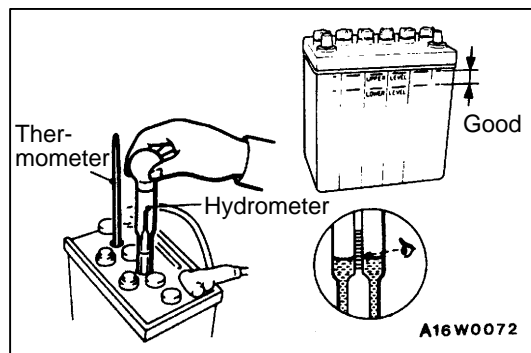


BATTERY

SERVICE SPECIFICATION

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



ON-VEHICLE SERVICE

FLUID LEVEL AND SPECIFIC GRAVITY CHECK

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

Standard value: 1.220–1.290 [20°C]

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

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

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

Dt: Actually measured specific gravity

t: Actually measured temperature

CHARGING

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

Caution

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

BATTERY TESTING PROCEDURE**TEST STEP**

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

OK

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

NG

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

OK

Retest

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

NG

Replace battery

OK

Normal

LOAD TEST RATE CHART


Battery type	34B19L(S)	55D23L
Charging time when fully discharged h [5-amp rated current charging]	6	10
Load test (Amps)	130	178

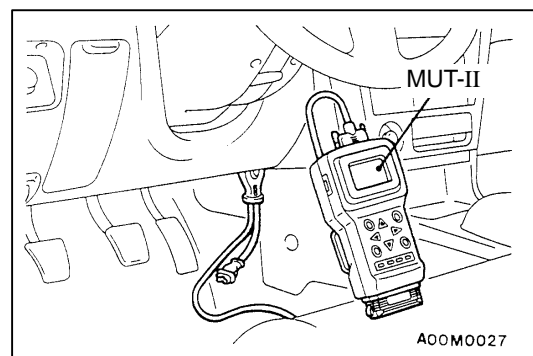
LOAD TEST CHART

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

IGNITION SWITCH

SPECIAL TOOL <VEHICLES FOR GCC>

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	ETACS-ECU input signal checking



TROUBLESHOOTING <VEHICLES FOR GCC>

DIAGNOSIS FUNCTION

INPUT SIGNAL INSPECTION POINTS

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

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptoms		Inspection procedure
Communication with MUT-II is impossible.	Communication with all systems is impossible.	1
	Communication with one-shot pulse input signal only is impossible.	2
Key reminder warning buzzer system	While the key reminder warning buzzer is sounding, the ignition key is turned to the ON position but the sound dose not stop. (However, it stops when the driver's side door is closed.)	3
	The key reminder warning buzzer does not stop sounding even if the key is removed. (However, it stops when the driver's side door is closed.)	4
	Then key reminder warning buzzer does not sound ever if the driver's side door is opened while the key is still inserted. (However, the ignition key should be in the OFF position.)	5

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

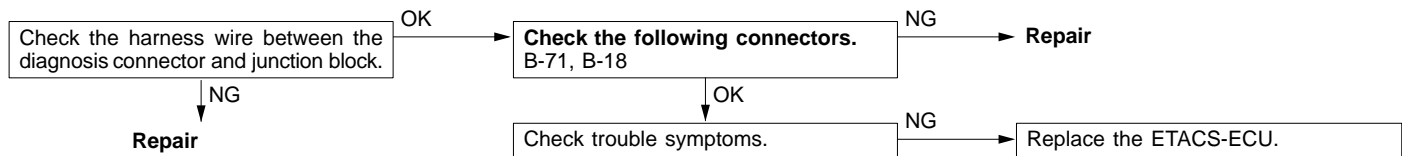
Inspection Procedure 1

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

Refer to **GROUP 13A – Troubleshooting.**

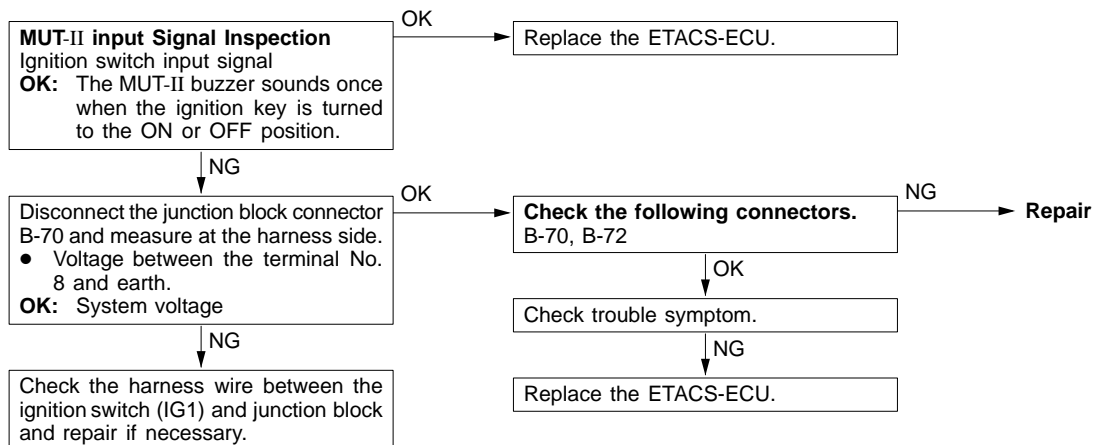
Inspection Procedure 2

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



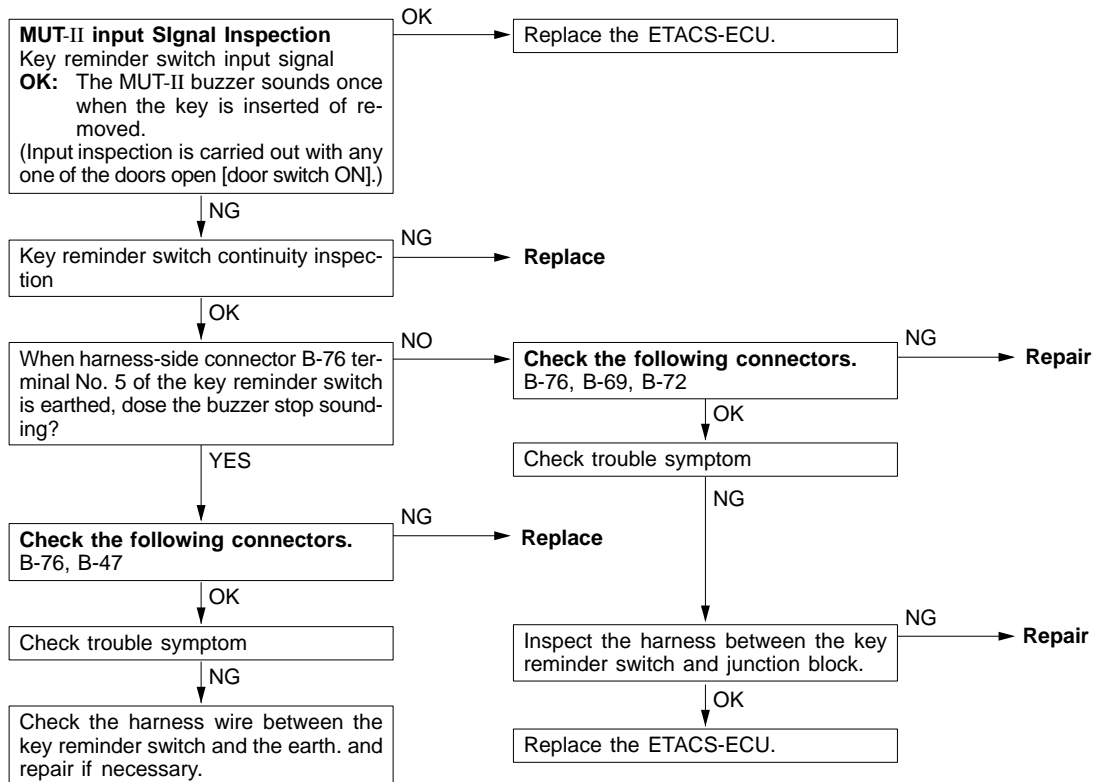
Inspection Procedure 3

While the key reminder warning buzzer is sounding, the ignition key is turned to the ON position but the sound dose not stop. (However, it stops when the driver's side door is closed.)	Probable cause
The cause is probably a malfunction of the ignition switch input circuit or ETACS-ECU. Furthermore, if there is a malfunction of a multipurpose fuse, the cause may also be a short circuit in a harness.	<ul style="list-style-type: none"> • Malfunction of fuse • Malfunction of harness or connector • Malfunction of ETACS-ECU



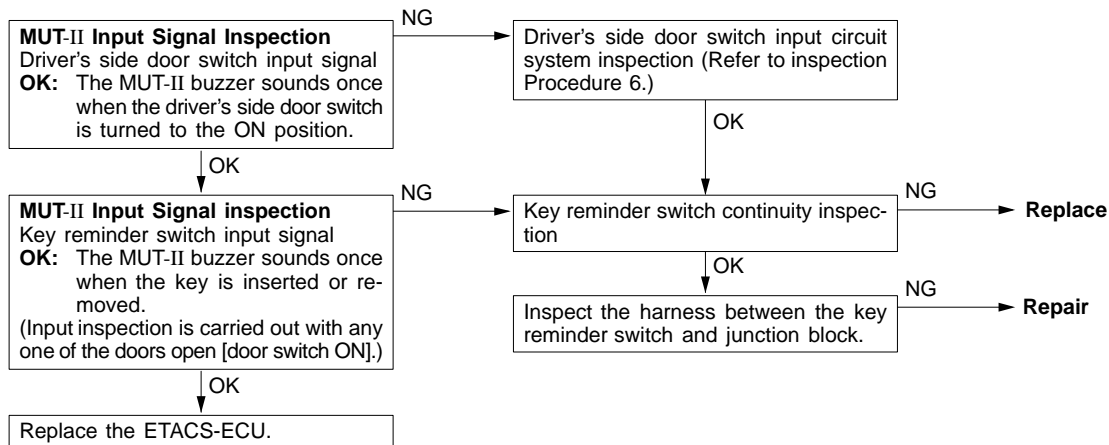
Inspection Procedure 4

The key reminder warning buzzer does not stop sounding even if the key is removed. (However, it stops when the driver's side door is closed.)	Probable cause
The cause is probably a malfunction of the key reminder switch input circuit system, or a malfunction of ETACS-ECU.	<ul style="list-style-type: none"> • Malfunction of key reminder switch • Malfunction of harness or connector • Malfunction of ETACS-ECU



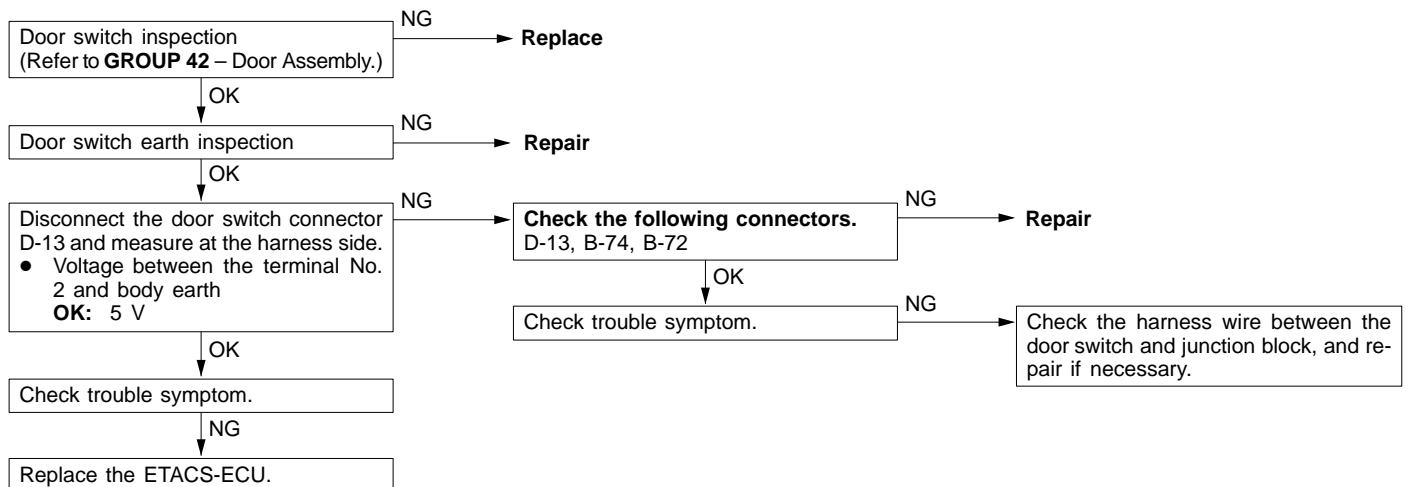
Inspection Procedure 5

Then Key reminder warning buzzer does not sound ever if the driver's side door is opened while the key is still inserted. (However, the ignition key should be in the OFF position.)	Probable cause
The cause is probably a malfunction of the door switch input circuit system, or a malfunction of the key reminder switch input circuit system.	<ul style="list-style-type: none"> • Malfunction of door switch • Malfunction of key reminder switch • Malfunction of harness or connector • Malfunction of ETACS-ECU



Inspection Procedure 6

Driver's side door switch input circuit system inspection

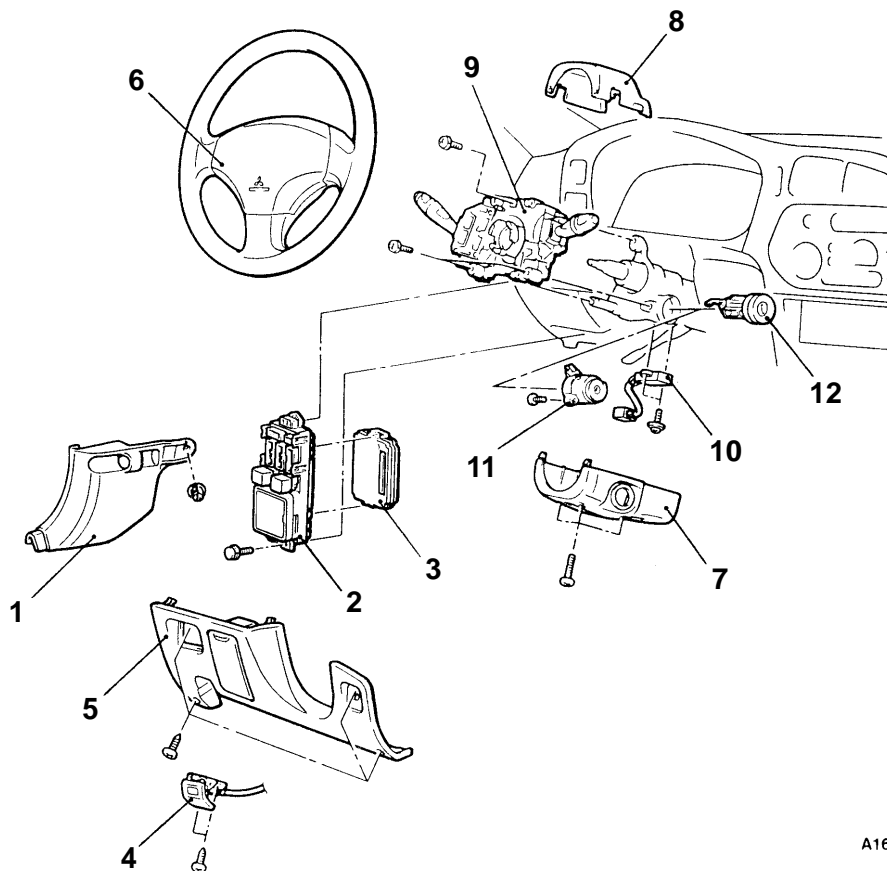


IGNITION SWITCH

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](#)



A16M0317

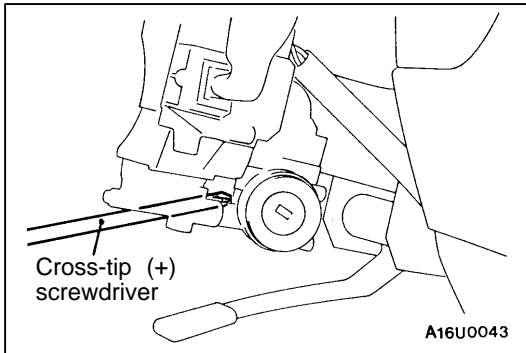
ETACS-ECU removal steps <Vehicles for GCC>

1. Cowl side trim (L.H.)
2. Junction block
3. ETACS-ECU

Ignition switch removal steps

4. Hood lock release handle
5. Driver side lower cover
6. [Steering wheel](#)
7. Column cover, lower
8. Column cover, upper
9. [Column switch](#)
10. Key reminder switch
<Vehicles for GCC>
11. Steering lock cylinder
12. Ignition switch

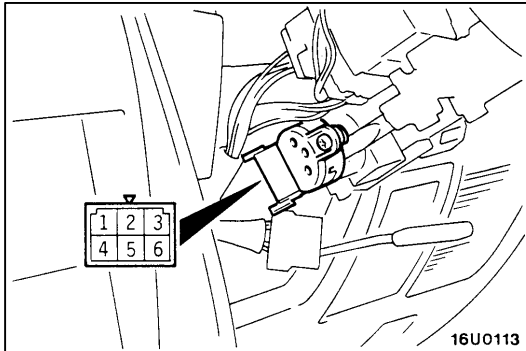




REMOVAL SERVICE POINT

◀A▶ STEERING LOCK CYLINDER REMOVAL

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

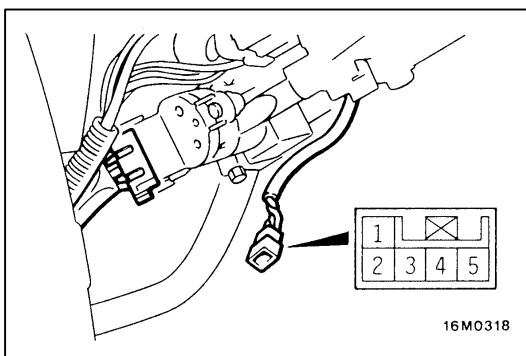


INSPECTION

IGNITION SWITCH CONTINUITY CHECK

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

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



KEY REMINDER SWITCH CONTINUITY CHECK

Disconnect the key reminder switch connector with the switch installed on the vehicle, and then check continuity.

