
CHASSIS ELECTRICAL

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

WARNING!

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

NOTE

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

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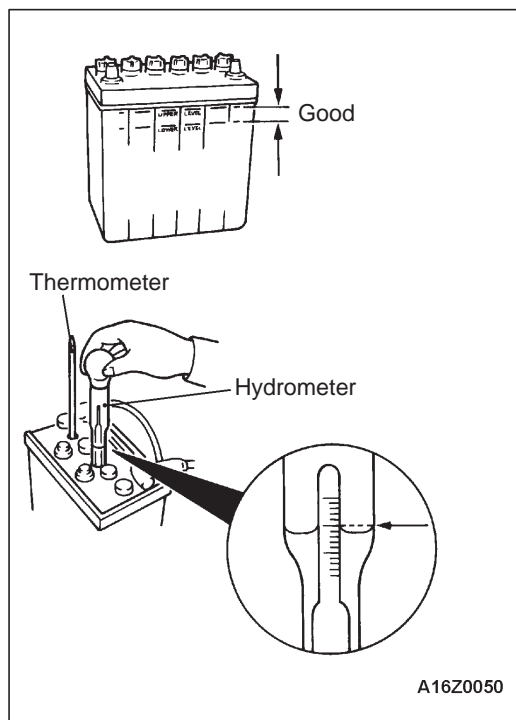
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BATTERY

SERVICE SPECIFICATION

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



ON-VEHICLE SERVICE

FLUID LEVEL AND SPECIFIC GRAVITY CHECK

1. Inspect whether or not the battery fluid is between the UPPER LEVEL and LOWER LEVEL marks.

Caution

- (1) If the battery fluid is below the LOWER LEVEL, the battery could explode in using.
- (2) If the battery fluid is over the UPPER LEVEL, leakage could result.

2. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.

Standard value: 1.220 – 1.290 [20°C]

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

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

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

Dt: Actually measured specific gravity

t: Actually measured temperature

CHARGING

1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.
2. The current normally used for charging a battery should be approximately 1/10th of the battery capacity. When performing a quick-charging due to lack of time, etc., the charging current should never exceed the battery capacity as indicated in amperes.

Battery type	Capacity (5 HR)	Normal charging current	Quick-charging current
65D23L	52 Ah	5.2 A	53 A

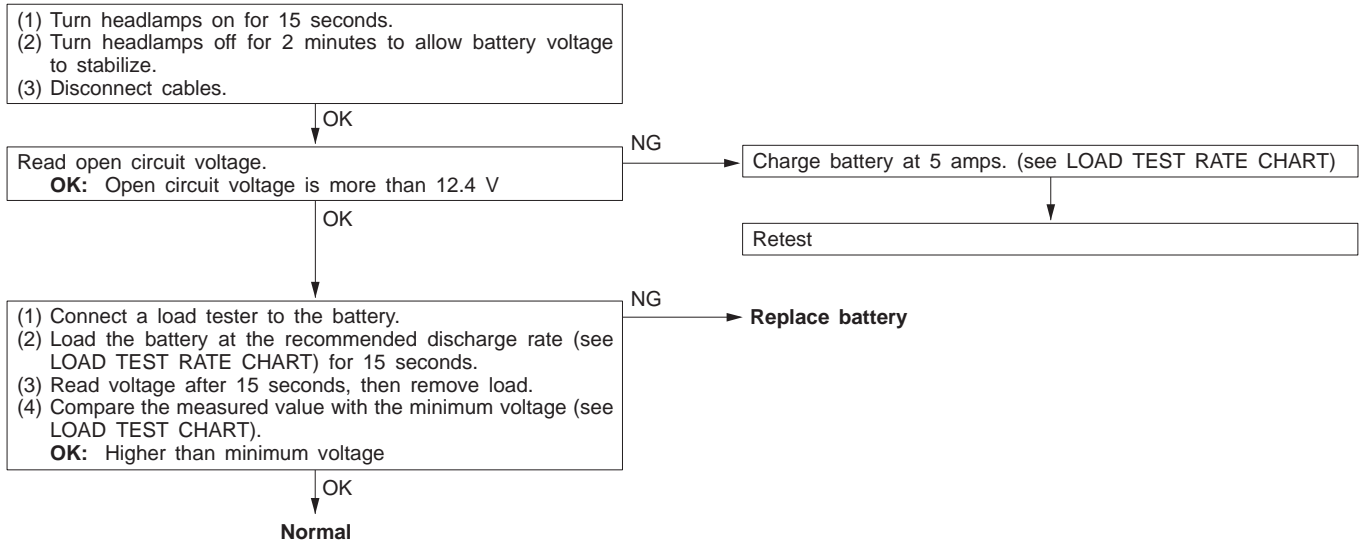
3. Determining if charging is completed.
 - (1) If the specific gravity of the battery fluid reaches 1.250 – 1.290 and remains constant for at least one hour.
 - (2) If the voltage of each cell reaches 2.5 – 2.8 V and remains constant for at least one hour.

Caution

- (1) Remove the battery caps during charging.
- (2) Be careful since the battery fluid level may rise during charging.
- (3) Keep all sources of fire away while charging because there is a danger of explosion.
- (4) Be careful not to do anything that could generate sparks while charging.
- (5) When charging is completed, replace the battery caps, pour clean water over the battery to remove any sulfuric acid and dry.
- (6) Perform the charging in the well-ventilated place.
- (7) Do not raise the battery fluid temperature more than approximately 45°C (In case of quick-charging: approximately 55°C).

BATTERY TESTING PROCEDURE

TEST STEP



LOAD TEST RATE CHART


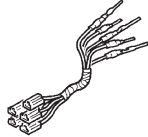
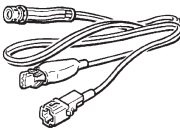
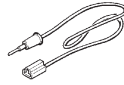

Battery type	65D23L
Charging time when fully discharged h [5-amp rated current charging]	11
Load test (Amps)	300

LOAD TEST CHART

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

IGNITION SWITCH AND IMMOBILIZER SYSTEM

SPECIAL TOOL

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	<ul style="list-style-type: none"> ● Immobilizer system check (Diagnosis display using the MUT-II) ● Registration of the encrypted code
<p>A</p>  <p>B</p>  <p>C</p>  <p>D</p>  <p>C991223</p>	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	<ul style="list-style-type: none"> ● Fuel gauge simple check A: Connector pin contact pressure check B: Power circuit check C: Power circuit check D: Commercial tester connection

TROUBLESHOOTING

Caution

The encrypted code should always be re-registered when replacing the immobilizer-ECU.

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING

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

DIAGNOSIS FUNCTION

DIAGNOSIS CODES CHECK

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

ERASING DIAGNOSIS CODES

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

Caution

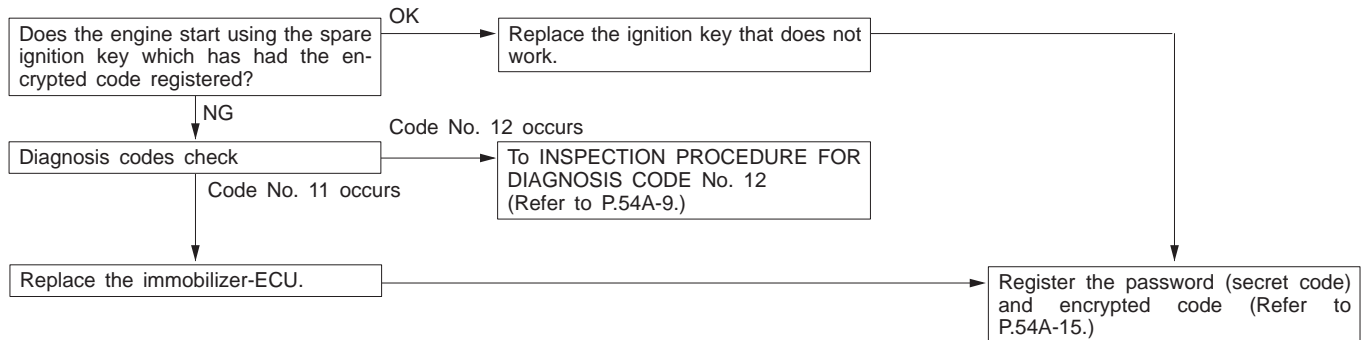
The diagnosis codes which result from disconnecting the battery cables cannot be erased.

INSPECTION CHART FOR DIAGNOSIS CODES

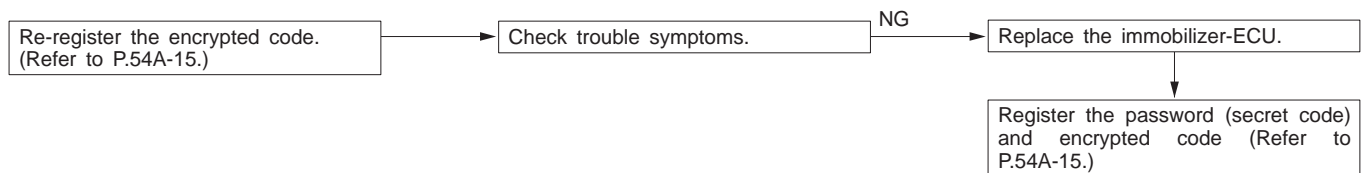
Diagnosis code No.	Inspection items	Reference page
11	Transponder communication system	54A-9
12	Encrypted code are not the same or are not registered	54A-9

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code No. 11 Transponder communication system	Probable cause
The encrypted code of the transponder is not sent to the immobilizer-ECU immediately after the ignition switch is turned to the ON position.	<ul style="list-style-type: none"> • Malfunction of the transponder • Malfunction of the ignition key ring antenna • Malfunction of the immobilizer-ECU



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



INSPECTION CHART FOR TROUBLE SYMPTOMS

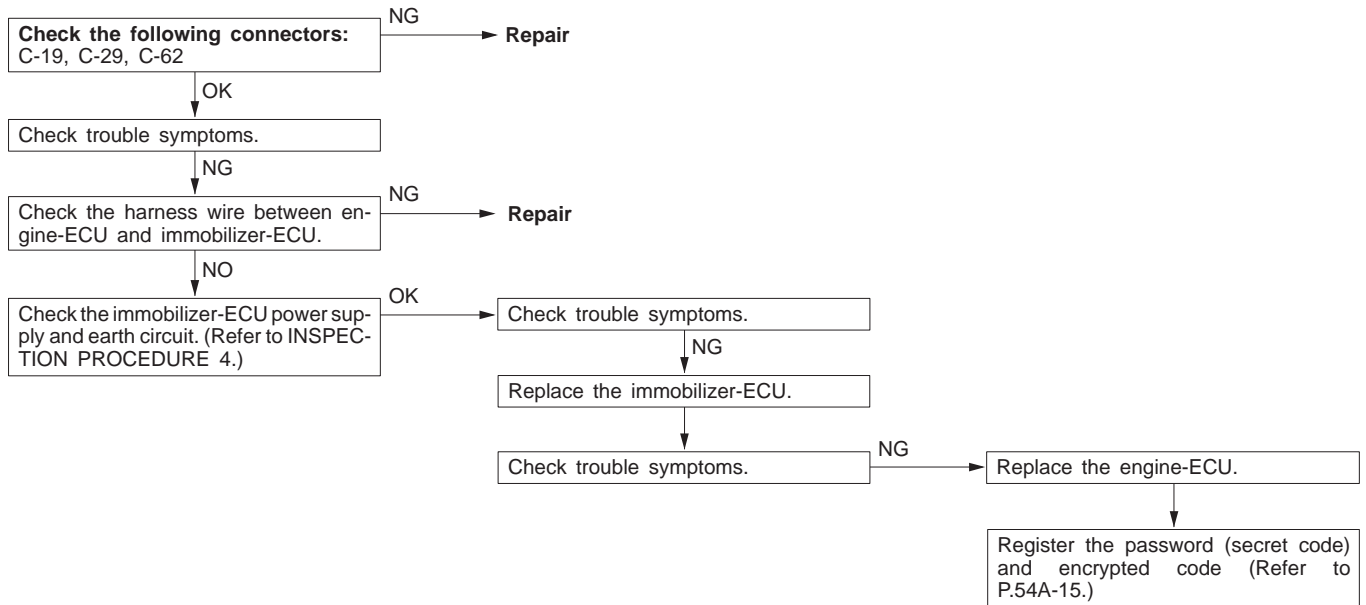
Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	–	GROUP 13B, 13C – Troubleshooting
Diagnosis code No. 54 has been generated by the engine-ECU.	1	54A-10
Encrypted code cannot be registered using the MUT-II.	2	54A-10
Engine does not start (Cranking but no initial combustion).	3	54A-11
Malfunction of the immobilizer-ECU power supply and earth circuit	4	54A-11

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INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

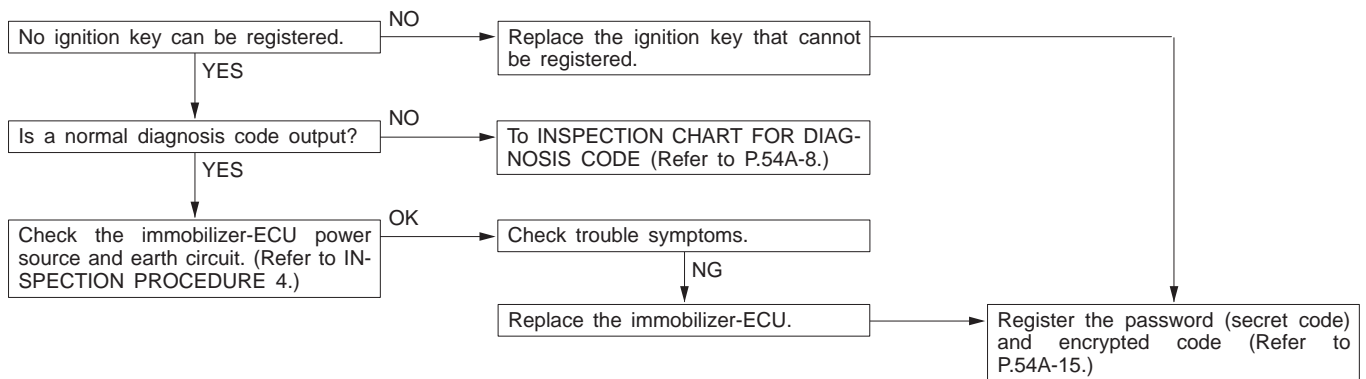
Inspection Procedure 1

Diagnosis code No. 54 has been generated by the engine-ECU.	Probable cause
There is a problem with communication between the engine-ECU and the immobilizer-ECU.	<ul style="list-style-type: none"> ● Malfunction of harness or connector ● Malfunction of the immobilizer-ECU ● Malfunction of the engine-ECU



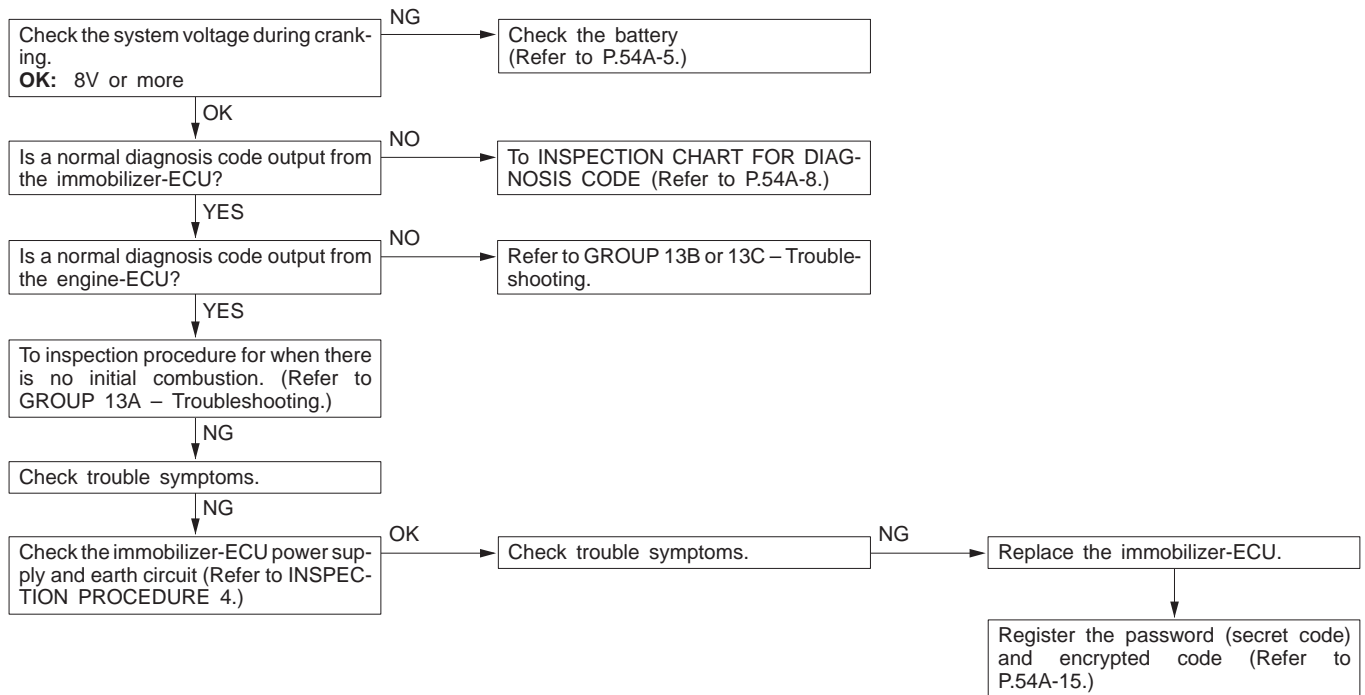
Inspection Procedure 2

Encrypted code cannot be registered using the MUT-II.	Probable cause
The cause is probably that there is no encrypted code registered in the immobilizer-ECU, or there is a malfunction of the immobilizer-ECU.	<ul style="list-style-type: none"> ● Malfunction of the transponder ● Malfunction of the ignition key ring antenna ● Malfunction of harness or connector ● Malfunction of the immobilizer-ECU



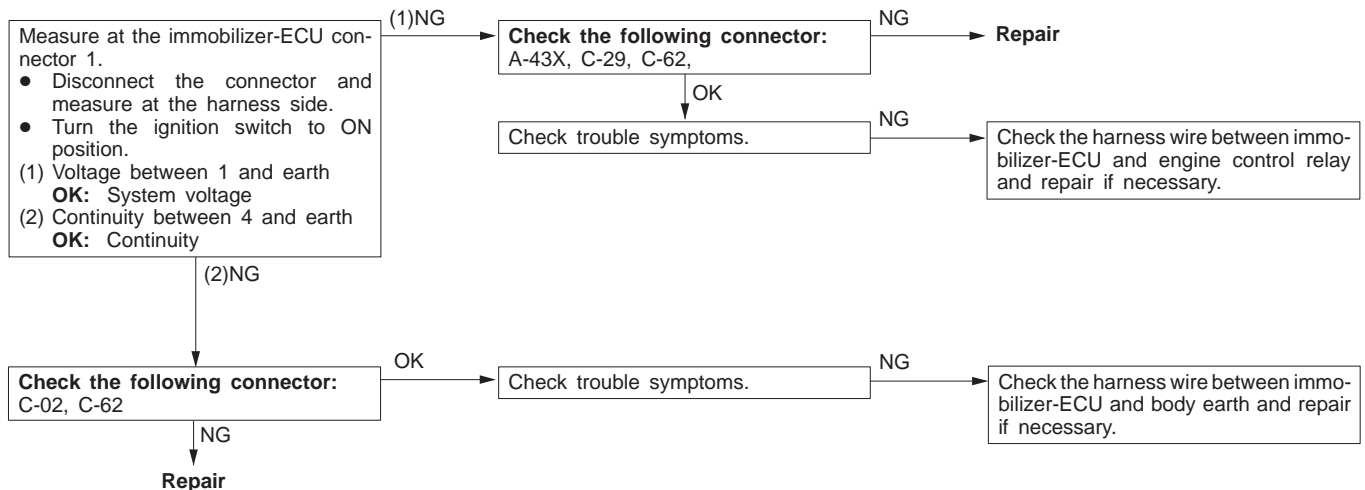
Inspection Procedure 3

Engine does not start (cranking but no initial combustion).	Probable cause
If the fuel injectors are not operating, there might be a problem with the MPI system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.	<ul style="list-style-type: none"> Malfunction of the MPI system Malfunction of the immobilizer-ECU



Inspection Procedure 4

Malfunction of the immobilizer-ECU power supply and earth circuit



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

CHECK AT IMMOBILIZER-ECU TERMINAL VOLTAGE CHECK CHART



W0599AE

Terminal No.	Signal	Checking requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	–	–	–
3	Engine-ECU	–	–
4	Immobilizer-ECU earth	Always	0 V

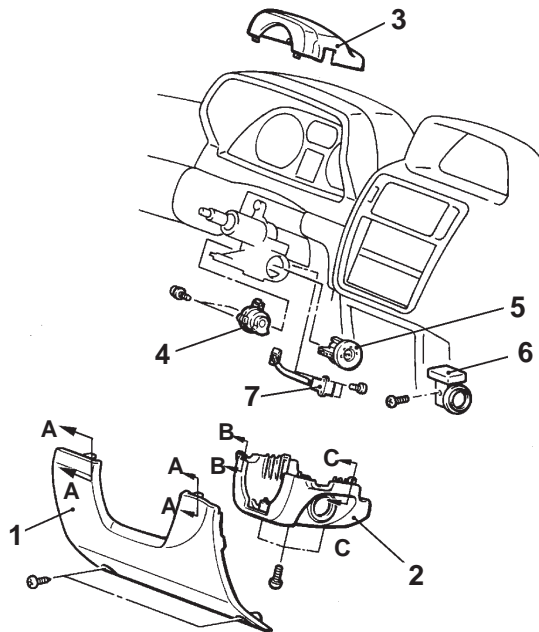
IGNITION SWITCH AND IMMOBILIZER SYSTEM

REMOVAL AND INSTALLATION

Caution: SRS

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

Pre-removal and Post-installation Operation
 Clock Spring and Column Switch Removal and Installation (Refer to GROUP 52B – Air Bag Modules and Clock Spring.)



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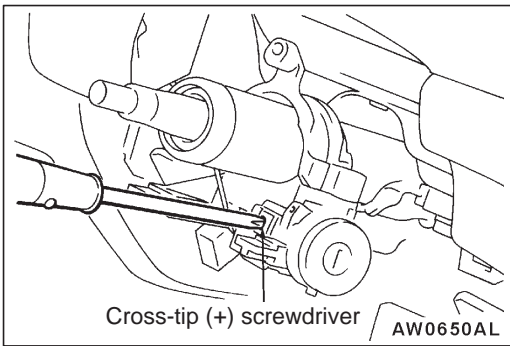
Section A – A	Section B – B	Section C – C
<p>Instrument panel Clip 1 AW0989AL</p>	<p>3 Tab 2 W1109AL</p>	<p>3 Tab 2 W1110AL</p>

Removal steps

1. Instrument under cover
2. Column cover, lower
3. Column cover, upper
4. Ignition switch



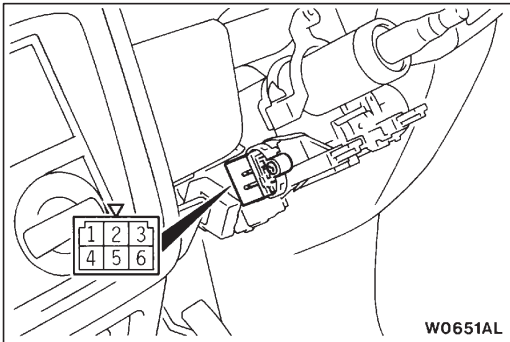
5. Steering lock cylinder
6. Immobilizer-ECU
7. Key reminder switch



REMOVAL SERVICE POINTS

◀A▶ STEERING LOCK CYLINDER REMOVAL

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

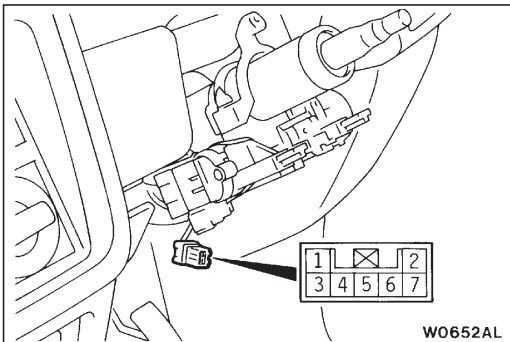


INSPECTION

IGNITION SWITCH CONTINUITY CHECK

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

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



KEY REMINDER SWITCH CONTINUITY CHECK

Disconnect the key reminder switch connector with the switch attached to the vehicle, and then check the continuity between the terminals.

Ignition key	Terminal No.	
	4	6
Removed	○	○
Inserted		

ENCRYPTED CODE REGISTRATION METHOD AND RESETTING THE CODE TO THE FACTORY SETTING

Register the encrypted code in the immobilizer-ECU and then reset the code to the factory setting after parts have been replaced.

Replacement part	Encrypted code
Ignition key	Necessary
Immobilizer-ECU	Necessary
Engine-ECU*	Necessary

NOTE

*: If the engine-ECU is replaced, the immobilizer-ECU and ignition key should be replaced together with it. Each engine-ECU has an individual information for immobilizer-ECU, and the individual information is registered in the immobilizer-ECU and ignition key.

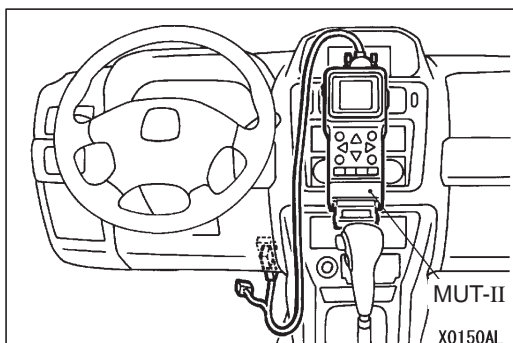
ENCRYPTED CODE REGISTRATION METHOD

If using an ignition key that has just been newly purchased, or if the immobilizer-ECU has been replaced, you will need to register the encrypted codes for each ignition key being used into the immobilizer-ECU. (A maximum of eight different encrypted codes can be registered.)

Moreover, when the immobilizer-ECU has been replaced, you will need to use the MUT-II to input the vehicle secret code and to register the password (secret code) that the user specifies into the immobilizer-ECU. (Refer to the “MUT-II REFERENCE MANUAL” or “MUT-II OPERATING INSTRUCTIONS”)

Caution

If registering of the encrypted codes is carried out after all previously-registered codes have been erased, you should have ready all of the ignition keys that have already been registered.



1. Connect the MUT-II to the diagnosis connector.

Caution

Turn the ignition switch to LOCK (OFF) position before connection or disconnection of the MUT-II.

2. Check that the diagnosis code No.54 is not being generated by the engine-ECU. If it is being generated check according to the Troubleshooting Procedures.
3. Use the ignition key that is to be registered to turn on the ignition switch.

54A-16 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer System

4. Use the MUT-II to register the encrypted code. To register the second or subsequent key, leave the MUT-II connected and remove the first registered key. Within 5 seconds insert the key to be registered and turn on the ignition switch.

NOTE

After 5 seconds have elapsed, the key registration must be repeated from the beginning because the key registration mode terminates.

5. This completes the registration operation. Turn the ignition switch to LOCK (OFF) position and wait for approx. 10 seconds.
6. Check that the engine can be started with each of the ignition keys.
7. Check the diagnosis output from engine-ECU, and erase code No.54 if it appears.

COMBINATION METERS

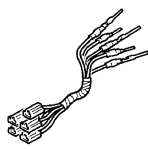
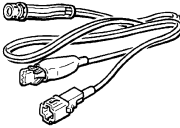
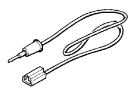

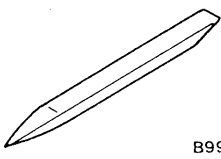
SERVICE SPECIFICATIONS

Items	Items	Standard value	
Speedometer indication error km/h(mph)	40 (20)	40 – 48 (20 – 25)	
	80 (40)	80 – 92 (40 – 47)	
	120 (60)	120 – 136 (60 – 69)	
	160 (80)	160 – 180 (80 – 91)	
	– (100)	– (100 – 114)	
Tachometer indication error r/min	700	±100	
	3,000	+150 –100	
	5,000	+325 –125	
	6,000	+375 –125	
Fuel gauge unit resistance Ω	Main	Float point F	1 – 3
		Float point E	49.7 – 51.7
	Sub	Float point F	1– 3
		Float point E	55.3 – 57.3
Fuel gauge unit float height mm	Main	A (Float point F)	44.5 – 52.5
		B (Float point E)	220.3 – 228.3
	Sub	A (Float point F)	30.4 – 36.4
		B (Float point E)	238.5 – 244.5
Engine coolant temperature gauge unit resistance (at 70°C) Ω		104 ± 13.5	
Fuel gauge resistance Ω	Power supply and earth	233.3	
	Power supply and fuel gauge	108.3	
	Fuel gauge and earth	125.0	
Engine coolant temperature gauge resistance Ω	Power supply and earth	178.9	
	Power supply and engine coolant temperature gauge	54	
	Engine coolant temperature gauge and earth	232.9	

SEALANT

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

SPECIAL TOOLS

Tool	Number	Name	Use
<p>A</p>  <p>B</p>  <p>C</p>  <p>D</p>  <p>C991223</p>	<p>MB991223</p> <p>A: MB991219</p> <p>B: MB991220</p> <p>C: MB991221</p> <p>D: MB991222</p>	<p>Harness set</p> <p>A: Test harness</p> <p>B: LED harness</p> <p>C: LED harness adapter</p> <p>D: Probe</p>	<ul style="list-style-type: none"> Fuel gauge simple check <p>A: Connector pin contact pressure check</p> <p>B: Power circuit check</p> <p>C: Power circuit check</p> <p>D: Commercial tester connection</p>
 <p>B990784</p>	<p>MB990784</p>	<p>Ornament remover</p>	<p>Removal of meter hood</p>

TROUBLESHOOTING

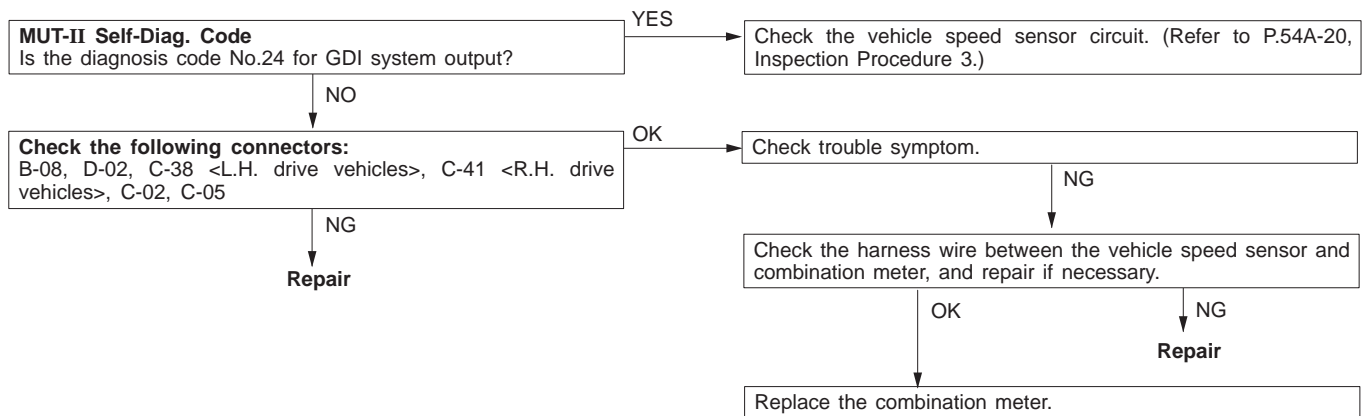
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure	Reference page
Speedometer does not work.	1	54A-19
Tachometer does not work.	2	54A-20
Fuel gauge does not operate.	4	54A-21
Engine coolant temperature gauge does not operate.	5	54A-22
GDI ECO indication lamp does not illumination	6	54A-23

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

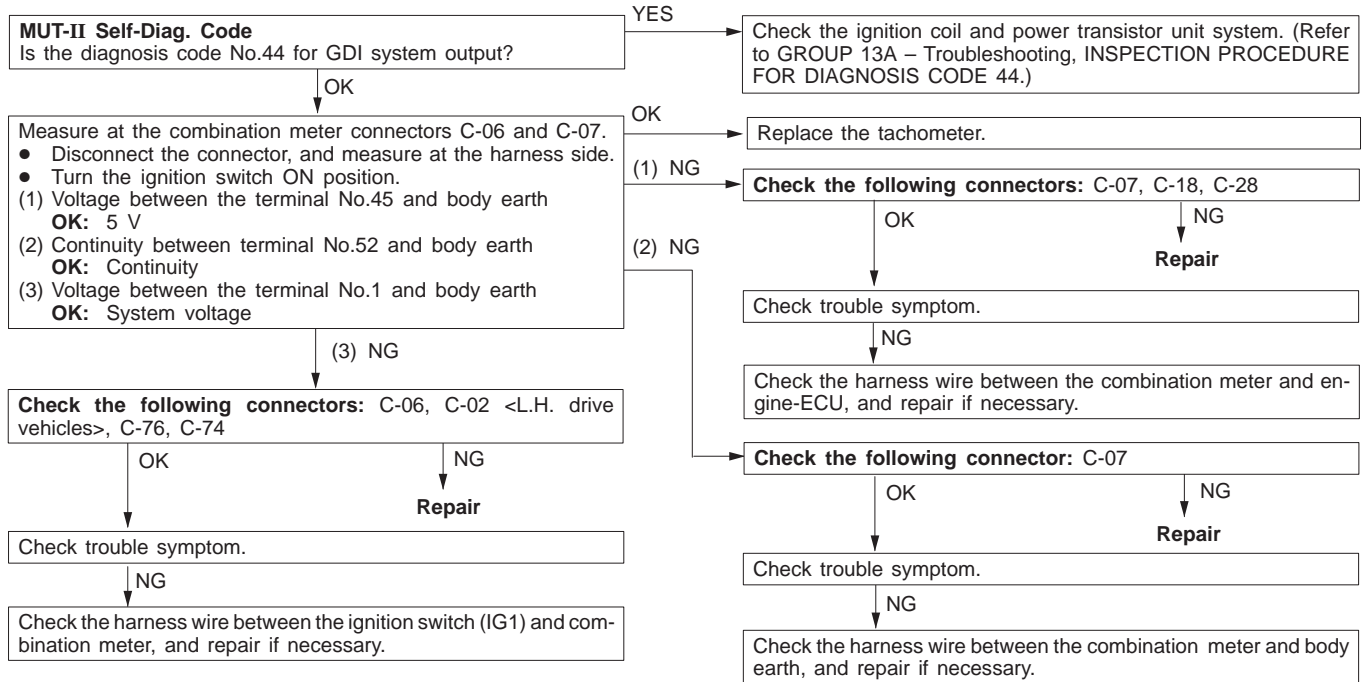
Inspection Procedure 1

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



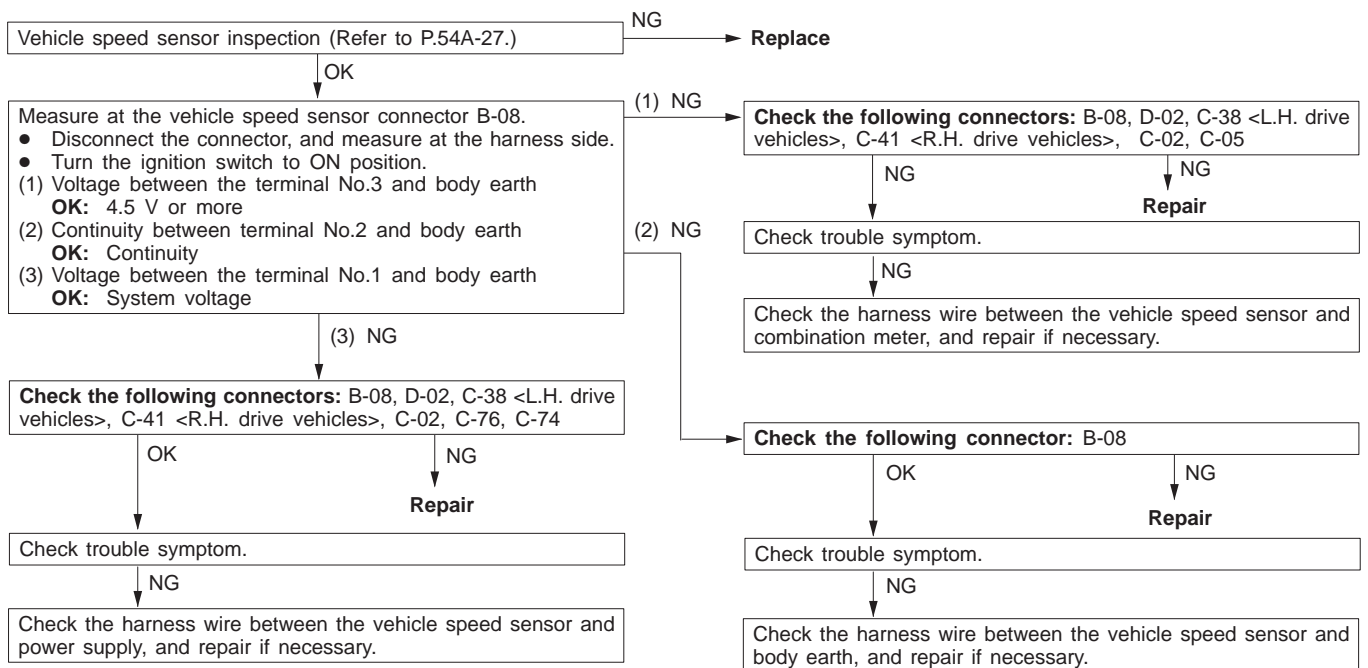
Inspection Procedure 2

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



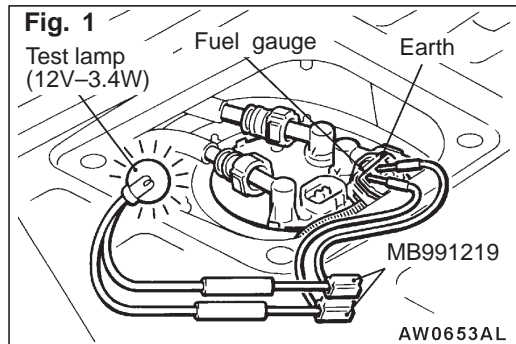
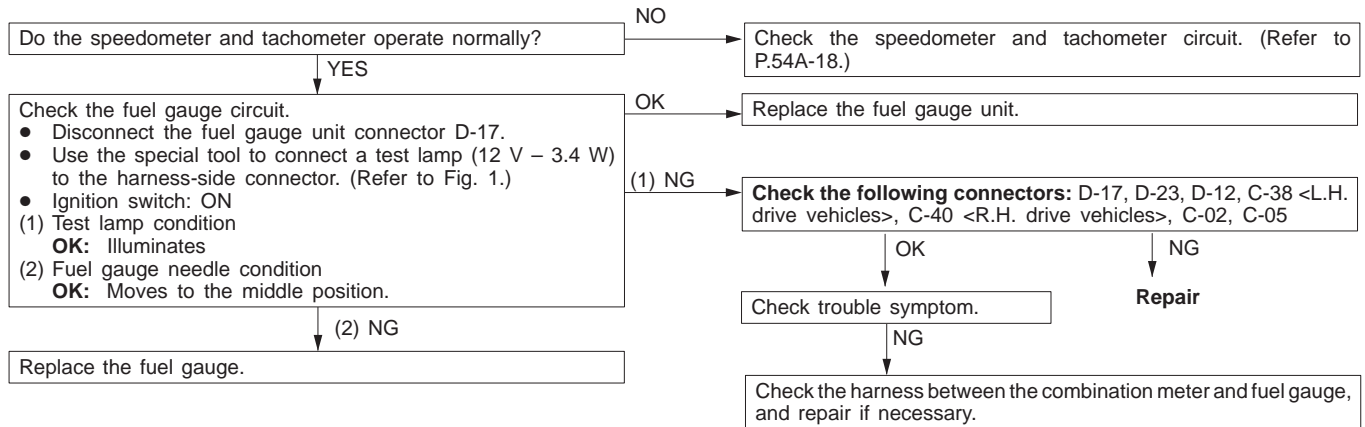
Inspection Procedure 3

