CHASSIS ELECTRICAL

CONTENTS

54109000112

CONTINUED ON NEXT PAGE

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

WARNING!

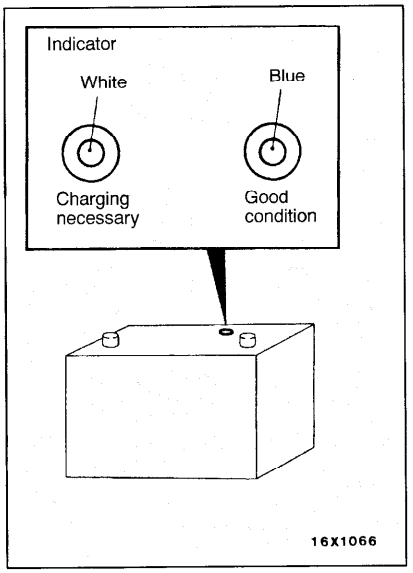
(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).

(2) 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) and GROUP 00 - Maintenance Service before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

The SRS includes the following components: SRS-ECU, SRS warning light, 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 and asterisk (*).



BATTERY

54100100057

ON-VEHICLE SERVICE

BATTERY CHECK

BATTERY VISUAL INSPECTION (1)

The battery contains a visual test indicator which gives a blue signal when an adequate charge level exists, and a white signal when charging is required.

BATTERY VISUAL INSPECTION (2)

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

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

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

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

BATTERY CHARGING

54100110074

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

Battery electrolyte temperature may temporarily be allowed to rise to 55°C (131°F). Increase of electrolyte temperature above 55°C (131°F) is harmful to the battery, causing deformation of battery cell, decrease in life of battery, etc.

CHARGE RATE

If the test indicator is white, the battery should be charged as outlined below.
When the dot appears or when maximum charge shown below is reached, charging should be stopped.

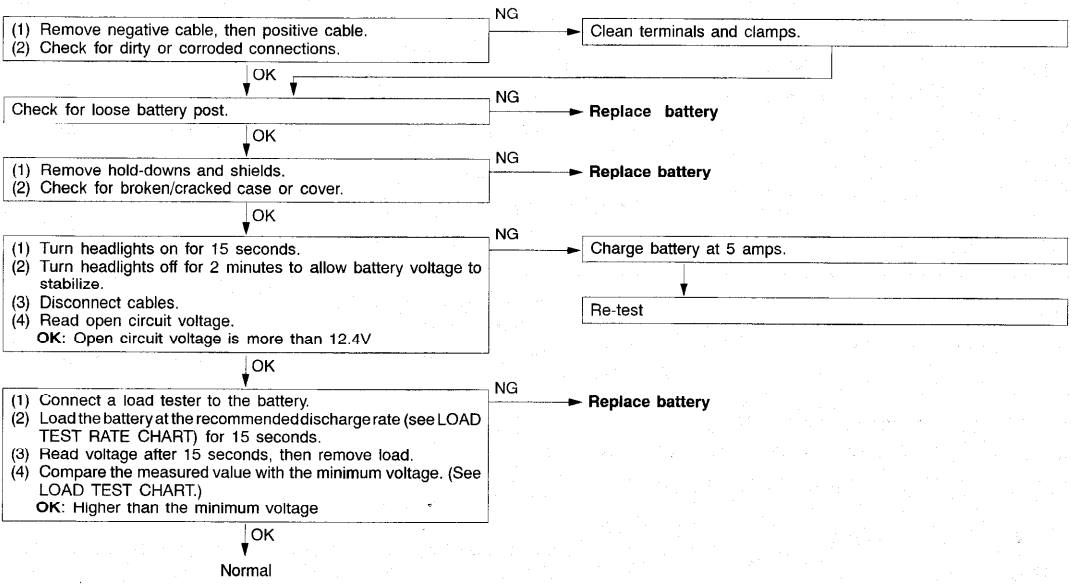
Charge Rate Chart

Battery	55B24L (433 amps)
Slow charging	5 amps 10 hrs.
	10 amps 5 hrs.
Fast charging	20 amps 2.5 hrs.
	30 amps 1.5 hrs.

BATTERY TESTING PROCEDURE

54100120091

TEST STEP



LOAD TEST CHART

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

LOAD TEST RATE CHART

Load test (AMPS)	210 amps
Cranking rating (0°F)	433 amps
Reserve capacity	79 minutes
Application	55B24L

IGNITION SWITCH

54300010240

GENERAL INFORMATION

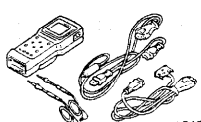
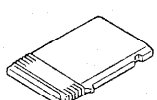
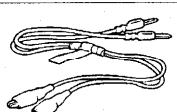
OPERATION

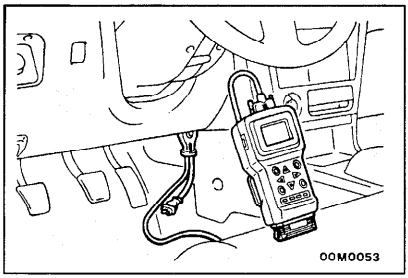
Ignition key reminder warning buzzer circuit

- When, with the ignition key inserted in the key cylinder (with the key reminder switch at OFF), the driver's door is opened (door switch is switched ON), the ECU detective circuit will activate.
- This system is controlled by either ETACS-ECU or BUZZER-ECU on non-ETACS equipped vehicles.
- With the detective circuit activated, buzzer output from the drive circuit makes the buzzer sound intermittently to remind the ignition key is still in the ignition switch.

SPECIAL TOOLS

54300060214

Tool	Tool number and name	Supersession	Application
 B991502	MB991502 Scan tool (MUT-II)	MB991496-OD	ETACS-ECU input signal checking
 B991325	ROM pack		ETACS-ECU input signal checking
 B991529	MB991529 Diagnostic trouble code check harness	Tool not necessary if scan tool <MUT-II> is available	ETACS-ECU input signal checking (when using a voltmeter)



TROUBLESHOOTING

54300700093

DIAGNOSTIC FUNCTION

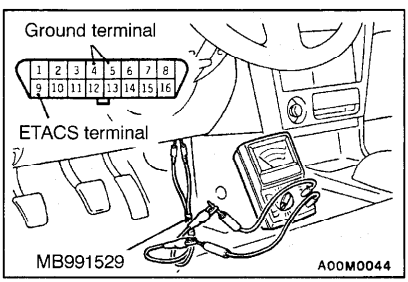
INPUT SIGNAL INSPECTION POINTS <VEHICLES WITH ETACS-ECU>

When Using the Scan Tool

1. Connect the scan tool to the data link connector.

   Caution
   The ignition switch should always be turned OFF when connecting and disconnecting the scan tool.

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



When Using the Voltmeter

1. Use the special tool to connect a voltmeter between the ground terminal and the ETACS terminal of data link connector.
2. If the voltmeter indicator deflects once when a switch is operated (ON/OFF), the ECU input signal for that switch circuit system is normal.

INSPECTION CHART FOR TROUBLE SYMPTOMS

54300720709

Trouble symptom		Inspection procedure No.	Reference page
Communication with scan tool is not possible. <Vehicles with ETACS-ECU>	Communication with all systems is not possible.	1	54-7
	Communication with the one-shot pulse input signal only is not possible.	2	54-7
Ignition key reminder warning buzzer	While the ignition key reminder warning buzzer sounds, the buzzer does not stop sounding when the ignition key is turned to the ON position. (The buzzer does not sound by closing the driver's door.)	3	54-7
	The ignition key reminder warning buzzer does not stop sounding by removing the ignition key. (The buzzer does not sound by closing the driver's door.)	4	54-8
	The ignition key reminder warning buzzer does not sound when the ignition key is inserted and the driver's door is opened. (The ignition key is turned to OFF position.)	5	54-9

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

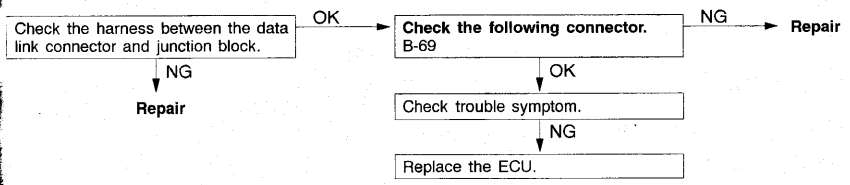
INSPECTION PROCEDURE 1

Communication with scan tool is not possible. (Communication with all systems is not possible.)	Probable cause
The reason is probably a defect in the power supply system (including ground) for the diagnostic line.	• Malfunction of connector • Malfunction of harness wire

Refer to GROUP 13A - Trouble-shooting.

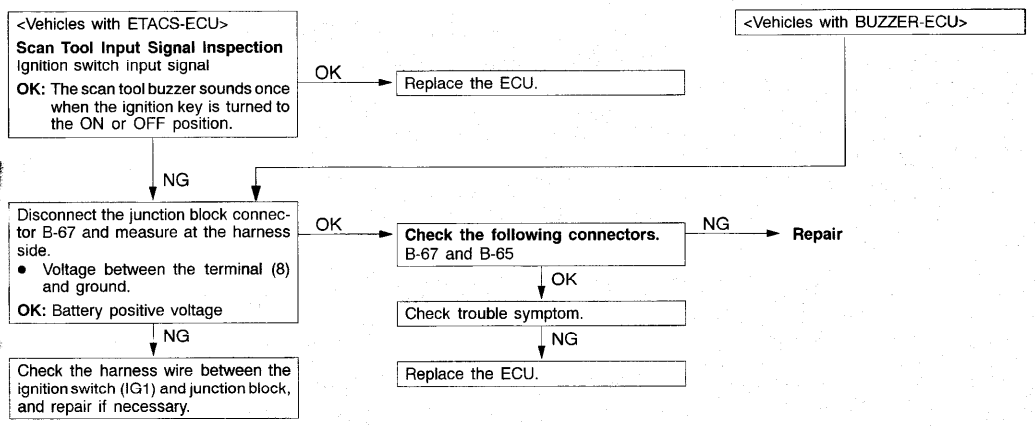
INSPECTION PROCEDURE 2

Communication with scan tool is not possible. (Communication with the one-shot pulse input signal only is not possible.)	Probable cause
The cause is probably a defective one-shot pulse input signal circuit system of the diagnostic line.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



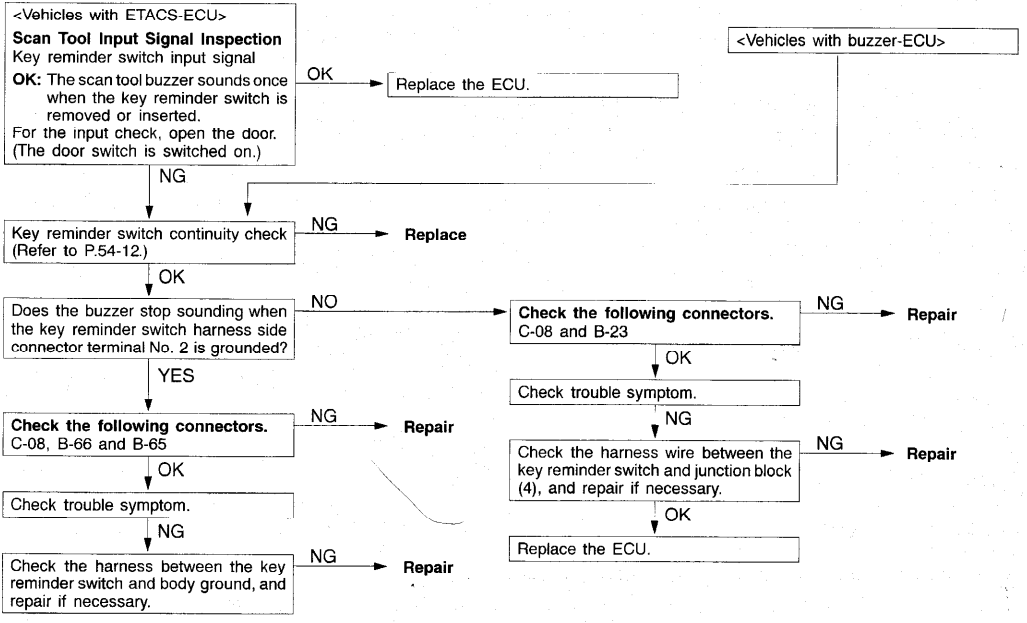
INSPECTION PROCEDURE 3

• While key hole illumination light is illuminated, ignition key is turned to the ON position but key hole illumination light does not switch off. (However, it switches off after 10 seconds.) • While the ignition key reminder warning buzzer sounds, the buzzer does not stop sounding when the ignition key is turned to the ON position. (The buzzer does not sound by closing the driver's door.)	Probable cause
The cause is probably a defective ignition switch input circuit or a defective ECU.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



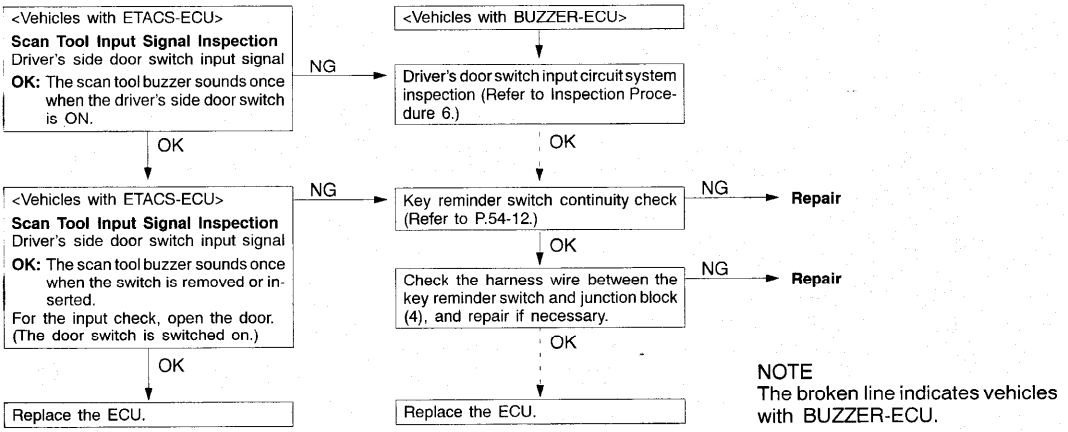
INSPECTION PROCEDURE 4

The ignition key reminder warning buzzer does not stop sounding by removing the ignition key. (The buzzer does not sound by closing the driver's door.)	Probable cause
It is possible that there is a malfunction of the key reminder switch input circuit or the ECU.	• Malfunction of key reminder switch • Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



INSPECTION PROCEDURE 5

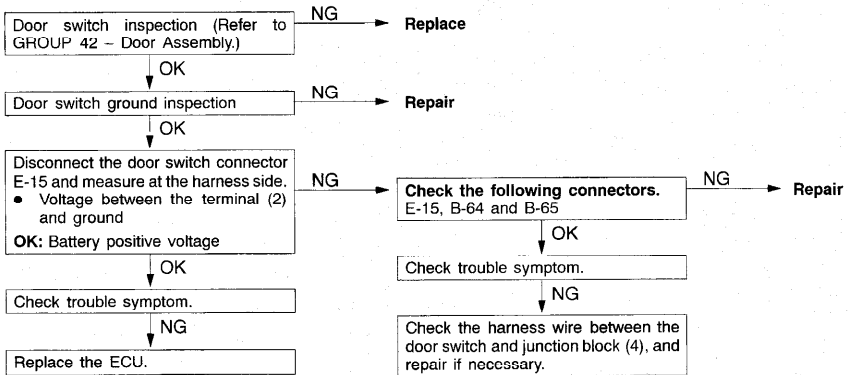
The ignition key reminder warning buzzer does not sound when the ignition key is inserted in the key cylinder and the driver's door is opened. (The ignition key is turned to OFF position.)	Probable cause
It is possible that there is a malfunction of the door switch input circuit or the key reminder switch input circuit, in case the ignition key hole illumination light is defective.	• Malfunction of driver's side door switch • Malfunction of bulb • Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



NOTE
The broken line indicates vehicles with BUZZER-ECU.

