

CHASSIS ELECTRICAL

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CHASSIS ELECTRICAL

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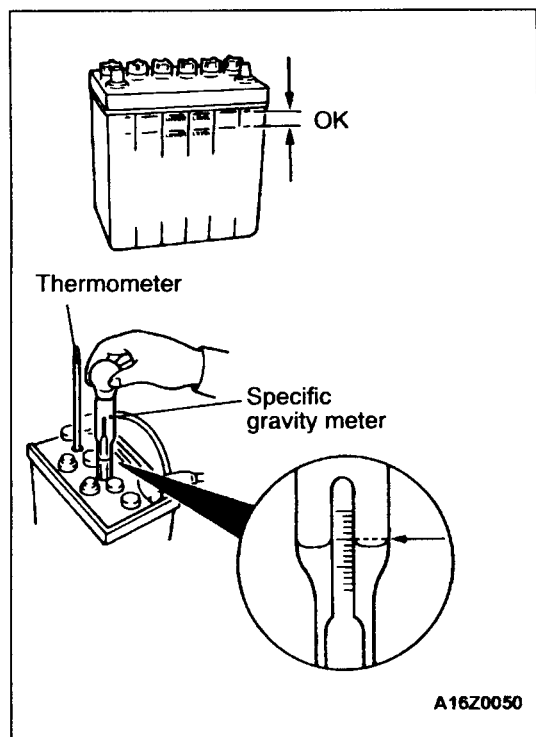
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BATTERY

SERVICE SPECIFICATIONS

Item	Standard value
Battery electrolyte specific gravity	1.220 – 1.290 (electrolyte temperature 20°C)



ON-VEHICLE SERVICE

ELECTROLYTE LEVEL AND SPECIFIC GRAVITY CHECK

1. Check that the battery electrolyte level is between the UPPER LEVEL and LOWER LEVEL indications.

Caution

- (1) If the battery is used with the electrolyte level below the LOWER LEVEL indicator, there is the danger that explosions may occur, so add water to the battery until the electrolyte level is between the LOWER LEVEL and UPPER LEVEL indications.
- (2) If too much water is added to make the level rise above the UPPER LEVEL indication, the electrolyte may leak out, so adjust so that the electrolyte level is between the LOWER LEVEL and UPPER LEVEL indications.
2. Use a specific gravity meter and a thermometer to measure the specific gravity.

Standard value:

1.220 – 1.290 (electrolyte temperature 20°C)

The specific gravity of the battery electrolyte changes according to the temperature, so the specific gravity when the electrolyte is at a temperature of 20°C can be calculated using the following formula.

Use the converted value to judge whether the electrolyte is okay or not.

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

D_{20} : Specific gravity converted to a value for electrolyte temperature of 20°C°

t : Electrolyte temperature at the time of measurement

D_t : Actual specific gravity

CHARGING

1. Remove the battery from the vehicle.
2. The normal charging current is a value in amperes which is 1/10th of the battery capacity. If the battery needs to be charged rapidly because of reasons such as time limitations, the maximum charging current for rapid charging is the battery capacity expressed as an ampere value.

Battery type	Capacity (5-hour rate)	Normal charging current	Rapid charging current
75D23	54 A	5.4 A	54 A
80D26	58 A	5.8 A	58 A
95D31	70 A	7.0 A	70 A

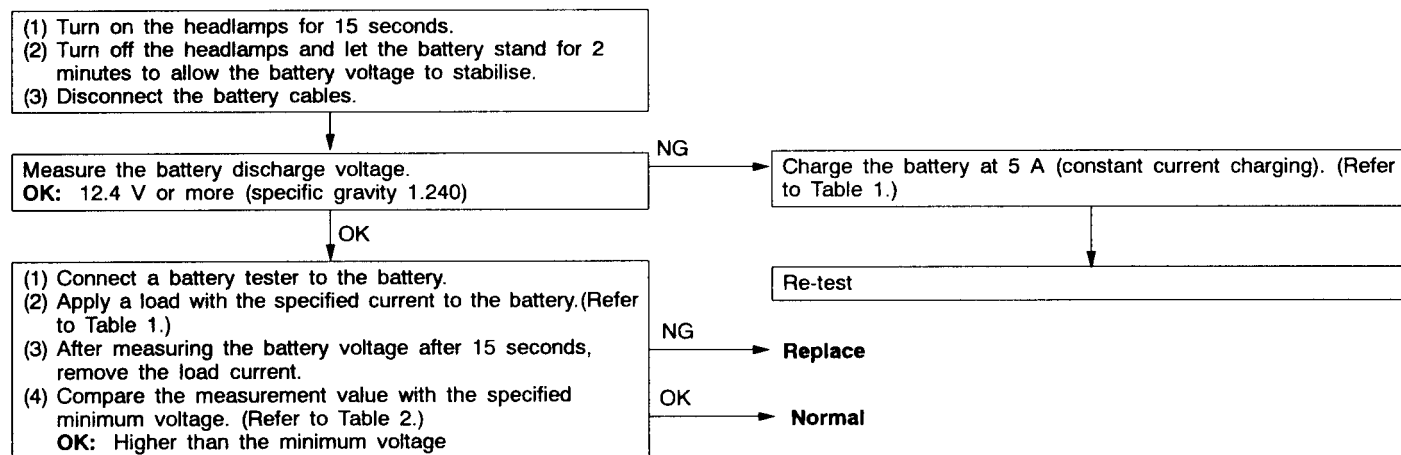
3. Determine when charging is finished.
 - When the specific gravity of the battery electrolyte is constantly within 1.250 – 1.290 for a continuous period of one hour or more
 - When the voltage per cell during charging is 2.5 – 2.8 V constantly for a continuous period of one hour or more

Caution

1. The battery plugs should be removed during charging.
2. The battery electrolyte level may rise and overflow from the battery during charging.
3. Explosions may occur if the battery is brought close to naked flames during charging.
4. Be careful to avoid tasks that might produce sparks or other danger while the battery is charging.
5. After charging is complete, replace the battery plugs, pour water over the battery to rinse away any sulphuric acid, and let the battery stand to dry.
6. Charge the battery in a well-ventilated location.
7. Do not let the battery electrolyte temperature rise above approximately 45°C (approximately 55°C during rapid charging).

BATTERY TEST

Test procedure



(Table 1)

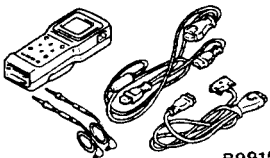
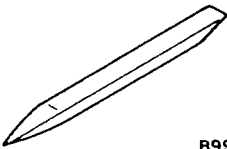
Battery type	75D23	80D26	95D31
Charging time when fully discharged [5 A constant current charging] (H)	11	12	14
Load current (A)	260	281	311

(Table 2)

Outside air temperature (°C)	21 or more	16 – 20	10 – 15	4 – 9	–1 – 3	–1 – –1	–12 – –1	–18 – –13
Minimum voltage (V)	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

IGNITION SWITCH AND IMMOBILIZER <EXCEPT FOR 4D56>

SPECIAL TOOLS

Tools	No.	Name	Application
 B991502	MB991502	MUT-II Sub assembly	Checking the ETACS-ECU input signals
 B990784	MB990784	Ornament remover	Instrument panel under cover and column cover removal

TROUBLESHOOTING

IGNITION SWITCH

The ignition switch is controlled by the Smart Wiring System (SWS). For troubleshooting procedures, refer to GROUP 54B.

IMMOBILIZER

BASIC FLOW OF PROBLEM DIAGNOSIS

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

DIAGNOSIS FUNCTION

READING DIAGNOSIS CODES

The diagnosis codes can be read using the MUT-II or by using the Simple Check Diagnosis mode. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points)

NOTE

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

DIAGNOSIS CODE MEMORY ERASING PROCEDURE

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

INSPECTION USING SIMPLE CHECK DIAGNOSIS MODE

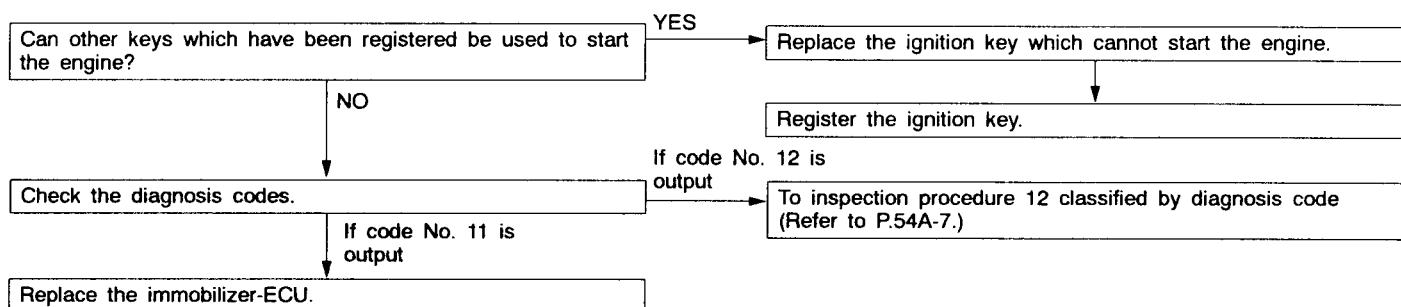
1. Change to Simple Check Diagnosis mode and activate switch diagnosis mode.
(Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)
2. In this condition, the input signals for the following switches can be checked.

CHART CLASSIFIED BY DIAGNOSIS CODES

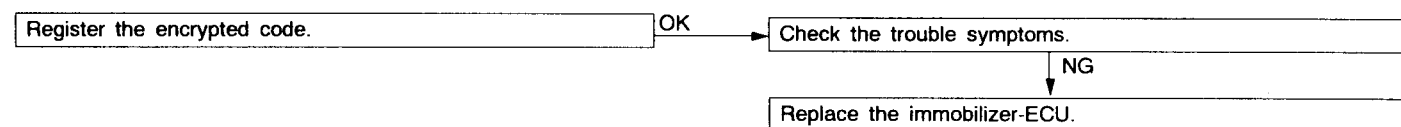
Code No.	Diagnosis contents	Reference page
11	Problem related to communication with the ignition key	54A-7
12	Ignition key is not registered, or encrypted code from ignition key does not match.	54A-7

INSPECTION PROCEDURES FOR EACH DIAGNOSIS CODE

Code No. 11 Problem related to communication with the ignition key	Probable cause
When the ignition switch is at the ON position, the encrypted codes are not transmitted from the ignition key to the immobilizer-ECU.	• Malfunction of ignition key • Malfunction of immobilizer-ECU



Code No. 12 Ignition key is not registered, or encrypted code from ignition key does not match.	Probable cause
The ignition key has not been registered with the immobilizer-ECU.	• The ignition key has not been registered with the immobilizer-ECU. • Malfunction of immobilizer-ECU

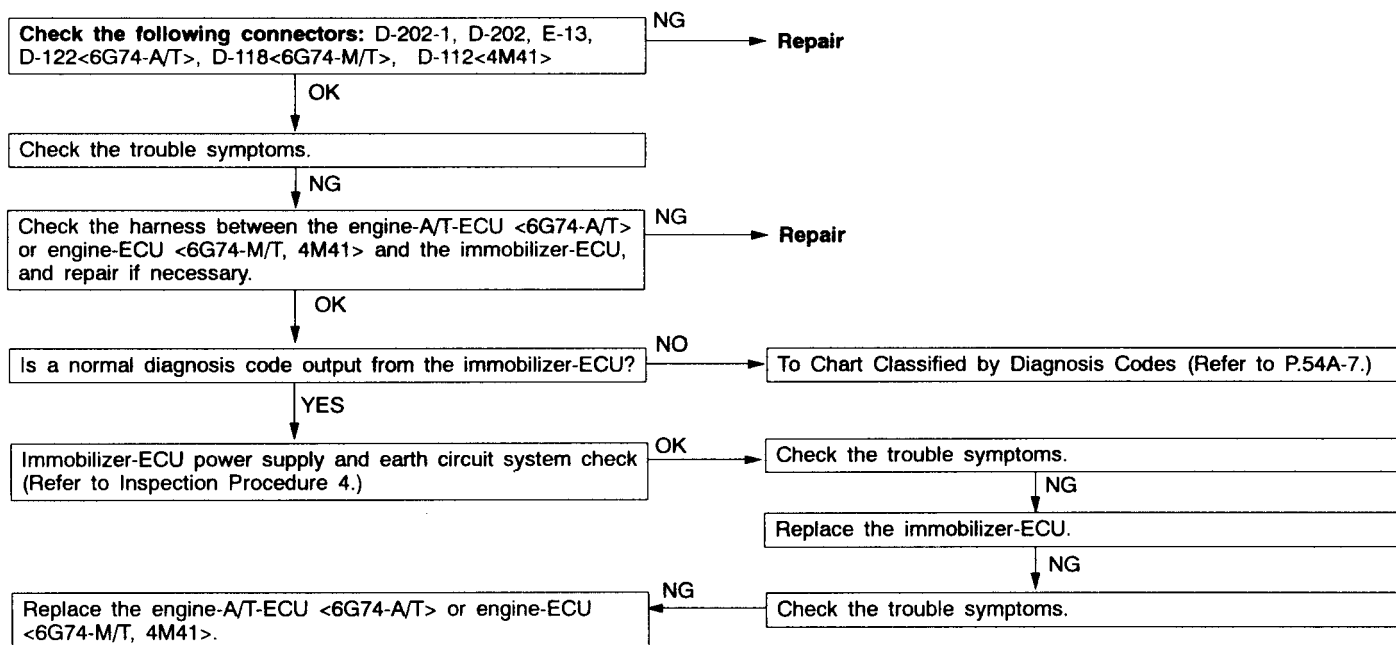


INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

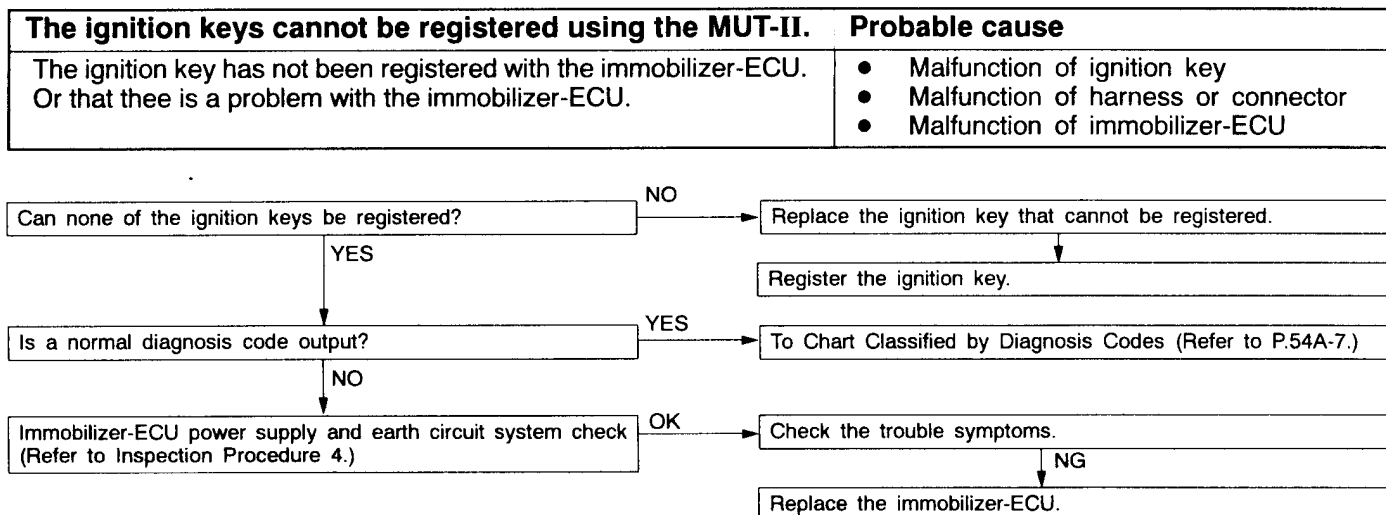
Trouble Symptom	Inspection procedure No.	Reference page
Communication with MUT-II is not possible.	–	GROUP 13B, 13C – Trouble-shooting
Diagnosis code No. 54 is generated by the engine-A/T-ECU <6G74-A/T> or by the engine-ECU <6G74-M/T, 4M41>.	1	54A-8
The ignition keys cannot be registered using the MUT-II.	2	54A-9
The engine does not start. (The engine cranks but does not fire.)	3	54A-9
Immobilizer-ECU power supply and earth circuit system check	4	54A-10

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM
Inspection procedure 1

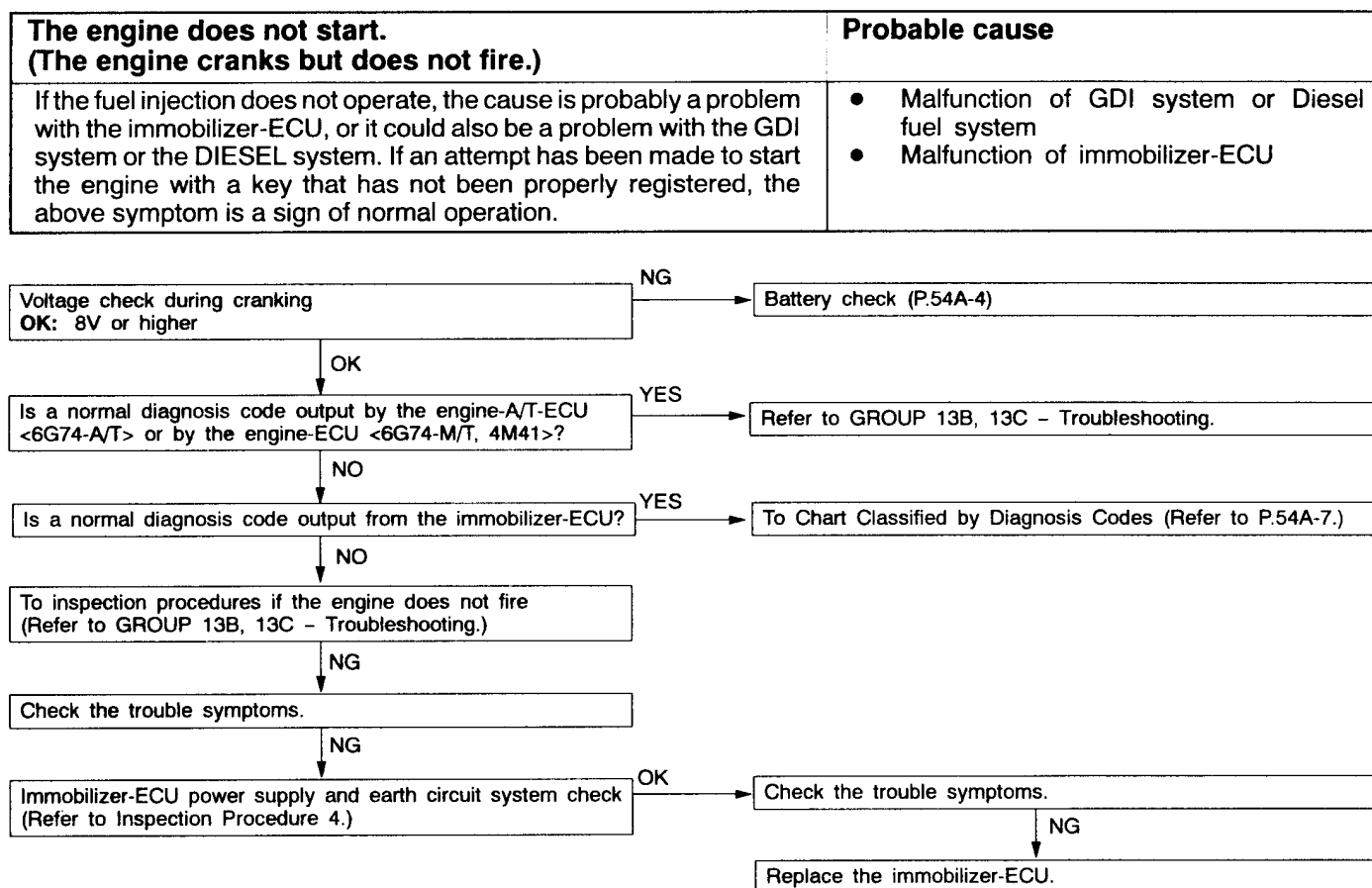
Diagnosis code No. 54 is generated by the engine-A/T-ECU <6G74-A/T> or by the engine-ECU <6G74-M/T, 4M41>.	Probable cause
The cause is probably a problem with communication between the engine-A/T-ECU <6G74-A/T> or engine-ECU <6G74-M/T, 4M41> and the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of engine-A/T-ECU <6G74-A/T> or engine-ECU <6G74-M/T, 4M41> • Malfunction of immobilizer-ECU • Malfunction of ignition key • The ignition key has not been registered with the immobilizer-ECU.