Vehicle speed sensor circuit system inspection



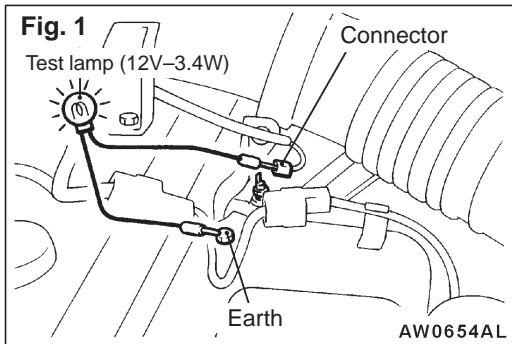
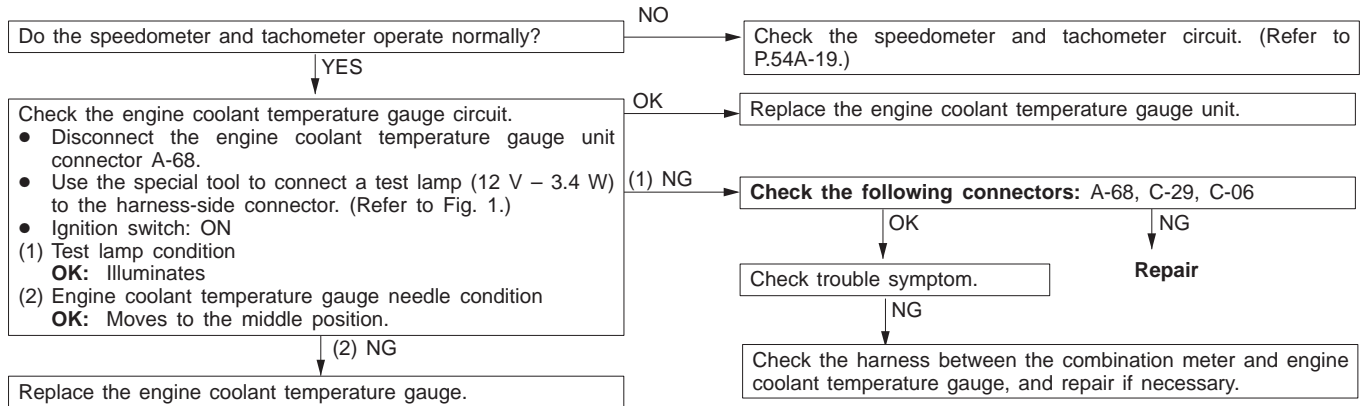
Inspection Procedure 4

Fuel gauge does not operate.	Probable cause
If speedometer and tachometer operate normally, the harness from power supply to combination meter is normal.	<ul style="list-style-type: none"> ● Malfunction of fuel gauge unit ● Malfunction of fuel gauge ● Malfunction of harness or connector



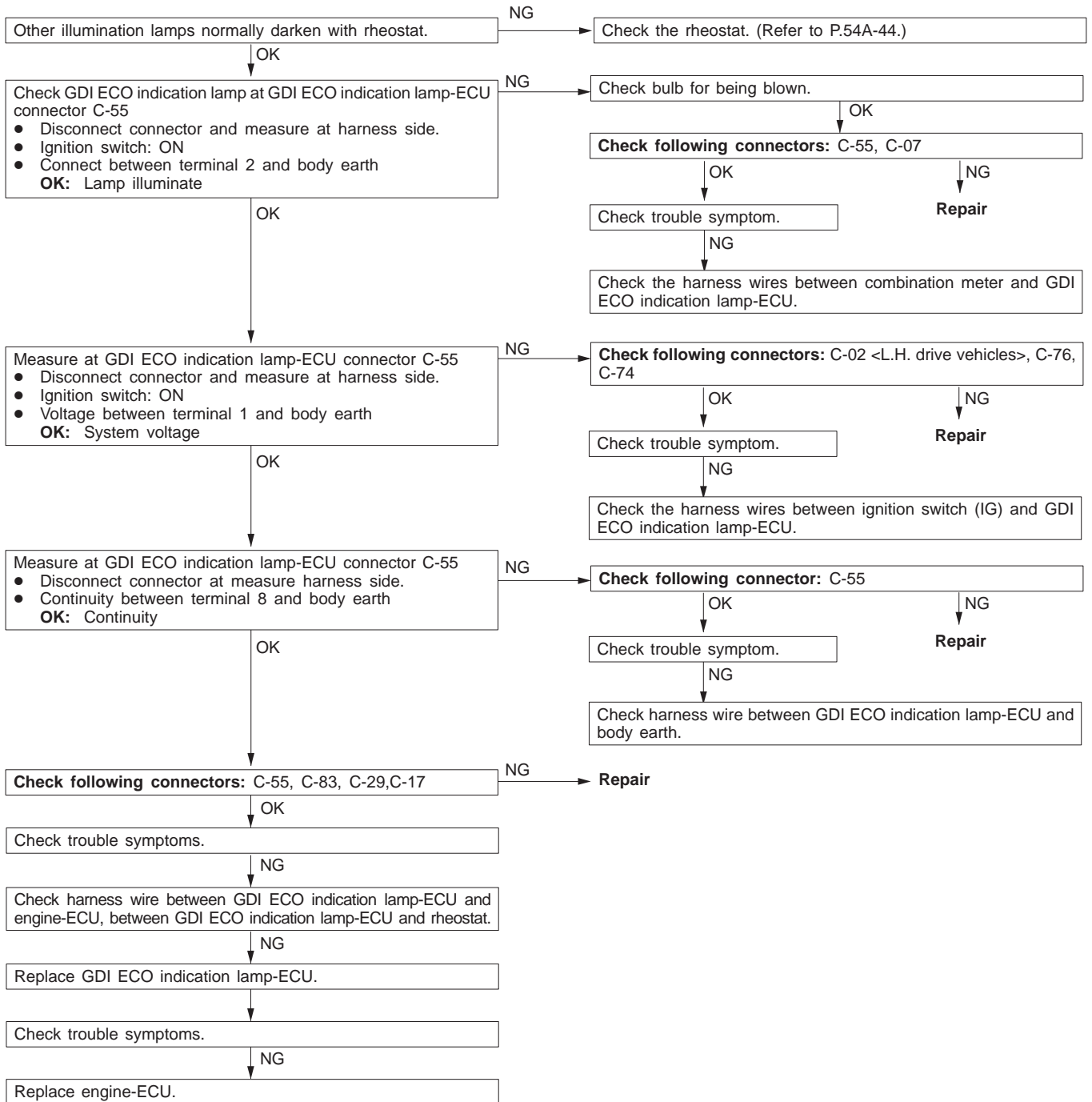
Inspection Procedure 5

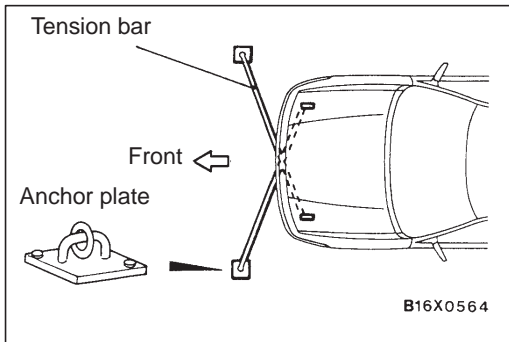
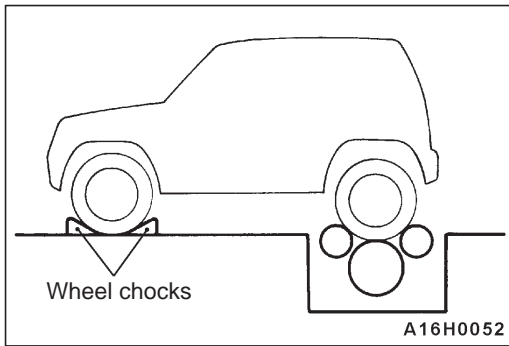
Engine coolant temperature gauge does not operate.	Probable cause
If speedometer and tachometer operate normally, the harness from power supply to combination meter is normal.	<ul style="list-style-type: none"> ● Malfunction of engine coolant temperature gauge unit ● Malfunction of engine coolant temperature gauge ● Malfunction of harness or connector



Inspection Procedure 6

GDI ECO indication lamp does not illuminate.	Probable cause
GDI ECO indication lamp is illuminated by GDI ECO indication lamp-ECU. When it does not illuminates, GDI ECO indication lamp bulb may be blown, or combination meter, power supply circuit of GDI ECO indication lamp-ECU or GDI ECO indication lamp-ECU may be malfunctioning.	<ul style="list-style-type: none"> ● ECO indication lamp bulb blown ● Malfunction of combination meter ● Malfunction of GDI ECO indication lamp ● Malfunction of engine-ECU ● Damaged harness or connectors





ON-VEHICLE SERVICE

SPEEDOMETER CHECK

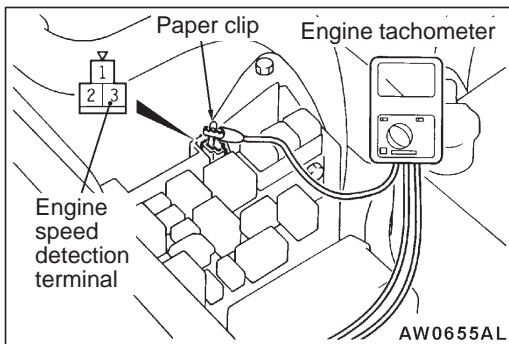
1. Adjust the pressure of the tyres to the specified level. (Refer to GROUP 31 – Service Specifications.)
2. Set the vehicle onto a speedometer tester.
3. Use wheel chocks to hold the front wheels, and apply the parking brake firmly.
4. To prevent the front wheels from moving from side to side, attach tension bars to the tie-down hooks, 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 km/h (mph)	Allowable range km/h (mph)
40 (20)	40 – 48 (20 – 25)
80 (40)	80 – 92 (40 – 47)
120 (60)	120 – 136 (60 – 69)
160 (80)	160 – 180 (80 – 91)
– (100)	– (100 – 114)



TACHOMETER CHECK

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

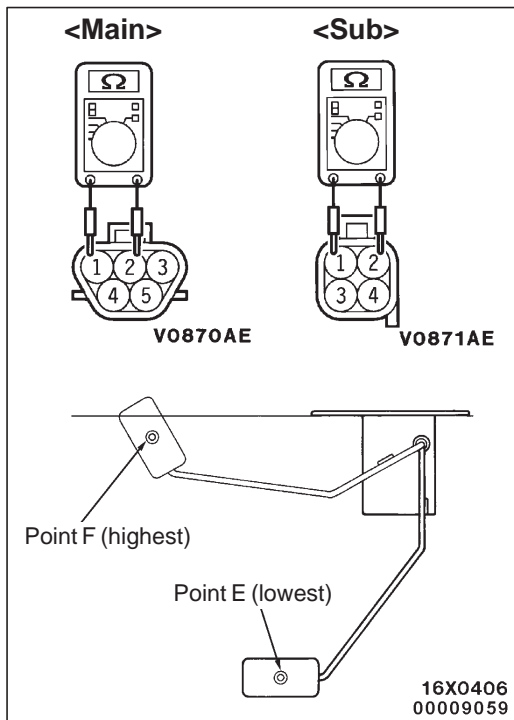
NOTE

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

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

Standard values:

700 r/min: ± 100 r/min
 3,000 r/min: +150 r/min
 –100 r/min
 5,000 r/min: +325 r/min
 –125 r/min
 6,000 r/min: +375 r/min
 –125 r/min



FUEL GAUGE UNIT CHECK

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

FUEL GAUGE UNIT RESISTANCE

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

Standard value:

Items		Standard value Ω
Main	Float point F	1 – 3
	Float point E	49.7 – 51.7
Sub	Float point F	1 – 3
	Float point E	55.3 – 57.3

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

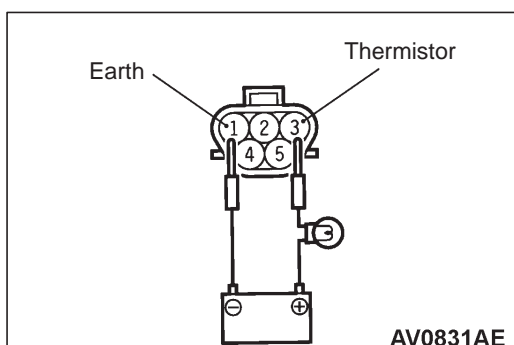
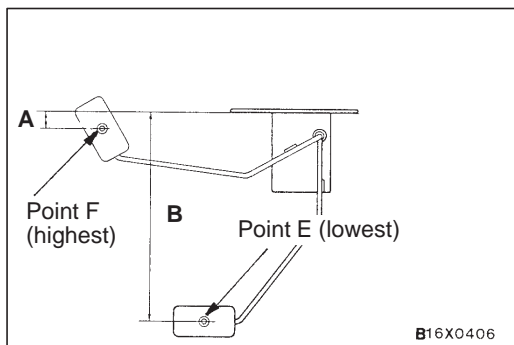
FUEL GAUGE UNIT FLOAT HEIGHT

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:

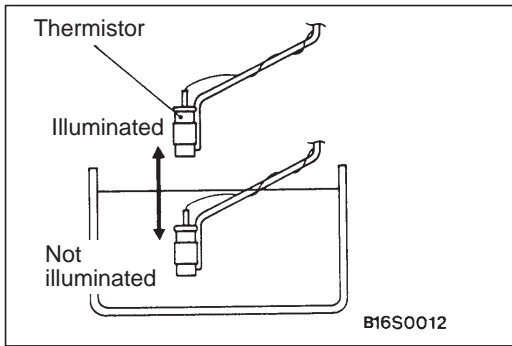
Items		Standard value mm
Main	Float point F	44.5 – 52.5
	Float point E	220.3 – 228.3
Sub	Float point F	30.4 – 36.4
	Float point E	238.5 – 244.5

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



FUEL LEVEL SENSOR (THERMISTOR)

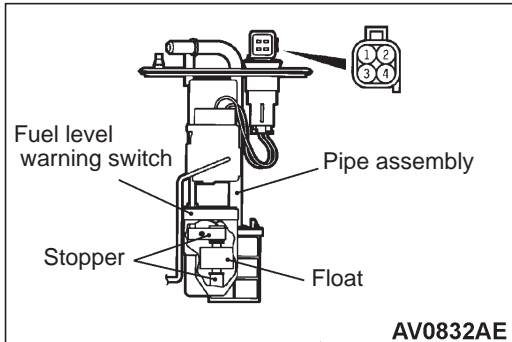
1. Connect the battery to the main fuel gauge unit connector via test lamp (12 V – 3.4 W) as shown in the illustration.



- Condition is good if the test 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.



FUEL LEVEL WARNING SWITCH CHECK

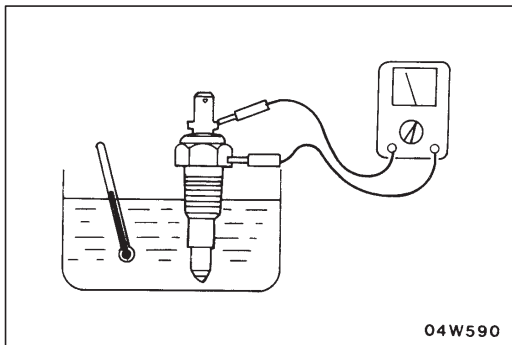
- Remove the sub fuel gauge unit pipe assembly. (Refer to GROUP 13B – Fuel Tank.)

NOTE

Moving up and down of the float makes the reed switch of fuel level warning switch turned on and off.

- Check the continuity between the terminals.

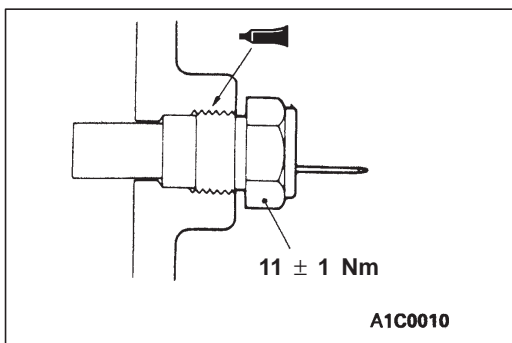
Float position	Terminal No.	
	3	4
When float is in contact with upper stopper		
When float is in contact with lower stopper	○	○



ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

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

Standard value: 104 ± 13.5 Ω



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

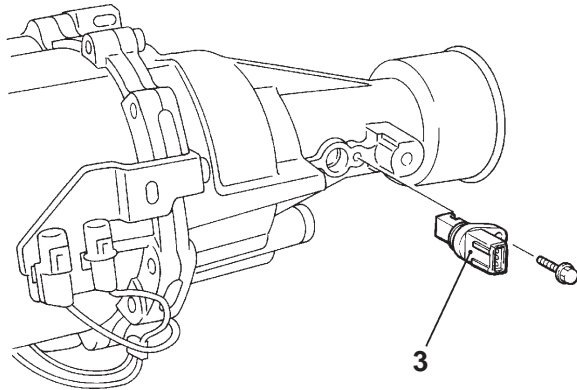
Specified sealant:

3M Adhesive Nut Locking No. 4171 or equivalent

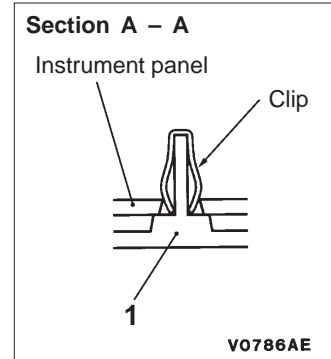
- Add engine coolant. (Refer to GROUP 14 – On-vehicle Service.)

COMBINATION METERS

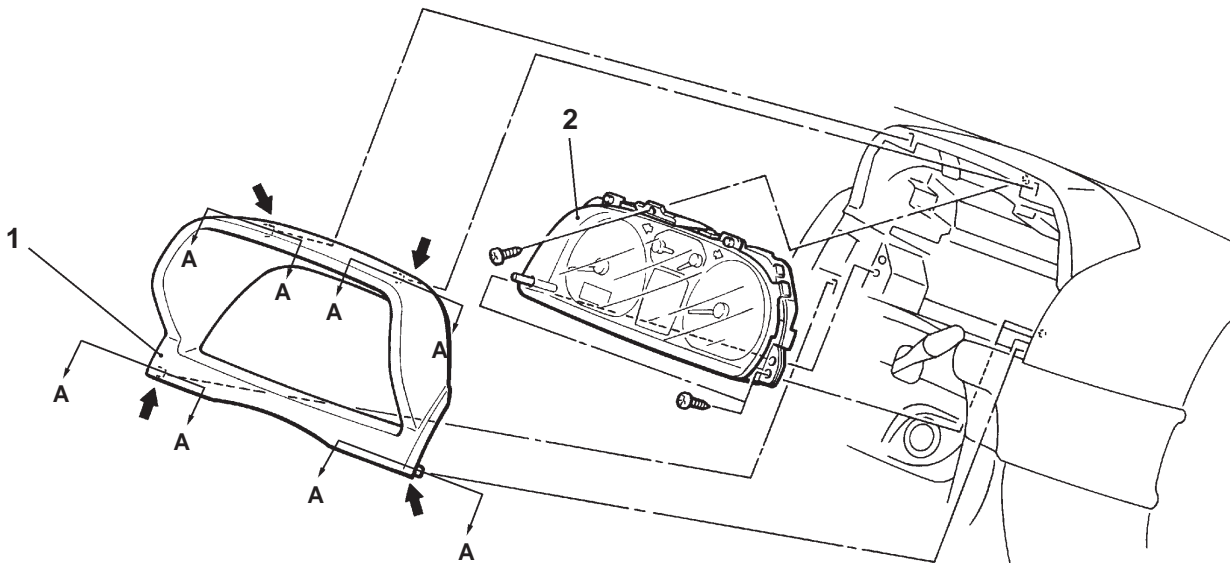
REMOVAL AND INSTALLATION



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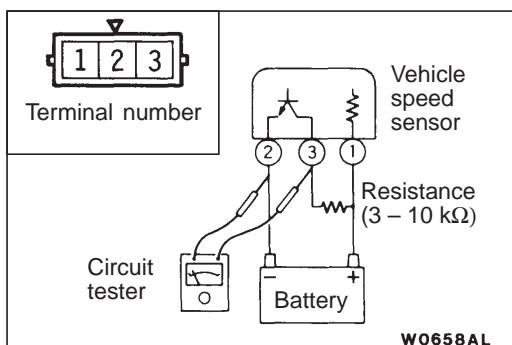
← Clip position

Combination meter removal steps

1. Meter hood
2. Combination meter

Vehicle speed sensor removal

3. Vehicle speed sensor

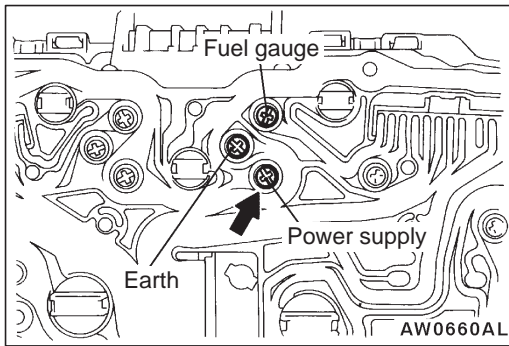


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INSPECTION

VEHICLE SPEED SENSOR INSPECTION

1. Lift up the vehicle.
2. Remove the vehicle speed sensor, and then connect the vehicle speed sensor and a resistance (3 – 10 kΩ) as shown in the illustration.
3. Use a circuit tester to check that the voltage between terminal 2 and terminal 3 changes when turning a shaft of the vehicle speed sensor (4 pulses per each one turn).

**FUEL GAUGE RESISTANCE CHECK**

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

Standard value:

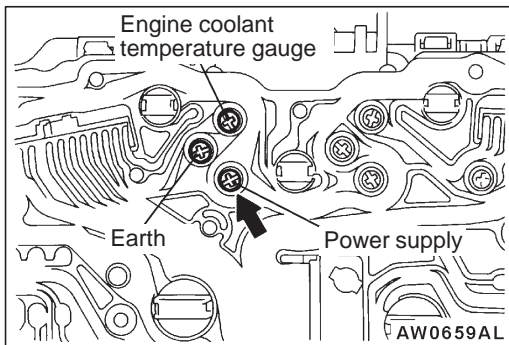
Power supply – Earth: 233.3 Ω

Power supply – Fuel gauge: 108.3 Ω

Fuel gauge – Ground: 125.0 Ω

Caution

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

**ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK**

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

Standard value:

Power supply – Earth: 178.9 Ω

Power supply – Engine coolant temperature gauge: 54 Ω

Engine coolant temperature gauge – Earth: 232.9 Ω

Caution

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

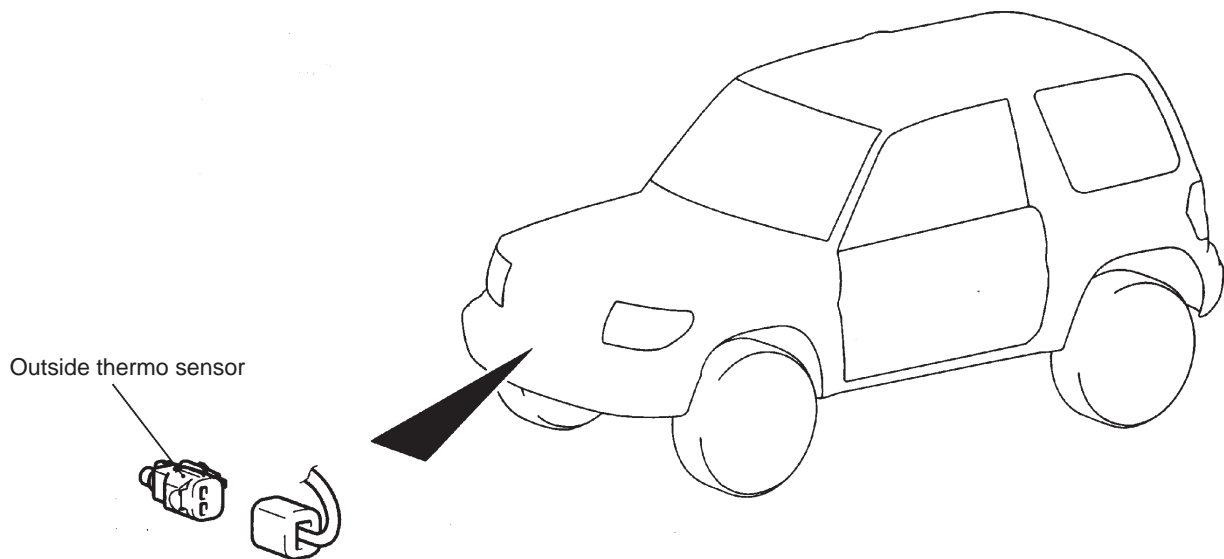
OUTSIDE THERMO SENSOR

SERVICE SPECIFICATIONS

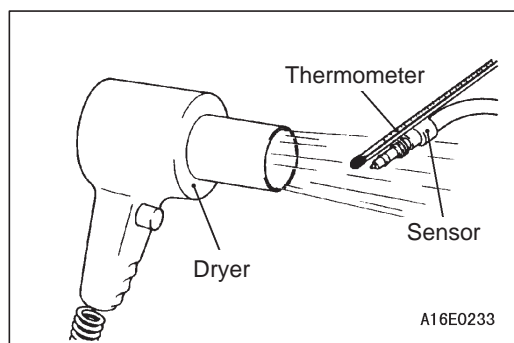
Items	Standard value	
Internal resistance of outside thermo sensor Ω	At 25 °	Approx. 1,700

OUTSIDE THERMO SENSOR

REMOVAL AND INSTALLATION



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INSPECTION

OUTSIDE THERMO SENSOR INTERNAL RESISTANCE CHECK

Check the internal resistance of the outside thermo sensor are at the standard value at temperatures of 25 °C.

Standard value:

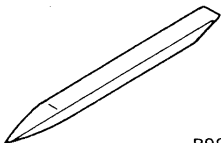
Approx. 1,700 Ω (at 25 °C)

HEADLAMP, FRONT TURN-SIGNAL LAMP AND FRONT FOG LAMP

SERVICE SPECIFICATIONS

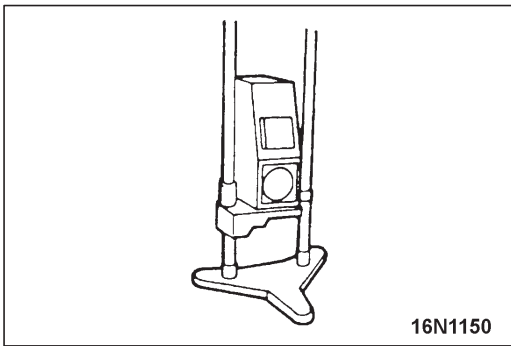
Items		Standard value	Limit
Headlamp aiming for low beam	Vertical direction	60 mm below horizontal (H)	–
	Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)	–
Headlamp intensity cd		–	30,000 or more
Front fog lamp aiming	Vertical direction	100 mm below horizontal (H)	–
	Horizontal direction	Parallel to direction of vehicle travel	–

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of switch garnish

TROUBLESHOOTING

The headlamp, turn-signal lamp and front fog lamp are controlled by the smart wiring system (SWS). For troubleshooting, refer to GROUP 54B – Troubleshooting.



ON-VEHICLE SERVICE

HEADLAMP AIMING

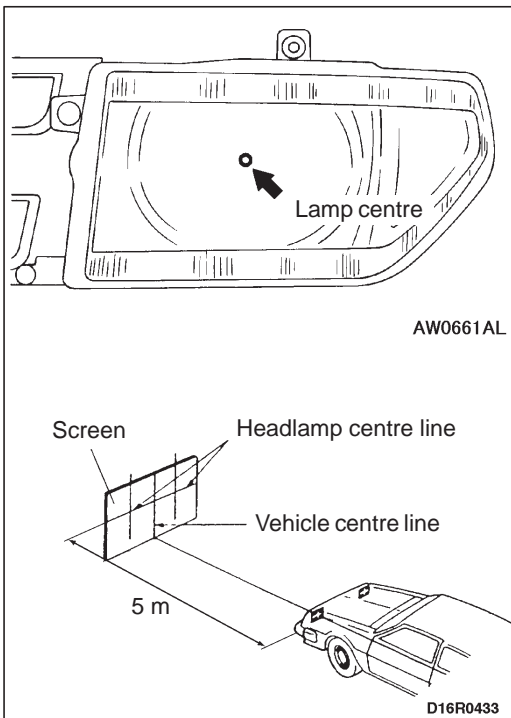
<USING A BEAM SETTING EQUIPMENT>

1. The headlamps should be aimed with the proper beam setting equipment, and in accordance with the equipment manufacturer's instructions.

NOTE

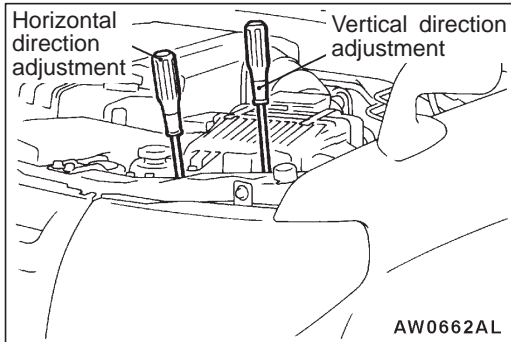
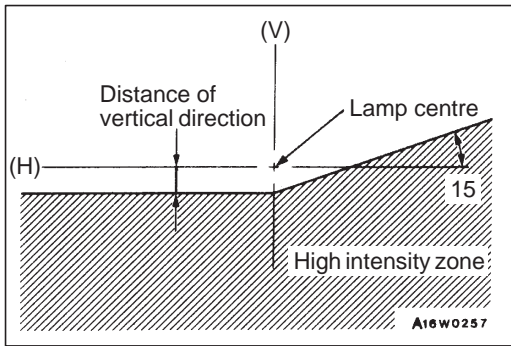
If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.

2. Alternately turn the adjusting screw to adjust the headlamp aiming. (Refer to P.54A-32.)



<USING A SCREEN>

1. Inflate the tyres to the specified pressures and there should be no other load in the vehicles other than driver or substituted weight of approximately 75 kg placed in driver's position.
2. Put the headlamp leveling switch in "0" position.
3. Set the distance between the screen and the centre marks of the headlamps as shown in the illustration.



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

Standard value:

(Vertical direction)

60 mm below horizontal (H)

(Horizontal direction)

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

NOTE

The illustration shows L.H. drive vehicles. For R.H. drive vehicles, it is symmetrical.

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

Caution

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

HEADLAMP INTENSITY MEASUREMENT

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

Limit: 30,000 cd or more

NOTE

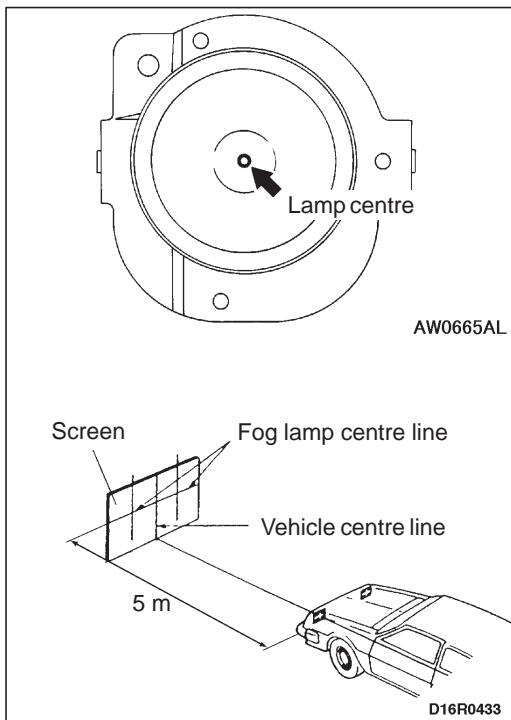
1. When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
2. There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
3. If an illuminometer is used to make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

$I = Er^2$ Where:

I=intensity (cd)

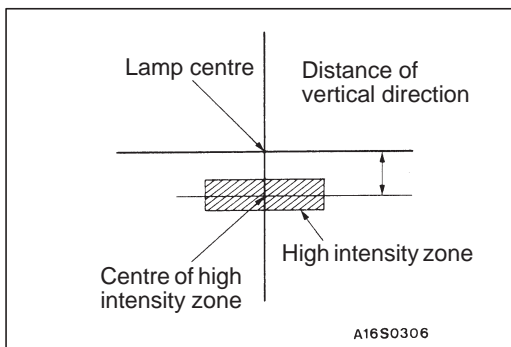
E=illumination (lux)

r=distance (m) from headlamps to illuminometer



FRONT FOG LAMP AIMING

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



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

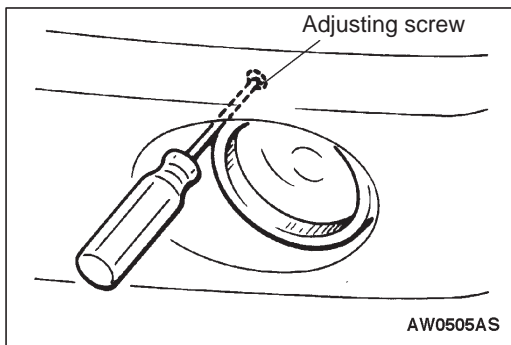
Standard value:

(Vertical direction)

100 mm below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

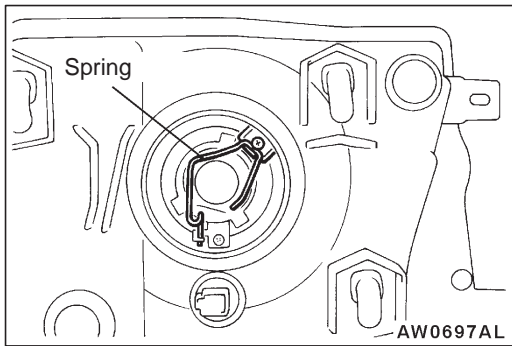


NOTE

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

Caution

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



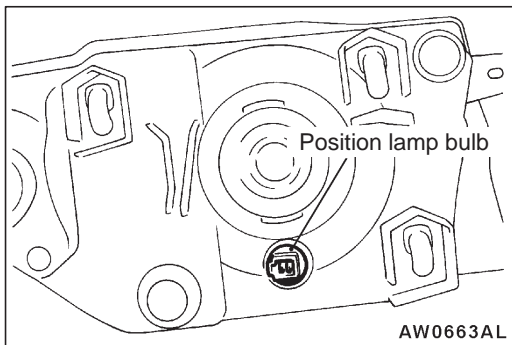
BULB REPLACEMENT

<Headlamp Bulb>

1. Disconnect the connector.
2. Remove the socket cover.
3. Remove the bulb mounting spring, and then withdraw the bulb.
4. Install new bulb, and then connect the connector securely.

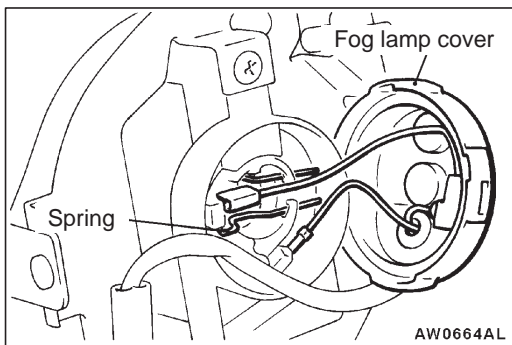
Caution

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



<Position Lamp Bulb>

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



<Front fog lamp Bulb>

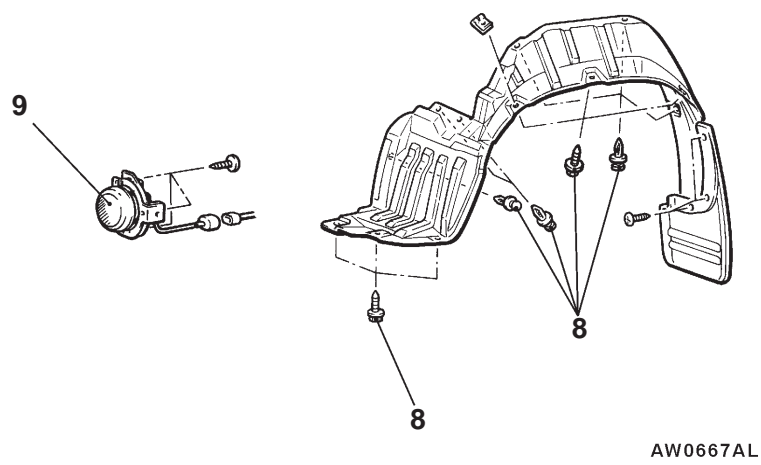
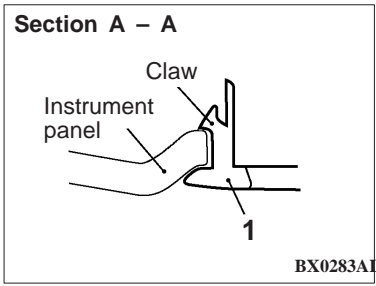
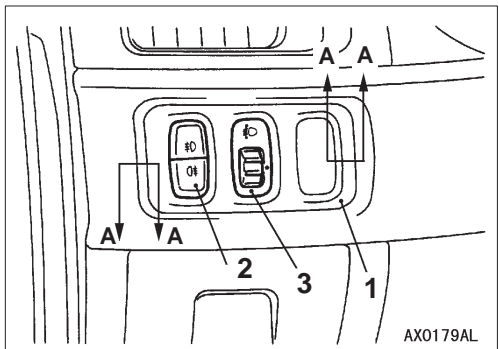
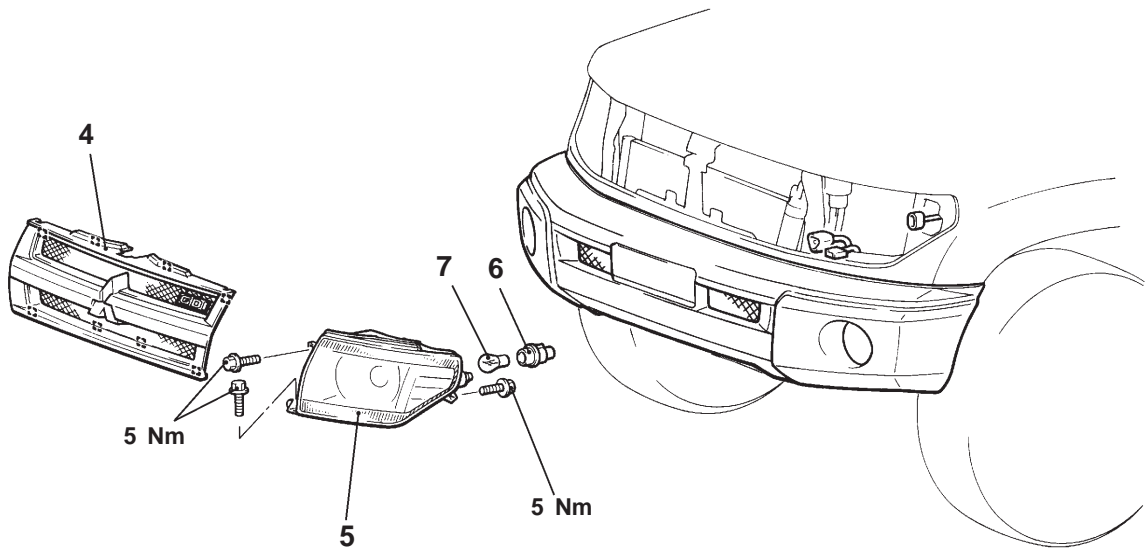
1. Remove the front fog lamp.
2. Remove the front fog lamp cover.
3. Remove the front bulb mounting spring, and then withdraw the bulb.
4. Disconnect the connector, and then replace the bulb.

Caution

- (1) Always use the genuine part for replacement.
- (2) Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.
- (3) Be sure to install the socket cap. If the socket cap is improperly installed, the lens will be fogged or water may enter the lamp unit.

