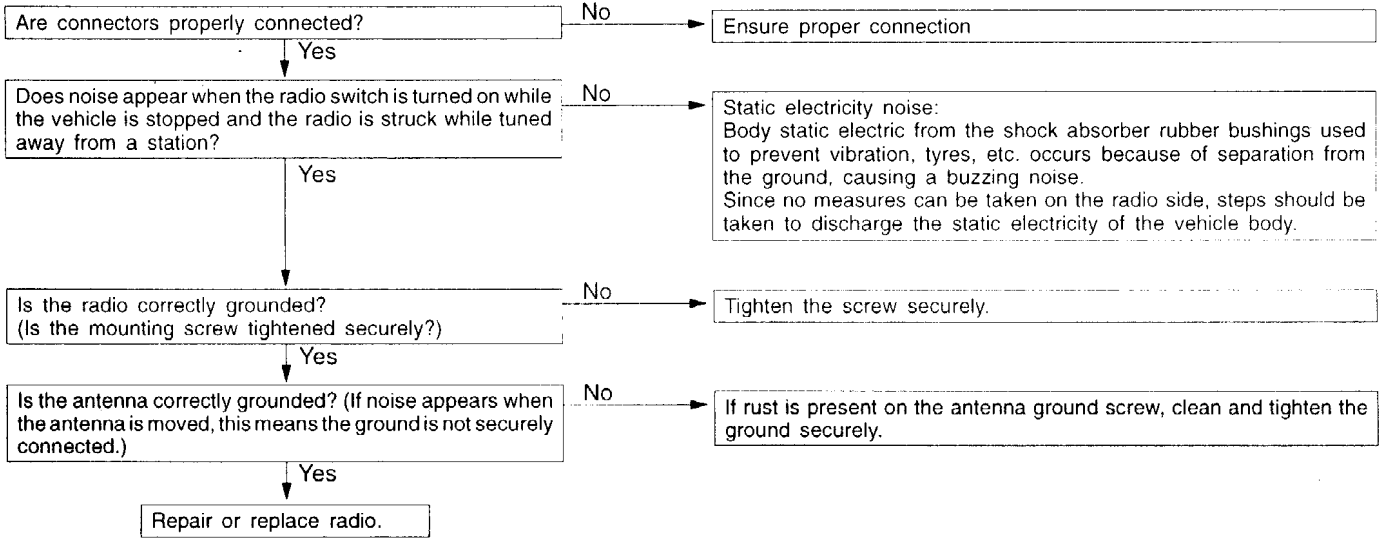
**NOTE**

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

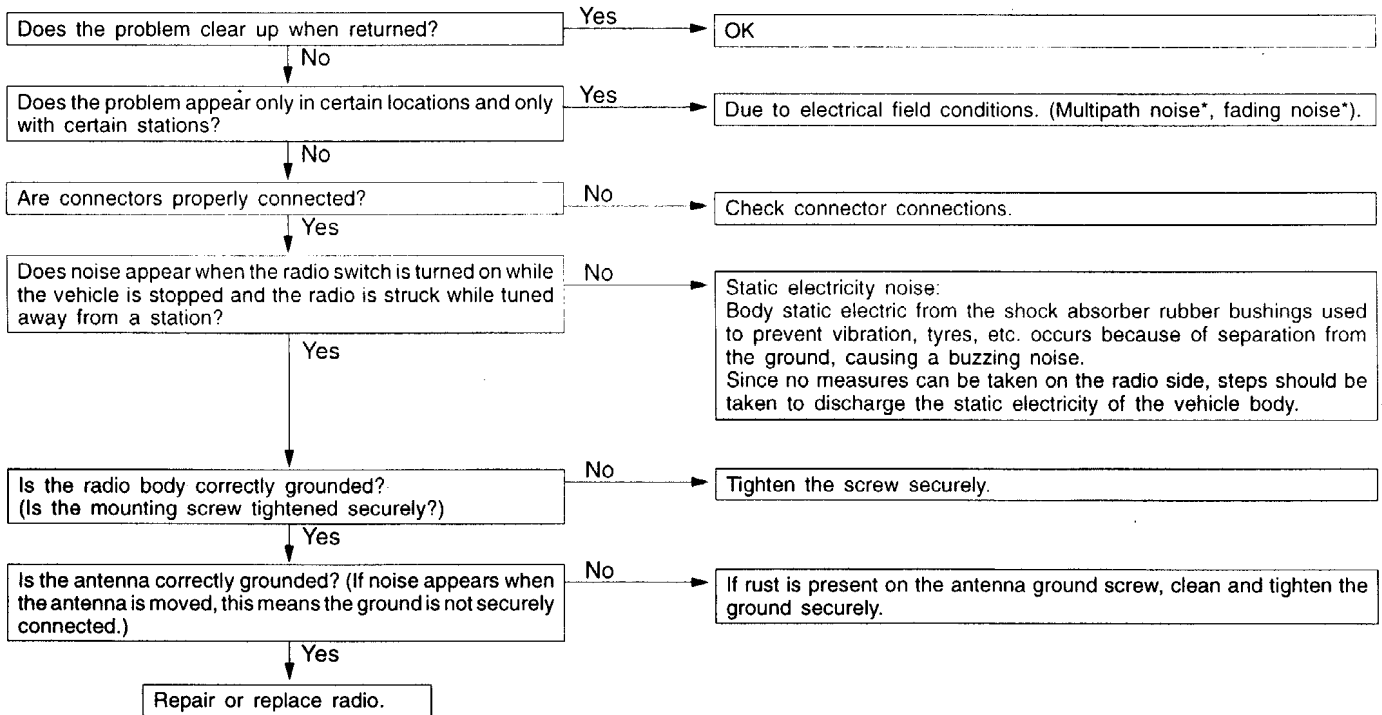
against A.C.) decreases, and current flow is facilitated. A noise suppressing condenser which takes advantage of this property is inserted between the power line for the noise source and the ground. This suppresses noise by grounding the noise component (A.C. or pulse signal) to the body of the vehicle.

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.**

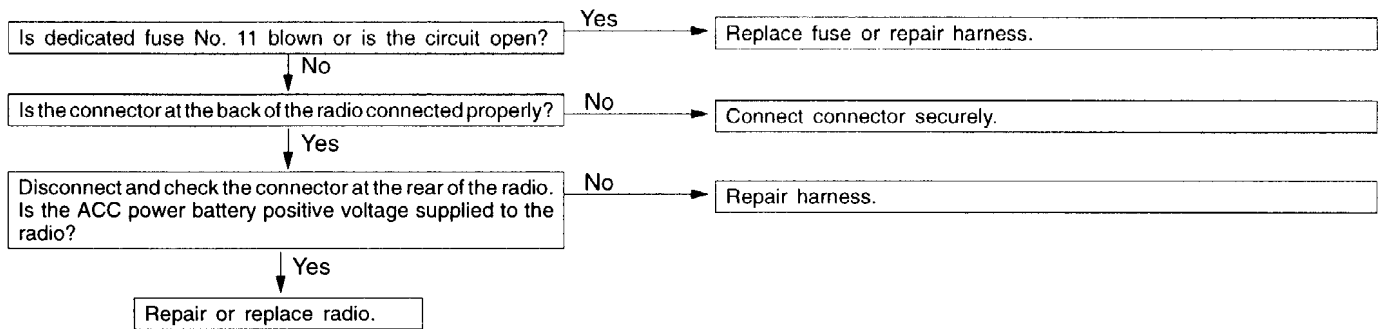
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

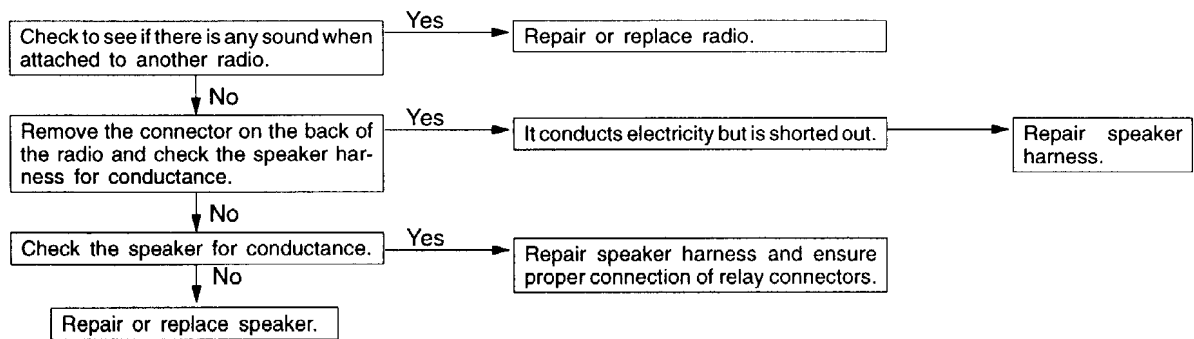
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

**B. RADIO**

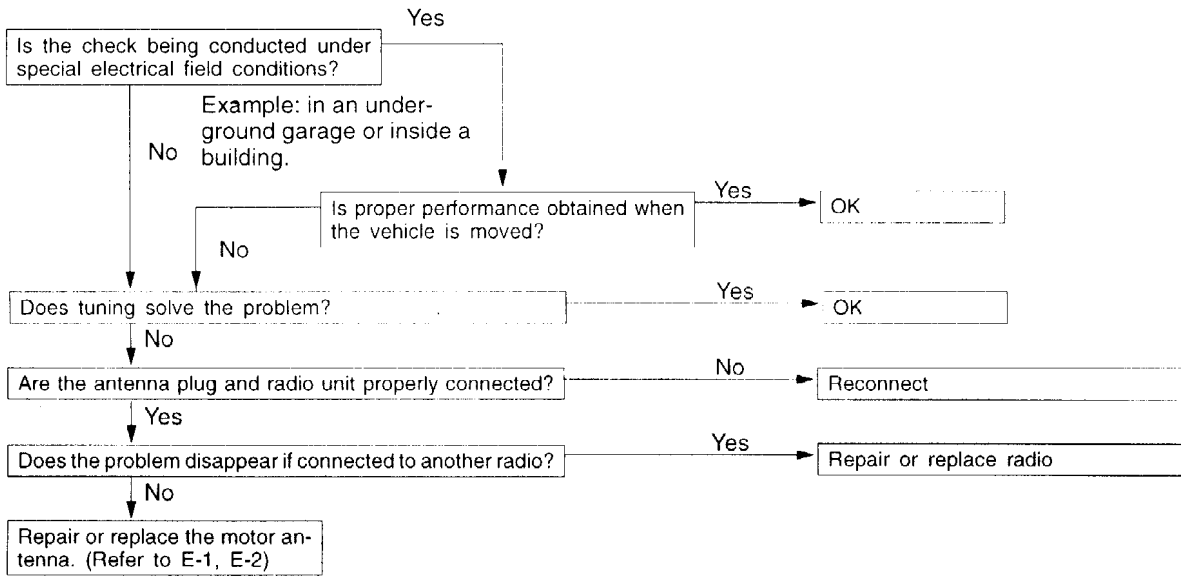
**B-1 No power is supplied when the switch is set to ON.**



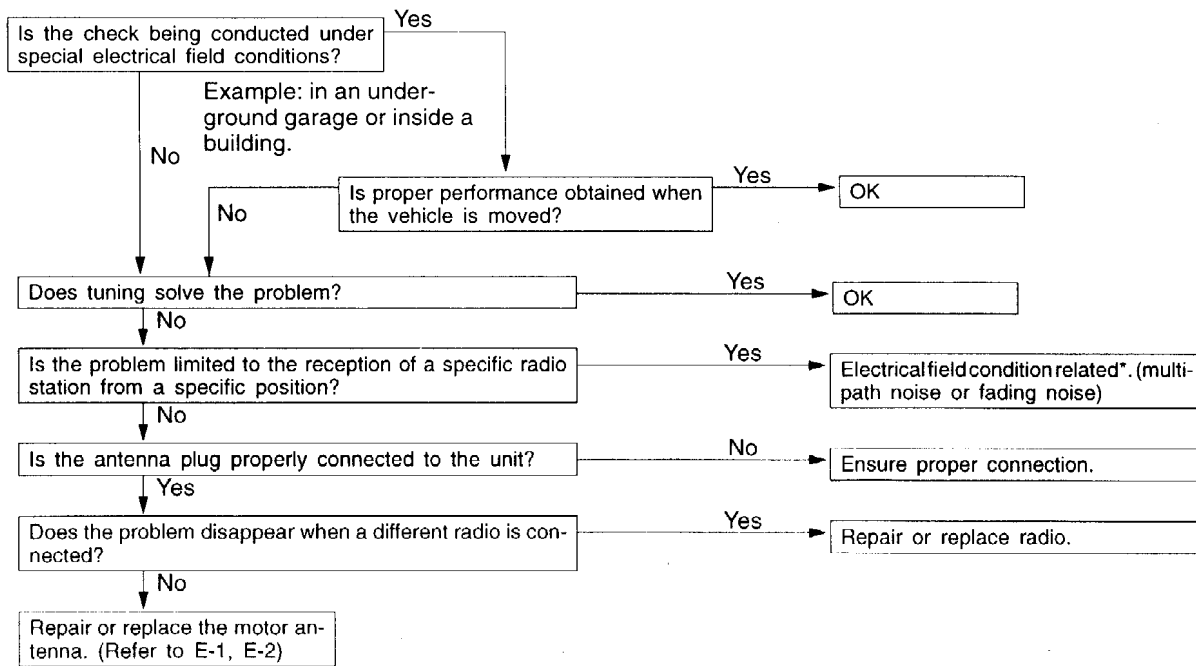
**B-2 No sound from one speaker.**



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

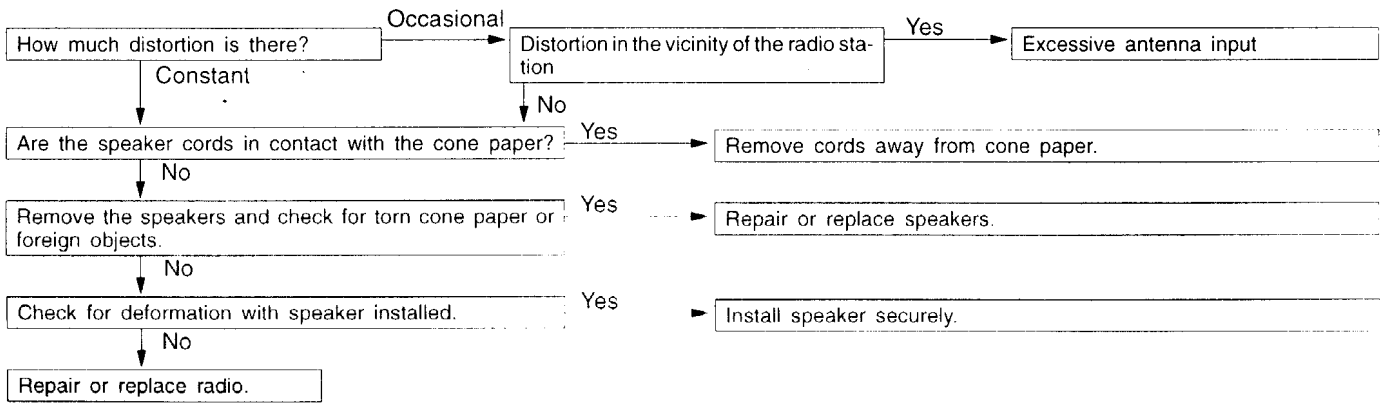


**B-4** Insufficient sensitivity.

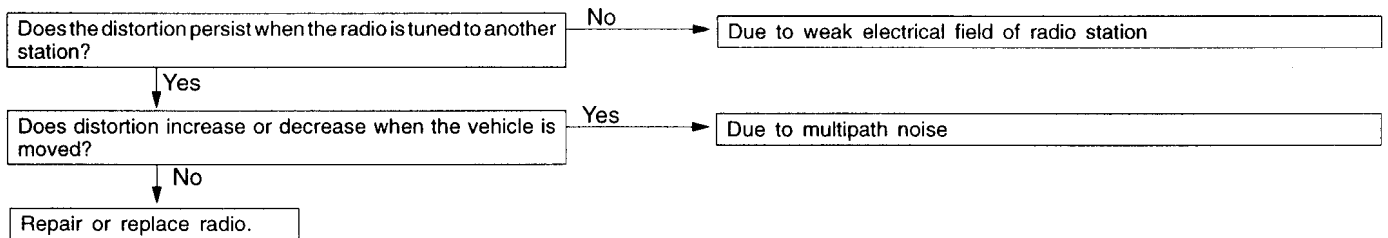


- \* About multipath noise and fading noise  
Because the frequency of FM waves is extremely high, it is highly susceptible to effects from geological formations and buildings. These effects disrupt the broadcast signal and obstruct reception in several ways.
- Multipath noise  
This describes the echo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

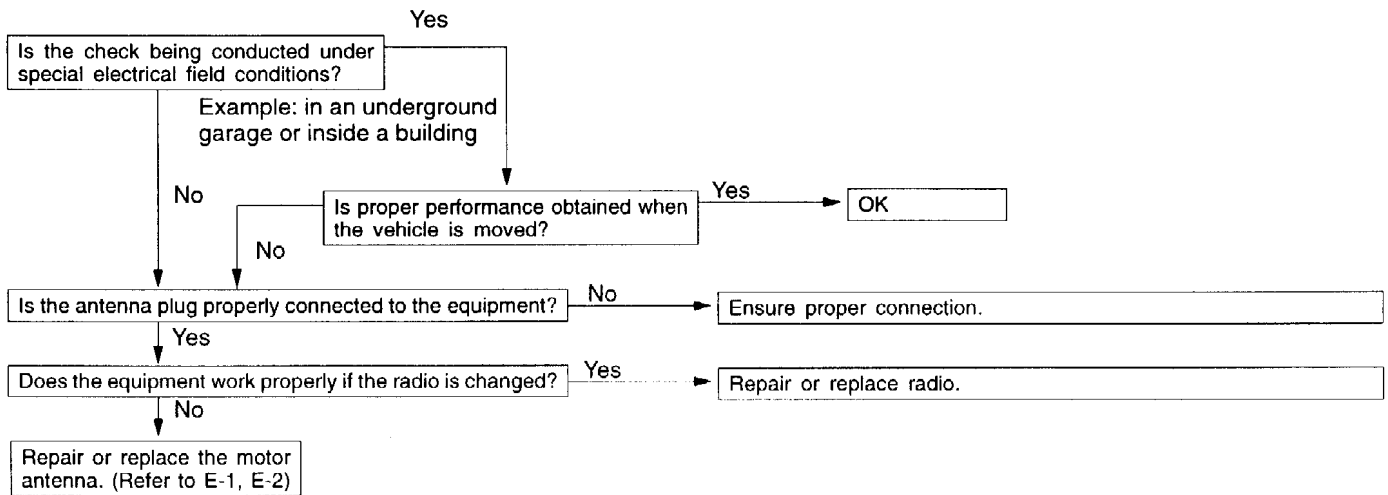
**B-5 Distortion on AM or on both AM and FM.**