Inspection procedure 2



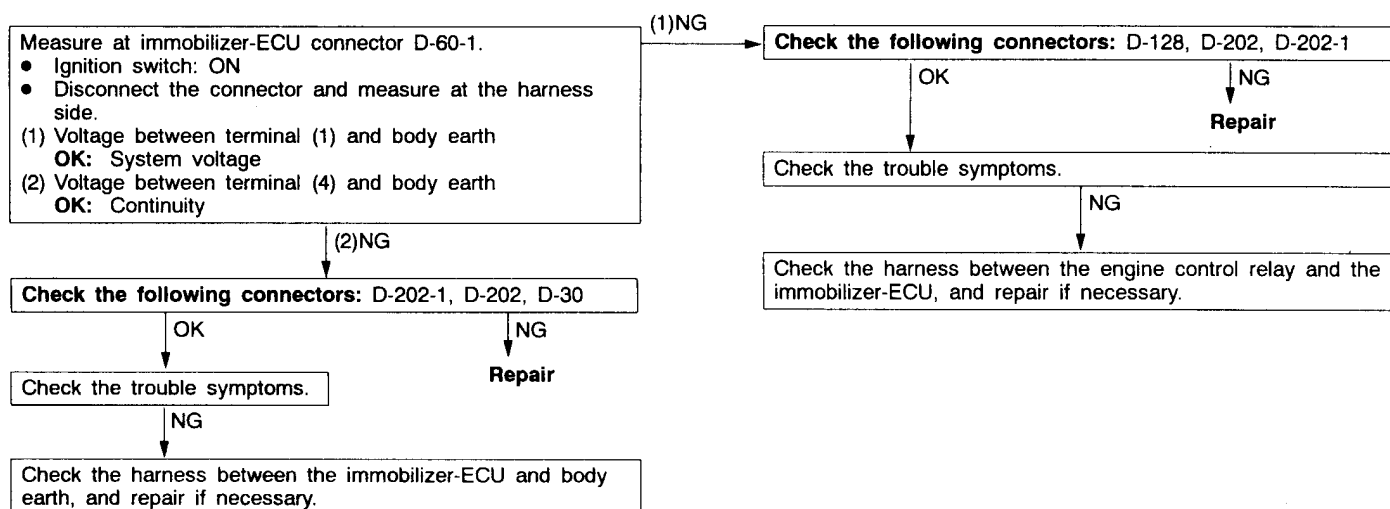
Inspection procedure 3



54A-10 CHASSIS ELECTRICAL – Ignition Switch and Immobilizer <except for 4D56>

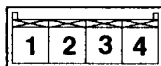
Inspection procedure 4

Immobilizer-ECU power supply and earth circuit system check



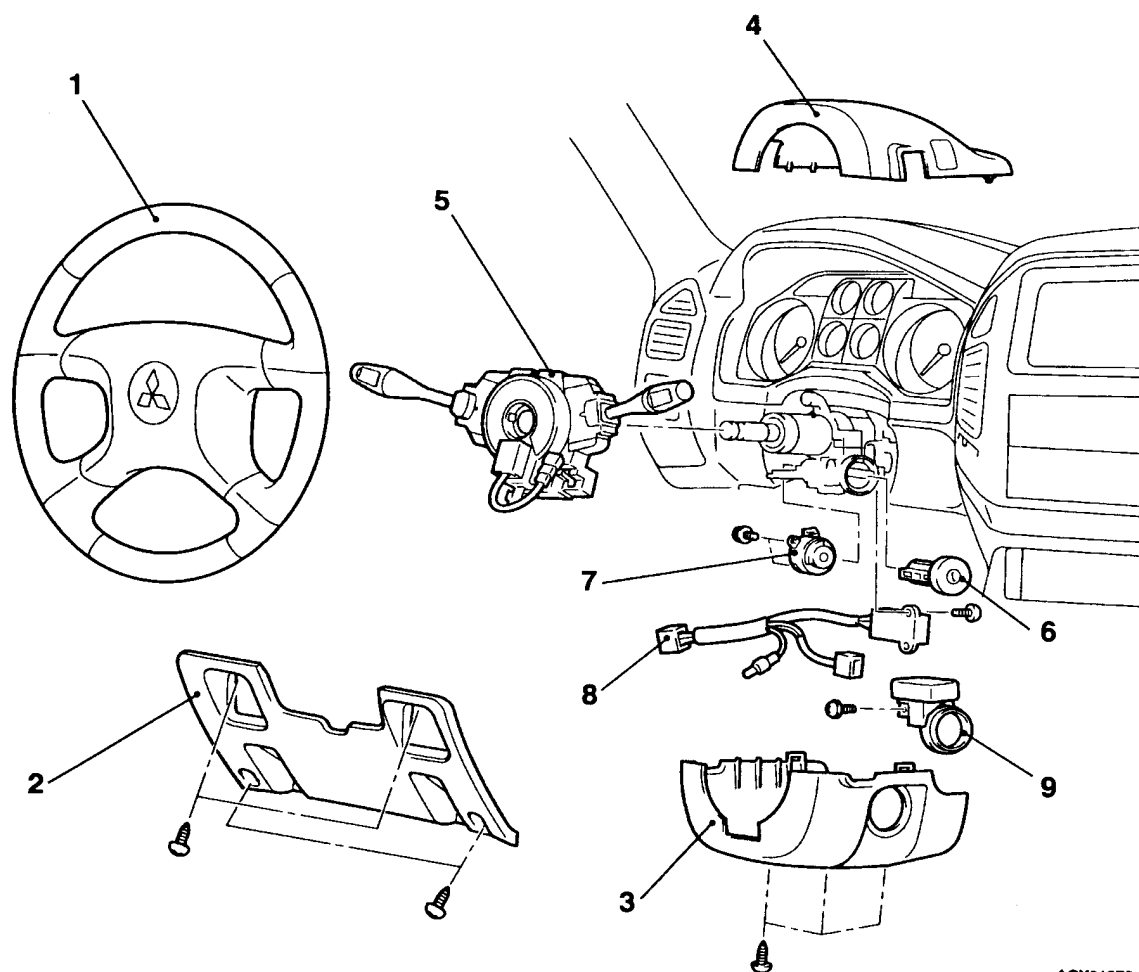
IMMOBILIZER-ECU CHECK

TERMINAL VOLTAGE CHECK TABLE



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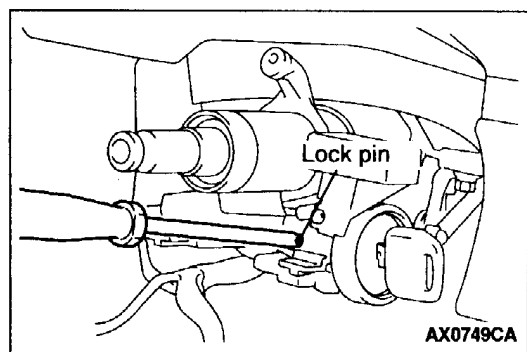
Terminal No.	Signal	Inspection conditions	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	–	–	–
3	Engine-A/T-ECU <6G74-A/T>, Engine-ECU <6G74-M/T, 4M41>	–	–
4	Immobilizer-ECU earth	At all times	0V

IGNITION SWITCH AND IMMOBILIZER-ECU**REMOVAL AND INSTALLATION**

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Removal steps

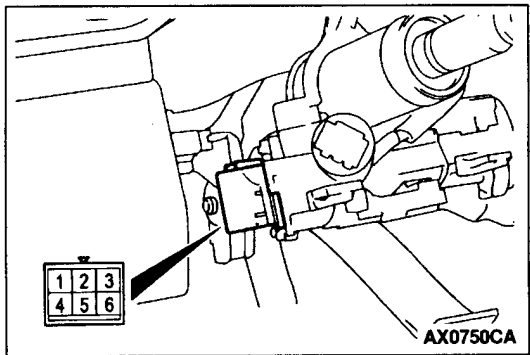
- | | | |
|---|-----|---|
| <ol style="list-style-type: none"> 1. Steering wheel
(Refer to GROUP 37A.) 2. Instrument panel under cover
(Refer to GROUP 52A – Instrument Panel.) 3. Lower column cover (Refer to GROUP 52A – Instrument Panel.) | ◀A▶ | <ol style="list-style-type: none"> 4. Upper column cover (Refer to GROUP 52A – Instrument Panel.) 5. Column Switch 6. Steering lock cylinder 7. Ignition switch 8. Key Reminder Switch 9. Immobilizer-ECU |
|---|-----|---|



AX0749CA

REMOVAL SERVICE POINTS**◀A▶ STEERING LOCK CYLINDER REMOVAL**

1. Insert the key into the steering lock cylinder, and then turn the ignition switch to the ACC position.
2. While using a Phillips screwdriver (small) or similar tool to push the lock pin, remove the steering lock cylinder.

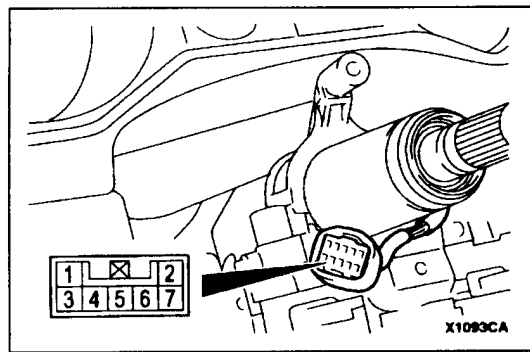


INSPECTION

IGNITION SWITCH CONTINUITY CHECK

With the ignition switch installed to the vehicle, disconnect and check the ignition switch connector.

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



KEY REMINDER SWITCH CONTINUITY CHECK

With the key reminder switch installed to the vehicle, disconnect and check the key reminder switch connector.

Ignition key condition	Terminal No.	
	4	6
Removed	○	○
Inserted		

ENCRYPTED CODE REGISTRATION METHOD AND RESETING 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
Ignition key ring antenna and immobilizer-ECU	Necessary
Engine-ECU*	Necessary

NOTE

* : If the engine-ECU is replaced, the ignition key ring antenna and 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.

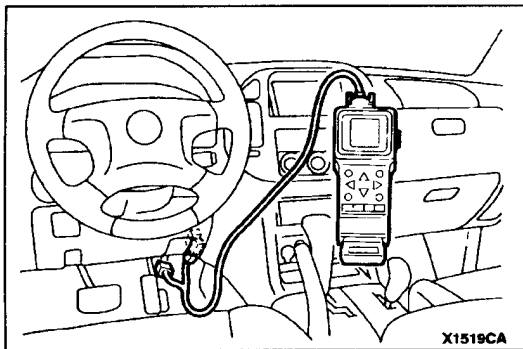
ENCRYPTED CODE REGISTRATION METHOD

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 register the password that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

Caution

Because 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.

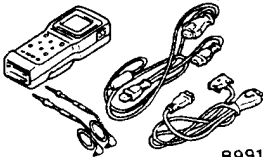
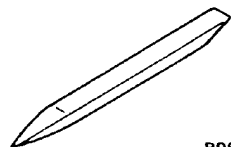
Caution

Turn the ignition switch to the LOCK (OFF) before connecting or disconnecting of the MUT-II.

2. Check that diagnosis code No.54 is not set by the engine-ECU. If it is set, check according to the Troubleshooting Procedures. (Refer to GROUP 13A – Troubleshooting.)
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. If you are registering two or more codes, use the next key to the registered to turn on the ignition switch without disconnecting the MUT-II.
5. Turn the ignition switch to the LOCK (OFF) position.
6. Check that the engine can be started with each of the ignition keys.
7. Check the diagnosis output from the engine-ECU, and erase code No.54 if it appears. (Refer to GROUP 13A – Troubleshooting.)
8. Disconnect the MUT-II. This completes the registration operation.

IGNITION SWITCH AND IMMOBILIZER<4D56>

SPECIAL TOOLS

Tools	No.	Name	Application
 B991502	MB991502	MUT-II Sub assembly	Checking the ETACS-ECU input signals
 B990784	MB990784	Ornament remover	Instrument panel under cover and column cover removal

TROUBLESHOOTING

IGNITION SWITCH

The ignition switch is controlled by the Smart Wiring System (SWS), for troubleshooting procedures, refer to GROUP 54B.

IMMOBILIZER

BASIC FLOW OF PROBLEM DIAGNOSIS

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

DIAGNOSIS FUNCTION

READING DIAGNOSIS CODES

The diagnosis codes can be read using the MUT-II or by using the Simple Check Diagnosis mode. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

NOTE

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

DIAGNOSIS CODE MEMORY ERASING PROCEDURE

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

INSPECTION USING SIMPLE CHECK DIAGNOSIS MODE

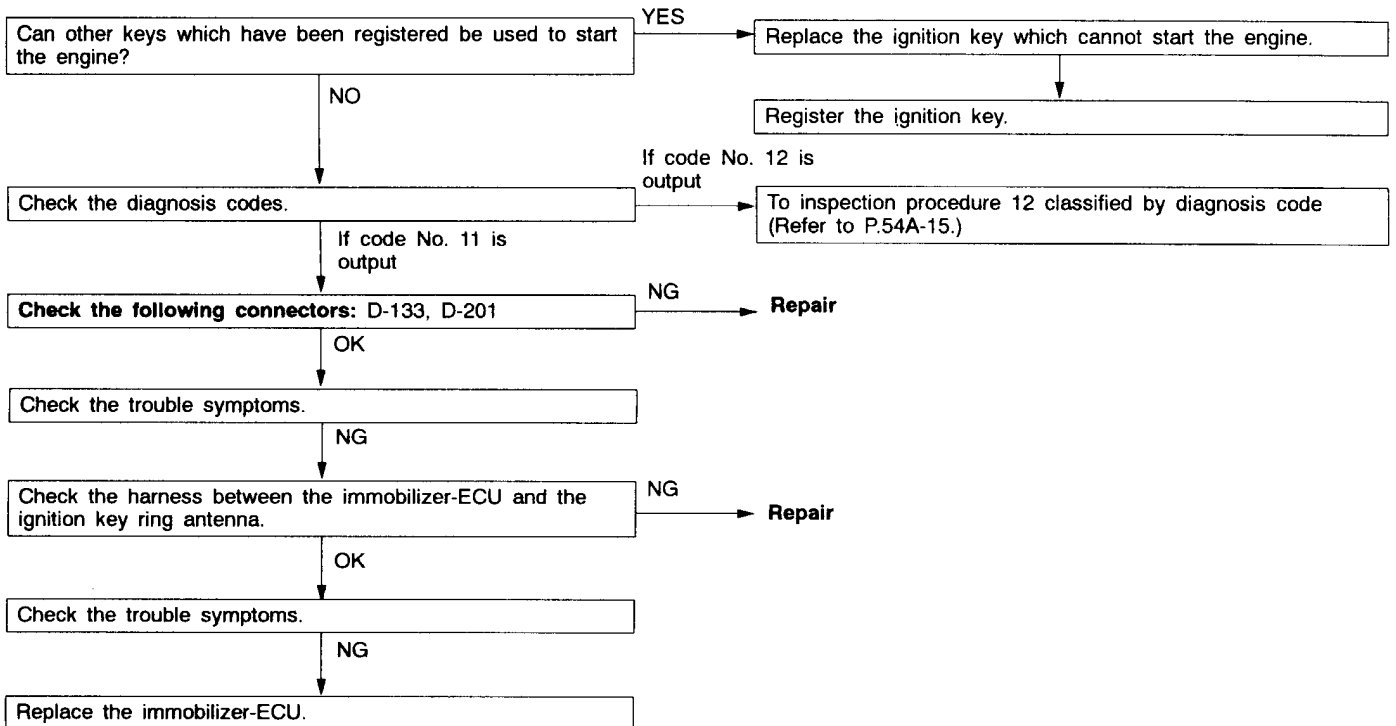
1. Change to Simple Check Diagnosis mode and activate switch diagnosis mode. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)
2. In this condition, the input signals for the following switches can be checked.

