
CHASSIS ELECTRICAL

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CHASSIS ELECTRICAL 54A

SMART WIRING SYSTEM (SWS) 54B



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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GRADE> 67**

SPECIAL TOOL 67

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MULTI-CENTER DISPLAY 79

**MULTI-CENTER DISPLAY <HIGH
GRADE> 80**

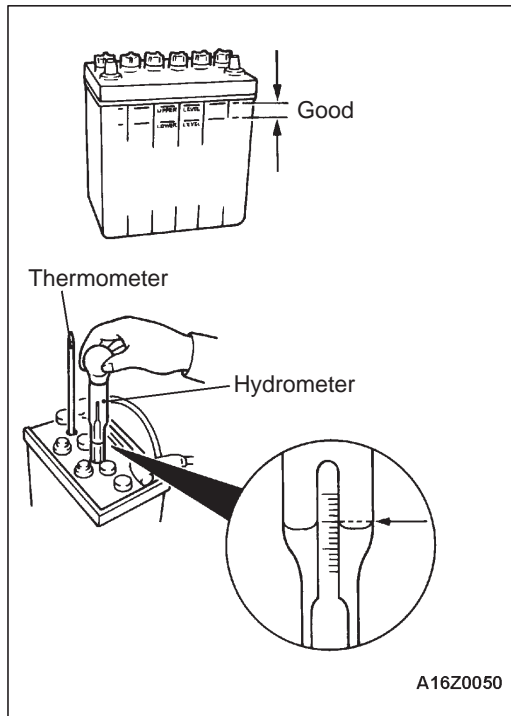
TROUBLESHOOTING 80

MULTI-CENTER DISPLAY 108

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

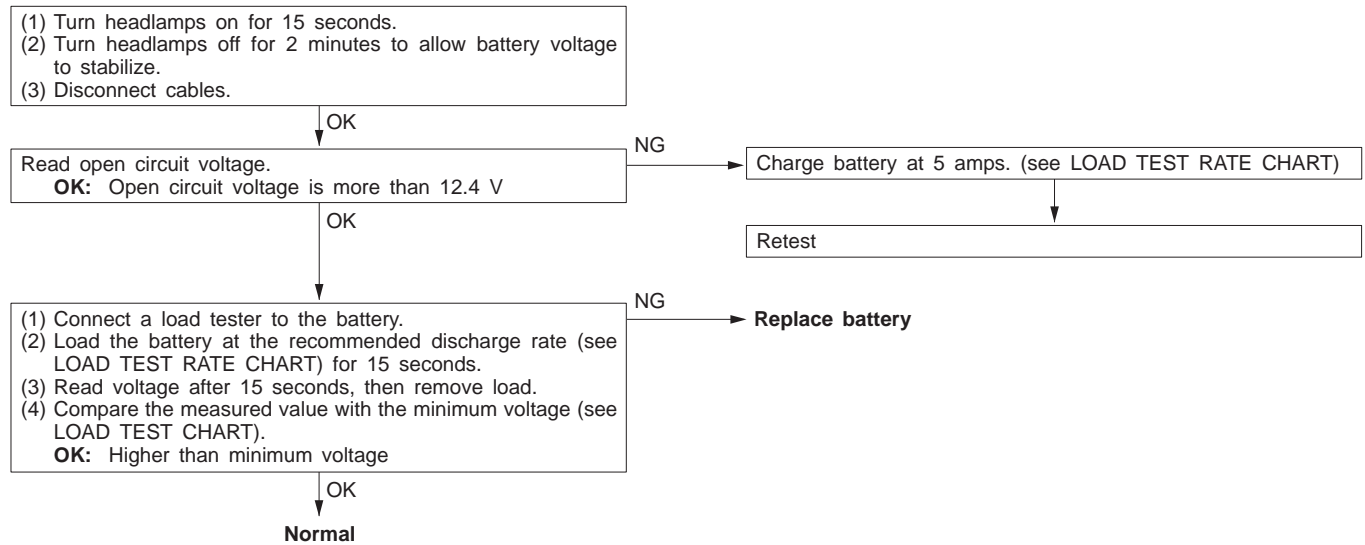
1. When charging a battery while still installed in the vehicle, disconnect the battery cables to prevent damage to electrical parts.
2. The current normally used for charging a battery should be approximately 1/10th of the battery capacity. When performing a quick-charging due to lack of time, etc., 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**

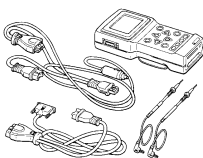
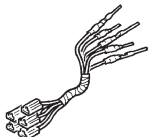
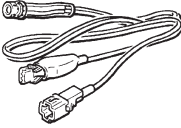
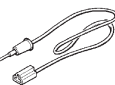

Battery type	65D23L
Charging time when fully discharged h [5-amp rated current charging]	11
Load test (Amps)	300

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>	<p>MB991223</p> <p>A: MB991219 B: MB991220 C: MB991221 D: MB991222</p>	<p>Harness set</p> <p>A: Test harness B: LED harness C: LED harness adapter D: Probe</p>	<ul style="list-style-type: none"> Fuel gauge simple check <p>A: Connector pin contact pressure check B: Power circuit check C: Power circuit check D: Commercial tester connection</p>

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

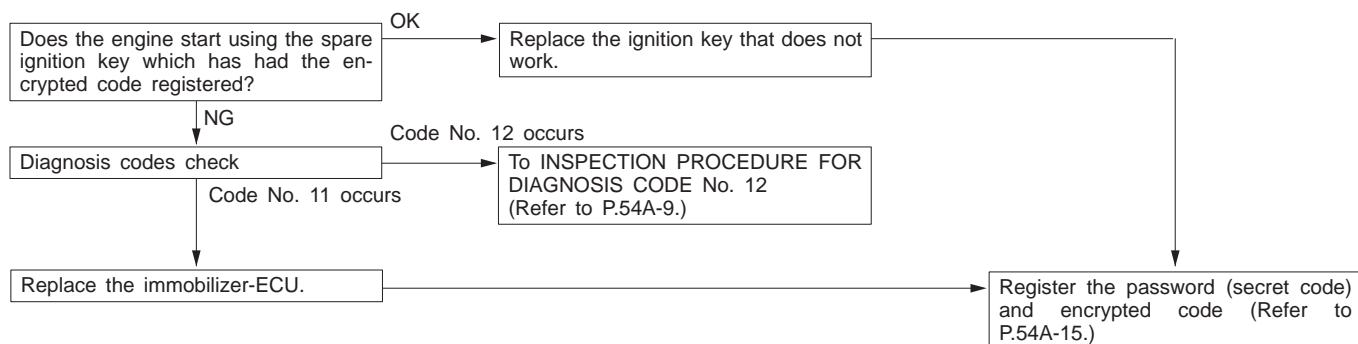
The diagnosis codes which result from disconnecting the battery cables cannot be erased.

INSPECTION CHART FOR DIAGNOSIS CODES

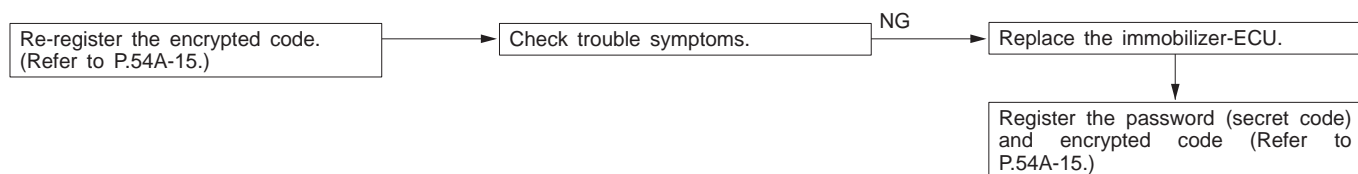
Diagnosis code No.	Inspection items	Reference page
11	Transponder communication system	54A-9
12	Encrypted code are not the same or are not registered	54A-9

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

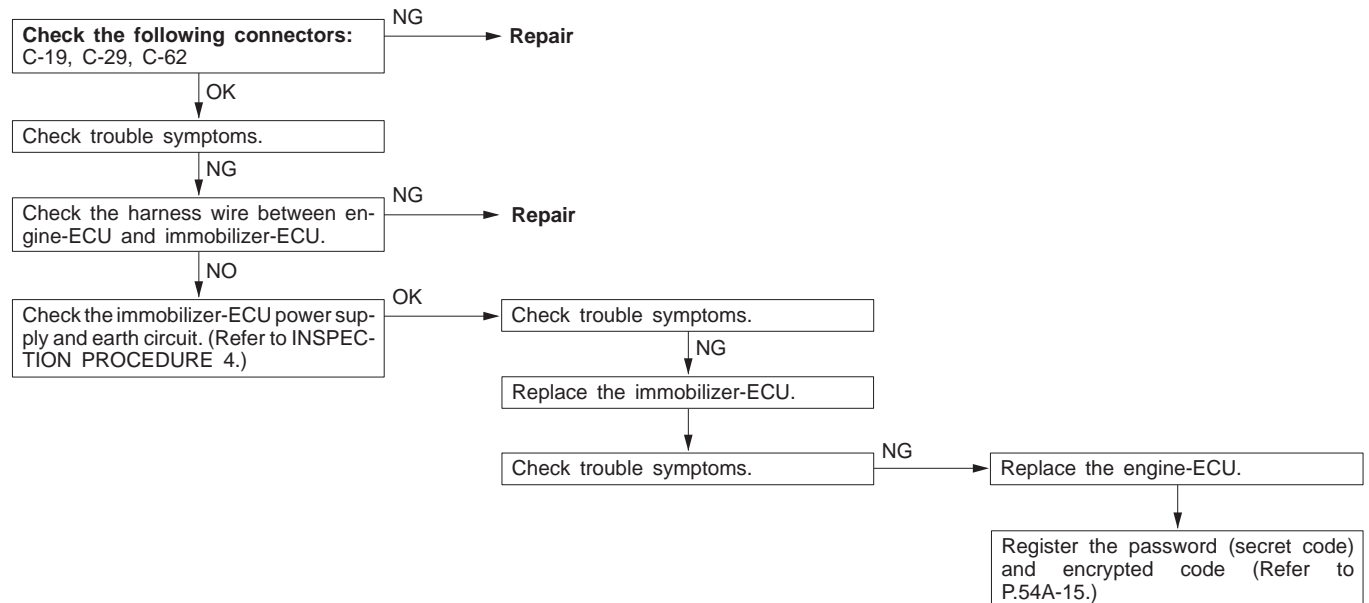
Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	–	GROUP 13B, 13C – Troubleshooting
Diagnosis code No. 54 has been generated by the engine-ECU.	1	54A-10
Encrypted code cannot be registered using the MUT-II.	2	54A-10
Engine does not start (Cranking but no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

54A-10 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer System

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

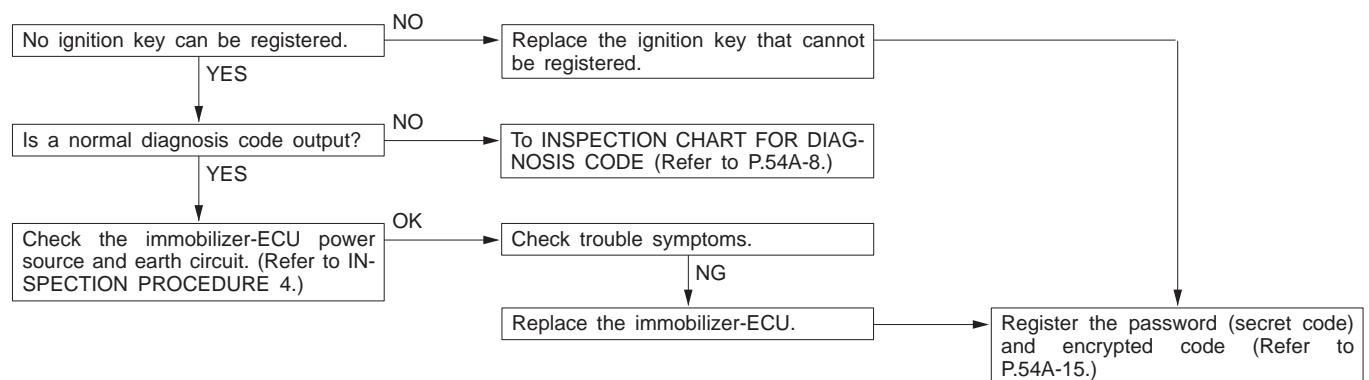
Inspection Procedure 1

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



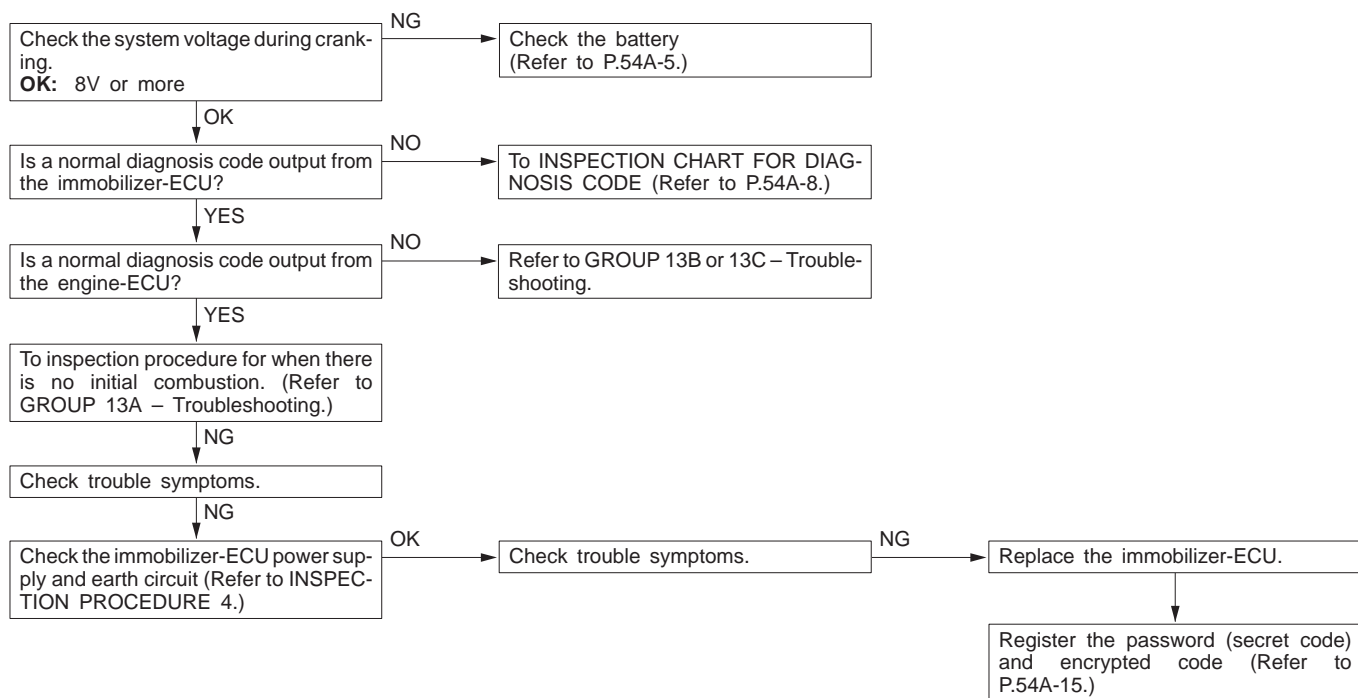
Inspection Procedure 2

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



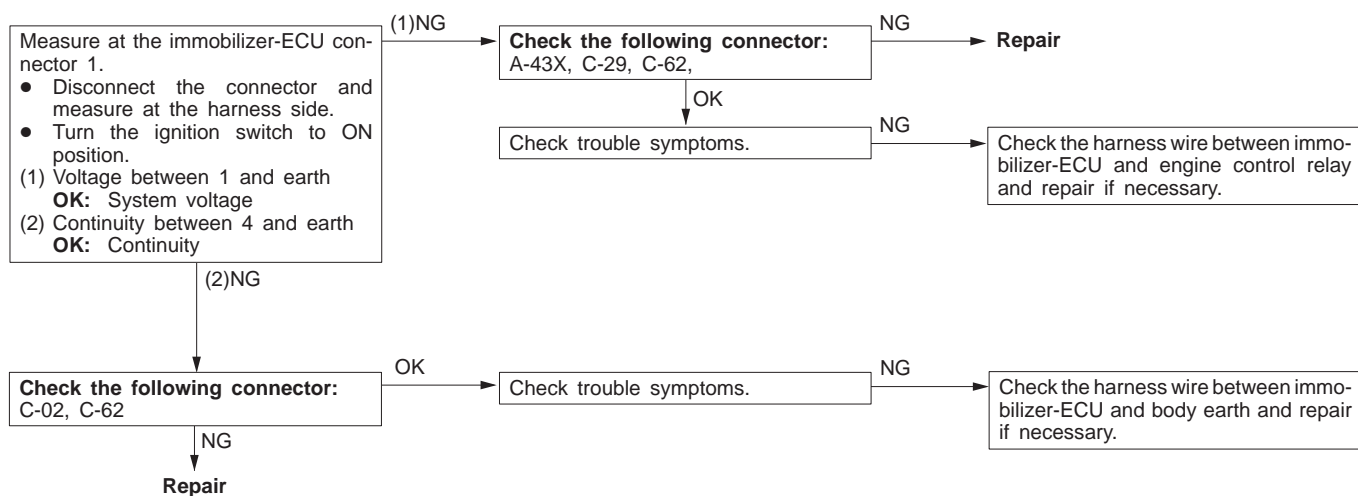
Inspection Procedure 3

Engine does not start (cranking but no initial combustion).	Probable cause
<p>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.</p> <p>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.</p>	<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

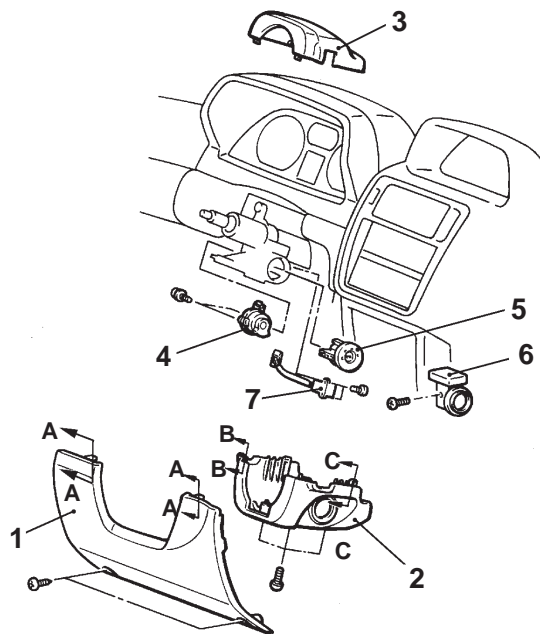
Terminal No.	Signal	Checking requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	–	–	–
3	Engine-ECU	–	–
4	Immobilizer-ECU earth	Always	0 V

IGNITION SWITCH AND IMMOBILIZER SYSTEM**REMOVAL AND INSTALLATION****Caution: SRS**

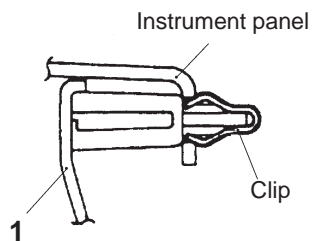
Before removal of air bag module and clock spring, refer to GROUP 52B – Service Precautions and Air Bag Module and Clock Spring.

Pre-removal and Post-installation Operation

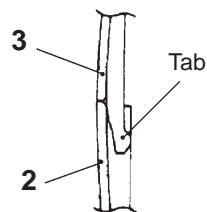
Clock Spring and Column Switch Removal and Installation (Refer to GROUP 52B – Air Bag Modules and Clock Spring.)



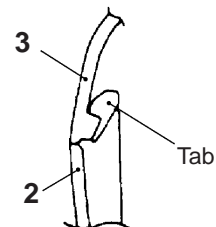
AX0131AL

Section A – A

AW0989AL

Section B – B

W1109AL

Section C – C

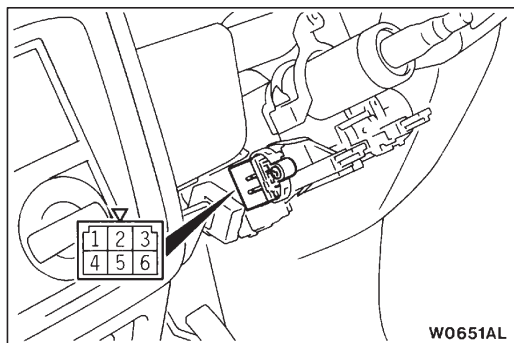
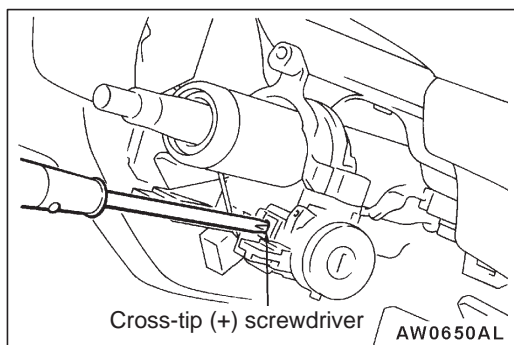
W1110AL

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

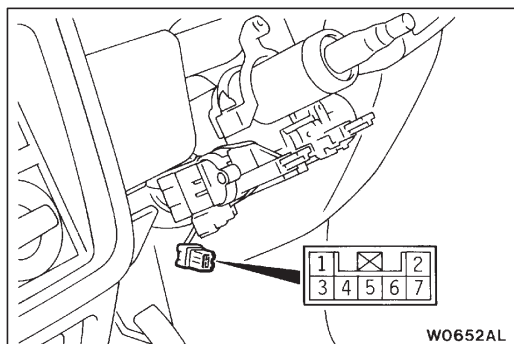
1. Insert the key in the steering lock cylinder and turn it to the “ACC” position.
2. Using a cross-tip (+) screwdriver (small) or a similar tool, push the lock pin of the steering lock cylinder inward and then pull the steering lock cylinder toward you.

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.

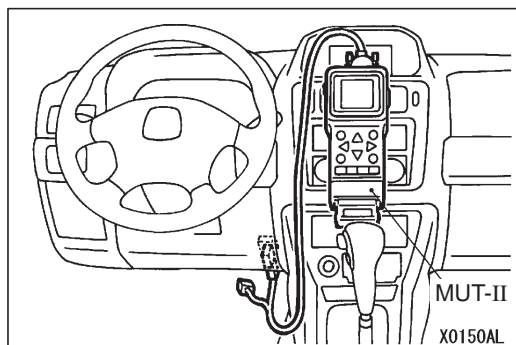
ENCRYPTED CODE REGISTRATION METHOD

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.

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

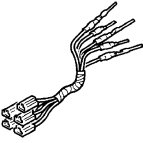
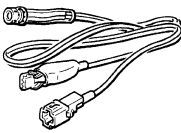
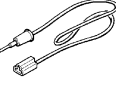

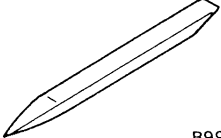
SERVICE SPECIFICATIONS

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 tempera- ture 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>	MB990784	Ornament remover	Removal of meter hood

TROUBLESHOOTING

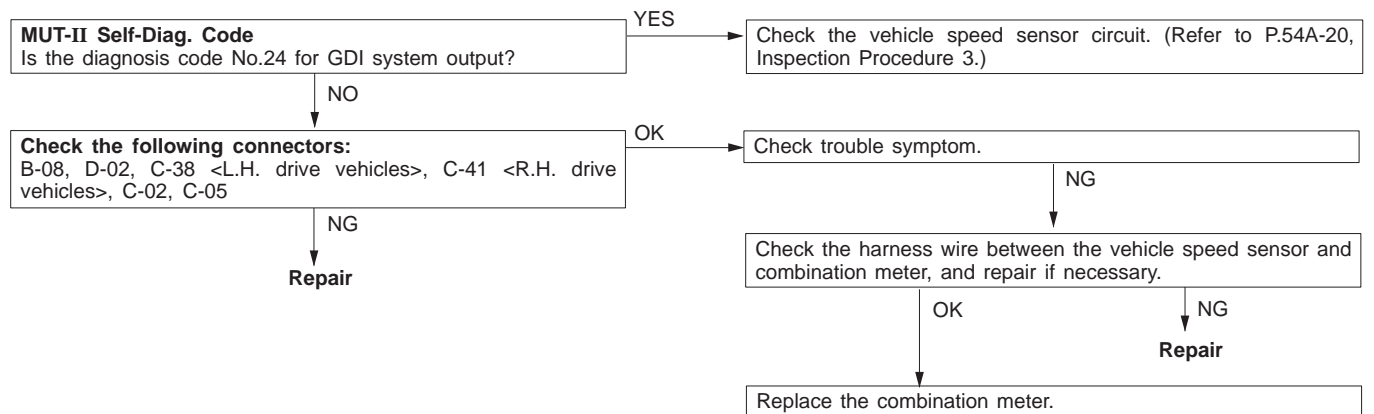
INSPECTION CHART FOR TROUBLE SYMPTOMS

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

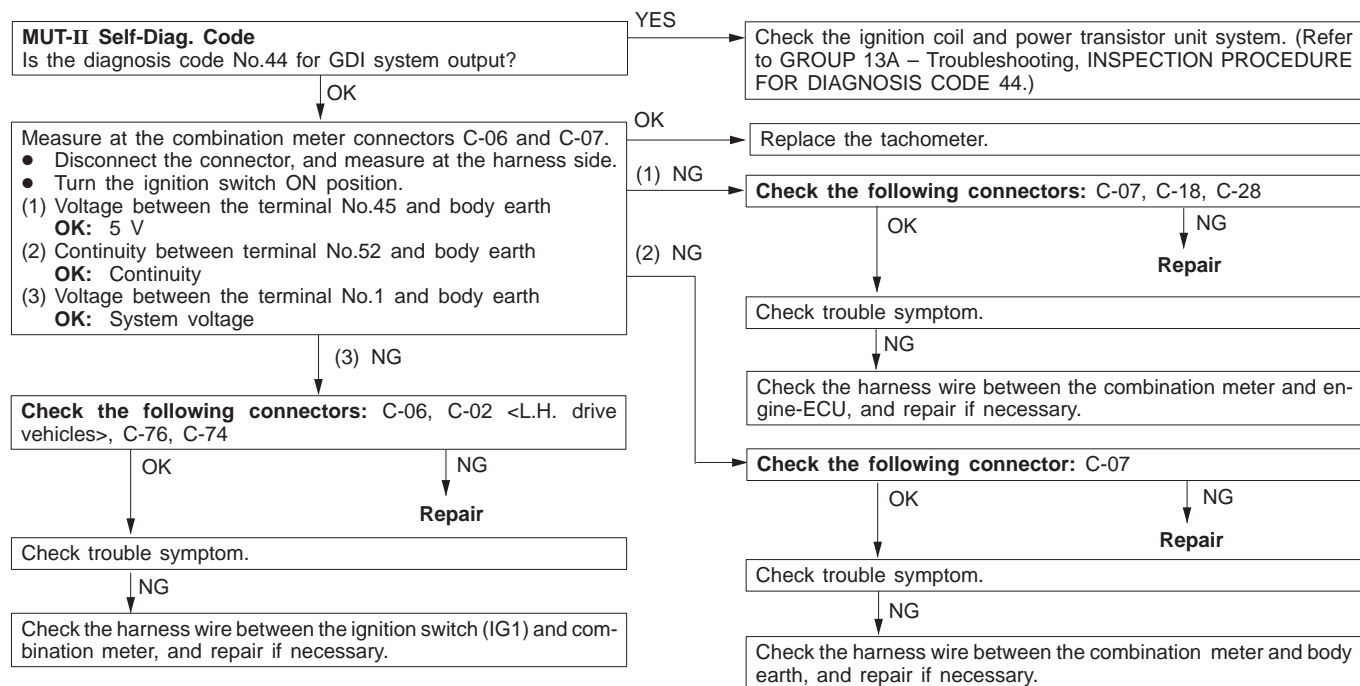
Inspection Procedure 1

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



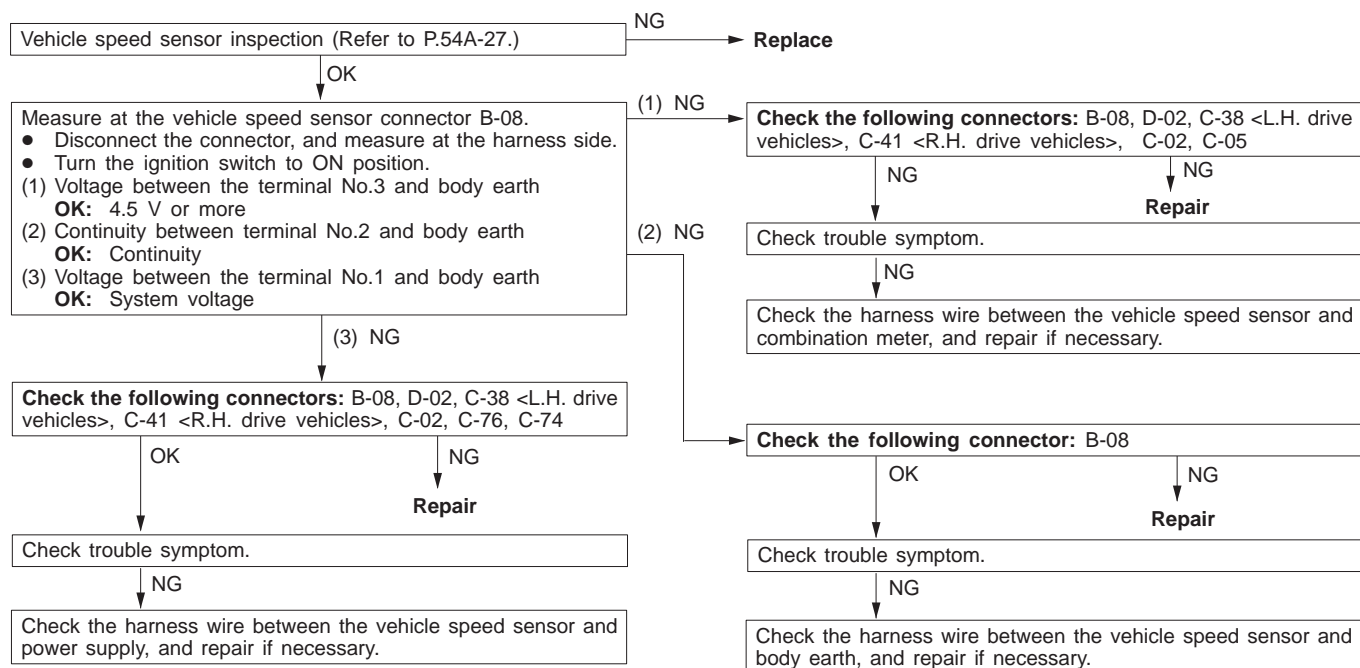
Inspection Procedure 2

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



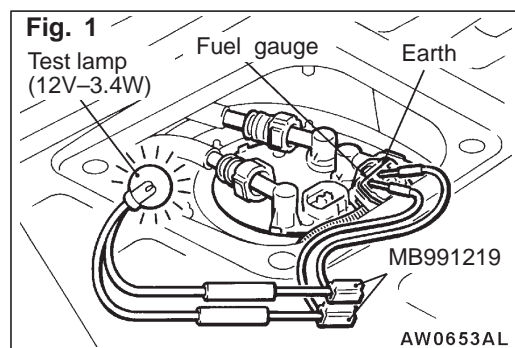
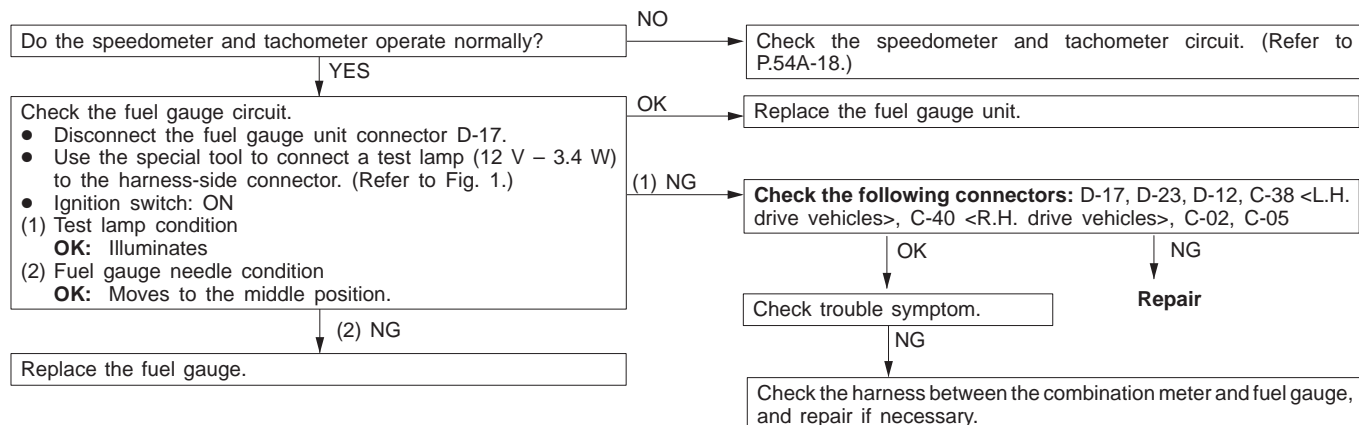
Inspection Procedure 3

Vehicle speed sensor circuit system inspection



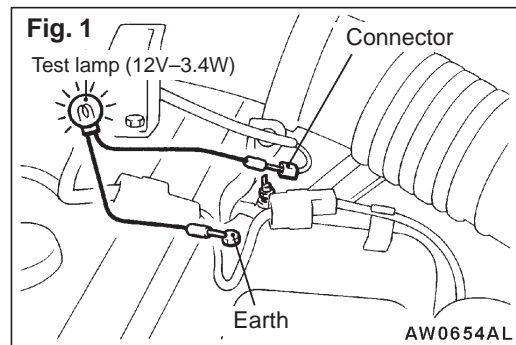
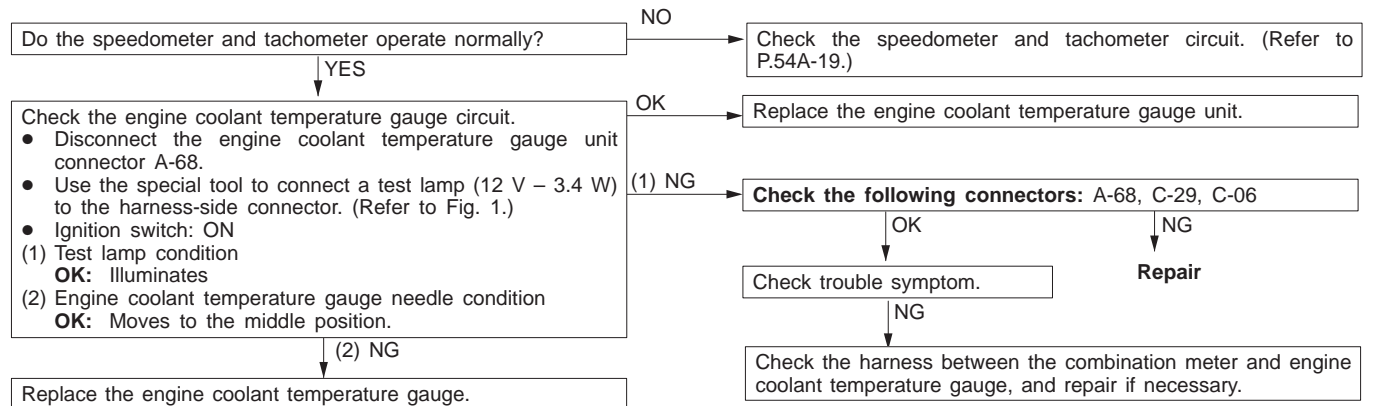
Inspection Procedure 4

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



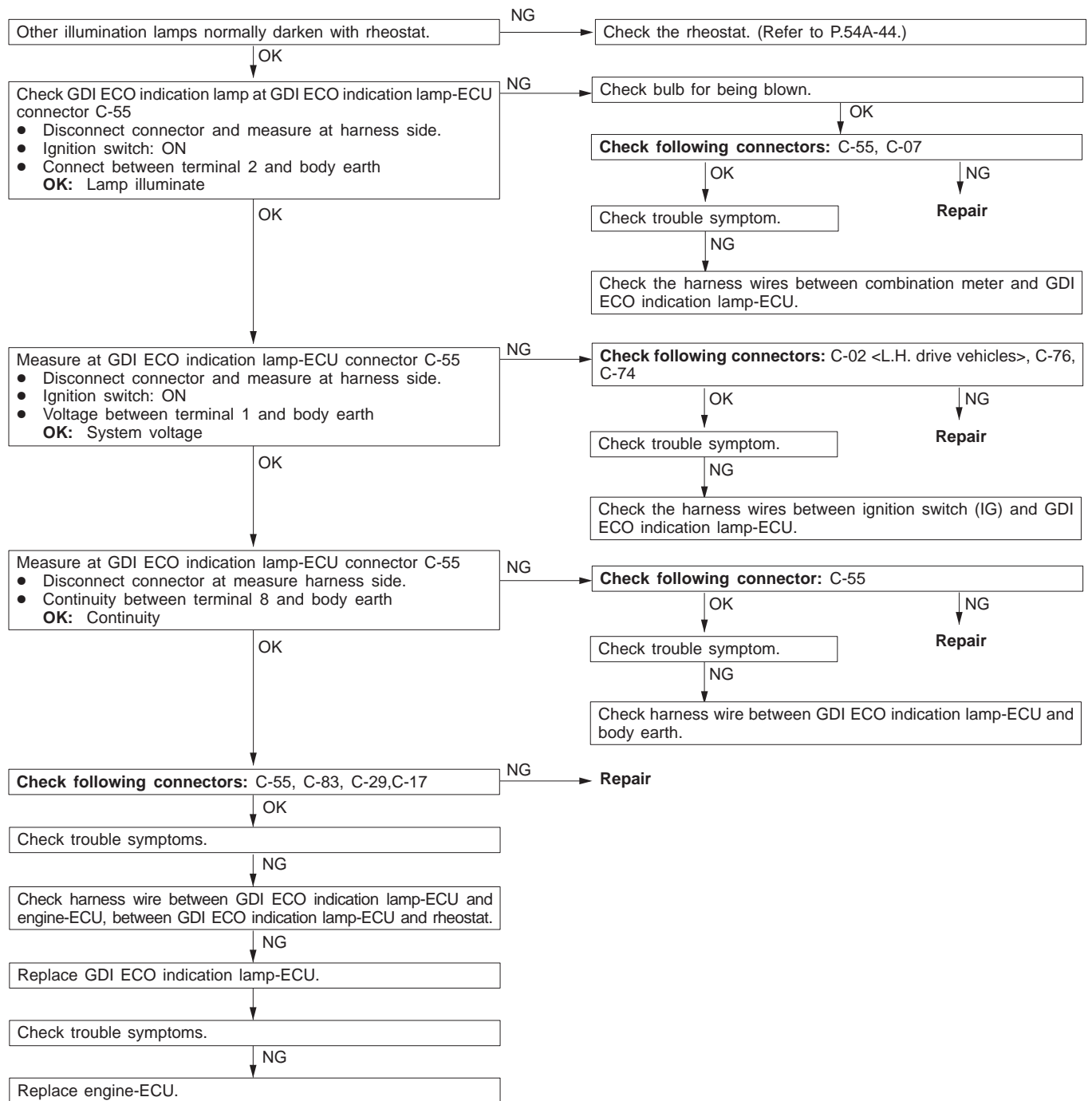
Inspection Procedure 5

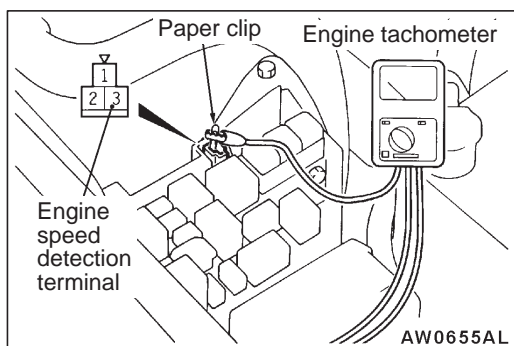
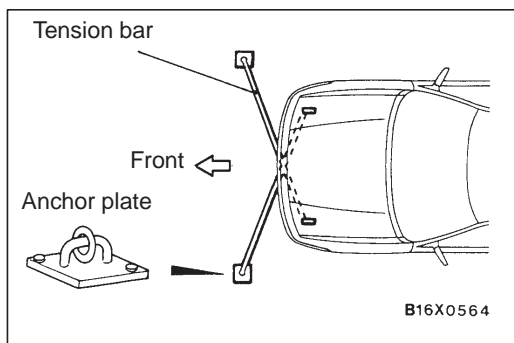
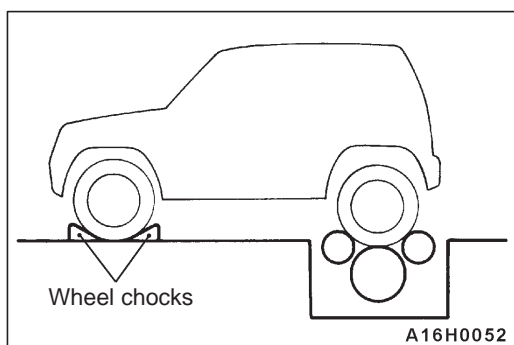
Engine coolant temperature gauge does not operate.	Probable cause
If speedometer and tachometer operate normally, the harness from power supply to combination meter is normal.	<ul style="list-style-type: none"> Malfunction of engine coolant temperature gauge unit Malfunction of engine coolant temperature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



Inspection Procedure 6

GDI ECO indication lamp does not illuminate.	Probable cause
<p>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.</p>	<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.

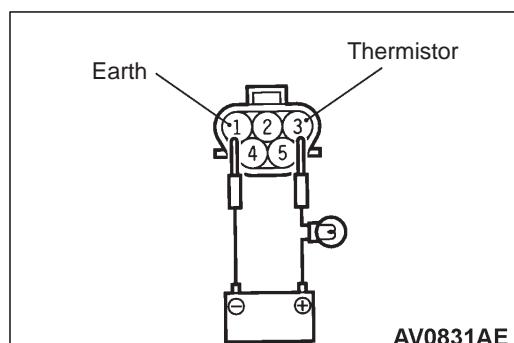
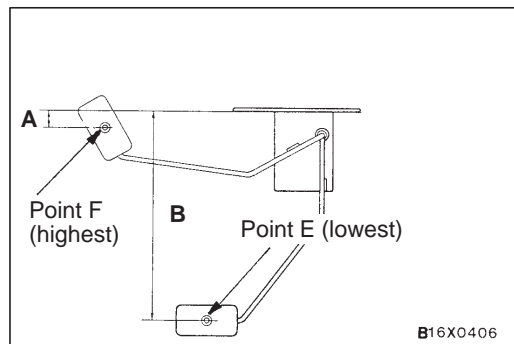
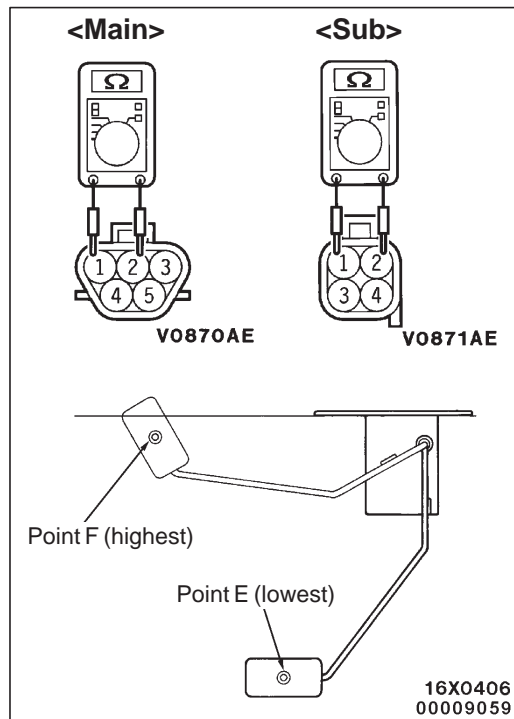
NOTE

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.

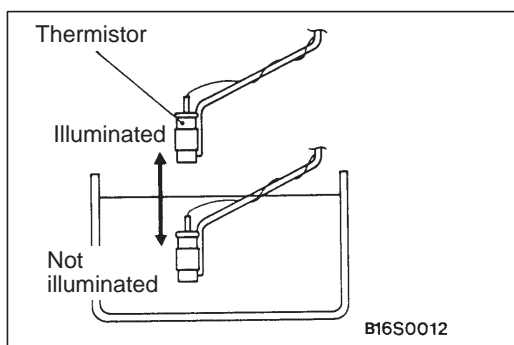
Standard value:

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)

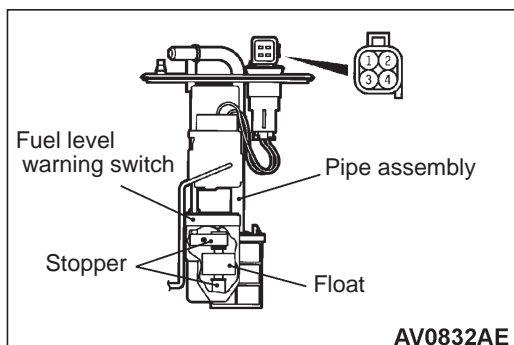
1. Connect the battery to the main fuel gauge unit connector via test lamp (12 V – 3.4 W) as shown in the illustration.



- 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**

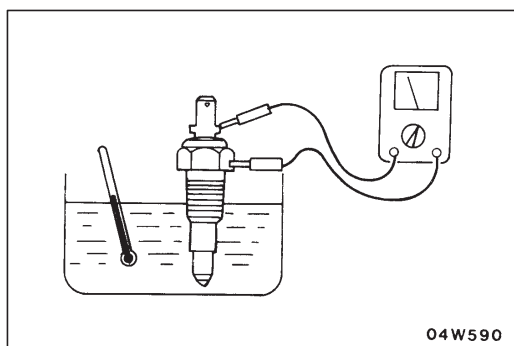
- Remove the sub fuel gauge unit pipe assembly. (Refer to GROUP 13B – Fuel Tank.)

NOTE

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

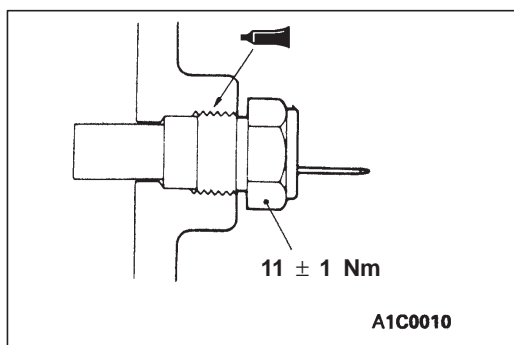
- Check the continuity between the terminals.

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.

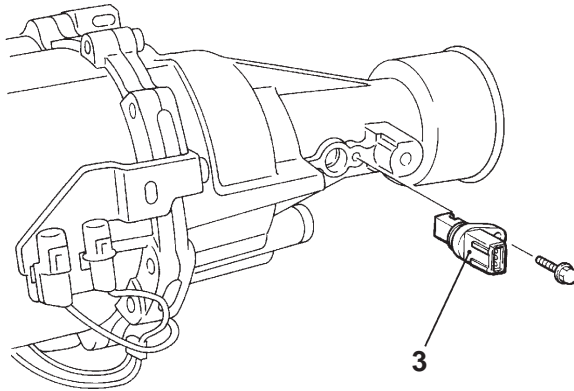
Specified sealant:

3M Adhesive Nut Locking No. 4171 or equivalent

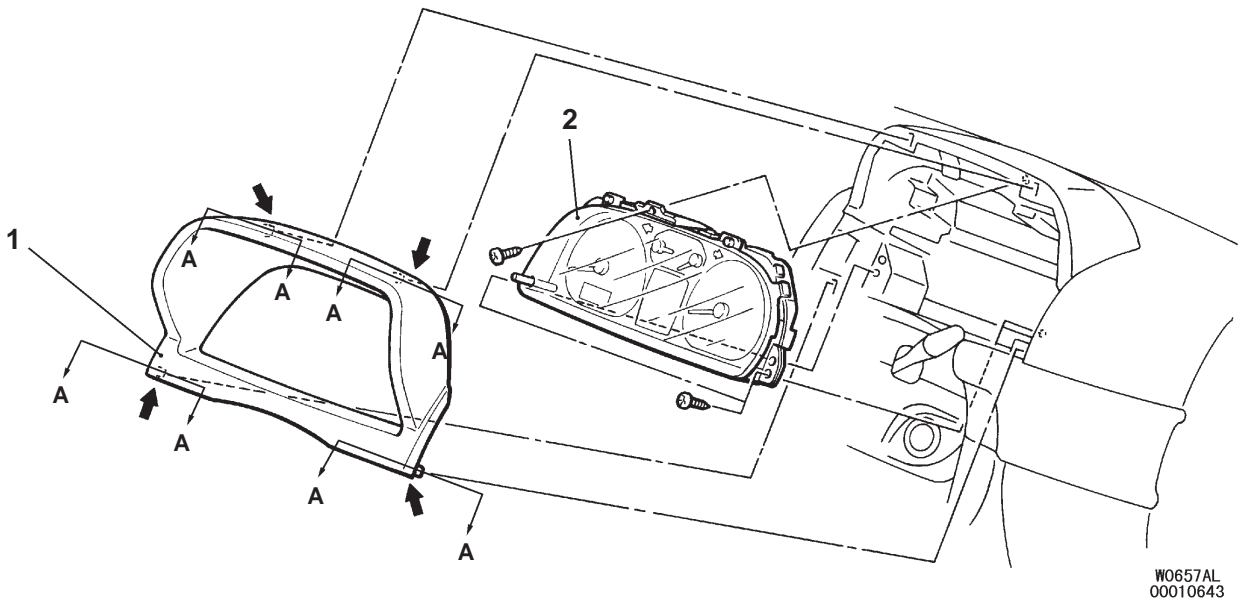
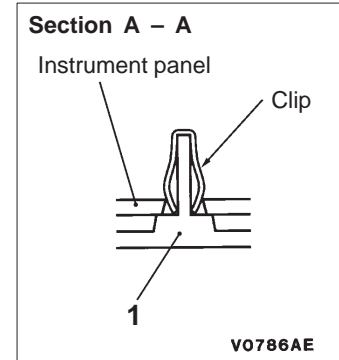
- Add engine coolant. (Refer to GROUP 14 – On-vehicle Service.)

COMBINATION METERS

REMOVAL AND INSTALLATION



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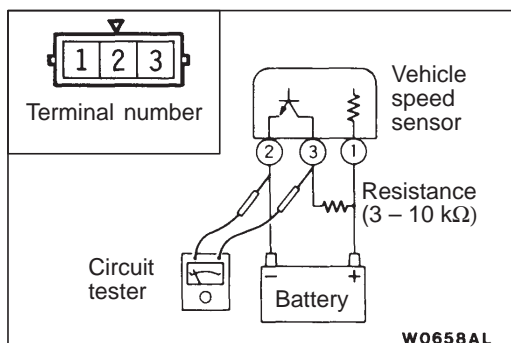
← Clip position

Combination meter removal steps

1. Meter hood
2. Combination meter

Vehicle speed sensor removal

3. Vehicle speed sensor

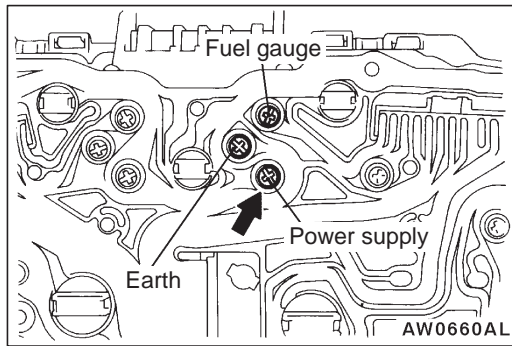


W0658AL

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:

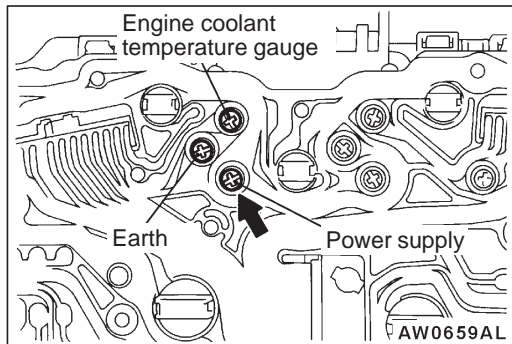
Power supply – Earth: 233.3 Ω

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.

