

# CHASSIS ELECTRICAL

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E54AA--

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

#### WARNING!

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

#### NOTE

The SRS includes the following components: impact sensors, SRS diagnosis unit, SRS warning lamp, air bag module, clock spring and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (\*).

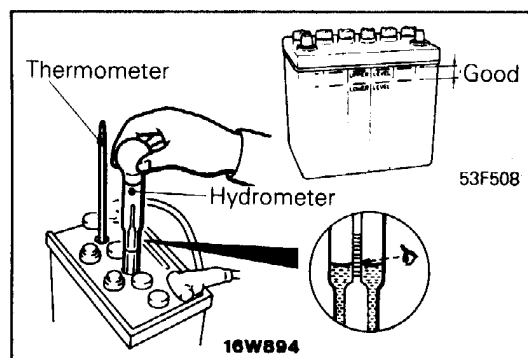
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# BATTERY SPECIFICATION

## SERVICE SPECIFICATION

E54CB--

Item	Specification
Specific gravity of the battery fluid	1.220–1.290 [20°C (68°F)]



## SERVICE ADJUSTMENT PROCEDURES

E54CBAD

### INSPECTION OF FLUID LEVEL AND SPECIFIC GRAVITY

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

**Standard value: 1.220–1.290 [20°C (68°F)]**

The specific gravity of the battery fluid varies with the temperature, so use the following formula to calculate the specific gravity for 20°C (68°F). Use the calculated value to determine whether or not the specific gravity is satisfactory.

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

**$D_{20}$ : specific gravity of the battery fluid calculated for 20°C (68°F).**

**$D_t$ : actually measured specific gravity**

**$t$ : actually measured temperature**

### VISUAL INSPECTION

Inspect after removing the battery.

#### Caution

**If battery fluid has leaked from the battery, use rubber gloves to protect your hands when removing the battery.**

- (1) If there is corrosion of the battery stays or battery brackets from the battery fluid, clean by washing in warm or cold water.
- (2) If there is a leak from a crack in the battery case, replace the battery.
- (3) Clean the battery terminals with a wire brush, and replace any parts that are damaged.

### CHARGING

1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.
2. The current normally used to charge a battery should be approximately 1/10th the battery capacity.

3. When quick charging due to lack of time, etc., the charging current should never exceed the battery capacity as indicated in amperes.
4. Determining if charging is completed.
  - (1) If the specific gravity of the battery fluid reaches 1.250–1.290 and remains constant for at least one hour.
  - (2) If the voltage of each cell reaches 2.5–2.8 V and remains constant for at least one hour.

#### Caution

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

BATTERY TEST

E54CBAA

TEST STEP	RESULT	ACTION TO TAKE
A0 VISUAL INSPECTION <ul style="list-style-type: none"> <li>Remove negative cable, then positive cable.</li> <li>Check for dirty or corroded connections.</li> </ul>	<del>OK</del> ► OK ►	CLEAN terminals and clamps. Go to A1. Go to A1.
A1 LOOSE BATTERY POST <ul style="list-style-type: none"> <li>Check for loose battery post.</li> </ul>	<del>OK</del> ► OK ►	REPLACE battery. Go to A2.
A2 CRACKED BATTERY COVER <ul style="list-style-type: none"> <li>Remove hold-downs and shields.</li> <li>Check for broken/cracked case or cover.</li> </ul>	<del>OK</del> ► OK ►	REPLACE battery. Go to A3.
A3 OPEN CIRCUIT VOLTAGE TEST. <ul style="list-style-type: none"> <li>Turn headlamps on for 15 seconds.</li> <li>Turn headlamps off for 2 minutes to allow battery voltage to stabilize.</li> <li>Disconnect cables.</li> <li>Read open circuit voltage.</li> </ul>	<del>OK</del> ► OPEN CIRCUIT VOLTAGE UNDER 12.4 VOLTS OK ►	CHARGE battery at 5 amps, then go to A3. Go to A4.
A4 LOAD TEST <ul style="list-style-type: none"> <li>Connect a load tester to the battery.</li> <li>Load the battery at the recommended discharge rate (See LOAD TEST RATE CHART) for 15 seconds.</li> <li>Read voltage after 15 seconds, then remove load.</li> </ul>	<del>OK</del> ► VOLTAGE IS LESS THAN MINIMUM LISTED OK ► VOLTAGE IS MORE THAN MINIMUM LISTED	REPLACE battery. Battery OK.

LOAD TEST RATE CHART

Load test (amps)	Cranking rating [-18°C (0°F)]	Reserve capacity (min.)	Application
170	356	99	55D23R
240	490	123	75D26R

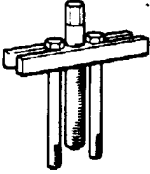
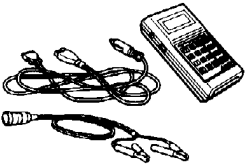

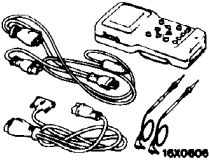
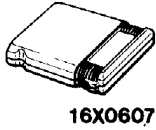
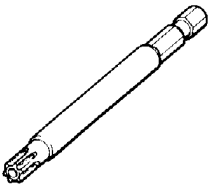
LOAD TEST CHART

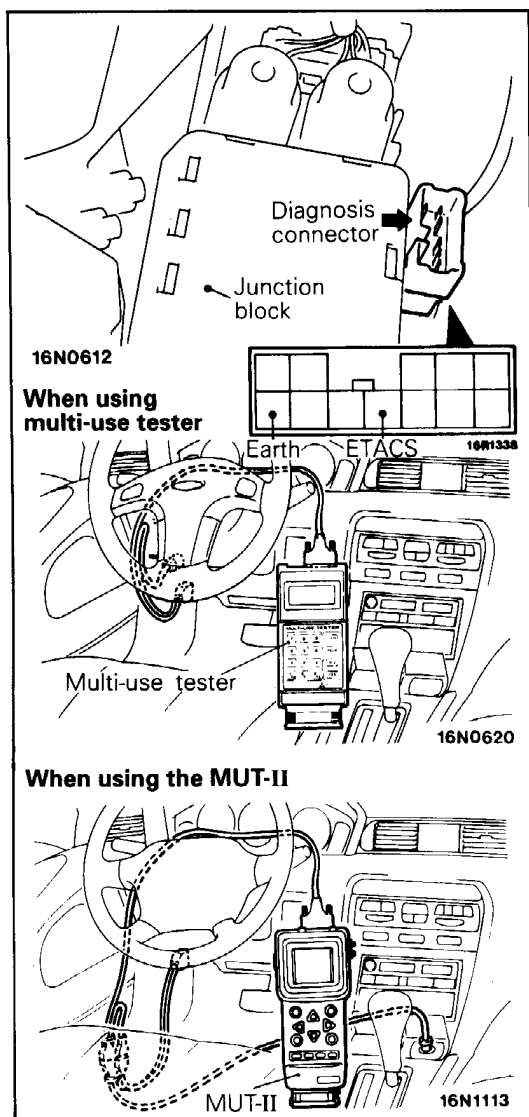
Minimum voltage	Temperature	
	°C	°F
9.6	21 and above	70 and above
9.5	16	60
9.4	10	50
9.3	4	40
9.1	-1	30
8.9	-7	20
8.7	-12	10
8.5	-18	0

# IGNITION SWITCH

## SPECIAL TOOLS

E54DA--

Tool	Number	Name	Use
	MB990803	Steering wheel puller	Removal of steering wheel (LH drive vehicles only)
	MB991341	Multi-use tester assembly	Up to 1993 models ETACS input checking
		ROM pack  (For the number, refer to GROUP 00 – Precautions Before Service.)	
	MB991502	MUT-II	All models ETACS input checking
		ROM pack	
	MB990826	Torx wrench	Removal and installation of steering column



## TROUBLESHOOTING (KEY ILLUMINATION TIMER) INPUT CHECK

Using the multi-use tester <Up to 1993 models> or MUT-II <All models> check whether or not the input signals from each switch are being input to the electronic control unit.

- (1) Connect the multi-use tester or MUT-II to the diagnosis connector (located at the right or left side of the junction block).

### Caution

**Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.**

- (2) Check to be sure that the buzzer of the multi-use tester or MUT-II sounds one time, when each switch noted below is operated.

If the buzzer sounds, the input signals are being input to the electronic control unit, so that switch can be considered to be functioning normally. If there is a malfunction, there is an abnormality in the switch or in the switch input circuit, so they should be inspected.

- Ignition switch
- Driver door switch

## QUICK-REFERENCE TABLE

Problem	Probable cause (s)	Checking procedure	Remedy
Ignition key illumination light doesn't illuminate when driver's door is opened.	Damage or disconnection of the wiring of the wiring of the power supply or earth circuit	Check by using check chart No. 1 (P.54-6).	Repair the harness.
	Damaged or disconnected wiring of either (or both) driver door switch	If input checks indicate a malfunction, check by using check chart No. 3 (P.54-8).	Repair the harness or replace driver door switch.
	Damaged or disconnected wiring of ignition key illumination light driver or power-supply circuit.	Check by using check chart No.4 (P.54-9).	Repair the harness or replace the ignition key illumination light.
	Malfunction of the ECU	–	Replace the ECU.
Ignition key illumination light remains illuminated when ignition key is turned to ON.	Damaged or disconnected wiring of ignition switch ON input circuit	Check by using check chart No. 2 (P.54-7).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.

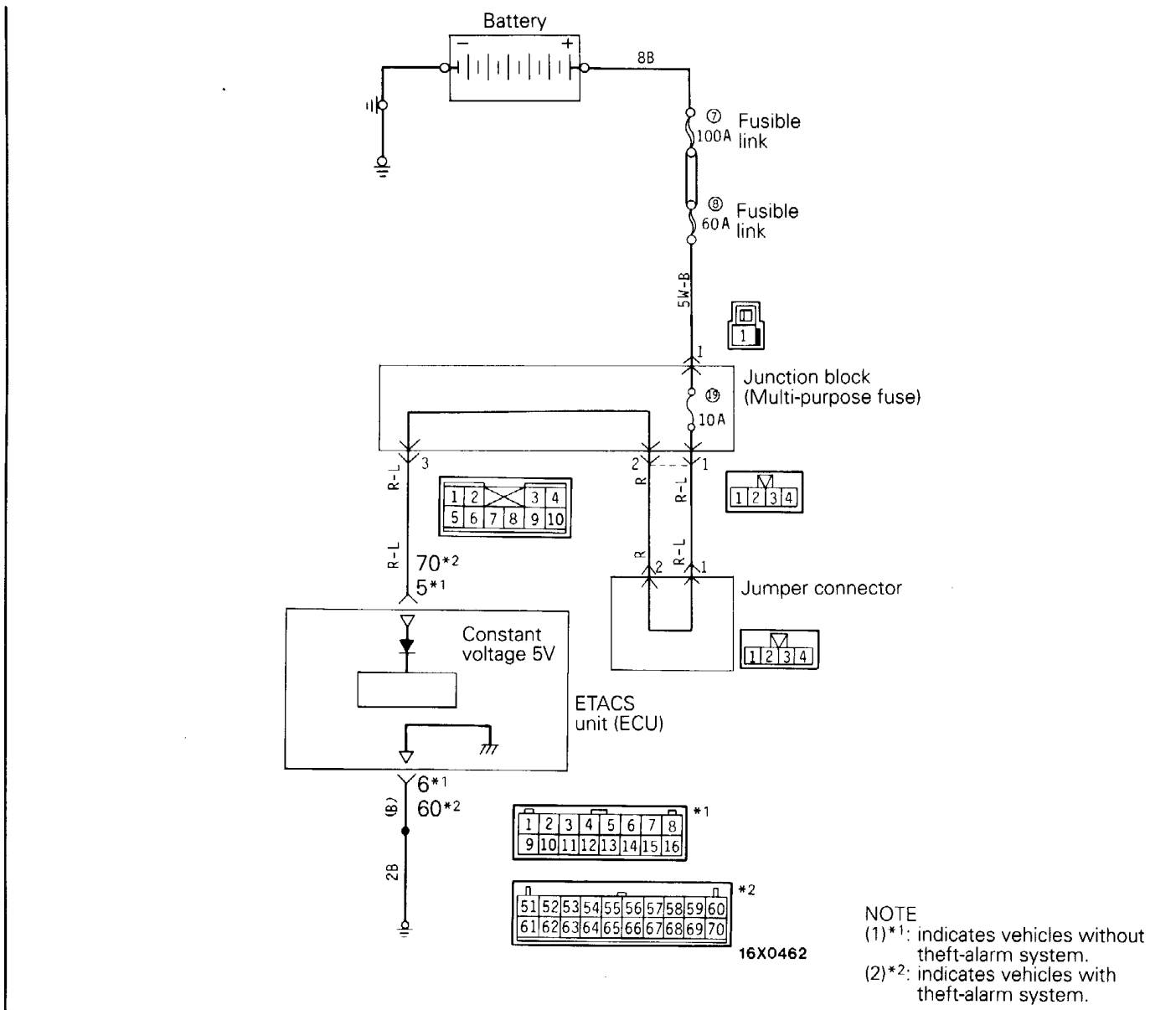
ECU (Electronic Control Unit): ETACS unit

**NOTES**



CHECKING INDIVIDUAL PART AND CIRCUIT

1. ETACS POWER-SUPPLY AND EARTH CIRCUIT



**Description of operation**

The battery supplies a stabilized 5V power supply to the electronic control unit, via the constant-voltage circuit and terminal ⑤\*1, ⑦\*2 directly connected to the battery.

If there is an abnormal condition of the power-supply circuit, illumination functions also will not operate.

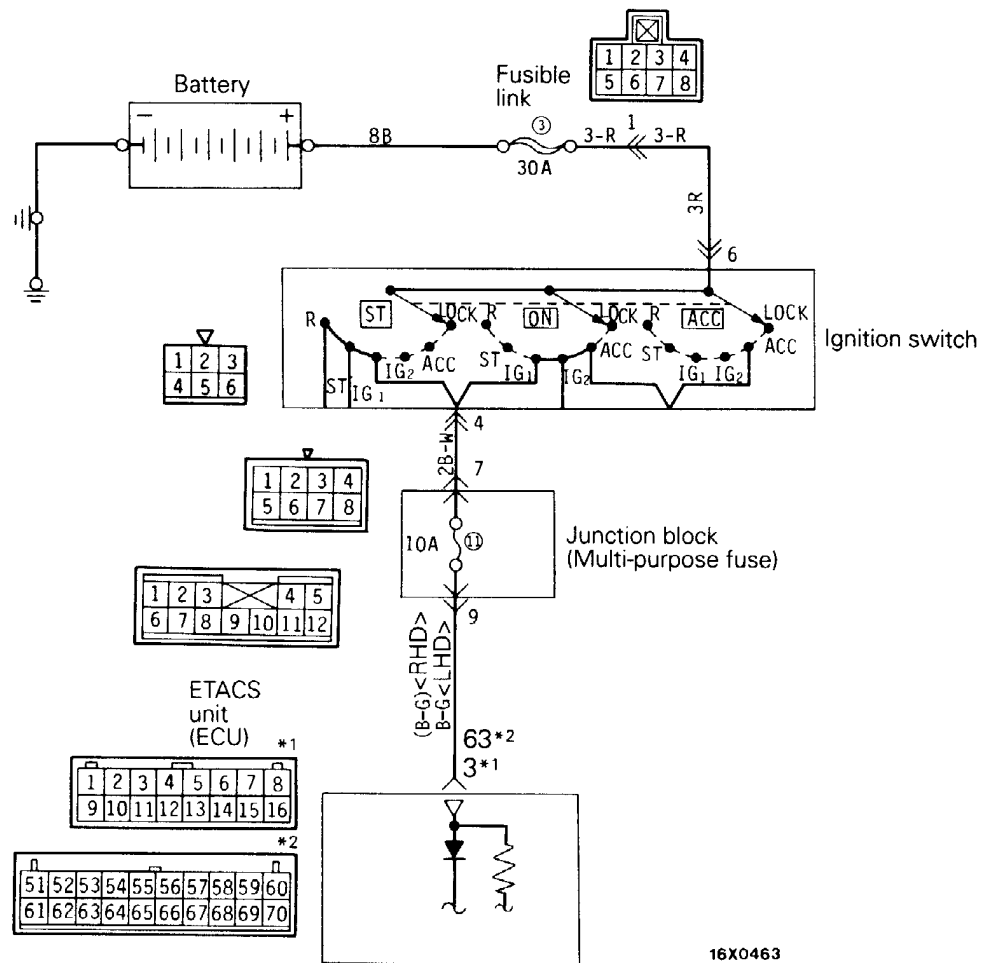
**Electronic control unit voltage (connection status of the electronic control unit connector)**

ECU terminal No.	Signal	Condition	Terminal voltage
5*1, 7*2	Electronic control unit power supply	At all times	System voltage

**Checking the ground circuit (Disconnect the connector and check the wiring harness side.)**

Terminal No.	Connected to/measured part	Measurement	Tester connection	Check conditions	Standard
6*1, 60*2	Electronic control unit earth	Continuity	6-earth*1 60-earth*2	At all times	Continuity

2. IGNITION SWITCH INPUT CIRCUIT



16X0463

NOTE  
 (1)\*1: indicates vehicles without theft-alarm system.  
 (2)\*2: indicates vehicles with theft-alarm system.

**Description of operation**

When the ignition switch is ON, an H signal is sent to the ECU. The timer circuit is switched OFF, and illumination is interrupted.

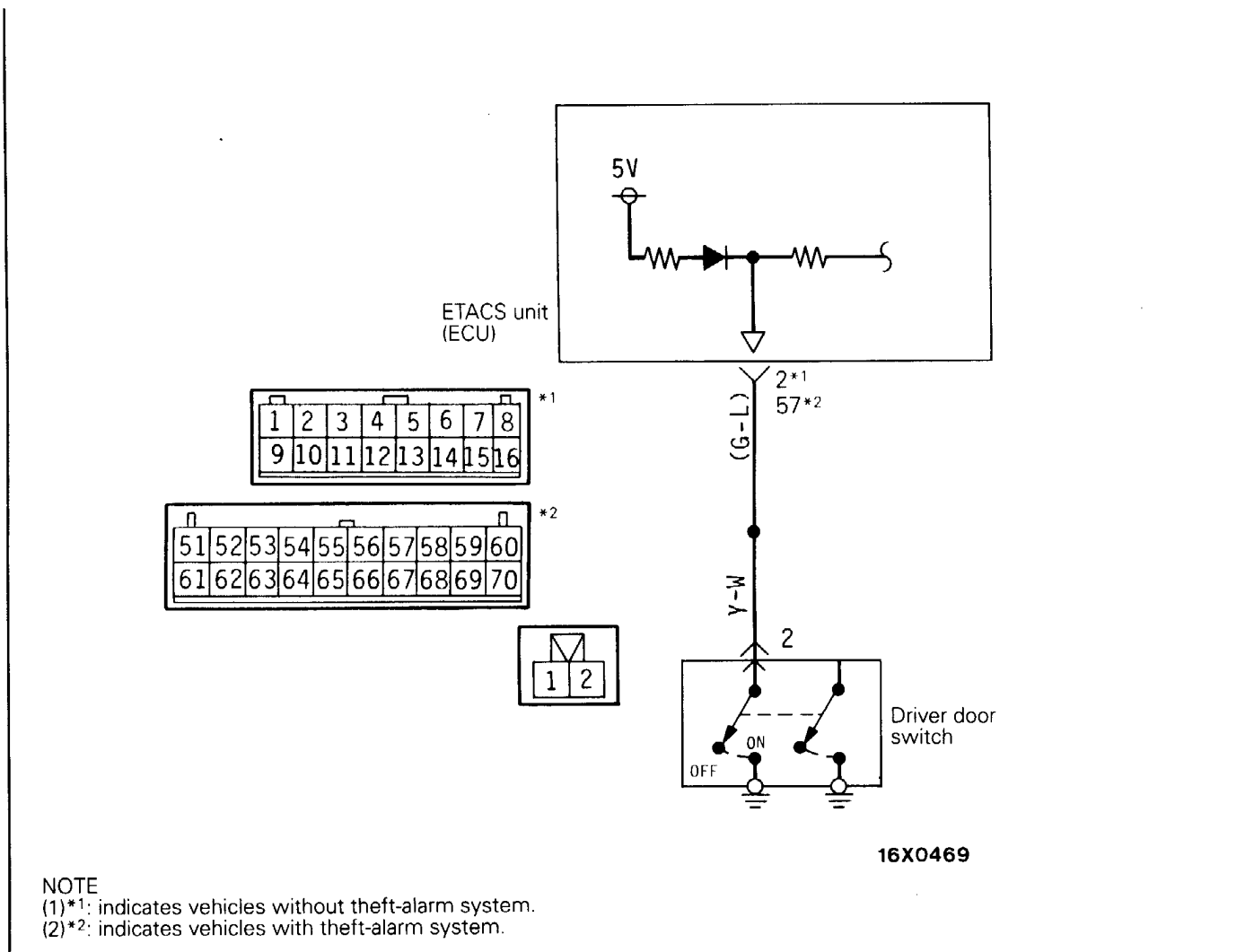
**Electronic control unit terminal voltage (Disconnect the connector of the electronic control unit and check the wiring harness side.)**

ECU terminal No.	Signal	Condition	Standard
3*1 63*2	Ignition switch: "ON"	Ignition switch	OFF
			ON

**Checking the individual part**

Ignition switch ... Refer to P.54-11.

3. DRIVER DOOR SWITCH INPUT CIRCUIT



Description of operation

When the front door is closed (the door switch is switched OFF), HIGH-level signals are sent to the electronic control unit; when the driver door

is opened (the door switch is switched ON), LOW-level signals are sent to the electronic control unit.

Electronic control unit terminal voltage (connection status of the electronic control unit connector)

ECU terminal No.	Signal	Condition		Terminal voltage
2*1 57*2	Driver door switch signal	Driver door	Open	0V
			Closed	5V

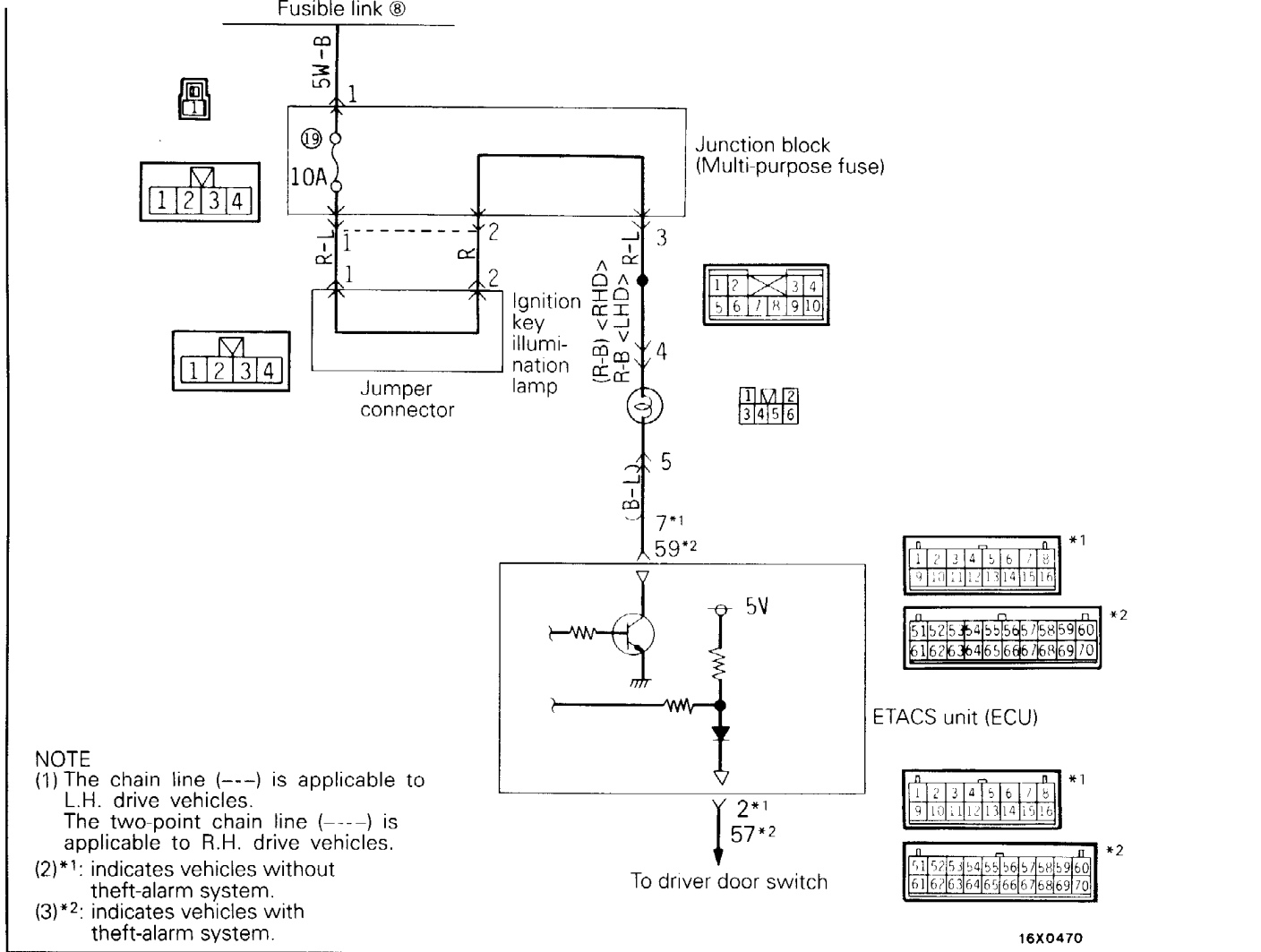
Checking the driver door switch circuit (Disconnect the connector of the electronic control unit and check the wiring harness side.)

ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check conditions	Standard
2*1 57*2	Driver door switch	Continuity	2-earth*1 57-earth*2	Driver door	Closed No continuity
				Open Continuity	

Checking the individual part

Door switch ... Refer to GROUP 42 – Door Assembly.

4. KEY ILLUMINATION LAMP DRIVE CIRCUIT



**Description of operation**

When the driver side door is opened, the door operates, turning the transistor ON, and the ignition key hole is illuminated.

**Electronic control unit terminal voltage (status of the electronic control unit connector)**

ECU terminal No.	Signal	Conditions	Terminal voltage
59*2, 7*1	Ignition key illumination lamp signal	At all times	System voltage

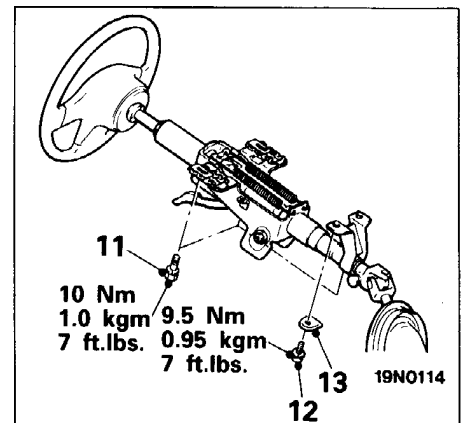
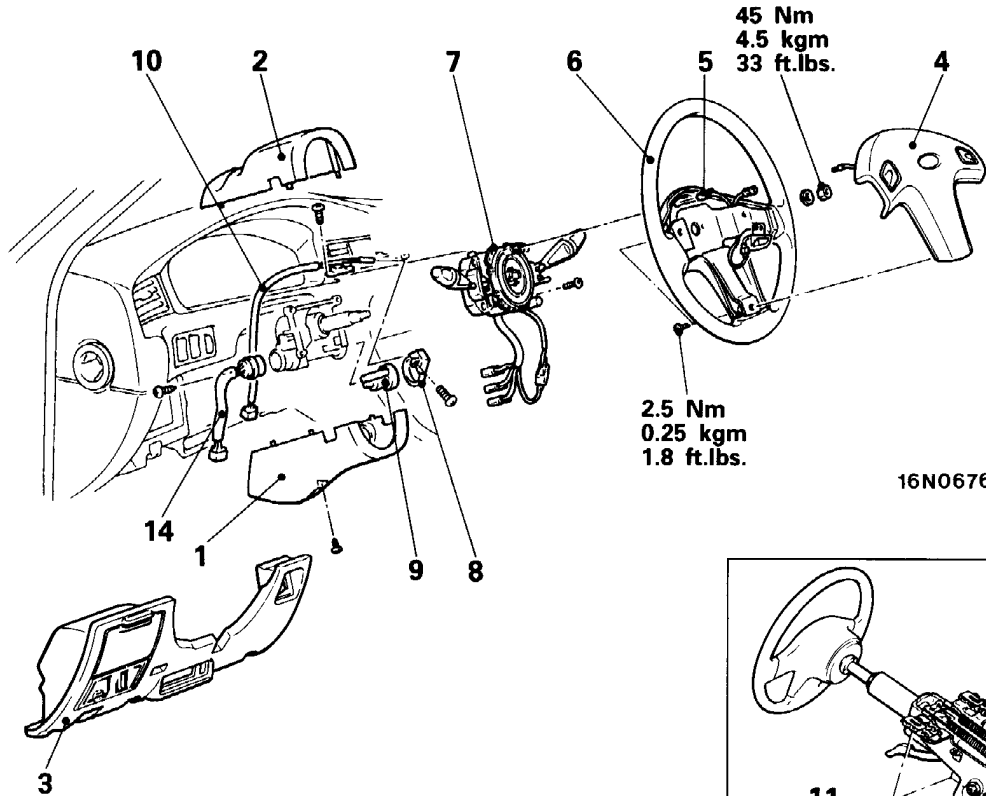
**Checking the individual part**

Ignition switch ... Refer to P.54-11.

IGNITION SWITCH <EXCEPT L.H. DRIVE VEHICLES WITH SRS>

E54DH-

REMOVAL AND INSTALLATION



**Removal steps of key reminder switch segment**

- 1. Column cover lower
- 2. Column cover upper
- 3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
- 4. Horn pad \*1
- 5. Harness connector <LH drive vehicles with cruise control>
- 6. Steering wheel \*1
- 7. Column switch \*1
- 10. Key reminder switch segment



**Removal steps of ignition switch segment**

- 1. Column cover lower
- 2. Column cover upper
- 3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
- 11. Steering column installation bolts \*2
- 12. Special bolt \*2
- 13. Special washer \*2
- 14. Ignition switch segment



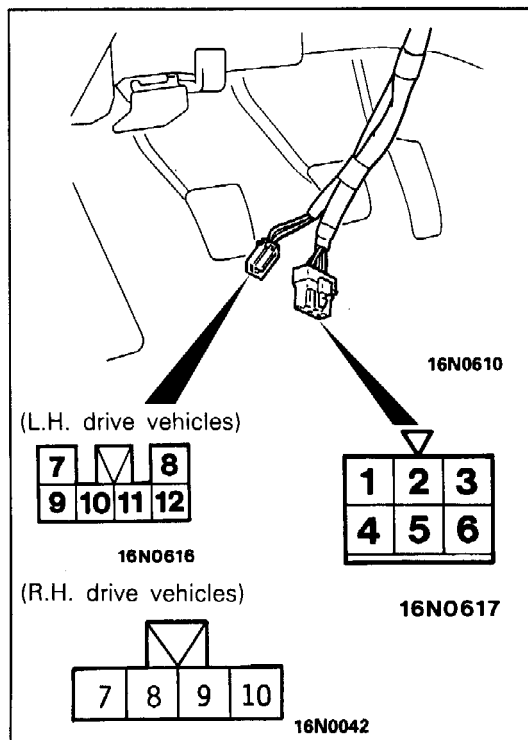
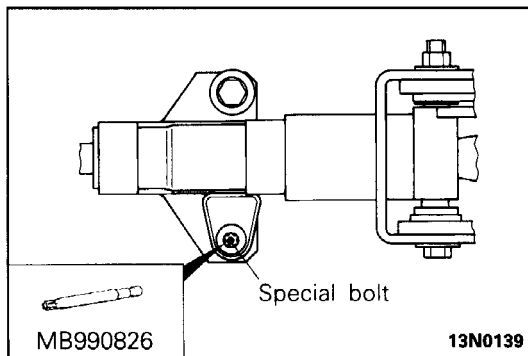
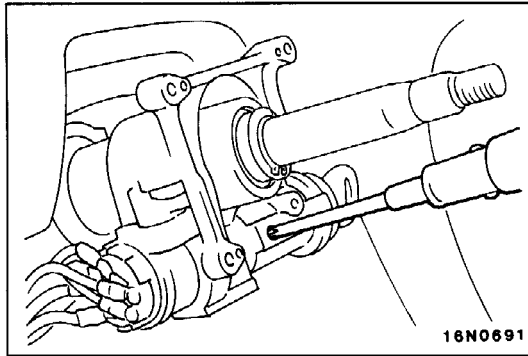
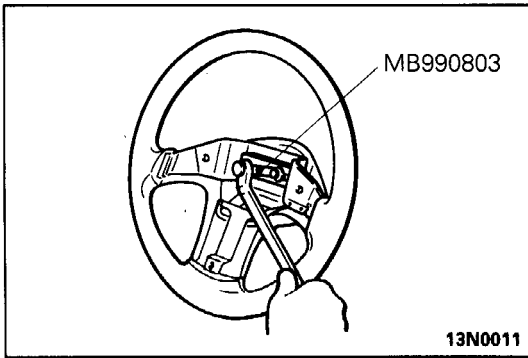
**Removal steps of steering lock cylinder**

- 1. Column cover lower
- 2. Column cover upper
- 3. Driver side lower panel \*1 (Refer to GROUP 52 – Instrument Panel)
- 4. Horn pad \*1
- 5. Harness connector <LH drive vehicles with cruise control>
- 6. Steering wheel \*1
- 7. Column switch \*1
- 8. Ignition key illumination ring
- 9. Steering lock cylinder



NOTE

- (1) \*1 indicates removal for LH drive vehicles only.
- (2) \*2 indicates removal for RH drive vehicles only.



**SERVICE POINTS OF REMOVAL**

E54DIAE

**6. REMOVAL OF STEERING WHEEL (LH DRIVE VEHICLES ONLY)**

Remove the steering wheel by using the special tool.

**9. REMOVAL OF STEERING LOCK CYLINDER**

- (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.

**12. REMOVAL OF SPECIAL BOLT (RH DRIVE VEHICLES ONLY)**

Remove the special bolt by using the special tool.

**INSPECTION**

E54DJAM

**IGNITION SWITCH**

- (1) Remove the column cover lower and the driver side lower panel. (Refer to P.54-10.)
- (2) Disconnect the wiring connector from the ignition switch and the key reminder switch, and connect an ohmmeter to the switch side connector.
- (3) Operate the switch, and check the continuity between the terminals.

Position	Terminal	Ignition switch						Key reminder switch		Ignition key illumination lamp	
		1	2	3	4	5	6	7	9 (10)	10 (8)	11 (9)
LOCK	Removed							○—○			
	Inserted										○—○
ACC				○—○							
ON			○—○	○—○							
START		○—○		○—○							

**NOTE**

- (1) The terminal numbers inside ( ) indicate RH drive vehicles.
- (2) ○—○ indicates that there is continuity between the terminals.

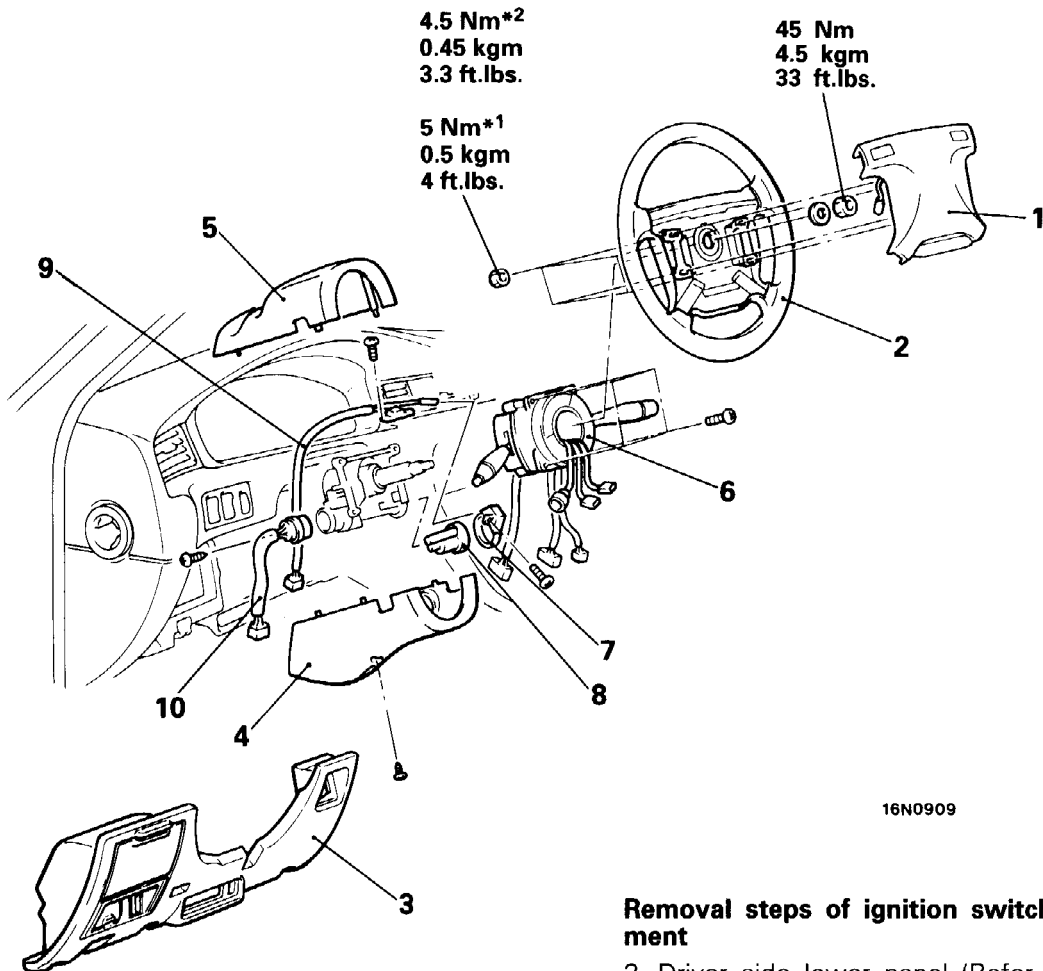
## IGNITION SWITCH &lt;L.H. DRIVE VEHICLES WITH SRS&gt;

E54DH-A

## REMOVAL AND INSTALLATION

**CAUTION: SRS**

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



16N0909

**Removal steps of ignition switch segment**

3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
4. Column cover lower
5. Column cover upper
10. Ignition switch segment

**Removal steps of key reminder switch segment**

1. Air bag module (Refer to GROUP 52B – Air Bag Module and Clock Spring)
2. Steering wheel
3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
4. Column cover lower
5. Column cover upper
6. Column switch and clock spring (Refer to GROUP 52B – Air Bag Module and Clock Spring)
9. Key reminder switch segment

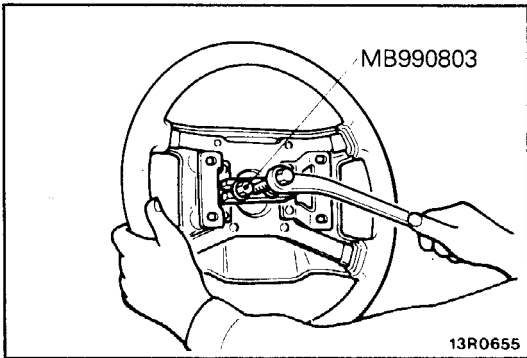
**Removal steps of steering lock cylinder**

1. Air bag module (Refer to GROUP 52B – Air Bag Module and Clock Spring)
2. Steering wheel
3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
4. Column cover lower
5. Column cover upper
6. Column switch and clock spring (Refer to GROUP 52B – Air Bag Module and Clock Spring)
7. Ignition key illumination ring
8. Steering lock cylinder

**NOTE**

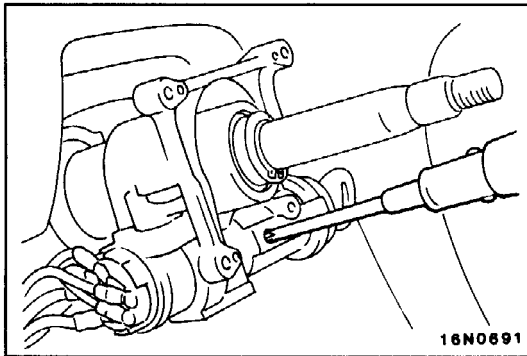
\*1: Vehicles built up to April, 1994

\*2: Vehicles built from May, 1994



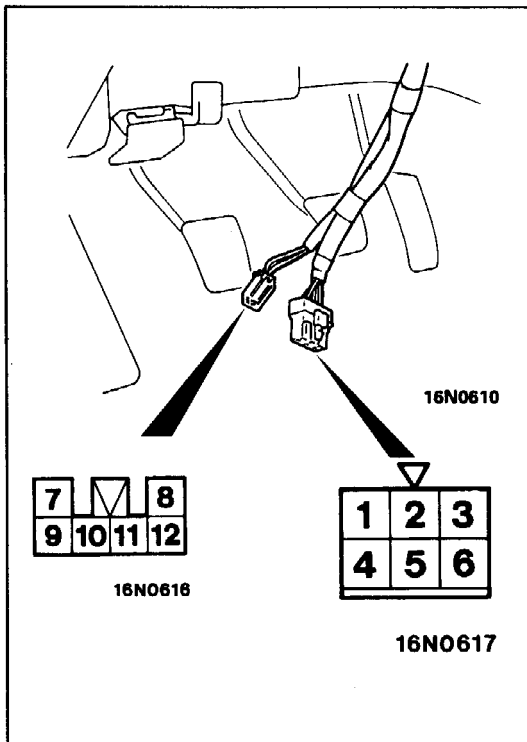
**SERVICE POINTS OF REMOVAL**

**2. REMOVAL OF STEERING WHEEL**



**8. REMOVAL OF STEERING LOCK CYLINDER**

- (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**

- (1) Remove the column cover lower and the driver side lower panel. (Refer to P.54-10.)
- (2) Disconnect the wiring connector from the ignition switch and the key reminder switch, and connect an ohmmeter to the switch side connector.
- (3) Operate the switch, and check the continuity between the terminals.

Position	Terminal Key	Ignition switch						Key reminder switch		Ignition key illumination lamp	
		1	2	3	4	5	6	7	9	10	11
LOCK	Removed							○—○			
	Inserted			○—○	○—○						○—○
ACC				○—○	○—○						
ON				○—○	○—○						
START		○—○			○—○	○—○					

**NOTE**

○—○ indicates that there is continuity between the terminals.