HEADLAMP, FRONT TURN-SIGNAL LAMP AND FRONT FOG LAMP

REMOVAL AND INSTALLATION



Fog lamp switch and headlamp leveling switch removal steps

1. Switch panel
2. Fog lamp switch
3. Headlamp leveling switch

Headlamp removal steps

4. Radiator grille
5. Headlamp
6. Front turn-signal lamp socket
7. Front turn-signal lamp bulb

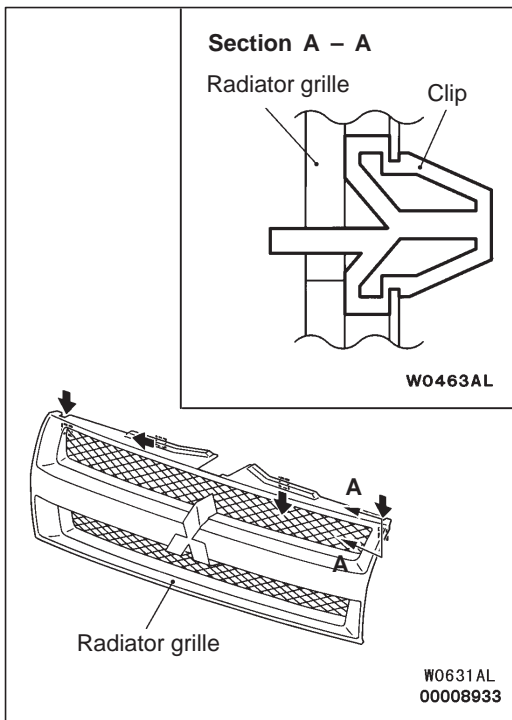
Front fog lamp removal steps

8. Splash shield front part mounting clips and screws
9. Front fog lamp

NOTE

For removal and installation of the column switch (lighting switch), refer to GROUP 37A – Steering Wheel and Shaft.

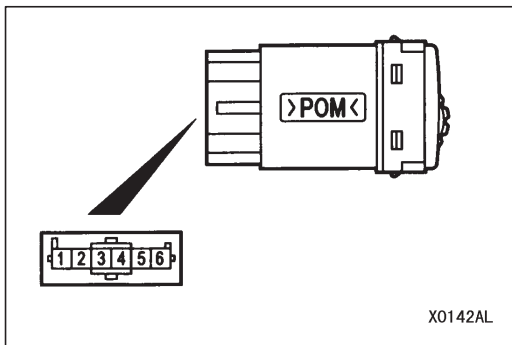




REMOVAL SERVICE POINT

◀A▶ RADIATOR GRILLE REMOVAL

1. Pull the radiator grille toward you gently, and press the clip tab with a flat-tipped screwdriver toward the arrow to remove the radiator grille.
2. Remove the clips from the body, and install them to the radiator grille temporarily for reinstallation.



INSPECTION

HEADLAMP LEVELING SWITCH CONTINUITY CHECK

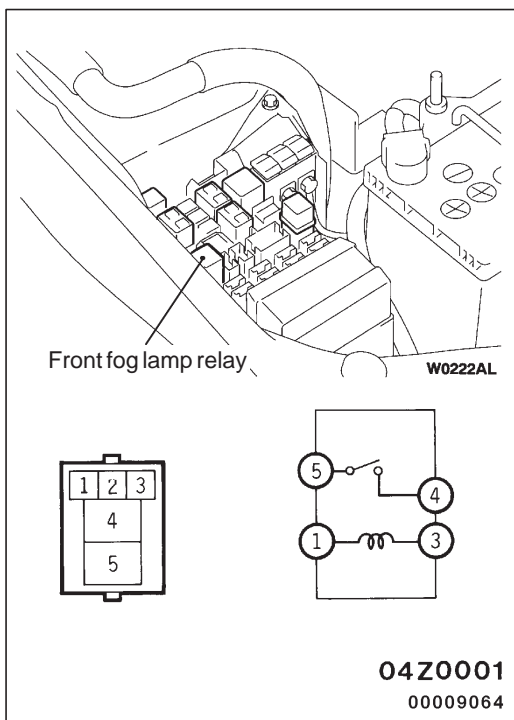
1. Check the continuity between terminals 4 and 5 (illumination circuit).
2. Operating the headlamp leveling switch, check that the resistance between terminals 4 and 5 meets the condition below.

Switch position	Resistance value
0	12 kΩ
1	5.1 kΩ
2	2.7 kΩ
3	1.5 kΩ
4	620 Ω



FOG LAMP SWITCH CONTINUITY CHECK

Switch position	Terminal No.				
	1	2	3	ILL	4
Released			○—○	○—(I)—○	○—○
Pressed	○—○		○—○	○—(I)—○	○—○

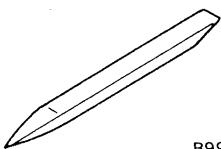


FRONT FOG LAMP RELAY CONTINUITY CHECK

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

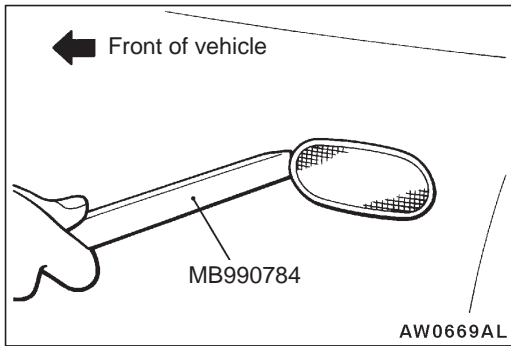
SIDE TURN-SIGNAL LAMP

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of side turn-signal lamp

TROUBLESHOOTING

The side turn-signal lamp is controlled by the smart wiring system (SWS). For troubleshooting, refer to GROUP 54B – Troubleshooting.



SIDE TURN-SIGNAL LAMP

REMOVAL SERVICE POINT

SIDE TURN-SIGNAL LAMP REMOVAL

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

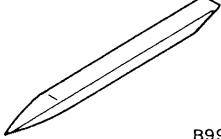
ROOM LAMP

TROUBLESHOOTING

The room lamp is controlled the smart wiring system (SWS). For troubleshooting, refer to GROUP 54B – Troubleshooting.

REAR COMBINATION LAMP, REAR FOG LAMP

SPECIAL TOOLS

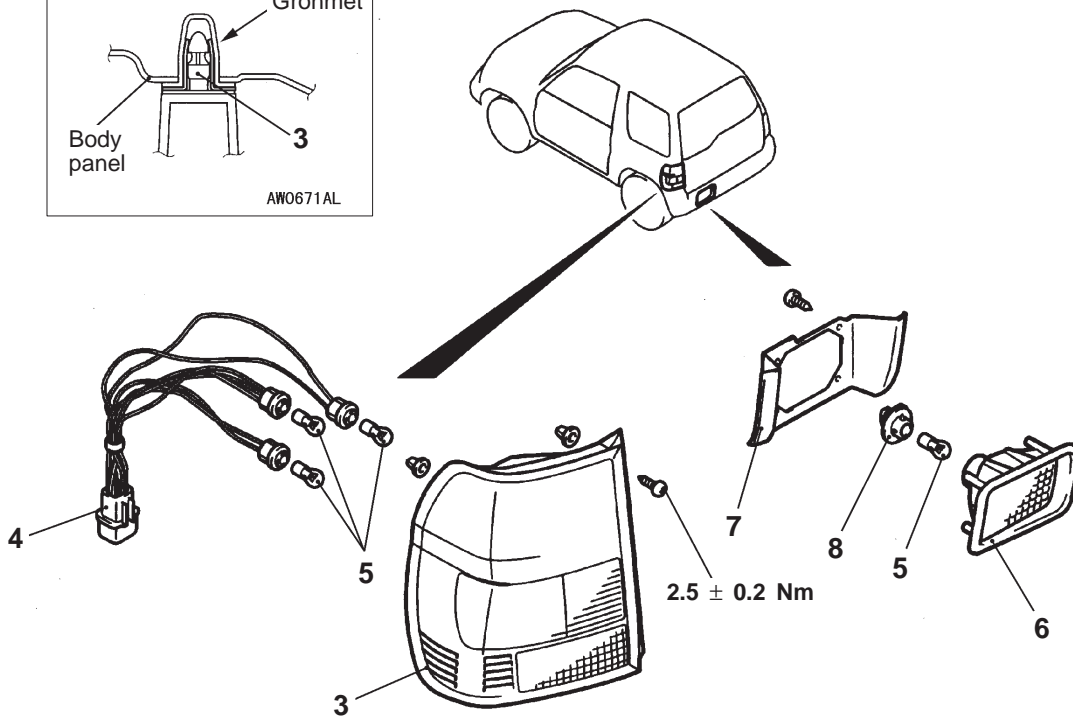
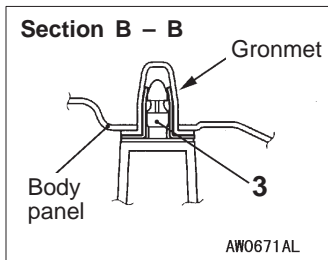
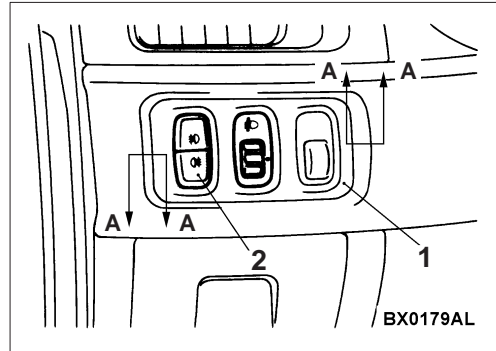
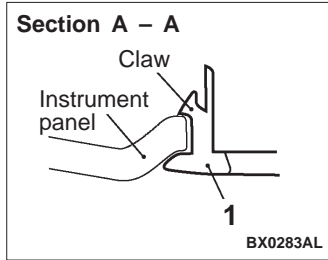
Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of side turn-signal lamp

TROUBLESHOOTING

The tail lamp, turn-signal lamp and rear fog lamp are controlled by the smart wiring system (SWS). For troubleshooting, refer to GROUP 54B – Troubleshooting.

REAR COMBINATION LAMP, REAR FOG LAMP

REMOVAL AND INSTALLATION <L.H. drive vehicles>



AX0127AL

Fog lamp switch removal steps

1. Switch panel
2. Fog lamp switch

Rear combination lamp removal steps

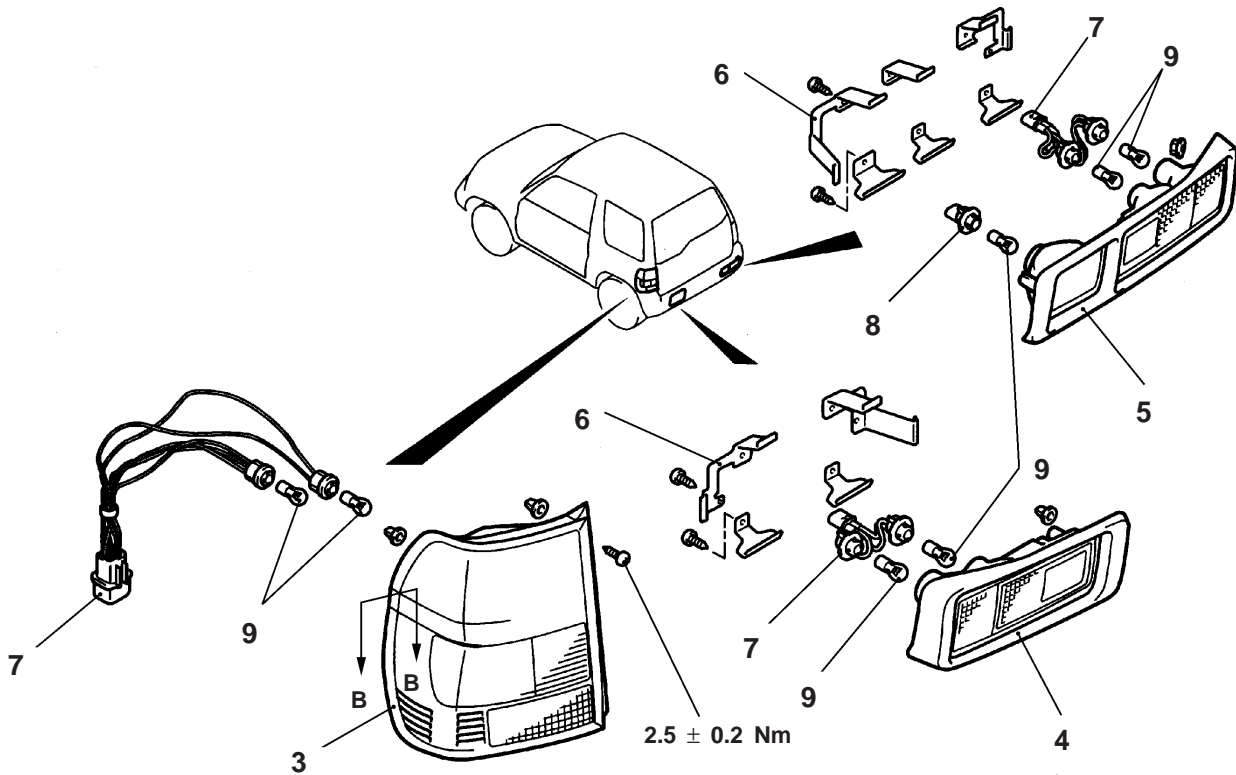
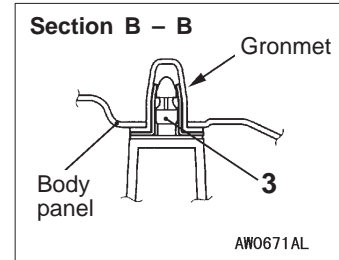
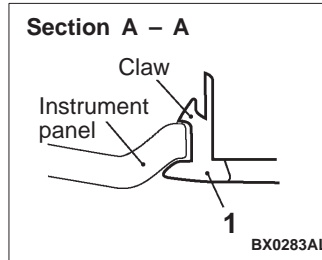
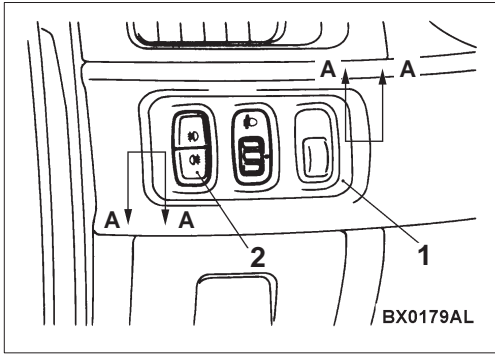
- Quarter Trim Removal and Installation (Refer to GROUP 52A)
- 3. Rear combination lamp
- 4. Socket assembly
- 5. Bulb

Rear fog lamp removal steps

- Rear mad guard (Refer to GROUP 51)
- Rear splash shield
- 6. Rear fog lamp
- 7. Bracket
- 8. Socket

54A-40 CHASSIS ELECTRICAL – Rear Combination Lamp, Rear Fog Lamp

REMOVAL AND INSTALLATION <R.H. drive vehicles>



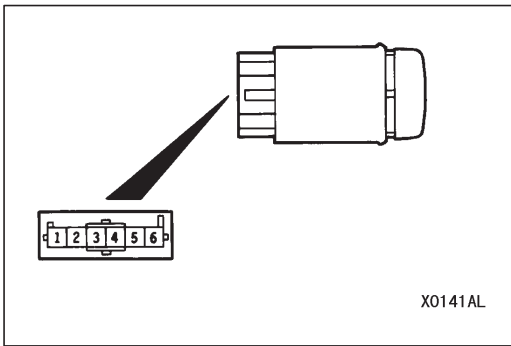
Fog lamp switch removal steps

1. Switch panel
2. Fog lamp switch

Rear combination lamp removal steps

- Quarter trim removal and installation (Refer to GROUP 52A)
- 3. Rear combination lamp (Stop and back up lamp)

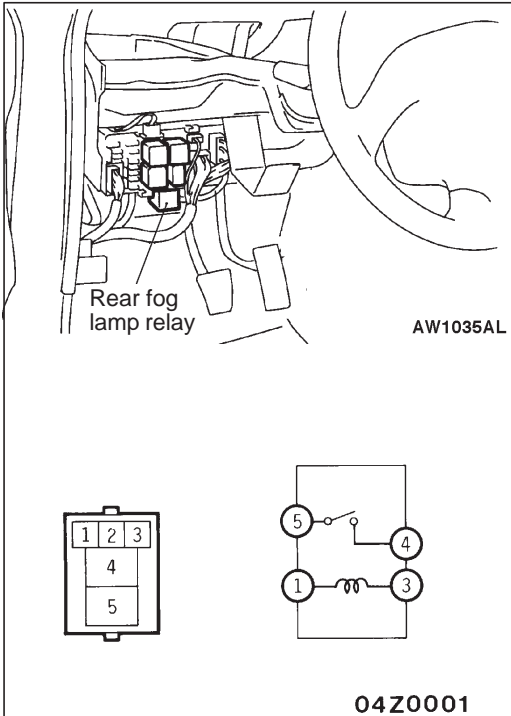
4. Rear combination lamp (Turn-signal and tail lamp)
5. Rear combination lamp (Rear fog lamp, turn-signal lamp and tail lamp)
6. Bracket
7. Socket assembly
8. Socket
9. Bulb



INSPECTION

FOG LAMP SWITCH CONTINUITY CHECK

	Terminal No.				
	3	ILL	4	5	6
Released	○	⊕	○		
Pressed	○	⊕	○	○	○



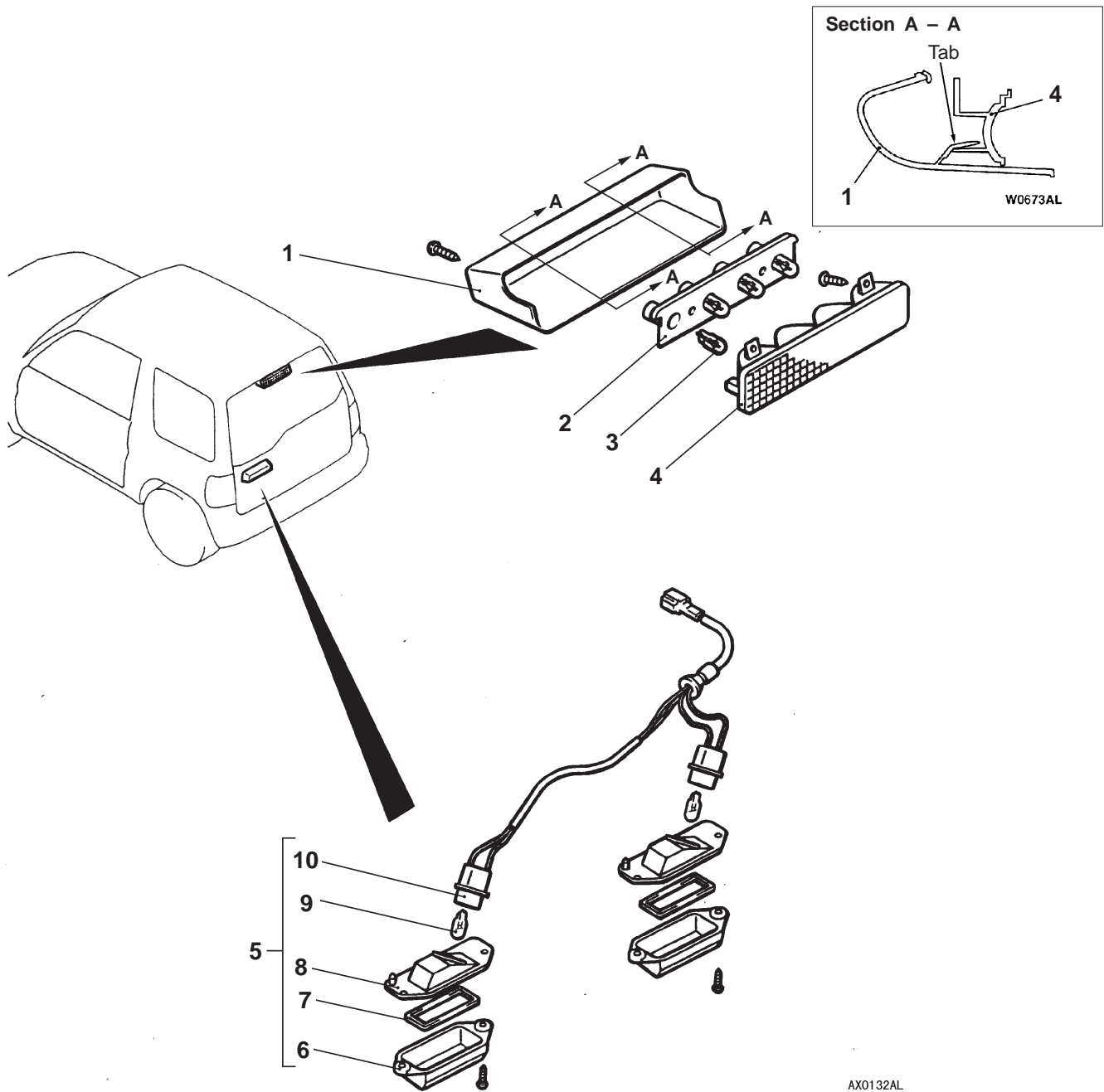
INSPECTION

REAR FOG LAMP RELAY CONTINUITY CHECK

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

HIGH-MOUNTED STOP LAMP AND LICENCE PLATE LAMP

REMOVAL AND INSTALLATION



High-mounted stop lamp removal steps

1. High-mounted stop lamp cover
2. Socket assembly
3. Bulb
4. High-mounted stop lamp

Licence plate lamp removal steps

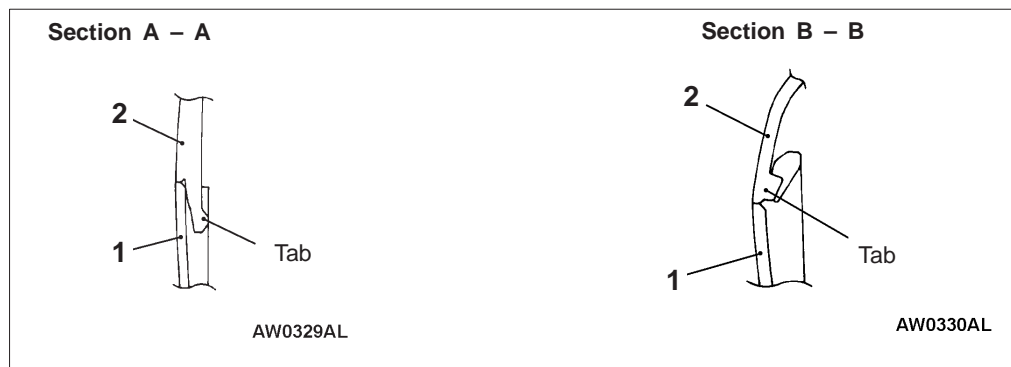
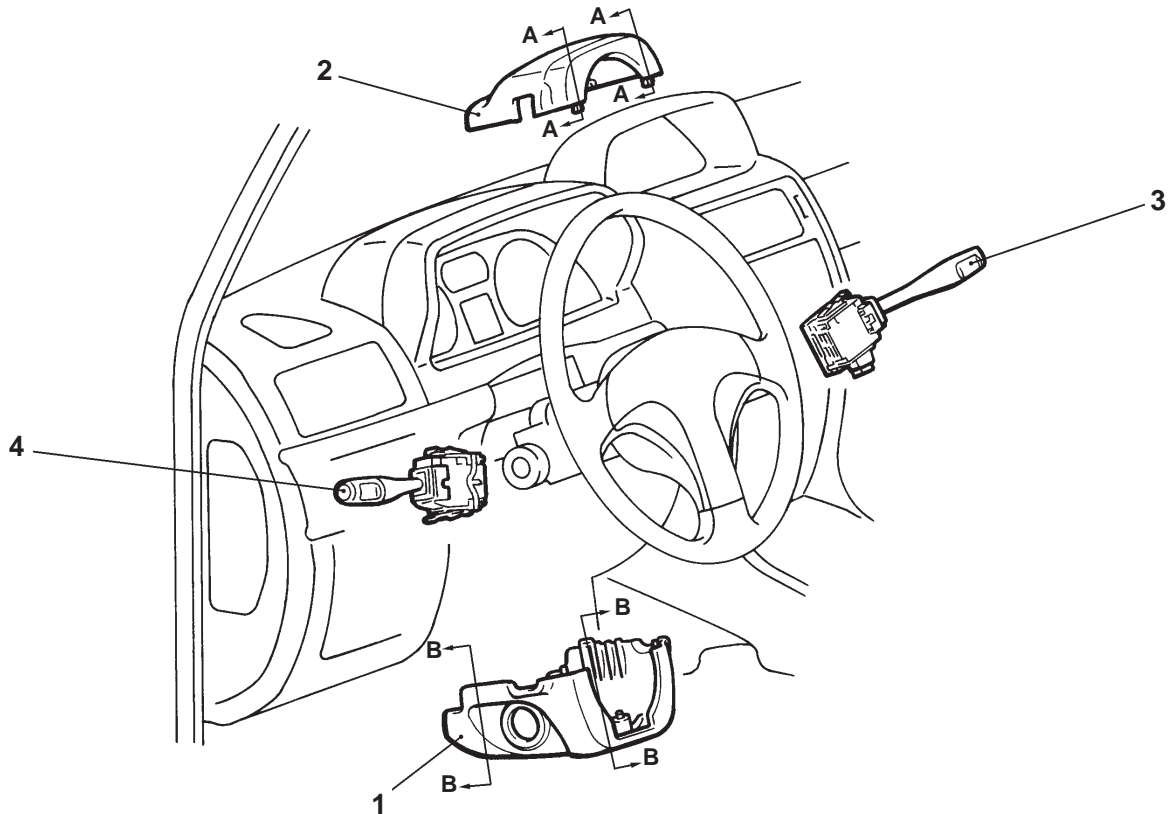
- Back door trim and waterproof film (Refer to GROUP 42.)

- Licence plate lamp garnish (Refer to GROUP 42 – Back Door.)
- 5. Licence plate lamp assembly
- 6. Lens
- 7. Packing
- 8. Licence plate lamp
- 9. Bulb
- 10. Socket assembly

AX0132AL

COLUMN SWITCH

REMOVAL AND INSTALLATION



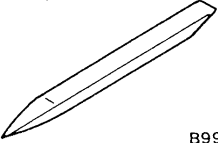
AW1051AL

Removal steps

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Column cover, lower 2. Column cover, upper | <ol style="list-style-type: none"> 3. Wiper and washer switch 4. Lighting switch |
|--|--|

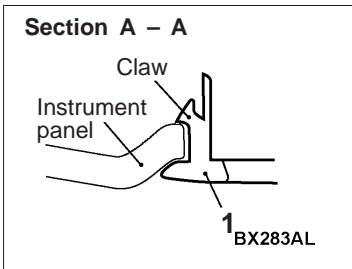
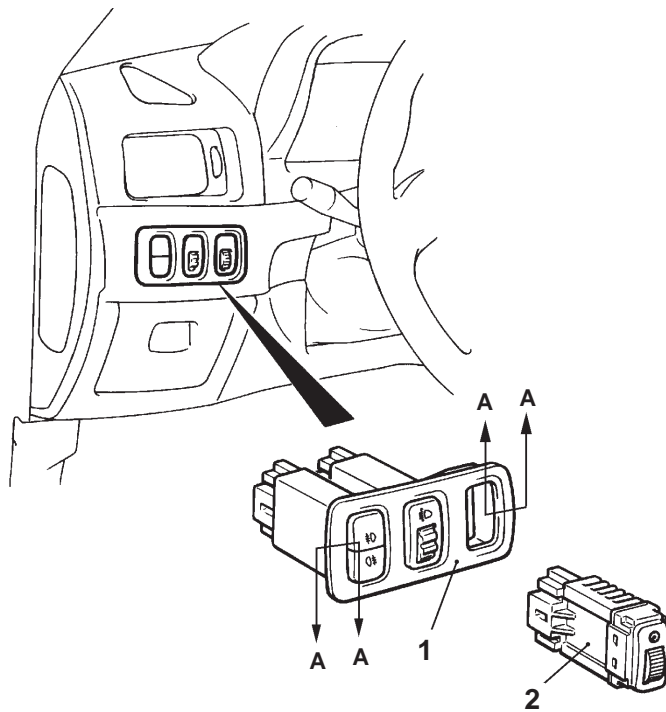
RHEOSTAT

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of switch garnish

RHEOSTAT

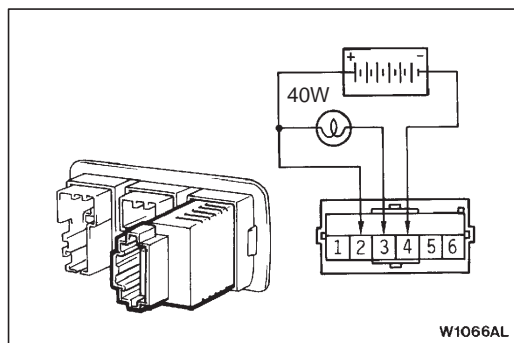
REMOVAL AND INSTALLATION



AX0144AL

Removal steps

1. Switch panel
2. Rheostat



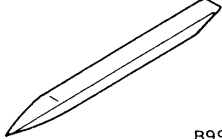
W1066AL

INSPECTION

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

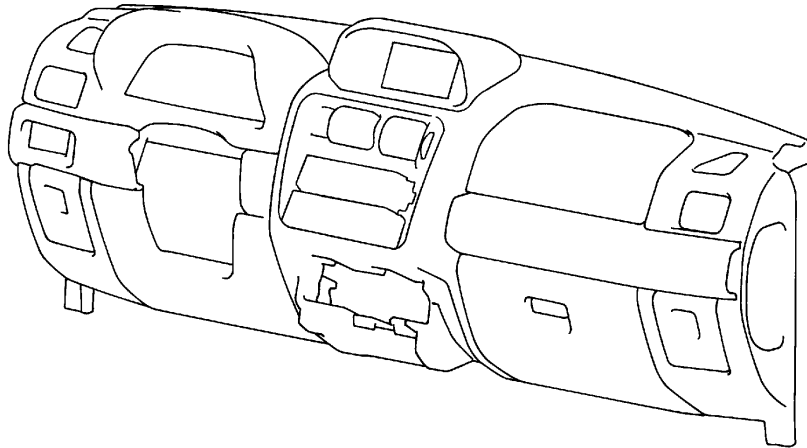
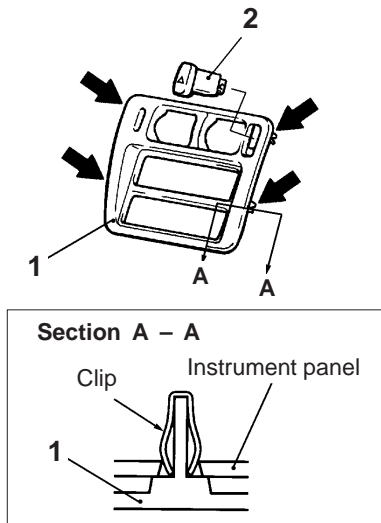
HAZARD WARNING LAMP SWITCH

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of center panel

HAZARD WARNING LAMP SWITCH

REMOVAL AND INSTALLATION

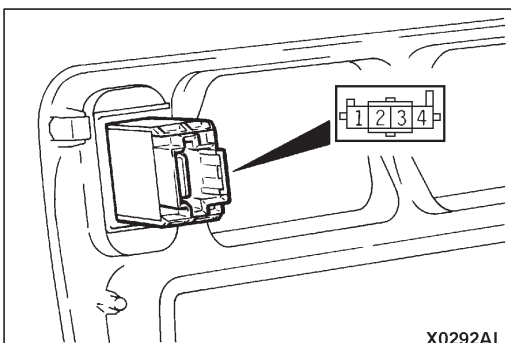


← : shows clips.

AW1049AL

Removal steps

1. Center panel
2. Hazard warning lamp switch



INSPECTION

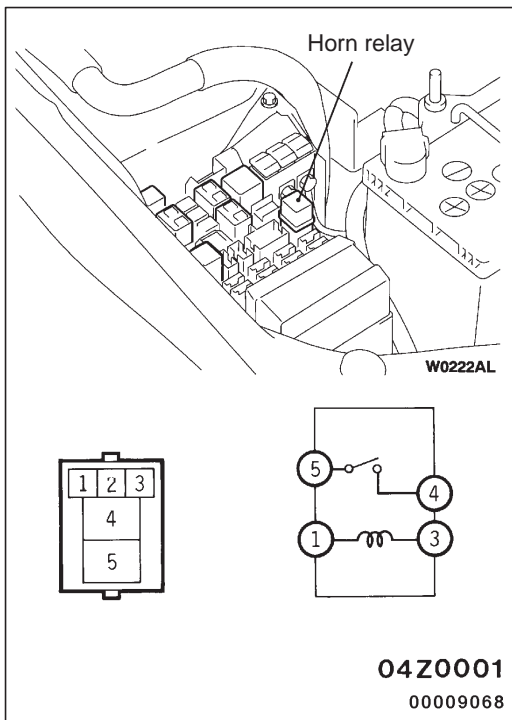
Switch position	Terminal No.			
	1	2	3	4
OFF			○	○ ILL
ON	○	○	○	○ ILL

HORN

INSPECTION

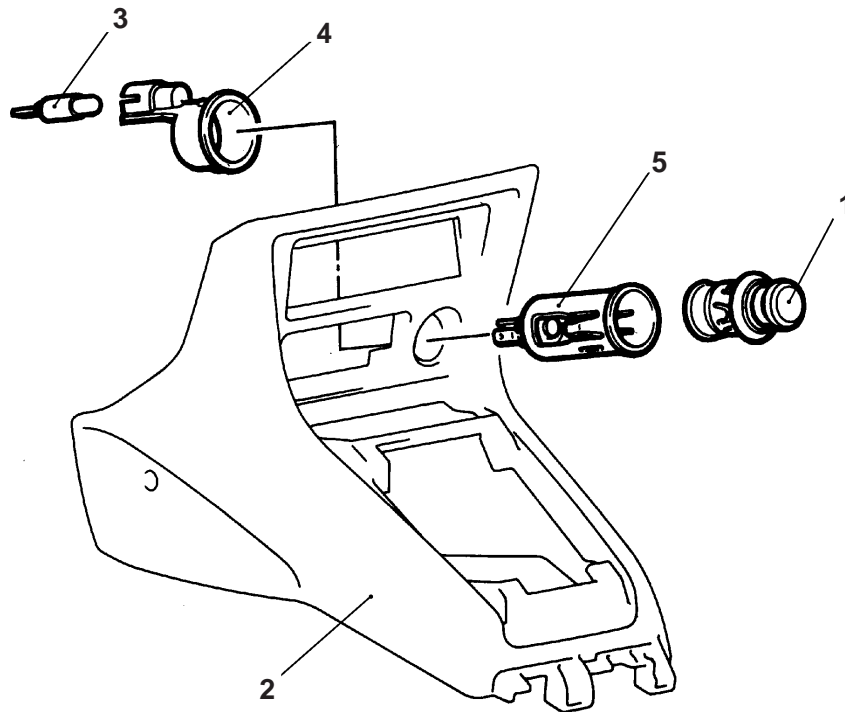
HORN RELAY CONTINUITY CHECK

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



CIGARETTE LIGHTER

REMOVAL AND INSTALLATION

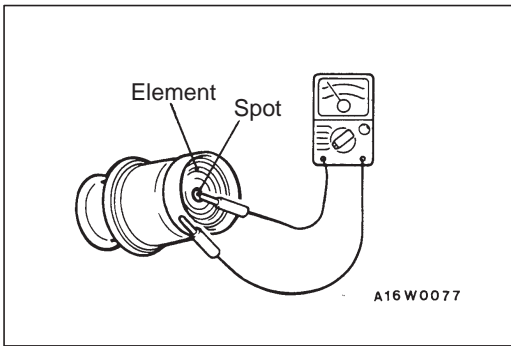


AX0149AL

Removal steps

1. Plug
2. Floor console (Refer to GROUP 52A)

3. Bulb
4. Socket case
5. Socket



INSPECTION

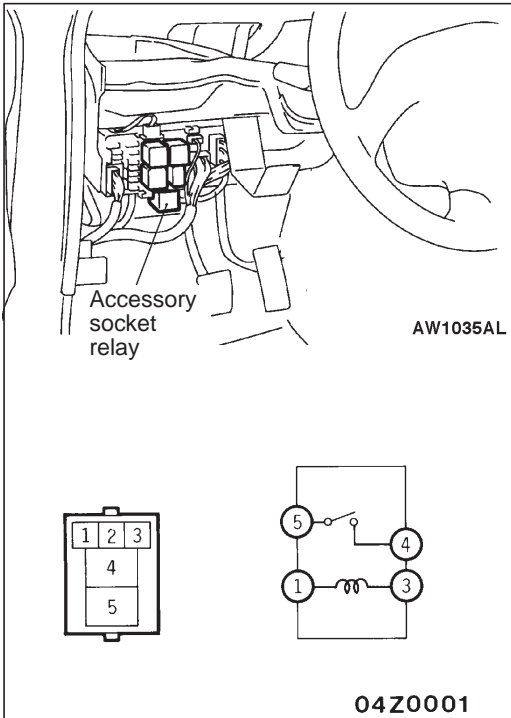
- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using a circuit tester, check the continuity of the element.

ACCESSORY SOCKET

INSPECTION

ACCESSORY SOCKET RELAY CONTINUITY CHECK

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



RADIO AND TAPE PLAYER

TROUBLESHOOTING

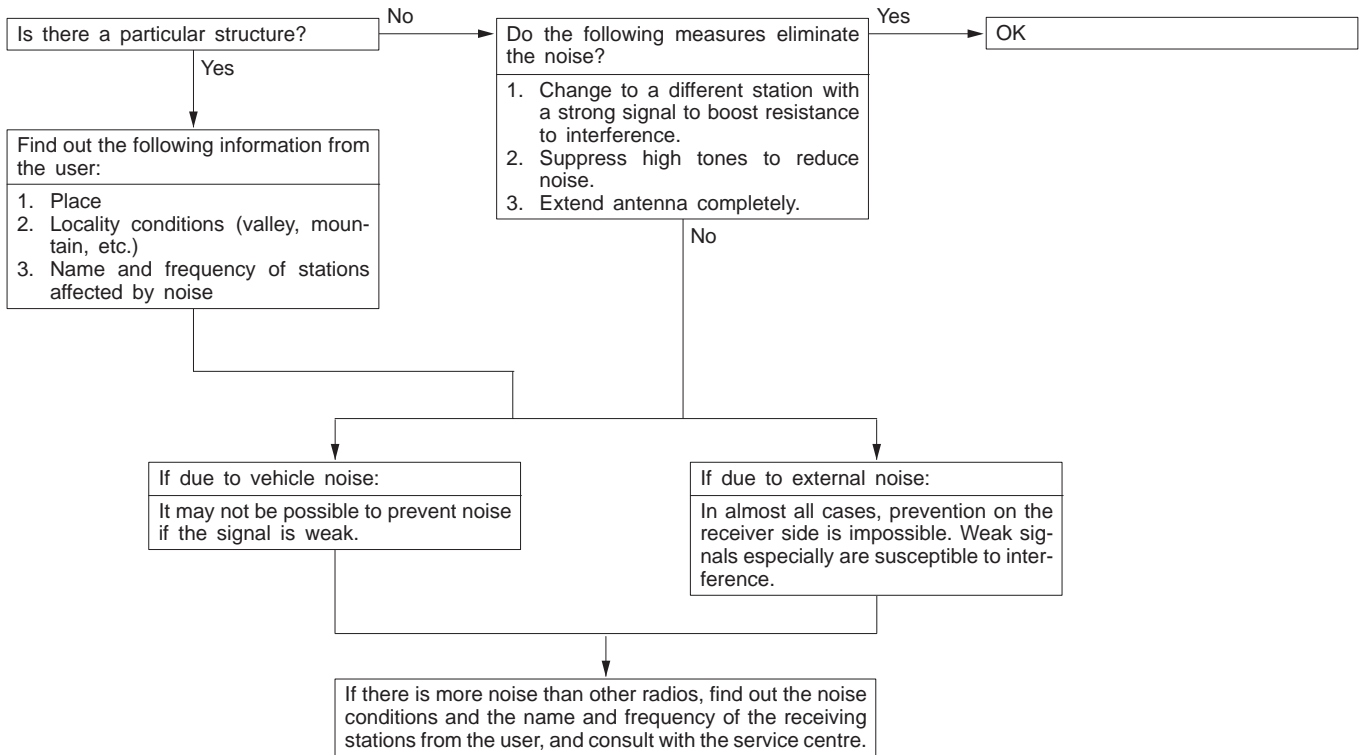
QUICK-REFERENCE TROUBLESHOOTING CHART

Items	Problem symptom	Relevant chart
Noise	Noise appears at certain places when travelling.	A-1
	Mixed with noise, only at night.	A-2
	Broadcasts can be heard but FM/MW/LW has a lot of noise.	A-3
	There is noise when starting the engine.	A-4
	Some noise appears when there is vibration or shocks during travelling.	A-5
	Ever-present noise.	A-6
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 FM/MW/LW or no sound from FM/MW/LW	B-3
	Insufficient sensitivity.	B-4
	Distortion on FM/MW/LW.	B-5
	Too few automatic select stations.	B-6
	Insufficient memory (preset stations are erased).	B-7
Tape player	Cassette tape will not be inserted.	C-1
	No sound.	C-2
	No sound from one speaker.	C-3
	Sound quality is poor, or sound is weak.	C-4
	Cassette tape will not be ejected.	C-5
	Uneven revolution. Tape speed is fast or slow.	C-6
	Faulty auto reverse.	C-7
	Tape gets caught in mechanism.	C-8

CHART

A. NOISE

A-1 Noise appears at certain places when travelling.