INSPECTION PROCEDURE 6

Driver's side door switch input circuit system inspection



IGNITION SWITCH

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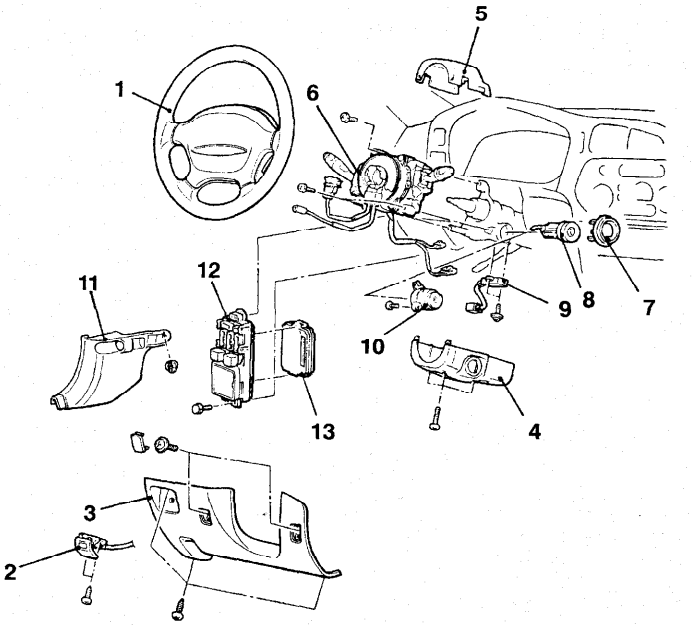
REMOVAL AND INSTALLATION

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



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Steering lock cylinder removal steps

1. Steering wheel (Refer to GROUP 37A - Steering Wheel and Shaft)
2. Hood lock release handle
3. Instrument under cover
4. Column cover, lower
5. Column cover, upper
▶A◀ 6. Clock spring and column switch assembly
7. Ring cover
◀A▶ 8. Steering lock cylinder

Key reminder switch removal steps

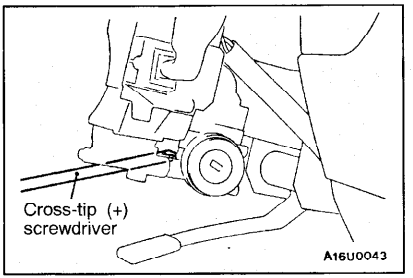
4. Column cover, lower
5. Column cover, upper
9. Key reminder switch

Ignition switch removal steps

4. Column cover, lower
5. Column cover, upper
10. Ignition switch

BUZZER-ECU or ETACS-ECU removal steps

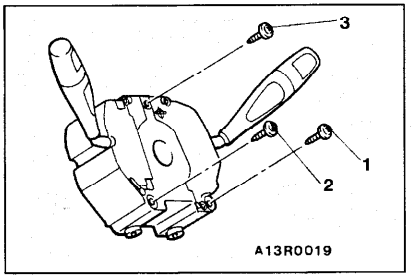
11. Cowl side trim (LH)
12. Junction block
13. BUZZER-ECU or ETACS-ECU



REMOVAL SERVICE POINT

◀A▶ STEERING LOCK CYLINDER REMOVAL

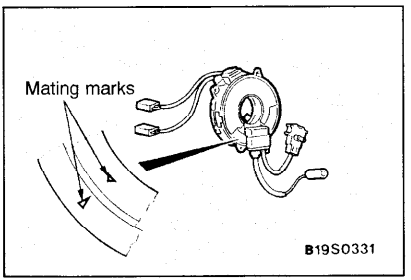
1. Insert the key in the steering lock cylinder and turn it to the "ACC" position.
2. Using a cross-tip (+) screwdriver (small) or similar tool, push the lock pin of the steering lock cylinder inward and then pull the steering lock cylinder toward you.



INSTALLATION SERVICE POINT

▶A◀ CLOCK SPRING AND COLUMN SWITCH ASSEMBLY INSTALLATION

1. Tighten the screws in the order shown.



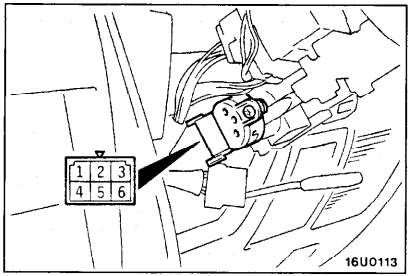
2. Align the clock spring mating marks and, after turning the front wheels to the straight-ahead position, install the clock springs to the column switch.

Mating Mark Alignment

Turn the clock spring clockwise fully, and then turn back it approx. 3 4/5 turns counterclockwise to align the mating marks.

Caution

If the clock spring's mating marks are not properly aligned, the steering wheel may not rotate completely during a turn, or the flat cable within the clock spring may be severed, obstructing normal operation of the SRS and possibly leading to serious injury to the vehicle's driver.



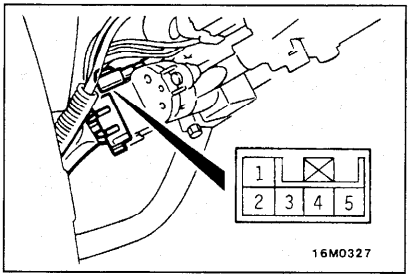
INSPECTION

54300220117

IGNITION SWITCH CONTINUITY CHECK

1. Remove the column cover lower and upper.
2. Disconnect the wiring connector from the ignition switch and connect an ohmmeter to the switch side connector.
3. Operate the ignition switch and check the continuity.

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



KEY REMINDER SWITCH CONTINUITY CHECK

54300770056

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

Ignition key	Terminal No.	
	2	5
Removed	○	○
Inserted		

COMBINATION METERS

54300010189

GENERAL INFORMATION

OPERATION

Fuel gauge

- When the ignition key is at the "ON" position, the fuel gauge is activated.
- When there is much fuel, the unit's resistance is small and the current flowing in the circuit is great, so the gauge's indicator indicates in the "F" area.
- When there is little fuel, the unit's resistance is high and the current flowing in the circuit is small, so the gauge's indicator indicates in the "E" area.

Engine coolant temperature gauge

- When the ignition key is at the "ON" position, the engine coolant temperature gauge is activated.
- When the engine coolant temperature is high, the unit's resistance is low and there is a great flow of current in the circuit, so the gauge's indicator indicates in the "H" area.
- When the engine coolant temperature is low, the unit's resistance is high and there is a small flow of current in the circuit, so the gauge's indicator indicates in the "C" area.

Electric type speedometer

- With the ignition switch turned to "ON" position, speedometer operates.
- The electric type speedometer uses an electric circuit to pulse the wave of the electric signal from the vehicle speed sensor. After calculating vehicle speed, the speedometer driver circuit drives the pointer.

Brake warning light

This warning light illuminates when the ignition key is in "ON" position, and goes off after the engine has started. This indicator comes on when the parking brake is applied or brake fluid level falls below the specific level.

Oil pressure warning light

This warning light illuminates when the ignition key is in "ON" position, and goes off after the engine has started. This indicator comes on when the engine stalls or trouble occurs in the oil circulating system while driving.

Low fuel warning light

With the ignition key turned to the "ON" position, the fuel level sensor resistance becomes small by its exposure from the fuel, when the fuel level comes down.
When the resistance value becomes lower than the specified value, the fuel warning light comes on to indicate that the fuel residual quantity is small.

SERVICE SPECIFICATIONS

54300030109

Items		Standard values
Speedometer indication error mph	20	19 - 22
	40	38 - 44
	60	57 - 66
	80	76 - 88
	100	94 - 110
Tachometer indication error rpm	700	±100
	3,000	±150
	5,000	±250
	6,000	±300
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 (in.)	A (Float point "F")	17.4 (.69)
	B (Float point "E")	130.2 (5.1)

Items		Standard values
Fuel gauge resistance Ω	Power supply and ground	192 ± 19.2
	Power supply and fuel gauge	89 ± 8.9
	Fuel gauge and ground	103 ± 10.3
Engine coolant temperature gauge resistance Ω	Power supply and ground	187 ± 18.7
	Power supply and engine coolant temperature gauge	90 ± 4.5
	Engine coolant temperature gauge and ground	247 ± 24.7
Engine coolant temperature gauge unit resistance [at 70°C (158°F)] Ω		104 ± 13.5

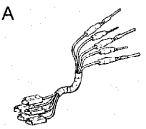
SEALANT

54300050020

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

SPECIAL TOOLS

54300060221

Tool	Tool number and name	Supersession	Application
A  B  C  D 	MB991223 Harness set A: MB991219 Test harness B: MB991220 LED harness C: MB991221 LED adapter D: MB991222 Probe	MB991223	Fuel gauge simple check A: Connector pin contact pressure check B,C: Power circuit check D: Commercial tester connection
	MB990784 Ornament remover	General service tool	Removal of meter bezel

TROUBLESHOOTING

5430720211

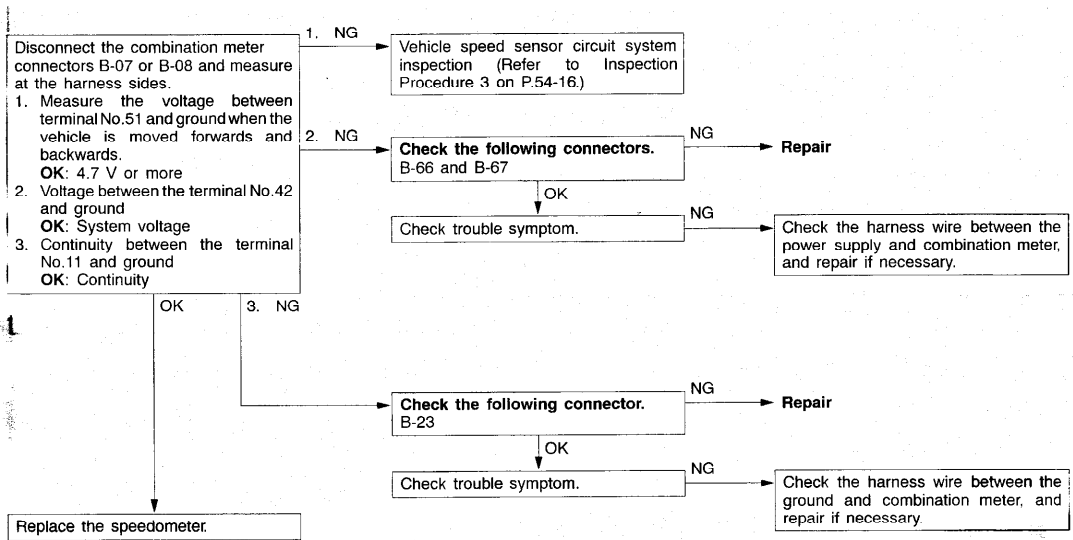
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure	Reference page
Speedometer does not work.	1	54-15
Tachometer does not work.	2	54-16

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

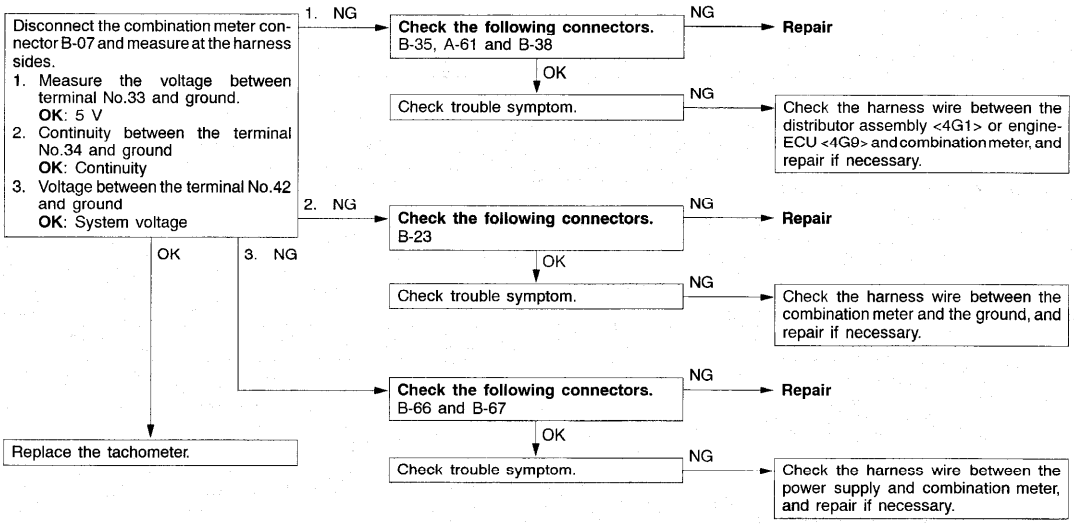
Inspection Procedure 1

Speedometer does not work.	Probable cause
The cause may be a defective vehicle speed sensor circuit system or a defective speedometer. Vehicle speed sensor is also used by the engine-ECU and A/T-ECU.	• Malfunction of vehicle speed sensor • Malfunction of speedometer • Malfunction of harness or connector



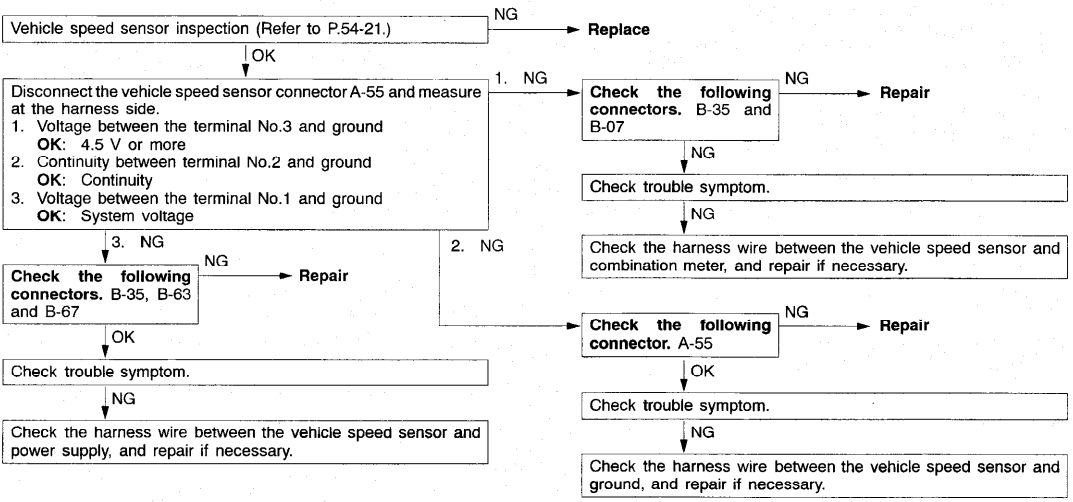
Inspection Procedure 2

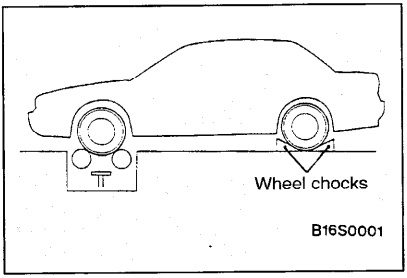
Tachometer does not work.	Probable cause
The ignition signal may not be input from the engine, or there may be a malfunction in the power supply or ground circuit.	• Malfunction of tachometer • Malfunction of harness or connector



Inspection Procedure 3

Vehicle speed sensor circuit system inspection



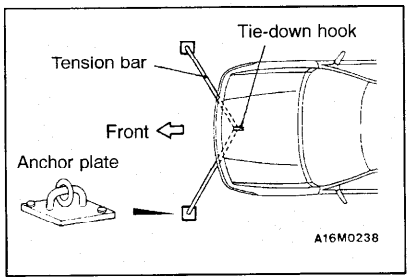


ON-VEHICLE SERVICE

54300090084

SPEEDOMETER CHECK

1. Adjust tire pressure to the specified level. (Refer to GROUP 31 – Service Specifications.)
2. Set the vehicle onto a speedometer tester and use wheel chocks to hold the rear wheels.
3. Make sure the parking brake has been applied.



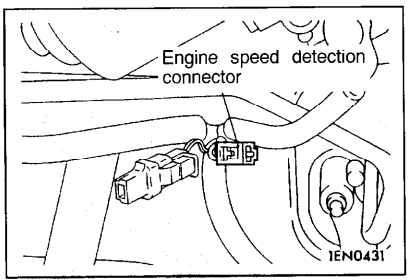
4. To prevent the front wheel from moving from side to side, attach tension bars to the tie-down hook, and secure both ends to anchor plates.
5. To prevent the vehicle from launching, attach a chain or wire to the rear retraction hook, and make sure the end of the chain or wire is secured firmly.
6.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

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

Standard values:

Standard indication mph	Allowable range mph
20	19 - 22
40	38 - 44
60	57 - 66
80	76 - 88
100	94 - 110

7. If not to the standard value, inspect for proper tire size. If not correct, replace tires with original size tires and retest. If correct, replace the speedometer. If still not to standard value, replace vehicle speed sensor.



TACHOMETER CHECK

54300100084

1. Insert a paper clip in the engine speed detection connector from the harness side, and attach an external high quality tachometer.

NOTE
For tachometer check, use an external high quality inductive tachometer.

2. Compare the readings of the vehicle tachometer and the external 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

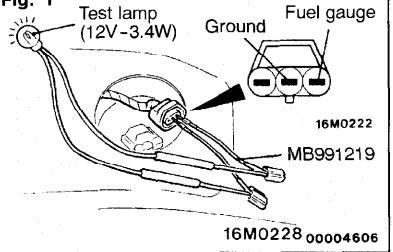
FUEL GAUGE SIMPLE CHECK

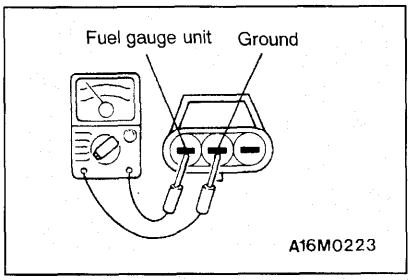
54300110100

Remove the fuel gauge unit connector.
↓
Use the special tool to connect a test lamp (12 V - 3.4 W) to the harness connector. (Refer to Fig.1)
↓
When the ignition switch is turned to ON, the test lamp illuminates. —OK→ The needle of the fuel gauge moves. —OK→ Replace the fuel gauge unit.
↓ NG
Repair the harness.