**B-6 Distortion on FM only**

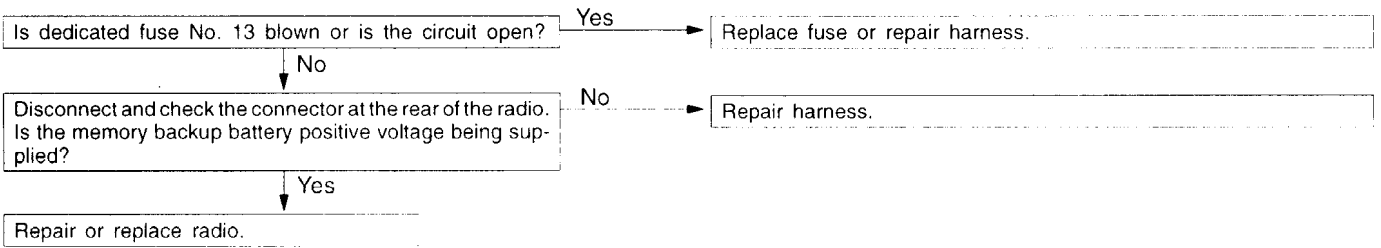


**B-7 Too few automatic select stations.**



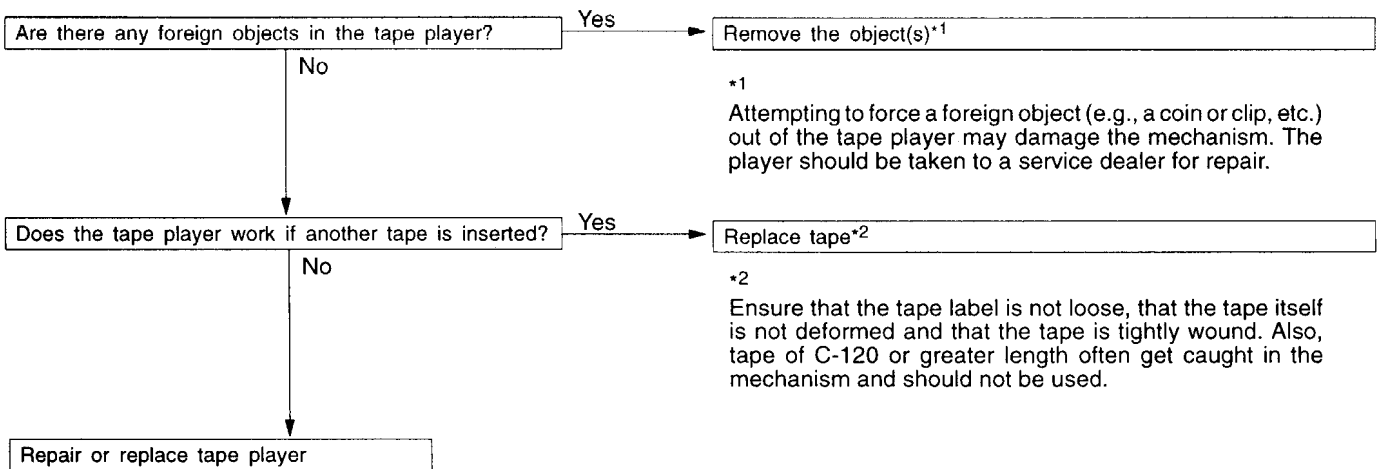


**B-8 Insufficient memory (preset stations are erased).**

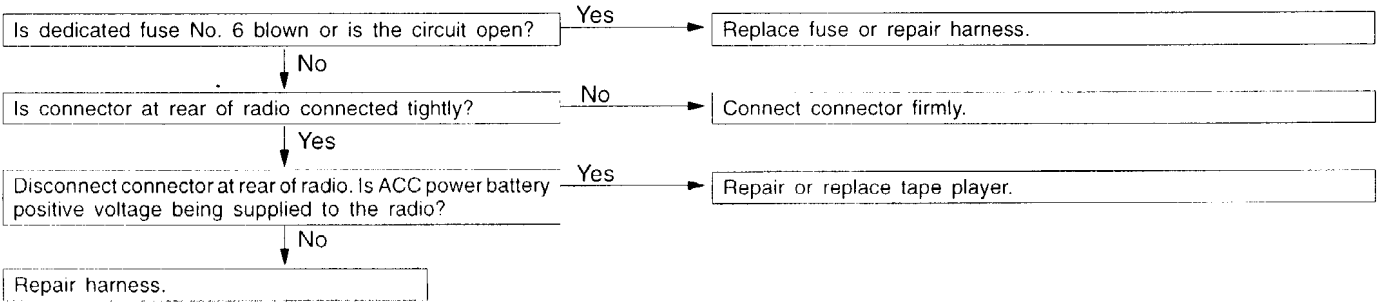


**C. TAPE PLAYER**

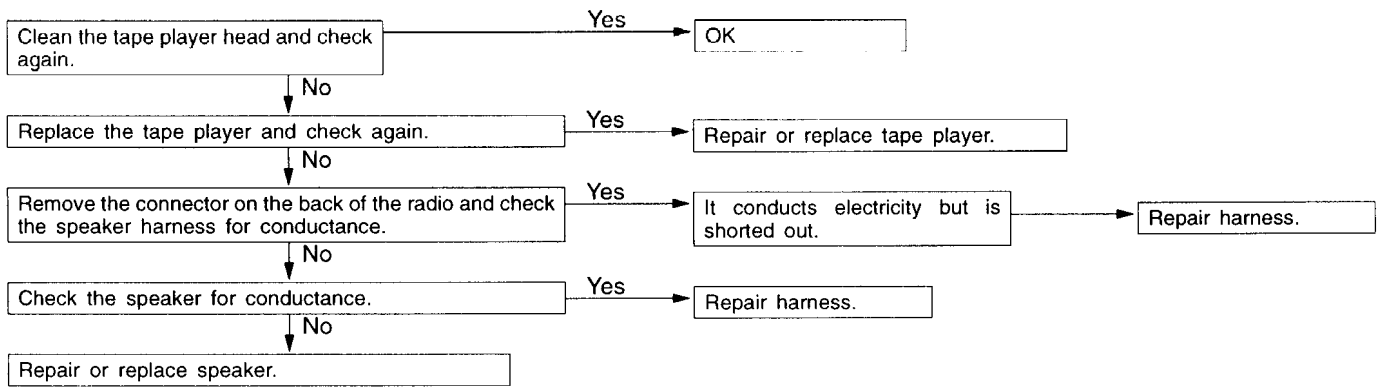
**C-1 Cassette tape will not be inserted.**



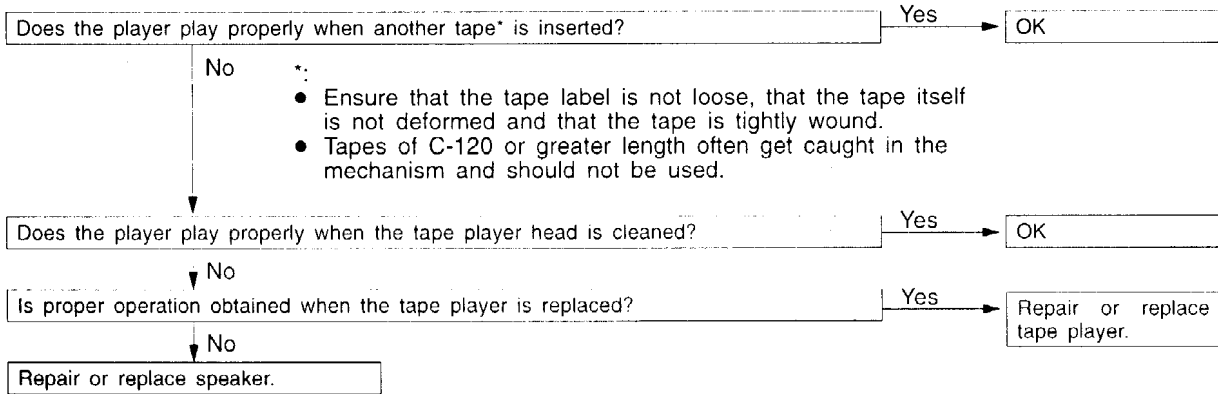
**C-2 No sound (even after a tape has been inserted).**



**C-3 No sound from one speaker.**



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

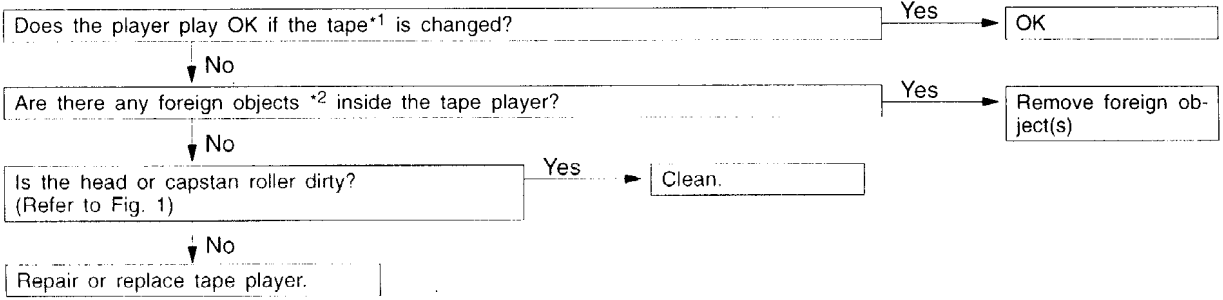


**C-5 Cassette tape will not eject.**

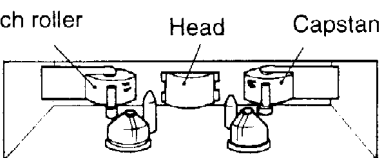
The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are

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

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



**Fig. 1**



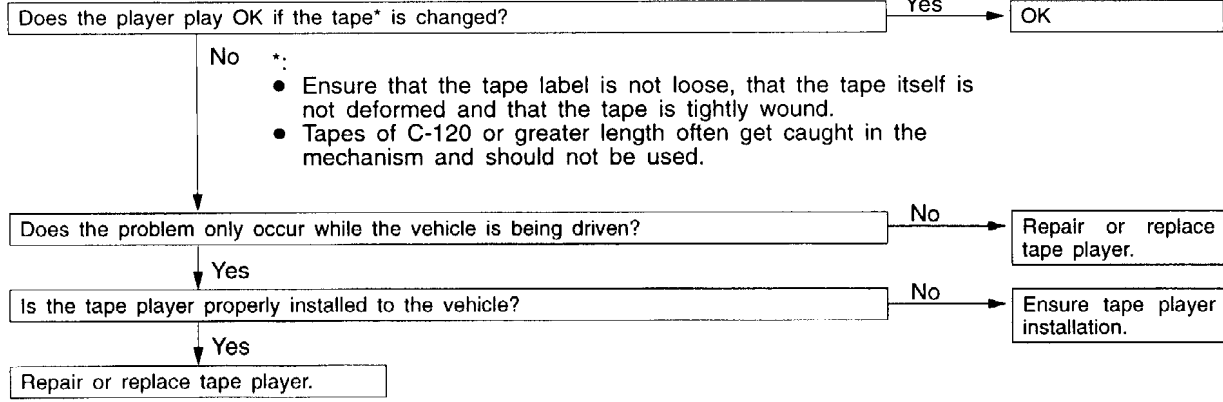
Pinch roller      Head      Capstan roller

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

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

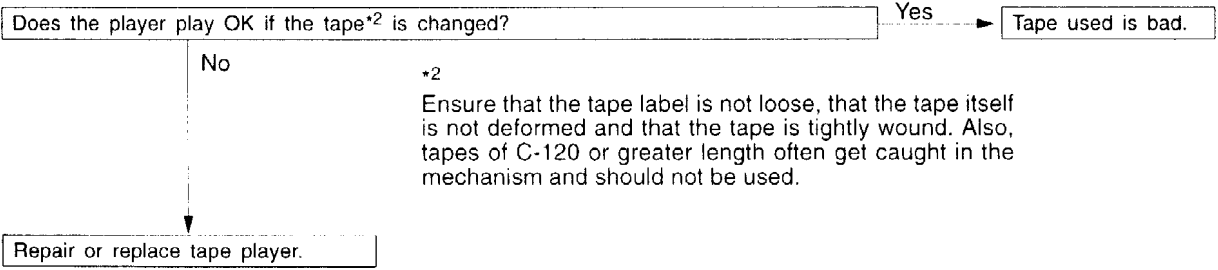
A16A0668

**C-7 Faulty auto reverse.**



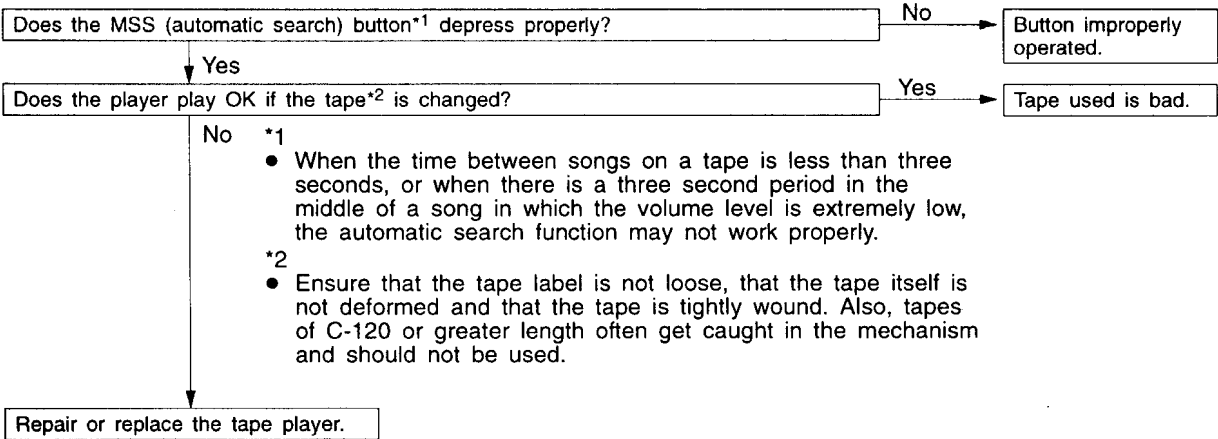
**C-8 | Tape gets caught in mechanism\*1.**

\*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.



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

**C-9 | Automatic search does not work**

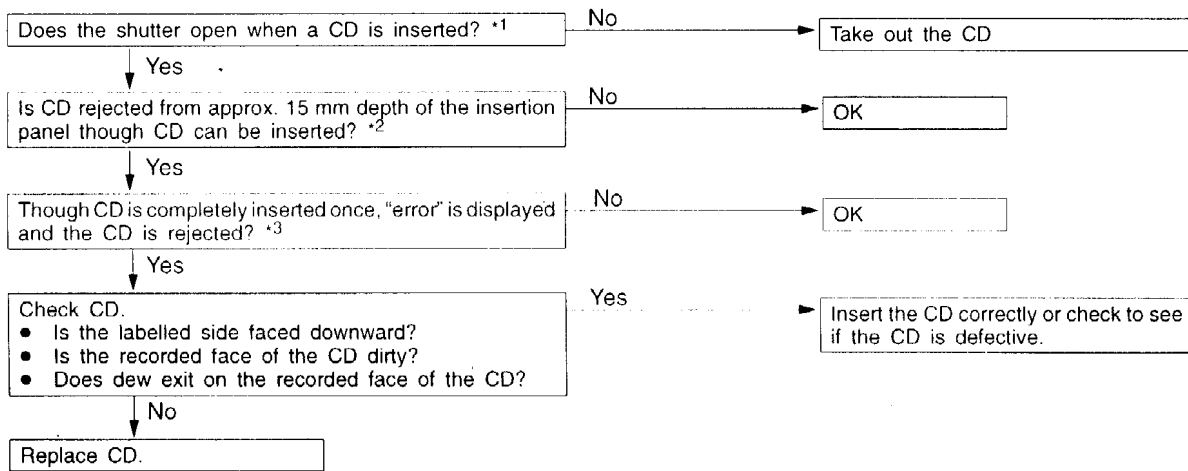


\*1  
• When the time between songs on a tape is less than three seconds, or when there is a three second period in the middle of a song in which the volume level is extremely low, the automatic search function may not work properly.

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

## D. CD PLAYER

## D-1 CD will not be accepted.

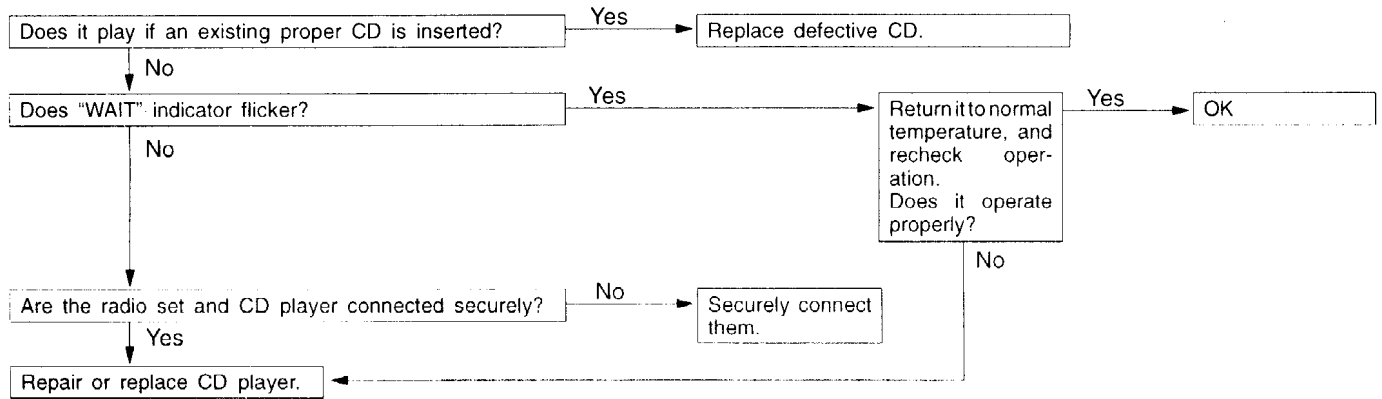


\*1 If the CD is already loaded, doesn't the shutter open to allow insertion when another CD is inserted?