A-2 Mixed with noise, only at night.

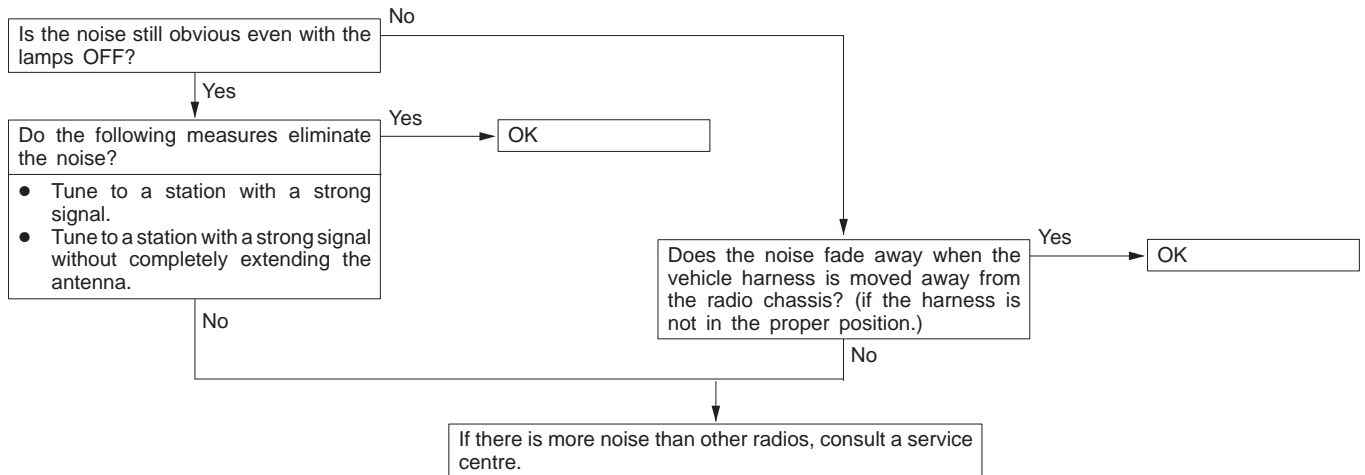
The following factors can be considered as possible causes of noise appearing at night.

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

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

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

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



A-3 Broadcasts can be heard but FM/MW/LW has a lot of noise.

(1)

Noise occurs when the engine is stopped.

Yes

Do the following measures eliminate the noise?

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

Yes

OK

No

Is the radio body earth mounted securely?

No

Securely tighten the nuts for the body earth.

Yes

Is the antenna plug properly connected to the radio?

No

Correctly attach the antenna plug.

Yes

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

No

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

Yes

Is the noise eliminated?

Yes

OK

No

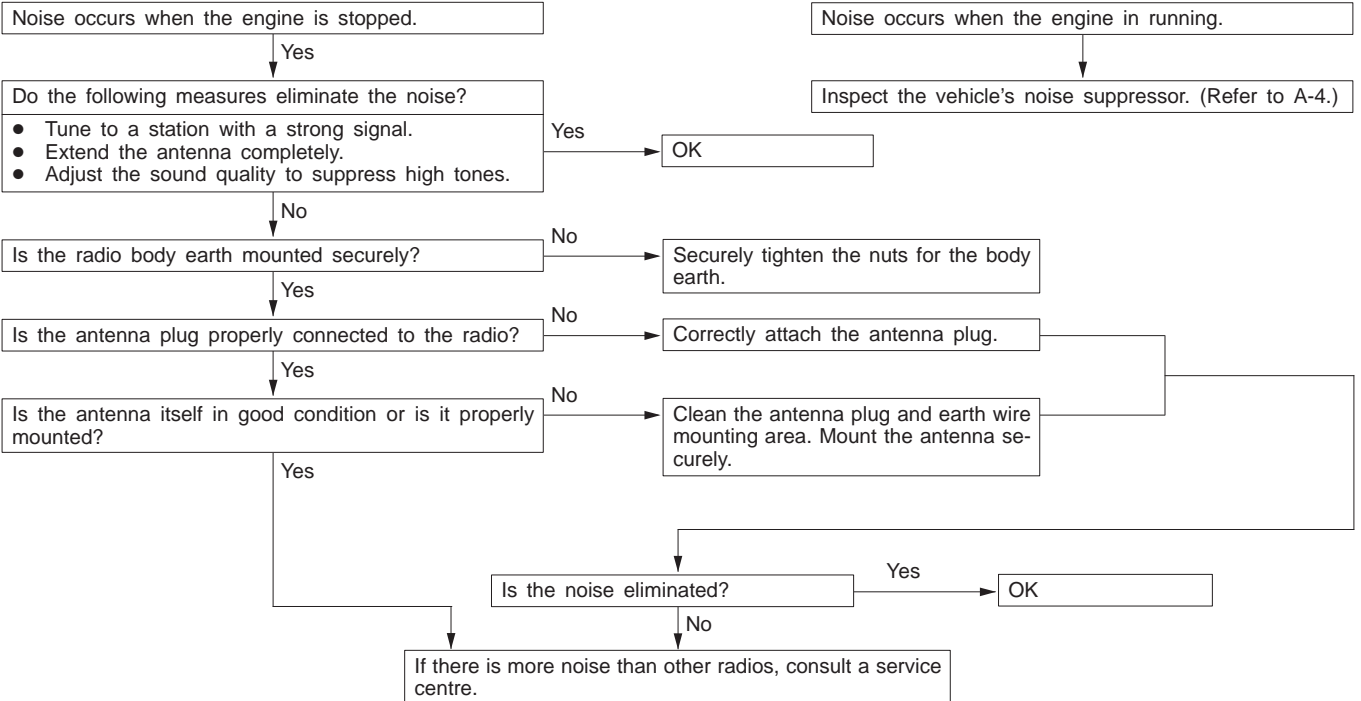
If there is more noise than other radios, consult a service centre.

(2)

Noise occurs when the engine in running.

↓

Inspect the vehicle's noise suppressor. (Refer to A-4.)



A-4 There is noise when starting the engine.

Noise type Sounds are in parentheses ().	Conditions	Cause	Remedy
FM/MW/LW: Ignition noise (Popping, snapping, cracking, buzzing)	<ul style="list-style-type: none"> Increasing the engine speed causing the popping sound to speed up, and volume decreases. Disappears when the ignition switch is turned to ACC. 	<ul style="list-style-type: none"> Mainly due to the spark plugs. Due to the engine noise. 	<ul style="list-style-type: none"> Check or replace the earth cable. (Refer to Fig. 1 on P.54A-59.) Check or replace the noise capacitor.
Other electrical components	–	Noise may appear as electrical components become older.	Repair or replace electrical components.
Static electricity (Cracking, crinkling)	<ul style="list-style-type: none"> Disappears when the vehicle is completely stopped. Severe when the clutch is engaged. 	Occurs when parts or wiring move for some reason and contact metal parts of the body.	Return parts or wiring to their proper position.
	<ul style="list-style-type: none"> Various noises are produced depending on the body part of the vehicle. 	Due to detachment from the body of the front hood, bumpers, exhaust pipe and muffler, suspension, etc.	Tighten the mounting bolts securely. Cases where the problem is not eliminated by a single response to one area are common, due to several body parts being imperfectly earthed.

Caution

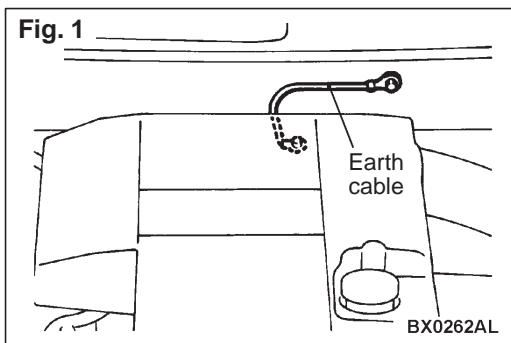
1. **Connecting a high tension cable to the noise filter may destroy the noise filter and should never be done.**
2. **Check that there is no external noise. Since failure caused by this may result in misdiagnosis due to inability to identify the noise source, this operation must be performed.**
3. **Noise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

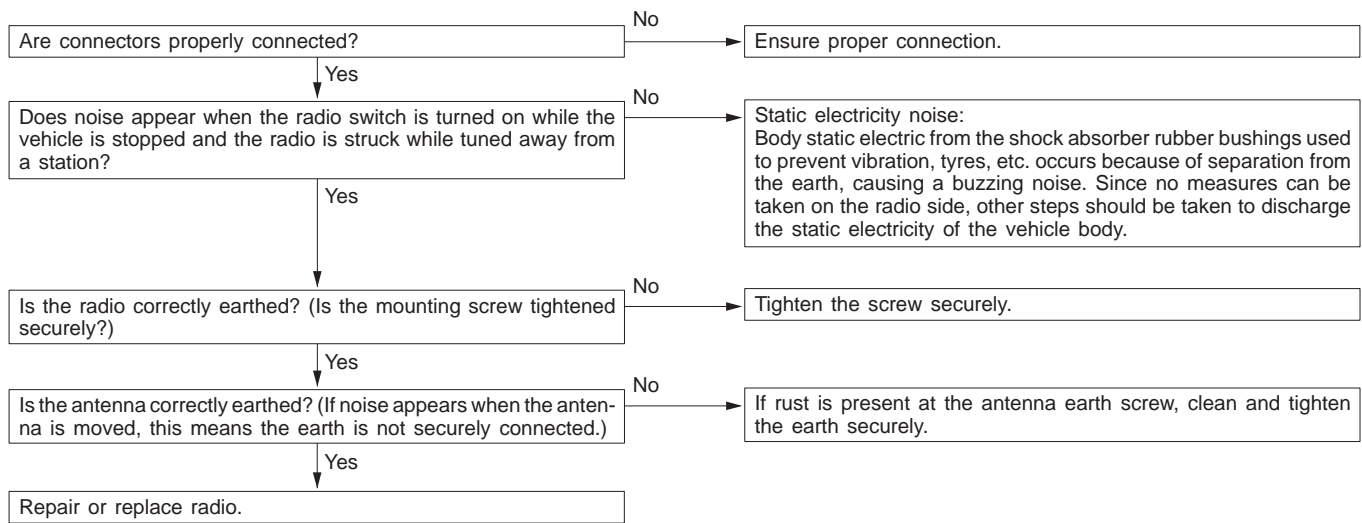
NOTE

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

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

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



A-5 Some noise appears when there is vibration or shocks during travelling.**A-6 Ever-present noise.**

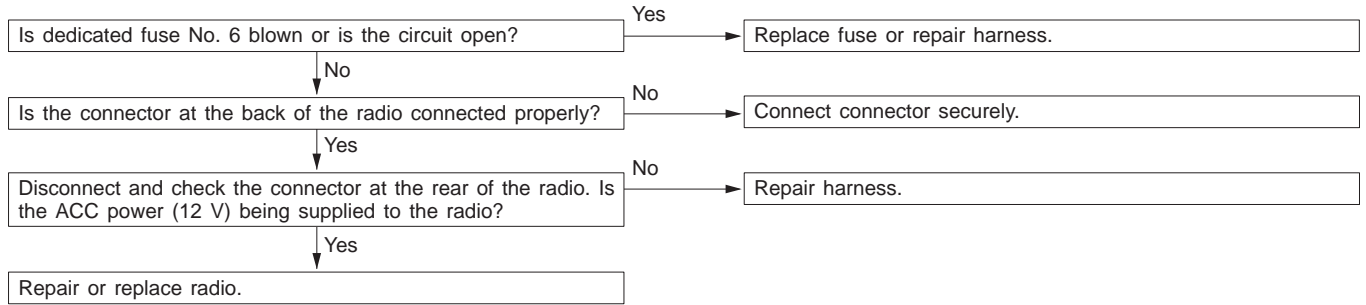
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

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

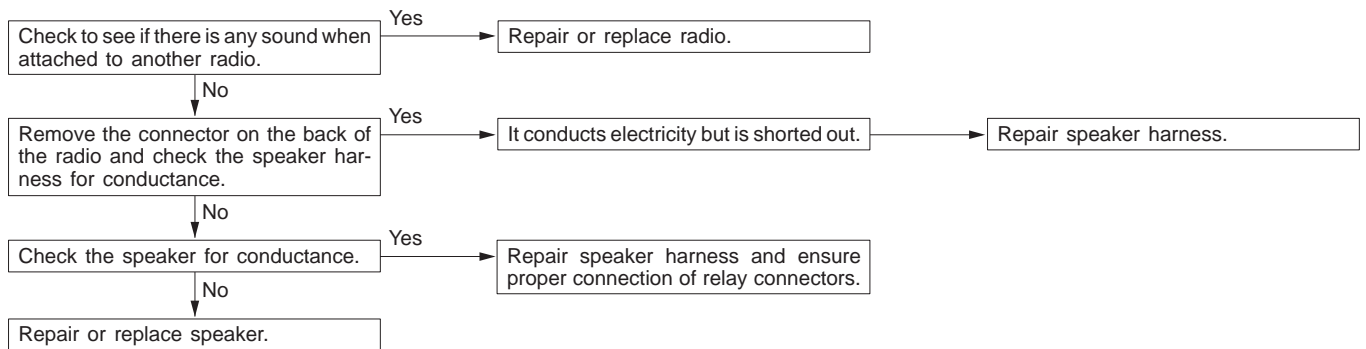
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with FM/MW/LW, the station names, frequencies, etc., and contact a service centre.

B. RADIO

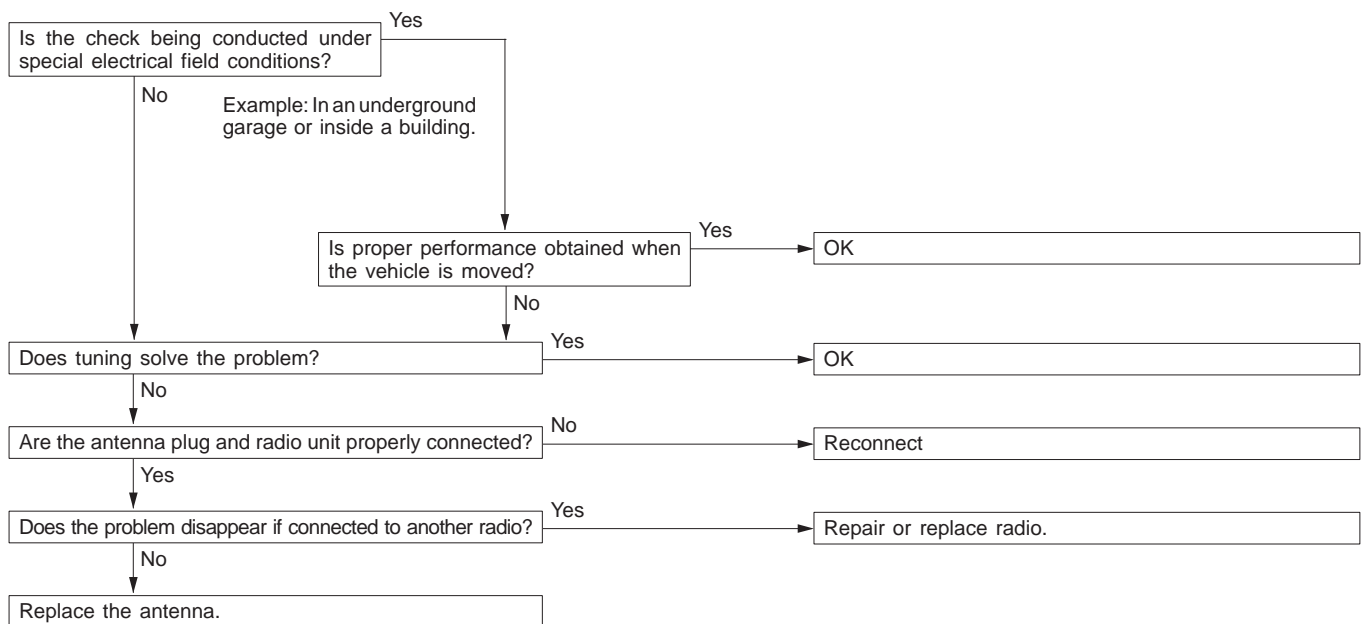
B-1 No power is supplied when the switch is set to ON.



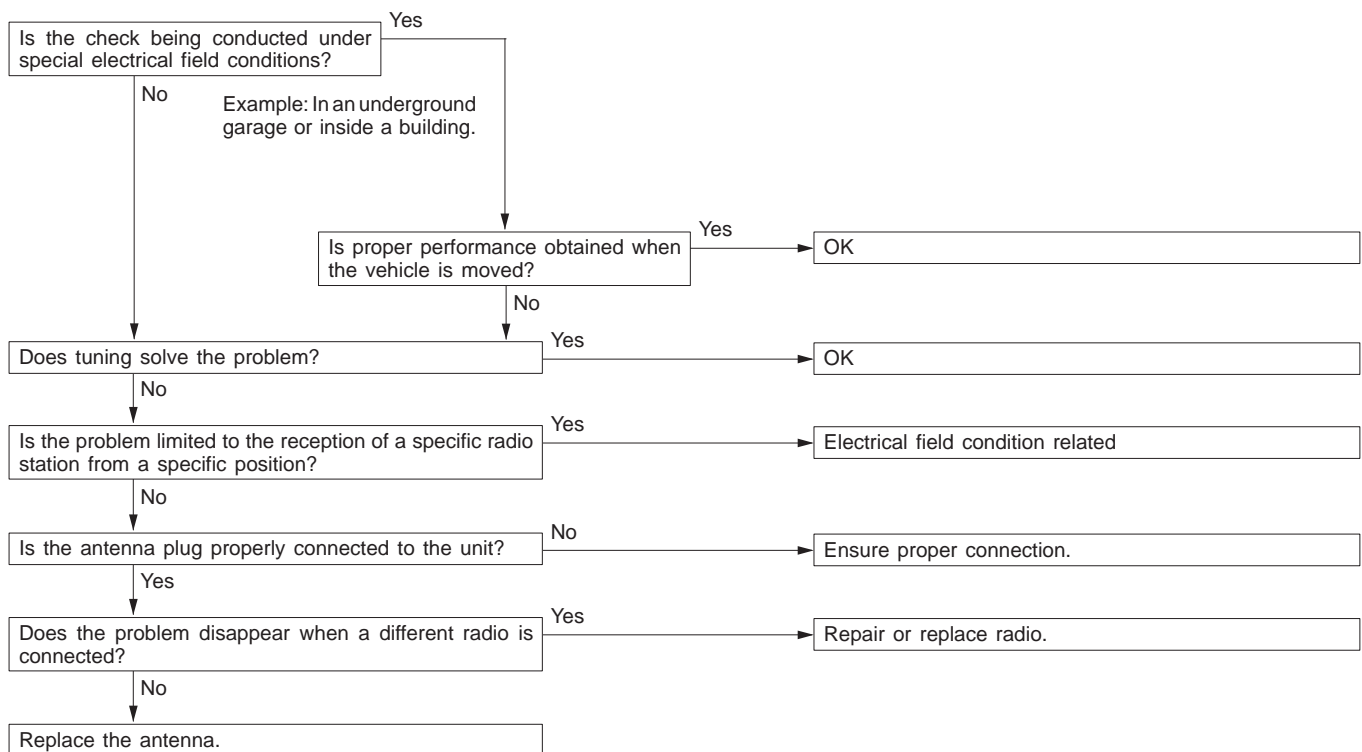
B-2 No sound from one speaker.



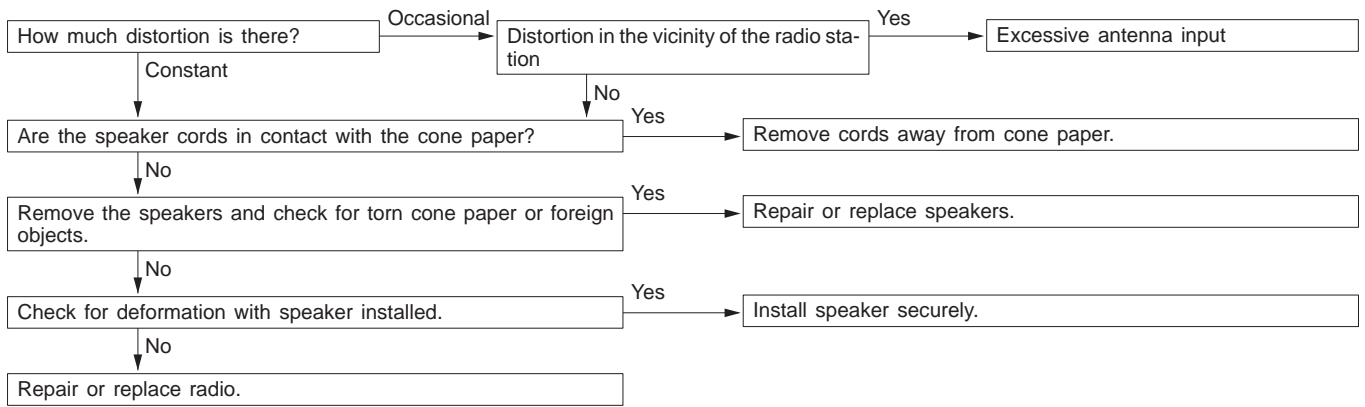
B-3 There is noise but no reception for FM/MW/LW or no sound from FM/MW/LW.



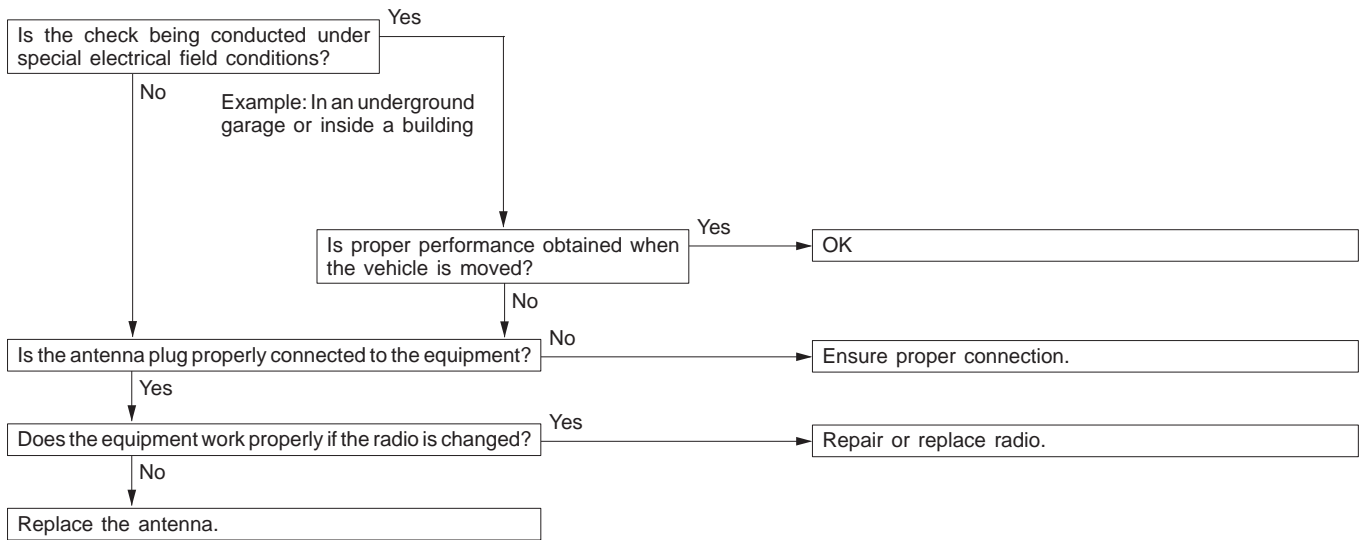
B-4 Insufficient sensitivity.



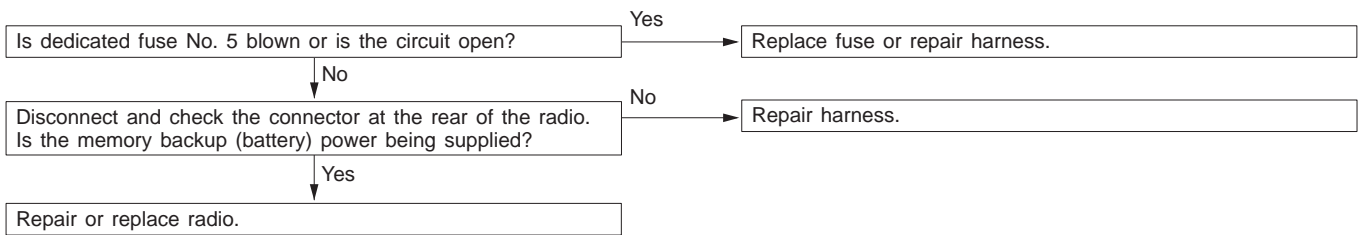
B-5 Distortion on FM/MW/LW.



B-6 Too few automatic select stations.

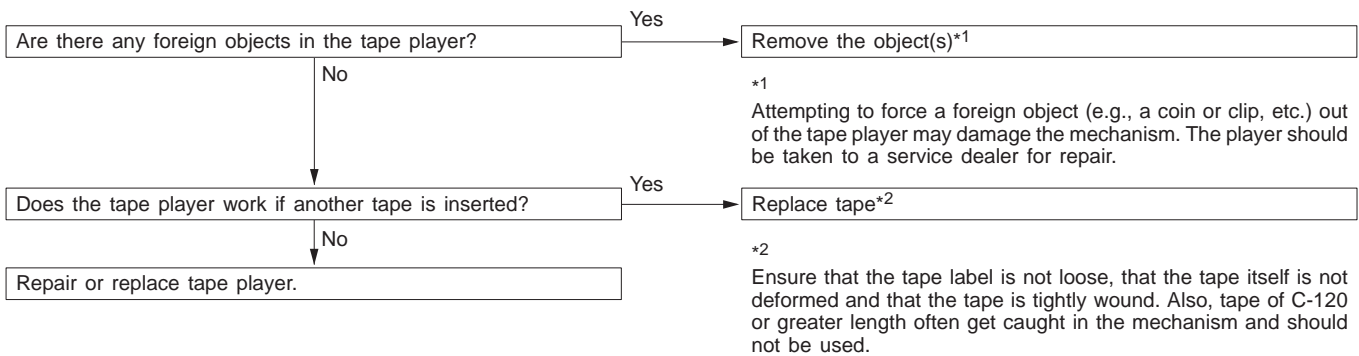


B-7 Insufficient memory (preset stations are erased).

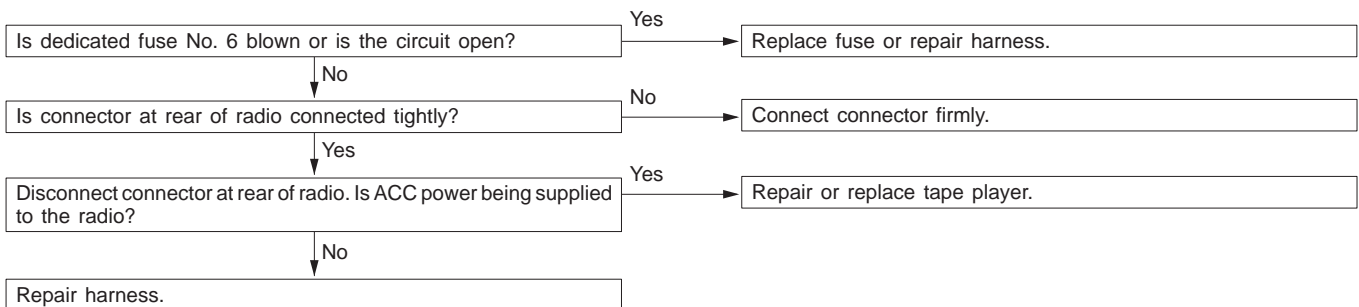


C. TAPE PLAYER

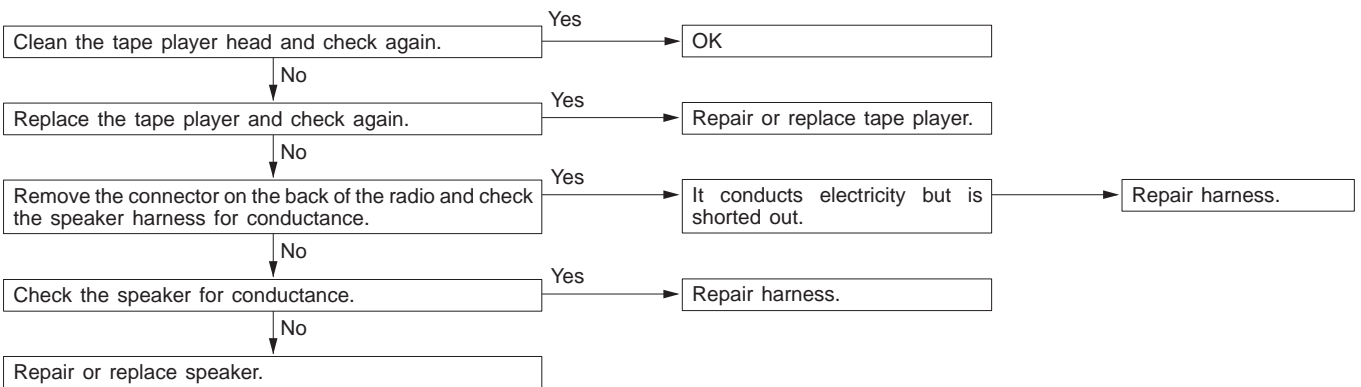
C-1 Cassette tape will not be inserted.



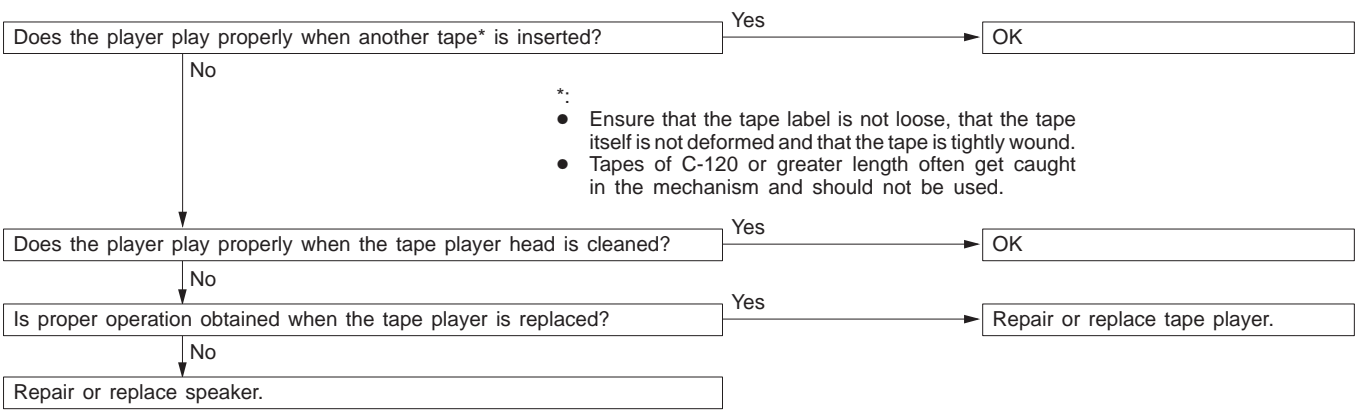
C-2 No sound (even after a tape has been inserted).



C-3 No sound from one speaker.



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

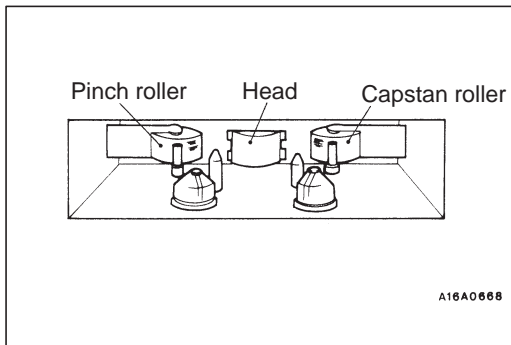
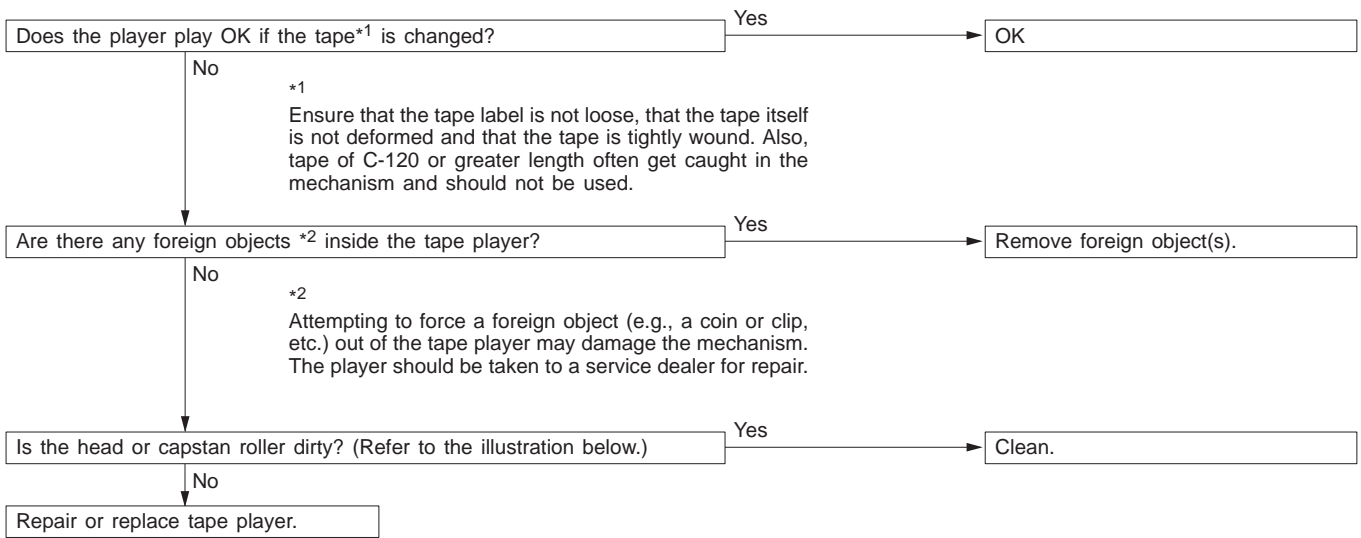


C-5 Cassette tape will not be ejected.

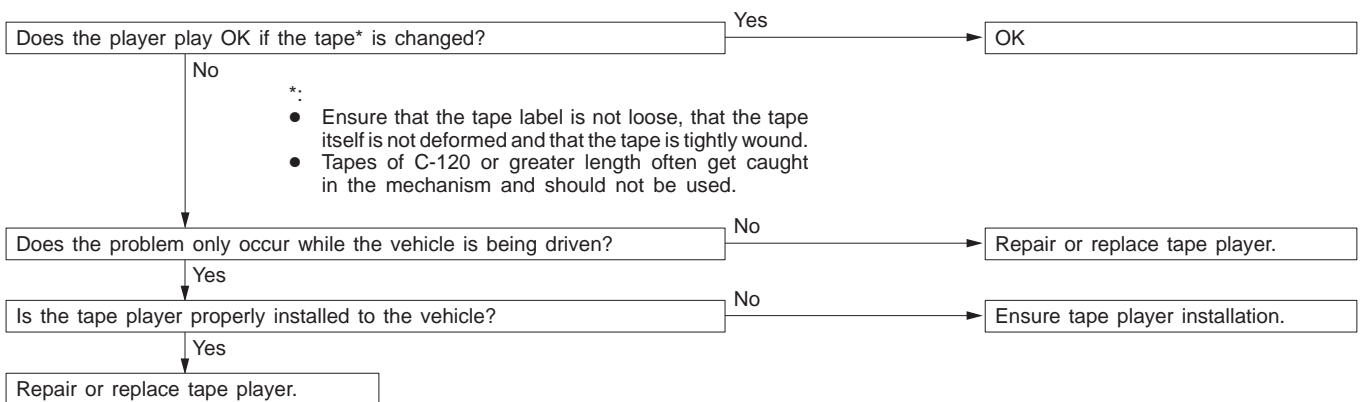
The problems covered here are all the result of the use of a bad tape (deformed or not properly tightened) or of a malfunction of the tape player itself. Malfunctions involving the tape becoming caught in the mechanism and ruining the case are

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

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

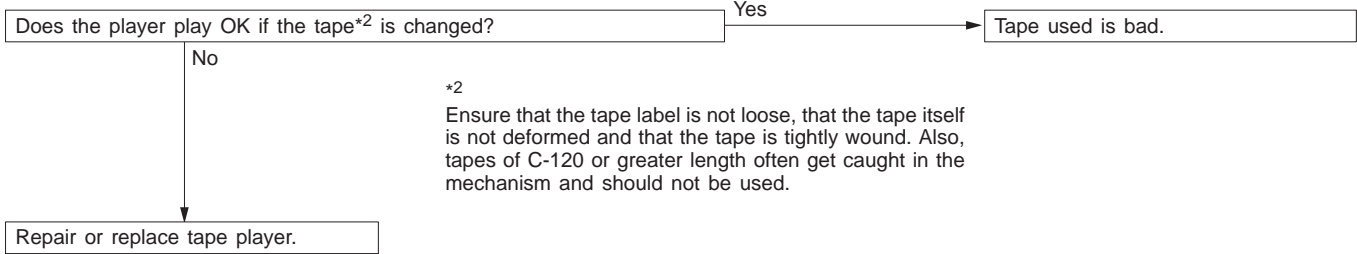


C-7 Faulty auto reverse.



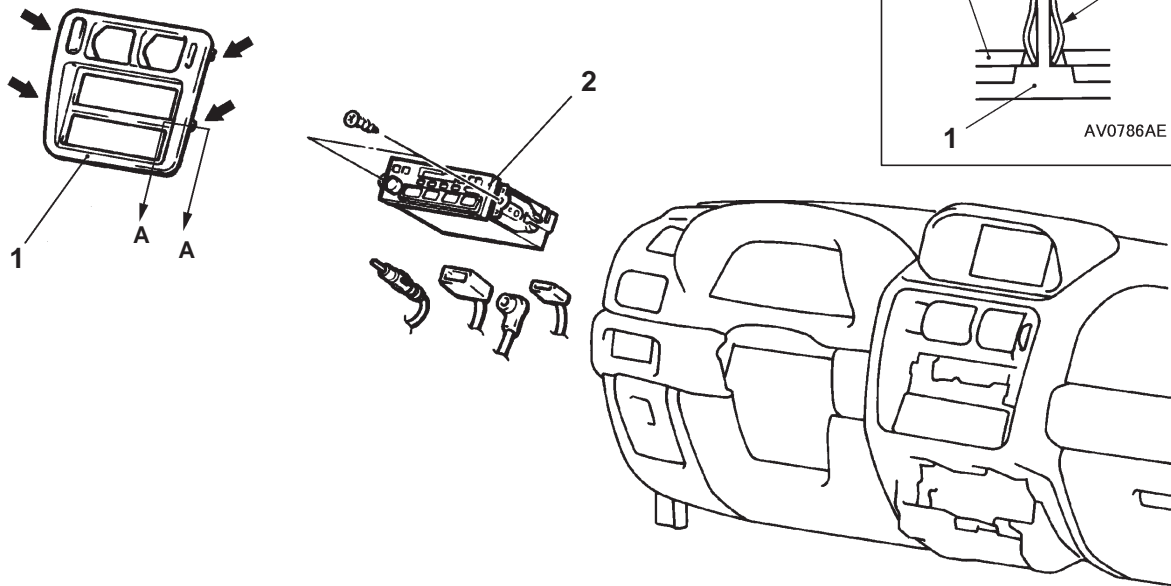
C-8 Tape gets caught in mechanism*1.