The needle of the fuel gauge moves. —NG→ Replace the fuel gauge.

Fig: 1





FUEL GAUGE UNIT CHECK

54300120141

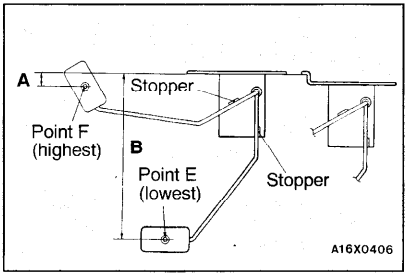
Remove the fuel gauge unit from the fuel tank. (Refer to GROUP 13F.)

FUEL GAUGE UNIT RESISTANCE

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

   Standard value:
   Point F: 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).
3. If all checks are correct, proceed to fuel gauge unit float height check. If any check is not correct, replace the fuel gauge unit.

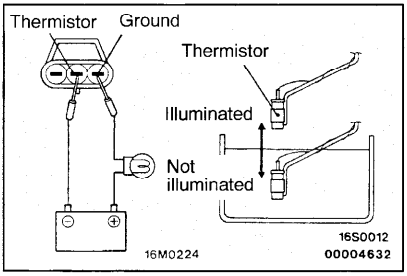


FUEL GAUGE UNIT FLOAT HEIGHT

1. 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

2. Adjust the float arm to the standard value, then proceed to the thermistor check.



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 comes on when it is taken out of water.

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

3. If all checks are correct, the fuel gauge unit is OK. If any check is not correct, replace the fuel gauge unit.

ENGINE COOLANT TEMPERATURE GAUGE SIMPLE CHECK

54300140116

Remove the engine coolant gauge unit connector.

↓

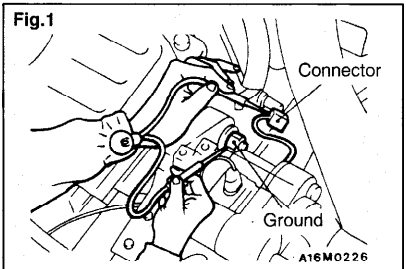
Connect a test lamp (12 V - 3.4 W) between the harness side connector and the ground. (Refer to Fig.1)

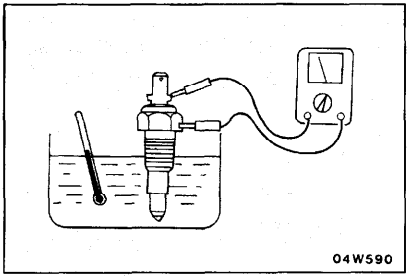
↓

When the ignition switch is turned to "ON", the test lamp illuminates.

- NG → Repair the harness.
- OK → The needle of the engine coolant temperature gauge moves.
  - NG → Replace the engine coolant temperature gauge.
  - OK → Replace the engine coolant temperature gauge unit.

Fig.1



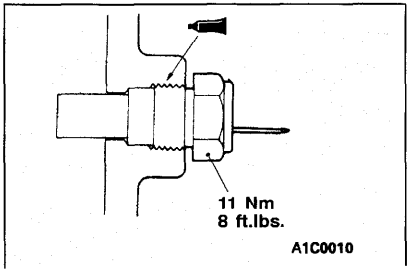


ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

54300150263

1. Bleed the engine coolant.
   (Refer to GROUP 00 – Maintenance Service.)
2. Remove the engine coolant temperature gauge unit.
3. Immerse the unit in 70°C water to measure the resistance.

   Standard value: 104 ± 13.5 Ω
4. If within the standard value, the sensor is OK. Re-install it, then check the engine coolant temperature gauge. (Refer to P.54-21.) If not within the standard value, replace it.



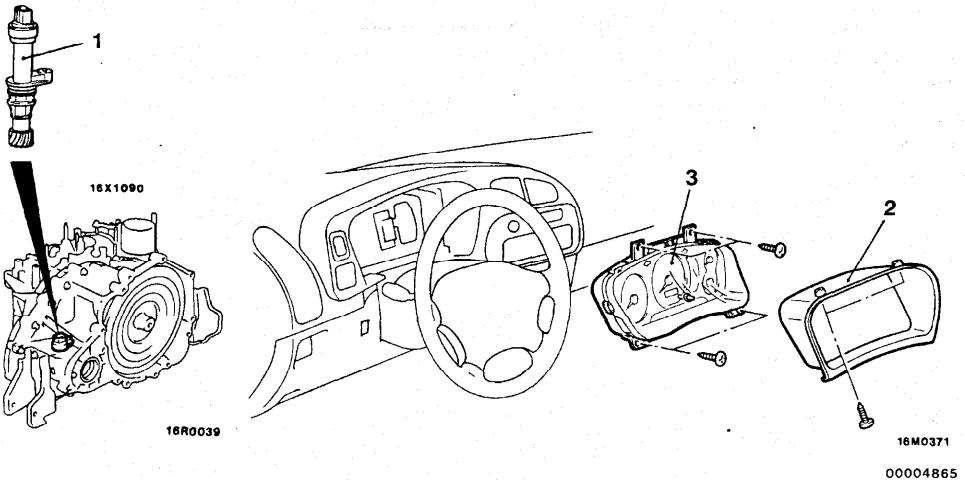
5. After checking, apply the specified adhesive around the thread of engine coolant temperature gauge unit.

   Specified sealant:
   3M Adhesive Nut Locking No. 4171 or equivalent
6. Add engine coolant.
   (Refer to GROUP 00 – Maintenance Service.)

COMBINATION METERS

54300290118

REMOVAL AND INSTALLATION



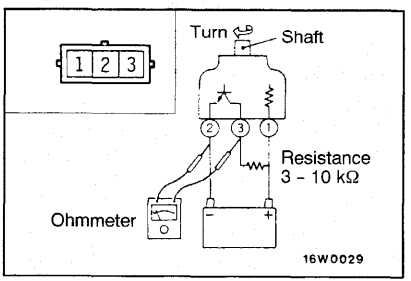
Vehicle speed sensor removal steps

- Air Cleaner, Air Intake Hose

1. Vehicle speed sensor

Combination meter removal steps

2. Meter bezel
3. Combination meter

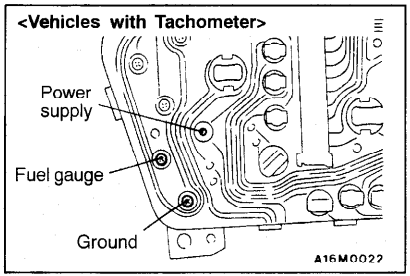


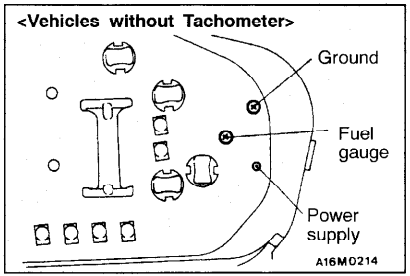
INSPECTION

54300640067

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)
3. If within the standard value, the vehicle speed sensor is OK.
   If not within the standard value, replace the vehicle speed sensor.





FUEL GAUGE RESISTANCE CHECK

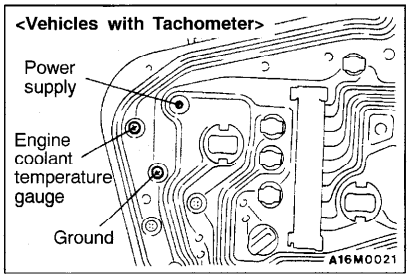
54300300088

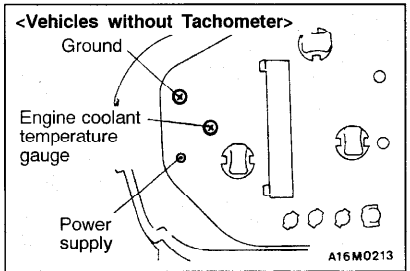
1. Remove the power supply tightening screw.
2. Use an ohmmeter to measure the resistance value between the terminals.

   Standard value:
   Power supply - Ground: 192 ± 19.2
   Power supply - Fuel gauge: 89 ± 8.9
   Fuel gauge - Ground: 103 ± 10.3

3. If within the standard value, the fuel gauge is OK.
   If not within the standard value, replace the fuel gauge.

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

54300300095

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

   Standard value:
   Power supply - Ground: 187 ± 18.7
   Power supply - Engine coolant temperature gauge: 90 ± 4.5
   Engine coolant temperature gauge - Ground: 247 ± 24.7

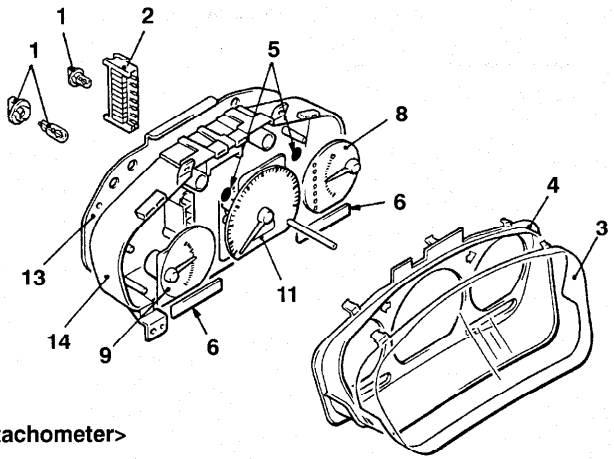
3. If within the standard value, the engine coolant temperature gauge is OK.
   If not within the standard value, replace the engine coolant temperature gauge.

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

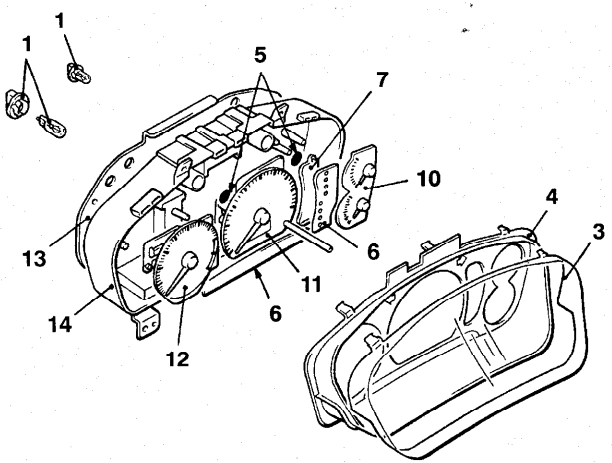
DISASSEMBLY AND REASSEMBLY

54300310074

<Vehicle without tachometer>



<Vehicle with tachometer>



16M0330

00004794

Disassembly steps

1. Bulb, socket
2. Automatic transaxle indicator
3. Meter glass
4. Meter window plate
5. Turn-signal indicator lens
6. Indicator lens
7. Indicator prism
8. Engine coolant temperature gauge
9. Fuel gauge
10. Fuel and engine coolant temperature gauge
11. Speedometer
12. Tachometer
13. Printed circuit board
14. Meter case

HEADLIGHT AND TURN-SIGNAL LIGHT

54200010179

GENERAL INFORMATION

OPERATION

Low-beam and high-beam

- Turn the lighting switch to "second position," and the contact point of the headlight relay will be closed to turn on the headlight relay.
- Pull the dimmer switch to "LO," and the low-beam will be lit. Pull the switch to "HI," and the high-beam will be lit.

Passing

- When the low-beam is lit, pull the passing switch to "ON," and the high-beam will be lit together with the low-beam.
- When the dimmer switch is at "LO" and the lighting switch is at "OFF" or "first position," and the passing switch is pulled "ON," the contact point of the headlight relay will be closed, turning on the headlight relay, and the low-beam and high-beam will be simultaneously lit.
- When the dimmer switch is at "HI" and the lighting switch is at "OFF" or "first position," and the passing switch is pulled "ON," the contact point of the headlight relay will be closed, turning on the headlight relay, and the high-beam will be simultaneously lit.

Low-beam and High-beam indicator light

- When the high-beam is lit or when the passing switch is activated, the high-beam indicator light will be lit.

Turn-signal lights

When operation is normal

- When the ignition switch is switched to the "ON" position, battery voltage is applied (via the hazard warning light switch) to the turn-signal and hazard-flasher unit.
- When the turn-signal switch is switched to the "LH" (or "RH") position, transistor (within the flasher unit) is switched ON and the relay contact (also within the flasher unit) is switched ON. As a result, the "LH" (or "RH") turn-signal lights and turn-signal indicator light illuminate.
- At the same time, charging to the capacitor(within the flasher unit) begins, and charging continues until the lower-limit potential (set by microcomputer within the flasher unit) is reached.
- When the capacitor becomes fully charged, the microprocessor (within the flasher unit) output reverses and transistor is switched OFF; the relay contact is also switched OFF, and, as a result, the "LH" (or "RH") turn-signal lights and turn-signal indicator light are switched OFF.
- At the same time that transistor (within the flasher unit) is switched OFF, the capacitor begins discharging, and, when discharging finishes, the output of the microcomputer (within the flasher unit) once again reverses and transistor (within the flasher unit) is switched ON, after which the "LH" (or "RH") turn-signal lights and turn-signal indicator light illuminate.
- As a result of the continued repetition of the steps described above, the "LH" (or "RH") turn-signal lights and turn-signal indicator light flash ON and OFF repeatedly.

If one light's wiring is damaged or disconnected

- If the bulb for one turn-signal light is damaged or disconnected, the resistance for the entire light circuitry increases, resulting in a decrease of the voltage at the resistor (parallel connection with capacitor) part within the flasher unit.
- As a result of this being detected, the lower-limit potential set by the microcomputer (within the flasher unit) is increased, with the result that the time required for charging of the capacitor becomes shorter.
- As a result, the ON and OFF cycles of transistor (within the flasher unit) also become shorter, and thus the number of flashes of the lights becomes greater.

Hazard-warning lights

- When the hazard warning light switch is switched to the "ON" position, the relay contact of the flasher unit is switched ON and OFF repeatedly, in the same manner as for the operation of the turn-signal lights, and the left and right turn-signal lights and turn-signal indicator lights simultaneously flash repeatedly.

NOTE
The number of flashes of the hazard-warning lights does not change if there is damaged or disconnected wiring of one light.

Conditions for switch-ON of headlight relay

Ignition switch	Lighting switch	Dimmer/passing switch	Headlight relay
"ACC" or "ON"	"Second position"	At rest	ON
"ACC" or "ON"	"LO" or "OFF"	"PASS"	ON

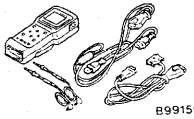
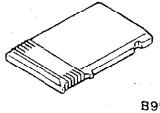
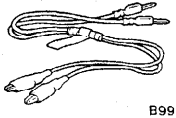
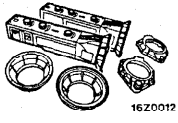
SERVICE SPECIFICATIONS

54200030137

Items	Limit
Headlight intensity	20,000 cd or more

SPECIAL TOOLS

54200060266

Tool	Tool number and name	Supersession	Application
 B991502	MB991502 Scan tool (MUT-II)	MB991496-OD	ETACS-ECU input signal checking
 B991325	ROM pack		ETACS-ECU input signal checking
 B991529	MB991529 Diagnostic trouble code check harness	Tool not necessary if scan tool <MUT-II> is available	ETACS-ECU input signal checking (when using a voltmeter)
 16Z0012	Headlight aimer	General service tool	Headlight aiming

TROUBLESHOOTING

54200070238

TROUBLESHOOTING HINTS

Headlight

1. None of the headlight comes on.
   (1) Tail light comes on.
   - Check the headlight relay. (Refer to P.54-33.)
   - Check the lighting switch. (Refer to P.54-34.)

   (2) The tail light neither comes on nor does the charging warning light go out.
   - Check the fusible link No. 6.
2. Low-beam does not come on on either side.
   - Check the grounding circuit.
   - Check each headlight.
3. High-beam does not come on on either side but comes on when the passing switch is ON.
   - Check the dimmer switch. (Refer to P.54-34.)
4. High-beam indicator light does not come on. However, high-beam is lit when the dimmer switch is at "HI" position or the passing switch is activated.
   - Check the dedicated fuse No. 7.
   - Check the bulb.
5. When passing is activated, the headlights will not come on. However, the headlights will come on when the dimmer switch is at either "LO" or "HI."
   - Check the passing switch. (Refer to P.54-34.)

Turn-signal light

1. The turn-signal lights and hazard-warning lights do not operate at all.
   - Check the hazard warning light switch contact (power supply side).
   - Check the flasher unit.
2. All turn-signal lights at the left (or right) side do not function.
   The hazard-warning lights function normally.
   - Check the hazard warning light switch contact (turn-signal side).
   - Check the turn-signal switch. (Refer to P.54-34.)
3. The number of flashes of the turn-signal lights is excessive.
   - Check the bulbs.
4. The hazard-warning lights do not function.
   The turn-signal lights function normally.
   - Check the hazard warning light switch contact (hazard-warning light side).