CHART CLASSIFIED BY DIAGNOSIS CODES

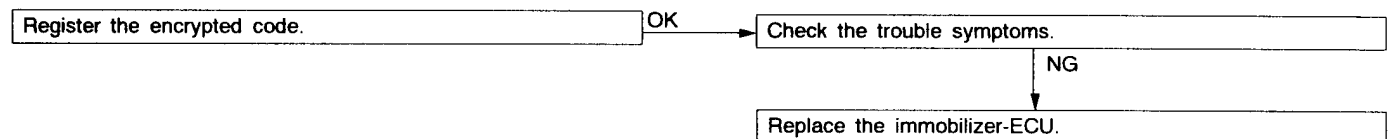
Code No.	Diagnosis contents	Reference page
11	Problem related to communication with the ignition key	54A-15
12	Ignition key is not registered, or encrypted code from ignition key does not match.	54A-15

INSPECTION PROCEDURES FOR EACH DIAGNOSIS CODE

Code No. 11 Problem related to communication with the ignition key	Probable cause
When the ignition switch is at the ON position, the encrypted codes are not transmitted from the ignition key to the immobilizer-ECU.	• Malfunction of ignition key • Malfunction of immobilizer-ECU • Malfunction of harness or connector



Code No. 12 Ignition key is not registered, or encrypted code from ignition key does not match.	Probable cause
The ignition key has not been registered with the immobilizer-ECU.	• The ignition key has not been registered with the immobilizer-ECU. • Malfunction of immobilizer-ECU



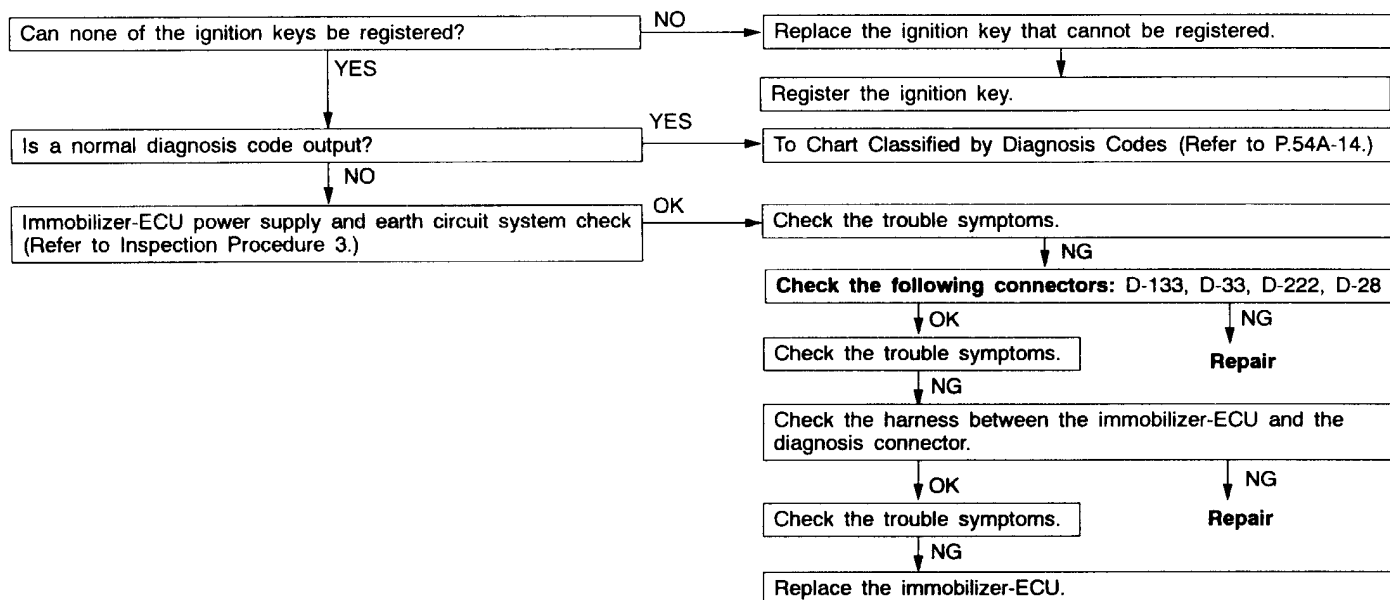
INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

Trouble Symptom	Inspection procedure No.	Reference page
Communication with MUT-II is not possible.	—	GROUP 13B, 13C – Trouble-shooting
The ignition keys cannot be registered using the MUT-II.	1	54A-16
The engine does not start. (The engine cranks but does not fire.)	2	54A-17
Immobilizer-ECU power supply and earth circuit system check	3	54A-18

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

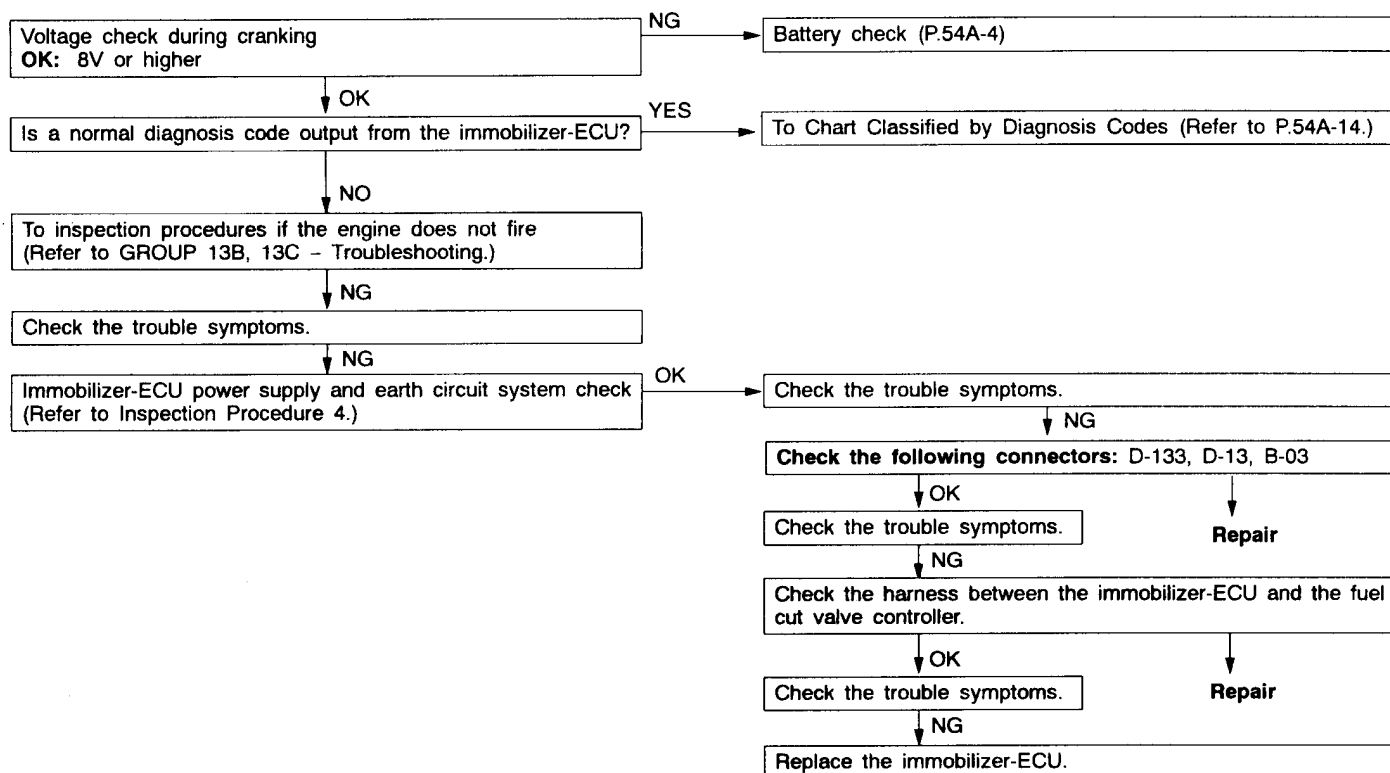
Inspection procedure 1

The ignition keys cannot be registered using the MUT-II.	Probable cause
The ignition key has not been registered with the immobilizer-ECU. Or that there is a problem with the immobilizer-ECU.	• Malfunction of ignition key • Malfunction of harness or connector • Malfunction of immobilizer-ECU



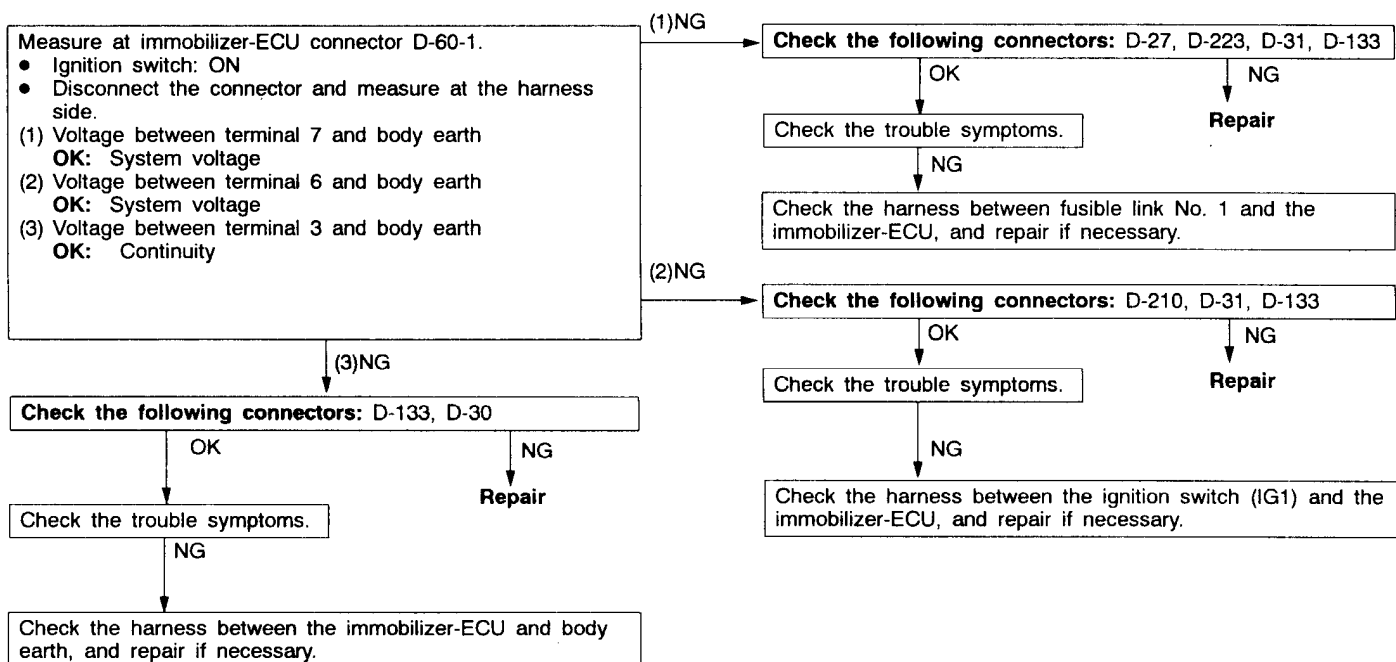
Inspection procedure 2

The engine does not start. (The engine cranks but does not fire.)	Probable cause
If the fuel injection does not operate, the cause is probably a problem with the immobilizer-ECU, or it could also be a problem with the diesel fuel system. If an attempt has been made to start the engine with a key that has not been properly registered, the above symptom is a sign of normal operation.	• Malfunction of diesel fuel system • Malfunction of immobilizer-ECU



Inspection procedure 3

Immobilizer-ECU power supply and earth circuit system check



IMMOBILIZER-ECU CHECK

TERMINAL VOLTAGE CHECK TABLE

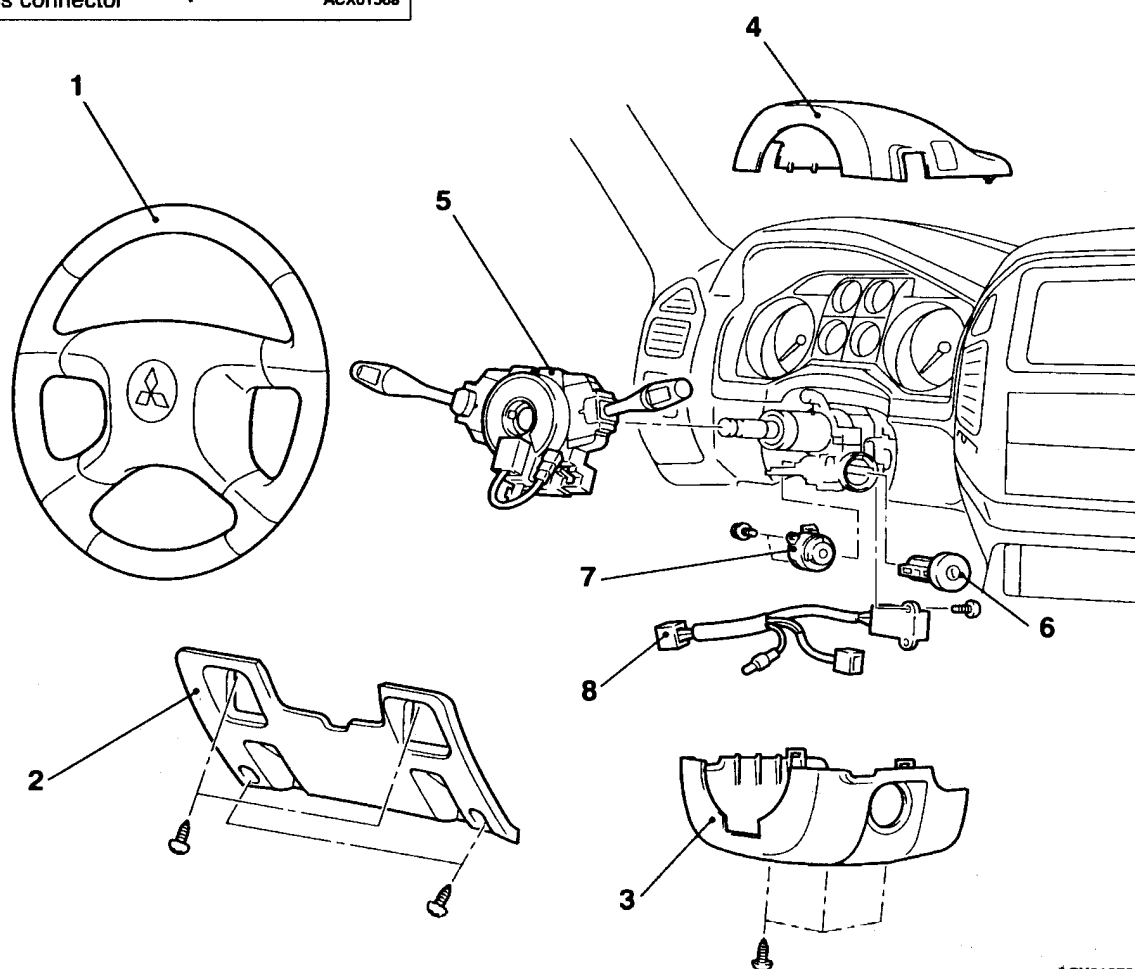
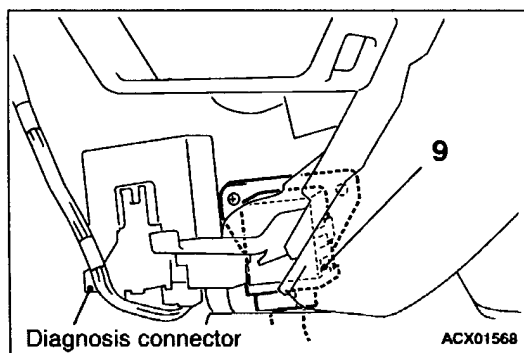
1	2			3	4	5
6	7	8	9	10	11	12

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Terminal No.	Signal	Inspection conditions	Terminal voltage
1	Diagnosis connector	–	–
2	–	–	–
3	Immobilizer-ECU earth	Always	0 V
4	–	–	–
5	Engine-ECU	–	–
6	Ignition switch (IG1) power supply	Ignition switch : ON	System voltage
7	Immobilizer-ECU power supply	Always	System voltage
8, 9	–	–	–
10	Ignition key ring antenna	–	–
11	Ignition key ring antenna	–	–
12	Diagnosis connector	–	–

IGNITION SWITCH AND IMMOBILIZER-ECU

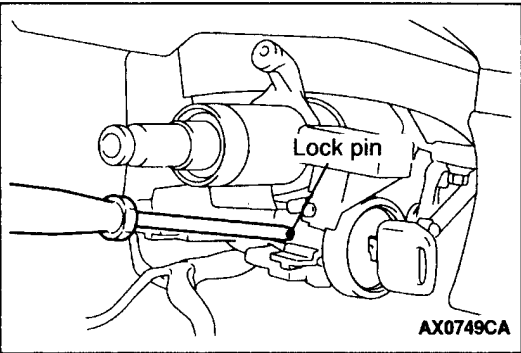
REMOVAL AND INSTALLATION

**Removal steps**

1. Steering wheel
(Refer to GROUP 37A.)
2. Instrument panel under cover
(Refer to GROUP 52A – Instrument Panel.)
3. Lower column cover (Refer to GROUP 52A – Instrument Panel.)



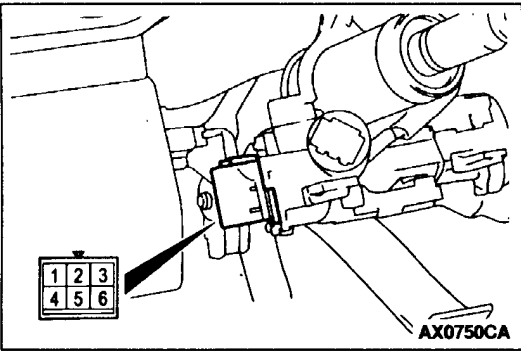
4. Upper column cover (Refer to GROUP 52A – Instrument Panel.)
5. Column Switch
6. Steering lock cylinder
7. Ignition switch
8. Key Reminder Switch
9. Immobilizer-ECU



REMOVAL SERVICE POINTS

◀A▶ STEERING LOCK CYLINDER REMOVAL

1. Insert the key into the steering lock cylinder, and then turn the ignition switch to the ACC position.
2. While using a Phillips screwdriver (small) or similar tool to push the lock pin, remove the steering lock cylinder.