Ignition key	Terminal No.	
	2	5
Removed	○	○
Inserted		

COMBINATION METERS

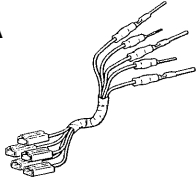
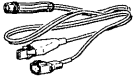



SERVICE SPECIFICATIONS

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

SEALANT

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

SPECIAL TOOLS

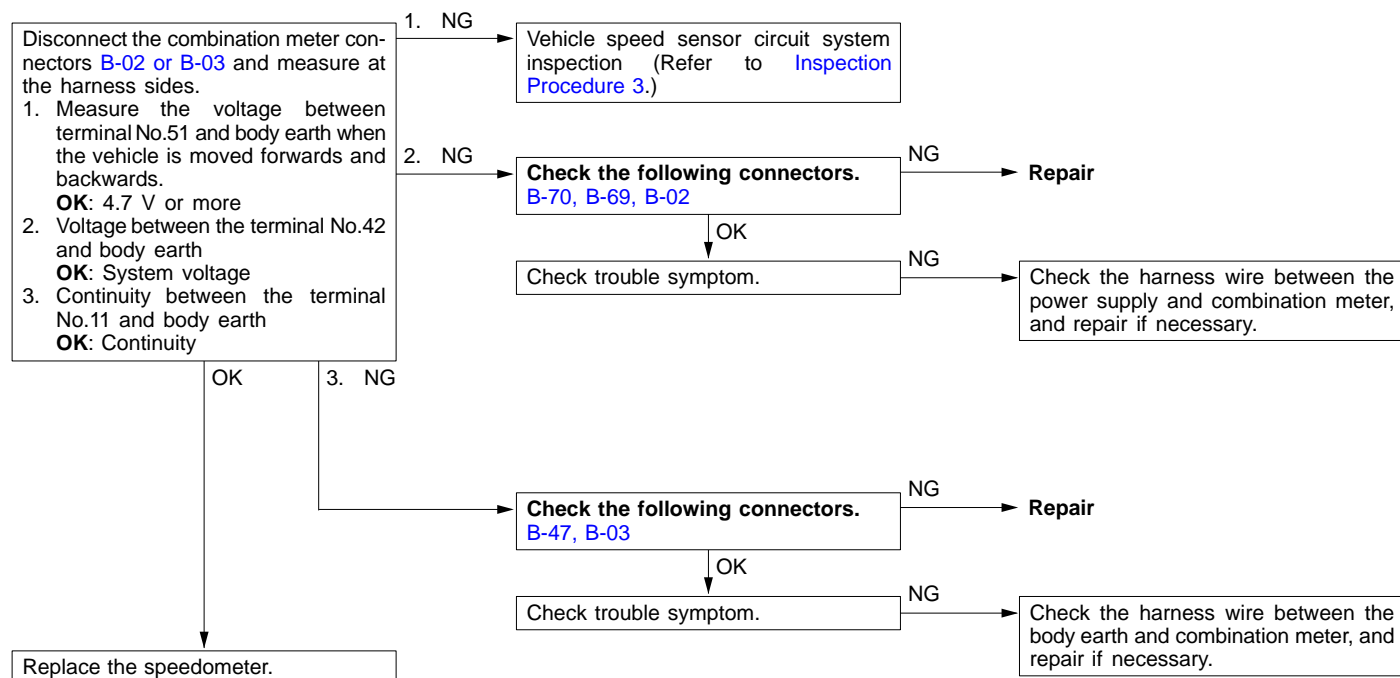
Tool	Number	Name	Use
<div><div>A</div><div>B</div><div>C</div><div>D</div></div>	<div>MB991223</div> <div>A: MB991219</div> <div>B: MB991220</div> <div>C: MB991221</div> <div>D: MB991222</div>	<div>Harness set</div> <div>A: Test harness</div> <div>B: LED harness</div> <div>C: LED harness adapter</div>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

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure
Speedometer does not work.	1
Tachometer does not work.	2

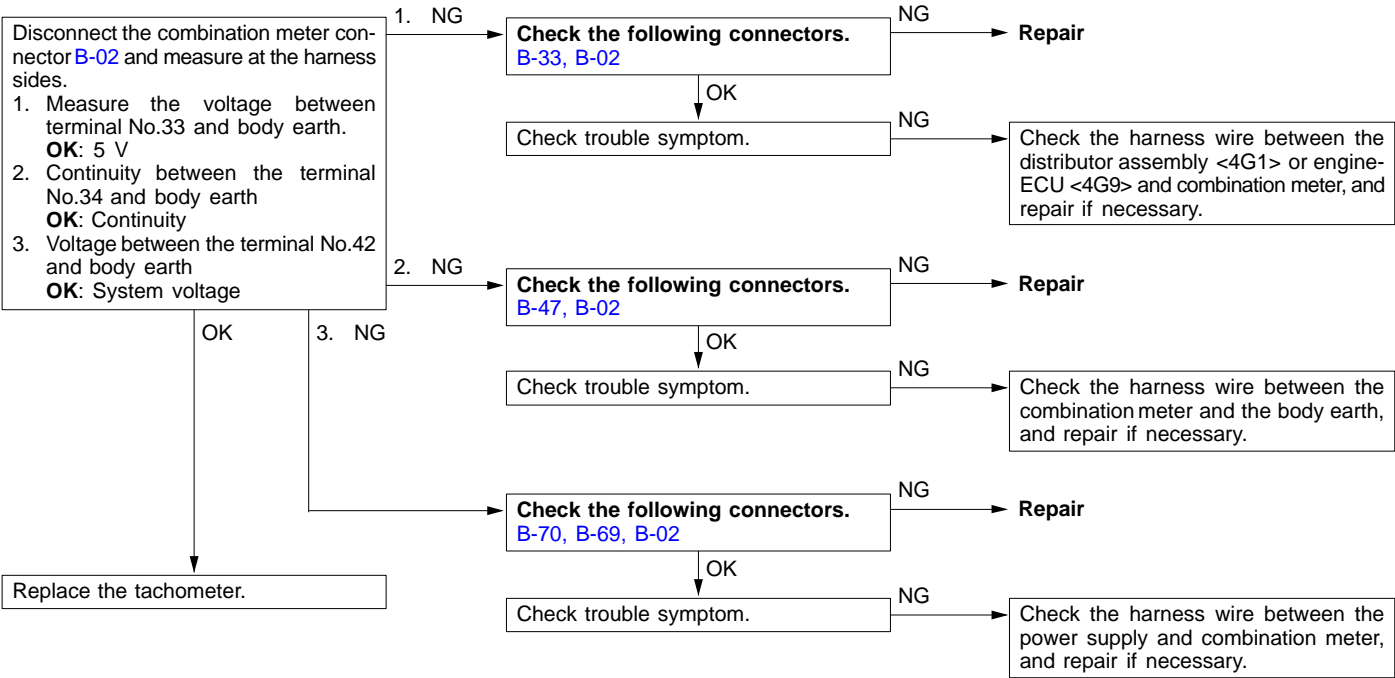
Inspection Procedure 1

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



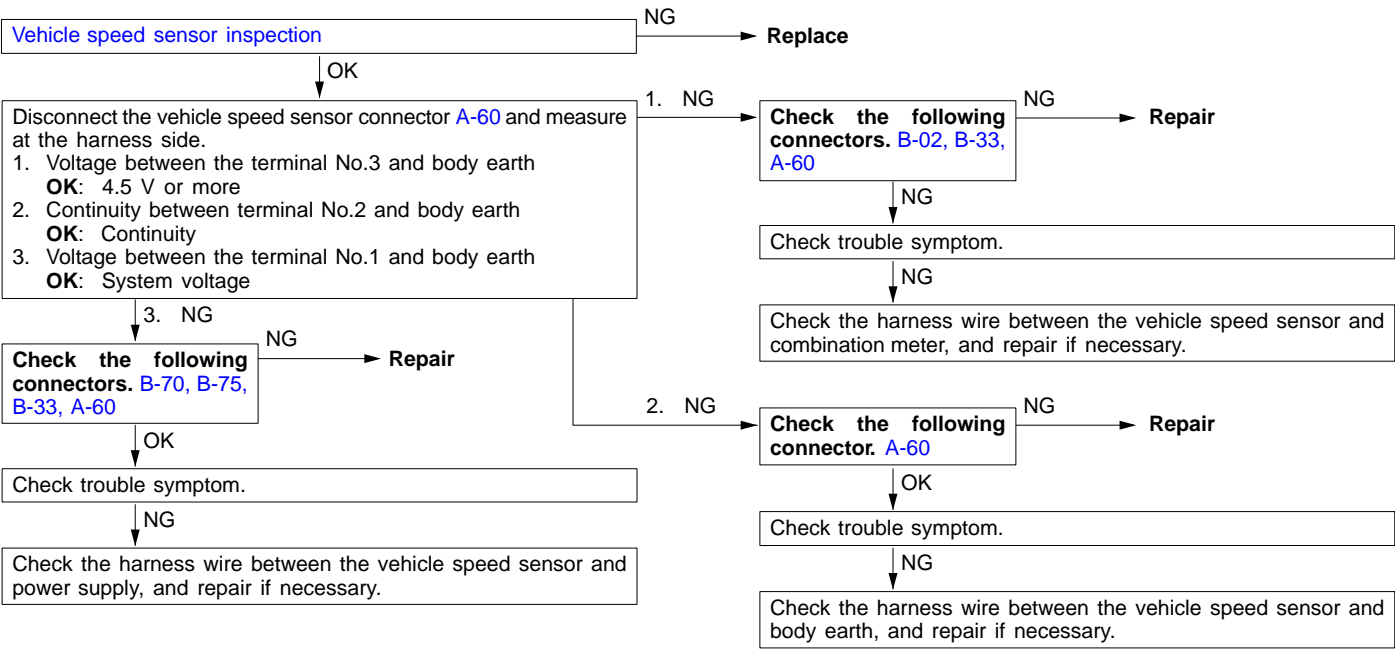
Inspection Procedure 2

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



Inspection Procedure 3

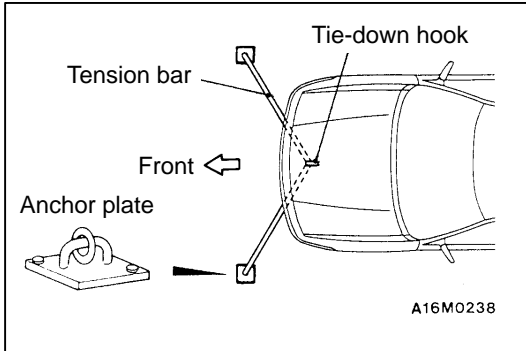
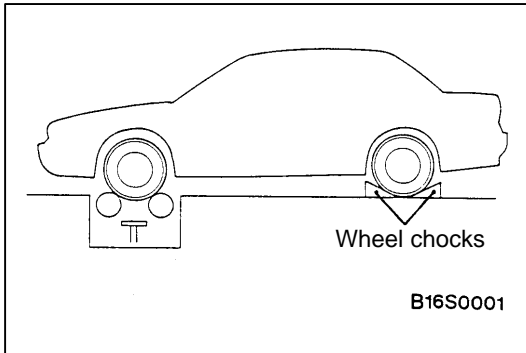
Vehicle speed sensor circuit system inspection



ON-VEHICLE SERVICE

SPEEDOMETER CHECK

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



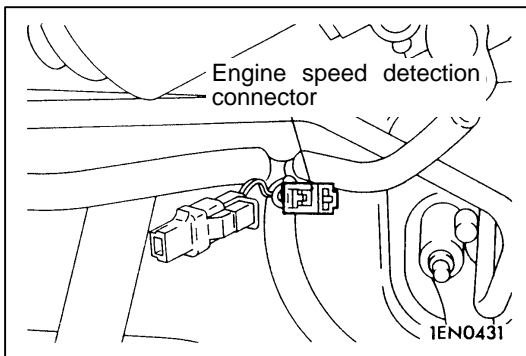
3. To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.
4. To prevent the vehicles from starting, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured firmly.
5.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

Caution

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

Standard values:

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



TACHOMETER CHECK

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

NOTE

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

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

Standard values:

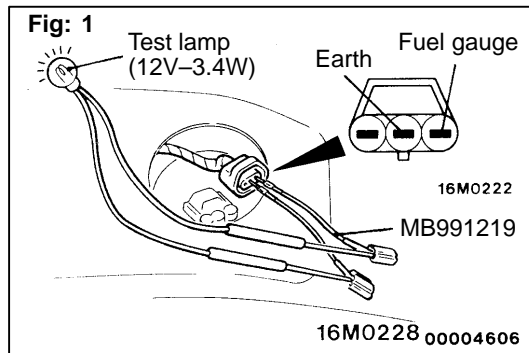
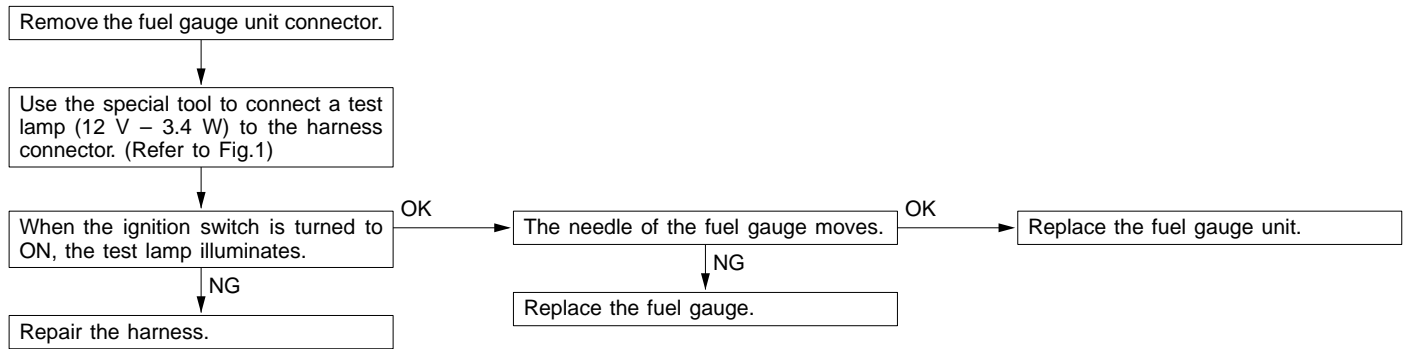
700 r/min : ± 100 r/min

3,000 r/min : ± 150 r/min

5,000 r/min : ± 250 r/min

6,000 r/min : ± 300 r/min

FUEL GAUGE SIMPLE CHECK



FUEL GAUGE UNIT CHECK

Remove the fuel gauge unit from the fuel tank.

FUEL GAUGE UNIT RESISTANCE

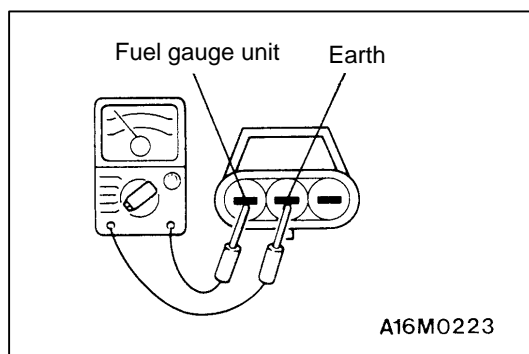
1. Check that resistance value between the fuel gauge terminal and earth terminal is at standard value when fuel gauge unit float is at point F (highest) and point E (lowest).

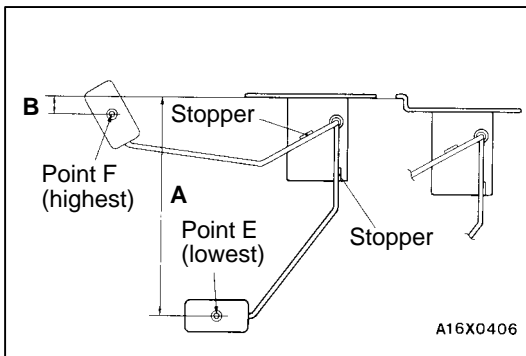
Standard value:

Point F: 0.9 – 5.1 Ω

Point E: 102.3 – 117.7 Ω

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

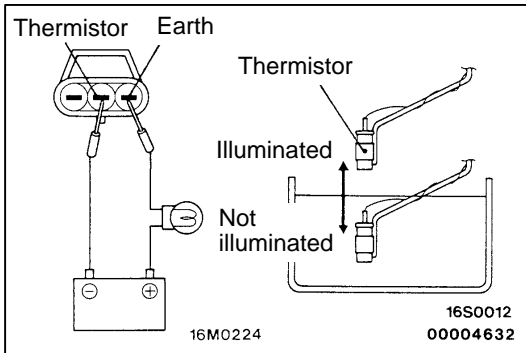




FUEL GAUGE UNIT FLOAT HEIGHT

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

Standard value:
A: 17.4 mm
B: 130.2 mm



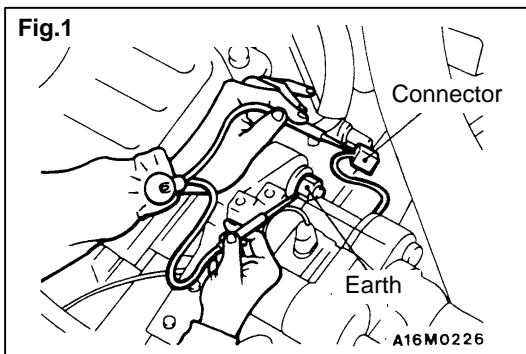
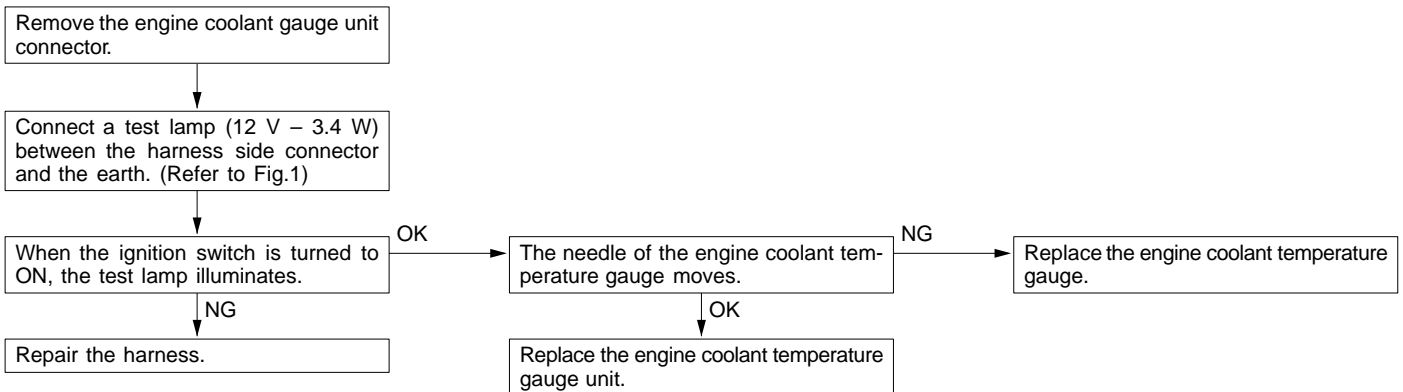
THERMISTOR