INSPECTION CHART FOR TROUBLE SYMPTOMS

54200910158

Trouble symptoms		Inspection procedure	Reference page
Communication with Scan Tool is impossible. <Vehicles with ETACS-ECU>	Communication with all systems is impossible.	1	54-27
	Communication with one-shot pulse input signal only is impossible.	2	54-27
The lighting monitor buzzer does not sound under the following conditions while tail lights or headlights illuminate. • When the ignition switch is turned to OFF and the driver's side door is open.		3	54-27

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

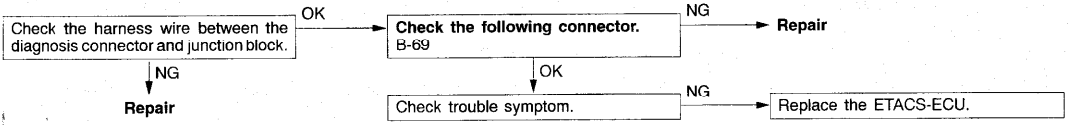
Inspection Procedure 1

Communication with the scan tool is impossible. (Communication with all systems is impossible.)	Probable cause
The cause is probably a defective power supply system (including ground) for the diagnosis line.	• Malfunction of connector • Malfunction of harness wire

Refer to GROUP 13A - Troubleshooting.

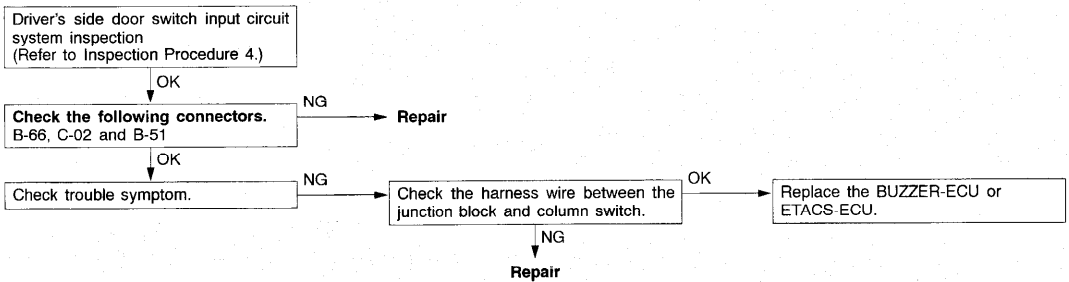
Inspection Procedure 2

Communication with the scan tool 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.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ETACS-ECU



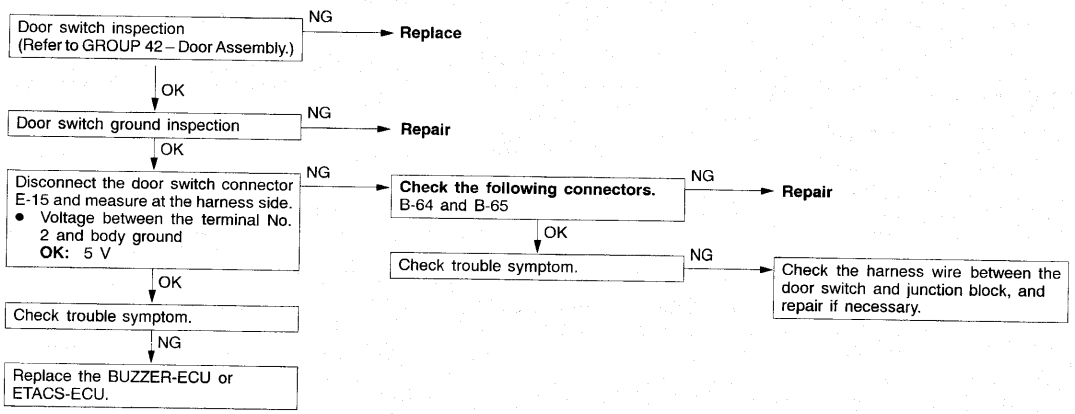
Inspection Procedure 3

The ignition switch is turned to the "OFF" position and the driver's side door is opened while the tail lights or headlight are operating, but the light reminder warning 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.	• Malfunction of driver's side door switch • Malfunction of harness or connector • Malfunction of BUZZER-ECU or ETACS-ECU



Inspection Procedure 4

Driver's side door switch input circuit system inspection



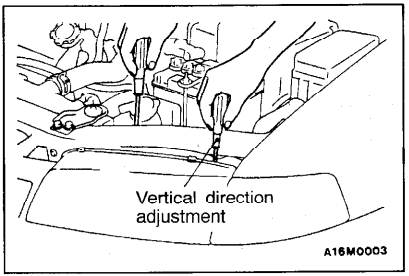
ON-VEHICLE SERVICE

54200090104

AIMING WITH GAUGES ON THE HEADLIGHT <4-door models>

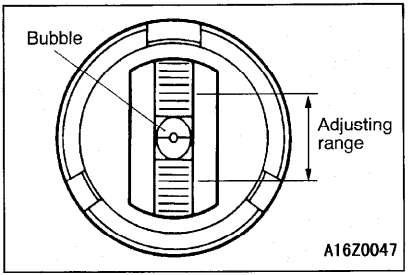
PRE-AIMING INSTRUCTIONS

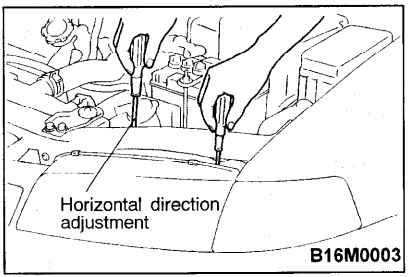
1. Inspect for badly rusted or faulty headlight assemblies.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Place vehicle on a lever floor.
4. Bounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
5. Inspect tire inflation. Adjust inflation as necessary.
6. Rock vehicle sideways to allow vehicle to assume its normal position.
7. If fuel tank is not full, place a weight in trunk of vehicle to simulate weight of a full tank [3 kg (6.5 lbs.) per gallon.]
8. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg (150 lbs.) placed in driver's position.
9. Thoroughly clean headlight lenses.



VERTICAL ADJUSTING

Adjust the vertical angle by rotating the vertical adjusting screw so that the bubble in the vertical adjusting gauge locates inside the adjusting range.

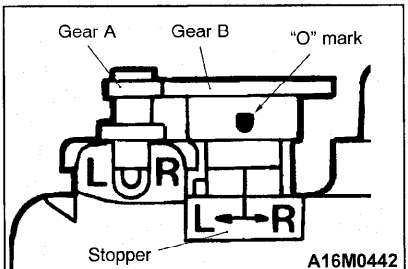




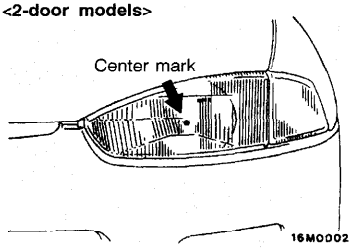
HORIZONTAL ADJUSTING

1. Check that gear (A) and gear (B) are engaged. If they are not engaged, press down the stopper until the gears engage.
2. Turn the horizontal adjusting screw to align the "O" mark of gear (B) with the stopper line and the headlight housing line.

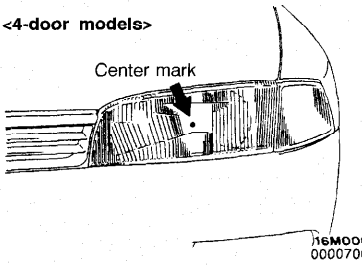
NOTE
If this aiming is impossible due to the body damage, refer to "Aiming with screen."



<2-door models>



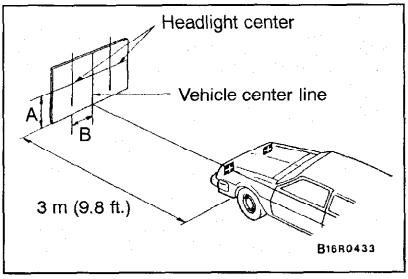
<4-door models>



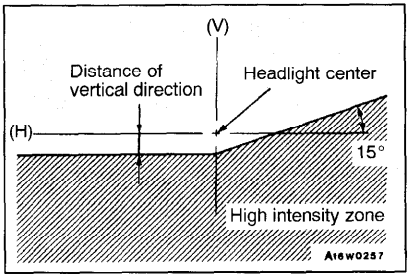
AIMING WITH SCREEN OR WALL

HEADLIGHT AIM PREPARATION

1. Set the distance between the screen and the bulb center marks of the headlight as shown in the illustration.



2. Four lines of adhesive tape or equivalent markings are required on screen or wall:
   (1) Position a vertical tape or mark so that it is aligned with the vehicle center line.
   (2) Position a horizontal tape or mark with reference to center line of headlight bulb dimension A.
   (3) Position a vertical tape on the screen with reference to the center line of each headlight bulb dimension B.



VISUAL HEADLIGHT ADJUSTMENT

1. A properly aimed lower beam will appear on the aiming screen 3 m (9.8 ft.) in front of the vehicle. The shaded area as shown in the illustration indicates high intensity zone.

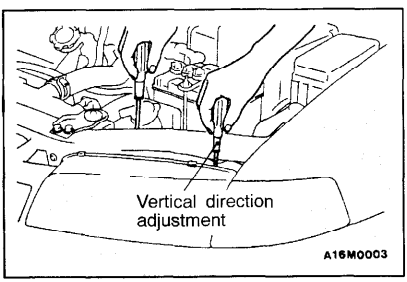
   Standard value:
   (Vertical direction)
   36 mm (1.42 in.) below horizontal (H)
   (Horizontal direction)
   Position where the 15° sloping section intersects the vertical line (V)

   NOTE
   The position 3 m (9.8 feet) in front of the vehicle indicates the position from the headlight center mark.

2. When adjusting headlight, disconnect the other headlight harness.
3. Adjust low beam of the headlights to match the low beam pattern on the aiming screen.

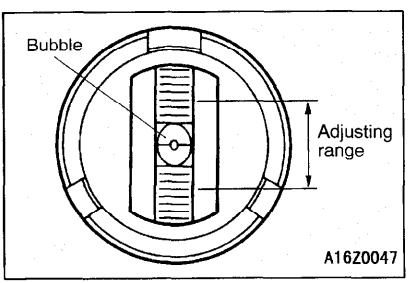
   Caution
   Do not cover a headlight for more than three minutes, or the plastic headlight lens will be deformed.

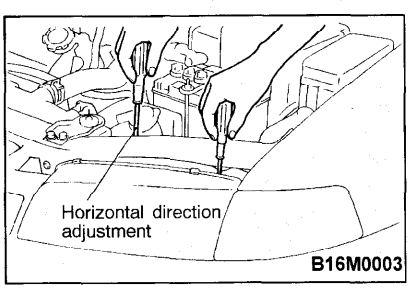
NOTE
If the visual headlight adjustment at low beam is made, the adjustment at high beam is not necessary.



VERTICAL ADJUSTING <4-door models>

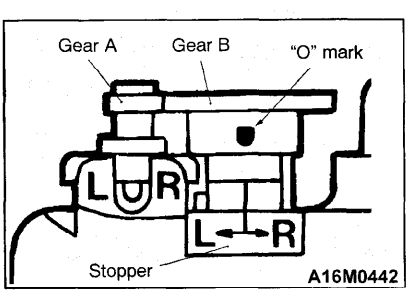
1. Adjust the vertical angle by rotating the vertical adjusting screw so that the bubble in the vertical adjusting gauge locates inside the adjusting range.
2. Check to see if the light distribution projected on the aiming screen is the same as the light distribution pattern described in Visual Headlight Adjustment.
3. If they differ, turn the vertical adjusting screw to adjust the vertical angle until the light distribution coincides with the correct lighting pattern.





HORIZONTAL ADJUSTING <4-door models>

1. Check that gear (A) and gear (B) are engaged. If they are not engaged, press down the stopper until the gears engage.
2. Check to see if the light distribution projected on the aiming screen is the same as the light distribution pattern described in Visual Headlight Adjustment.
3. If they differ, turn the vertical adjusting screw to adjust the vertical angle until the light distribution coincides with the correct lighting pattern.
4. Turn the horizontal adjusting screw to align the "O" mark of gear (B) with the stopper line and the headlight housing line.
5. Pull the stopper up to disengage gears (A) and (B).

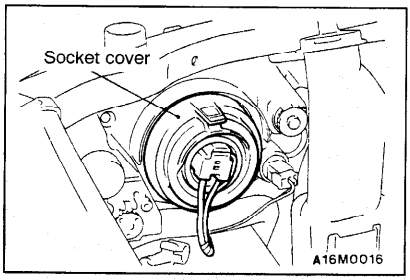


LUMINOUS INTENSITY MEASUREMENT

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

Limit: 20,000 cd or more

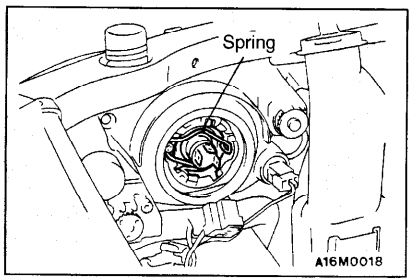
NOTE
(1) When measuring the luminous intensity of headlight, keep the engine at 2,000 r/min and have the battery charged.
(2) If there are specific regulations for luminous intensity of headlights in the region where the vehicle is operated, make sure that the intensity conforms to the requirements of such regulations.



BULB REPLACEMENT

54200130127

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



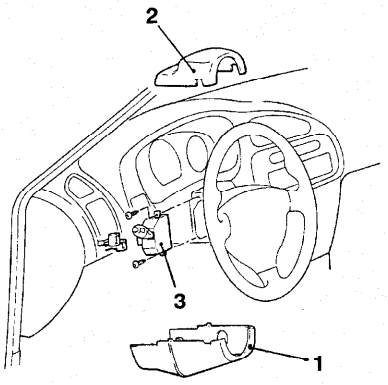
3. Unhook the spring securing the bulb, and then remove the bulb.

Caution
Do not touch the surface of the bulb with hands or dirty gloves as the bulb may pop after a short time. If the surface does become dirty, clean it with alcohol, and let it dry thoroughly before installing.

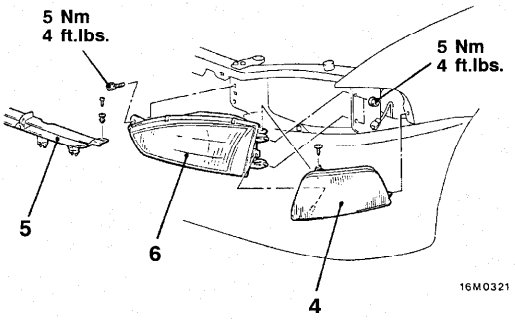
HEADLIGHT AND FRONT TURN-SIGNAL LIGHT

54200240097

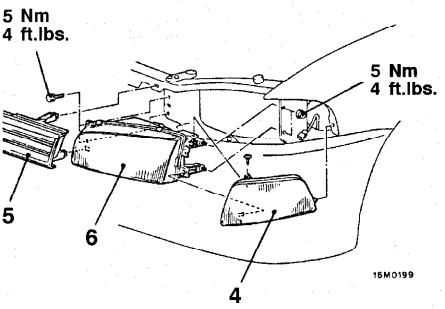
REMOVAL AND INSTALLATION



<2-door models>



<4-door models>



00004795

Lighting switch removal steps

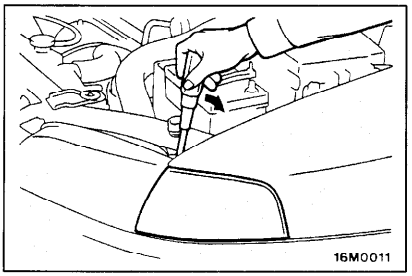
1. Column cover, lower
2. Column cover, upper
3. Lighting switch

◀A▶

◀B▶ ▶A◀

Headlight removal steps

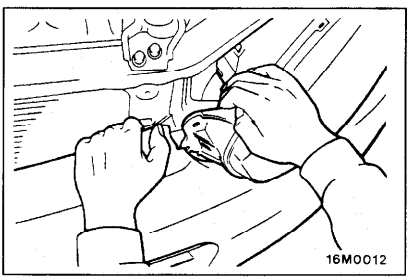
4. Front turn-signal light
5. Radiator grille (Refer to GROUP 51.)
6. Headlight



REMOVAL SERVICE POINT

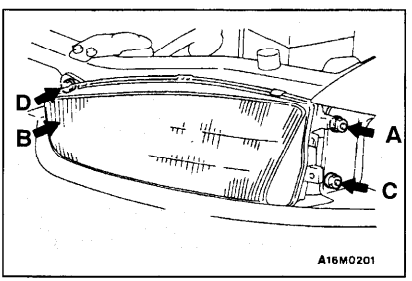
◀A▶ FRONT TURN-SIGNAL LIGHT REMOVAL

Pry a screwdriver into the direction shown to move the front turn-signal light forwards.