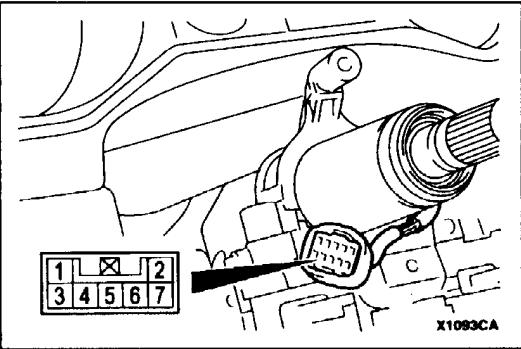


INSPECTION

IGNITION SWITCH CONTINUITY CHECK

With the ignition switch installed to the vehicle, disconnect and check the ignition switch connector.

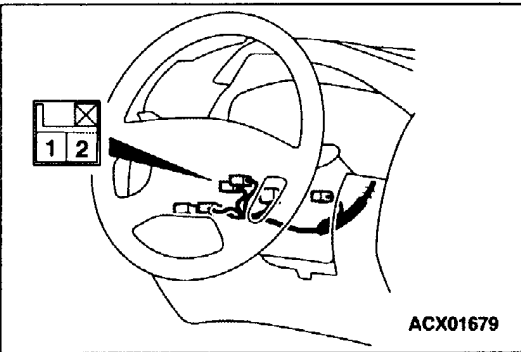
Ignition switch position	Terminal No.				
	1	2	4	5	6
LOCK					
ACC		○			○
ON		○	○	○	○
START		○	○	○	



KEY REMINDER SWITCH CONTINUITY CHECK

With the key reminder switch installed to the vehicle, disconnect and check the key reminder switch connector.

Ignition key condition	Terminal No.	
	4	6
Removed	○	○
Inserted		



IGNITION KEY RING ANTENNA CONTINUITY CHECK

Use a circuit tester to check the continuity between the terminals.

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
Ignition key ring antenna and immobilizer-ECU	Necessary
Engine-ECU*	Necessary

NOTE

* : If the engine-ECU is replaced, the ignition key ring antenna and 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.

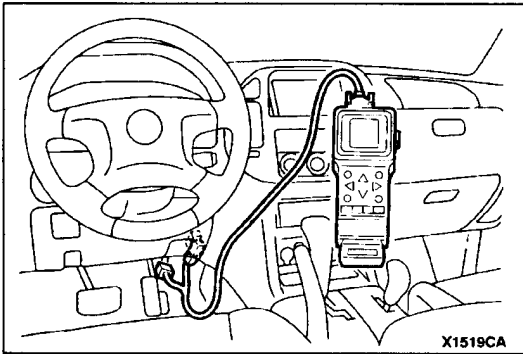
ENCRYPTED CODE REGISTRATION METHOD

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 register the password that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

Caution

Because 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 the LOCK (OFF) before connecting or disconnecting of the MUT-II.

2. Check that diagnosis code No.54 is not set by the engine-ECU. If it is set, check according to the Troubleshooting Procedures. (Refer to GROUP 13A - Troubleshooting.)
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. If you are registering two or more codes, use the next key to the registered to turn on the ignition switch without disconnecting the MUT-II.
5. Turn the ignition switch to the LOCK (OFF) position.
6. Check that the engine can be started with each of the ignition keys.
7. Check the diagnosis output from the engine-ECU, and erase code No.54 if it appears. (Refer to GROUP 13A - Troubleshooting.)
8. Disconnect the MUT-II. This completes the registration operation.

COMBINATION METER

SERVICE SPECIFICATIONS

Item			Standard value	Limit
Speedometer indication range km/h	At 20 km/h		18 – 23	–
	At 40 km/h		37 – 45	–
	At 80 km/h		75 – 88	–
	At 120 km/h		113 – 132	–
	At 160 km/h		150 – 176	–
Speedometer needle swing km/h (when driving at 35 km/h or higher)			–	± 3
Tachometer indication error r/min	When engine speed is 700 r/min		± 120	–
	When engine speed is 2,000 r/min	Petrol	–175+225	–
		Diesel	±175	–
	When engine speed is 3,000 r/min	Petrol	–175+300	–
		Diesel	± 225	–
	When engine speed is 4,000 r/min	Petrol	–225+375	–
		Diesel	± 300	–
	When engine speed is 4,750 r/min <Diesel vehicles>		± 260	–
When engine speed is 5,000 r/min <Petrol vehicles>		–225+425	–	
When engine speed is 6,000 r/min <Petrol vehicles>		–225+475	–	
Fuel gauge unit standard resistance value Ω	F position		3	–
	E position		110	–
Fuel gauge unit float height mm	F position		11.9	–
	E position		195.2	–
Engine coolant temperature gauge unit standard resistance value Ω			104 ± 13.5	–
Combination meter internal resistance value Ω (Measured at connector D-38 and connector D-40)	62 – 11 (IG power supply – earth)		1MΩ or more	–
	62 – 25 (IG power supply – earth)		1MΩ or more	–
	62 – 63 (IG power supply – fuel gauge)		1MΩ or more	–
	62 – 64 (IG power supply – engine coolant temperature gauge)		1MΩ or more	–
	63 – 11 (fuel gauge – earth)		180	–
	63 – 25 (fuel gauge – earth)		180	–
	64 – 11 (engine coolant temperature gauge – earth)		210	–
	64 – 25 (engine coolant temperature gauge – earth)		210	–
	67 – 11 (battery power supply – earth)		1MΩ or more	–
	67 – 25 (battery power supply – earth)		1MΩ or more	–
	67 – 63 (battery power supply – fuel gauge)		1MΩ or more	–
	67 – 64 (battery power supply – engine coolant temperature gauge)		1MΩ or more	–

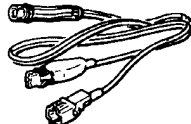
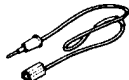
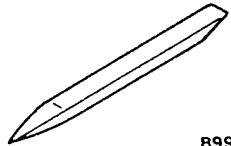
SEALANTS

Usage location	Brand
Engine coolant temperature gauge unit	Semi-drying sealant: Threebond 1104 [0110207], Threebond 1141E (Manufactured by Threebond)

NOTE

Numbers in [] indicate genuine parts numbers.

SPECIAL TOOLS

Tools	No.	Name	Application
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Check harness B: LED harness C: LED harness adapter D: Probe	Fuel gauge simple checking Engine coolant temperature gauge simple checking A: For checking contact pin contact pressure B: For checking the power supply C: For checking the power supply D: For checking the power supply circuit
 B990784	MB990784	Ornament remover	Meter bezel removal

TROUBLESHOOTING

DIAGNOSIS FUNCTION

Input signal check procedure

1. Connect the MUT-II or a voltage meter to the diagnosis connector, and check the input. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)
2. The vehicle speed sensor input signal can be checked.

NOTE

If the vehicle speed sensor input signal cannot be checked using the MUT-II, the cause is probably a malfunction of the diagnosis circuit system.

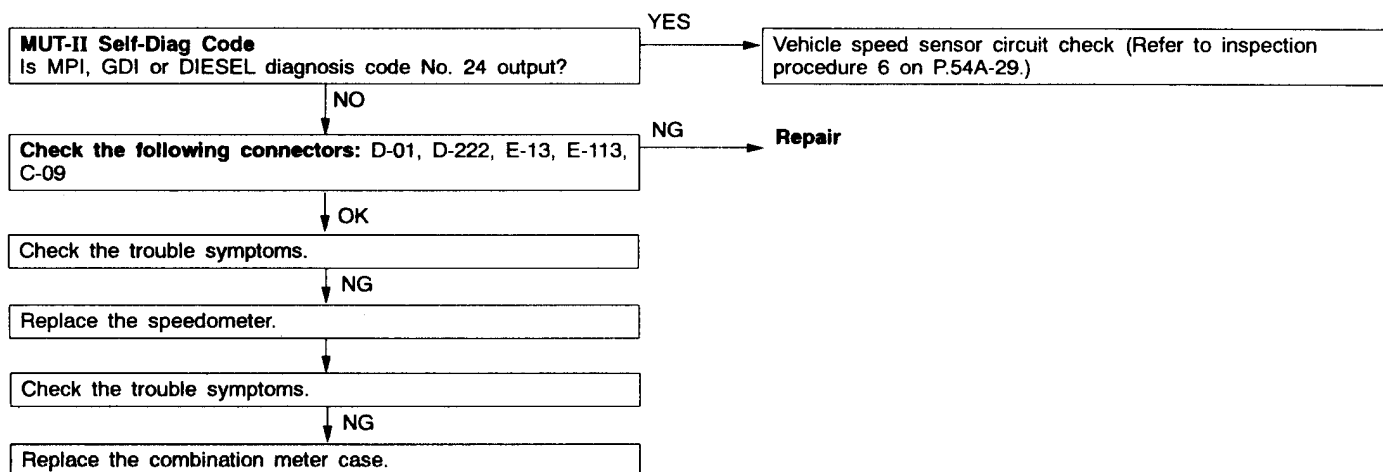
CHART CLASSIFIED BY TROUBLE SYMPTOMS

Trouble Symptom	Inspection No.	procedure	Reference page
Speedometer does not operate. (Other meters and gauges operate.)	1		54A-25
Tachometer does not operate. (Other meters and gauges operate.)	2		54A-26
Fuel gauge does not operate. (Other meters and gauges operate.)	3		54A-27
Engine coolant temperature gauge does not operate. (Other meters and gauges operate.)	4		54A-28
None of the meters and gauges operate.	5		54A-29

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

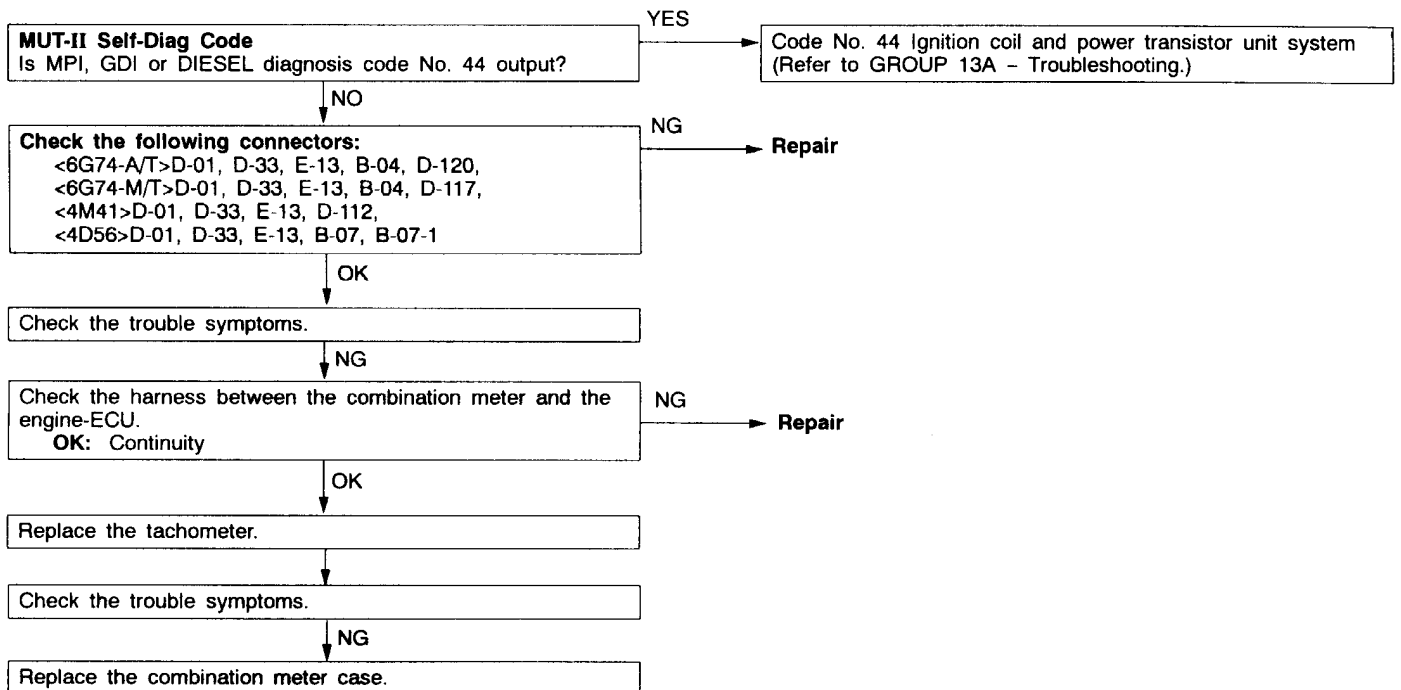
Inspection procedure 1

Speedometer does not operate. (Other meters and gauges operate.)	Probable cause
The cause is probably a malfunction of the vehicle speed sensor input system.	• Malfunction of vehicle speed sensor • Malfunction of harness or connector • Malfunction of speedometer • Malfunction of printed circuit board



Inspection procedure 2

Tachometer does not operate.(Other meters and gauges operate.)	Probable cause
The cause is probably that the ignition signal is not being input from the engine, or that there is a malfunction of the meter power supply or earth circuit.	• Malfunction of tachometer • Malfunction of harness or connector • Malfunction of printed circuit board



Inspection procedure 3

Fuel gauge does not operate. (Other meters and gauges operate.)	Probable cause
If the speedometer and tachometer are normal, the harness from the power supply to the combination meter is normal.	• Malfunction of fuel gauge unit • Malfunction of fuel gauge and engine coolant temperature assembly • Malfunction of harness or connector • Malfunction of printed circuit board

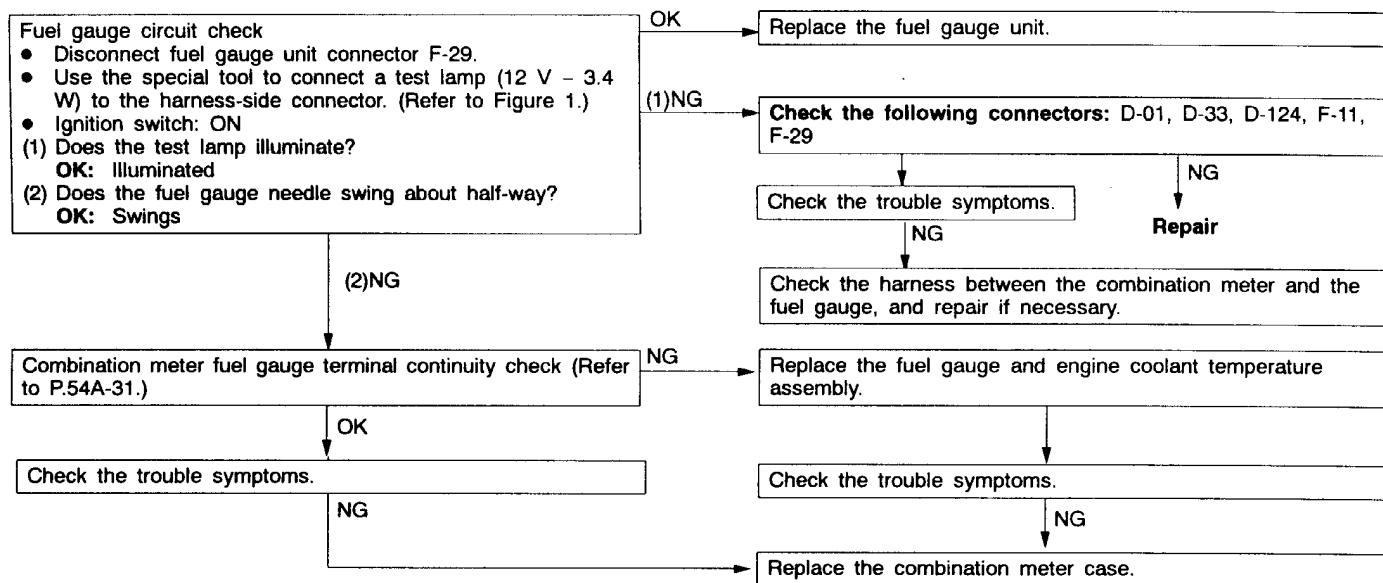
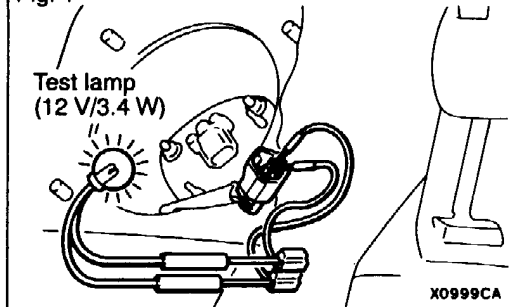
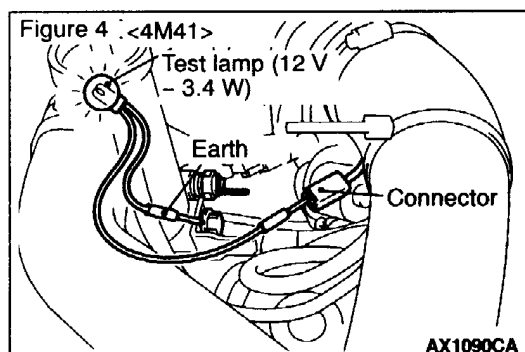
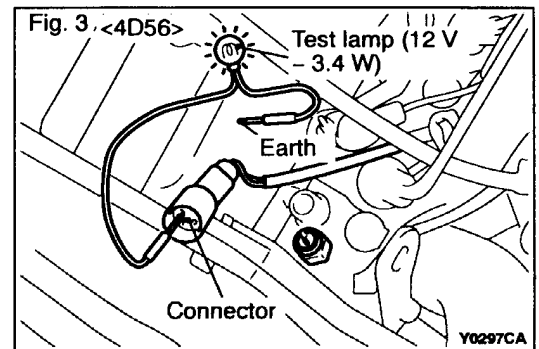
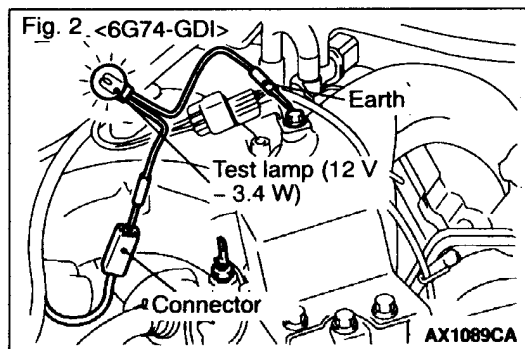
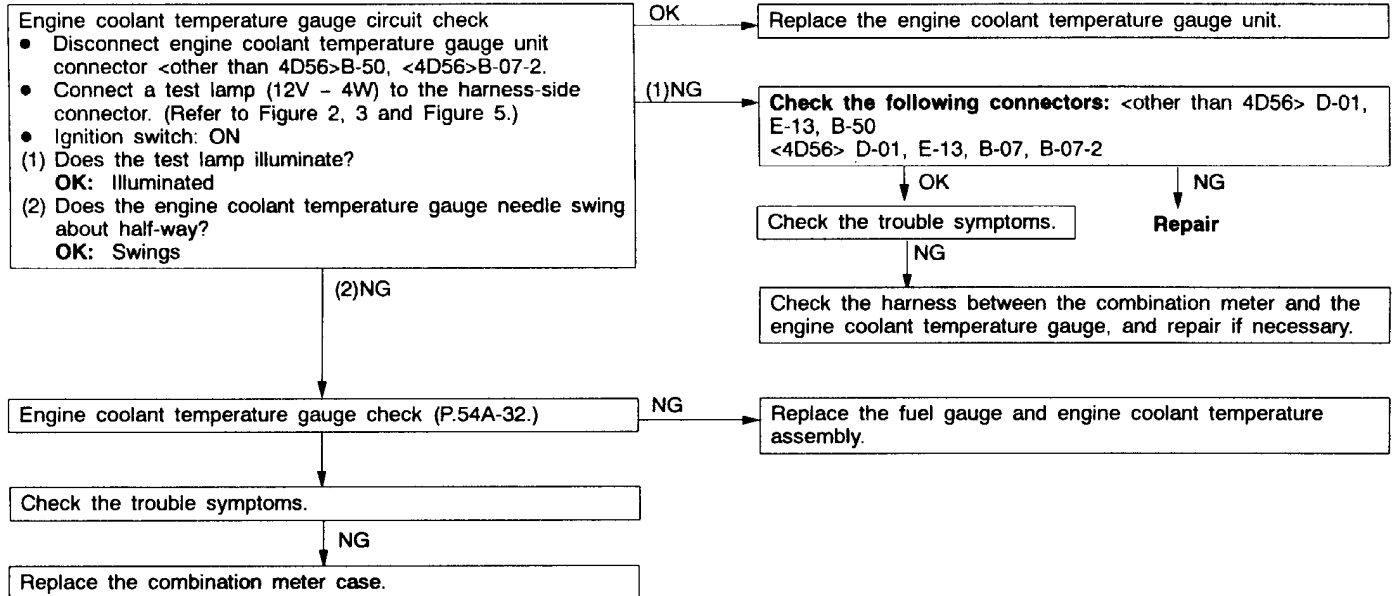