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



*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.

RADIO AND TAPE PLAYER REMOVAL AND INSTALLATION



← : shows clips.

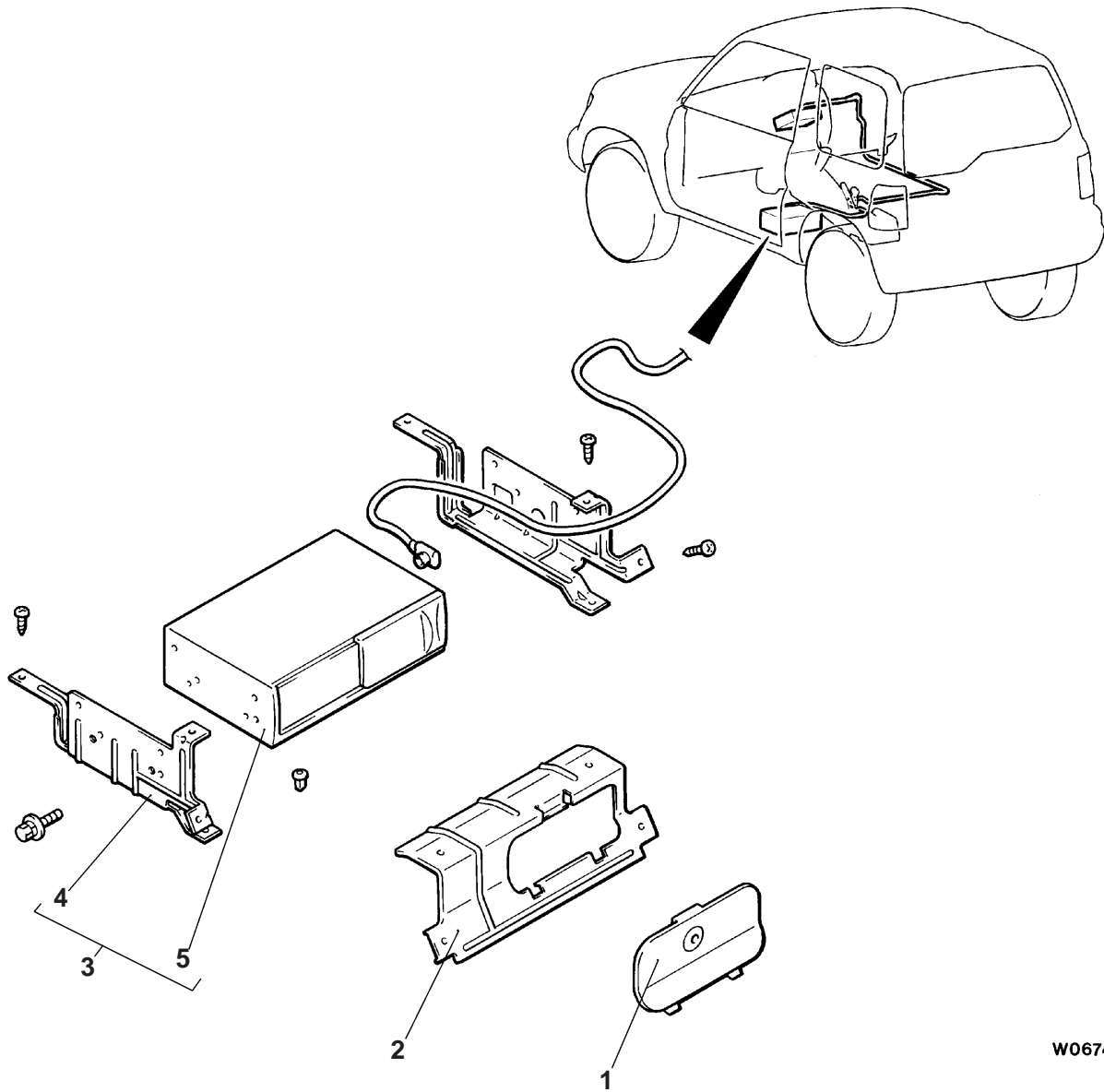
AX0130AL

Removal steps

1. Center panel
2. Radio and tape player

CD AUTOCHANGER

REMOVAL AND INSTALLATION



W0674AL

Removal steps

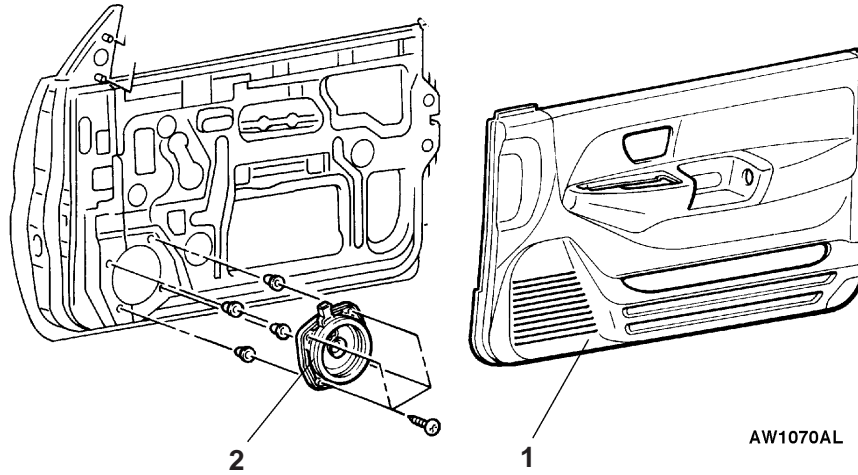
- Front seat (LH)
- 1. Lid
- 2. Cover

- 3. CD autochanger assembly
- 4. Bracket
- 5. CD autochanger

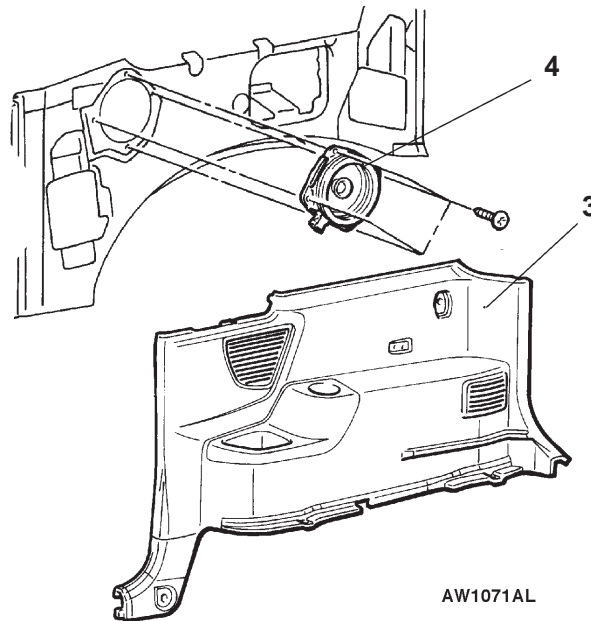
SPEAKER

REMOVAL AND INSTALLATION

<Front speaker>



<Rear speaker>



Front speaker removal steps

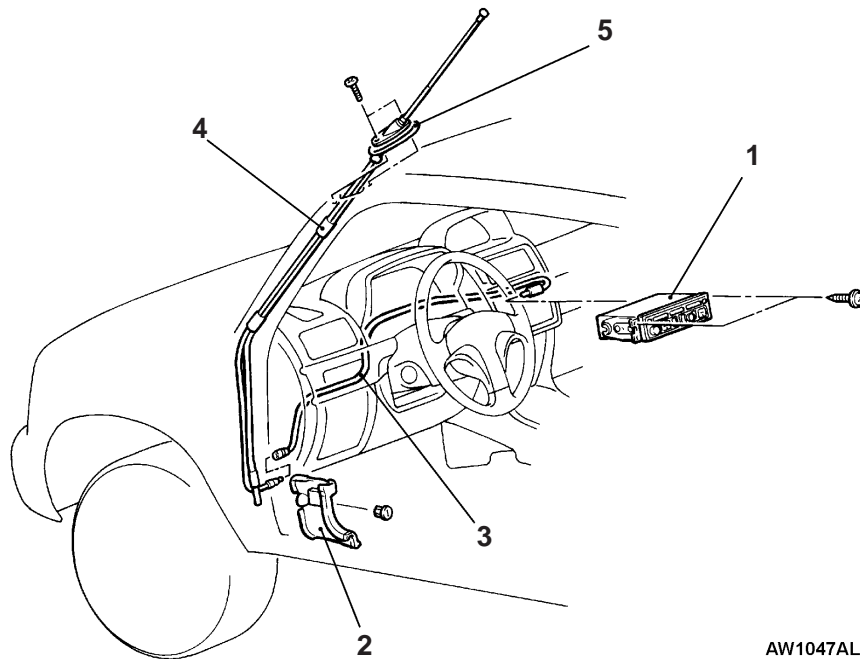
1. Front door trim (Refer to GROUP 42.)
2. Speaker

Rear speaker removal steps

3. Quarter trim (Refer to GROUP 52A.)
4. Speaker

ANTENNA

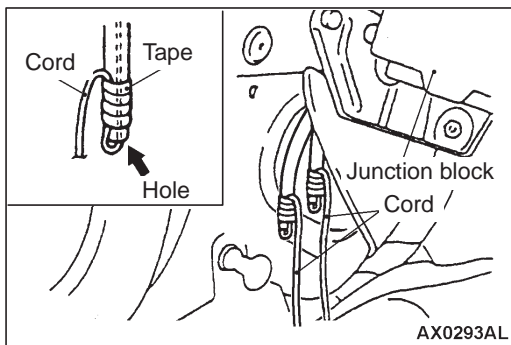
REMOVAL AND INSTALLATION



AW1047AL

Removal steps

- | | | |
|--|-----|--|
| <ol style="list-style-type: none"> 1. Radio and tape player (Refer to P.54-61.) <ul style="list-style-type: none"> ● Instrument under cover (Refer to GROUP 52A.) 2. Cowl side trim (Refer to GROUP 52A) | ◀A▶ | <ol style="list-style-type: none"> 3. Antenna assembly 4. Antenna base <ul style="list-style-type: none"> ● Instrument panel (Refer to GROUP 52A) 5. Antenna feeder |
|--|-----|--|



REMOVAL SERVICE POINT

◀A▶ ANTENNA ASSEMBLY REMOVAL

Observe the following steps to make the feeder cable of the antenna to be routed easily during reinstallation.

1. Secure a cord to the end of the feeder cable.
2. Pull out the feeder cable slightly until the tube end of the antenna can be seen.
3. Insert a cord into the tube end, and secure the cord with plastic tape as shown.

Caution

Make sure that the cord is not loosened.

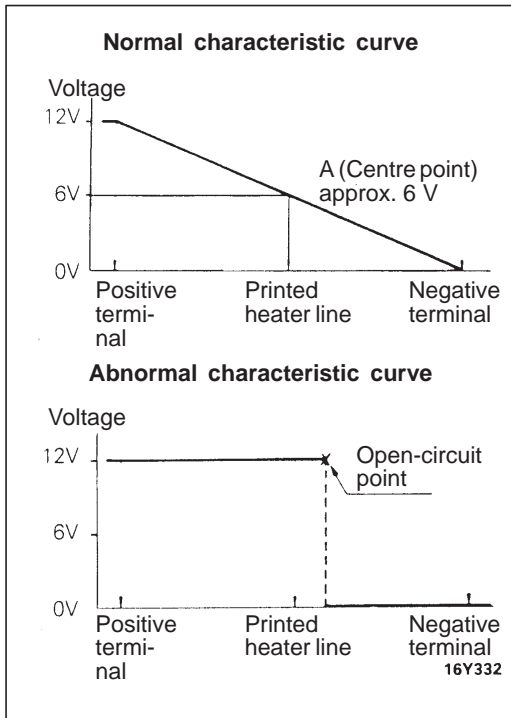
4. Remove the antenna assembly by pulling it gradually.

REAR WINDOW DEFOGGER

ON-VEHICLE SERVICE

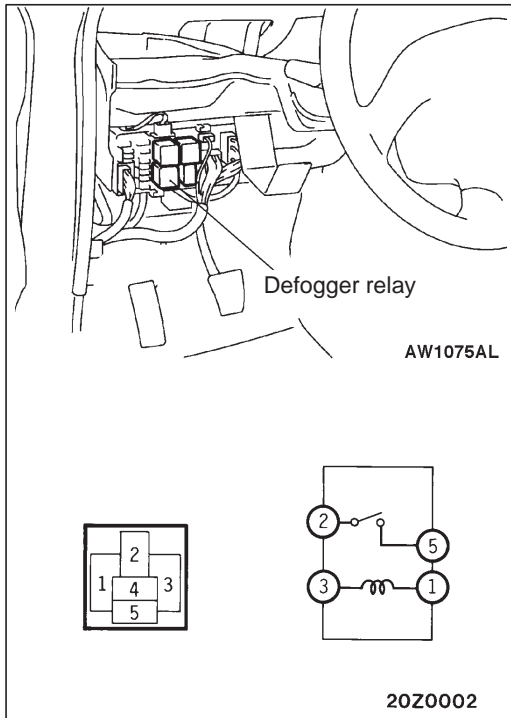
PRINTED-HEATER LINE CHECK

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



REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

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



REAR WINDOW DEFOGGER SWITCH

REMOVAL AND INSTALLATION

Refer to GROUP 55 – Heater Control.

INSPECTION

DEFOGGER SWITCH CONTINUITY CHECK

<Vehicles with heated-mirrors>

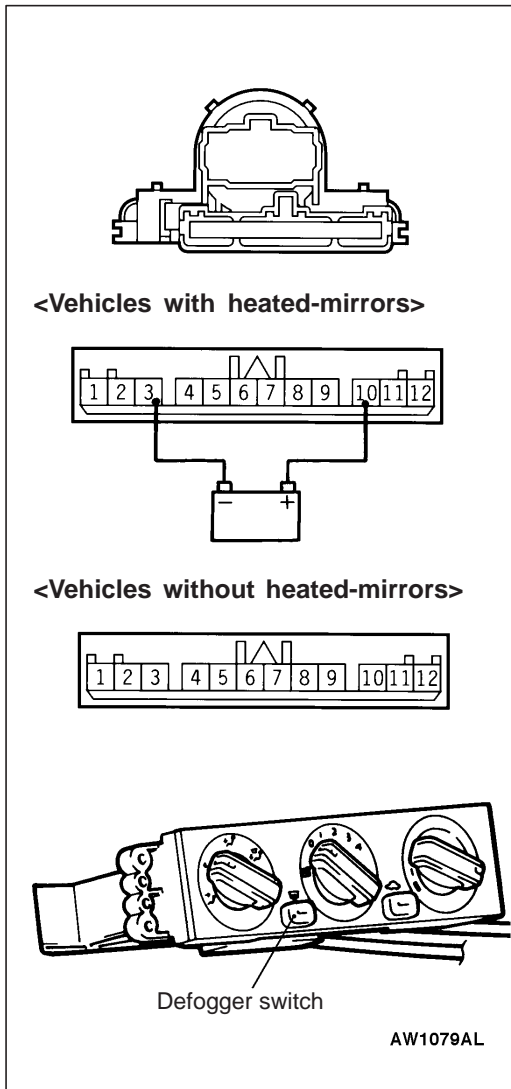
Switch position	Terminal No.				
	3	10	-	11	12
OFF	○ -	○ +	IND ⊕	○	
ON	○ - ○	○ +	IND ⊕	○	○

NOTE

Turn on the defogger switch, and then check that there is continuity between the terminals 3 and 12 for 9 to 13 minutes and after it, the defogger switch is turned off.

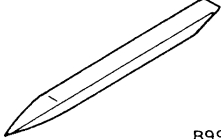
<Vehicles without heated-mirrors>

Switch position	Terminal No.			
	10	-	11	12
OFF	○	IND ⊕	○	
ON	○	IND ⊕	○ ○	○



MULTI-CENTER DISPLAY <MIDDLE GRADE>

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Removal of center display hood

TROUBLESHOOTING

NOTES WITH REGARD TO SERVICE PROCEDURES

1. Before removing the battery

The audio system has a large amount of data stored in memory which the user enters over time. When the terminals are disconnected from the battery, the memory which stores this data is affected as shown in the table below. Accordingly, it is necessary to make sure that you take notes of important information before disconnecting the battery.

Function	Input function/memory	When battery is disconnected
Radio	Channels which are selected during a search	Disappear after a few seconds
	Preset channels	
Tone/Balance	Position set on Bass, Treble, Balance and Fader	
Clock set on display	Current time	Keep a data for approx. one hour
Brightness set for display	Position set on display	
Unit set for trip computer	km or mile, L/100km or mpg or km/L	
Average speed on display	Average speed after reset	
Average fuel consumption on display	Average fuel consumption after reset	
Cruising range on display	Cruising range, fuel economy	
Outside temperature on display	A temperature after the ignition switch is turned to OFF (LOCK).	Keep a data for approx. one hour If the engine is hot, the multi center display might show high temperature when the display unit is reconnected after one hour.

2. Diagnosis Function for Audio System

Audio system has the following diagnosis function.

Function	Contents
Speaker diagnosis function	This function checks if the speakers are all working normally on the audio system or not.
Service functions (1) Check the LCD segments (2) Check the sensors (3) Check units connected into audio system	There are the following 3 diagnosis modes available. The LCD segments for display available to light on or not. Outside temperature, voltage of fuel gauge unit and battery, remaining fuel level, fuel economy calculated after refuelling. Units connected on display Voltage on terminal for MUT-II Engine speed signal, which is sent by ECU Oscillation of internal clock

3. Speaker Connection Diagnosis

Outline

- This diagnosis function checks whether the more than one wired speakers are normally connected to the audio unit and the speaker wiring is pinched in the vehicle.
- The test tone sounds from an applicable speaker according to the display (FL, FR, RL, RR).

Function explanation

To diagnose speaker connections, follow the procedure below to enter the test mode.

1. Entry to test mode

- (1) Turn the ignition switch to ACC.
- (2) Turn off the power supply switch of the audio unit.
- (3) Press the "CH1" button.
- (4) Press the "Automatic tuning in down button."
- (5) Press the "Automatic tuning in up button."
- (6) Press the "CH6" button. Then the audio unit will enter the test mode.

NOTE

The above operation must be finished within 60 seconds after the power supply switch is turned off (If 60 seconds have passed, the operation is invalid).

If you fail in the operation, you must push the power supply switch twice to reset the unit. Then repeat the steps above from step (1).

- (7) The test tone will sound at a constant interval. If you want to change an applicable speaker, you should press the "CH6" button.

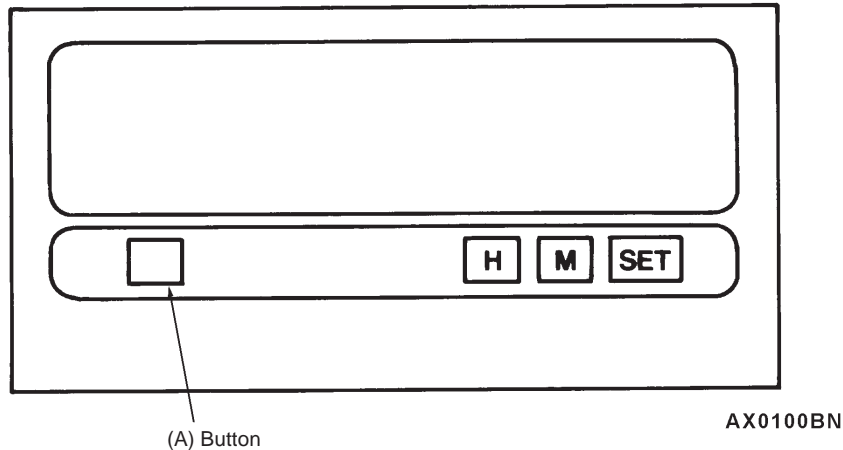
2. Cancelling the test mode

The test mode will be canceled by one of the operations below.

- Press any button (except the "CH6" button). In addition, if a mode button (LW/MW/LW, CD, TAPE) is pressed, the audio unit will enter an applicable function after cancelling the test mode.
- Turn the ignition switch to OFF(LOCK).

4. Service Mode For Multi-center Display

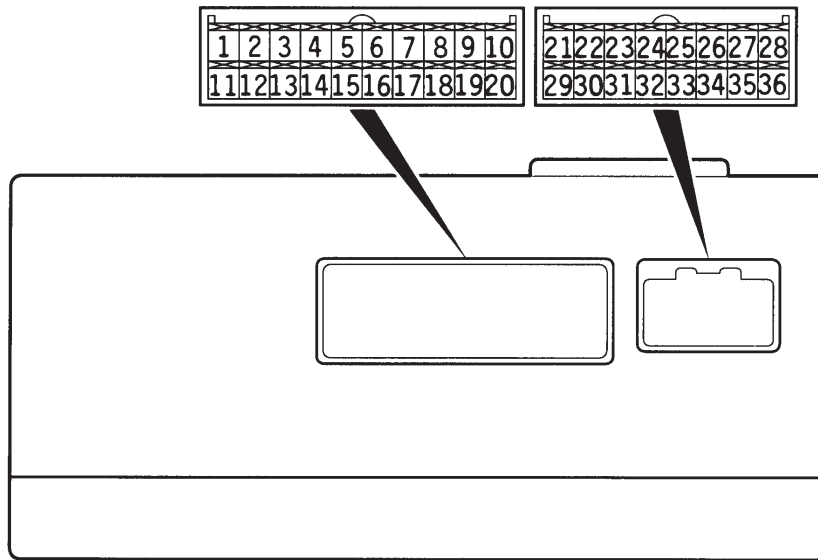
1. Enter and terminate the service mode
 - (1) To enter the service mode, turn the ignition switch to ACC.
 - (2) Press the “H” button twice.
 - (3) Press the “SET” button and (A) button at the same time.
 - (4) Then the audio unit will enter the service mode.
 First of all, the service mode will show model identification for the multi center display and the vehicle identification. Then the service mode proceeds to three checks; LCD segment check, Sensor check and Unit check. To switch over these checks, press the “SET” button.
 - (5) To terminate the service mode, press any button other than the “SET” button.



2. Details of the service mode
 The service mode checks the following in that order:
 - (1) LCD segment check
 This screen is divided into four areas. Each area will be active sequentially whenever the “SET” button is pressed.
 When the “SET” button is pressed four times in this screen, the service mode will proceed to the Sensor check.
 - (2) Sensor check
 This screen shows voltage signals from the outside temperature sensor, the fuel gauge unit, and the ignition switch as well as fuel economy.
 When the “SET” button is pressed once in this screen, the service mode will proceed to the Unit check.
 - (3) Unit check connected into audio system
 This screen shows an audio equipment, air conditioner or MUT-II connected in the system, percentage of system voltage, engine speed sent by the engine-ECU, and oscillation of internal clock.
 When the “SET” button is pressed once in this screen, the service mode will return to the first screen (model identification screen).

MAIN UNIT TERMINAL VOLTAGES

1. MULTI-CENTER DISPLAY UNIT



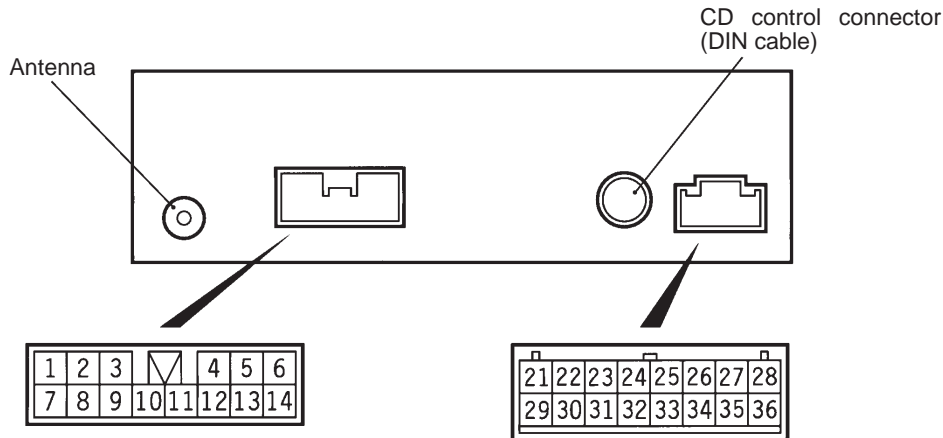
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Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1 – 4	–	–	–	–	–	–
5	Input	ISOK	Hi: System voltage Lo: 0 – 1	○	○	MUT-II cannot be used to check engine-ECU.
6	–	–	–	–	–	–
7	Input/Output	M-DATA (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	○	Audio display dose not appear. Panel switch cannot be operated for audio unit. Nighttime illumination dose not appear for audio unit.
8	Input/Output	M-CLOCK (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	○	Audio display dose not appear. Panel switch cannot be operated for audio unit. Nighttime illumination dose not appear for audio unit.
9 – 14	–	–	–	–	–	–
15	Input/Output	K	Hi: System voltage Lo: 0 – 1	○	○	Values on Trip information screen (average speed, fuel consumption and cruising distance) are abnormal. Communication is not possible between the engine-ECU and the MUT-II.
16	–	–	–	–	–	–

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
17	Input/Output	M-BUSY (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	○	Audio display dose not appear. Panel switch cannot be operated for audio unit. Nighttime illumination dose not appear for audio unit.
18	–	SHIELD-GND	–	–	–	–
19 – 22	–	–	–	–	–	–
23	Input	EX-TEMP		○	○	Outside air temperature does not appear.
24	Input	ILL+	Hi: System voltage Lo: 0 – 1	○	–	Nighttime illumination does not appear for any navigation system units.
				–	○	Blown multipurpose fuse.
25	Input	ACC (ACC power supply)	System voltage	○	–	Screen display does not appear.
				–	○	Blown multipurpose fuse.
26	Input	+B	System voltage	○	–	Screen display does not appear.
				–	○	Blown multipurpose fuse.
27	Input	VSS		○	–	No effect.
28	–	GND (Ground)	–	○	–	Screen display does not appear.
29, 30	–	–	–	–	–	–
31	–	GND-TEMP	–	○	○	Outside air temperature does not appear.
32	–	ILL-	–	–	–	–
33	Input	FUEL GAUGE	–	○	○	Abnormal cruising distance display.
34, 35	–	–	–	–	–	–
36	Input	IG1	System voltage	○	–	Communication with engine-ECU is not possible. Driving data values displayed are abnormal.
				–	○	Communication with engine-ECU is not possible. Driving data values displayed are abnormal. Blown multipurpose fuse.

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2. AUDIO UNIT



BV0846AE

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1	Output	SPEAKER RR (+)	0 – System voltage (AC)	○	–	No sound is output from rear right speaker.
				–	○	No sound is output from rear left and right speakers.
2	Output	SPEAKER RL (+)	0 – System voltage (AC)	○	–	No sound is output from rear left speaker.
				–	○	No sound is output from rear left and right speakers.
3	–	–	–	–	–	–
4	Input	ILL (+)	Hi: System voltage Lo: 0 – 1	○	–	Nighttime illumination does not appear for audio unit.
				–	○	Blown multipurpose fuse.
5	Output	SPEAKER FL (+)	0 – System voltage (AC)	○	–	No sound is output from front left speaker.
				–	○	No sound is output from front left and right speakers.
6	Output	SPEAKER FR (+)	0 – System voltage (AC)	○	–	No sound is output from front right speaker.
				–	○	No sound is output from front left and right speakers.
7	Output	SPEAKER RR (–)	0 – System voltage (AC)	○	–	No sound is output from rear right speaker.
				–	○	No sound is output from rear left and right speakers.

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
8	Output	SPEAKER RL (-)	0 – System voltage (AC)	○	–	The rear left speaker does not sound.
				–	○	The rear left and right speakers do not sound.
9	–	–	–	–	–	–
10	Input	ACC (ACC power supply) (System voltage)	System voltage	○	–	The audio unit power supply does not turn on.
				–	○	Blown multipurpose fuse.
11	Input	+B (System voltage)	System voltage	○	–	Cassette is not ejected when the ignition switch is at ACC. The memory are cleared.
				–	○	Blown multipurpose fuse.
12	–	ILL (-)	–	–	–	–
13	Output	SPEAKER FL (-)	0 – System voltage (AC)	○	–	The front left speaker does not sound.
				–	○	The front left and right speakers do not sound.
14	Output	SPEAKER FR (-)	0 – System voltage (AC)	○	–	The front right speaker does not sound.
				–	○	The front left and right speakers do not sound.
21	Input/Output	M-DATA	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
22	Input/Output	M-SCK	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
23 – 28	–	–	–	–	–	–
29	Input/Output	M-BUSY	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
30	–	SHIELD EARTH (M-BUS)	–	–	–	–
31– 36	–	–	–	–	–	–

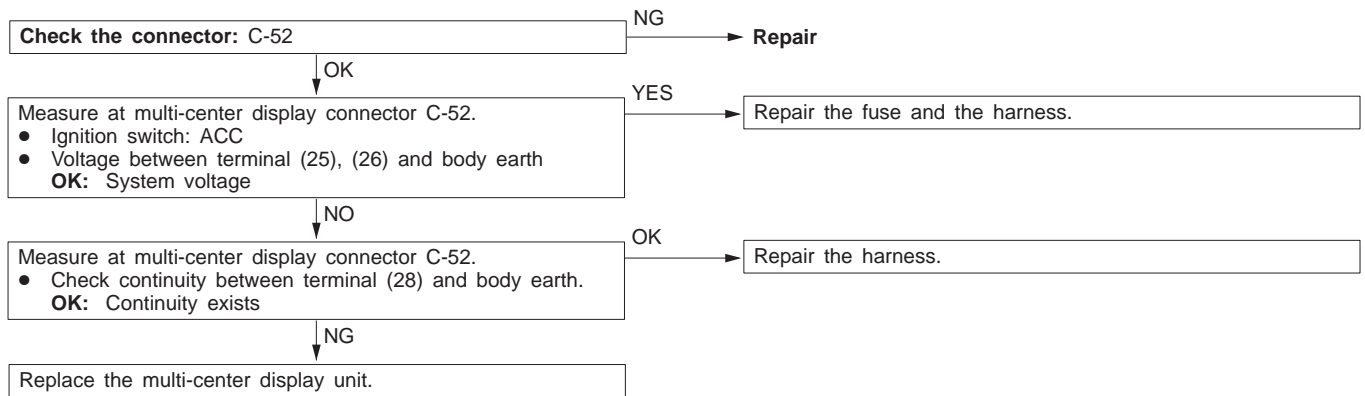
INSPECTION CHART CLASSIFIED BY TROUBLE SYMPTOMS

Related Unit	Trouble Symptom	Inspection Procedure No.	Reference Page
Malfunction of multi-center display	No display appears after the ignition key is turned to ACC.	1	54A-74
	TAPE/CD, UML switches do not work.	2	54A-75
	CD switches do not work.	3	54A-76
	Outside temperature data is not displayed. /Outside temperature data is abnormal.	4	54A-76
	Abnormal driving data display <ul style="list-style-type: none"> ● Abnormal average fuel consumption and average speed displays. ● Abnormal cruising distance displays 	5	54A-77
	No illumination of audio button	6	54A-78
	Dim display	7	54A-78
	Clock runs fast or slow	8	54A-78

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

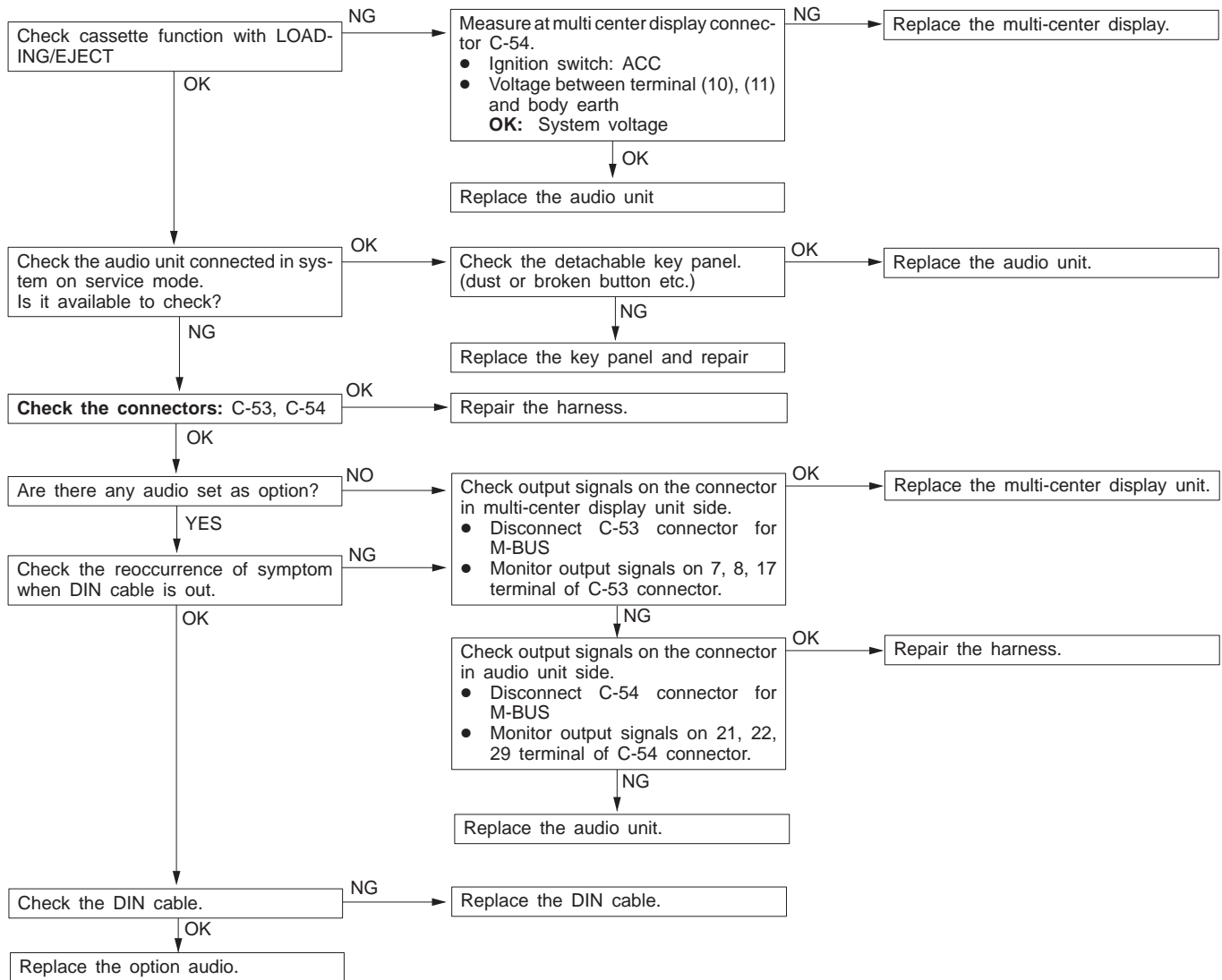
INSPECTION PROCEDURE 1

No display appears after the ignition key is turned to ACC.



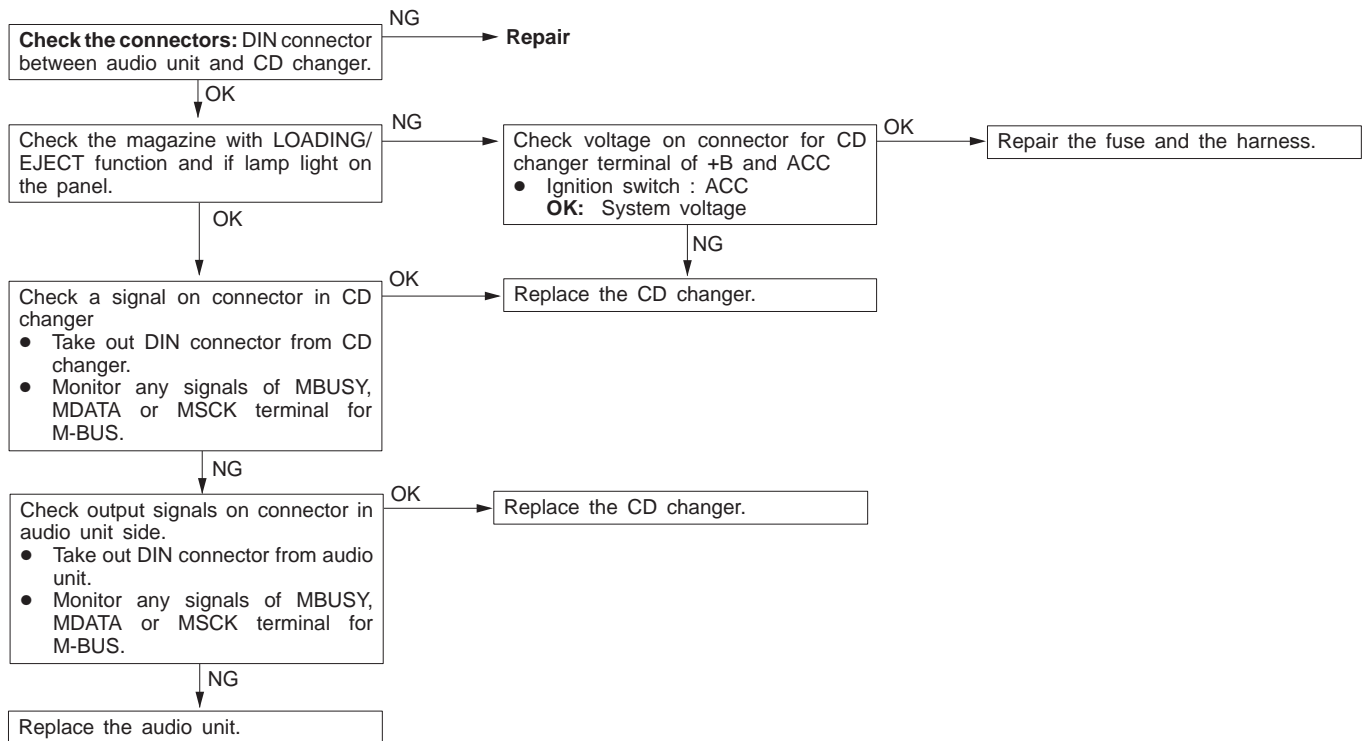
INSPECTION PROCEDURE 2

TAPE/CD, UML switches do not work.



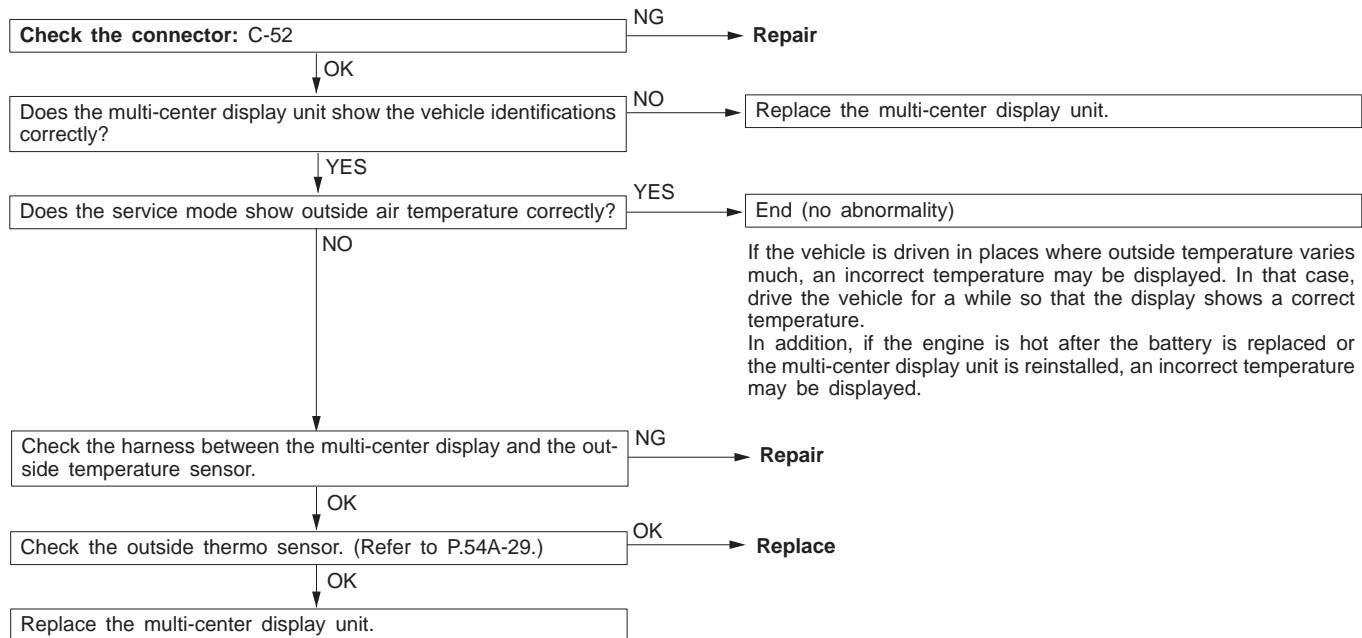
INSPECTION PROCEDURE 3

CD switch do not work.