\*2 If the key switch is not at ACC or ON, the CD stops at depth of 15 mm below the panel surface even when it is inserted, and it will be rejected when pushed farther?

\*3 Even though the CD is loaded, E (error) is sometimes displayed with the CD rejected because of vibration/shock or dew on the CD face or optical lens.

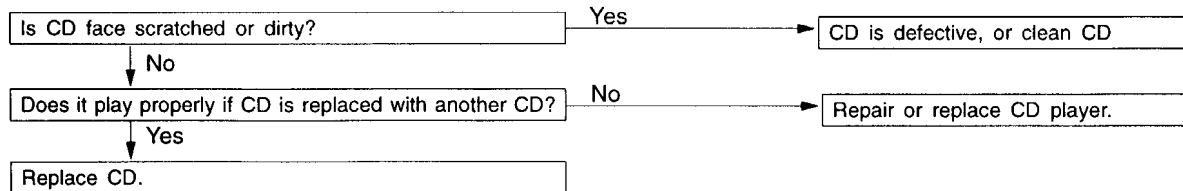
**D-2 No sound.**



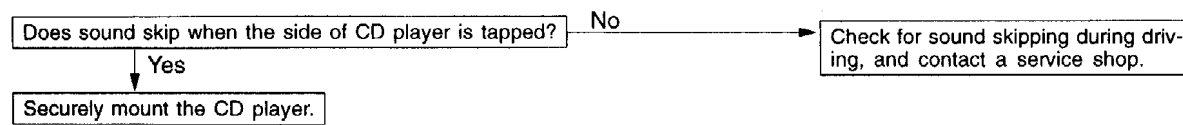
(The combined radio cassette must operate properly.)

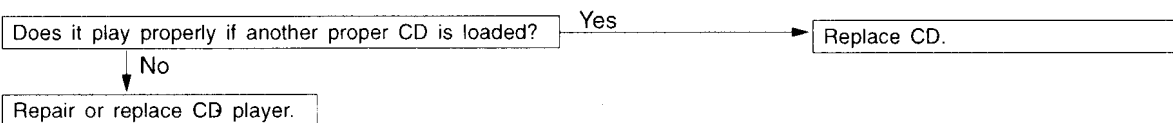
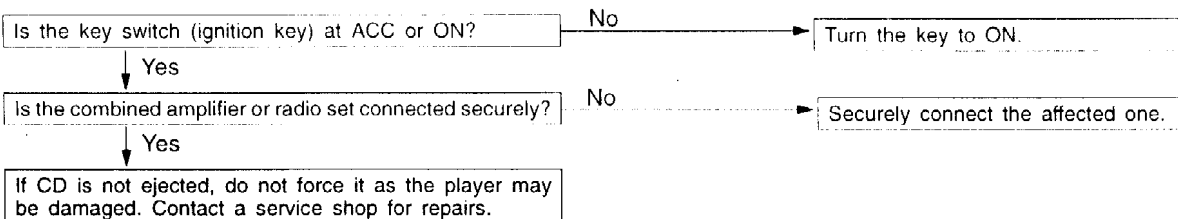
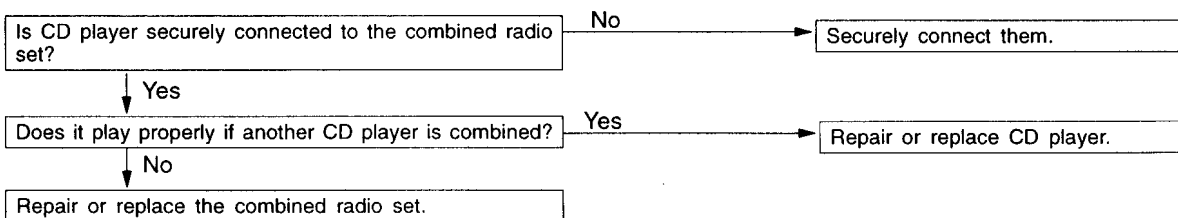
**D-3 CD sound skips.**

1. Sound sometimes skips during parking.



2. Sound sometimes skips during driving.  
 (Stop vehicle, and check it.)  
 (Check it by using a CD which is free of scratch, dirt or other abnormality.)



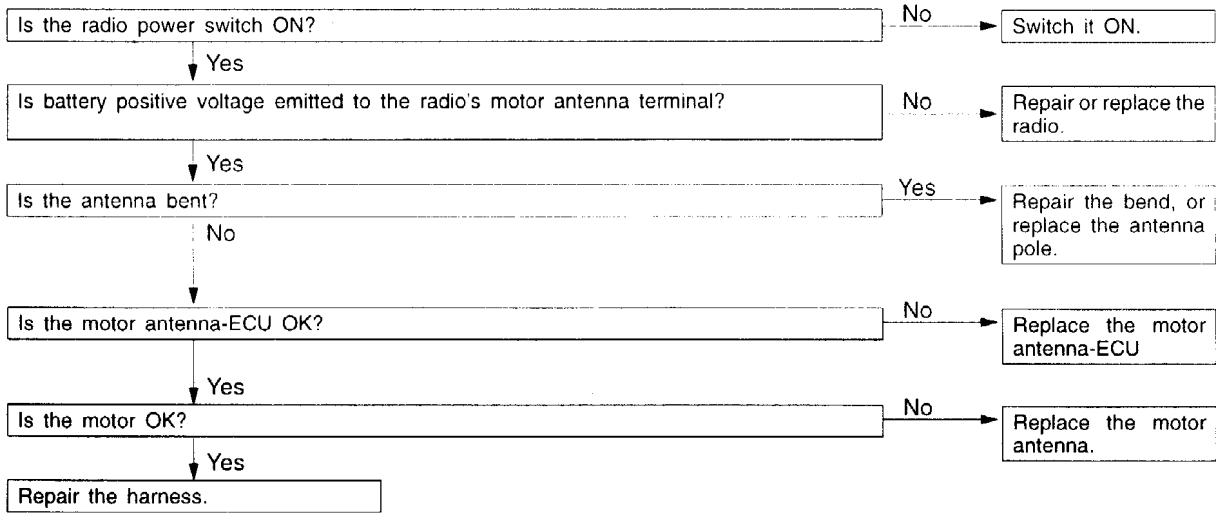
**D-4 Sound quality is poor****D-5 CD will not be ejected.****D-6 No sound from one speaker.**



**E. MOTOR ANTENNA**

**E-1 Motor antenna won't extend or retract.**

Clean and polish the surface of the antenna rod.



**E-2 Motor antenna extends and retracts but does not receive signals.**

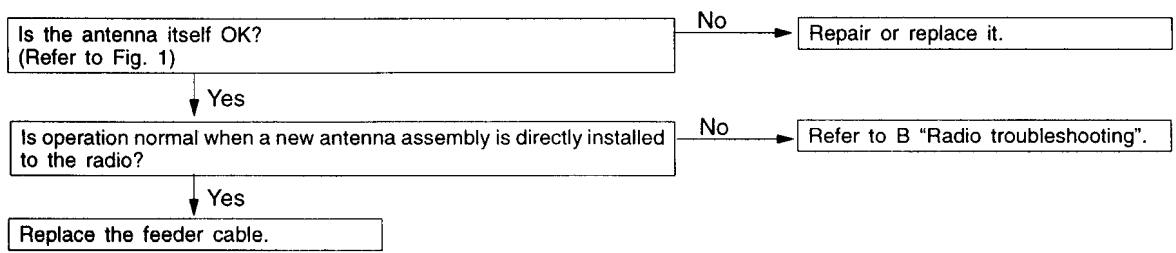
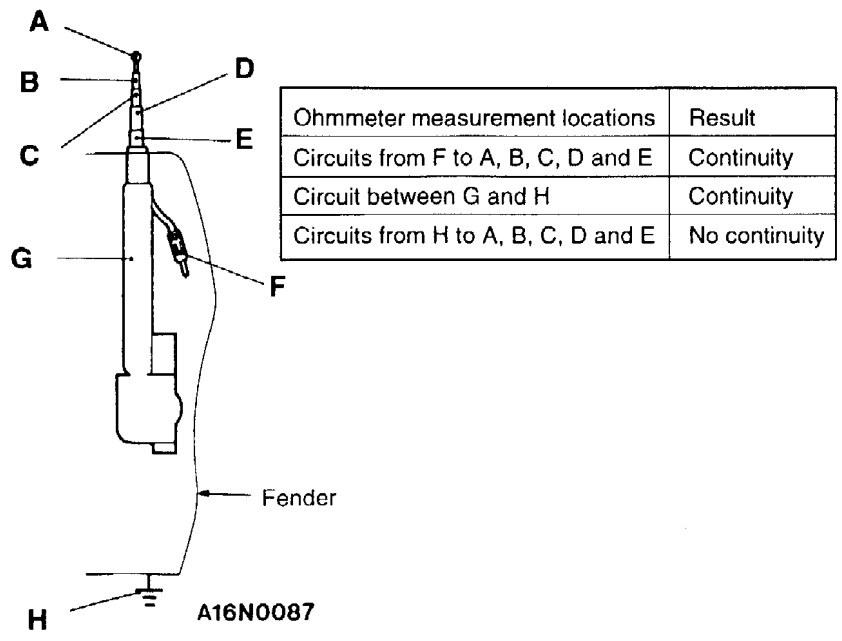
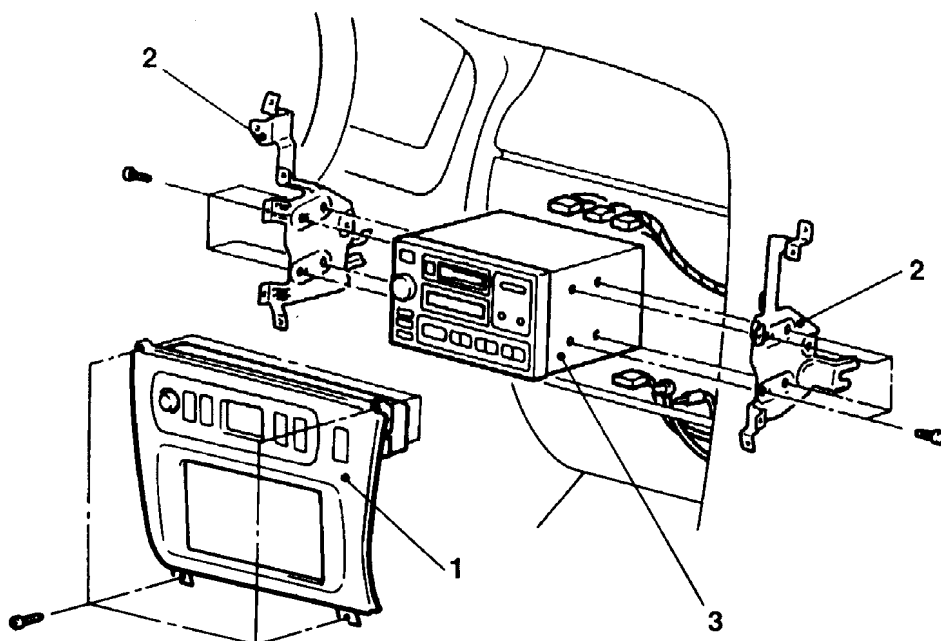


Fig. 1



**RADIO WITH TAPE PLAYER AND CD PLAYER****REMOVAL AND INSTALLATION**

16AE069N

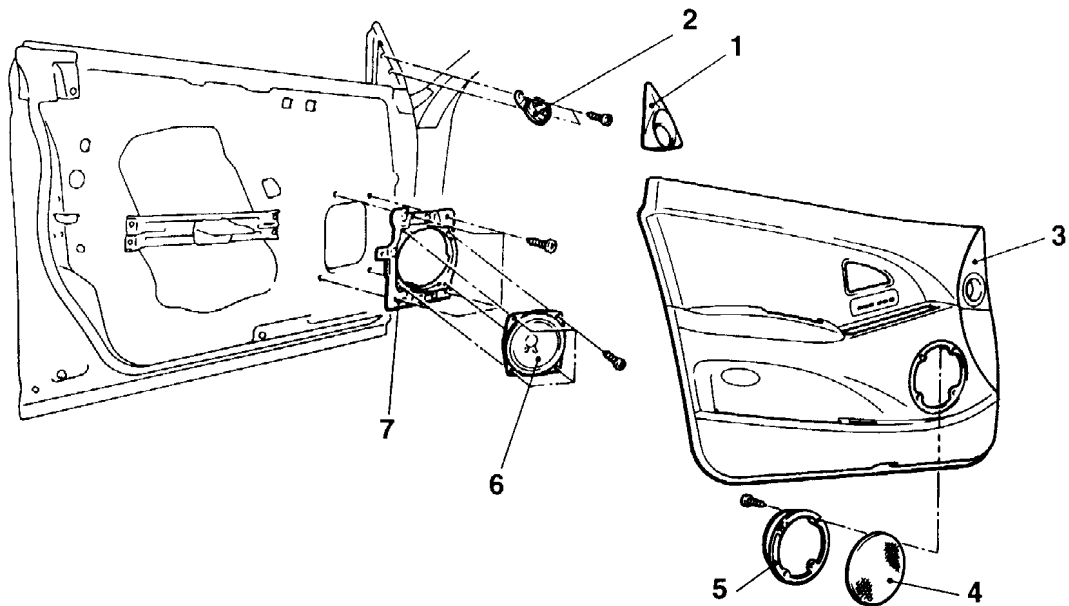
**Removal steps**

- Floor console assembly (Refer to Group 52A–Floor console)
- Centre air outlet assembly (Refer to Group 52A–Instrument panel)
- Ashtray (Refer to P.54-74)

1. Air conditioner control panel assembly
2. Radio bracket
3. Radio and cassette player

**DOOR SPEAKER AND REAR SPEAKER****REMOVAL AND INSTALLATION**

&lt;Door speaker&gt;



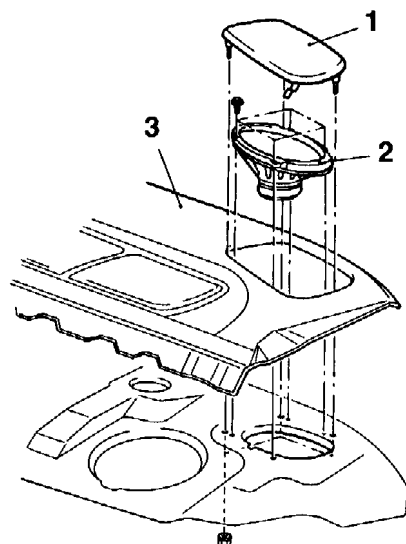
16AE070N

**Door speaker removal steps**

1. Tweeter cover
2. Tweeter speaker
3. Door trim (Refer to Group 42–Door Trim and Waterproof Film)

4. Speaker mesh
5. Speaker cover
6. Speaker
7. Speaker base

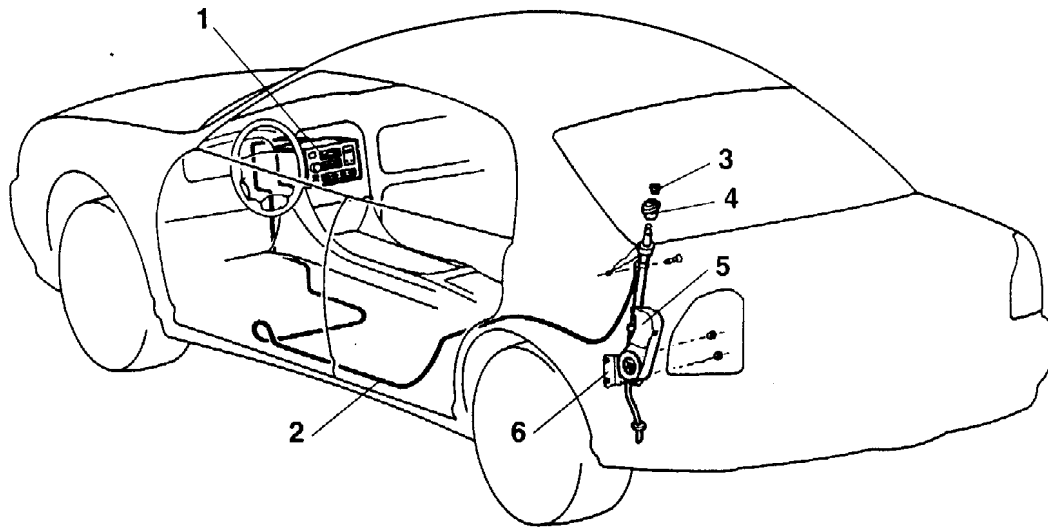
&lt;Rear speaker&gt;



16TE002A

**Rear speaker removal steps**

1. Speaker mesh
2. Speaker
- Rear seat cushion (Refer to group 52A – Rear seat)
3. Rear shelf trim (Refer to group 52A –Trims)