# METERS AND GAUGES SPECIFICATIONS

## SERVICE SPECIFICATIONS

E54EB-

Items	Specifications
Standard value	
Speedometer indication error	km/h (mph)
40 (20)	40–48 (20–25)
80 (40)	80–92 (40–47)
120 (60)	120–136 (60–69)
160 (80)	160–180 (80–91)
– (100)	– (100–114)
Tachometer indication error	r/min
1,000	± 100
3,000	± 150
5,000	± 250
6,000	± 300
Fuel gauge unit resistance	Ω
Float point "F"	3 ± 1
Float point "E"	110 ± 1
Fuel gauge unit float height	mm (in.)
A (Float point "F")	40.95 (1.6)
B (Float point "E")	173.25 (6.8)
Fuel gauge resistance	Ω
power supply and earth	274 ± 27
power supply and fuel gauge	86 ± 8
fuel gauge and earth	188 ± 18
Engine coolant temperature gauge resistance	Ω
power supply and engine coolant temperature gauge	51 ± 5
power supply and earth	130 ± 13
engine coolant temperature gauge and earth	181 ± 18

**SERVICE ADJUSTMENT PROCEDURES**  
E54EGAS

**SPEEDOMETER INSPECTION**

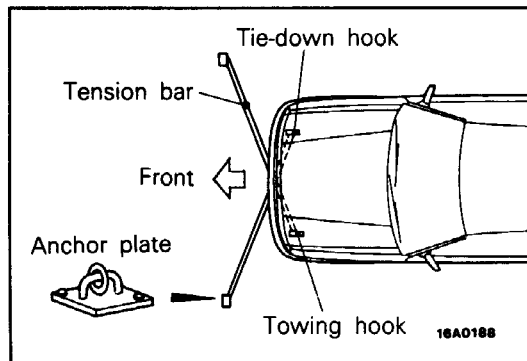
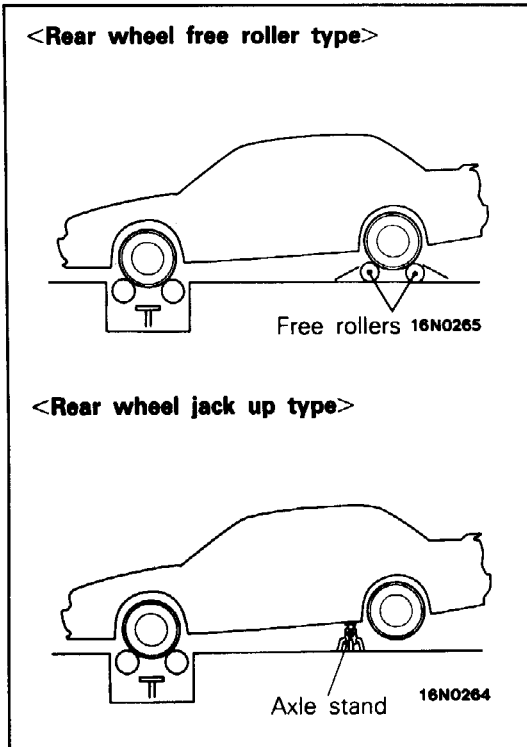
- (1) Adjust the pressure of the tyres to the specified level. (Refer to GROUP 31 – General Specifications.)
- (2) Place the vehicle on a speedometer tester drum.
- (3) Place securely the free rollers to the floor, under the rear wheels so that they are fitted for the wheel base and the wheel tread. <Rear wheel free roller type>
- (4) Jack up the rear wheels and place the axle stands in the specified places. <Rear wheel jack-up type>
- (5) Turn the TCL switch OFF.  
<Vehicles with traction control system>
- (6) Make sure the parking brake has been set.
- (7) To prevent the front wheel from moving from side to side, attach tension bars to the towing hook and tie-down hook, and secure both ends to anchor plates.
- (8) To prevent the vehicle from starting, attach a chain or wire to the rear traction hook, and make sure the end of the chain or wire is secured firmly.
- (9) Check if the speedometer indication range is within the standard values.

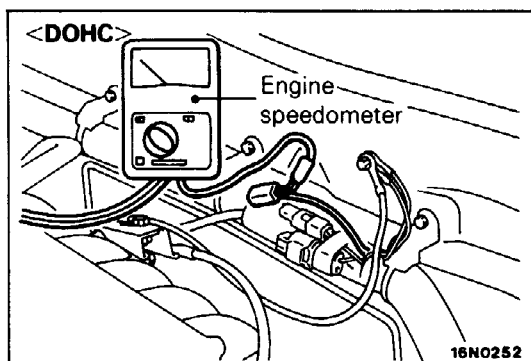
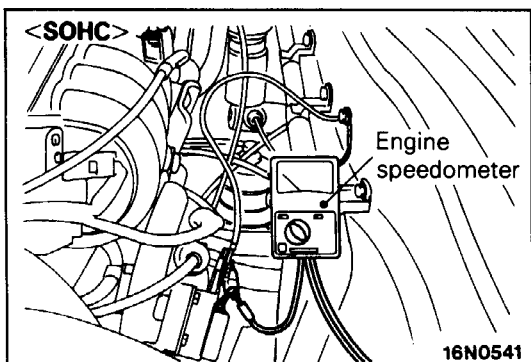
**Caution**

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

**Standard values:**

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





### TACHOMETER INSPECTION

- (1) Insert a paper clip in the connector from the harness side, and attach the engine speedometer.

#### Caution

**As the tachometer is negative earthed, do not connect battery conversely to prevent damaging transistor and diode.**

#### 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.

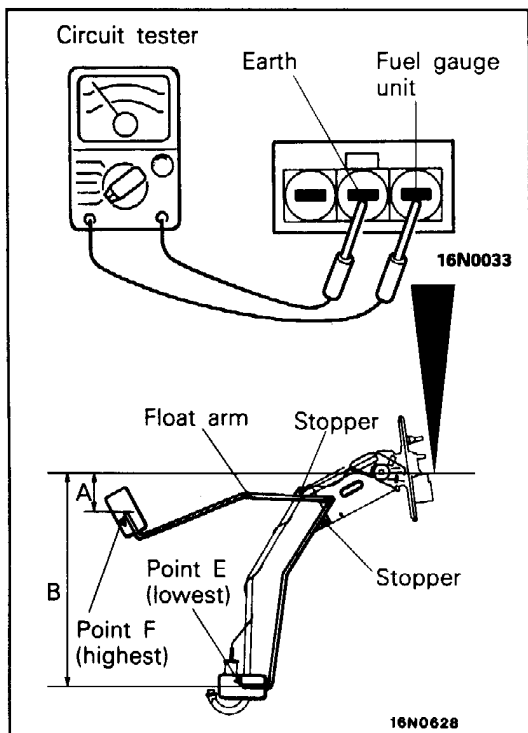
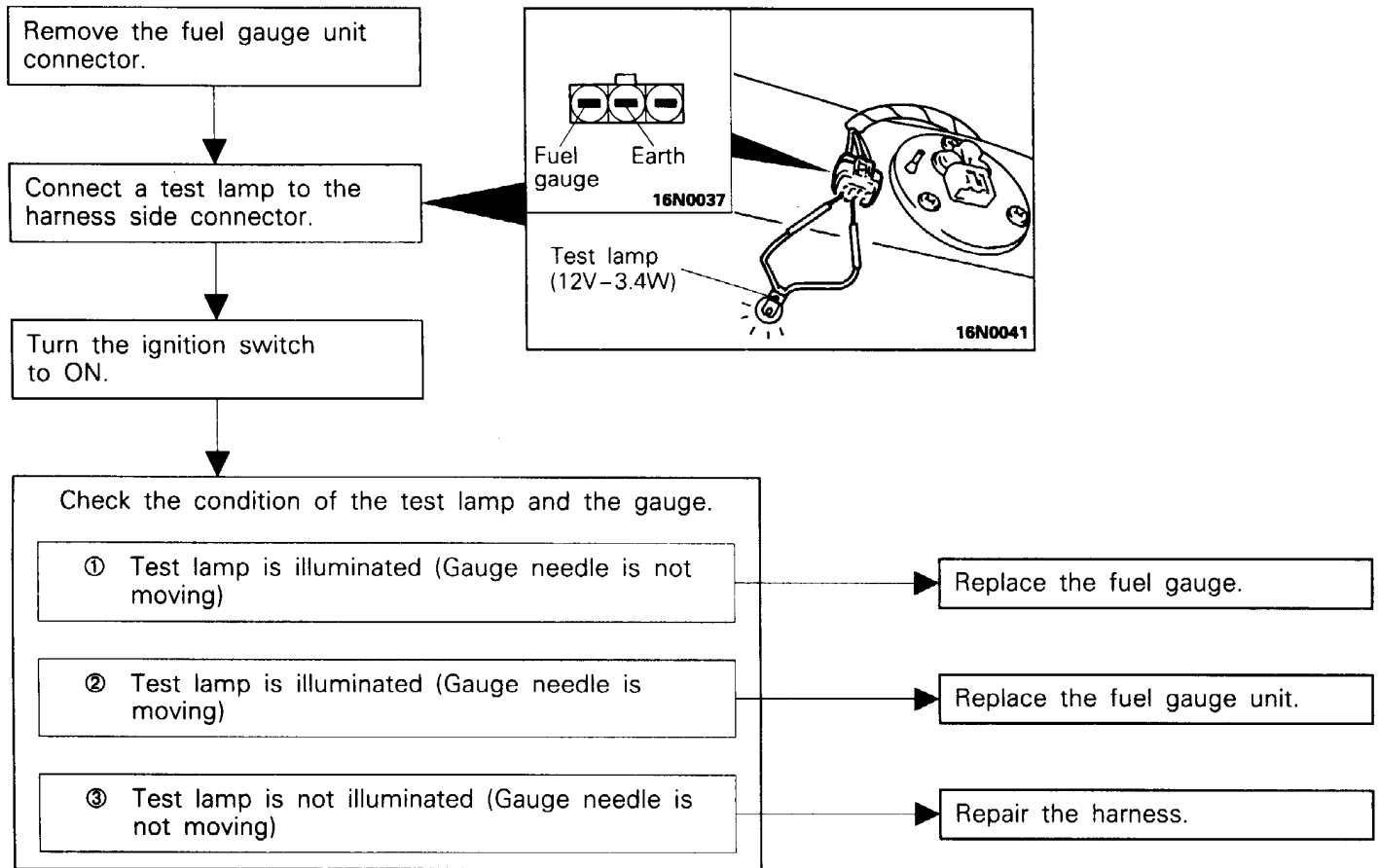
#### Standard value:

Engine speed	Indicated variation
1,000 r/min.:	± 100 r/min.
3,000 r/min.:	± 150 r/min.
5,000 r/min.:	± 250 r/min.
6,000 r/min.:	± 300 r/min.

#### Caution

The signal output from the engine speed inspection terminal in DOHC engines represents one-third of the full engine speed, so always take the measurement with the speedometer range matching a two-cylinder range. (Shows actual revolutions.)

FUEL GAUGE SIMPLE INSPECTION



FUEL GAUGE UNIT INSPECTION

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

Fuel Gauge Unit Resistance

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

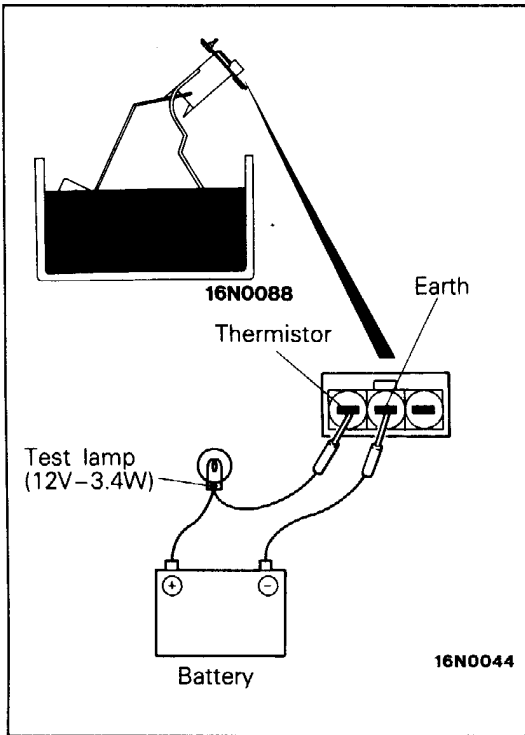
**Standard value:** Point F  $3 \pm 1 \Omega$   
 Point E  $110 \pm 1 \Omega$

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

Fuel Gauge Unit Float Height

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

**Standard value:** A:  $40.95 \text{ mm (1.6 in.)}$   
 B:  $173.25 \text{ mm (6.8 in.)}$



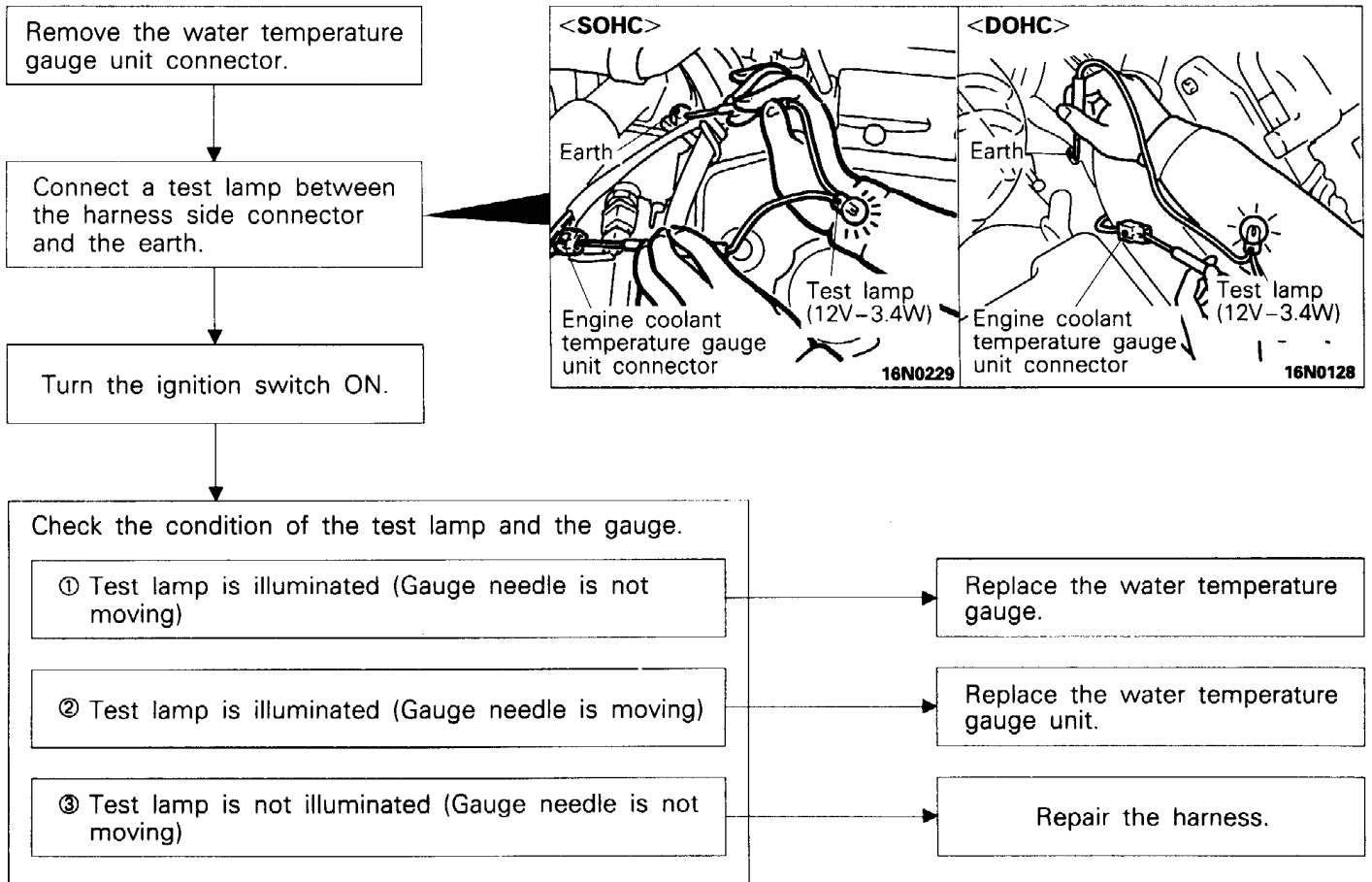
**FUEL SENSOR INSPECTION**

Connect fuel gauge unit to battery via test lamp (12V-3.4W). Immerse in water. Condition good if lamp goes off when unit thermistor is in water and lights when unit 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 INSPECTION**

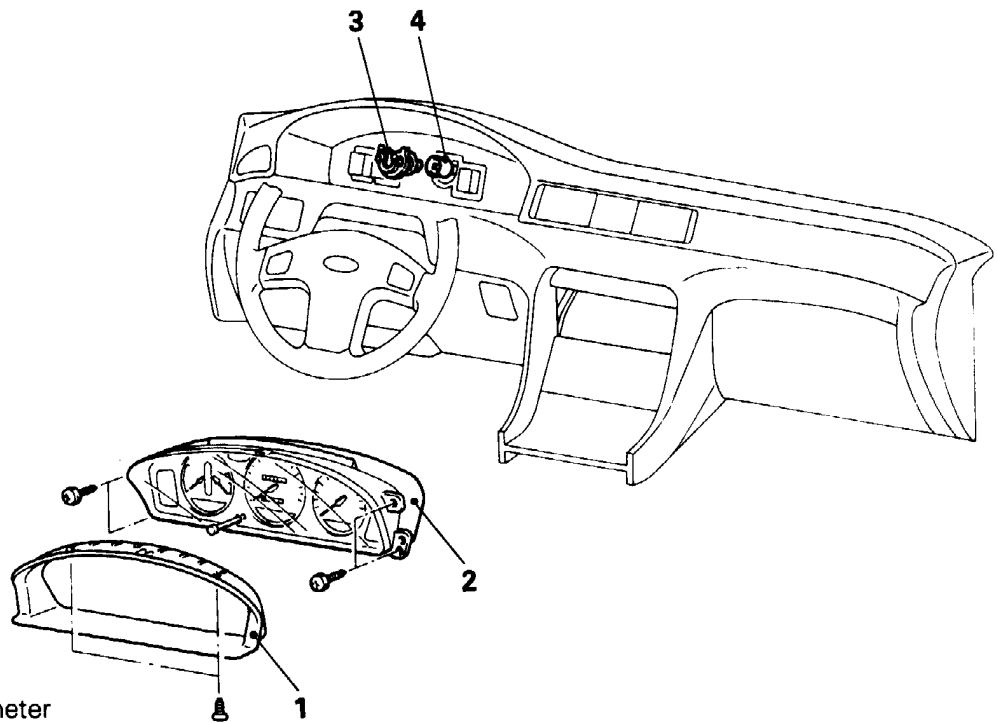


**ENGINE COOLANT TEMPERATURE GAUGE UNIT INSPECTION**

Refer to GROUP 14 – Engine Coolant Temperature Gauge Unit.

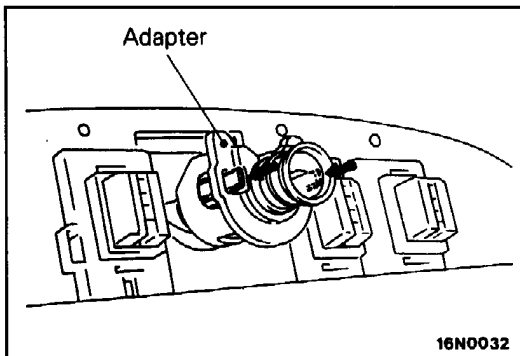
## COMBINATION METER REMOVAL AND INSTALLATION

E54EH-

**Removal steps**

1. Meter bezel
2. Combination meter
3. Adapter
4. Speedometer cable

16N0713



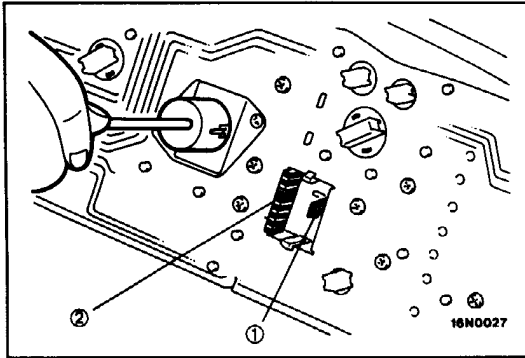
16N0032

**SERVICE POINT OF REMOVAL**

E54EIAI

**3. REMOVAL OF ADAPTER**

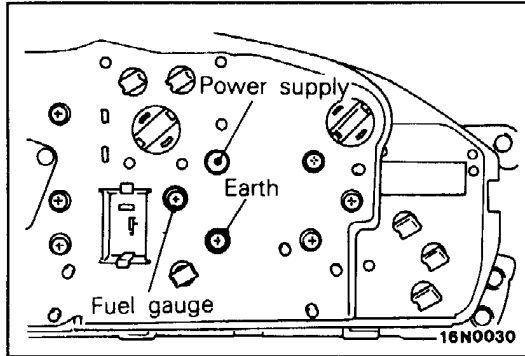
- (1) Disconnect the speedometer cable at the transmission end of the cable.
- (2) Plug the speedometer cable slightly toward the vehicle interior, release the lock by turning the adapter to the left or right, and then remove the adapter.



**INSPECTION**

**REED SWITCH**

Using an ohmmeter, check that continuity and discontinuity alternates between terminals 1 and 2 four times at every rotation of the shaft of the speedometer cable connection.



**FUEL GAUGE RESISTANCE**

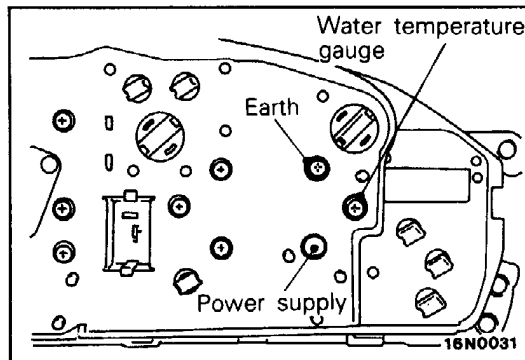
- (1) Remove the power supply tightening screw.
- (2) Use a circuit tester to measure the resistance value between the terminals.

**Standard value**

<b>Power supply – earth:</b>	<b>274 ± 27 Ω</b>
<b>Power supply – fuel gauge:</b>	<b>86 ± 8 Ω</b>
<b>Fuel gauge – earth:</b>	<b>188 ± 18 Ω</b>

**Caution**

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



**ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE**

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

**Caution**

The measured current should be 4 mA or less.

**Standard values**

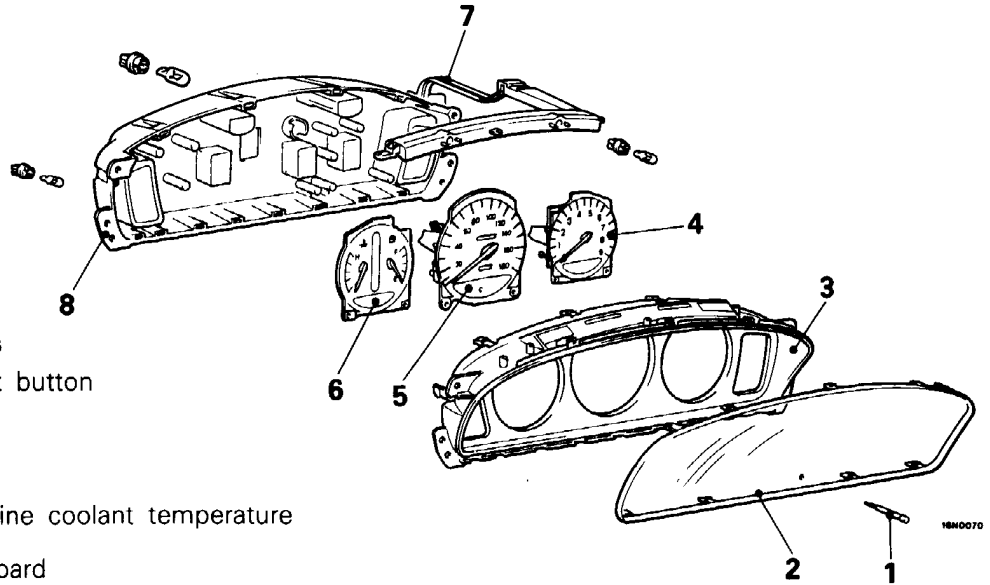
<b>Power supply – water temperature gauge:</b>	<b>51 ± 5 Ω</b>
<b>Power supply – earth:</b>	<b>130 ± 13Ω</b>
<b>Water temperature gauge – earth:</b>	<b>181 ± 18Ω</b>

**Caution**

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

DISASSEMBLY AND REASSEMBLY

E54EL-



**Disassembly steps**

1. Trip meter reset button
2. Meter glass
3. Window plate
4. Tachometer
5. Speedometer
6. Fuel gauge Engine coolant temperature gauge
7. Printed-circuit board
8. Meter case

INDICATORS AND WARNING LAMPS

E54FBAB

Unit: W

Items	Specifications
Upper-beam indication lamp	1.4
Turn-signal indication lamp	3.0
Hazard indication lamp	1.4
Rear fog lamp indication lamp	1.4
Overdrive off indication lamp (A/T)	1.12
Power/Economy indication lamp (A/T)	1.12
Automatic transmission indication lamp	1.12
Cruise control indication lamp	1.4
Traction control indication lamp	1.4
Electronic control suspension indication lamp	Light-emitting diode (LED)
Oil pressure warning lamp	1.4
Brake warning lamp	1.4
Charge warning lamp	1.4
Low fuel warning lamp	3.0
Door ajar warning lamp	1.12
Low washer fluid warning lamp	1.4
Check engine warning lamp	1.4
4-wheel steering warning lamp	1.4
Anti-lock braking system warning lamp	1.4
Low engine oil warning lamp	1.4
Supplemental restraint system warning lamp	1.4



# LIGHTING SYSTEM SPECIFICATIONS

## SERVICE SPECIFICATION

E54GB--

Items	Specifications
Standard value	
Headlamp aiming	
For lower beam adjustment	
Vertical direction	60 mm (2.36 in.) below horizontal (H)
Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)
For upper beam adjustment	
Vertical direction	22 mm (0.87 in.) below horizontal (H)
Horizontal direction	Parallel to direction of vehicle travel
Front fog lamp aiming	
Vertical direction	100 mm (3.94 in.) below horizontal (H)*1
	192 mm (7.56 in.) below horizontal (H)*2
Horizontal direction	Parallel to direction of vehicle travel
Resistance between resistor terminals <R.H. drive vehicles with dim-dip lamp>	Approx. 1Ω
Resistance between headlamp leveling switch terminals	
Switch position	
0	120 Ω
1	300 Ω
2	620 Ω
3	1,100 Ω
4	2,000 Ω
Limit	
Headlamp intensity	30,000 cd or more

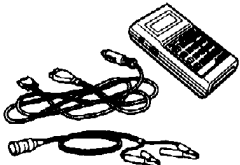

## NOTE

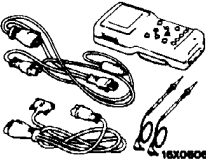

\*1 : &lt;Vehicles built up to October, 1992&gt;

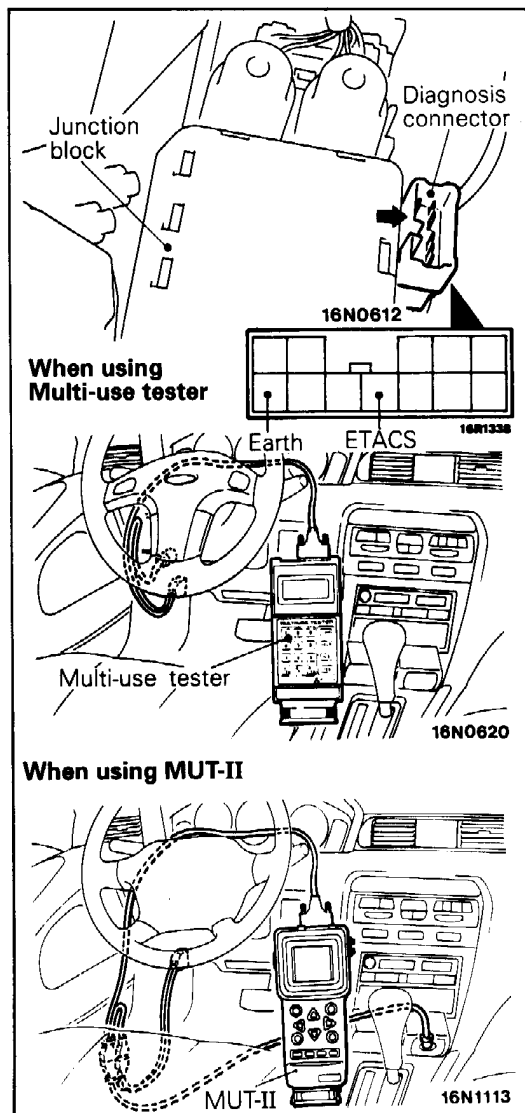
\*2 : &lt;Vehicles built from November, 1992&gt;

## SPECIAL TOOLS

E54GF--

Tool	Number	Name	Use
	MB991341	Multi-use tester assembly	Up to 1993 models ETACS input checking
		ROM pack	
	(For the number, refer to GROUP 00 – Precautions Before Service.)		

Tool	Number	Name	Use
	MB991502	MUT-II	All models ETACS input checking
 16X0607		ROM pack (for MUT-II)	



## TROUBLESHOOTING (DELAYED SWITCH-OFF ROOM LAMP AND FOOT LIGHT)

### INPUT CHECK

Using the multi-use tester <Up to 1993 models> or MUT-II <All models> check whether or not the input signals from each switch are being input to the electronic control unit.

- (1) Connect the multi-use tester or MUT-II to the diagnosis connector (located at the right or left side of the junction block).

#### Caution

**Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.**

- (2) Check to be sure that the buzzer of the multi-use tester or MUT-II sounds one time, when each switch noted below is operated.

If the buzzer sounds, the input signals are being input to the electronic control unit, so that switch can be considered to be functioning normally.

If there is a malfunction, there is an abnormality in the switch or in the switch input circuit, so they should be inspected.

- Ignition switch
- All door switches

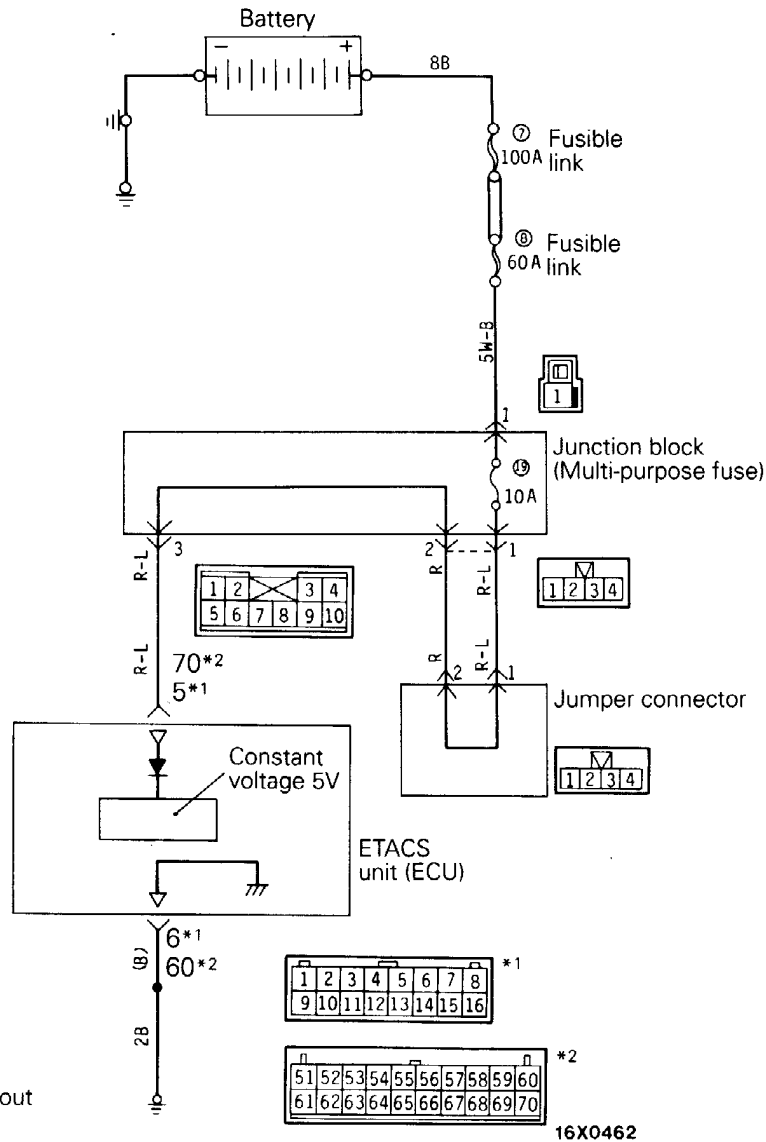
## TROUBLESHOOTING QUICK-REFERENCE TABLE

Problem	Probable cause	Check method	Remedy
With the room lamp switch set to the position interlocked with the doors, the lights don't illuminate when any door is opened. (The room lamp should illuminate, however, when the room lamp switch is at the ON position.)	Damaged or disconnected wiring of door switches input circuit	If input checks indicate a malfunction, check by using check chart No. 3 (P.54-25).	Replace the door switches or repair the harness.
	Damaged or disconnected wiring of room lamp drive circuit	Check by using check chart No. 4 (P.54-26).	Replace the room lamp switch or repair the harness.
	Malfunction of the ECU	–	Replace the ECU.
Even when the door is closed, the room lamp and the foot lamp do not become dimmed.	Broken wire in the power circuit or earth circuit	Check by using circuit and individual part check No. 1 (P.54-23).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.
When any door is opened, the foot lamp does not illuminate.	Broken wire in the door switch input circuits (all doors)	If the result of an input check is defective, check by using circuit and individual part check No. 3 (P.54-25).	Replace the door switch or repair the harness.
	Broken wire in the foot lamp drive circuit	Check by using circuit and individual part check No. 5 (P.54-27).	Replace the foot lamp or repair the harness.
	Malfunction of the ECU	–	Replace the ECU.
While the foot lamp is dimmed, even if the ignition switch is turned to ON, the room lamp does not switch off.	Broken wire in the ignition switch input circuit.	If the result of an input check shows a malfunction, check by using circuit and individual part check No. 2 (P.54-24).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.
While the room lamp is dimmed, even if the ignition switch is turned to ON, the foot lamp does not switch off.	Broken wire in the ignition switch input circuit.	If the result of an input check is defective, check by using circuit and individual part check No. 2 (P.54-24).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.

ECU (Electronic control unit): ETACS unit

CHECKING INDIVIDUAL PART AND CIRCUIT

1. ETACS POWER-SUPPLY AND EARTH CIRCUIT



NOTE  
 (1)\*1: indicates vehicles without theft-alarm system.  
 (2)\*2: indicates vehicles with theft-alarm system.

Description of operation

The battery supplies a stabilized 5V power supply to the electronic control unit, via the constant-voltage circuit and terminal ⑤\*1, ⑦⑩\*2 directly connected to the battery.

If there is an abnormal condition of the power-supply circuit, delayed switch-off functions also will not operate.

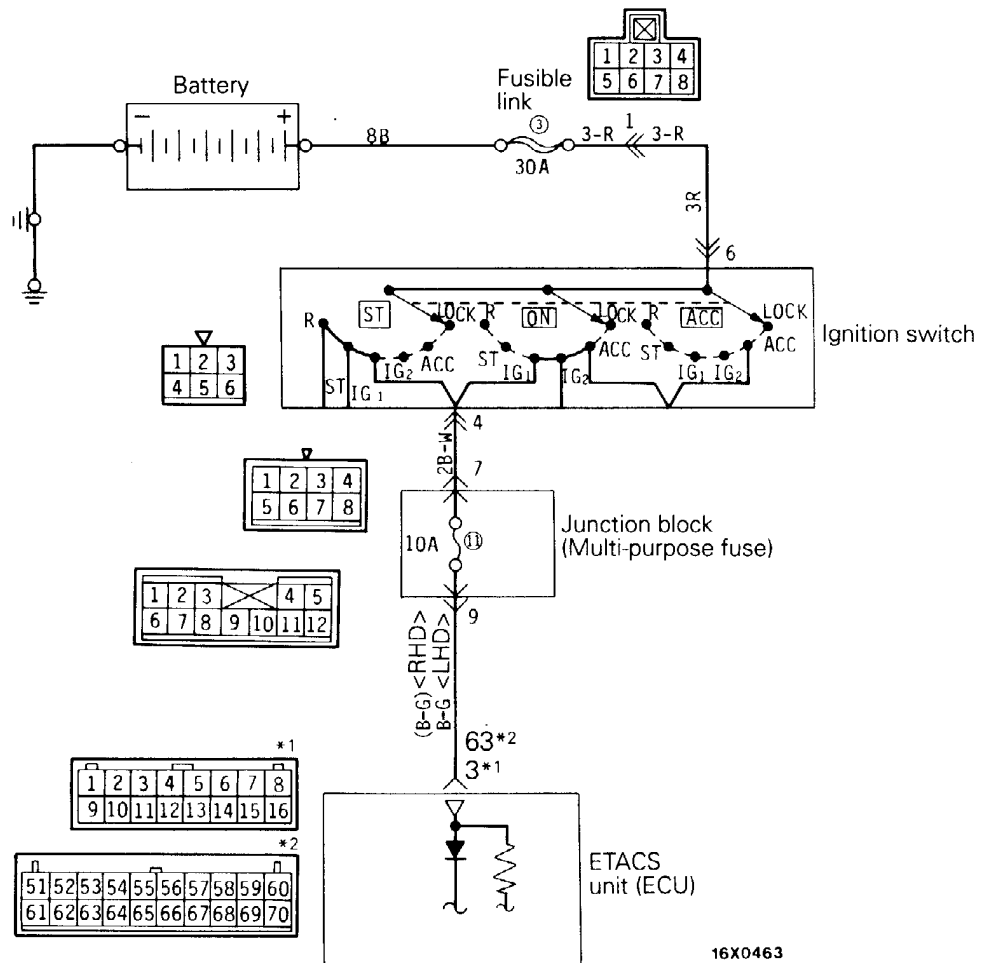
Electronic control unit voltage (connection status of the electronic control unit connector)

ECU terminal No.	Signal	Condition	Terminal voltage
5*1, 70*2	Electronic control unit power supply	At all times	System voltage

Checking the ground circuit (Disconnect the connector and check the wiring harness side.)

Terminal No.	Connected to/measured part	Measurement	Tester connection	Check conditions	Standard
6*1, 60*2	Electronic control unit earth	Continuity	6-earth*1 60-earth*2	At all times	Continuity

2. IGNITION SWITCH INPUT CIRCUIT



16X0463

NOTE  
 (1)\*1: indicates vehicles without theft-alarm system.  
 (2)\*2: indicates vehicles with theft-alarm system.

**Description of operation**

When the ignition switch is ON, an H signal is sent to the ECU. The timer circuit is switched OFF, and dimmer operation is interrupted.

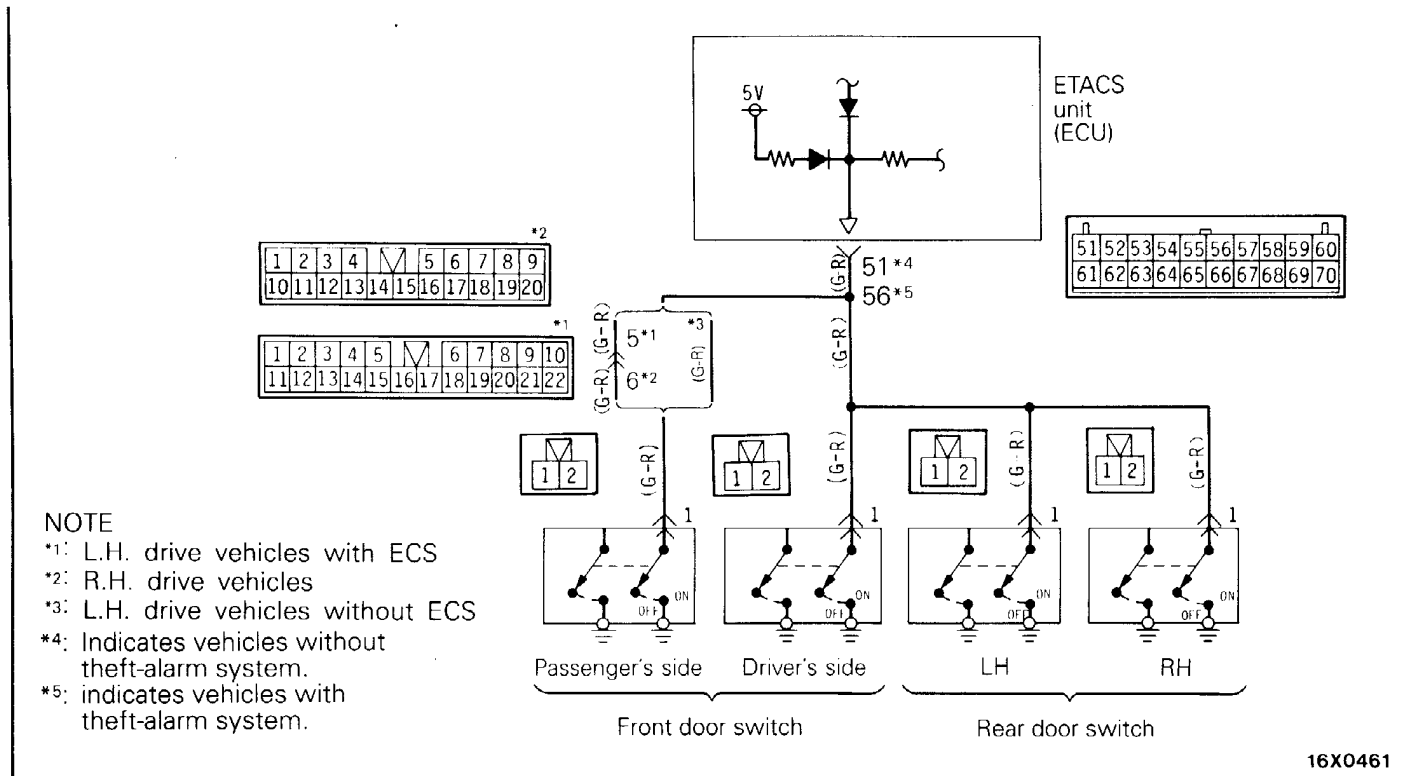
**Electronic control unit terminal voltage (Disconnect the connector of the electronic control unit and check the wiring harness side.)**

ECU terminal No.	Signal	Condition	Standard
3*1 63*2	Ignition switch: "ON"	Ignition switch	OFF
			ON

**Checking the individual part**

Ignition switch ... Refer to P.54-11.

3. DOOR SWITCH (ALL DOORS) INPUT CIRCUIT



16X0461

**Operation description**

When all doors are closed and the ignition switch is turned to OFF, an H signal is sent to the ECU.  
 If there is an abnormal condition of the door switch system, the room lamp will not function normally at the door-interlocked setting of its switch.

**Electronic control unit terminal voltage (status of the electronic control unit connector)**

ECU terminal No.	Signal	Conditions	Terminal voltage
51*4 56*5	Door switch signal	Door is opened (door switch: ON)*	0V
		All doors are closed (door switch: OFF)	5V

**Checking the door switch circuit**

(Disconnect the electronic control unit connector and check the wiring harness side.)