INSPECTION PROCEDURE 4

Outside air temperature data is not displayed. /Outside air temperature data is abnormal.

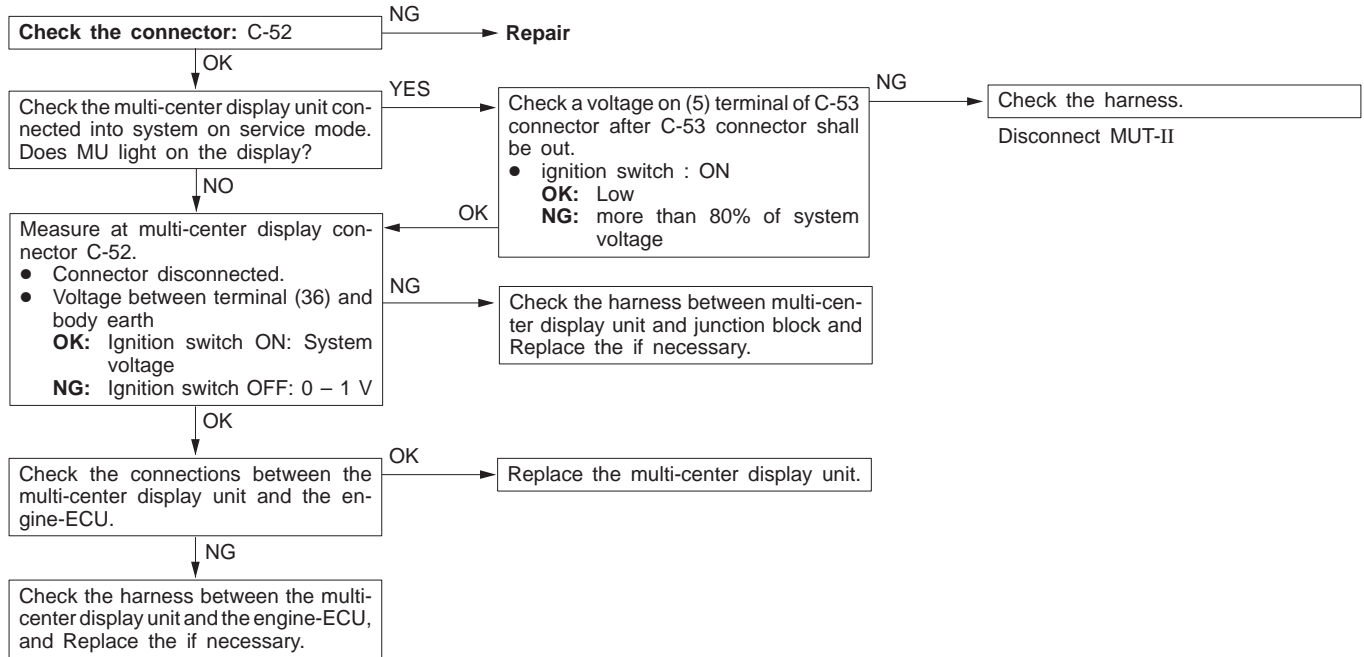


INSPECTION PROCEDURE 5

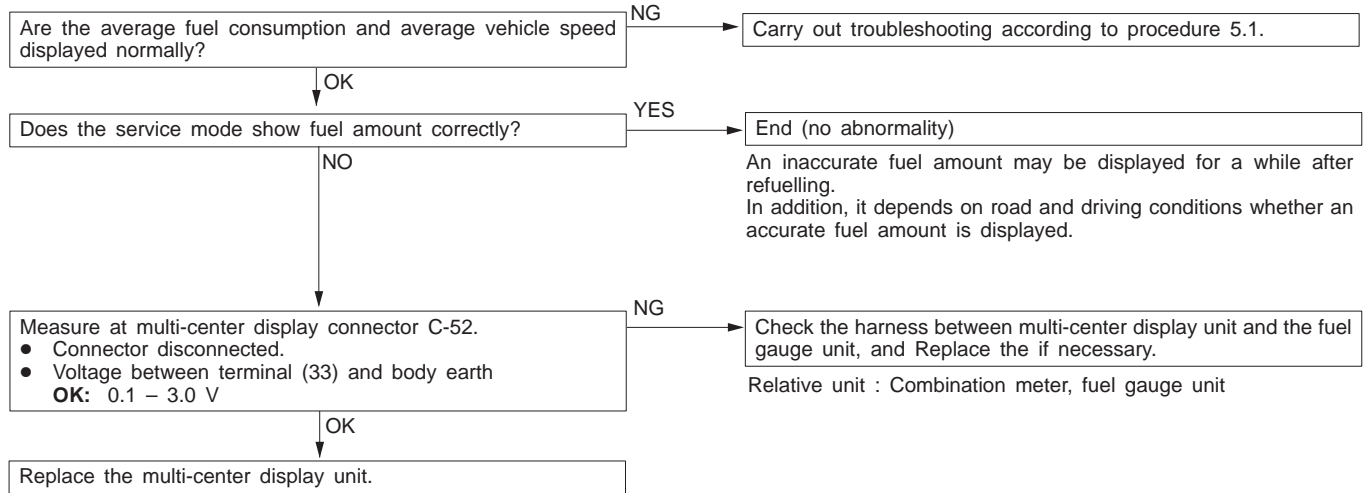
Abnormal driving data displays.

- Abnormal average fuel consumption and average speed displays.
- Abnormal cruising distance displays.

1. When average fuel consumption and average speed displays are abnormal.



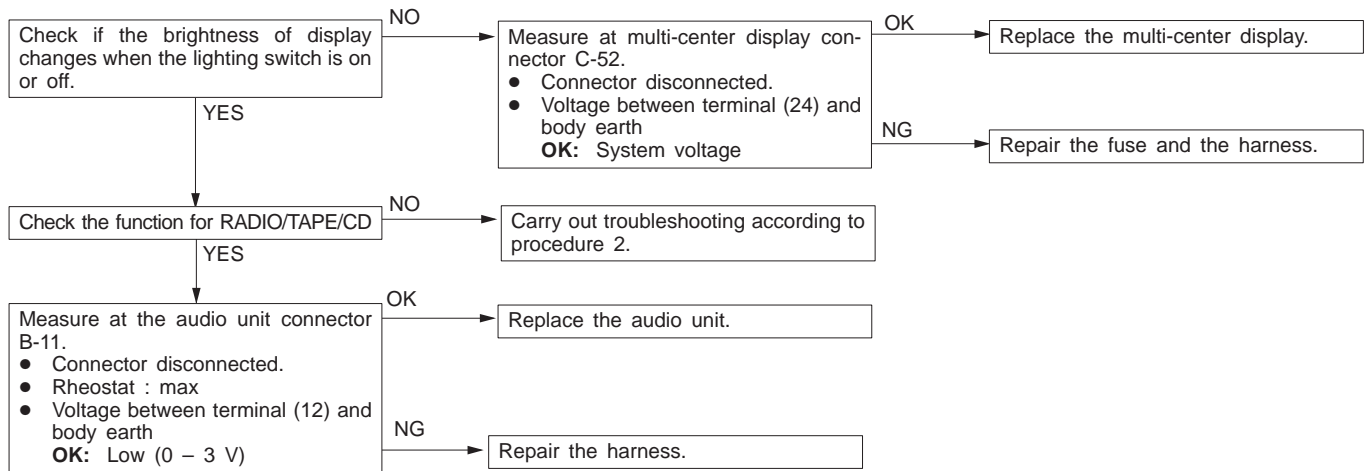
2. When cruising distance display is abnormal.



54A-78 CHASSIS ELECTRICAL – Multi-center Display <Middle Grade>

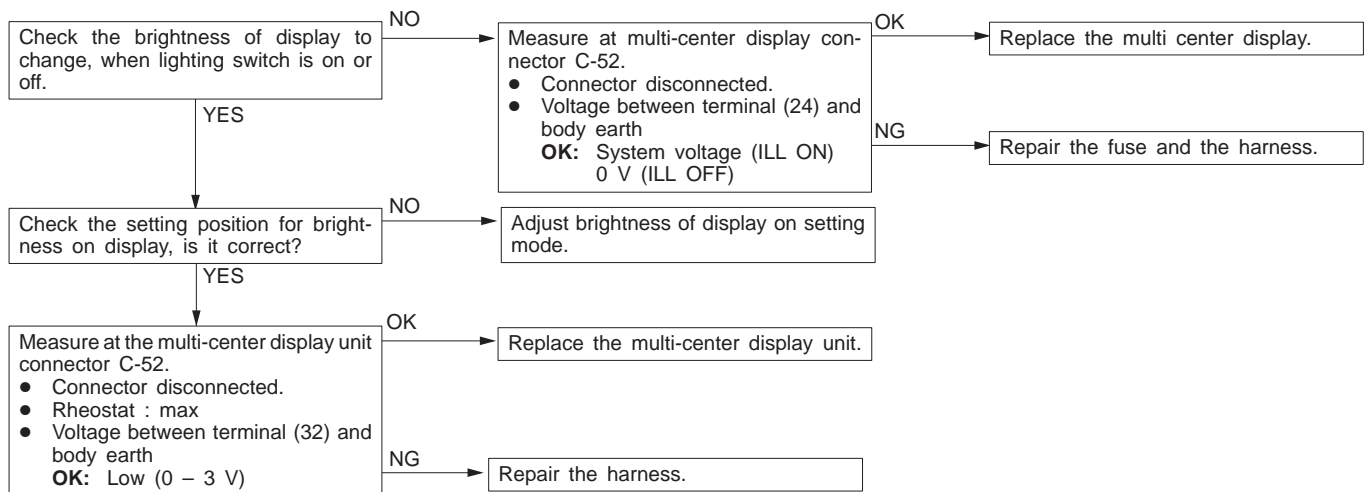
INSPECTION PROCEDURE 6

No illumination for audio buttons light on.



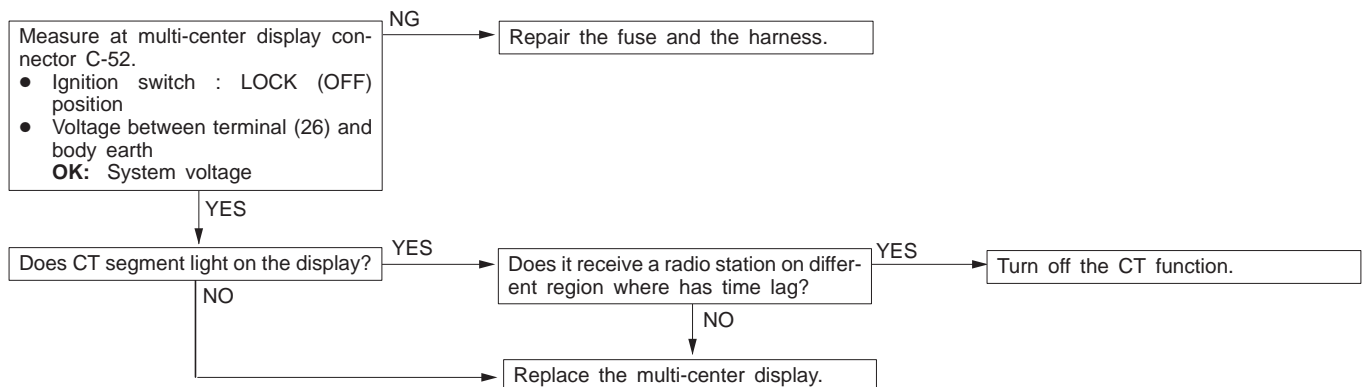
INSPECTION PROCEDURE 7

Dim display

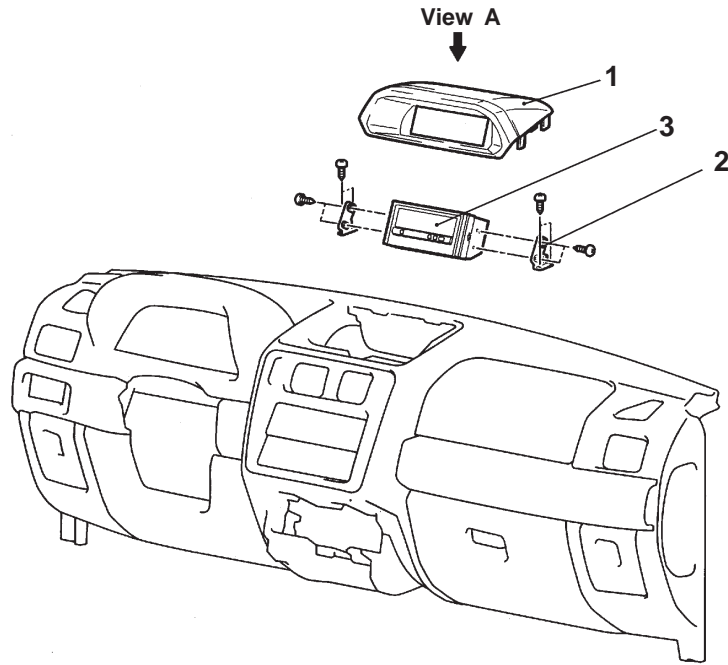


INSPECTION PROCEDURE 8

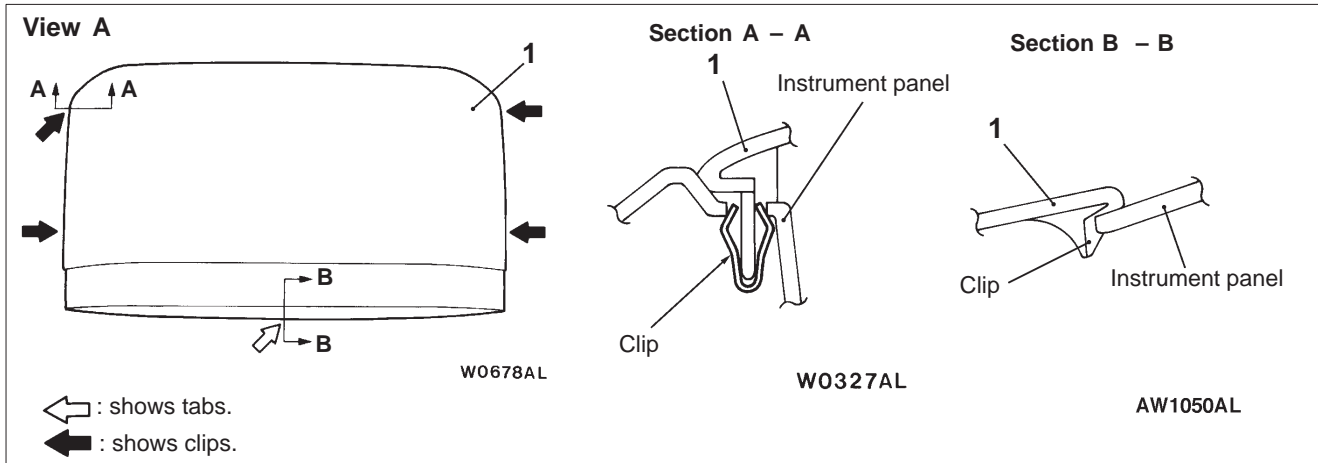
Clock runs fast or slow/indicate different time



MULTI-CENTER DISPLAY REMOVAL AND INSTALLATION



AX0129AL



Removal steps

1. Center display hood
2. Bracket

3. Multi-center display

MULTI-CENTER DISPLAY <HIGH GRADE>

TROUBLESHOOTING

NOTES WITH REGARD TO SERVICE PROCEDURES

1. Before removing the battery

The multi-center display has a large amount of data stored in memory which the user enters over time. When the terminals are disconnected from the battery, the memory which stores this data is affected as shown in the table below. Accordingly, it is necessary to make sure that you take notes of important information before disconnecting the battery.

Function	Input function	When battery is disconnected
Radio function	Channels which are selected during a search	Disappear after a few seconds
	Preset channels	Do not disappear
Navigation function	Current location	Do not disappear
	Recommended route	
	Destination	
	Route search conditions	
	Sensor initialization data	
	Language selection setting	
	Guidance volume setting	
Data search function, data display and input functions	Registered location names	Do not disappear
	Past destinations	
	Average fuel consumption, average speed, cruising range	
Clock display function	Current time	Do not disappear
Vehicle model settings for travel data	Setting details for vehicle model	
Monitor backlight luminance setting	Luminance setting value	

2. Notes on trouble diagnosis relating to the overall system

- (1) If a problem occurs which seems like all of the functions have developed an abnormality simultaneously, the cause is most likely a communication abnormality between the various systems. Thus you should use the communication checking service function in the trouble diagnosis service functions in order to verify the cause.

- (2) If the above is not the problem, check the connections of the related harness connectors. If a malfunctioning location is discovered, repair it and then re-check the trouble symptoms.
- (3) If there are no abnormalities in the harness connections, check the harnesses themselves. If there are no abnormalities in the harnesses, replace the relevant unit. Make a note of any error codes and service function data generated at this time.

NOTE

If the cause of the problem seems to be related to system communication, carry out troubleshooting.

3. Notes on trouble diagnosis when only specific functions are abnormal

- (1) If only certain functions are showing an abnormality, use the audio checking function of the service functions to check the hardware switches.
- (2) If the switch functions are normal, check the connections of the related harness connectors. If a malfunctioning location is discovered, repair it and then re-check the trouble symptoms.
- (3) If there are no abnormalities in the harness connections, check the harnesses themselves. If there are no abnormalities in the harnesses, replace the unit which controls that function.

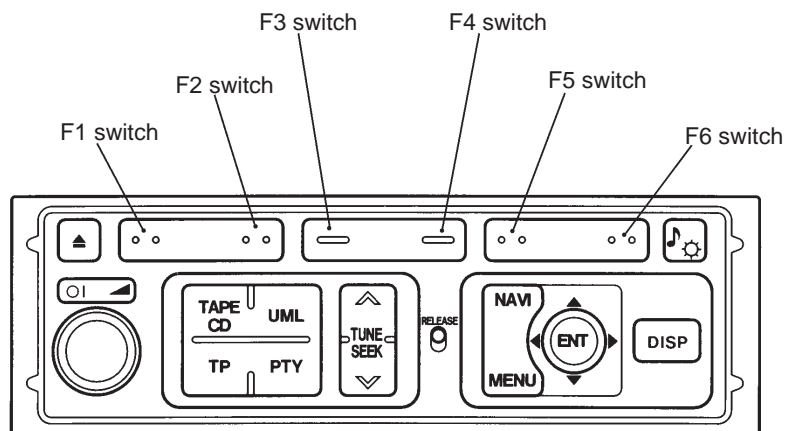
4. Notes on trouble diagnosis of the navigation function

- (1) The vehicle positioning accuracy of the navigation function is limited because of the principle of operation which it uses. Because of this, the system may be operating normally even though customers might be reporting a problem.

Before carrying out troubleshooting, get as much information as possible from the customer regarding things such as usage conditions and driving locations. If it is possible to judge from this that the problem is not caused by a system abnormality, explain the principle of operation used by the navigation function and how to utilize it effectively.

- (2) If you find that there is a system abnormality, check according to the Inspection Chart Classified by Trouble Symptoms in the Troubleshooting section.

MITSUBISHI MULTI COMMUNICATION SYSTEM DISPLAY PANEL

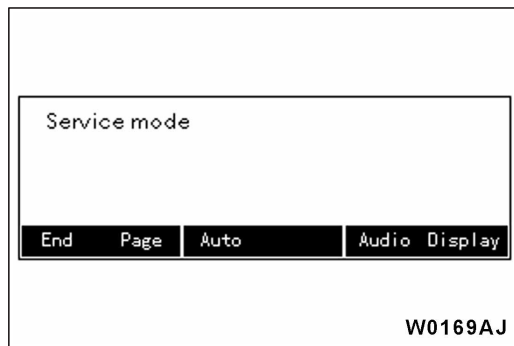


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TROUBLE DIAGNOSIS SERVICE FUNCTIONS

The Multi-center Display is equipped with the following trouble diagnosis service functions.

Function	Contents
Diagnosis function	During normal use, this function constantly monitors the system communication lines, and displays an error if it finds any abnormalities.
CD-ROM checking function	This function displays a message if it cannot read the CD-ROM or if no CD-ROM is inserted.
Service functions 1. Monitor checking 2. Audio checking 3. Automatic diagnosis by mode 4. Self-diagnosis <ul style="list-style-type: none"> ● Wiring and communication checking ● Sensor checking ● Vehicle signals ● Version data 5. Diagnosis recording	<p>There are five checking modes available: monitor checking, audio checking, automatic checking by mode, self-diagnosis and diagnosis recording.</p> <p>This mode checks that the image display function is operating normally.</p> <p>This mode checks that the speakers and operating switches of the audio system are all working normally.</p> <p>In this mode, wiring and communication checking, audio checking, sensor checking and vehicle signal checking are carried out continuously.</p> <p>This mode includes functions such as wiring and communication checking, sensor checking, vehicle signals and version data checking.</p> <p>This checks system communication between all units.</p> <p>This checks all of the sensors that are necessary to the navigation system.</p> <p>This displays the current vehicle signal condition.</p> <p>This displays the version numbers for each unit in the Multi Center Display.</p> <p>This mode displays error codes from communication checking. (Error codes are erased when the ignition switch is turned to OFF.)</p>

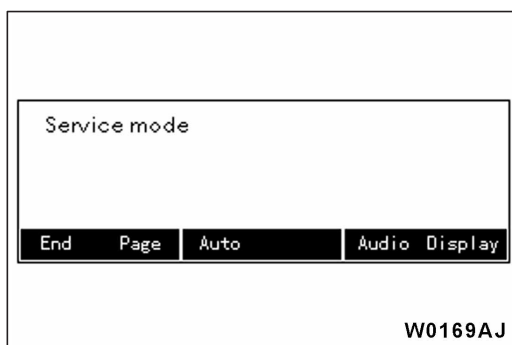


1. ACTIVATING AND ENDING SERVICE MODE

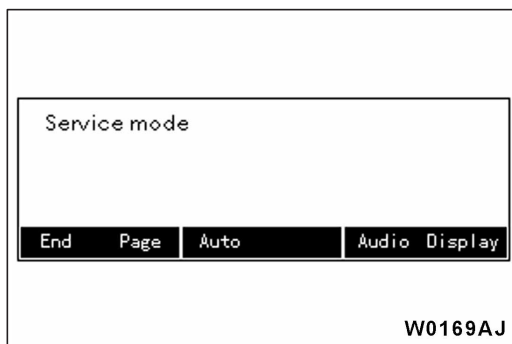
- (1) Activating service mode can be carried out by turning the ignition switch to the ON position while pressing the DISP switch on the audio unit and the F6 switch. (Continue pressing each switch for at least 5 seconds after turning the ignition switch to ON.)
- (2) If the special CD-ROM has been inserted into the navigation unit but the program has not been set up, the program will then be loaded from the CD-ROM. Service mode can be used once this process is completed.

NOTE

The special CD-ROM is a map CD-ROM which a distributor vends.

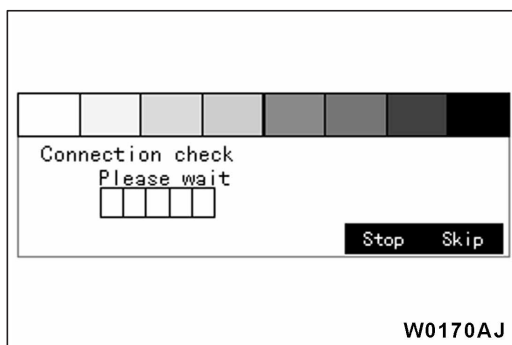


- (3) If the F1 switch is pressed at the service mode initial screen, service mode will be ended and the screen will change to navigation mode.

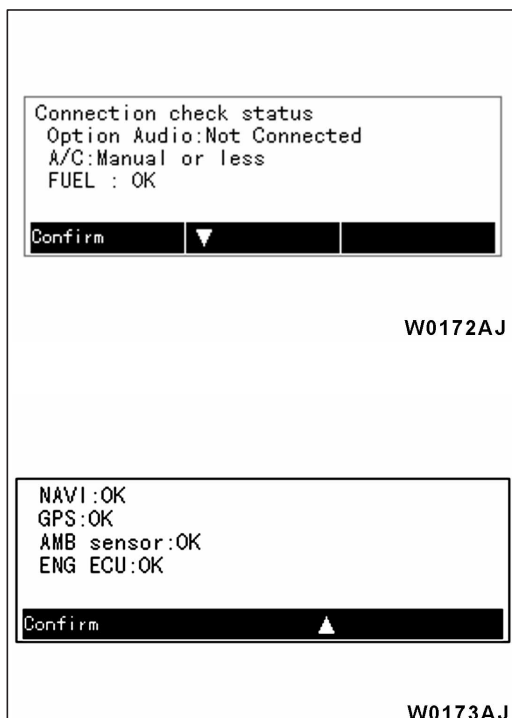


2. AUTOMATIC DIAGNOSIS BY MODE

- (1) If the F3 switch is pressed at the service mode screen, automatic diagnosis by mode will start.



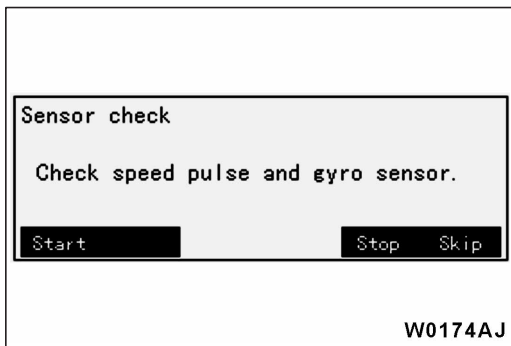
- (2) A colored bar will appear on the screen of the Multi-center Display unit, and all units which are connected to the navigation unit will be checked during this time.



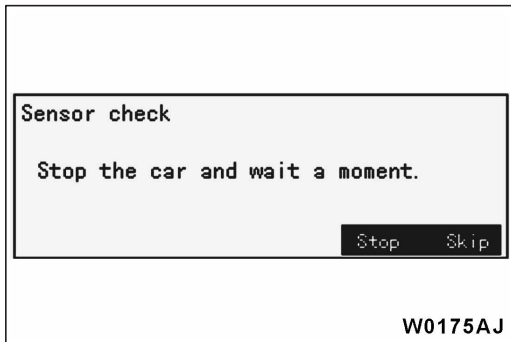
- (3) Once the transmission checking is completed, the results of the wiring and transmission checking will appear on the screen. After checking the results, press the F1 switch to proceed to the next check. The next check will start when the switch is pressed.

NOTE

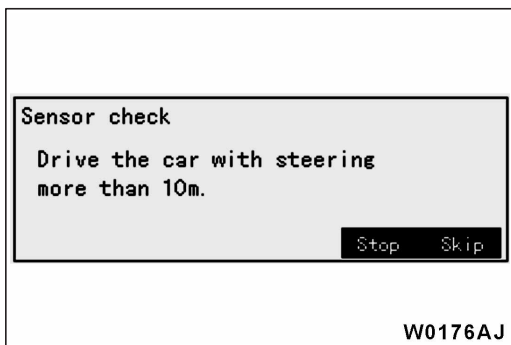
- 1) If the fuel gauge and the engine-ECU are checked while the ignition switch is at ACC, an error will be generated, but this is not a sign of an abnormality.
- 2) If checking is carried out while the fuel tank is full or the while ignition switch is at ACC, the fuel gauge may be shown to be not connected, but this is not a sign of an abnormality.



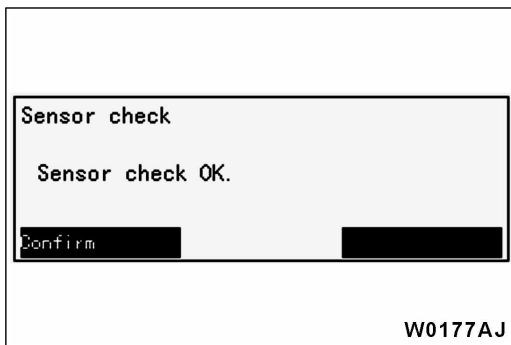
- (4) The next mode is the sensor checking mode. Press the F1 switch to start sensor checking. If you would like to proceed to the next checking operation without carrying out sensor checking, press the F6 switch.



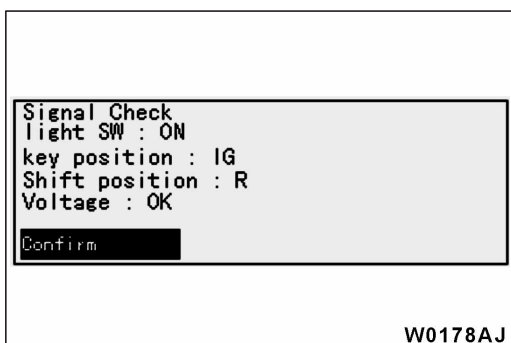
- (5) When sensor checking starts, the gyro output will be checked first while the vehicle is stopped, so make sure that the vehicle is stopped for this check. If the vehicle is moving when the sensor checking starts, the vehicle speed sensor will be shown as defective. Follow the guidance message on the multi-center display.



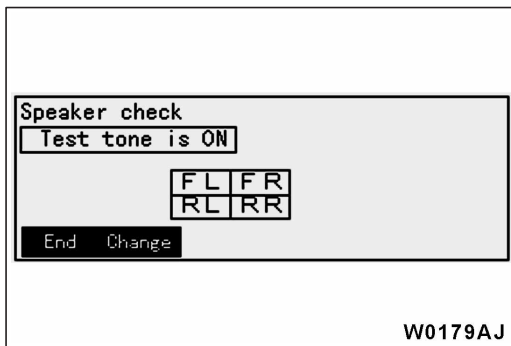
- (6) Next, drive the vehicle for approximately 10 meters while changing the running direction in order to check the vehicle speed pulse and the gyro sensor output. The sensor checking will then be completed. If there is an open circuit in the vehicle speed sensor, sensor checking will not complete even after the vehicle has travelled more than 10 meters. In this case, press the F5 switch to stop checking. If the vehicle does not move or there is an open circuit in vehicle speed sensor, the vehicle speed sensor will be shown as defective.



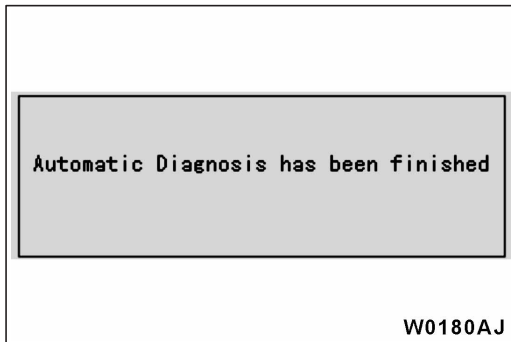
- (7) When sensor checking is completed, the check results will appear on the screen. After checking the results, press the F1 switch to proceed to the next check.



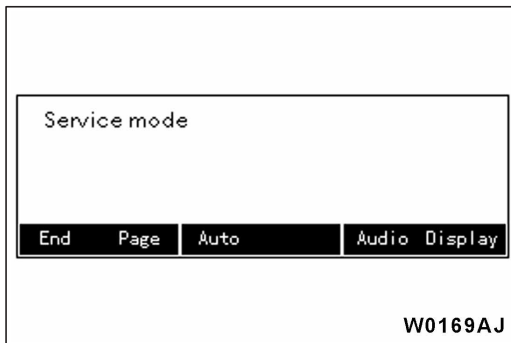
- (8) The next mode is the vehicle signal checking mode. The lighting switch condition, ignition key position, shift lever selection (R or a position other than R) and the power supply voltage drop will be appear on the screen. Check that the details displayed match the actual vehicle signals, and then press the F1 switch. If the vehicles does not move or there is an open circuit in vehicle speed sensor, the vehicle speed sensor will be shown as defective.



- (9) The next mode is speaker checking mode. The test sound will be output alternately from each speaker each time the F2 switch is pressed. At the early mass production, sometimes radio sound will be output. This is not a sign of abnormality.

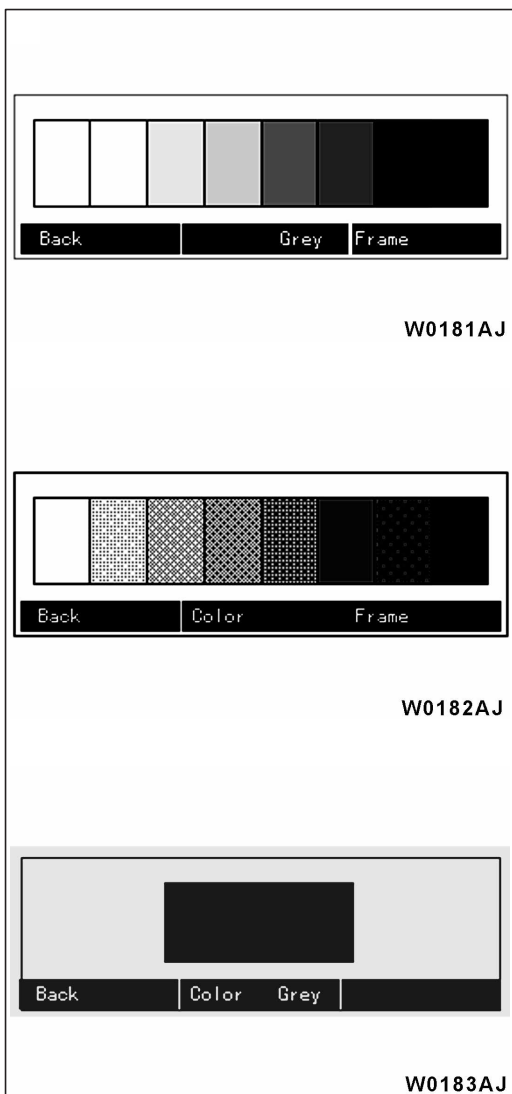


- (10) Press the F1 switch to end service mode. The screen will change to navigation mode.

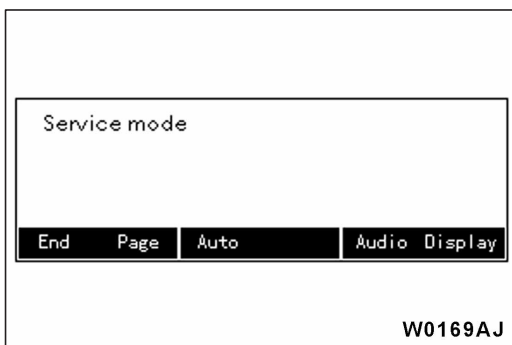


3. MONITOR CHECKING

- (1) If the F6 switch is pressed at the service mode initial screen, monitor checking will start.

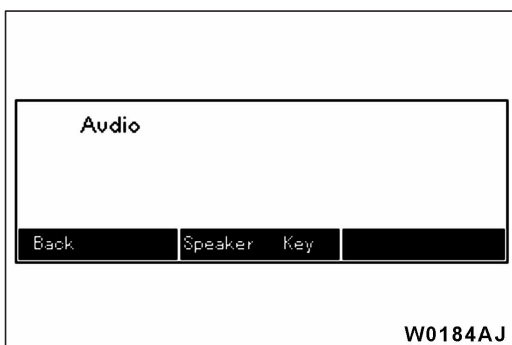


- (2) A colored bar will appear on the screen. Press a function switch to change to another screen. The screen will return to the service mode initial screen if the F1 switch is pressed.

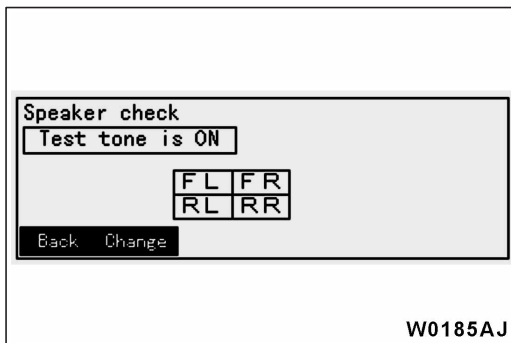


4. AUDIO CHECKING

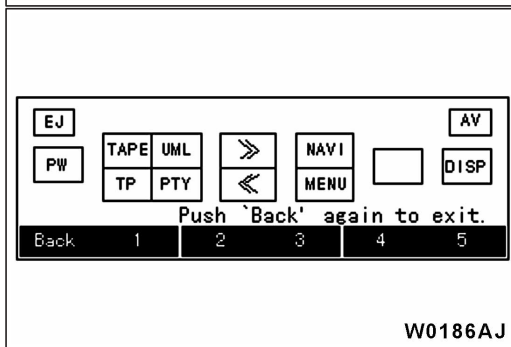
- (1) If the F5 switch is pressed at the service mode initial screen, the audio checking menu screen will appear.



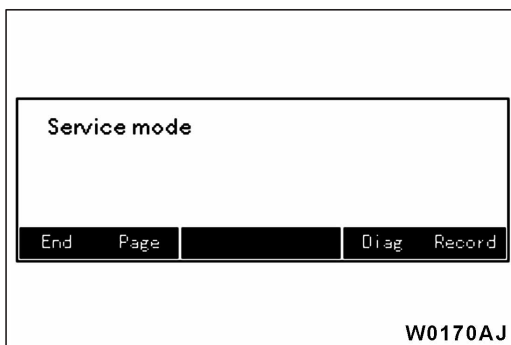
- (2) Next, press the function switches to carry out audio checking.



- (3) Press the F3 switch to display the speaker checking screen. The test sound will be output alternately from each speaker each time the F2 switch is pressed. Press the F1 switch to end speaker checking and return to the audio checking menu screen. At the early mass production, sometimes radio sound will be output. This is not a sign of abnormality.

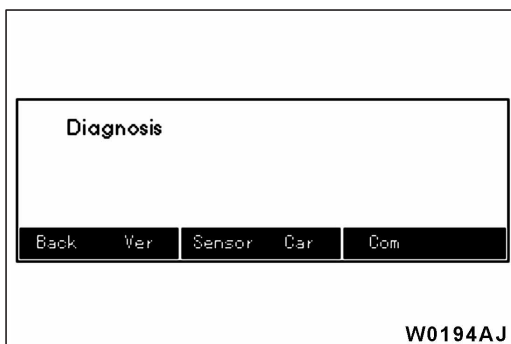


- (4) Press F4 to display the audio key checking screen. When one of the audio switches is pressed, the screen display color for that switch should change. This indicates that this particular switch system is working normally. Press the F1 switch to check the operation of the F1 switch. Press the F1 switch once more to return to the audio checking menu screen.