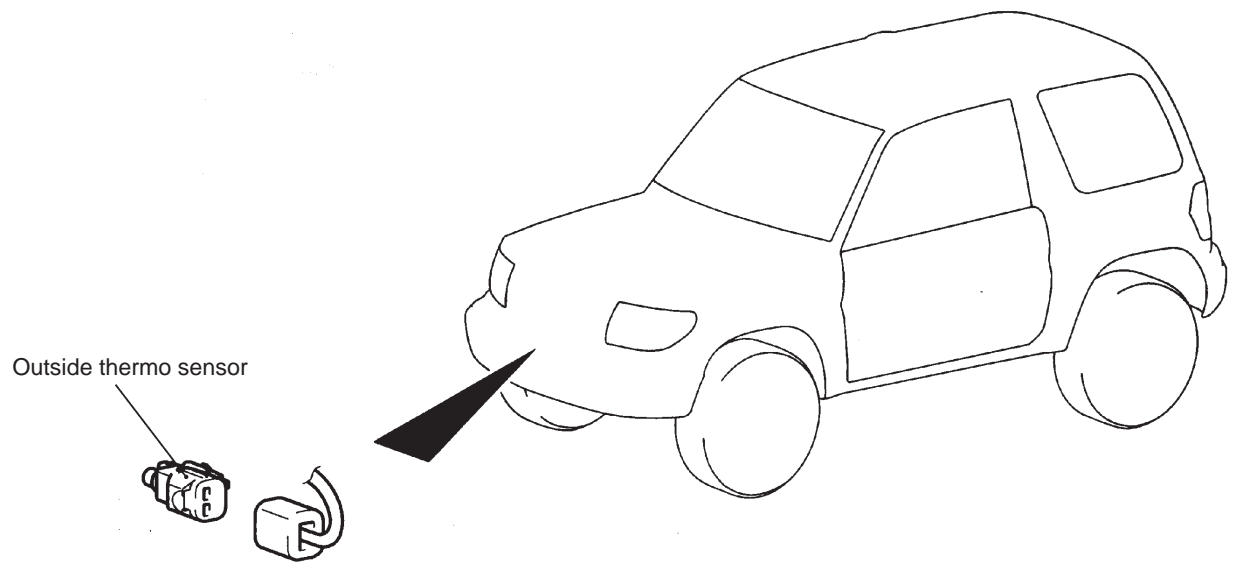
OUTSIDE THERMO SENSOR

SERVICE SPECIFICATIONS

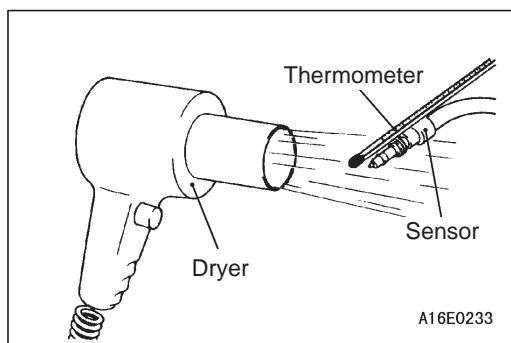
Items		Standard value
Internal resistance of outside thermo sensor Ω	At 25 °	Approx. 1,700

OUTSIDE THERMO SENSOR

REMOVAL AND INSTALLATION



AX0222AL



A16E0233

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:

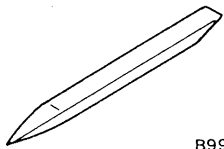
Approx. 1,700 Ω (at 25 °C)

HEADLAMP, FRONT TURN-SIGNAL LAMP AND FRONT FOG LAMP

SERVICE SPECIFICATIONS

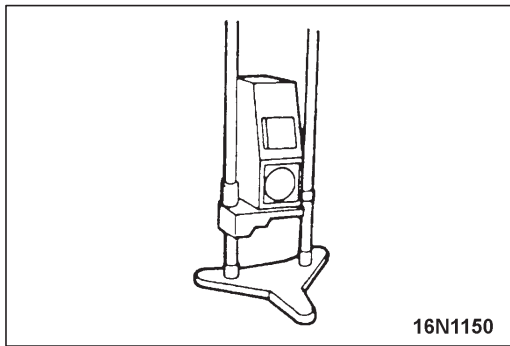
Items		Standard value	Limit
Headlamp aiming for low beam	Vertical direction	60 mm below horizontal (H)	—
	Horizontal direction	Position where the 15° sloping section intersects the vertical line (V)	—
Headlamp intensity cd		—	30,000 or more
Front fog lamp aiming	Vertical direction	100 mm below horizontal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

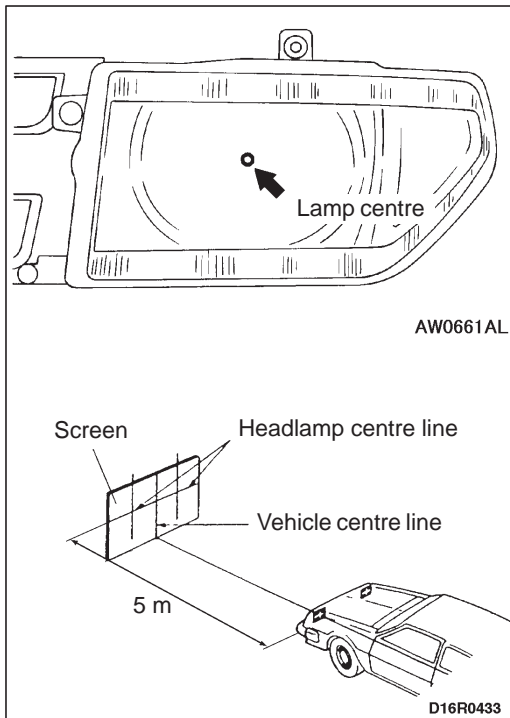
<USING A BEAM SETTING EQUIPMENT>

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

NOTE

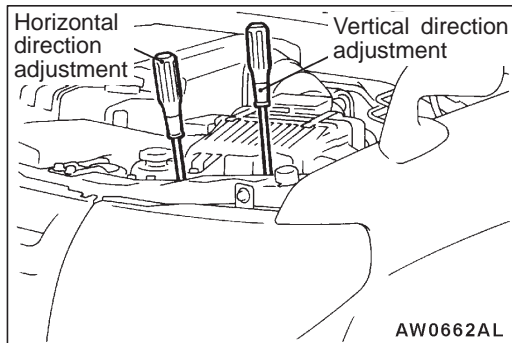
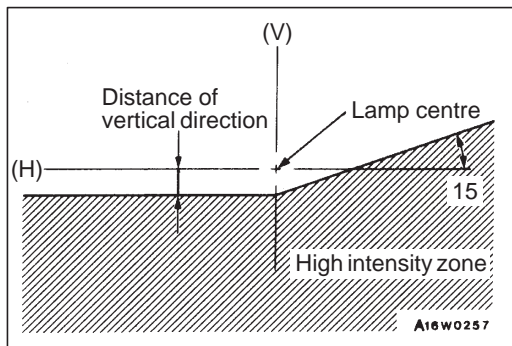
If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.

2. Alternately turn the adjusting screw to adjust the headlamp aiming. (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

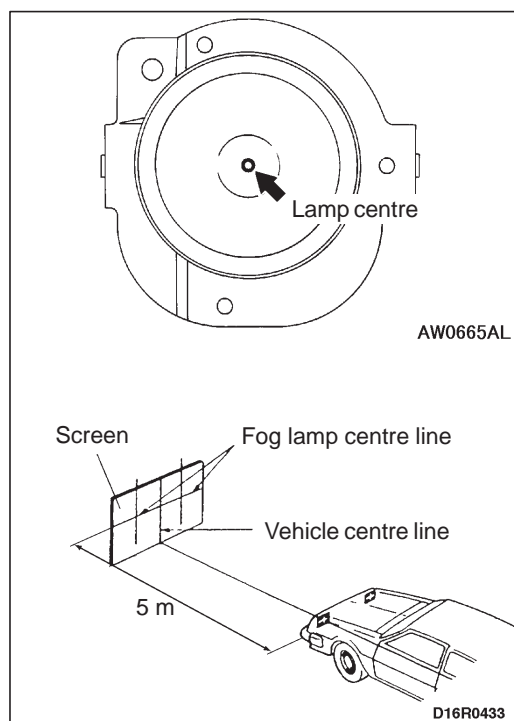
1. When measuring the intensity, maintain an engine speed of 2,000 r/min, with the battery in the charging condition.
2. There may be special local regulations pertaining to headlamp intensity, be sure to make any adjustments necessary to satisfy such regulations.
3. If an illuminometer is used to make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

$I = Er^2$ Where:

I=intensity (cd)

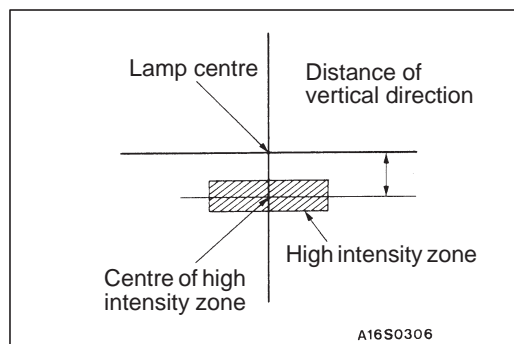
E=illumination (lux)

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.

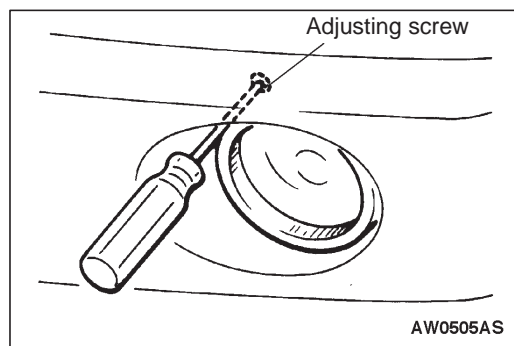
Standard value:

(Vertical direction)

100 mm below horizontal (H)

(Horizontal direction)

Parallel to direction of vehicle travel

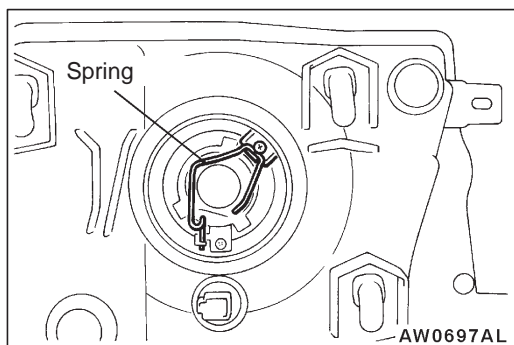


NOTE

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.



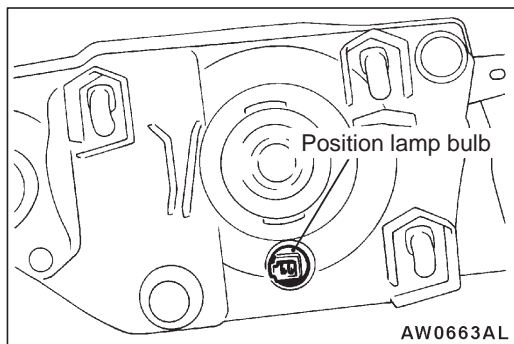
BULB REPLACEMENT

<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.

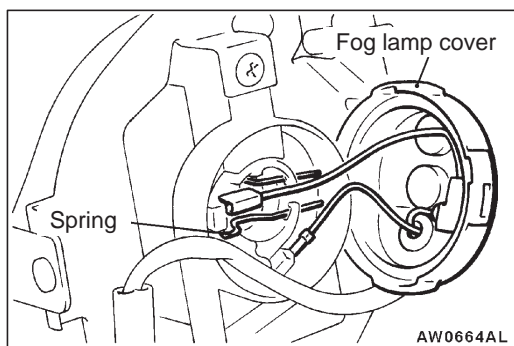
Caution

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>

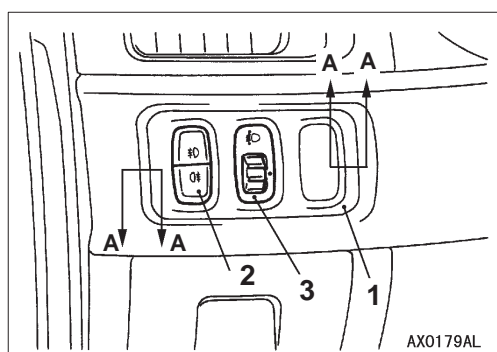
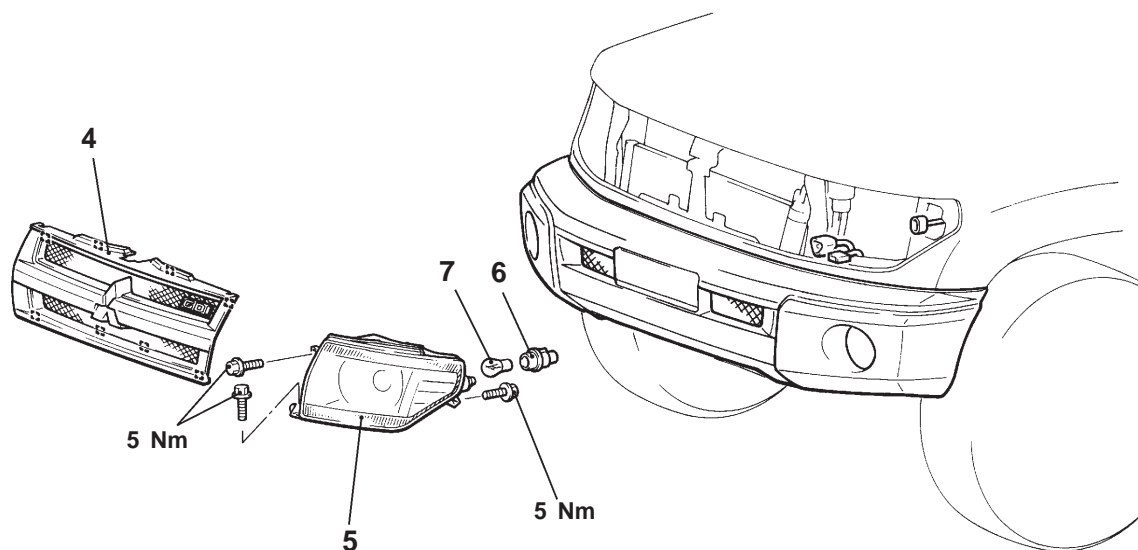
1. Remove the front fog lamp.
2. Remove the front fog lamp cover.
3. Remove the front bulb mounting spring, and then withdraw the bulb.
4. Disconnect the connector, and then replace the bulb.

Caution

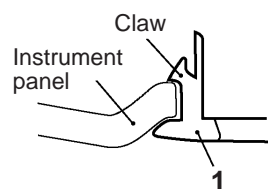
- (1) Always use the genuine part for replacement.
- (2) Do not touch the surface of the bulb with hands or dirty gloves. If the surface does become dirty, clean it with alcohol or thinner, and let it dry thoroughly before installing.
- (3) Be sure to install the socket cap. If the socket cap is improperly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

HEADLAMP, FRONT TURN-SIGNAL LAMP AND FRONT FOG LAMP

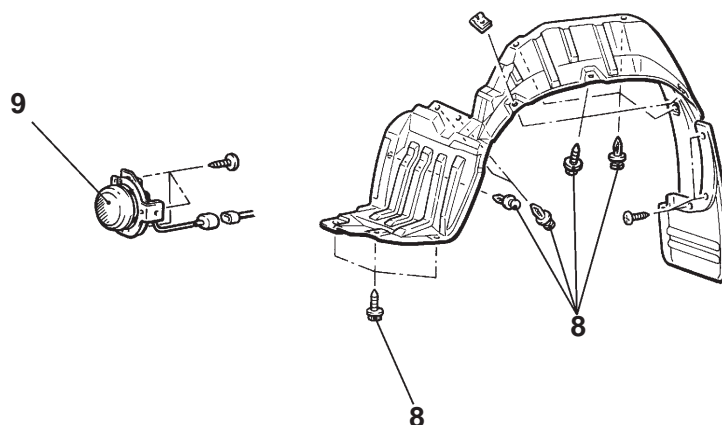
REMOVAL AND INSTALLATION



Section A - A



BX0283AL



AW0667AL

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

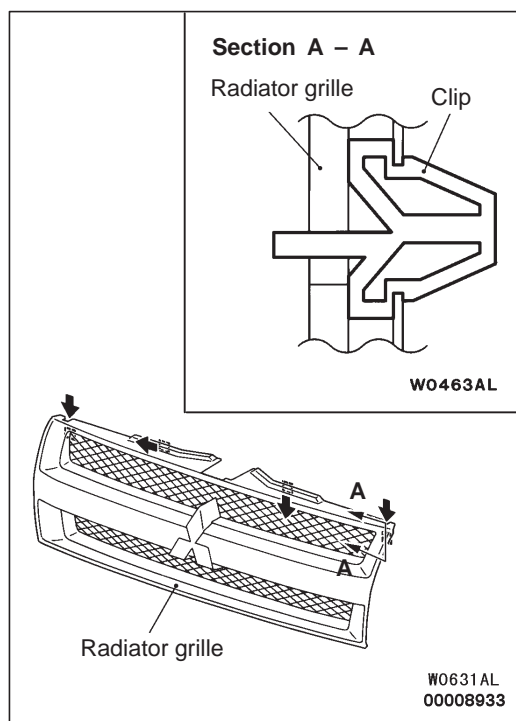
Front fog lamp removal steps

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.

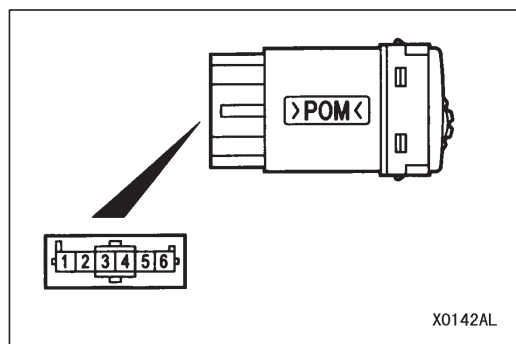




REMOVAL SERVICE POINT

◀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.

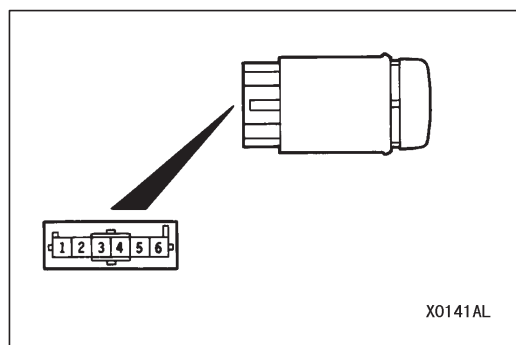


INSPECTION

HEADLAMP LEVELING SWITCH CONTINUITY CHECK

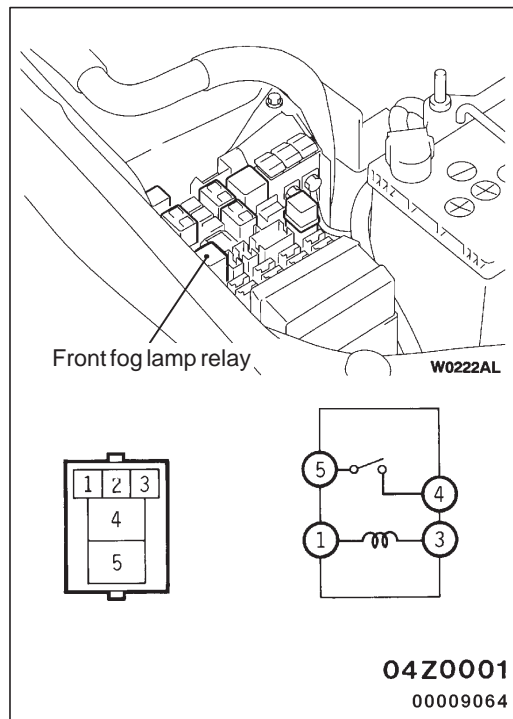
1. Check the continuity between terminals 4 and 5 (illumination circuit).
2. Operating the headlamp leveling switch, check that the resistance between terminals 4 and 5 meets the condition below.

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			○	○	○
Pressed	○	○	○	○	○

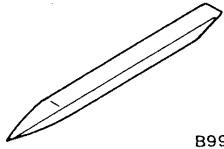


FRONT FOG LAMP RELAY CONTINUITY CHECK

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

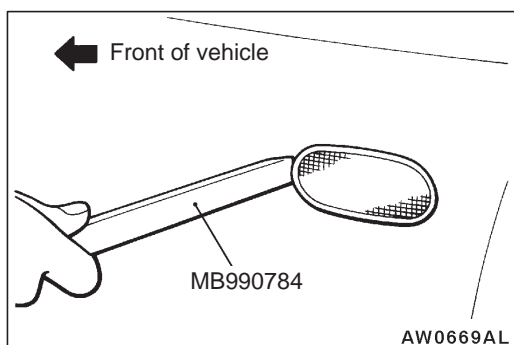
SIDE TURN-SIGNAL LAMP

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.

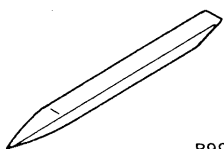
ROOM LAMP

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

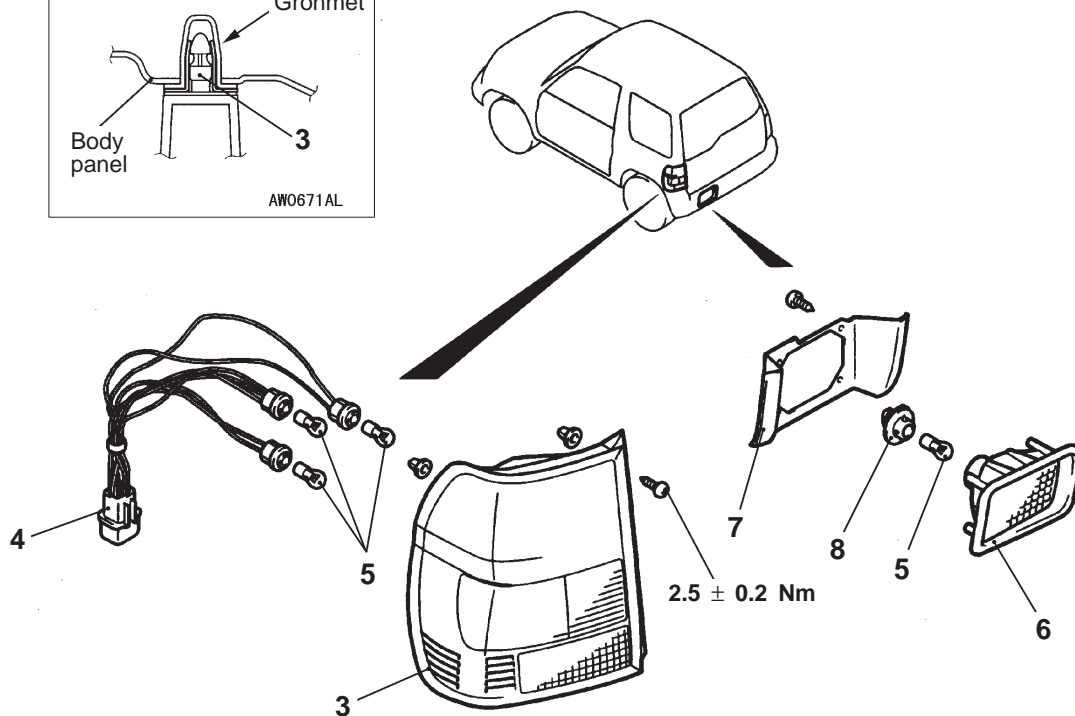
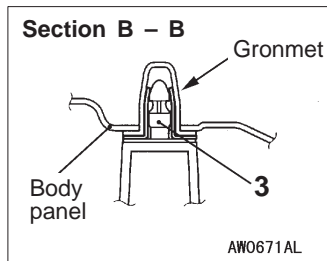
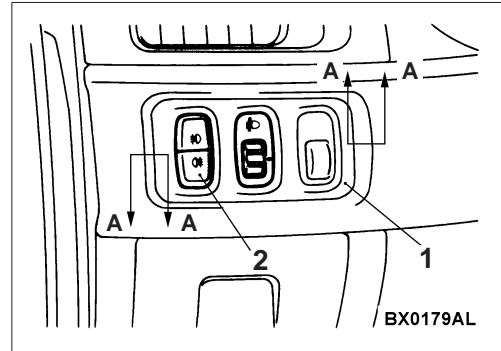
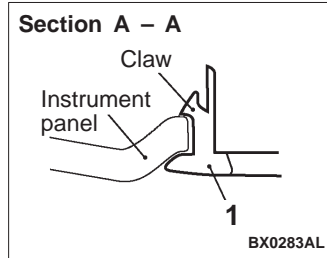
Tool	Number	Name	Use
	MB990784	Ornament remover	Removal of side turn-signal lamp

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

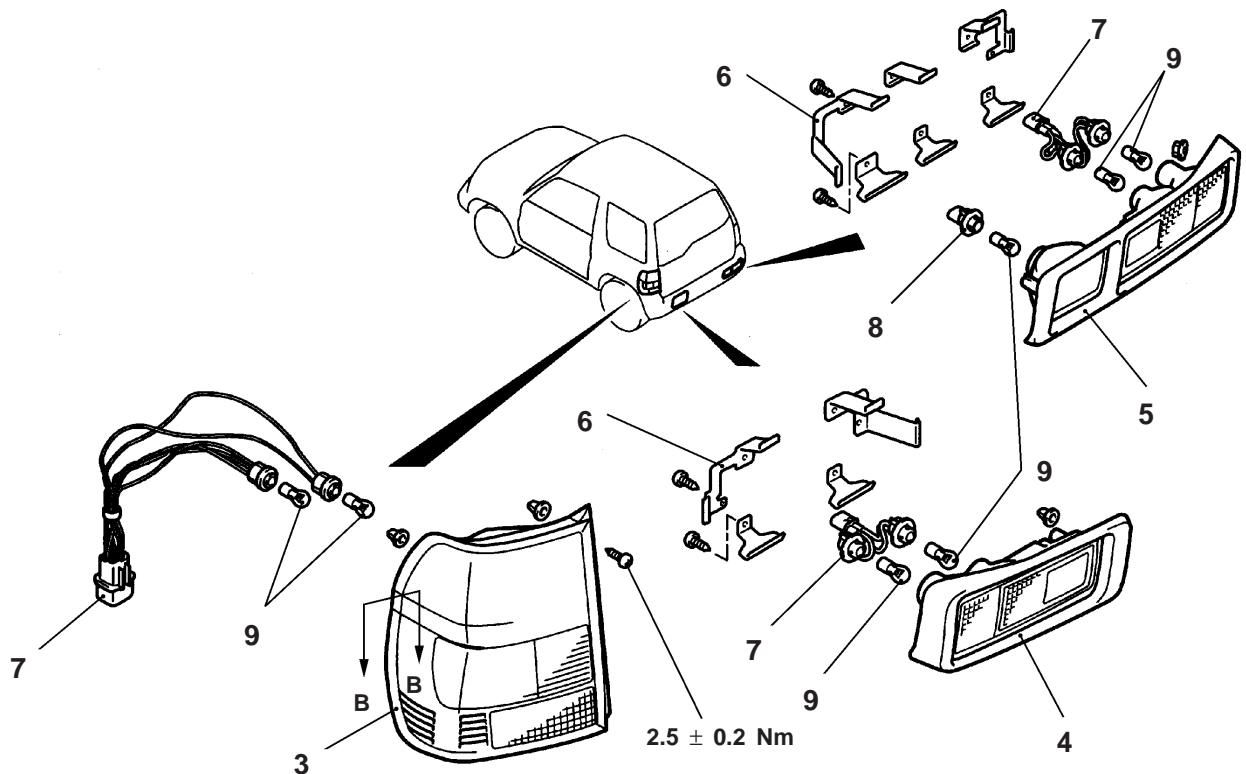
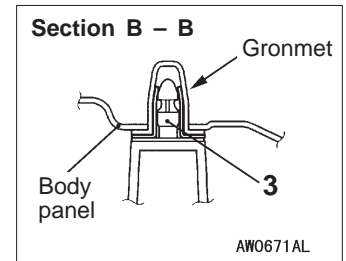
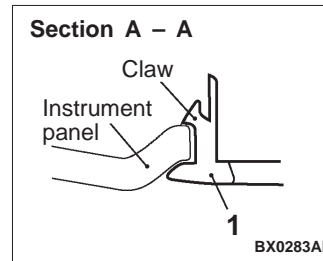
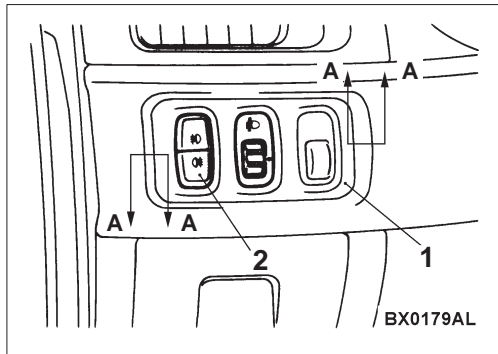
- Quarter Trim Removal and Installation (Refer to GROUP 52A)
- 3. Rear combination lamp
- 4. Socket assembly
- 5. Bulb

Rear fog lamp removal steps

- Rear mud 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>



AX0128AL

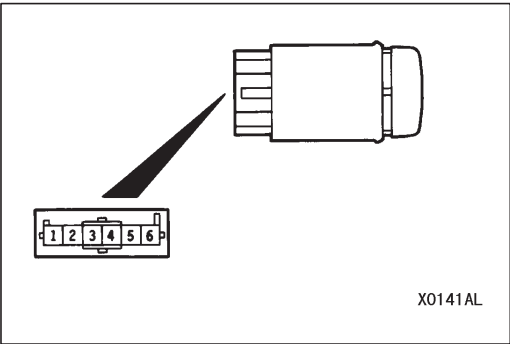
Fog lamp switch removal steps

1. Switch panel
2. Fog lamp switch

Rear combination lamp removal steps

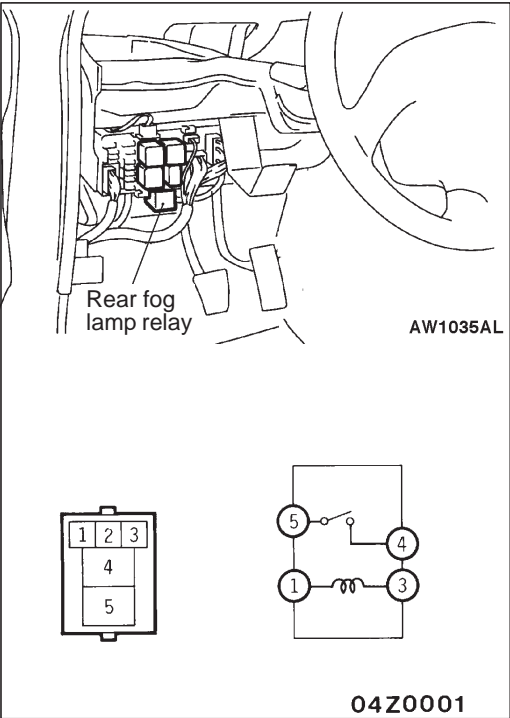
- Quarter trim removal and installation (Refer to GROUP 52A)
3. Rear combination lamp (Stop and back up lamp)

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					

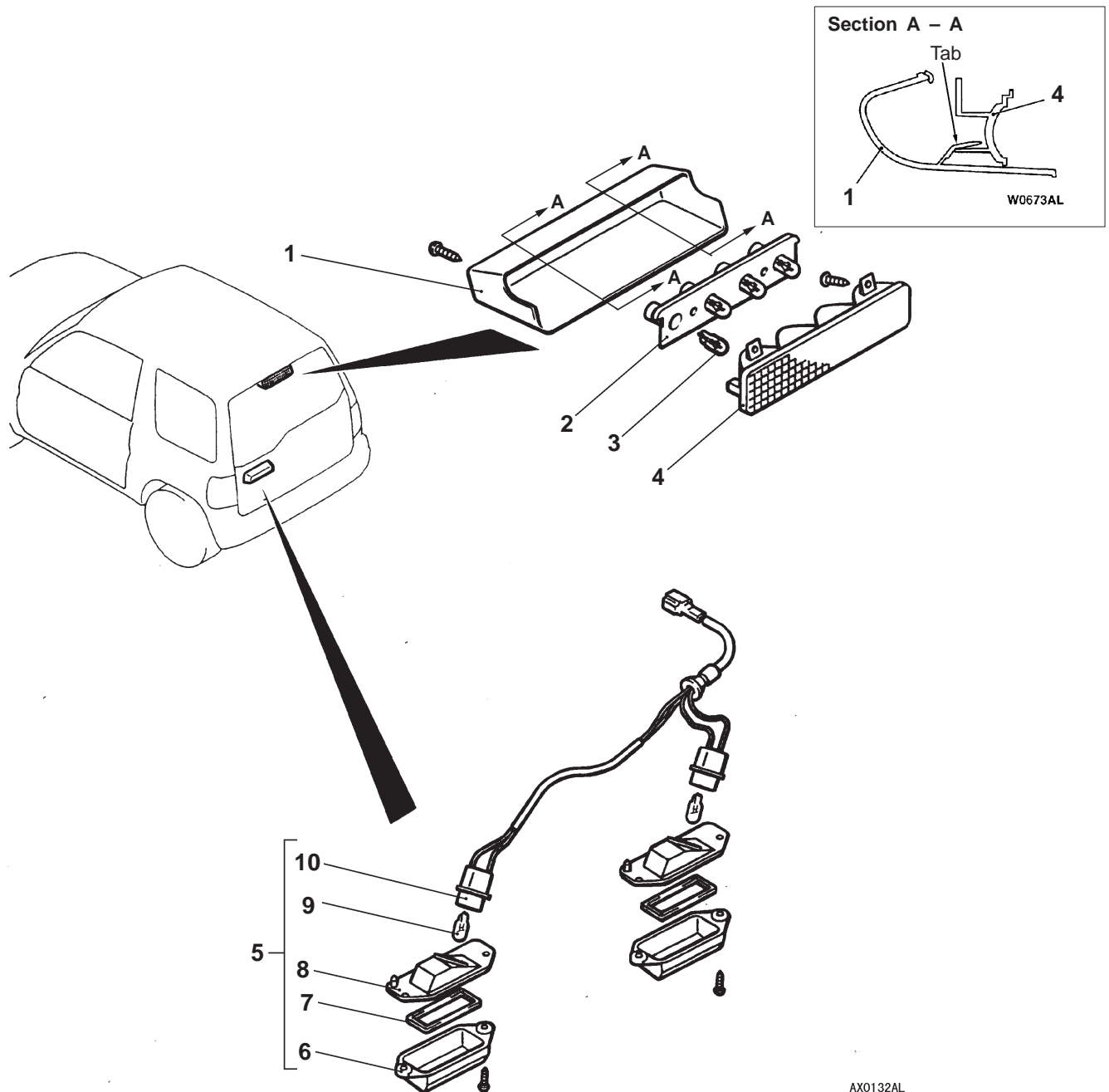


INSPECTION
REAR FOG LAMP RELAY CONTINUITY CHECK

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

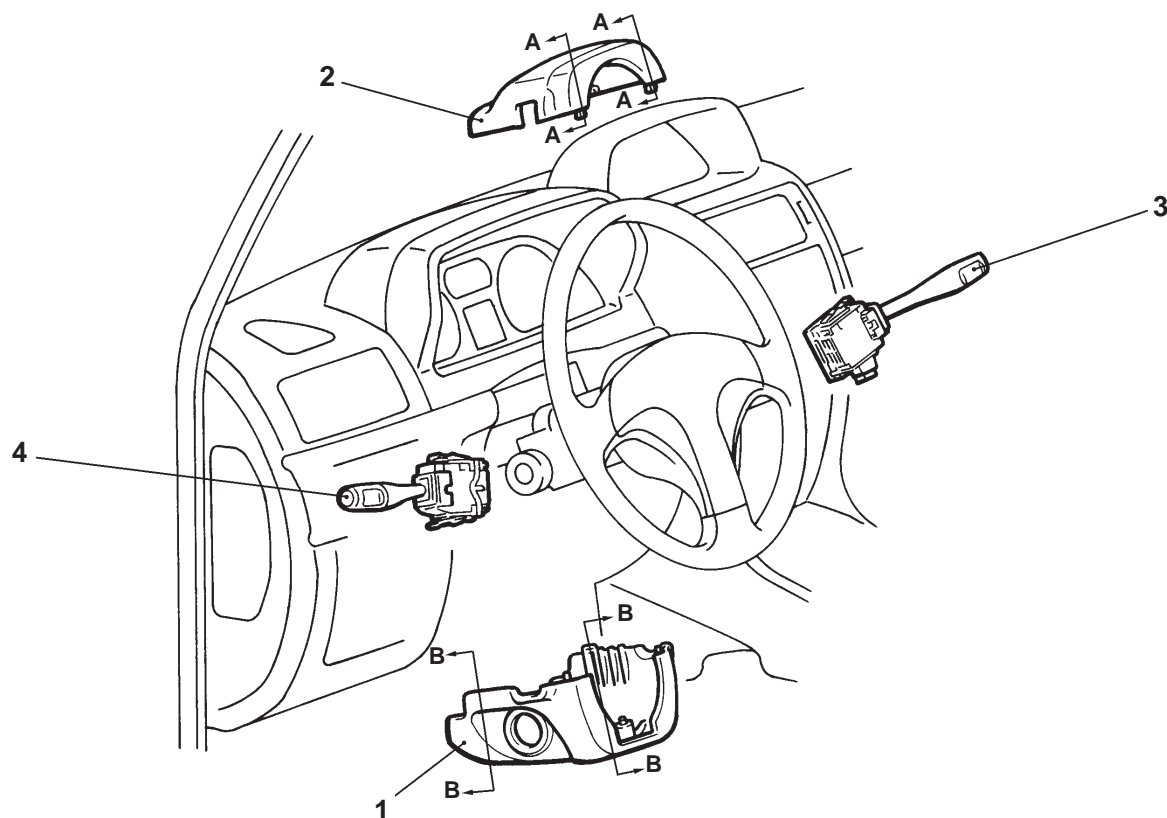
- Back door trim and waterproof film (Refer to GROUP 42.)

- 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

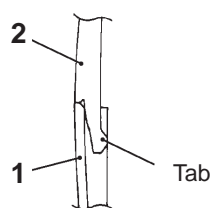
AX0132AL

COLUMN SWITCH

REMOVAL AND INSTALLATION

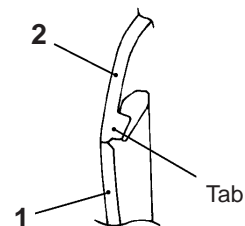


Section A – A



AW0329AL

Section B – B



AW0330AL

AW1051AL

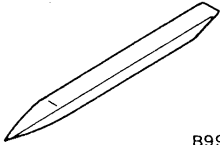
Removal steps

1. Column cover, lower
2. Column cover, upper

3. Wiper and washer switch
4. Lighting switch

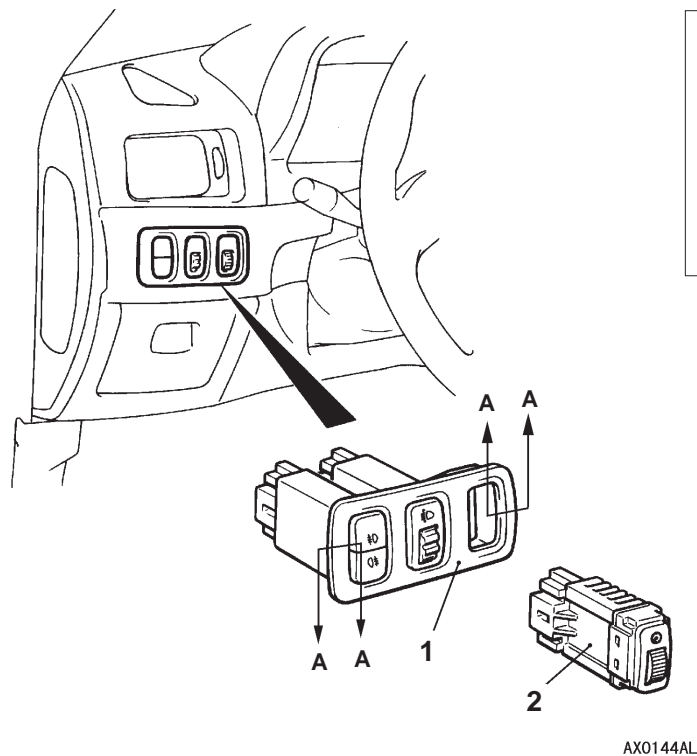
RHEOSTAT

SPECIAL TOOL

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

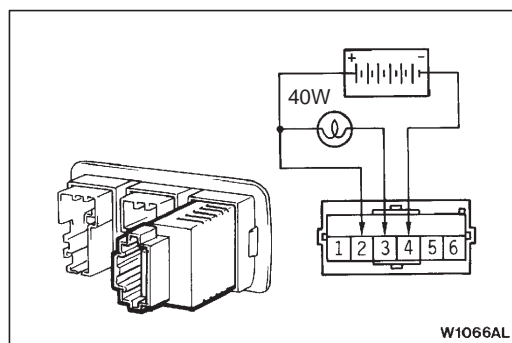
RHEOSTAT

REMOVAL AND INSTALLATION



Removal steps

1. Switch panel
2. Rheostat

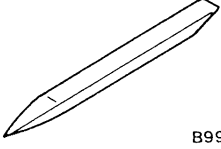


INSPECTION

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.

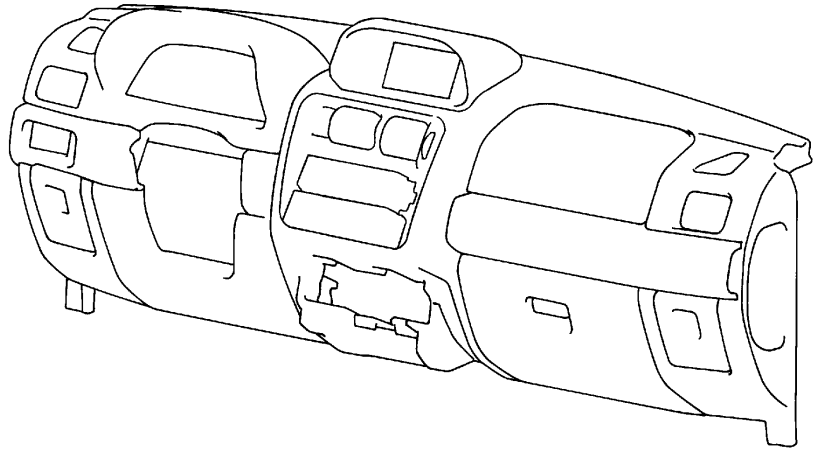
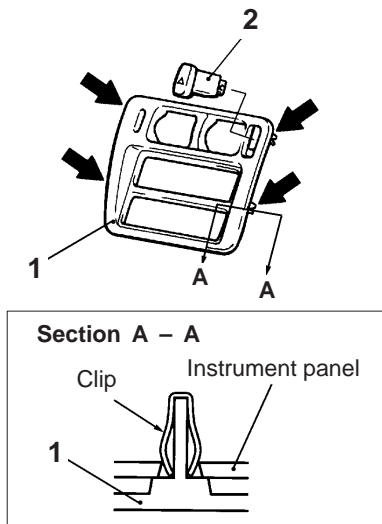
HAZARD WARNING LAMP SWITCH

SPECIAL TOOL

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

HAZARD WARNING LAMP SWITCH

REMOVAL AND INSTALLATION

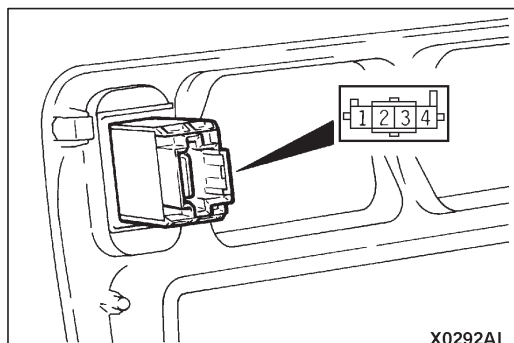


← : shows clips.

AW1049AL

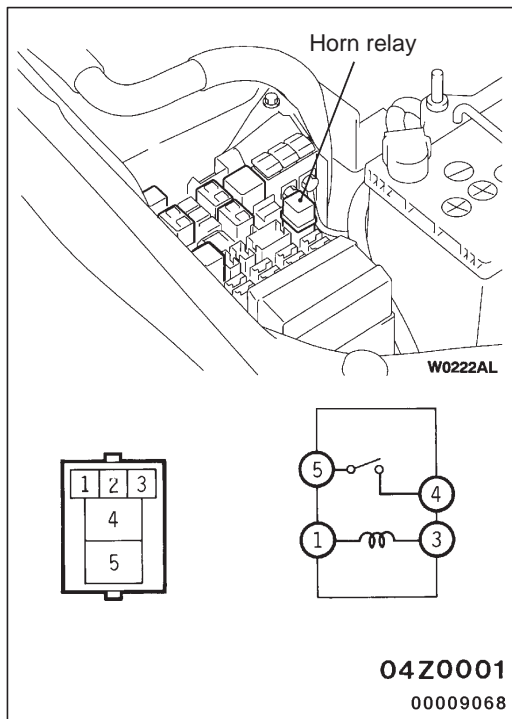
Removal steps

1. Center panel
2. Hazard warning lamp switch



INSPECTION

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



HORN

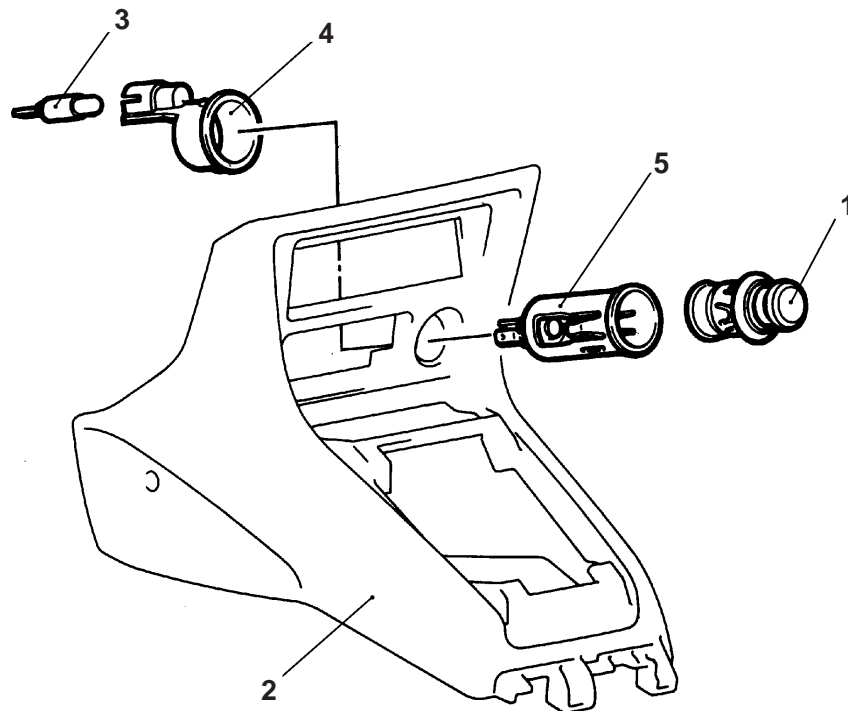
INSPECTION

HORN RELAY CONTINUITY CHECK

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

CIGARETTE LIGHTER

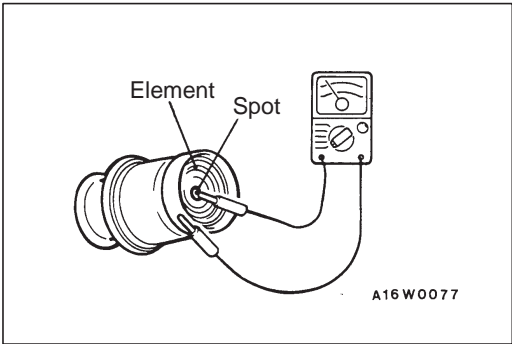
REMOVAL AND INSTALLATION



Removal steps

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

3. Bulb
4. Socket case
5. Socket



INSPECTION

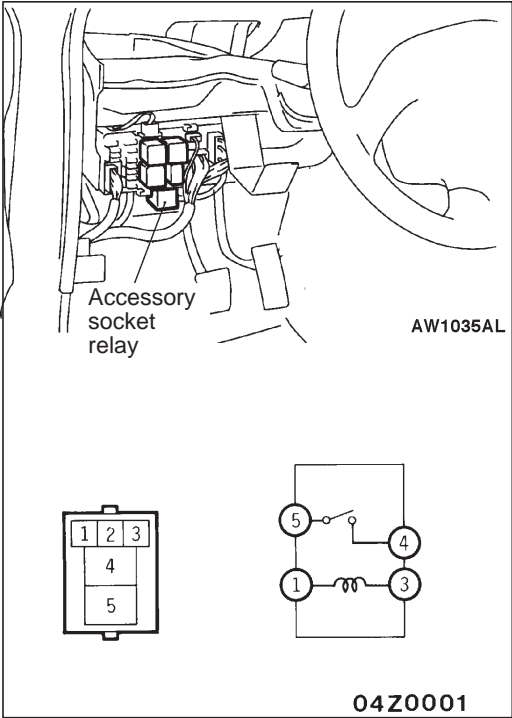
- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using a circuit tester, check the continuity of the element.

ACCESSORY SOCKET

INSPECTION

ACCESSORY SOCKET RELAY CONTINUITY CHECK

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



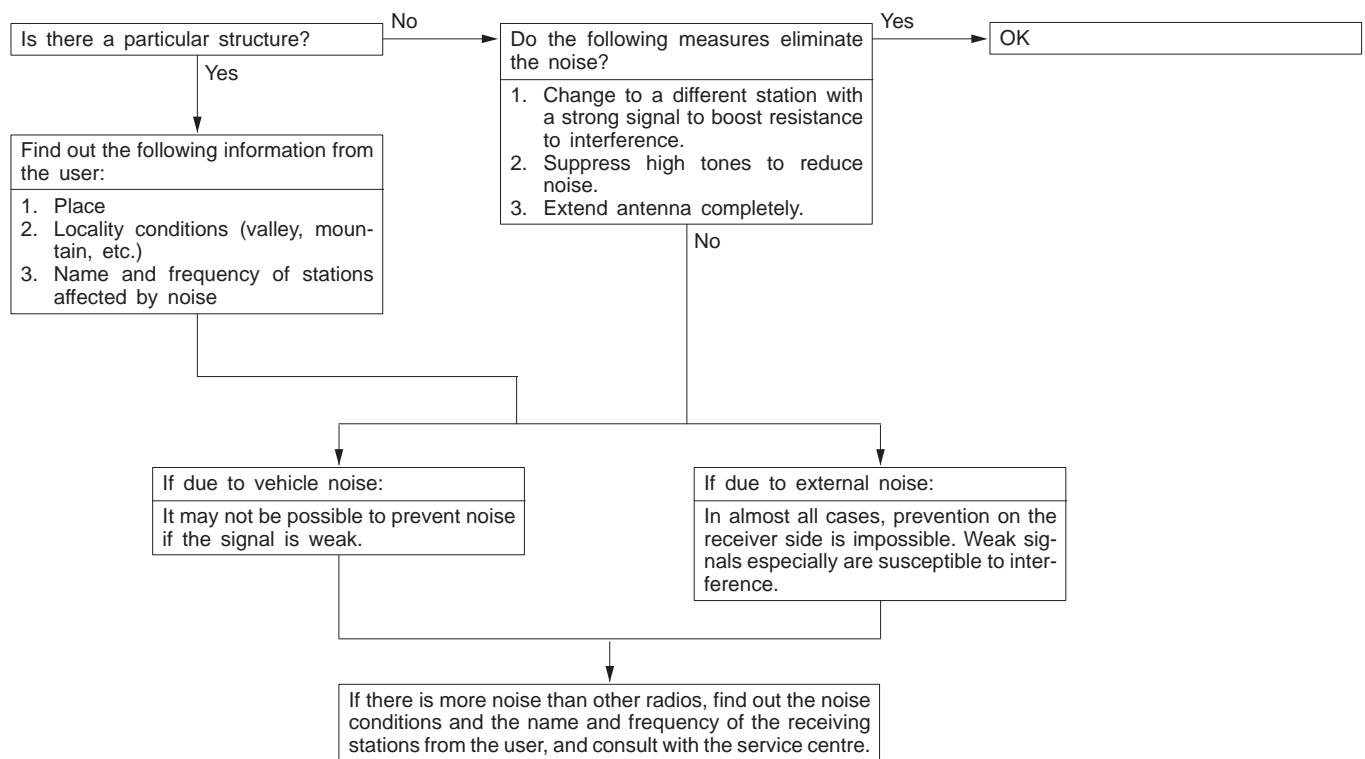
04Z0001

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.

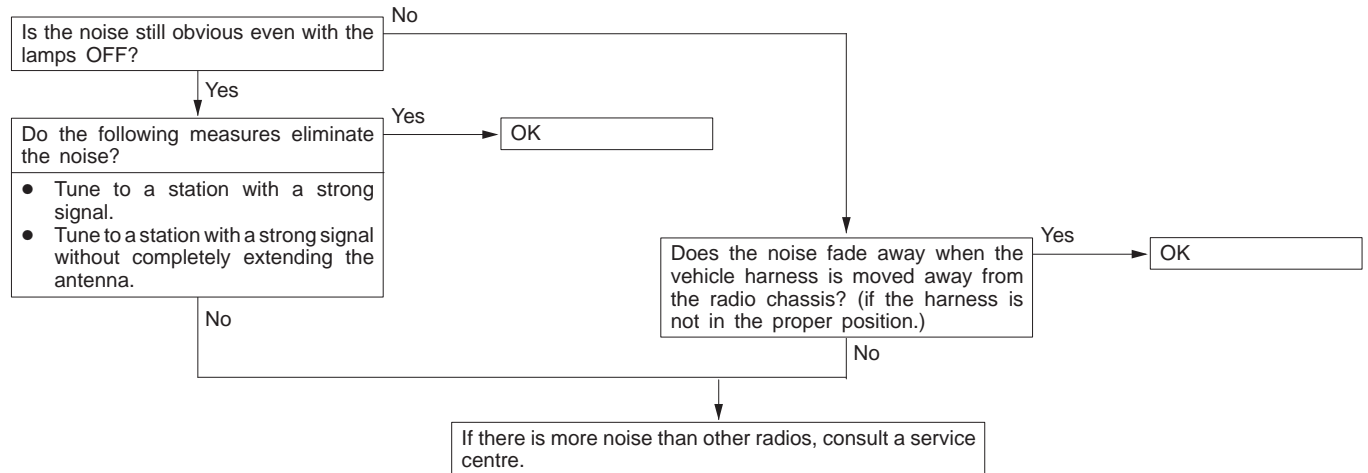
The following factors can be considered as possible causes of noise appearing at night.

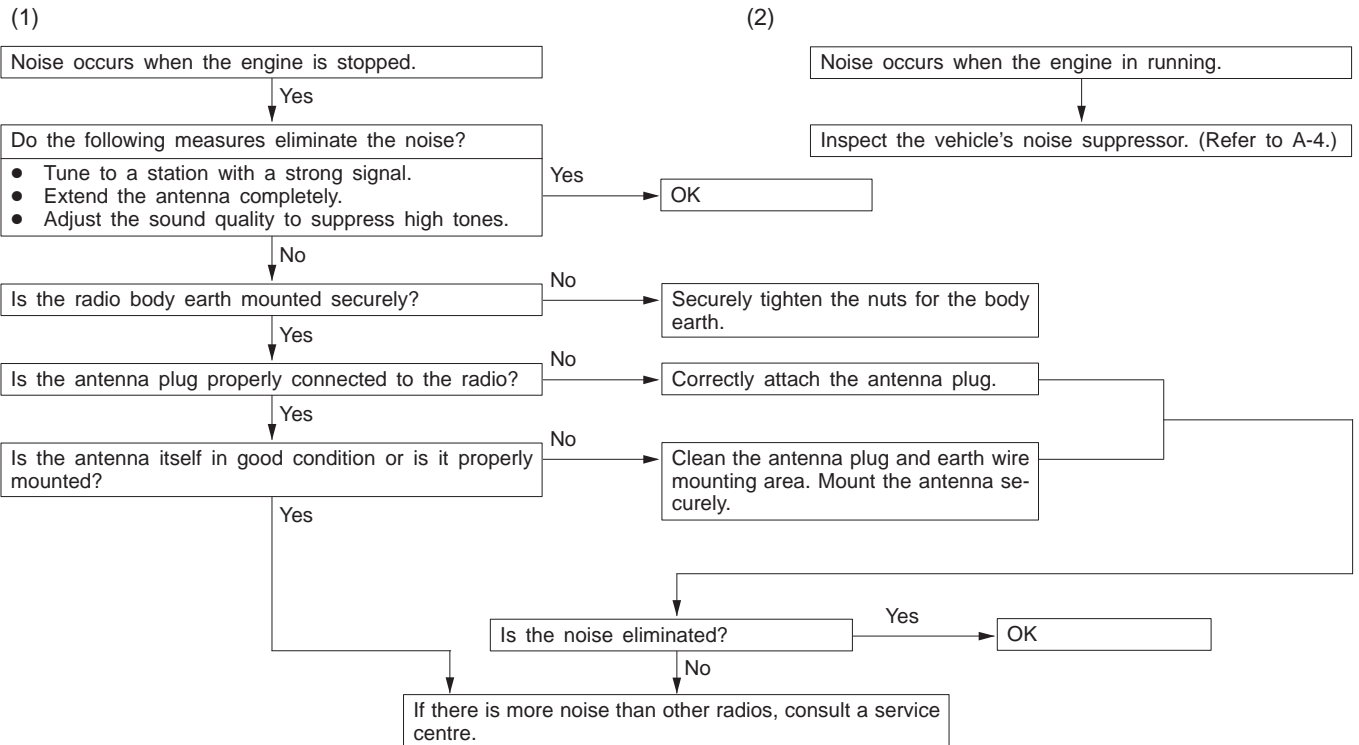
1. Factors due to signal conditions: Due to the fact that long-distance signals are more easily received at night, even stations that are received without problem during the day may experience interference in a general worsening of reception conditions. The weaker a station is the more susceptible it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

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.