**ANTENNA****REMOVAL AND INSTALLATION**

16AE101N

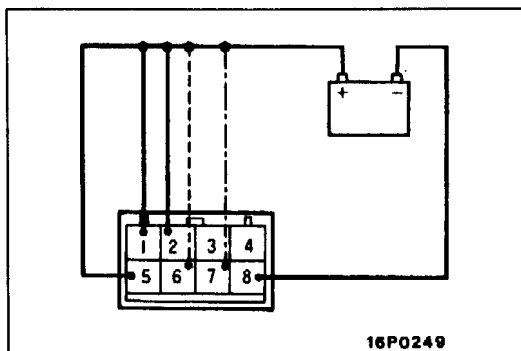
**Antenna feeder cable removal steps**

1. Audio unit (Refer to P. 54-98.)
  - Front seat (Driver's side) (Refer to GROUP 52A – Front Seat)
  - Console box (Refer to GROUP 52A – Floor Console)
  - Front scuff plate (L.H.) (Refer to GROUP 52A – Trims)
  - Cowl side trim (L.H.) (Refer to GROUP 52A – Trims)
  - Rear scuff plate (L.H.) (Refer to GROUP 52A – Trims)
  - Centre pillar trim lower (L.H.) (Refer to GROUP 52A – Trims)

- Rear seat assembly (Refer to GROUP 52A – Rear Seat)
  - Rear pillar trim (L.H.) (Refer to GROUP 52A – Trims)
  - Trunk side trim (L.H.) (Refer to GROUP 52A – Trims)
2. Antenna feeder cable

**Motor antenna removal steps**

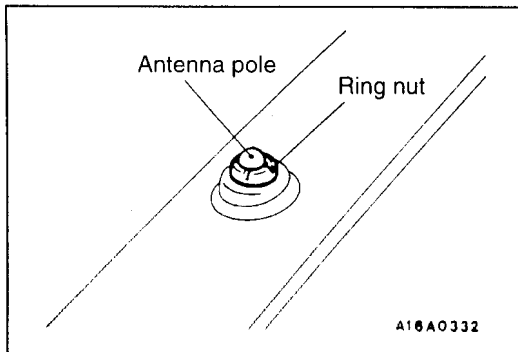
- Trunk side trim (Refer to GROUP 52A – Trims)
3. Ring nut
  4. Base
  5. Antenna bracket
  6. Motor antenna



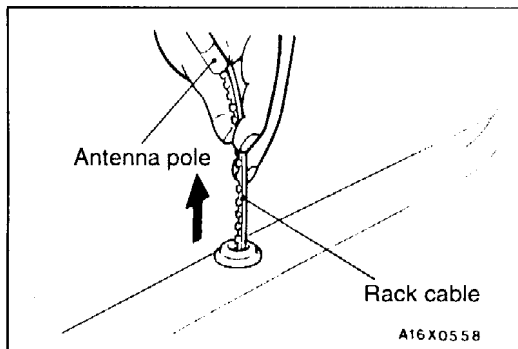
16P0249

**INSPECTION****ANTENNA MOTOR**

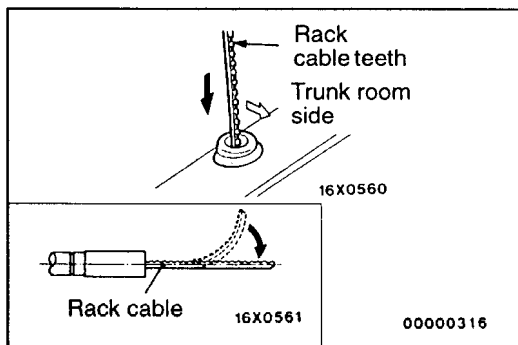
1. Connect the circuits shown as solid lines.
2. Check that when circuits shown as broken lines are connected, the antenna rises.
3. Verify that when the circuits shown as broken lines are disconnected and the circuits shown as dotted lines are connected, the antenna descends to the intermediate position.
4. Verify that when the circuits shown as dotted lines are disconnected, the antenna descends all the way.

**ANTENNA POLE REPLACEMENT**

1. Remove the ring nut.



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

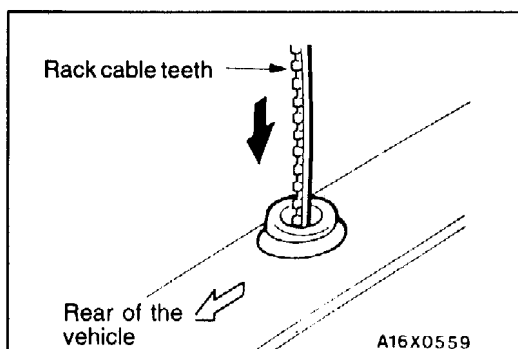


3. Draw out the antenna pole to the maximum extension.

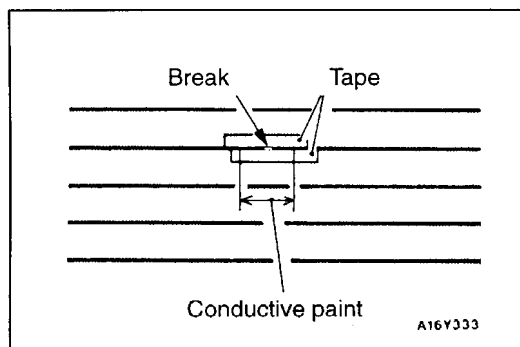
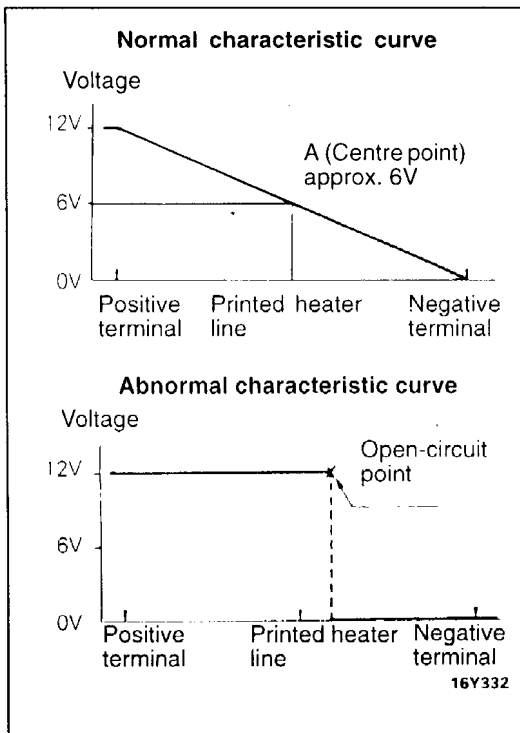
**NOTE**

If there is a bend in the motor end of the rack cable, remove the bend.

4. Insert the rack cable into the motor assembly with the rack cable teeth facing the trunk room side.



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



## REAR WINDOW DEFOGGER 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 voltmeter at rear window glass centre A.  
Condition good of indicating about 6V.
3. If battery positive voltage is indicated at A, there is a break in the negative terminals from A.  
Move test bar slowly to negative terminal to detect where voltage changes suddenly (0V).
4. If 0V is indicated at A, there is a break in the positive terminals from A. Defect where the voltage changes suddenly (battery positive voltage) with the same method described.

### PRINTED-HEATER LINE REPAIR

#### REQUIRED MATERIALS

- Thinner
- Tape
- Conductive paint
- Lead-free gasoline
- Fine brush

1. Clean disconnected area with lead-free gasoline. Tape along both sides of heater element.
2. Mix conductive paint thoroughly. Thin the required amount of paint in a separate container with a small amount of thinner and paint break three times at 15 minutes intervals.
3. Remove tape and leave for a while before use (circuit complete).
4. When completely dry (after 24 hours) finish exterior with a knife.

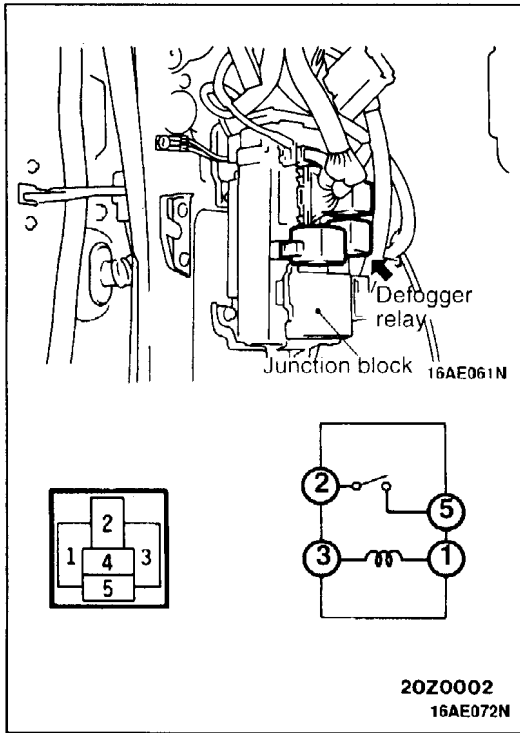
#### Caution

**Clean glass with a soft cloth (dry or damp) along defogger heater element.**

## REAR WINDOW DEFOGGER SWITCH

### REMOVAL AND INSTALLATION

Refer to Group 55—Air Conditioning Control Unit Assembly.



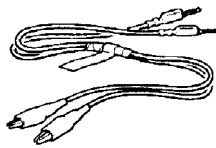


**DEFOGGER RELAY CONTINUITY CHECK**

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

## SIMPLIFIED WIRING SYSTEM (SWS)

### SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II	Simplified Wiring System (SWS) diagnostic checking
		ROM pack	
	MB991529	Diagnosis trouble code check harness	Simplified Wiring System (SWS) diagnostic checking

## TROUBLESHOOTING

### STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

#### DIAGNOSIS FUNCTION

##### DIAGNOSIS CODES CHECK

Read a diagnosis code by the MUT-II or high beam indicator lamp. (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.

##### SWS SIMPLIFIED FAULT DIAGNOSTIC MODE

The following tests can be performed using the SWS Simplified Fault Diagnosis Mode:

- SWS ECU specification
- Switch input signals for each ECU
- Diagnosis trouble code output

##### SWITCHING TO SIMPLIFIED FAULT DIAGNOSTIC MODE

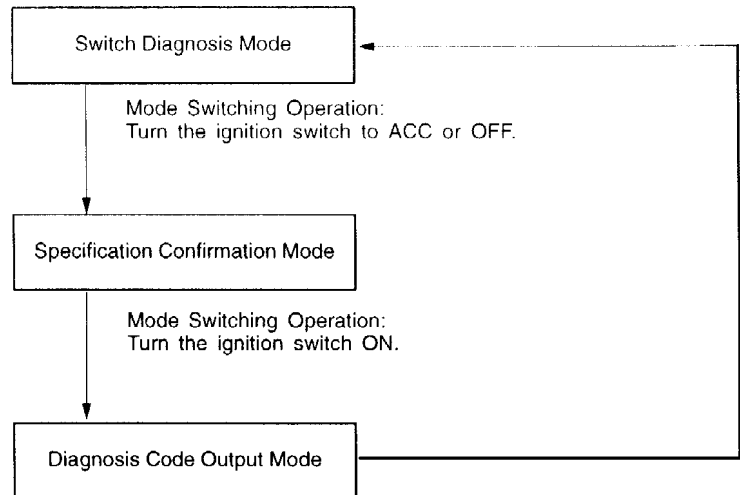
1. Ground the No. 1 terminal of the diagnosis connector (diagnostic control terminal) using a special tool.
2. Turn the ignition switch ON.
3. Operate the passing switch twice or more within five seconds.



**SIMPLIFIED FAULT DIAGNOSTIC MODE SELECTION**

The Simplified Fault Diagnostic Mode comprises the following three modes; these modes can be switched by operating the ignition or other switches.

When the ignition is switched ON initially, the system will be in Diagnosis Code Output Mode.



Mode Switching Operation:  
Operate any of the switches which can be checked (e.g. lighting switch).

**NOTE**

Refer to P.54-109 for switches which can be checked.

**Specification Confirmation Mode**

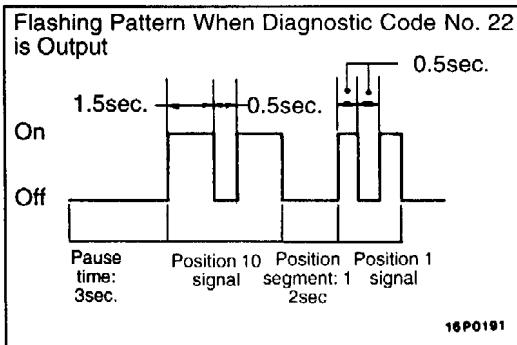
This is a mode which displays a flashing pattern for the various ECU specifications of the Simplified Wiring System (SWS) on the high beam indicator lamp, similar to that shown at left, enabling the operator to confirm whether the vehicle is fitted with the correct specification ECU. If the codes in the table below are output, it can be concluded that the situation is normal.

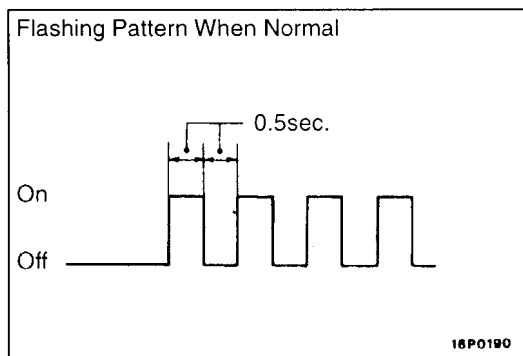
**NOTE**

Because the code is output only once, it is necessary to switch once to another mode when you wish to re-confirm a code.

**Display for Normal Parameters**

Display Sequence	Normal Codes		Applicable ECU
	LHD	RHD	
1	15	16	Instrument panel ECU
2	25	26	ETACS-ECU
3	35	36	Assist-ECU
4	45	46	Front Door Module





### Diagnosis Code Output Mode

Diagnosis codes are displayed by the flashing of the high beam indicator lamp. A normal pattern is shown in the diagram at left, and when a breakdown occurs, the same flashing pattern as Specification Confirmation Mode is displayed.

#### NOTE

Diagnosis codes are output once each in diminishing number order, it is therefore necessary to switch once to another mode when you wish to reconfirm a code.

### Switch Diagnosis Mode

This is a mode in which the switch input signals which are input into each ECU on the Simplified Wiring System (SWS) can be checked – if the input signal for a switch is normal when that switch is operated in this mode, the high beam indicator lamp flashes and a buzzer sounds.

Assist-ECU	Instrument panel ECU	Front door module (Driver)	ETACS-ECU
IG power source Door switch (Pass. Fr, Rr) Power window switch (Pass. Fr, Rr) ● UP ● DOWN Door lock switch (Pass. Fr, Rr)	IG power source Lighting switch ● TAIL ● HEAD Dimmer switch ● HI ● LO Fog lamp switch Front wiper switch ● HI ● LO ● INT ● Variable Speed Front washer switch	IG power source Door mirror switch ● UP ● DOWN ● RIGHT ● LEFT Power window lock switch Power window switch (for all windows) ● UP ● DOWN ● AUTO DOWN (Driver only) Power window relay Door lock switch Door key switch ● Lock ● Unlock	IG power source Door switch (Driver. Fr, Rr) Seat belt switch Power window switch (Driver. Rr) ● UP ● DOWN Door lock switch (Pass. Rr) Parking brake switch

### Returning to Normal Mode

1. Turn the ignition switch OFF.
2. Remove the special tool from the diagnosis connector. The mode will now return to Normal.

**DIAGNOSTIC CODE CLASSIFICATION CHART**

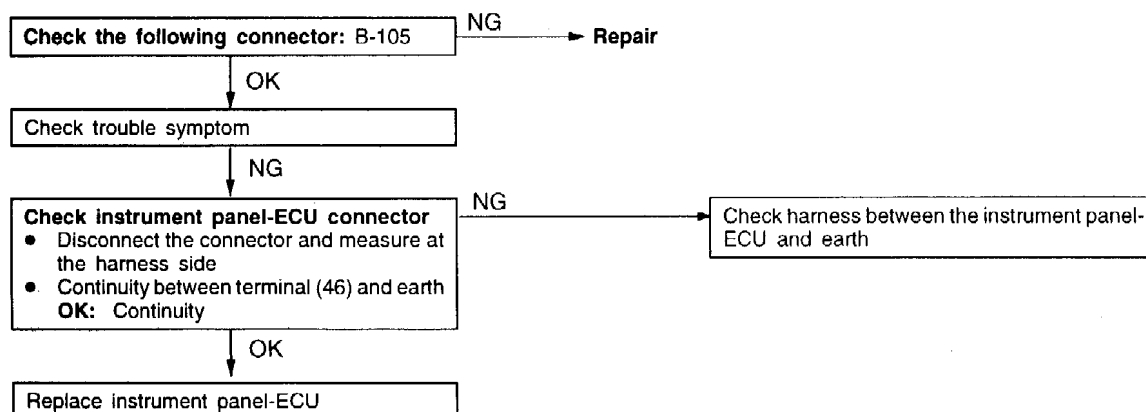
Code No.	Diagnostic item	Reference page
11	Connector for instrument panel harness and control harness disconnected	54-107
12	Connector for instrument panel harness and dash harness disconnected	54-108
21	Connector for dash panel harness and front harness disconnected	54-108
23	Connector for dash harness and front harness disconnected	54-109
24	Connector for dash harness and control harness disconnected	54-109
25	IOD fuse malfunction (ACC)	54-110
26	Ignition fuse malfunction (IG)	54-110
27	ECU fuse malfunction (IG2)	54-110
28	ECU fuse malfunction (IG2)	54-111
29	ETACS-ECU malfunction	54-111
31	Connector for control harness and front harness disconnected	54-111
32	Alternator fuse (special fuse No. 8) blown	54-112
33	MPI fuse (special fuse No. 9) blown	54-112
34*	Assist-ECU malfunction	54-113
41*	Front door module (Driver) malfunction	54-113

**NOTE**

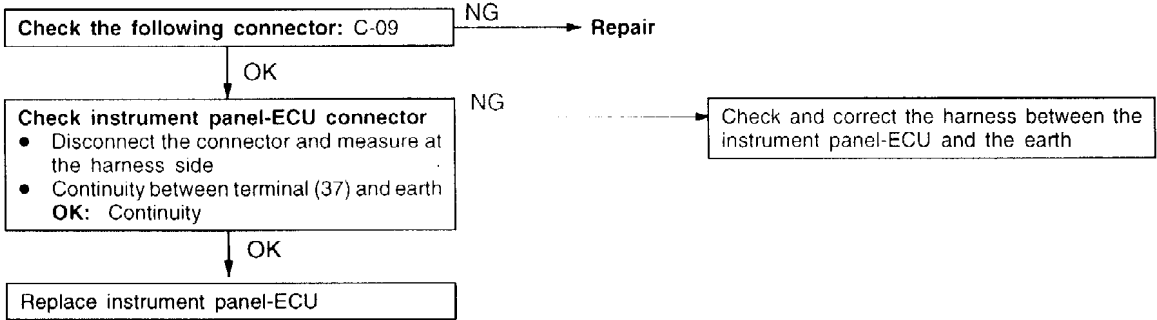
\*Diagnosis codes marked with an asterisk can only detect the abbreviated confirmation diagnostic code.