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

Caution

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

ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK



ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

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

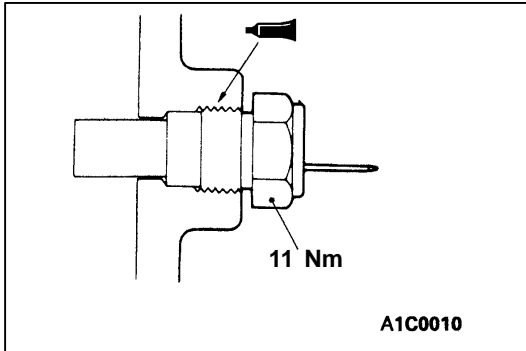
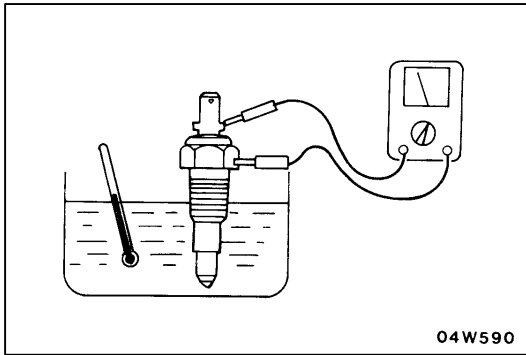
Standard value: $104 \pm 13.5 \Omega$

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

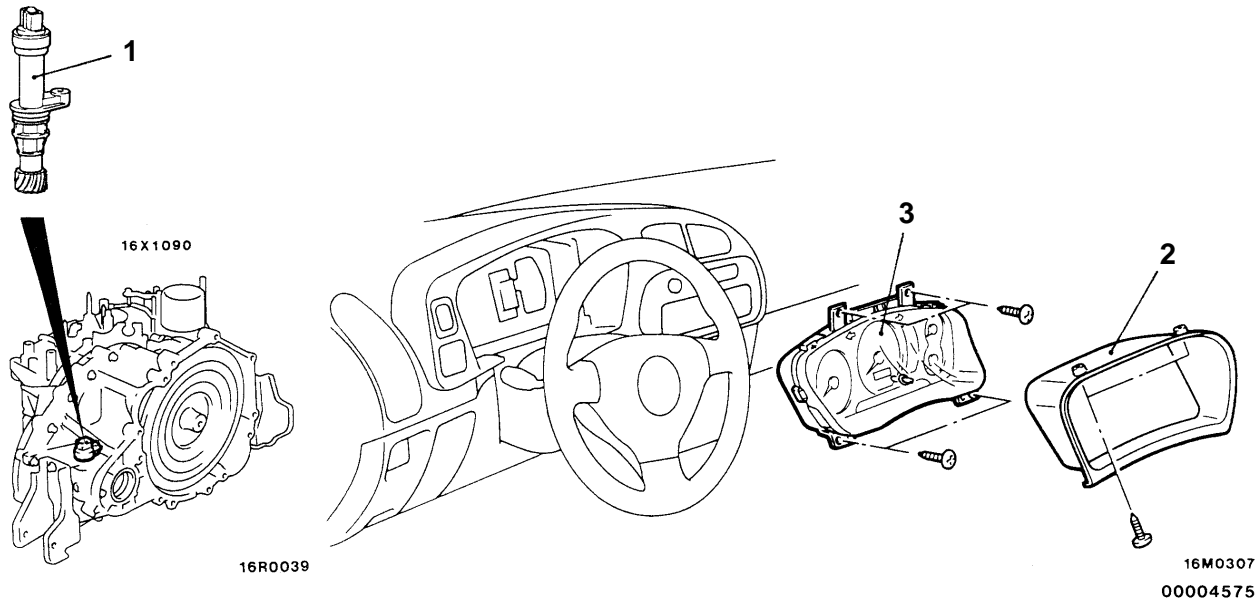
Specified sealant:

3M Adhesive Nut Locking No. 4171 or equivalent

5. [Add engine coolant](#)



COMBINATION METERS REMOVAL AND INSTALLATION

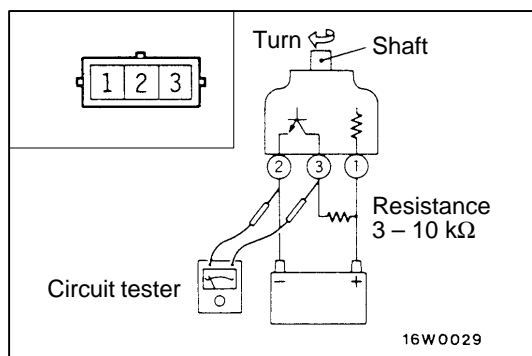


Vehicle speed sensor removal steps

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

Combination meter removal steps

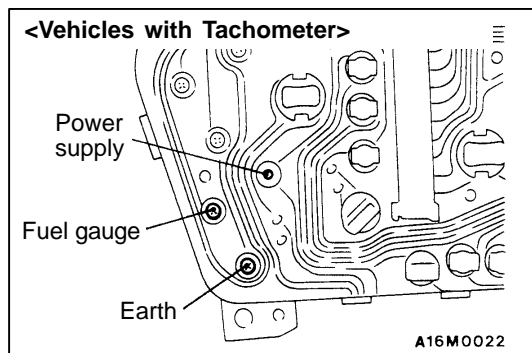
2. Meter bezel
3. Combination meter



INSPECTION

VEHICLE SPEED SENSOR CHECK

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



FUEL GAUGE RESISTANCE CHECK

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

Standard value:

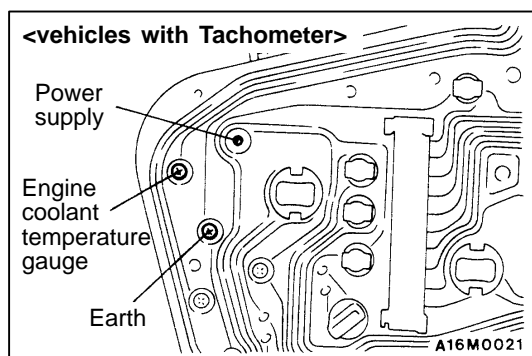
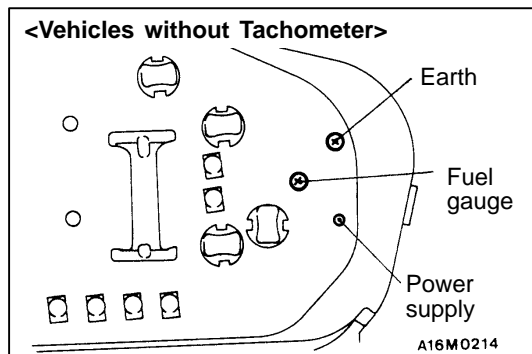
Power supply – Earth: 192 ± 19.2

Power supply – Fuel gauge: 89 ± 8.9

Fuel gauge – Earth: 103 ± 10.3

Caution

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



ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK

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

Standard value:

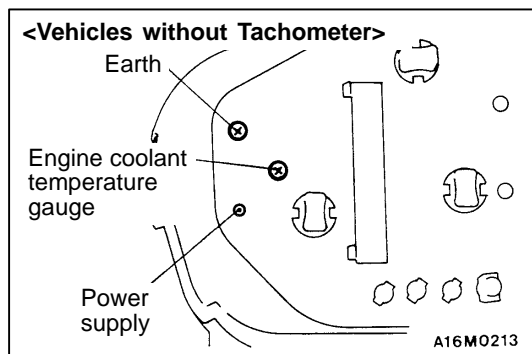
Power supply – Earth: 187 ± 18.7

Power supply – Engine coolant temperature gauge: 90 ± 4.5

Engine coolant temperature gauge – Earth: 247 ± 24.7

Caution

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

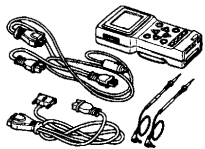
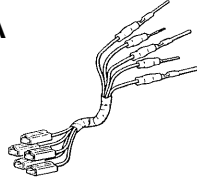
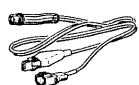
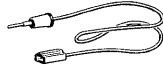



HEADLAMP AND FRONT TURN-SIGNAL LAMP

SERVICE SPECIFICATIONS

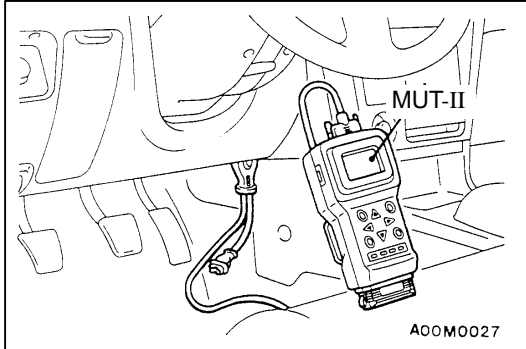
Items		Standard value	Limit
Headlamp aiming for low beam	Vertical direction	60 mm below horizontal (H)	–
	Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)	–
Headlamp intensity cd		–	30,000 or more

SPECIAL TOOLS

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

TROUBLESHOOTING

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



DIAGNOSIS FUNCTION

INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

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

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptoms		Inspection procedure
Communication with MUT-II is impossible. <Vehicles with ETACS-ECU>	Communication with all systems is impossible.	1
	Communication with one-shot pulse input signal only is impossible.	2
The lighting monitor buzzer doesn't sound under the following conditions while tail lamps or headlamps illuminate. <ul style="list-style-type: none"> • When the ignition switch is turned to OFF and the driver's side door is open. • When the ignition key removed <Vehicles for GCC> 		3

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

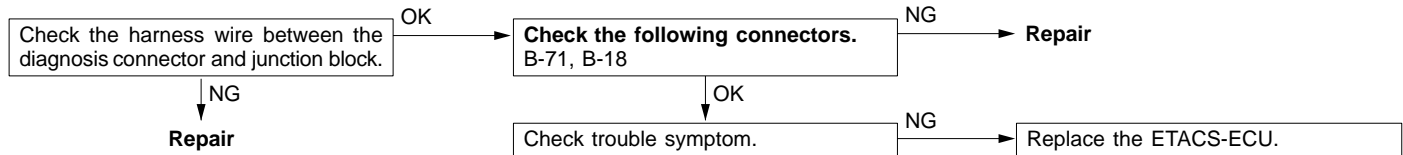
Inspection Procedure 1

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

Refer – [Troubleshooting](#).

Inspection Procedure 2

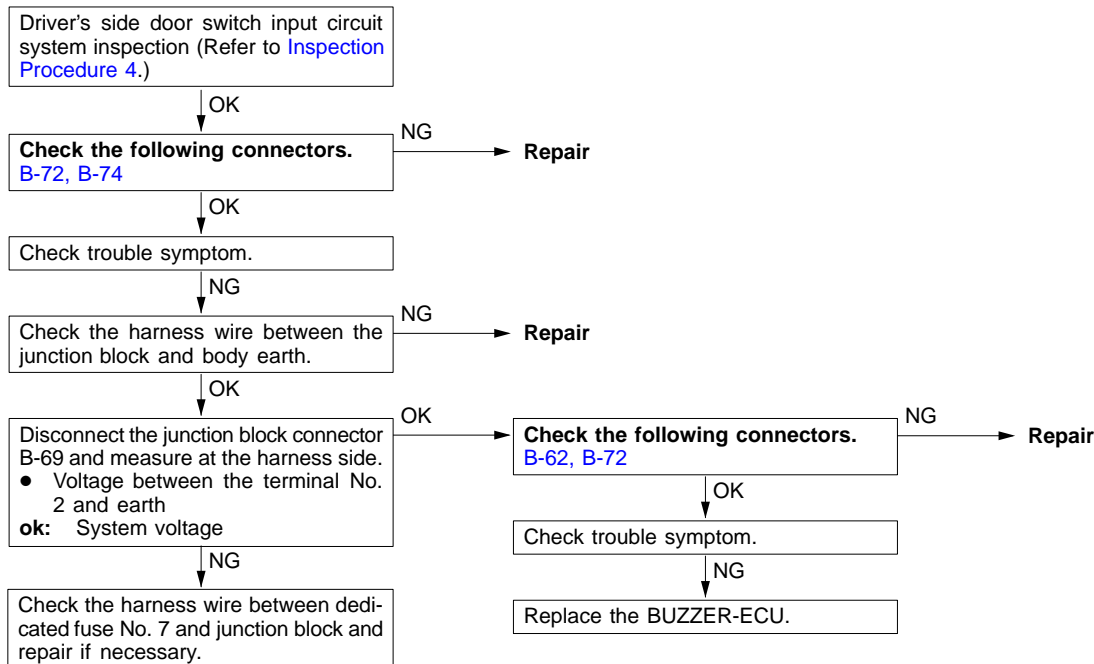
Communication with MUT-II is impossible. (Communication with the one-shot pulse input signal only is impossible.)	Probable cause
The cause is probably a defective one-shot pulse input circuit system of the diagnosis line.	<ul style="list-style-type: none"> • Malfunction of connector • Malfunction of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



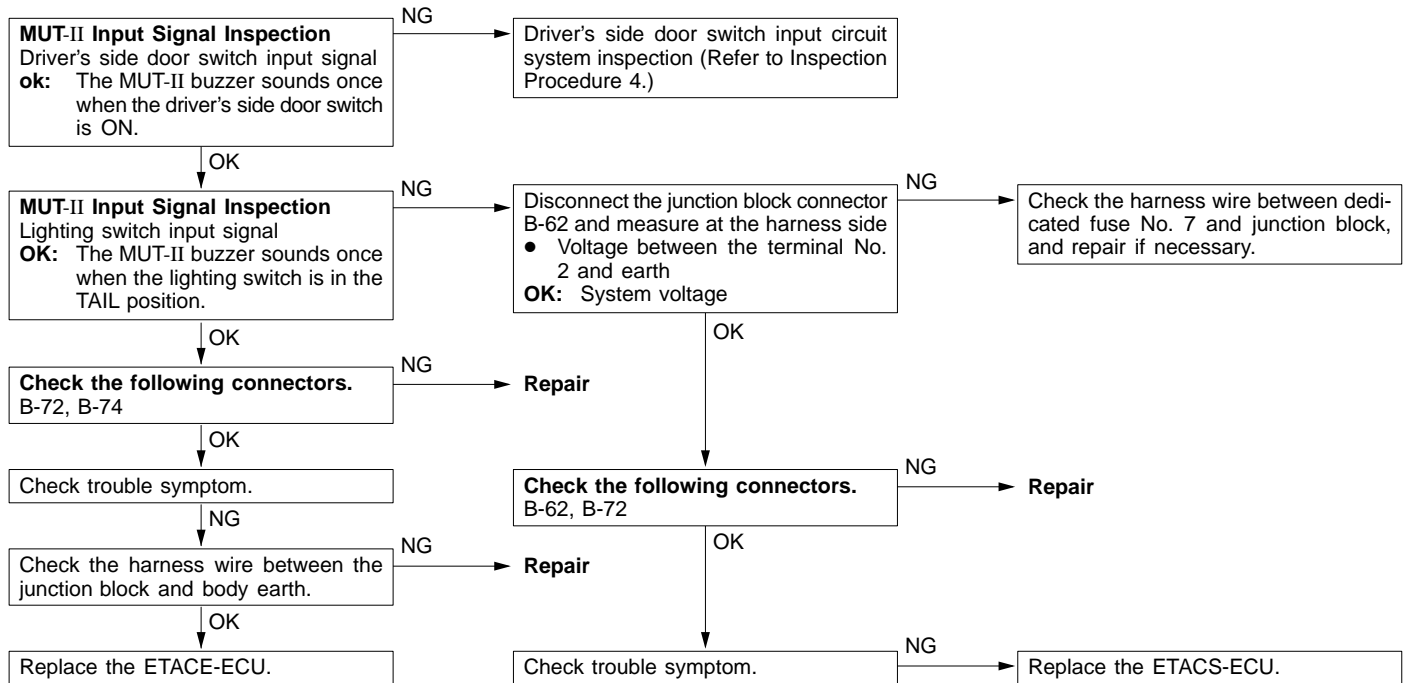
Inspection Procedure 3

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

<Vehicles with BUZZER-ECU>

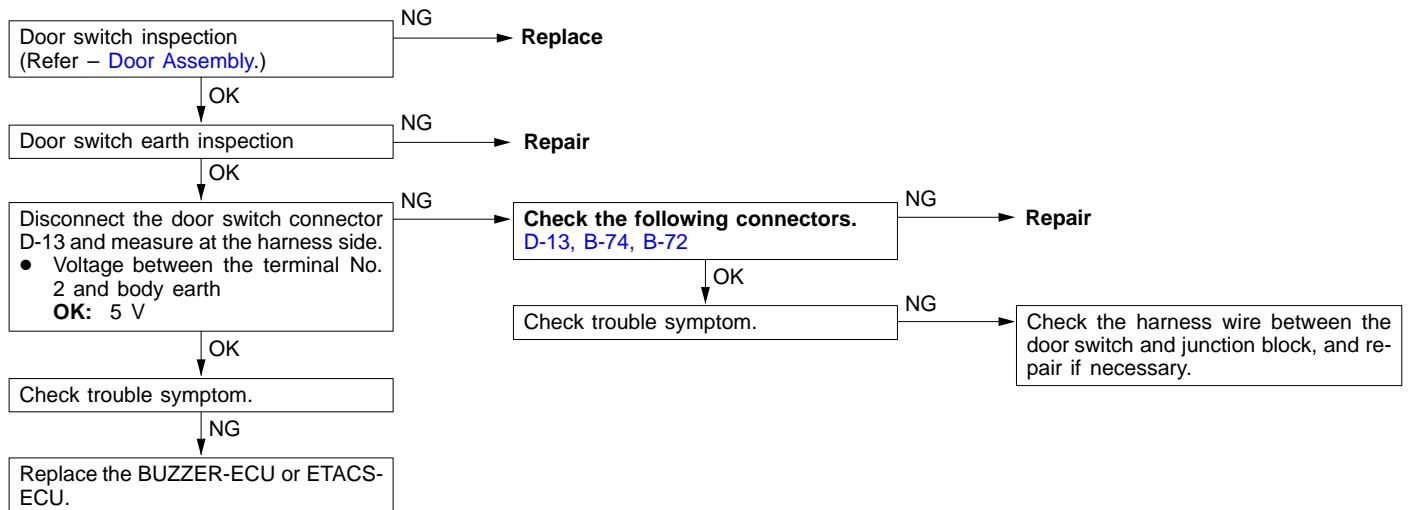


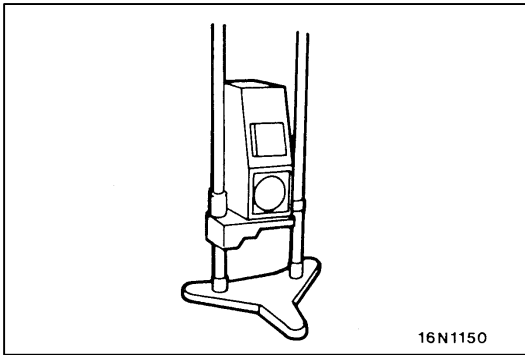
<Vehicles with ETACS-ECU>



Inspection Procedure 4

Driver's side door switch input circuit system inspection





ON-VEHICLE SERVICE

HEADLAMP AIMING

<USING A BEAMSETTING EQUIPMENT>

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

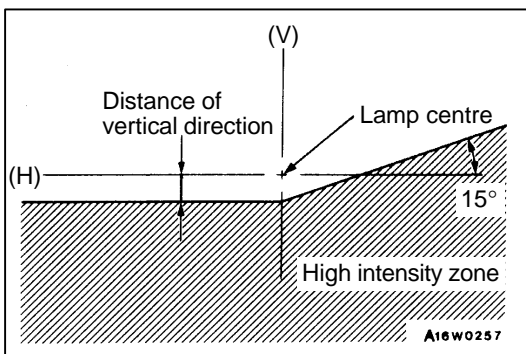
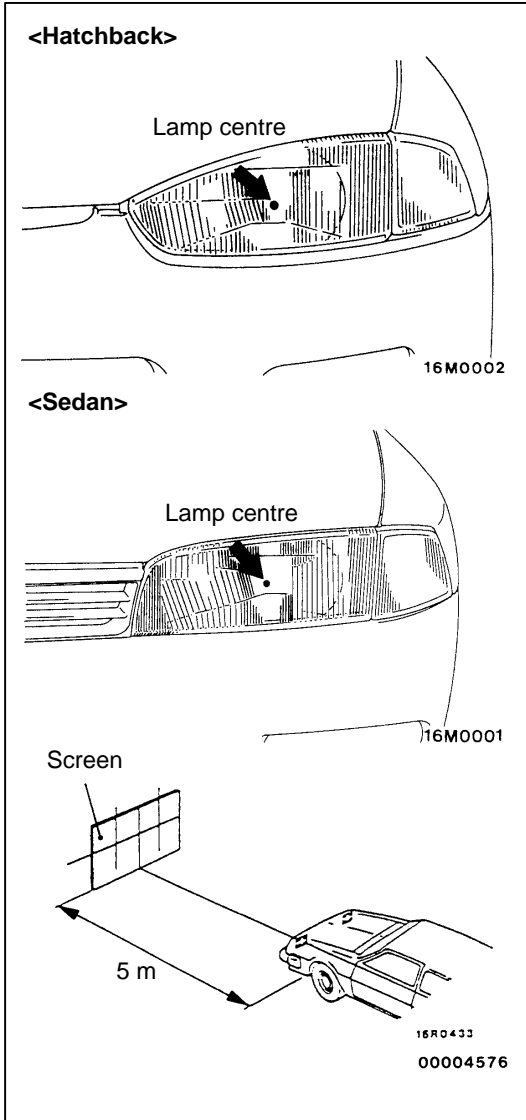
NOTE