◀B▶ HEADLIGHT REMOVAL <2-door models>

1. Pull the bumper towards you.
2. Pull the inside of headlight towards you.
3. Pull the outside of headlight towards you.
4. Remove the headlight.



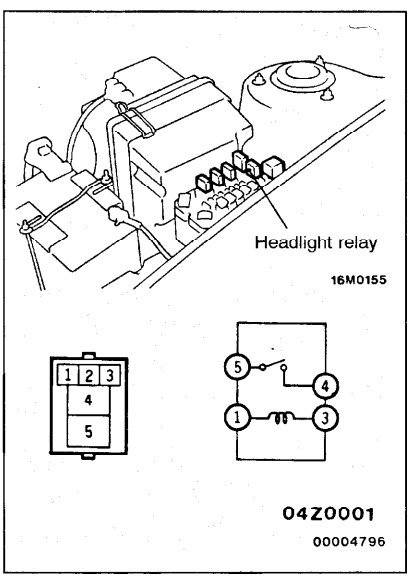
INSTALLATION SERVICE POINTS

▶A◀ HEADLIGHT INSTALLATION

Tighten the mounting bolts and nuts in A, B, C, D order.

NOTE

The bolt marked by "B" applies to 4-door models only.

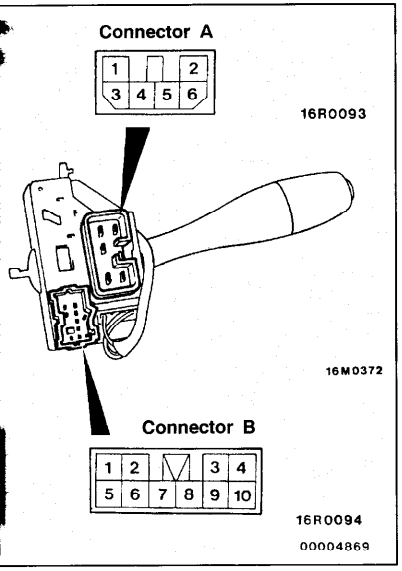


INSPECTION

54200820093

HEADLIGHT RELAY CHECK

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



LIGHTING SWITCH, DIMMER/PASSING SWITCH AND TURN-SIGNAL LIGHT SWITCH CHECK

54200800059

Switch position		Connector A-terminal No.					Connector B-terminal No.					
		1	2	3	4	6	3	5	6	7	8	9
LIGHTING SWITCH	OFF											
	First position							○	○	○		
	Second position	○	○	○	○	○		○	○	○		
DIMMER/ PASSING SWITCH	HI			○	○							
	LOW				○	○						
	PASSING	○	○	○	*1 ○	○ *2						
TURN-SIGNAL LIGHT SWITCH	RH										○	○
	OFF											
	LH						○	○	○	○	○	

NOTE

1. *1 indicates continuity when the dimmer switch is at the low beam position.
2. *2 indicates continuity when the dimmer switch is at the high beam position.

HAZARD WARNING LIGHT SWITCH CONTINUITY CHECK

54200670094

Refer to P.54-47.

FOG LIGHT

54200010186

GENERAL INFORMATION

OPERATION

- If the fog light switch is set at the "ON" position when the lighting switch is at the "second position" and the dimmer switch is at the "low beam" position, current flows through the headlight relay, dedicated fuse, fog light relay, fog light switch, diode, dimmer switch and ground, causing the fog light relay contacts to close.
- Once the fog light relay contacts have closed, current flows through the dedicated fuse, fog light relay (contacts), fog light and ground, causing the fog lights to go on.

SERVICE SPECIFICATIONS

54200030144

Items		Standard value
Fog light aiming	Vertical direction	100 mm (4 in.) below horizontal (H)
	Horizontal direction	Parallel to direction of vehicle travel

SPECIAL TOOL

54200060273

Tool	Tool number and name	Suppression	Application
	MB990784 Ornament remover	General service tool	Fog light switch removal

TROUBLESHOOTING

54200070245

TROUBLESHOOTING HINTS

Fog lights do not come on.

- Check the dedicated fuse No. 5 or No. 9.
- Check the fog light relay. (Refer to P.54-38.)
- Check the fog light switch. (Refer to P.54-38.)
- Check the dimmer switch. (Refer to P.54-34.)

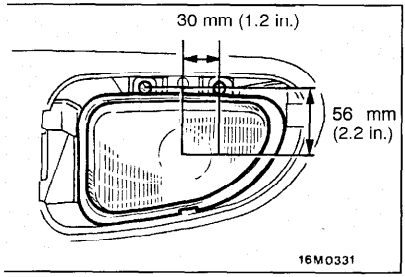
ON-VEHICLE SERVICE

54200110077

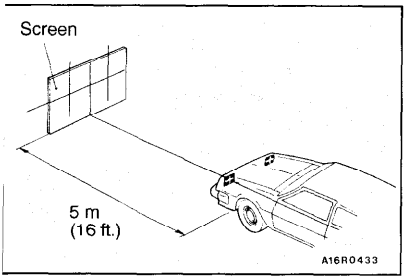
FOG LIGHT AIMING

1. Check for badly rusted or loose fog light.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Place vehicle on a level floor.
4. Bounce front suspension through three oscillations by applying body weight to hood or bumper.
5. Check the tire inflation pressure. Adjust as necessary.
6. Rock the vehicle sideways to allow vehicle to assume its normal position.
7. If fuel tank is not full, place a weight in trunk of vehicle to simulate weight of a full tank [3 kg (6.5 lbs.) par gallon].
8. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg (150 lbs.) placed in driver's position.
9. Thoroughly clean fog light lenses.

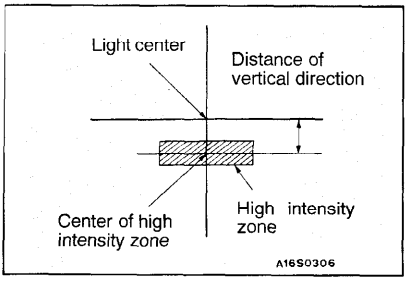
10. Remove the fog light bezel.



11. Measure the center of the fog lights as shown in the illustration.

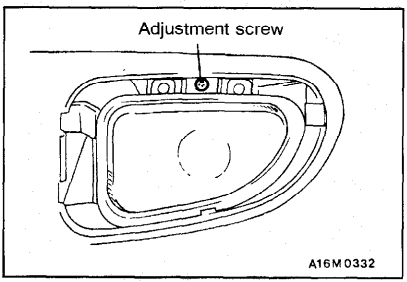


12. Set the distance between the screen and the center of the fog lights as shown in the illustration.



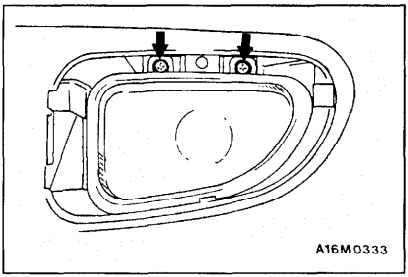
13. Check if the beam shining onto the screen is at the standard value.

Standard value:
Vertical direction
100 mm (4 in.) 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 for improper/defective mounting location.

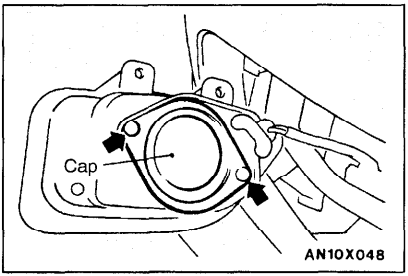
Caution
When making the aiming adjustment, be sure to block the beam of those lights which are not being adjusted.



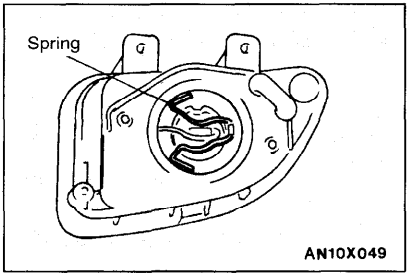
BULB REPLACEMENT

54200130134

1. Remove the fog light bezel.
2. Remove the fog light unit fixing screw, and pull the light unit to remove it.



3. Remove the cap.



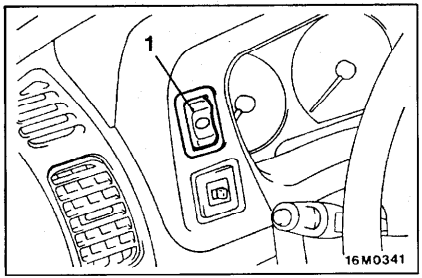
4. Unhook the spring securing the bulb and then remove the bulb.

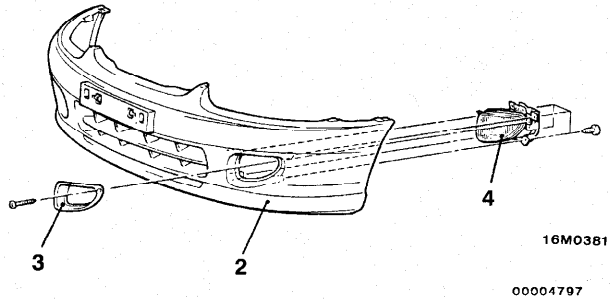
Caution
Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol, and let it dry thoroughly before installing.

FOG LIGHT

54200150109

REMOVAL AND INSTALLATION

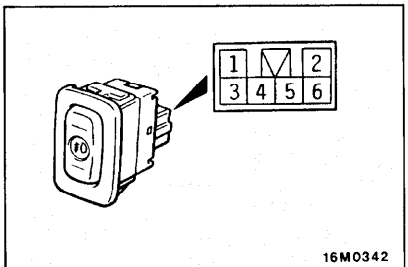




1. Fog light switch

Fog light removal steps

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

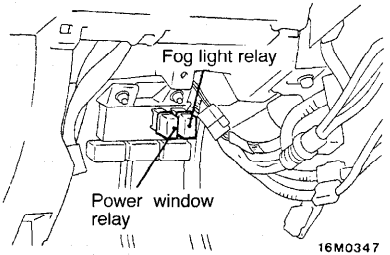


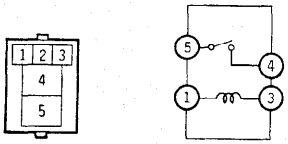
INSPECTION

54200740061

FOG LIGHT SWITCH CONTINUITY CHECK

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





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FOG LIGHT RELAY CONTINUITY CHECK 54200750064

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

REAR COMBINATION LIGHT

54200010193

GENERAL INFORMATION

OPERATION

Tail light

- When the lighting switch is set to the "first position" or "second position" position, electricity flows via dedicated fuse No. 7 to each light, and each light illuminates.

Back-up light

- When, with the ignition switch at the "ON" position, the shift lever (or the selector lever) is moved to the "R" position, the back-up light switch (M/T) is switched ON (or the park/neutral position switch (A/T) is switched to the "R" position), and the back-up light illuminates.

Stop light

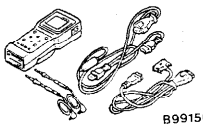
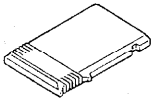
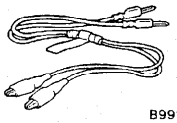
- Battery voltage is always applied to the stop light switch through dedicated fuse No. 11.
- When the brake pedal is pressed, the stop light switch will be turned "ON" to turn on the stop lights.

Lighting monitor buzzer

- When, with the tail light illuminated (lighting switch-first position), the ignition switch is turned off and the driver's door is opened (door switch is switched ON), the ECU detective circuit will function.
- With the detective circuit activated, buzzer output makes the buzzer sound continuously to remind that the tail light is illuminated.
- The key reminder buzzer has a function priority to the lighting monitor buzzer. With the key inserted in the key cylinder, buzzer sounds intermittently.

SPECIAL TOOLS

54200060280

Tool	Tool number and name	Supersession	Application
 B991502	MB991502 Scan tool (MUT-II)	MB991496-OD	ETACS-ECU input signal checking
 B991325	ROM pack		ETACS-ECU input signal checking
 B991529	MB991529 Diagnostic trouble code check harness	Tool not necessary if scan tool <MUT-II> is available	ETACS-ECU input signal checking (When using a voltmeter)

TROUBLESHOOTING

54300720716

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with scan tool is not possible.<Vehicles with ETACS-ECU>	Communication with all systems is not possible.	1	54-40
	Communication with one-shot pulse input signal only is not possible.	2	54-40
While the tail lights or headlight are illuminated, driver's side door is opened but the light reminder warning buzzer does not sound. (With the ignition key inserted in the key cylinder, the ignition key reminder warning buzzer sounds.)		3	54-41

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

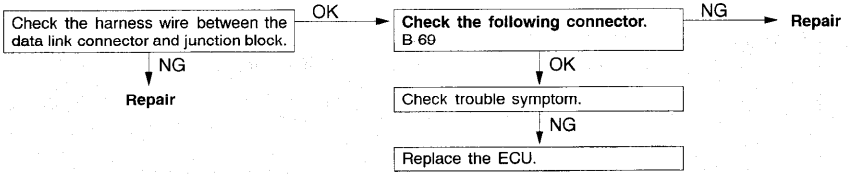
INSPECTION PROCEDURE 1

Communication with scan tool is not possible. (Communication with all systems is not possible.)	**Probable cause**
The cause is probably a defect in the power supply system (including ground) for the diagnostic line.	• Malfunction of connector • Malfunction harness wire

Refer to GROUP 13A - Troubleshooting.

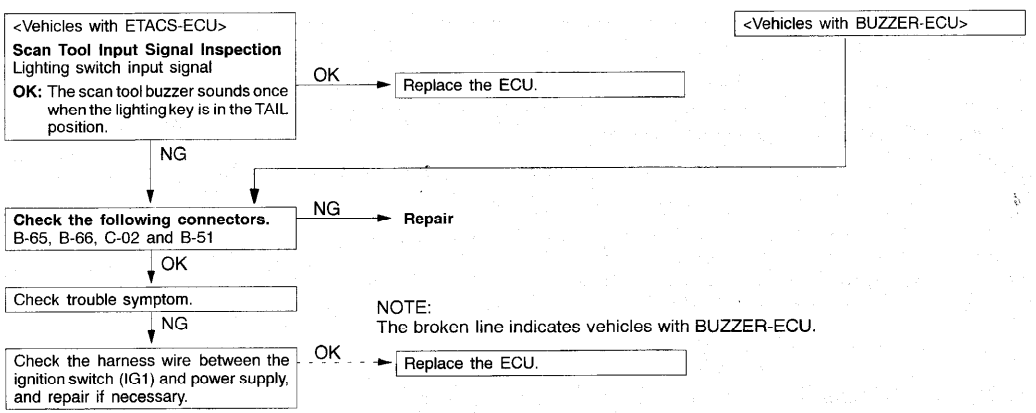
INSPECTION PROCEDURE 2

Communication with scan tool is not possible. (Communication with one-shot pulse input signal only is not possible.)	Probable cause
The cause probably a defective one-shot pulse input signal circuit system of the diagnostic line.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



INSPECTION PROCEDURE 3

While the tail lights or headlight are illuminated, driver's side door is opened but the light reminder warning buzzer does not sound. (With the ignition key inserted in the key cylinder, the ignition key reminder warning buzzer sounds.)	Probable cause
The cause is probably a defective lighting switch input circuit system or a defective ECU. While the ignition key reminder warning buzzer sounds, the taillight or headlight are turned ON but the light reminder warning buzzer does not sound.	• Malfunction of connector • Malfunction of harness wire • Malfunction of ECU



TROUBLESHOOTING HINTS

54200070252

Tail light

All lights do not illuminate.

(1) The headlights also do not illuminate.
- Check fusible link No. 4.

(2) The headlights illuminate.
- Check dedicated fuse No. 7.

Back-up light

Even if the shift lever (or the selector lever) is moved to "R" position, the back-up light will not come on.
- Check the back-up light switch <M/T>
- Check the park/neutral position switch <A/T> (Refer to GROUP 23A-On-vehicle Service)
- Check the back-up light bulb.

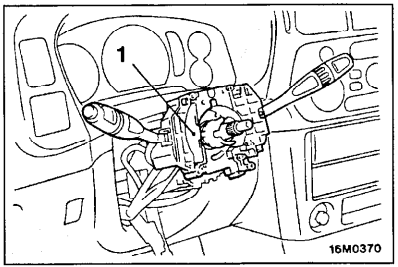
Stop light

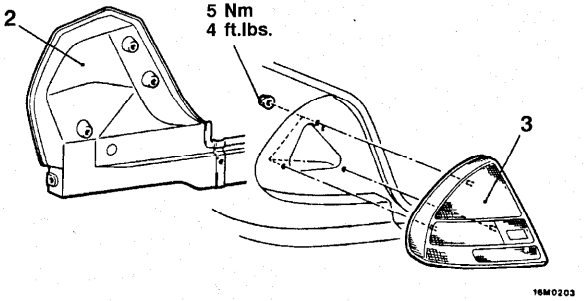
1. The stop lights do not come on.
   - Check the stop light switch (Refer to GROUP 35A - On-vehicle Service).
   - Check the dedicated fuse No. 11.
2. Some stop lights do not come on.
   - Check the ground circuit.