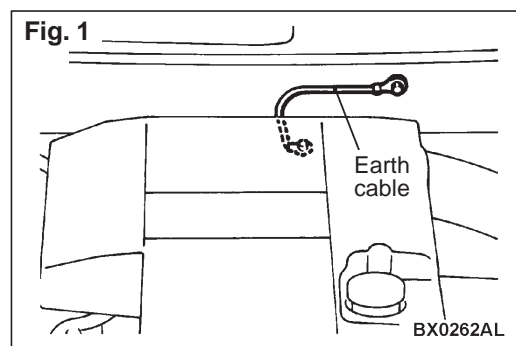
NOTE

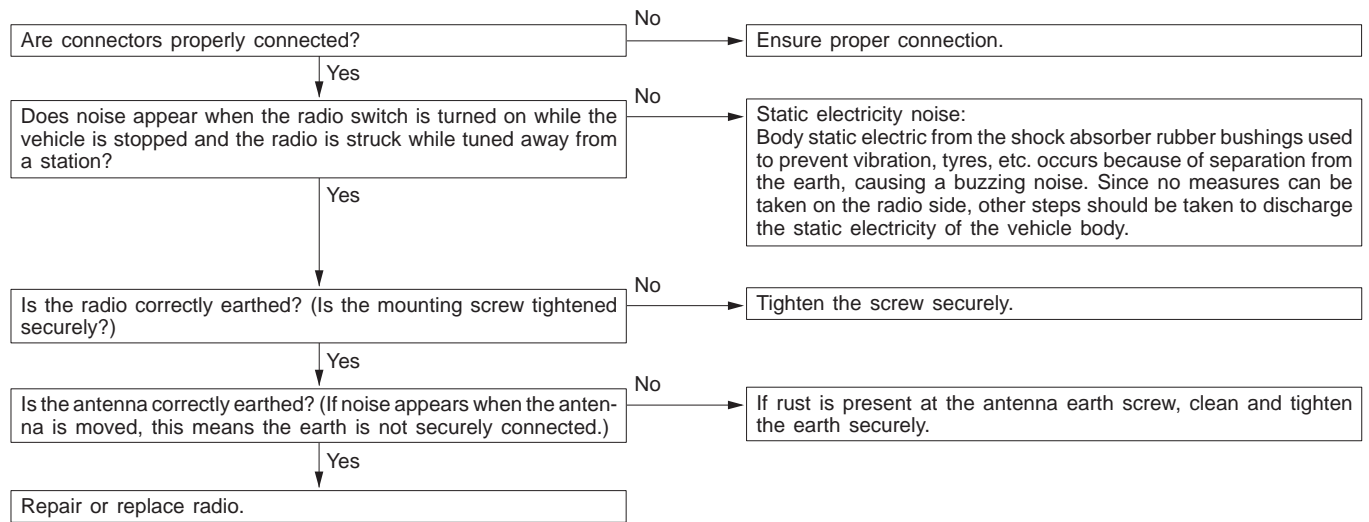
1. Capacitor
The capacitor does not pass D.C. current, but as the number of waves increases when it

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.

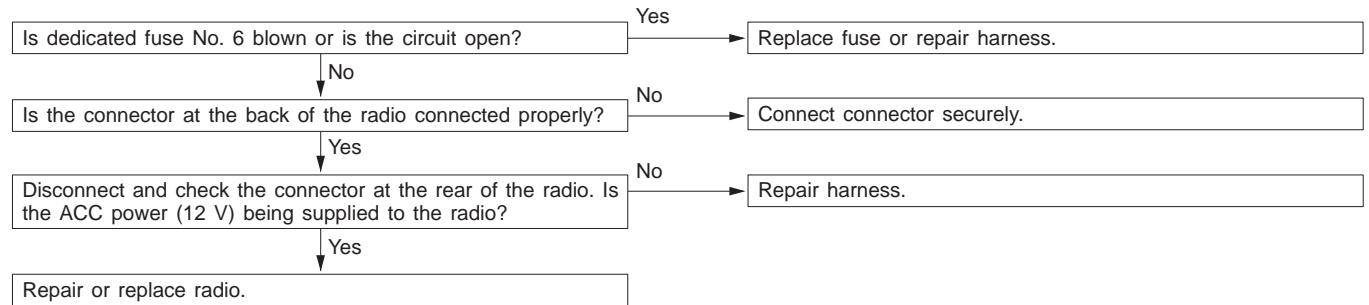
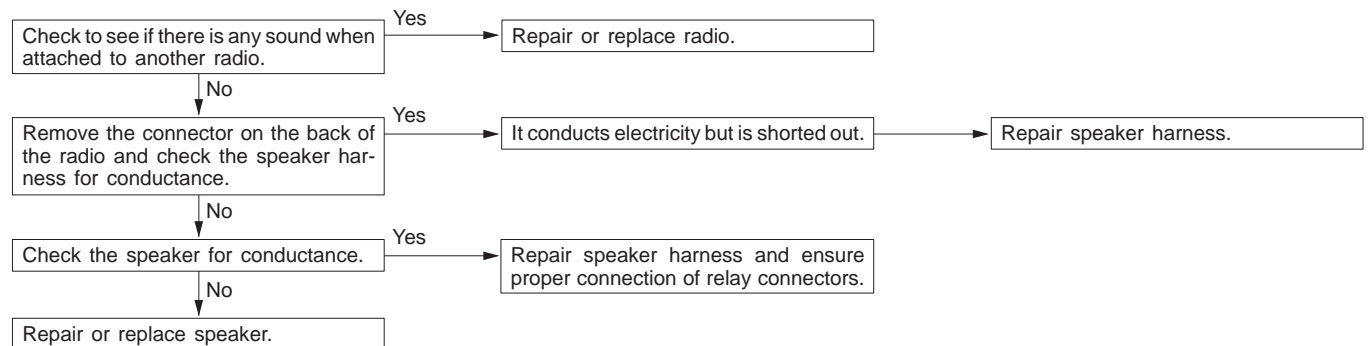


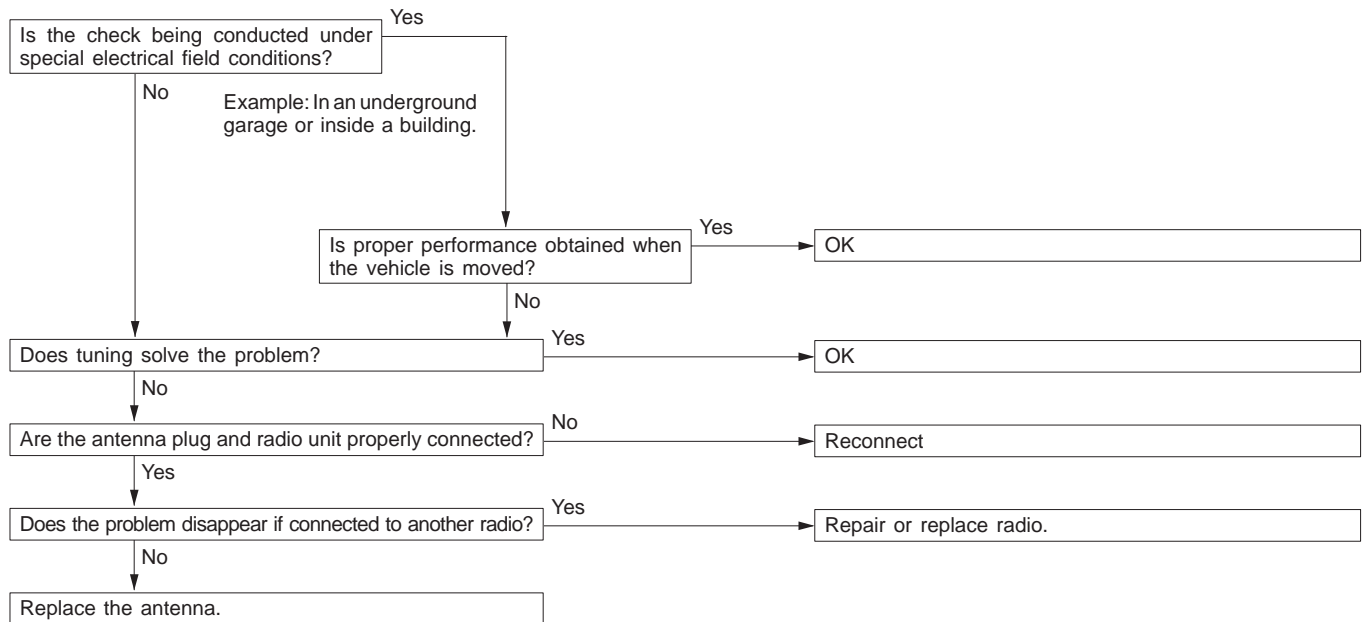
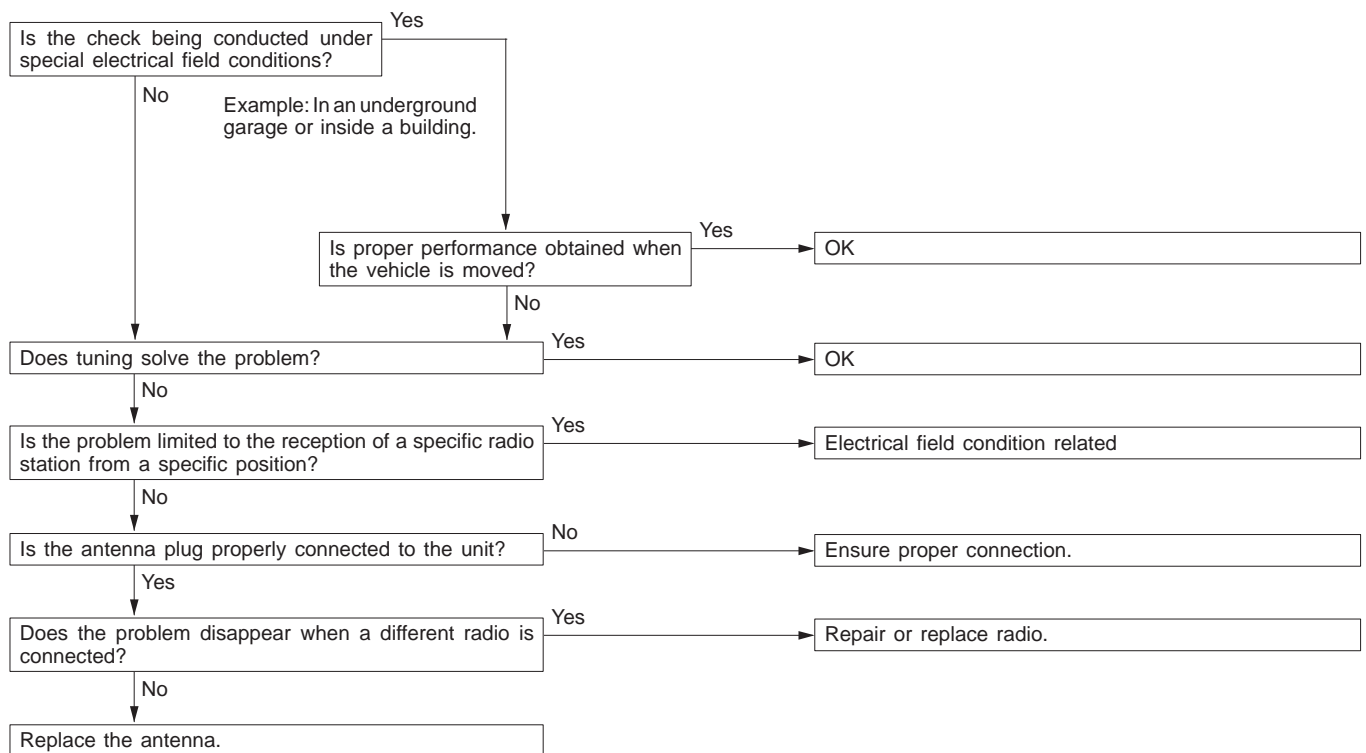
A-5 Some noise appears when there is vibration or shocks during travelling.**A-6 Ever-present noise.**

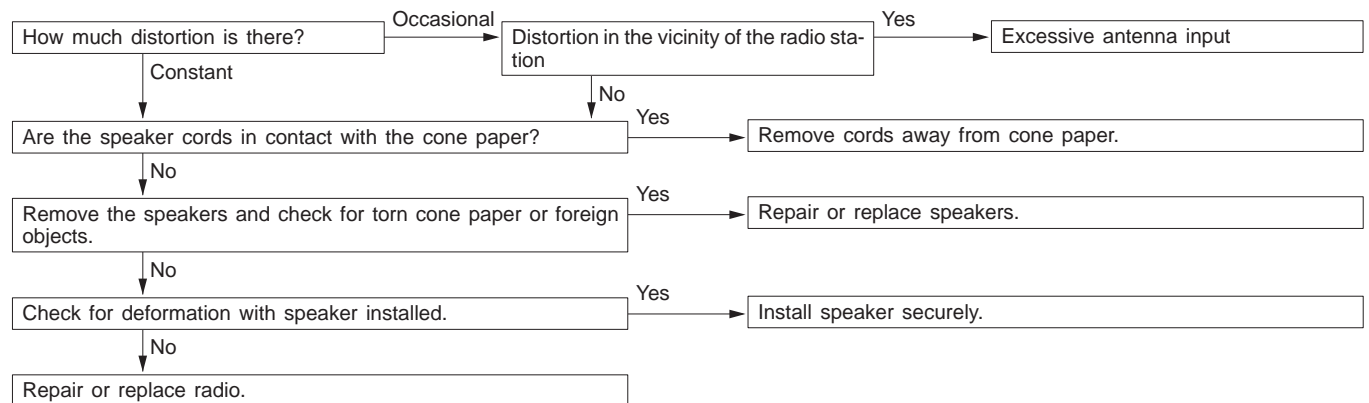
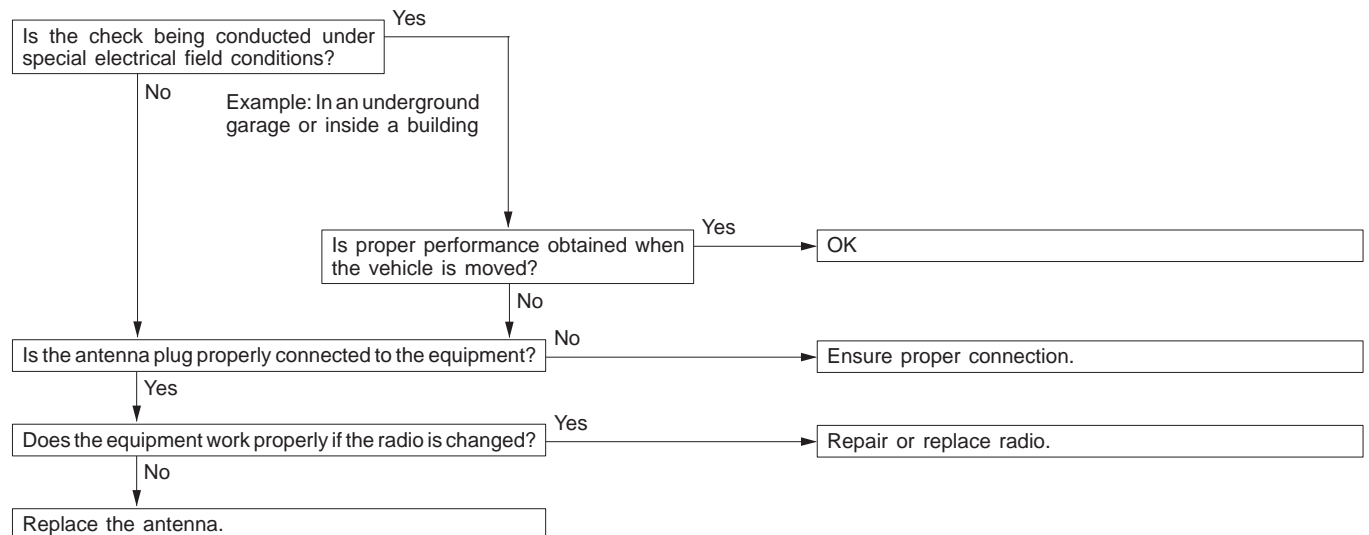
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

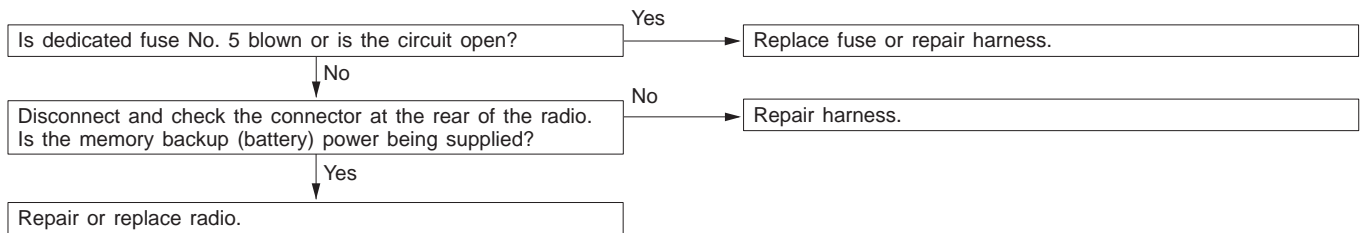
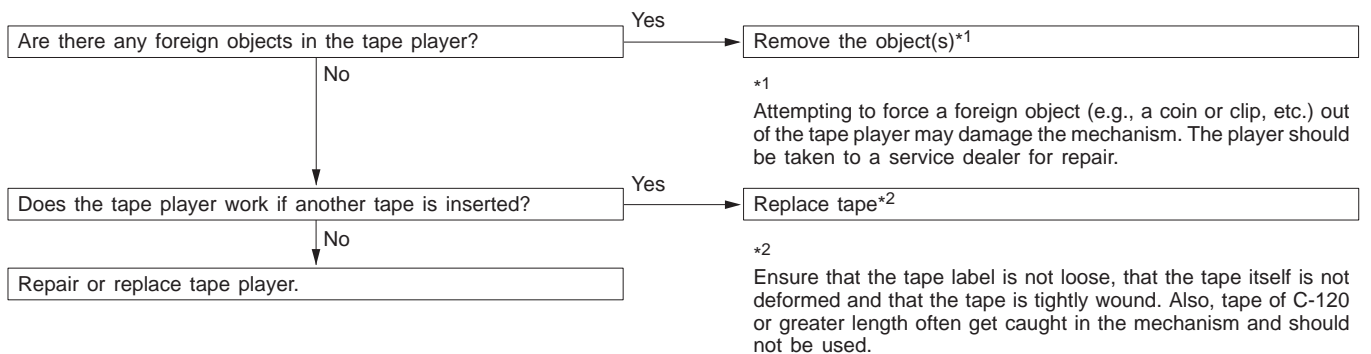
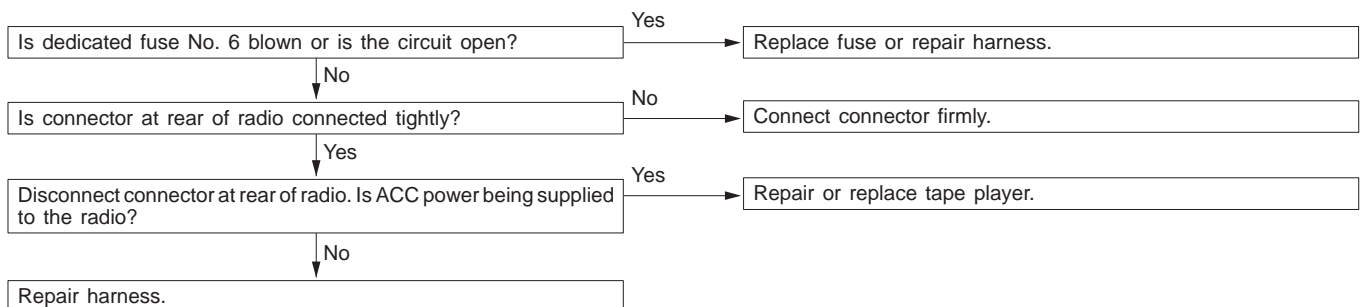
- Travelling conditions of the vehicle
- Terrain of area travelled through
- Surrounding buildings
- Signal conditions
- Time period

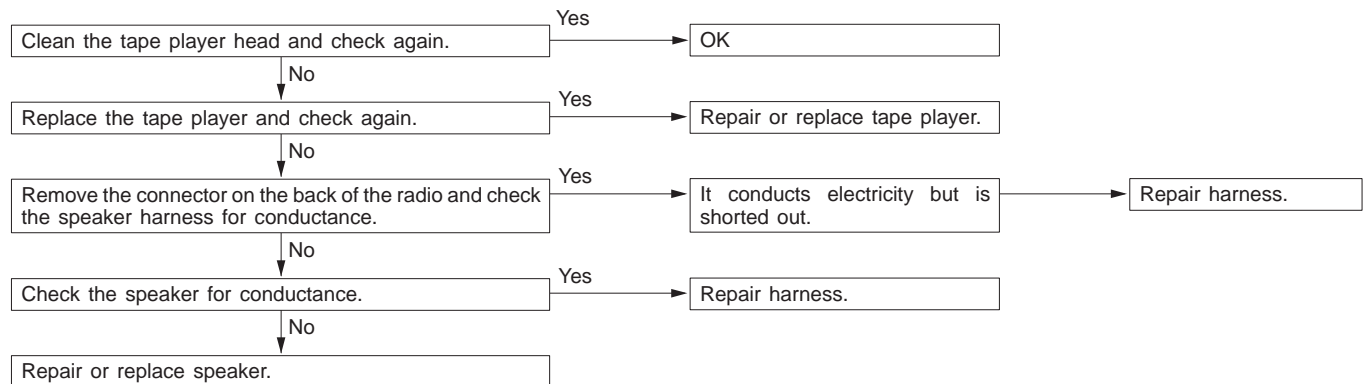
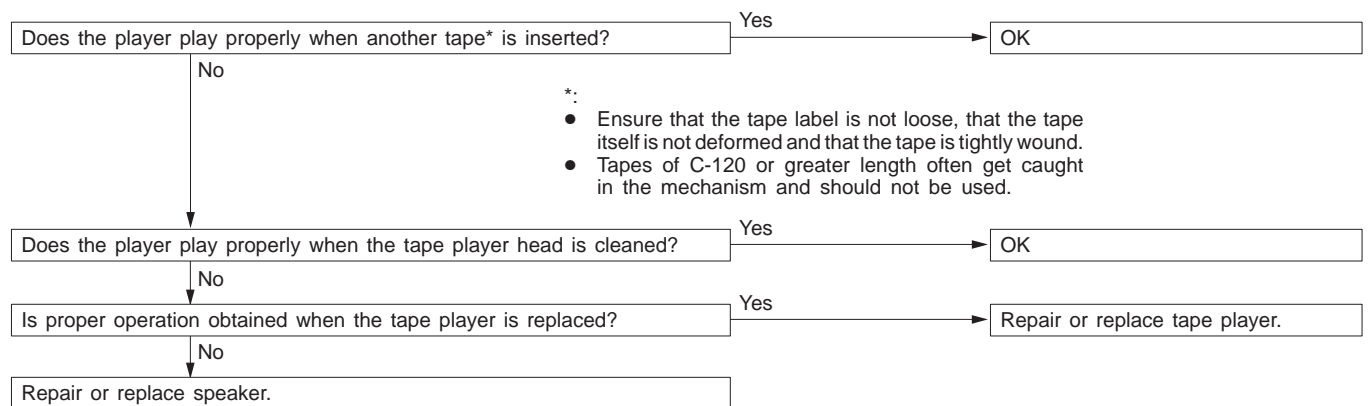
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with FM/MW/LW, the station names, frequencies, etc., and contact a service centre.

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.**

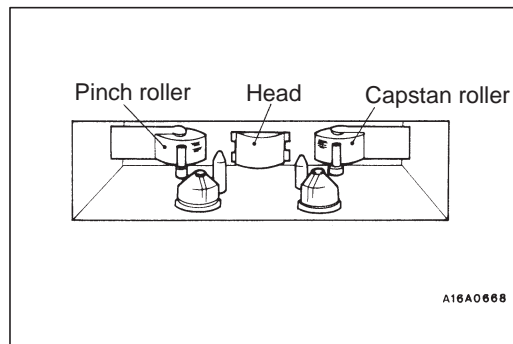
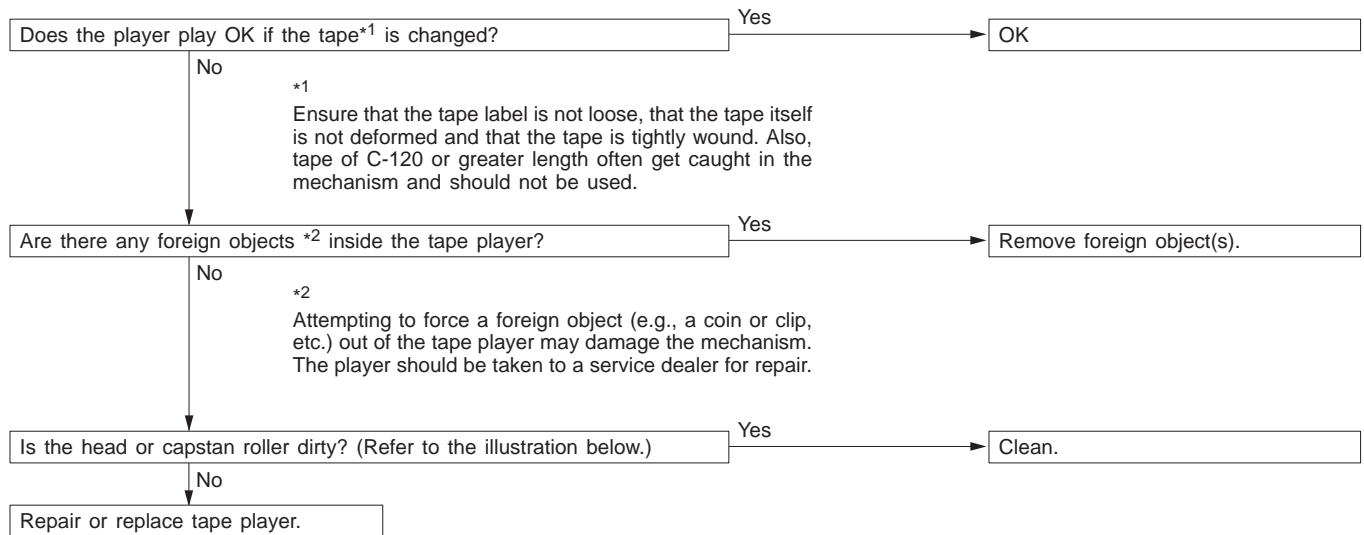
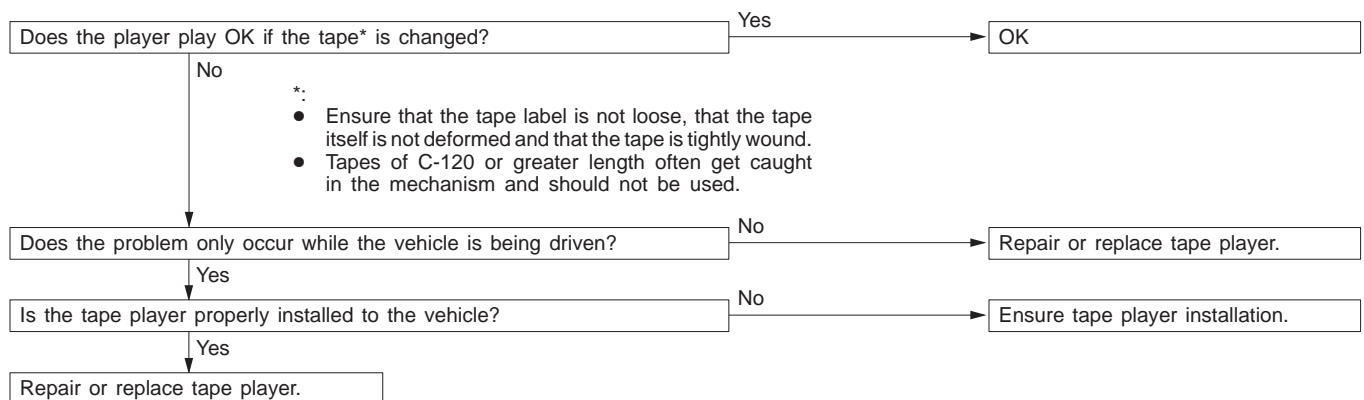
B-5 Distortion on FM/MW/LW.**B-6 Too few automatic select stations.**

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

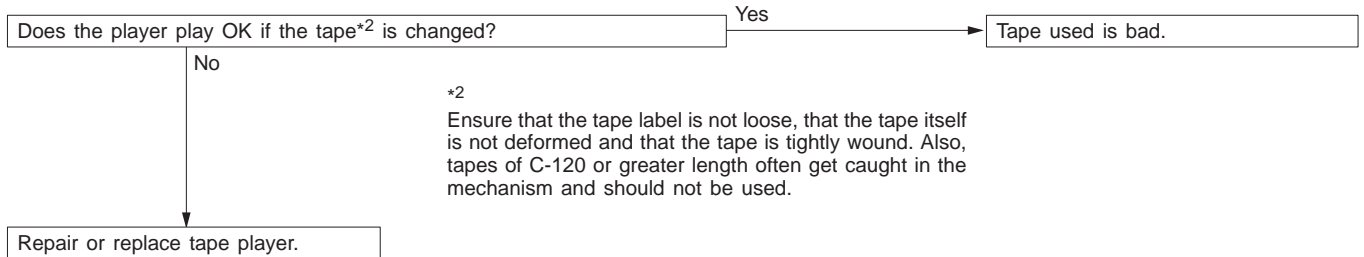
also possible, and attempting to force the tape out of the player can cause damage to the mechanism. The player should be taken to a service dealer for repair.

C-6 Uneven revolution. Tape speed is fast or slow.**C-7 Faulty auto reverse.**

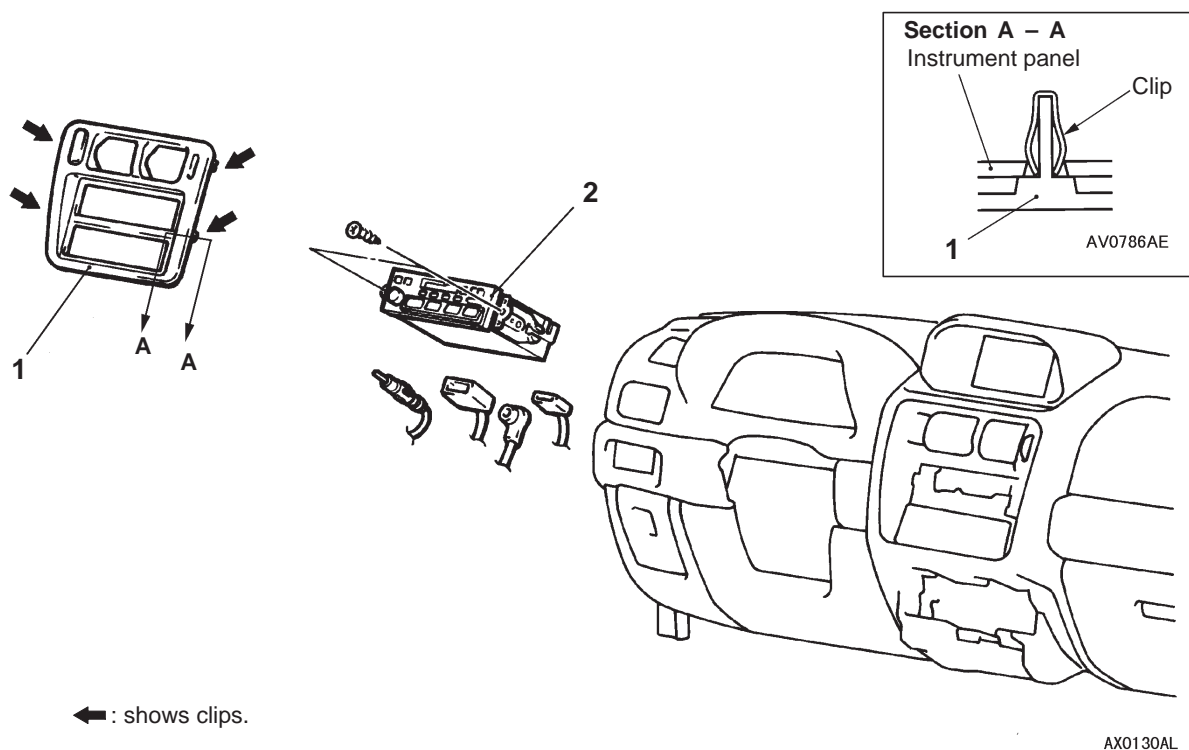
C-8 Tape gets caught in mechanism*1.

*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.



RADIO AND TAPE PLAYER REMOVAL AND INSTALLATION

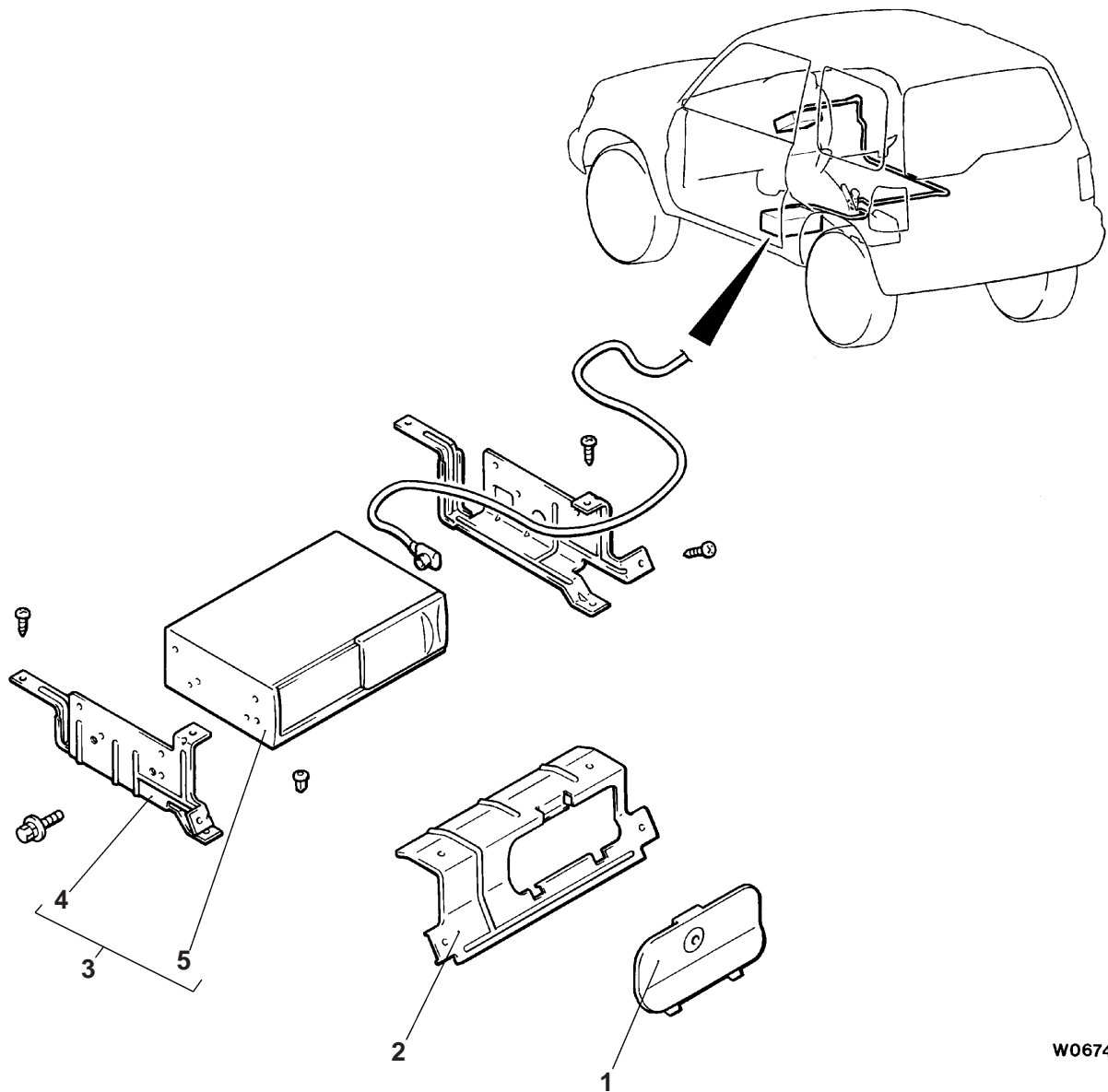


Removal steps

1. Center panel
2. Radio and tape player

CD AUTOCHANGER

REMOVAL AND INSTALLATION



W0674AL

Removal steps

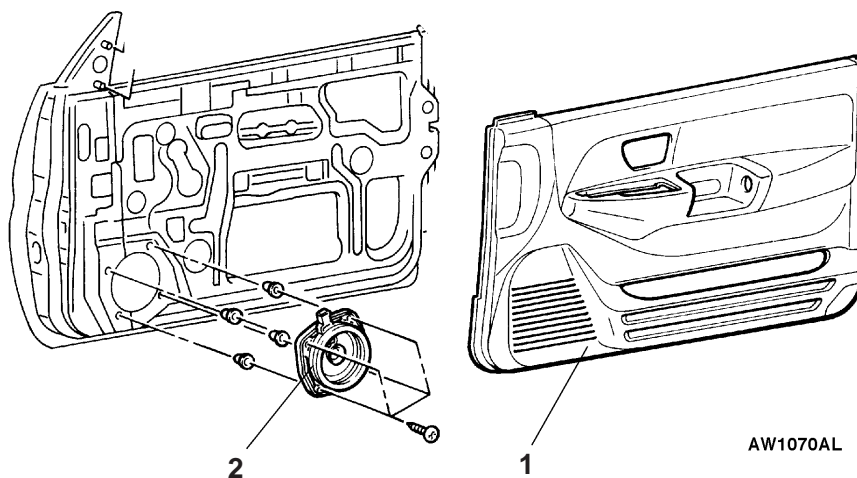
- Front seat (LH)
- 1. Lid
- 2. Cover

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

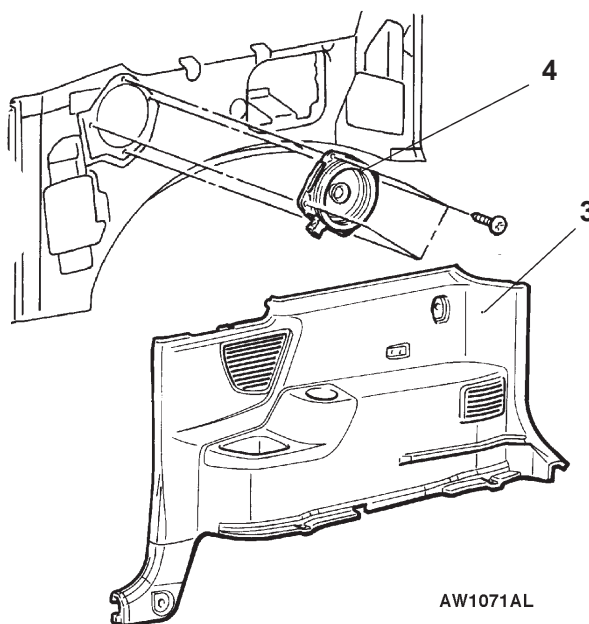
SPEAKER

REMOVAL AND INSTALLATION

<Front speaker>



<Rear speaker>



Front speaker removal steps

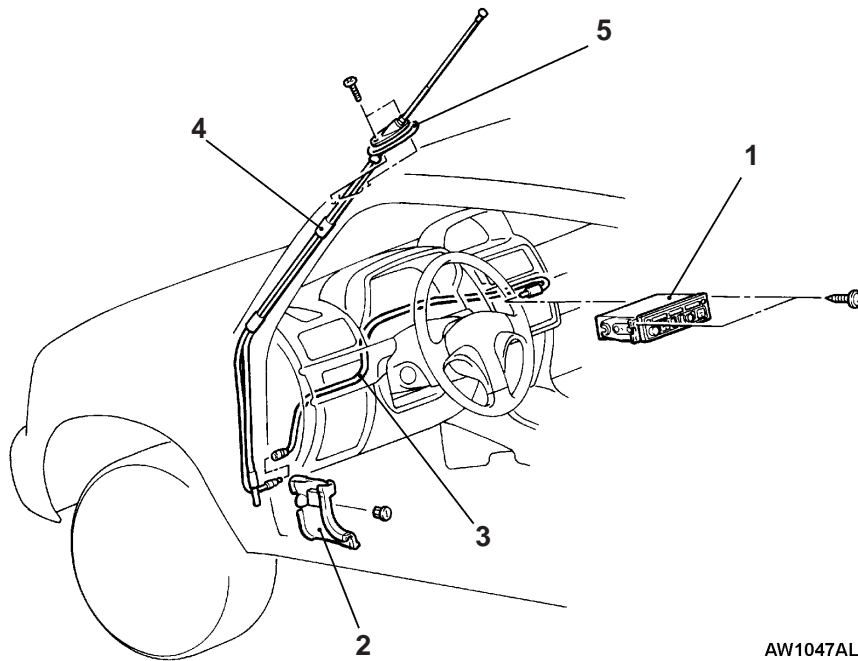
1. Front door trim (Refer to GROUP 42.)
2. Speaker

Rear speaker removal steps

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

ANTENNA

REMOVAL AND INSTALLATION

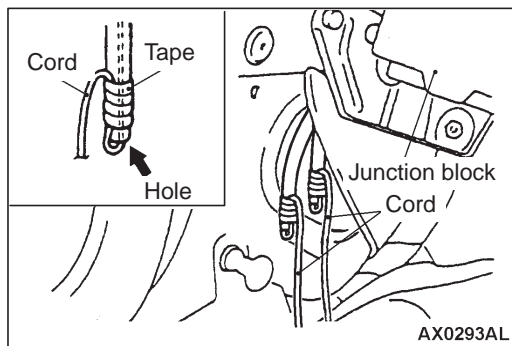


Removal steps

1. Radio and tape player (Refer to P.54-61.)
 - Instrument under cover (Refer to GROUP 52A.)
2. Cowl side trim (Refer to GROUP 52A)



3. Antenna assembly
4. Antenna base
 - Instrument panel (Refer to GROUP 52A)
5. Antenna feeder



REMOVAL SERVICE POINT

◀A▶ ANTENNA ASSEMBLY REMOVAL

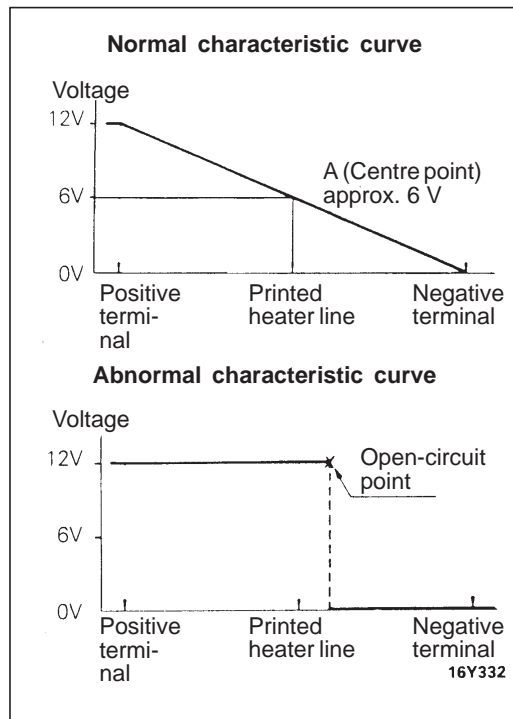
Observe the following steps to make the feeder cable of the antenna to be routed easily during reinstallation.

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.

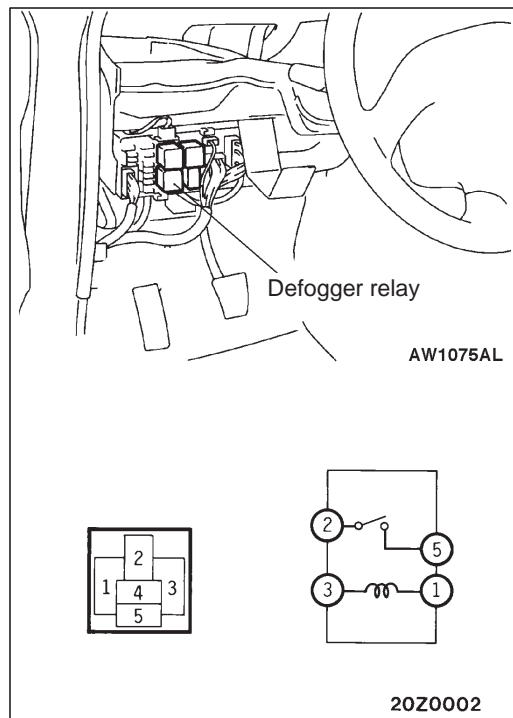


REAR WINDOW DEFOGGER

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.

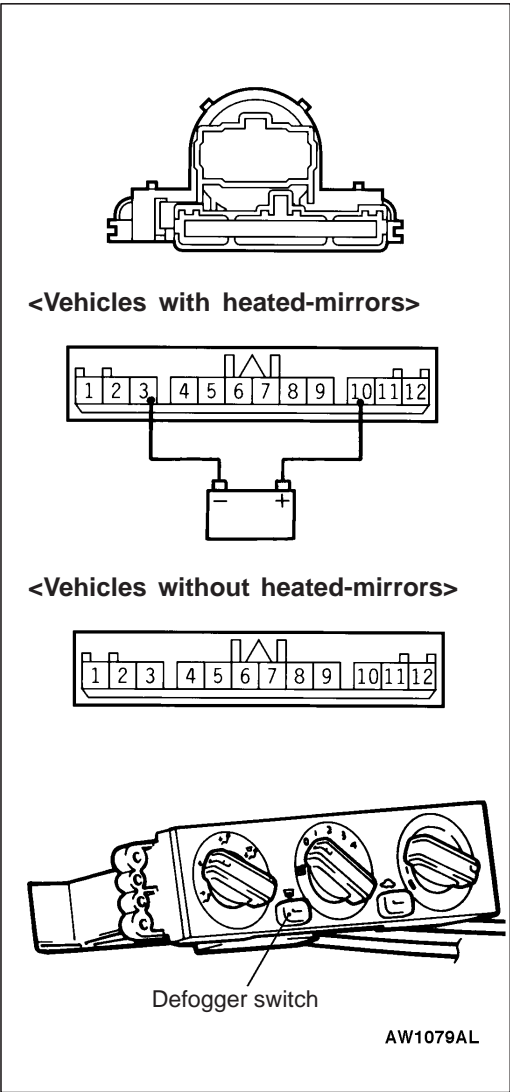


REAR WINDOW DEFOGGER RELAY CONTINUITY CHECK

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

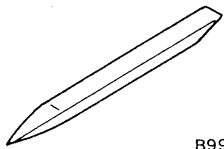
Turn on the defogger switch, and then check that there is continuity between the terminals 3 and 12 for 9 to 13 minutes and after it, the defogger switch is turned off.

<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).

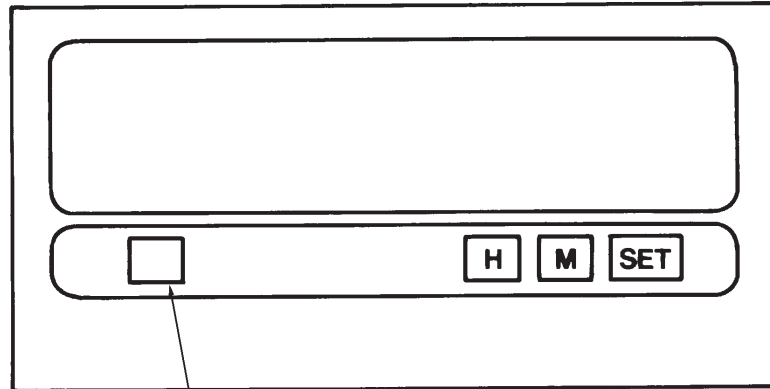
4. Service Mode For Multi-center Display

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.



AX0100BN

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

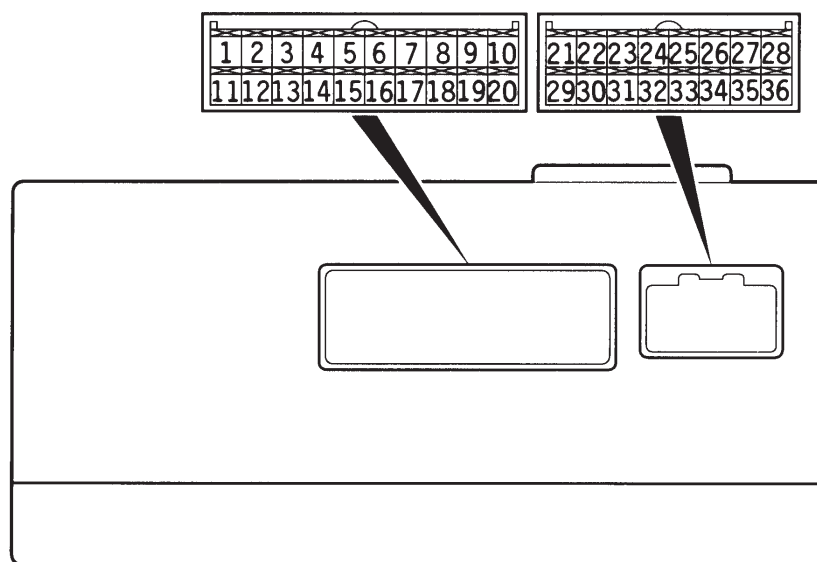
This screen shows voltage signals from the outside temperature sensor, the fuel gauge unit, and the ignition switch as well as fuel economy.

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.

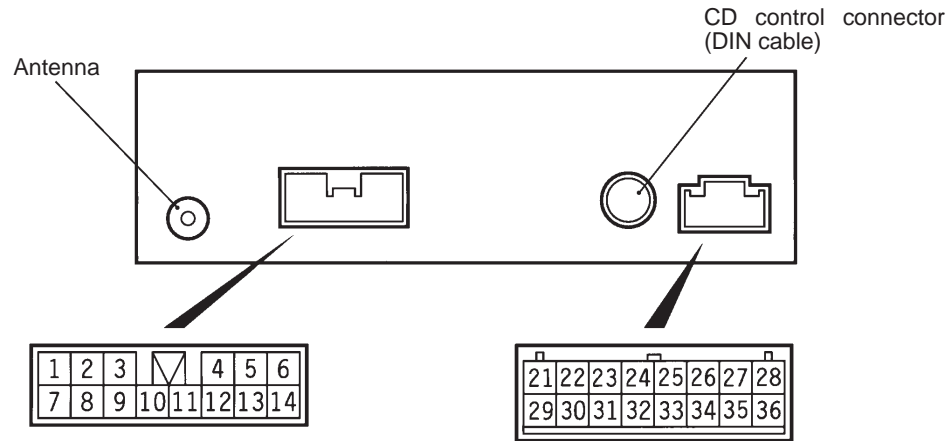
When the "SET" button is pressed once in this screen, the service mode will return to the first screen (model identification screen).

MAIN UNIT TERMINAL VOLTAGES
1. MULTI-CENTER DISPLAY UNIT

W0278AJ

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 does not appear. Panel switch cannot be operated for audio unit. Nighttime illumination does 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.

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	–	–	–	–	–	–

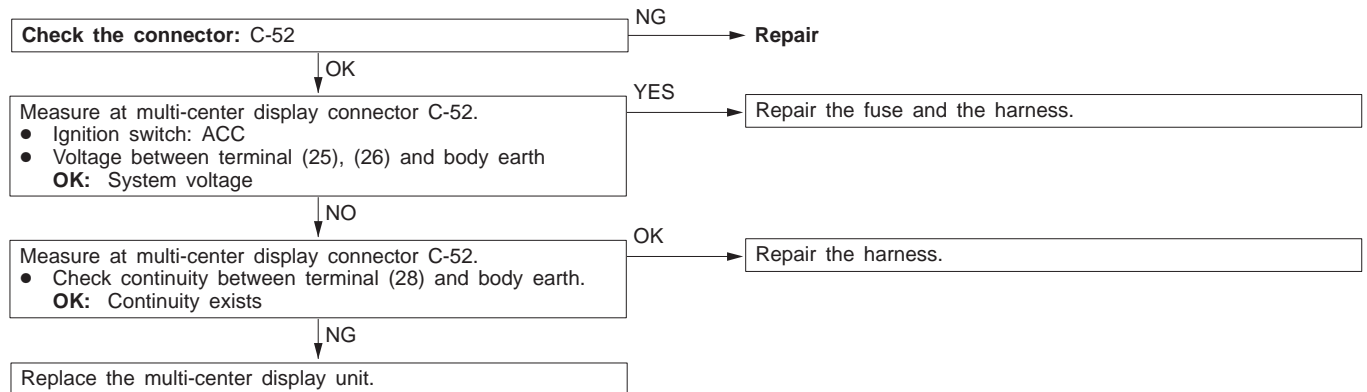
INSPECTION CHART CLASSIFIED BY TROUBLE SYMPTOMS

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

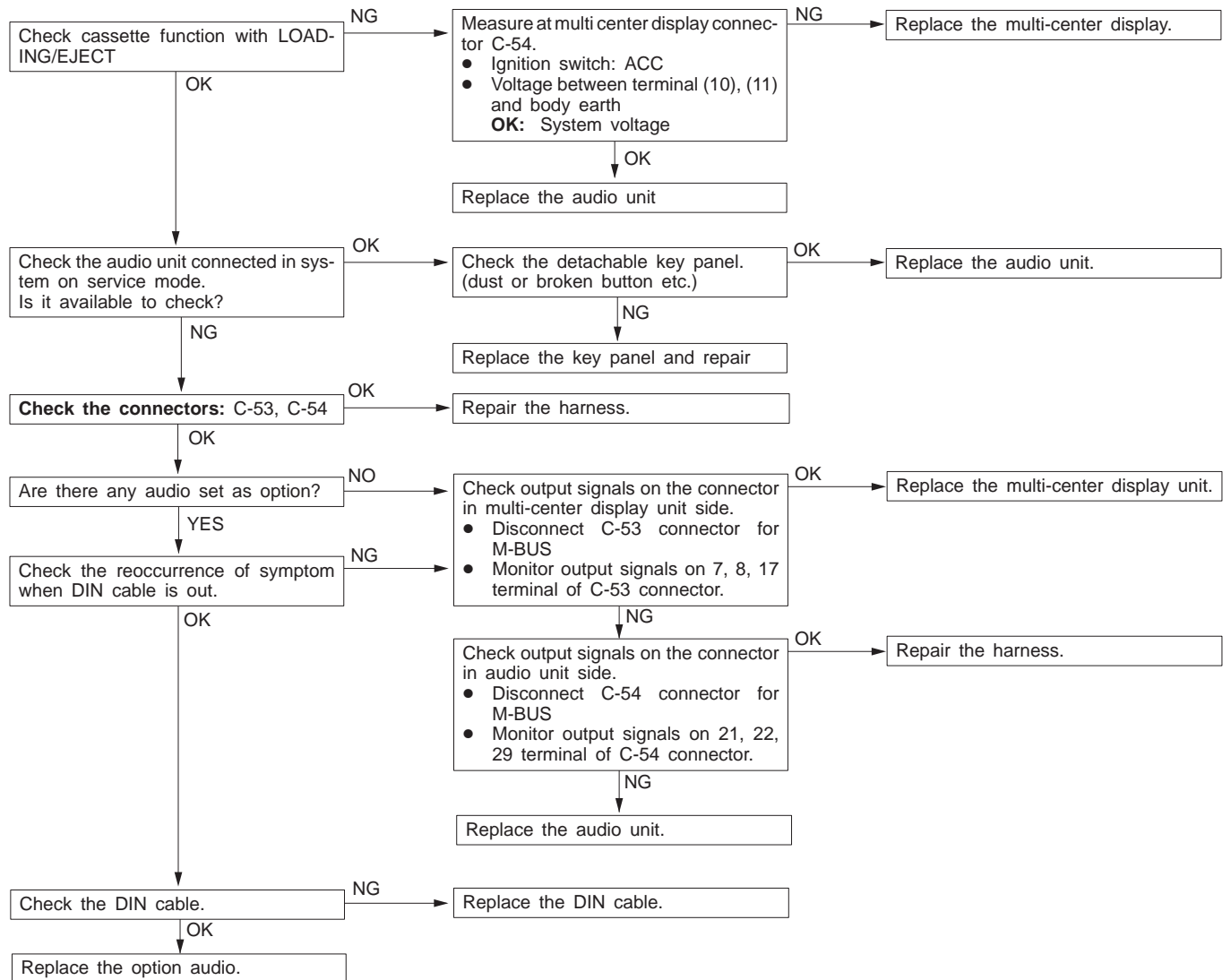
INSPECTION PROCEDURE 1

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



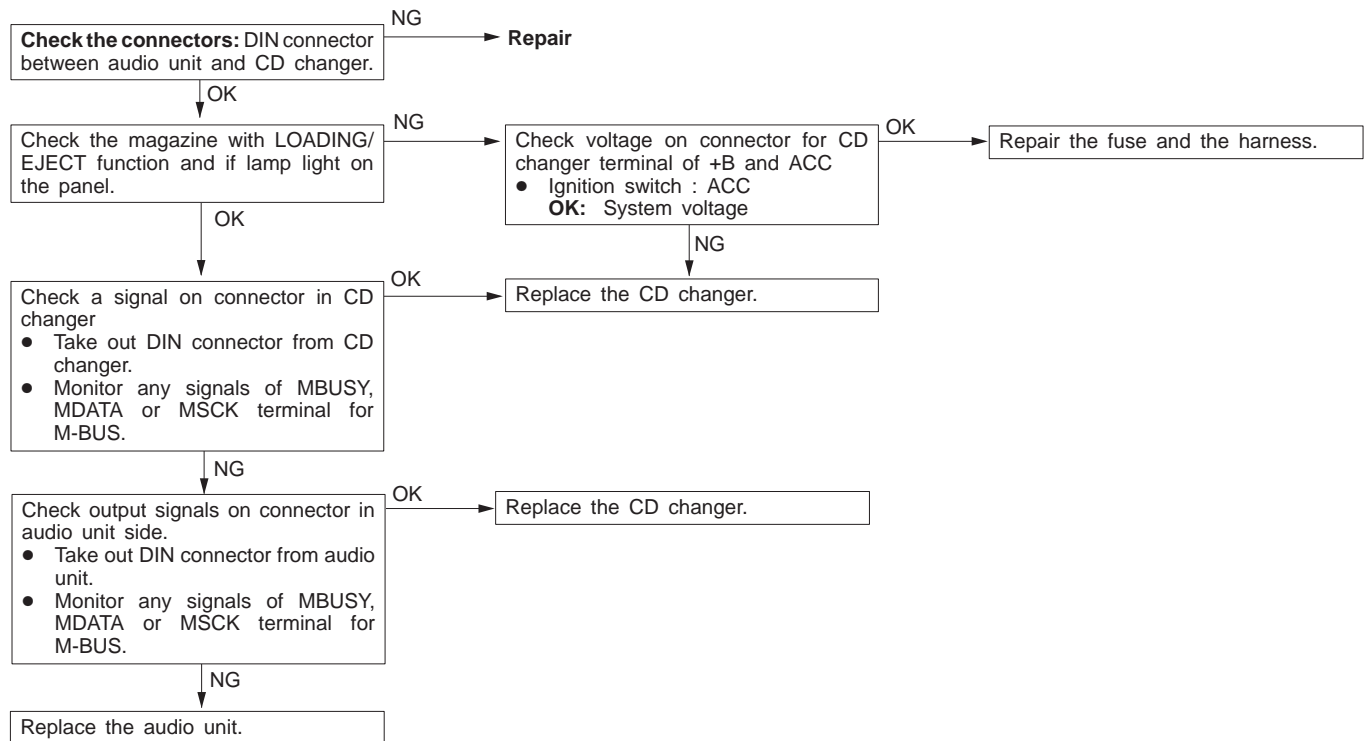
INSPECTION PROCEDURE 2

TAPE/CD, UML switches do not work.