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

2. Alternately turn the adjusting screw to adjust the [headlamp aiming](#).

<USING A SCREEN>

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



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

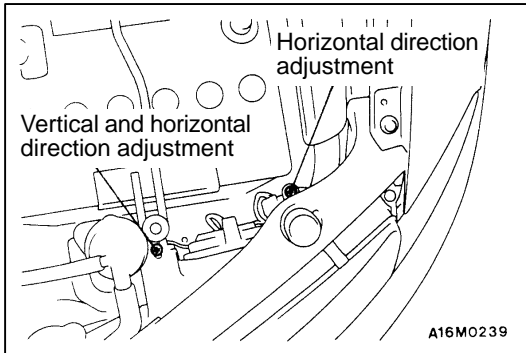
Standard value:

(Vertical direction)

60 mm below horizontal (H)

(Horizontal direction)

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



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

Caution

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

MAIN

Group
54

1996

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.

$I = Er^2$ Where:

I = intensity (cd)

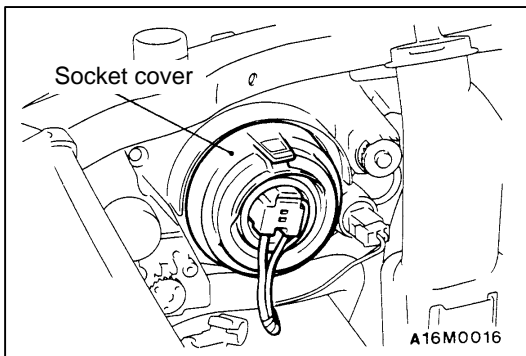
E = illumination (lux)

r = distance (m) from headlamps to illuminometer

BULB REPLACEMENT

<Headlamp Bulb>

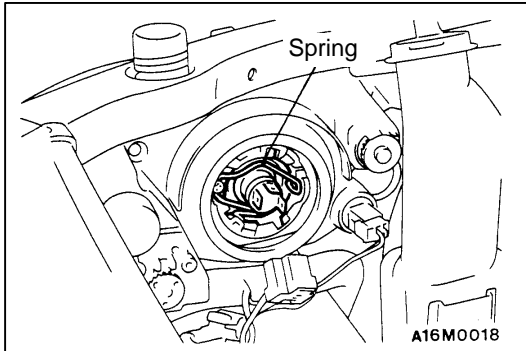
1. Disconnect the connector.
2. Remove the socket cover.



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

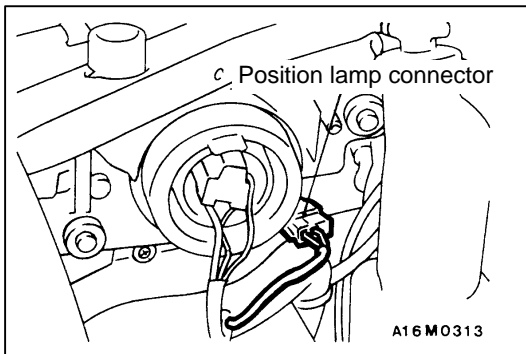
Caution

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



<Position Lamp Bulb>

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

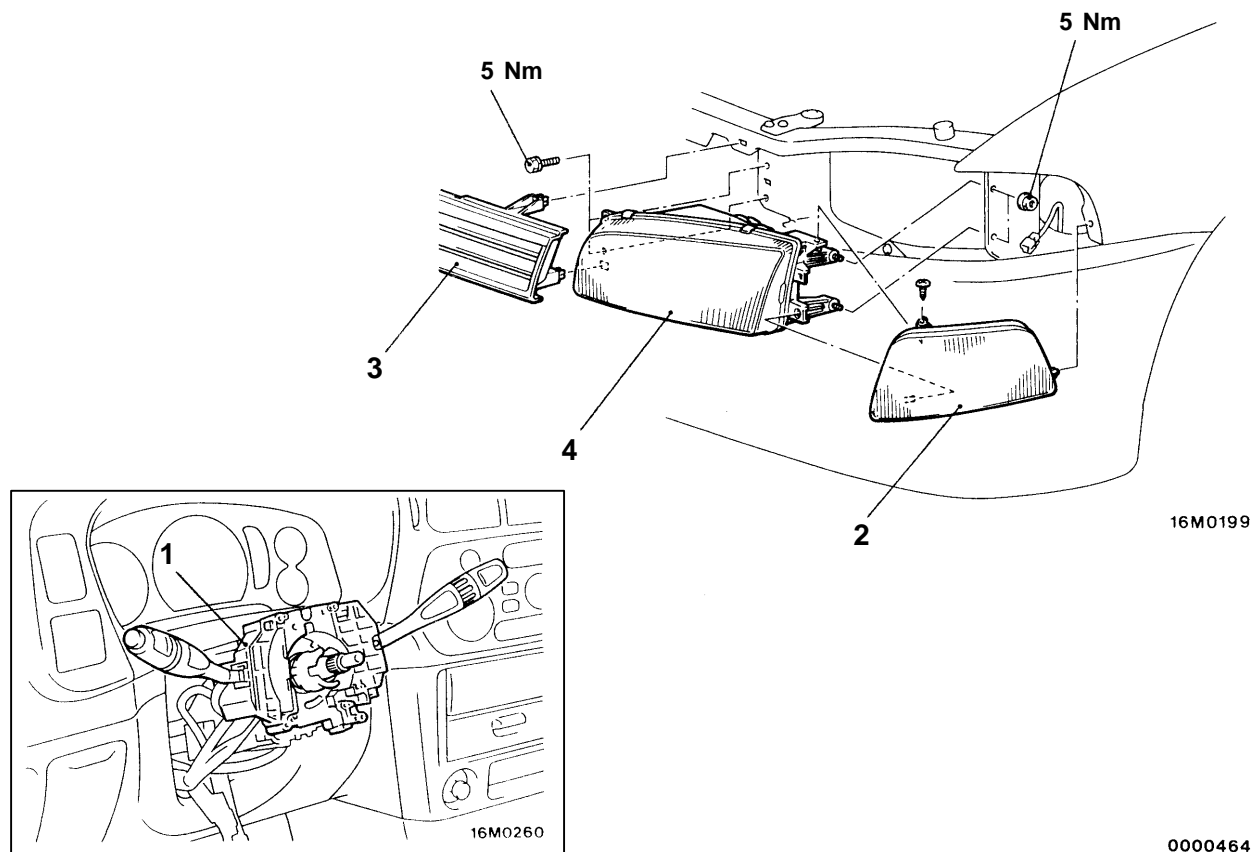


HEADLAMP AND FRONT TURN-SIGNAL LAMP

REMOVAL AND INSTALLATION

CAUTION: SRS

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



00004648

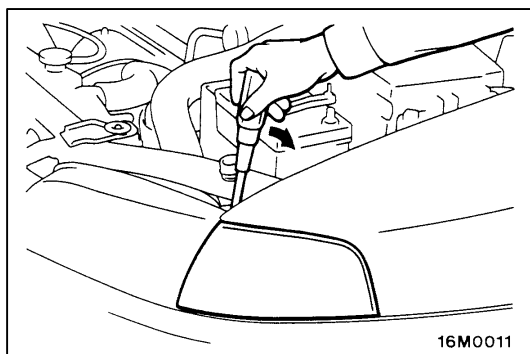
1. Column switch <Lighting switch and dimmer/passing switch>

◀A▶

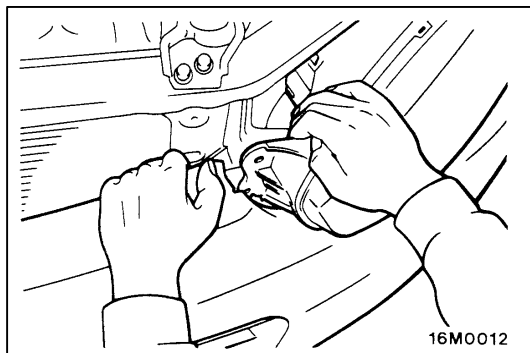
◀B▶

Headlamp removal steps

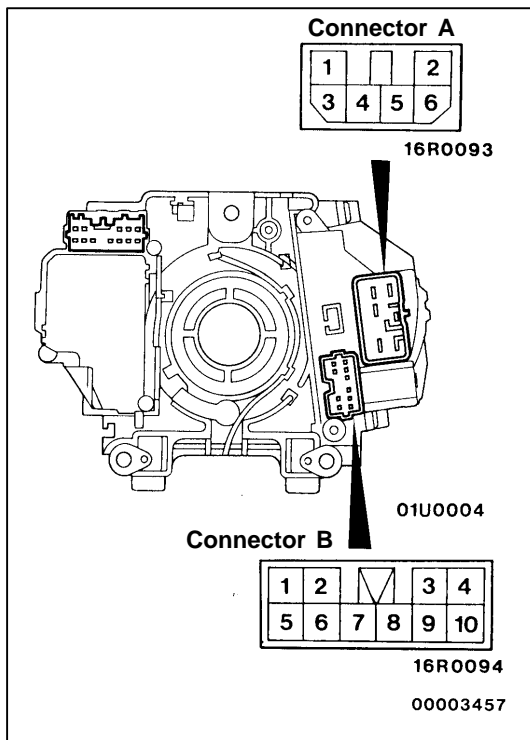
2. Front turn-signal lamp
3. Radiator grille <Sedan>
4. Headlamp

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

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

**◀B▶ HEADLAMP REMOVAL <HATCHBACK>**

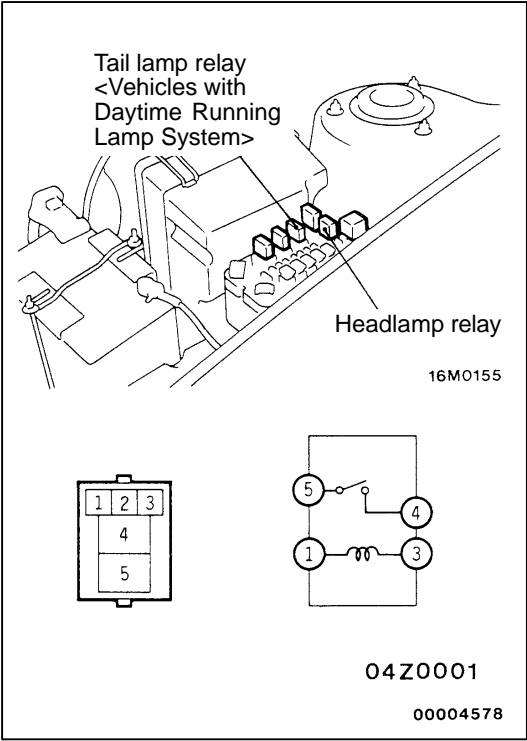
After removing the inside of the headlamp while pulling the bumper towards you as shown in the illustration, remove the outside, and then remove the headlamp.

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

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

NOTE

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




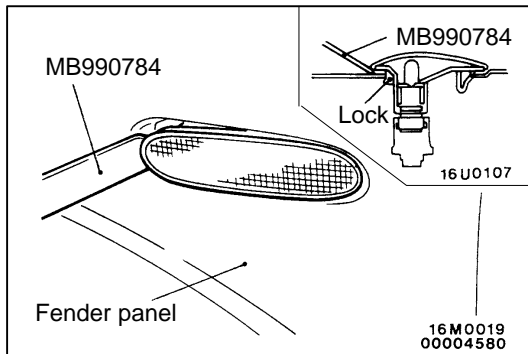
HEADLAMP RELAY AND TAIL LAMP RELAY CHECK

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

SIDE TURN-SIGNAL LAMP

SPECIAL TOOL

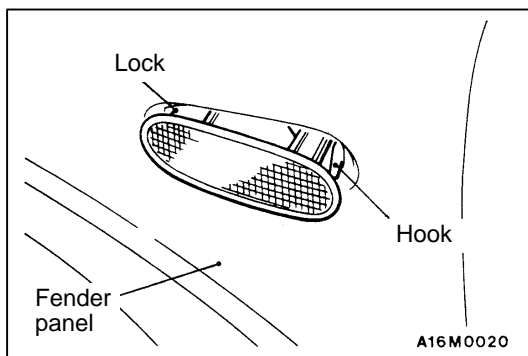
Tool	Number	Name	Use
	MB990784	Ornament remover	Removal of side turn-signal lamp



SIDE TURN-SIGNAL LAMP

REMOVAL

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



INSTALLATION


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

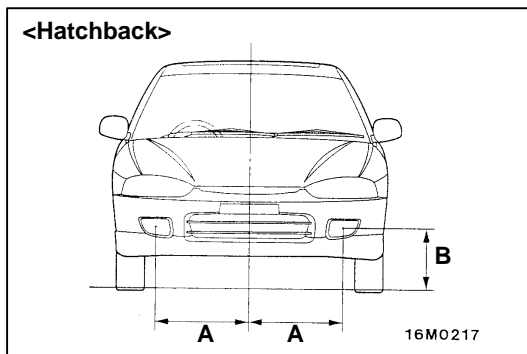
FRONT FOG LAMP

SERVICE SPECIFICATIONS

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

SPECIAL TOOL

Tool	Number	Name	Use
	MB990784	Ornament remover	Fog lamp switch removal



ON-VEHICLE SERVICE

FRONT FOG LAMP AIMING

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

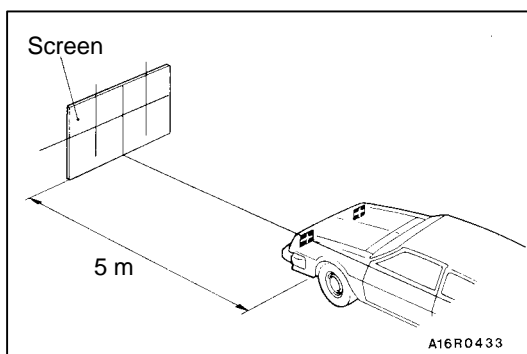
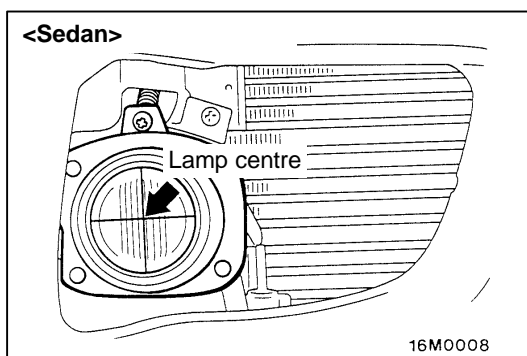
NOTE

Measure the centre of the fog lamp as shown.

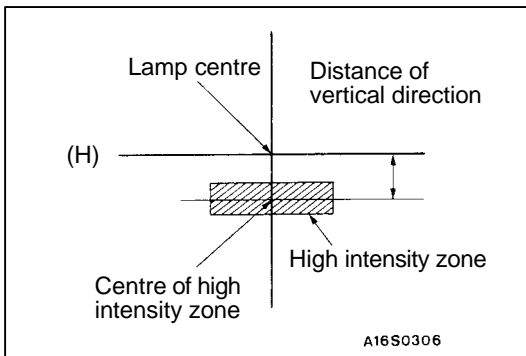
<Hatchback>

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

B: 360 mm



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



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

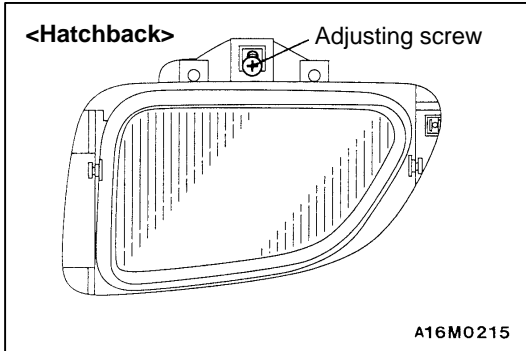
Standard value:

(Vertical direction)

100 mm below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

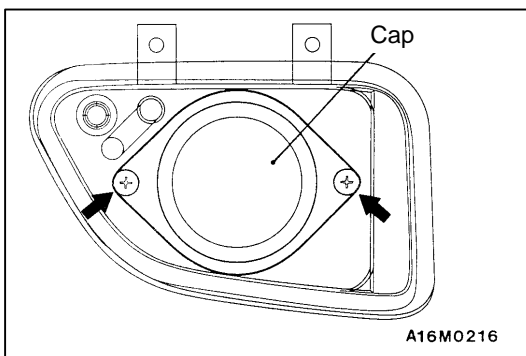
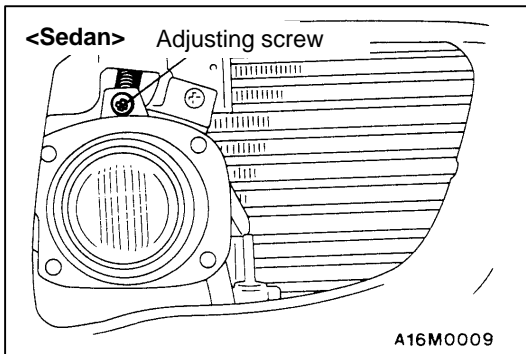


NOTE

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

Caution

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



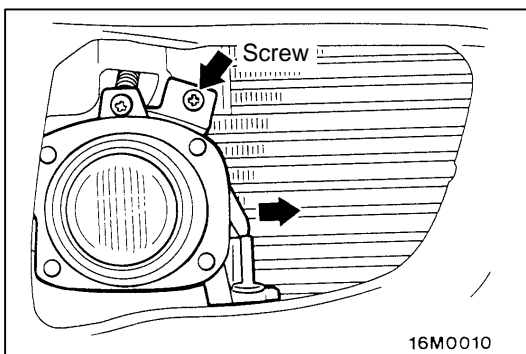
BULB REPLACEMENT

<Hatchback>

- Remove the fog lamp.
- Remove the cap and pull out the bulb.