REAR COMBINATION LIGHT

54200390068

REMOVAL AND INSTALLATION





00004799

1. Column switch <Lighting switch and turn-signal light switch> (Refer to P.54-32.)

Rear combination light removal steps

2. Rear end trim (Refer to GROUP 52A)
3. Rear combination light

INSPECTION

54200760067

LIGHTING SWITCH AND TURN-SIGNAL LIGHT SWITCH CONTINUITY CHECK

Refer to P.54-34.

HIGH MOUNTED STOP LIGHT

54200070269

TROUBLESHOOTING

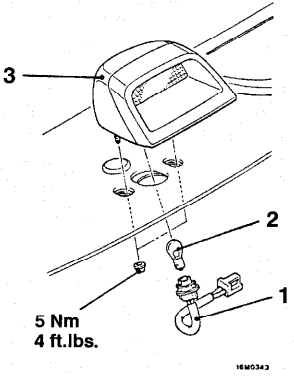
Refer to Rear Combination Light - Troubleshooting Hints.

HIGH MOUNTED STOP LIGHT

54200510105

REMOVAL AND INSTALLATION

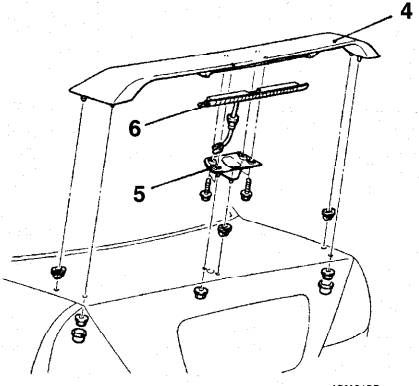
<On rear shelf>



Removal steps for light on rear shelf

1. Socket assembly
2. Bulb
3. High mounted stop light

<On rear spoiler>



00004800

Removal steps for light on rear spoiler

4. Rear spoiler
5. Center stay
6. LED panel

INTERIOR LIGHT

54200010209

GENERAL INFORMATION

OPERATION

Luggage compartment light

- Battery voltage is always applied (via fusible link No. 2 and dedicated fuse No. 2) to the luggage compatment light.
- When the trunk lid is opened, the trunk lid latch switch is switched "ON" and the luggage compartment light illuminates.

Dome light

- The dome light is always illuminated when the dome light switch is at the "ON" position.
- The dome light illuminates when any door is opened while the dome light switch is at the "DOOR" position.
- The dome light does not illuminate when the dome light switch is switched OFF regardless of door positions.

TROUBLESHOOTING

54200070276

TROUBLESHOOTING HINTS

Luggage compartment light

Luggage compartment light does not come on.

- Check the bulb.
- Check the trunk lid latch switch. (Refer to GROUP 42 - Trunk Lid.)

Dome light

The dome light does not illuminate.

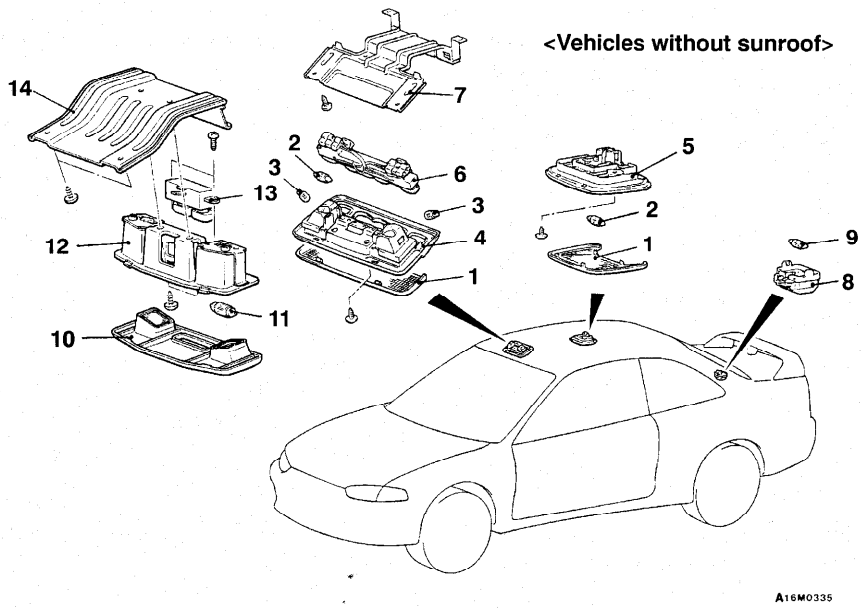
1. The clock also stopped.
   - Check dedicated fuse No. 2.
2. The dome light does not illuminate when with the dome light switch at the "DOOR" position, any door is opened.
   - Check the bulb.
   - Check the dome light switch.
3. The dome light does not illuminate when with the dome light switch at the "DOOR" position, a certain door or doors is/are opened.
   - Check the door switch [the door switch(es) for the door(s) that does not activate the dome light when opened].

INTERIOR LIGHT

54200630054

REMOVAL AND INSTALLATION

<Vehicles with map light> <Vehicles with sunroof> <Vehicles without sunroof>



Dome light removal steps

1. Dome light lens
2. Dome light bulb
3. Reading light bulb
4. Dome light and sunroof switch body <Vehicles with sunroof>
5. Dome light switch body <Vehicles without sunroof>
6. Dome light and reading light switch <Vehicles with sunroof>
7. Dome light bracket <Vehicles with sunroof>

Luggage compartment light removal steps

8. Luggage compartment light assembly
9. Luggage compartment light bulb

Map light removal steps

10. Map light lens
11. Map light bulb
12. Map light body
13. Map light switch
14. Map light bracket

RHEOSTAT

54200060297

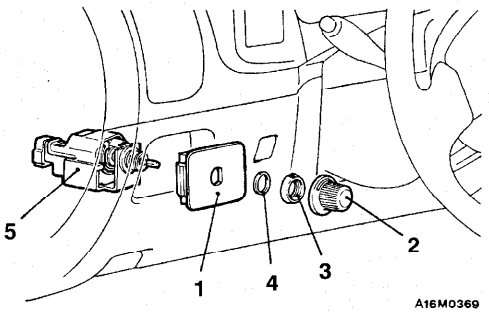
SPECIAL TOOL

Tool	Tool number and name	Supersession	Use
	MB990784 Ornament remover	General service tool	Removal of switch garnish

RHEOSTAT

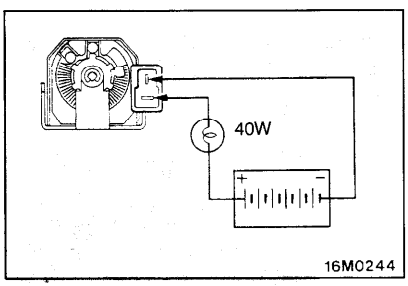
54200600130

REMOVAL AND INSTALLATION



Removal steps

1. Switch garnish
2. Knob
3. Ring nut
4. Plate
5. Rheostat



INSPECTION

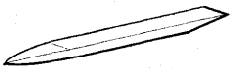
54200610195

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 LIGHT SWITCH

54200060303

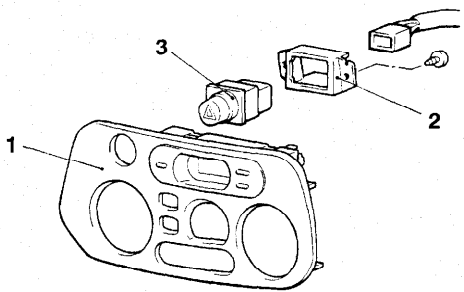
SPECIAL TOOL

Tool	Tool number and name	Supersession	Use
	MB990784 Ornament remover	General service tool	Heater control panel removal

HAZARD WARNING LIGHT SWITCH

54200660077

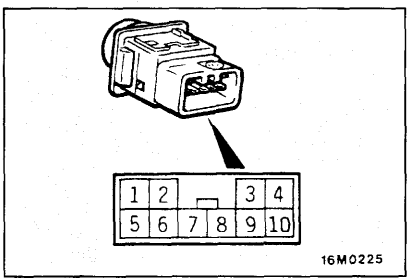
REMOVAL AND INSTALLATION



A16M0284

Removal steps

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



16M0225

INSPECTION

54200670087

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

HORN

54300010257

GENERAL INFORMATION

OPERATION

- Battery voltage is always applied to the horn relay through dedicated fuse No. 4.
- When the horn switch is turned "ON", the contact point of horn relay will be closed to turn "ON" the horn relay. While the horn switch is "ON", the horn sounds.

TROUBLESHOOTING

54300070279

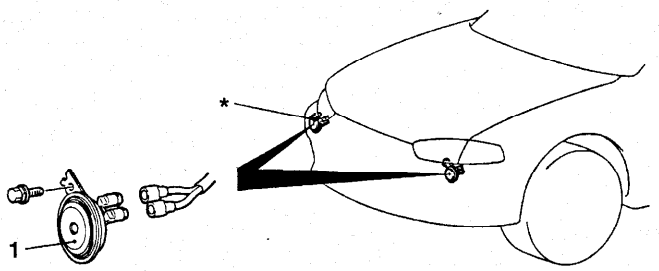
TROUBLESHOOTING HINTS

1. Horn does not sound.
   - Check the dedicated fuse No. 4.
   - Check the horn relay.
   - Check the horn switch.
   - Check the horn.
   - Check the ground circuit.
   - Check connectors and wiring harness.
2. Only one horn sounds.
   - Check the horn.
   - Check connectors and wiring harness.

HORN

54300790021

REMOVAL AND INSTALLATION



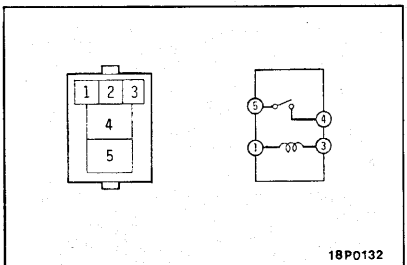
A16M0348

Removal steps

- Front bumper (Refer to GROUP 51.)

1. Horn

NOTE
The horn marked by * applies to 4-door models and 2-door 1.8L models.



18P0132

INSPECTION

54300650039

HORN RELAY CONTINUITY CHECK

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

CIGARETTE LIGHTER

54300010202

GENERAL INFORMATION

OPERATION

- If the plug is pressed into the socket, the plug will remain in, and the cigarette lighter will be turned "ON".
- The element area of the plug is heated. The plug will automatically return to turn "OFF" the cigarette lighter.

TROUBLESHOOTING

54300070613

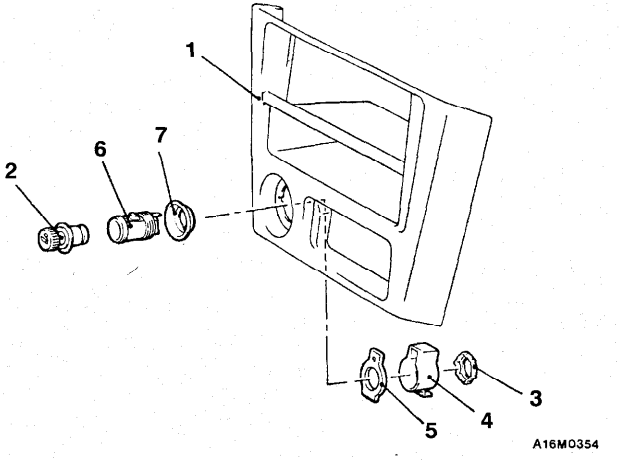
TROUBLESHOOTING HINTS

1. Cigarette lighter does not operate.
   - Check the cigarette lighter. (Refer to P.54-50.)
2. Cigarette lighter illumination light does not come on or is dim.
   - Check the rheostat. (Refer to P.54-46.)

CIGARETTE LIGHTER

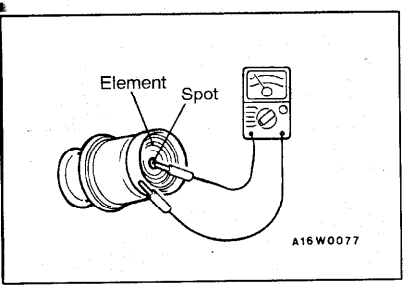
54300560080

REMOVAL AND INSTALLATION



Removal steps

1. Audio panel
2. Plug
3. Fixing ring
4. Socket case
5. Socket washer
6. Socket
7. Protector



INSPECTION

54300570083

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

CLOCK

54200060310

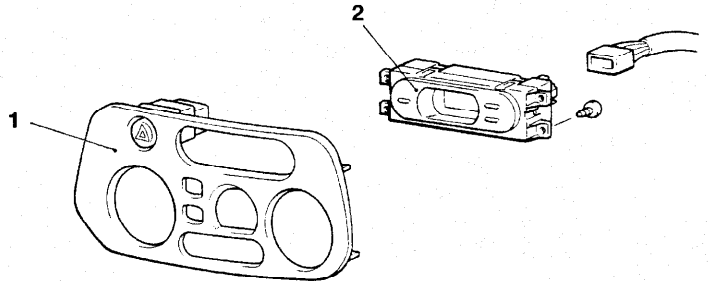
SPECIAL TOOL

Tool	Tool number and name	Supersession	Use
	MB990784 Ornament remover	General service tool	Heater control panel removal

CLOCK

54300590041

REMOVAL AND INSTALLATION



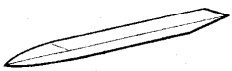
Removal steps

1. Heater control panel
2. Clock

RADIO AND TAPE PLAYER

54400060040

SPECIAL TOOL

Tool	Tool number and name	Supersession	Use
	MB990784 Ornament remover	General service tool	Audio panel removal

TROUBLESHOOTING

54400070135

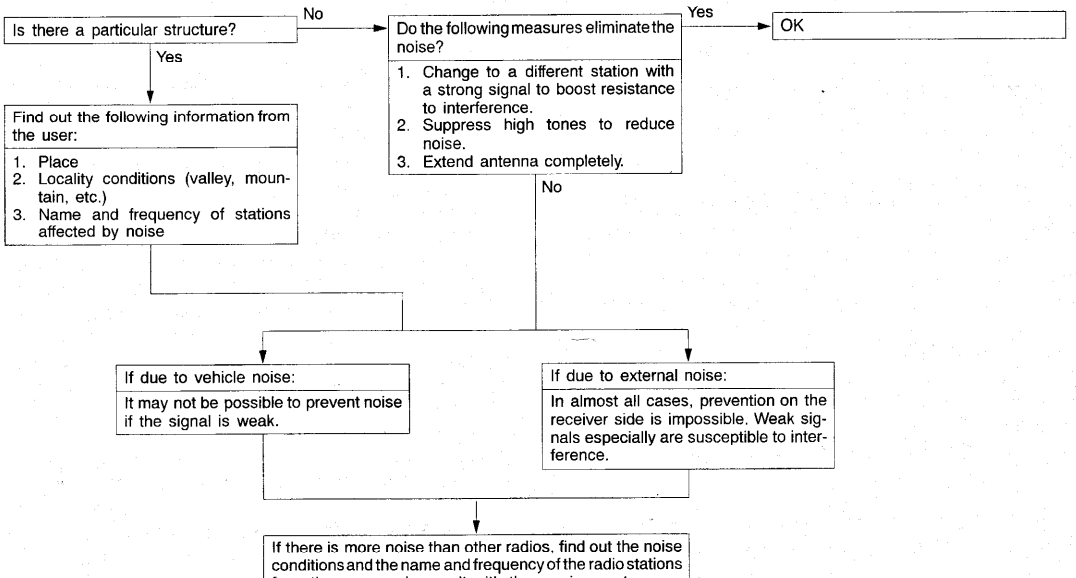
QUICK-REFERENCE TROUBLESHOOTING CHART

Items	Problem symptom	Relevant chart
Noise	Noise appears at certain places when travelling (AM).	A-1
	Noise appears at certain places when travelling (FM).	A-2
	Mixed with noise, only at night (AM).	A-3
	Broadcasts can be heard but both AM and FM have a lot of noise.	A-4
	There is more noise either on AM or on FM.	A-5
	There is noise when starting the engine.	A-6
	Some noise appears when there is vibration or shocks during travelling.	A-7
	Noise sometimes appears on FM during travelling.	A-8
	Ever-present noise.	A-9
Radio	When switch is set to ON, no power is available.	B-1
	No sound from one speaker.	B-2
	There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.	B-3
	Insufficient sensitivity.	B-4
	Distortion on AM or on both AM and FM.	B-5
	Distortion on FM only.	B-6
	Too few automatic select stations.	B-7
	Insufficient memory (preset stations are erased).	B-8
Tape player	Cassette tape is not accepted.	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 traveling (FM).

Do the following measures eliminate the noise?
- Change to a different station with a strong signal to boost resistance to interference.
- Suppress high tones to reduce noise.
- Extend antenna completely.

Yes → OK

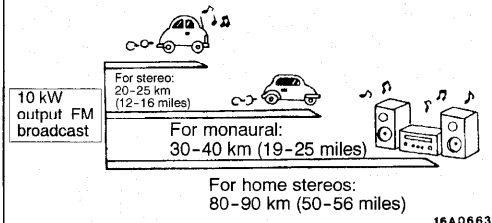
No ↓

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

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.