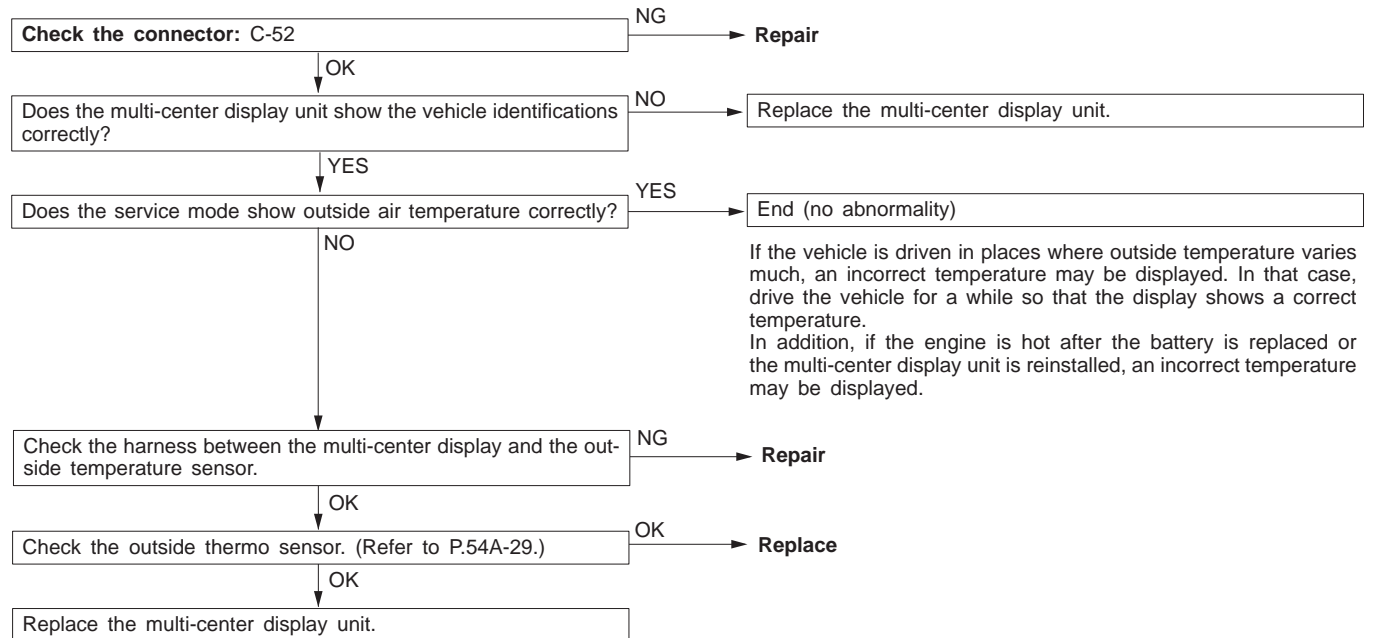
INSPECTION PROCEDURE 3

CD switch do not work.



INSPECTION PROCEDURE 4

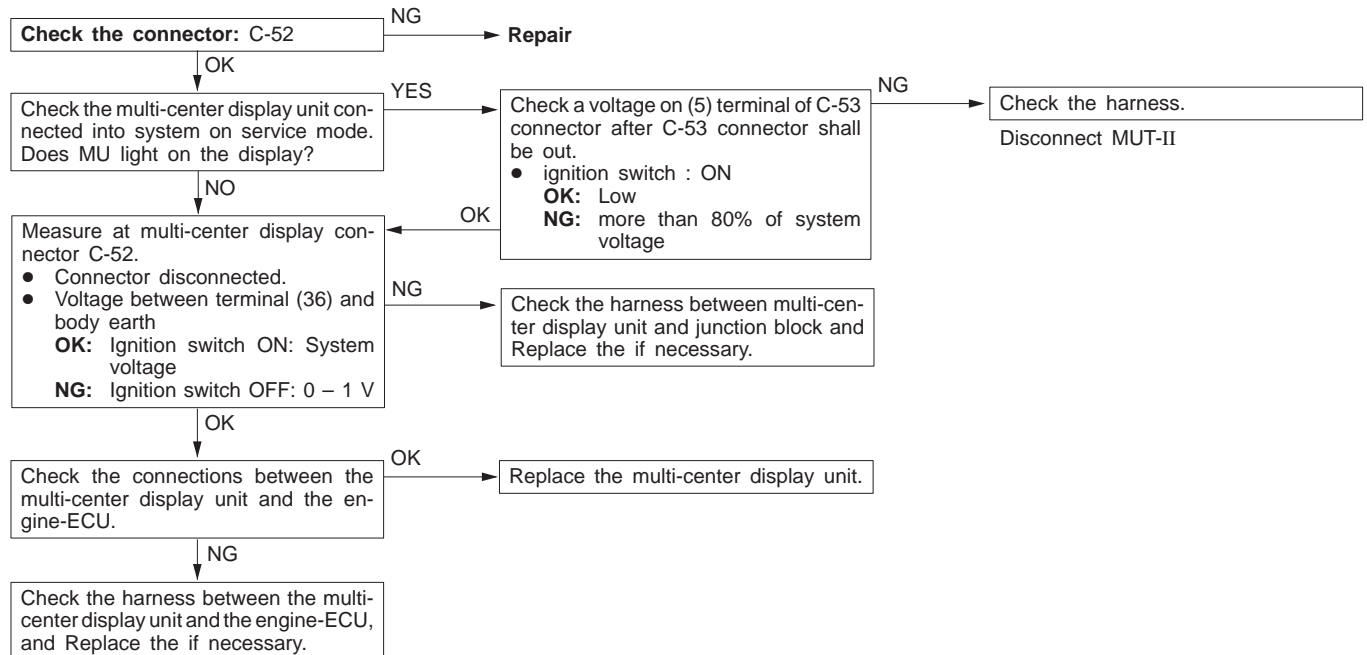
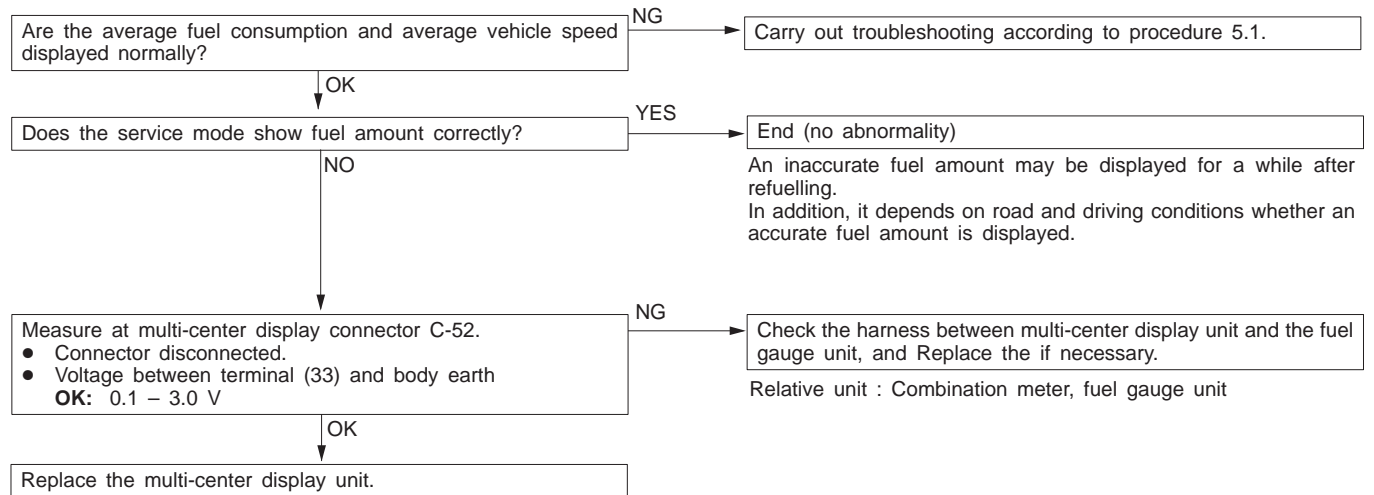
Outside air temperature data is not displayed. /Outside air temperature data is abnormal.



INSPECTION PROCEDURE 5

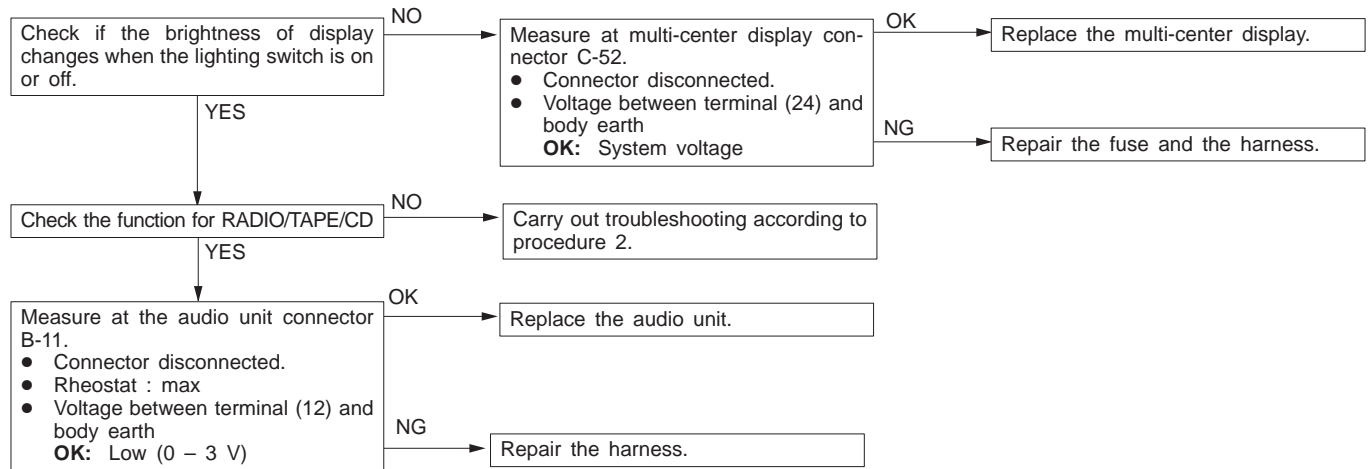
Abnormal driving data displays.

- 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.**

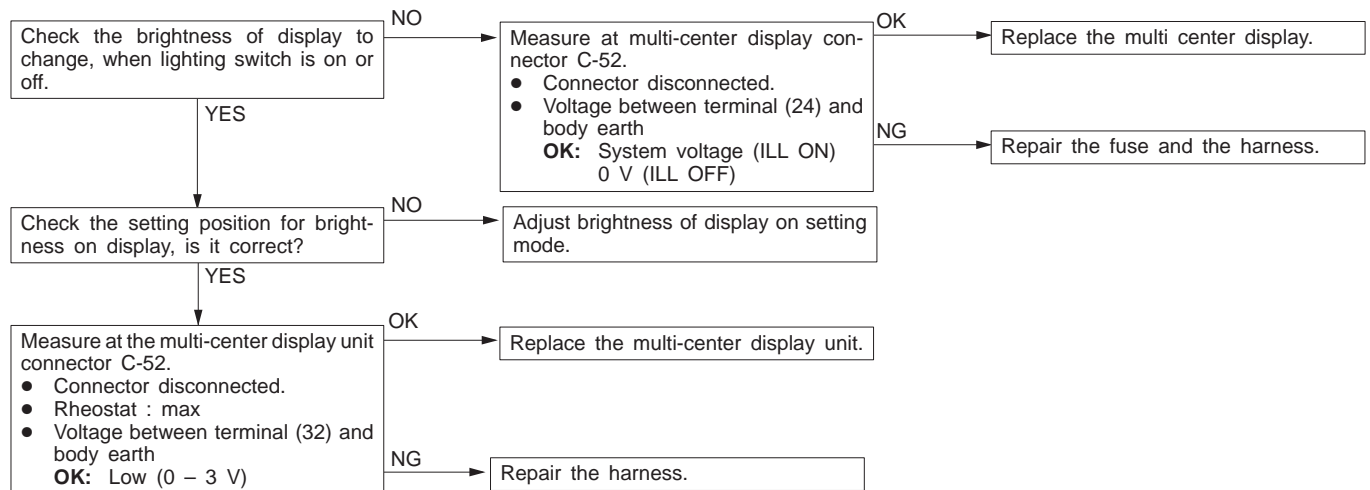
INSPECTION PROCEDURE 6

No illumination for audio buttons light on.



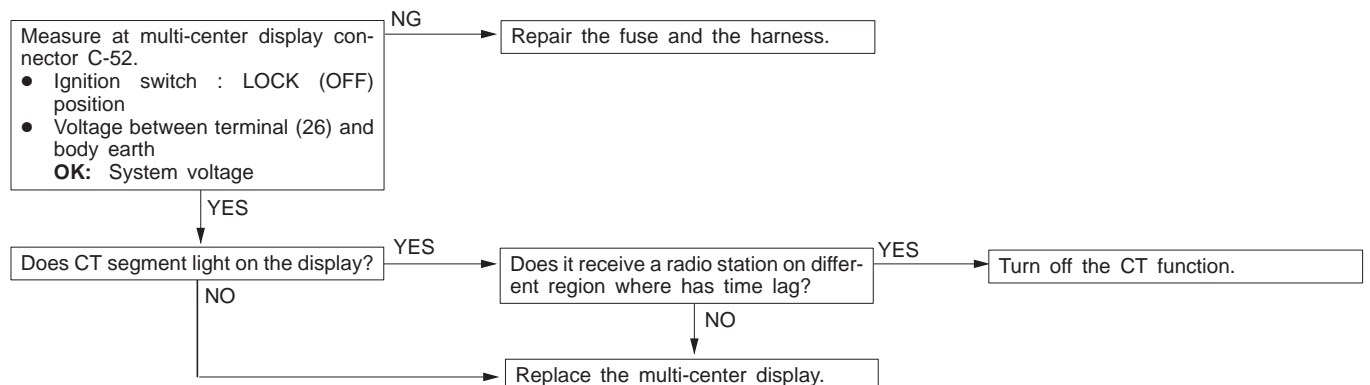
INSPECTION PROCEDURE 7

Dim display

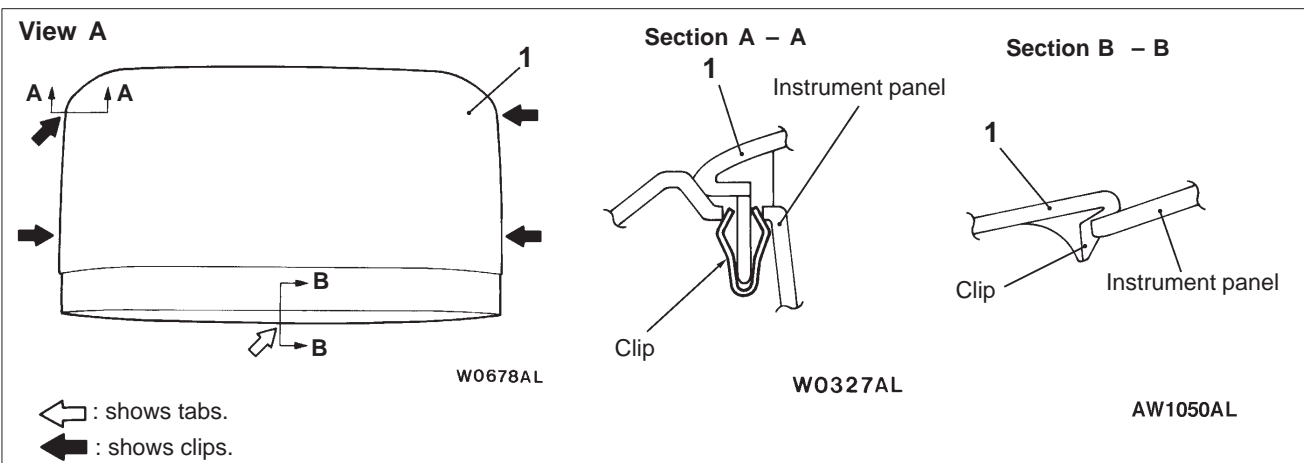
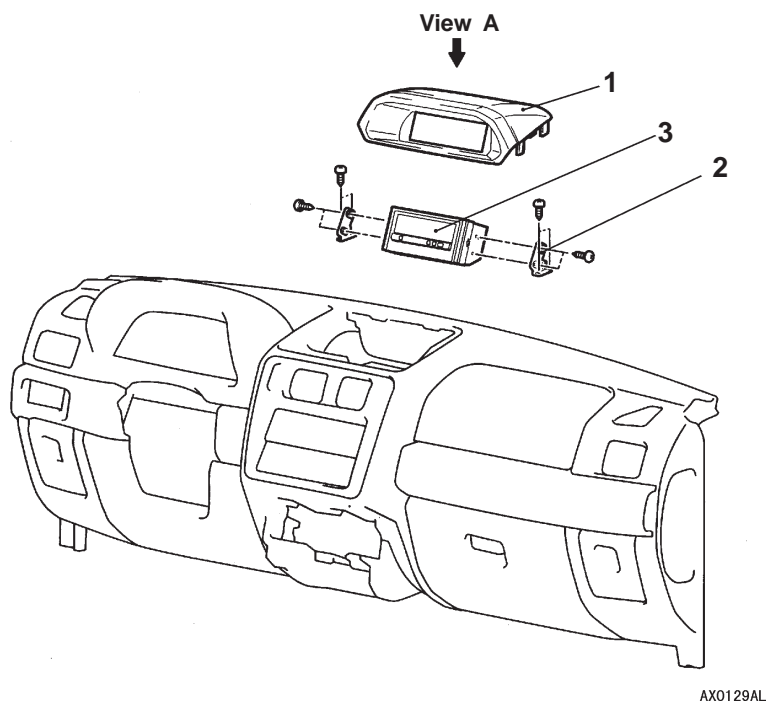


INSPECTION PROCEDURE 8

Clock runs fast or slow/indicate different time



MULTI-CENTER DISPLAY REMOVAL AND INSTALLATION



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	
	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	Disappear after a few seconds
	Past destinations	
	Average fuel consumption, average speed, cruising range	
Clock display function	Current time	
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

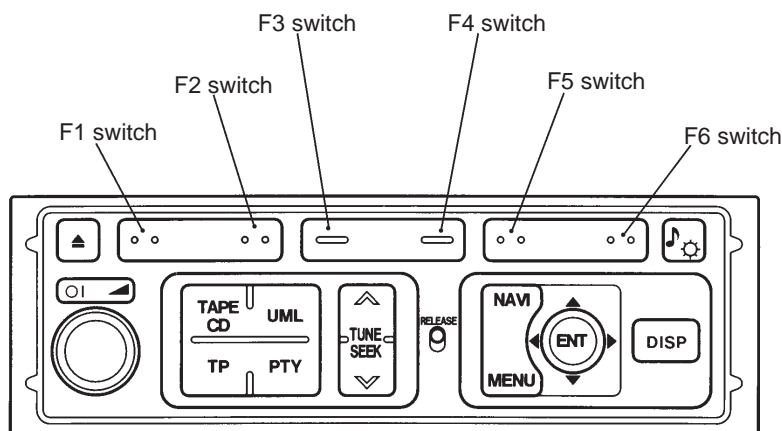
- (1) If only certain functions are showing an abnormality, use the audio checking function of the service functions to check the hardware switches.
- (2) If the switch functions are normal, check the connections of the related harness connectors. If a malfunctioning location is discovered, repair it 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.

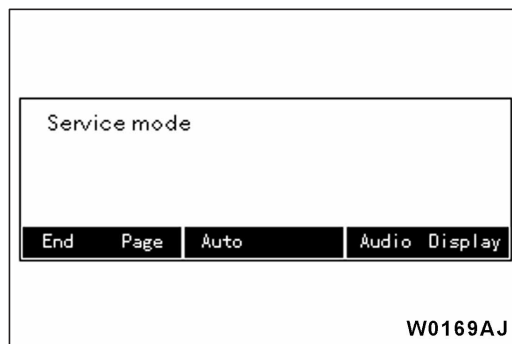
MITSUBISHI MULTI COMMUNICATION SYSTEM DISPLAY PANEL

AV0273AJ

TROUBLE DIAGNOSIS SERVICE FUNCTIONS

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

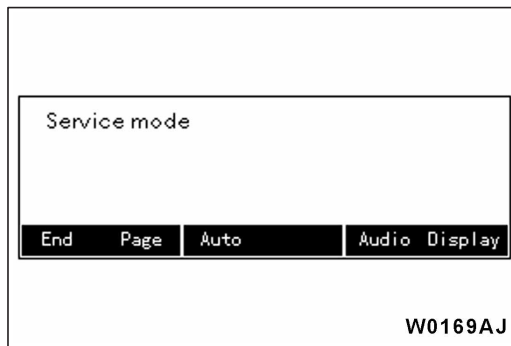
Function	Contents
Diagnosis function	During normal use, this function constantly monitors the system communication lines, and displays an error if it finds any abnormalities.
CD-ROM checking function	This function displays a message if it cannot read the CD-ROM or if no CD-ROM is inserted.
Service functions	There are five checking modes available: monitor checking, audio checking, automatic checking by mode, self-diagnosis and diagnosis recording.
1. Monitor checking	This mode checks that the image display function is operating normally.
2. Audio checking	This mode checks that the speakers and operating switches of the audio system are all working normally.
3. Automatic diagnosis by mode	In this mode, wiring and communication checking, audio checking, sensor checking and vehicle signal checking are carried out continuously.
4. Self-diagnosis	This mode includes functions such as wiring and communication checking, sensor checking, vehicle signals and version data checking.
• Wiring and communication checking	This checks system communication between all units.
• Sensor checking	This checks all of the sensors that are necessary to the navigation system.
• Vehicle signals	This displays the current vehicle signal condition.
• Version data	This displays the version numbers for each unit in the Multi Center Display.
5. Diagnosis recording	This mode displays error codes from communication checking. (Error codes are erased when the ignition switch is turned to OFF.)

**1. ACTIVATING AND ENDING SERVICE MODE**

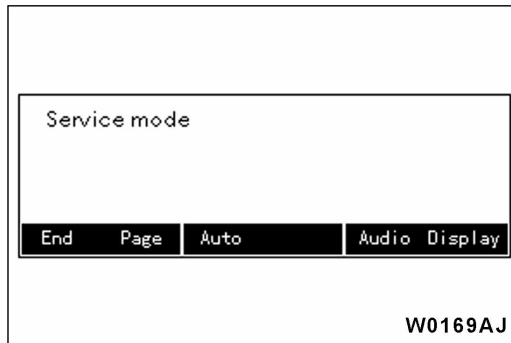
- (1) Activating service mode can be carried out by turning the ignition switch to the ON position while pressing the DISP switch on the audio unit and the F6 switch. (Continue pressing each switch for at least 5 seconds after turning the ignition switch to ON.)
- (2) If the special CD-ROM has been inserted 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.

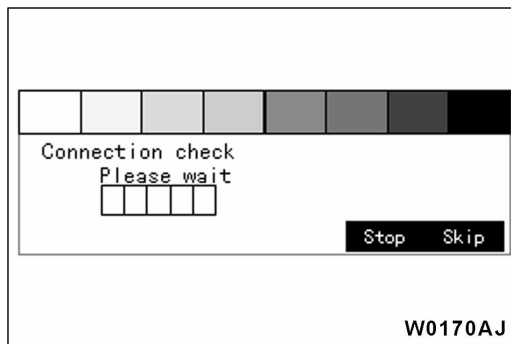


- (3) If the F1 switch is pressed at the service mode initial screen, service mode will be ended and the screen will change to navigation mode.

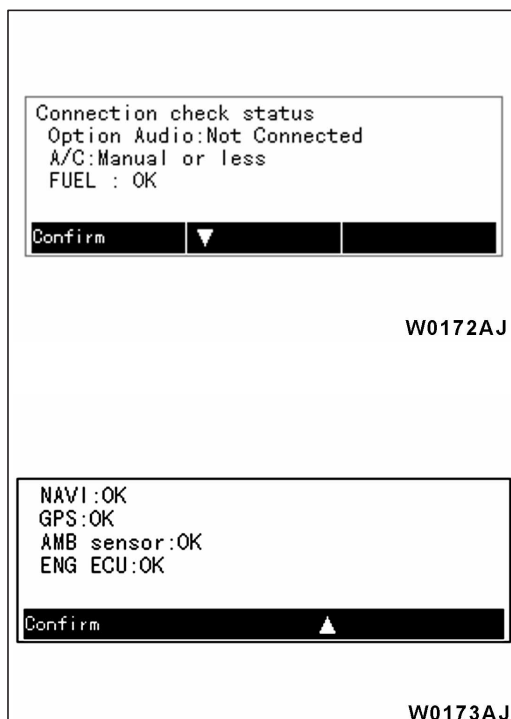


2. AUTOMATIC DIAGNOSIS BY MODE

- (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.

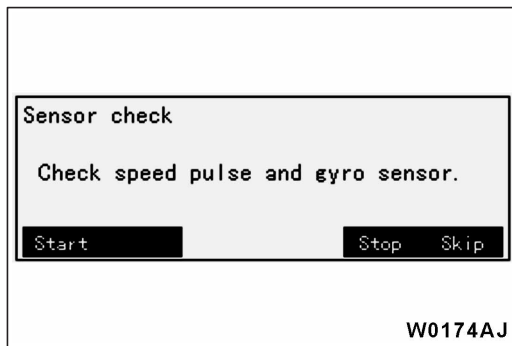


- (3) Once the transmission checking is completed, the results of the wiring and transmission checking will appear on the screen.

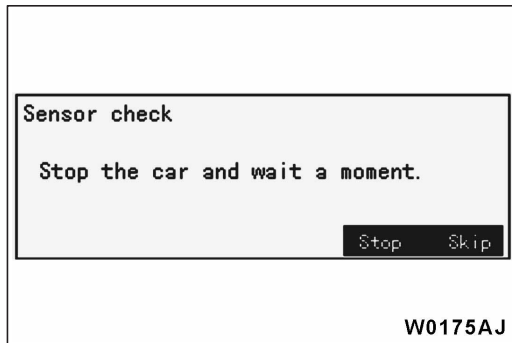
After checking the results, press the F1 switch to proceed to the next check. The next check will start when the switch is pressed.

NOTE

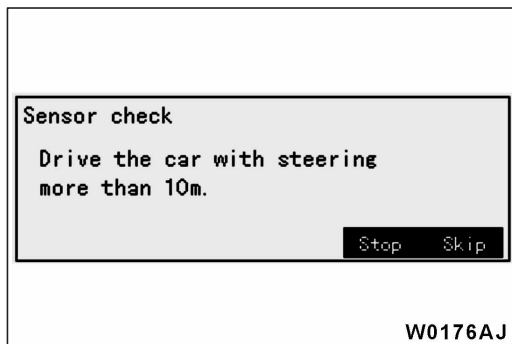
- 1) If the fuel gauge and the engine-ECU are checked while the ignition switch is at ACC, an error will be generated, but this is not a sign of an abnormality.
- 2) If checking is carried out while the fuel tank is full or the while ignition switch is at ACC, the fuel gauge may be shown to be not connected,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



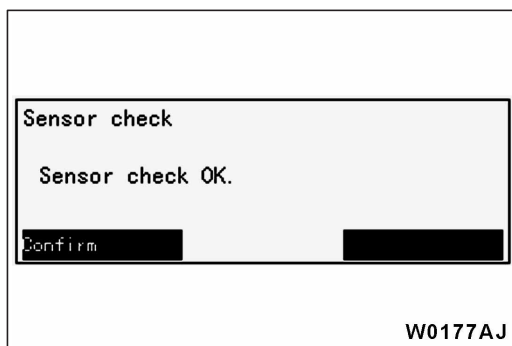
- (4) The next mode is the sensor checking mode. Press the F1 switch to start sensor checking.
If you would like to proceed to the next checking operation without carrying out sensor checking, press the F6 switch.



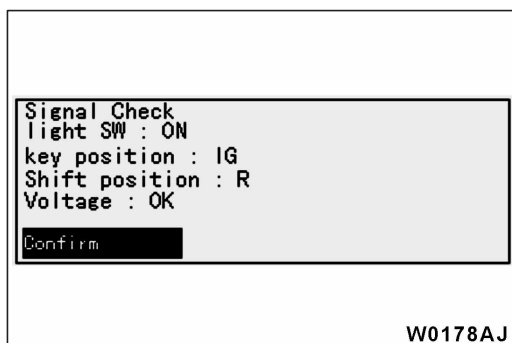
- (5) When sensor checking starts, the gyro output will be checked first while the vehicle is stopped, so make sure that the vehicle is stopped for this check.
If the vehicle is moving when the sensor checking starts, the vehicle speed sensor will be shown as defective.
Follow the guidance message on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



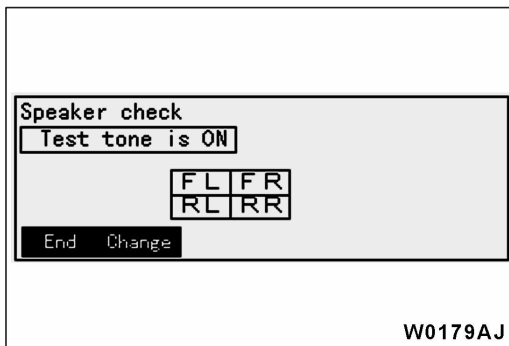
- (6) Next, drive the vehicle for approximately 10 meters while changing the running direction in order to check the vehicle speed pulse and the gyro sensor output. The sensor checking will then be completed. If there is an open circuit in the vehicle speed sensor, sensor checking will not complete even 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.



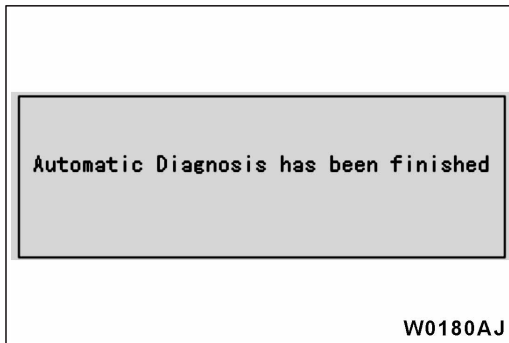
- (7) When sensor checking is completed, the check results will appear on the screen. After checking the results, press the F1 switch to proceed to the next check.



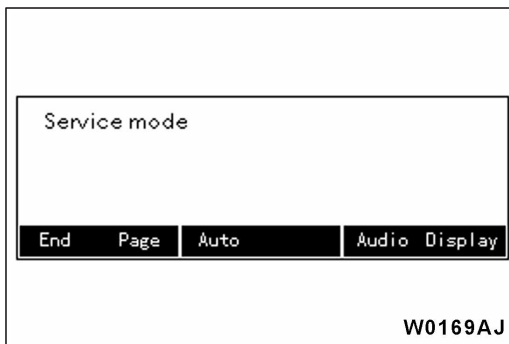
- (8) The next mode is the vehicle signal checking mode. The lighting switch condition, ignition key position, shift lever selection (R or a position other than R) and the power supply voltage drop will be appear on the screen. Check that the details displayed match the actual vehicle signals, and then 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.

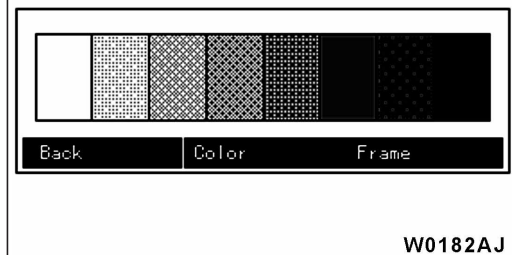
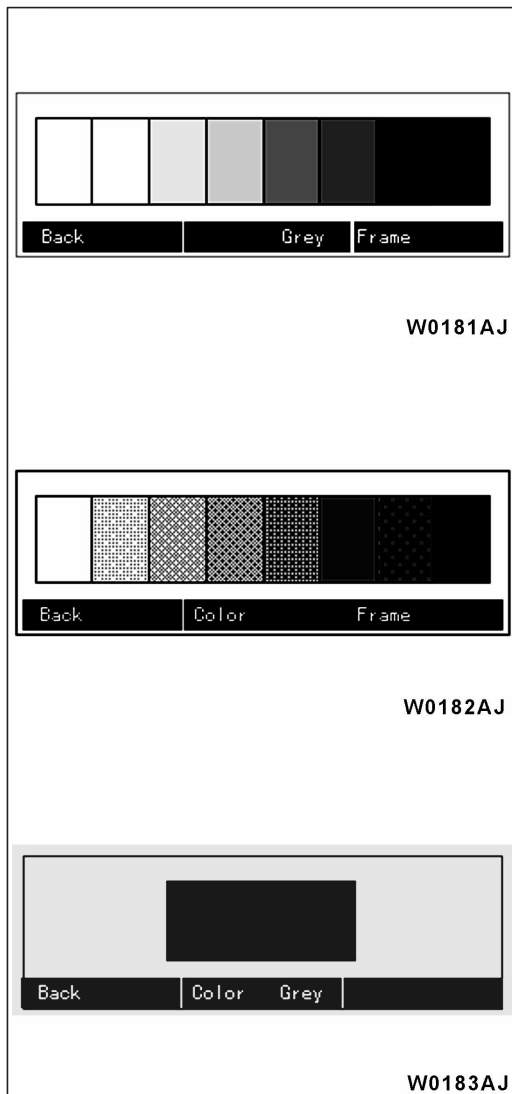


- (10) Press the F1 switch to end service mode. The screen will change to navigation mode.

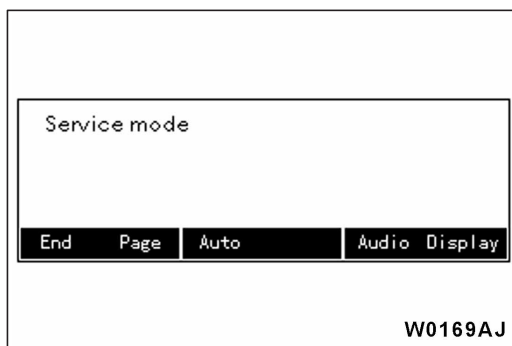


3. MONITOR CHECKING

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

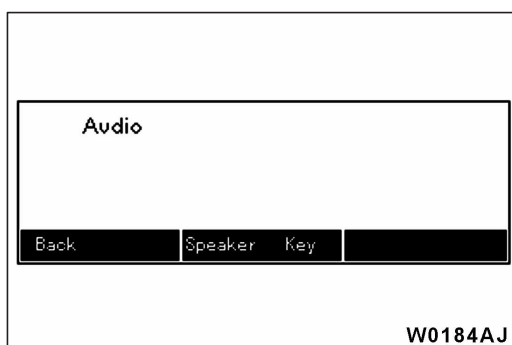


- (2) A colored bar will appear on the screen. Press a function switch to change to another screen. The screen will return to the service mode initial screen if the F1 switch is pressed.

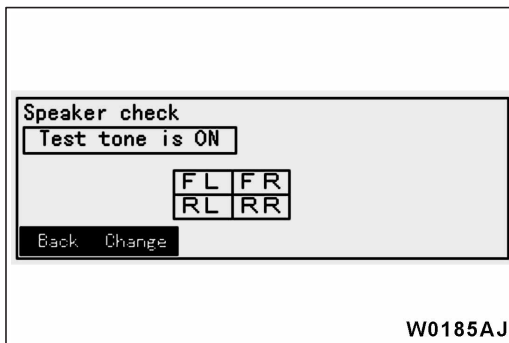


4. AUDIO CHECKING

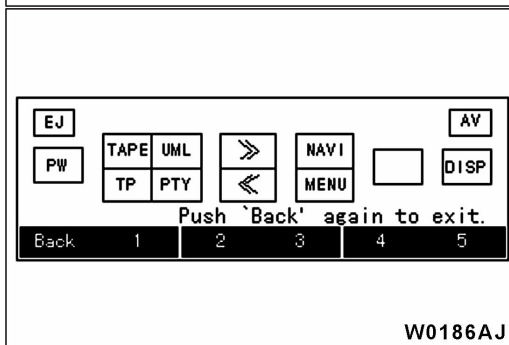
- (1) If the F5 switch is pressed at the service mode initial screen, the audio checking menu screen will appear.



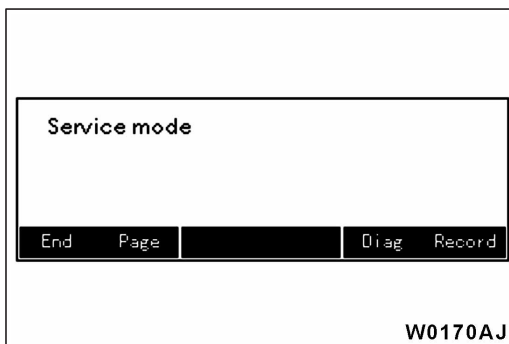
- (2) Next, press the function switches to carry out audio checking.



- (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.

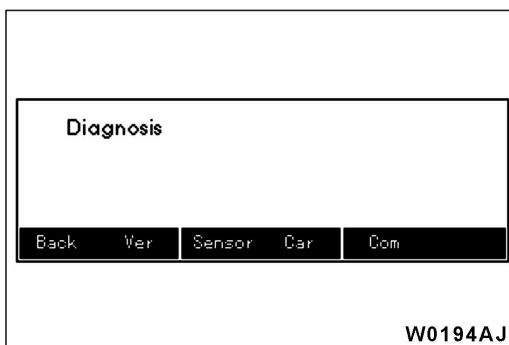


- (4) Press F4 to display the audio key checking screen. When one of the audio switches is pressed, the screen display color for that switch should change. This indicates that this particular switch system is working normally. Press the F1 switch to check the operation of the F1 switch. Press the F1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

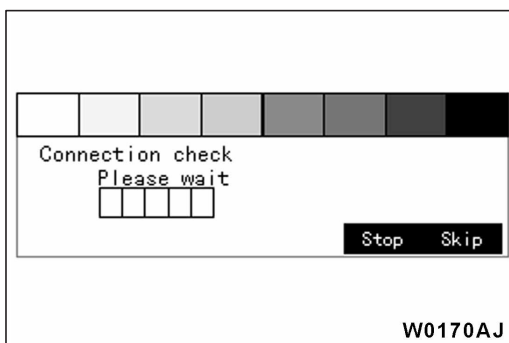


5. SELF-DIAGNOSIS

- (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.

Connection check status

Option Audio:Not Connected

A/C:Manual or less

FUEL : OK

Confirm ▼

W0172AJ

NAVI:OK

GPS:OK

AMB sensor:OK

ENG ECU:OK

Confirm ▲

W0173AJ

Sensor check

Check speed pulse and gyro sensor.

Start Stop

W0188AJ

Sensor check

Stop the car and wait a moment.

Stop

W0189AJ

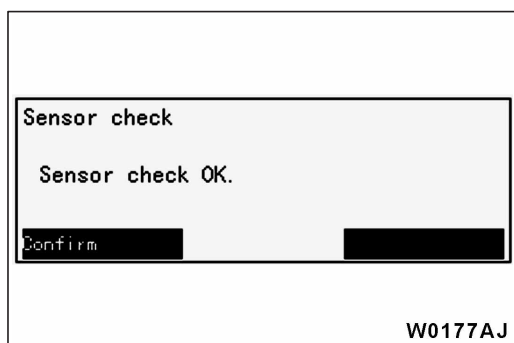
Sensor check

Drive the car with steering more than 10m.

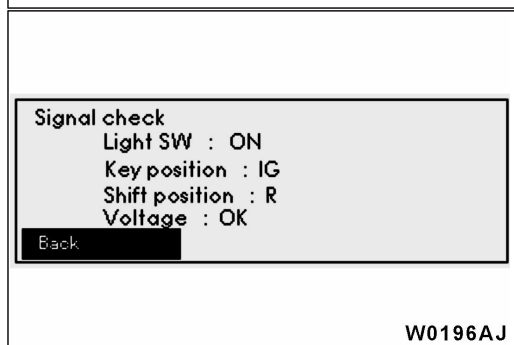
Stop

W0190AJ

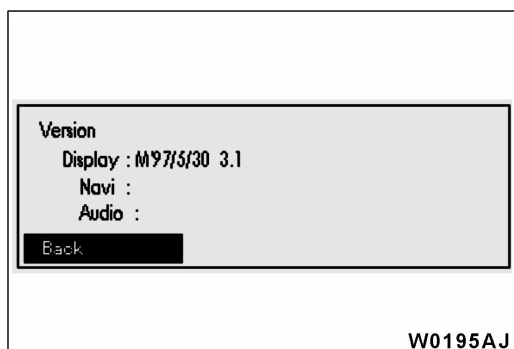
- (4) Once the transmission checking is completed, the results of checking will appear on the screen. After checking the results, press the F1 switch to return to the self-diagnosis menu screen.
- (5) If the F6 switch is pressed at the self-diagnosis menu screen, sensor checking will start. Press the 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.



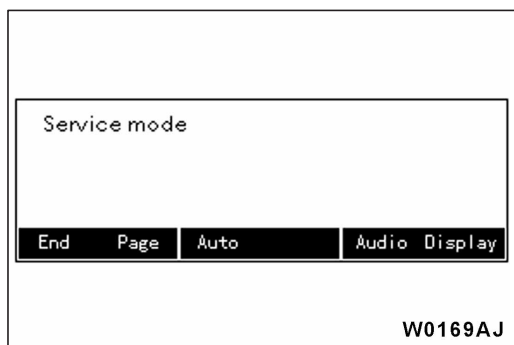
- (8) When sensor checking is completed, the check results will appear on the screen. After checking the results, press the F1 switch to return to the self-diagnosis menu screen.



- (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.

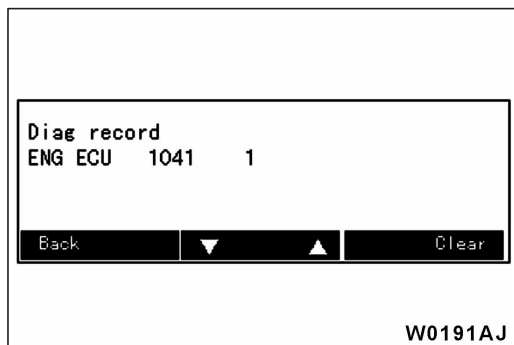


If the F2 switch is pressed at the self-diagnosis menu screen, version data self-diagnosis will be carried out, and the check results will appear on the screen. Press the F1 switch to return to the self-diagnosis menu screen.

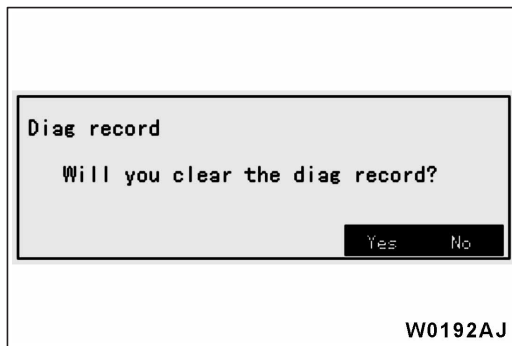


6. DIAGNOSIS RECORDING

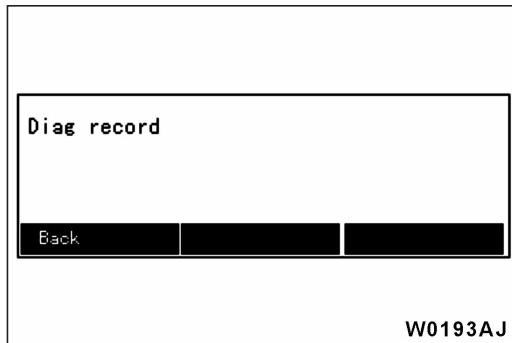
- (1) If the F6 switch is pressed at the service mode initial screen, the diagnosis recording screen will appear.
(2) Press the F1 switch to return to the service mode initial screen.



- (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.



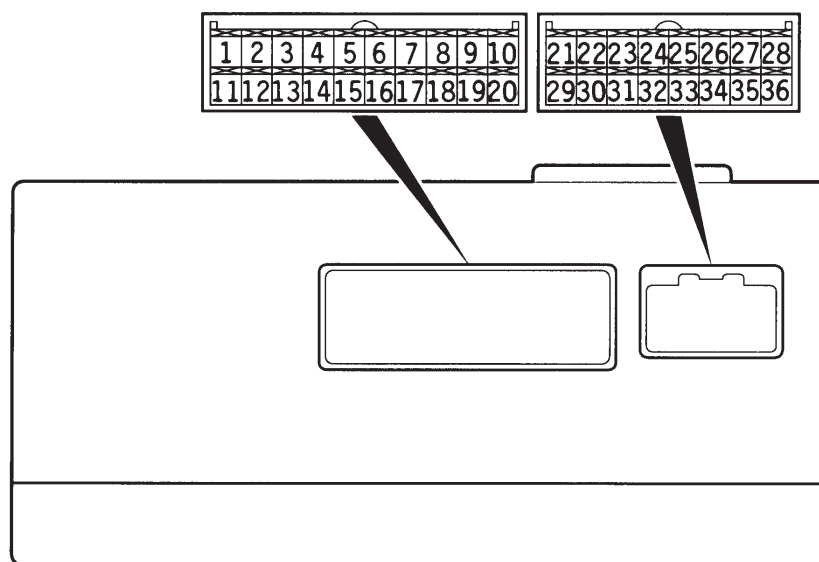
- (5) Press the F1 switch to return to the service mode initial screen.

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

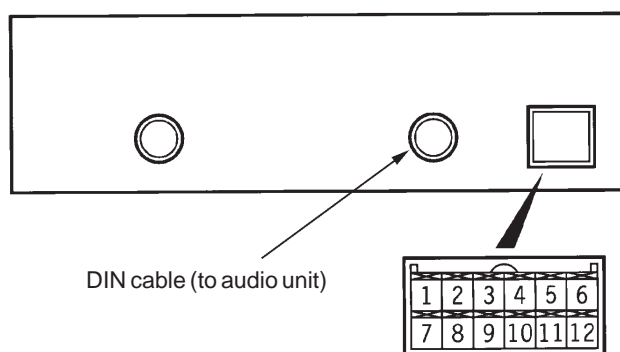
Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
1	Input	G+SYTNC (AUDIO)	–	○	○	Noise display (random dot pattern)
2	Input	B+SYNC (AUDIO)	–	○	○	Blue, white, cyan and magenta do not appear in RGB 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.