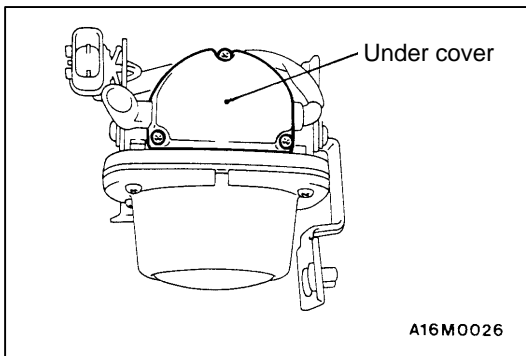
Caution

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

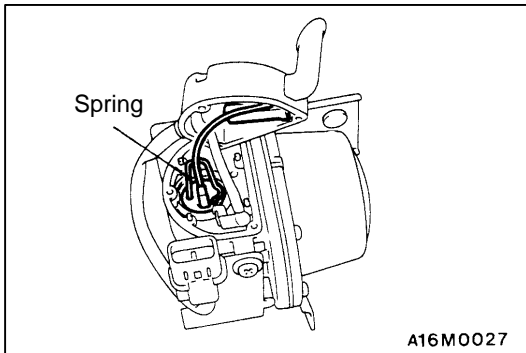


<Sedan>

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



3. Remove the fog lamp under cover.



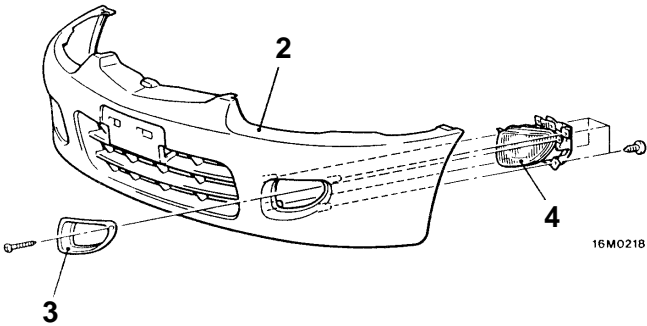
4. Unhook the spring which secures the bulb and then remove the bulb.

Caution

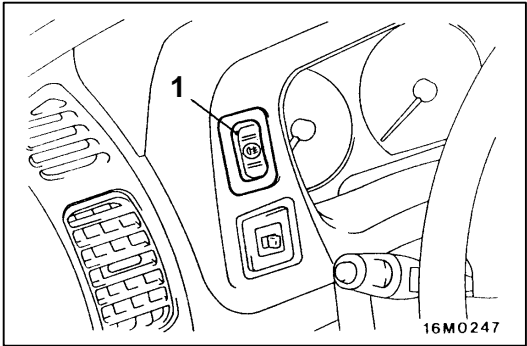
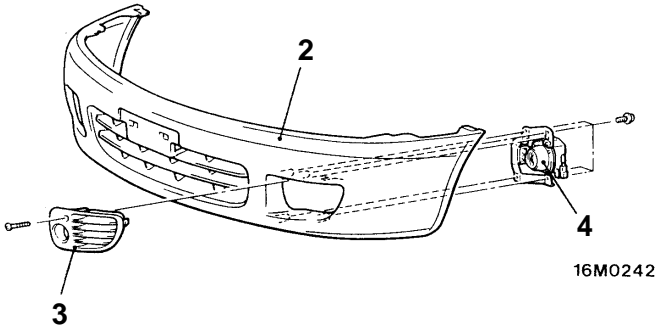
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.

FRONT FOG LAMP
REMOVAL AND INSTALLATION

<Hatchback>



<Sedan>

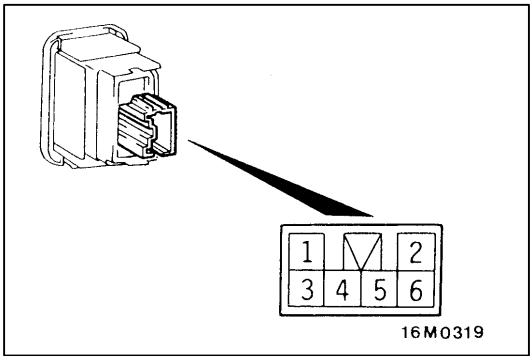


00004649

1. Front fog lamp switch

Front fog lamp removal steps

- 2. Front bumper
- 3. Fog lamp bezel
- 4. Front fog lamp assembly



INSPECTION
FRONT FOG LAMP SWITCH CONTINUITY CHECK

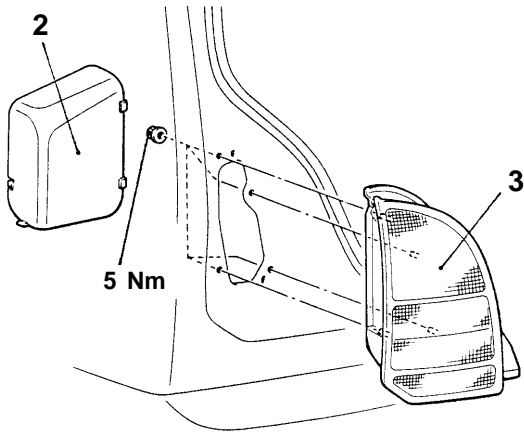
Switch position	Terminal No.						
	1		2	3	4	5	6
OFF	○	ILL	○				
ON	○	ILL	○	○	○	○	○

REAR COMBINATION LAMP

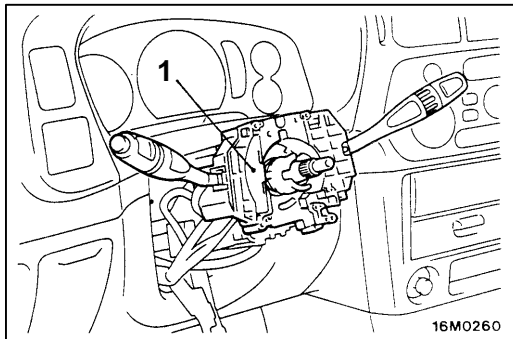
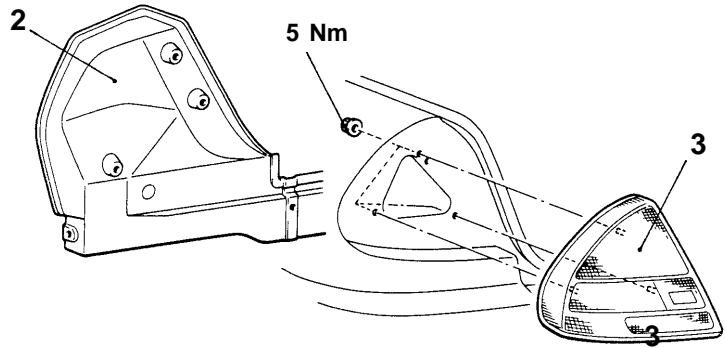
REMOVAL AND INSTALLATION

Caution: SRS
Before removal of air bag module and clock spring, refer to GROUP 52B – [SRS Service Precautions](#) and [Air Bag Module and Clock Spring](#).

<Hatchback>



<Sedan>



1. Column switch <Lighting switch and turn-signal lamp switch>

Rear combination lamp removal steps

2. Lamp lid <Hatchback> or Rear end trim <Sedan>
3. Rear combination lamp

INSPECTION

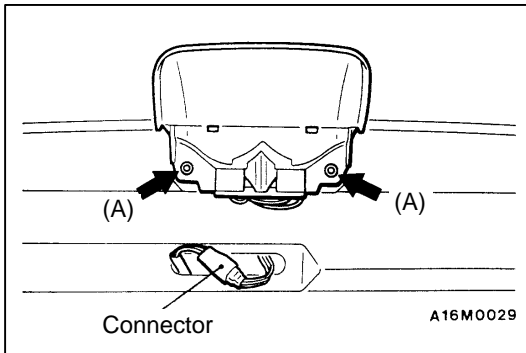
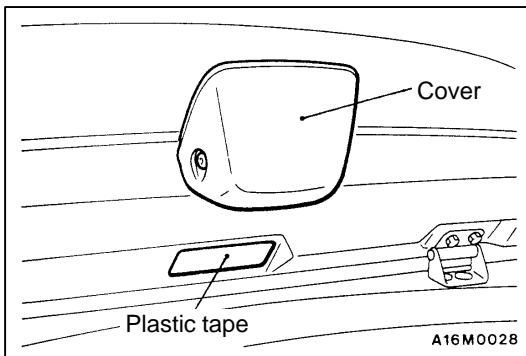
LIGHTING SWITCH AND TURN-SIGNAL LAMP SWITCH CHECK

HIGH-MOUNTED STOP LAMP

REMOVAL SERVICE POINT


HIGH-MOUNTED STOP LAMP REMOVAL <Hatchback>

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



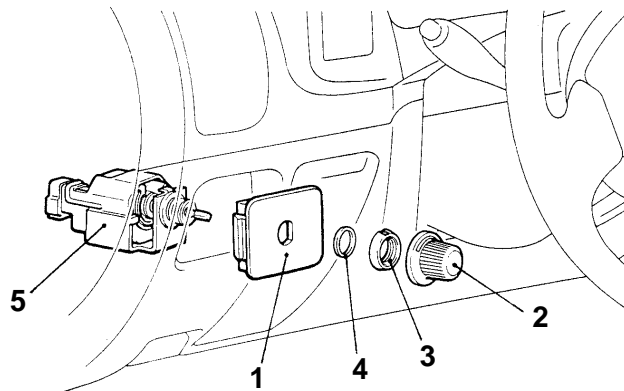
RHEOSTAT

SPECIAL TOOL

Tool	Number	Name	Use
	MB990784	Ornament remover	Removal of switch garnish

RHEOSTAT

REMOVAL AND INSTALLATION

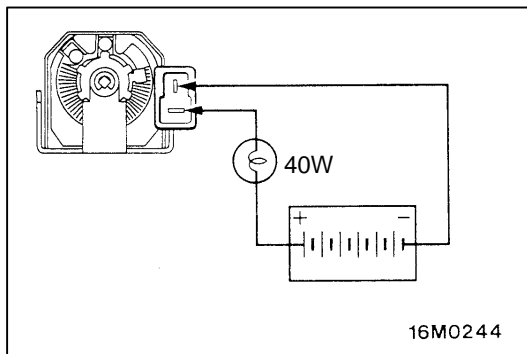


A16M0243

Removal steps

1. Switch garnish
2. Knob
3. Ring nut

4. Plate
5. Rheostat




16M0244

INSPECTION

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

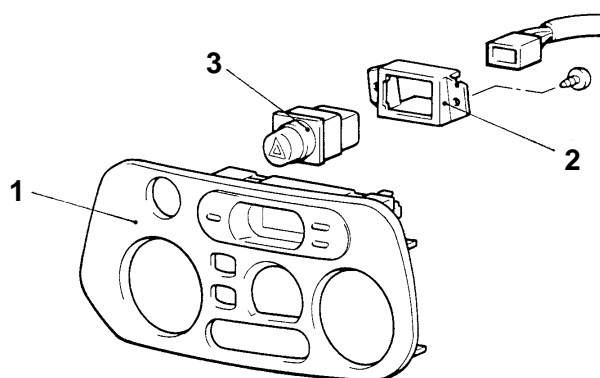
HAZARD WARNING LAMP SWITCH

SPECIAL TOOL

Tool	Number	Name	Use
	MB990784	Ornament remover	Heater control panel removal

HAZARD WARNING LAMP SWITCH

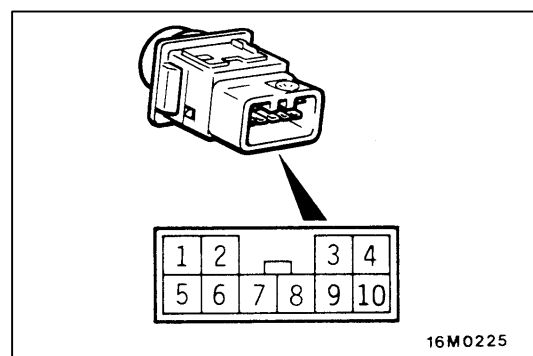
REMOVAL AND INSTALLATION



A16M0284

Removal steps

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



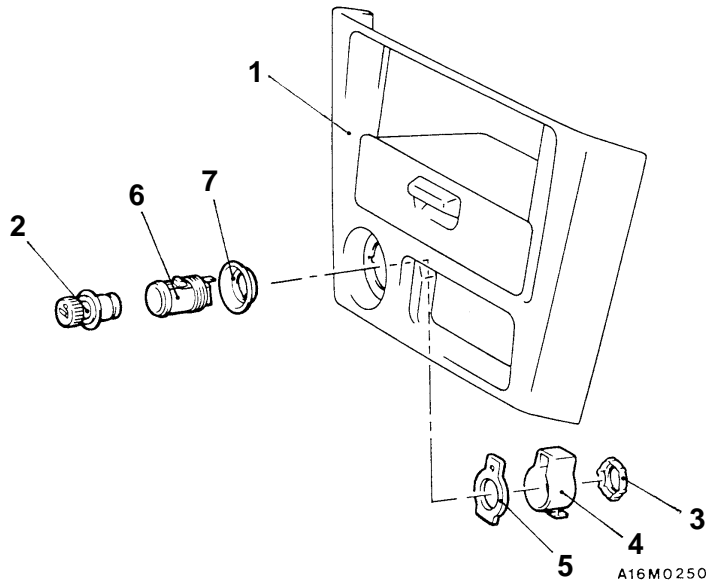
16M0225

INSPECTION

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

CIGARETTE LIGHTER

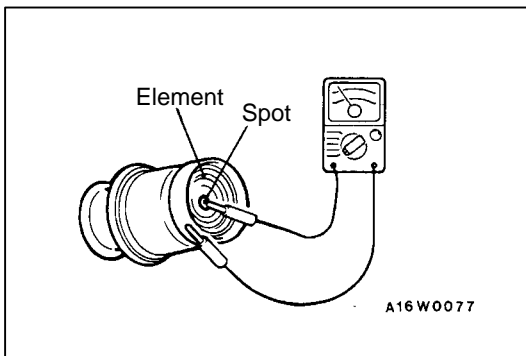
REMOVAL AND INSTALLATION



Removal steps

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

5. Socket washer
6. Socket
7. Protector




INSPECTION

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

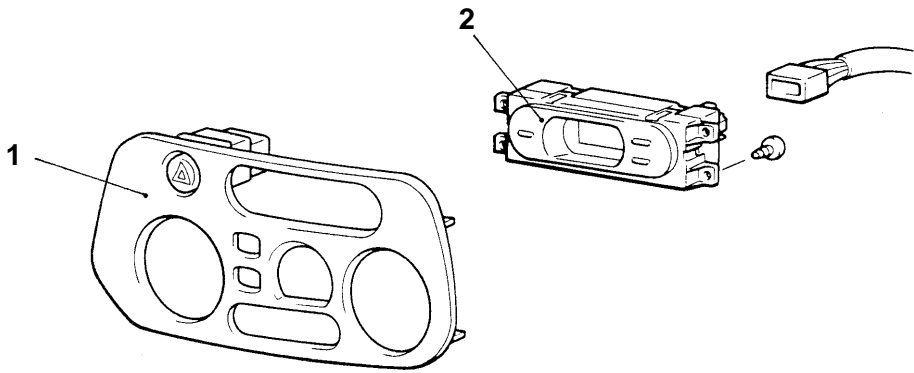
CLOCK

SPECIAL TOOL

Tool	Number	Name	Use
	MB990784	Ornament remover	Heater control panel removal

CLOCK

REMOVAL AND INSTALLATION




A16M0285

Removal steps

- 1. Heater control panel
- 2. Clock

RADIO AND TAPE PLAYER

SPECIAL TOOL

Tool	Number	Name	Use
	MB990784	Ornament remover	Audio panel removal

TROUBLESHOOTING

QUICK-REFERENCE TROUBLESHOOTING CHART

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

NOTE

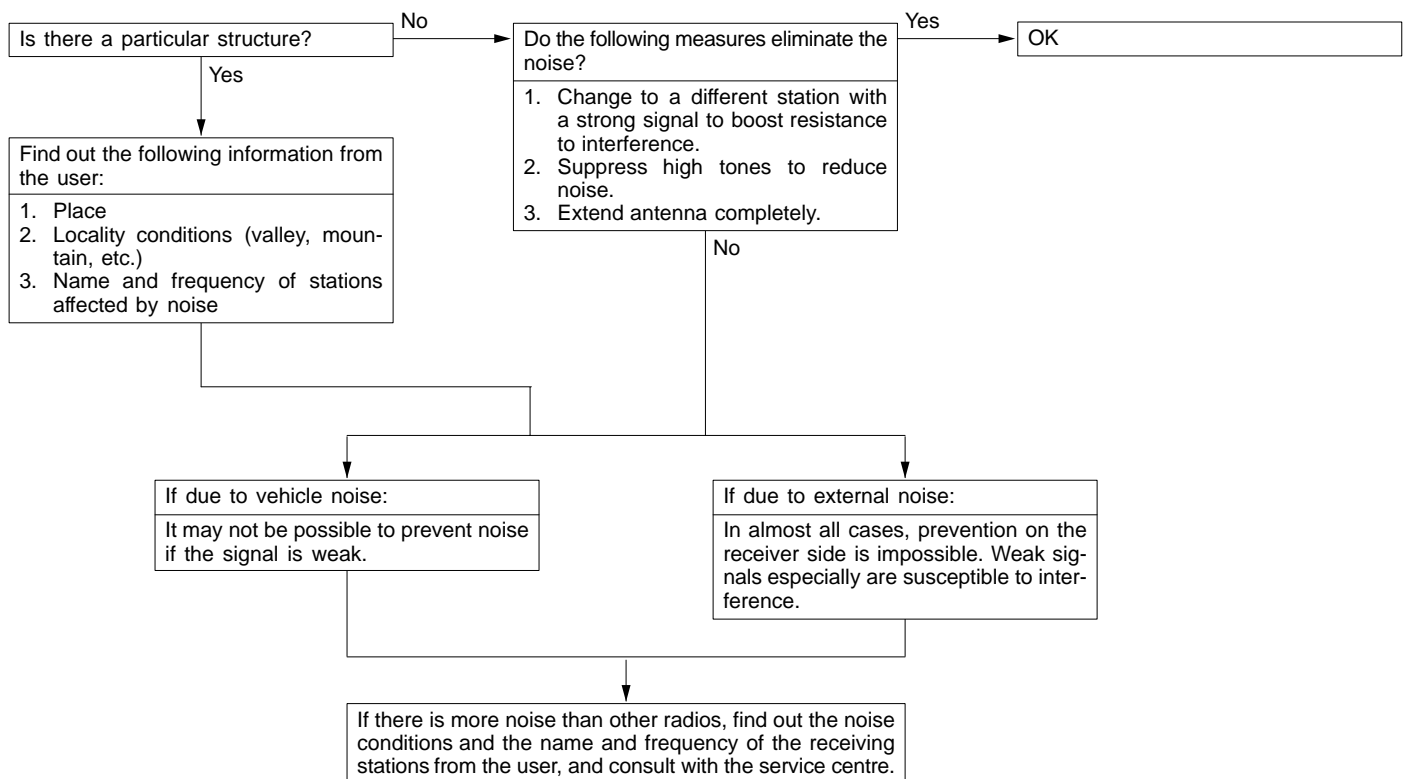
Refer to problem symptoms of AM radio for MW radio.