**INSPECTION PROCEDURES FOR DIAGNOSIS CODES**

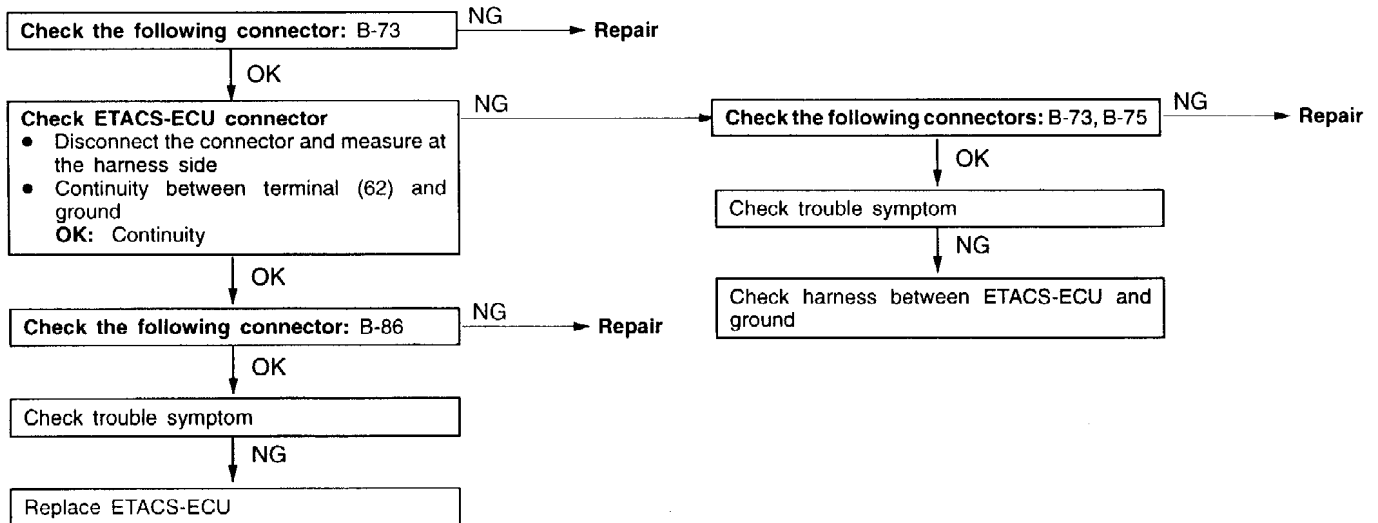
Code No. 11. Connector for instrument panel harness and control harness disconnected	Probable cause
This code is output when the connector for the instrument panel harness and the control harness is disconnected or when the disconnection detection harness of the instrument panel ECU connector is broken.	<ul style="list-style-type: none"> <li>• Instrument panel-ECU malfunction</li> <li>• Harness malfunction</li> <li>• Connector for instrument panel harness and control harness disconnected</li> </ul>



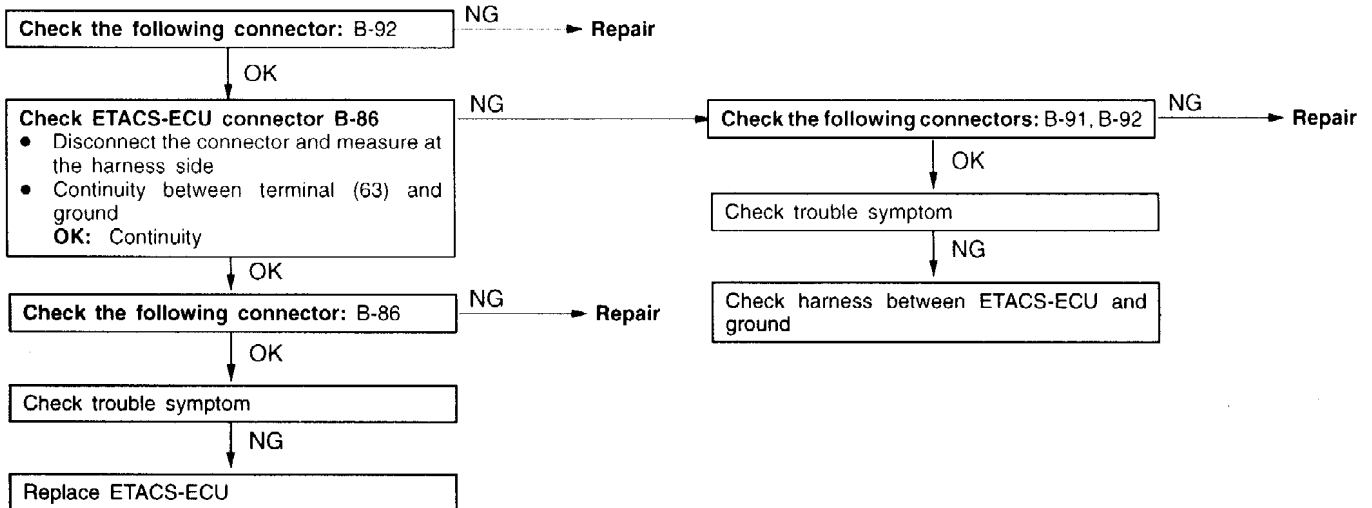
Code No. 12. Connector for instrument panel harness and dash harness disconnected	Probable cause
This code is output when the connector for the instrument panel harness and dash harness is disconnected or when the disconnection detection harness of the instrument panel-ECU connector is broken.	<ul style="list-style-type: none"> <li>• Instrument panel-ECU malfunction</li> <li>• Connector for instrument panel harness and control harness disconnected.</li> <li>• Harness malfunction</li> </ul>



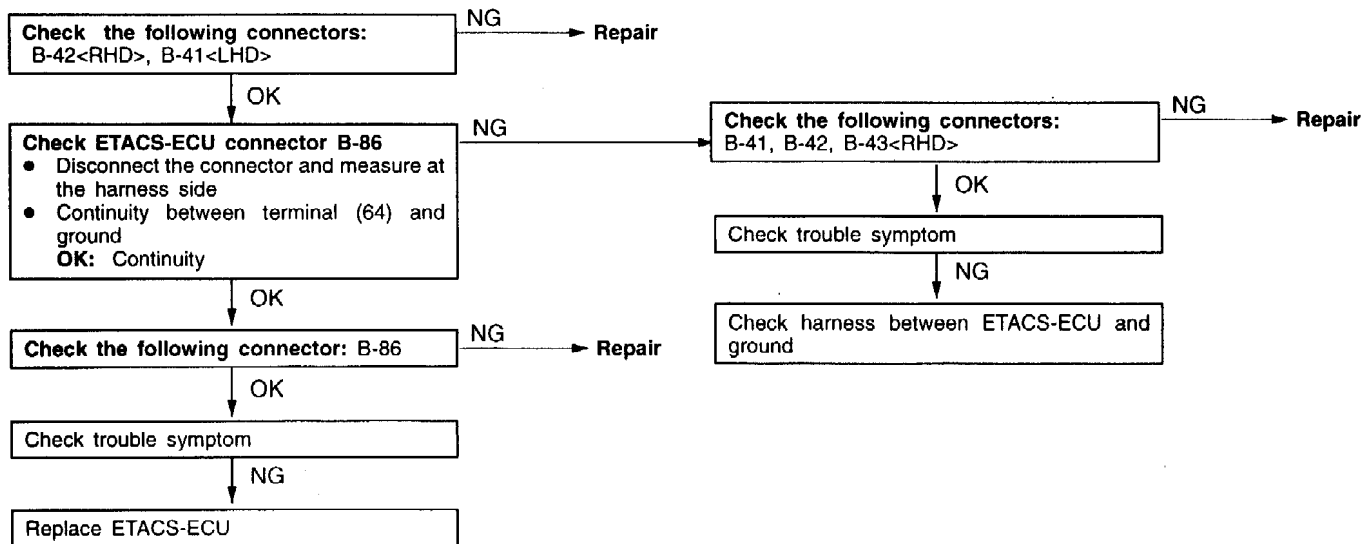
Code No. 21. Connector for dash harness and front harness disconnected	Probable cause
This code is output when the connector for the dash harness and the front harness is disconnected or when the disconnection detection harness of the ETACS-ECU connector is broken.	<ul style="list-style-type: none"> <li>• ETACS-ECU malfunction</li> <li>• Harness malfunction</li> <li>• Connector for dash harness and front harness</li> </ul>



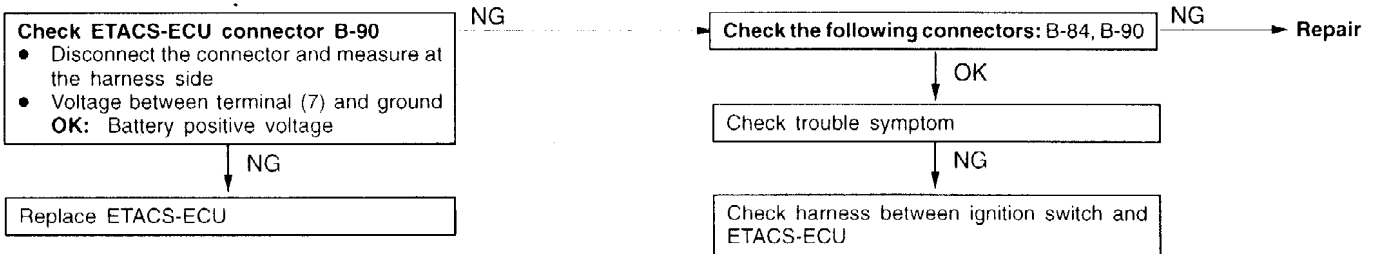
Code No. 23. Connector for dash harness and floor harness disconnected	Probable cause
This code is output when the connector for the dash harness and the floor harness is disconnected or when the disconnection detection harness of the ETACS-ECU connector is broken.	<ul style="list-style-type: none"> <li>● ETACS-ECU malfunction</li> <li>● Harness malfunction</li> <li>● Connector for dash harness and floor harness disconnected</li> </ul>



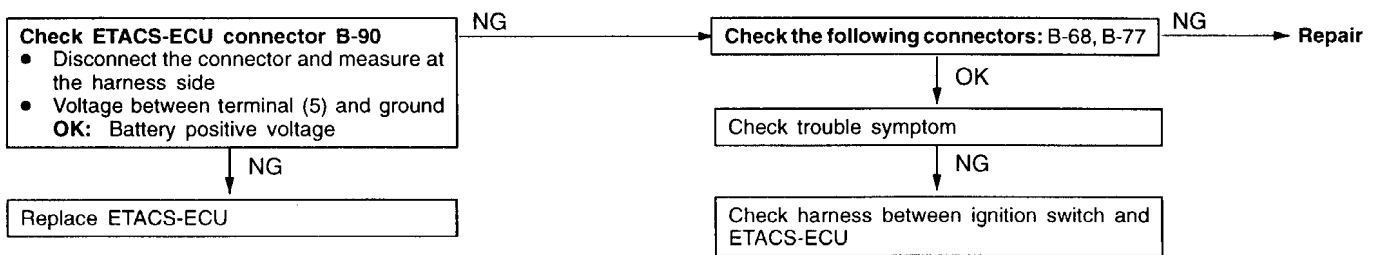
Code No. 24. Connector for dash harness and control harness disconnected	Probable cause
This code is output when the connector for the dash harness and the control harness is disconnected or when the disconnection detection harness of the ETACS-ECU connector is broken.	<ul style="list-style-type: none"> <li>● ETACS-ECU malfunction</li> <li>● Harness malfunction</li> <li>● Connector for dash harness and control harness disconnected</li> </ul>



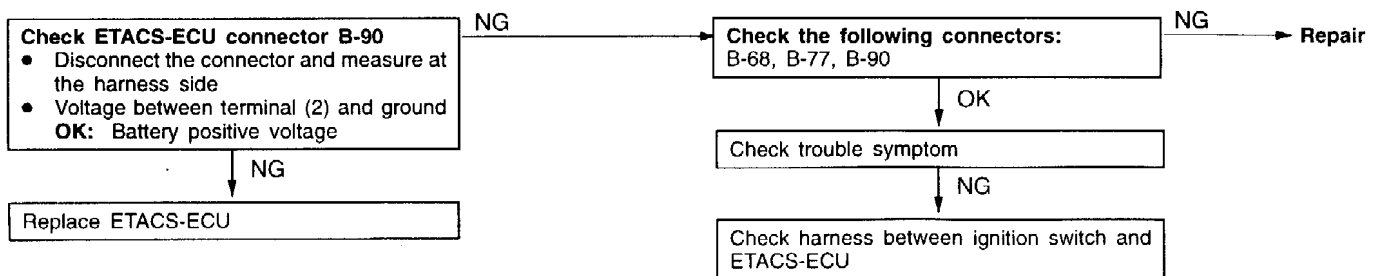
Code No. 25. IOD fuse malfunction (ACC)	Probable cause
This code is output when multipurpose fuse No. 6 (ETACS-ECU, ACC power source) blows or when the ACC power source circuit harness is disconnected.	<ul style="list-style-type: none"> <li>● Multipurpose fuse No. 6 blown</li> <li>● Harness or connector malfunction</li> <li>● ETACS-ECU malfunction</li> </ul>



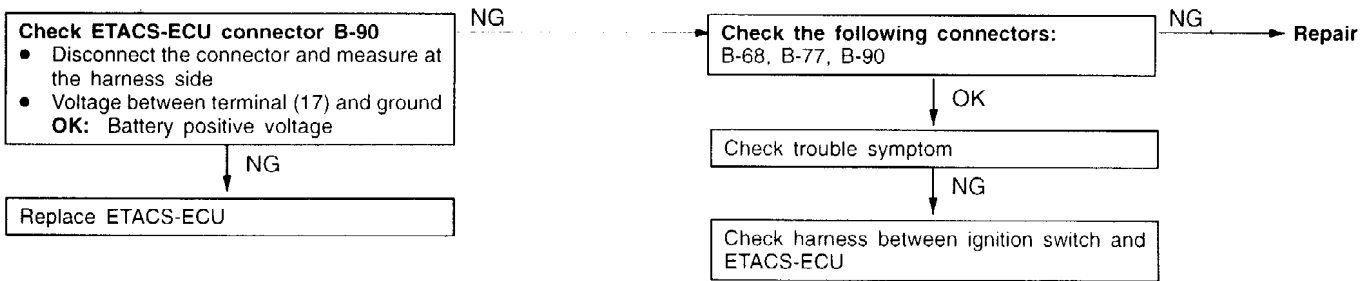
Code No. 26. Ignition fuse malfunction (IG1)	Probable cause
This code is output when multipurpose fuse No. 12 (ETACS-ECU, IG1 power source) blows or when the IG1 power source circuit harness is disconnected.	<ul style="list-style-type: none"> <li>● Multipurpose fuse No. 12 blown</li> <li>● Harness or connector malfunction</li> <li>● ETACS-ECU malfunction</li> </ul>



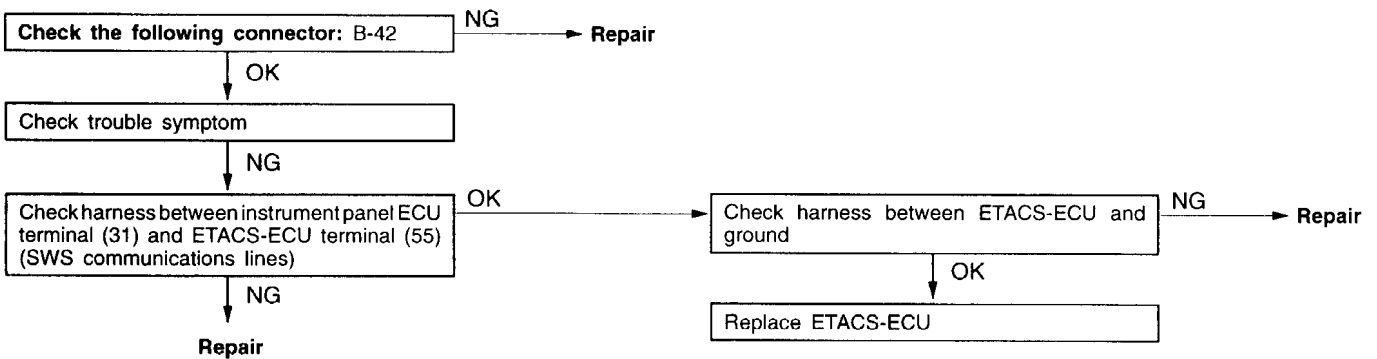
Code No. 27. ECU fuse malfunction (IG2)	Probable cause
This code is output when multipurpose fuse No. 15 (ETACS-ECU, IG2 power source) blows or when the IG2 power source circuit harness is disconnected.	<ul style="list-style-type: none"> <li>● Multipurpose fuse No. 15 blown</li> <li>● Harness or connector malfunction</li> <li>● ETACS-ECU malfunction</li> </ul>