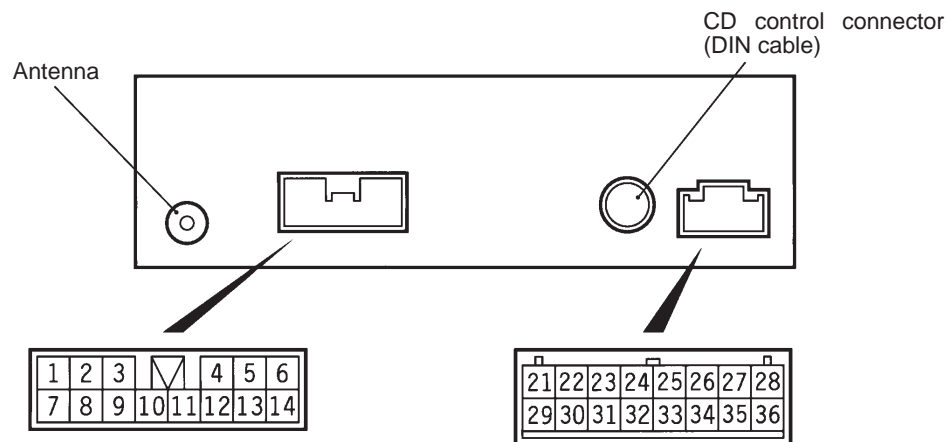
Terminal No.	Input/Output	Signal Symbol	Terminal Voltage (V)	Harness Problem		Trouble Symptom Resulting from Harness Problem
				Open Circuit	Short-circuit	
34, 35	–	–	–	–	–	–
36	Input	IG1	System voltage	○	–	Communication with engine-ECU is not possible. Driving data values displayed are abnormal.
	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

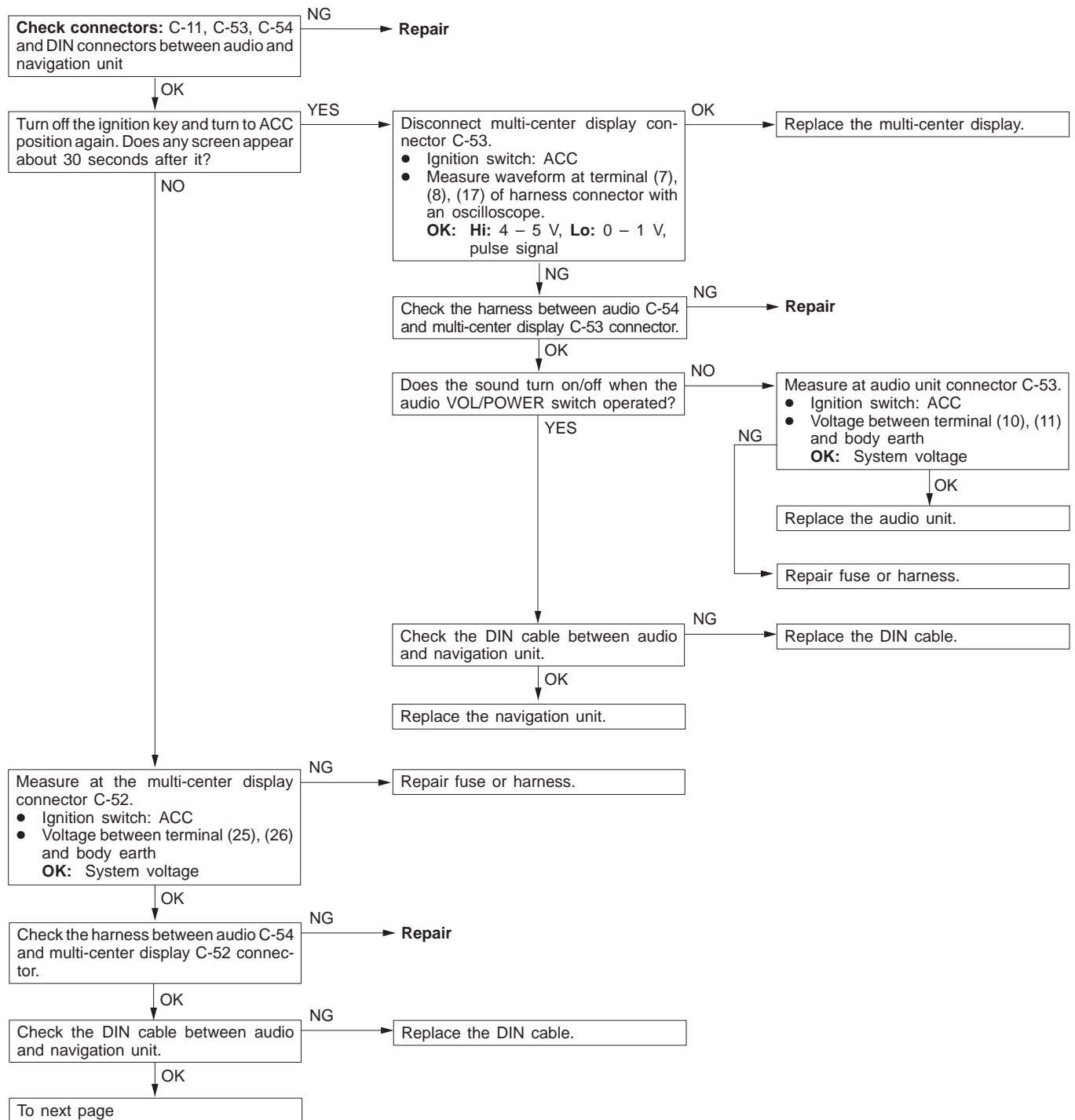
INSPECTION CHART CLASSIFIED BY TROUBLE SYMPTOMS

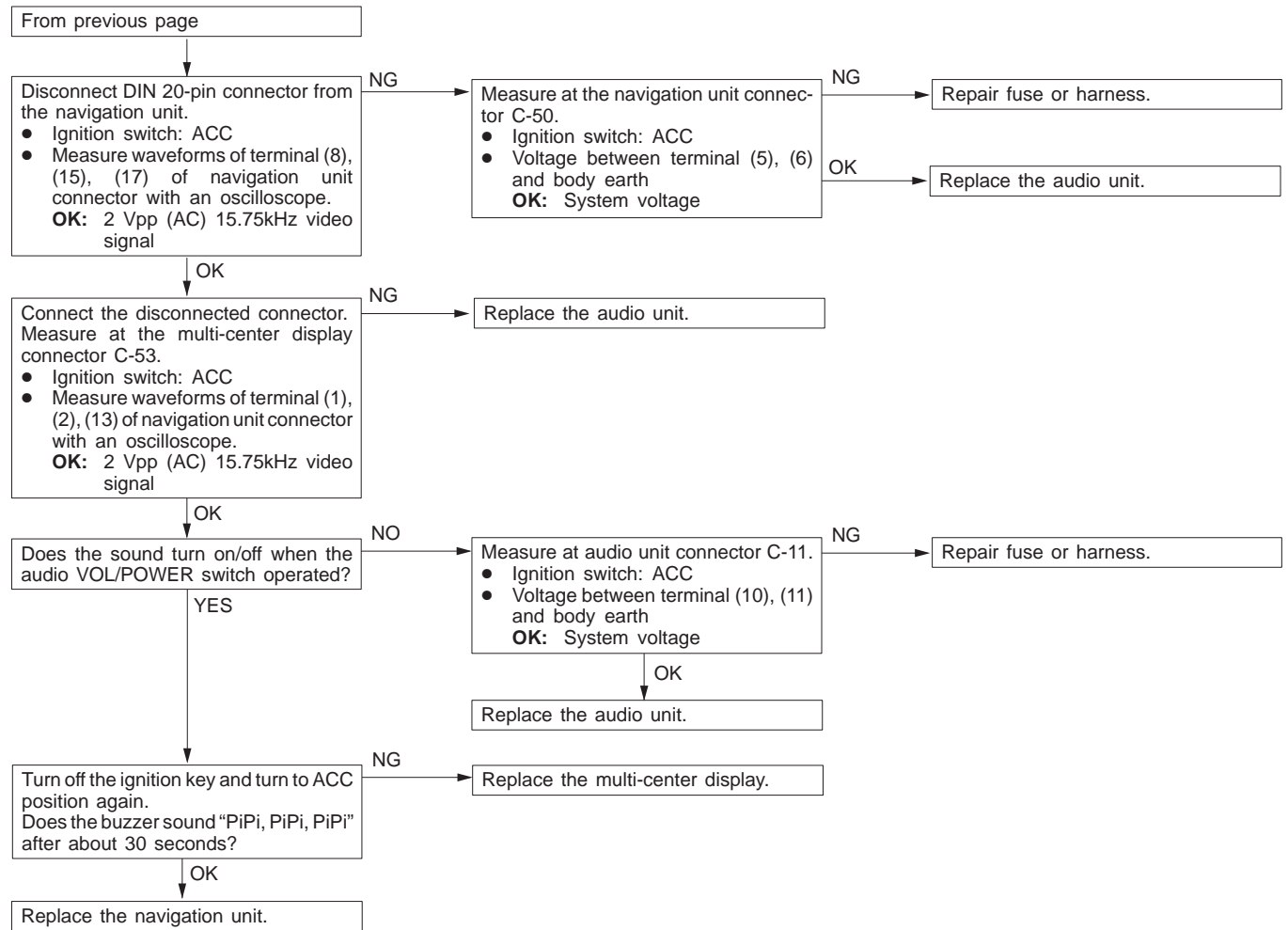
Related Unit	Trouble Symptom	Inspection Procedure No.	Reference Page
Malfunction of navigation unit, multi-center display, audio unit and related sensor, harness	TAPE/CD, UML switches do not work. No display appears after the ignition key is turned to ACC.	1	54A-97
	TAPE/CD, UML switches do not work. (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

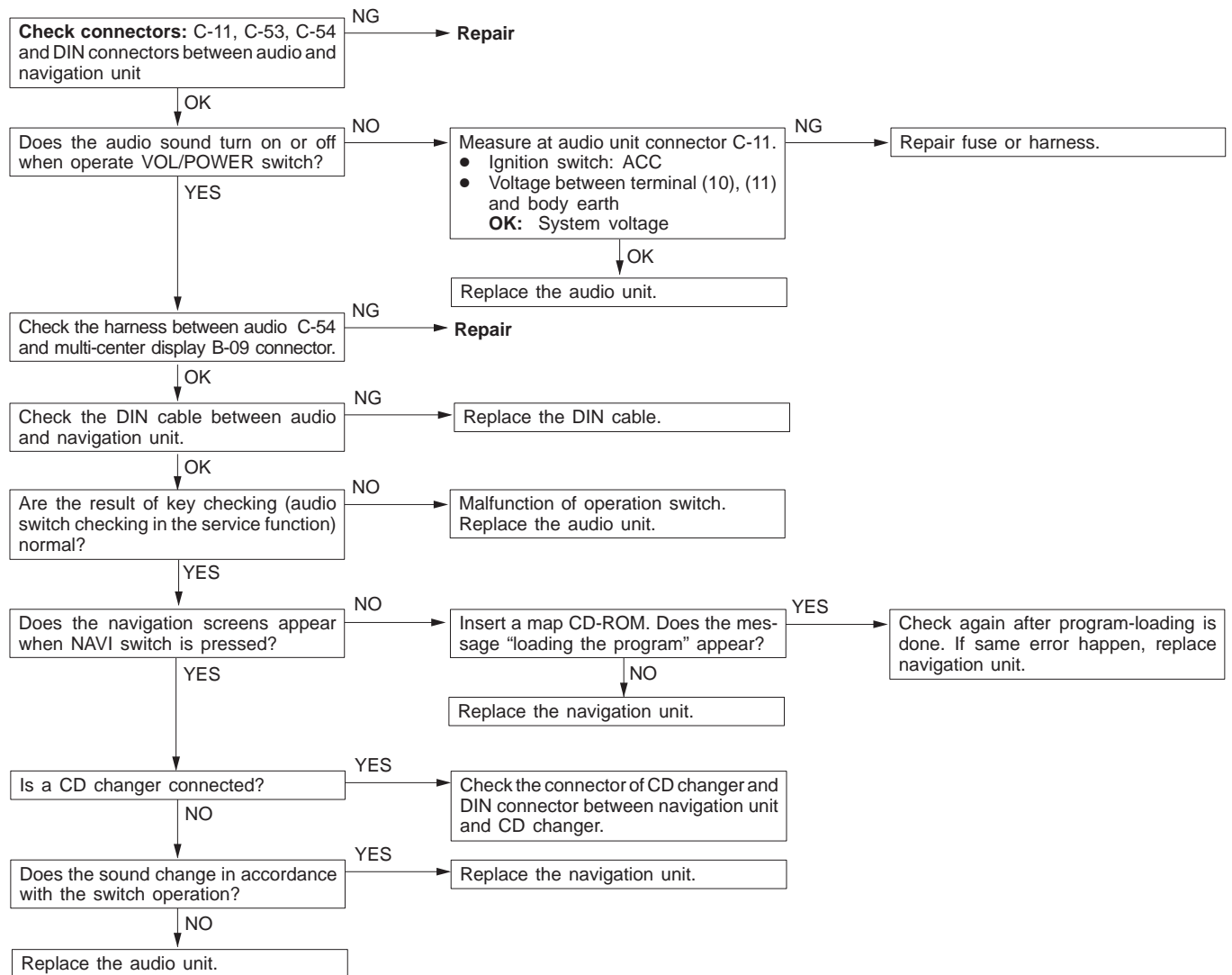
TAPE/CD, UML switches do not work. No display appears after the ignition key is turned to ACC.





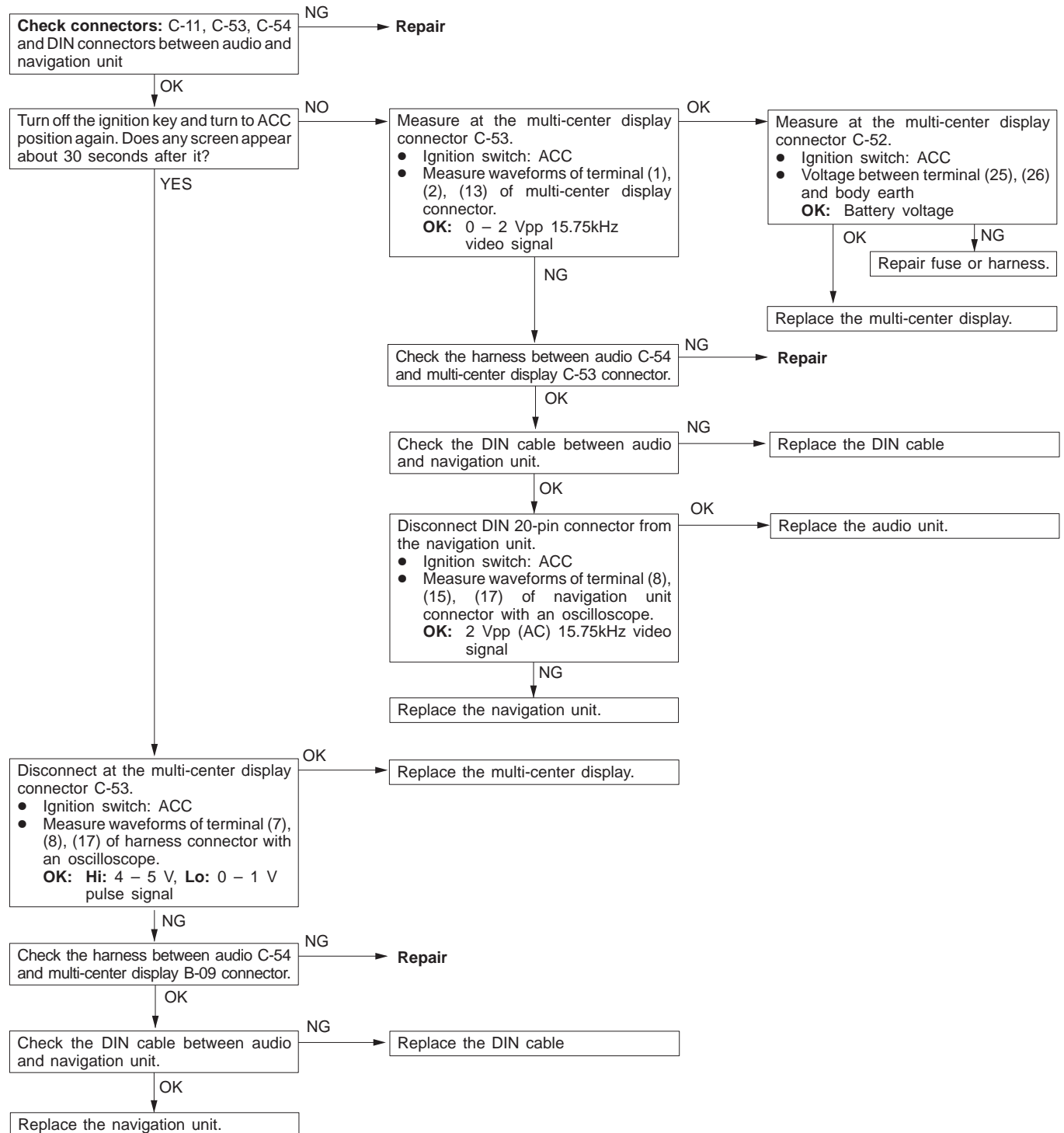
INSPECTION PROCEDURE 2

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



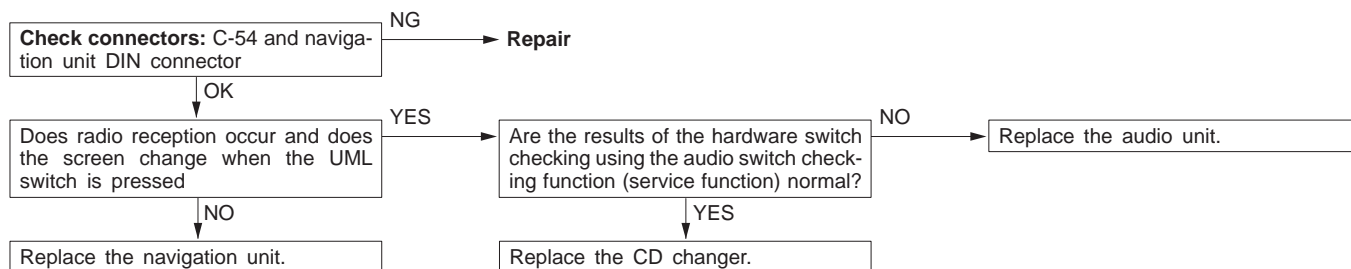
INSPECTION PROCEDURE 3

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



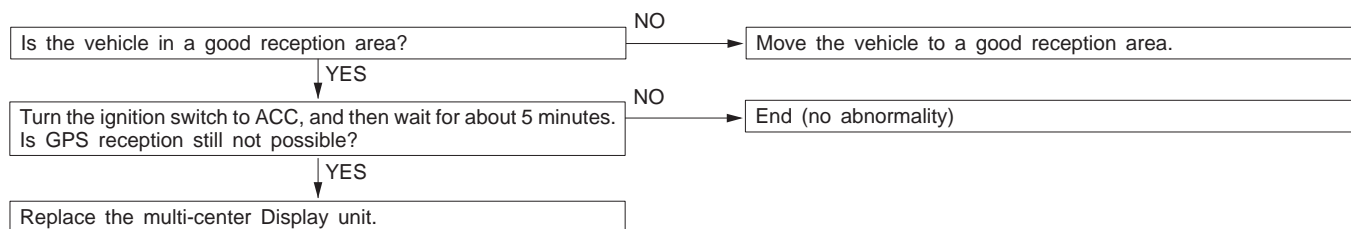
INSPECTION PROCEDURE 4

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



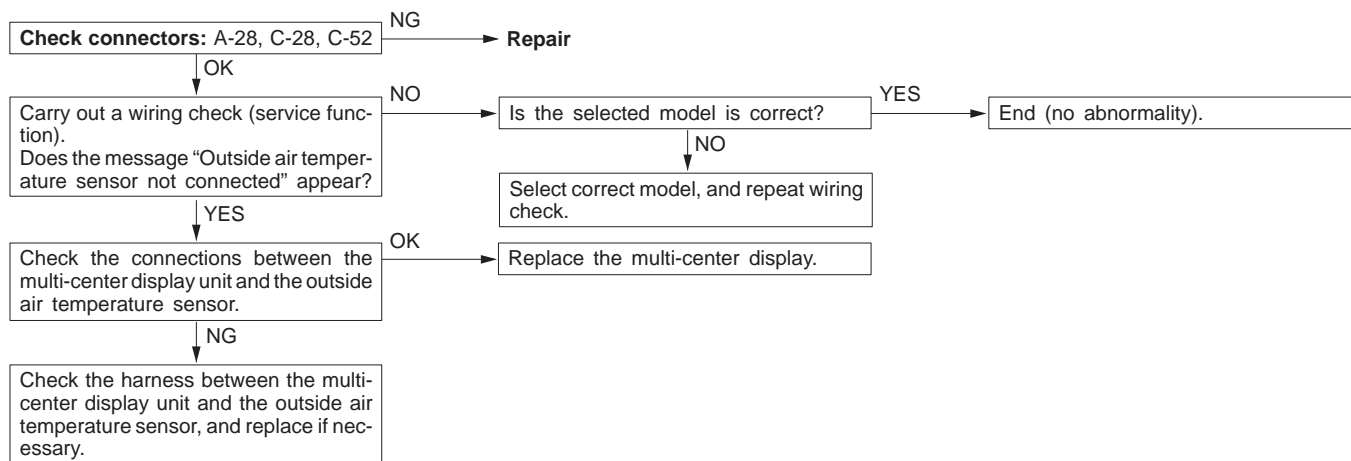
INSPECTION PROCEDURE 5

GPS reception is not possible.



INSPECTION PROCEDURE 6

Outside air temperature data is not displayed.

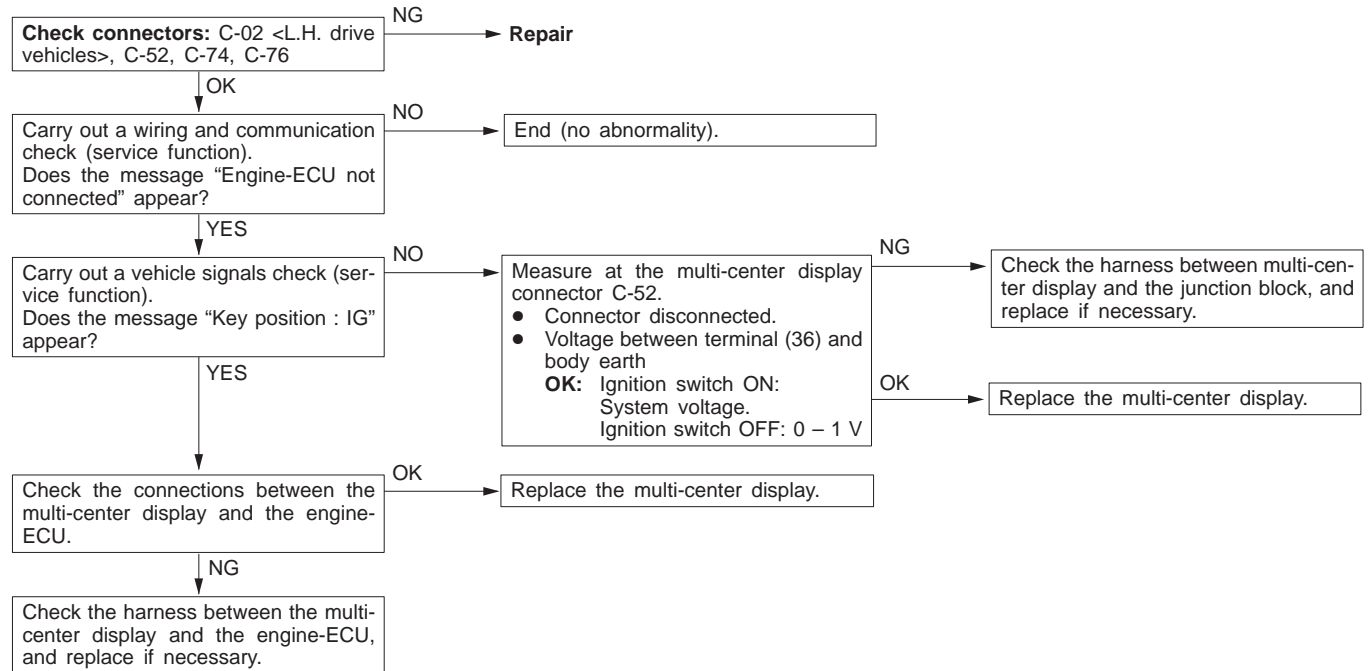


INSPECTION PROCEDURE 7

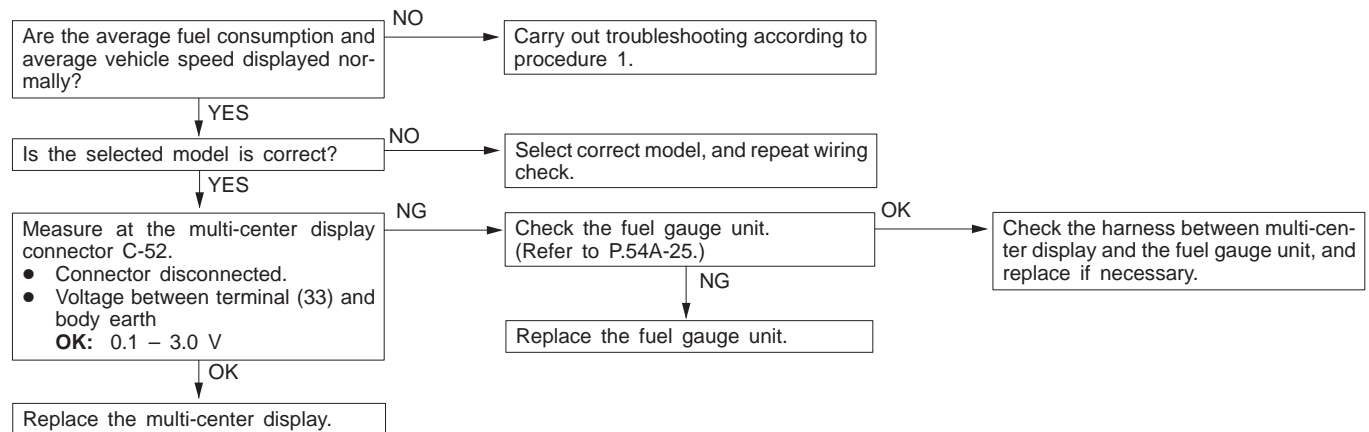
Abnormal driving data displays.

- 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.

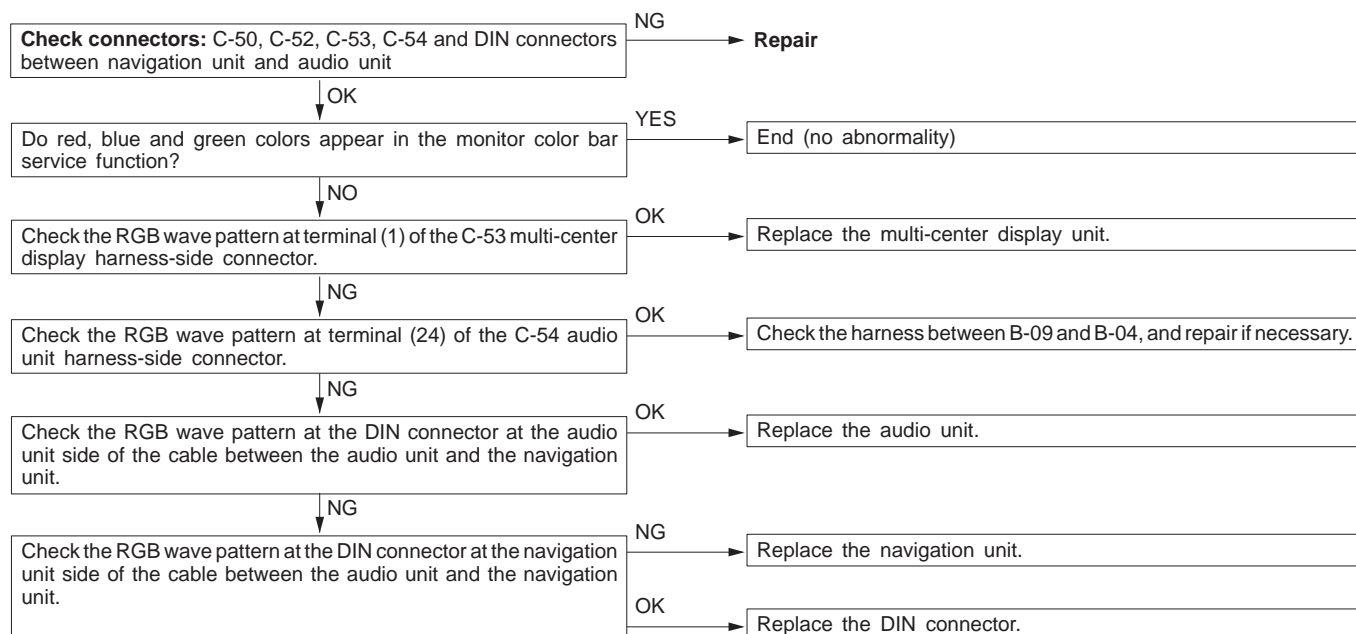


2. When cruising distance display is abnormal.



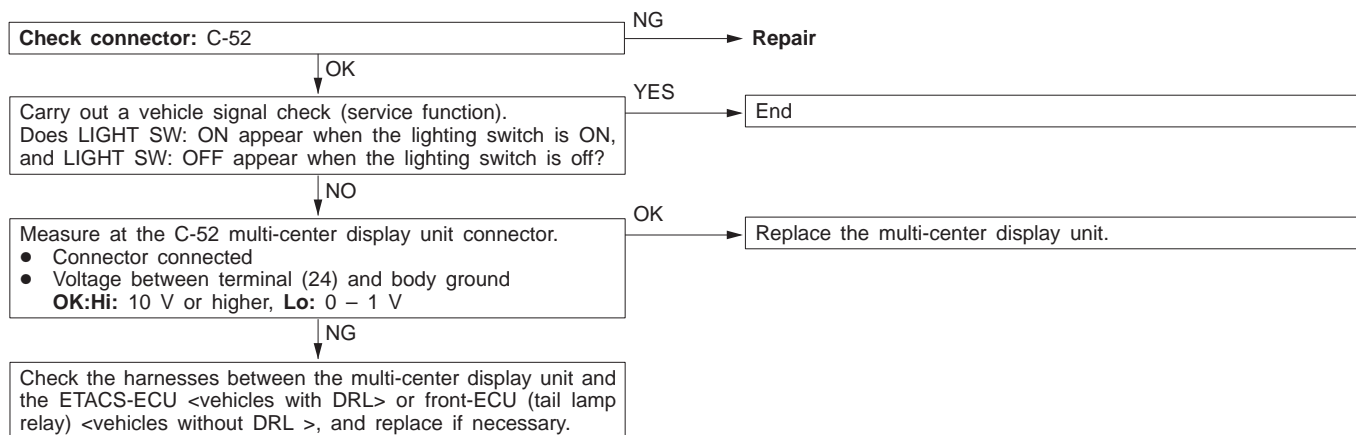
INSPECTION PROCEDURE 8

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



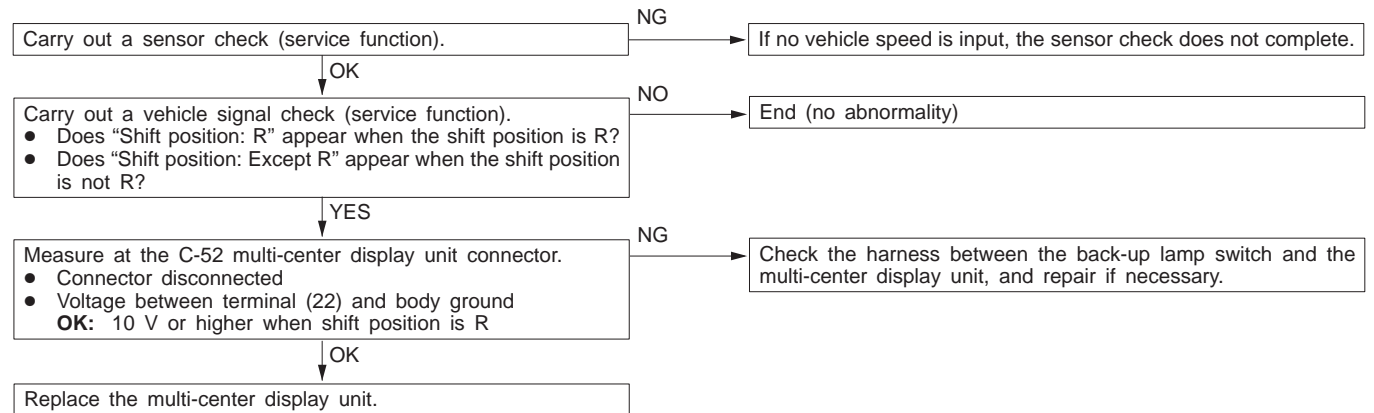
INSPECTION PROCEDURE 9

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



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.

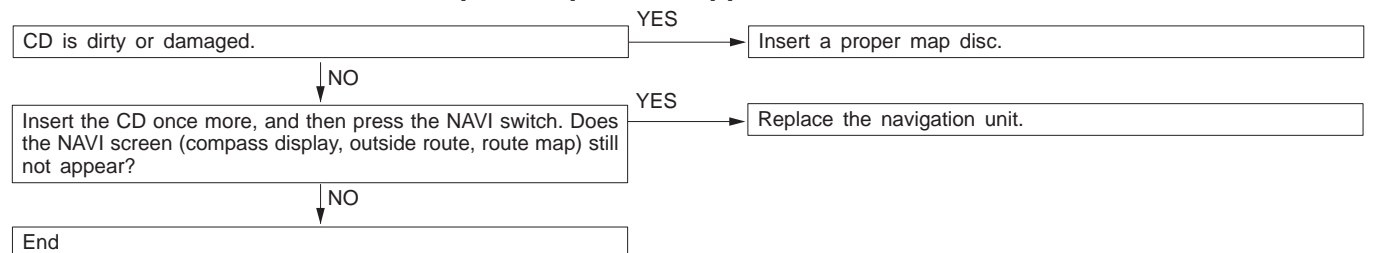


INSPECTION PROCEDURE 11

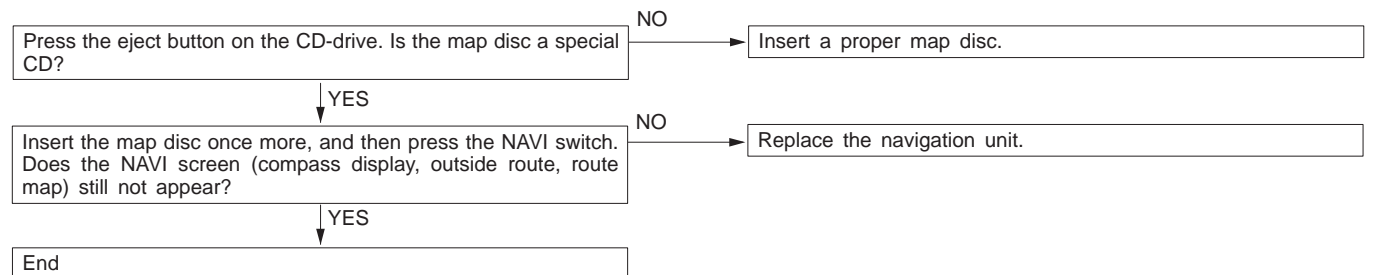
One of the following messages appears during navigation mode.

- 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.

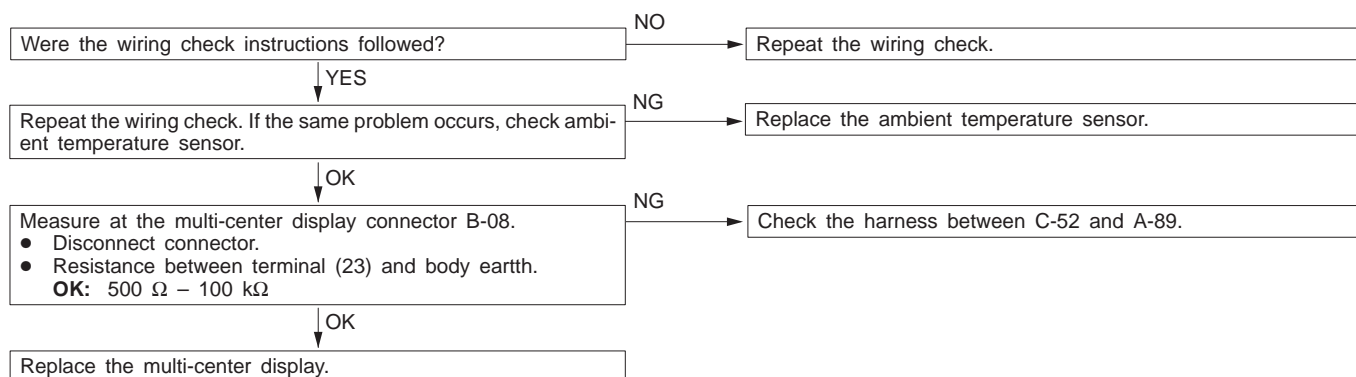


2. "No disc is in the CD-drive. Insert a map disc, please." or "A music disc is in the CD-drive" appears.



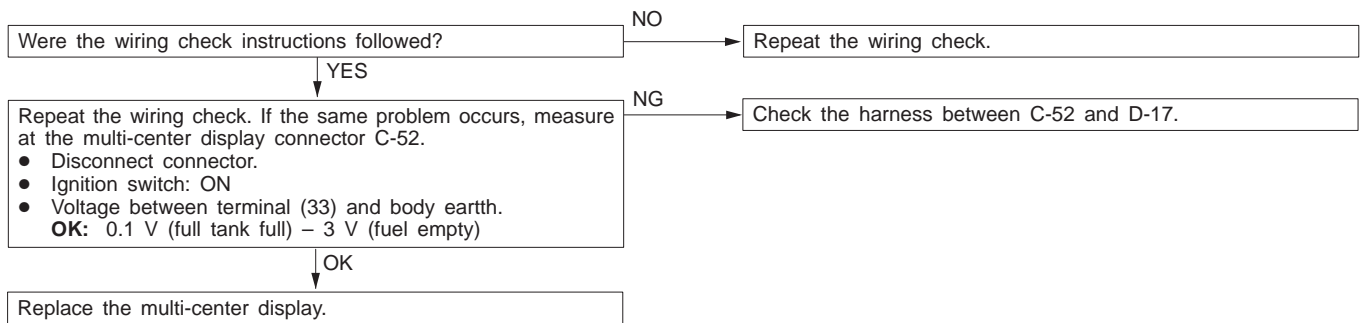
ERROR CODE TABLE <ACCORDING TO SCREEN DISPLAY>

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

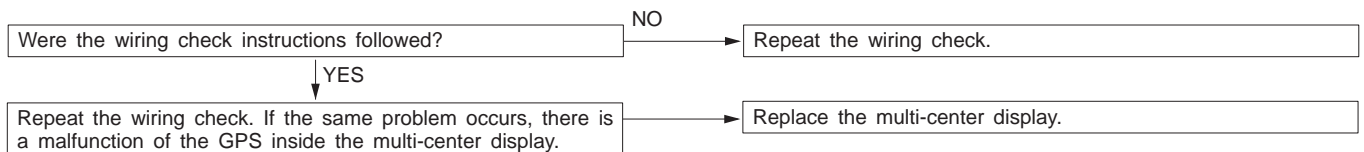
INSPECTION PROCEDURES FOR EACH ERROR CODE <ACCORDING TO SCREEN DISPLAY>**Error Code No. 1011**

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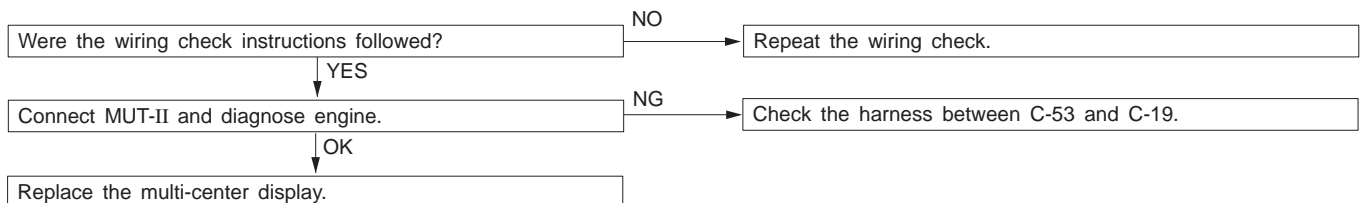
Error Code No. 1021



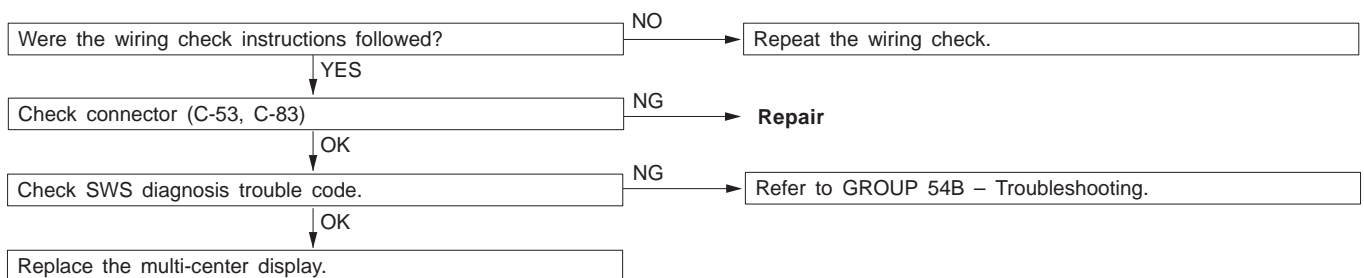
Error Code No. 1031



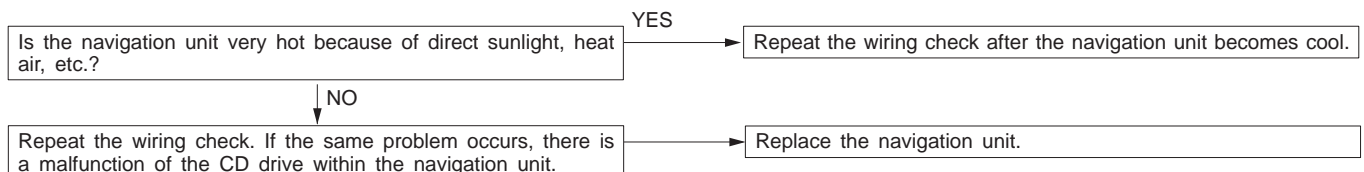
Error Code No. 1041



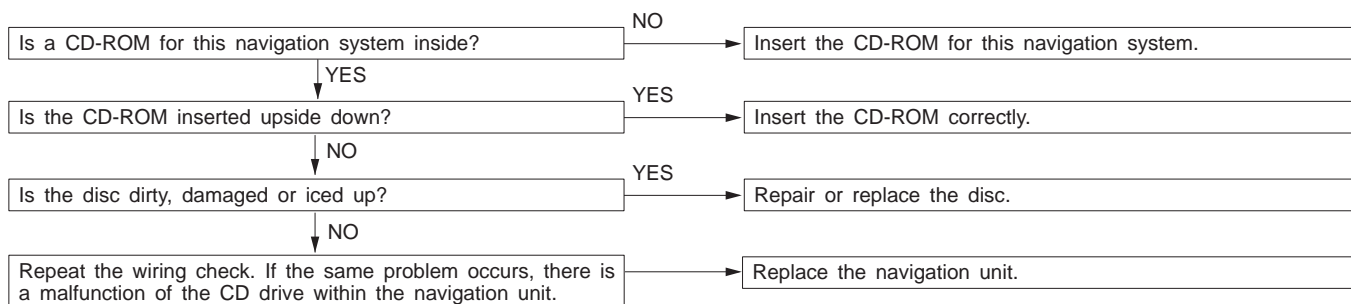
Error Code No. 1051



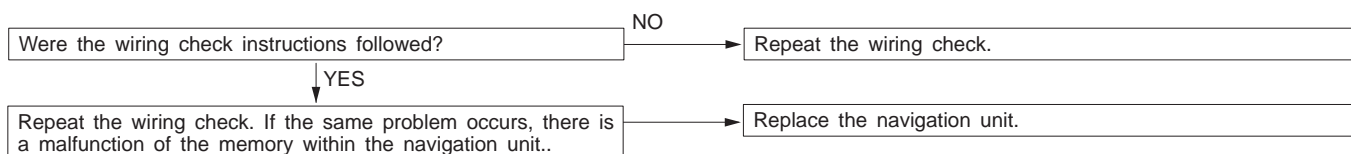
Error Code No. 1091



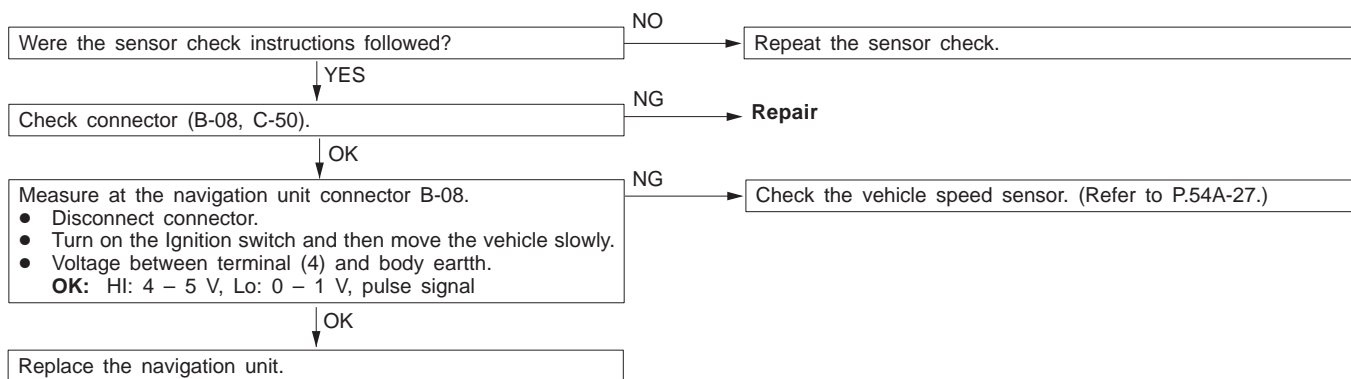
Error Code No. 1092, 1093, 1094, 1095, 1096



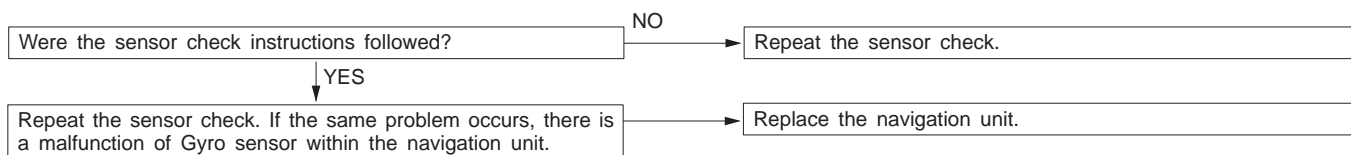
Error Code No. 10A1, 10B1



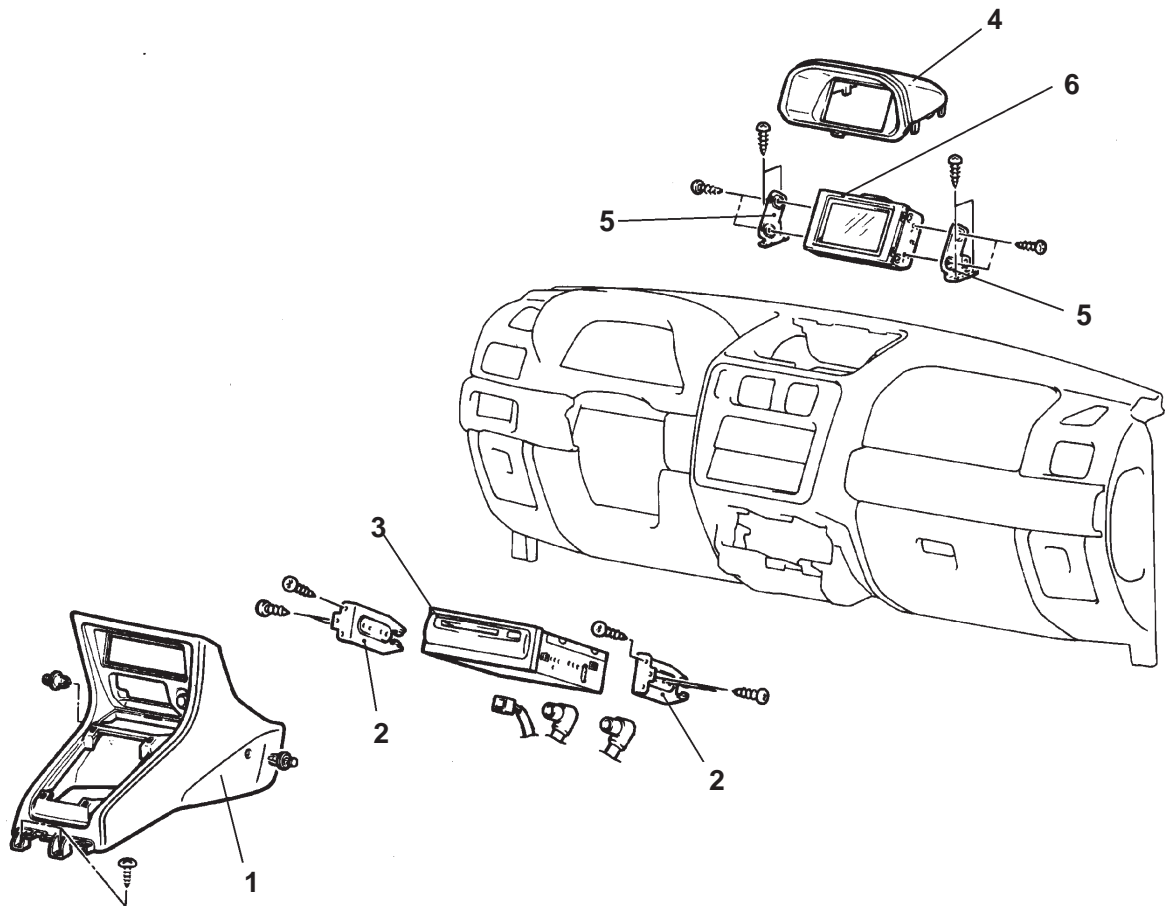
Error Code No. 20D1, 30D1



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

SMART WIRING SYSTEM (SWS)

CONTENTS

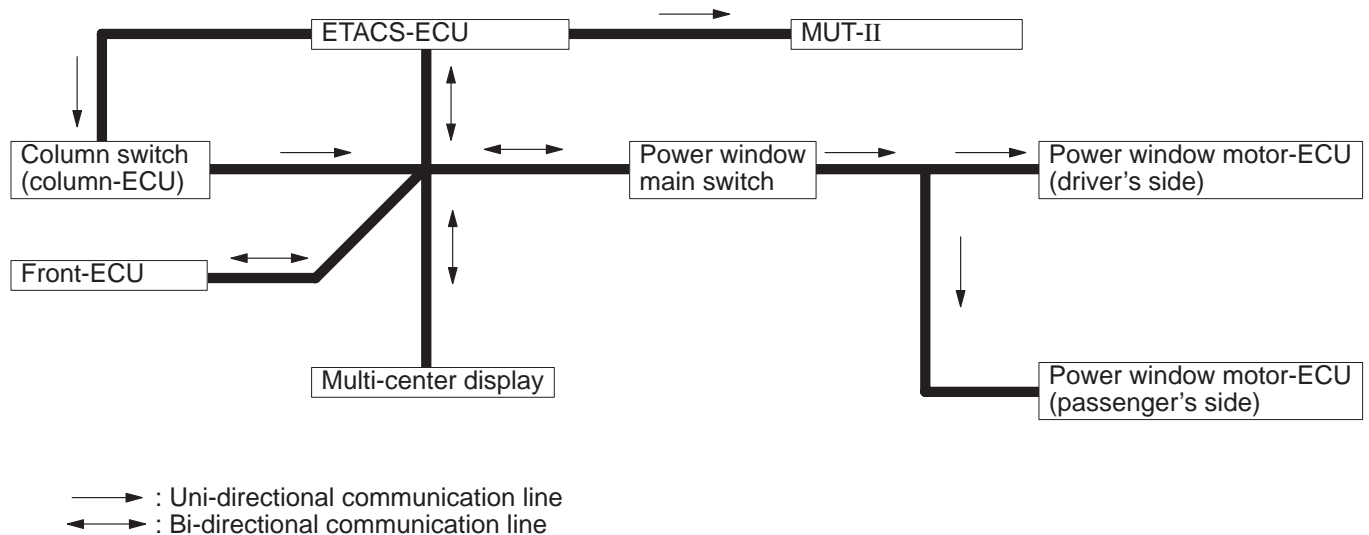
GENERAL INFOMATION	54B-1	TROUBLESHOOTING	54B-6
SPECIAL TOOLS	54B-5		



GENERAL INFORMATION

COMMUNICATION LINE

Data lines for multiplex communication are connected between the front-ECU, ETACS-ECU, column switch assembly, multi-center display, power window main switch, and power window motors as illustrated below.



OPERATION

BUZZER

Light Reminder Warning Function

When the driver's door is opened (driver's door switch ON) with light switch in the TAIL or HEAD position, the buzzer will sound continuously to remind the driver that the lights (taillights or headlights) are ON.

Multi-center Display Buzzer Function

If there is a request from the multi-center display to make the buzzer sound, the ETACS-ECU causes the buzzer to sound.

CENTRAL DOOR LOCKING SYSTEM

Central Door Locking System Operation

If a door is locked or unlocked by using any one of the key cylinders (driver's door, passenger's door or back door), all of the doors are locked or unlocked. In addition, all doors can be locked and unlocked by using the driver's door lock knob.

Forgotten Key Prevention Function

This function automatically release the door lock if the inside door lock knob is placed in the lock position with the door opened while the key is still in the ignition switch, thereby preventing the key from being left behind locked door.

POWER WINDOWS

Power Windows Operation

A signal line dedicated for transmission of multiplex communication data is connected between the power window main switches and the power window motor-ECU.

Communication is uni-directional. The power window main switches have a transmitting circuit only, whereas the power window sub switches have a receiving circuit only.

KEYLESS ENTRY SYSTEM

If the transmitter LOCK or UNLOCK switch is pressed while the ignition key is removed and all of the doors are closed, the doors can be locked or unlocked. If the doors are closed, the hazard warning lamps, the room lamp and the horn will operate due to answerback function. Because of the answerback function, the hazard warning lamps

WINDSHIELD WIPER AND WASHER

Windshield Low-speed (and High-speed) Wiper Operation

- If the windshield low-speed wiper switch is turned to the ON position with the ignition switch at the ACC or ON position, the column switch sends a low-speed wiper ON and high-speed wiper OFF signals to the front-ECU. This turns the wiper signal on and the wiper speed switching relay off (low-speed), causing the wipers to operate at low-speed.
- If the windshield high-speed wiper switch is turned to the ON position, the column switch sends a low-speed wiper OFF and high-speed wiper ON signals to the front-ECU. This turns both the wiper signal and the wiper speed switching relay on (high-speed), causing the wipers to operate at high-speed.

Windshield Intermittent Wiper Operation

The ETACS-ECU calculates the wiper operation interval according to the voltage signal sent from the column switch. (For vehicles without variable intermittent wiper, the intermittent interval is fixed at 4 seconds.) Then the ETACS-ECU sends a signal to the front-ECU. The front-ECU determines the wiper operation interval and turns on the wiper signal relay. This causes the wiper auto stop relay to turn on. Then the wiper auto stop relay will turn off after the wipers reach the park position. This causes the wiper signal relay and then the wipers to turn off.

If the wiper signal relay remains off for the wiper operation interval, the relay turns on again, causing the wipers to operate in intermittent mode.

Power Window Timer Function

With the ignition switch in the ON position, the power window relay and power window switch receipt permission are turned ON [the power window switch receipt permission signal remains ON for 30 seconds after the ignition switch is turned LOCK (OFF)], enabling opening and closing of the windows. The power window relay goes ON for additional 30 seconds. If the driver's door is subsequently closed during this period, the receipt permission signal goes OFF. The power window relay goes OFF 10 seconds after the receipt permission signal goes OFF.

flash twice, and the room lamp flashes twice when the doors are locked. Meanwhile, when the doors are unlocked, the hazard warning lamps flash and the room lamp illuminate for 15 seconds. The hazard answerback functions can be cancelled by using the MUT-II.

Windshield Mist Wiper Operation

- If the windshield mist wiper switch of the column switch is turned to the ON position with the ignition switch at ACC or ON position, the mist wiper high-speed operation signal is sent to the front-ECU. This signal turns on the wiper speed switching relay, causing the wipers to work at high-speed while the mist switch is on.
- While the windshield mist wiper switch remains turned on when the intermittent mode is still working, the wipers work as the mist wiper. However, the wipers return to the intermittent mode again when the wiper auto stop signal turns on after the mist wiper switch is turned off.

Windshield Washer Operation

If the windshield washer switch of the column switch is turned to the ON position with the ignition switch at ACC or ON position, the windshield washer ON signal is sent to the front-ECU, causing the windshield wiper signal to turn on after 0.3 seconds. After the windshield washer switch signal turns off, the windshield wiper signal turns off in three seconds.

If the windshield wiper switch is turned to the ON position while the windshield wiper is at intermittent mode, the windshield washer works for that period when the windshield washer switch remains on. Then the wipers return to the intermittent mode.

REAR WIPER AND WASHER

Rear Wiper Operation

If the rear wiper switch is turned to the ON position with the ignition switch at ACC or ON position, the ETACS-ECU cause the rear wiper to operate continuously two times then intermittently at eight-second intervals.

If the shift lever <M/T> selector lever <A/T> is moved to the R position when the rear wiper switch is turned to the ON position and the ignition switch at ACC or ON position, back-up lamp switch <M/T> or inhibitor switch R <A/T> turns ON. One second later, the ETACS-ECU causes the rear wiper to operate two times continuously to ensure good rearward visibility. The ETACS-ECU then causes the rear wiper to again operate intermittently at eight-second intervals.

HEADLAMP WASHER

If the headlamp washer switch of the column switch assembly is turned to the ON position with the

HEADLAMP

Headlamp Auto-cut Function

If the ignition switch is turned to LOCK (OFF) or ACC position, when the headlamps are on, the headlamps will be switched off in three minutes. If the driver's door is opened within that three-minute period, the headlamps will be switched off automatically. This prevents the battery from discharged.

In addition, if the headlamps are turned on when the ignition switch is at LOCK (OFF) or ACC position, the headlamps will not be switched off.

FLASHER TIMER

Turn-signal Lamp

When the ignition switch is turned to ON position and turn-signal lamp switch is placed in the ON position for right or left turn signaling, the system generates turn-signal lamp drive signals (flashing signals).

The system also notifies of a blown turn-signal lamp bulb by shortening the flashing intervals of the corresponding indicator lamp.

FRONT FOG LAMP

The front fog lamp switch becomes active only when the tail lamps are on. Therefore, if the tail lamps are turned off, the fog lamps will also be switched

REAR FOG LAMP

The rear fog lamp switch becomes active only when the headlamps or front fog lamps* are on. Therefore, if the headlamps and front fog lamps* are turned off, the rear fog lamps will also be switched off. Whenever the headlamps or front fog lamps* are

Rear Washer Operation

If the rear washer switch is turned to the ON position with the ignition switch at ACC or ON position, the rear washer ON signal is sent to the ETACS-ECU, causing the rear wiper signal to turn on after 0.3 seconds. After the rear washer switch signal turns off, the rear wiper signal turns off in three seconds. If the rear wiper switch is turned to the ON position while the rear wiper is at intermittent mode, the rear washer works for that period when the washer switch remains on. Then the rear wipers return to the intermittent mode.

ignition switch in the ACC or ON position, the front-ECU turns on the headlamp washer relay.

Headlamp Dimmer Switch Auto-reset Function

This function allows the dimmer switch to be reset to the low-beam position whenever the headlamp switch is turned ON.

Daytime Running Lamp (DRL) Function

If the ignition switch is turned to ON when the headlamps and tail lamps are off, the headlamps (low-beam) and tail lamps turn on.

Hazard Warning Lamp

The system detects a change from ON to OFF of the hazard lamp input signal and activates the hazard lamps if they are not in operation or deactivates the lamps if they are operating (reversal of state between activation and deactivation).

off. Whenever the tail lamps are turned on at the next time, the front fog lamps will always be off regardless of the switch positions.

turned on at the next time, the rear fog lamps will always be off regardless of the switch positions.