Terminal No.	Connected to/measured component	Measurement	Tester connection	Check conditions	Standard
51*4 56*5	Door switch	Continuity	51-earth*4 56-earth*5	All doors are closed	No continuity
				Door is opened*	Continuity

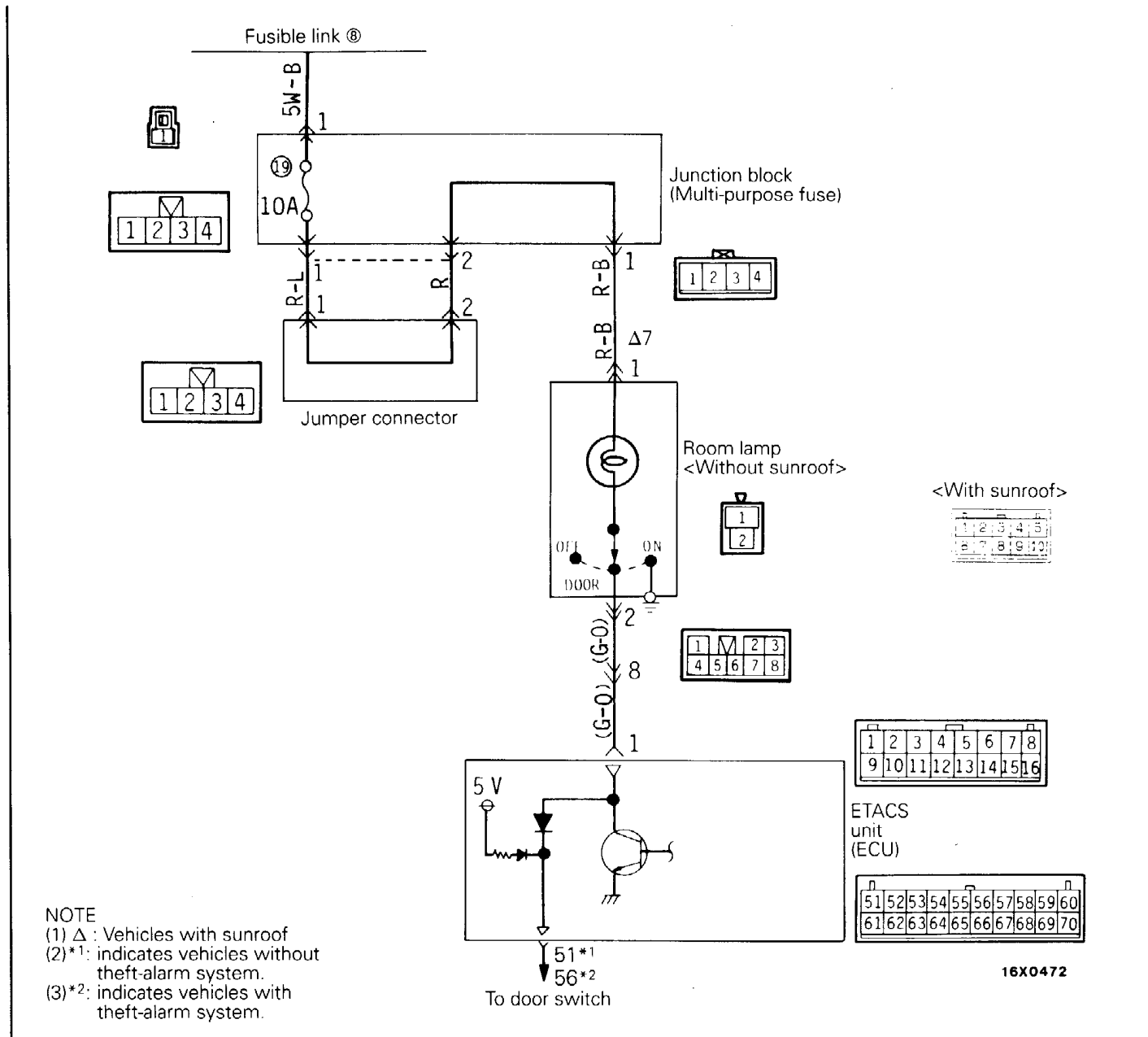
**Individual part check**

Door switch ... Refer to GROUP 42 – Door Assembly.

**NOTE**

When making the checks indicated by the \* symbol, conduct the check for each individual door, checking to be sure that only the door being checking is open.

4. ROOM LAMP DRIVE CIRCUIT



**Description of operation**

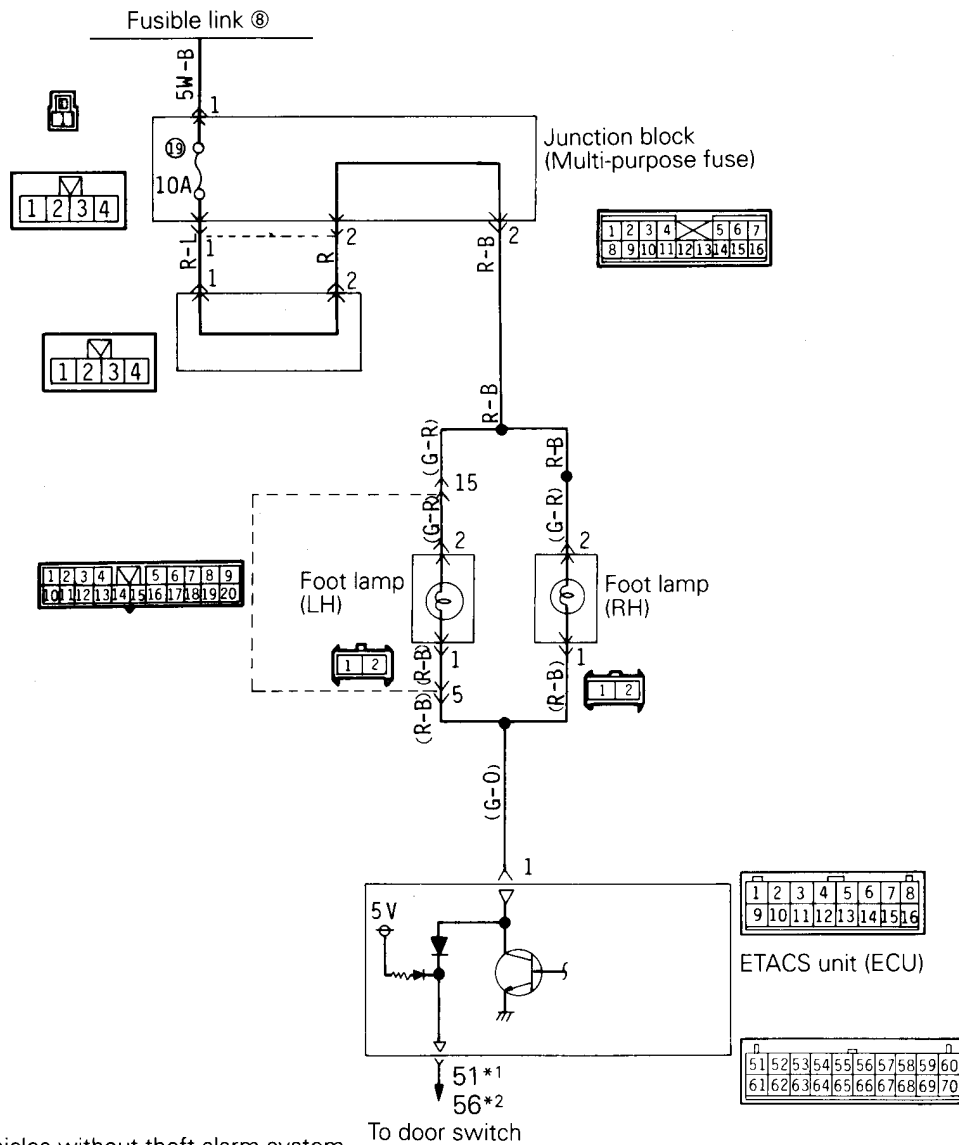
When a door is opened, the lamp (if the room light switch is at the door-interlock position) are grounded, via the electronic control unit, at the

door switch. When the door is closed in that condition, the transistor is ON and the lamps are dimmed.

**Electronic control unit terminal voltage (status of the electronic control unit connector)**

ECU terminal No.	Signal	Condition		Terminal voltage
1	Room lamp signal	All doors closed	Room lamp switch position	0V
			Except DOOR	System voltage
			DOOR	

5. FOOT LAMP DRIVE CIRCUIT



NOTE  
 (1)\*1: indicates vehicles without theft-alarm system.  
 (2)\*2: indicates vehicles with theft-alarm system.

16X0467

**Description of operation**

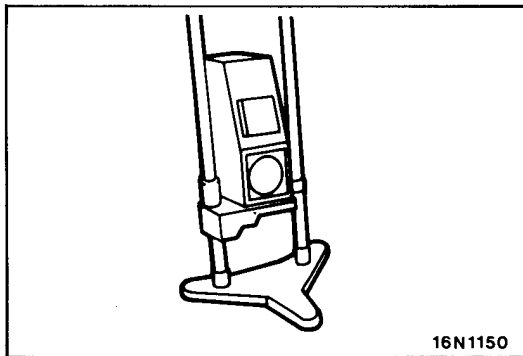
When a door is opened, the foot light (if the room light switch is at the door-interlock position) are grounded, via the electronic control unit, at

the door switch. When the door is closed in that condition, the transistor is ON and the lamps are dimmed.

**Electronic control unit terminal voltage (status of the electronic control unit connector)**

ECU Terminal No.	Signal	Condition	Terminal voltage
1	Foot lamp signal	At all times	System voltage





## SERVICE ADJUSTMENT PROCEDURES

E54GGAV

### HEADLAMP AIMING

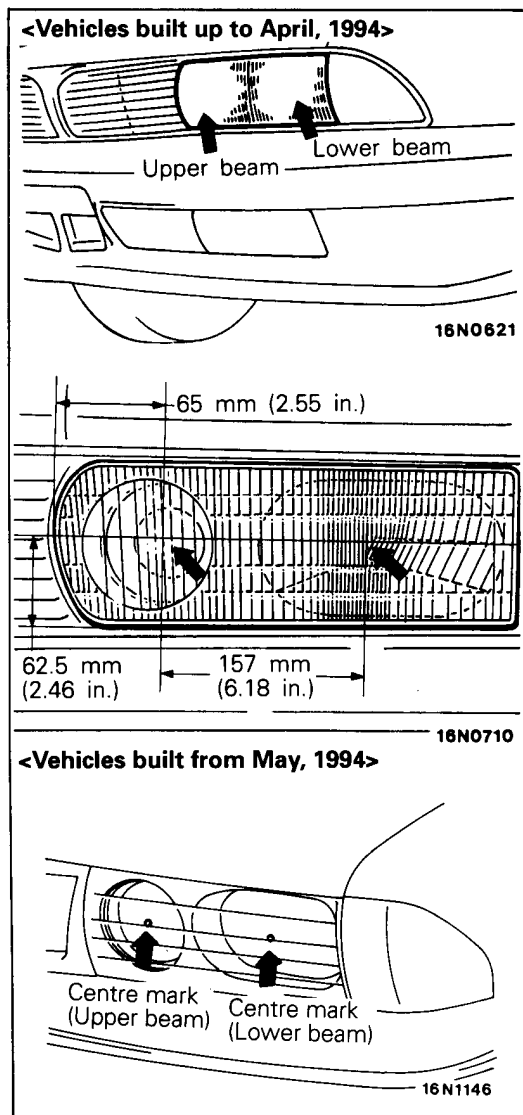
#### <Using a Beamsetting Equipment>

- (1) The headlamps should be aimed with the proper beamsetting equipment, and in accordance with the equipment manufacturer's instructions.

#### NOTE

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

- (2) Alternately turn the adjusting screw to adjust the headlamp aiming. (Refer to P.54-29.)



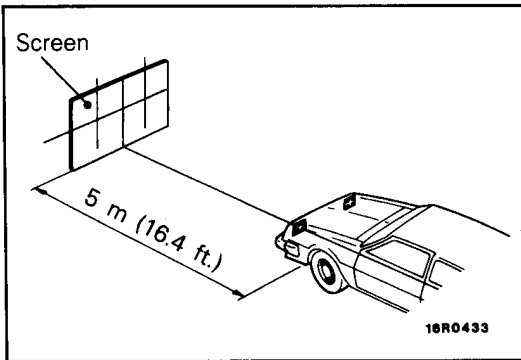
#### <Using a Screen>

- (1) For vehicles built up to April, 1994, measure the centre of the headlamp as shown in the illustration.

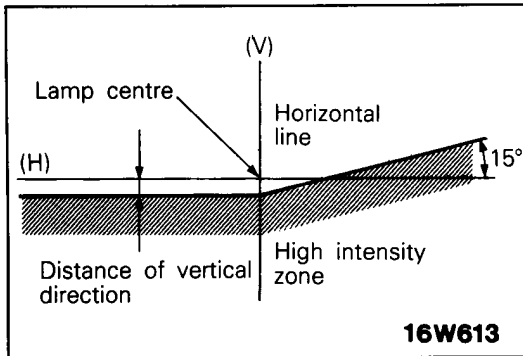
#### NOTE

For vehicles built from May, 1994, this is not necessary as the headlamps are provided with a centre mark.

- (2) Inflate the tyres to the specified pressures and remove the load from the vehicle (except a driver).



- (3) Set the distance between the screen and the centre of the headlamps as shown in the illustration.
- (4) With the engine running at 2,000 r/min, aim the headlamps.



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

**Standard value: <For lower beam adjustment>**

**(Vertical direction)**

**60 mm (2.36 in.) below horizontal (H)**

**(Horizontal direction)**

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

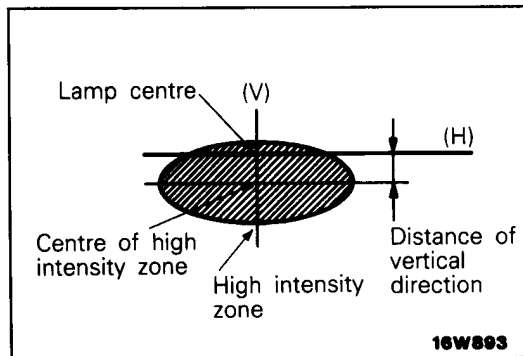
**Standard value: <For upper beam adjustment>**

**(Vertical direction)**

**22 mm (0.87 in.) below horizontal (H)**

**(Horizontal direction)**

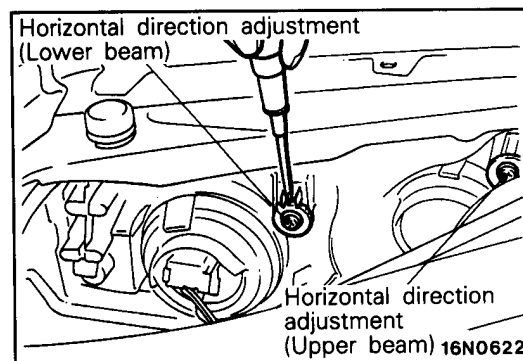
**Parallel to direction of vehicle travel**



**Caution**

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

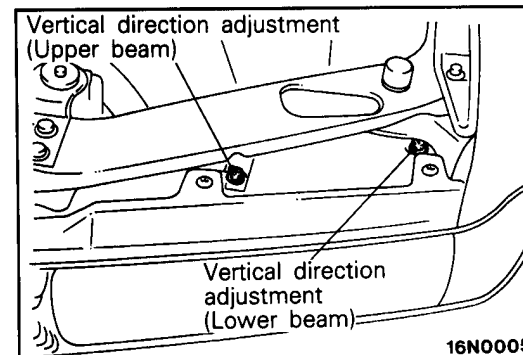
**When it is difficult, because of outside light, to distinguish the light/dark dividing line, use a curtain, screen or similar material to reduce the effects of the outside light.**



- (6) Alternately turn the adjusting screw to adjust the headlamp aiming.

**Caution**

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



**INTENSITY MEASUREMENT**

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

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

**NOTE**

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

$$I = E r^2$$

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

**REPLACEMENT OF REPLACEABLE BULB**

**<Headlamp Bulb>**

1. Remove the washer tank. (When replacing only the right side) (Refer to GROUP 51 – Windshield Wiper and Washer.)
2. Disconnect the connector. (When replacing only the lower beam)
3. Remove the socket cover.

4. Remove the bulb attachment spring and pull out the bulb.

**Caution**

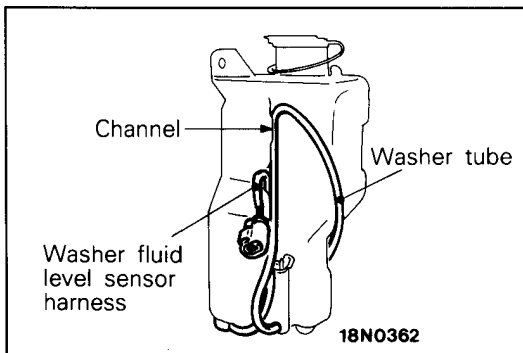
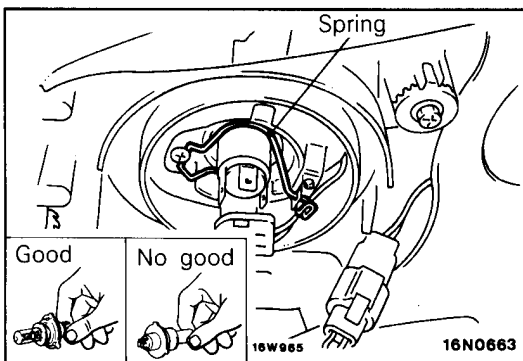
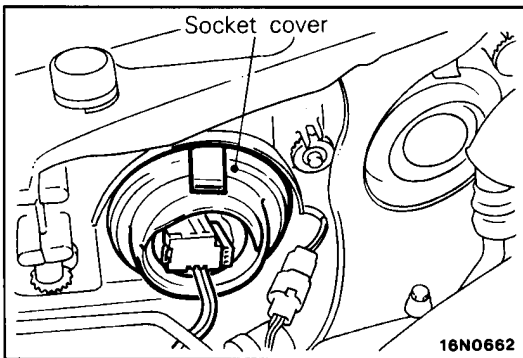
**Do not touch the surface of the headlamp bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.**

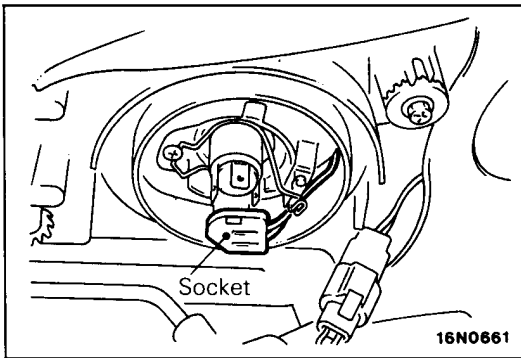
5. Install the socket cover securely.

**NOTE**

If the socket 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.

Pass the harness of the washer fluid level sensor and the washer tube in that order along the windshield washer tank channel, and then install the windshield washer tank (when only replacing the right side).





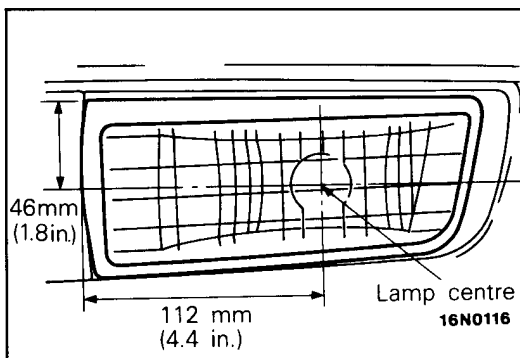
<Position Lamp Bulb>

1. Remove the washer tank. (When replacing only the right side bulb) (Refer to GROUP 51 – Windshield Wiper and Washer.)
2. Remove the socket cover and then remove the bulb.
3. Install the socket cover securely.

NOTE

If the socket 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.

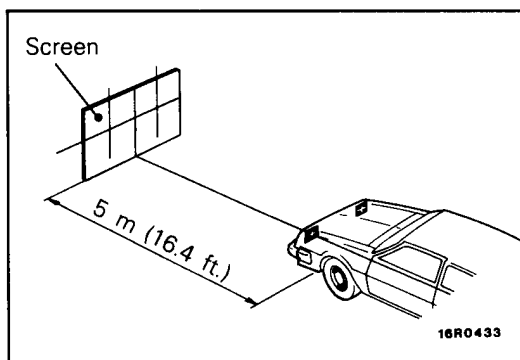
4. When only replacing the right side, install the windshield washer tank.



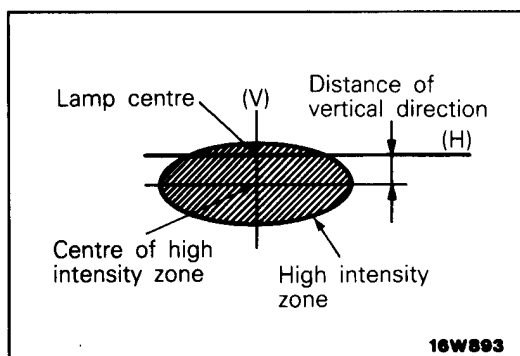
FRONT FOG LAMP AIMING

<Vehicles built up to October, 1992>

1. Measure the centre of the fog lamps, as shown in the illustration.
2. Inflate the tyres to the specified pressures and remove the load from the vehicle (except a driver).



3. Set the distance between the screen and the centre of the fog lamps at 5 m (16.4 ft.).
4. With the engine running at 2,000 r/min., aim the fog lamp.



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

Standard value:

(Vertical direction)

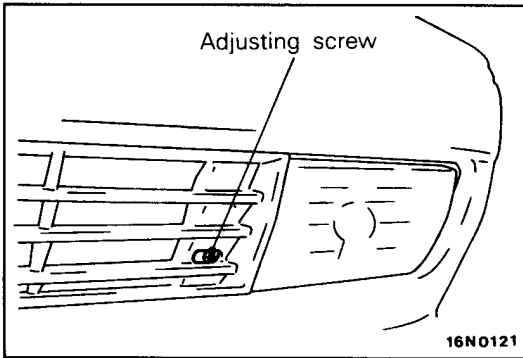
100 mm (3.94 in.) below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

Caution

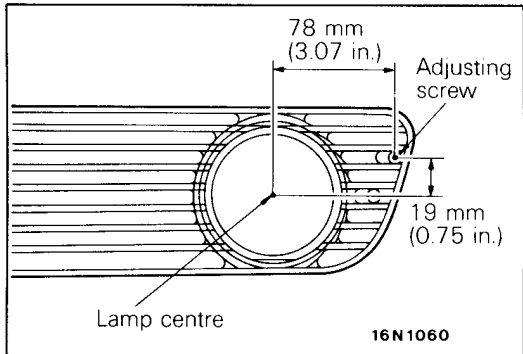
When making the aiming adjustment, be sure to mask those lamps which are not being adjusted.



- Alternately turn the adjustment screw to adjust the fog lamp aiming.

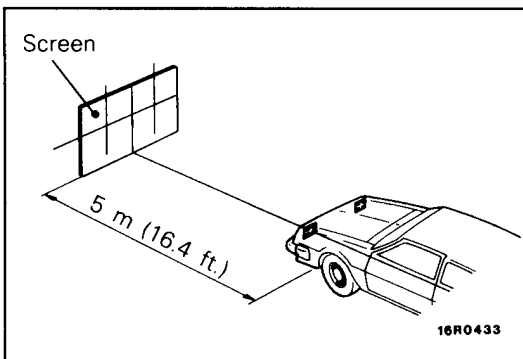
**Caution**

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

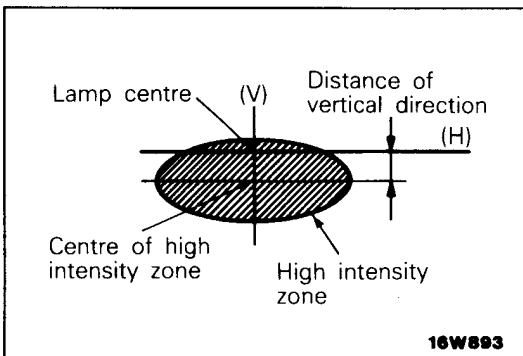


<Vehicles built from November, 1992>

- Measure the centre of the fog lamps, as shown in the illustration.
- Inflate the tyres to the specified pressures and remove the load from the vehicle (except a driver).



- Set the distance between the screen and the centre of the fog lamps at 5 m (16.4 ft.).
- With the engine running at 2,000 r/min., aim the fog lamp.



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

**Standard value:**

**(Vertical direction)**

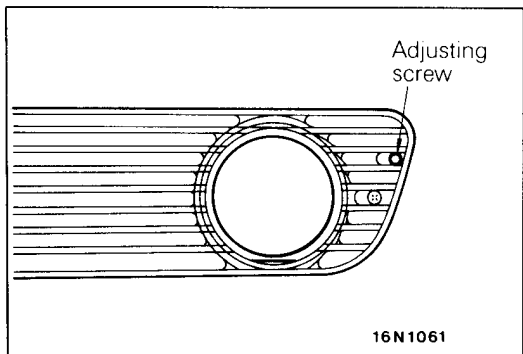
192 mm (7.56 in.) below horizontal (H)

**(Horizontal direction)**

Parallel to direction of vehicle travel

**Caution**

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

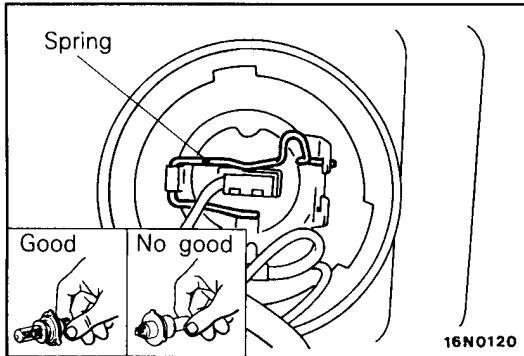
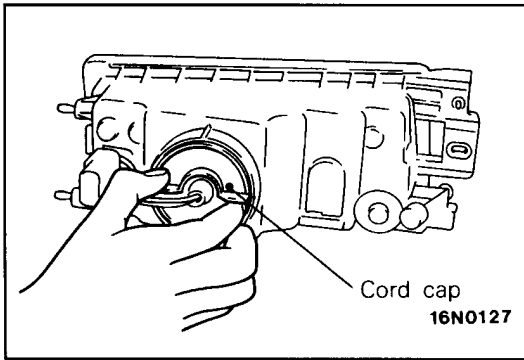


- Alternately turn the adjustment screw to adjust the fog lamp aiming.

**Caution**

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

NOTES



### REPLACEMENT OF REPLACEABLE BULB

1. Remove the fog lamp (Refer to P.54-34).
2. Disconnect the cord cap.

3. 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.**

4. Install the cord cap securely.

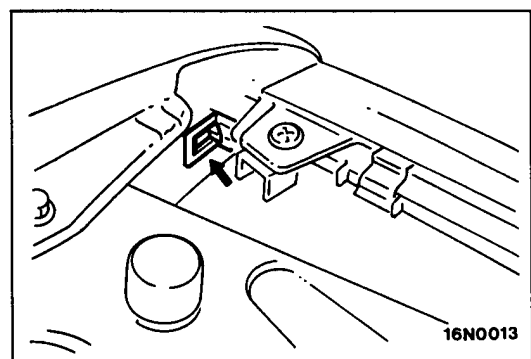
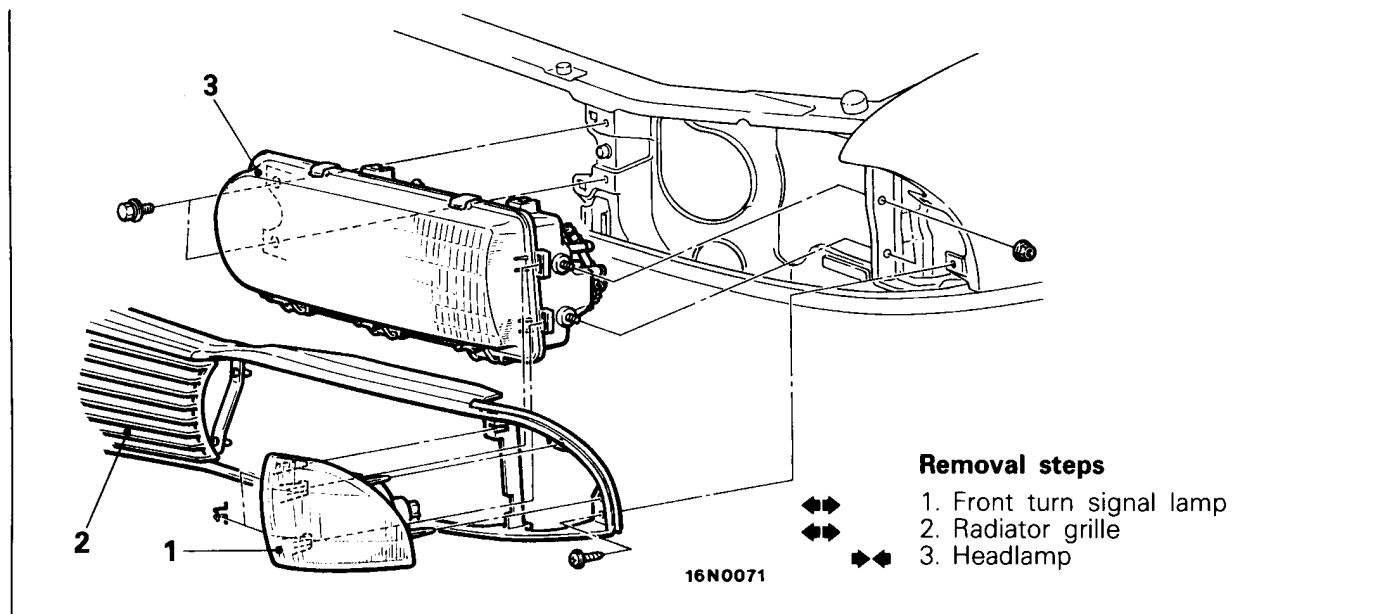
#### NOTE

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

**HEADLAMP AND FRONT TURN SIGNAL LAMP**

E54GHAM

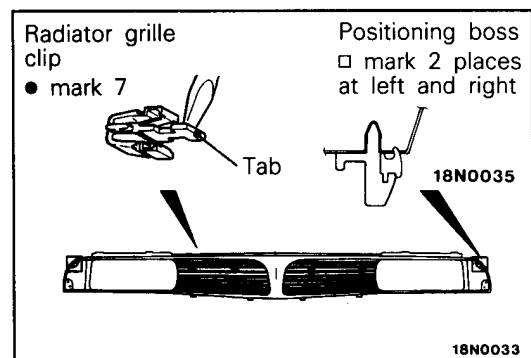
**REMOVAL AND INSTALLATION <Vehicles built up to April, 1994>**



**SERVICE POINTS OF REMOVAL**

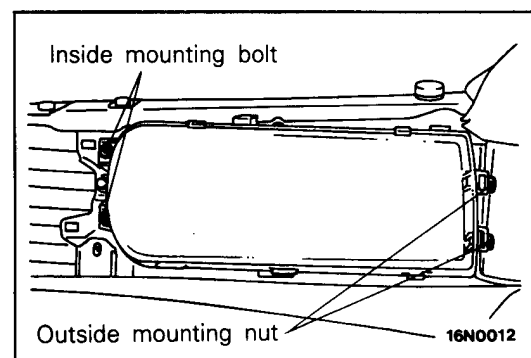
**1. REMOVAL OF FRONT TURN SIGNAL LAMP**

Remove the front turn signal lamp setting hooks, and remove the front turn signal lamp by pulling it towards the front of the vehicle.



**2. REMOVAL OF RADIATOR GRILLE**

After removing the mounting screw, push the tab of the radiator grille clip downwards and to the left with a (-) driver as shown in the illustration, and remove the radiator grille by pulling it towards you.



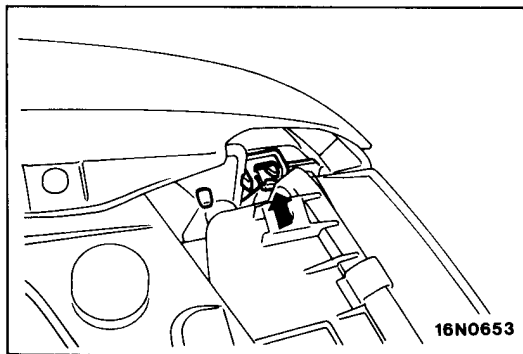
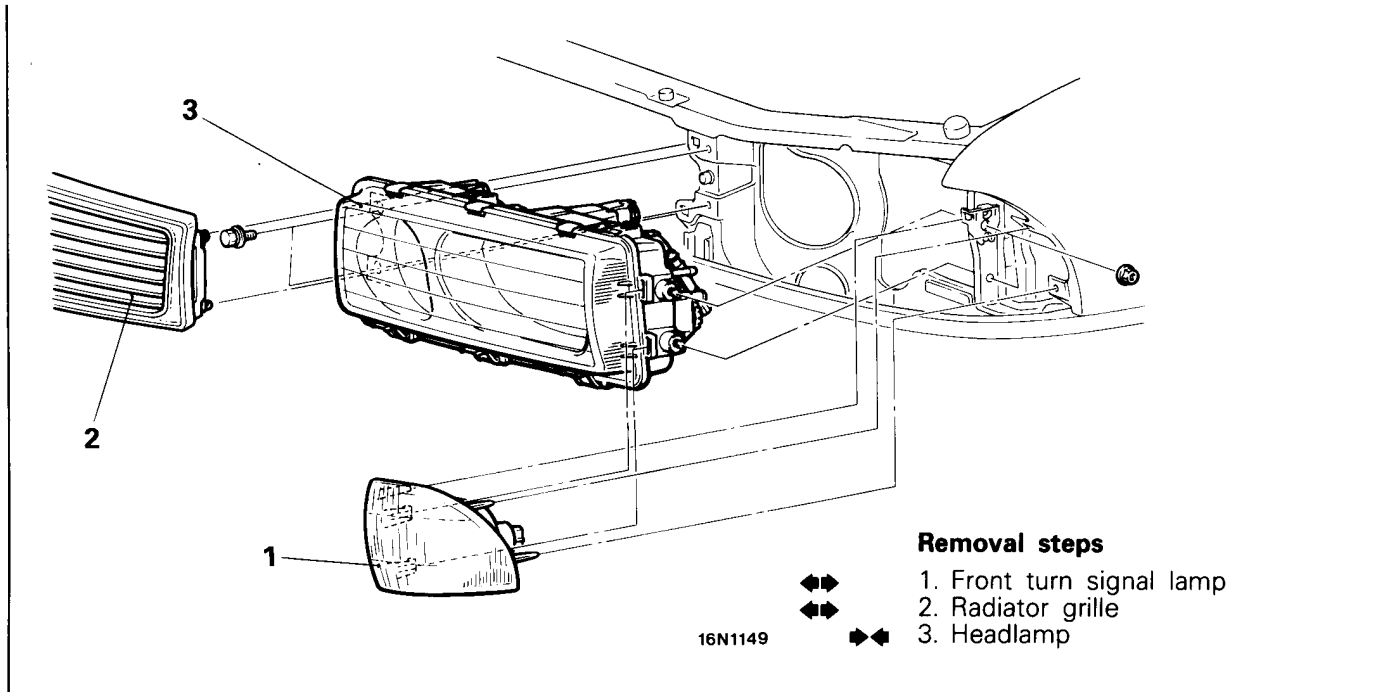
**SERVICE POINT OF INSTALLATION**

**3. INSTALLATION OF HEADLAMP**

After tightening the outside mounting nuts, tighten the inside mounting bolt.



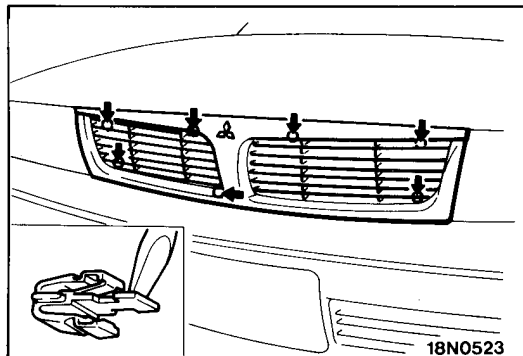
REMOVAL AND INSTALLATION <Vehicles built from May, 1994>



**SERVICE POINTS OF REMOVAL**

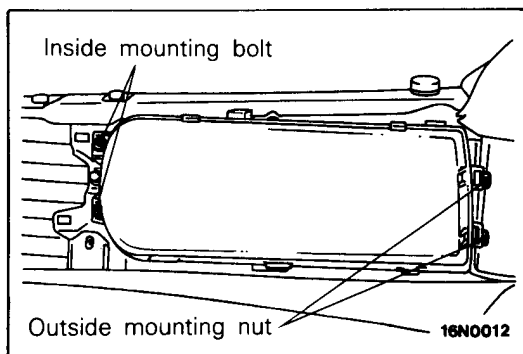
**1. REMOVAL OF FRONT TURN SIGNAL LAMP**

Remove the front turn signal lamp setting hooks, and remove the front turn signal lamp by pulling it towards the front of the vehicle.



**2. REMOVAL OF RADIATOR GRILLE**

While pulling the radiator grille gently towards you, push the clip tabs in the direction of the arrows with a flat-tipped screwdriver to remove the radiator grille.



**SERVICE POINT OF INSTALLATION**

**3. INSTALLATION OF HEADLAMP**

After tightening the outside mounting nuts, tighten the inside mounting bolt.

NOTES

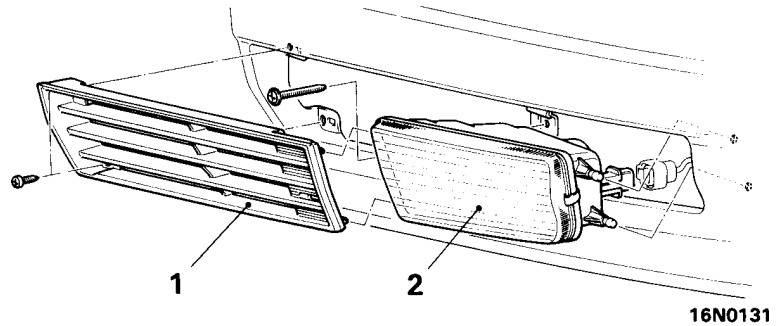
## FRONT FOG LAMP

## REMOVAL AND INSTALLATION

<Vehicles built up to October, 1992>

**Removal steps**

1. Under grille
2. Fog lamp

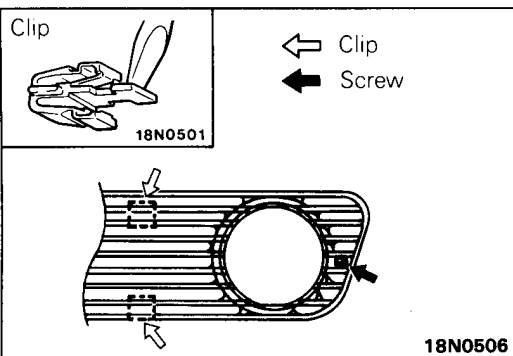
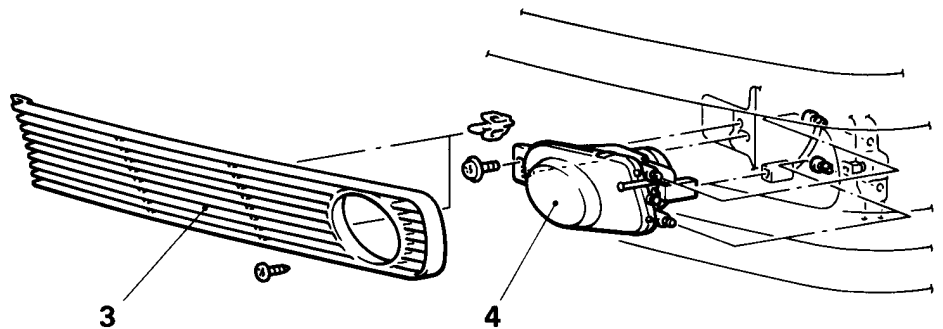


<Vehicles built from November, 1992>

**Removal steps**



3. Under grille
4. Fog lamp



### SERVICE POINTS OF REMOVAL

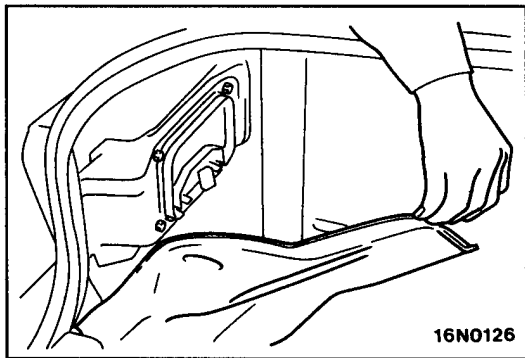
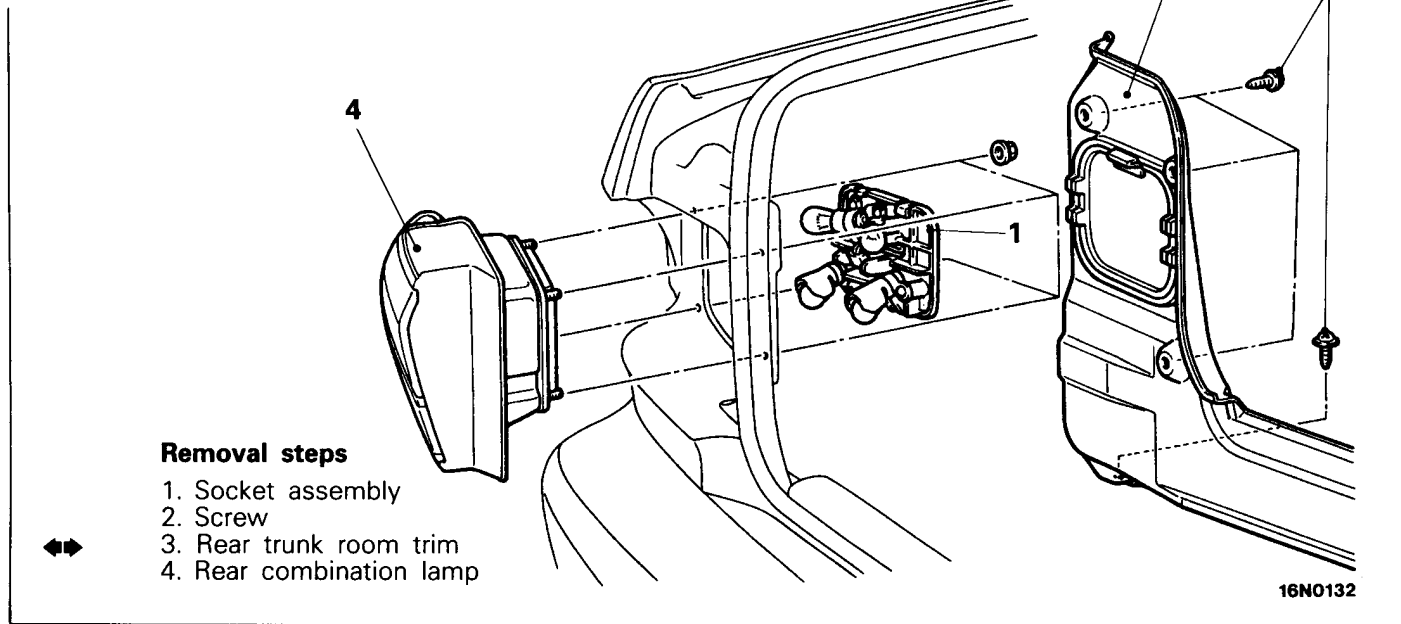
#### 3. REMOVAL OF UNDER GRILLE

Unscrew and push the tab of the clips with a flat-tipped screwdriver. Then remove the under grille by pulling it towards you.