Fig. 1



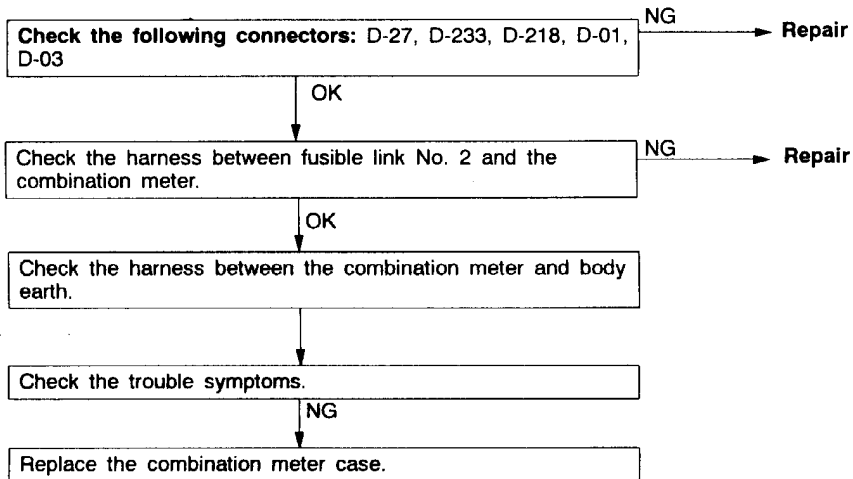
Inspection procedure 4

Engine coolant temperature gauge does not operate. (Other meters and gauges operate.)	Probable cause
If the speedometer and tachometer are normal, the harness from the power supply to the combination meter is normal.	- Malfunction of engine coolant temperature gauge unit - Malfunction of fuel gauge and engine coolant temperature assembly - Malfunction of harness or connector - Malfunction of printed circuit board

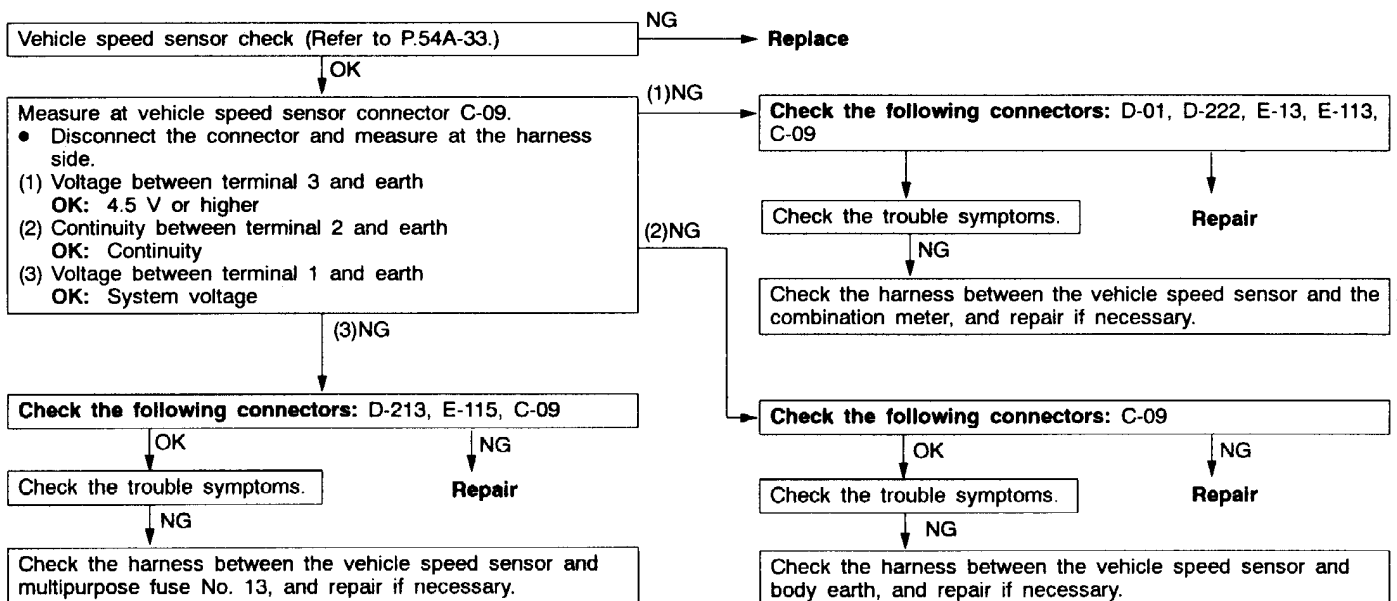


Inspection procedure 5

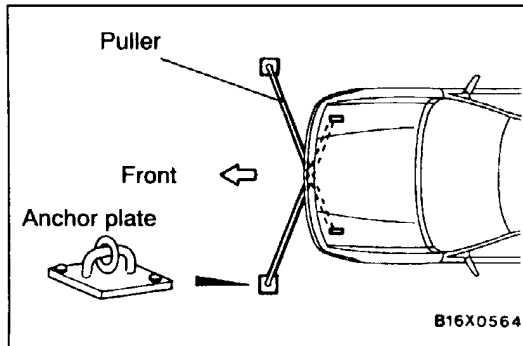
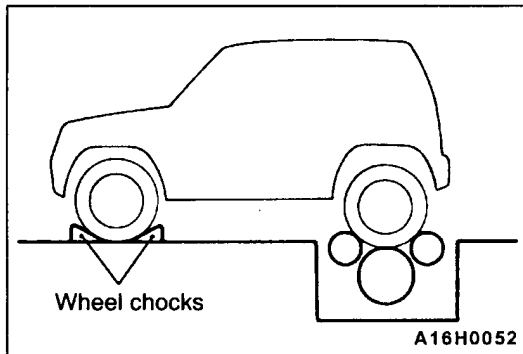
None of the meters and gauges operate.	Probable cause
If the indicators and warning lamps are normal, then the harness from the power supply (IG1) to the combination meter is normal.	- Malfunction of printed circuit board - Malfunction of harness or connector

**Inspection procedure 6**

Vehicle speed sensor check
The vehicle speed sensor is used by the speedometer, engine-ECU and A/T-ECU.

**NOTE**

If the trouble symptoms cannot be eliminated by the above checks, there is probably a short-circuit at the vehicle speed sensor output side (harness, speedometer, engine-ECU or A/T-ECU), and so this should be checked.



ON-VEHICLE SERVICE

SPEEDOMETER CHECK

1. Check that the tyre inflation pressure is at the value indicated on the tyre pressure labels.
2. Place the vehicle onto a speedometer tester.
3. Place wheel locks on front wheels.

NOTE

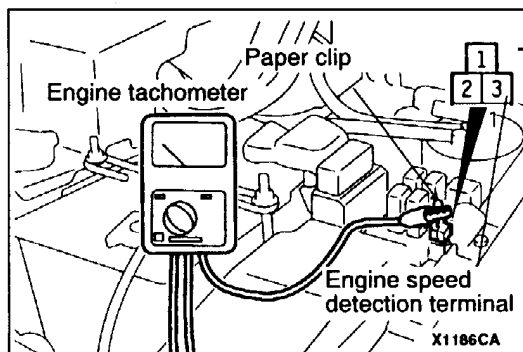
Set the vehicle to 2WD.

4. Install a puller to the towing hook and tie-down hook at the front of the vehicle to stop the front wheels from moving sideways, and secure both ends of the puller to anchor plates.
5. Connect a chain or wire cable to the rear towing hook and secure the other end to a strong, rigid support, to stop the vehicle from moving.
6. Check that the speedometer display range is within the standard value, and that the needle swing is within the limit value.

Standard value:

Speed km/h	20	40	80	120	160
Speedometer display range km/h	18 – 23	37 – 45	75 – 88	113 – 132	150 – 176

Limit: Needle swing (driving at a speed of 35 km/h or higher) ± 3 km/h

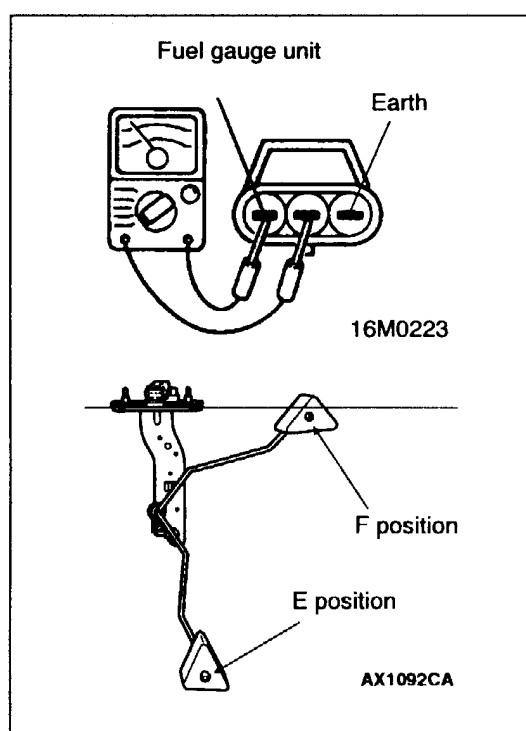


TACHOMETER CHECK

1. Insert a paper clip into the harness-side engine speed detection terminal and connect an engine tachometer.
2. Compare the engine tachometer display and the vehicle tachometer display at various engine speeds, and check that the display errors are within the standard value ranges.

Standard value:

Engine speed r/min		Tachometer display error r/min
700		± 120
2,000	Petrol	-175+225
	Diesel	± 175
3,000	Petrol	-175+300
	Diesel	± 225
4,000	Petrol	-225+375
	Diesel	± 300
4,750 (Diesel)		± 260
5,000 (Petrol)		-225+425
6,000 (Petrol)		-225+475

**FUEL GAUGE UNIT CHECK**

Remove the fuel gauge unit from the fuel tank.

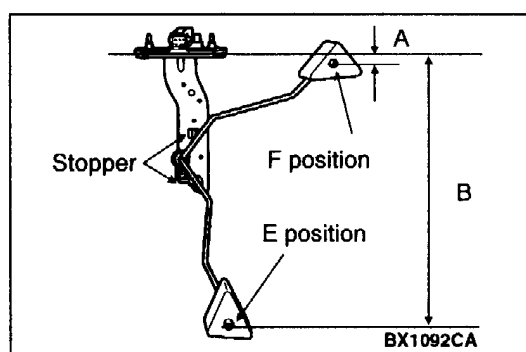
Fuel gauge unit standard resistance value

1. Check that the resistance between the fuel gauge unit terminal and the earth terminal is at the standard value when the float of the fuel gauge unit is at the F position and the E position.

Standard value:

Float position	Gauge resistance value
F position	3 Ω
E position	110 Ω

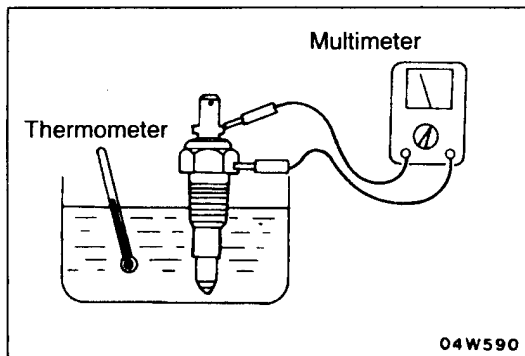
2. Check that the resistance value changes smoothly when the float is moved slowly between the F position and the E position.

**Fuel gauge unit float height**

Move the float and check that F position height (A) and E position height (B) are at the standard values when the float arm touches the stopper.

Standard value:

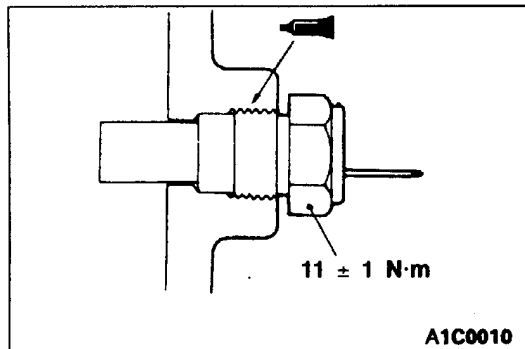
Float position	Float centre height
F position (A)	11.9 mm
E position (B)	195.2 mm



ENGINE COOLANT TEMPERATURE GAUGE UNIT CHECK

1. Drain the engine coolant. (Refer to GROUP 14 – On-vehicle Service.)
2. Remove the engine coolant temperature gauge unit.
3. Immerse the engine coolant temperature gauge unit in water at a temperature of 70°C and check that the basic resistance is at within the standard value range.

Standard value: $104 \pm 13.5 \Omega$



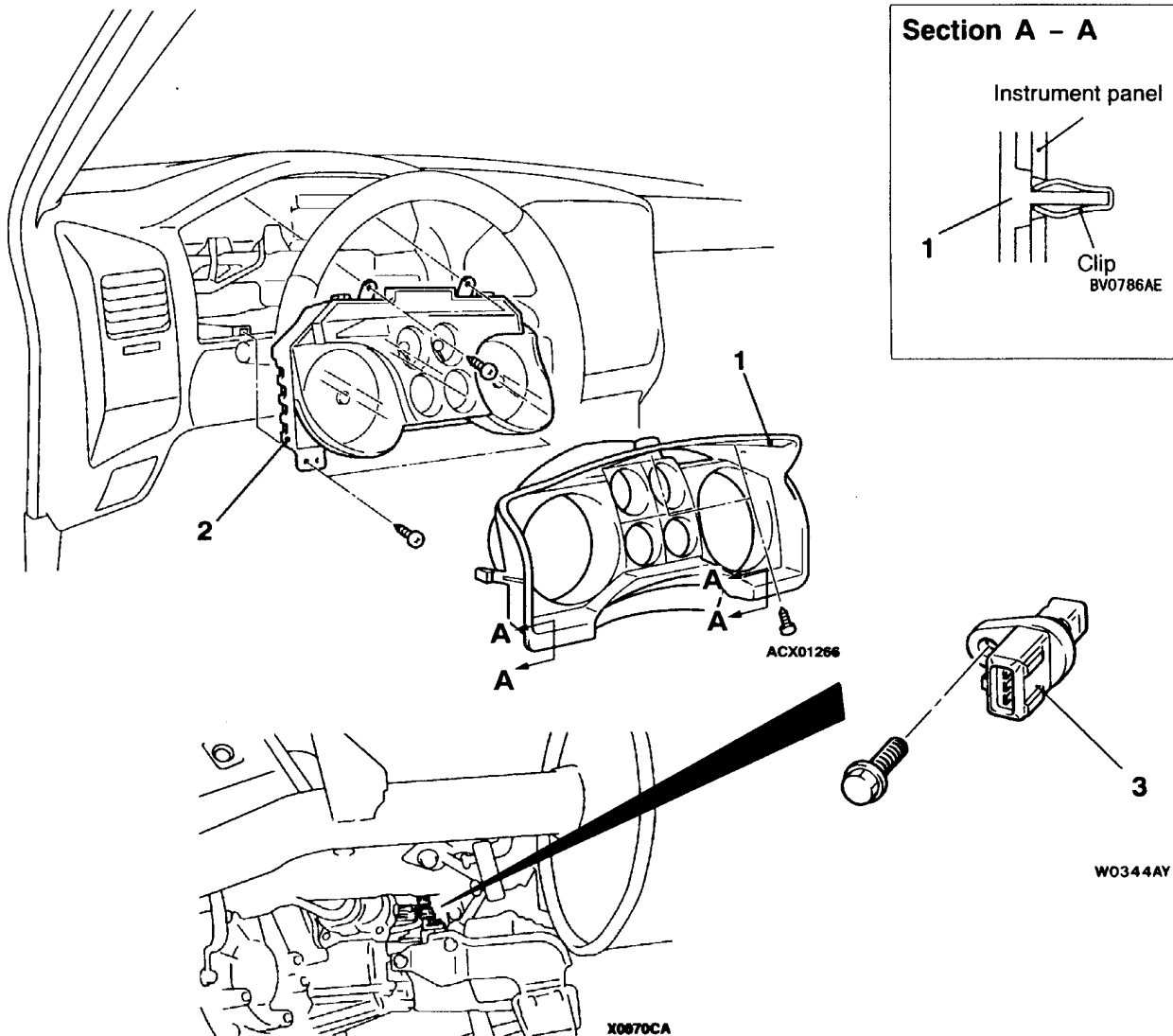
4. After checking, apply specified sealant to the threaded section of the engine coolant temperature gauge unit, and then tighten it to the specified torque.