NOTE

*: In vehicles without front fog lamps, these conditions apply to the headlamps only.

ROOM LAMP

With the room lamp switch in the DOOR position, the ETACS-ECU controls the room lamp operation as follows:

- When a door is opened from outside or inside [with the ignition switch turned to LOCK (OFF) position]:
When a door is opened, the ETACS-ECU causes the room lamp to be illuminated at the 100% intensity. When the door is closed, it dims out the room lamp to 65% intensity and approx. 30 seconds later, turns out the lamp completely. During this period (timer controlled period), the room lamp does out if the ignition switch is turned to ON position or the doors are locked.
- When a door is opened or closed with the ignition switch in the ON position:
The room lamp illuminates at 100% intensity when a door is opened and turned out when it is closed.
- When no door is opened and the ignition key is removed:

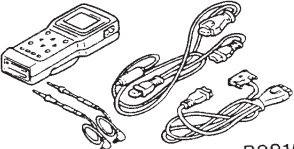
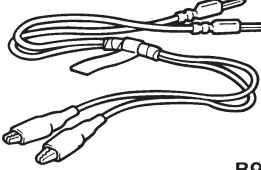
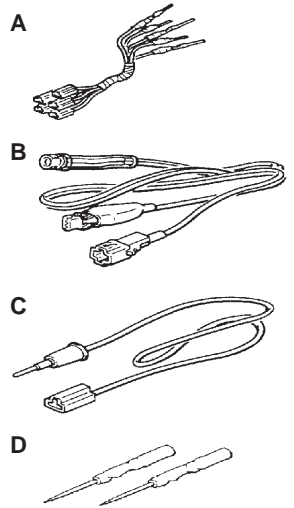
When the ignition key is removed with all the doors closed, the room lamp is illuminated at an intensity of 65% and turned out approx. 30 seconds later. During that time (timer-controlled period), the room lamp does out if the ignition key is inserted and turned to ON position or the door locking system is activated.

- Room lamp's answerback operation in response to door lock control by keyless entry system:

To allow the driver to ascertain the result of the door locking/unlocking control action by the use of the keyless entry system, the ETACS-ECU causes the room lamp to blink twice when the doors are locked through the system and to illuminate for approx. 15 seconds when the doors are locked.

The room lamp's answerback operation in response to a keyless entry system control action is accompanied by operation of the hazard warning lamps.

SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	Checking of the SWS (Diagnosis code display and input check with the MUT-II)
 B991529	MB991529	Diagnosis code check harness	Simple diagnosis
 A B C D C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Measurement of terminal voltage at ECUs A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

TROUBLESHOOTING

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

DIAGNOSTIC FUNCTION

DIAGNOSIS CODES CHECK

Use the MUT-II to check a diagnosis code.

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

NOTE

Connect the MUT-II to the 16-pin diagnosis connector (black).

INPUT SIGNAL CHECK

1. Use the MUT-II to check a input signal.
(Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)
2. In this condition, the following input switches can be checked.
3. If an abnormality is found during the input signal check, carry out troubleshooting while referring to the Trouble Symptom Check page.

Input Signal Check Function

Input signal	Buzzer operation condition
Ignition switch (ACC)	Turned from LOCK (OFF) to ACC
Ignition switch (IG1)	Turned from ACC to ON
Key reminder switch	Ignition key removed from ignition key cylinder (from inserted position)
Hazard warning lamp switch	Turned from OFF to ON
Front fog lamp switch <vehicles with front fog lamp>	
Rear fog lamp switch	
Back-up lamp switch <M/T>	Shift lever moved to R position
Inhibitor switch (reverse) <A/T>	Selector lever moved to R position
Rear wiper motor auto-stop signal	Rear wiper begins to operate (The input signal is sent before the rear wiper begins to operate)
Driver's door switch	Driver's door opened from closed condition
Door switches	All doors closed to any door opened
Passenger's door key cylinder switch <vehicles with central door locking system>	Passenger's door locked or unlocked using ignition key
Back door key cylinder switch <vehicles with central door locking system>	Back door locked or unlocked using ignition key
Driver's door lock actuator switch <vehicles with central door locking system>	Driver's door lock knob moved from lock position to unlock position or vice versa

Input signal		Buzzer operation condition
Column switch	Tail lamp switch	Turned the lighting switch from OFF to tail lamp position
	Headlamp switch	Turn the lighting switch from tail lamp position to headlamp position
	Dimmer switch	Turned from OFF to ON
	Passing switch	
	Turn-signal lamp switch	
	Windshield mist wiper switch	
	Windshield intermittent wiper switch	
	Windshield low-speed wiper switch	
	Windshield high-speed wiper switch	
	Windshield intermittent wiper interval adjusting knob <vehicles with variable windshield intermittent wiper>	Rotate the windshield intermittent wiper interval adjusting knob from FAST to SLOW when the ignition switch is at ON position (The ETACS-ECU sends a signal around the medium knob position)
	Windshield washer switch	Turned from OFF to ON
	Rear wiper switch	
	Rear washer switch	
	Headlamp washer switch <vehicles with headlamp washer>	
Power window main switch	Any switch <vehicles with power window>	
Transmitter	Any switch <vehicles with keyless entry system>	
Multi-center display	Any switch <vehicles with multi-center display>	

DIAGNOSIS CODE CHART

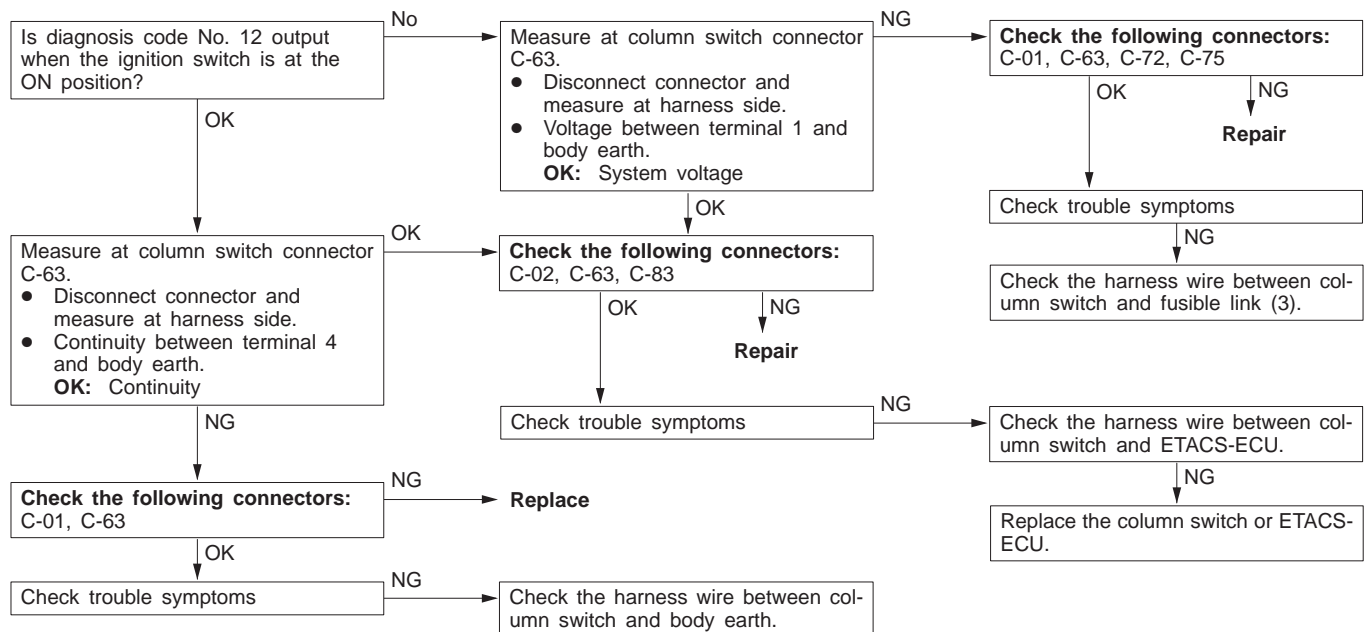
Code No.	Diagnosis item	Reference page
11	Failure concerning the ETACS-ECU	54B-8
12	Failure concerning the column switch or improper connecting with the ETACS-ECU	54B-8
13	Failure concerning the front-ECU	54B-9
21	Short circuit in communication line	54B-10

DIAGNOSIS CODE INSPECTION PROCEDURES

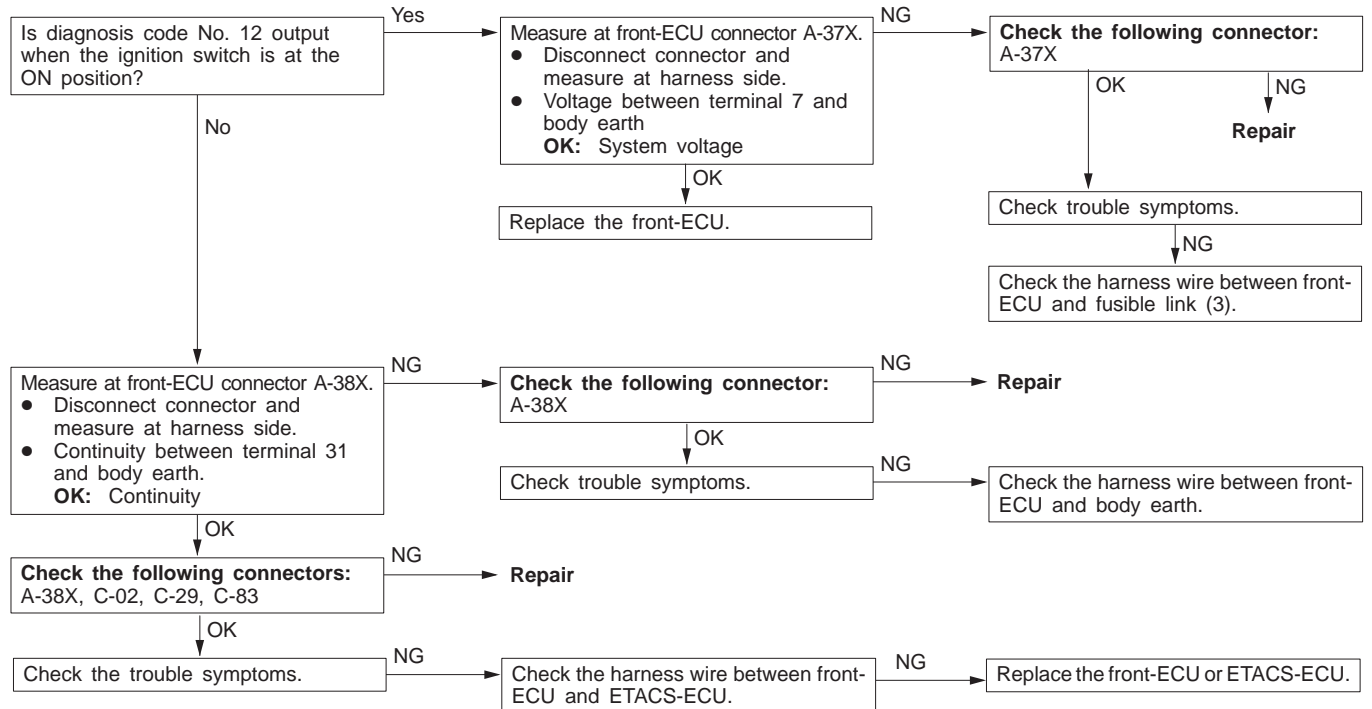
Code No.11 Failure concerning the ETACS-ECU	Probable cause
The ETACS-ECU monitors its own communication data, and sends a diagnosis code when an error takes place consecutive fifteen times in 0.6 second. The diagnosis code will be erased when the ETACS-ECU determines that its own communication data is sent consecutive 15 times in 0.6 second.	<ul style="list-style-type: none"> Malfunction of ETACS-ECU

Replace the ETACS-ECU.

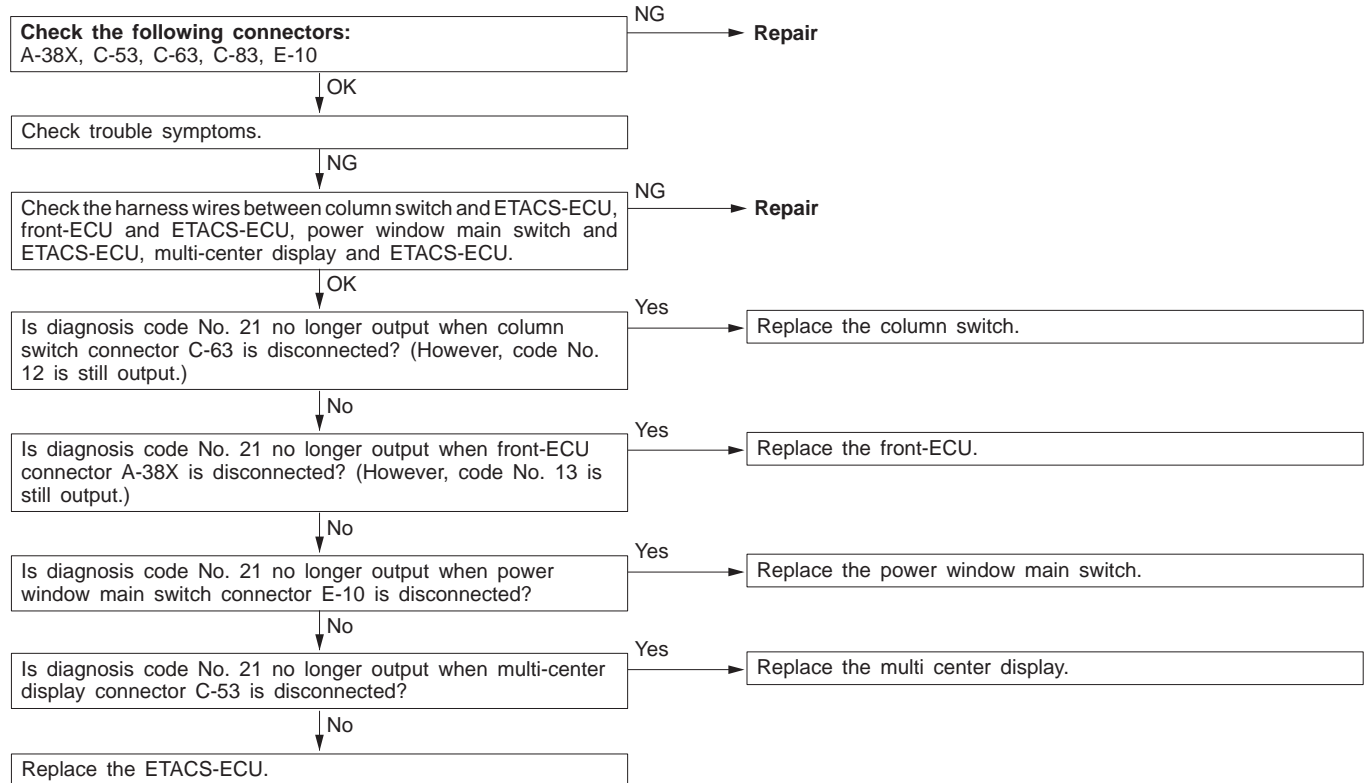
Code No.12 Failure concerning the column switch or improper connection with the ETACS-ECU	Probable cause
This diagnosis code is displayed when the column switch sends a signal regardless of the transmission request signal from the ETACS-ECU (three times or more in one second). The diagnosis code is erased when the column switch continues to send a signal according to the transmission request signal from the ETACS-ECU for one second.	<ul style="list-style-type: none"> Malfunction of column switch Malfunction of ETACS-ECU Malfunction of wiring harness or connector



Code No.13 Failure concerning the front-ECU	Probable cause
<p>This diagnosis code is displayed when the signals that the front-ECU sends to the ETACS-ECU are errors consecutive fifteen times in 0.6 second.</p> <p>The diagnosis code will be erased when the front-ECU sends normal signals to the ETACS-ECU consecutive 15 times in 0.6 second.</p>	<ul style="list-style-type: none"> • Malfunction of front-ECU • Malfunction of ETACS-ECU • Malfunction of wiring harness or connector



Code No.21 Short circuit in communication lines	Probable cause
This diagnosis code is displayed when the SWS communication line voltage reaches the LO level for 0.3 second. The diagnosis code is erased when voltage in the ETACS-ECU data line reaches the HI level for 0.3 second, or the ETACS-ECU receives a normal signal from other ECUs or switches. While this code is displayed, other codes are not displayed.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of power window main switch <vehicles with front power window> • Malfunction of multi center display <vehicles with multi center display> • Malfunction of ETACS-ECU • Malfunction of wiring harness or connector



TROUBLE SYMPTOM CHART

Trouble symptom		Inspection procedure	Reference page
Communication with the MUT-II is impossible.		A-1	54B-14
Buzzer	Light reminder warning function does not work normally.	B-1	54B-15
	Multi-center display alarm function does not work normally.	B-2	54B-15
Central door locking system	Central door locking system does not work normally.	C-1	54B-16
	Some doors do not lock or unlock.	C-2	54B-16
	All the doors do not lock or unlock with just the driver's door lock key cylinder key operation or driver's inside lock knob operation.	C-3	54B-17
	All the doors do not lock or unlock with just the passenger's or back door lock key cylinder key operation.	C-4	54B-17
	Forgotten key prevention function does not work.	C-5	54B-17
Power window	Power window do not work at all.	D-1	54B-18
	Power window main switch can not operate driver's window.	D-2	54B-18
	Power window sub switch can not operate passenger's window.	D-3	54B-19
	Power window main switch can not operate passenger's window.	D-4	54B-20
	Power window timer function does not work normally.	D-5	54B-20
	When the glass is raised, it then lowers automatically.	D-6	54B-21
	The glass is not lowered when something is jammed in the window.	D-7	54B-21
	When the glass is fully raised, it then lowers automatically.	D-8	54B-21
Keyless entry system	Keyless entry system does not operate.	E-1	54B-22
	The room lamp and hazard warning lamps do not operate through the answerback function.	E-2	54B-22
	The encrypted code cannot be registered.	E-3	54B-22
Windshield wiper and washer	Windshield wiper does not operate.	F-1	54B-23
	Any of the windshield wiper switch positions is defective.	F-2	54B-24
	Windshield wiper does not stop at the predetermined park position.	F-3	54B-24
	Windshield intermittent wiper interval cannot be adjusted.	F-4	54B-25
	Windshield washer does not work.	F-5	54B-25

Trouble symptom		Inspection procedure	Reference page
Rear wiper and washer	Rear wiper does not work at all.	G-1	54B-26
	Rear wiper does not stop at the predetermined park position.	G-2	54B-26
	When the shift lever <M/T> or selector lever <A/T> is moved to R position during the rear wiper operation, the rear wiper does not operate at the continuous mode.	G-3	54B-27
	Rear washer does not work.	G-4	54B-27
Headlamp washer	Headlamp washer does not work.	H-1	54B-28
Headlamp, tail lamp	Tail lamp do not illuminate.	I-1	54B-29
	Headlamps (low-beam) do no illuminate.	I-2	54B-29
	Headlamps (high-beam) do no illuminate.	I-3	54B-30
	Headlamps do not illuminate when the passing switch is operated.	I-4	54B-30
	The headlamp auto-cut function does not work normally.	I-5	54B-31
	Headlamp dimmer switch auto-reset function does not work normally.	I-6	54B-31
	Daytime running lamp (DRL) function does not work.	I-7	54B-31
Flasher timer	Turn-signal lamp do not flash when the turn-signal lamp switch is turned on.	J-1	54B-32
	Hazard warning lamps do not flash when the hazard warning lamp switch is turned on.	J-2	54B-33
Front fog lamp	Front fog lamps do not illuminate when the front fog lamp switch is turned on.	K-1	54B-34
	Front fog lamp do not go out when the tail lamps are turned off while the fog lamps are on.	K-2	54B-34
Rear fog lamp	Rear fog lamp do not illuminate when the rear fog lamp switch is turned on.	L-1	54B-35
	Rear fog lamp do not out when the headlamps and front fog lamps <vehicles with front fog lamp> are turned off while the fog lamp is on.	L-2	54B-36
Room lamp	The room lamp does not illuminate.	M-1	54B-36
	The doom lamp dimming function does not work normally.	M-2	54B-37
Multi-center display	The multi-center display does not work normally.	–	GROUP 54A – Multi-center Display.

DEFECTS FOUND BY INPUT SIGNAL CHECK

If the input signal check finds a defect, follow the table below to check.

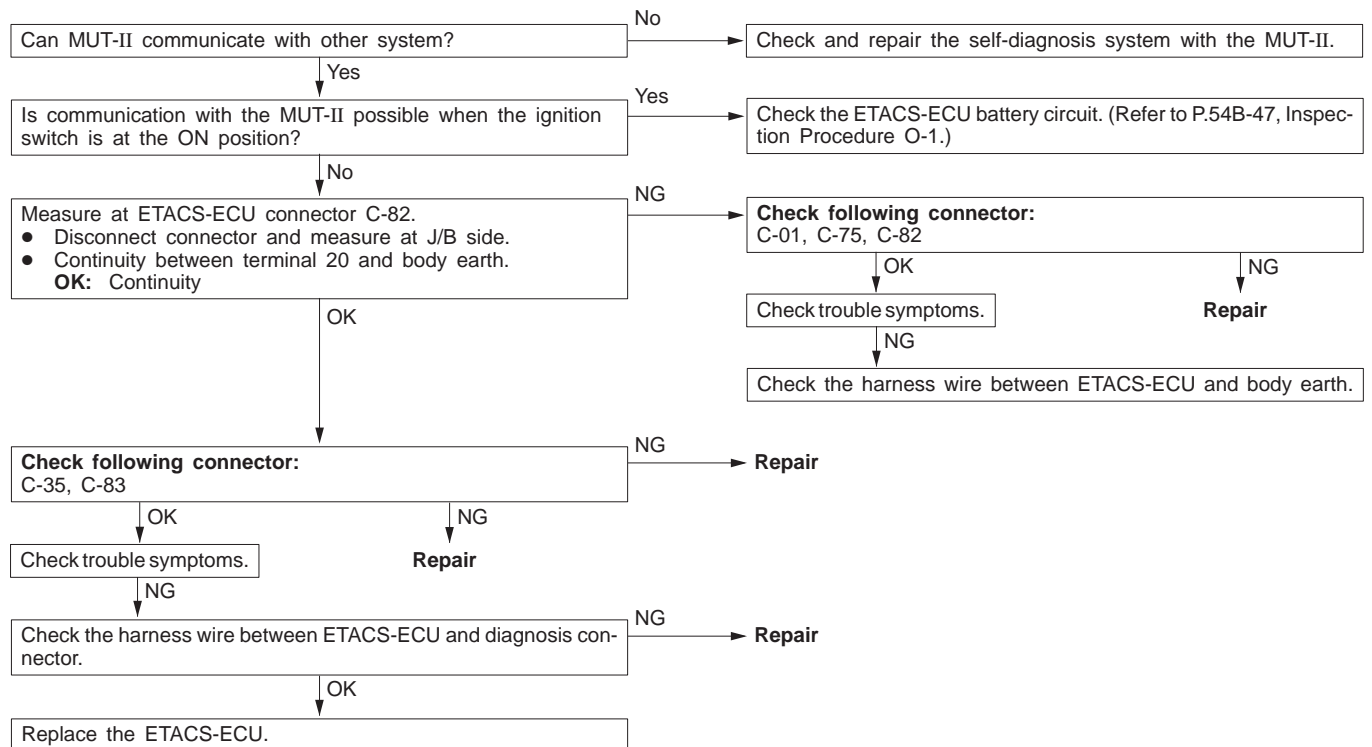
Trouble symptom		Inspection procedure	Reference page
Ignition switch (ACC) signal is not sent to the ETACS-ECU.		N-1	54B-37
Ignition switch (IG1) signal is not sent to the ETACS-ECU.		N-2	54B-38
Key reminder switch signal is not sent to the ETACS-ECU.		N-3	54B-38
Hazard warning lamp switch signal is not sent to the ETACS-ECU.		N-4	54B-39
Front fog lamp switch signal is not sent to the ETACS-ECU.		N-5	54B-39
Rear fog lamp switch signal is not sent to the ETACS-ECU.		N-6	54B-40
Back-up lamp switch signal is not sent to the ETACS-ECU. <M/T>		N-7	54B-40
Inhibitor switch (reverse) signal is not sent to the ETACS-ECU. <A/T>		N-8	54B-41
Rear wiper motor auto-stop signal is not sent to the ETACS-ECU.		N-9	54B-41
Driver's door switch signal is not sent to the ETACS-ECU.		N-10	54B-42
Door switches signal is not sent to the ETACS-ECU.			
Passenger's door lock key cylinder switch signal is not sent to the ETACS-ECU.		N-11	54B-43
Back door lock key cylinder switch signal is not sent to the ETACS-ECU.		N-12	54B-43
Driver's door lock actuator switch signal is not sent to the ETACS-ECU.		N-13	54B-44
Column switch	Tail lamp switch signal is not sent to the ETACS-ECU.	N-14	54B-45
	Headlamp switch signal is not sent to the ETACS-ECU.		
	Dimmer switch signal is not sent to the ETACS-ECU.		
	Passing switch signal is not sent to the ETACS-ECU.		
	Turn-signal lamp switch signal is not sent to the ETACS-ECU.		
	Windshield mist wiper switch signal is not sent to the ETACS-ECU.		
	Windshield intermittent wiper switch signal is not sent to the ETACS-ECU.		
	Windshield low-speed wiper switch signal is not sent to the ETACS-ECU.		
	Windshield high-speed wiper switch signal is not sent to the ETACS-ECU.		
	Windshield intermittent wiper interval adjusting knob signal is not sent to the ETACS-ECU.	N-15	54B-45
	Windshield wiper switch signal is not sent to the ETACS-ECU.	N-14	54B-45
	Rear wiper switch signal is not sent to the ETACS-ECU.		
	Rear washer switch signal is not sent to the ETACS-ECU.		
	Headlamp washer switch signal is not sent to the ETACS-ECU.		

Trouble symptom		Inspection procedure	Reference page
Power window main switch	Any switch signal is not sent to the ETACS-ECU.	N-16	54B-46
Transmitter	Any switch signal is not sent to the ETACS-ECU.	N-17	54B-46
Multi-center display	Any switch signal is not sent to the ETACS-ECU.	N-18	54B-47

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

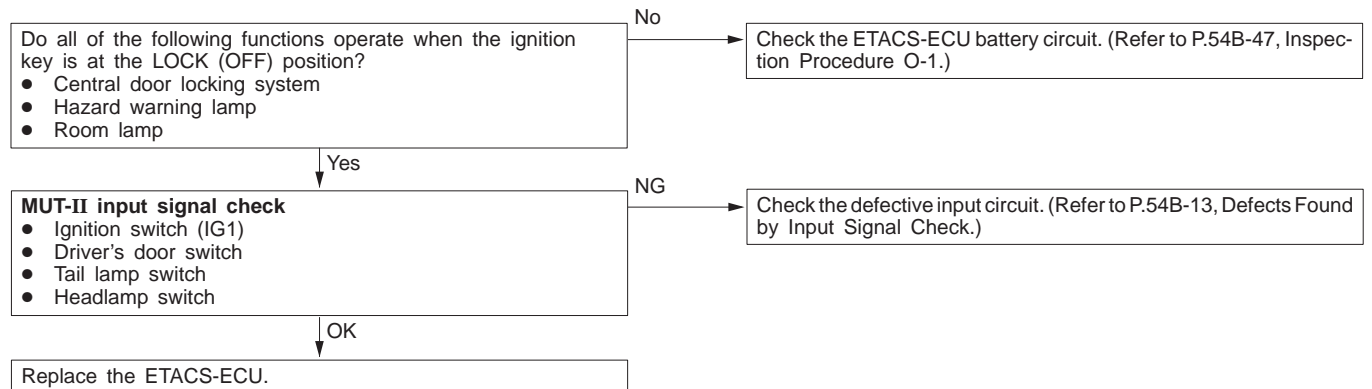
Inspection Procedure A-1

Communication with the MUT-II is impossible.	Probable cause
The harness wires between the ETACS-ECU power supply line or the ETACS-ECU and the diagnosis connector may be defective.	<ul style="list-style-type: none"> Malfunction of ETACS-ECU Malfunction of harness wire or connector



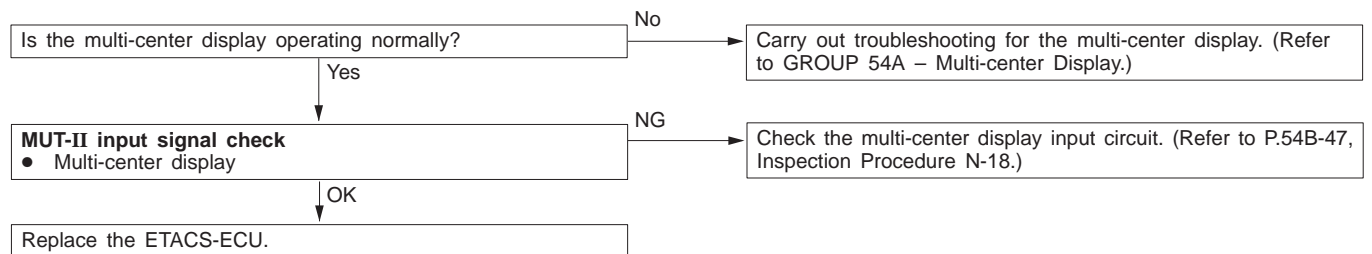
Inspection Procedure B-1

Buzzer: Light reminder warning function does not work normally.	Probable cause
<p>The ETACS-ECU operates the light reminder warning function, based on input signals from the following switched:</p> <ul style="list-style-type: none"> • Ignition switch (IG1) • Driver's door switch • Tail lamp switch • headlamp switch <p>If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.</p>	<ul style="list-style-type: none"> • Malfunction of driver's door switch • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



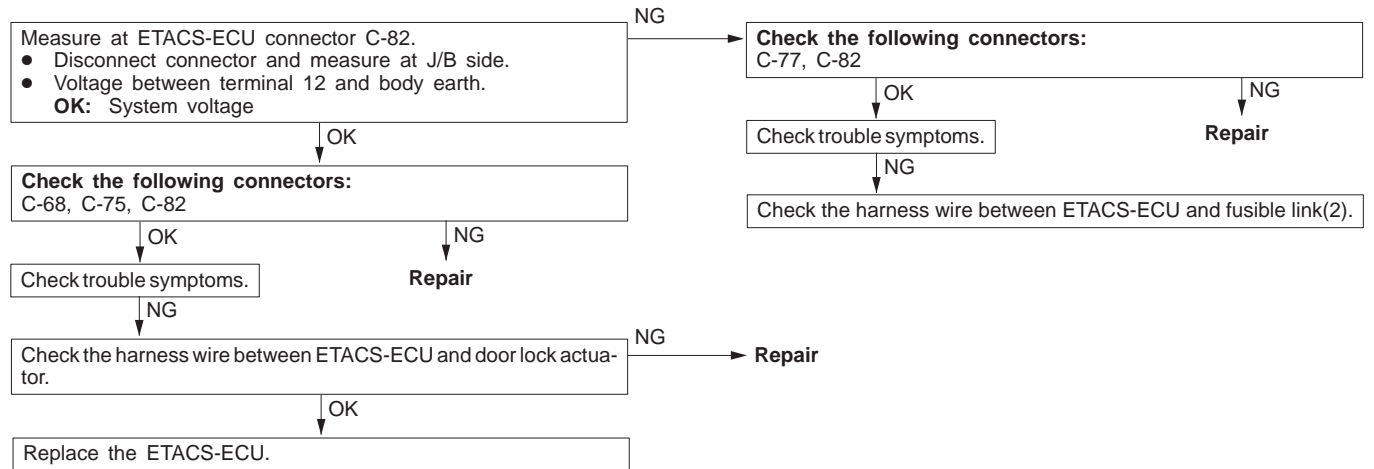
Inspection Procedure B-2

Buzzer: Multi-center display buzzer function does not work normally.	Probable cause
<p>If the multi-center display is operating normally, the cause is probably a malfunction in the harness between the multi-center display and the ETACS-ECU or in the ETACS-ECU itself.</p>	<ul style="list-style-type: none"> • Malfunction of multi-center display • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



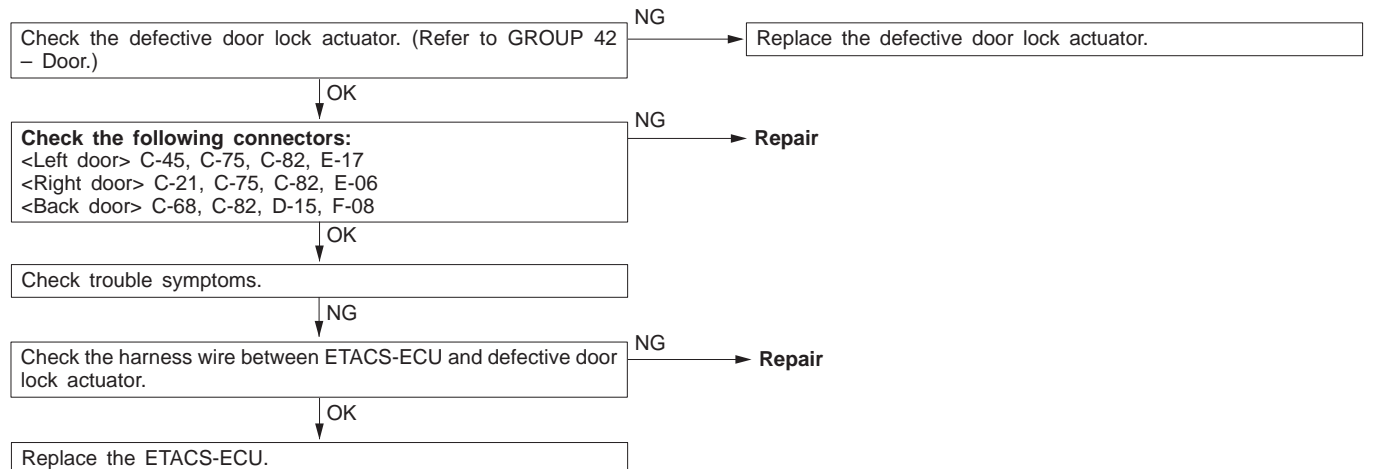
Inspection Procedure C-1

Central door locking system: Central door locking system does not work normally.	Probable cause
The power supply circuit, the circuit shared by door lock actuators, or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> Malfunction of ETACS-ECU Malfunction of harness wire or connector



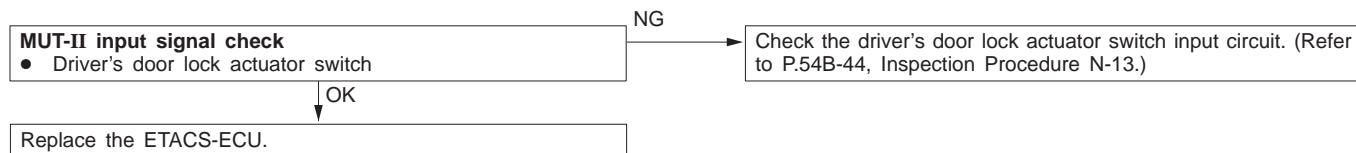
Inspection Procedure C-2

Central door locking system: Some doors do not lock or unlock.	Probable cause
The door lock actuator, or the harness wire between ETACS-ECU and the door lock actuator may be defective.	<ul style="list-style-type: none"> Malfunction of driver's, passenger's or back door lock actuator Malfunction of ETACS-ECU Malfunction of harness wire or connector



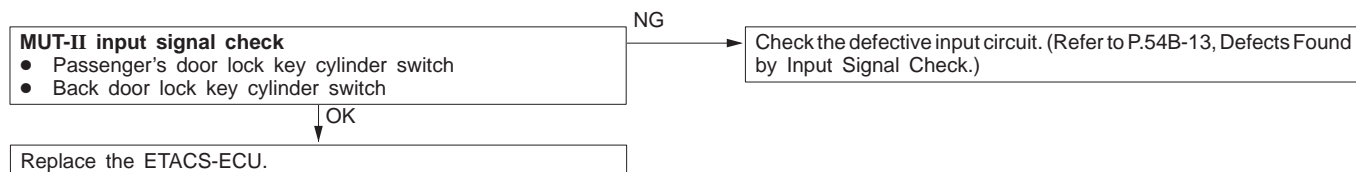
Inspection Procedure C-3

Central door locking system: All the doors do not lock or unlock with just the driver's door lock key cylinder key operation or driver's inside lock knob operation.	Probable cause
The driver's door lock actuator switch or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of driver's door lock actuator • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



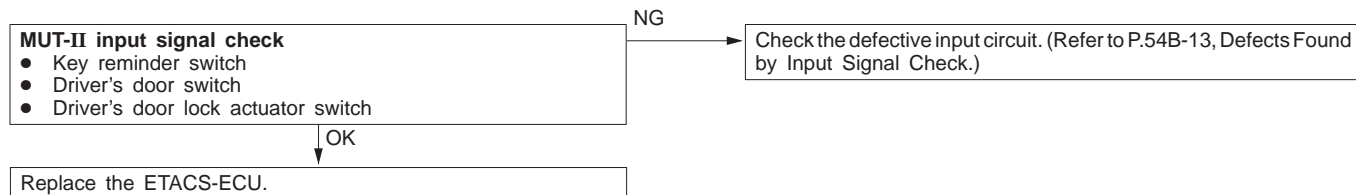
Inspection Procedure C-4

Central door locking system: All the doors do not lock or unlock with just the passenger's or back door lock key cylinder key operation.	Probable cause
The passenger's or back door lock key cylinder or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of passenger's or back door lock key cylinder switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



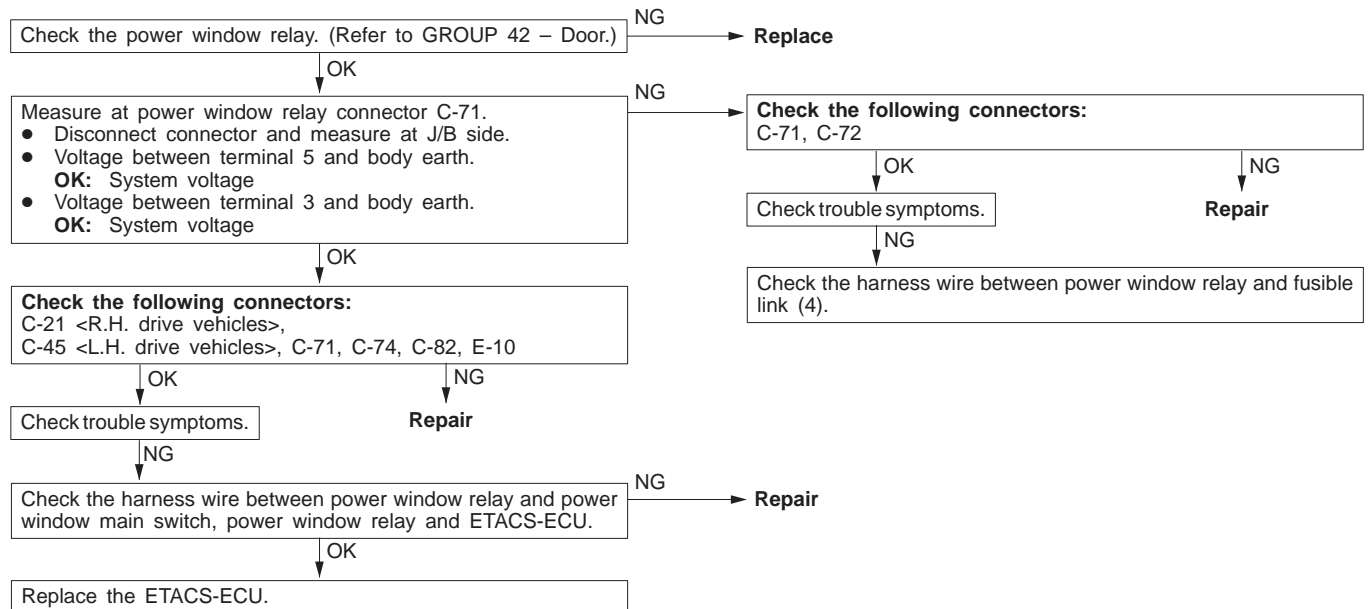
Inspection Procedure C-5

Central door locking system: Forgotten key prevention function does not work.	Probable cause
<p>The ETACS-ECU operates the forgotten key prevention function, based on the input signals from the following switches:</p> <ul style="list-style-type: none"> • Key reminder switch • Driver's door switch • Driver's door lock actuator switch <p>If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.</p>	<ul style="list-style-type: none"> • Malfunction of key reminder switch • Malfunction of driver's door switch • Malfunction of driver's door lock actuator • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



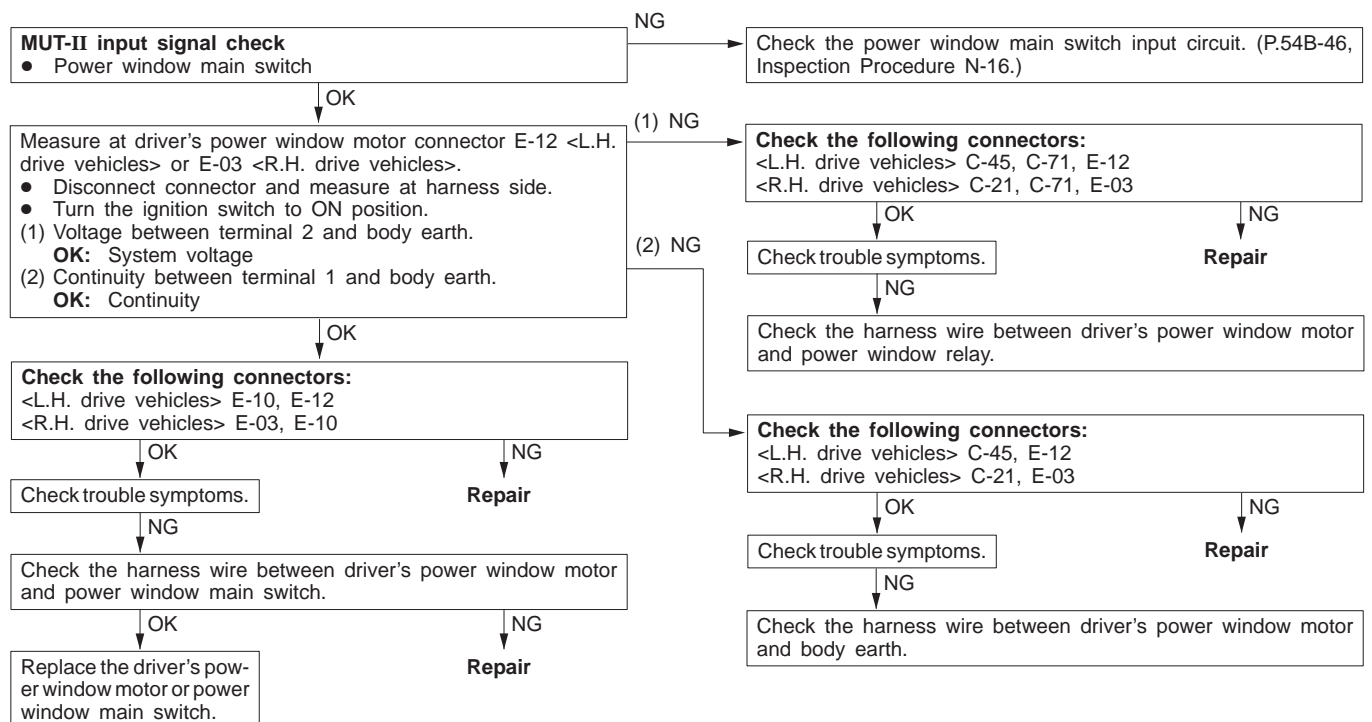
Inspection Procedure D-1

Power window: Power window do not work at all.	Probable cause
The power window relay or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of power window relay • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



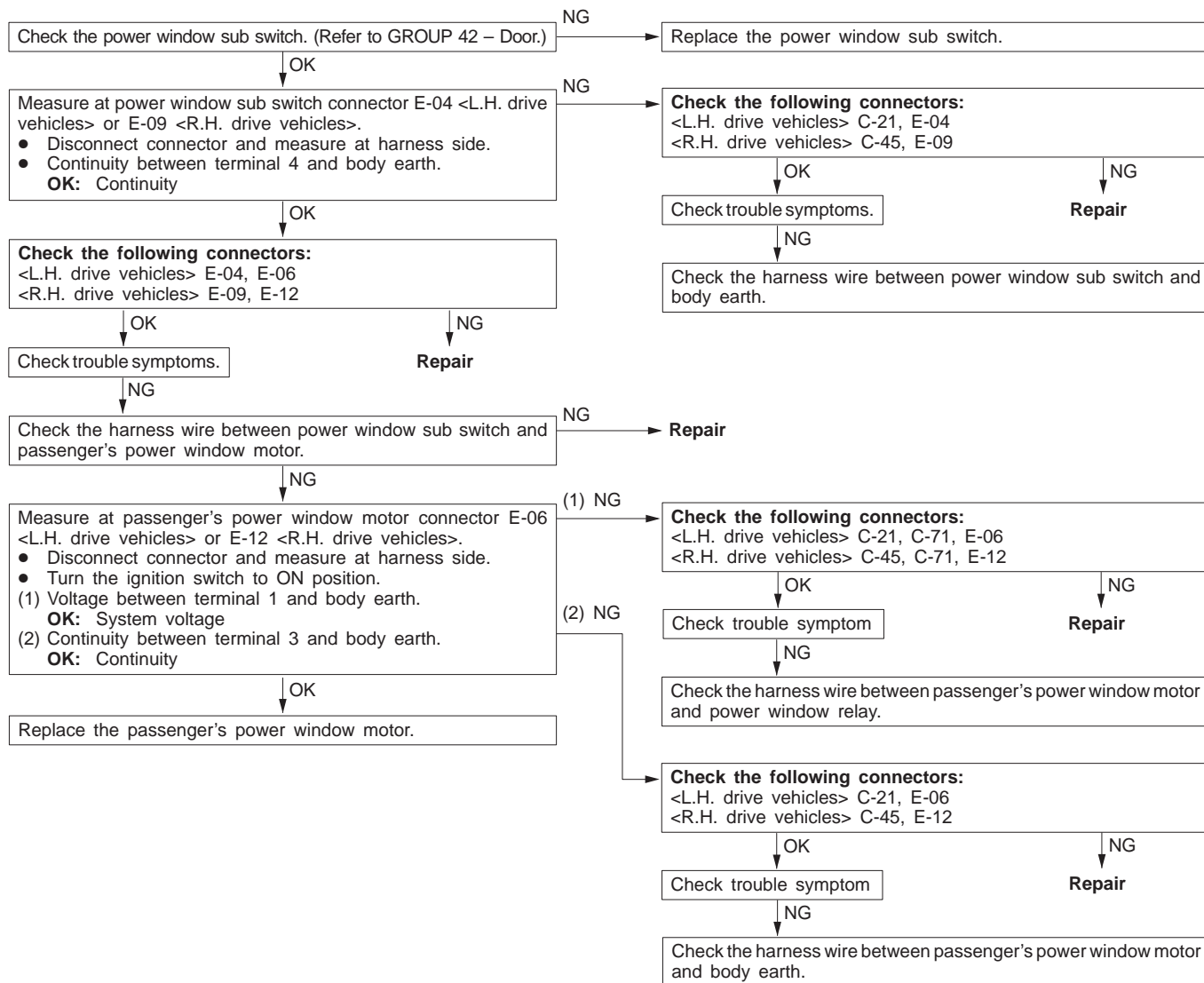
Inspection Procedure D-2

Power window: Power window main switch can not operate drive's window.	Probable cause
The cause is probably a malfunction of the power window main switch or driver's side power window motor, or an abnormality in the power supply circuit.	<ul style="list-style-type: none"> • Malfunction of power window main switch • Malfunction of driver's power window motor • Malfunction of harness wire or connector



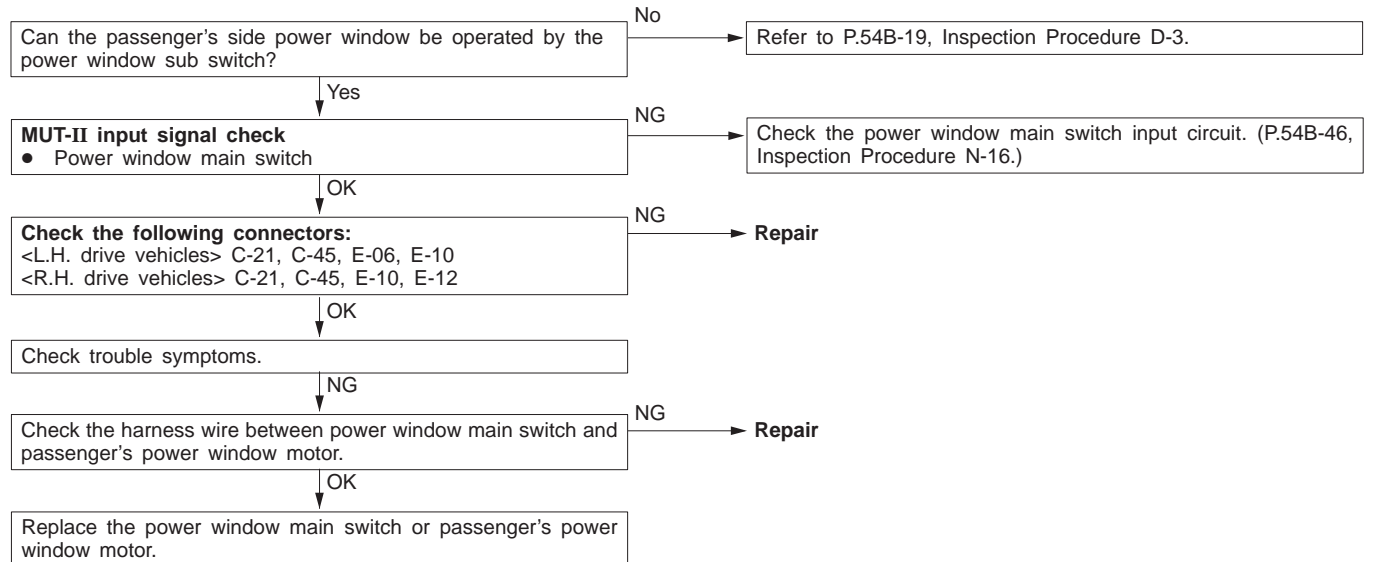
Inspection Procedure D-3

Power window: Power window sub switch can not operate passenger's window.	Probable cause
The cause is probably a malfunction of the power window main switch or driver's side power window motor, or an abnormality in the power supply circuit.	<ul style="list-style-type: none"> Malfunction of power window sub switch Malfunction of passenger's power window motor Malfunction of harness wire or connector



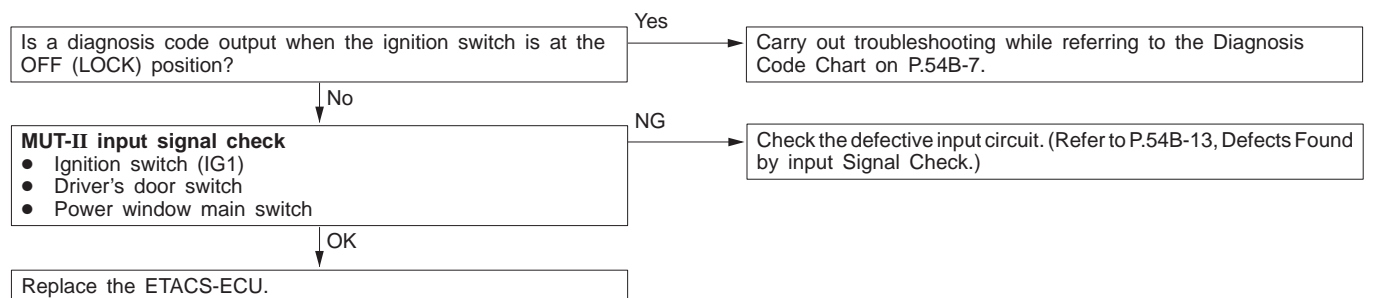
Inspection Procedure D-4

Power window: Power window main switch can not operate passenger's window.	Probable cause
The cause is probably a malfunction of the power window main switch or driver's side power window motor, or an abnormality in the power supply circuit.	<ul style="list-style-type: none"> • Malfunction of power window main switch • Malfunction of passenger's power window motor • Malfunction of harness wire or connector



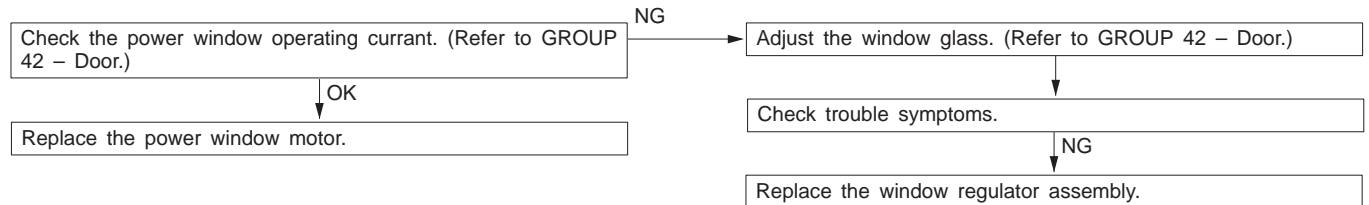
Inspection Procedure D-5

Power window: Power window timer function does not work normally.	Probable cause
<p>The ETACS-ECU operates the power window timer function, based on the input signals from the following switches:</p> <ul style="list-style-type: none"> • Ignition switch (IG1) • Driver's door switch <p>If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.</p>	<ul style="list-style-type: none"> • Malfunction of driver's door switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



Inspection Procedure D-6

Power window: When the glass is raised, it then lowers automatically.	Probable cause
If the sliding resistance is too large when the glass is being raised, it is judged that something is jammed in the window, and the window is lowered by approximately 150 mm.	<ul style="list-style-type: none"> • Incorrect window glass adjustment • Glass slider is incorrectly installed or warped • Malfunction of power window motor



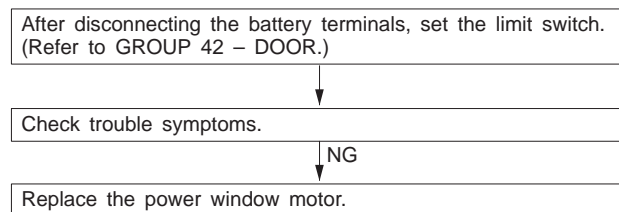
Inspection Procedure D-7

Power window: The glass is jammed in the window.	Probable cause
The cause may be a malfunction of the revolution detection sensor in the power window motor.	<ul style="list-style-type: none"> • Malfunction of power window motor

Replace the power window motor.