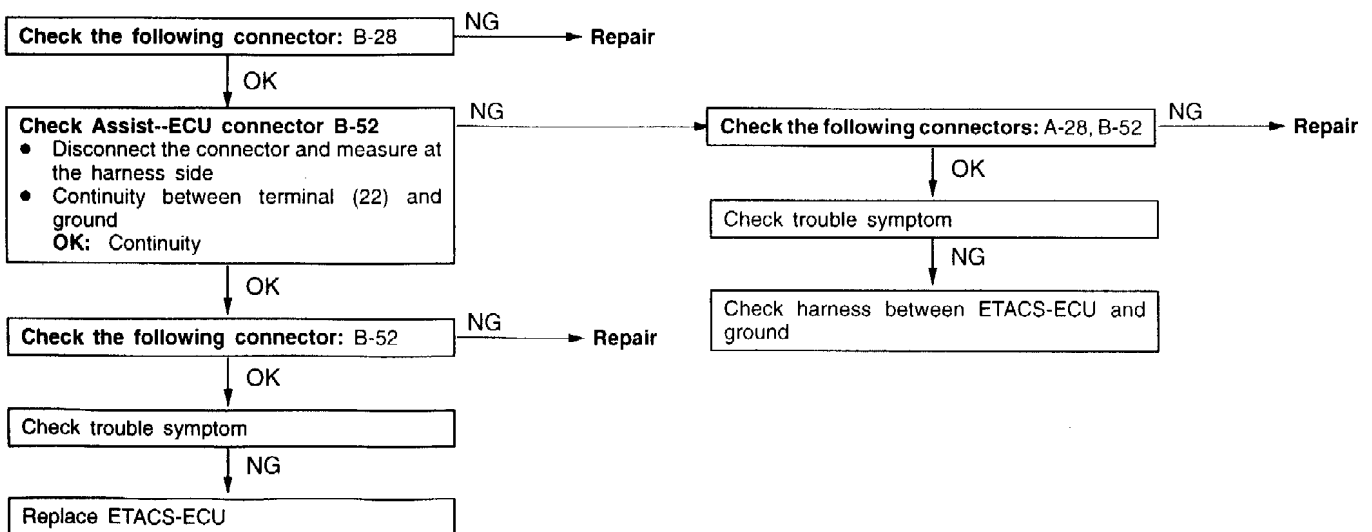
Code No. 28. ECU fuse malfunction (IG2)	Probable cause
This code is output when multipurpose fuse No. 9 (ETACS-ECU, IG2 power source) blows or when the IG2 power source circuit harness is disconnected.	<ul style="list-style-type: none"> <li>• Multipurpose fuse No. 9 blown</li> <li>• Harness or connector malfunction</li> <li>• ETACS-ECU malfunction</li> </ul>



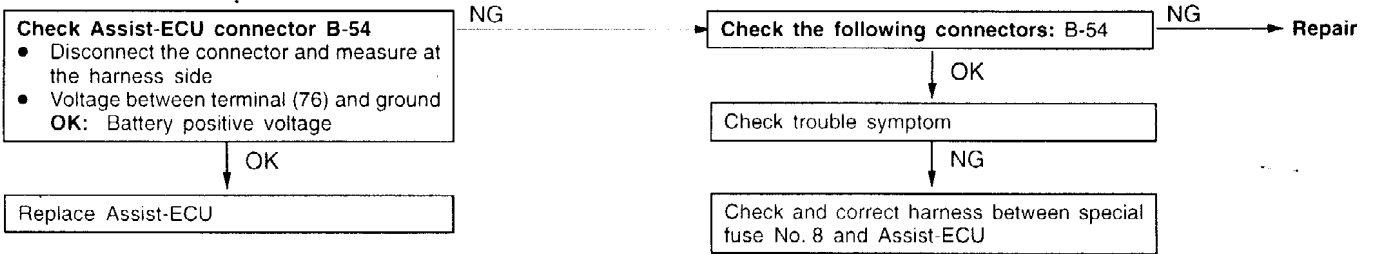
Code No. 29. ETACS-ECU malfunction	Probable cause
This code is output when the instrument panel ECU fails to receive communications data continuously from the ETACS-ECU for 1 second or longer (SWS communications line malfunction).	<ul style="list-style-type: none"> <li>• ETACS-ECU malfunction</li> <li>• Malfunction in the harness or connector of communications lines</li> </ul>



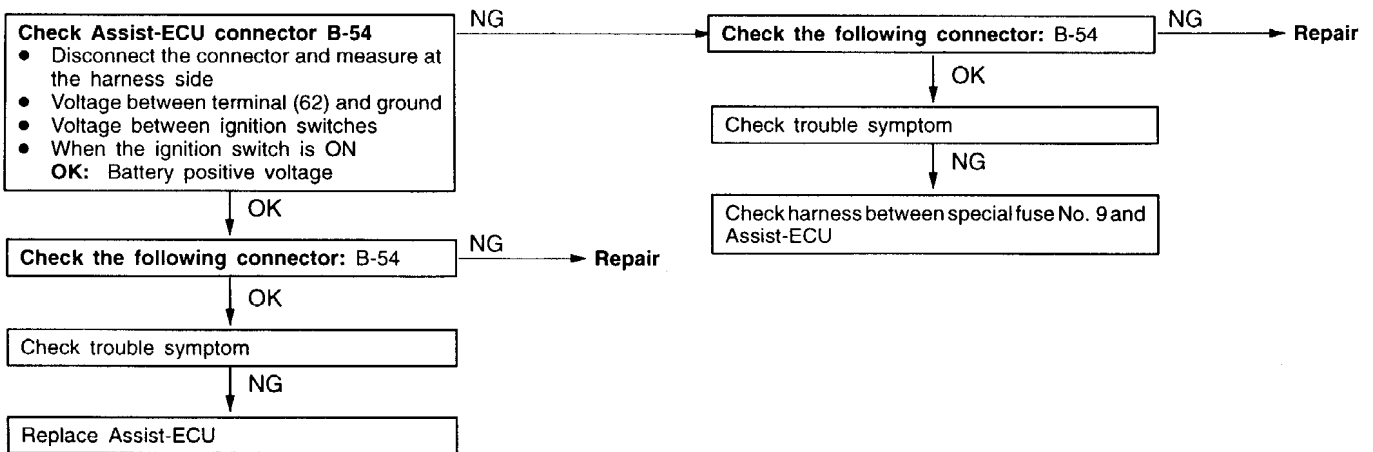
Code No. 31. Connector for control harness and front harness disconnected	Probable cause
This code is output when the connector for the control harness and the front harness is disconnected or when the disconnection detection harness of the Assist-ECU connector is broken.	<ul style="list-style-type: none"> <li>• Assist-ECU malfunction</li> <li>• harness malfunction</li> <li>• Connector for control harness and front harness disconnected</li> </ul>



Code No. 32. Alternator fuse (special fuse No. 8) blown	Probable cause
This code is output when special fuse No. 8 (alternator) blows or when the harness is disconnected.	<ul style="list-style-type: none"> <li>● Special fuse No. 8 blown</li> <li>● Harness and connector malfunction</li> <li>● Assist-ECU malfunction</li> </ul>

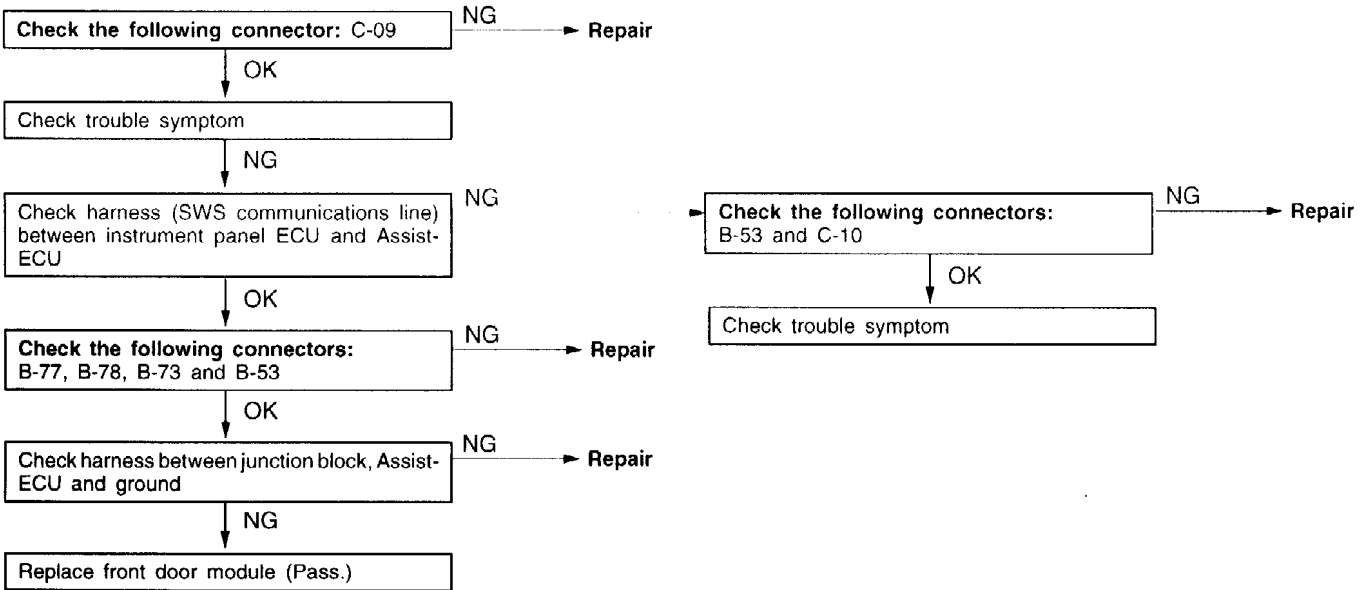


Code No. 33. MPI fuse (special fuse No. 9) blown	Probable cause
This code is output when special fuse No. 9 (MPI) blows or when the harness is disconnected.	<ul style="list-style-type: none"> <li>● Special fuse No. 9 blown</li> <li>● Harness and connector malfunction</li> <li>● Assist-ECU malfunction</li> </ul>

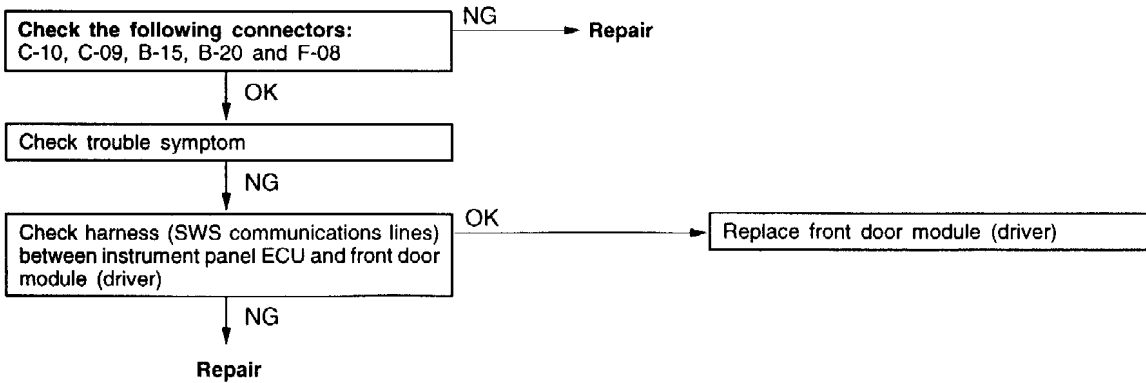




Code No. 34. Assist-ECU malfunction	Probable cause
This code is output when the instrument panel ECU fails to receive communications data continuously from the Assist-ECU for one second or longer (communications line malfunction)	<ul style="list-style-type: none"> <li>● Assist-ECU malfunction</li> <li>● Malfunction in harness or connector of communications lines</li> <li>● Harness or connector malfunction</li> </ul>



Code No. 41. Front door module (driver) malfunction	Probable cause
This code is output when the instrument panel ECU fails to receive communications data continuously from the front door module (driver) for one second or longer (communications line malfunction).	<ul style="list-style-type: none"> <li>● Front door module (driver) malfunction.</li> <li>● Harness or connector malfunction</li> <li>● Malfunction in the harness or connector of the communications lines</li> </ul>

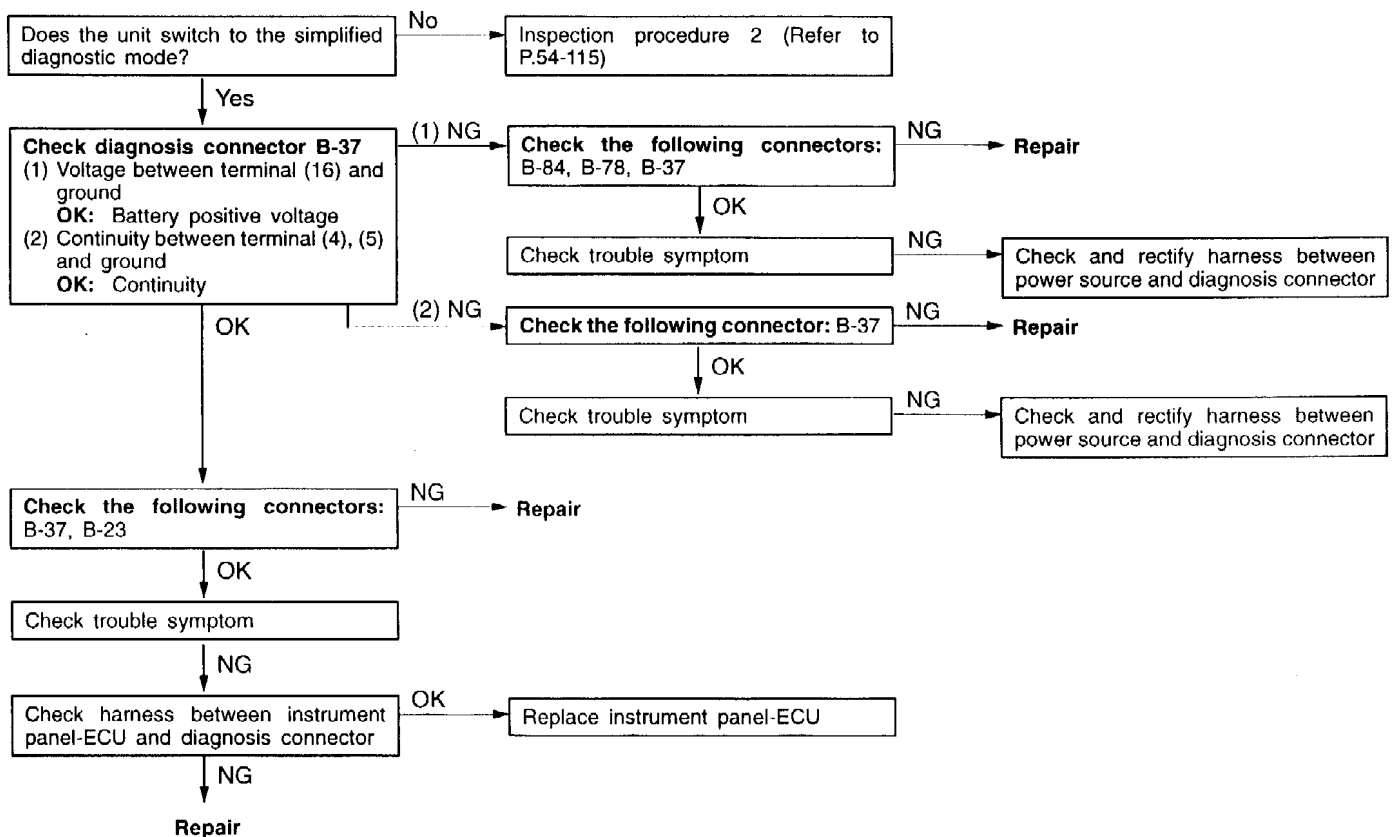


**REFERENCE CHART FOR TROUBLE SYMPTOMS**

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II not possible	1	54-114
Operating the dimmer or passing switch does not invoke the simplified diagnostic mode (driving speed is 0 km/h)	2	54-115
Simplified diagnostic mode does not cancel when the diagnostic control terminal is open circuit, or when the vehicle is driven.	3	54-116
Even if the specification confirmation mode is selected while the simplified diagnostic mode is in effect, the specification code of each unit is not displayed on the high beam indicator, or the display is wrong (the ignition switch is OFF)	4	54-117
Operating any SWS switch (P.54-109) while the switch diagnostic mode of the simplified diagnostic mode is in effect does not sound the buzzer or turn the high beam indicator on (ignition switch is ON)	5	54-118
The diagnostic code display is incorrect during the diagnostic output mode of the simplified diagnostic mode, or the display does not disappear even when the malfunction has been fixed (the ignition switch is ON)	6	54-118
The display does not read "correct", even though a malfunction does not exist while the diagnostic output mode of the simplified diagnostic mode is in effect, or the display indicates "correct", although there is a malfunction (the ignition switch is ON)	7	54-119

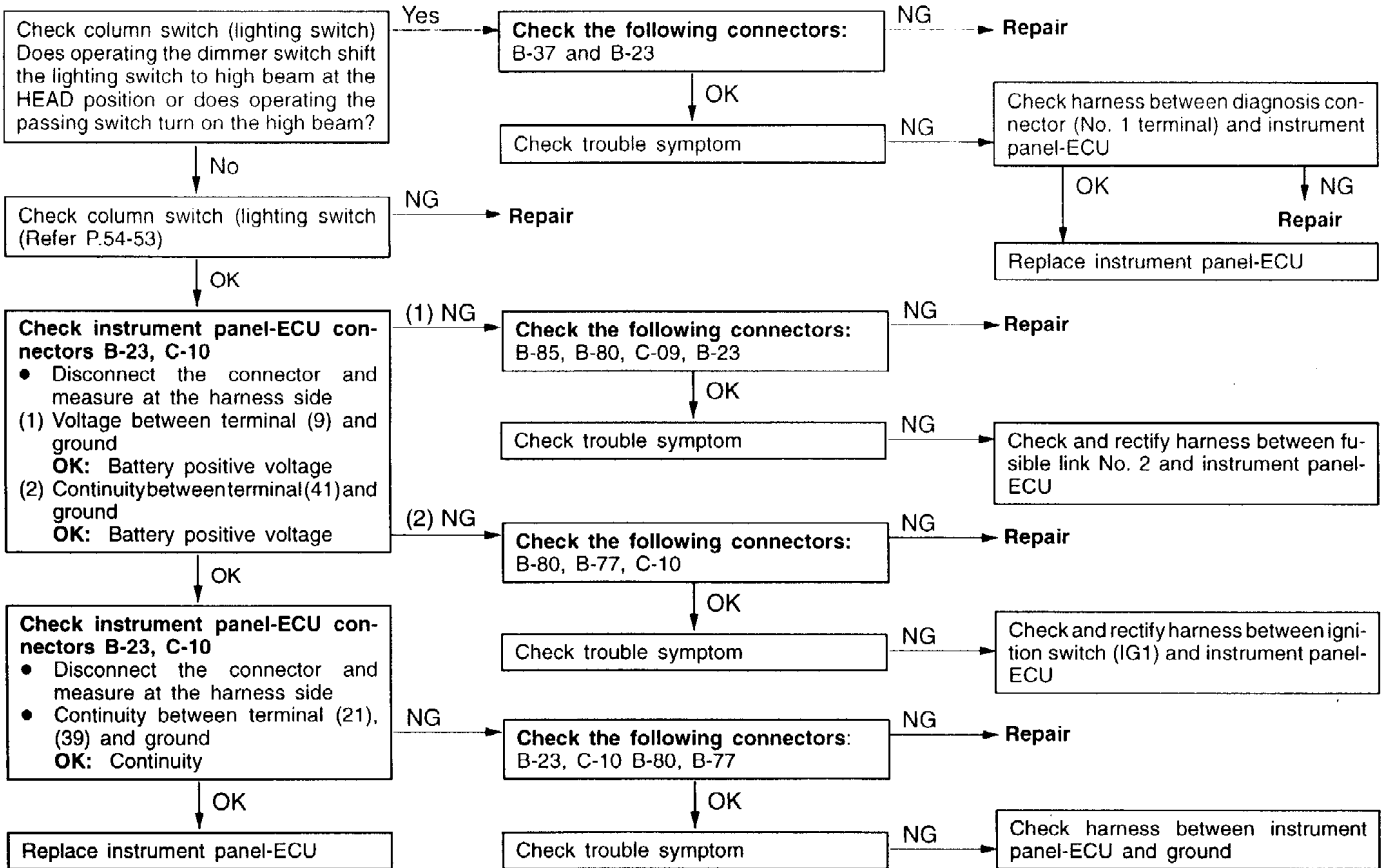
**INSPECTION PROCEDURE 1**

Communication with MUT-II not possible	Probable cause
Problem with the instrument panel-ECU power source or the ground circuit if instrument panel-ECU functions are not working	<ul style="list-style-type: none"> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> </ul>