Semi-drying sealant: Threebond 1104 or equivalent

5. Refill the engine coolant. (Refer to GROUP 14 – On-vehicle Service.)

COMBINATION METER

REMOVAL AND INSTALLATION

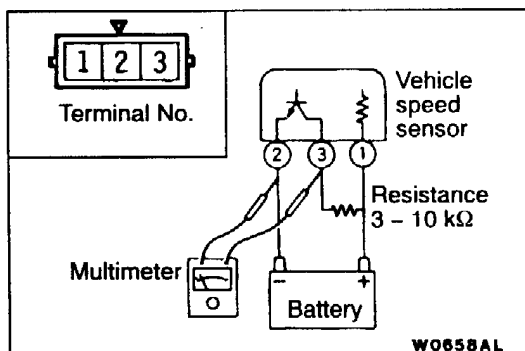


Combination meter removal steps

1. Meter bezel
2. Combination meter

Vehicle speed sensor removal

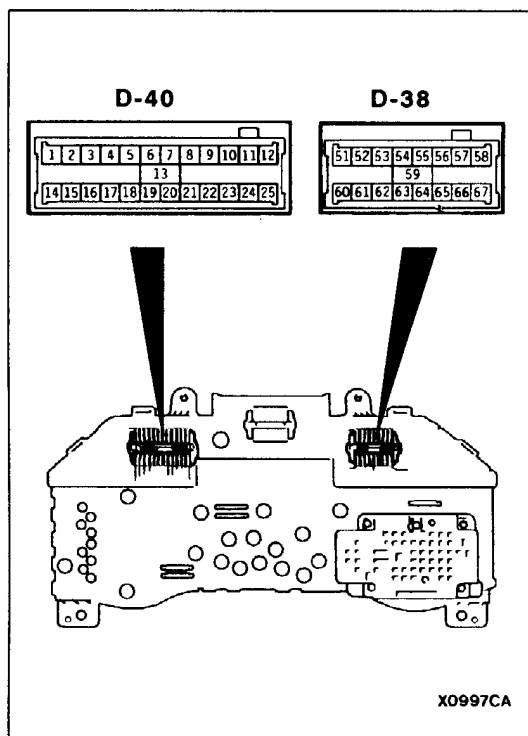
3. Vehicle speed sensor



INSPECTION

VEHICLE SPEED SENSOR CHECK

1. Jack up the vehicle.
2. Remove the vehicle speed sensor, and then connect a 3 - 10 kΩ resistance as shown in the illustration at left.
3. Use a multimeter to check the change in voltage between terminals (2) and (3) when the propeller shaft is rotated (4 pulses per rotation).

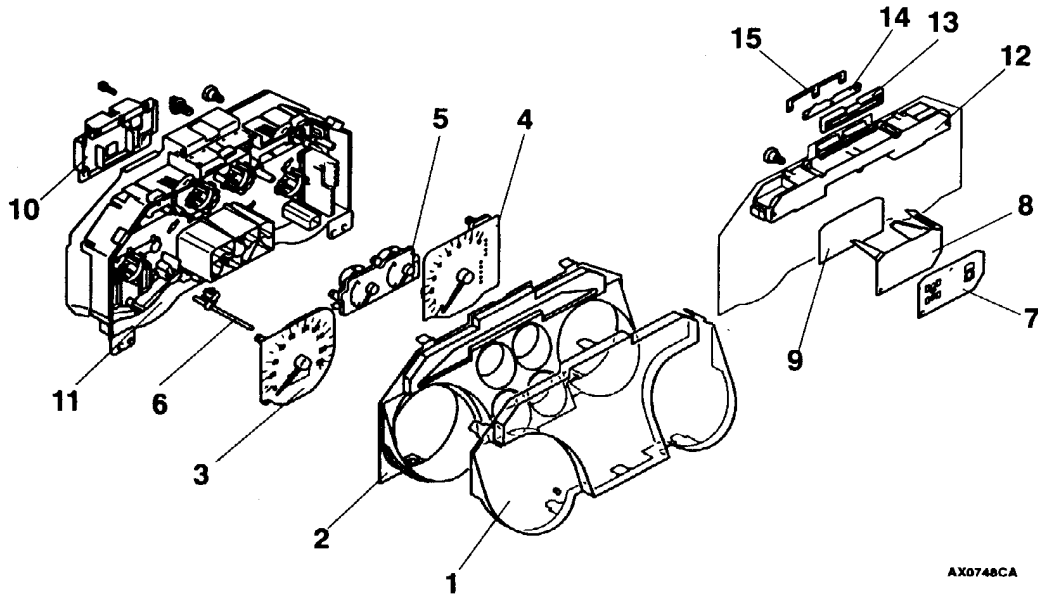


COMBINATION METER INTERNAL RESISTANCE VALUE CHECK

Use a multimeter to measure the resistance between the terminals.

Standard value:

Measurement terminal No.	Terminal name	Standard value
62 – 11	IG power supply – Earth	1M Ω or more
62 – 25	IG power supply – Earth	1M Ω or more
62 – 63	IG power supply – Fuel gauge	1M Ω or more
62 – 64	IG power supply – Engine coolant temperature gauge	1M Ω or more
63 – 11	Fuel gauge – Earth	180 Ω
63 – 25	Fuel gauge – Earth	180 Ω
64 – 11	Engine coolant temperature gauge – Earth	210 Ω
64 – 25	Engine coolant temperature gauge – Earth	210 Ω
67 – 11	Battery power supply – Earth	1M Ω or more
67 – 25	Battery power supply – Earth	1M Ω or more
67 – 63	Battery power supply – Fuel gauge	1M Ω or more
67 – 64	Battery power supply – Engine coolant temperature gauge	1M Ω or more

DISASSEMBLY AND REASSEMBLY

AX0748CA

Disassembly steps

1. Glass
2. Window plate
3. Speedometer
4. Tachometer
5. Fuel gauge and engine coolant temperature assembly
6. Trip meter knob
7. Indicator plate
8. Indicator prism
9. Indicator lens
10. Instrument panel printed circuit board
11. Replace the combination meter case
12. Indicator case
13. Combination plate A
14. Combination plate B
15. Combination plate C

HEADLAMP ASSEMBLY

SERVICE SPECIFICATIONS

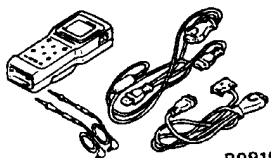
Item			Standard value	Limit
Headlamp emitter adjustment [Cut-off line (light/dark boundary line) position]	Low-beam	Vertical direction	0.57° (10 mm) down from horizontal line H	—
		Horizontal direction	Position where 15° rising portion intersects vertical line V	—
Headlamp illumination measurement cd (Corresponding to road surface 40 m in front at low beam)			—	6,400 or higher for each lamp

NOTES ON HANDLING HEADLAMPS AND FRONT TURN-SIGNAL LAMPS

The headlamps and front turn-signal lamps have plastic outer lenses, and so the following points should be noted during handling.

- Do not leave the headlamps on for more than 3 minutes while they are covered with protectors, otherwise damage may result.
- Do not mask the surfaces of the outer lenses by attaching tape.
- Do not scrape the surfaces of the outer lenses with tools that have sharp points.
- Use only the specified wax remover, and wash thoroughly with water.
- Only the specified genuine bulbs should be used.

SPECIAL TOOLS

Tools	No.	Name	Application
 8991502	MB991502	MUT-II sub assembly	Checking the ETACS-ECU input signals

TROUBLESHOOTING

The headlamps are controlled by the Smart Wiring System (SWS). For troubleshooting procedures, refer to GROUP 54B.

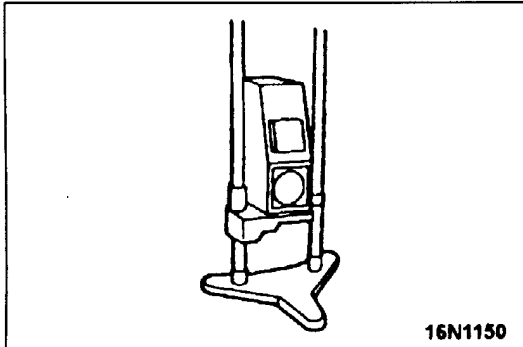
ON-VEHICLE SERVICE

HEADLAMP AIMING ADJUSTMENT

After setting the vehicle to the following condition, adjust the headlamp aiming.

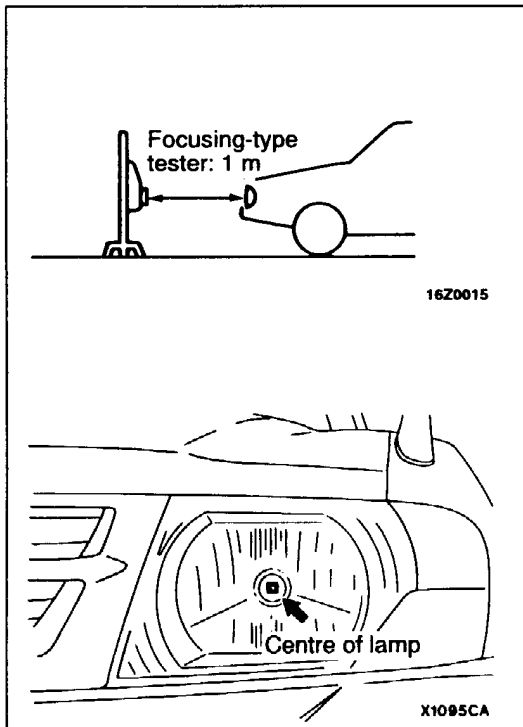
- Check that the tyre inflation pressure is at the value indicated on the tyre pressure labels.
- Set the vehicle to the unladen condition and park it on a level surface.
- Have a single person (approximately 55 kg) sit in the driver's seat.

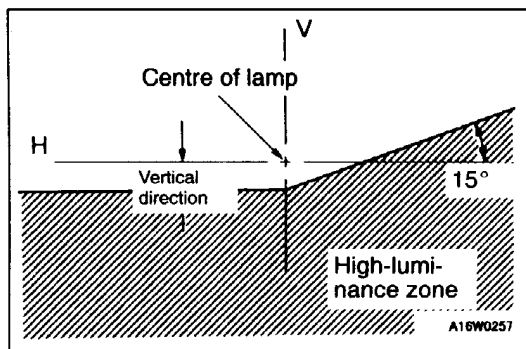
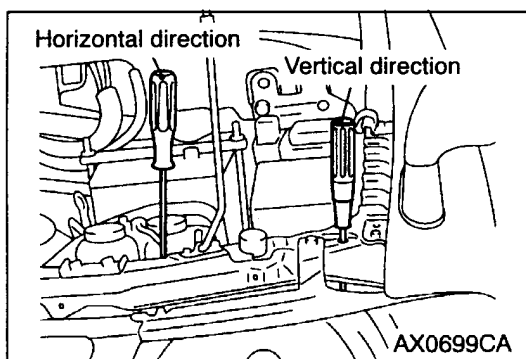
- Run the engine at a speed of 2000 r/min to fully charge the battery.
- Turn the headlamp level control switch to position "0".



LOW BEAM ADJUSTMENT

1. Adjust the low-beam light axis by following the procedure given for the focusing-type headlamp tester which you are using.
2. Set the tester so that the centre of the focusing lens is 1 m directly in front of the centre of the headlamp.





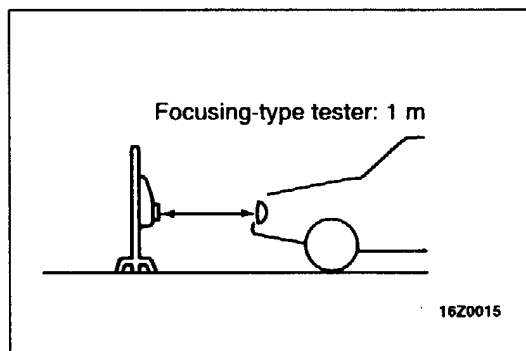
3. Turn the adjusting screws to adjust so that the deviation in the centre of the high-luminance zone (main optical axis) is at the standard value.

Standard value:

Vertical direction	0.57 ° (10 mm) down from horizontal line H
Horizontal direction	Position where 15 ° rising portion intersects vertical line V

Caution

- (1) For the headlamp which is not being measured, disconnect that headlamp's connector if possible so that it does not illuminate while carrying out the adjustment. Furthermore, make sure that the light axis does not get shifted when re-connecting the connector.
- (2) The headlamps have outer lenses which are made of plastic, so if covering the lens surface with an object which does not let light pass through, the headlamp should not be turned on for any more than 3 minutes. In addition, do not mask the outer lens surface by attaching tape or similar.
- (3) The adjustment should always be completed by turning the adjusting screws in the tightening direction.



LUMINANCE MEASUREMENT

1. Place the tester receiver so that it is directly opposite the headlamp at the distance shown in the illustration.
2. Run the engine at a speed of 2000 r/min to fully charge the battery.
3. Align with the centre of the lamp.

NOTE

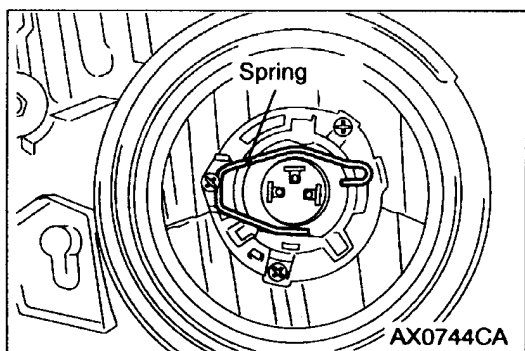
Check that the light/dark separation line on the adjustment screen and the low-beam cut-off line are aligned at this time.

4. With the headlamps set to low beam, check that the luminance satisfies the limit value.

Limit: 6,400 cd or higher for each lamp

Caution

- (1) For the headlamp which is not being measured, disconnect that headlamp's connector if possible so that it does not illuminate while carrying out the adjustment. Furthermore, make sure that the light axis does not get shifted when re-connecting the connector.
- (2) The headlamps have outer lenses which are made of plastic, so if covering the lens surface with an object which does not let light pass through, the headlamp should not be turned on for any more than 3 minutes. In addition, do not mask the outer lens surface by attaching tape or similar.

**HEADLAMP BULB REPLACEMENT**

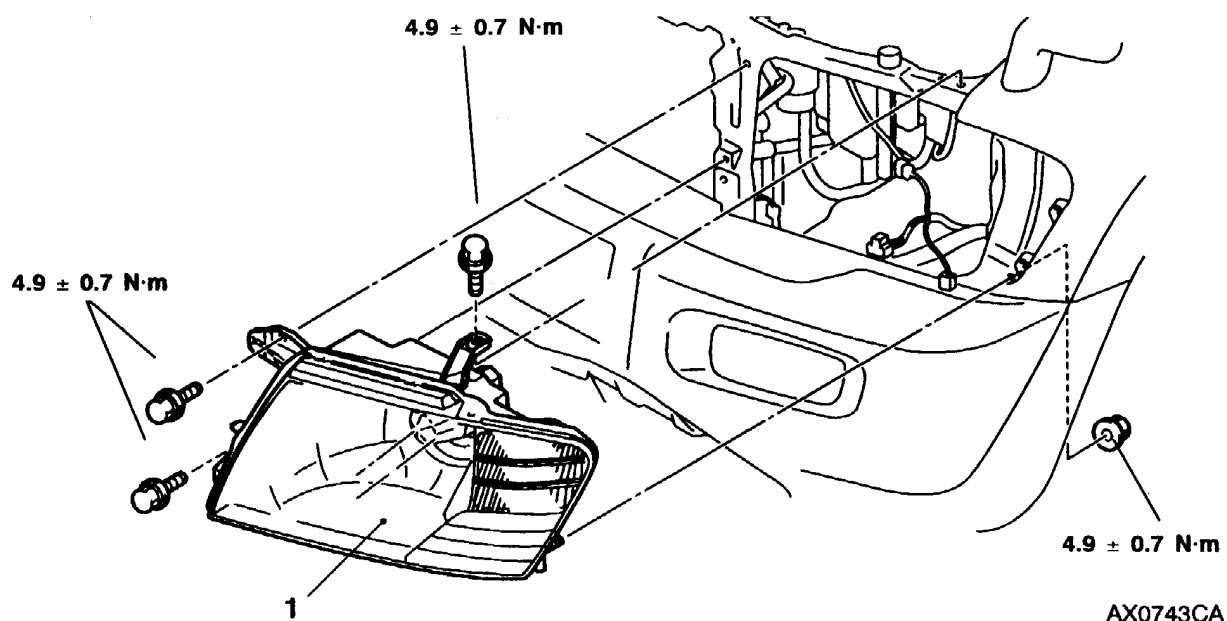
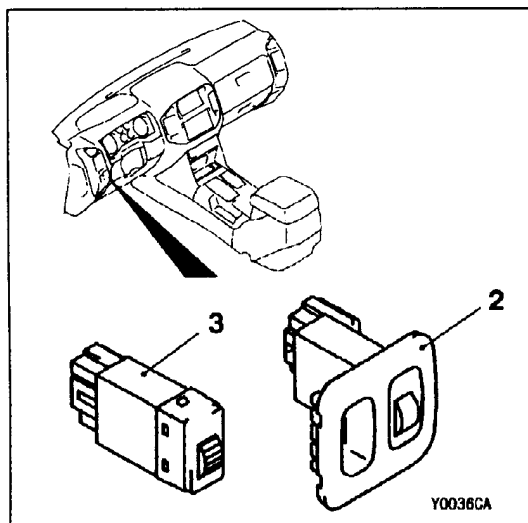
1. Remove the air cleaner case (R.H. side) and the ABS valve relay (L.H. side).
2. Disconnect the connector.
3. Remove the socket cover.
4. Remove the bulb retainer spring, and then take out the bulb.
5. After replacing the bulb, securely connect the connector.