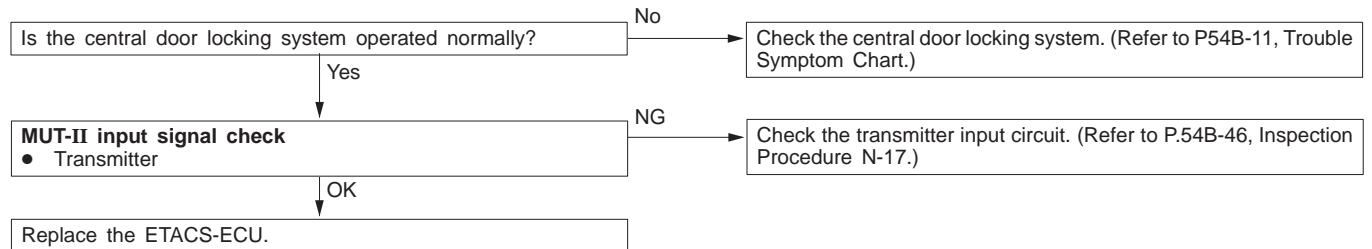
Inspection Procedure D-8

Power window: When the glass is fully raised, it then lowers automatically.	Probable cause
The cause may be a malfunction of the revolution detection sensor in the power window motor.	<ul style="list-style-type: none"> • Malfunction of power window motor



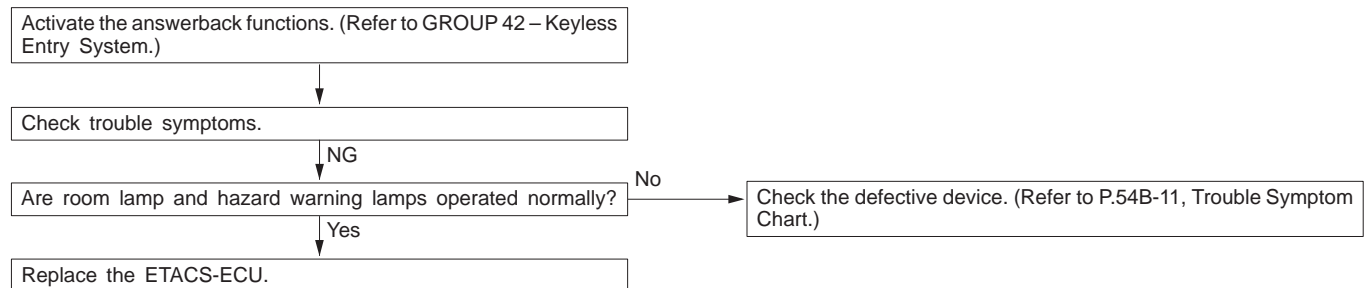
Inspection Procedure E-1

Keyless entry system: Keyless entry system does not operate.	Probable cause
The cause may be a malfunction of the receiver and transmitter communication system	<ul style="list-style-type: none"> Malfunction of transmitter Malfunction of ETACS-ECU



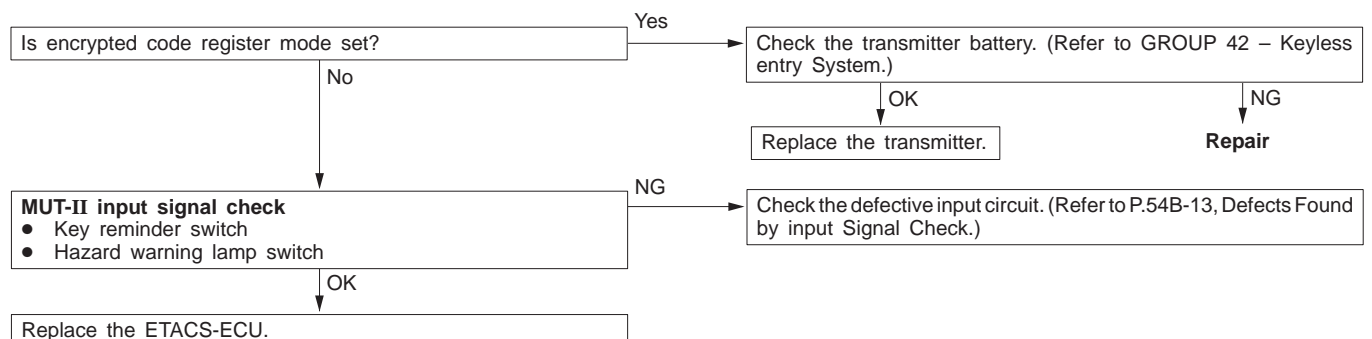
Inspection Procedure E-2

Keyless entry system: The room lamp and hazard warning lamps do not operate through the answerback function.	Probable cause
The hazard warning lamp answerback function can be selected by the driver's desire (can be deactivated). However, the room lamp answerback function can not be deactivated. If all of these device do not operate through the answerback function, the ETACS-ECU may be defective.	<ul style="list-style-type: none"> Malfunction of turn-signal lamp Malfunction of room lamp Malfunction of ETACS-ECU Malfunction of harness wire or connector



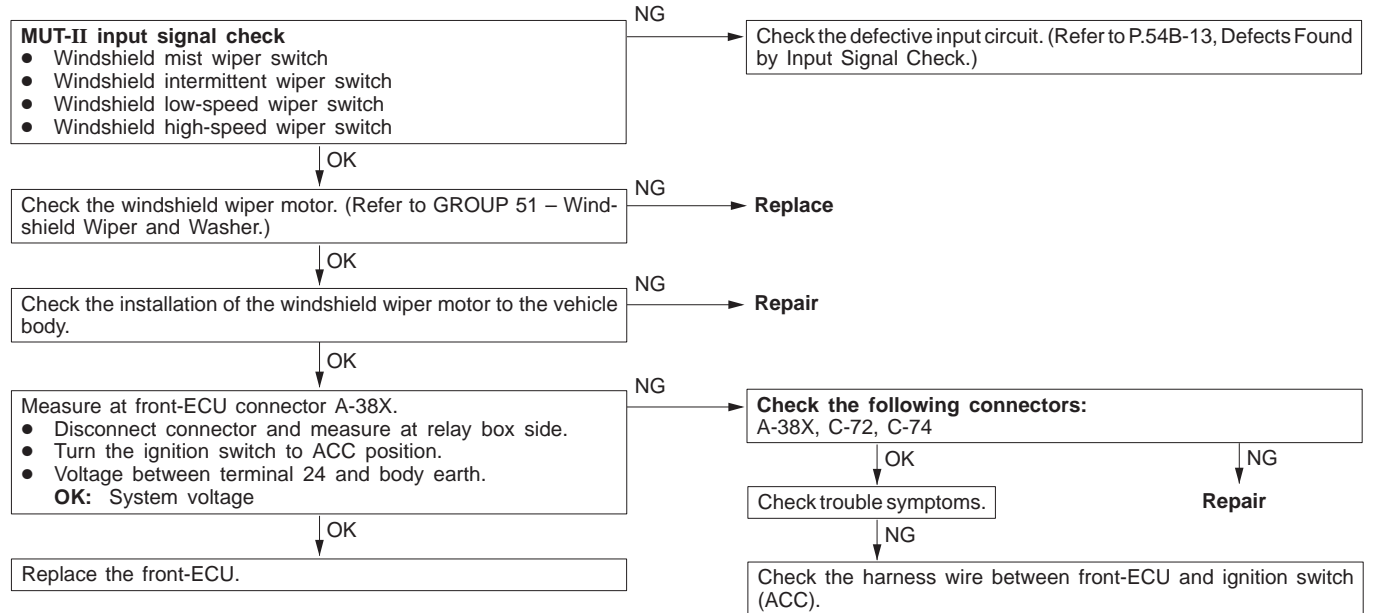
Inspection Procedure E-3

Keyless entry system: The encrypted code cannot be registered.	Probable cause
<p>The ETACS-ECU activates the encrypted code register mode according to the following switch signals.</p> <ul style="list-style-type: none"> Key reminder switch Hazard warning lamp switch <p>If the encrypted code register mode is not set, the relevant input signal circuit or the ETACS-ECU may be defective.</p> <p>If a transmitter can not be registered although the encrypted code register mode is set, the transmitter or the ETACS-ECU may be defective.</p>	<ul style="list-style-type: none"> Malfunction of key reminder switch Malfunction of hazard warning lamp switch Malfunction of transmitter Malfunction of ETACS-ECU Malfunction of harness wire or connector



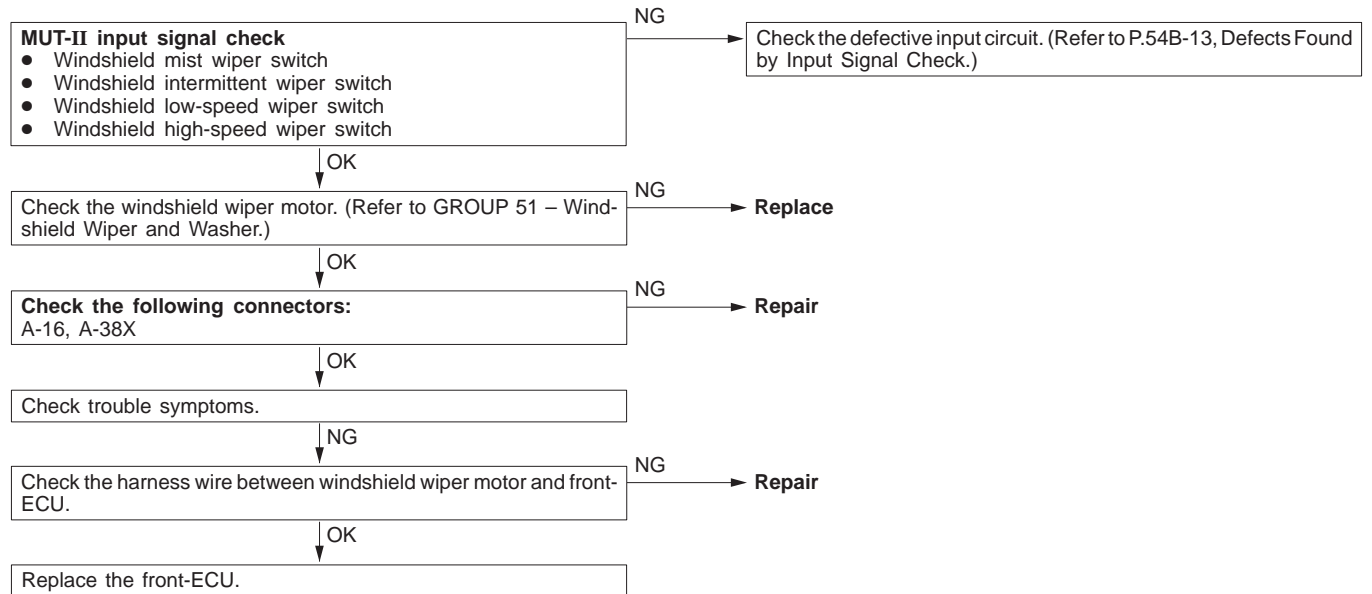
Inspection Procedure F-1

Windshield wiper and washer: Windshield wiper does not operate.	Probable cause
If the windshield wiper does not work at all, the windshield wiper motor, column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of windshield wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



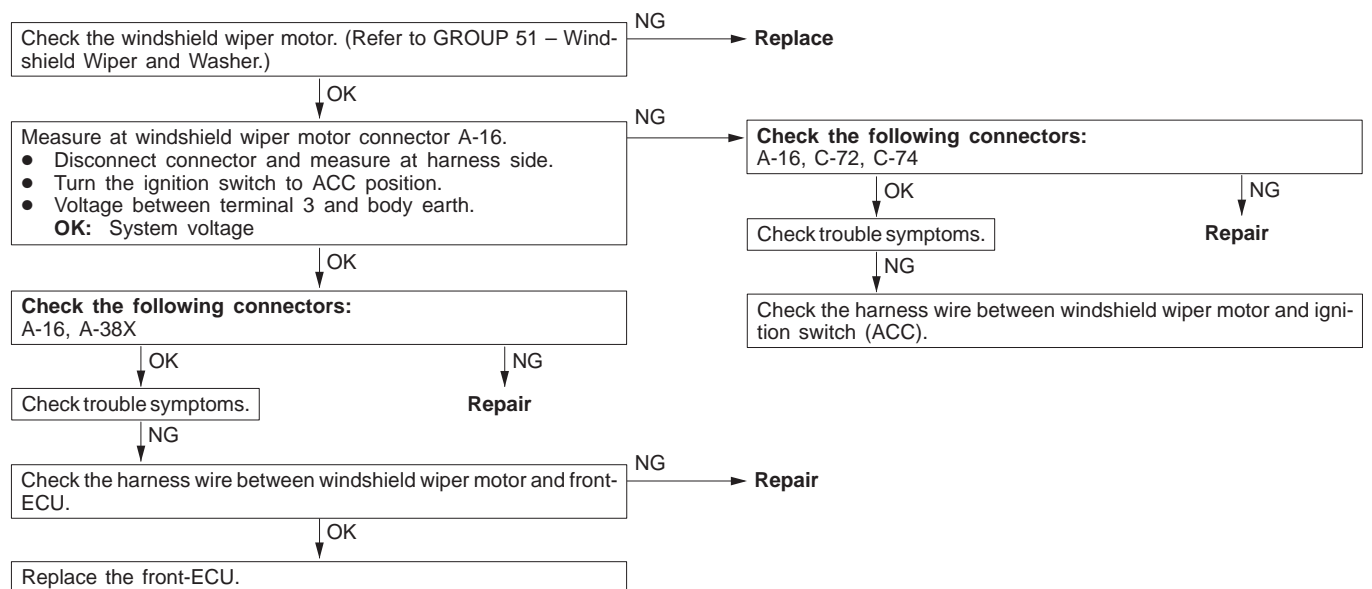
Inspection Procedure F-2

Windshield wiper and washer: Any of the windshield wiper switch positions is defective.	Probable cause
The windshield wiper motor, column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of windshield wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



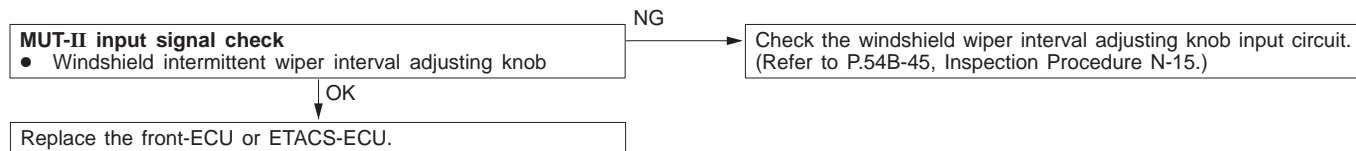
Inspection Procedure F-3

Windshield wiper and washer: Windshield wiper does not stop at the predetermined park position.	Probable cause
The windshield wiper motor or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of windshield wiper motor • Malfunction of front-ECU • Malfunction of harness wire or connector



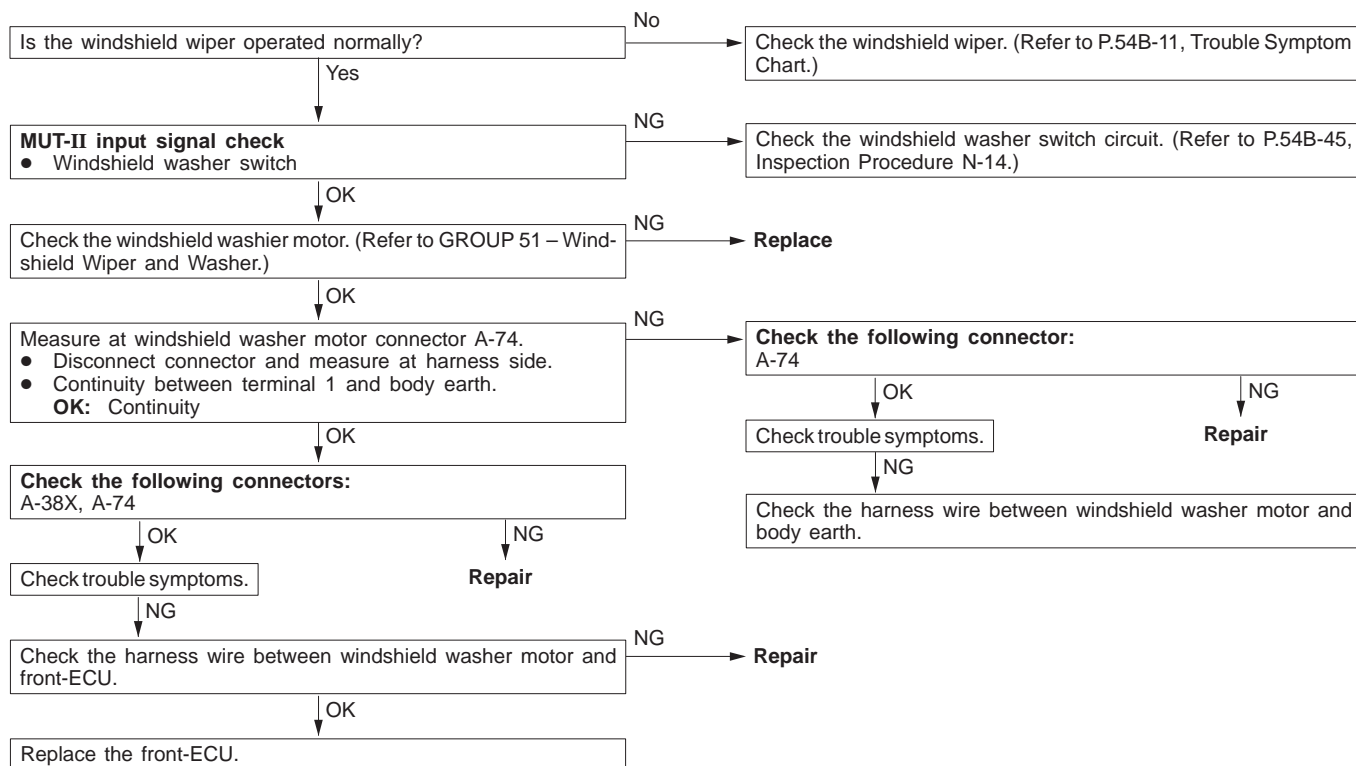
Inspection Procedure F-4

Windshield wiper and washer: Windshield intermittent wiper interval cannot be adjusted.	Probable cause
The ETACS-ECU calculates the intermittent wiper interval, and sends a signal to the front-ECU through the SWS communication line. If the signal is defective, the front-ECU will ignore the signal and set the intermittent wiper interval to 4 seconds.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



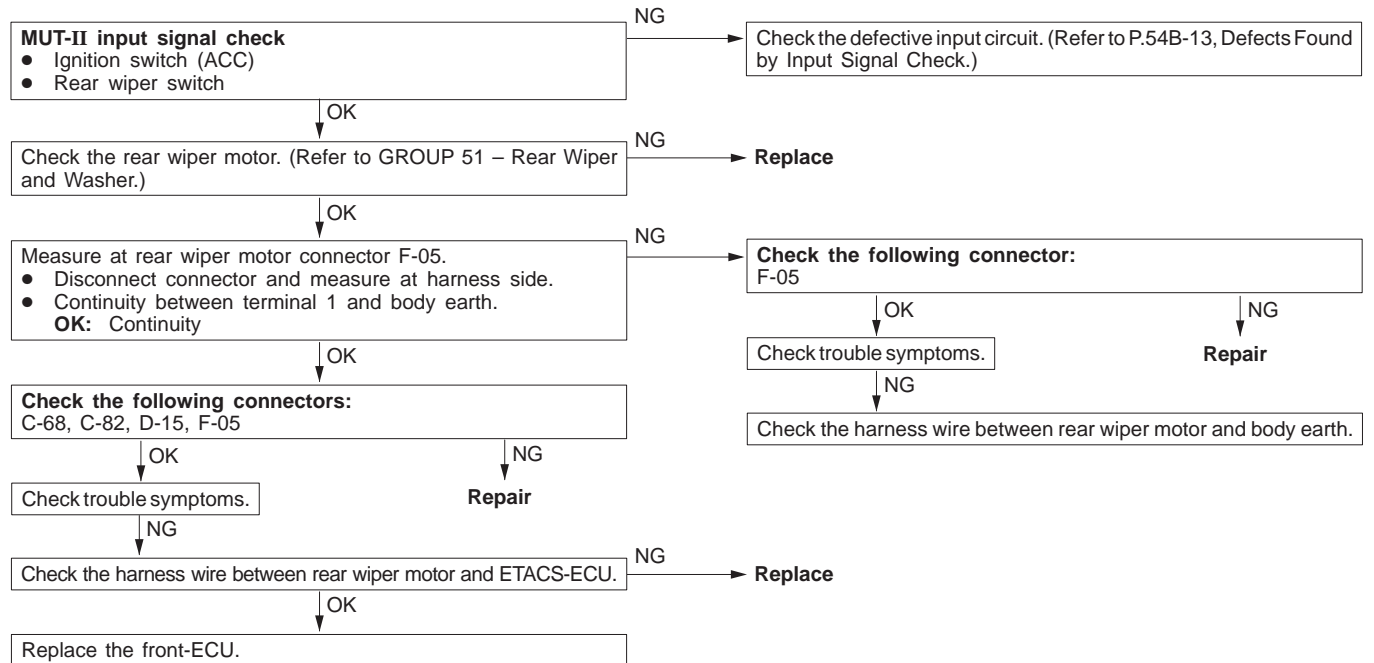
Inspection Procedure F-5

Windshield wiper and washer: Windshield washer does not work.	Probable cause
The windshield washer motor, the column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of windshield washer motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



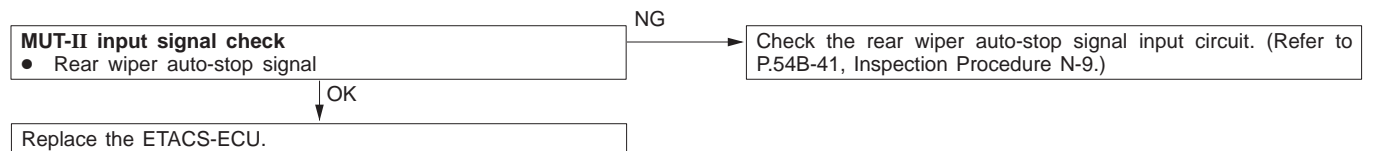
Inspection Procedure G-1

Rear wiper and washer: Rear wiper does not work normally.	Probable cause
<p>The ETACS-ECU operates the rear wiper according to the input signals from the following switches:</p> <ul style="list-style-type: none"> • Ignition switch (ACC) • Rear wiper switch <p>If the rear wiper does not work normally, the relevant input signal circuit, the rear wiper motor, the column switch or the ETACS-ECU may be defective.</p>	<ul style="list-style-type: none"> • Malfunction of rear wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



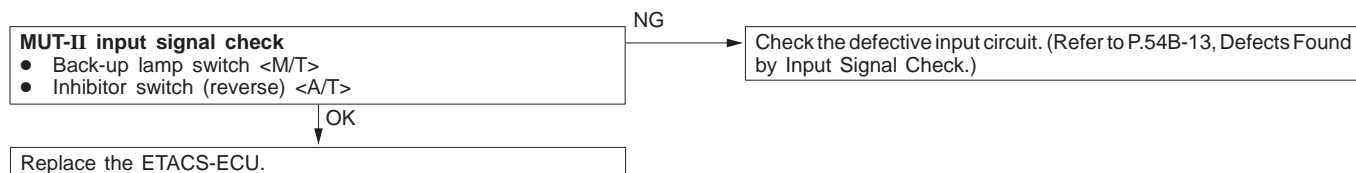
Inspection Procedure G-2

Rear wiper and washer: Rear wiper does not stop at the predetermined park position.	Probable cause
<p>The rear wiper motor or the ETACS-ECU may be defective.</p>	<ul style="list-style-type: none"> • Malfunction of rear wiper motor • Malfunction of front-ECU • Malfunction of harness wire or connector



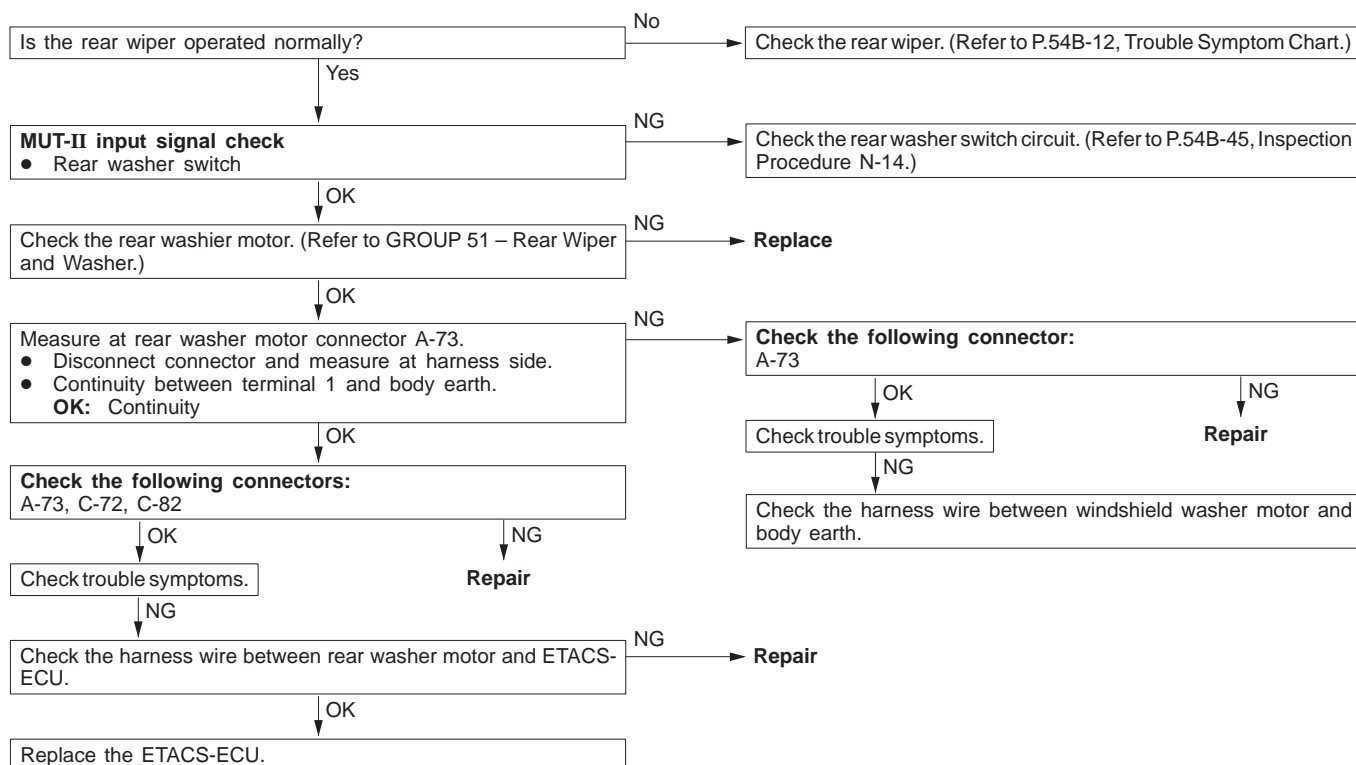
Inspection Procedure G-3

Rear wiper and washer: When the shift lever <M/T> or selector lever <A/T> is moved to R position during the rear wiper operation, the rear wiper does not operate at the continuous mode.	Probable cause
The ETACS-ECU operates the rear wiper consecutively twice when the shift lever <M/T> or selector lever <A/T> is moved to R position while the rear wiper is turned on. If the rear wiper does not work consecutively twice, the back-up lamp switch <M/T> or the inhibitor switch (reverse) <A/T> may be defective.	<ul style="list-style-type: none"> • Malfunction of back-up lamp switch • Malfunction of inhibitor switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



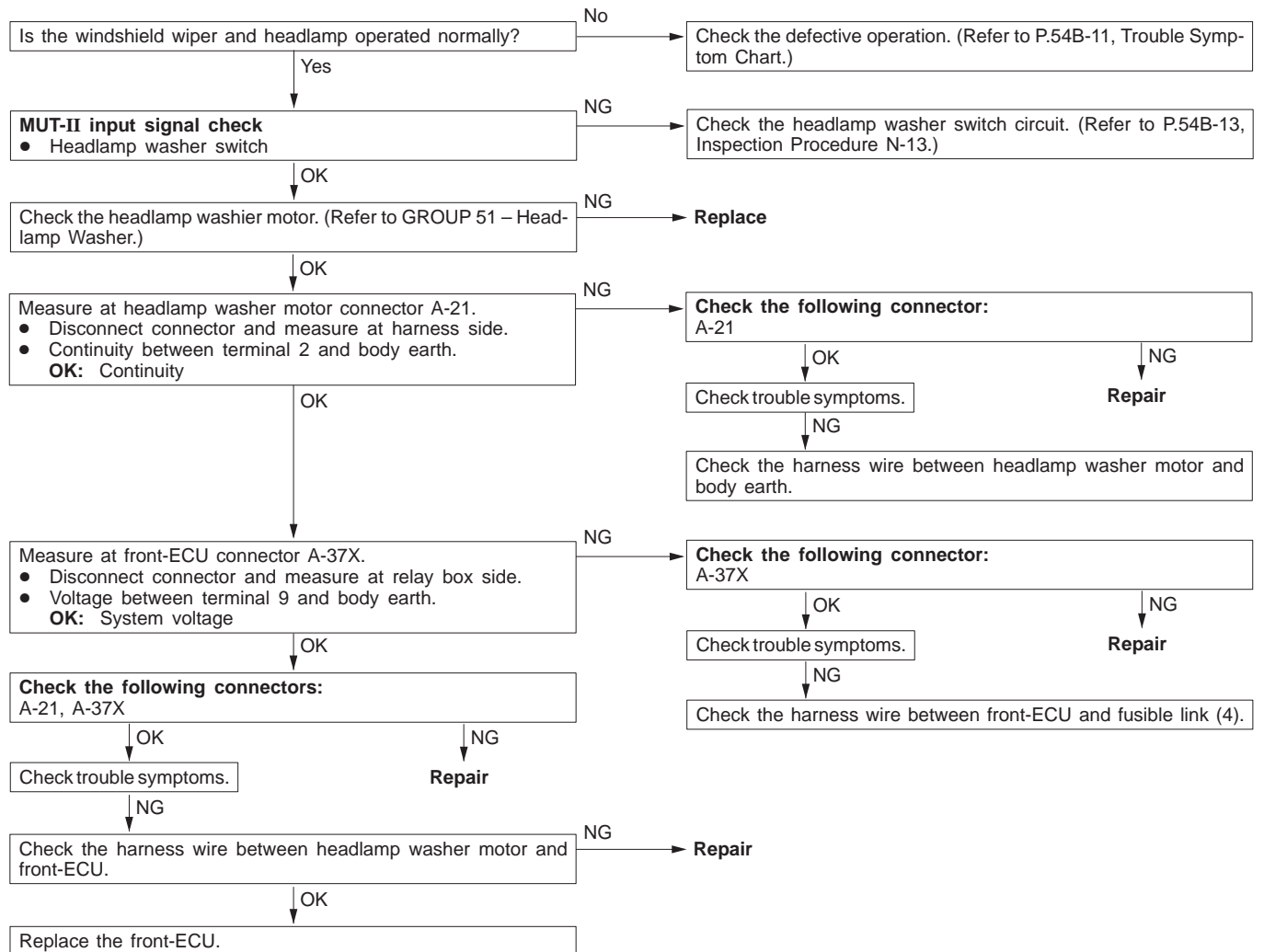
Inspection Procedure G-4

Rear wiper and washer: Rear washer does not work.	Probable cause
The rear washer motor, the column switch or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of rear washer motor • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



Inspection Procedure H-1

Headlamp washer: Headlamp washer does not work.	Probable cause
The front-ECU operates the headlamp washers if the headlamp washer switch is turned to ON while the headlamp relays (low and high) are ON and the ignition switch is at the ACC or ON position. If the headlamp washer does not work normally, the headlamp washer motor, the column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of headlamp washer motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

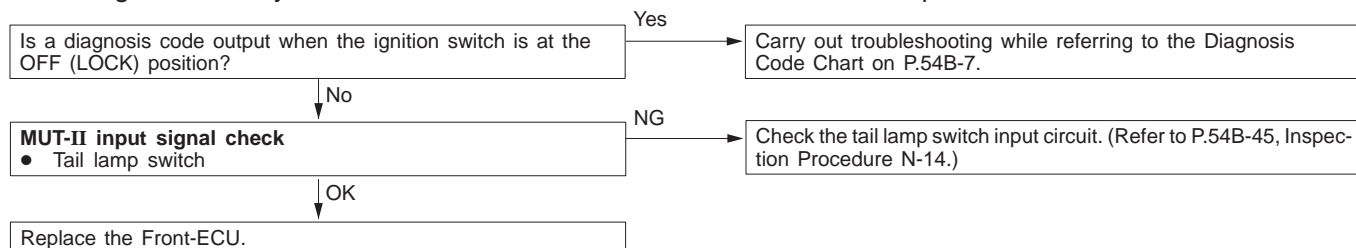


Inspection Procedure I-1

Headlamp, tail lamp: Tail lamp do not illuminate.	Probable cause
The column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

NOTE

If only one lamp does not illuminate, the harness wire between the lamp and front-ECU may be defective or the light bulb may be burned out. In this case, check the tail lamp circuit.

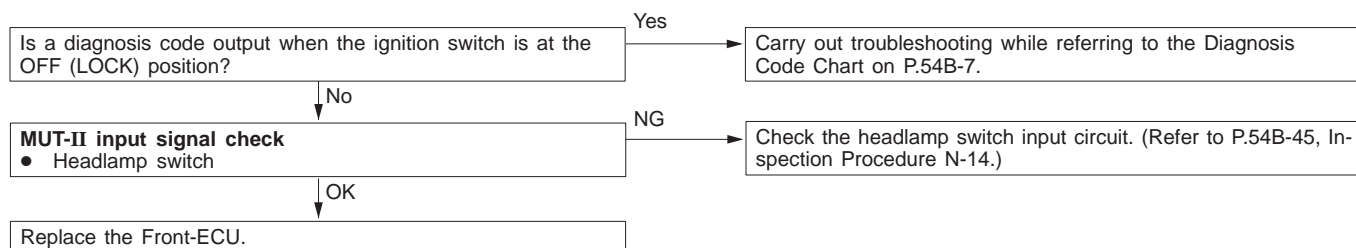


Inspection Procedure I-2

Headlamp, tail lamp: Headlamps (low-beam) do not illuminate.	Probable cause
The column switch or the front-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

NOTE

If only one of the headlamps (low-beam) does not illuminate, the harness wire between the headlamp and front-ECU may be defective or the headlamp bulb may be burned out. In this case, check the headlamp circuit.

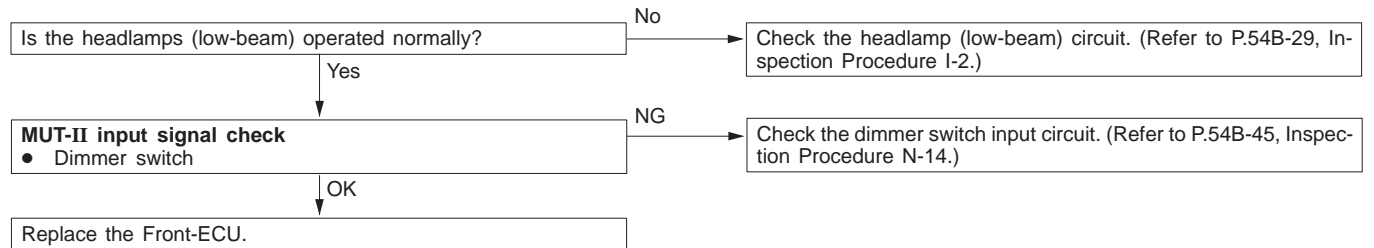


Inspection Procedure I-3

Headlamp, tail lamp: Headlamps (high-beam) do not illuminate.	Probable cause
The column switch or the front-ECU is suspected to be defective.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

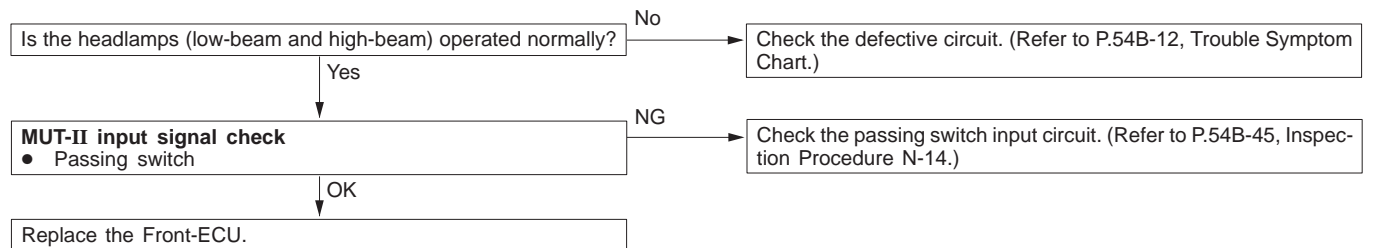
NOTE

If only one of the headlamps (high-beam) does not illuminate, the harness wire between the headlamp and front-ECU may be defective or the headlamp bulb may be burned out. In this case, check the headlamp circuit.



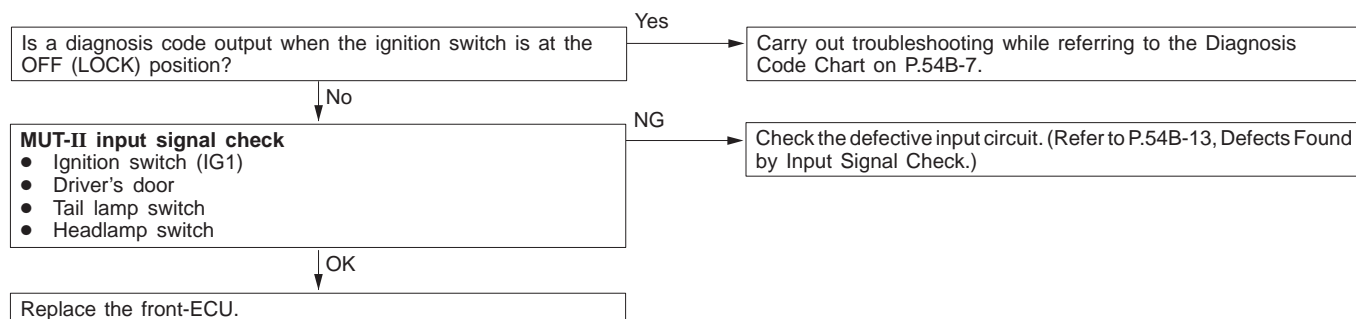
Inspection Procedure I-4

Headlamp, tail lamp: Headlamps do not illuminate when the passing switch is operated.	Probable cause
If the headlamps (low-beam and high-beam) are defective, the column switch or the front-ECU is suspected to be defective.	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



Inspection Procedure I-5

Headlamp, tail lamp: The headlamp auto-cut function does not work normally.	Probable cause
<p>The ETACS-ECU operates the headlamp auto-cut function, based on the signals from the following switch:</p> <ul style="list-style-type: none"> • Ignition switch (IG1) • Driver's door switch • Tail lamp switch • Headlamp switch <p>If the function does work normally, a defect on relevant input circuits, the ETACS-ECU or the front-ECU is suspected.</p>	<ul style="list-style-type: none"> • Malfunction of driver's door switch • Malfunction of column switch. • Malfunction of front-ECU • Malfunction of harness wire or connector



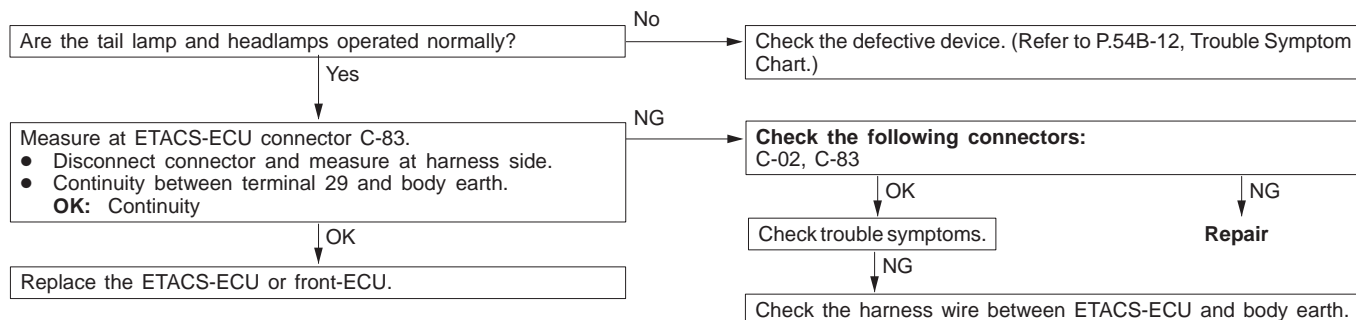
Inspection Procedure I-6

Headlamp, tail lamp: Headlamps dimmer switch auto-reset function does not work normally.	Probable cause
<p>The headlamp dimmer switch auto-reset function is controlled by the front-ECU. If a defect appears, the front-ECU may be defective.</p>	<ul style="list-style-type: none"> • Malfunction of front-ECU

Replace the front-ECU.

Inspection Procedure I-7

Headlamp, tail lamp: Daytime running lamp (DRL) function does not work.	Probable cause
<p>The headlamp dimmer switch auto-reset function is controlled by the front-ECU. If a defect appears, the front-ECU may be defective.</p>	<ul style="list-style-type: none"> • Malfunction of ETACS-ECU • Malfunction of front-ECU • Malfunction of harness wire or connector.

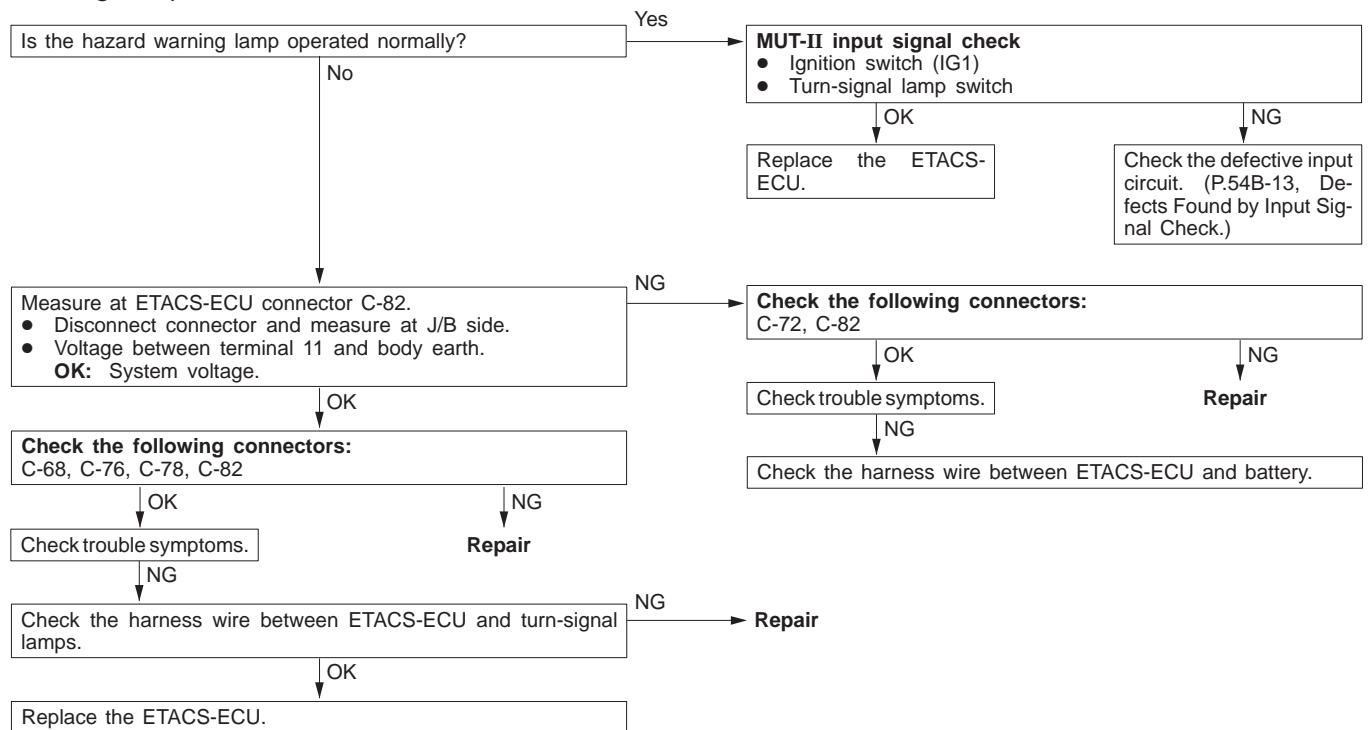


Inspection Procedure J-1

Flasher timer: Turn-signal lamp do not flash when the turn-signal lamp switch is turned on.	Probable cause
<p>The ETACS-ECU makes the turn-signal lamps flash, based on the input signals from the following switched:</p> <ul style="list-style-type: none"> • Ignition switch (IG1) • Turn-signal lamp switch <p>If the turn-signal lamps do not flash normally, a defect on the relevant circuits or the ETACS-ECU may be suspected.</p> <p>If the hazard warning lamps also do not flash, a defect in the ETACS-ECU power supply line specific to the turn-signal lamps is suspected.</p>	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.

NOTE

If only one of the turn-signal lamp does not flash, the harness wire between the lamp and ETACS-ECU may be defective or the lamp bulb may be burned out. In this case, check the turn-signal lamp and hazard warning lamp circuit.

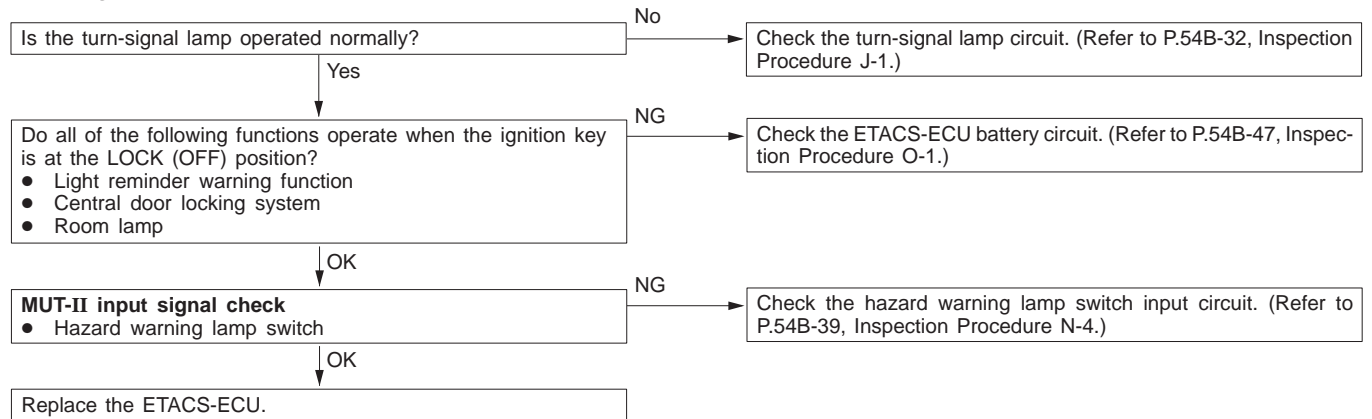


Inspection Procedure J-2

Flasher timer: Hazard warning lamp do not flash when the hazard warning lamp switch is turned on.	Probable cause
The ETACS-ECU makes the turn-signal lamps flash, base on the input signals from the hazard warning lamp switch. If the turn-signal lamps do not flash normally, the hazard warning lamp switch input circuit or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of hazard warning lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.

NOTE

If only one of the turn-signal lamp does not flash, the harness wire between the lamp and ETACS-ECU may be defective or the lamp bulb may be burned out. In this case, check the turn-signal lamp and hazard warning lamp circuit.

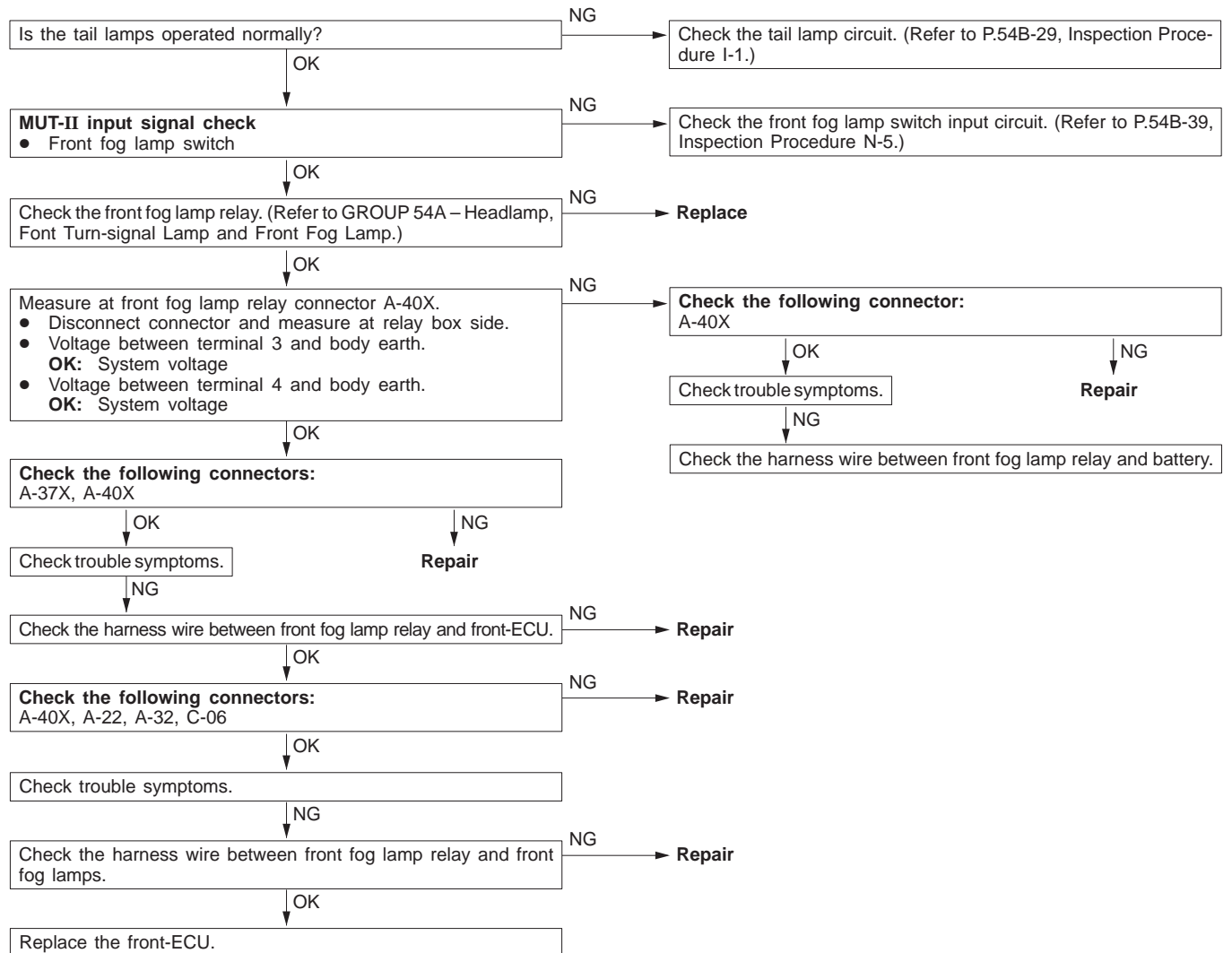


Inspection Procedure K-1

Front fog lamp: Front fog lamps do not illuminate when the front fog lamp switch is turned on.	Probable cause
If the tail lamps illuminate normally, the front fog lamp switch, the front fog lamp relay, the front-ECU or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of front fog lamp switch • Malfunction of front fog lamp relay • Malfunction of front-ECU • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.

NOTE

If only one of the front fog lamp or fog lamp indicator lamp does not illuminate, the harness wire between the lamp and front fog lamp relay may be defective or the lamp bulb may be burned out. In this case, check the front fog lamp circuit.



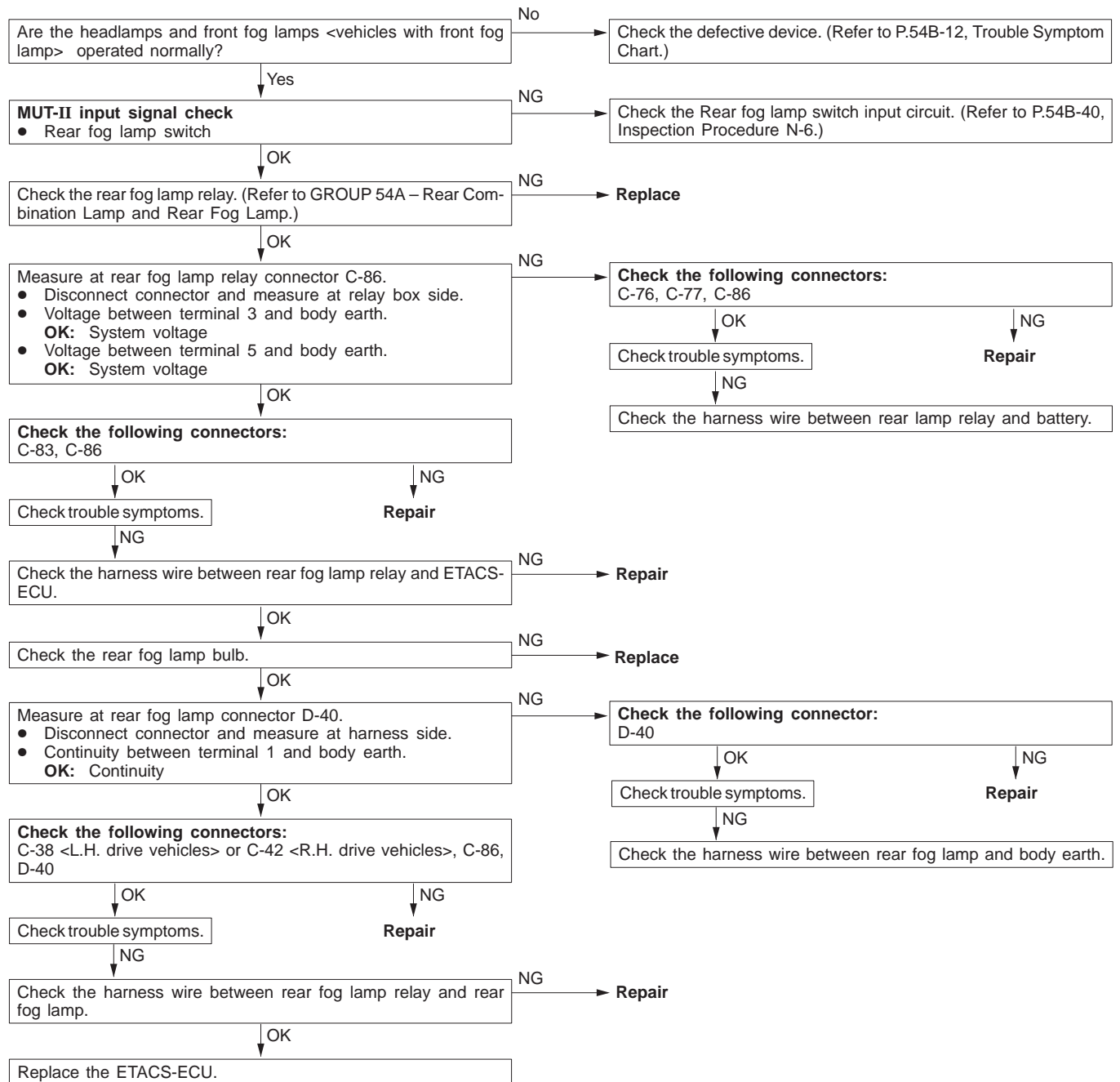
Inspection Procedure K-2

Front fog lamp: Front fog lamp do not go out when the tail lamps are turned off while the fog lamps are on.	Probable cause
If the malfunction above occurs, the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of ETACS-ECU

Replace the ETACS-ECU.