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

CHART

A. NOISE

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



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

Do the following measures eliminate the noise?

- Change to a different station with a strong signal to boost resistance to interference.
- Suppress high tones to reduce noise.
- Extend antenna completely.

Yes

OK

No

If there is more noise than other radios, find out the noise conditions and the name and frequency of the receiving stations from the user, and consult with the service centre.

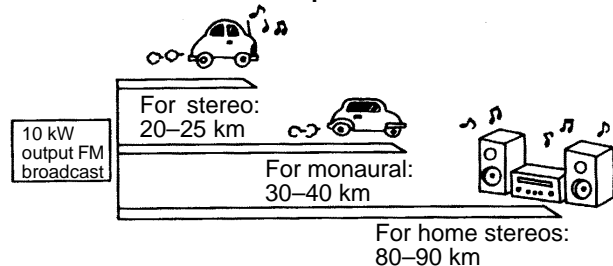
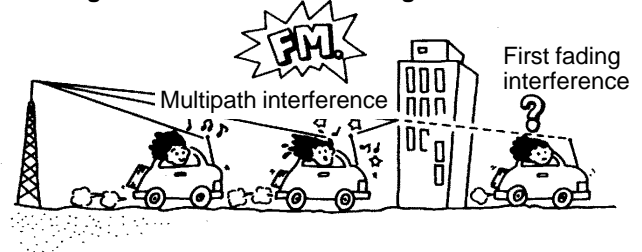
NOTE

About FM waves:

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

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

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

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

16W0268

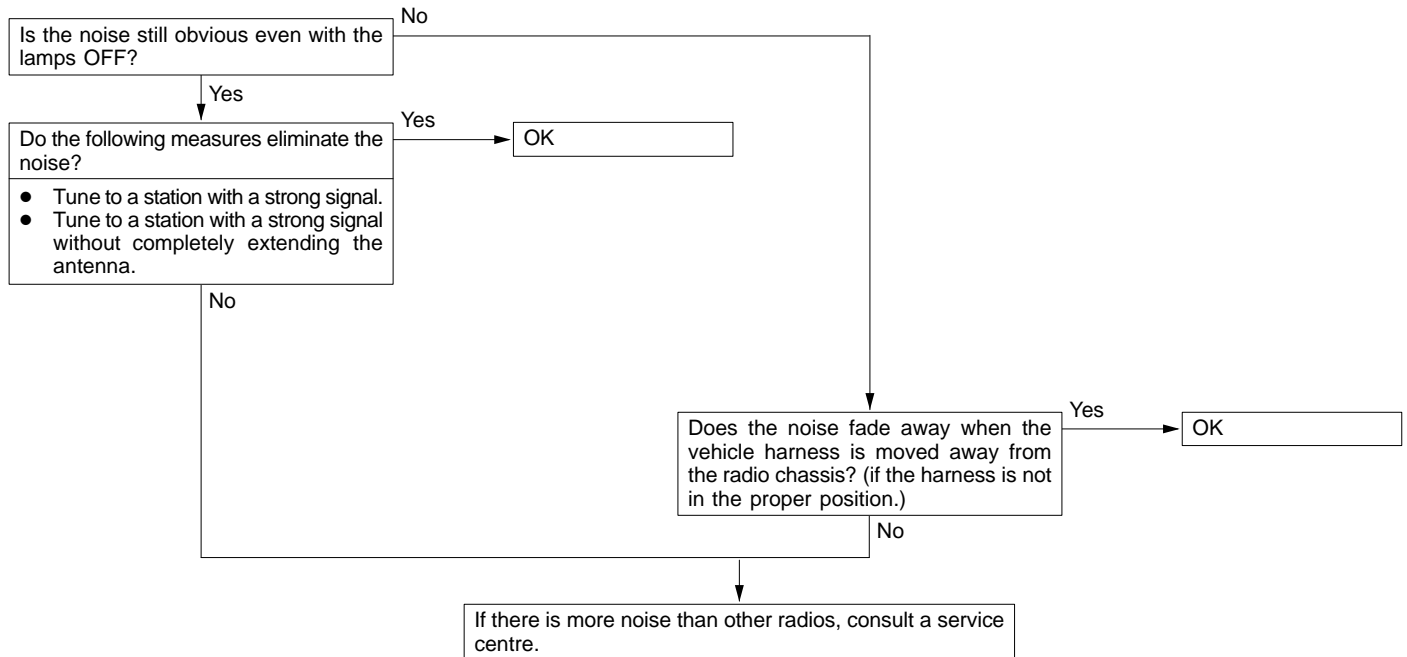
A-3 Mixed with noise, only at night (AM).

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

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

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

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



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

(1)

Noise occurs when the engine is stopped.

Yes

Do the following measures eliminate the noise?

- Tune to a station with a strong signal.
- Extend the antenna completely.
- Adjust the sound quality to suppress high tones.

Yes

OK

No

Is the radio body earth mounted securely?

No

Securely tighten the nuts for the body earth.

Yes

Is the antenna plug properly connected to the radio?

No

Correctly attach the antenna plug.

Yes

Is the antenna itself in good condition or is it properly mounted?

No

Clean the antenna plug and earth wire mounting area. Mount the antenna securely.

Yes

Is the noise eliminated?

Yes

OK

No

If there is more noise than other radios, consult a service centre.

(2)

Noise occurs when the engine is running.

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

NOTE

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

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

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

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

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

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

No

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

No

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

Yes

Yes

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

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

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

A-6 There is noise when starting the engine.

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

Caution

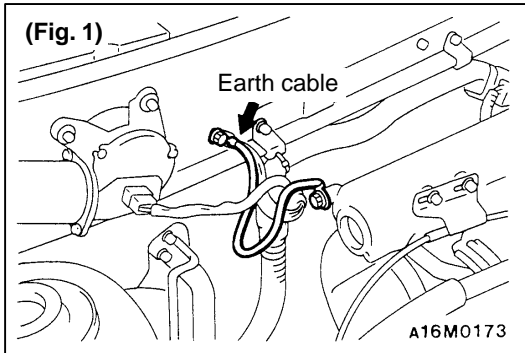
1. **Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.**
2. **Check that there is no external noise. Since failure caused by this may result in misdiagnosis due to inability to identify the noise source, this operation must be performed.**
3. **Noise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

NOTE

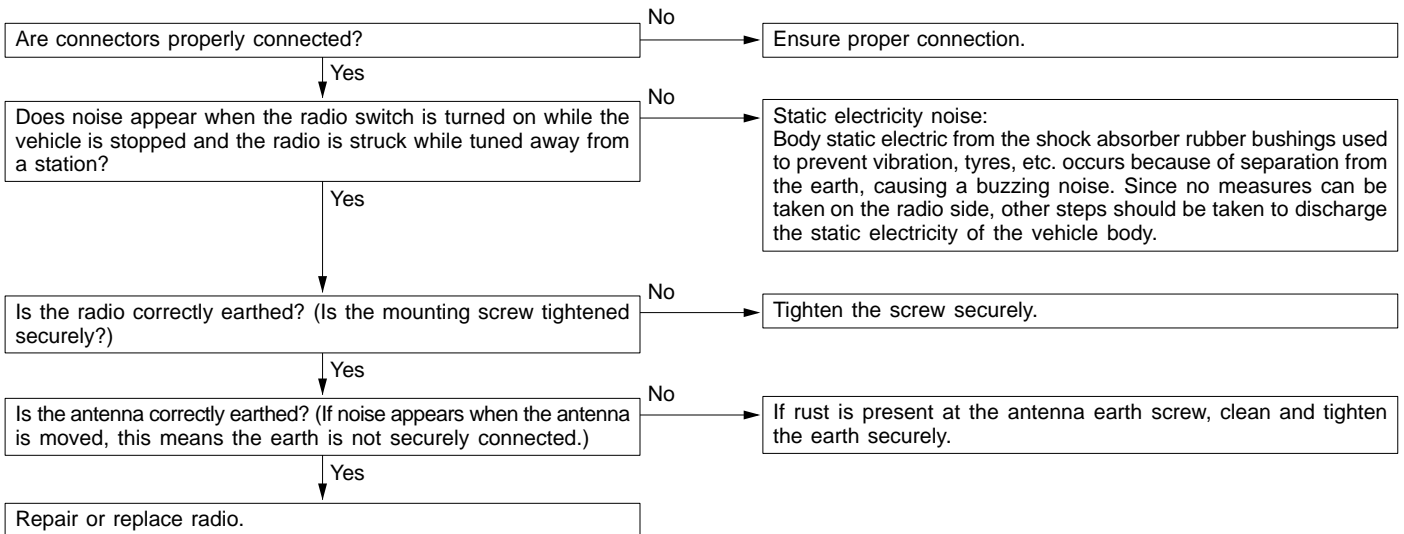
1. Capacitor
The capacitor does not pass D.C. current, but as the number of waves increases when it

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

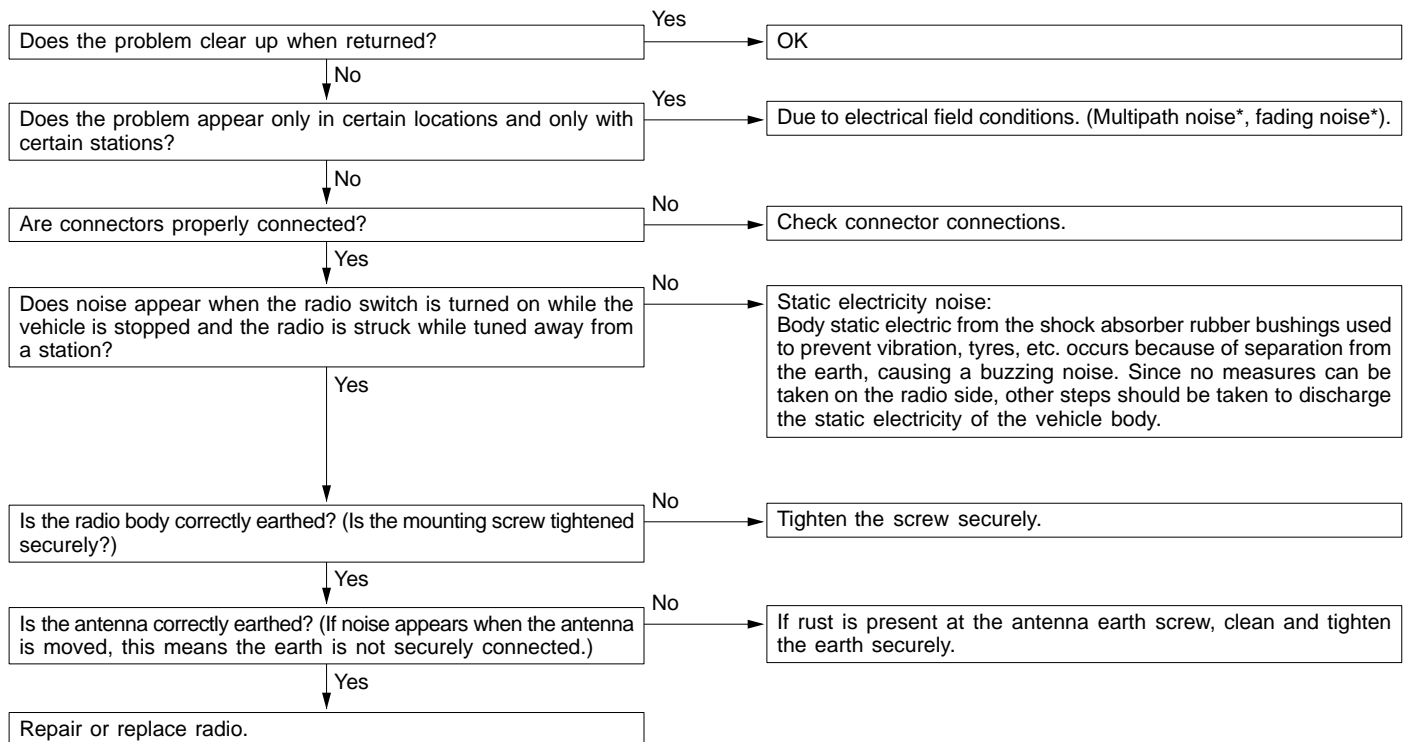
2. Coil
The coil passes D.C. current, but impedance rises as the number of waves increases relative to the A.C. current. A noise suppressing coil which takes advantage of this property is inserted into the power line for the noise source, and works by preventing the noise component from flowing or radiating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



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



A-8 Noise sometimes appears on FM during travelling.



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

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

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

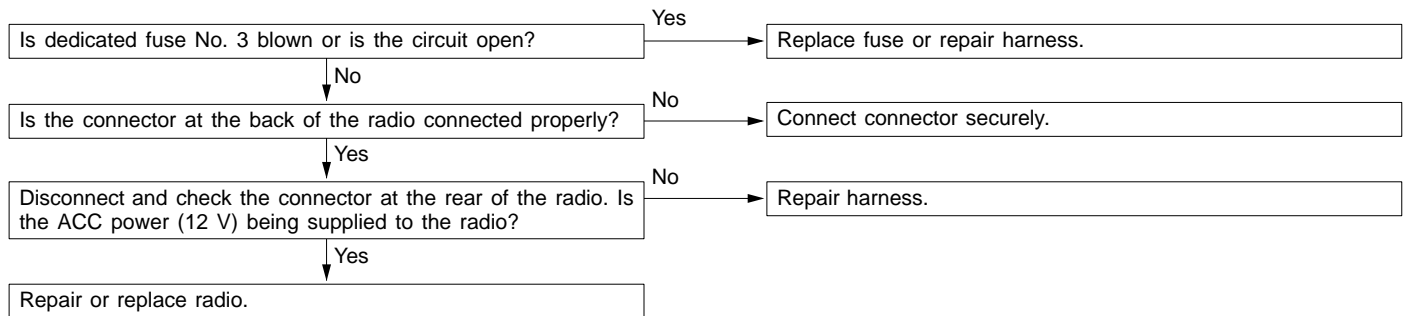
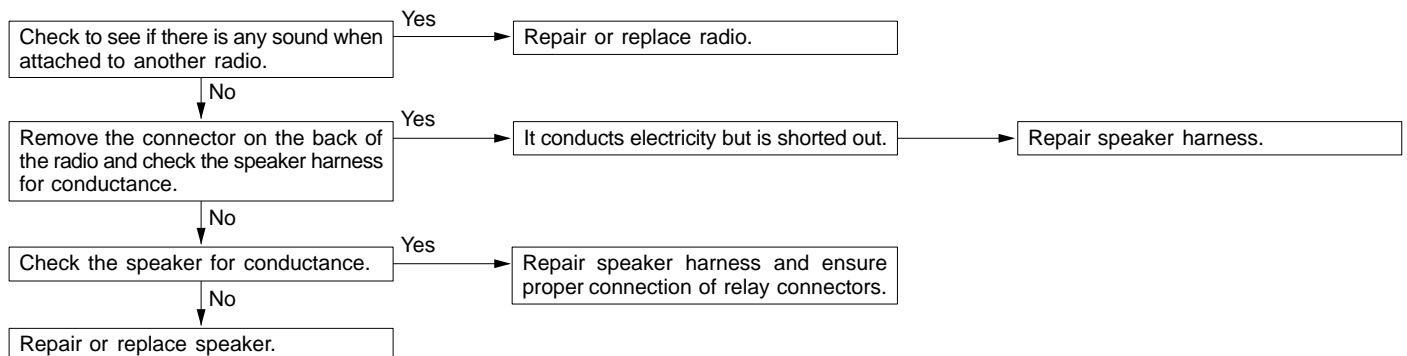
- Fading noise
This is a buzzing noise that occurs when the broadcast beam is disrupted by obstructing objects and the signal strength fluctuates intricately within a narrow range.

A-9 Ever-present noise.