# REAR COMBINATION LAMP

## REMOVAL AND INSTALLATION

E54GVAE



### SERVICE POINTS OF REMOVAL

#### 3. REMOVAL OF REAR TRUNK ROOM TRIM

Remove the screws (4 places) and roll up the rear trunk room trim inside the vehicle.

**54-34-2**

---

**NOTES**

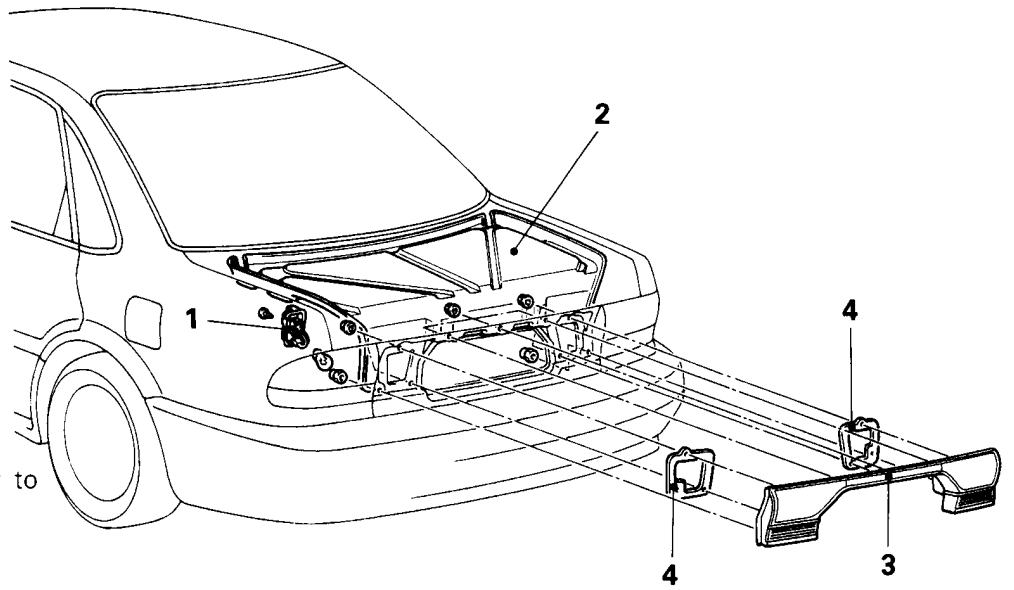
**REAR LID LAMP**

E54GPAC

**REMOVAL AND INSTALLATION**

**Removal steps**

1. Socket assembly
2. Rear lid trim (Refer to GROUP 52 – Trim)
3. Rear lid lamp
4. Base gasket



16N0654

**ROOM LAMP <Vehicles With Sunroof>**

E54GEAB

**REMOVAL AND INSTALLATION**

**Removal steps**

**<Removal of room lamp bulb>**

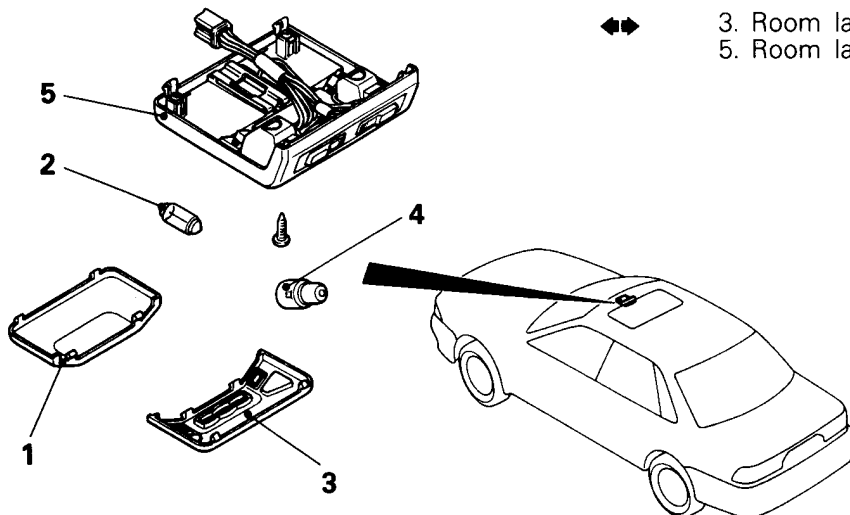
- ↔ 1. Room lamp lens
- ↔ 2. Room lamp bulb

**<Removal of spot lamp bulb>**

- ↔ 3. Room lamp switch cover
- ↔ 4. Spot lamp bulb

**<Removal of room lamp body>**

- ↔ 3. Room lamp switch cover
- ↔ 5. Room lamp body



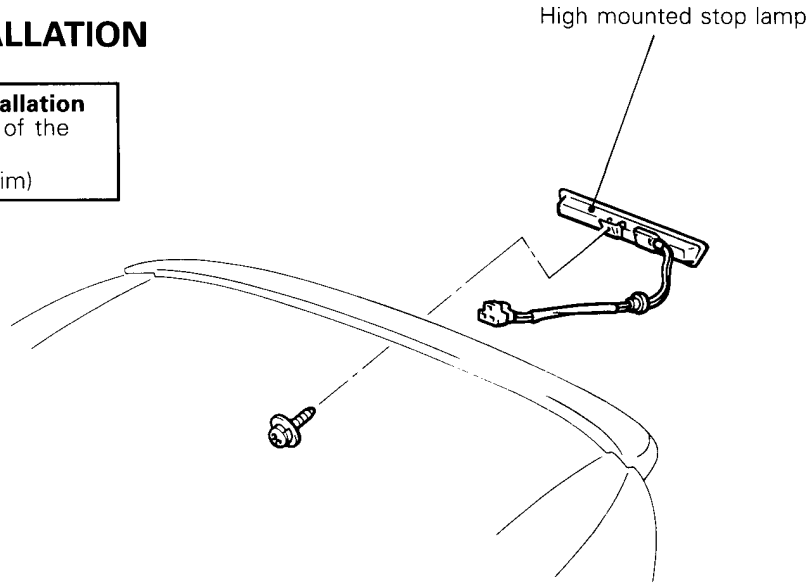
16N0650

# HIGH MOUNTED STOP LAMP

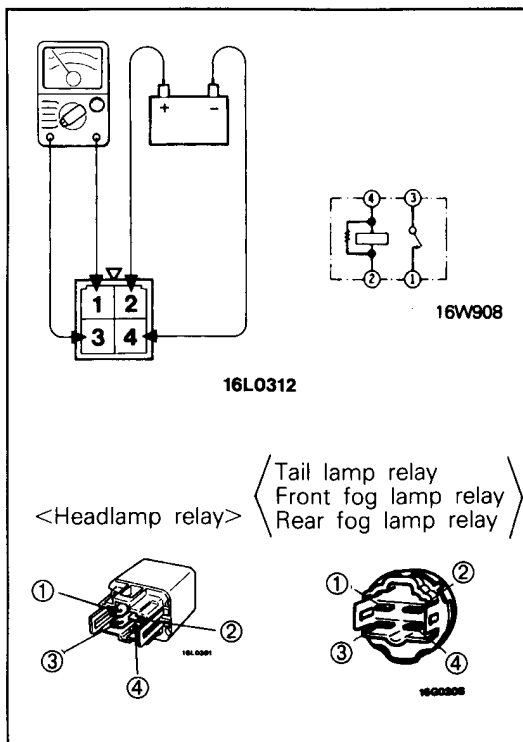
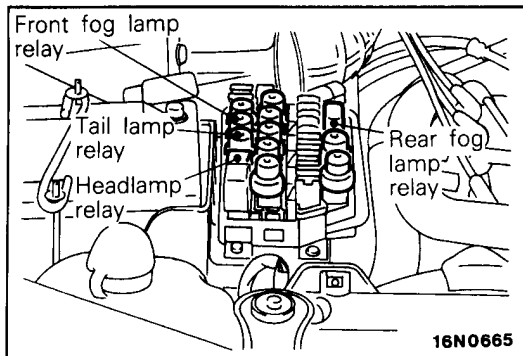
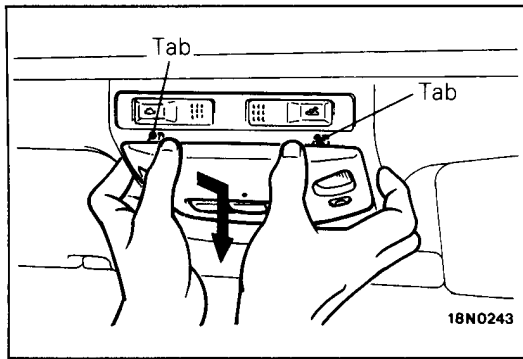
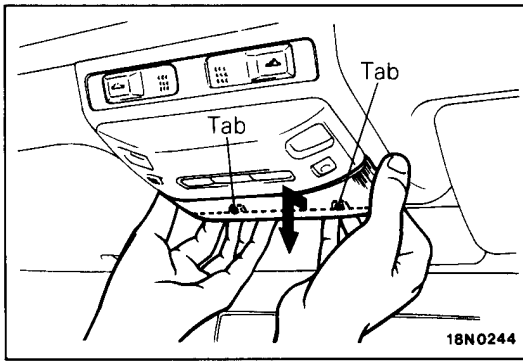
## REMOVAL AND INSTALLATION

**Pre-removal and Post-installation**

- Removal and Installation of the Trunk Lid Trim.  
(Refer to GROUP 52 – Trim)



18N0465



**SERVICE POINTS OF REMOVAL**

**1. REMOVAL OF ROOM LAMP LENS**

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

**3. REMOVAL OF ROOM LAMP SWITCH COVER**

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

**RELAY**

E54GIAM

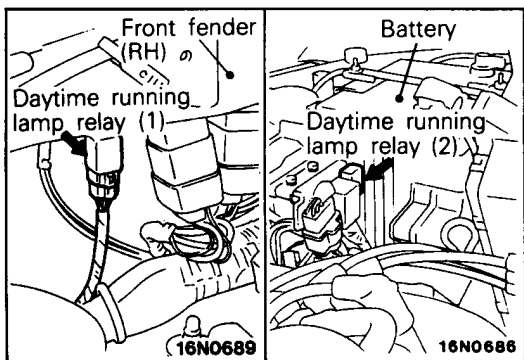
**INSPECTION**

**HEADLAMP RELAY, TAIL LAMP RELAY, FRONT FOG LAMP RELAY AND REAR FOG LAMP RELAY CHECKING**

- (1) Remove the headlamp relay, tail lamp relay, front fog lamp relay and rear fog lamp relay from the engine compartment relay box.
- (2) Apply battery voltage to terminal ②, and check the continuity between the terminals when terminal ④ is earthed.

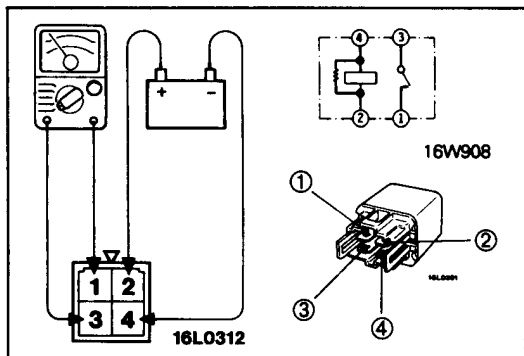
Power is supplied	①-③ terminals	Continuity
Power is not supplied	①-③ terminals	No continuity
	②-④ terminals	Continuity





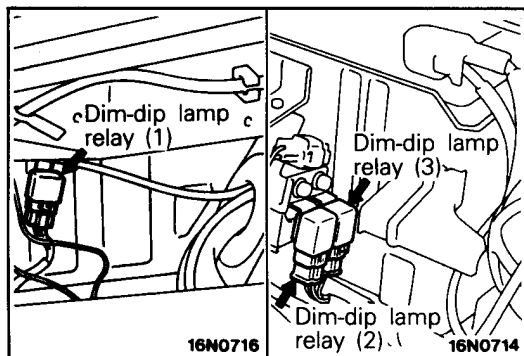
**DAYTIME RUNNING LAMP RELAY (1), (2)**  
**<Vehicles for Norway, Sweden and Iceland>**

- (1) Remove the battery.
- (2) Remove the intake air cleaner duct and then remove the daytime running lamp relay (1).
- (3) Remove the relay box and remove daytime running lamp relays (2).



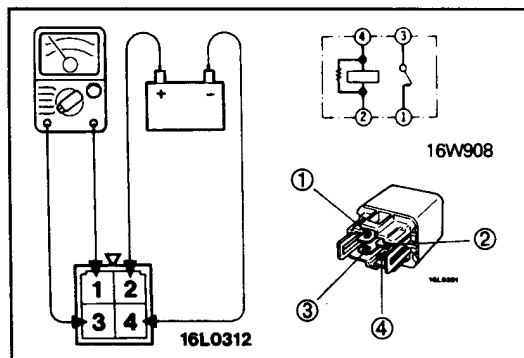
- (4) Apply battery voltage to terminal ②, and check the continuity between the terminals when terminal ④ is earthed.

Power is supplied	①-③ terminals	Continuity
Power is not supplied	①-③ terminals	No continuity
	②-④ terminals	Continuity



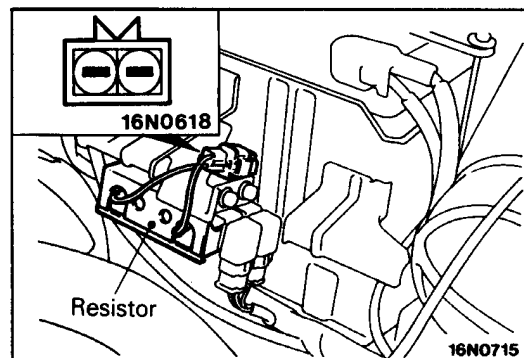
**DIM-DIP LAMP RELAY (1), (2), (3) <R.H. Drive Vehicles>**

- (1) Remove the battery.
- (2) Remove the intake air cleaner duct and then remove the dim-dip lamp relay (1).
- (3) Remove the relay box and remove dim-dip lamp relays (2) and (3).



- (4) Apply battery voltage to terminal ②, and check the continuity between the terminals when terminal ④ is earthed.

Power is supplied	①-③ terminals	Continuity
Power is not supplied	①-③ terminals	No continuity
	②-④ terminals	Continuity

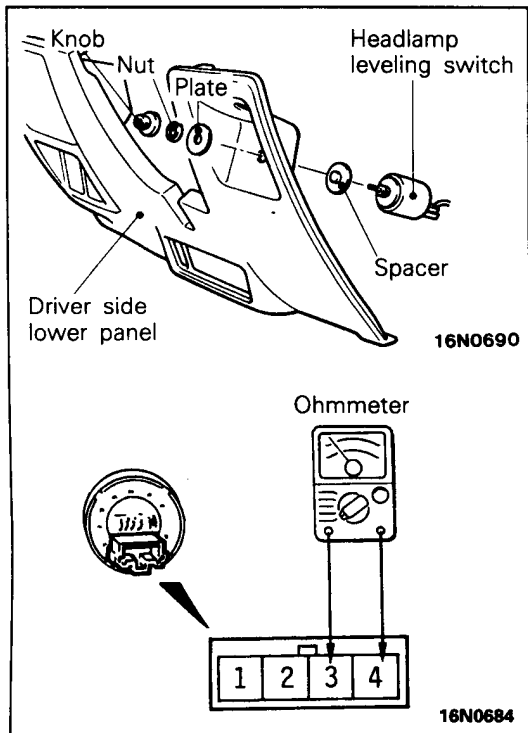


**RESISTOR <R.H. Drive Vehicle>**

**INSPECTION**

- (1) Remove the relay box and remove the resistor connector.
- (2) Connect an ohmmeter to the resistor connector terminal and check the resistance value.

**Standard value: Approx. 1Ω**



## SWITCH

E54GYAD

### INSPECTION

#### HEADLAMP LEVELING SWITCH

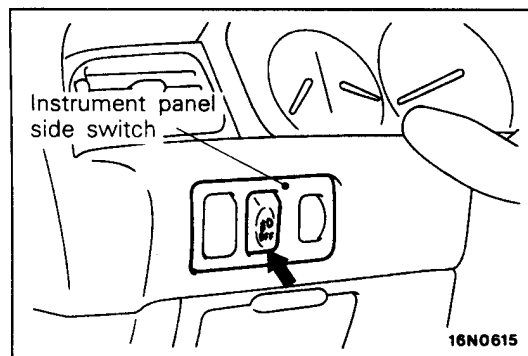
(1) Remove the driver side lower panel. (Refer to GROUP 52 - Instrument Panel.)

(2) Connect the ohmmeter to headlamp levelling switch connector terminals ③ and ④.

(3) Operate the switch and check the resistance values in each switch position.

**Standard value:**

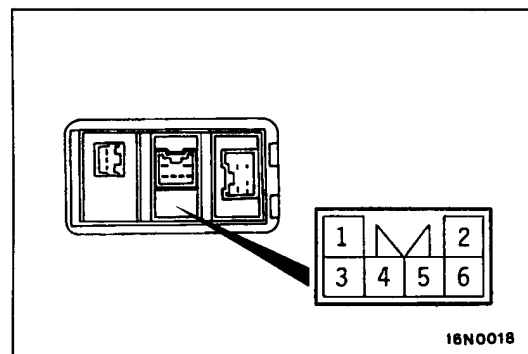
Switch position	0	1	2	3	4
Resistance $\Omega$	120	300	620	1,100	2,000



#### FRONT FOG LAMP SWITCH

E54GWAB

(1) Remove the instrument panel side switch from the instrument panel.



(2) Operate the switch and check for continuity between the terminals.

Switch position \ Terminal No.	1	2	3	4	5	6
OFF		ILL				
ON	○—○	○—○	○—○	○—○	○—○	○—○

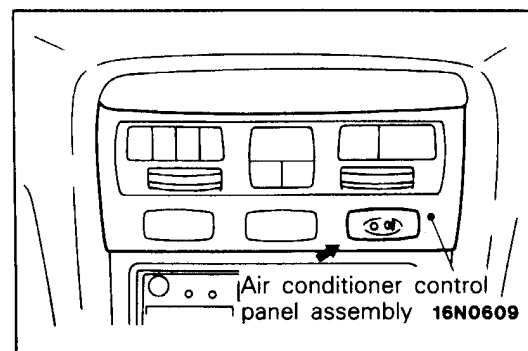
NOTE

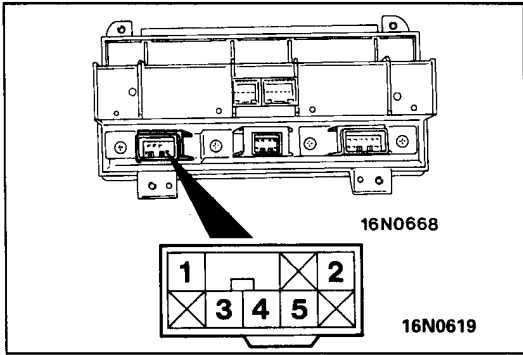
○—○ indicates that there is continuity between the terminals.

#### REAR FOG LAMP SWITCH

E54GMAG

(1) Remove the air conditioner control panel assembly. (Refer to GROUP 55 - Air Conditioner Control Unit)





(2) Operate the switch and check for continuity between the terminals.

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

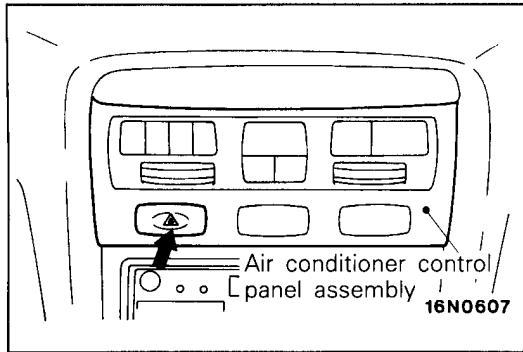
NOTE

○—○ indicates that there is continuity between is terminals.

**HAZARD SWITCH**

E54GLAI

(1) Remove the air conditioner control panel assembly. (Refer to GROUP 55 – Air Conditioner Control Unit)



(2) Operate the switch and check for continuity between the terminals.

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

NOTE

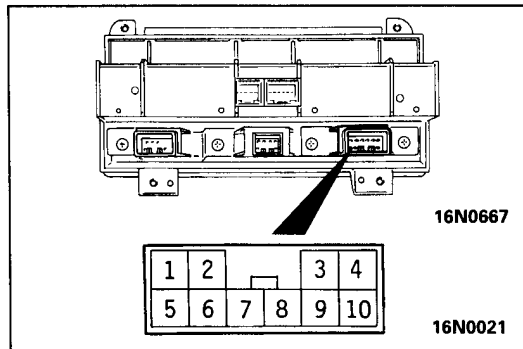
○—○ indicates that there is continuity between the terminals.

**RHEOSTAT**

E54GNAF

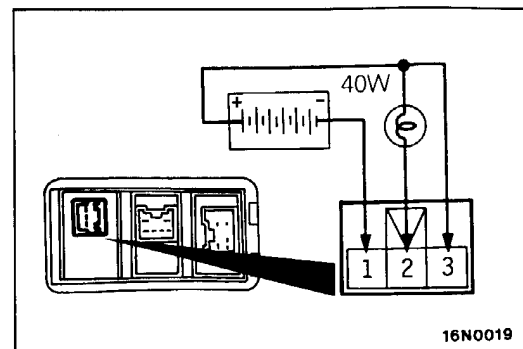
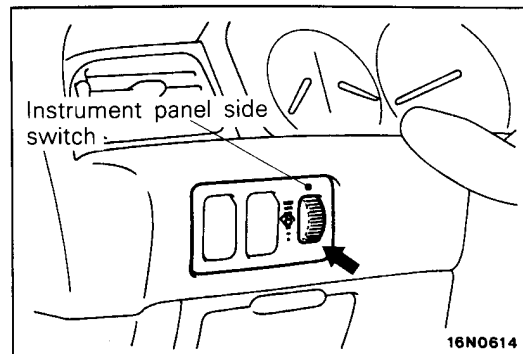
**INSPECTION**

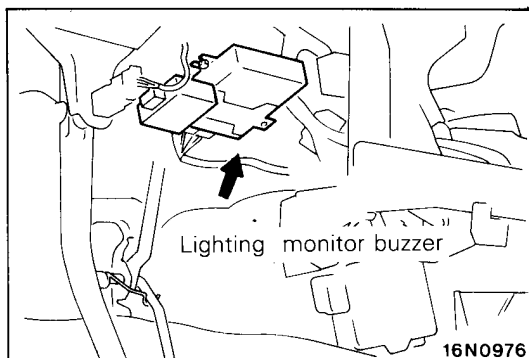
(1) Remove the instrument panel side switch from the instrument panel.



(2) Connect the battery and the test bulb (40W) as shown in the illustration.

(3) Operate the rheostat, and if the brightness changes smoothly without switching off, then the rheostat function is normal.

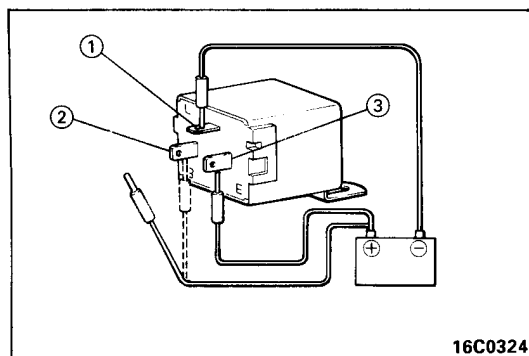




## LIGHTING MONITOR BUZZER

### <VEHICLES BUILT FROM NOVEMBER, 1991> INSPECTION

(1) Remove the lighting monitor buzzer.

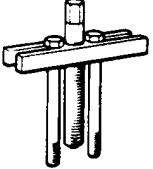


(2) Apply the battery voltage to lighting monitor buzzer terminal No.③, and check to be sure that the buzzer sounds when terminal No.①, is earthed.

(3) When the battery voltage is applied to terminal No.②, check to be sure that the buzzer stops sounding.

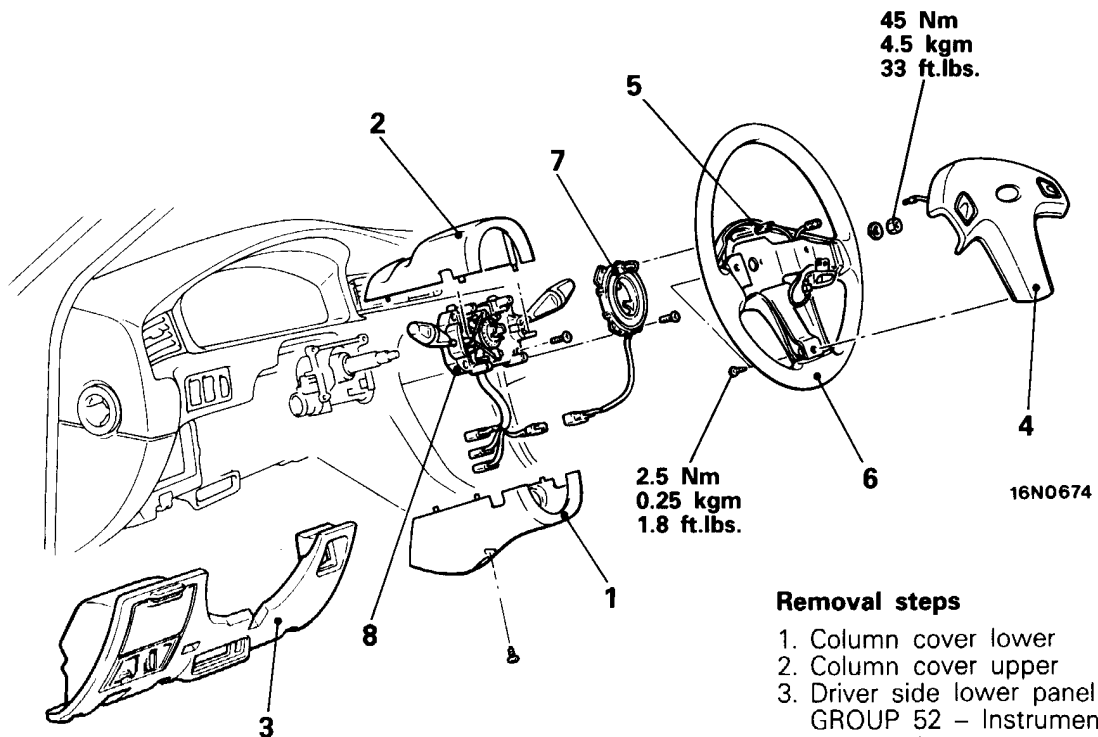
# COLUMN SWITCH SPECIAL TOOL

E54HF--

Tool	Number	Name	Use
	MB990803	Steering wheel puller	Removal of steering wheel

## COLUMN SWITCH <VEHICLES WITHOUT SRS> REMOVAL AND INSTALLATION

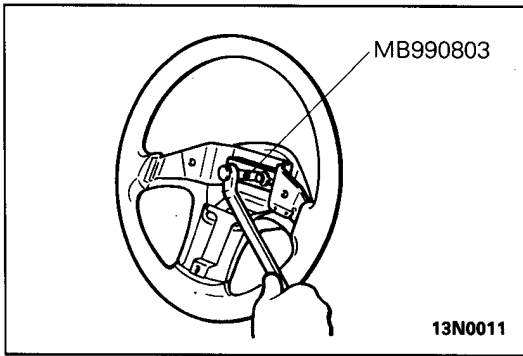
E54HH--



### Removal steps

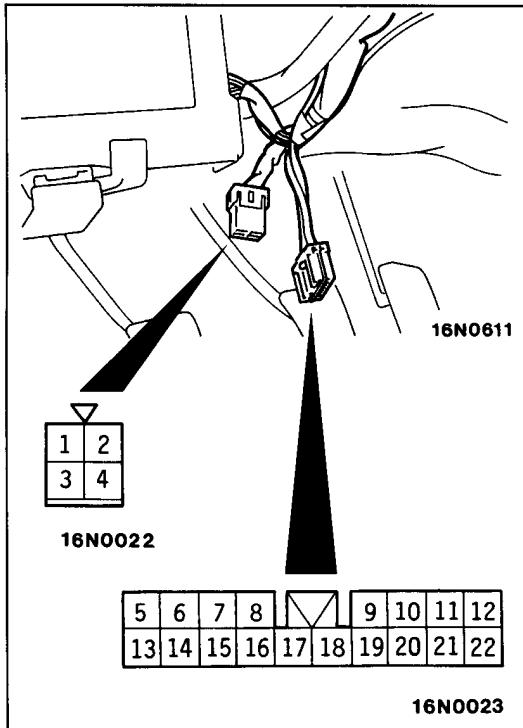
1. Column cover lower
2. Column cover upper
3. Driver side lower panel (Refer to GROUP 52 – Instrument Panel)
4. Horn pad
5. Harness connector  
<Vehicles with cruise control>
6. Steering wheel
7. Slip ring  
<Vehicles with cruise control>
8. Column switch





**SERVICE POINTS OF REMOVAL**

**6. REMOVAL OF STEERING WHEEL**



**INSPECTION**

- (1) Remove the column cover lower.
- (2) Remove the driver side lower panel. (Refer to GROUP 52 – Instrument Panel)
- (3) Remove the column switch connector.

- (4) Operate the switch and check for continuity between the terminals.

		Terminal No.												
		1	3	4	5	8	9	10	17	18	19			
TURN SIGNAL	RH													○—○
	OFF													
	LH						○—○							
LIGHTING	OFF													
	TAIL					○—○								
	HEAD					○—○		○—○						
DIMMER/PASSING	LOWER	○—○												
	UPPER	○—○												
	PASSING	○—○		○—○										

NOTE  
 ○—○ indicates that there is continuity between the terminals.

**WIPER AND WASHER SWITCH**

Refer to GROUP 51 – Windshield Wiper and Washer

**HEADLAMP WASHER SWITCH**

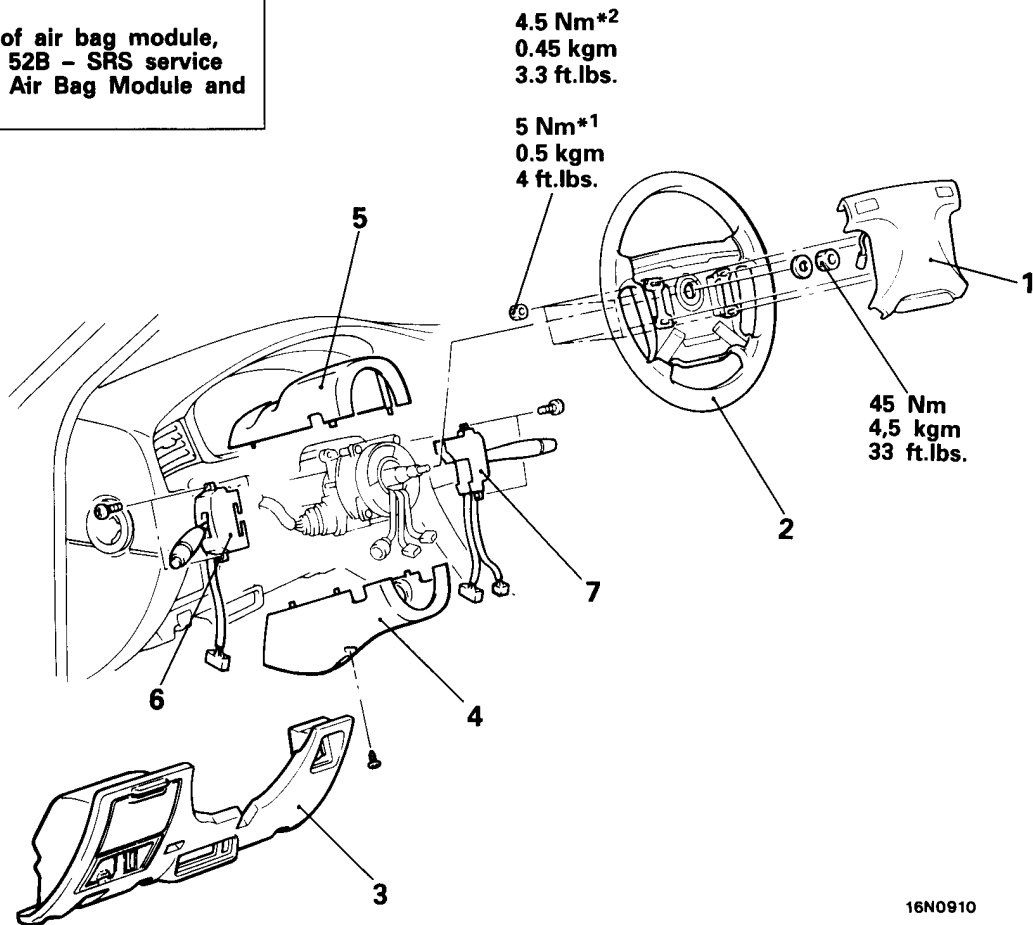
Refer to GROUP 51 – Headlamp Washer.

## COLUMN SWITCH &lt;VEHICLES WITH SRS&gt;

E54HH-A

## REMOVAL AND INSTALLATION

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



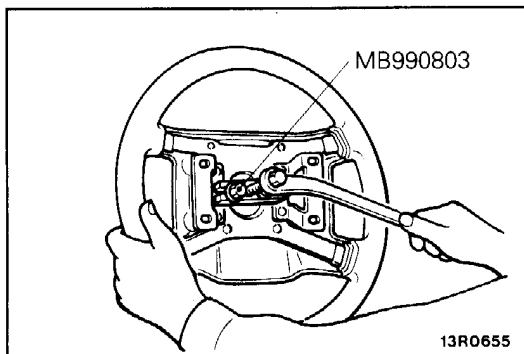
16N0910

**Removal steps**

- ↔
1. Air bag module  
(Refer to GROUP 52B – Air Bag Module and Clock Spring)
  2. Steering wheel
  3. Driver side lower panel  
(Refer to GROUP 52 – Instrument panel)
  4. Column cover lower
  5. Column cover upper
  6. Column switch left (For lighting switch, dimmer/passing switch and turn signal switch)
  7. Column switch right (for wiper and washer switch)

**NOTE**

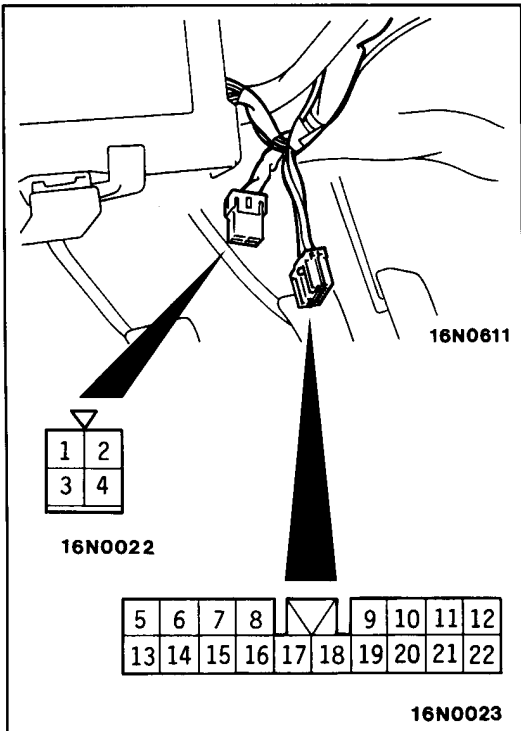
- \*1: Vehicles built up to April, 1994  
\*2: Vehicles built from May, 1994



13R0655

**SERVICE POINTS OF REMOVAL****2. REMOVAL OF STEERING WHEEL**

E54HIAa



**INSPECTION**

- (1) Remove the column cover lower.
- (2) Remove the driver side lower panel. (Refer to GROUP 52 – Instrument Panel)
- (3) Remove the column switch connector.

- (4) Operate the switch and check for continuity between the terminals.

Switch position		Terminal No.												
		1	3	4	5	8	9	10	17	18	19			
TURN SIGNAL	RH												○—○	
	OFF													
	LH						○—○							
LIGHTING	OFF													
	TAIL					○—○								
	HEAD					○—○		○—○						
DIMMER/ PASSING <L.H. drive vehicles>	LOWER (PASSING)	○—○				(○—○—○—○)								
	UPPER (PASSING)	○—○		○		(○—○—○—○)								
DIMMER/ PASSING <R.H. drive vehicles>	LOWER	○—○												
	UPPER	○—○		○										
	PASSING	○—○		○—○										

**NOTE**

○—○ indicates that there is continuity between the terminals.

**WIPER AND WASHER SWITCH**

Refer to GROUP 51 – Windshield Wiper and Washer

**HEADLAMP WASHER SWITCH**

Refer to GROUP 51 – Headlamp Washer.



# HORN

## HORN SWITCH <VEHICLES WITH SRS>

E541QAH

### REMOVAL AND INSTALLATION

<Vehicles built up to April, 1994>

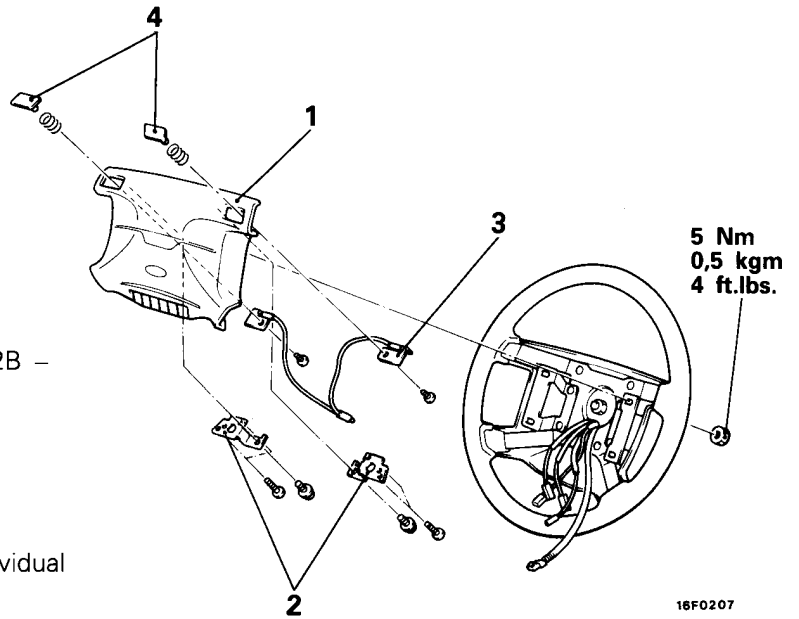
**CAUTION: SRS**  
 Before removal of air bag module, refer to GROUP 52B – SRS Service Precautions and Air Bag Module and Clock Spring.

**Removal steps**

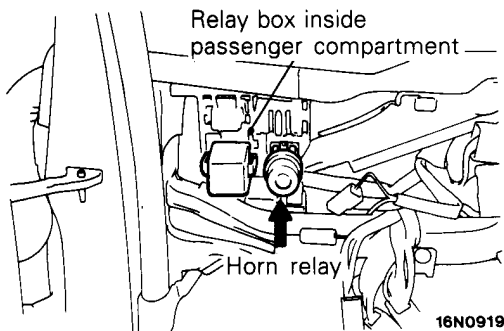
1. Air bag module (Refer to GROUP 52B – Air Bag Module and Clock Spring)
2. Horn contact switch
3. Horn contact plate and wire
4. Horn switch

<Vehicles built from May, 1994>

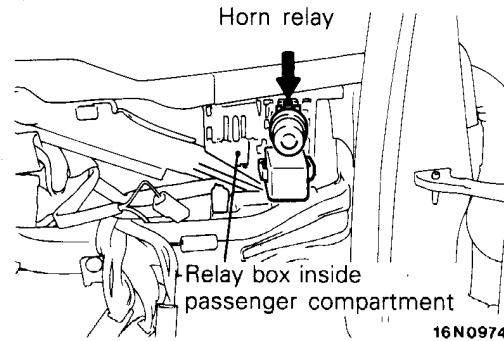
Because a horn switch is not supplied as an individual part, replace it as a steering wheel assembly.



<L.H. drive vehicles>



<R.H. drive vehicles>



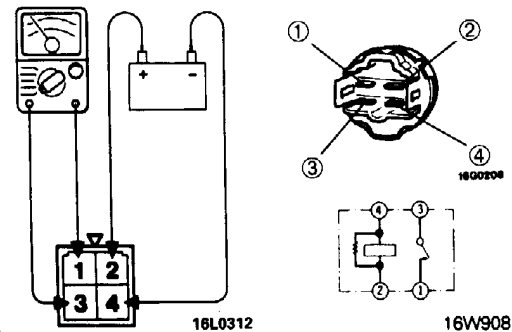
## HORN RELAY <VEHICLES WITH SRS>

E541RAA

### INSPECTION

Apply battery voltage to terminal 2, and check the continuity between the terminals when terminal 4 is earthed.

Power is supplied	1-3 terminals	Continuity
Power is not supplied	1-3 terminals	No continuity
	2-4 terminals	Continuity

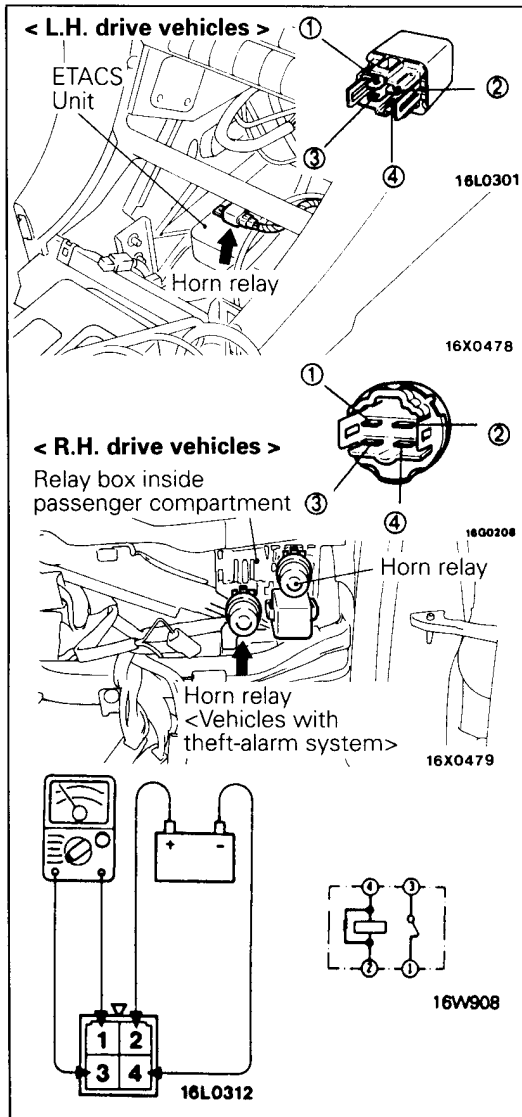


# HORN RELAY <VEHICLES WITH THEFT-ALARM SYSTEM>

## INSPECTION

Apply battery voltage to terminal ②, and check the continuity between the terminals when terminal ④ is earthed.