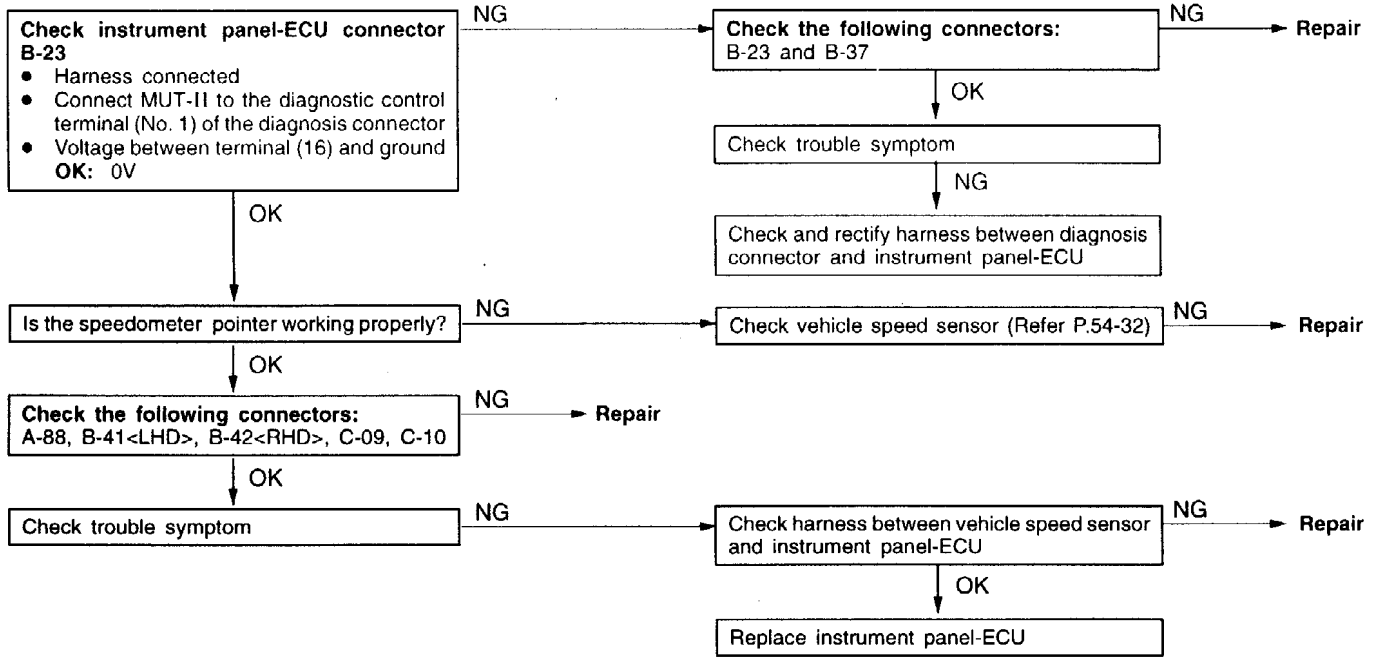
**INSPECTION PROCEDURE 2**

Operating the dimmer or passing switch does not invoke the simplified diagnostic mode	Probable cause
Problem with the input circuit system of the diagnostic control terminal or in the lighting switch	<ul style="list-style-type: none"> <li>• Lighting switch malfunction</li> <li>• Harness or connector malfunction</li> <li>• Instrument panel malfunction</li> </ul>



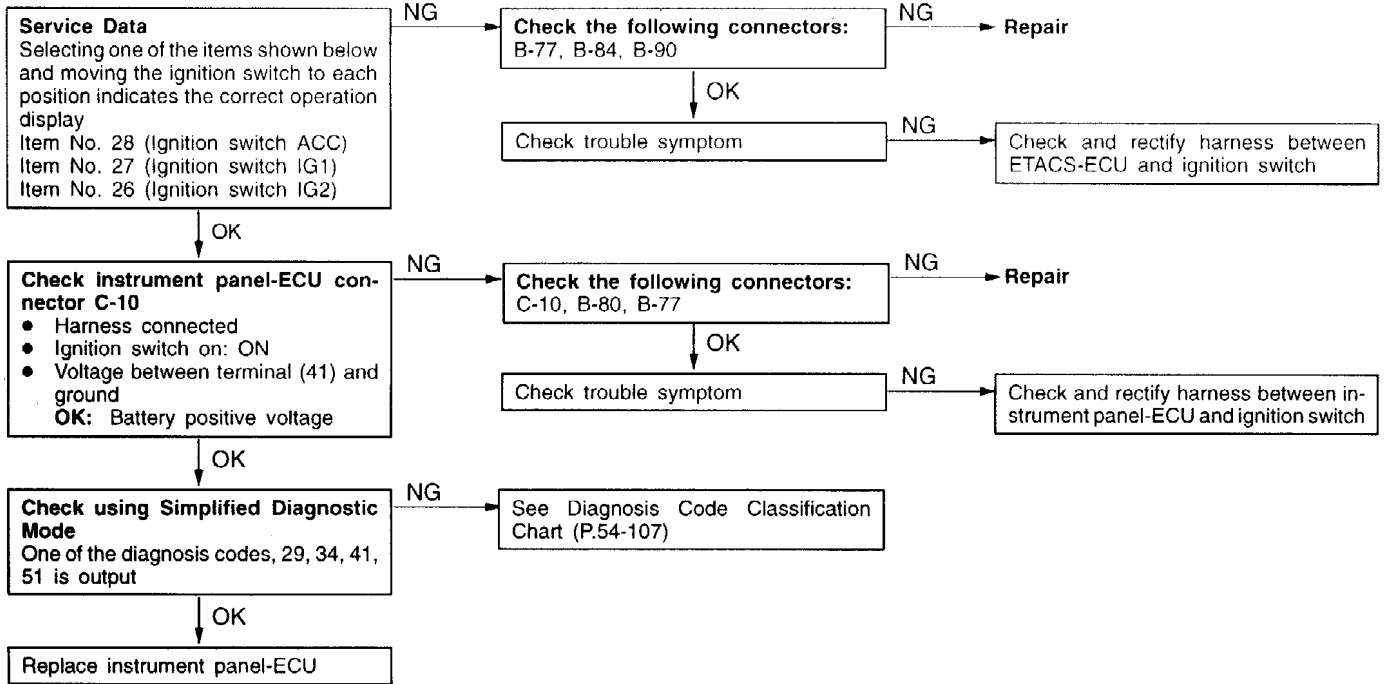
**INSPECTION PROCEDURE 3**

Simplified diagnostic mode does not cancel when the diagnostic control terminal is open circuit, or when the vehicle is driven	Probable cause
Grounding of the diagnostic control terminal or malfunction in the input circuit system of the speedometer driving pulse	<ul style="list-style-type: none"> <li>• Speed sensor malfunction</li> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> </ul>



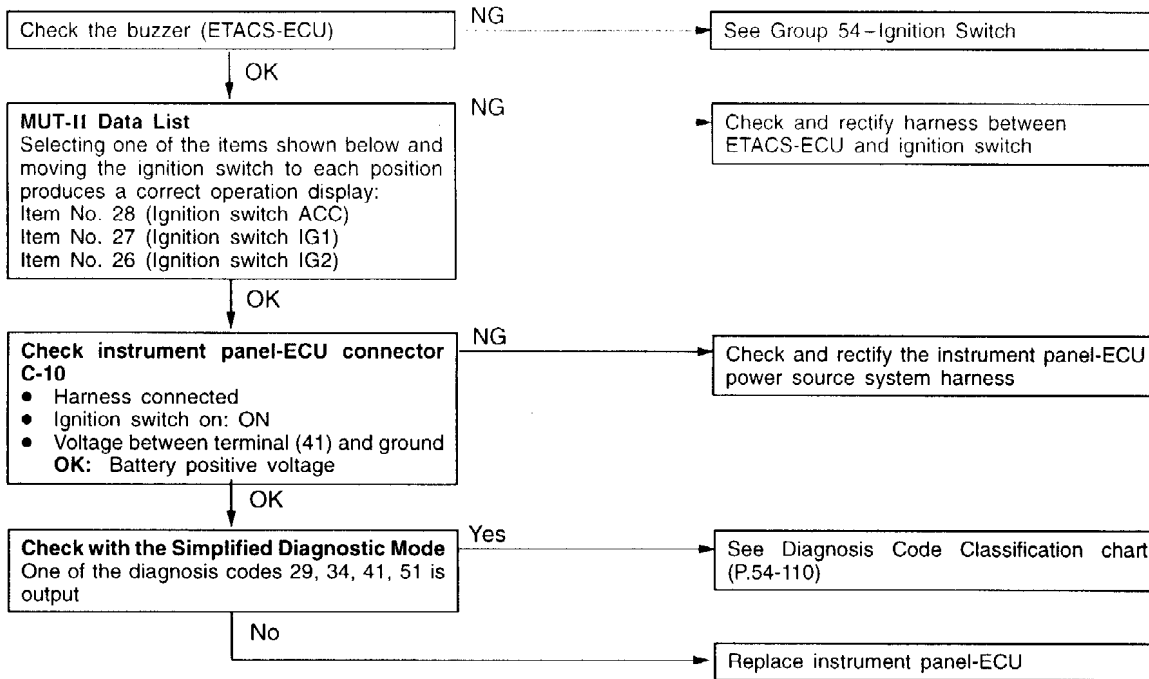
**INSPECTION PROCEDURE 4**

<p><b>Even with the specification confirmation mode selected while the simplified diagnostic mode is in effect, the specification code of each unit is not displayed on the high beam indicator or the display is wrong. (However, the ignition switch is OFF)</b></p>	<p><b>Probable cause</b></p>
<p>Problem with the ignition switch input circuit of the instrument panel ECU or in the SWS communications line</p>	<ul style="list-style-type: none"> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> </ul>



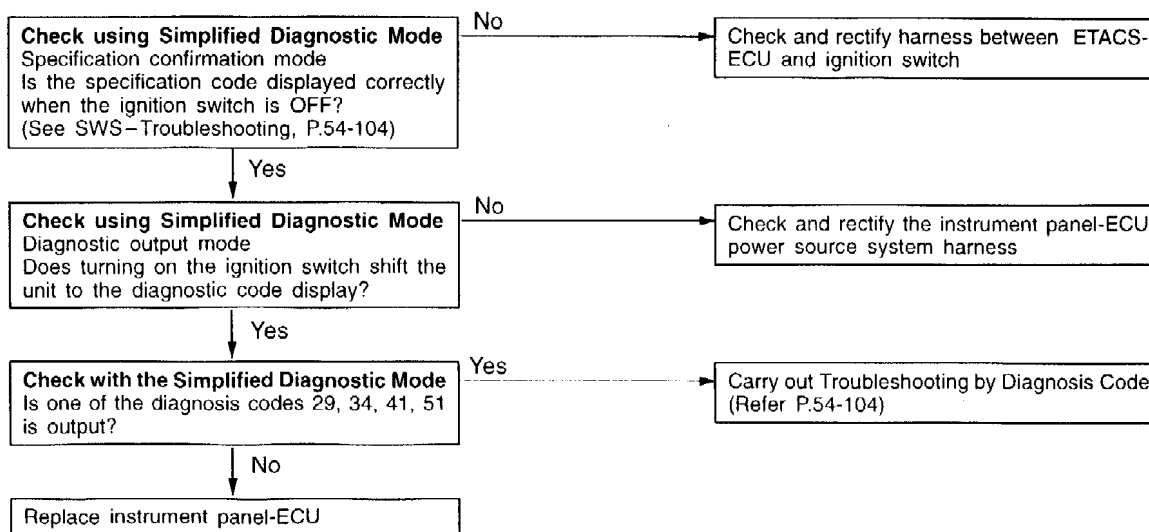
**INSPECTION PROCEDURE 5**

<p><b>Operating any SWS switch (P.54-104) while the switch diagnostic mode of the simplified diagnostic mode is in effect does not sound the buzzer or turn on the high beam indicator. (However, the ignition switch is ON)</b></p>	<p><b>Probable cause</b></p>
<p>Problem with the ignition switch input circuit of the instrument panel-ECU or with the SWS communications line. The buzzer within the ETACS-ECU may also be malfunctioning</p>	<ul style="list-style-type: none"> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> <li>• ETACS-ECU malfunction</li> </ul>



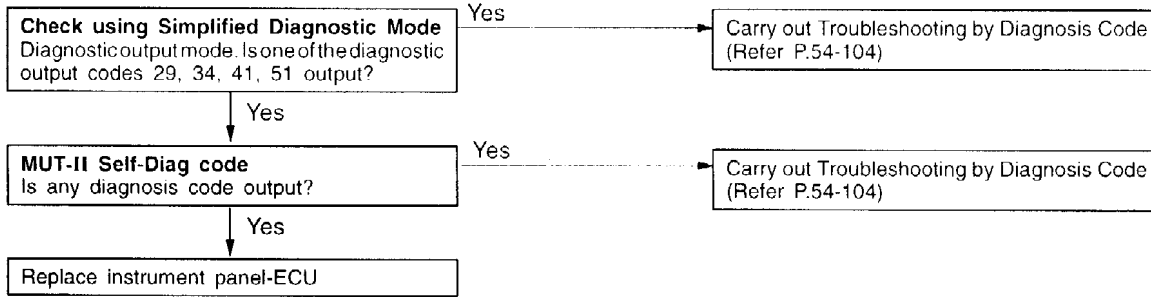
**INSPECTION PROCEDURE 6**

<p><b>The diagnostic code display, which appears while the diagnostic output mode of the simplified diagnostic mode is in effect, is incorrect, or the display does not disappear after the malfunction has been fixed. However, the ignition switch is ON)</b></p>	<p><b>Probable cause</b></p>
<p>Problem with the ignition switch circuit of the instrument panel-ECU. (The malfunction in the ignition switch input circuit causes the specification confirmation code of each unit to be displayed)</p>	<ul style="list-style-type: none"> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> </ul>



**INSPECTION PROCEDURE 7**

<p>The display does not read “correct”, even though a malfunction does not exist while the diagnostic output mode of the simplified diagnostic mode is in effect, or the display indicates “correct”, although there is a malfunction. (However, the ignition switch is ON)</p>	<p><b>Probable cause</b></p>
<p>Problem with the SWS communications line or with the instrument panel-ECU</p>	<ul style="list-style-type: none"> <li>• Harness or connector malfunction</li> <li>• Instrument panel-ECU malfunction</li> </ul>



## SERVICE DATA REFERENCE CHART

Item No.	Item Operation	Item No.	Item Operation	Item No.	Item Operation
11.	Car speed (20 km/h) – above/below	42.	Shift position D – On/Off	77.	Power window (FR): (Up) – On/Off
12.	Headlamp (LO) – On/Off	43.	Shift position N – On/Off	78.	Power window lock switch – On/Off
13.	Headlamp (HI) – On/Off	44.	Shift position R – On/Off	79.	Door key unlock switch – On/Off
14.	Tail lamp – On/Off	45.	Shift position P – On/Off	80.	Door unlock switch: DM*3 – On/Off
15.	Fog lamp – On/Off	46.	Fuel warning – On/Off	81.	Electronic remote-controlled mirror (right) – On/Off
16.	Car speed (3 km/h) – above/below	47.	Door switch (RL) – Locked/Unlocked	82.	Electronic remote-controlled mirror (lower) – On/Off
17.	Front wiper mist – On/Off	48.	Door switch (RR) – Locked/Unlocked	83.	Power window (RL): (Down) – On/Off
18.	Front washer switch – On/Off	51.	Shift position 3 – On/Off	84.	Power window (RR): (Down) – On/Off
19.	Door lock switch (RR) – Locked/Unlocked	52.	Shift position 2 – On/Off	85.	Power window (FL): (Down) – On/Off
20.	Front wiper – operating/stopped	53.	Shift position 1 – On/Off	88.	Electronic remote-controlled mirror switch FL/FR
21.	Front wiper (HI) – operating/stopped	55.	Wiper motor switch *1 – On/Off	89.	Door lock switch (FL) – Locked/Unlocked
22.	Seat belt switch – On/Off	56.	Auto cruise Warning – On/Off	96.	Centre door lock switch (FR) – On/Off
23.	Door lock switch (RR) – Locked/Unlocked	59.	Oil pressure warning – On/Off	97.	Door lock switch (FR) On/Off
24.	Door switch (RR) – Opened/Closed	60.	Charge warning – On/Off	98.	Door key lock switch (FR) On/Off
25.	Door switch (FL) – Opened/Closed	61.	Brake fluid warning – On/Off	99.	Centre door unlock switch (FR) – On/Off
26.	Ignition switch (IG2) – On/Off	63.	ABS warning – On/Off		
27.	Ignition switch (IG1) – On/Off	71.	Door lock switch – On/Off		
28.	Ignition switch (ACC) – On/Off	72.	Door lock switch: DM*2 – On/Off		
37.	Parking switch – On/Off	73.	Electronic remote-controlled mirror (left) – On/Off		
38.	Key reminder switch – take out the ignition key/insert the ignition key	74.	Electronic remote-controlled mirror (upper) – On/Off		
39.	Door switch (RL) – Opened/Closed	75.	Power window (RL): (Up) – On/Off		
40.	Door switch (FL) – Opened/Closed	76.	Power window (RR): (Up) – On/Off		
41.	Power window switch effectiveness – effective/ineffective				

## NOTE

\*1. Rotary sliding switch in the wiper motor.