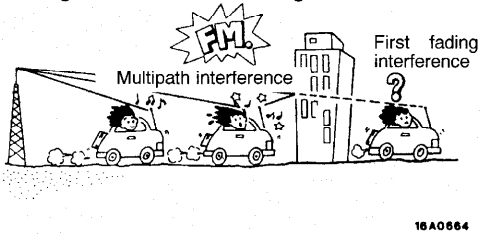
1. The signal becomes weak as the distance from the station's transmission antenna increases. Although this may vary according to the signal strength of the transmitting station and intervening geographical formation or buildings, the area of good reception is approx. 20-25 km (12-16 miles) for stereo 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 travelling, noise will appear each time the vehicle's antenna passes through this kind of obstructed area. The strength and interval of the noise varies according to the signal strength and the conditions of deflection. <This is called multipath noise, and is a repetitious buzzing.>
4. Since FM stereo transmission and reception has a weaker field than monaural, it is often accompanied by a hissing noise.

FM Broadcast Good Reception Areas



16A0663

FM Signal Characteristics and Signal Interference

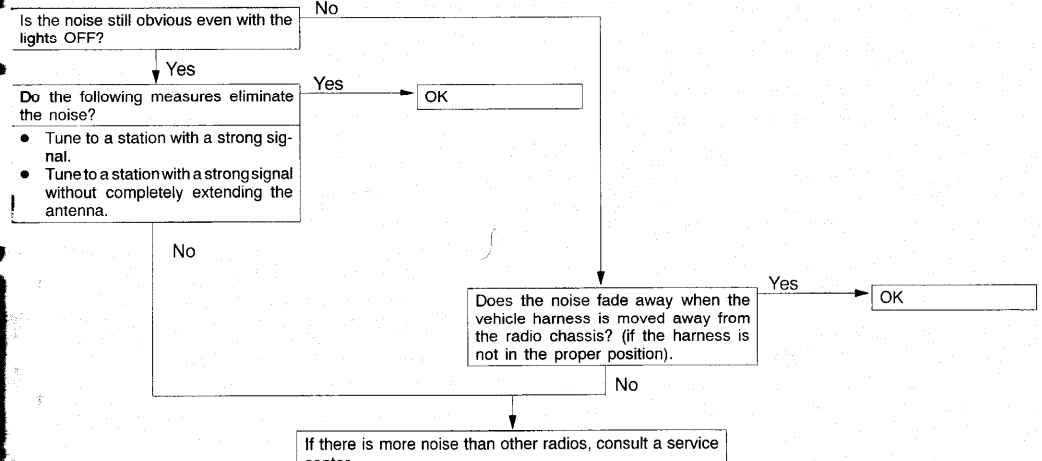


16A0664

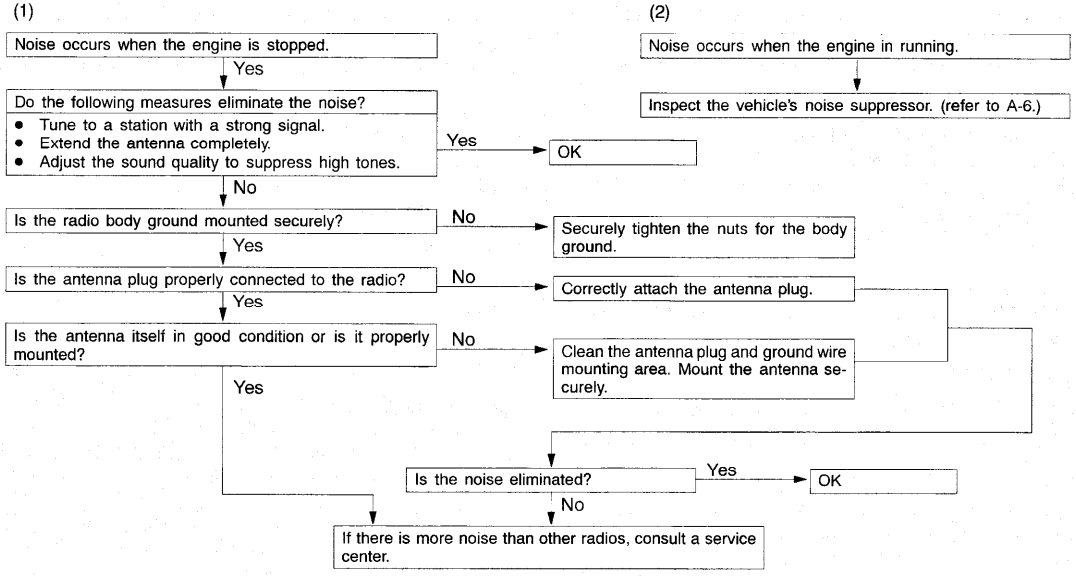
A-3 Mixed with noise, only at night (AM).

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: Generator noise may be a cause.



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

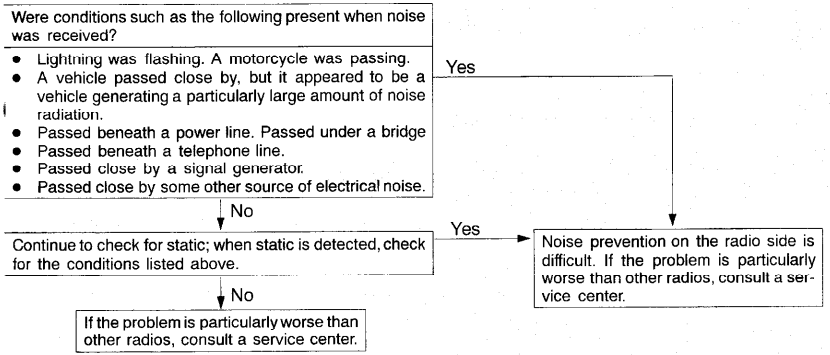


NOTE
About noise encountered during FM reception only.
Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multi-path). (Refer to A-2.)

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

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

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



2. There is much noise only on FM
   Due to differences in FM and AM systems, FM is not as susceptible as AM to interference from engines, power lines, lightning, etc. On the other hand, there are cases due to the characteristics of FM waves of noise or distortion generated by typical noise interference (first fading and multipath). (Refer to A-2) <Noise (hissing) occurs in weak signal areas such as mountainous regions, but this is not due to a problem with the radio.>

A-6 There is noise when starting the engine.

Noise type Sounds are in parentheses ( ).	Conditions	Cause	Remedy
AM, FM: Ignition noise (Popping, snapping, cracking, buzzing)	• Increasing the engine speed causing the popping sound to speed up, and volume decreases. • Disappears when the ignition switch is turned to ACC.	• Mainly due to the spark plug circuit. • Due to engine noise.	• Use engine analyzer to diagnose ignition system. • Check or replace the ground cable. (Refer to Fig. 1.) • 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)	• Disappears when the vehicle is completely stopped. • Severe when transmission is engaged and vehicle is moving.	Occurs when parts or wiring move for some reason and contact metal parts of the body.	Return parts or wiring to their proper position.
	• Various noises are produced depending on the body part of the vehicle.	Due to detachment from the body of the front hood, bumpers, exhaust pipe and muffler, suspension, etc.	Tighten the mounting bolts securely. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly grounded.

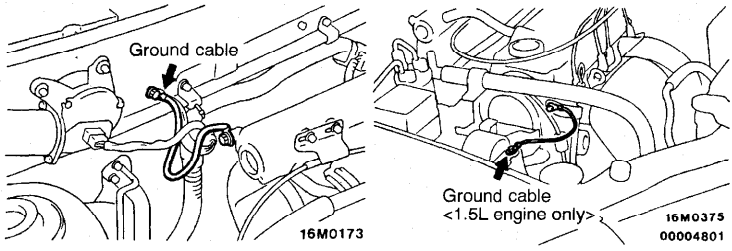
Caution

1. **Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.**
2. **Check that there is no external noise. Since failure 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 ground. This suppresses noise by grounding the noise component (A.C. or pulse signal) to the body of the vehicle.
2. Coil
   The coil passes D.C. current, but impedance rises as the number of waves increases relative to the A.C. current. A noise suppressing coil which takes advantage of this property is inserted into the power line for the noise source, and works by preventing the noise component from flowing or radiating out of the line.

(Fig. 1)



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

- Are connectors properly connected?
  - No → Ensure proper connection.
  - Yes ↓
- Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is bumped while tuned away from a station?
  - No → Static electricity noise: Body static electric from the shock absorber rubber bushings used to prevent vibration, tires, etc. occurs because of separation from the earth, causing a buzzing noise. Since no measures can be taken on the radio side, other steps should be taken to discharge the static electricity of the vehicle body. (e.g. ground a chain from the vehicle body.)
  - Yes ↓
- Is the radio correctly grounded? (Is the mounting screw tightened securely?)
  - No → Tighten the screw securely.
  - Yes ↓
- Is the antenna correctly grounded? (If noise appears when the antennais moved, this means the ground is not securely connected.)
  - No → If rust is present at the antenna ground screw, clean and tighten the ground securely.
  - Yes ↓
- Repair or replace radio.

A-8 Noise sometimes appears on FM during travelling.

- Does the problem clear up when tuning a radio again?
  - Yes → OK
  - No ↓
- Does the problem appear only in certain locations and only with certain stations?
  - Yes → Due to electrical field conditions. (Multipath noise*, fading noise*).
  - No ↓
- Are connectors properly connected?
  - No → Check connector connections.
  - Yes ↓
- Does noise appear when the radio switch is turned on while the vehicle is stopped and the radio is bumped while tuned away from a station?
  - No → Static electricity noise: Body static electric from the shock absorber rubber bushings used to prevent vibration, tires, etc. occurs because of separation from the ground, causing a buzzing noise. Since no measures can be taken on the radio side, other steps should be taken to discharge the static electricity of the vehicle body. (e.g. ground a chain from the vehicle body.)
  - Yes ↓
- Is the radio body correctly grounded? (Is the mounting screw tightened securely?)
  - No → Tighten the screw securely.
  - Yes ↓
- 's the antenna correctly grounded? (If noise appears when the antennais moved, this means the ground is not securely connected.)
  - No → If rust is present at the antenna ground screw, clean and tighten the ground securely.
  - Yes ↓
- Repair or replace radio.

* 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 closely within a narrow range.

A-9 Ever-present noise.

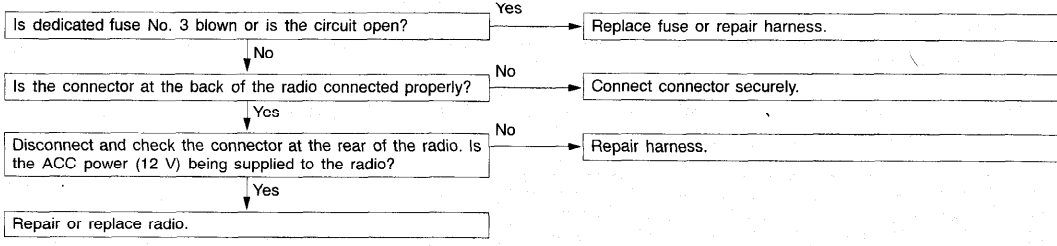
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

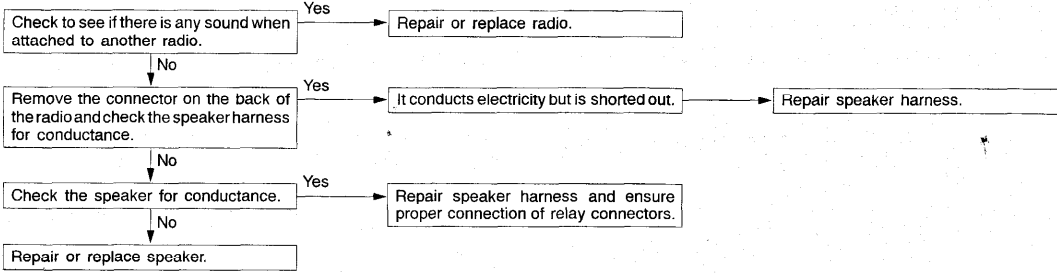
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with AM or FM, the station names, frequencies, etc., and contact a service center.

B. RADIO

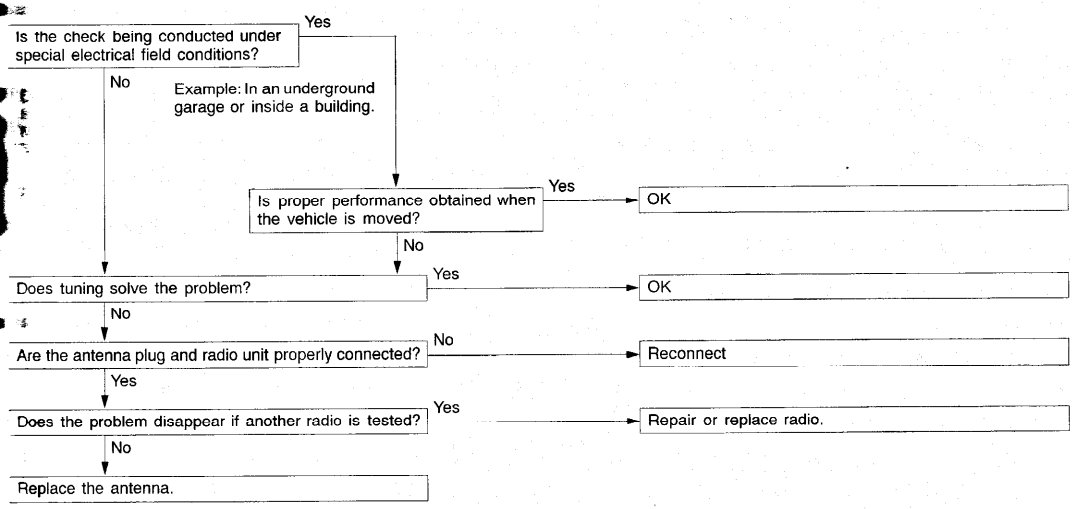
B-1 No power is supplied when the switch is set to ON.



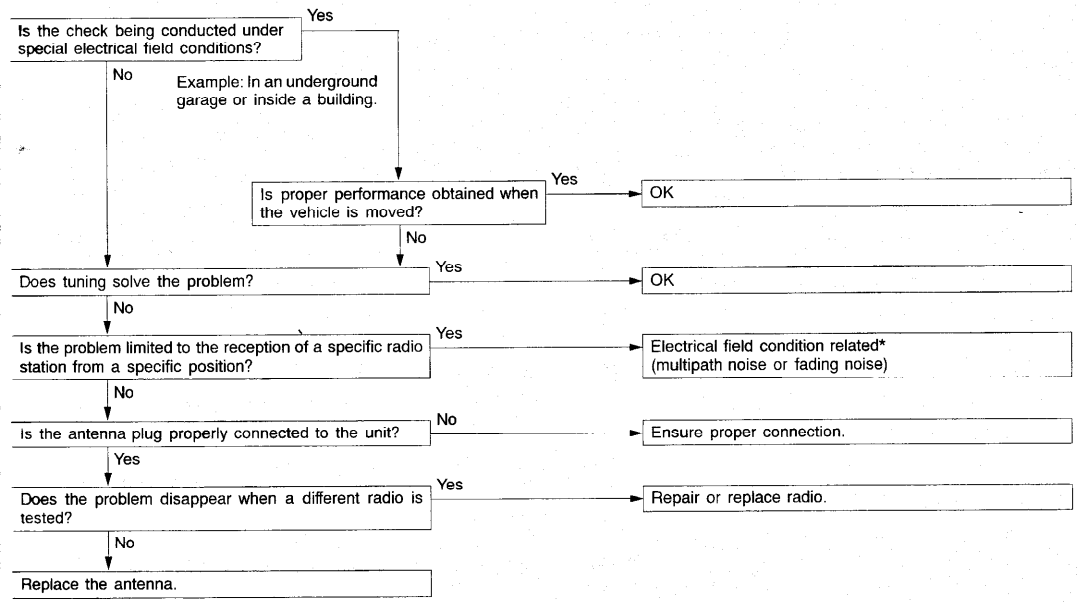
B-2 No sound from one speaker.



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

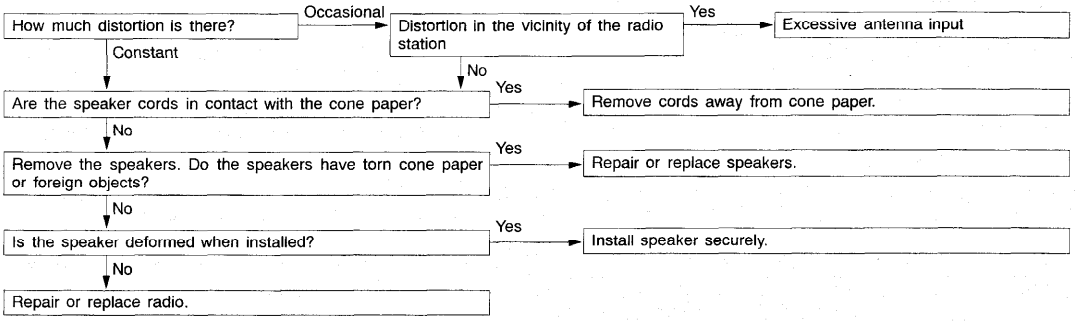


B-4 Insufficient sensitivity.