Power is supplied	1-3 terminals	Continuity
Power is not supplied	1-3 terminals	No continuity
	2-4 terminals	Continuity



# AUDIO SYSTEM TROUBLESHOOTING

E54LC--

## QUICK-REFERENCE TROUBLESHOOTING CHART

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

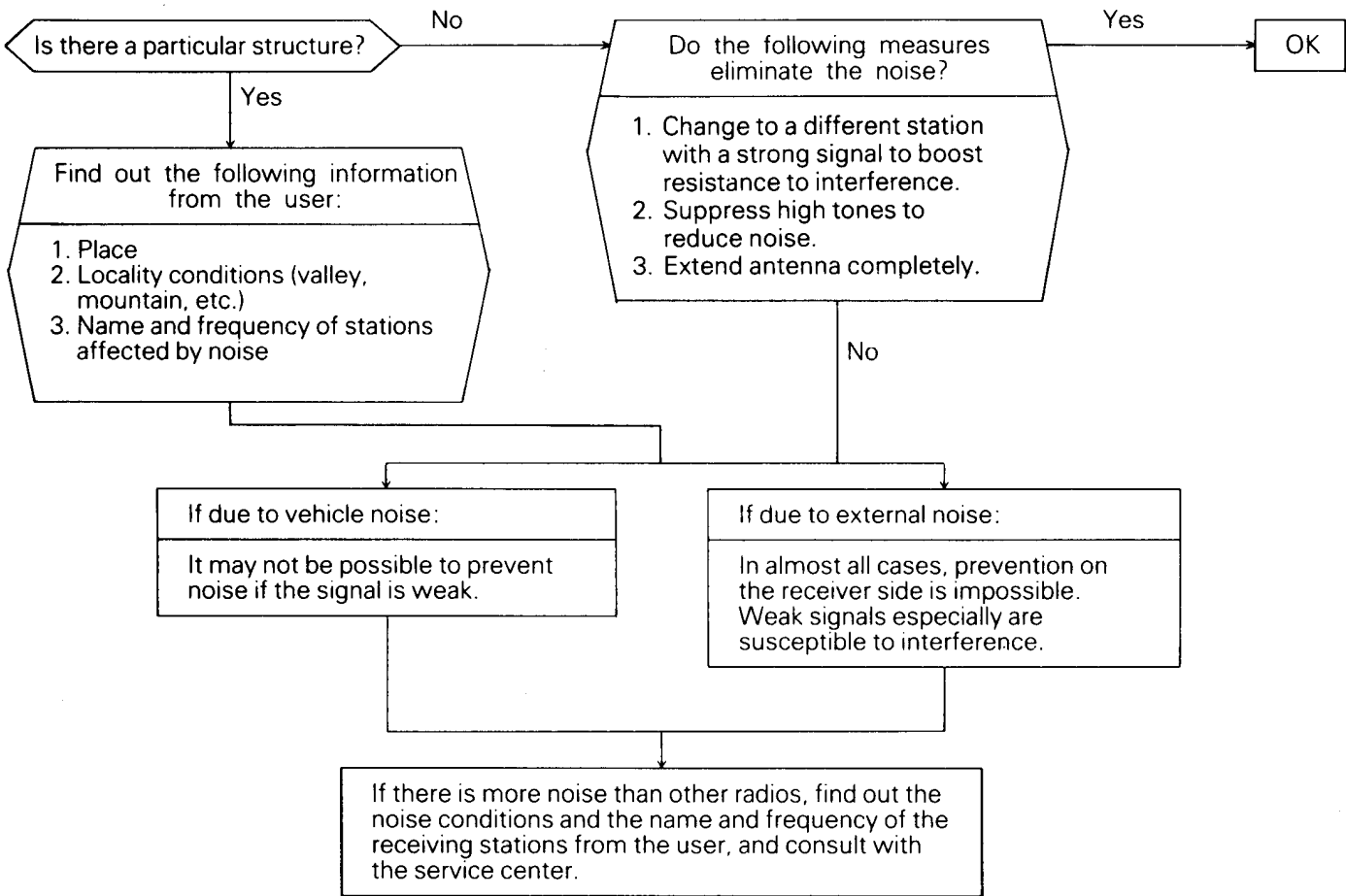
### NOTE

Refer to problem symptoms of AM radio for LW and MW radio.

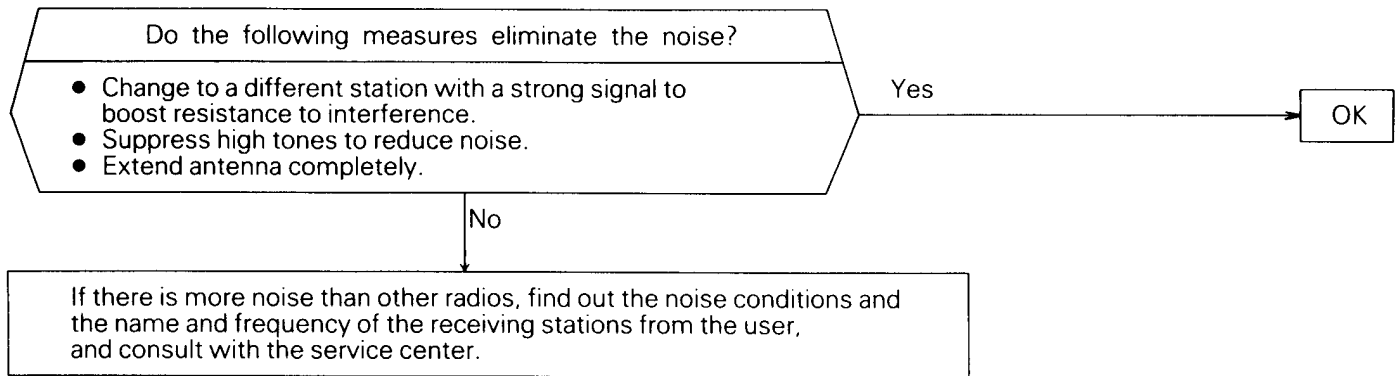
CHART

A. NOISE

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



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



**NOTE**

About FM waves:

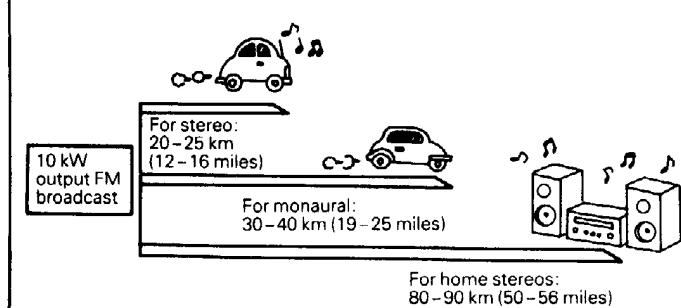
FM waves have the same properties as light, and can be deflected and blocked. Wave reception is not possible in the shadow of obstructions such as buildings or mountains.

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 formations or buildings, the area of good reception is approx. 20 – 25 km (12 – 16 miles) for stereo reception, and 30 – 40 km (19 – 25 miles) 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.>

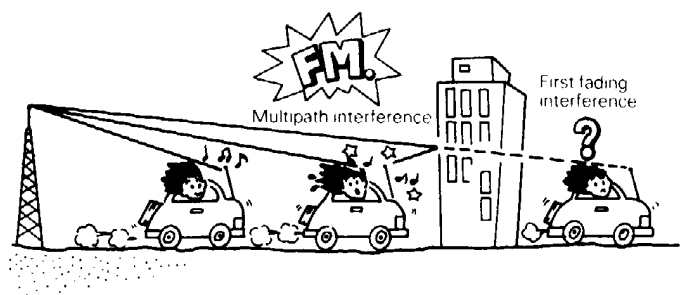
3. If a direct signal hits the antenna at the same time as a signal reflected by obstructions such as mountains or buildings, interference of the two signals will generate noise. During traveling, noise will appear each time the vehicle's antenna passes through this kind of obstructed area. The strength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

**FM Broadcast Good Reception Areas**



16A0663

**FM Signal Characteristics and Signal Interference**



16A0664

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

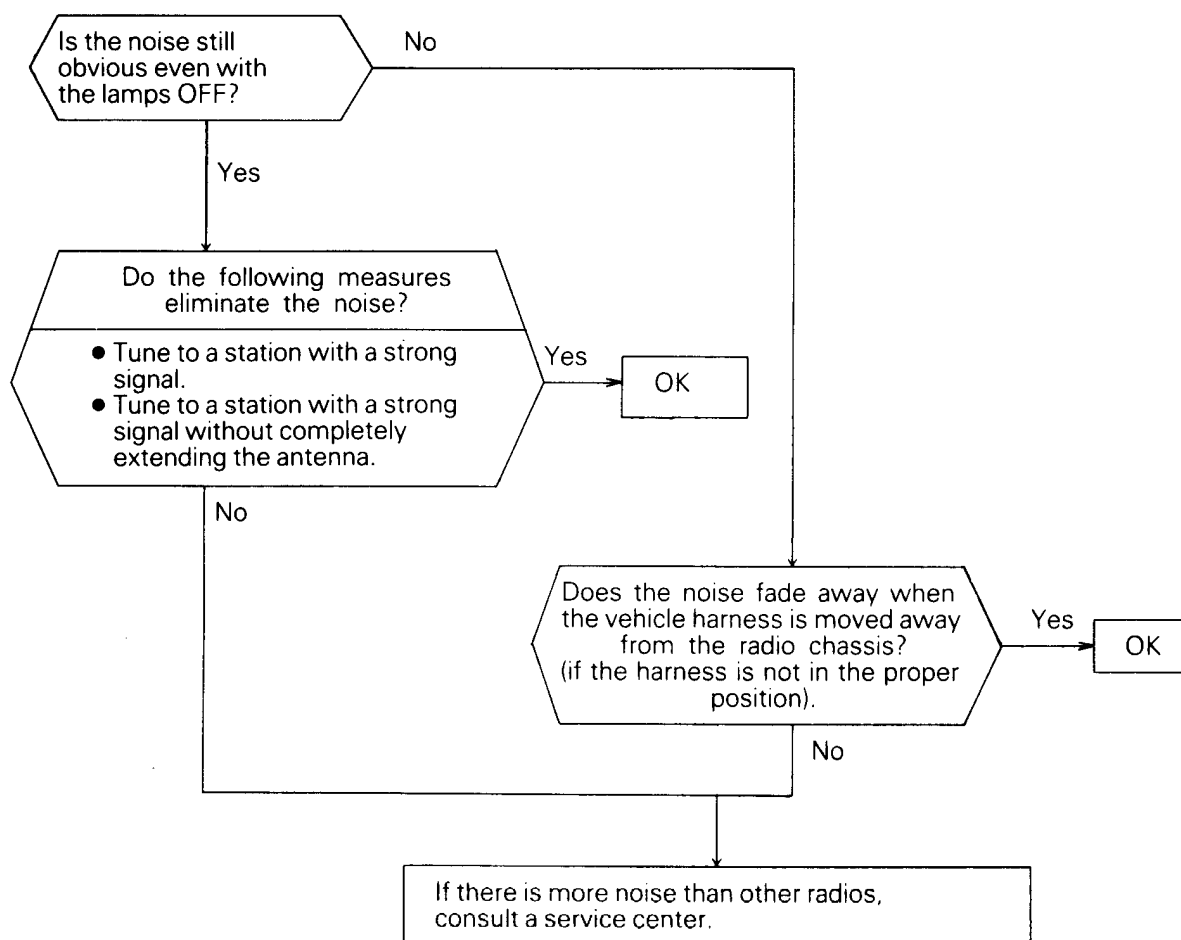
The following factors can be considered as possible causes of noise appearing at night.

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

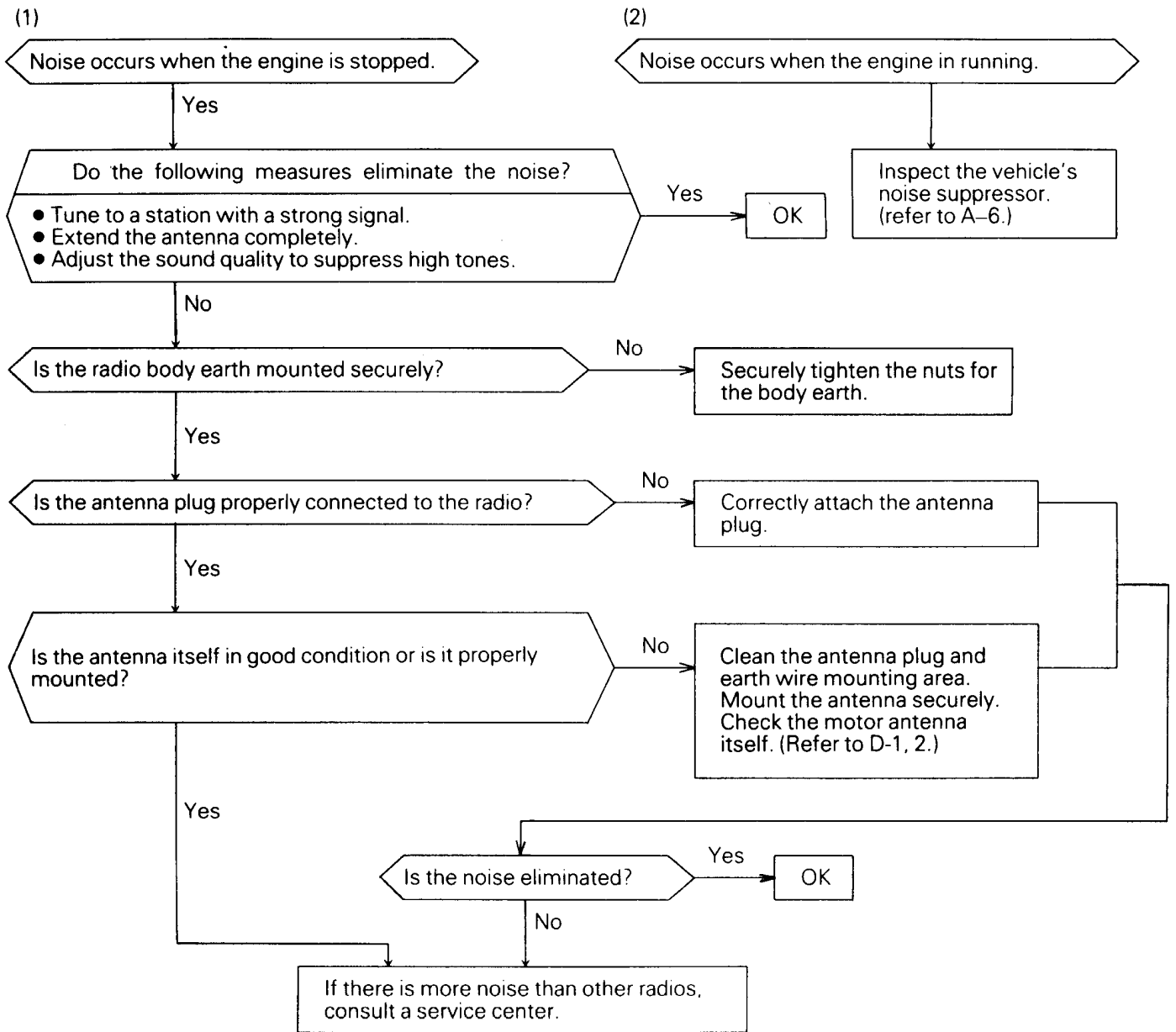
sound\* may occur.

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**

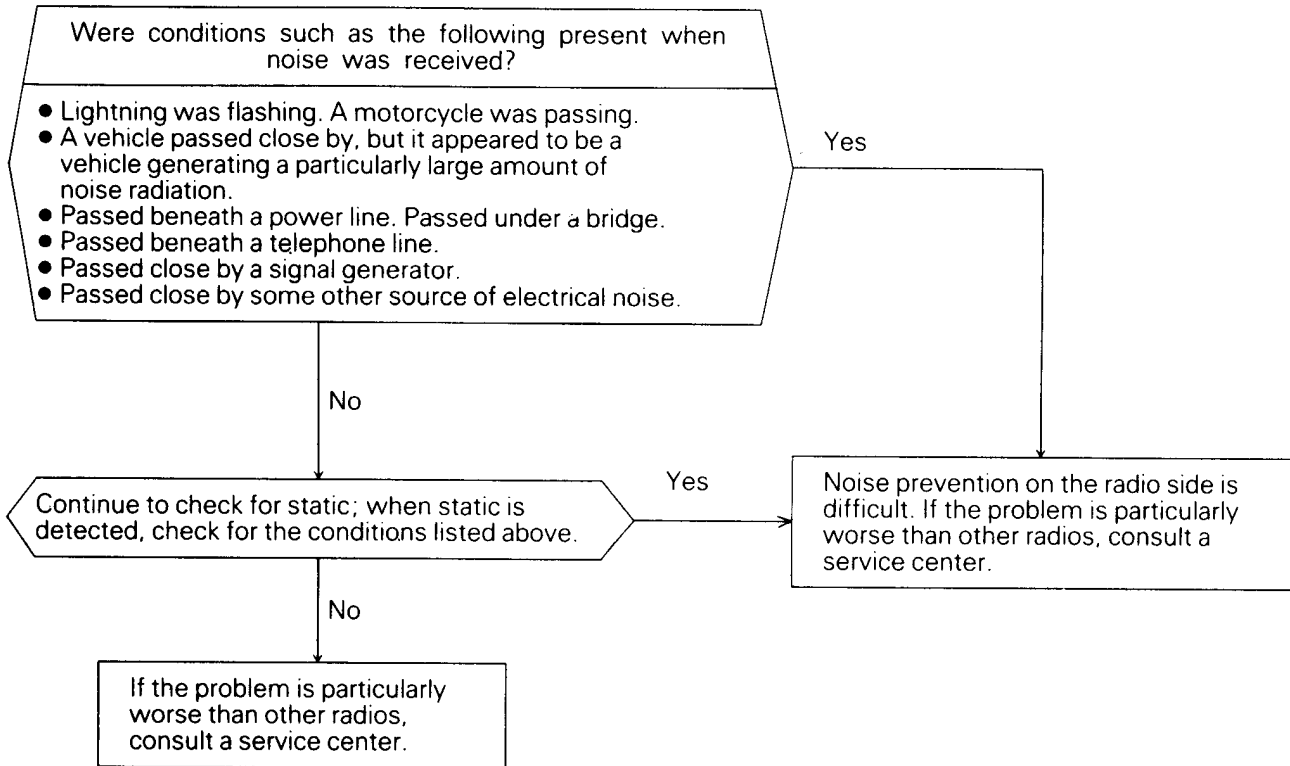
About noise encountered during FM reception only. Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical

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.**

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



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

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



<b>A-6</b>	<b>There is noise when starting the engine.</b>
------------	---

Noise type Sounds are in parentheses ( ).	Conditions	Cause	Inspection or replacement	
			Noise- preventive part	Mounting place (next page)
AM, FM: Ignition noise (Popping, Snapping, Cracking, Buzzing)	<ul style="list-style-type: none"> <li>Increasing the engine speed causing the popping sound to speed up, and volume decreases.</li> <li>Disappears when the ignition switch is turned to ACC.</li> </ul>	<ul style="list-style-type: none"> <li>Mainly due to the spark plugs.</li> <li>Due to the engine noise.</li> </ul>	<ul style="list-style-type: none"> <li>Noise filter</li> <li>Earth cable</li> <li>Noise capacitor</li> </ul>	2 2, 3 1, 2
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.	Earth 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 earthed.	

**Caution**

- Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.**
- 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.**
- Noise prevention should be performed by suppressing strong sources of noise step by step.**

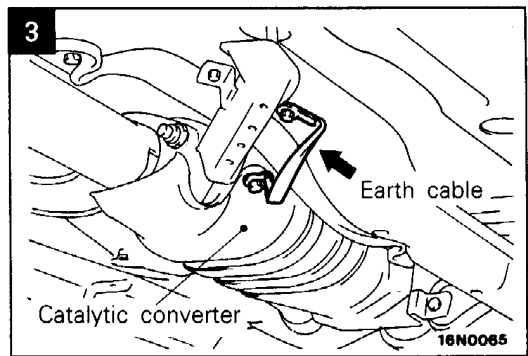
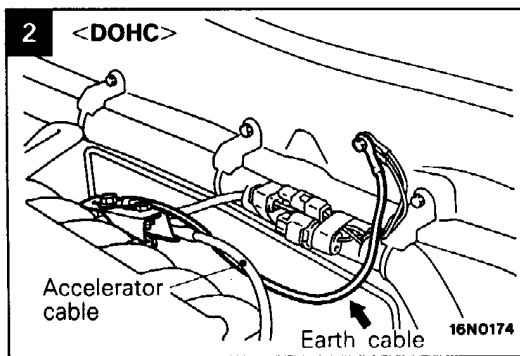
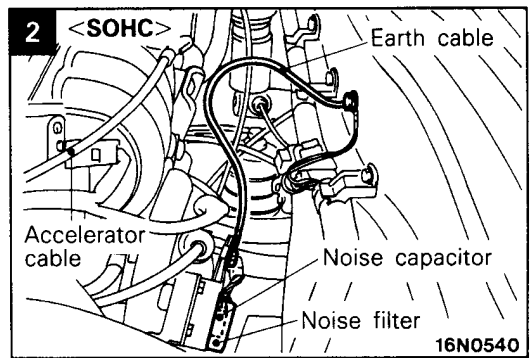
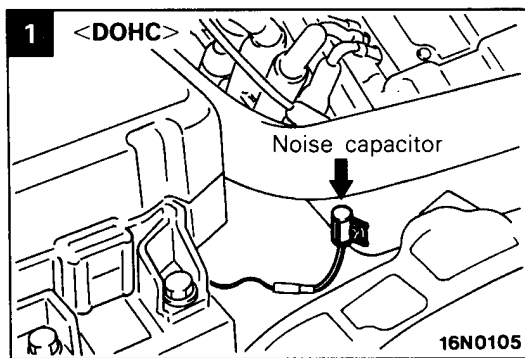
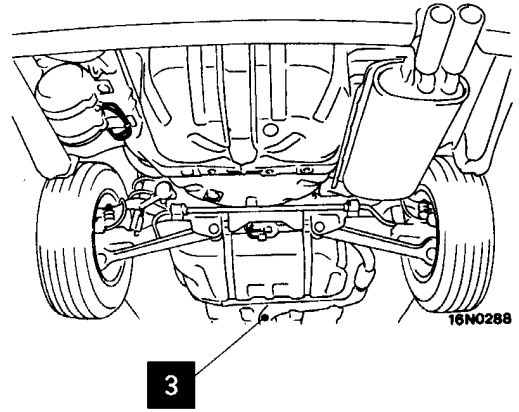
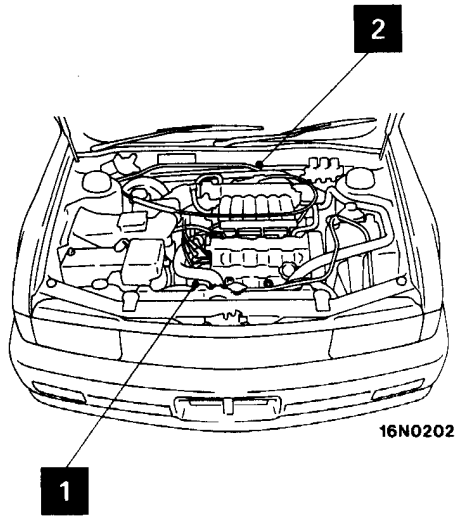
**NOTE**

- Capacitor**  
The capacitor does not pass D.C. current, but as the number of waves increases when it passes A.C. current, impedance (resistance against

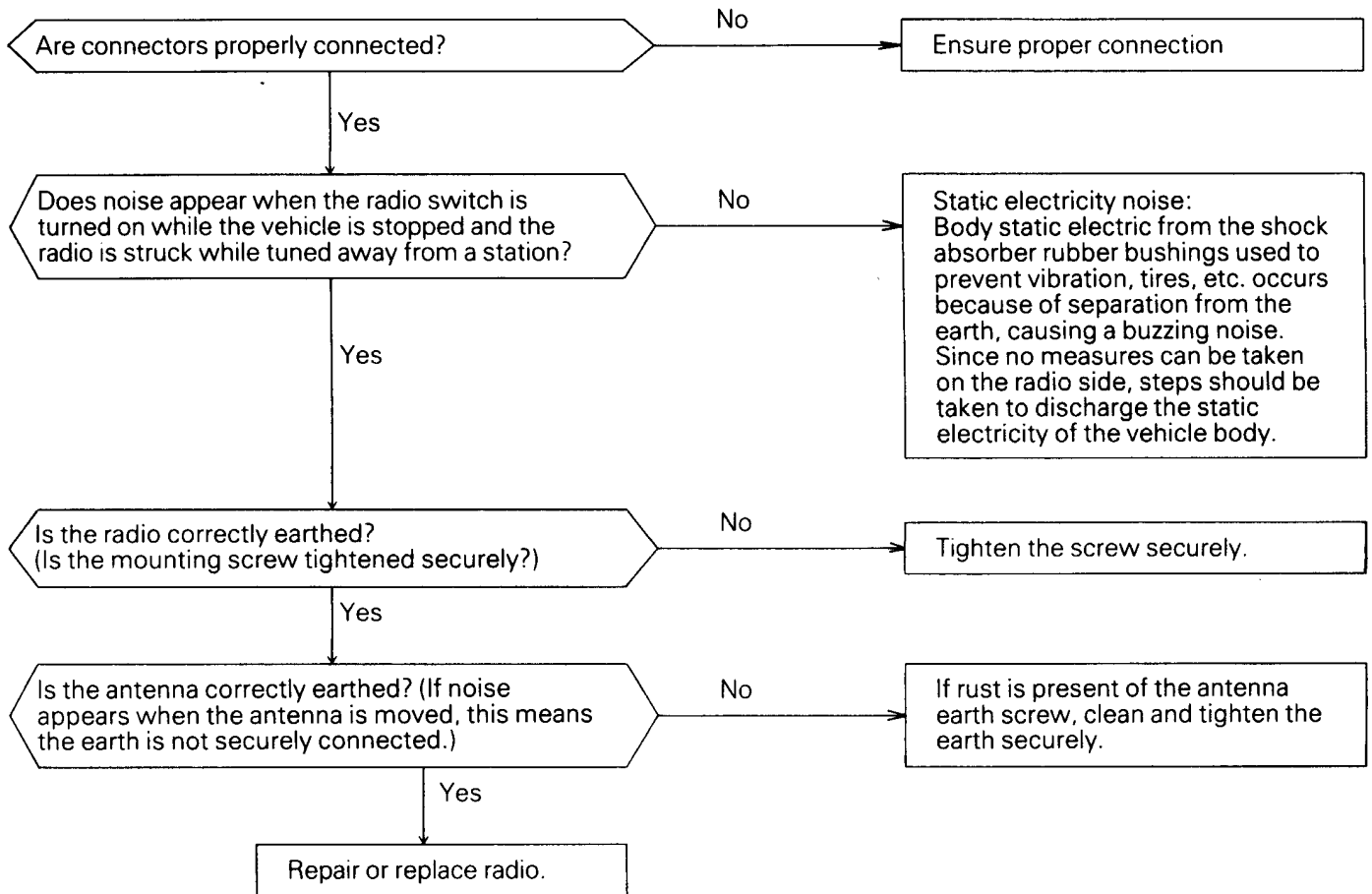
A.C.) decreases, and current flow is facilitated. A noise suppressing condenser which takes advantage of this property is inserted between the power line for the noise source and the earth. This suppresses noise by earthing the noise component (A.C. or pulse signal) to the body of the vehicle.

- 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.

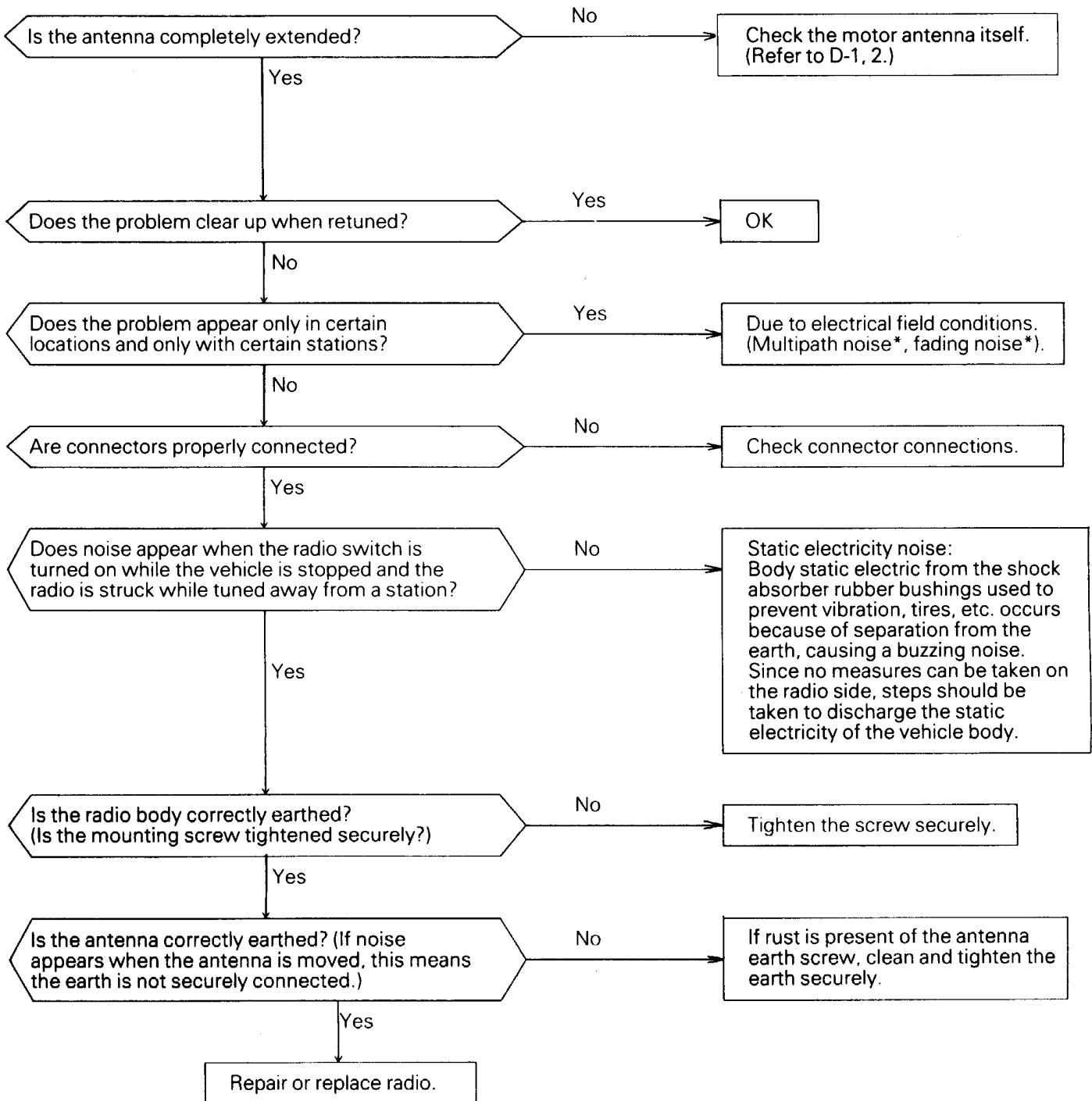
NOISE SUPPRESSOR MOUNTING LOCATION



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



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



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

- tion and enters the receiver with a slight time delay relative to the direct signal (repetitious buzzing).
- Fading noise  
This is a buzzing noise that occurs when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

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

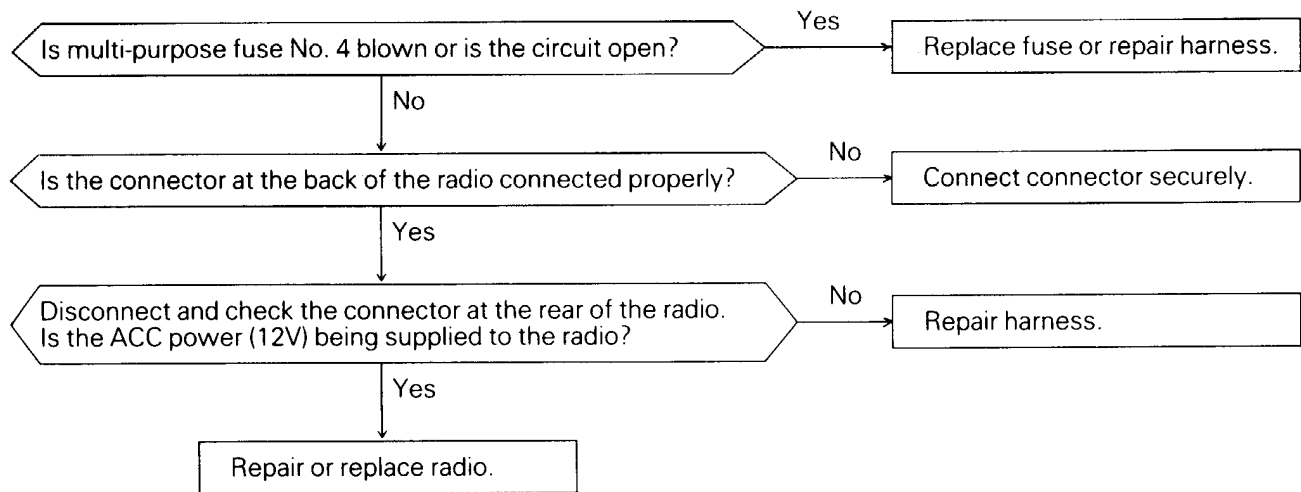
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

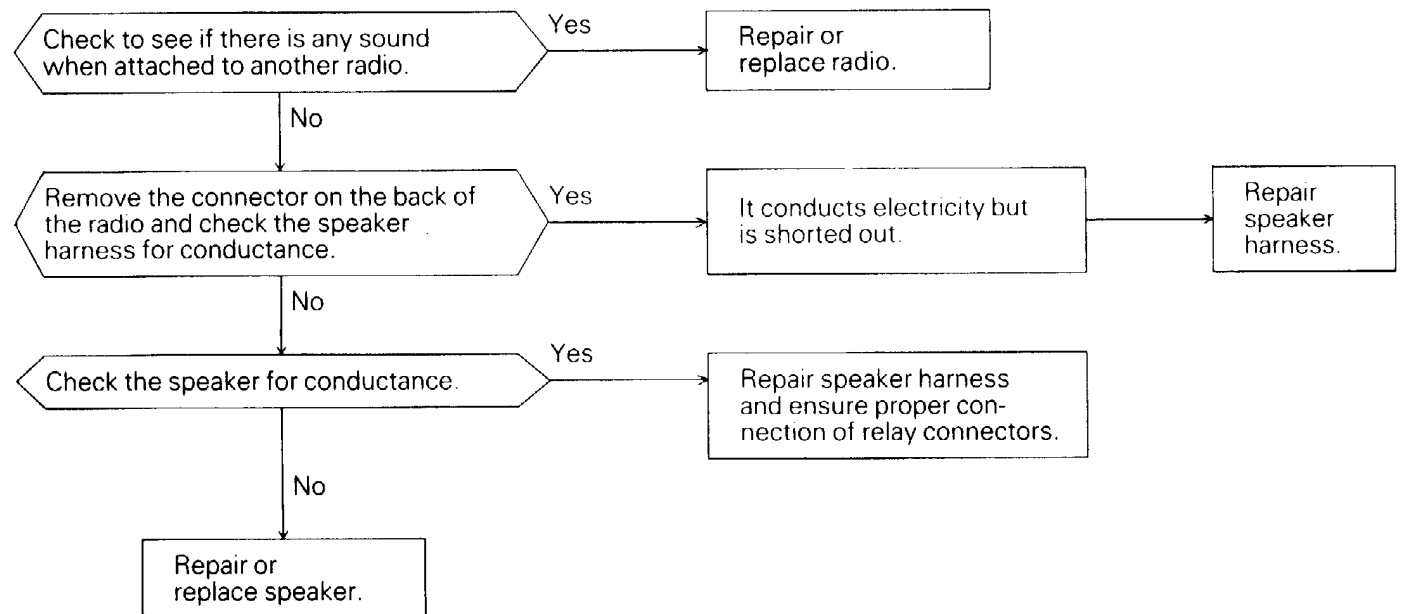
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service center.

**B. RADIO**

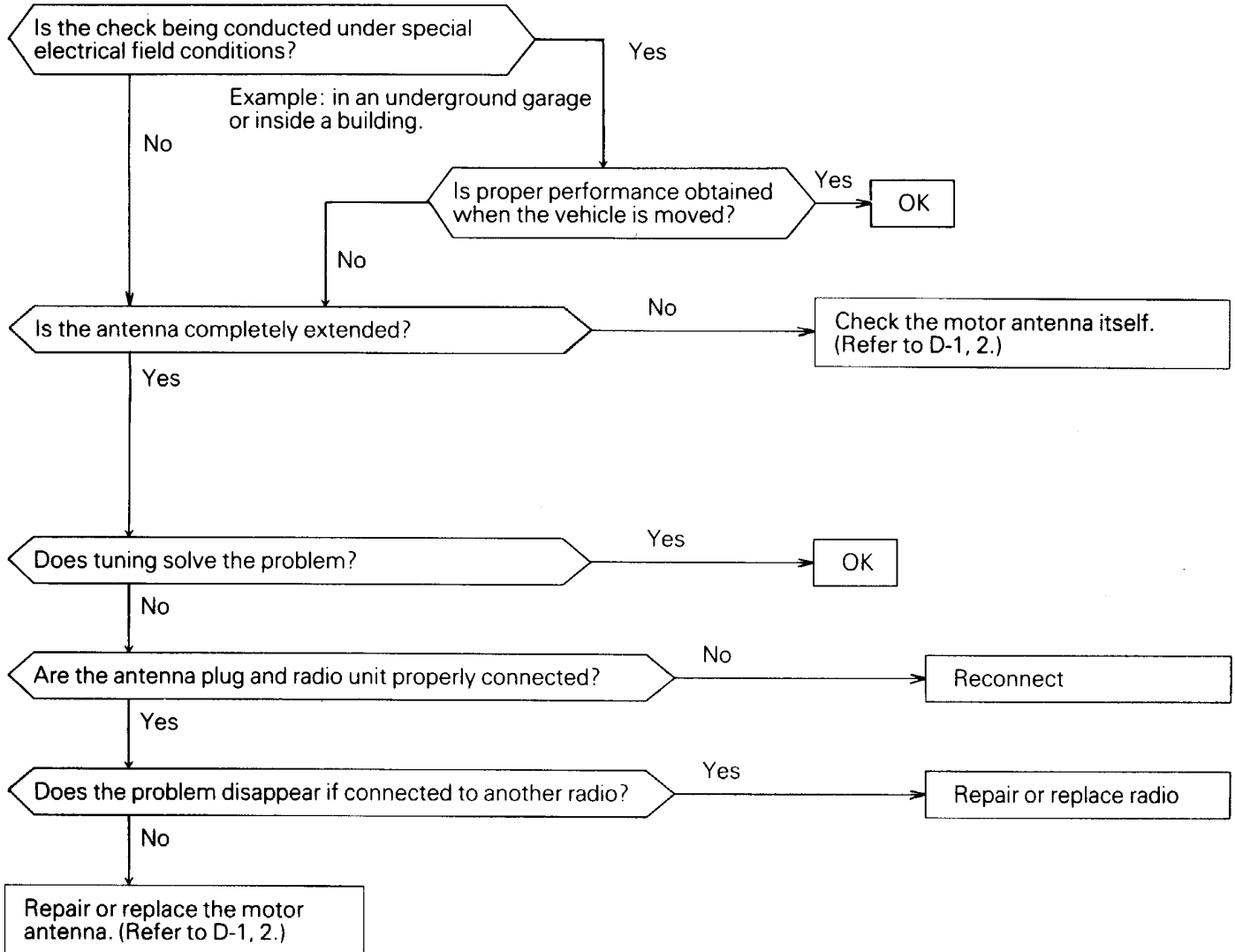
**B-1 No power is supplied when the switch is set to ON.**



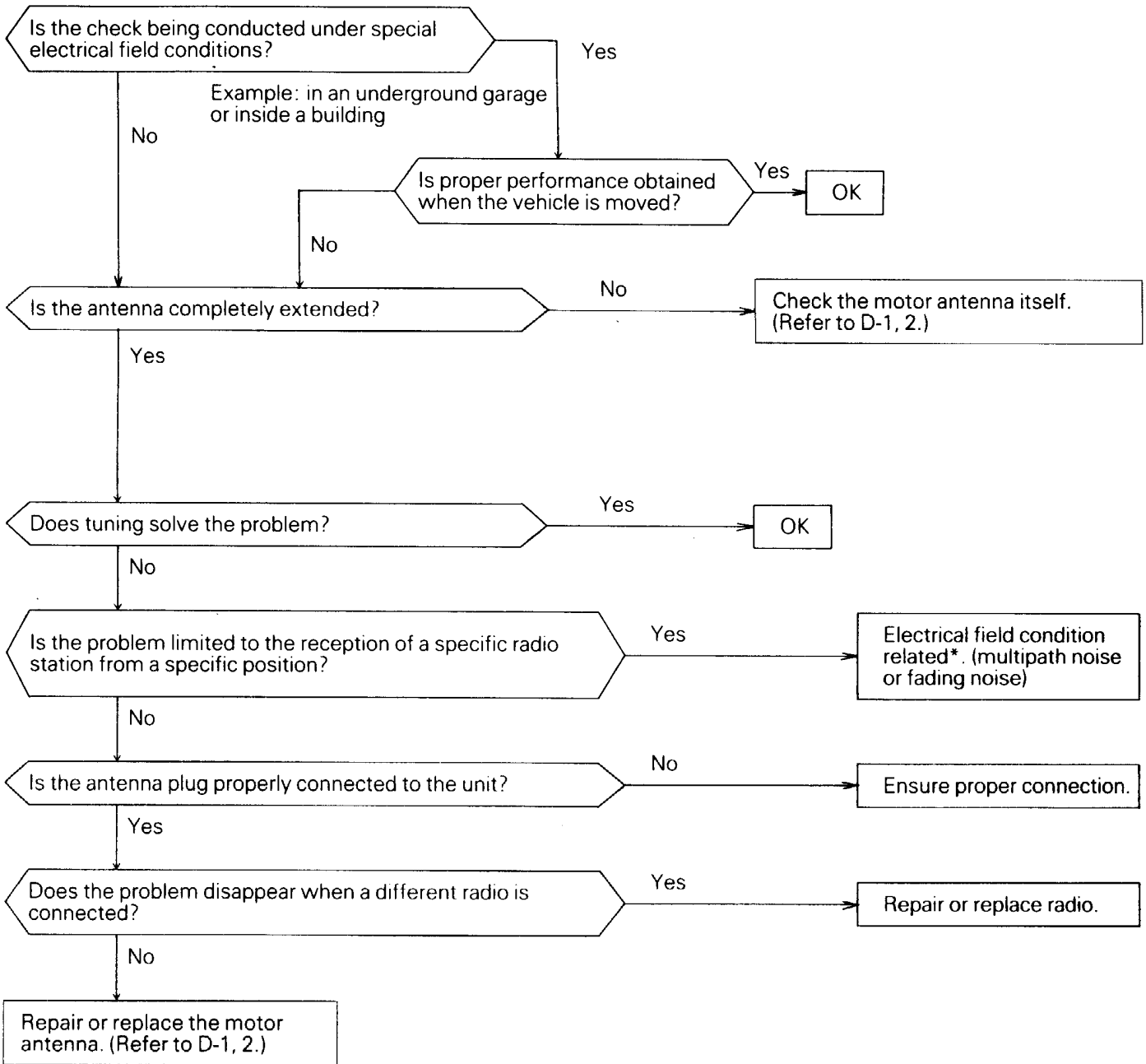
**B-2 No sound from one speaker.**



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

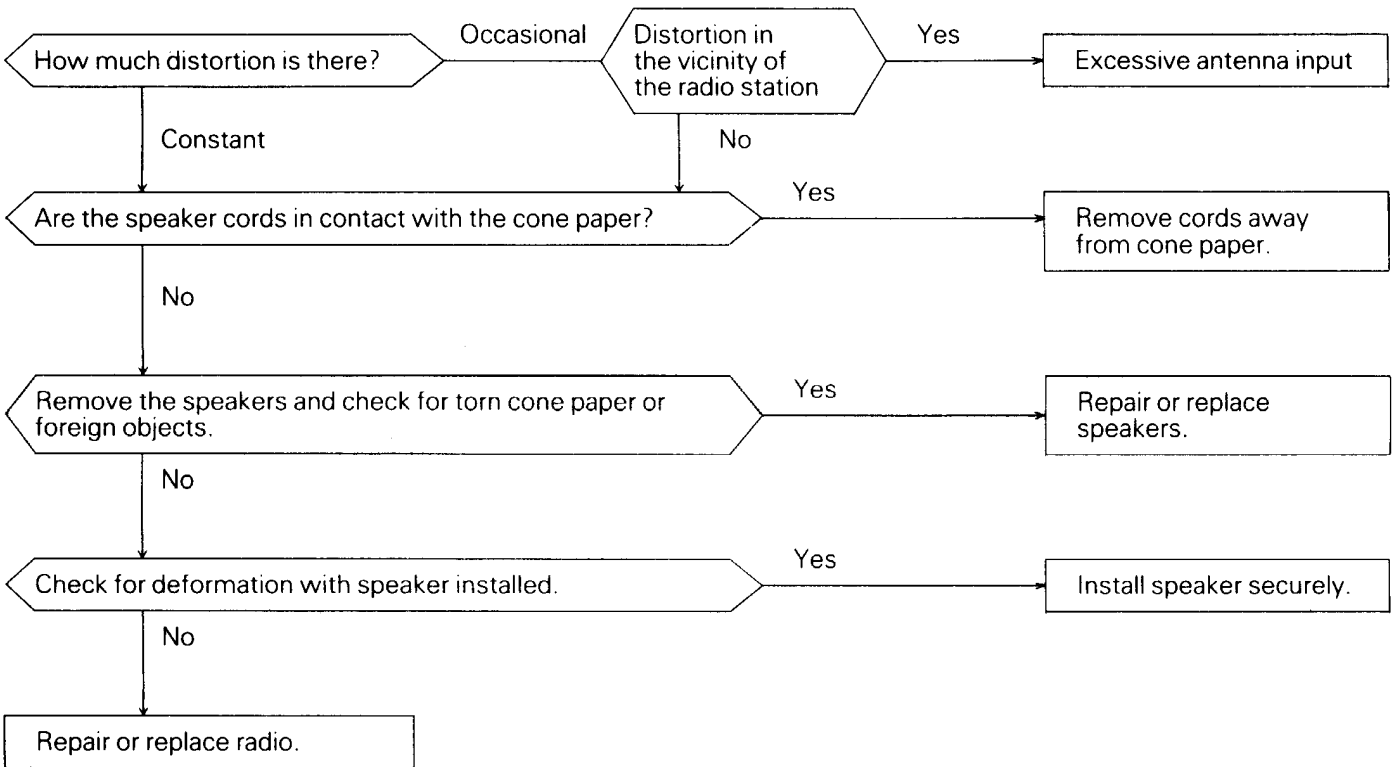


**B-4 Insufficient sensitivity.**

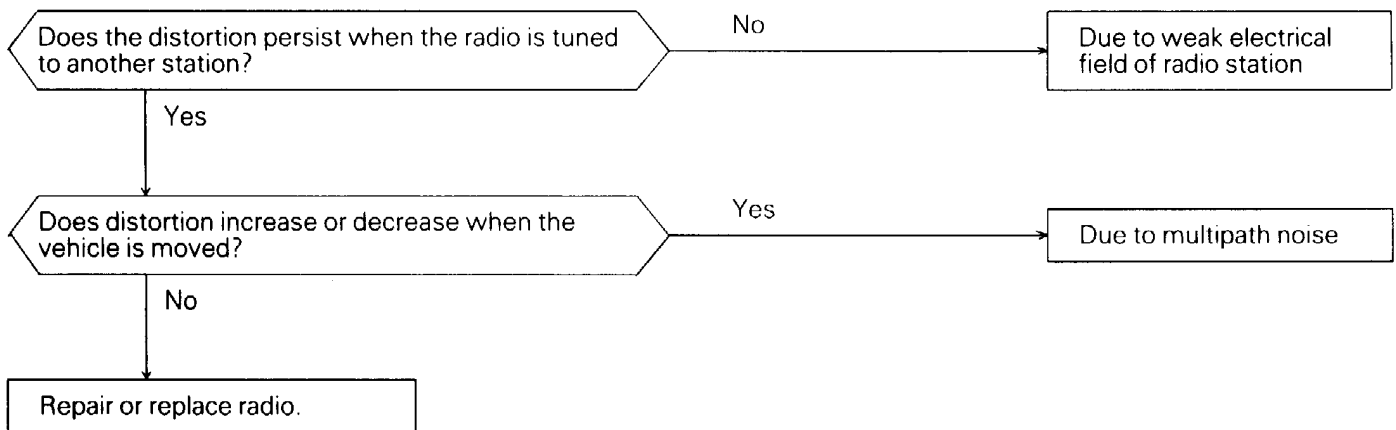


\* For multipath noise and fading noise problems, refer to P.54-51.