\*2. Centre door lock switch signal in the door module of the driver's seat.

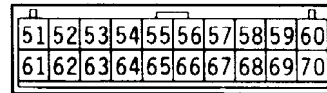
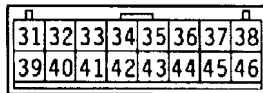
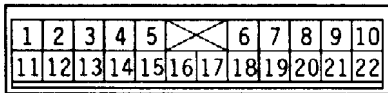
\*3. Centre door unlock switch signal in the door module of the driver's seat.



**ACTUATOR TEST REFERENCE CHART**

Item No.	Item Operation	Item No.	Item Operation	Item No.	Item Operation
02	Exterior lamps	03	Windshield wiper	04	Door lock

**INSTRUMENT PANEL-ECU TERMINAL CHECK**



16P0264

Connector Terminal No.	Signal Name	Inspection condition	Normal state
2	Headlamp switch signal	When headlamp switch is ON	0V
3	Headlamp switch	When headlamp switch is ON	
4	Dimmer switch (HI)	When dimmer switch is HI	
5	Fog lamp switch	When fog lamp switch is ON	
6	Front wiper switch (LO)	When front wiper LO switch is ON	
7	Front washer switch	When front washer switch is ON	
8	Ignition key surround illumination	Ignition key surround illumination Off→On	Battery positive voltage→1V
9	+B power source	Normal	Battery positive voltage
11	Front wiper switch signal	When the front wiper LO or HI switch is ON	0V
12	Tail lamp signal	When the taillamp switch or the headlamp switch is ON	
14	Taillamp switch	When the taillamp switch or the headlamp switch is ON	0V
15	Dimmer switch (LO)	When the dimmer switch LO is on	
16	Diagnostic control terminal	When the diagnosis connector is connected	
17	Diagnostic data line	When the ignition switch is ON (When the MUT-II is not used)	4V
18	Front wiper switch (HI)	When the front wiper switch HI is ON	0V
19	Front wiper switch (Auto)	Front wiper switch Auto is ON	
20	Front wiper intermittent dial	Intermittent dial is ON	0–2.5V
21	Instrument panel-ECU earth	Constant	0V
31	SWS communications line	When the ignition is ON	Approx. 5V*1
32*2	Oil pressure warning	Oil pressure warning OFF→ON	Battery positive voltage→1V
34	Door open warning	Door open warning OFF→ON	
37	Disconnection sensor 2	Constant	0V
38	Fuel warning *2	Fuel warning lamp OFF→ON	Battery positive voltage→1V

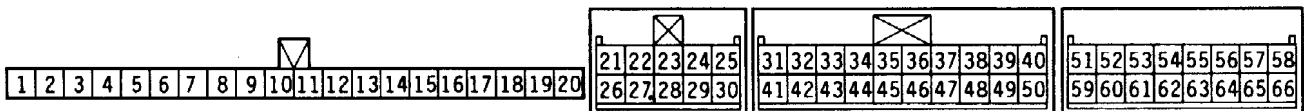
Connector Terminal No.	Signal Name	Inspection condition	Normal state
39	Instrument panel-ECU earth	Constant	0V
41	IG1	When the ignition is ON	Battery positive voltage
43	High beam indicator	High beam indicator OFF→ON	Battery positive voltage→1V
44	Vehicle speed sensor	When the ignition is ON – Stationary	0V or battery positive voltage
		When the ignition is OFF – Driving	Approx. 6V
45	Charge warning	Charge warning OFF→ON	Battery positive voltage→1V
46	Disconnection sensor 1	Constant	0V
52*2	Auto-cruise indicator	Auto-cruise indicator OFF→ON	Battery positive voltage→1V
54*2	ABS warning lamp	ABS warning lamp OFF→ON	
55*2	Brake warning lamp	Brake warning lamp OFF→ON	
56*2	Seat belt warning	Seat belt warning OFF→ON	
57*2	Shift 1 indicator	Shift 1 indicator OFF→ON	0V→Battery positive voltage
58*2	Shift 3 indicator	Shift 1 indicator OFF→ON	
59*2	Shift D indicator	Shift 1 indicator OFF→ON	
60*2	Shift R indicator	Shift 1 indicator OFF→ON	
63*2	Check engine lamp	Check engine lamp OFF→ON	Battery positive voltage→1V
67*2	Shift 2 indicator	Shift 1 indicator OFF→ON	0V→Battery positive voltage
68*2	Shift 4 indicator	Shift 1 indicator OFF→ON	
69*2	Shift N indicator	Shift 1 indicator OFF→ON	
70*2	Shift P indicator	Shift 1 indicator OFF→ON	

## NOTE

\*1. Reference value for pulse signals.

\*2. Vehicles with standard meters.

## ETACS-ECU TERMINAL CHECK



16P0265

Connector Terminal No.	Signal Name	Inspection condition	Normal state
1	Keyless entry identification signal	Constant	0V
2	Rear power window down relay (Driver side)	When the ignition switch is on	Battery positive voltage
3	Keyless entry door lock signal	When the front seat belt (FR) is not fastened	0V
5	IG <sub>1</sub> power source	When the ignition switch is on	Battery positive voltage
7	ACC	When the ignition switch is ACC	Battery positive voltage
13	Driver's door switch	Driver's door Close→Open	10V→0V
14	Door switch (Driver Fr)	Close→Open	
15	Power window relay signal	When the ignition switch is ON	Battery positive voltage
16	Power Source	Constant	
17	IG <sub>2</sub> power source	When the ignition switch is ON	
20	Interior lamp	Interior lamp OFF→ON	0V→Battery positive voltage
31	Door switch (Driver Rr)	Unlock→Lock	0V→10V
33	Keyless entry identification signal	When keyless entry signal is received	Approx. 1–5V
37	Rear power window down relay (Driver side)	Rear left power window Stop→Down	0V→Battery positive voltage
38	Keyless entry door unlock signal (all except driver's door)	Doors unlocked using keyless entry	Battery positive voltage
39	Keyless entry door lock signal	Doors locked using keyless entry	Battery positive voltage→0V→Battery positive voltage
41	Key reminder signal	Ignition key Insert→Remove	0V→Battery positive voltage
42	Trunk room lamp switch	Trunk lid Closed→Open	Battery positive voltage→0V
43	Door open signal	Any door Open→Closed	0V or 5V
47	Rear power window up relay (Driver side)	Rear left window Stop→Up	0V→Battery positive voltage
48	Keyless entry door unlock signal	Doors unlocked using keyless entry	Battery positive voltage→0V→Battery positive voltage
51	Key reminder switch	Ignition key Remove→Insert	0V→Battery positive voltage
53	Disconnection sensor 2	Constant	0V
55	SWS communications line	Constant	Approx. 5V*

Connector Terminal No.	Signal Name	Inspection condition	Normal state
56	Earth	Constant	0V
58	Parking brake switch	Parking brake Applied→Released	0V→Battery positive voltage
59	Door lock motor (unlock) (all doors except driver's)	Door lock OFF→UNLOCK	0V→Battery positive voltage→0V
60	Door lock motor (lock) (all doors except driver's)	Door lock OFF→LOCK	
62	Disconnection sensor 1	Constant	0V
63	Disconnection sensor 3	Constant	
64	Disconnection sensor 4	Constant	
65	Driver's door lock motor (unlock)	Door lock OFF→UNLOCK	0V→Battery positive voltage
66	Driver's door lock motor (lock)	Door lock OFF→LOCK	

## NOTE

\* Reference value for pulse signals.

## ASSIST-ECU TERMINAL CHECK

1	2	3	4	5	6
7	8	9	10	11	12
13	14				

21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36

41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82								

16P0266

Connector Terminal No.	Signal Name	Inspection condition	Normal state
1	Remaining fuel warning sensor signal	Low fuel warning (Ignition switch ON)	8V or less
4	Front passenger seat door switch	Front passenger seat Open→Closed	0V→10V
5	Power window down relay (Pass. Rr)	Rear right power window Stop→Down	0V→Battery positive voltage
6	ABS signal	When conditions for turning on the ABS warning lamp are met	0V
7	Power window lock signal	Power window lock switch Lock→Unlock	0V→Battery positive voltage
11	Door lock switch (Pass. Rr)	Rear right door Unlocked	0V
12	Door switch (Pass. Rr)	Rear right door Open	
13	Power window UP relay (Pass. Rr)	Rear right power window Stop→Up	0V→Battery positive voltage
14	Remaining fuel warning sensor signal ground	Constant	0V
21	Check engine signal	When conditions for turning on the check engine warning lamp are met	0V
22	Disconnection sensor	Constant	

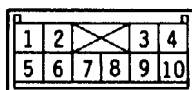
Connector Terminal No.	Signal Name	Inspection condition	Normal state
25	Shift R signal	Ignition switch is ON and shift position set at R	Battery positive voltage
26	Shift D signal	Ignition switch is ON and shift position set at D	
27	Shift 3 signal	Ignition switch is ON and shift position set at 3	
28	Shift L signal	Ignition switch is ON and shift position set at L	
30	Auto cruise signal	When conditions for turning on the Auto cruise indicator are met	0V
32	Shift P signal	Ignition switch ON and shift position set at P	Battery positive voltage
33	Shift N signal	Ignition switch ON and shift position set at N	
34	Shift 4 signal	Ignition switch ON and shift position set at 4	
35	Shift 2 signal	Ignition switch ON and shift position set at 2	
36	Starter relay	Ignition key Removed→Inserted	0V–10V
41	Power source	Constant	Battery positive voltage
42	Door mirror motor – front passenger seat	Mirror Stop→Right	0V→Approx.. 10V
43	Door mirror motor – front passenger seat	Mirror Stop→Down	
44	Door mirror motor – front passenger seat	Mirror Stop→Up	
45	Front passenger centre door lock switch (lock)	Switch Off→Lock	Battery positive voltage→0V
46	Front passenger door key cylinder switch (lock)	Key Off→Lock	Battery positive voltage→0V
47	Front passenger door key cylinder switch (unlock)	Key Off→Lock	Battery positive voltage→0V
48	SWS communications line	Ignition switch ON	Approx. 5V*
49	Power window switch on the front passenger side	Power window switch Lock→Unlock	Battery positive voltage→0V
50	Front wiper switch signal	Wiper switch LO or HI	0V
51	IG1 power source	Ignition switch is ON	Battery positive voltage
55	Headlamp switch signal	Headlamp switch is ON	0V
56	Front passenger centre door lock switch (unlock)	Switch OFF→Unlock	Battery positive voltage→0V
57	Assist-ECU ground	Constant	0V
58	Power window down relay (Pass. Fr)	Power window Stop→Down (Pass. Fr)	Battery positive voltage→0V
59	Power window up relay (Pass. Fr)	Power Stop→Up (Pass. Fr)	

Connector Terminal No.	Signal Name	Inspection condition	Normal state
60	Door lock switch on front passenger side	When the front passenger door is Unlocked	Battery positive voltage
61	Power window motor (-) (Pass. Fr)	Ignition switch ON	
62	MPI Blown fuse sensor	Ignition switch ON	
63	Power window relay	Ignition switch ON	
64	Headlamp LO relay	Headlamp is turned ON	1V
65	Taillamp relay	Taillamp is turned ON	
66	Washer motor	Ignition switch at ACC and washer switch is ON	Battery positive voltage
67	Wiper motor (LO)	Ignition switch at ACC and wiper switch at LO	Battery positive voltage
68	Wiper motor (HI)	Ignition switch at ACC and wiper switch at HI	
69	Wiper motor internal switch	When wiper motor is operating and stopped	Operating: Battery voltage Stopped: 0V
70	Wiper motor (ACC) signal	Ignition switch ACC position	Battery positive voltage
71	Blown fuse detection 2 (alternator)	Ignition switch ON	
73	Fog lamp relay	When the fog lamp is turned ON	1V
74	Headlamp HI relay	When the headlamp HI is turned ON	
75	Horn relay	When conditions for operating the theft alarm are met	0V
76	Alternator signal	Charge warning lamp is turned ON	8V or less
77	Power window relay signal	Ignition switch ON	Battery positive voltage
78	Earth	At all times	0V
79	Brake fluid level sensor signal	When conditions for turning on the brake fluid warning lamp are met	0V
81	Engine oil pressure signal	When conditions for turning on the oil pressure warning lamp are met	

## NOTE

\* Reference value for pulse signal.

## FRONT DOOR MODULE (DRIVER) TERMINAL CHECK



16P0267

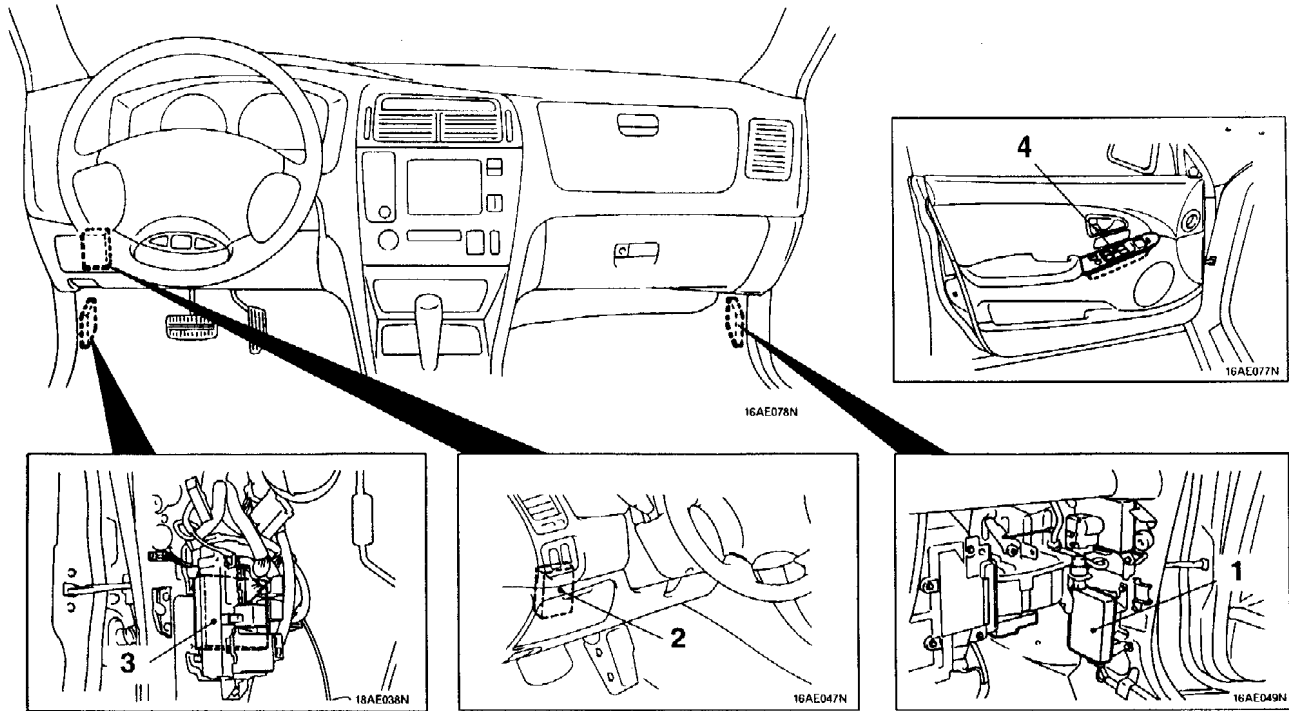
Connector Terminal No.	Signal Name	Inspection condition	Normal state	
1	Power window relay power source	Ignition switch on	Battery positive voltage	
2	B power source	At all times	Battery positive voltage	
3	Earth	At all times	0V	
4	Power window output (driver's side) (-)	Power window Stop→Down	0V→Battery positive voltage	
5	Power window output (driver's side) (+)	Power window Stop→Down		
10	Earth	At all times	0V	
11	SWS communications line	When ignition switch is on	Approx. 5V*	
12	Door handle signal	Door handle	Released	0V
			Pulled	Approx. 3.5V*
13	Door lock signal	Door lock knob	Lock	Approx. 3.5V*
			Unlock	0V
14	Door key signal (Lock)	Key Off→Lock	Battery positive voltage→0V	
15	Door key signal (Unlock)	Key Off→Unlock		
16	Output of driver's side door mirror motor	Mirror Stop→Right	0V→10V Approximately	
17	Output of driver's side door mirror motor	Mirror Stop→Up		
18	Output of driver's side door mirror motor	Mirror Stop→Down		

## NOTE

\* Reference value for pulse signals.

## SIMPLIFIED WIRING SYSTEM (SWS)

## REMOVAL AND INSTALLATION



16AE079N

**Assist-ECU removal steps**

- Cowl side trim (Pass.) (Refer to Group 52A)
  - Under cover assembly (Refer to Group 52A)
1. Assist-ECU

**Instrument panel-ECU removal steps**

- Under cover assembly (Refer to Group 52A–Instrument Panel)
2. Instrument panel-ECU

**ETACS-ECU removal steps**

- Cowl side trim (Driver) (Refer to Group 52A)
  - Under cover assembly (Refer to Group 52A)
  - Junction block assembly
3. ETACS-ECU

**Front door module (Driver) removal**

4. Front door module (Driver)