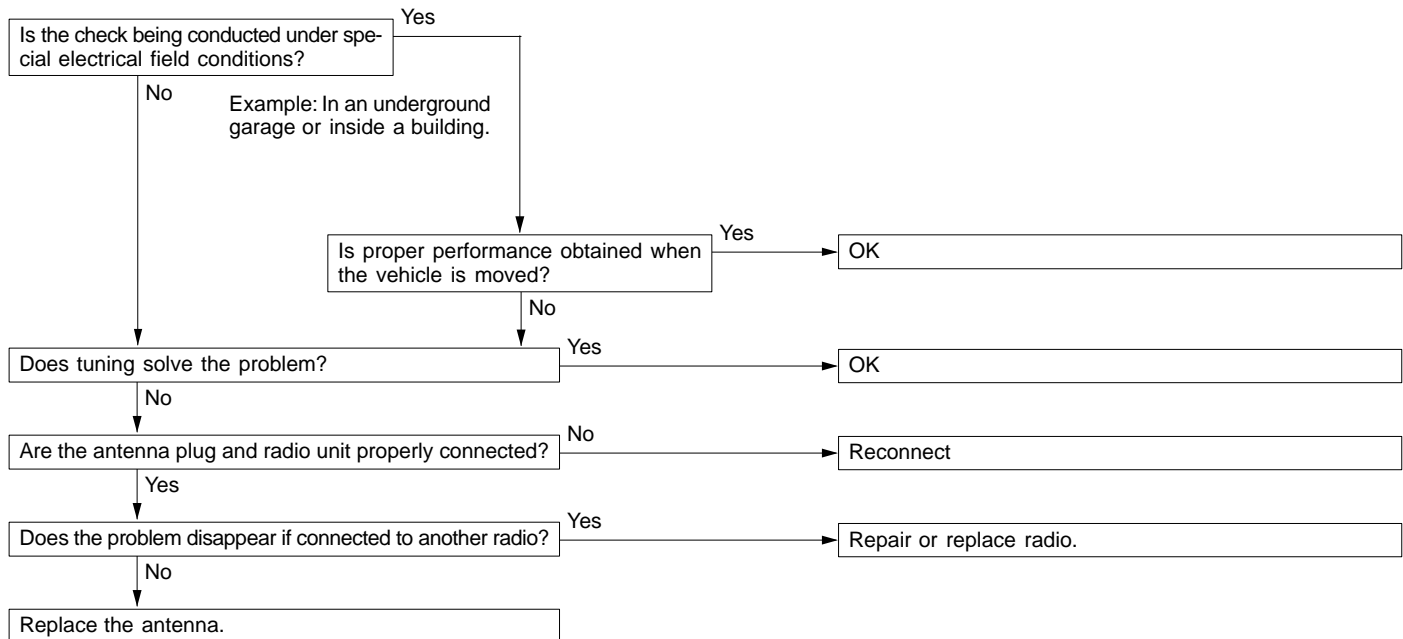
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

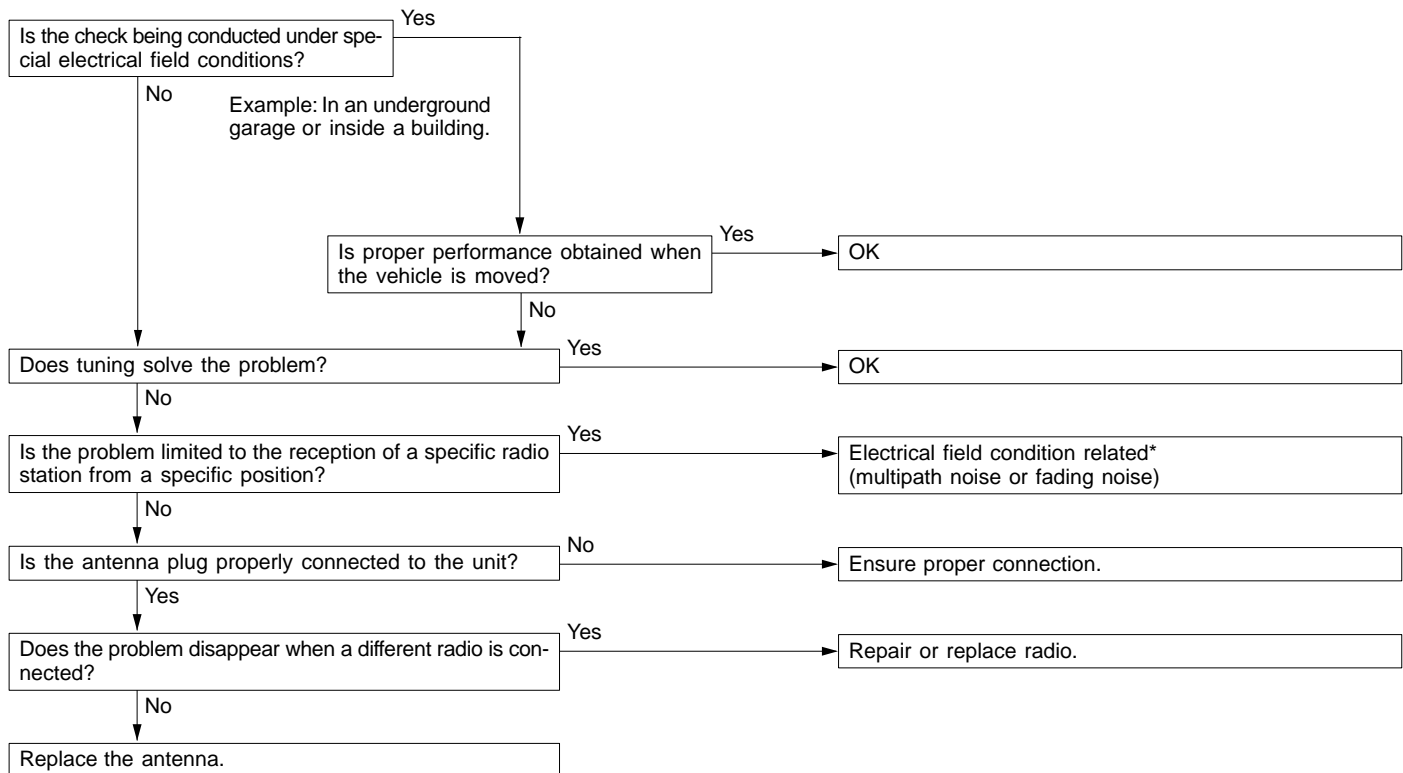
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service centre.

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

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

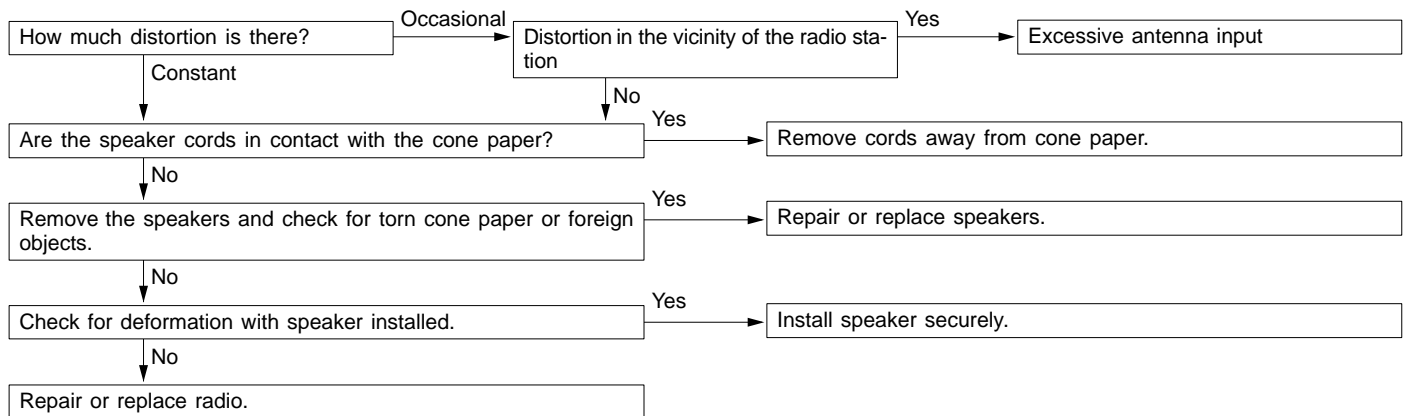


B-4 Insufficient sensitivity.

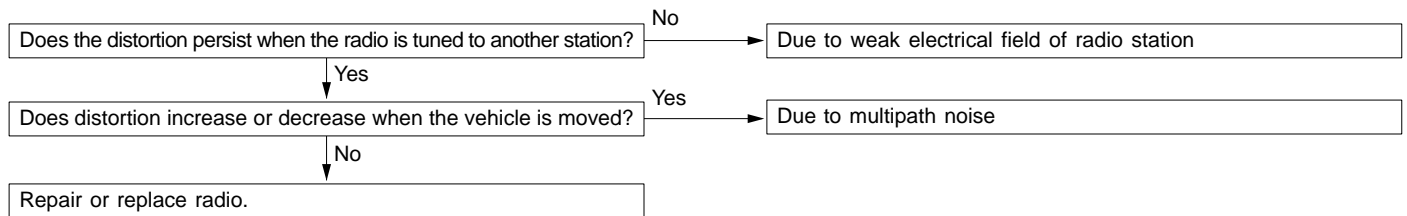


* For multipath noise and fading noise problems

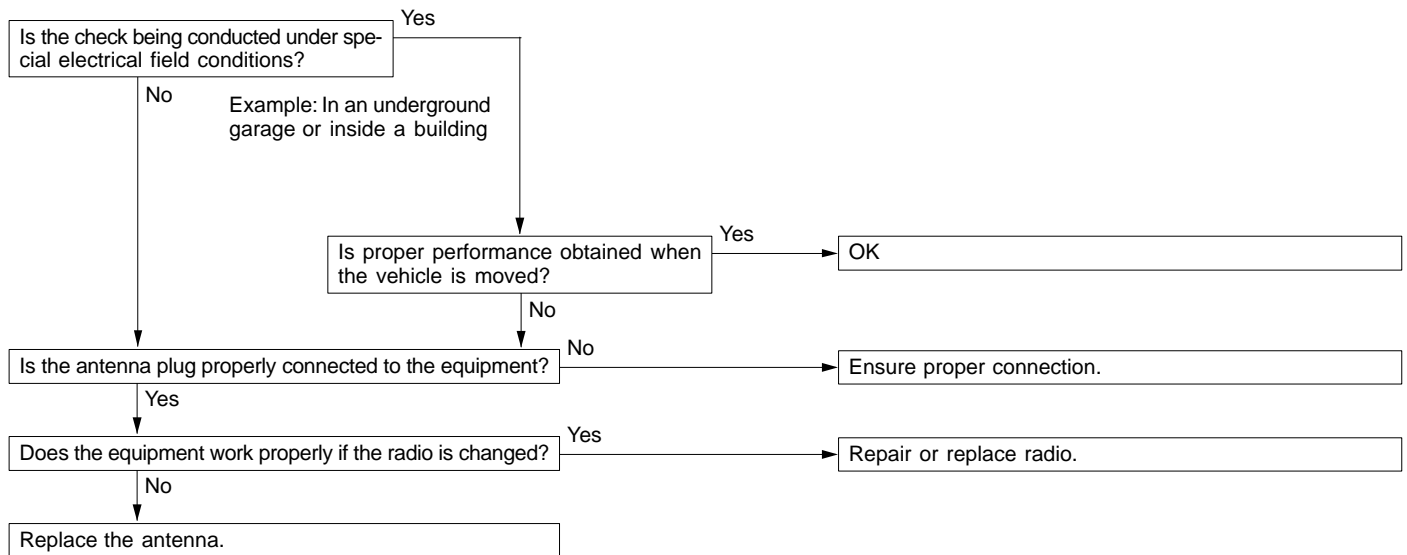
B-5 Distortion on AM or on both AM and FM.

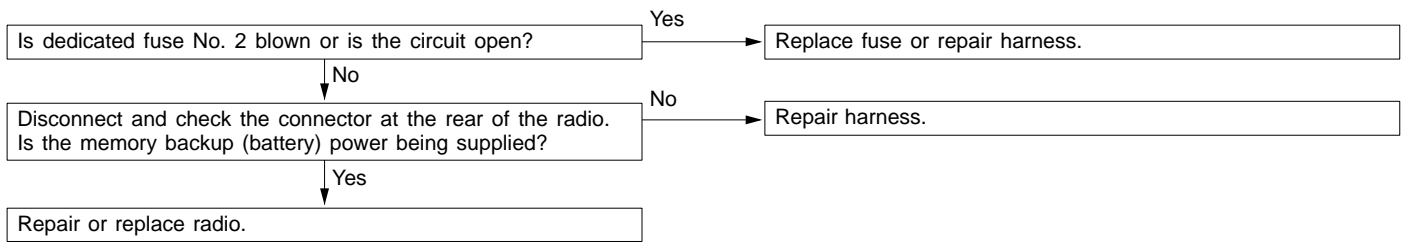
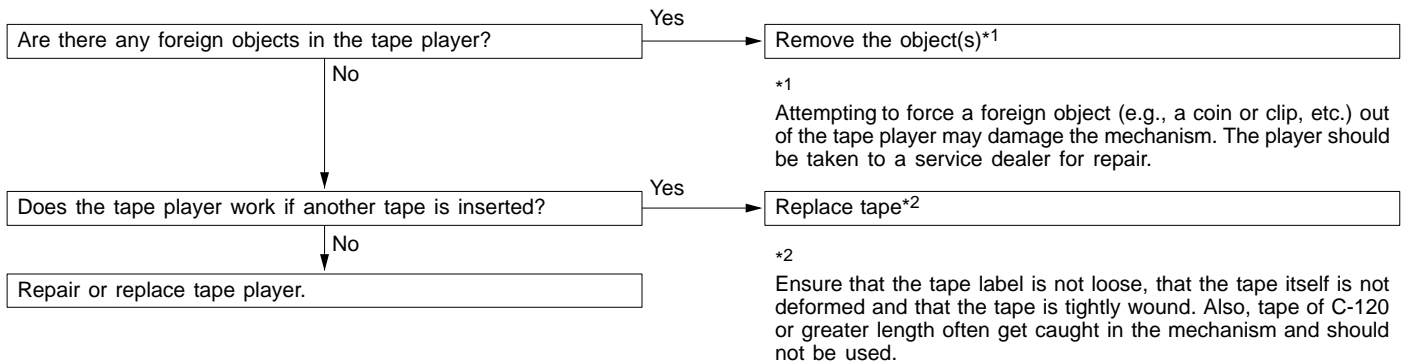
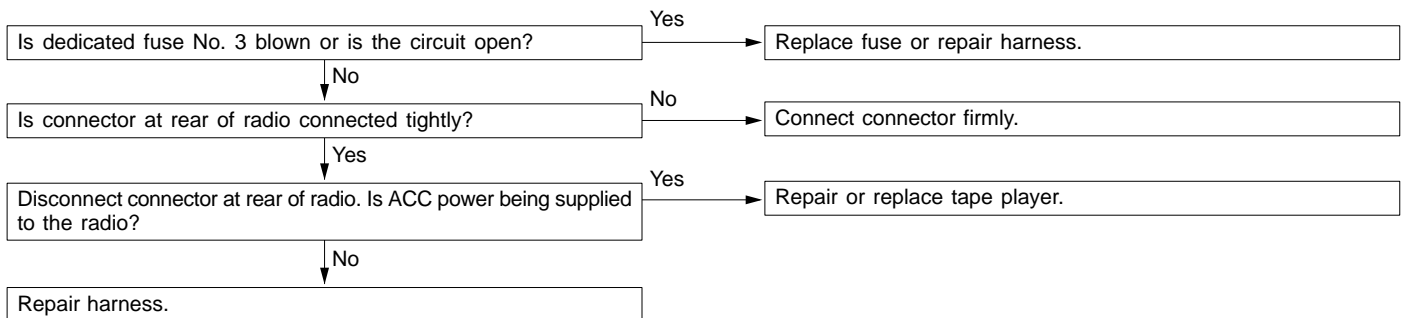


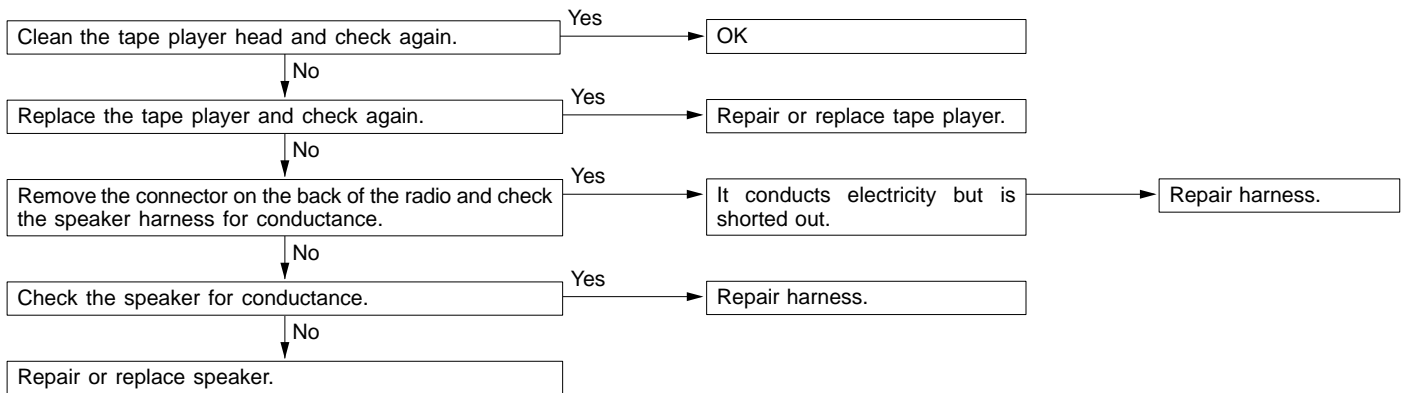
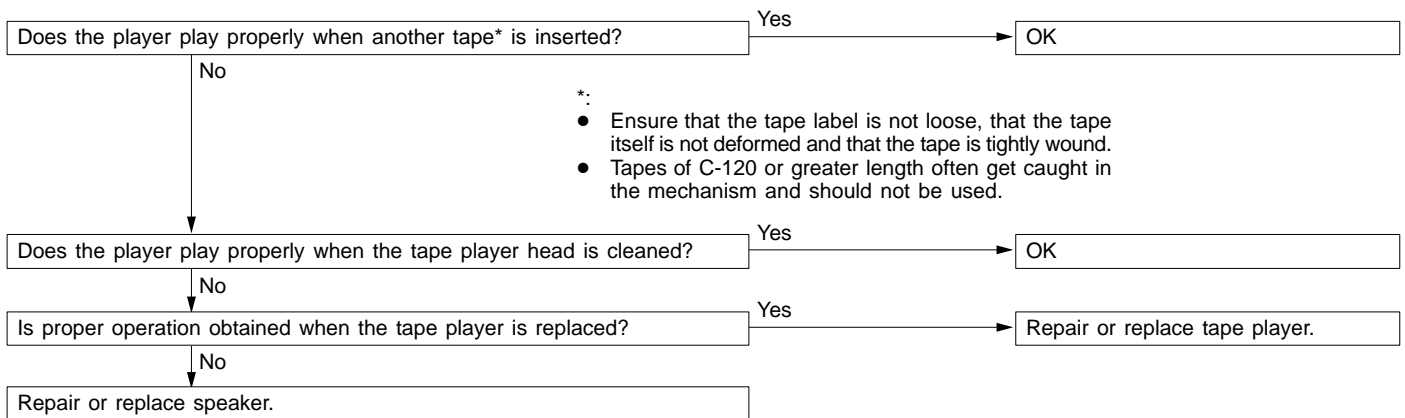
B-6 Distortion on FM only



B-7 Too few automatic select stations.