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

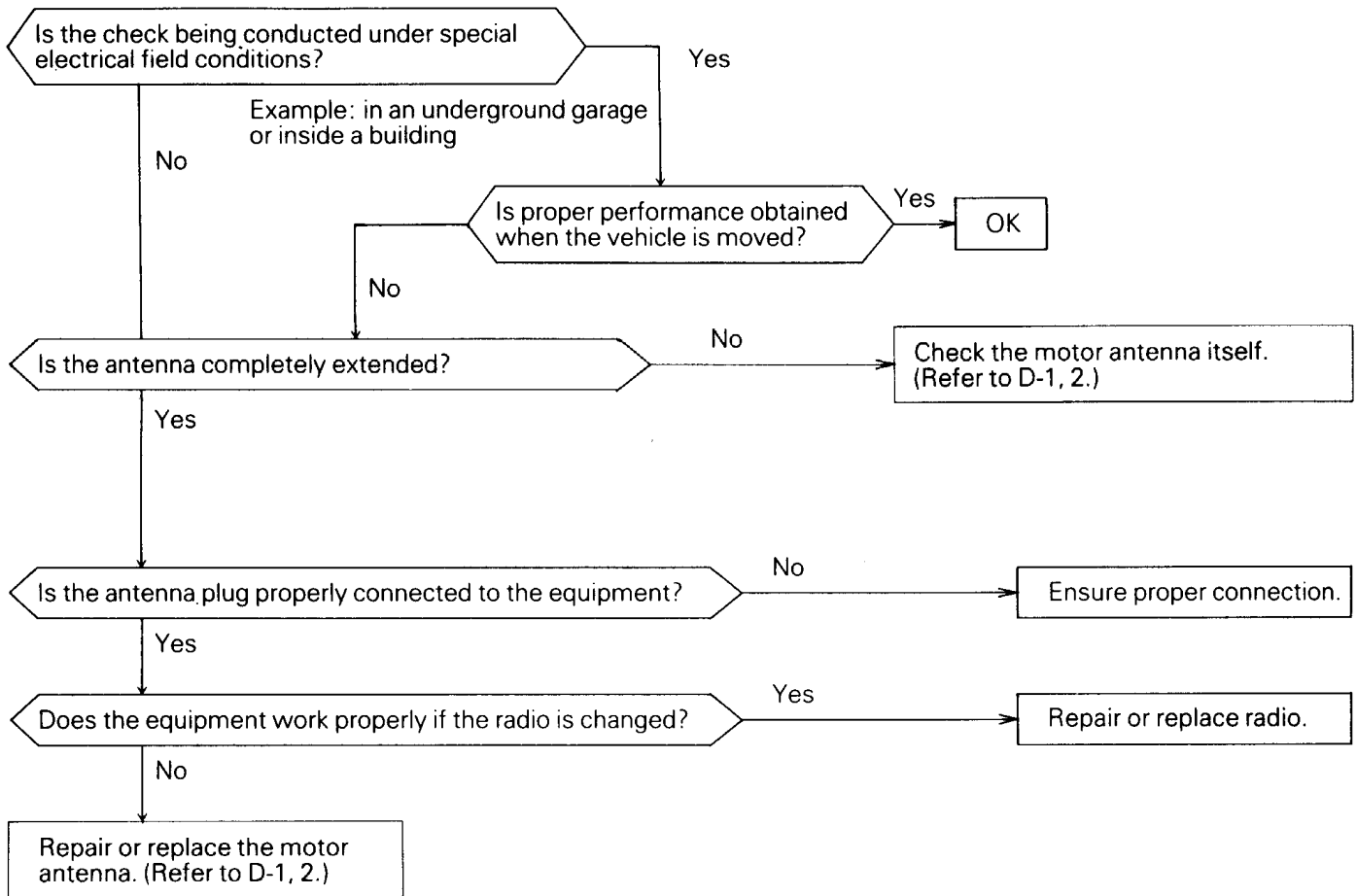


**B-6 Distortion on FM only**

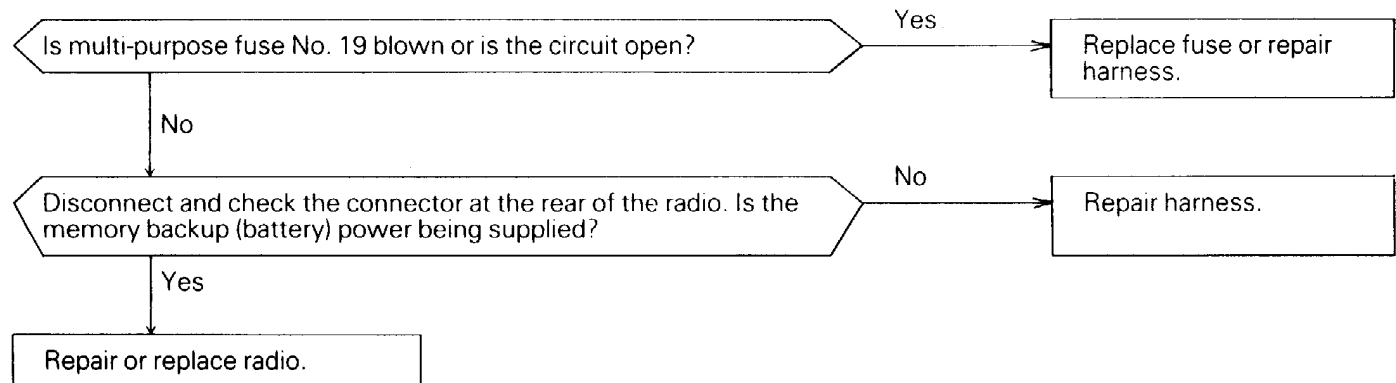




**B-7 Too few automatic select stations.**

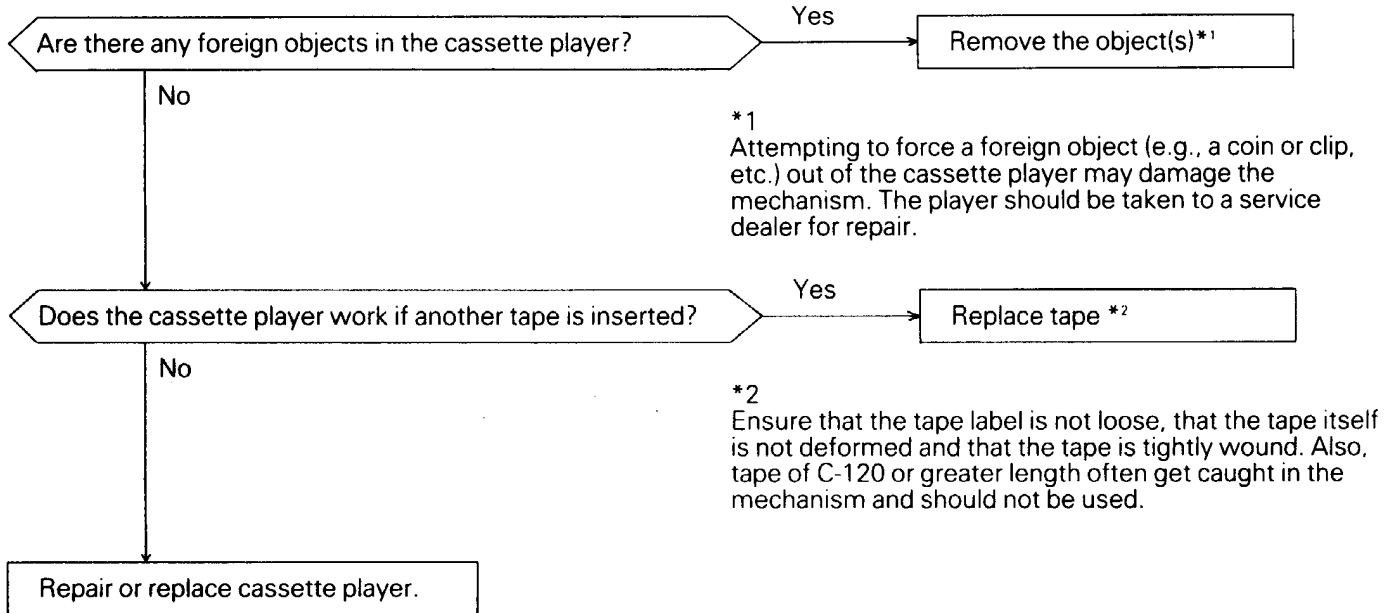


**B-8 Insufficient memory (preset stations are erased).**

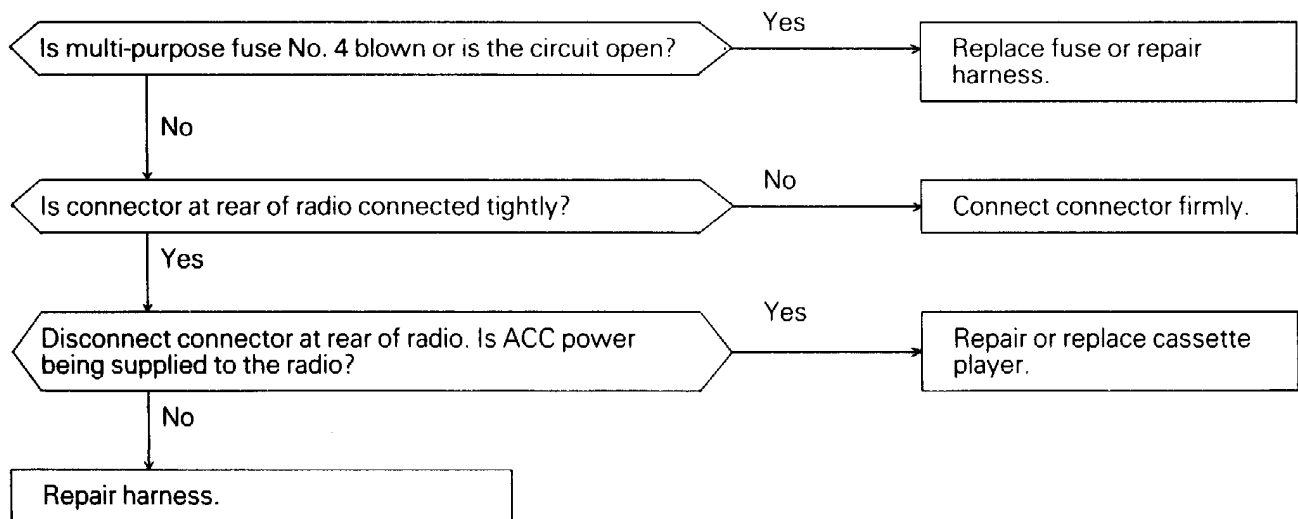


C. CASSETTE PLAYER

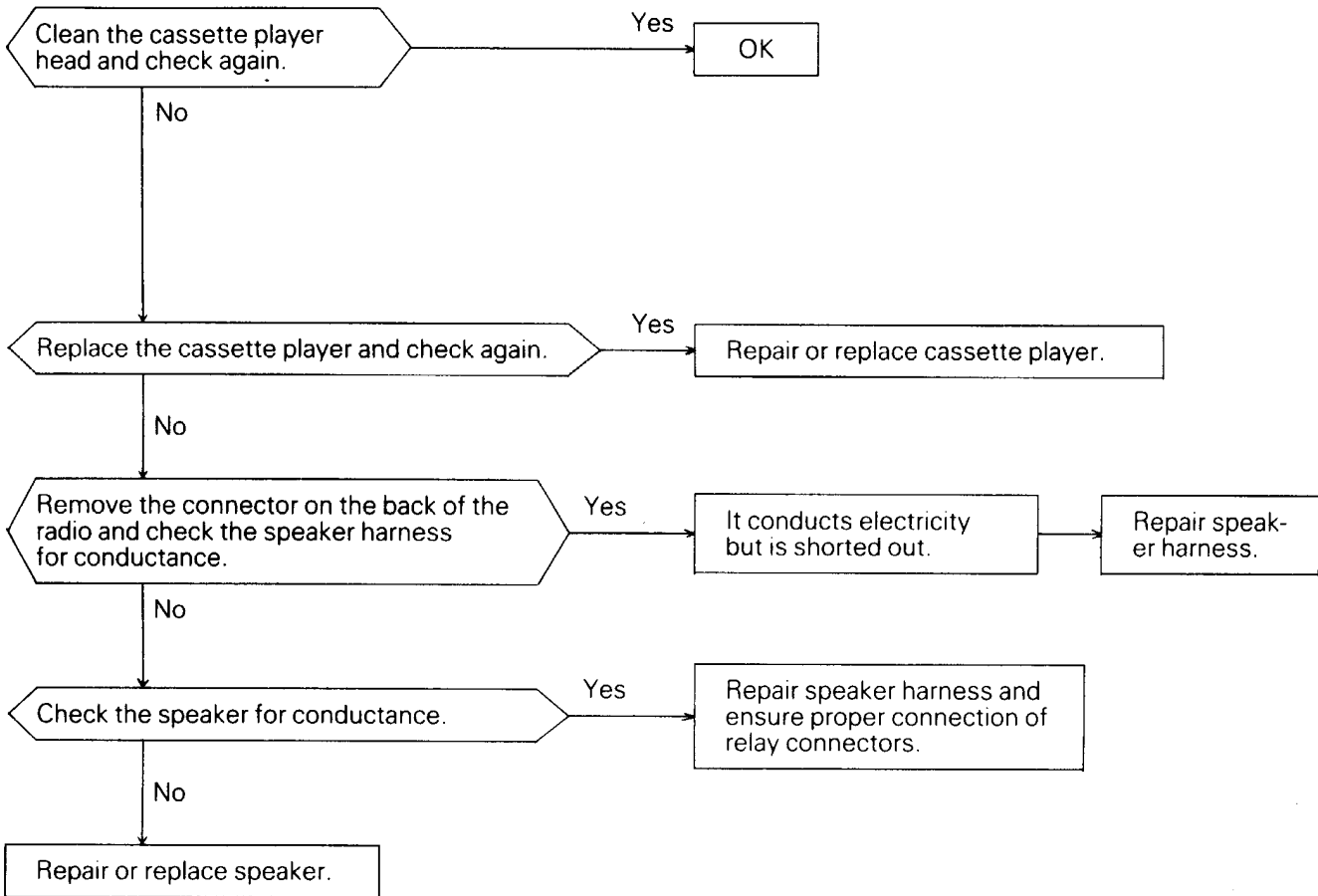
**C-1 Cassette tape will not be inserted.**



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

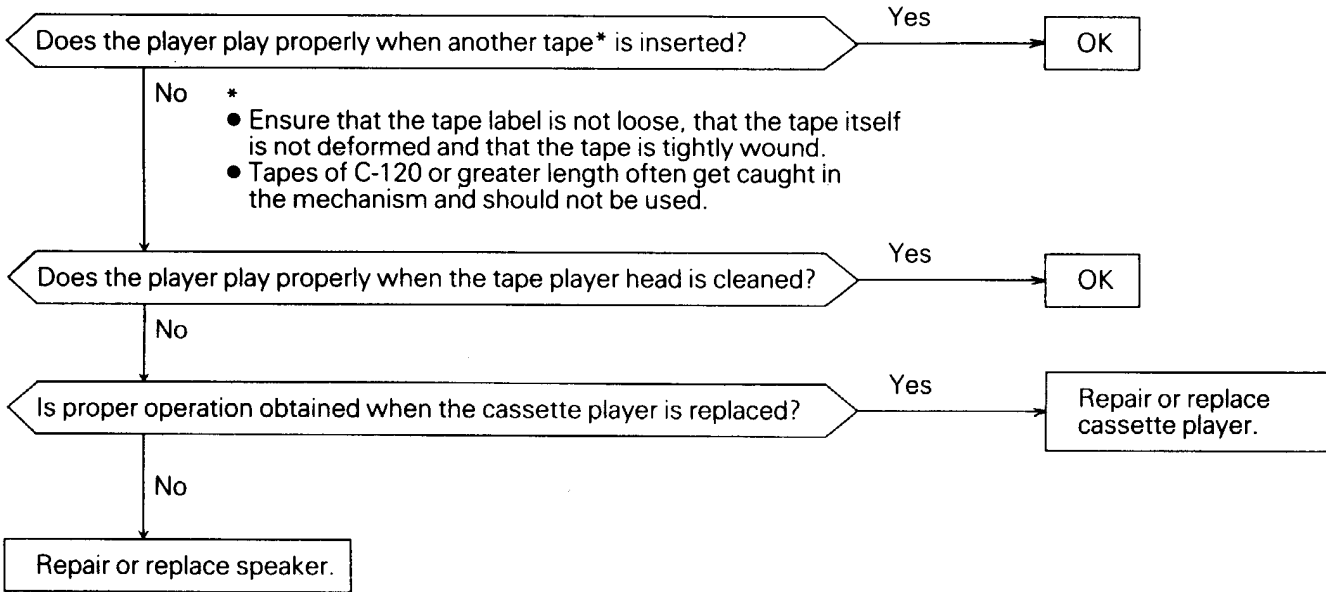


**C-3 No sound from one speaker.**



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

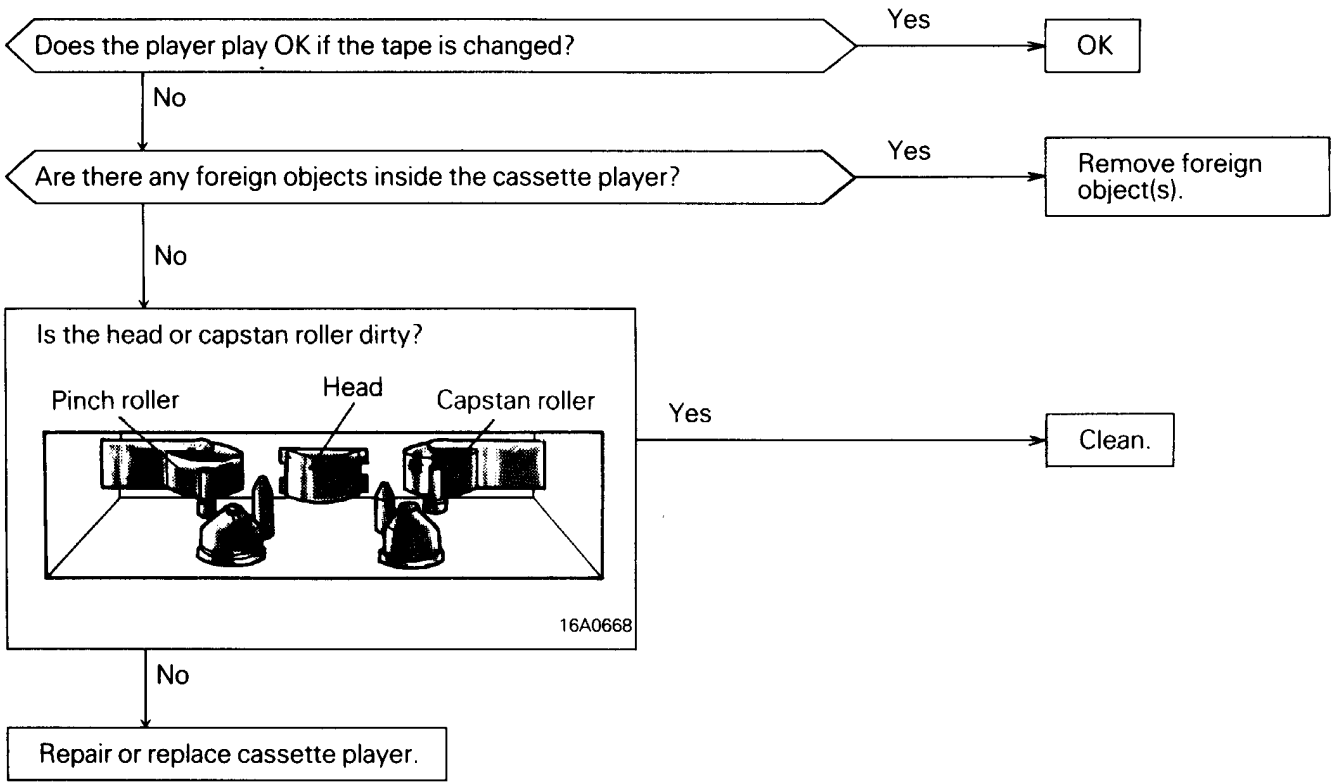
**C-4 Sound quality is poor, or sound is weak.**



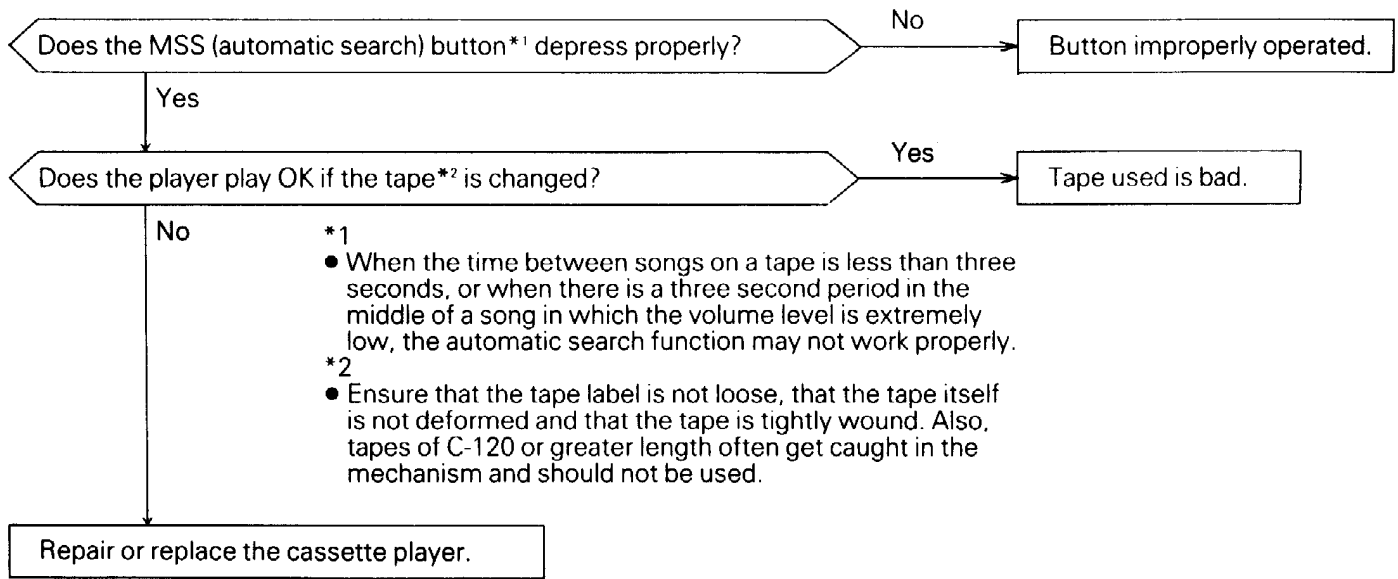
**C-5 Cassette tape will not eject.**

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 cassette player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.

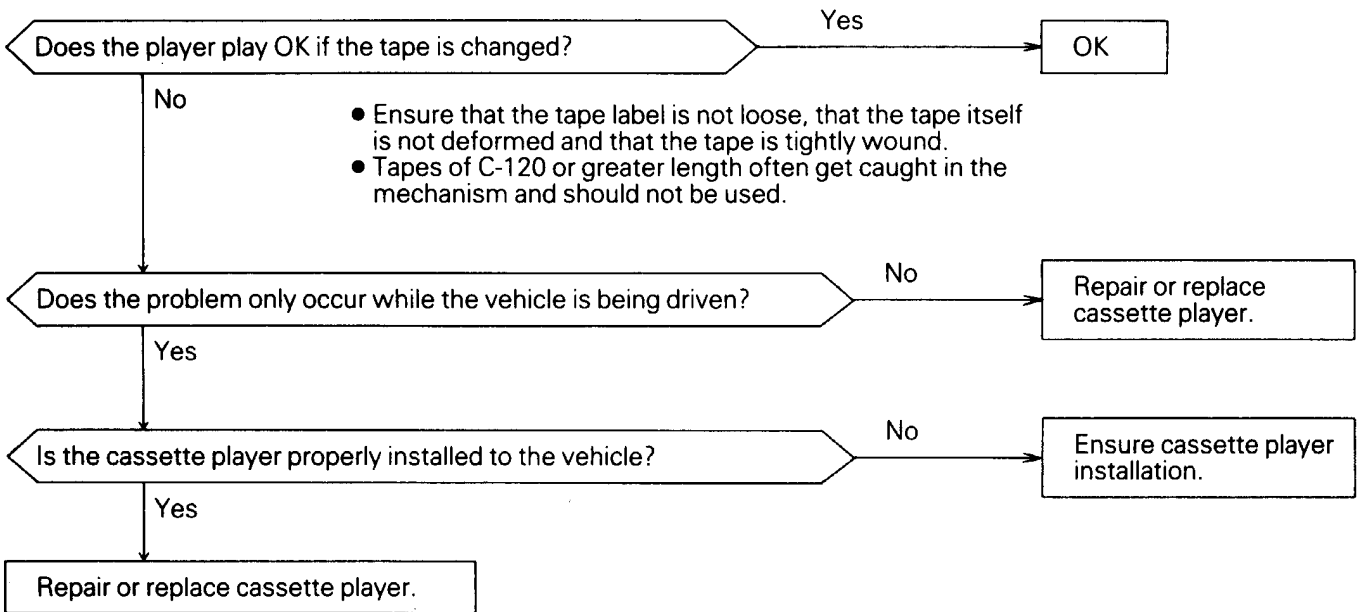
**C-6 Uneven revolution. Tape speed is fast or slow.**



**C-7 Automatic search does not work.**

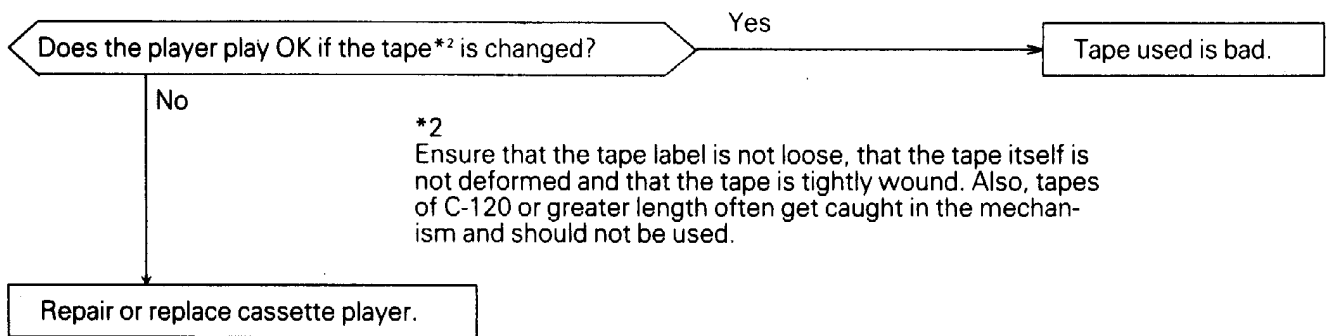


**C-8** **Faulty auto reverse.**



**C-9** **Tape gets caught in mechanism\*1.**

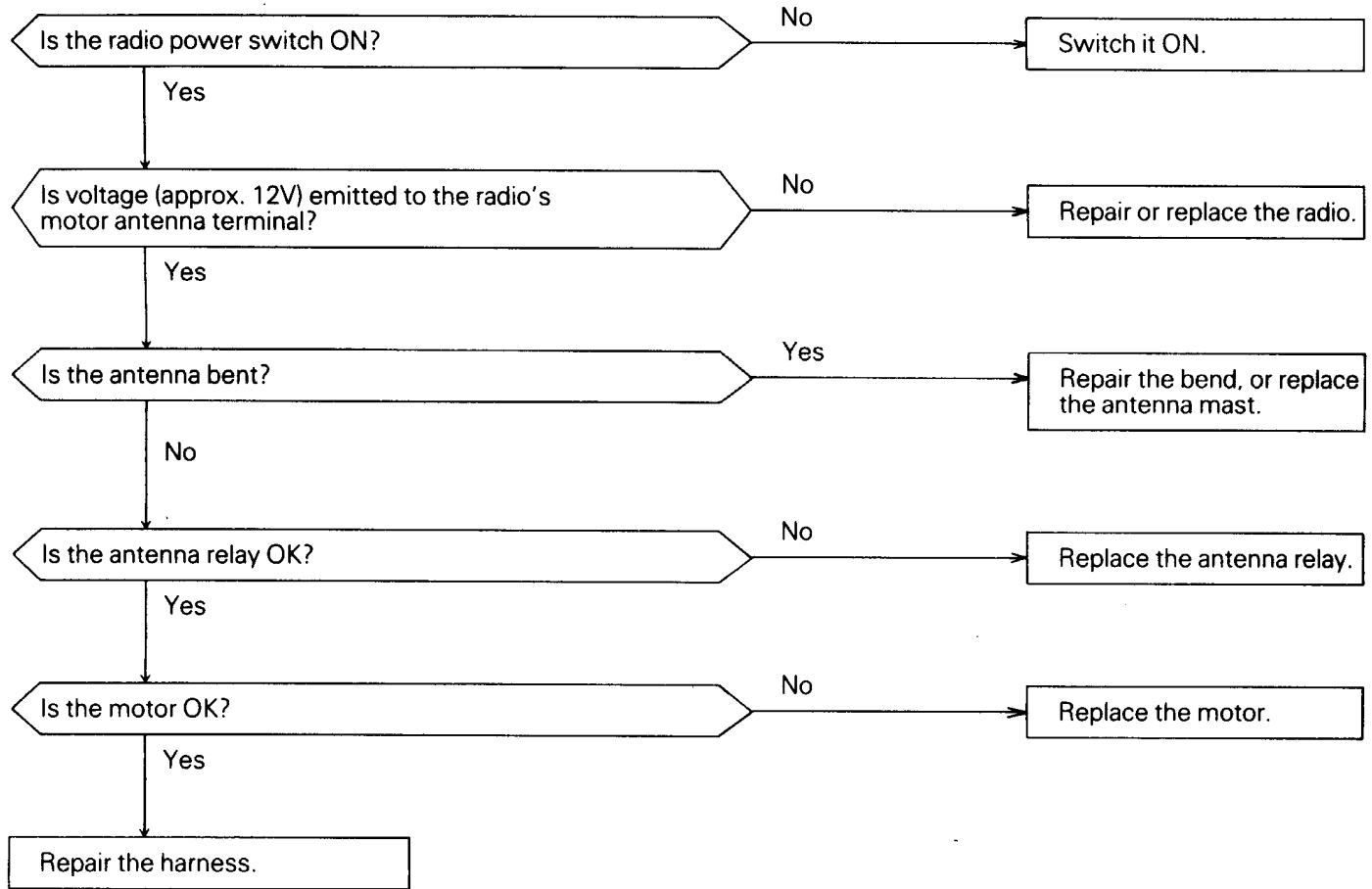
\*1  
When the tape is caught in the mechanism, the case may not eject. When this occurs, do not try to force the tape out as this may damage the tape player mechanism. Take the cassette to a service dealer for repair.



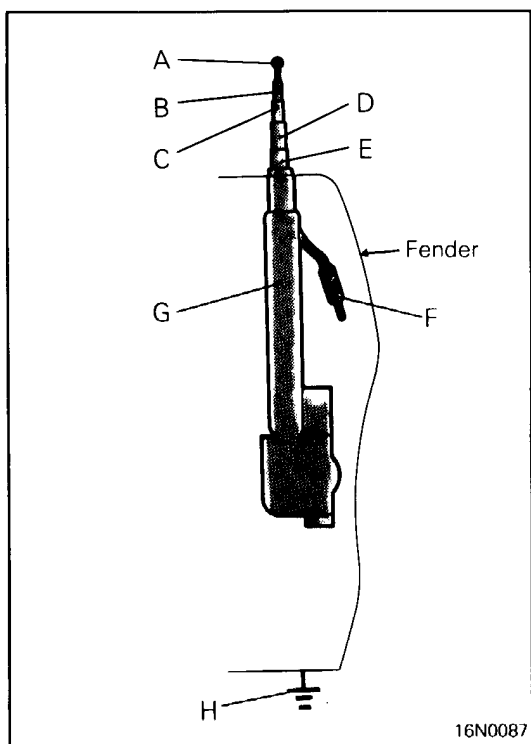
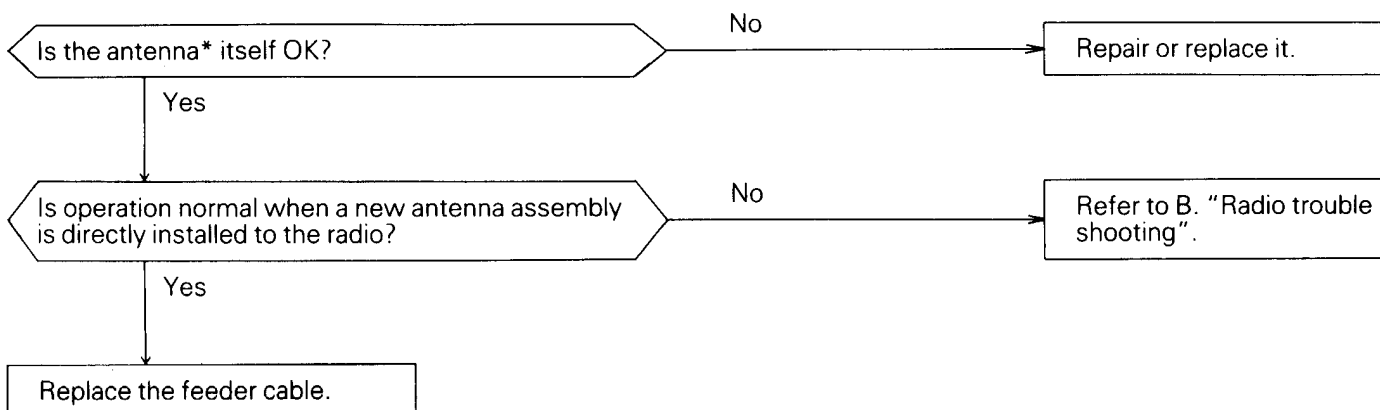
D. MOTOR ANTENNA

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

Clean and polish the surface of the antenna rod.



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



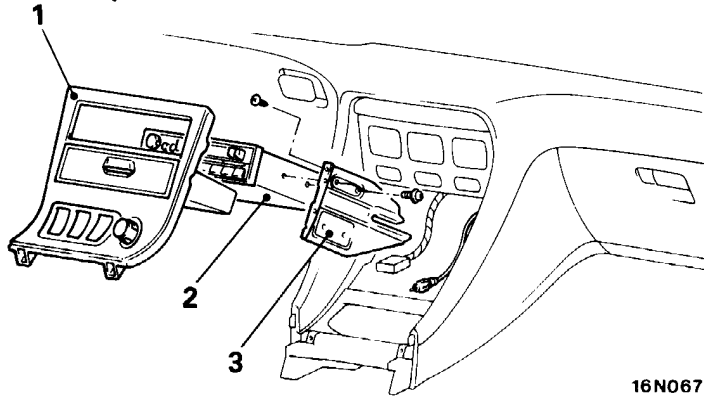
Checking the antenna\*

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



**RADIO AND TAPE PLAYER**

E54LHAK

**REMOVAL AND INSTALLATION**

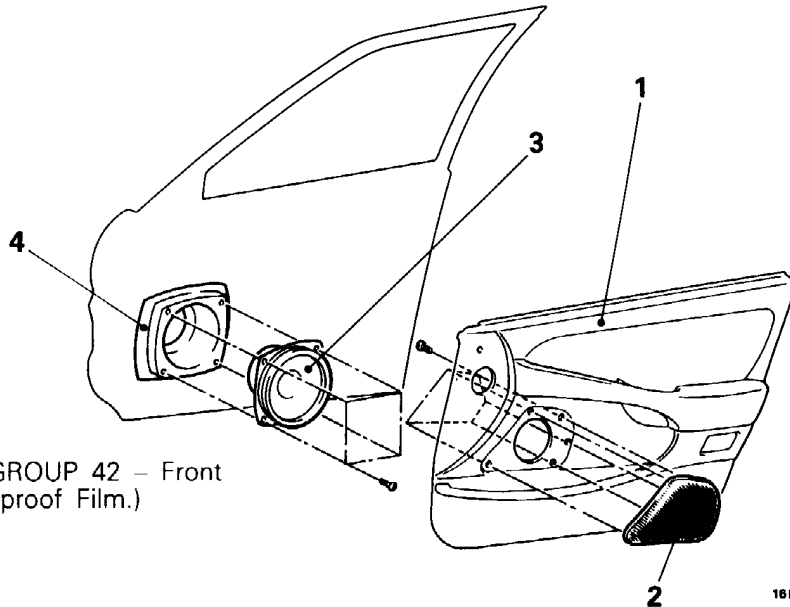
**CAUTION: SRS <L.H. drive vehicles>**  
 When removing and installing the floor console assembly from vehicles equipped with SRS, do not let it bump against the SRS diagnostic unit or other components.