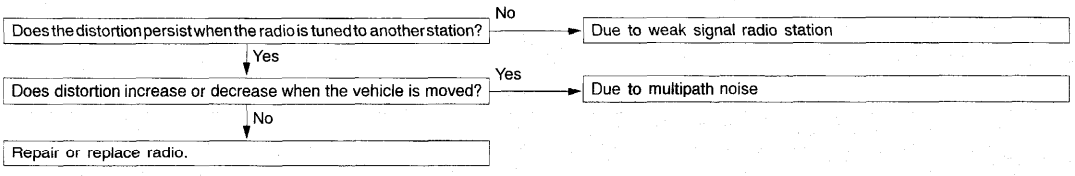


* For multipath noise and fading noise problems, refer to P.54-53.

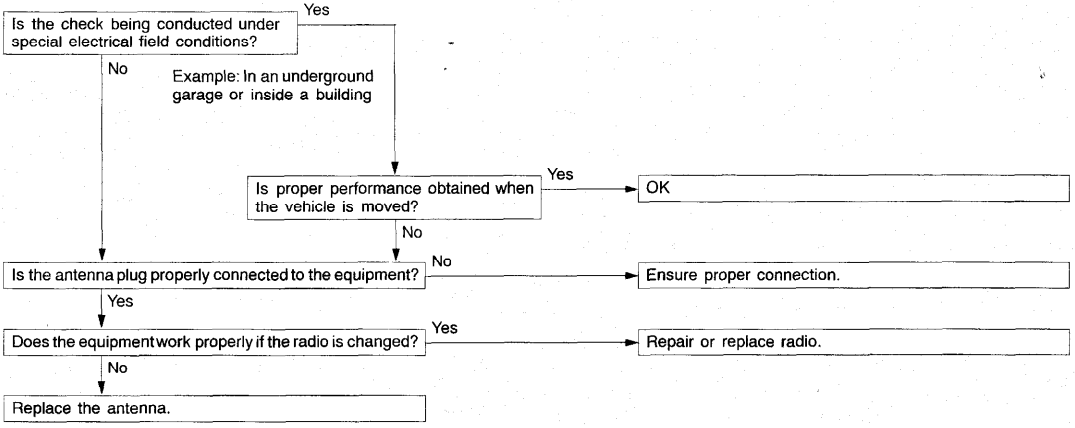
B-5 Distortion on AM or on both AM and FM.



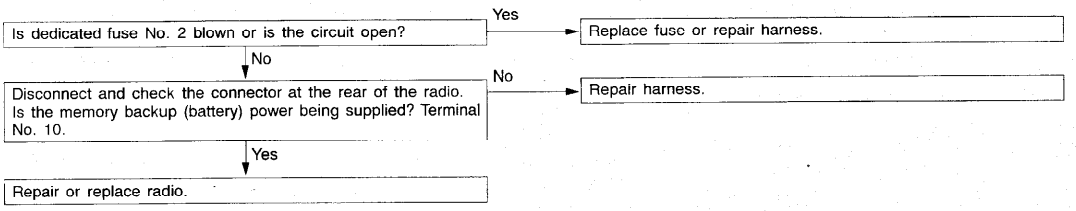
B-6 Distortion on FM only



B-7 Too few automatic select stations.

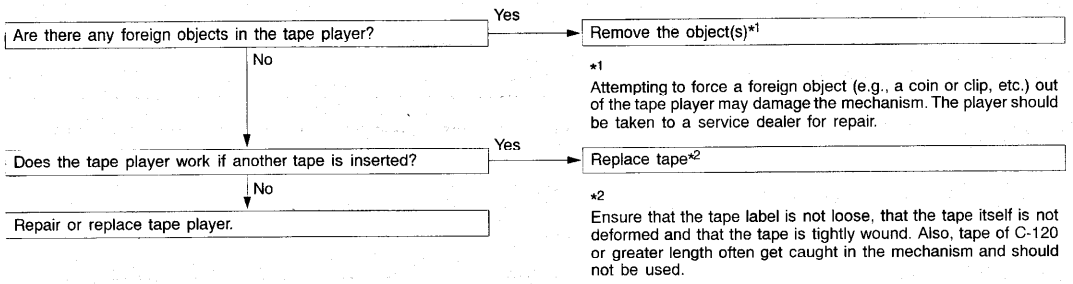


B-8 Insufficient memory (preset stations are erased).



C. TAPE PLAYER

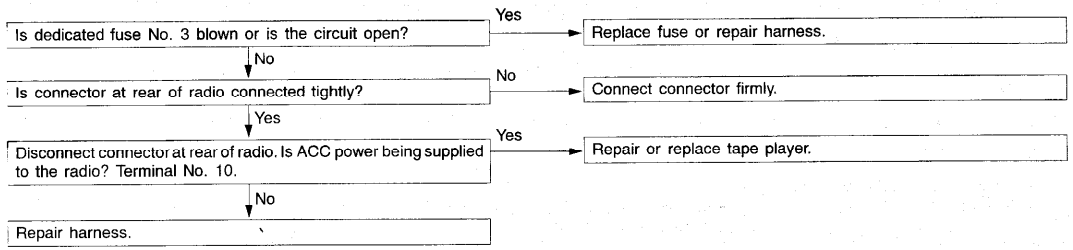
C-1 Cassette tape is not accepted.



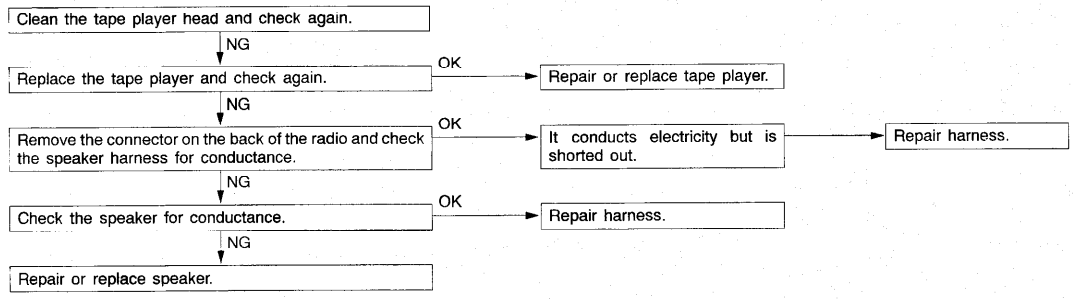
*1
Attempting to force a foreign object (e.g., a coin or clip, etc.) out of the tape player may damage the mechanism. The player should be taken to a service dealer for repair.

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

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.

Does the player play properly when another tape* is inserted?
- Yes → OK
- No

*:
- 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.

Does the player play properly when the tape player head is cleaned?
- Yes → OK
- No

Is proper operation obtained when the tape player is replaced?
- Yes → Repair or replace tape player.
- No

Repair or replace speaker.

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.

Does the player play OK if the tape*1 is changed?
- Yes → OK
- No

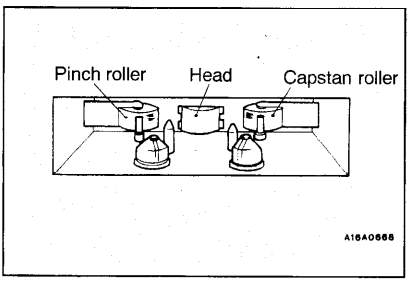
*1
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tape of C-120 or greater length often get caught in the mechanism and should not be used.

Are there any foreign objects *2 inside the tape player?
- Yes → Remove foreign object(s).
- No

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

Is the head or capstan roller dirty? (Refer to the illustration below.)
- Yes → Clean.
- No

Repair or replace tape player.



C-7 Faulty auto reverse.

Does the player play OK if the tape* is changed?
- Yes → OK
- No

*:
- 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.

Does the problem only occur while the vehicle is being driven?
- No → Repair or replace tape player.
- Yes

Is the tape player properly installed to the vehicle?
- No → Ensure tape player installation.
- Yes

Repair or replace tape player.

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

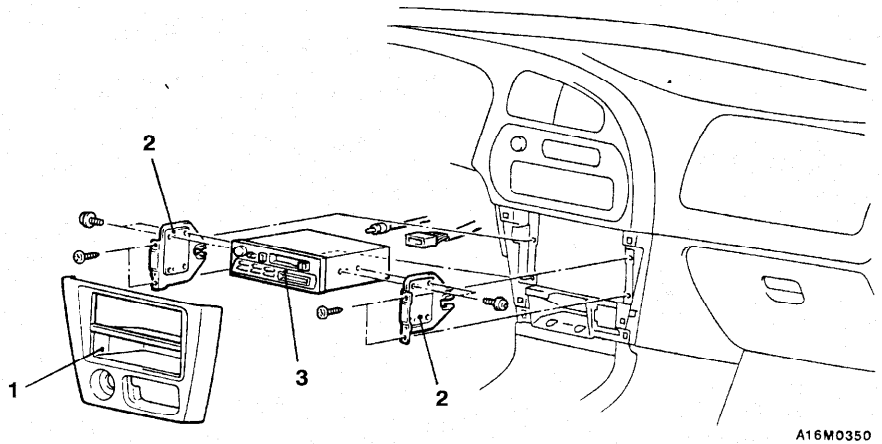
*2
Ensure that the tape label is not loose, that the tape itself is not deformed and that the tape is tightly wound. Also, tapes of C-120 or greater length often get caught in the mechanism and should not be used.

Repair or replace tape player.

RADIO AND TAPE PLAYER

54400140065

REMOVAL AND INSTALLATION



A16M0350

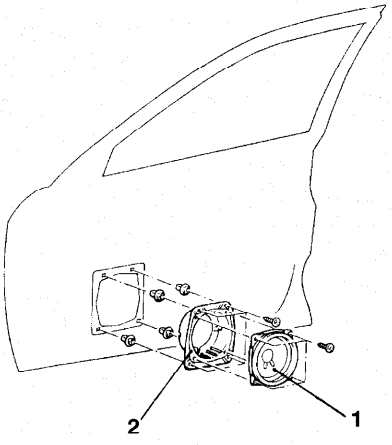
Removal steps

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

SPEAKER

REMOVAL AND INSTALLATION

<FRONT SPEAKER>

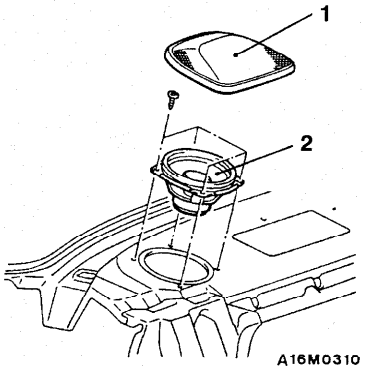


Removal steps

- Front door trim (Refer to GROUP 42.)

1. Front speaker
2. Speaker cover

<REAR SPEAKER>



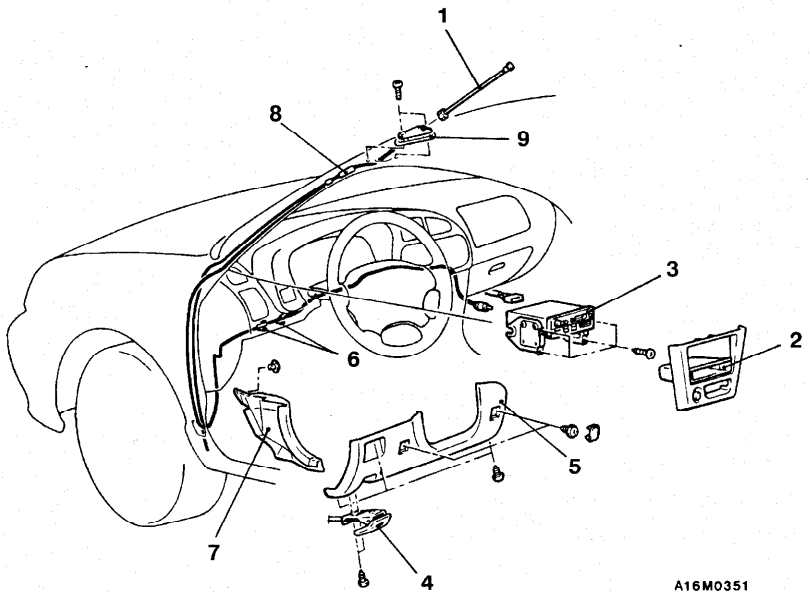
Removal steps

1. Rear speaker garnish
2. Rear speaker

ANTENNA

54400290104

REMOVAL AND INSTALLATION

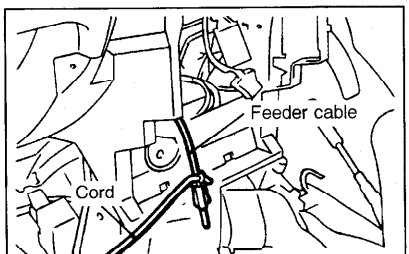


Removal steps

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

◀A▶ 8. Antenna assembly

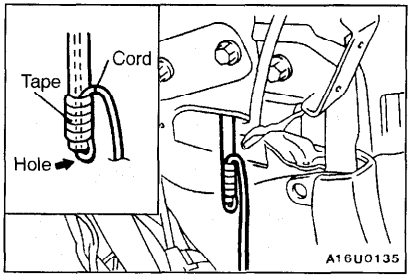
9. Antenna base gasket



REMOVAL SERVICE POINT

◀A▶ ANTENNA ASSEMBLY REMOVAL

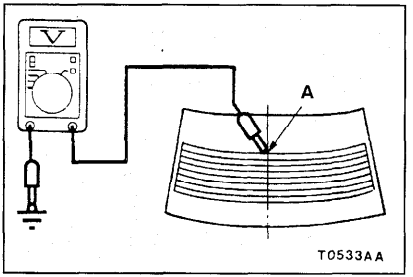
1. Tie a cord to the end of the feeder cable.



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. Slowly pull out the antenna base little by little to remove it.



REAR WINDOW DEFOGGER

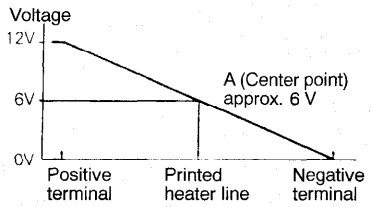
54300180033

ON-VEHICLE SERVICE

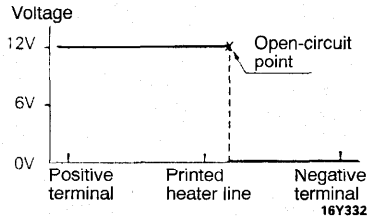
PRINTED-HEATER LINE CHECK

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

Normal characteristic curve



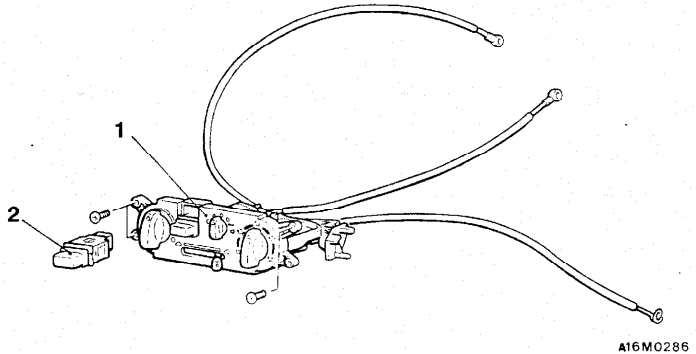
Abnormal characteristic curve



REAR WINDOW DEFOGGER SWITCH

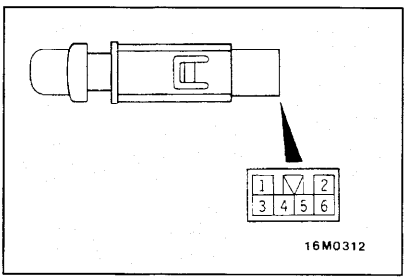
54300620153

REMOVAL AND INSTALLATION



Removal steps

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



INSPECTION

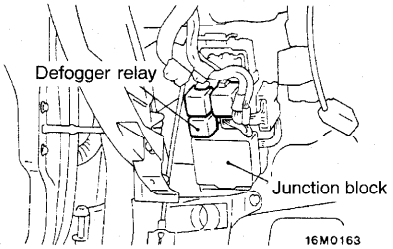
54300670066

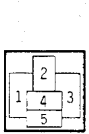
DEFOGGER SWITCH CONTINUITY CHECK

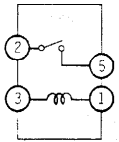
Switch position	Terminal No.							
	1		3	4	5	2		6
OFF		ILL					IND	
ON		ILL					IND	

NOTE

*: The switch will turns off in 13 - 17 minutes after it turns on.







20Z0002

00004586

REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

54300680076

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