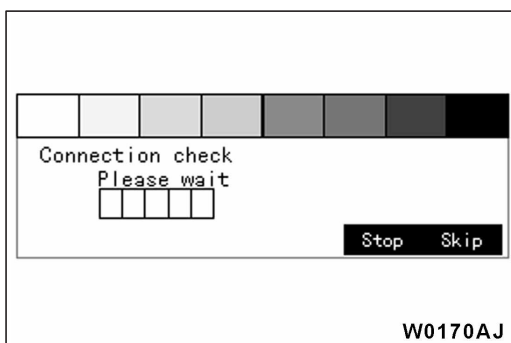


5. SELF-DIAGNOSIS

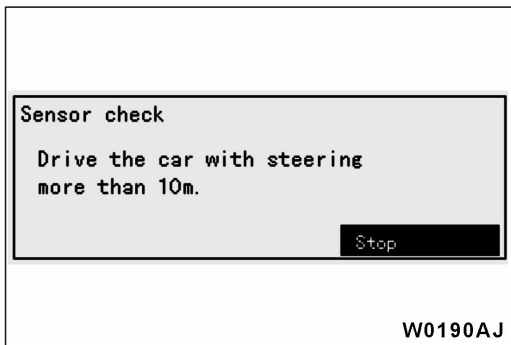
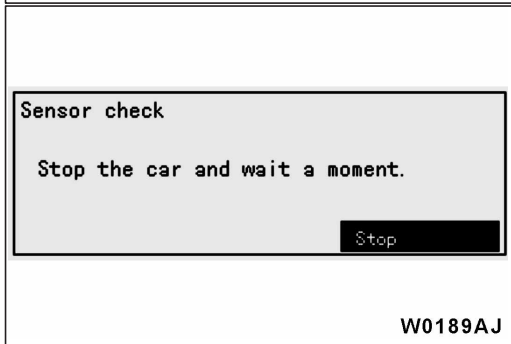
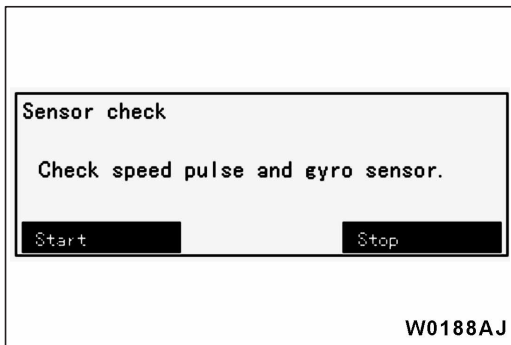
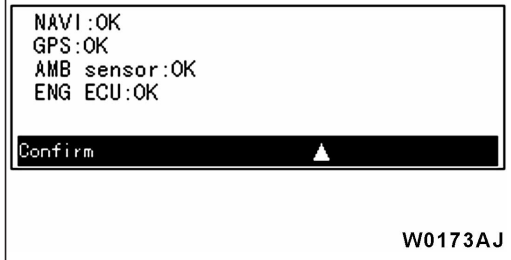
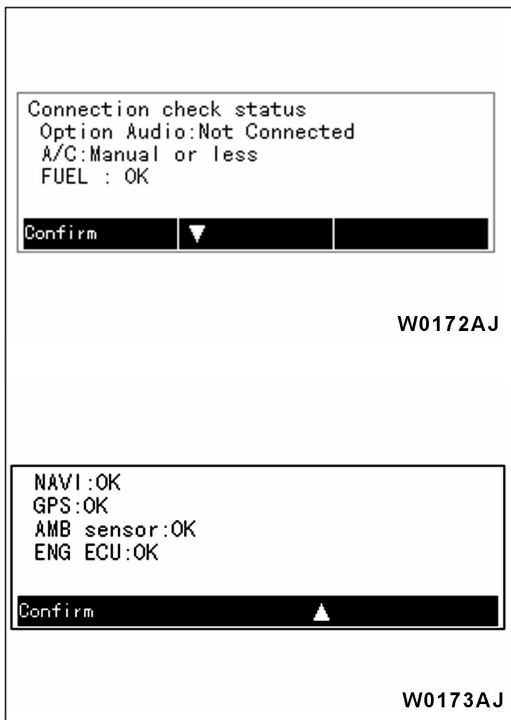
- (1) If the F5 switch is pressed at the service mode initial screen, the self-diagnosis menu screen will appear.



- (2) Next, use the function switches to carry out self-diagnosis.



- (3) When the F5 switch is pressed, self-diagnosis for the wiring is carried out. A colored bar will appear on the screen of the Multi-center Display unit, and all units which are connected to the navigation unit will be checked during this time.

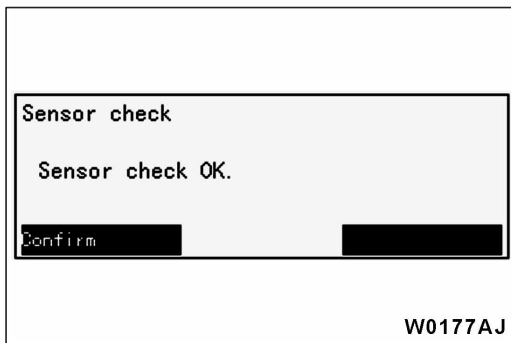


(4) Once the transmission checking is completed, the results of checking will appear on the screen. After checking the results, press the F1 switch to return to the self-diagnosis menu screen.

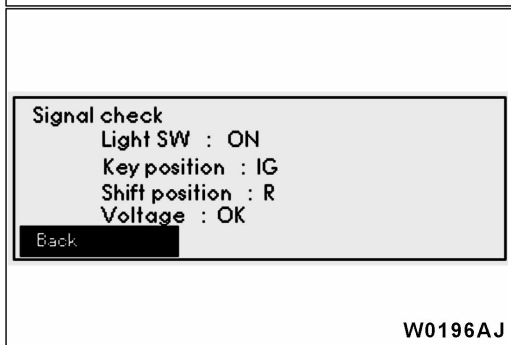
(5) If the F6 switch is pressed at the self-diagnosis menu screen, sensor checking will start. Press the F1 switch to start sensor checking. If you would like to return to the self-diagnosis menu screen without carrying out sensor checking, press the F5 switch.

(6) When sensor checking starts, the gyro output will be checked first while the vehicle is stopped, so make sure that the vehicle is stopped for this check. If the vehicle is moving when the sensor checking starts, the vehicle speed sensor will be shown as defective. Follow the guidance message on the multi-center display.

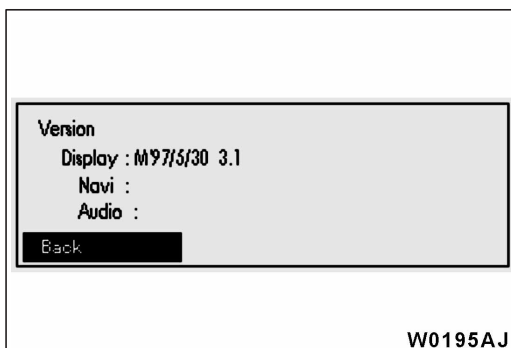
(7) Next, drive the vehicle for approximately 10 meters while changing the running direction in order to check the vehicle speed pulse and the gyro sensor output. The sensor checking will then be completed. If there is an open circuit in the vehicle speed sensor, sensor checking will not complete even after the vehicle has travelled more than 10 meters. In this case, press the F5 switch to stop checking. If the vehicle does not move or there is an open circuit in vehicle speed sensor, the vehicle speed sensor will be shown as defective.



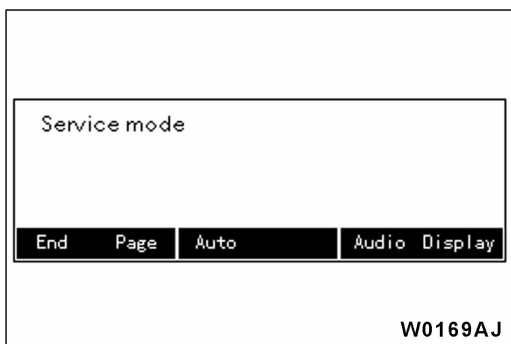
- (8) When sensor checking is completed, the check results will appear on the screen. After checking the results, press the F1 switch to return to the self-diagnosis menu screen.



- (9) If the F6 switch is pressed at the self-diagnosis menu screen, vehicle signal checking will start. The lighting switch condition, ignition key position, shift lever selection (R or a position other than R) and the power supply voltage drop will be appear on the screen. Press the F1 switch to return to the self-diagnosis menu screen.

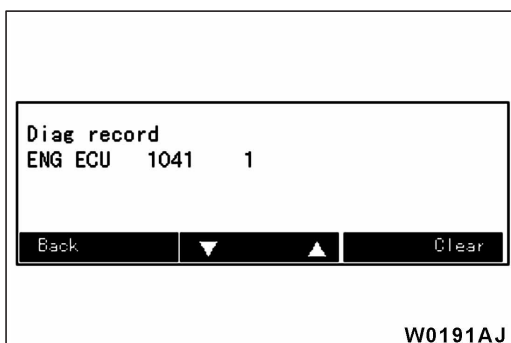


If the F2 switch is pressed at the self-diagnosis menu screen, version data self-diagnosis will be carried out, and the check results will appear on the screen. Press the F1 switch to return to the self-diagnosis menu screen.

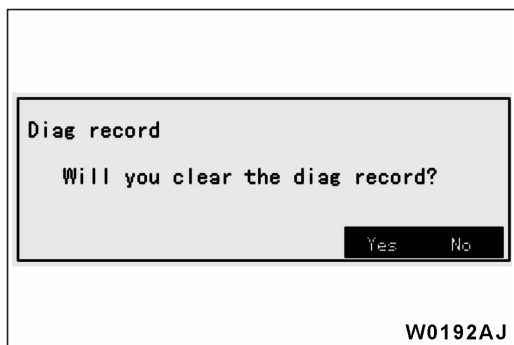


6. DIAGNOSIS RECORDING

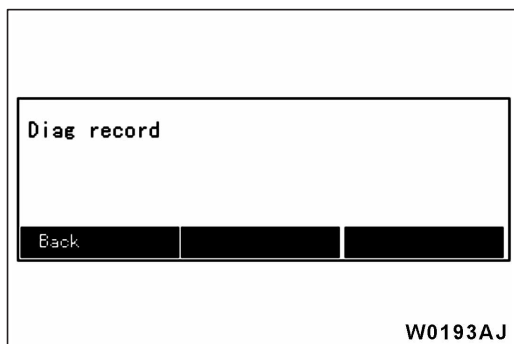
- (1) If the F6 switch is pressed at the service mode initial screen, the diagnosis recording screen will appear.
 (2) Press the F1 switch to return to the service mode initial screen.



- (3) Press the F6 switch to clear any error codes which may still be remaining from diagnosis recording. When this is done, the clearing confirmation screen will appear. If it is okay to continue with the clear, press the F5 switch. To cancel clearing, press the F6 switch. If the F6 switch is pressed, the screen will return to the diagnosis recording screen.



- (4) If the F5 switch is pressed, all past error codes will be cleared, and the screen will return to the diagnosis recording screen. The Clear button will not be displayed at this time.



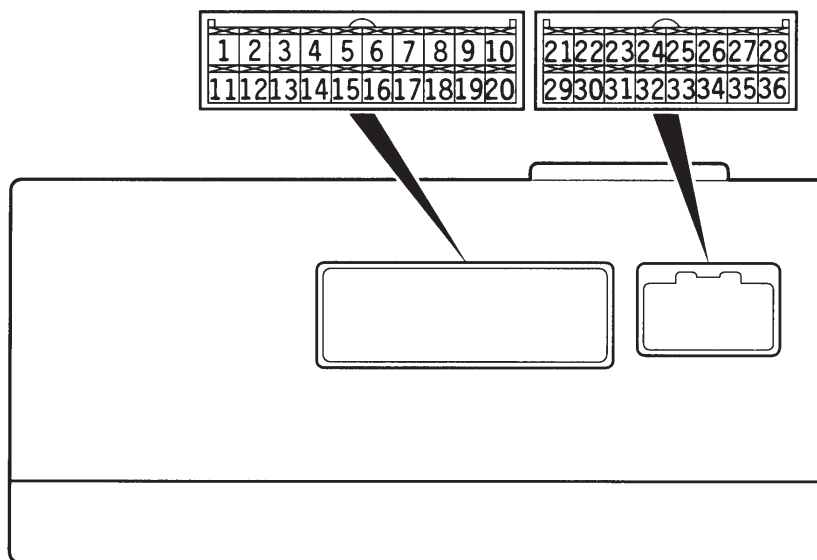
- (5) Press the F1 switch to return to the service mode initial screen.

7. ERROR CODE TABLE

Error Code No.	Error Details	Detection Method (Reference)	Reference Page
1011	Ambient temperature sensor not connected during diagnosis	Connection checking	54A-105
1021	Fuel gauge not connected during diagnosis	Connection checking	54A-106
1031	GPS abnormality during diagnosis	Connection checking	54A-106
1041	Engine-ECU not connected during diagnosis	Connection checking	54A-106
1051	SWS not connected during diagnosis (This error does not occur when correct car type is set)	Connection checking	54A-106
1091	CD drive too hot during diagnosis	Connection checking	54A-106
1092 – 1096	CD drive abnormality during diagnosis	Connection checking	54A-107
10A1, 10B1	Memory of navigation unit abnormality during diagnosis	Connection checking	54A-107
20D1, 30D1	Vehicle speed pulse abnormality during diagnosis	Sensor checking	54A-107
20E1, 20E2, 30E1, 30E2	Gyro level abnormality during diagnosis	Sensor checking	54A-107

MAIN UNIT TERMINAL VOLTAGES

1. MULTI-CENTER DISPLAY UNIT



W0278AJ

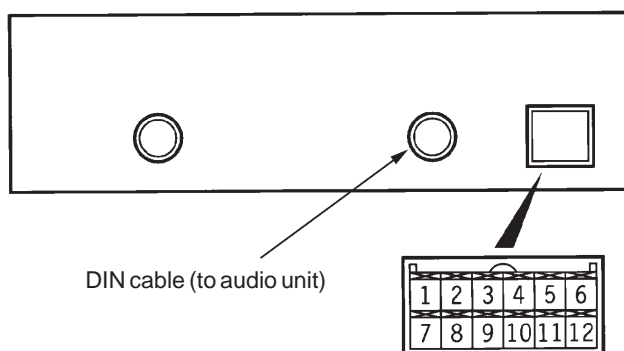
Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1	Input	G+SYTNC (AUDIO)	–	○	○	Noise display (random dot pattern)
2	Input	B+SYNC (AUDIO)	–	○	○	Blue, white, cyan and magenta do not appear in RGB screen.
3, 4	–	–	–	–	–	–
5	Input	ISOK	Hi: System voltage Lo: 0 – 1	○	○	MUT-II cannot be used to check engine-ECU.
6	Input/Output	DATA	Hi: System voltage Lo: 0 – 1	○	○	Switch operation sound buzzer does not peep.
7	Input/Output	M-DATA (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	○	Buzzer sounds 30 seconds after the power turned to on. Nighttime illumination does not appear for any navigation system.
8	Input/Output	M-CLOCK (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	○	Buzzer sounds 30 seconds after the power turned to on. Nighttime illumination does not appear for any navigation system.
9, 10	–	–	–	–	–	–
11	–	SHIELD-GND	–	–	–	–
12	–	–	–	–	–	–

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Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
13	Input	R+SYNC (AUDIO)	–	○	○	Red, white, yellow and magenta do not appear in RGB screen.
14	–	–	–	–	–	–
15	Input/Output	K	Hi: System voltage Lo: 0 – 1	○	○	Values on Trip information screen (average speed, fuel consumption and cruising distance) are abnormal. Wiring and communication error. Communication is not possible between the engine-ECU and the MUT-II.
16	–	–	–	–	–	–
17	Input/Output	M–BUSY (AUDIO)	Hi: 4 – 5 Lo: 0 – 1	○	–	Screen display does not appear.
				–	○	Buzzer sounds 30 seconds after the power turned to on. Nighttime illumination does not appear for any navigation system.
18	–	SHIELD–GND	–	–	–	–
19 – 21	–	–	–	–	–	–
22	Input	PS–R	Hi: System voltage Lo: 0 – 1	○	○	Current location is not correct when reversing.
23	Input	EX–TEMP	0 – 5	○	○	Outside air temperature does not appear.
24	Input	ILL+	Hi: System voltage Lo: 0 – 1	○	–	Nighttime illumination does not appear for any navigation system units.
				–	○	Blown multipurpose fuse.
25	Input	ACC (ACC power supply)	System voltage	○	–	Screen display does not appear.
				–	○	Blown multipurpose fuse.
26	Input	+B	System voltage	○	–	Screen display does not appear.
				–	○	Blown multipurpose fuse.
27	Input	VSS	Hi: 4 – 5 Lo: 0 – 1	○	–	No effect.
28	–	GND (Ground)	–	○	–	Screen display does not appear.
29, 30	–	–	–	–	–	–
31	–	GND–TEMP	–	○	○	Outside air temperature does not appear.
32	–	ILL –	–	–	–	–
33	Input	FUEL GAUGE	0 – 3	○	○	Abnormal cruising distance display.

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
34, 35	–	–	–	–	–	–
36	Input	IG1	System voltage	○	–	Communication with engine-ECU is not possible. Driving data values displayed are abnormal.
				–	○	Communication with engine-ECU is not possible. Driving data values displayed are abnormal. Blown multipurpose fuse.

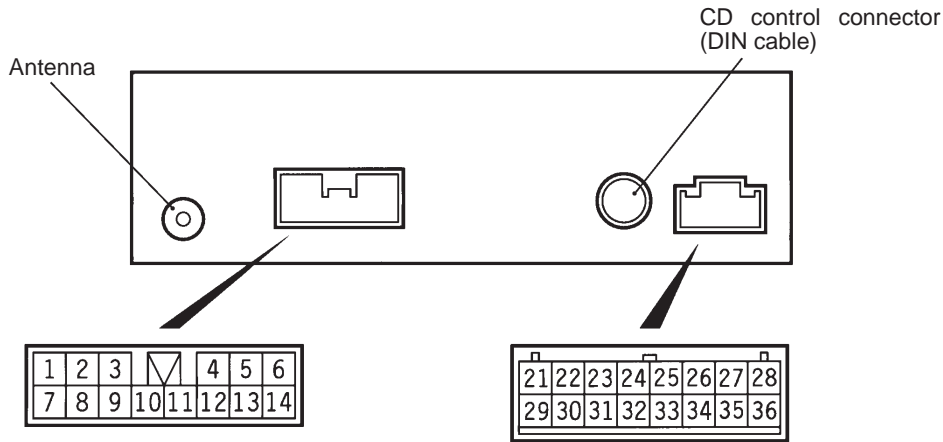
2. NAVIGATION UNIT



AV0845AE

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1 – 3	–	–	–	–	–	–
4	Input	VEHICLE SPEED PULSE	Voltage should change when wheels are turning. Hi: 4 – 5 Lo: 0 – 1	○	○	Compass display does not change when not following a route. Guide does not appear when following a route.
5	Input	+BATTERY	System voltage	○	–	Navigation does not operate.
				–	○	Blown fuse in +B system.
6	Input	ACCESSORY	System voltage	○	–	Navigation does not operate.
				–	○	Blown fuse in ACC system.
7 – 11	–	–	–	–	–	–
12	–	GND	–	○	–	Navigation sometimes does not operate.

3. AUDIO UNIT



BV0846AE

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1	Output	SPEAKER RR (+)	0 – System voltage (AC)	○	–	No sound is output from rear right speaker.
				–	○	No sound is output from rear left and right speakers.
2	Output	SPEAKER RL (+)	0 – System voltage (AC)	○	–	No sound is output from rear left speaker.
				–	○	No sound is output from rear left and right speakers.
3	–	–	–	–	–	–
4	Input	ILL (+)	Hi: System voltage Lo: 0 – 1	○	–	Nighttime illumination does not appear for audio unit.
				–	○	Blown multipurpose fuse.
5	Output	SPEAKER FL (+)	0 – System voltage (AC)	○	–	No sound is output from front left speaker.
				–	○	No sound is output from front left and right speakers.
6	Output	SPEAKER FR (+)	0 – System voltage (AC)	○	–	No sound is output from front right speaker.
				–	○	No sound is output from front left and right speakers.
7	Output	SPEAKER RR (–)	0 – System voltage (AC)	○	–	No sound is output from rear right speaker.
				–	○	No sound is output from rear left and right speakers.

Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
8	Output	SPEAKER RL (-)	0 – System voltage (AC)	○	–	No sound is output from rear left speaker.
				–	○	No sound is output from rear left and right speakers.
9	–	–	–	–	–	–
10	Input	ACC (ACC power supply) (Battery voltage)	System voltage	○	–	Audio power supply does not turn on.
				–	○	Blown multipurpose fuse.
11	Input	+B (Battery voltage)	System voltage	○	–	Cassette is not ejected when ACC power turned off. Contents of memory are cleared.
				–	○	Blown multipurpose fuse.
12	Input	ILL (-)	–	–	–	–
13	Output	SPEAKER FL (-)	0 – System voltage (AC)	○	–	No sound is output from front left speaker.
				–	○	No sound is output from front left and right speakers.
14	Output	SPEAKER FR (-)	0 – System voltage (AC)	○	–	No sound is output from front right speaker.
				–	○	No sound is output from front left and right speakers.
21	Input/Output	M-DATA	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
22	Input/Output	M-SCK	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
23	–	–	–	–	–	–
24	Output	G+SYNC	0 – 5	○	○	Abnormal navigation screen color.
25	Output	B+SYNC	0 – 5	○	○	Abnormal navigation screen color.
26 – 28	–	–	–	–	–	–
29	Input/Output	M-BUSY	Hi: 4 or more Lo: 1 or less	○	○	Panel switches cannot be operated.
30	–	SHIELD EARTH (M-BUS)	–	–	–	–

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Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
31	–	–	–	–	–	–
32	–	SHIELD EARTH	–	–	–	–
33	–	–	–	–	–	–
34	Output	R+SYNC	0 – 5	○	○	Abnormal navigation screen color.
35, 36	–	–	–	–	–	–

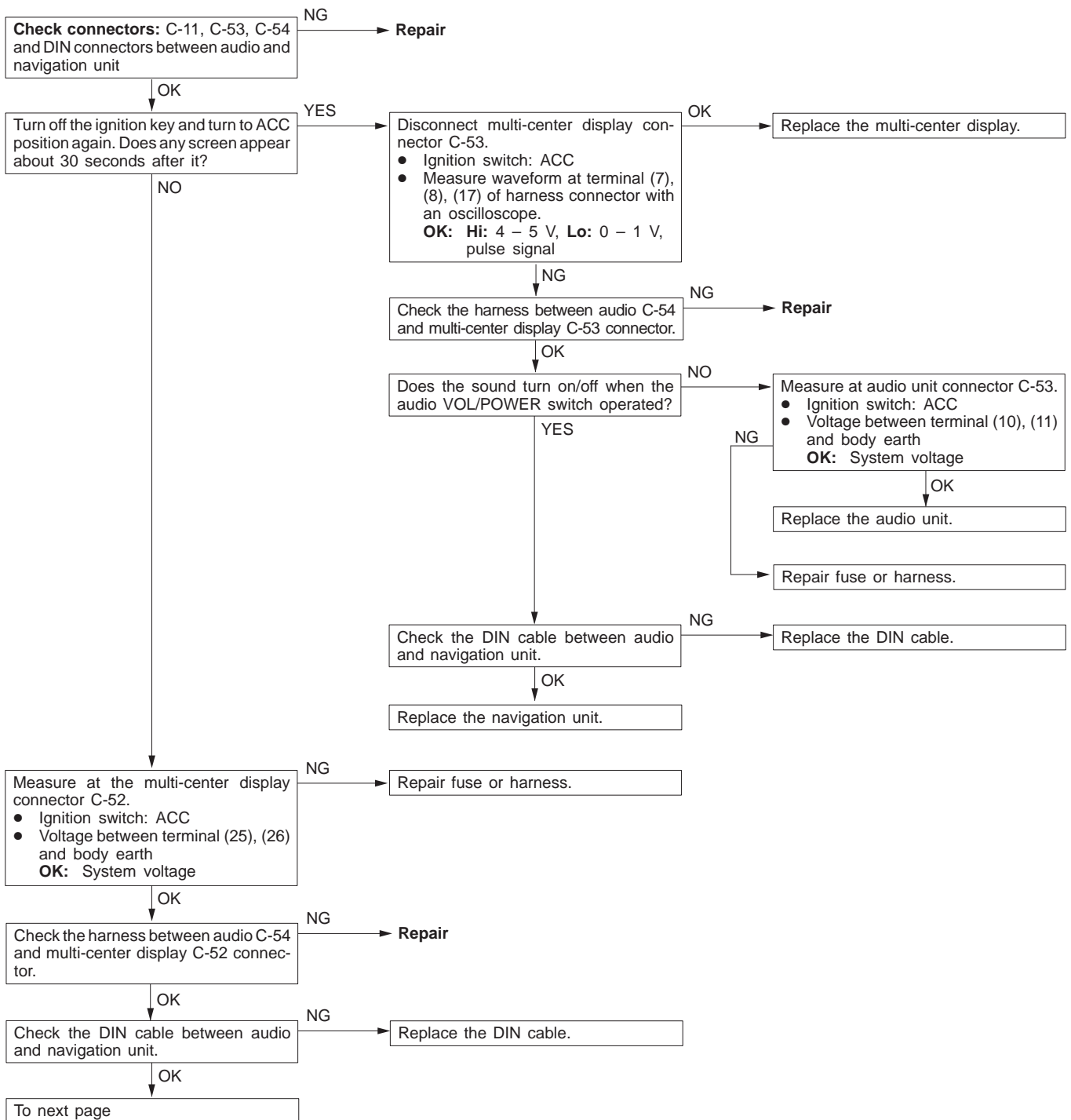
INSPECTION CHART CLASSIFIED BY TROUBLE SYMPTOMS

Related Unit	Trouble Symptom	Inspection Procedure No.	Reference Page
Malfunction of navigation unit, multi-center display, audio unit and related sensor, harness	TAPE/CD, UML switches do not work. No display appears after the ignition key is turned to ACC.	1	54A-97
	TAPE/CD, UML switches do not work. (Display appears.)	2	54A-99
	No display appears after the ignition key is turned to ACC, but TAPE/CD, UML switches can be operative.	3	54A-100
	CD changer screen display does not appear when TAPE/CD switch is operated.	4	54A-101
	GPS reception is not possible.	5	54A-101
	Outside air temperature data is not displayed.	6	54A-101
	Abnormal driving data display <ul style="list-style-type: none"> ● Abnormal average fuel consumption and average speed displays. ● Abnormal cruising distance displays 	7	54A-102
	Display moves about. Screen colours do not match correctly.	8	54A-103
	Daytime/nighttime display mode does not change in conjunction with lighting switch operations.	9	54A-103
	Compass display does not rotate , or guidance does not appear when following a route.	10	54A-104
	One of the following messages appears during navigation mode. <ul style="list-style-type: none"> ● The CD drive has failure condition. Check and reload the disc, please. ● Wrong disc is in the CD drive. Insert a map disc, please. ● No disc is in the CD drive. Insert a map disc please. ● A music disc is in the CD-drive. 	11	54A-104

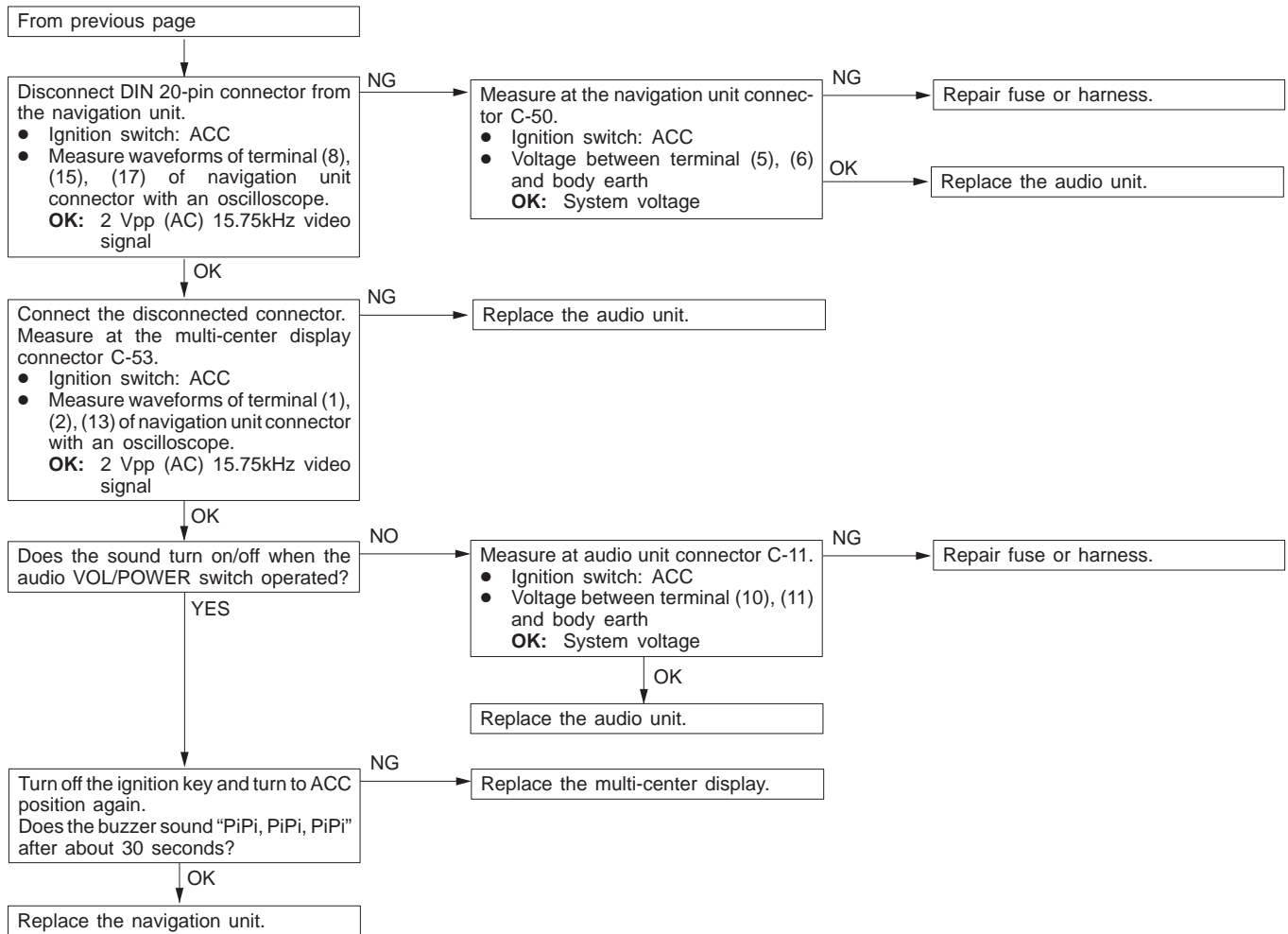
INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

INSPECTION PROCEDURE 1

TAPE/CD, UML switches do not work. No display appears after the ignition key is turned to ACC.

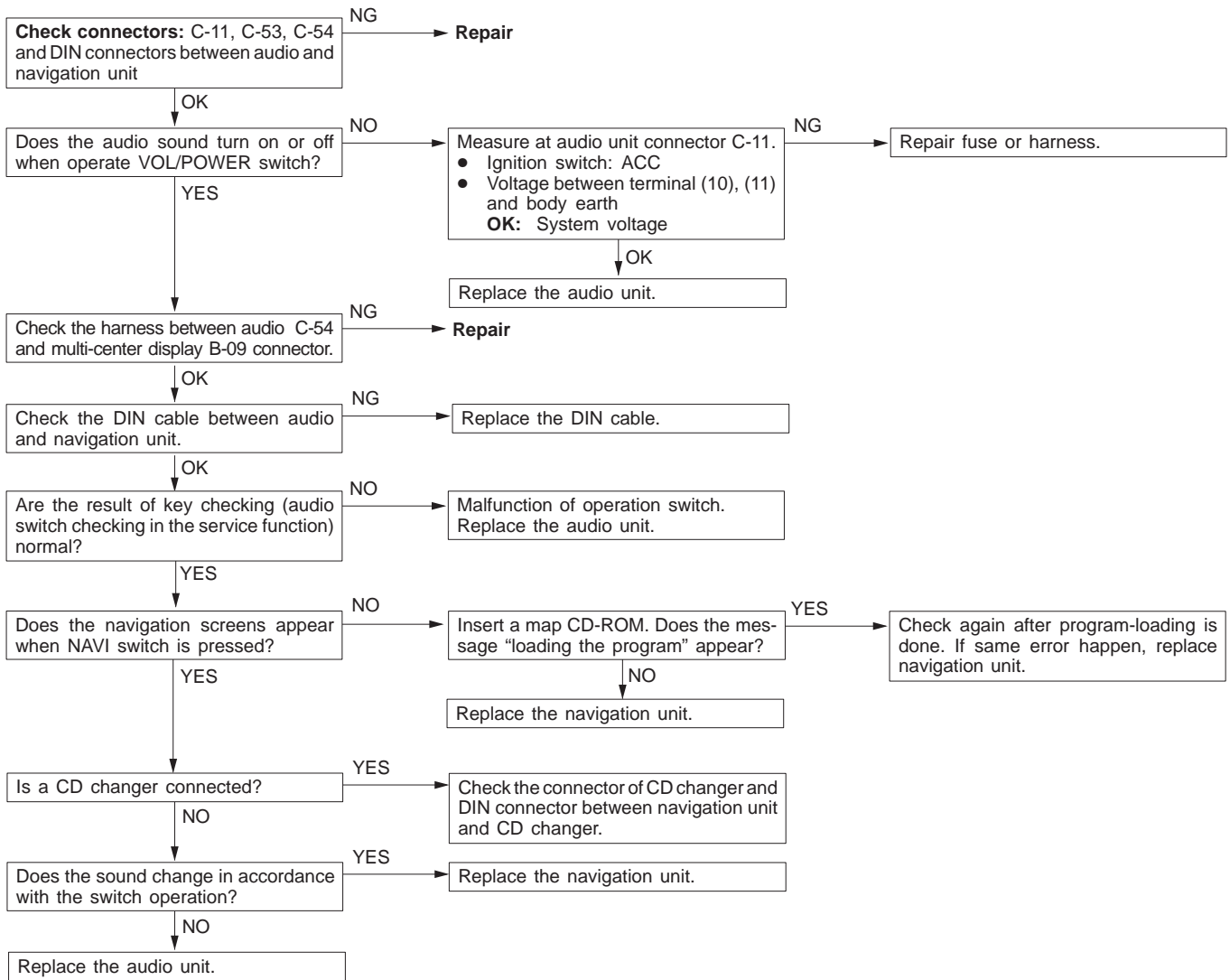


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INSPECTION PROCEDURE 2

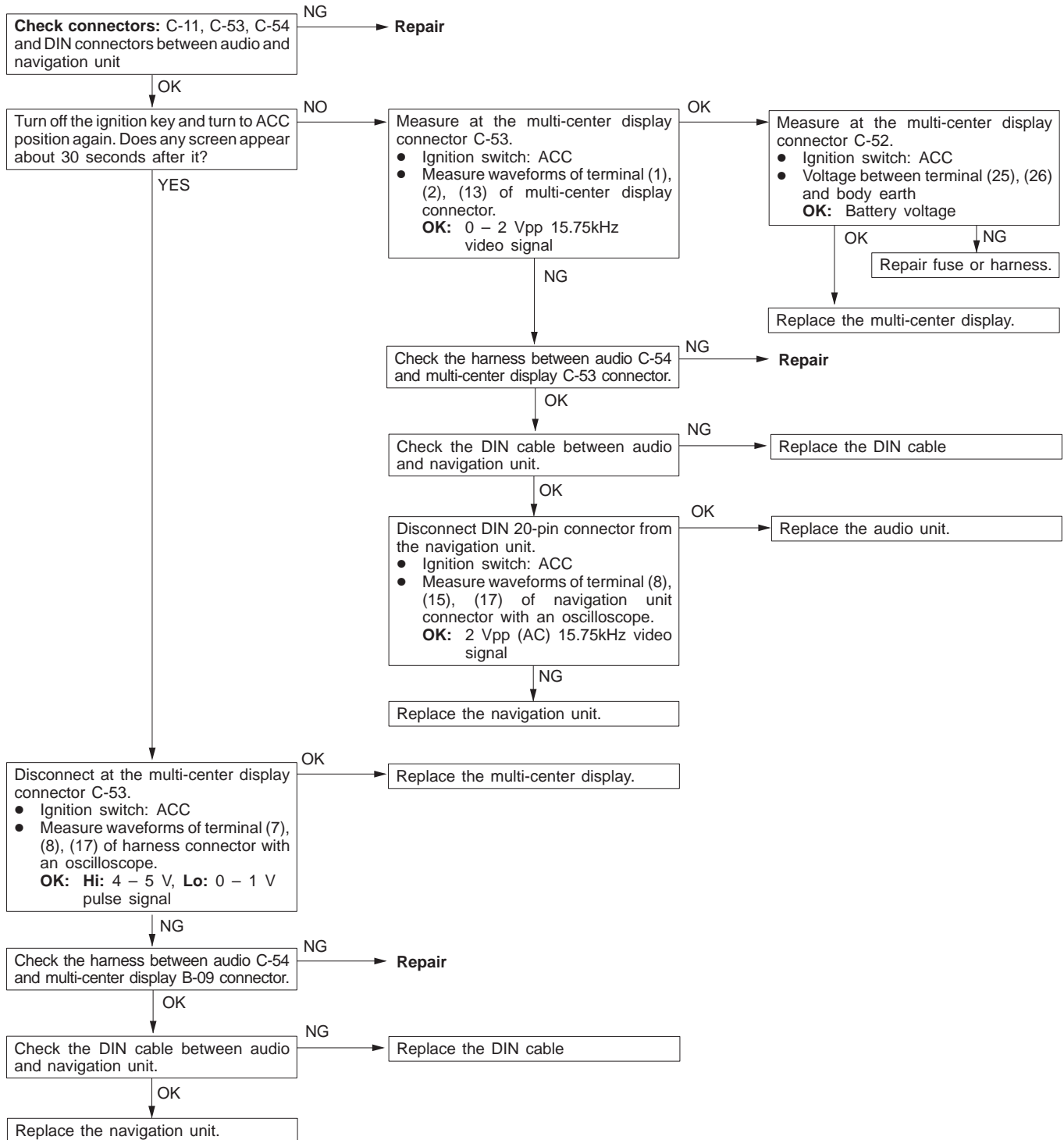
TAPE/CD, UML switches do not work. (Display appears.)



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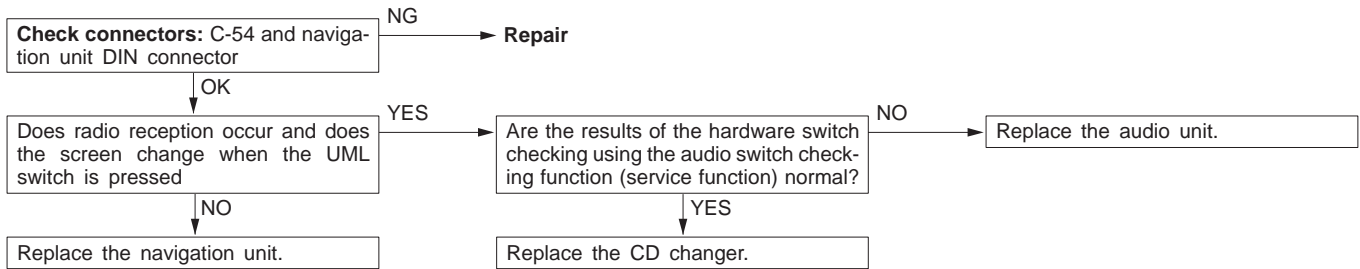
INSPECTION PROCEDURE 3

No display appears after the ignition key is turned to ACC, but TAPE/CD, UML switches can be operative.



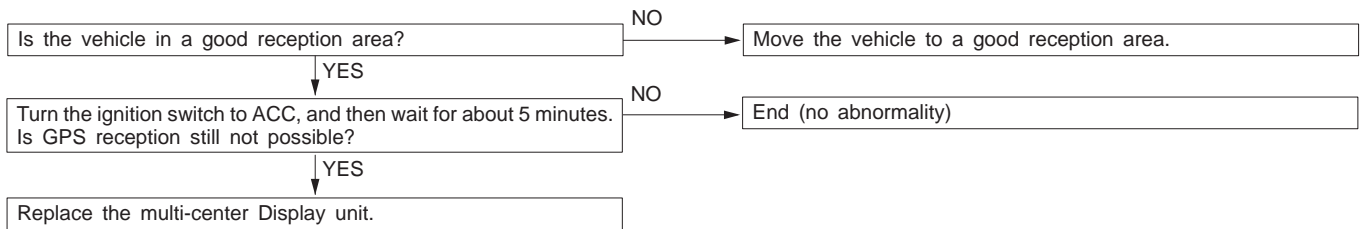
INSPECTION PROCEDURE 4

CD changer screen displays do not appear when TAPE/CD switches are operated.