**Removal steps**

- Floor console (Refer to GROUP 52 – Floor Console)
1. Audio panel
  2. Radio and tape player
  3. Audio bracket

**DOOR SPEAKER**

E54LICC

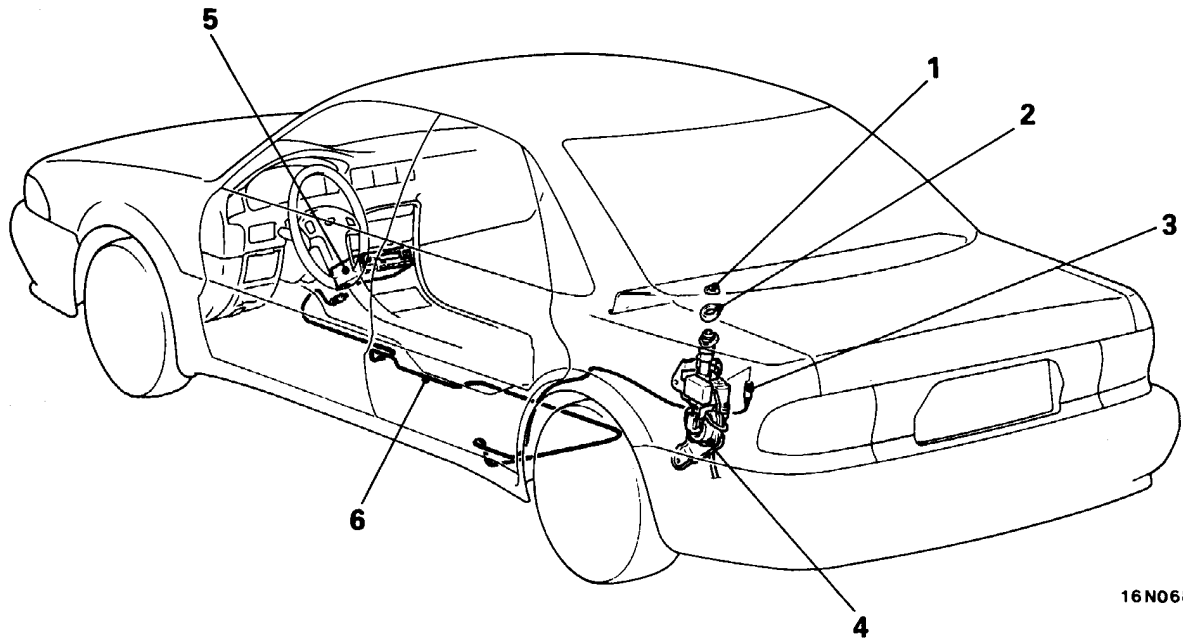
**REMOVAL AND INSTALLATION****Removal steps**

1. Door trim (Refer to GROUP 42 – Front Door Trim and Waterproof Film.)
2. Speaker garnish
3. Speaker
4. Speaker cover

**MOTOR ANTENNA AND ANTENNA FEEDER CABLE**

E54LJBD

**REMOVAL AND INSTALLATION**



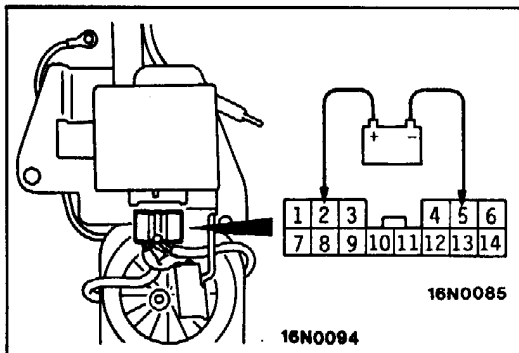
16N0685

**Removal steps of antenna feeder cable**

- Trunk side trim (LH)
  - Rear wheel arch trim (LH)
  - Front scuff plate (LH)
  - Rear scuff plate (LH)
  - Front seat (LH) and rear seat (Refer to GROUP 52 – Seat)
- } [Refer to GROUP 52]  
- Trims.
3. Motor antenna and antenna feeder cable connection
  5. Radio and tape player (P.54-64)
  6. Antenna feeder cable

**Removal steps of motor antenna**

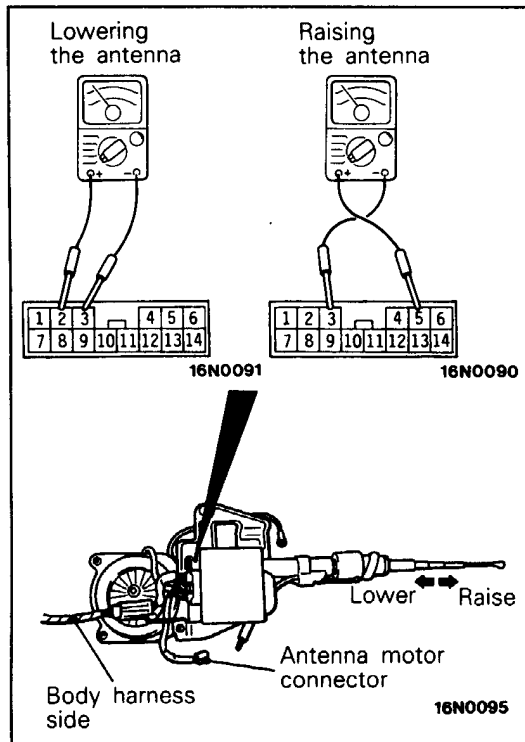
- Trunk side trim (LH) (Refer to GROUP 52 – Trims.)
1. Ring nut
  2. Base
  3. Motor antenna and antenna feeder cable connection
  4. Motor antenna



**INSPECTION**

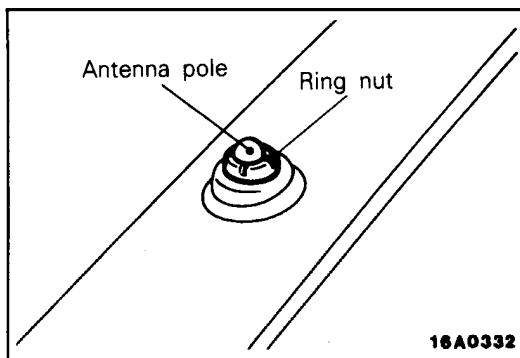
**ANTENNA MOTOR INSPECTION**

Remove the motor antenna control unit connector and check if the antenna goes up when the battery (+) side is connected to terminal②, and the battery (-) side to terminal⑨, and check if it goes down when the connections are reversed.

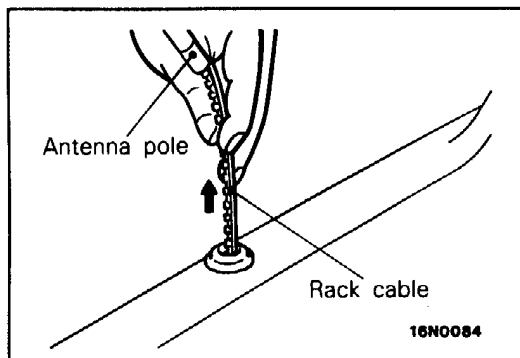
**MOTOR ANTENNA CONTROL UNIT CHECKING**

- (1) Connect the antenna to the harness connector (Body harness).
- (2) Remove the antenna motor connector.
- (3) With the ignition switch turned to ACC or ON, operate the radio switch and check the voltage between the terminals while the antenna is moving up and down.

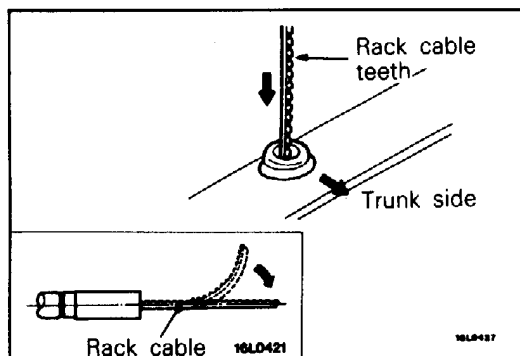
Antenna Operation Direction	Measurement Terminals	Voltage (V)
While moving down	2-3	10-13
While moving up	5-3	10-13

**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.

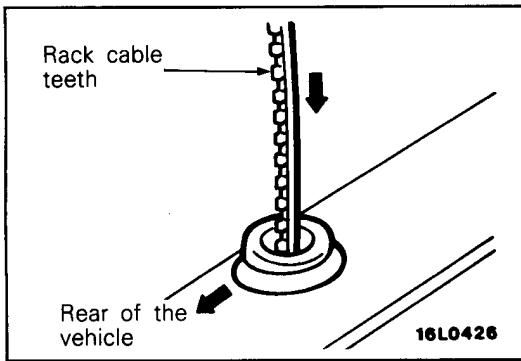


- (3) Draw out the antenna pole to the maximum extension.

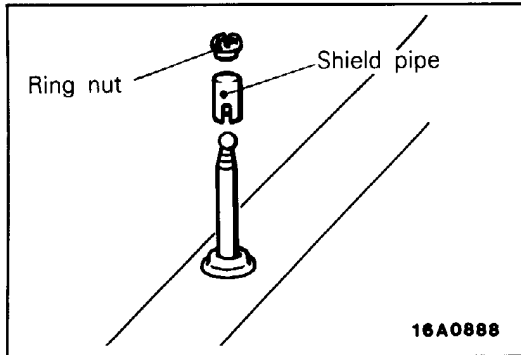
**NOTE**

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 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.

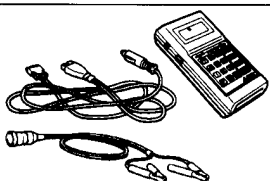

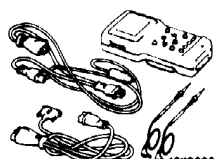
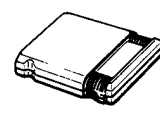


- (8) Attach the shield pipe to the antenna.
- (9) After tightening the ring nut, check the movement of the antenna by turning the radio switch ON and OFF.

# REAR WINDOW DEFOGGER

## SPECIAL TOOLS

E84MF-

Tool	Number	Name	Use
	MB991341	Multi-use tester assembly	Up to 1993 models ETACS input checking
	(For the number, refer to GROUP 00 – Precautions Before Service.)	ROM pack	
	MB991502	MUT-II	All models ETACS input checking
 16X0607		ROM pack (for MUT-II)	

## TROUBLESHOOTING (DEFOGGER TIMER)

### INPUT CHECK

Using the multi-use tester <Up to 1993 models> or MUT-II <All models> check whether or not the input signals from each switch are being input to the electronic control unit.

- (1) Connect the multi-use tester or MUT-II to the diagnosis connector (located at the right or left side of the junction block).

#### Caution

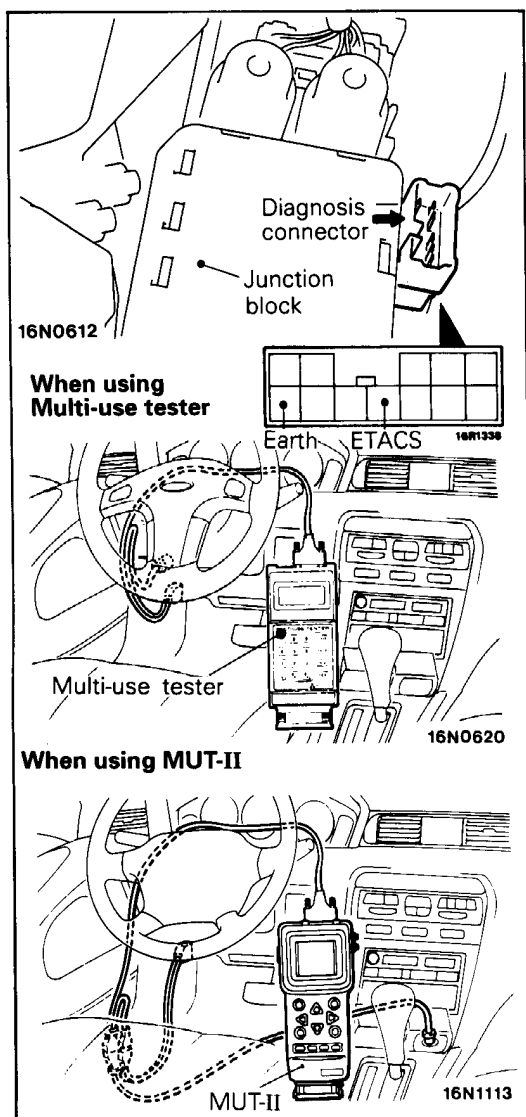
**Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.**

- (2) Check to be sure that the buzzer of the multi-use tester or MUT-II sounds one time, when each switch noted below is operated.

If the buzzer sounds, the input signals are being input to the electronic control unit, so that switch can be considered to be functioning normally.

If there is a malfunction, there is an abnormality in the switch or in the switch input circuit, so they should be inspected.

- Ignition switch
- Defogger switch



**54-68-2**

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**NOTES**

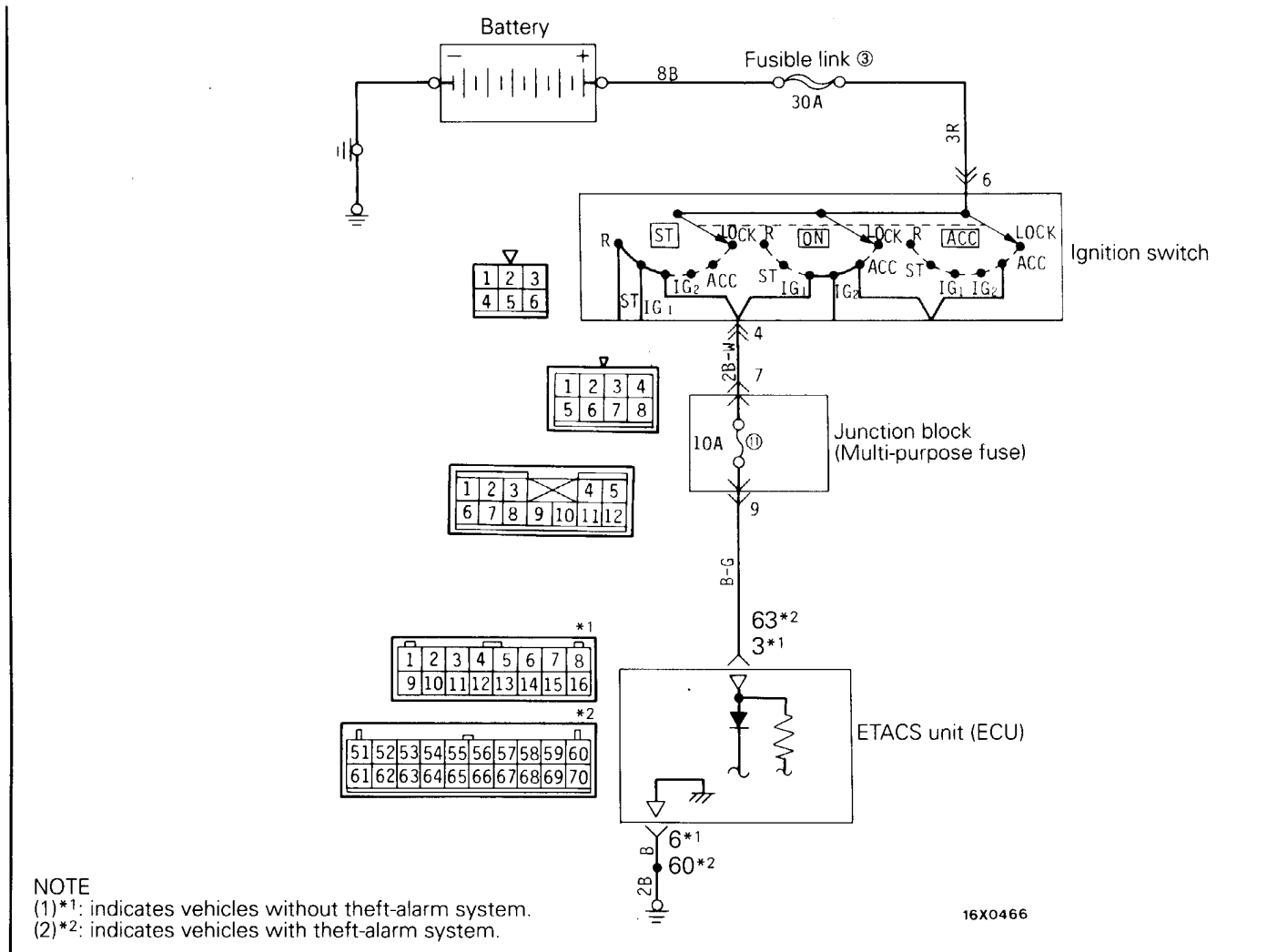
TROUBLESHOOTING QUICK-REFERENCE TABLE

Problem	Probable cause	Check method	Remedy
The rear window defogger does not function when the defogger switch is pressed.	Damaged or disconnected wiring of the and earth circuit ignition switch input circuit and earth circuit	If a malfunction is indicated as a result of checking the input signals, check by following individual part and the circuit check No. 1 procedures (P.54-70).	Repair the wiring harness.
	Damaged or disconnected wiring of the defogger switch input circuit	If a malfunction is indicated as a result of checking the input signals, check by following individual part and the circuit check No. 2 procedures (P.54-71).	Repair the harness or replace the defogger switch.
	Damaged or disconnected wiring of the defogger relay drive circuit	Check by following individual part and circuit check No. 3 procedures (P.54-72).	Repair the harness or replace the defogger relay.
	Malfunction of the electronic control unit	–	Replace the electronic control unit.
While the rear window defogger is operating, even if the defogger switch is pressed once more, the defogger remains operating.	Short-circuit of defogger relay drive circuit	Check by following individual part and circuit check No. 3 procedures (P.54-73).	Repair the harness.
	Malfunction of the electronic control unit	–	Replace the electronic control unit.



CHECKING INDIVIDUAL PART AND CIRCUIT

1. IGNITION SWITCH INPUT CIRCUIT AND EARTH CIRCUITS



**Description of operation**

A condition for operation of this system is the sending of HIGH-level signals to the electronic control unit when the ignition switch is switched to the "ON" position.

**Electronic control unit terminal voltage (Disconnect the connector of the electronic control unit and check the wiring harness side.)**

ECU terminal No.	Signal	Status	Standard
3*1 63*2	Ignition switch (ON)	Ignition switch OFF	0V
		Ignition switch ON	System voltage

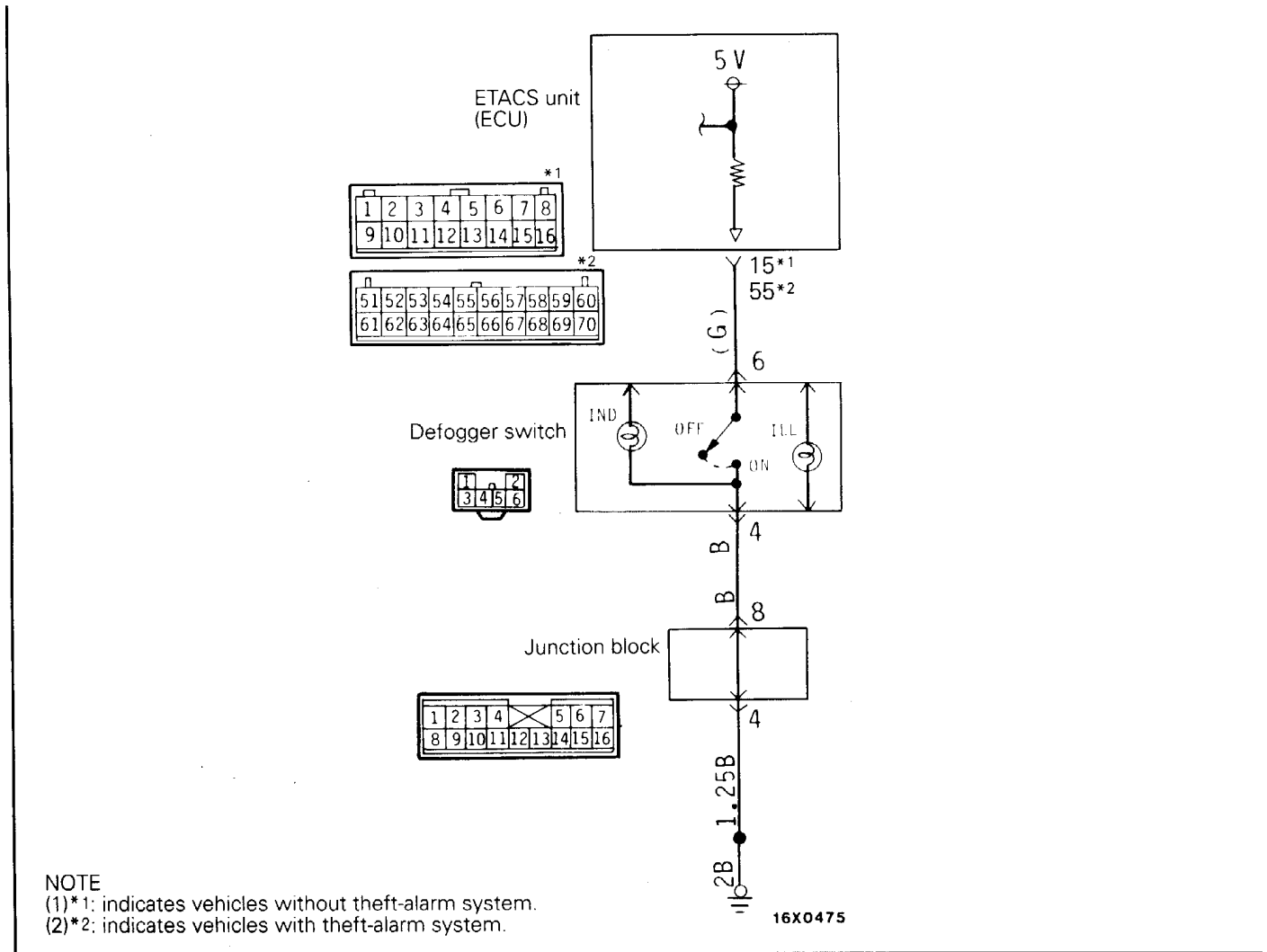
**Checking the ground circuit (Disconnect the connector and check the wiring harness side.)**

Terminal No.	Connected to/measured part	Measurement	Tester connection	Check conditions	Standard
6*1, 60*2	Electronic control unit earth	Continuity	6-earth*1 60-earth*2	At all times	Continuity

**Checking the individual part**

Ignition switch ... Refer to P.54-11.

2. DEFOGGER SWITCH INPUT CIRCUIT



**Description of operation**

When the defogger switch is switched OFF, HIGH-level signals are sent to the electronic control unit;

when the defogger switch is switched ON, LOW-level signals are sent to the electronic control unit.

**Electronic control unit terminal voltage (connection status of the electronic control unit connector)**

ECU terminal No.	Signal	Condition		Terminal voltage
15*1 55*2	Defogger switch signal	Defogger switch	ON	0V
			OFF	5V

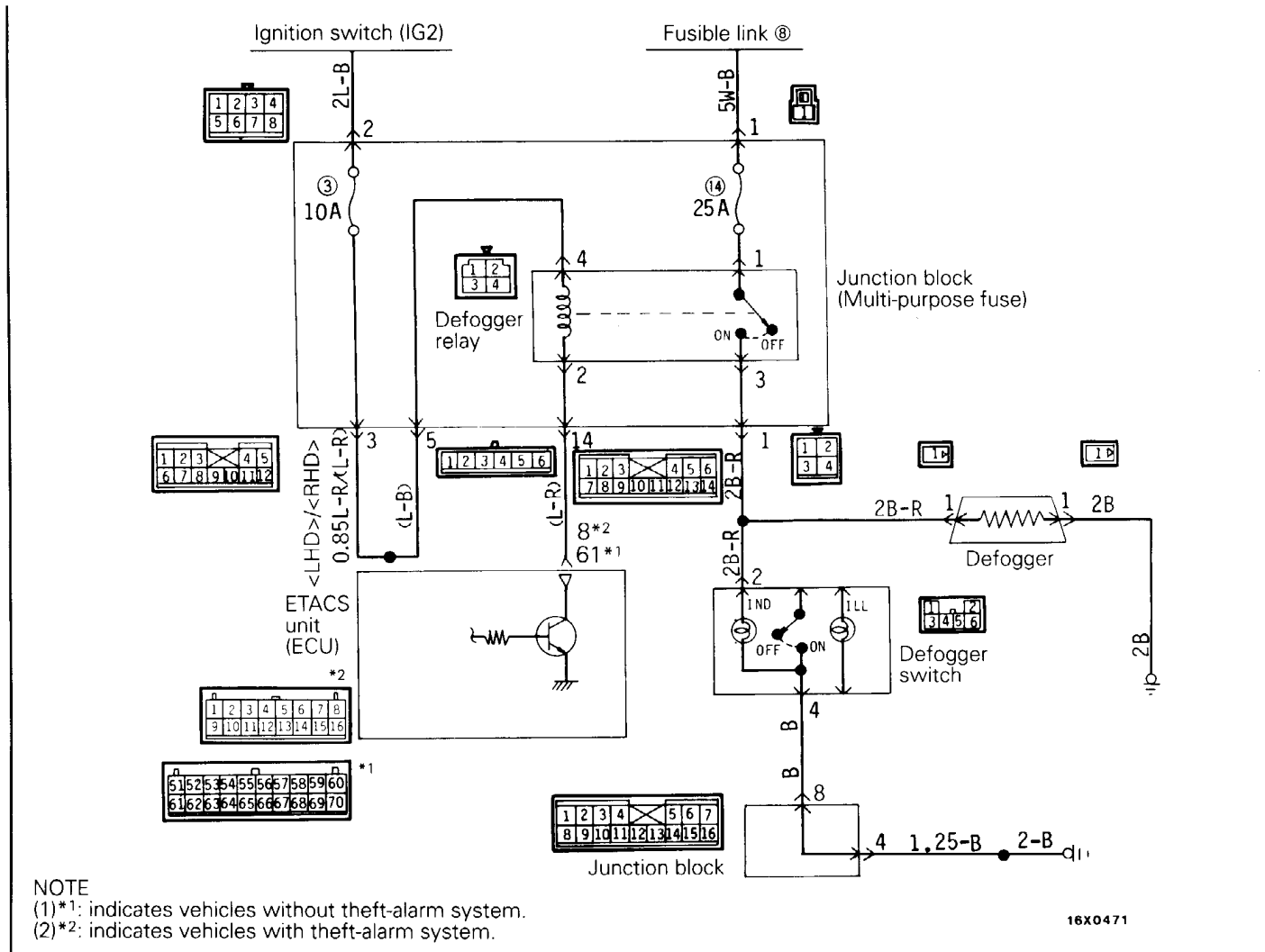
**Checking the defogger switch circuit (Disconnect the connector of the electronic control unit and check the wiring harness side.)**

ECU terminal No.	Connected to/measured component	Measurement	Tester connection	Check conditions	Standard
15*1 55*2	Defogger switch	Continuity	15-earth*1 55-earth*2	OFF	No continuity
				ON	Continuity

**Checking the individual part**

Defogger switch ... Refer to P.54-73.

3. DEFOGGER RELAY DRIVE CIRCUIT



**Description of operation**

When the ignition switch is ON, if the defogger switch is switched to ON, the ECU transistor turns ON and power is supplied to the defogger relay via the fusible link ⑧.

Furthermore, when the defogger relay turns ON, power is supplied to the defogger indicator (IND) lamp and to the defogger.

**NOTE**

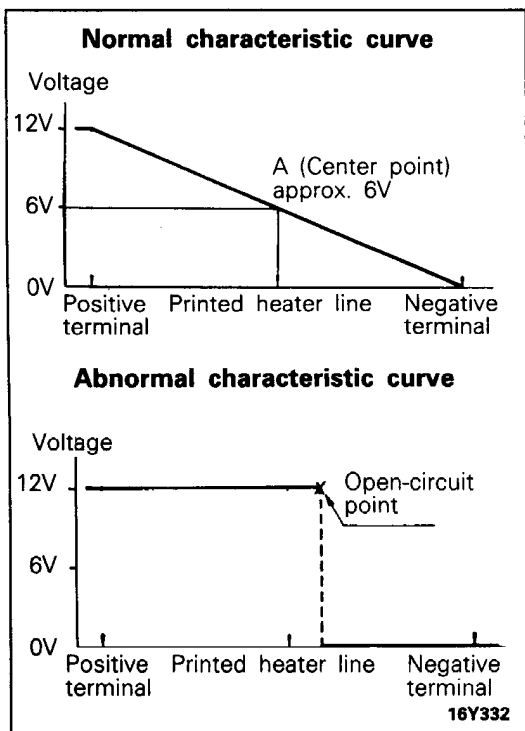
While the defogger is operating, if the defogger switch is pressed once more, the ECU transistor turns OFF, turning the defogger relay OFF and stopping the power supply.

**Electronic control unit terminal voltage (Disconnect the connector of the electronic control unit and check the wiring harness side.)**

ECU terminal No.	Signal	Condition	Terminal voltage
61*1, 8*2	Defogger relay signal	At all times	System voltage

**Checking the individual part**

Defogger relay ... Refer to P.54-73.



## SERVICE ADJUSTMENT PROCEDURES

E54MLAA

### PRINTED-HEATER LINE CHECK

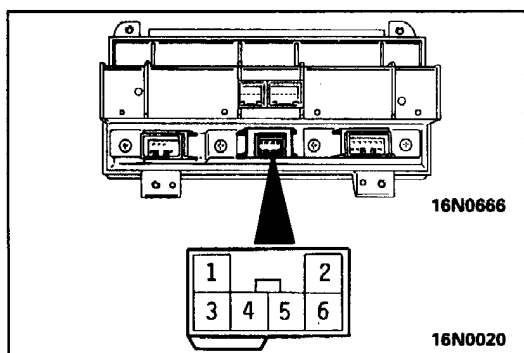
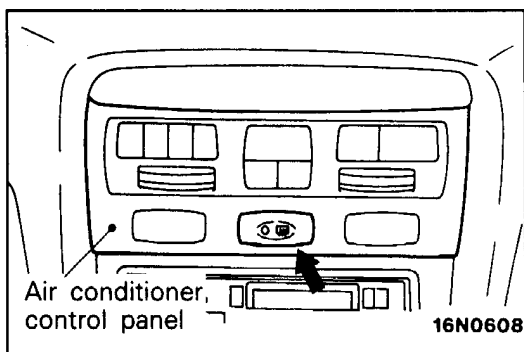
- (1) Run engine at 2,000 r/min. Check heater element with battery at full.
- (2) Turn ON rear window defogger switch. Measure heater element voltage with circuit tester at rear window glass centre A. Condition good if indicating about 6V.
- (3) If 12V is indicated at A, there is a break in the negative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

## REAR WINDOW DEFOGGER SWITCH

E54MHAD

### INSPECTION

- (1) Remove the air conditioner control panel assembly. (Refer to GROUP 55 – Air Conditioner Control Unit.)



- (2) Operate the switch and check for continuity between the terminals.

Terminal No.	4	6	1	5	2
Switch position					
OFF	○	○	IND	○	ILL
ON	○	○	IND	○	○

#### NOTE

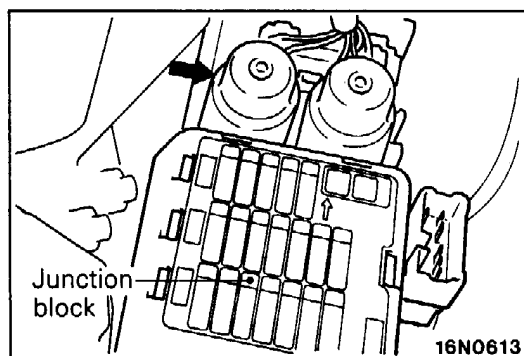
○—○ indicates that there is continuity between the terminals.

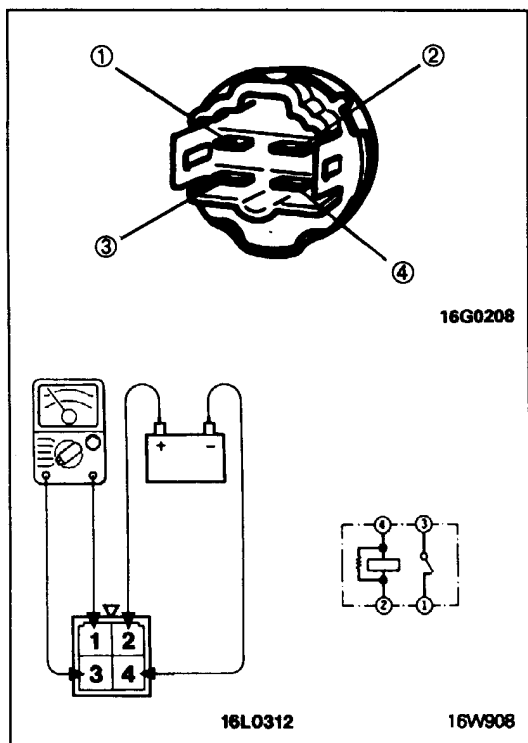
## REAR WINDOW DEFOGGER RELAY

E54MIAE

### INSPECTION

- (1) Remove the rear window defogger relay from the junction block.





(2) Apply battery voltage to terminal ②, and check the continuity between the terminals when terminal ④ is earthed.

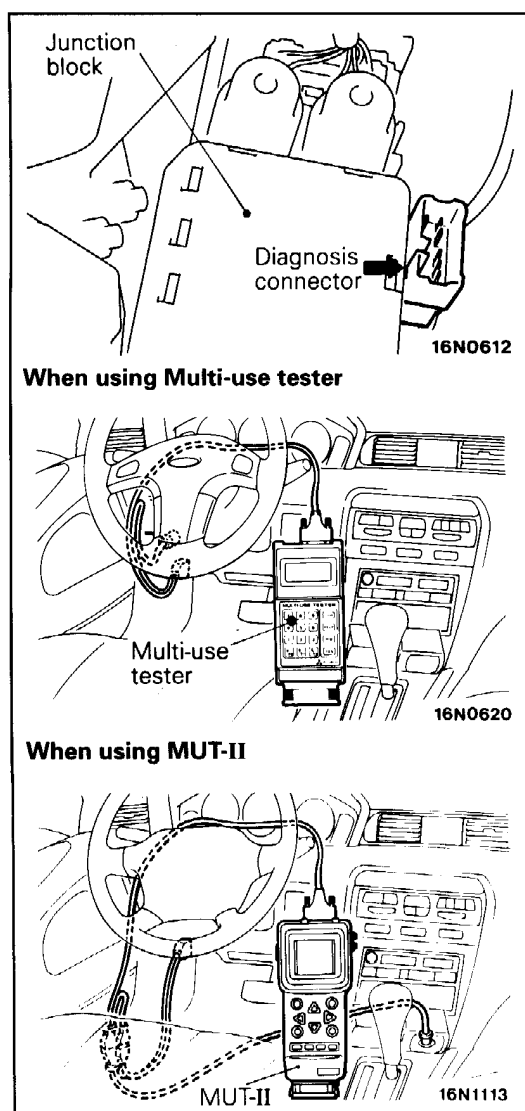
When power is supplied	Between terminals ① and ③	Continuity
When power is not supplied	Between terminals ① and ③	No continuity
	Between terminals ② and ④	Continuity

# SWS (Simplified Wiring System)

## TROUBLESHOOTING

When a malfunction develops in only a single function, the malfunction is probably in the switch, motor or harness, so check the switch input. If the switch is normal, check the motor or harness. If

several malfunctions develop at the same time, the malfunction is probably in the data wires or the power supply, so use the quick reference troubleshooting guide to carry out an inspection.



## INPUT INSPECTION

Using the multi-use tester <Up to 1993 models> or MUT-II <All models>, test to see if each switch in the front door module LH is functioning normally.

- (1) Connect the multi-use tester or MUT-II to the diagnosis connector on the right or left side of the junction block.

### Caution

**Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.**

- (2) Check if the multi-use tester or MUT-II buzzer sounds once when the switches below are operated:
  - Remote control mirror R/L changeover switch
  - Remote control mirror switch
  - FR power window switch
  - FL power window switch
  - RR power window switch
  - RL power window switch
  - Power window lock switch
- (3) If the buzzer sounds, the switch signal is being input into the ETACS control unit, and therefore that switch system and the data wire are normal. If neither happens, there is an abnormality in the switch or in the front door control unit LH inside circuit, so replace the front door control unit LH.

**QUICK REFERENCE TROUBLESHOOTING GUIDE****HOW TO USE THE QUICK REFERENCE TROUBLESHOOTING GUIDE**

- (1) Check for malfunctions by carrying out all of the following operations that are controlled by the SWS:
  - Operation of the remote control mirror.
  - Operation of all of the power windows by the front door control unit LH.
  - Operation of the power window by the front door control unit RH.
  - Operation of the power windows by the rear power window units (RH and LH).
  - Operation of the central door lock by the driver's inside locking knob.
- (2) After examining the malfunction problem that has been checked against the quick reference troubleshooting guide, follow the procedure indicated to rectify the fault. If the malfunction is not in the quick reference troubleshooting guide, inspect the related fuses and connectors.

**NOTES**



## QUICK REFERENCE TROUBLESHOOTING GUIDE

○: Operating normally

×: Not operating at all

△: (for power window only)

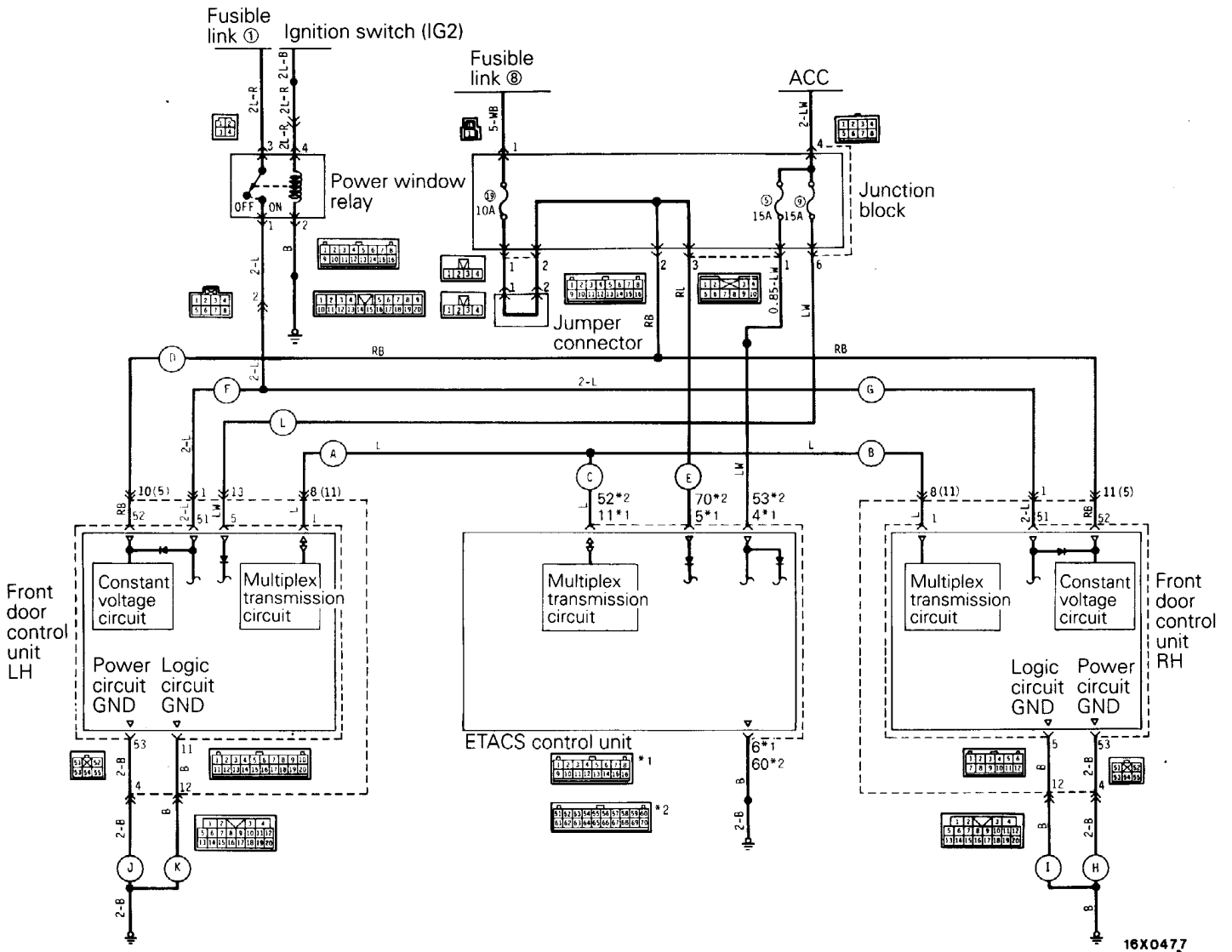
Cannot operate from front door control unit LH, but individual window switches can be operated.

Malfunctioning condition						Probable cause	Suggested remedy (inspect with the ignition switch ON)
Power windows			Remote-controlled mirror		Central door lock		
Front LH	Front RH	Rear seats	LH	RH			
○	△	△	○	×	○*1	Data wire has short-circuit. Data wire ① is broken. Front door control unit LH is defective.	Rectify by following flow chart 1.
○	△	○*2	○	×	○	Data wire ② is broken. Front door control unit RH is defective.	Measure the voltage between the body earth and the harness side connector No. 1 terminal of the front door control unit RH. Battery voltage: Replace the front door control unit RH. 0V: Repair the harness.
○	○	△	○	○	○*1	Data wire ③ is broken. System power cable ④ is broken. ETACS control unit is defective.	Measure the voltage between the body earth and the harness side connector No. 5 and No. 11 terminals of the ETACS control unit. Battery voltage: Replace the ETACS control unit. 0V: Repair the harness.
○	○	○	○	○	×	System power cable ⑤ is broken. Front door control unit LH is defective.	Measure the voltage between the body earth and the harness side connector No. 52 terminal of the front door control unit LH. Battery voltage: Replace the front door control unit LH. 0V: Repair the harness.
×	△	△	○	○	○	Power window power cable ⑥ is broken. Front door control unit LH is defective.	Measure the voltage between the body earth and the harness side connector No. 51 terminal of the front door control unit LH. Battery voltage: Replace the front door control unit LH. 0V: Repair the harness.
○	×	×	○	○	○	Power window power cable ⑦ is broken. Power earth wire ⑧ is broken. Front door control unit RH is defective.	Rectify by following flow chart 3.
○	×	△	○	×	○	Logic circuit earth wire ⑨ is broken. Front door control unit RH is defective.	Inspect the continuity between the body earth and the harness side connector No. 5 terminal of the front door control unit RH. Continuity: Replace front door control unit RH. No continuity: Repair harness.
×	○	○	○	○	×	Power earth wire ⑩ is broken. Front door control unit LH is defective.	Inspect the continuity between the body earth and the harness side connector No. 53 terminal of the front door control unit LH. Continuity: Replace front door control unit LH. No continuity: Repair harness.
×	△	△	×	×	×	Logic circuit earth wire ⑪ is broken. Front door control unit LH is defective.	Inspect the continuity between the body earth and the harness side connector No. 11 terminal of the front door control unit LH.
○	○	○	×	×	○	Multipurpose fuse 9 is blown. ACC power cable ⑫ is broken. Front door control unit LH is defective.	Measure the voltage between the body earth and the harness side connector No. 5 terminal of the front door control unit LH. Battery voltage: Replace the front door control unit LH. 0V: Inspect the fuse, repair the harness.
×	×	×	○	○	○	Sub fusible link 1 is blown. Power window relay is defective. Power window power cable ⑬ is broken. ETACS control unit is defective.	Measure the voltage between the body earth and the harness side connector No. 58 terminal of the ETACS control unit. Battery voltage: Replace the ETACS control unit. 0V: Inspect the fuse, repair the harness. Inspect power window relay itself. (Refer to GROUP 42 – Door Glass and Regulator.)

\*1: The key reminder warning will not function.

\*2: Power window lock will not function.