Inspection Procedure L-1

Rear fog lamp: Rear fog lamps do not illuminate when the rear fog lamp switch is turned on.	Probable cause
If the headlamps and front fog lamp <vehicles with front fog lamp> illuminate normally, the rear fog lamp switch, the rear fog lamp relay or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> • Malfunction of rear fog lamp switch • Malfunction of rear fog lamp relay • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



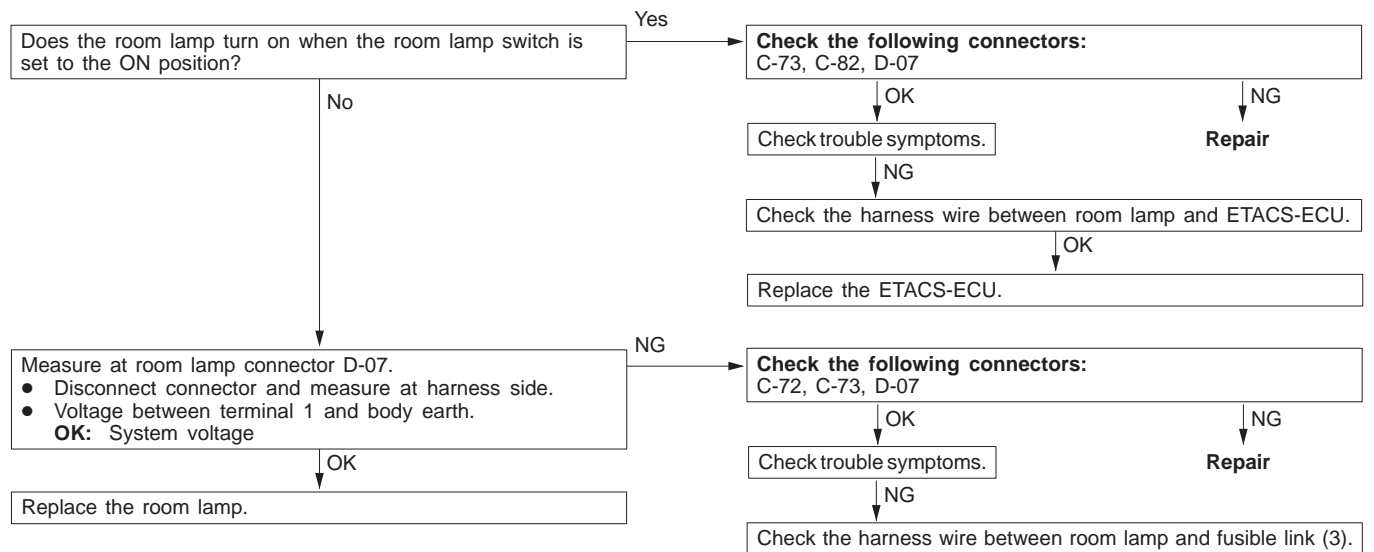
Inspection Procedure L-2

Rear fog lamp: Rear fog lamp do not go out when the headlamps and front fog lamps <vehicles with front fog lamp> are turned off while the fog lamps are on.	Probable cause
If the malfunction above occurs, the ETACS-ECU may be defective.	<ul style="list-style-type: none"> Malfunction of ETACS-ECU

Replace the ETACS-ECU.

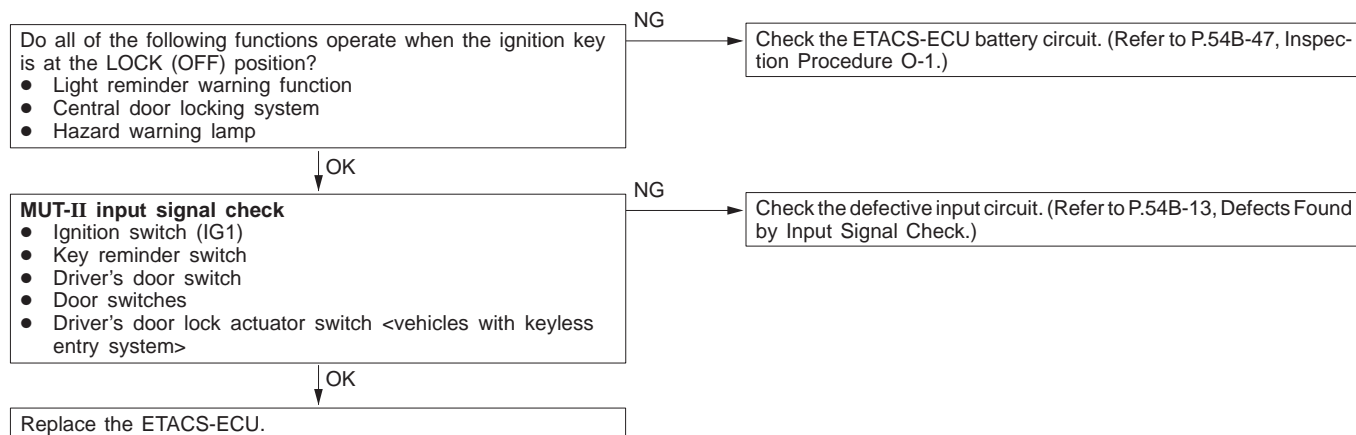
Inspection Procedure M-1

Room lamp: The room lamp does not illuminate.	Probable cause
If the room lamp does not illuminate at all, the room lamp bulb may be burned out, or the power supply circuit or the ETACS-ECU may be defective.	<ul style="list-style-type: none"> Malfunction of room lamp Malfunction of ETACS-ECU Malfunction of harness wire or connector



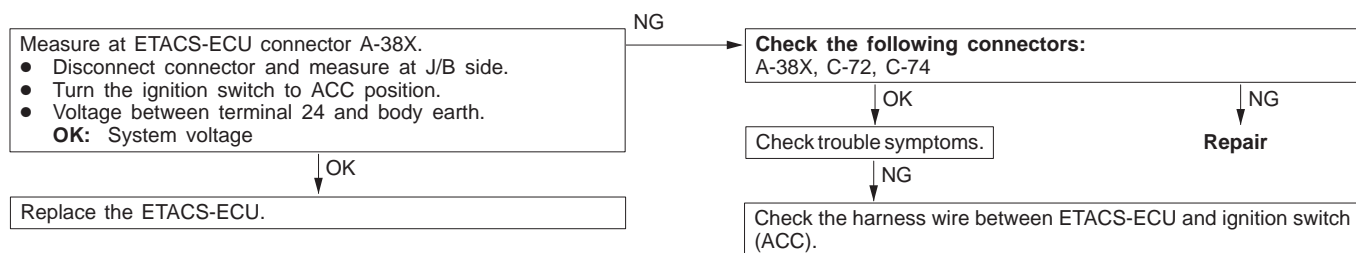
Inspection Procedure M-2

Room lamp: The room lamp dimming function does not work normally.	Probable cause
<p>The ETACS-ECU dims the room lamp according to the input signals from the following switches:</p> <ul style="list-style-type: none"> • Ignition switch (IG1) • Key reminder switch • Driver's door switch • Door switches • Driver's door lock actuator switch <vehicles with keyless entry system> <p>If the Room lamp does not be dimmed normally, the relevant input signal circuit or the ETACS-ECU may be defective.</p>	<ul style="list-style-type: none"> • Malfunction of key reminder switch • Malfunction of driver's door switch • Malfunction of door switches • Malfunction of driver's door lock actuator switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



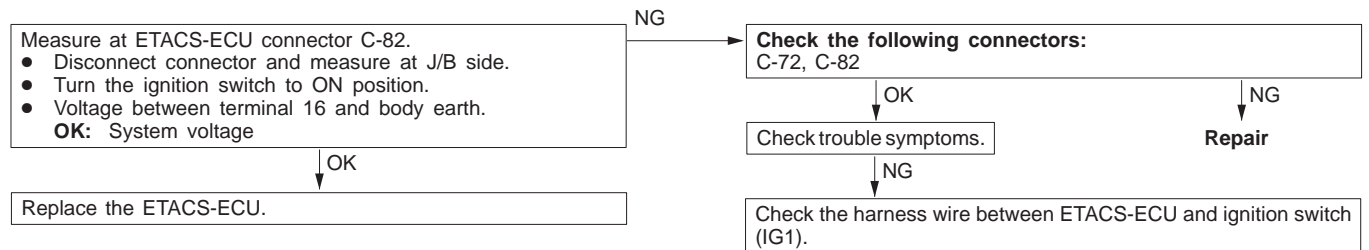
Inspection Procedure N-1

Ignition switch (ACC) signal is not sent to the ETACS-ECU.	Probable cause
<p>The ignition switch (ACC) input signal is used to operate the following devices. If the signal fails, these devices will not work normally.</p> <ul style="list-style-type: none"> • Windshield wiper and washer • Rear wiper and washer • Headlamp washer <vehicles with headlamp washer> 	<ul style="list-style-type: none"> • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



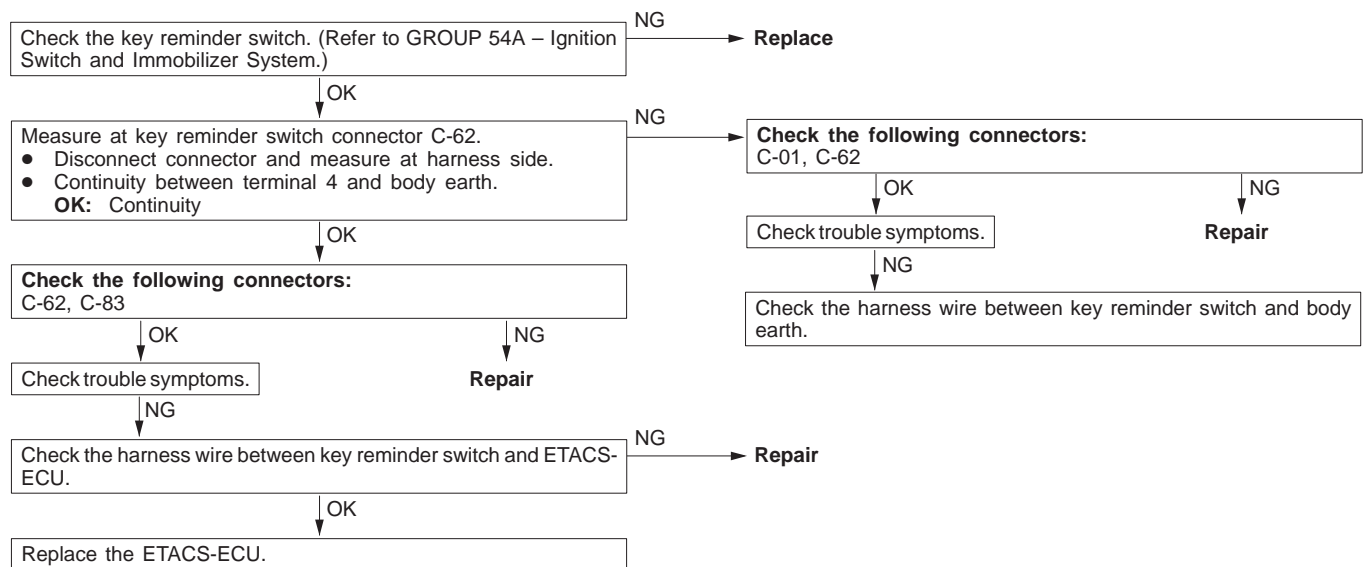
Inspection Procedure N-2

Ignition switch (IG1) signal is not sent to the ETACS-ECU.	Probable cause
<p>The ignition switch (IG1) input signal is used to operate the following devices. If the signal fails, these devices will not work normally.</p> <ul style="list-style-type: none"> • Light reminder alarm function • Power window timer function <vehicles with power window> • Headlamp auto-cut function • Turn-signal lamp • Room lamp dimming function 	<ul style="list-style-type: none"> • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



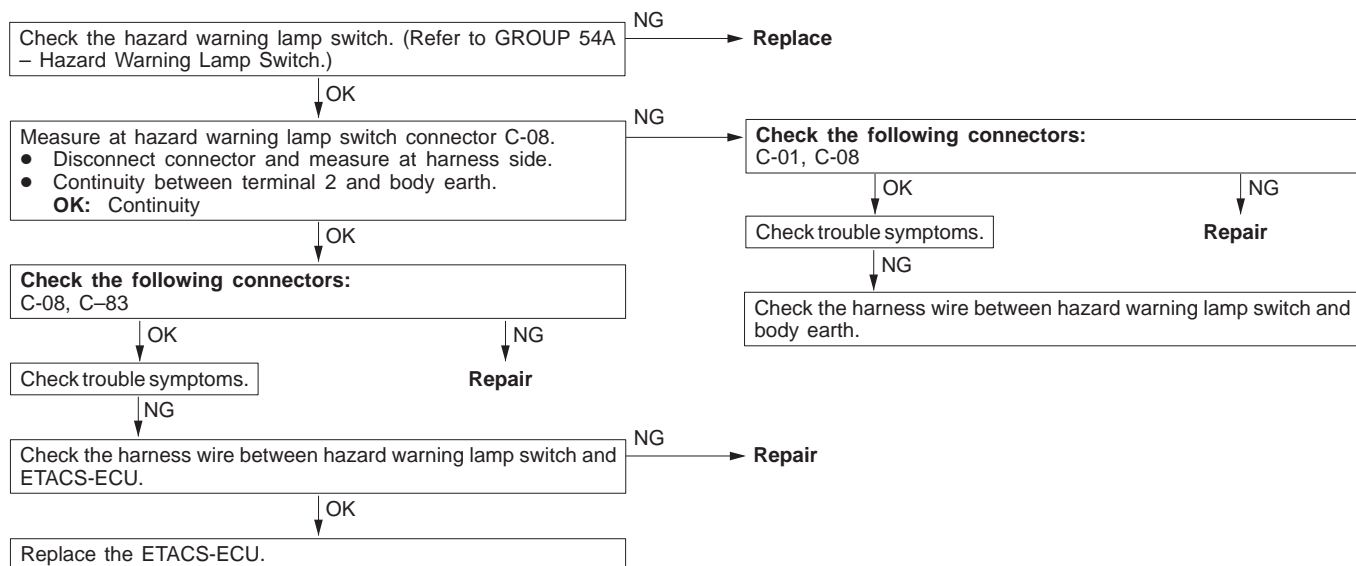
Inspection Procedure N-3

Key reminder switch signal is not sent to the ETACS-ECU.	Probable cause
<p>The key reminder switch input signal is used to operate the following devices. If the signal fails, these devices will not work normally.</p> <ul style="list-style-type: none"> • Forgotten key prevention function <Vehicles with keyless entry system> • Keyless entry system <Vehicles with keyless entry system> • Room lamp dimming function 	<ul style="list-style-type: none"> • Malfunction of key reminder switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



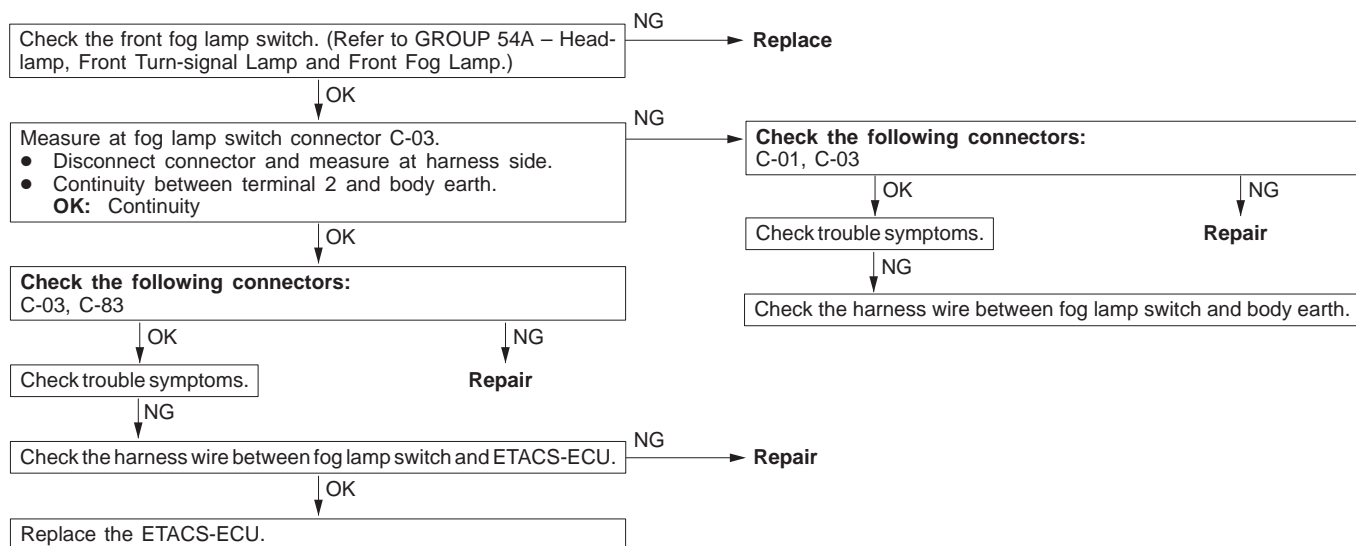
Inspection Procedure N-4

Hazard warning lamp switch signal is not sent to the ETACS-ECU.	Probable cause
<p>The hazard warning lamp switch input signal is used to operate the following devices. If the signal fails, these devices will not work normally.</p> <ul style="list-style-type: none"> • Hazard warning lamp • Keyless entry system (Registering the encrypted code) <vehicles with keyless entry system> 	<ul style="list-style-type: none"> • Malfunction of hazard warning lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



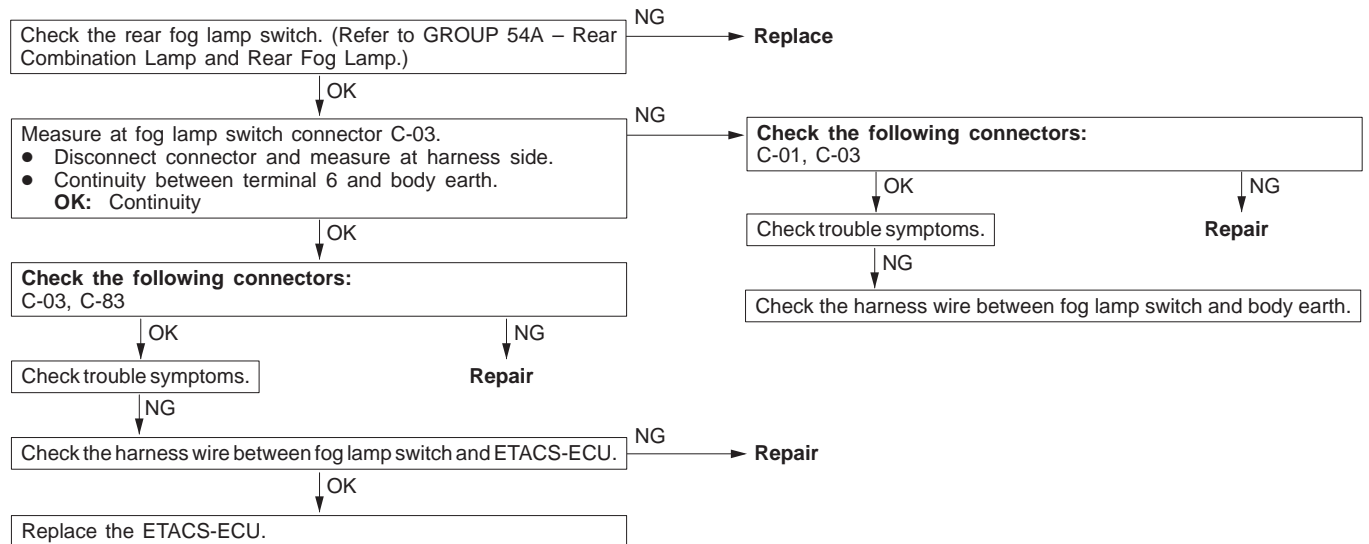
Inspection Procedure N-5

Front fog lamp switch signal is not sent to the ETACS-ECU.	Probable cause
<p>The front fog lamp switch input signal is used to operate the front fog lamp. If the signal fails, front fog lamp will not work normally.</p>	<ul style="list-style-type: none"> • Malfunction of fog lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



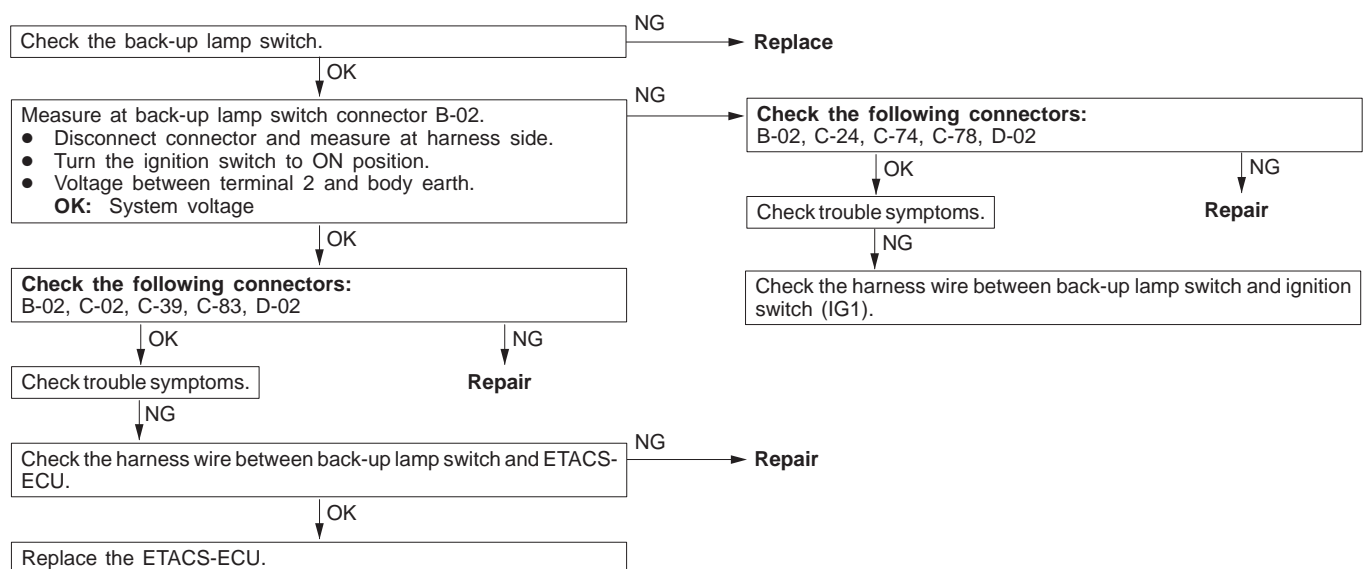
Inspection Procedure N-6

Rear fog lamp switch signal is not sent to the ETACS-ECU.	Probable cause
The rear fog lamp switch input signal is used to operate the rear fog lamp. If the signal fails, rear fog lamp will not work normally.	<ul style="list-style-type: none"> • Malfunction of fog lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



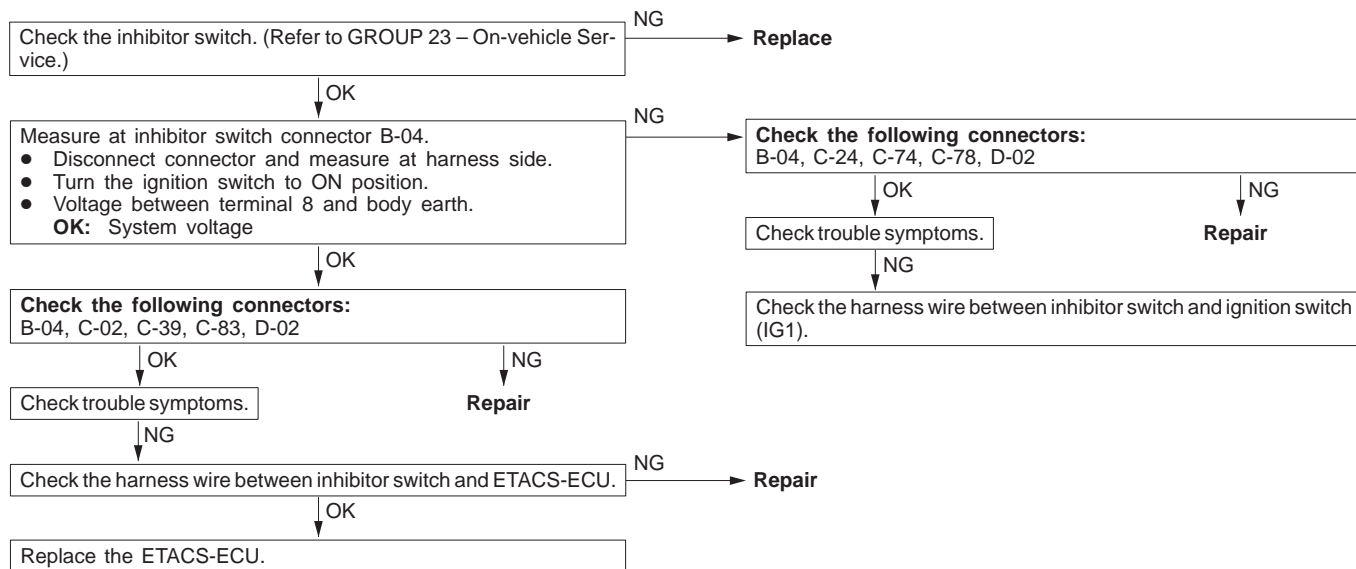
Inspection Procedure N-7

Back-up lamp switch signal is not sent to the ETACS-ECU. <M/T>	Probable cause
The back-up lamp switch input signal is used to operate the rear wiper. If the signal is an error, the rear wiper will not operate consecutively twice when the rear wiper is on and the shift lever is moved to R position.	<ul style="list-style-type: none"> • Malfunction of back-up lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



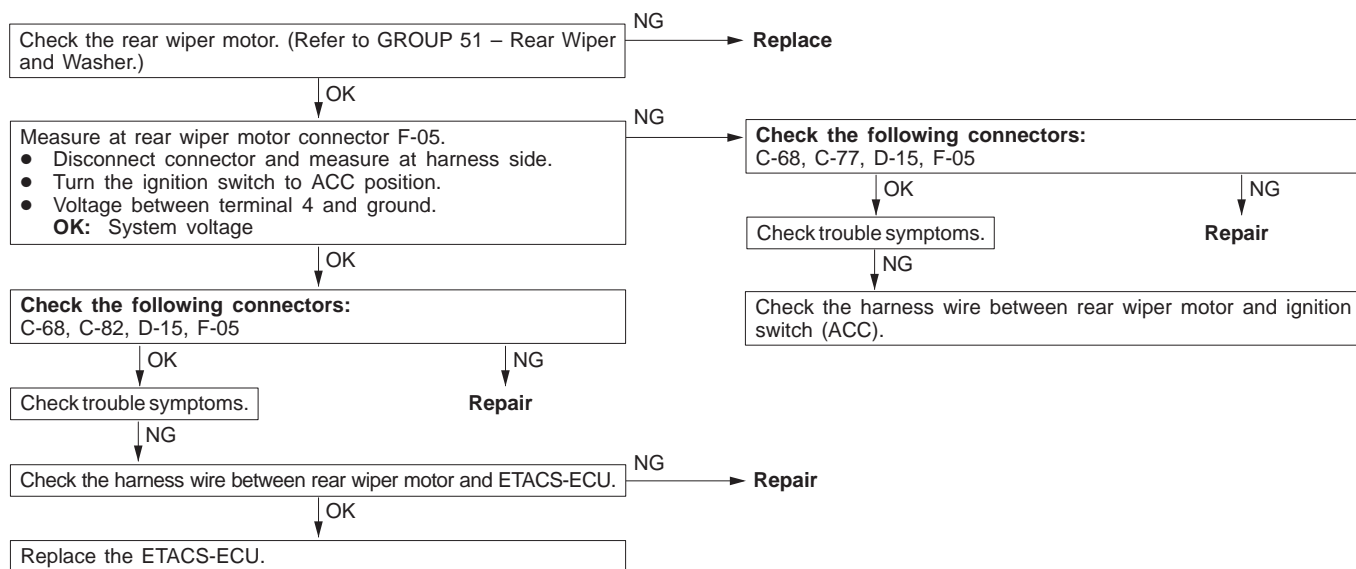
Inspection Procedure N-8

Inhibitor switch (reverse) signal is not sent to the ETACS-ECU. <A/T>	Probable cause
The inhibitor switch (reverse) input signal is used to operate the rear wiper. If the signal is an error, the rear wiper will not operate consecutively twice when the rear wiper is on and the selector lever is moved to R position.	<ul style="list-style-type: none"> • Malfunction of inhibitor switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



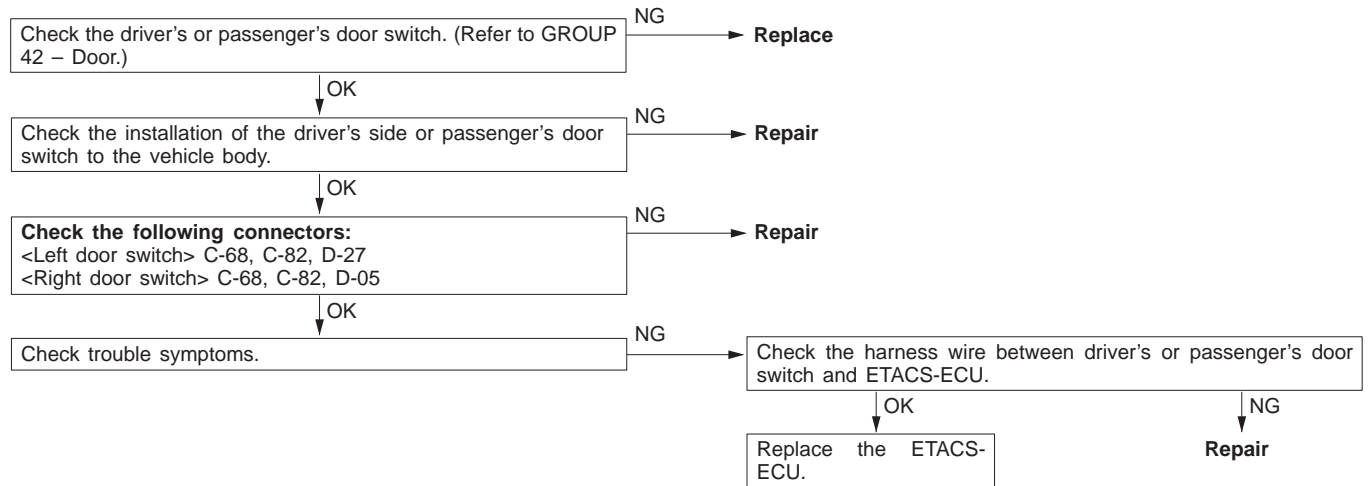
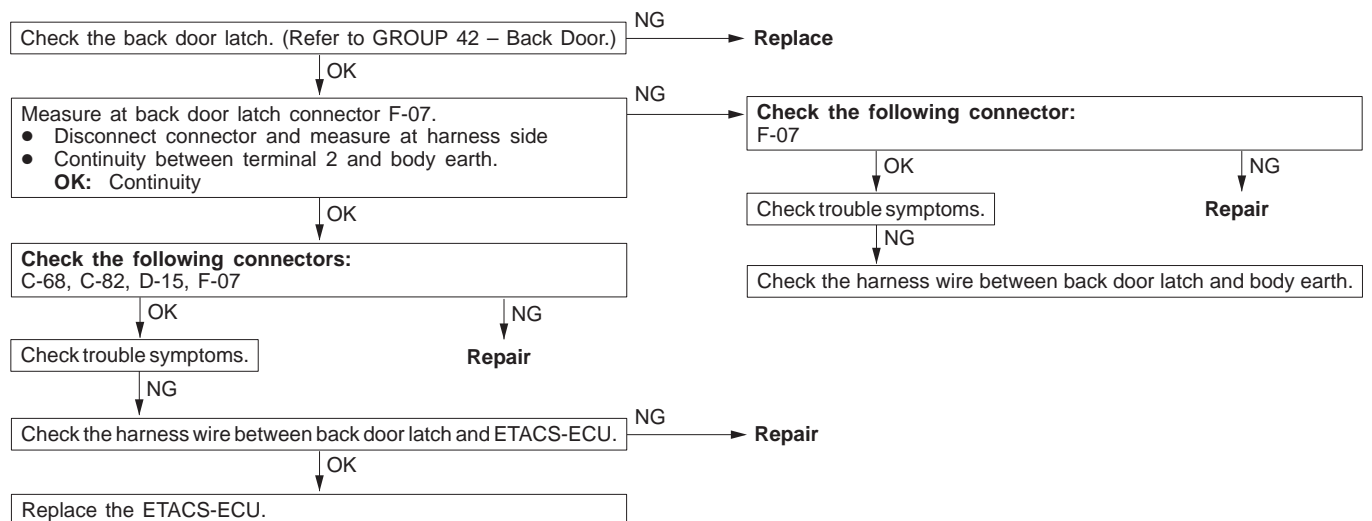
Inspection Procedure N-9

Rear wiper motor auto-stop signal is not sent to the ETACS-ECU.	Probable cause
Rear wiper motor auto-stop signal is used to operate the rear wiper. If the signal is an error, the rear wiper will not stop at the predetermined park position.	<ul style="list-style-type: none"> • Malfunction of rear wiper motor • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



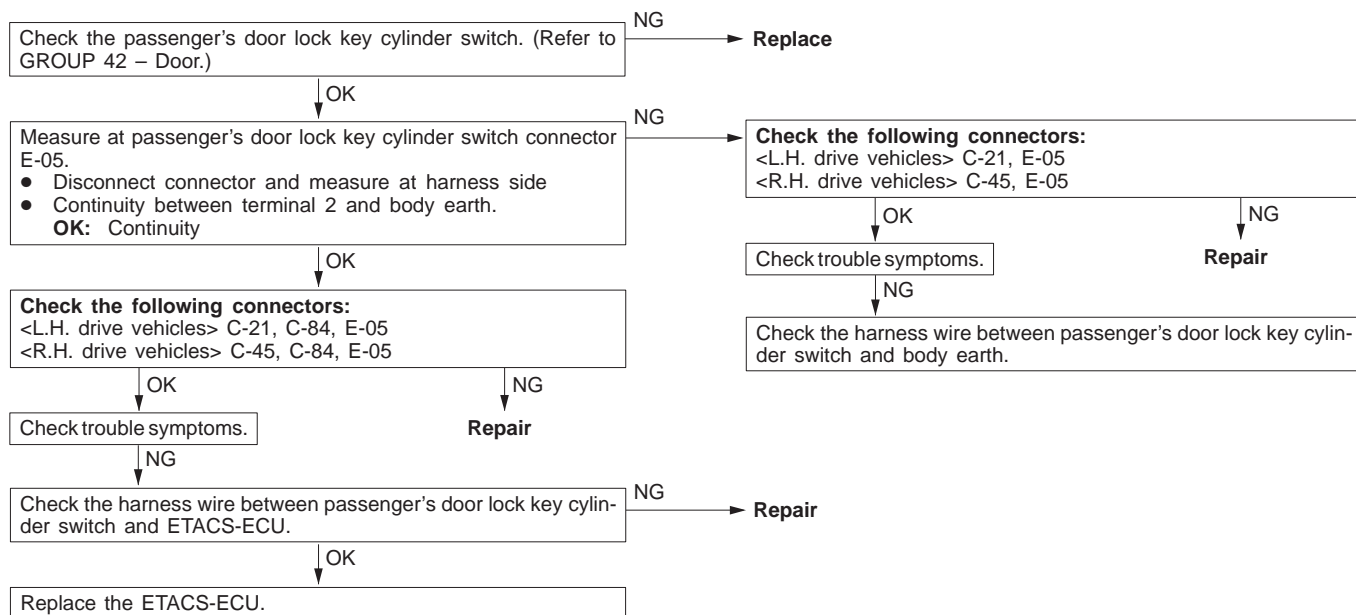
Inspection Procedure N-10

Driver's door switch signal is not sent to the ETACS-ECU.	Probable cause
Door switches signal is not sent to the ETACS-ECU.	
<Driver's door switch> The driver's door switch is used to operate the following functions. If the signal fails, these devices will not work normally. <ul style="list-style-type: none">● Light reminder warning function● Forgotten key prevention function <vehicles with keyless entry system>● Power window timer function <vehicles with power window>● Headlamp auto-cut function	
<Door switches> The door switches is used to operate the following devices. If the signal fails, these devices will not work normally. <ul style="list-style-type: none">● Keyless entry system <vehicles keyless entry system>● Room lamp dimming function	

<Driver's and passenger's door switch>**<Back door switch>**

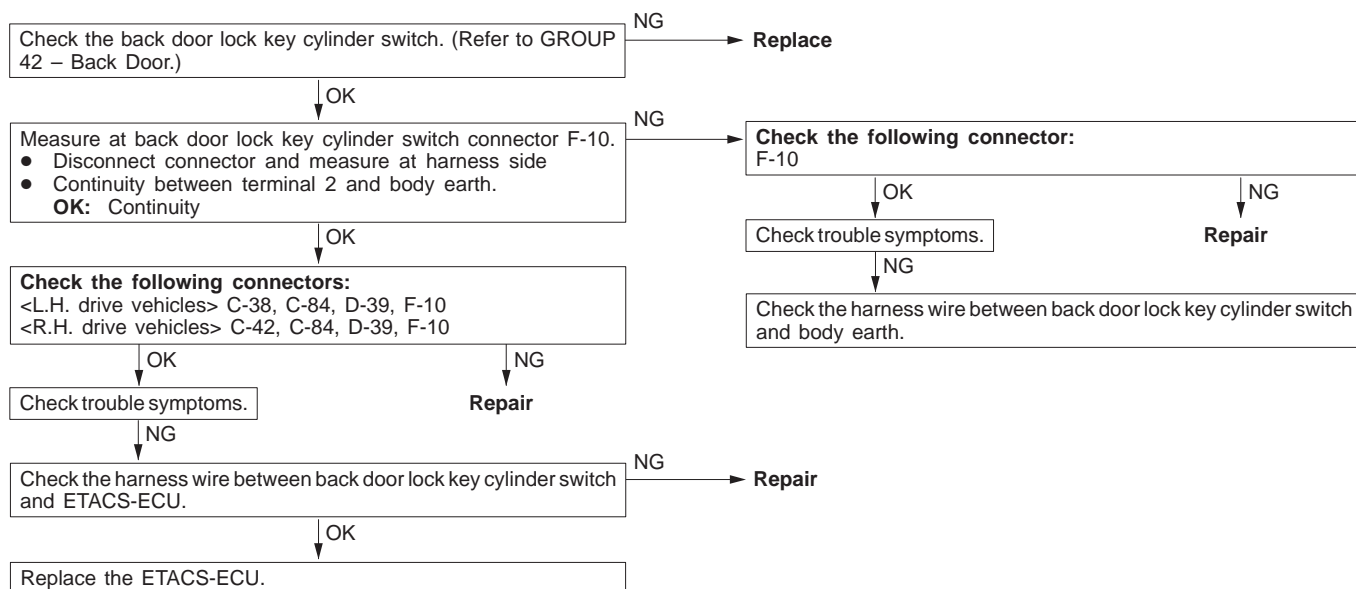
Inspection Procedure N-11

Passenger's door lock key cylinder switch signal is not sent to the ETACS-ECU.	Probable cause
The passenger's door lock key cylinder switch is used to operate the central door locking system. If the signal fails, central door locking system will not work normally.	<ul style="list-style-type: none"> Malfunction of passenger's door lock key cylinder switch Malfunction of ETACS-ECU Malfunction of harness wire or connector



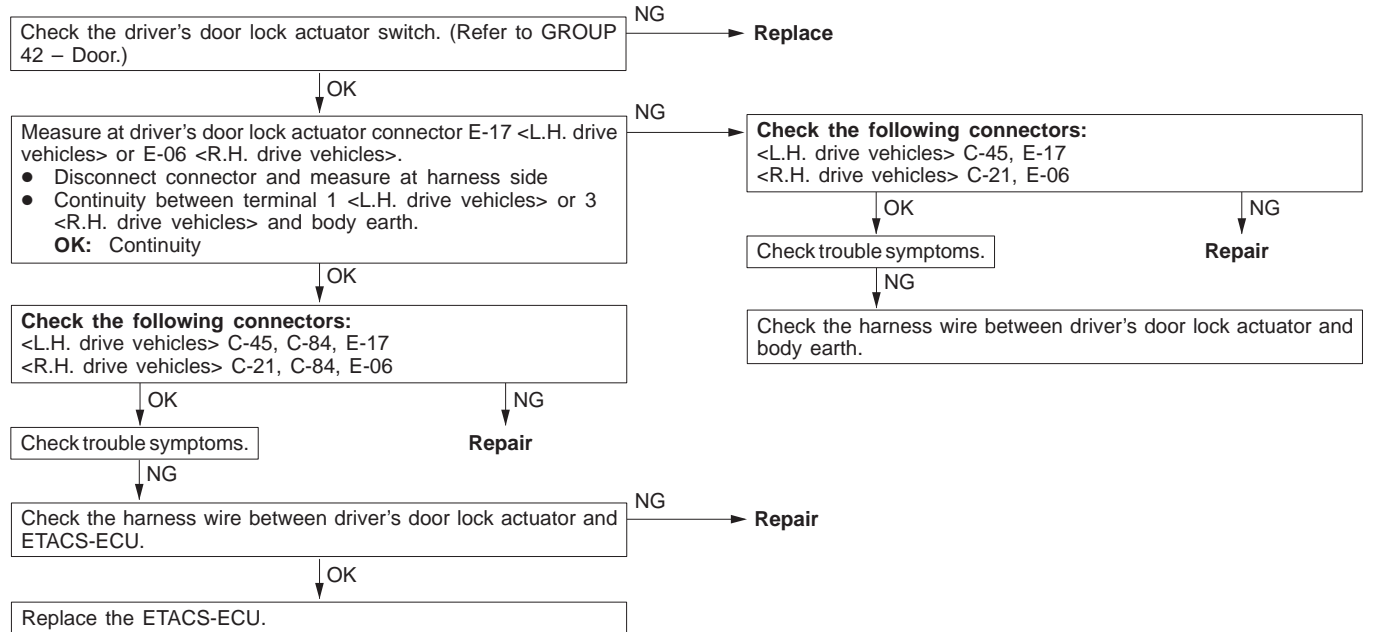
Inspection Procedure N-12

Back door lock key cylinder switch signal is not sent to the ETACS-ECU.	Probable cause
The back door lock key cylinder switch is used to operate the central door locking system. If the signal fails, central door locking system will not work normally.	<ul style="list-style-type: none"> Malfunction of back door lock key cylinder switch Malfunction of ETACS-ECU Malfunction of harness wire or connector



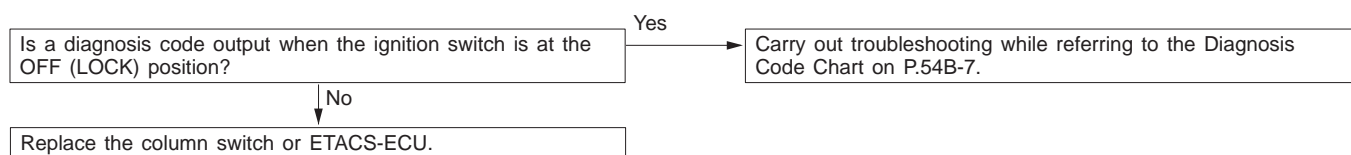
Inspection Procedure N-13

Driver's door lock actuator switch signal is not sent to the ETACS-ECU.	Probable cause
<p>The driver's door lock actuator switch is used to operate the following systems or functions. If the signal fails, these systems or function will not work normally.</p> <ul style="list-style-type: none"> • Central door locking system • Forgotten key prevention function <vehicles with keyless entry system> • Keyless entry system <vehicles with keyless entry system> 	<ul style="list-style-type: none"> • Malfunction of driver's door lock actuator • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



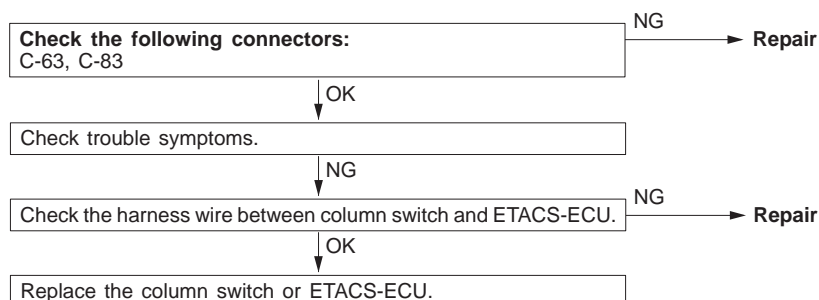
Inspection Procedure N-14

Column switch: <ul style="list-style-type: none"> • Tail lamp switch signal is not sent to the ETACS-ECU. • Headlamp switch signal is not sent to the ETACS-ECU. • Dimmer switch signal is not sent to the ETACS-ECU. • Passing switch signal is not sent to the ETACS-ECU. • Turn-signal lamp switch signal is not sent to the ETACS-ECU. • Windshield mist wiper switch signal is not sent to the ETACS-ECU. • Windshield intermittent wiper switch signal is not sent to the ETACS-ECU. • Windshield low-speed wiper switch signal is not sent to the ETACS-ECU. • Windshield high-speed wiper switch signal is not sent to the ETACS-ECU. • Windshield washer switch is not sent to the ETACS-ECU. • Rear wiper switch is not sent to the ETACS-ECU. • Rear washer is not sent to the ETACS-ECU. • Headlamp washer switch is not sent to the ETACS-ECU. 	Probable cause
<p>The column switch is used to operate the following systems or functions. If the signal fails, these systems or function will not work normally.</p> <ul style="list-style-type: none"> • Light reminder warning function • Windshield wiper and washer • Rear wiper and washer • Headlamp washer <vehicles with headlamp washer> • Headlamp, tail lamp • Turn-signal lamp • Front fog lamp <vehicles with front fog lamp> • Rear fog lamp 	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of ETACS-ECU



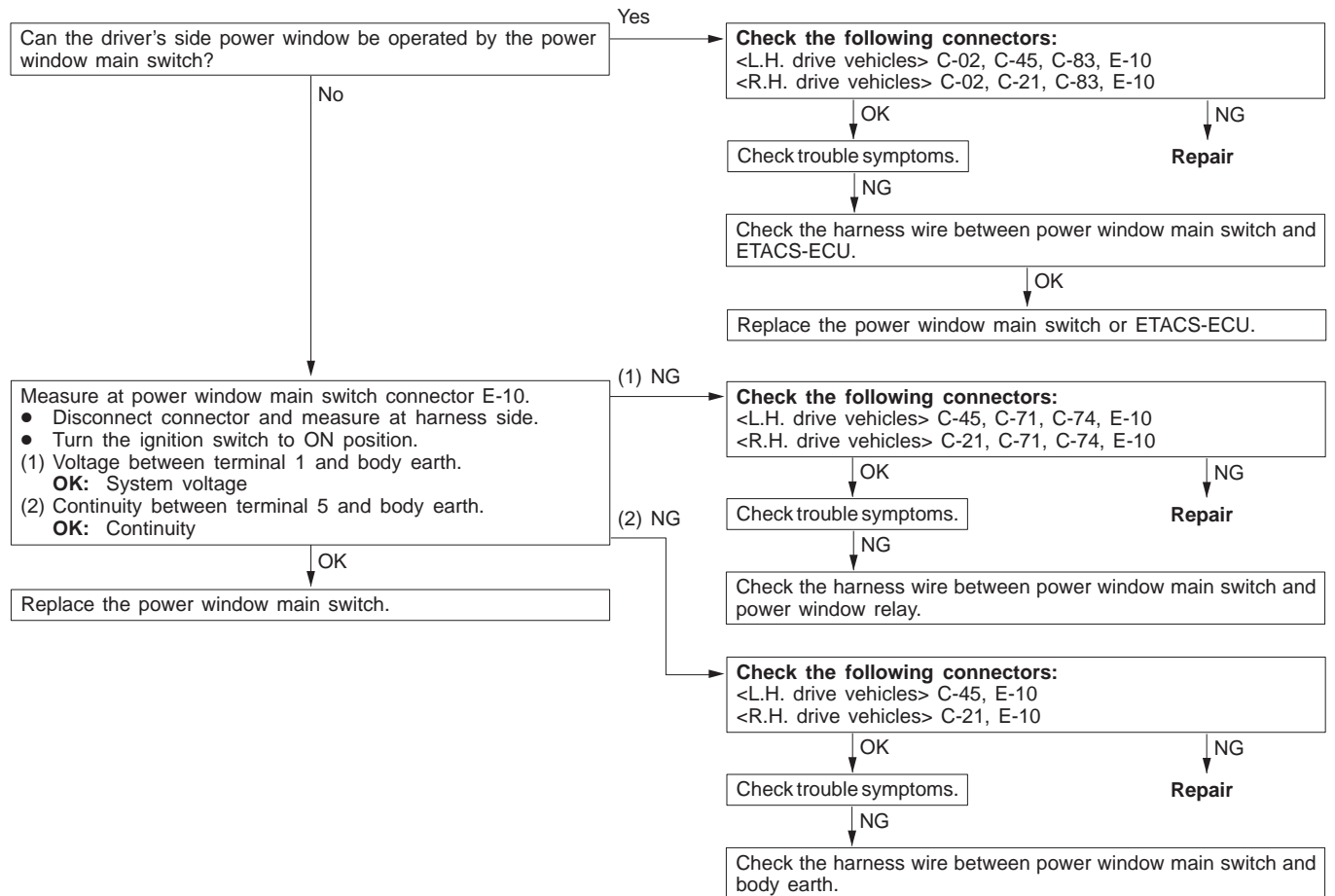
Inspection Procedure N-15

Column switch: Windshield intermittent wiper interval adjusting knob signal is not sent to the ETACS-ECU.	Probable cause
<p>If the windshield intermittent wiper interval adjusting knob is defective the windshield intermittent wiper interval can not be adjusted.</p>	<ul style="list-style-type: none"> • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



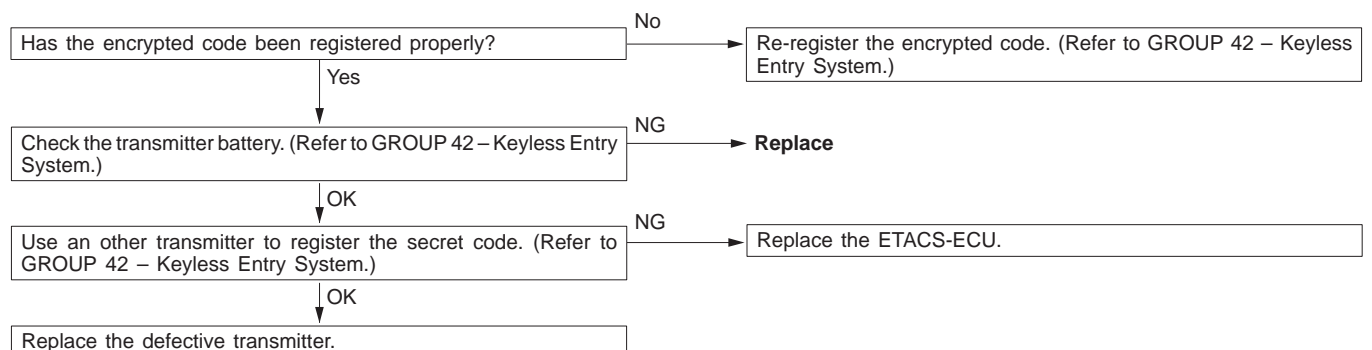
Inspection Procedure N-16

Power window main switch: Any switch signal is not sent to the ETACS-ECU.	Probable cause
If there is a problem with communication between the power window main switch and the ETACS-ECU, the input signal check for the power window main switch can no longer be carried out. In addition, the power window timer function will also stop working.	<ul style="list-style-type: none"> • Malfunction of power window main switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



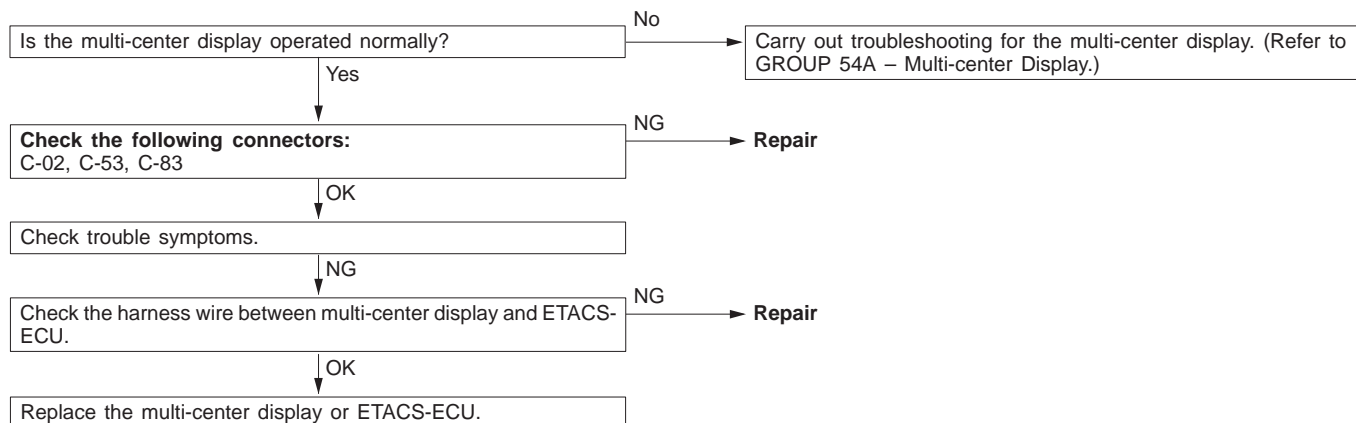
Inspection Procedure N-17

Transmitter: Any switch signal is not sent to the ETACS-ECU.	Probable cause
The transmitter input signal is used to operate the keyless entry system. If the signal fails, keyless entry will not work normally.	<ul style="list-style-type: none"> • Malfunction of transmitter • Malfunction of ETACS-ECU



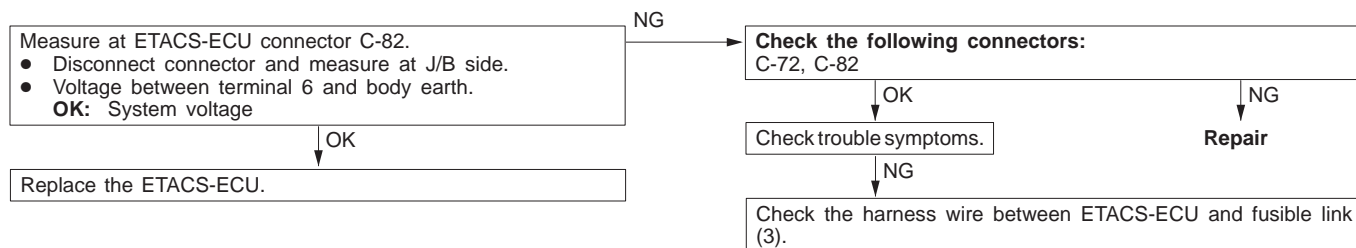
Inspection Procedure N-18

Multi-center display: Any switch signal is not sent to the ETACS-ECU.	Probable cause
The cause is probably a malfunction of the multi-center display or the ETACS-ECU.	<ul style="list-style-type: none"> • Malfunction of multi-center display • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



Inspection Procedure O-1

Check the circuit (power supply line) from the battery to the ETACS-ECU.	Probable cause
<p>If that power supply circuit is defective, the circuit flowing through the ignition switch (IG1) will function as a back-up circuit. In this case, the following functions will not work when the ignition switch is at LOCK (OFF) position.</p> <ul style="list-style-type: none"> • Light reminder alarm function • Central door lock ing system • Hazard warning lamp • Room lamp 	<ul style="list-style-type: none"> • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



NOTES