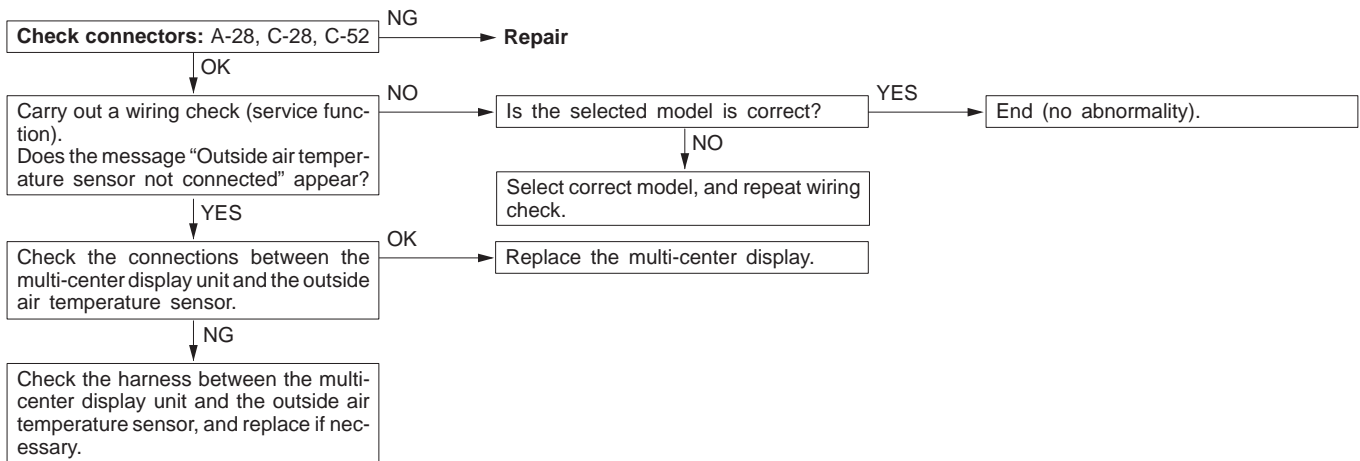
INSPECTION PROCEDURE 5

GPS reception is not possible.



INSPECTION PROCEDURE 6

Outside air temperature data is not displayed.

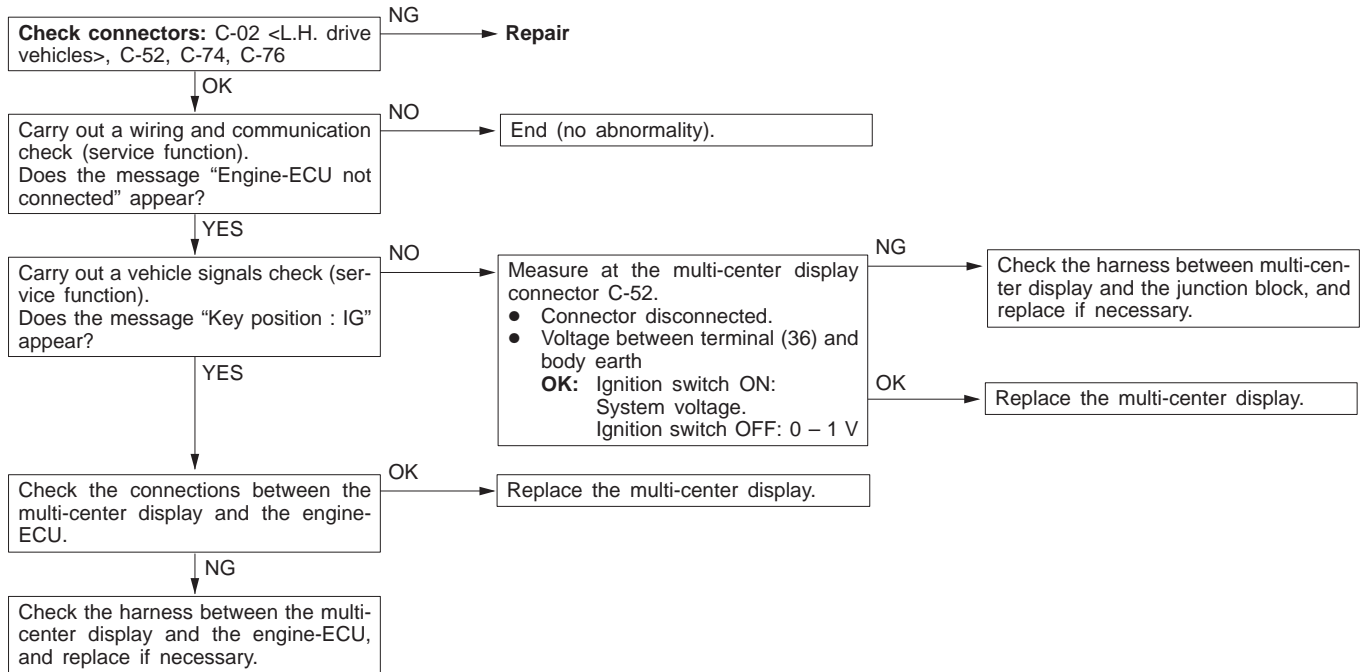


INSPECTION PROCEDURE 7

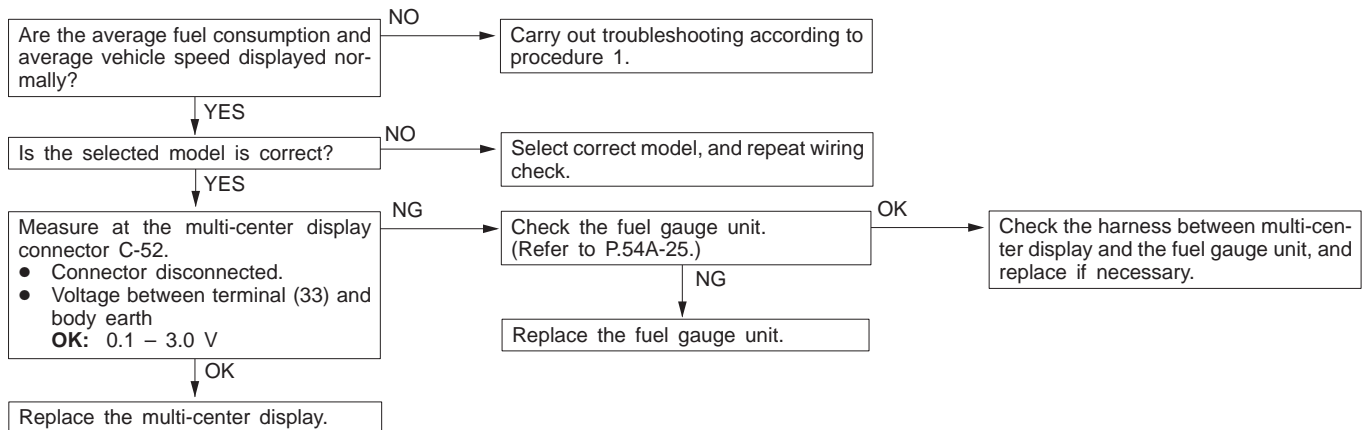
Abnormal driving data displays.

- Abnormal average fuel consumption (momentary fuel consumption) and average speed displays.
- Abnormal cruising distance displays.

1. When average fuel consumption (momentary fuel consumption) and average speed displays are abnormal.

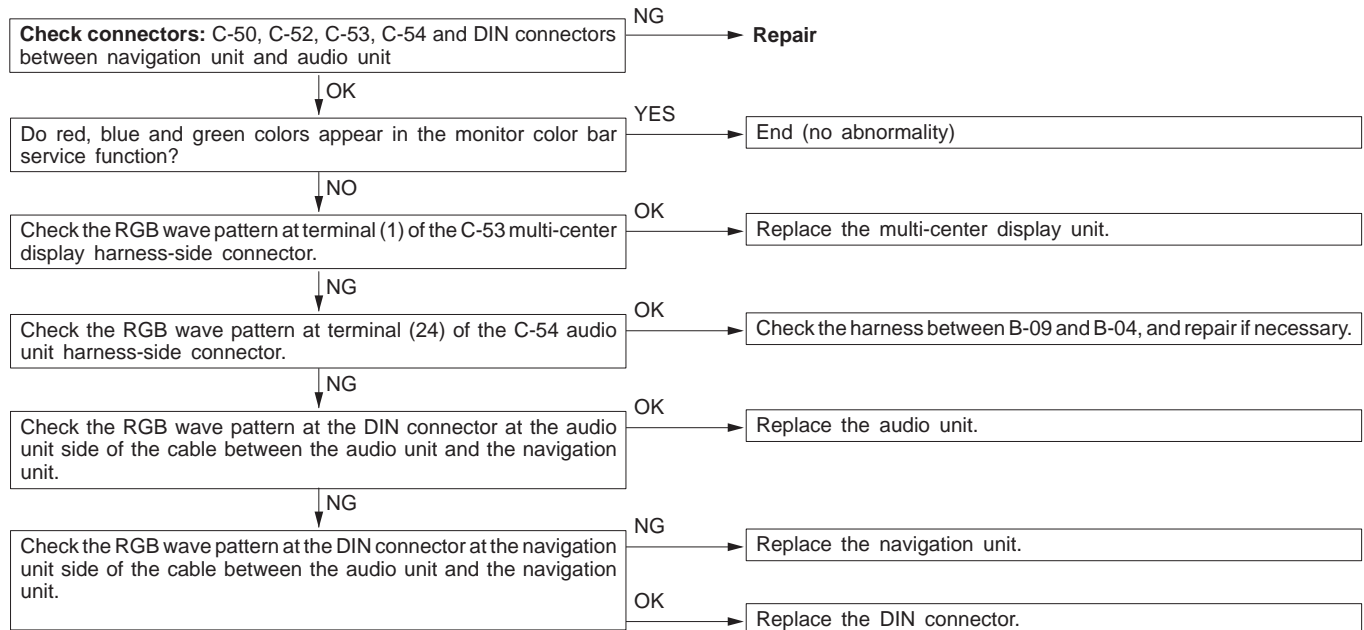


2. When cruising distance display is abnormal.



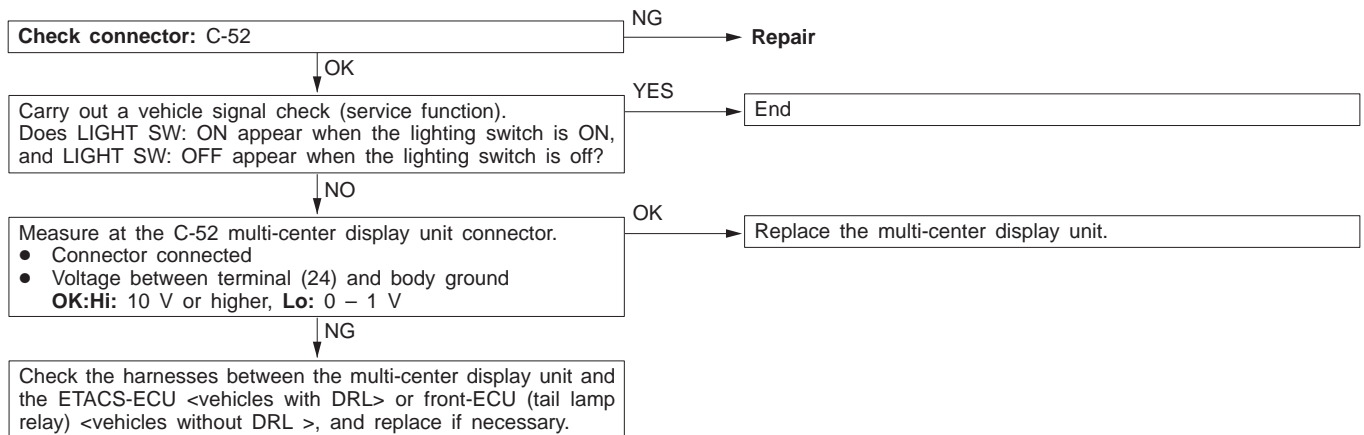
INSPECTION PROCEDURE 8

**Display moves about.
Screen colors do not match correctly.**



INSPECTION PROCEDURE 9

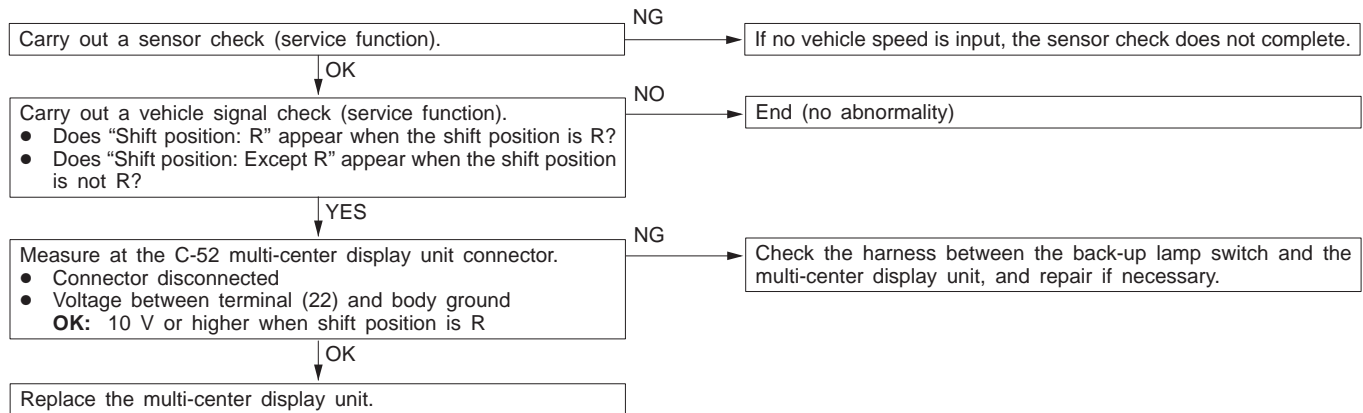
Daytime/nighttime display mode does not change in conjunction with lighting switch operations.



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INSPECTION PROCEDURE 10

Compass display does not change when not following a route, or guide does not appear when searching for and following a route.

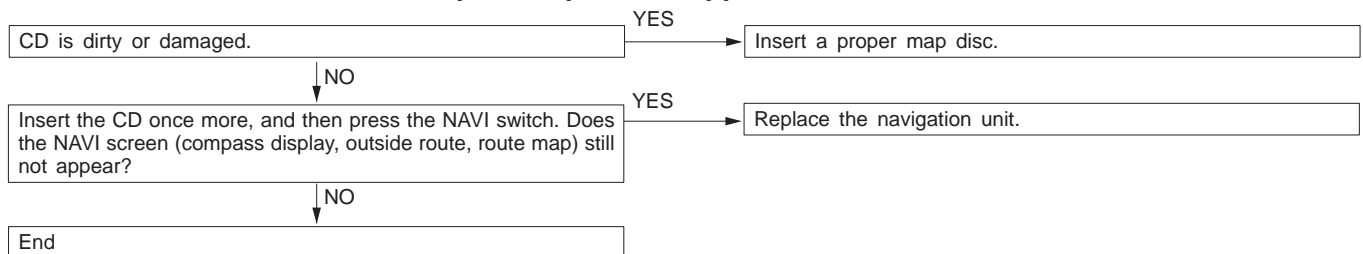


INSPECTION PROCEDURE 11

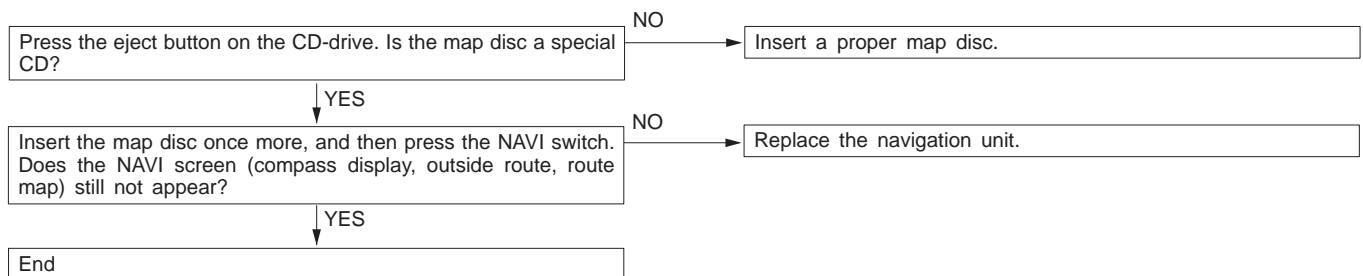
One of the following messages appears during navigation mode.

- The CD-drive has failure condition. Confirm and reload the disc, please.
- Wrong disc is in the CD-drive. Insert a map disc, please.
- No disc is in the CD-drive. Insert a map disc, please.
- A music disc is in the CD-drive.

1. **“The CD-drive has failure condition. Confirm and reload the disc, please.” or “Wrong disc is in the CD-drive. Insert a map disc, please.” appears.**



2. **“No disc is in the CD-drive. Insert a map disc, please.” or “A music disc is in the CD-drive” appears.**

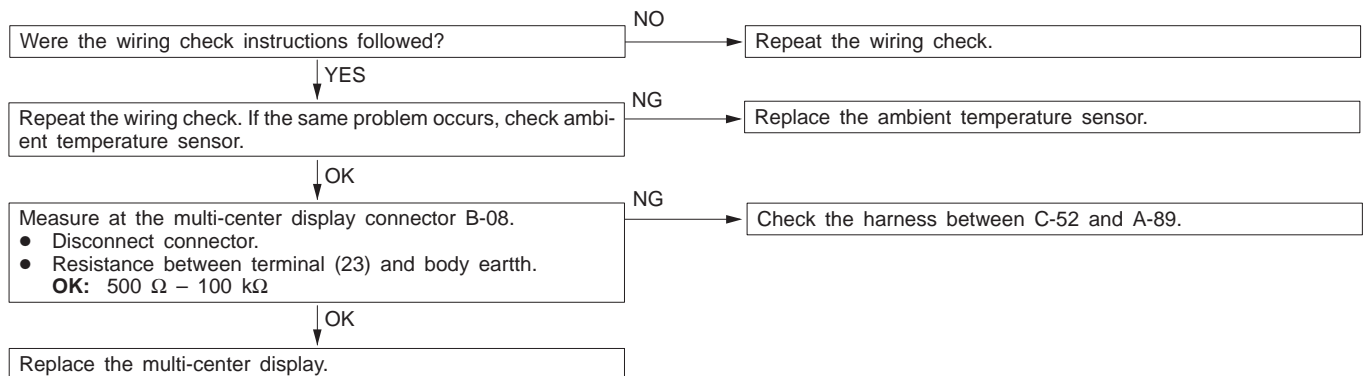


ERROR CODE TABLE <ACCORDING TO SCREEN DISPLAY>

Error Code No.	Error Details	Detection Method (Reference)	Reference Page
1011	Ambient temperature sensor not connected during diagnosis	Connection checking	54A-105
1021	Fuel gauge not connected during diagnosis	Connection checking	54A-106
1031	GPS abnormality during diagnosis	Connection checking	54A-106
1041	Engine-ECU not connected during diagnosis	Connection checking	54A-106
1051	SWS not connected during diagnosis	Connection checking	54A-106
1091	CD drive too hot during diagnosis	Connection checking	54A-106
1092 – 1096	CD drive abnormality during diagnosis	Connection checking	54A-107
10A1, 10B1	Memory of navigation unit abnormality during diagnosis	Connection checking	54A-107
20D1, 30D1	Vehicle speed pulse abnormality during diagnosis	Sensor checking	54A-107
20E1, 20E2, 30E1, 30E2	Gyro level abnormality during diagnosis	Sensor checking	54A-107

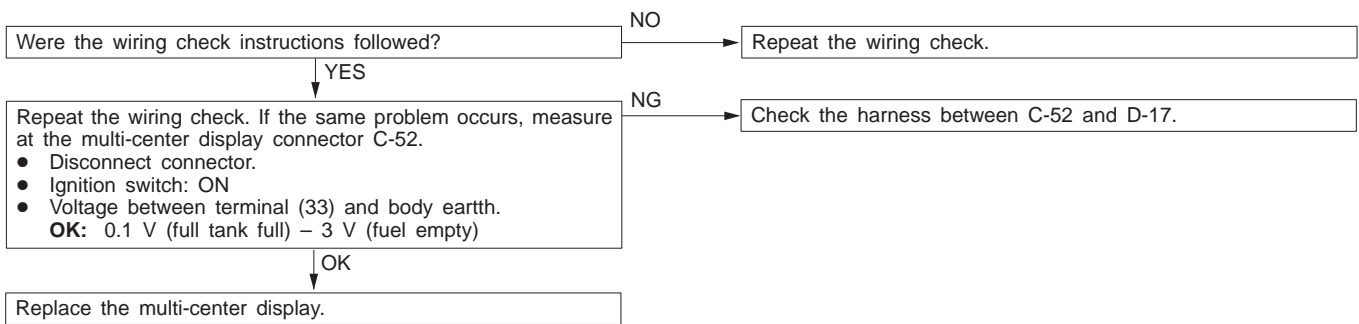
INSPECTION PROCEDURES FOR EACH ERROR CODE <ACCORDING TO SCREEN DISPLAY>

Error Code No. 1011

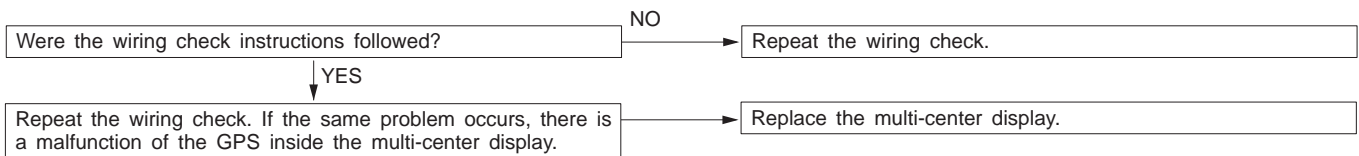


54A-106 CHASSIS ELECTRICAL – Multi-Center Display <High Grade>

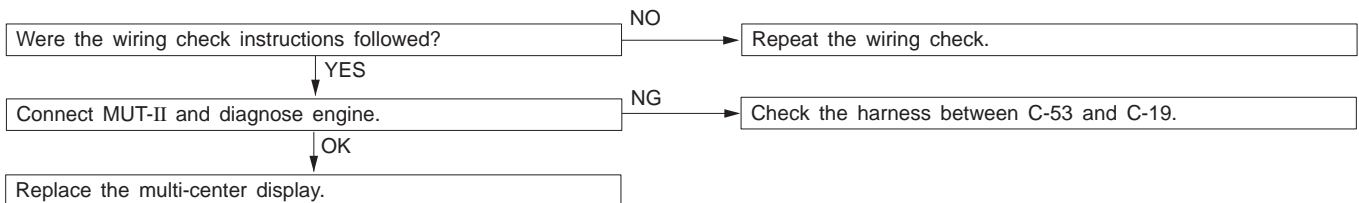
Error Code No. 1021



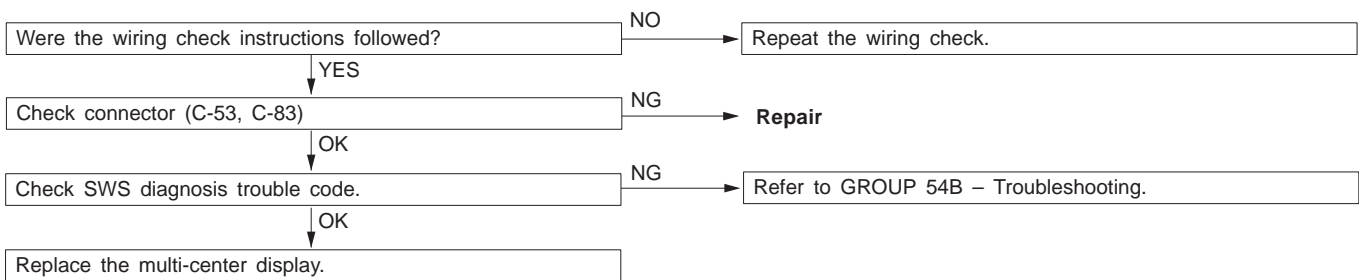
Error Code No. 1031



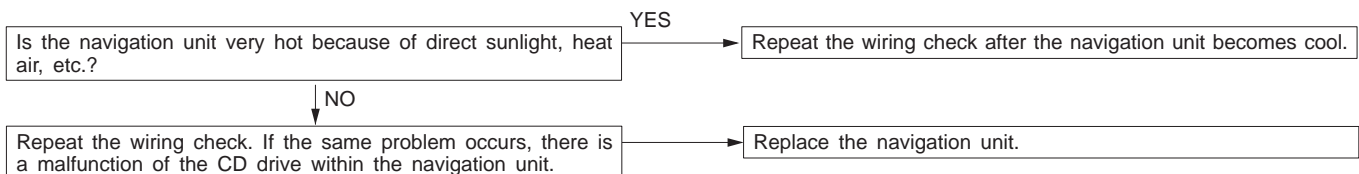
Error Code No. 1041



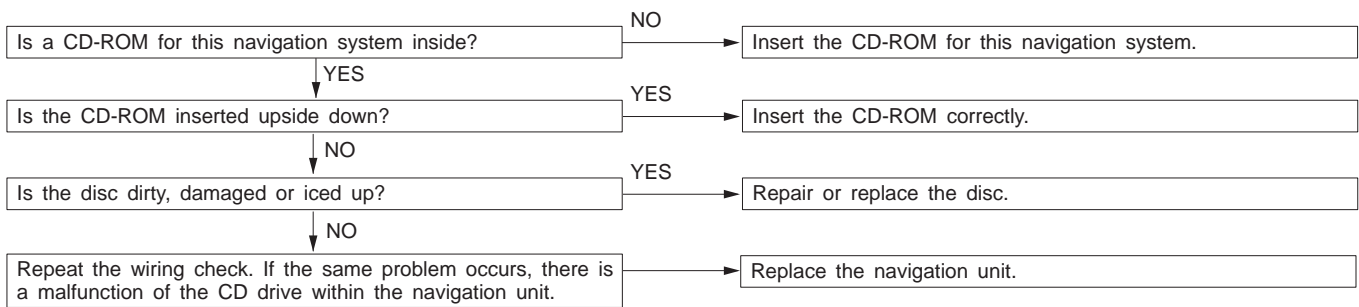
Error Code No. 1051



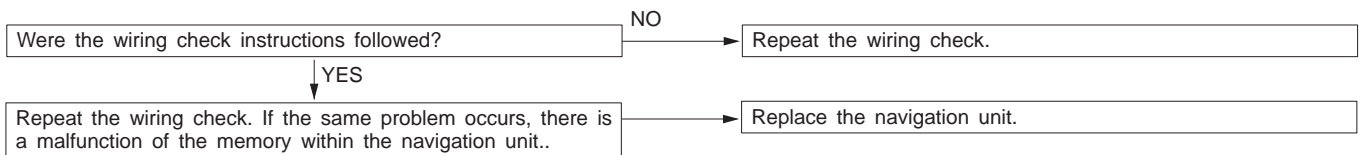
Error Code No. 1091



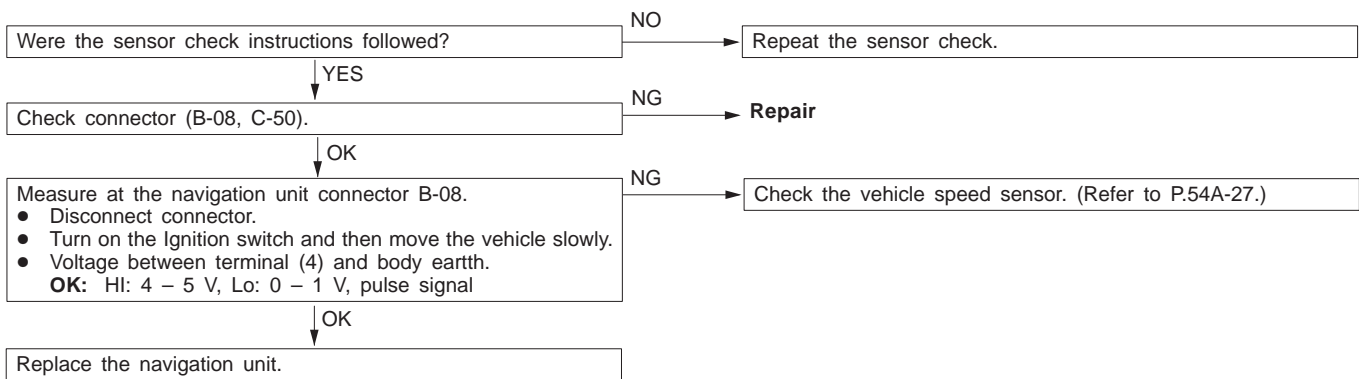
Error Code No. 1092, 1093, 1094, 1095, 1096



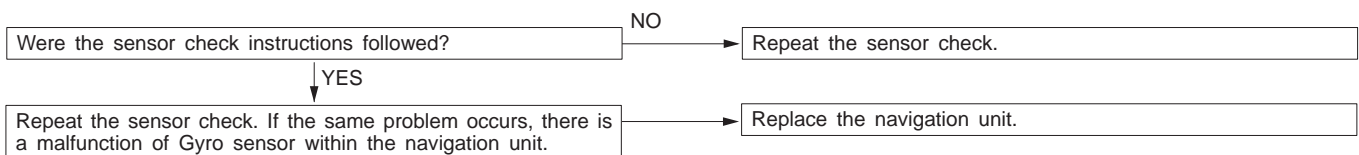
Error Code No. 10A1, 10B1



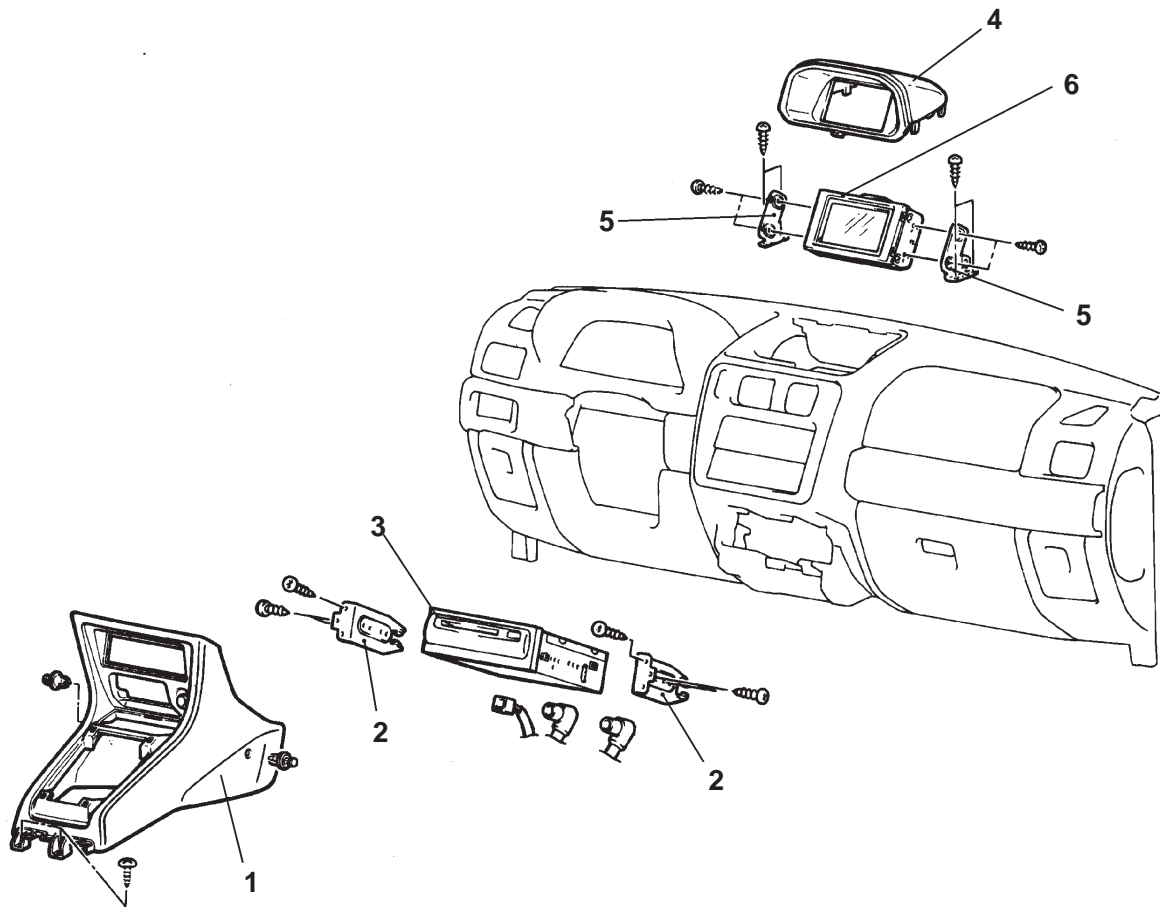
Error Code No. 20D1, 30D1



Error Code No. 20E1, 20E2, 30E1, 30E2



MULTI-CENTER DISPLAY REMOVAL AND INSTALLATION



AX0176AL

Navigation unit removal steps

1. Floor console (Refer to GROUP 52A – Floor console)
2. Radio bracket
3. Navigation unit

Multi-center display removal steps

4. Multi-center display hood (Refer to P.54A-79.)
5. Multi-center display bracket
6. Multi-center display

GROUP 54A

CHASSIS ELECTRICAL

GENERAL

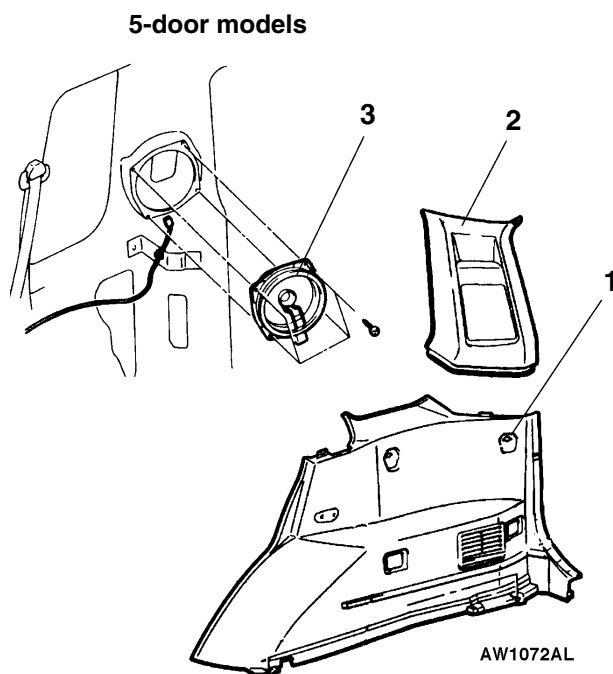
OUTLINE OF CHANGE

- Due to the introduction of 5-door models, the rear speaker service procedure has been changed.

SPEAKER

REMOVAL AND INSTALLATION

<Rear speaker>




Rear speaker removal steps

1. Quarter trim, lower (Refer to GROUP 52A.)
2. Rear pillar trim (Refer to GROUP 52A.)
3. Speaker



SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN		No.: ESB-00E54-502	
		Date:2000-07-30	<Model> <M/Y>
Subject: CORRECTION TO SERVICE MODE FOR MULTI-CENTER DISPLAY		(EC)PAJERO PININ/MONTERO io (H60,H70)	00-10
Group: CHASSIS ELECTRICAL	Draftno.: 99SY111917		
INFORMATION/CORRECTION		 O. Kai - E.V.P. & G.M. After Sales Service Dept.	

1. Description:

This Service Bulletin informs you that correction has been made to the service mode for the multi-center display (middle grade)

2. Applicable Manuals:

Manual	Pub. No.	Language	Page(s)
'00PAJERO PININ Workshop Manual chassis	CKRE00E1	(English)	54a-69
	CKRF00E1	(French)	
	CKRG00E1	(German)	
	CKRD00E1	(Dutch)	
	CKRI00E1	(Italian)	
'00 MONTERO Workshop Manual chassis	CKRS00E1	(Spanish)	

3. Details:

CHASSIS ELECTRICAL –Multi-center Display <Middle Grade> (page 2,3 and 4)

4. Service Mode For Multi-center Display

1. Enter and terminate the service mode

- (1) To enter the service mode, turn the ignition switch to ACC
- (2) Press the "H" button twice.
- (3) Press the "SET" button and (A) button at the same time.
- (4) Then the audio unit will enter the service mode.

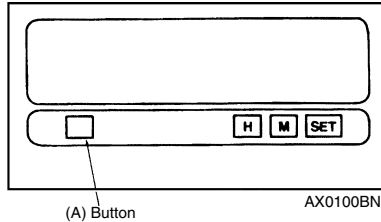
First of all, the service mode will show model identification for the multi center display and the vehicle identification. Then the service mode proceeds to three checks. LCD segment check, Sensor check and Unit check. To switch over these checks, press the "SET" button.

- (5) To terminate the service mode, press any button other than the "SET" button.

<Correct>

LOCK (OFF)

<Incorrect>



<Incorrect>

2. Details of the service mode

The service mode checks the following in that order:

- (1) LCD segment check

This screen is divided into four areas. Each area will be active sequentially whenever the "SET" button is pressed.

When the "SET" button is pressed four times in this screen, the service mode will proceed to the Sensor check.

- (2) Sensor check

This screen shows voltage signals from the outside temperature sensor, the fuel gauge unit, and the ignition switch as well as fuel economy.

When the "SET" button is pressed once in this screen, the service mode will proceed to the Unit check.

- (3) Unit check connected into audio system

This screen shows an audio equipment, air conditioner or MUT-II connected in the system, percentage of system voltage engine speed sent by the engine-ECU, and oscillation of internal clock.

When the "SET" button is pressed once in this screen, the service mode will return to the first screen (model identification screen).

<Correct>

- (2) While pressing (A) button, turn the ignition switch to ON. With (A) button depressed, press "H" button twice.
- (3) Press "SET" button.
- (4) Then the multi-center display will enter the service mode. Each mode will change each time "SET" button is pressed.

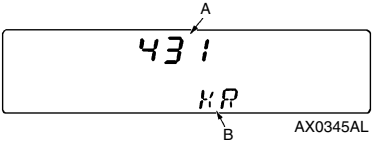
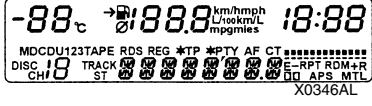
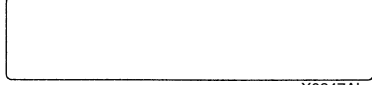
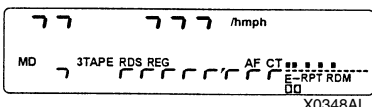
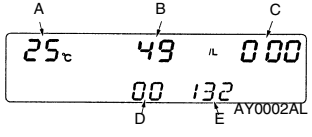
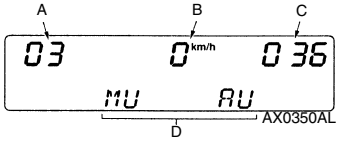
<Incorrect>

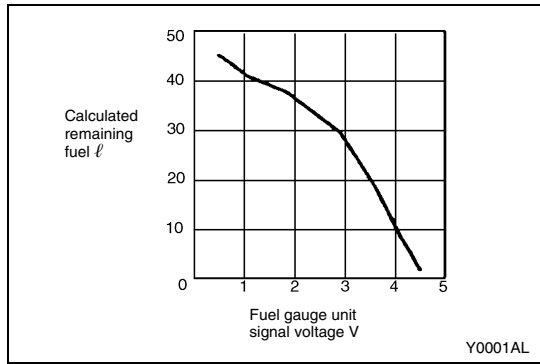
Add pages 3-4 of this bulletin here.

<Added>

2. Service mode menu and check procedure.

The service mode display changes by pressing “SET” button by following order. (Next to No.9, the function returns to No.1 and repeats the sequence from No.1.)

No.	Mode and display	Displayed contents	Unit	Checking item
1	Model name and vehicle type. 	A. Display model.	Code	Confirm the display model code. (“431” is displayed for this vehicle
		B. Vehicle type.	Code	Confirm the vehicle type. (“KR” is displayed for this vehicle.)
2	Segment check.(illuminate) 	All segment illuminated.	—	Check defect segments.
3	Segment check. (only back-lamp) 	Back-lamp only. (all segment off)	—	Check damage, dust etc.
4 - 7	¼ segment check. 	Each ¼ segment illuminate. (4 different displays appear. The left figure shows the first display.)	—	Check short circuit.
8	Temperature sensor and fue gauge unit signal check 	A. Calculated outside temperate.	°C	Check the displayed value.
		B. Calculated remaining fuel.	ℓ	Check the displayed value.*2
		C. Consumed fuel quantity since.	ℓ	Check the displayed value.
		D. Fuel gauge unit signal voltage.	V*1	Check th displayed value.*2
		E. IG voltage.	V*1	Check the displayed value. (Battery positive voltage)
9	Clock and connected components check. 	A. Voltage of MUT-II detection input.	%	Connect: more than 80, Disconnect: less than 50.
		B. Calculated vehicle speed.	Km/h	Check the displayed value.
		C. Clock.	Sec	Confirm operating.
		D. Connecting components.	Name	Conform connecte components (“MU”: MUT-II< “AU”: audio)



NOTE

- *¹: Display is made in 0.1 volts.
- *²: The relationship between the calculated remaining fuel and the fuel gauge unit signal voltage is as shown in the left figure