Caution

Do not touch the surface of the bulb with bare hands or with dirty gloves.

If the surface (glass section) should become dirty, clean it immediately with alcohol or thinner, and let it dry thoroughly before installing it.

HEADLAMP ASSEMBLY REMOVAL AND INSTALLATION

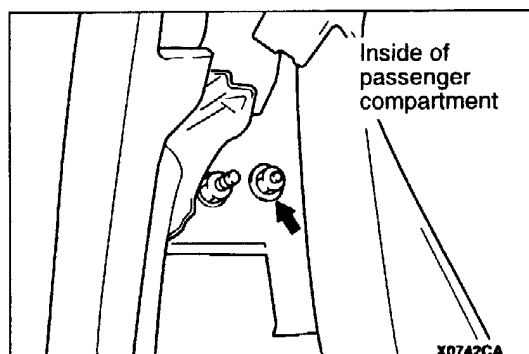


Headlamp removal steps

- Radiator grille (Refer to GROUP 51 – Front Bumper.)
- 1. Headlamp Assembly

Headlamp level control switch removal steps

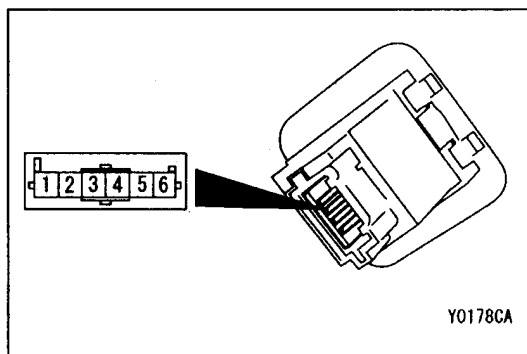
- 2. Switch garnish
- 3. Headlamp level control switch



REMOVAL SERVICE POINT

◀A▶ HEADLAMP ASSEMBLY REMOVAL

The headlamp mounting nut is the nut on the inside of the nut which is visible inside the passenger compartment when the front splash shield mounting is removed, and it is this nut which should be removed.



INSPECTION

HEADLAMP LEVEL CONTROL SWITCH CHECK

If the resistance value in the table shown below cannot be obtained after operating the headlamp level control switch, replace the headlamp level control switch.

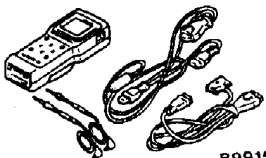
Terminal No. to measure resistance	Switch position				
	0	1	2	3	4
Resistance between terminals (4) and (5)	120	300	620	1,100	2,000

FOG LAMPS

SERVICE SPECIFICATIONS

Item	Standard value
Fog lamp light axis check	Illuminates to within 40 metres

SPECIAL TOOLS

Tools	No.	Name	Application
	MB991502	MUT-II sub assembly	Checking the ETACS-ECU input signals

TROUBLESHOOTING

The fog lamp are controlled by the Smart Wiring System (SWS). For troubleshooting procedures, refer to GROUP 54B.

ON-VEHICLE SERVICE

FOG LAMP AIMING CHECK

After setting the vehicle to the following condition, adjust the headlamp aiming.

- Check that the tyre inflation pressure is at the value indicated on the tyre pressure labels.
- Set the vehicle to the unladen condition and park it on a level surface.
- Have a single person (approximately 55 kg) sit in the driver's seat.

- Run the engine at a speed of 2,000 r/min to fully charge the battery.

Turn on the fog lamps and check that the illumination is within the standard value range.

Standard value: Illuminates to within 40 metres

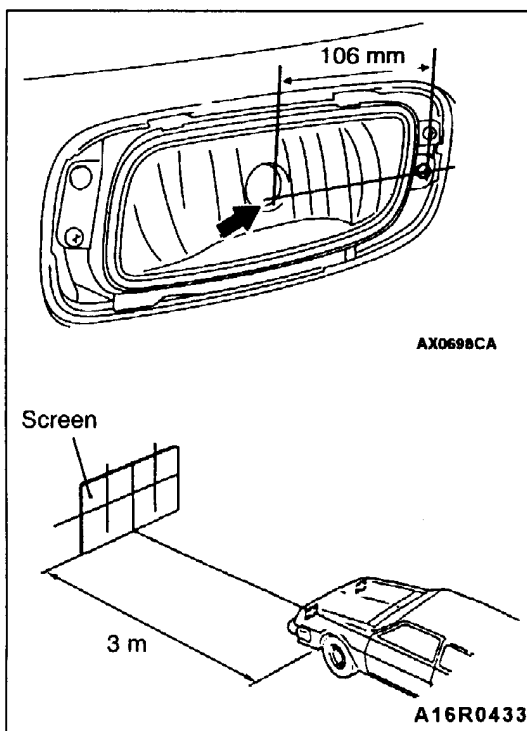
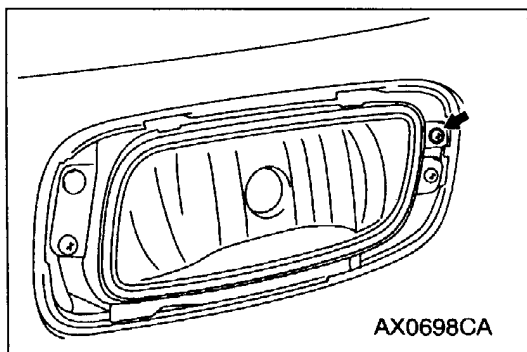
If the value is outside the standard value range, adjust using the adjusting screw.

NOTE

Horizontal adjustment is not possible.

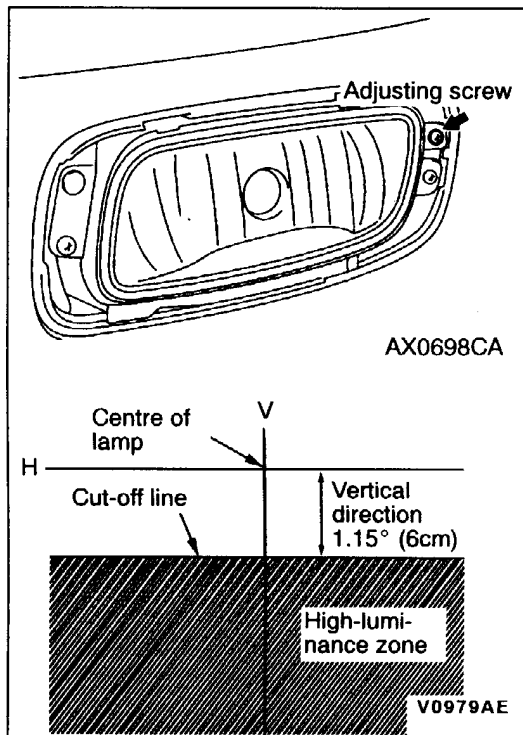
Caution

1. For the headlamp which is not being measured, disconnect that headlamp's connector if possible so that it does not illuminate while carrying out the adjustment. Furthermore, make sure that the light axis does not get shifted when re-connecting the connector.
2. The adjustment should always be completed by turning the adjusting screws in the tightening direction.



In addition, the method of checking the light axis on a screen (simple check) is given below.

1. Measure the centre of the fog lamp as shown in the illustration.
2. Place the screen so that it is directly opposite the centre of the fog lamp at a distance of 3 metres, and turn on the fog lamps.



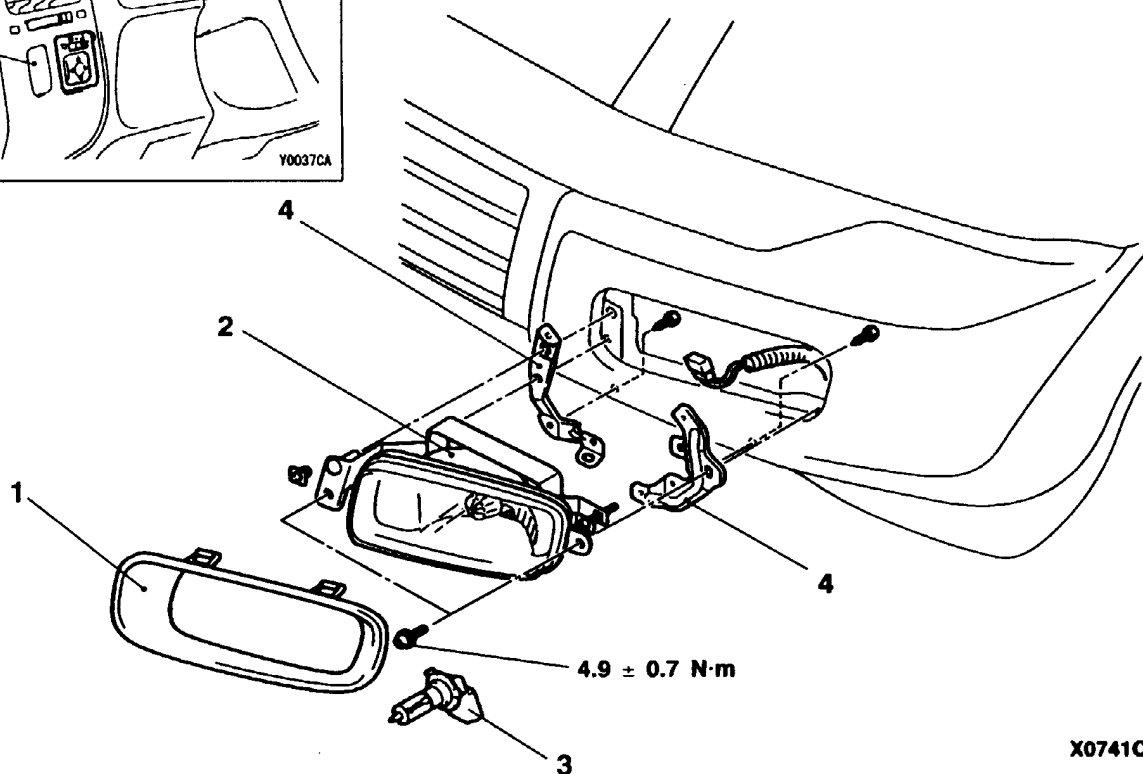
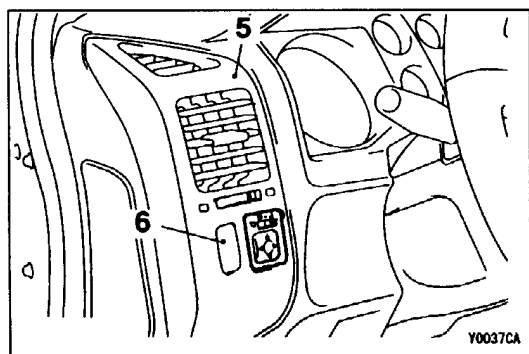
3. Turn the adjusting screw to adjust so that the position of the cut-off line (light/dark border line) is as shown in the figure.

NOTE

Horizontal adjustment is not possible.

Caution

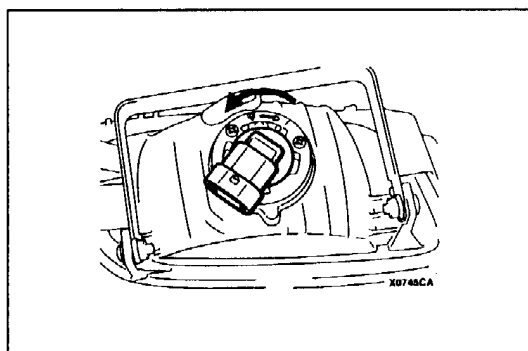
- (1) For the headlamp which is not being measured, disconnect that headlamp's connector if possible so that it does not illuminate while carrying out the adjustment. Furthermore, make sure that the light axis does not get shifted when re-connecting the connector.
- (2) The adjustment should always be completed by turning the adjusting screws in the tightening direction.

FOG LAMPS**REMOVAL AND INSTALLATION****Fog lamp removal steps**

1. Fog lamp bezel
2. Fog lamp
3. Bulb
4. Fog lamp bracket

Fog lamp switch removal steps

5. Air outlet assembly (Refer to GROUP 52A – Instrument Panel.)
6. Fog lamp switch

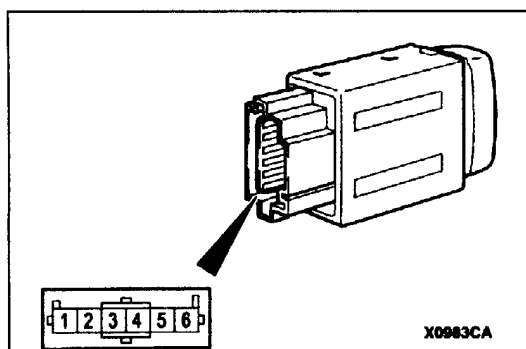
**REMOVAL SERVICE POINT****◀A▶ BULB REMOVAL**

Turn the bulb assembly anti-clockwise to remove the bulb.

Caution

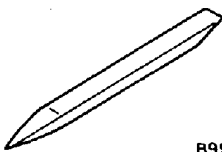
1. Only the specified genuine bulbs should be used.
2. Do not touch the surface of the bulb with bare hands or with dirty gloves.

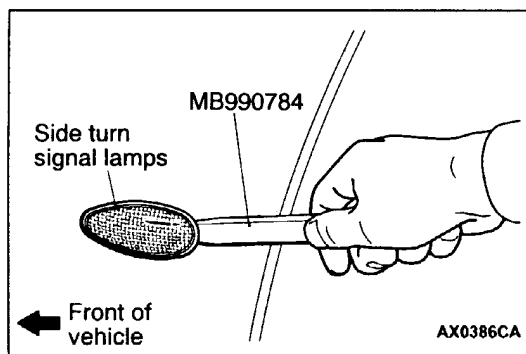
If the surface (glass section) should become dirty, clean it immediately with alcohol or thinner, and let it dry thoroughly before installing it.

**INSPECTION****FOG LAMP SWITCH CONTINUITY CHECK**

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

SIDE TURN-SIGNAL LAMPS**SPECIAL TOOL**

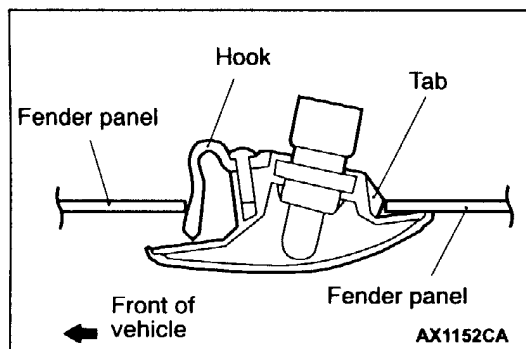
Tools	No.	Name	Application
	MB990784	Ornament remover	Side turn-signal lamp removal



SIDE TURN-SIGNAL LAMPS

REMOVAL SERVICE POINTS

Use the special tool or similar tool to disengage the hook from the fender, and then remove the side turn-signal lamp.



INSTALLATION SERVICE POINTS

Hook the tab onto the fender panel to install the side turn-signal lamp.

ROOM LAMP

TROUBLESHOOTING

The room lamps are controlled by the Smart Wiring System (SWS). For troubleshooting procedures, refer to GROUP 54B.

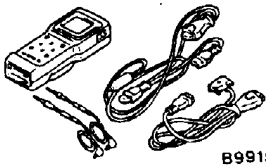
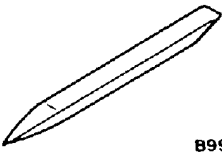
ON-VEHICLE SERVICE

ROOM LAMP DELAY-OFF TIME ADJUSTMENT PROCEDURE

The room lamps are controlled by the Smart Wiring System (SWS). For room lamp delay-off time adjustment procedures, refer to GROUP 54B.

REAR COMBINATION LAMPS

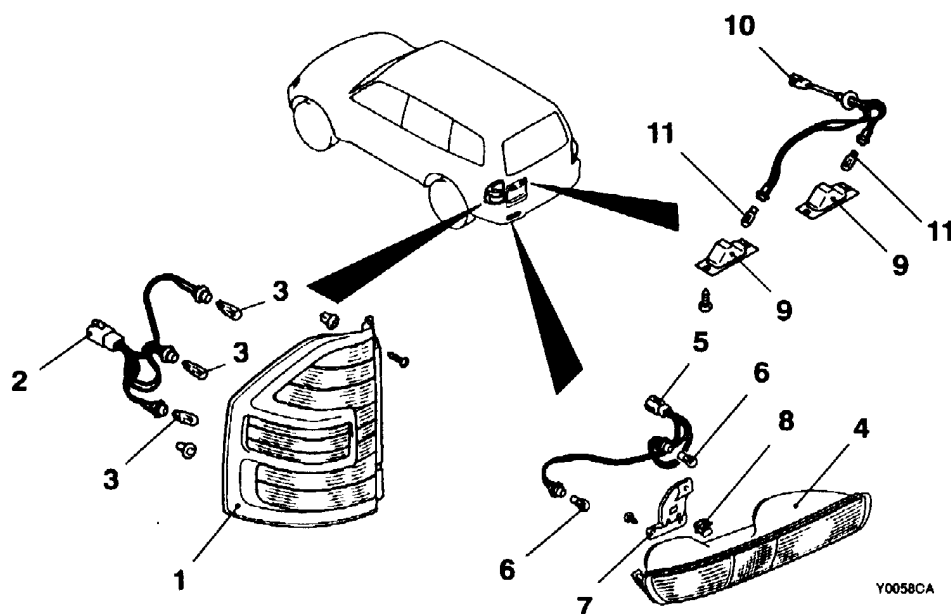
SPECIAL TOOLS

Tools	No.	Name	Application
 B991502	MB991502	MUT-II Sub assembly	Checking the ETACS-ECU input signals
 B990784	MB990784	Ornament remover	Rear combination lamp removal

TROUBLESHOOTING

Rear combination lamps are controlled by the Smart Wiring System (SWS). For troubleshooting procedures, refer to GROUP 54B.