DIAGRAM OF DATA WIRES AND POWER SYSTEM CONNECTIONS

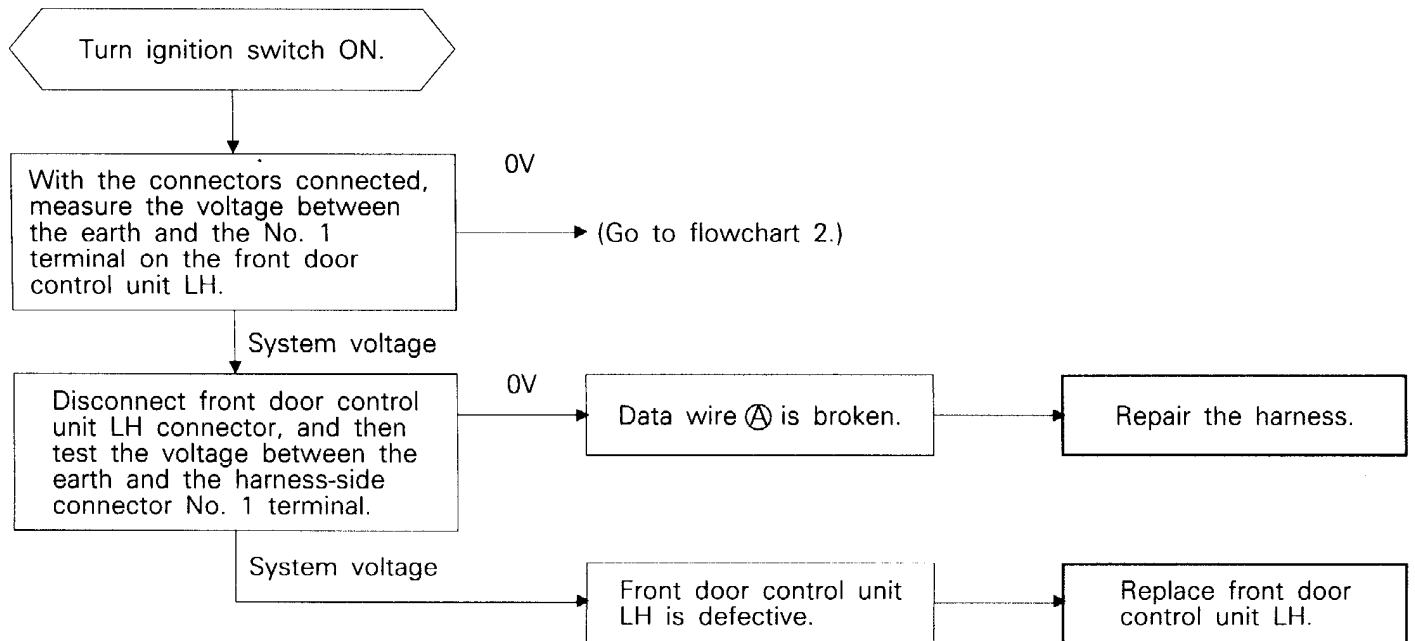


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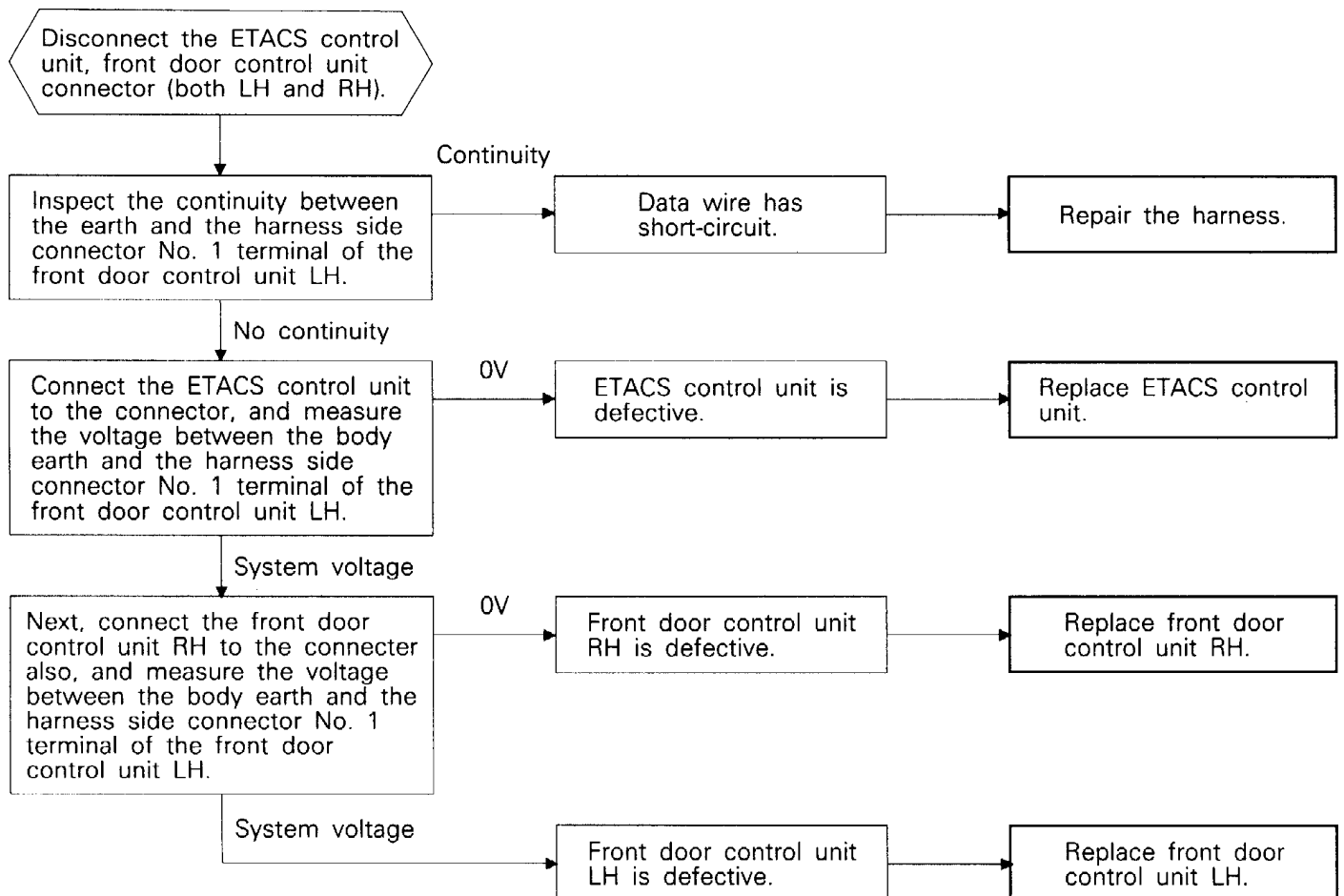
NOTE

- (1) The numbers inside ( ) indicate the terminal numbers of the R.H. drive vehicles.
- (2) \*1: indicates vehicles without theft-alarm system.
- (3) \*2: indicates vehicles with theft-alarm system.

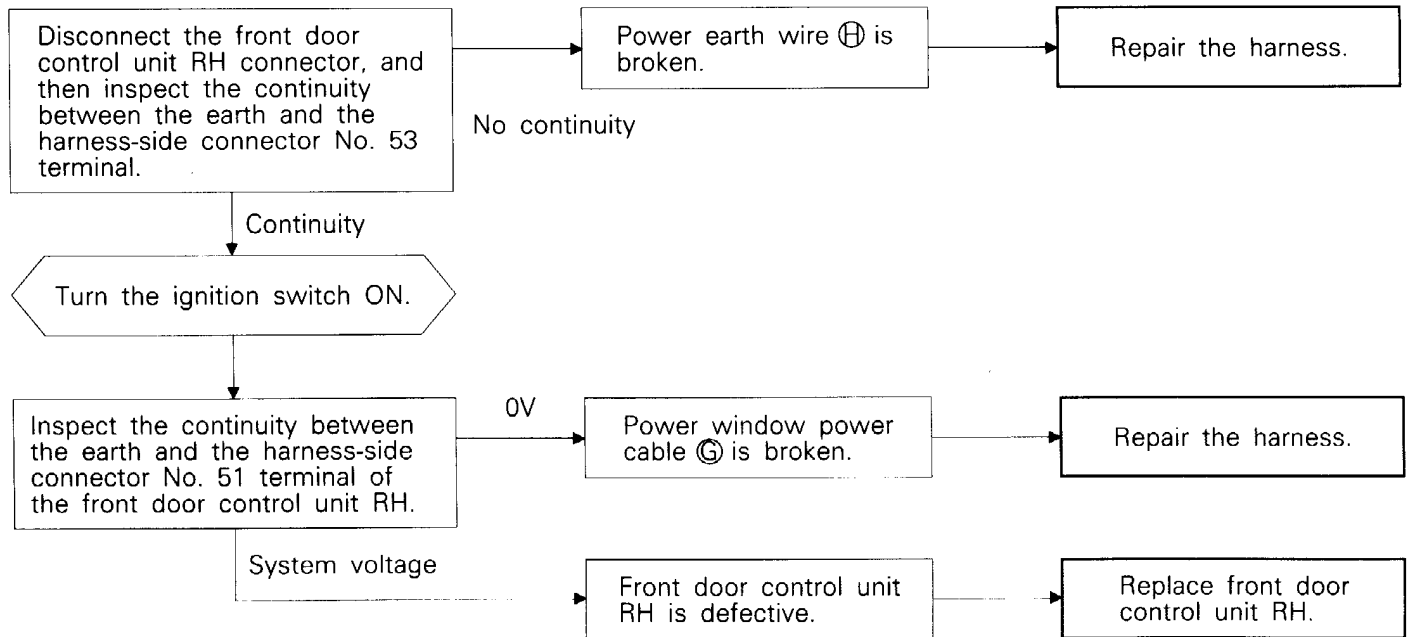
## FLOW CHART 1 (INSPECTION OF BROKEN DATA WIRES)



## FLOW CHART 2 (INSPECTION OF DATA WIRE SHORT-CIRCUITS)



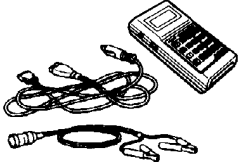

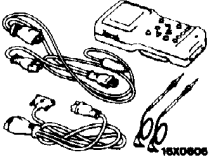

## FLOW CHART 3 (INSPECTION OF FRONT RH POWER WINDOW POWER CIRCUIT)

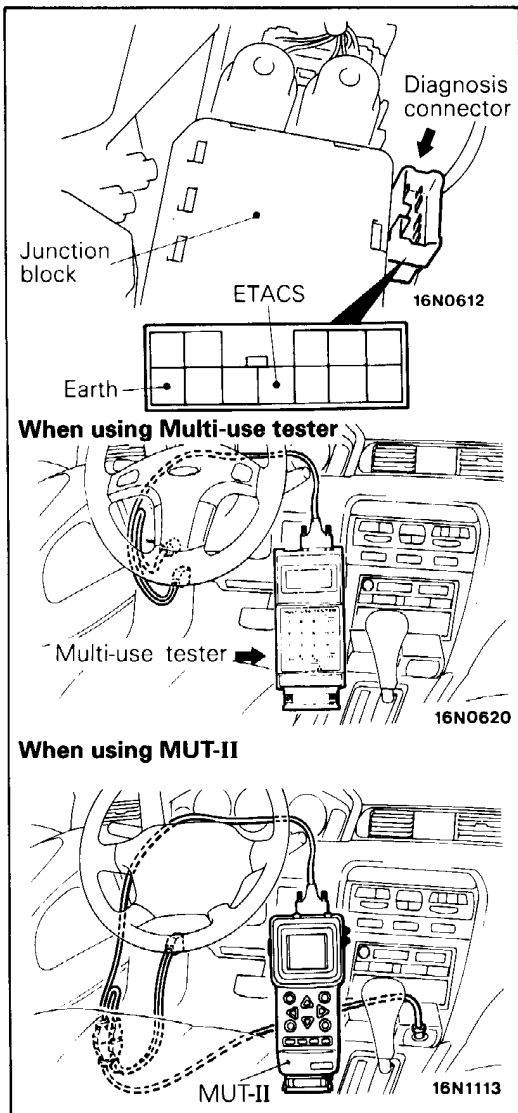


# THEFT-ALARM SYSTEM

## SPECIAL TOOLS

E54QN--

Tool	Number	Name	Use
	MB991341	Multi-use tester assembly	Up to 1993 models ETACS input checking
		ROM pack  (For the number, refer to GROUP 00 – Precautions Before Service.)	
	MB991502	MUT-II	All models ETACS input checking
 16X0607		ROM pack	



## TROUBLESHOOTING

### INPUT CHECK

Using the multi-use tester <Up to 1993 models> or MUT-II <All models>, check whether or not the input signals from each switch are being input to the electronic control unit.

- (1) Connect the multi-use tester or MUT-II to the diagnosis connector (located at the right or left side of the junction block).

#### Caution

**Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.**

- (2) Check to be sure that the buzzer of the multi-use tester or MUT-II sounds one time, when each switch noted below is operated.

If the buzzer sounds, the input signals are being input to the electronic control unit, so that switch can be considered to be functioning normally;

If there is a malfunction, there is an abnormality in the switch or in the switch input circuit, so they should be inspected.

- Driver and front passenger door switches
- Front passenger door lock actuator switches
- Hood switch
- Luggage compartment lamp switch
- Front passenger door key cylinder switch
- Trunk lid lock cylinder switch

**54-80-2**

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**NOTES**

## TROUBLESHOOTING QUICK-REFERENCE TABLE

## 1. ARMING / DISARMING RELATIONSHIP

Trouble symptom	Cause	Check method	Remedy
The system is not armed (The SECURITY lamp doesn't illuminate, and the alarm doesn't function.) (The central door locking system functions normally.)	Damaged or disconnected wiring of ECU power supply circuit	Check by using check chart No. 1.	Replace the fusible link No. ⑧ or the fuse No. ⑨. Repair the harness.
	Damaged or disconnected wiring of door switch input circuit	Check by using check chart No. 4.	Repair the harness or replace the door switch.
The arming procedures are followed, but the SECURITY lamp does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)	Damaged or disconnected wiring of SECURITY lamp activation circuit.	Check by using check chart No. 8.	Replace the fusible link No. ⑧ or the fuse No. ⑨. Repair the harness.
	Blown SECURITY lamp bulb		Replace the bulb.
	Malfunction of the ECU.	—	Replace the ECU.
The alarm sounds in error when, while the system is armed, a door or the trunk lid is unlocked by using the key.	Damaged or disconnected wiring of a door key cylinder and the trunk lid lock cylinder switch input circuit.	If input checks indicate a malfunction, check by using check chart No. 6.	Repair the harness or replace a door key cylinder and the trunk lid lock cylinder switch.
	Malfunction of a door key cylinder and the trunk lid lock cylinder switch.		
	Malfunction of the ECU.	—	Replace the ECU.

## 2. ACTIVATION / DEACTIVATION RELATIONSHIP

Trouble symptom	Cause	Check method	Remedy
There is no alarm when, as an alarm test, a door is opened without using the key. (The arming and disarming are normal, and the alarm is activated when the trunk lid or hood is opened.)	Damaged or disconnected wiring of door switch (all doors) input circuit	If input checks indicate a malfunction, check by using check chart No. 4.	Repair the harness or replace the door switch.
	Malfunction of the door switch		
	Malfunction of the ECU	—	Replace the ECU.
There is no alarm when, as an alarm test, the trunk lid is opened without using the key. (The alarm is activated, however, by opening a door or the hood.)	Damaged or disconnected wiring of luggage compartment lamp switch input circuit	If input checks indicate a malfunction, check by using check chart No. 7.	Repair the harness or replace the luggage compartment lamp switch.
	Malfunction of the luggage compartment lamp switch		
	Malfunction of the ECU.	—	Replace the ECU.

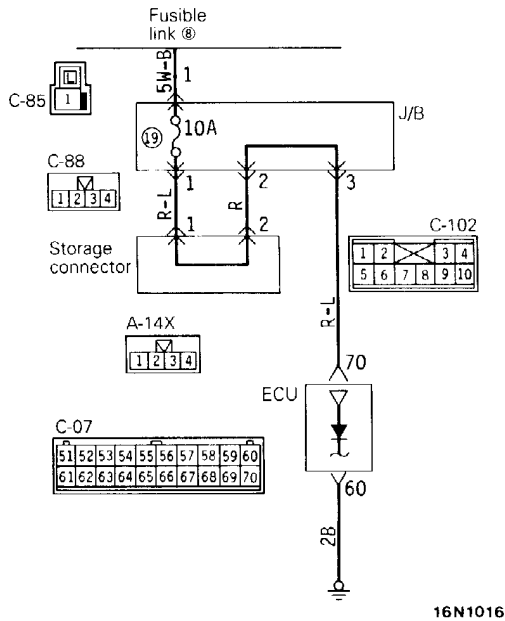


Trouble symptom	Cause	Check method	Remedy
There is no alarm when, as an alarm test the hood is opened from within the vehicle. (The alarm is activated, however, by opening a door or the trunk lid.)	Damaged or disconnected wiring of hood switch input circuit.	If input checks indicate a malfunction, check by using check chart No. 3.	Repair the harness or replace the hood switch.
	Malfunction of the hood switch.		
	Malfunction of the ECU.	–	Replace the ECU.
Engine does not start even when the starter relay switch is ON (normal closed condition).	<ul style="list-style-type: none"> <li>● Malfunction of the starter relay</li> <li>● Damage or disconnected wiring of starter relay activation circuit.</li> </ul>	Check by using check chart No. 15	Repair the harness. Replace the starter relay. Replace the magnet switch.
	Malfunction of the ECU.		Replace the ECU.
The theft-alarm horn does not sound when testing the alarm. The theft-alarm horn does not sound.	Damaged or disconnected wiring of the theft-alarm horn relay power supply circuit or the theft-alarm horn activation circuit.	Check by using check chart No. 9, 10.	Repair the harness. Replace the theft-alarm horn. Replace the theft-alarm horn relay.
	Malfunction of the ECU.		Replace the ECU.
The system is not deactivated when, during an alarm test in which the alarm is intentionally activated, the door or trunk lid is unlocked by using the key. (The system also cannot be disarmed.)	Damaged or disconnected wiring of door key cylinder and trunk lid lock cylinder switch input circuit	If input checks indicate a malfunction, check by using check chart No. 6.	Repair the harness. Replace the key cylinder switch or the trunk lid lock cylinder switch.
	Malfunction of door key cylinder or trunk lid lock cylinder switch.		
	Malfunction of the ECU.		Replace the ECU.

ECU: ETACS Unit

CHECKING THE CIRCUIT AND INDIVIDUAL PART

1. ETACS POWER-SUPPLY AND GROUND CIRCUITS



Description of operation

The battery supplies a stabilized 5V power supply to the ECU, via the constant-voltage circuit and terminal ⑦⑩ (which is directly connected to the battery).

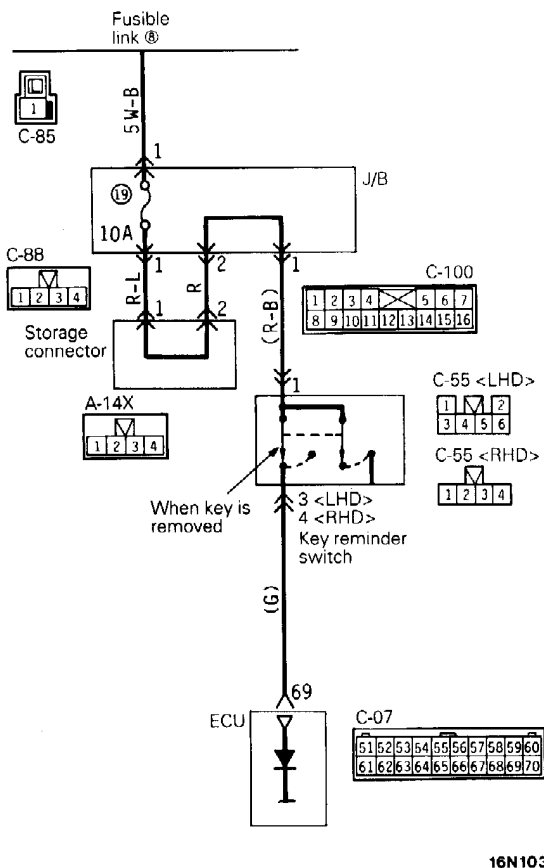
ECU terminal voltage (Connection condition of the ECU connector.)

ECU terminal No.	Signal	Condition	Terminal voltage
70	ECU power supply	At all times	System voltage

Checking the earth circuit (Disconnect the connector and check at the wiring harness side.)

ECU Terminal No.	Connected to/ measured component	Measurement	Tester connection	Check condition	Standard
60	ECU earth	Resistance	60 -earth	At all times	Continuity

2. KEY-REMINDER SWITCH INPUT CIRCUIT



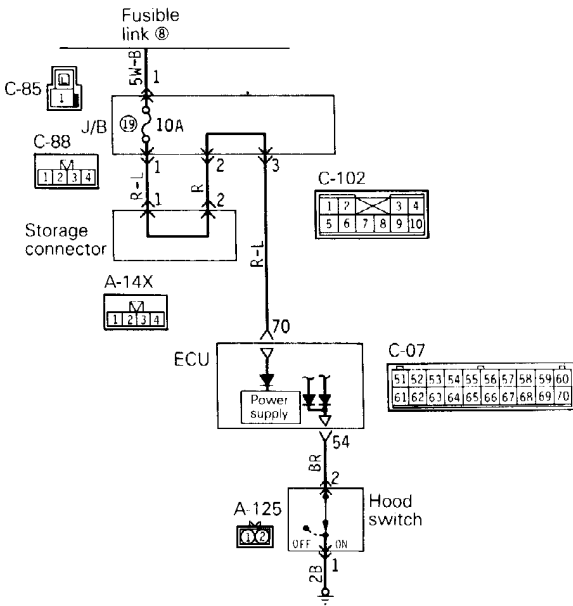
Description of operation

The key-reminder switch is switched OFF and HIGH-level signals are sent to the ECU when the key is inserted into the ignition key cylinder: when the key is removed, the key-reminder switch is switched ON and LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU connector).

ECU terminal No.	Signal	Condition	Terminal voltage
69	Key-reminder switch	Key removed	System voltage
		Key inserted	0V

3. HOOD SWITCH INPUT CIRCUIT



Description of operation

When the hood is closed (the hood switch is switched OFF), HIGH-level signals are sent to the ECU:  
 When the hood is opened (the hood switch is switched ON), LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU connector).

ECU terminal No.	Signal	Condition		Terminal voltage
54	Hood switch	Hood	Open	0V
			Closed	5V*

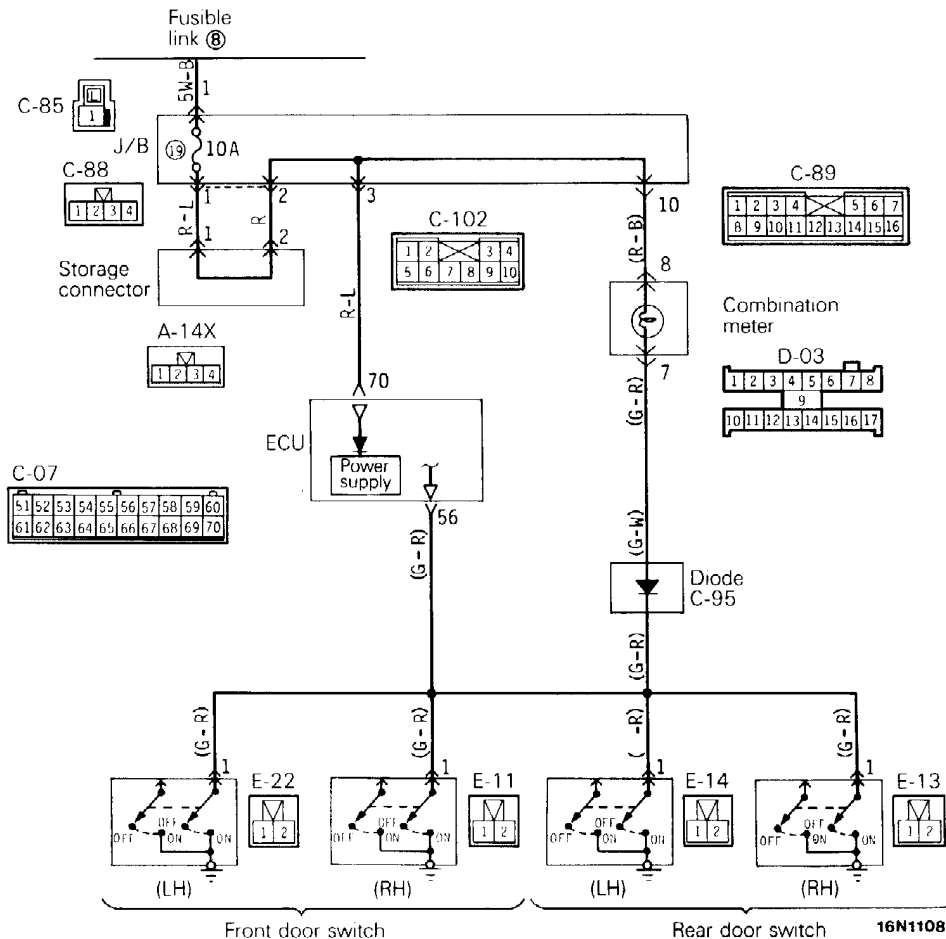
\* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.

Checking the hood switch circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
54	Hood switch	Resistance	54 - earth	Hood	Closed	No continuity
					Open	Continuity

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4. DOOR SWITCH INPUT CIRCUIT



Front door switch

Rear door switch

16N1108

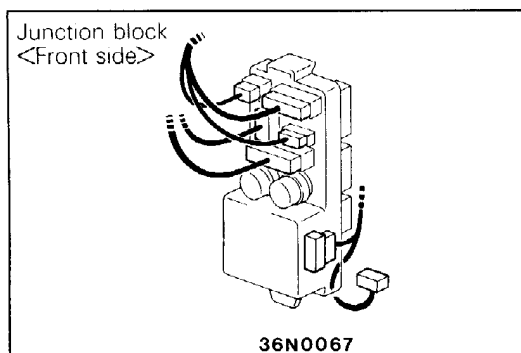
**Description of operation**

When the door is closed (the door switch is switched OFF), HIGH-level signals are sent to the ECU:

When the door is opened (the door switch is switched ON), LOW-level signals are sent to the ECU.

ECU terminal voltage (Connection condition of the ECU).

ECU terminal No.	Signal	Condition		Terminal voltage
		Door		
56	Door switch	Door	Open	0V
			Closed	System voltage*



- \* 1. Both the ECU and the door-ajar warning lamp of the combination meter are connected to the door switch. Because of this, the power supply voltage of the door-ajar warning lamp is detected as the ECU terminal voltage.
2. When the junction block (which is located at the left, under of the instrument panel) connector, indicated in the figure is disconnected, ECU terminal voltage, 5V (pulse), is detected. As measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.

Checking the door switch circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

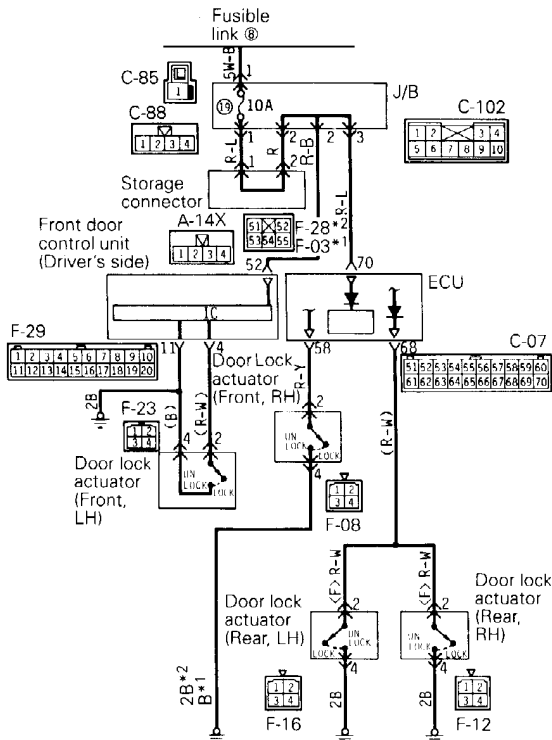
ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
				Door		
56	Door switch	Resistance	56 - earth	Door	Closed	No continuity
					Open	Continuity

5. DOOR LOCK ACTUATOR SWITCH INPUT CIRCUIT

Description of operation

When a door is locked by the lock knob or the key, the door lock actuator switch is switched OFF, and HIGH-level signals are sent to the ECU. These signals activate the timer circuit of the ECU, there by causing the activation circuit to function, thus activating the door lock actuator of all doors.

ECU terminal voltage (Connection condition of the ECU connector).



Remarks  
(1)\*1: RHD  
(2)\*2: LHD

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ECU terminal No.	Signal	Condition		Terminal voltage
58	Front door lock actuator switch (RHD)	Door lock actuator switch	Lock: OFF	5V*
68	Rear door lock actuator switch (LH or RH)		Unlock: ON	0V

Front door control unit (Driver's side) terminal voltage (Connection condition of the front door control unit connector)

Front door control unit terminal No.	Signal	Condition		Terminal voltage
4	Front door lock actuator switch (LH)	Door lock actuator switch	Lock: OFF	5V*
			Unlock: ON	0V

\* Measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.

Checking the door lock switch circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
58	Front door lock actuator switch (RH)	Resistance	58 - earth	Door lock actuator switch	Lock: OFF	No continuity
68	Rear door lock actuator switch (LH or RH)	Resistance	68 - earth		Unlock: ON	Continuity

Disconnect the connector of the front door control unit (Driver's side)

Front door control unit terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
4	Front door Lock actuator switch (LH)	Resistance	4 - earth	Door lock actuator switch	Lock: OFF	No continuity
					Unlock: ON	Continuity

6. DOOR KEY CYLINDER AND TRUNK LID LOCK CYLINDER SWITCH INPUT CIRCUIT

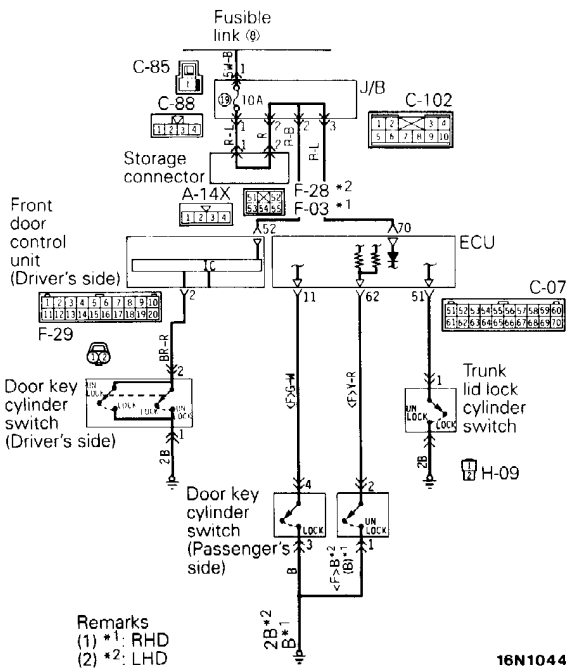
Description of operation

When the door key is rotated or the trunk lid key is unlocked, LOW-level signals are sent to the ECU. ECU terminal voltage (Connection condition of the ECU connector).

ECU terminal No.	Signal	Condition		Terminal voltage
62	Front door key cylinder switch (Passenger's side)	Door key cylinder	Neutral	5V
			Unlock	0V
11	Front door key cylinder switch (Passenger's side)	Door key cylinder	Neutral	5V
			Lock	0V
51	Trunk lid lock cylinder switch	Trunk lid	Lock	5V
			Unlock	0V

Front door control unit (Driver's side) terminal voltage (Connection condition of the front door control unit connector)

Front door control unit terminal No.	Signal	Condition		Terminal voltage
2	Front door cylinder switch (driver's side)	Door key cylinder	Not rotate	5V
			Rotate	0V



Checking the door key cylinder and trunk lid lock cylinder switch circuit

(Disconnect the connector of the ECU and check at the wiring harness side.)

ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
62	Door key cylinder switch (passenger's side)	Resistance	62 - earth	Door key cylinder (Passenger's side)	Neutral	No continuity
					Unlock	Continuity
11	Door key cylinder switch (passenger's side)	Resistance	11 - earth	Door key cylinder (Passenger's side)	Neutral	No continuity
					Lock	Continuity
51	Trunk lid lock cylinder switch	Resistance	51 - earth	Trunk lid	Lock	No continuity
					Unlock	Continuity

Disconnect the connector of the front door control unit (Driver's side)

Front door control unit terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
2	Door key cylinder switch (Driver's side)	Resistance	2 - earth	Door key cylinder (Driver's side)	Not rotate	No continuity
					Rotate	Continuity

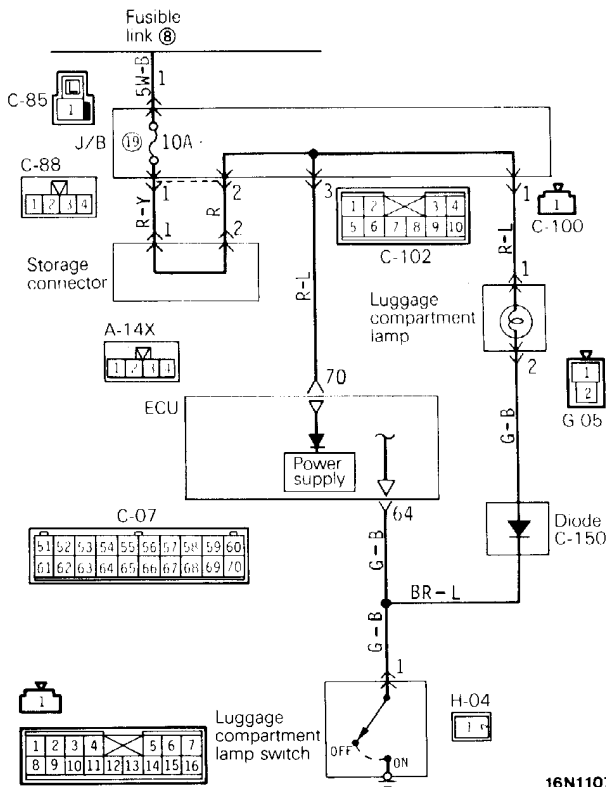
7. LUGGAGE COMPARTMENT LAMP SWITCH INPUT CIRCUIT

Description of operation

When the trunk lid is closed (the luggage compartment lamp switch is switched OFF), HIGH-level signals are sent to the ECU. When the trunk lid is opened (the luggage compartment lamp switch is switched ON), LOW-level signals are sent to the ECU. ECU terminal voltage (Connection condition of the ECU connector).

ECU terminal No.	Signal	Condition		Terminal voltage
		Trunk lid		
64	Luggage compartment lamp switch	Neutral		0V
		Closed		System voltage*

- \* 1. Both the ECU and the luggage compartment lamp are connected to the luggage compartment lamp switch. Because of this, the power supply voltage of the luggage compartment lamp is detected as the ECU terminal voltage.
- 2. When the connection of the luggage compartment lamp is disconnected, the ECU terminal voltage, 5V (pulse), is detected. As measurement is not possible by using a voltmeter, but is possible by using an oscilloscope.

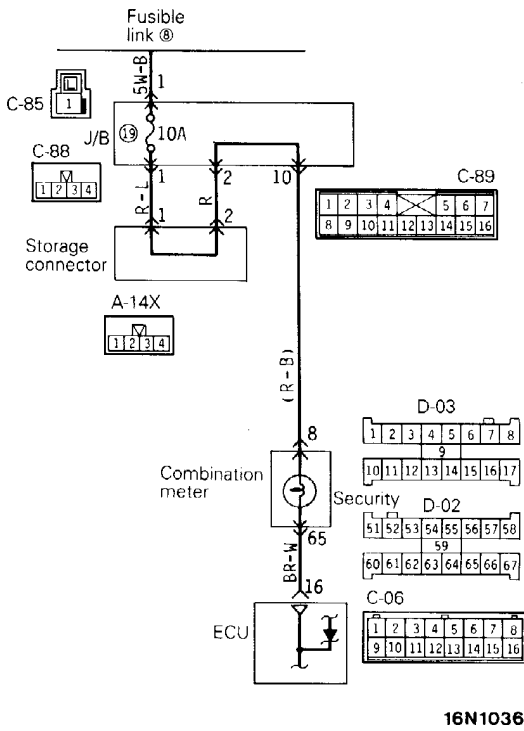


16N1107 Checking the liftgate switch circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

ECU terminal No.	Connected to/measured part	Measurement	Tester connection	Check condition		Standard
				Trunk lid		
64	Luggage compartment lamp switch	Resistance	64 - earth	Closed		No continuity
				Open		Continuity



8. SECURITY LIGHT ACTIVATION CIRCUIT



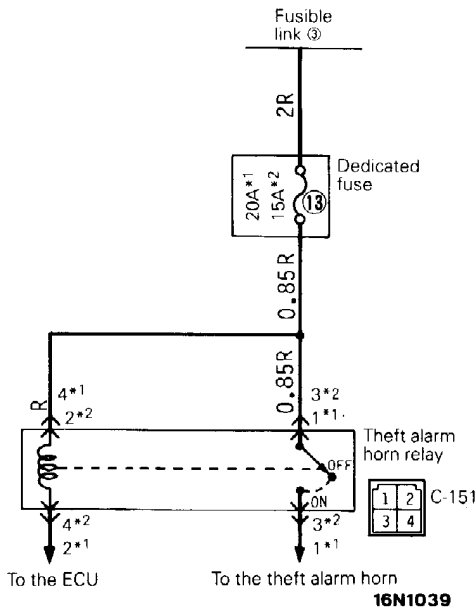
Description of operation

If all doors are in locked state after key locking or key-less locking, the ECU transistor is turned on and the security lamp comes on.

Checking the security lamp activation circuit (Disconnect the connector of the ECU and check at the wiring harness side.)

Step	Check object	Judgement		Cause	Remedy
		Normal	Mal-function		
1	D-03 connector terminal voltage 8	System voltage	0V	Fuse (10) damaged or disconnected Harness damaged or disconnected, or short-circuit	Replace the fuse Repair the harness
2	D-02 connector terminal voltage 65	System voltage	0V	Damaged or disconnected wiring of SECURITY lamp bulb Harness damaged or disconnected	Replace the bulb Repair the harness
3	ECU terminal voltage 16	System voltage	0V	Harness damaged or disconnected, or short-circuit	Repair the harness

9. THEFT ALARM HORN RELAY POWER-SUPPLY CIRCUIT



Description of operation

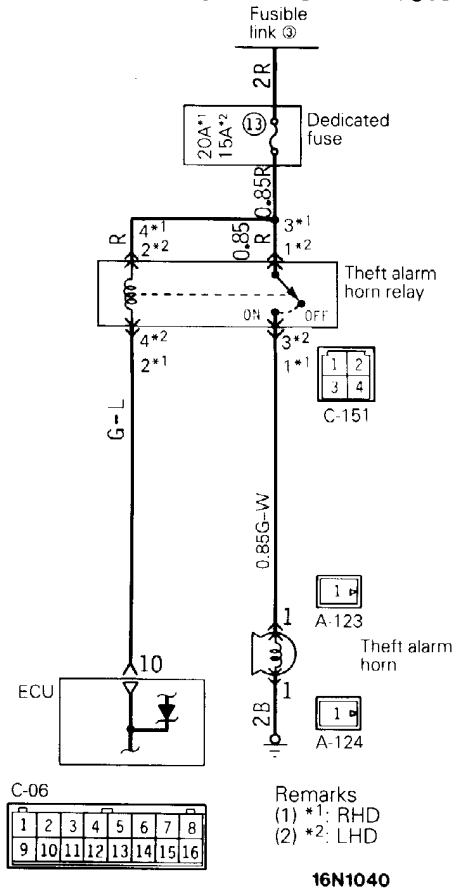
Power voltage is always supplied to the horn relay.

Checking the horn relay power-supply circuit (Disconnect the theft alarm horn relay)

Check object	Judgement		Cause	Remedy
	Normal	Mal-function		
HORN RELAY connector terminal voltage 1*1, 3*2	System voltage	0V	Fuse damaged or disconnected Damaged or disconnected harness	Replace the fuse Repair the harness

Remarks  
(1) \*1: RHD  
(2) \*2: LHD

10. THEFT ALARM HORN ACTIVATION CIRCUIT



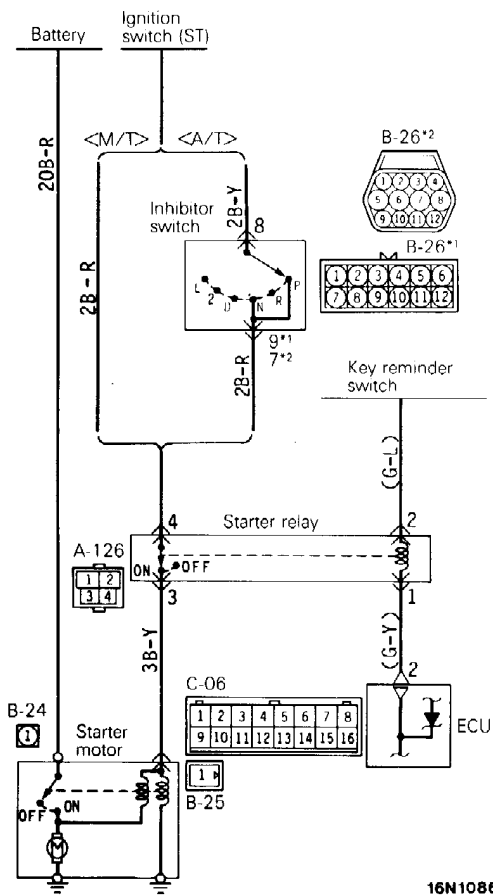
Description of operation

The ECU transistor is turned ON if the vehicle door, etc. are opened without use of the key. This energizes the horn relay to activate the horn.

Checking the horn activation circuit (Disconnect the connector of the ECU, then short-circuit terminal connector No. 10, and activate the horn relay.)

Step	Check object	Judgement		Cause	Remedy
		Normal	Mal-function		
1	Horn relay terminal voltage (3*2, 1*1-earth)	System voltage	0V	Malfunction of the horn relay	Check the horn relay
2	Horn terminal voltage (1*2, 3*1-earth)	System voltage	0V	Harness damaged or disconnected	Repair the harness
3	Horn terminal voltage (1'-earth)	Horn sounds (0V)	Horn doesn't sound (0V)	Malfunction of the horn	Replace the horn
		Battery voltage		Damaged or disconnected wiring of earth circuit	Repair the harness

11. STARTER RELAY ACTIVATION CIRCUIT



Description of operation

The ECU transistor is turned ON if the vehicle door etc. are opened without use of the key. This turns OFF the starter relay and power ceases to be supplied to the starter magnet switch.

Checking the starter relay activation circuit (Disconnect the connector of the ECU)

Step	Check object	Judgement		Cause	Remedy
		Normal	Mal-function		
1	Starter relay terminal voltage (3-earth)	System voltage	0V	Malfunction of the starter relay	Check the starter relay
2	Starter motor terminal (1-earth)	System voltage	0V	Harness damaged or disconnected	Repair the harness
(Starter motor connector B-25: Separation)					
3	Continuity between "B-25" connector and earth	0 Ω	∞ Ω	Damaged magnet switch	Replace magnet switch

NOTE

- \*1: Vehicles built up to October, 1992
- \*2: Vehicles built from November, 1992