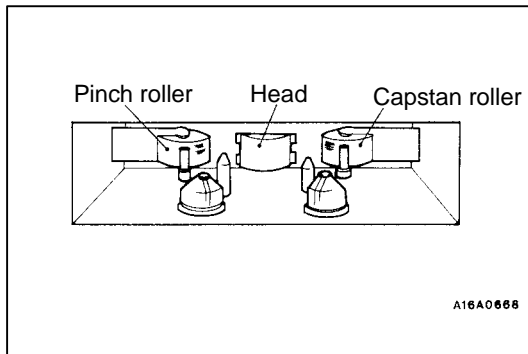
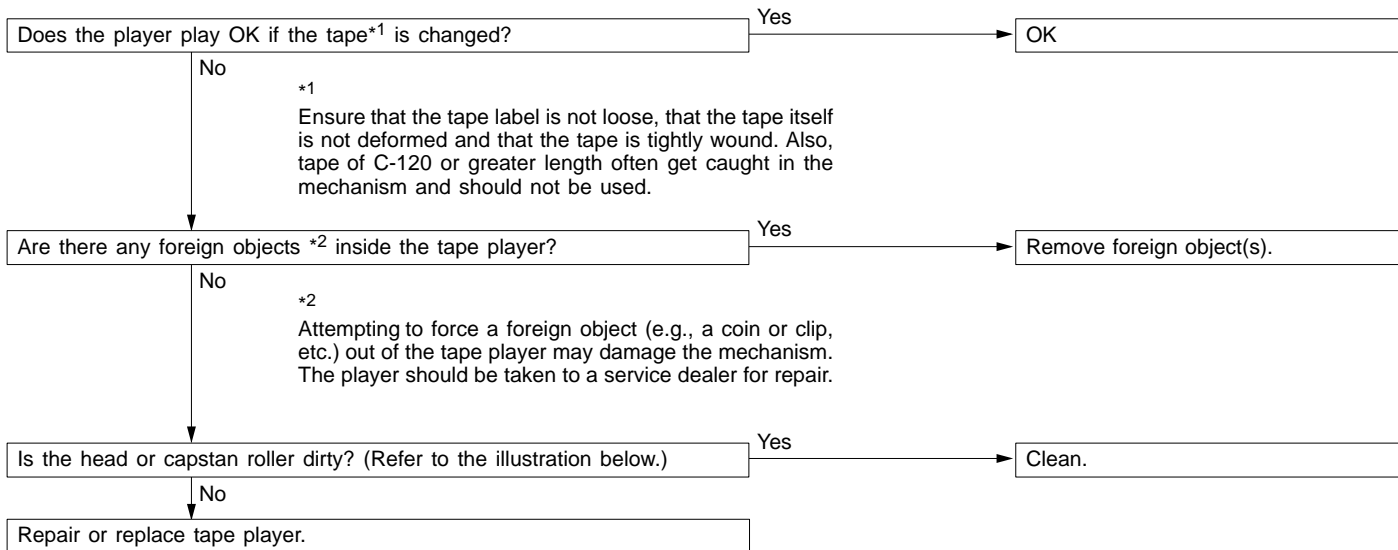
B–8 Insufficient memory (preset stations are erased).**C. TAPE PLAYER****C–1 Cassette tape will not be inserted.****C–2 No sound (even after a tape has been inserted).**

C-3 No sound from one speaker.**C-4 Sound quality is poor, or sound is weak.****C-5 Cassette tape will not be ejected.**

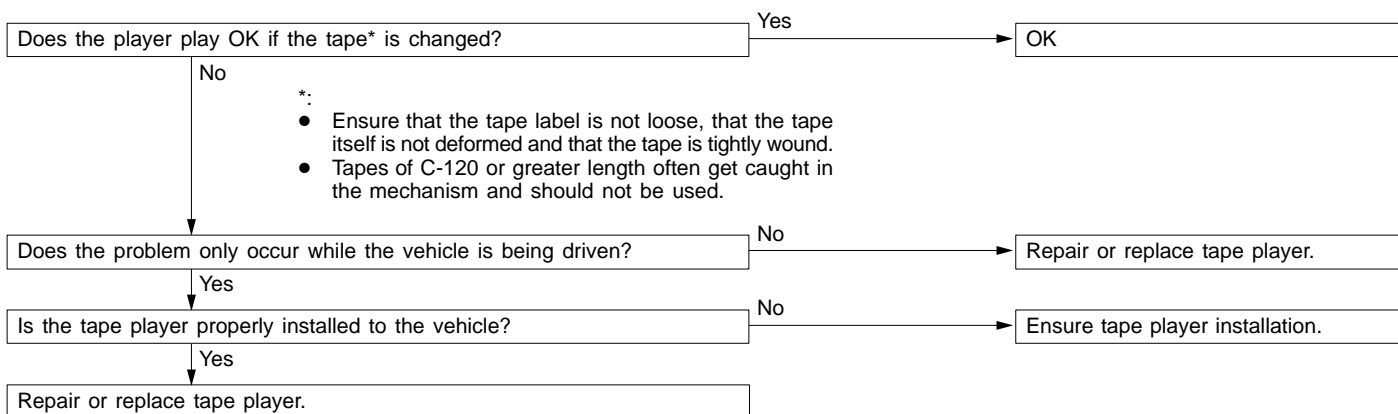
The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are

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

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



C-7 Faulty auto reverse.



C-8 Tape gets caught in mechanism*1.

*1

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

Does the player play OK if the tape*2 is changed?

Yes

Tape used is bad.

No

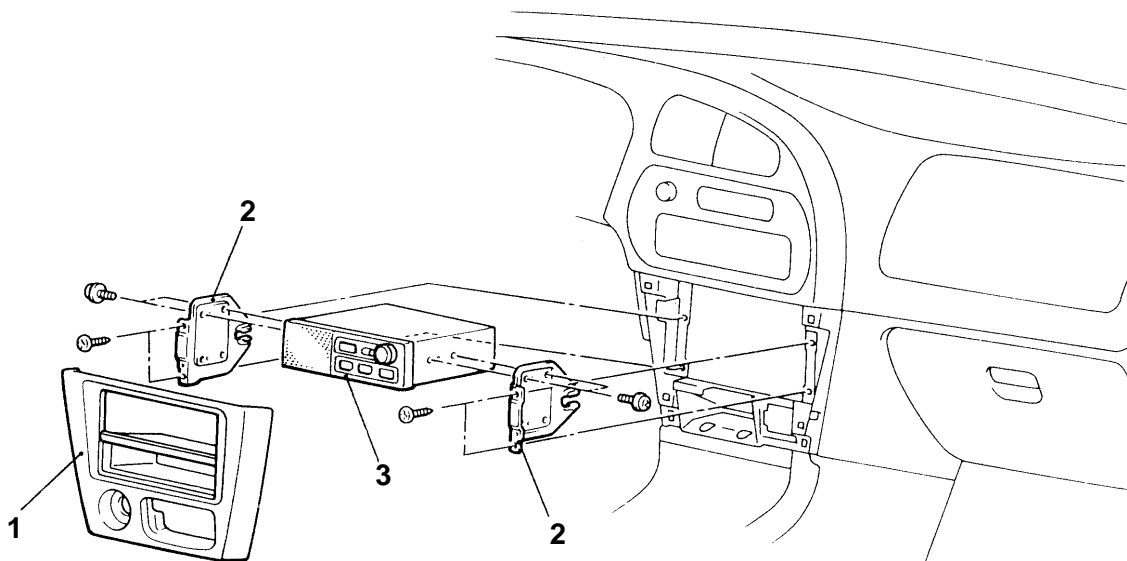
*2

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

Repair or replace tape player.

RADIO AND TAPE PLAYER

REMOVAL AND INSTALLATION



A16M0320

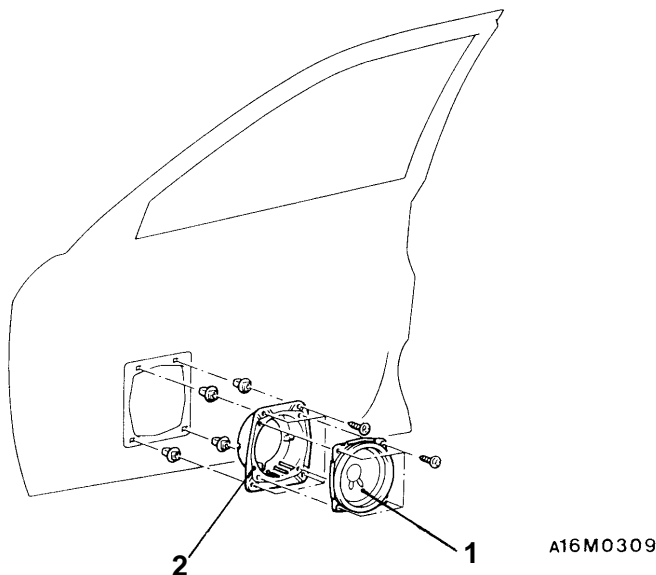
Removal steps

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

SPEAKER

REMOVAL AND INSTALLATION

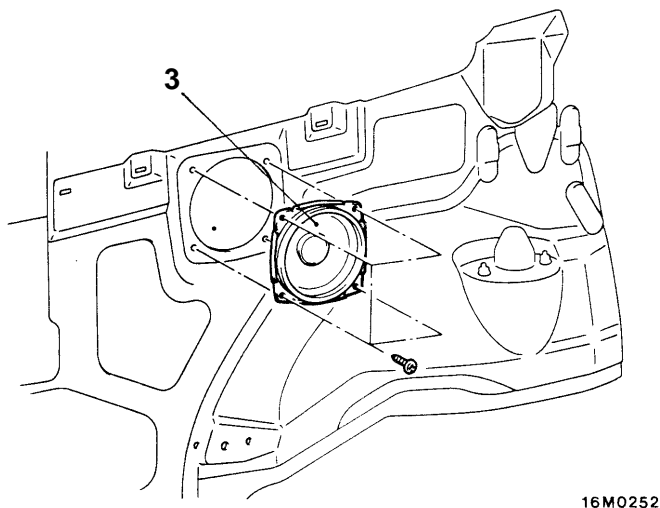
<FRONT SPEAKER>



Removal steps

- Front door trim
- 1. Front speaker
- 2. Speaker cover

<REAR SPEAKER – HATCHBACK>

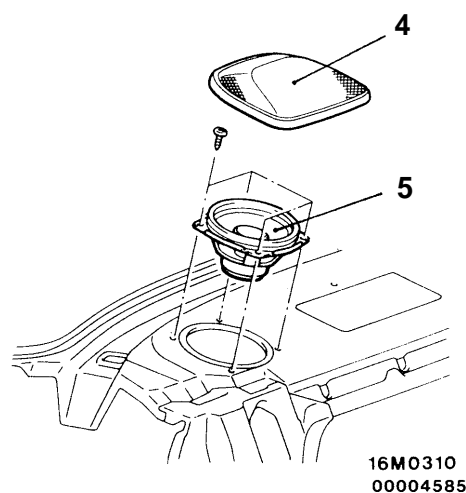


Removal steps

<Hatchback>

- Quarter trim
- 3. Rear speaker

<REAR SPEAKER – SEDAN>

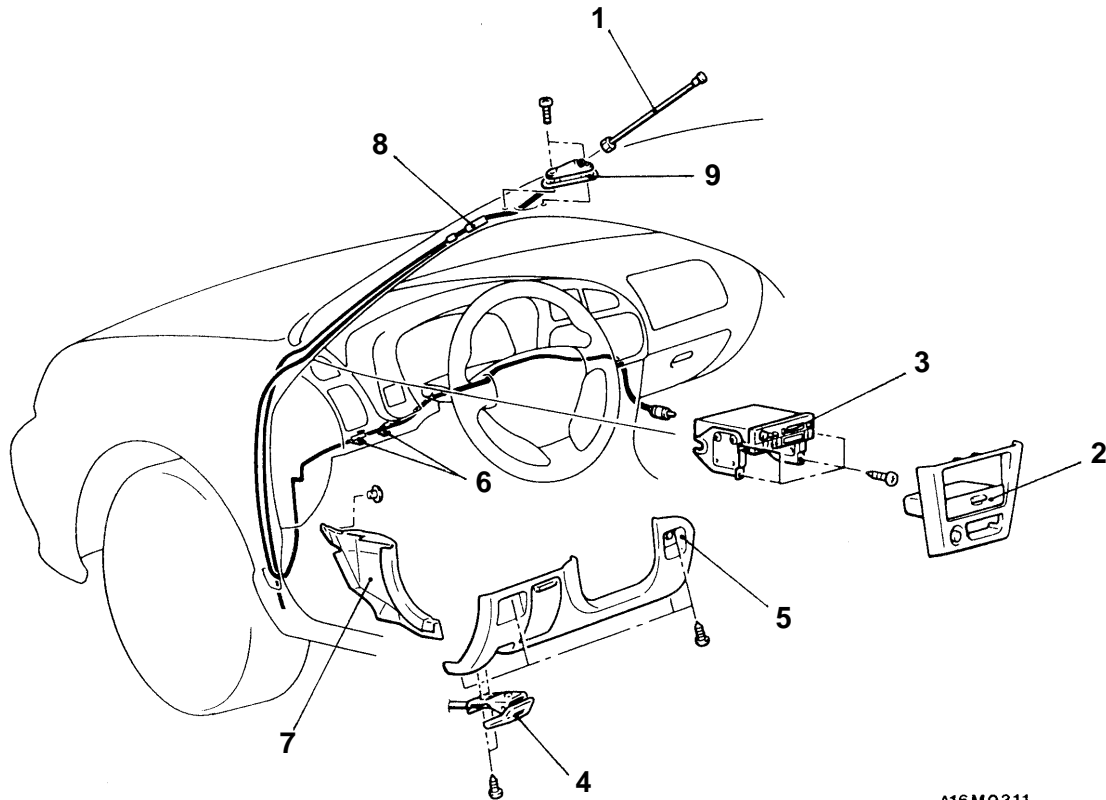


<Sedan>

- 4. Rear speaker garnish
- 5. Rear speaker

ANTENNA

REMOVAL AND INSTALLATION



A16M0311

Removal steps

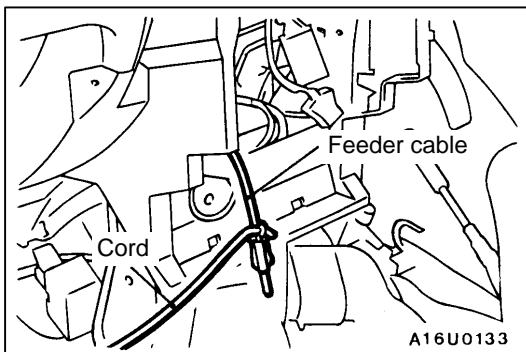
1. Antenna rod
2. Audio panel
3. Radio and tape player assembly
4. Hood lock release handle
5. Driver side lower cover
6. Clip
7. Cowl side trim
8. Antenna assembly
9. Antenna base gasket

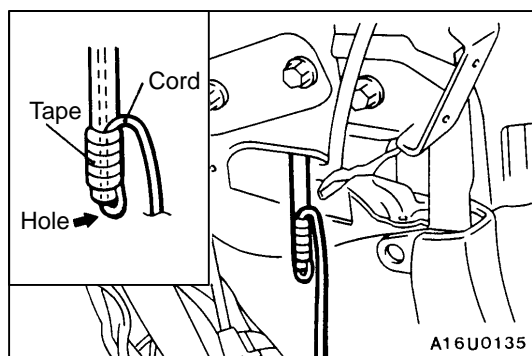


REMOVAL SERVICE POINT

◀A▶ ANTENNA BASE REMOVAL

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





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

Caution

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

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

MAIN

Group
54

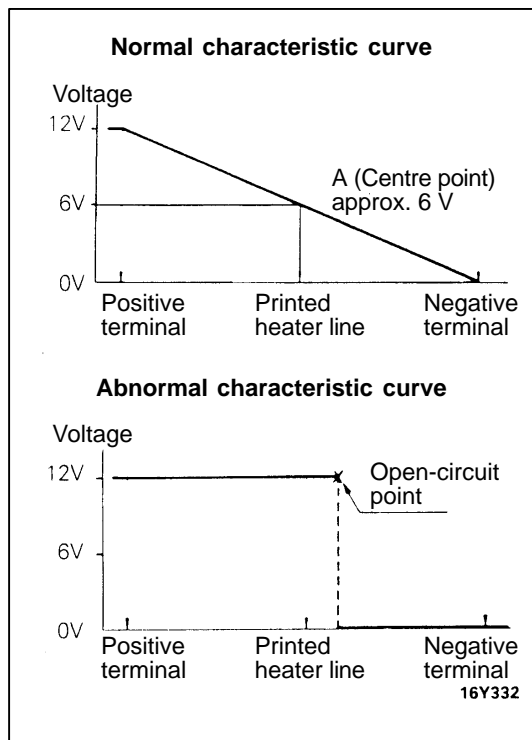
1996

REAR WINDOW DEFOGGER

ON-VEHICLE SERVICE

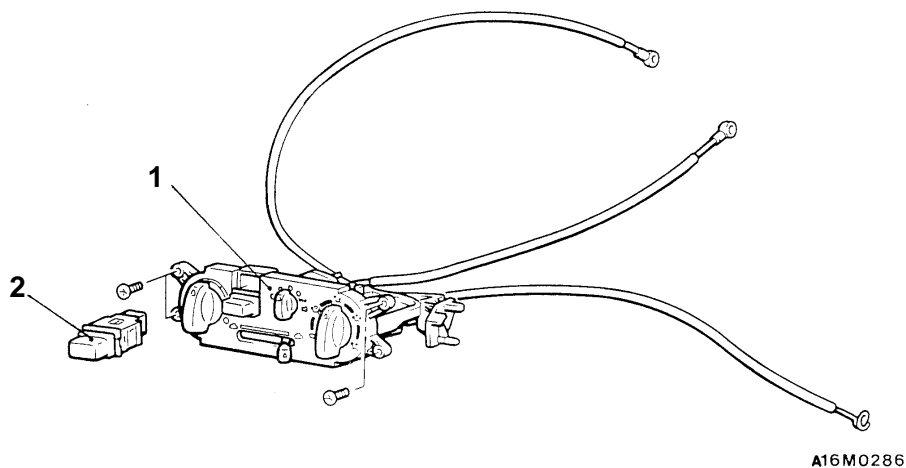
PRINTED-HEATER LINE CHECK

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



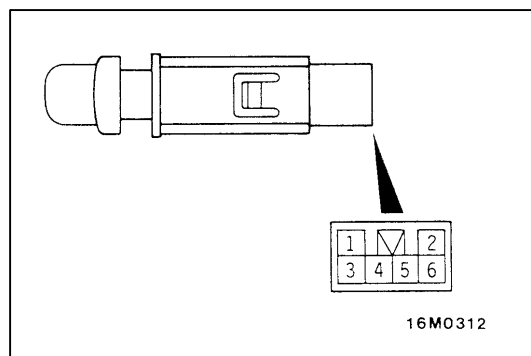
REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION



Removal steps

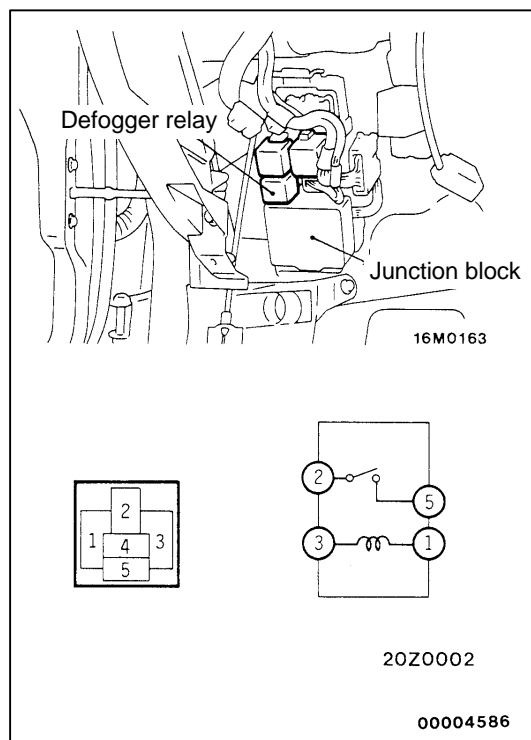
1. Heater control assembly
2. Rear window defogger switch



INSPECTION

DEFOGGER SWITCH CONTINUITY CHECK

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



REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

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