REAR COMBINATION LAMPS REMOVAL AND INSTALLATION



Rear combination lamp removal steps

1. Rear combination lamp
2. Socket assembly
3. Bulb

Rear lamp removal steps

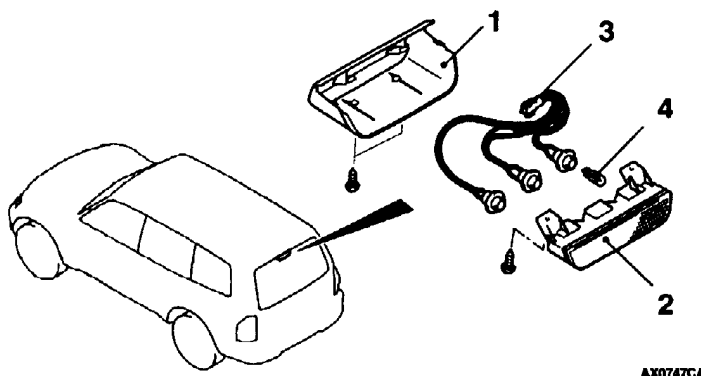
4. Rear lamp
5. Socket assembly
6. Bulb
7. Rear lamp bracket
8. Clip

Licence plate lamp removal steps

9. Licence plate lamp
10. Socket assembly
11. Bulb

HIGH-MOUNTED STOP LAMP

REMOVAL AND INSTALLATION



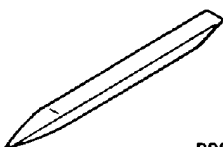
Removal steps

1. High-mounted stop lamp cover
2. High-mounted stop lamp body

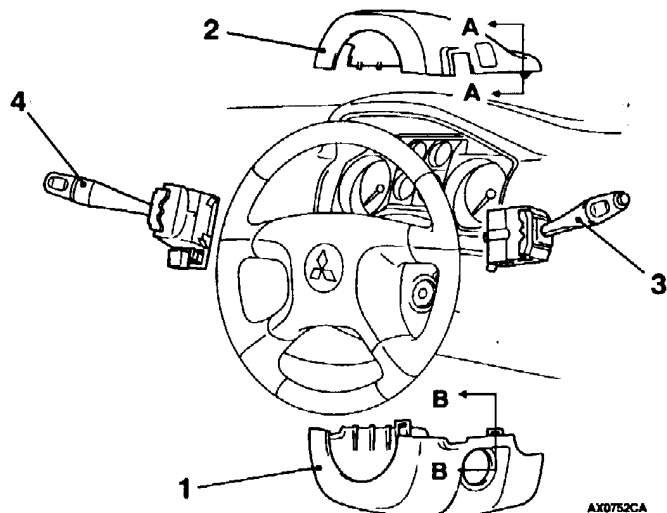
3. Socket assembly
4. Bulb

COLUMN SWITCH

SPECIAL TOOL

Tools	No.	Name	Application
 B990784	MB990784	Ornament remover	Column cover removal

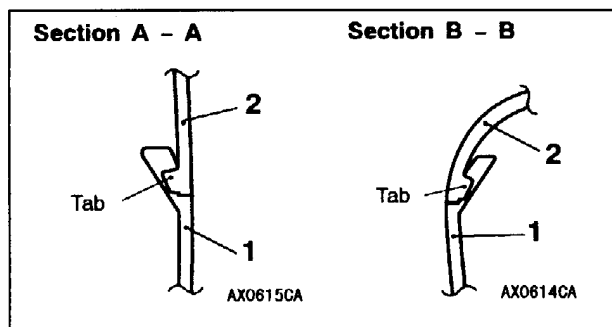
REMOVAL AND INSTALLATION

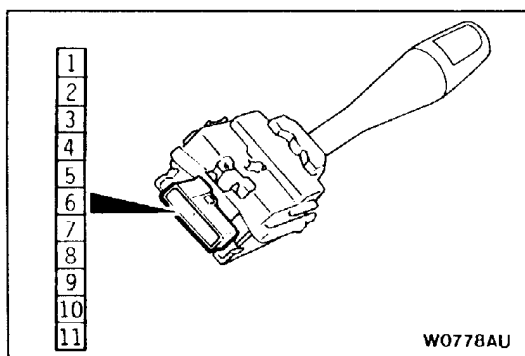


Removal steps

1. Lower column cover (Refer to GROUP 52A – Instrument Panel.)
2. Upper column cover (Refer to GROUP 52A – Instrument Panel.)

3. Wiper and washer switch
4. Lighting switch

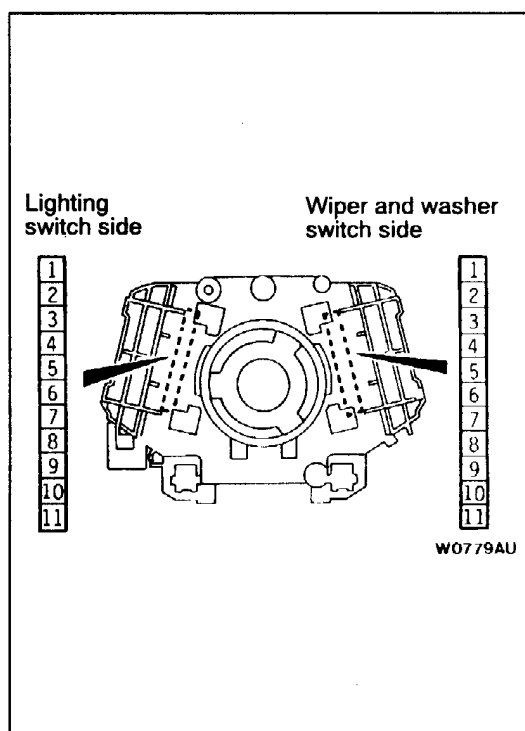




INSPECTION

LIGHTING SWITCH CONTINUITY CHECK <R.H. DRIVE VEHICLES>

Switch position		Terminal No.						
		3	6	7	8	9	10	11
OFF								
Tail gate lamps								
Headlamps								
Passing lamps								
Dimmer								
Turn-signal	lamp							
Turn-signal	lamp							



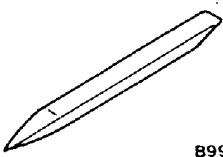
COLUMN SWITCH (SWITCH BODY) CONTINUITY CHECK

- (1) Remove the lighting switch and the wiper and washer switch.
- (2) Check that there is continuity between the same terminals [terminals (3) and (11)] of each connector of the column switch body which is still on the steering column.

[illegible]

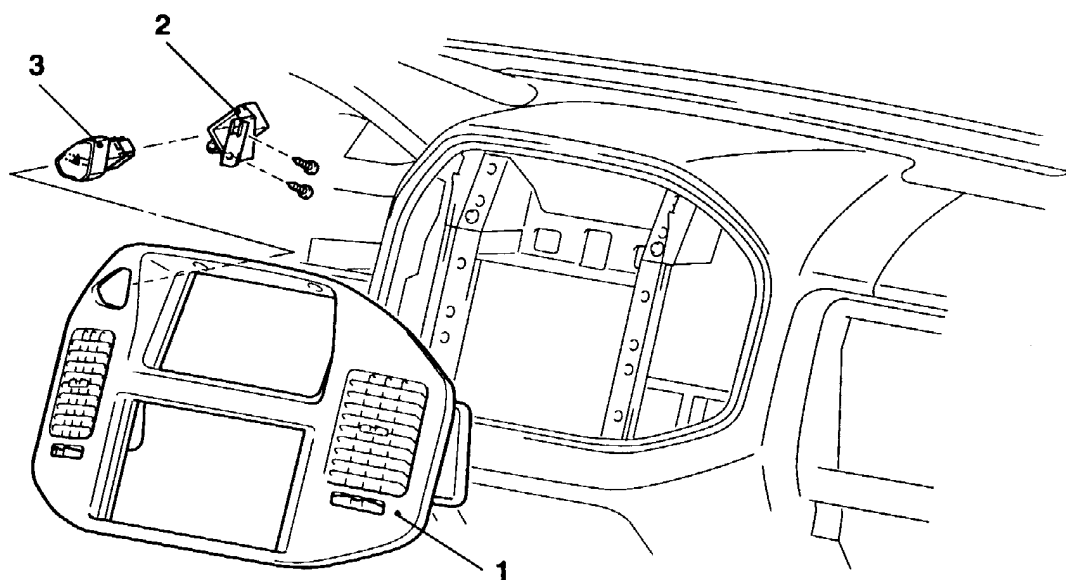
HAZARD WARNING LAMP SWITCH

SPECIAL TOOL

Tools	No.	Name	Application
 B990784	MB990784	Ornament remover	Center panel removal

HAZARD WARNING LAMP SWITCH

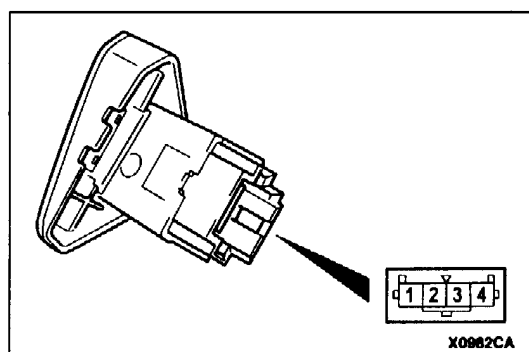
REMOVAL AND INSTALLATION



ACX01270

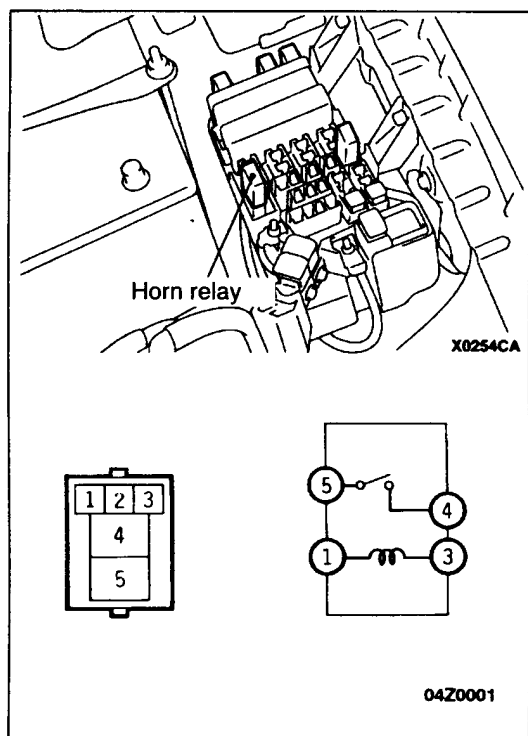
Removal steps

1. Center panel (Refer to GROUP 52A - Instrument Panel.)
2. Bracket
3. Hazard Warning Lamp Switch



HAZARD LAMP SWITCH CONTINUITY CHECK

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

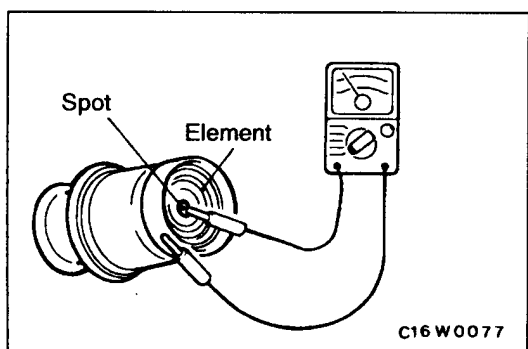


HORN

INSPECTION

HORN RELAY CONTINUITY CHECK

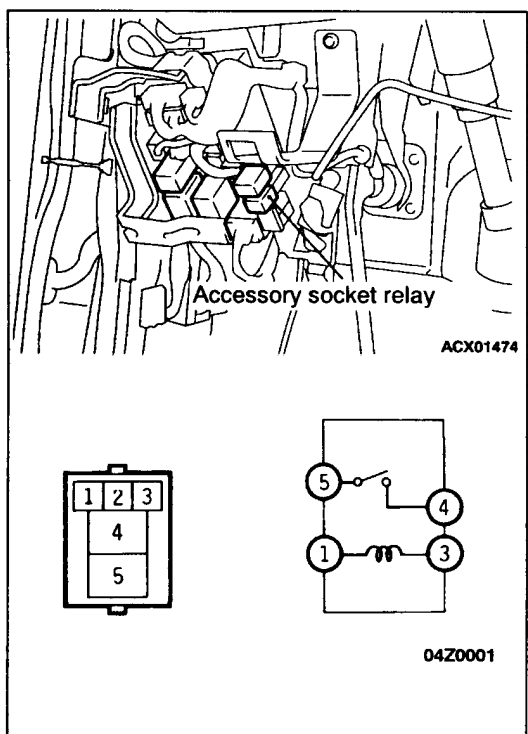
Switch position	Terminal No.			
	1	3	4	5
When current is not supplied	○	○		
When current is supplied	⊖	⊕	○	○



CIGARETTE LIGHTER

INSPECTION

- Remove the plug and check the spot for wear.
- Check that there are no tobacco stains or foreign particles on the element.
- Use a multimeter to check the continuity of the element.

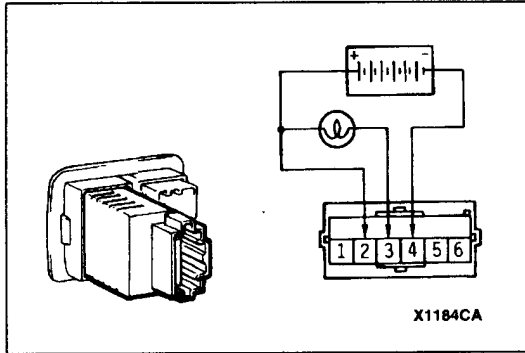


ACCESSORY SOCKET

INSPECTION

ACCESSORY SOCKET RELAY CONTINUITY CHECK

Switch position	Terminal No.			
	1	3	4	5
When current is not supplied	○	○		
When current is supplied	⊖	⊕	○	○



RHEOSTAT

INSPECTION

1. Connect a test lamp (40 W) to the battery as shown in the illustration.
2. Operate the rheostat. If the luminance of the lamp changes steadily with no flashing, the rheostat is functioning normally.

CLOCK OR CENTER DISPLAY

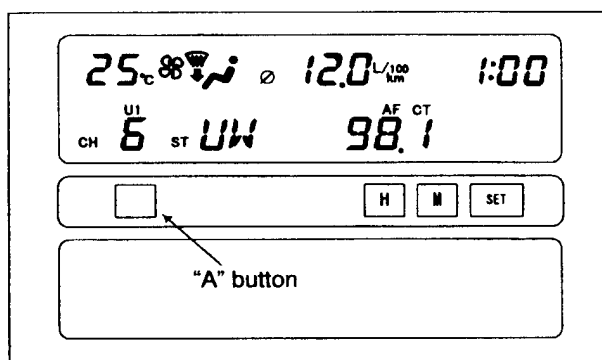
PRECAUTIONS WITH REGARD TO CENTER DISPLAY SERVICE WORK

When the battery is disconnected, model selection screen is shown in center display. Select the model with “H” key or “M” key and enter the selection with “SET” key. If model selection needs to be corrected, press the key on the left end to display the setting screen.

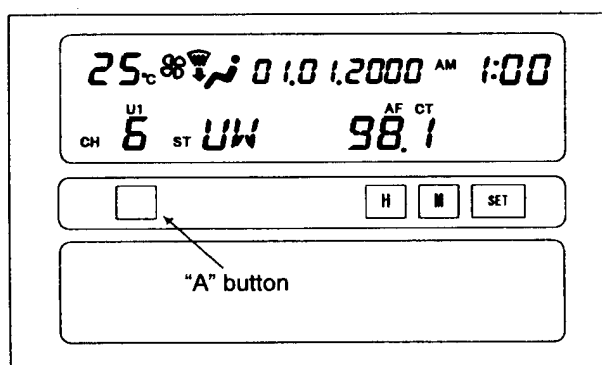
TROUBLESHOOTING

Vehicle	Center display unit
Petrol-powered vehicles	MR532880
	DU-435-1
Diesel-powered vehicles	MR532881
	DU-435-2

Petrol-powered vehicles



Diesel-powered vehicles



BEFORE REMOVING THE BATTERY

The Center display has a large amount of data unique to the vehicle in its memory. When the battery cable is disconnected, that memory 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 cable.

Function	Input function/memory	When battery cable is disconnected
Clock set on display	Current time	Retains data for approx. 1 hour
Vehicle model set	Short (3-door models)/long (5-door models)	Retains data for approx. 1 hour
Brightness set for display	Position set on display	Retains data for approx. 1 hour
Unit set for trip computer	km or mile, L/100km or mpg or km/L Average vehicle speed after reset	Retains data for approx. 1 hour
Average vehicle speed on display	Average vehicle speed after reset	Retains data for approx. 1 hour
Average fuel consumption on display	Average fuel consumption after reset	Retains data for approx. 1 hour
Cruising range on display	Cruising range, fuel economy	Retains data for approx. 1 hour
Outside temperature on display	Outside temperature after the ignition switch is turned to the OFF(LOCK) position.	Retains data for approx. 1 hour * The outside temperature sensor is located near the engine. Therefore, incorrectly high temperature may be displayed when the battery cable is reconnected within one hour.

DIAGNOSIS FUNCTION FOR CENTER DISPLAY

Center display has the following diagnosis function:

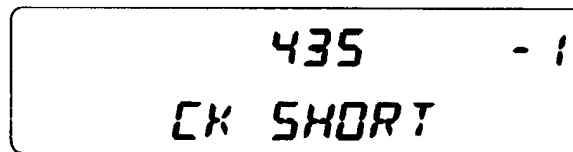
Function	Contents
Service function	There are the following 4 diagnosis modes available
1. Check of vehicle information	The vehicle, short (3-door models)/long (5-door models) set
2. Check of LCD segments	The LCD segments for display available to light on or not
3. Check of sensors	Outside temperature, voltage of fuel gauge unit, system voltage, fuel amount remains, fuel economy calculated after supply of fuel
4. Check of units connected into the center display	The units connected on display Voltage (%) on terminal for MUT-II Vehicle speed signal sent by engine-ECU Oscillating signal

SERVICE MODE FOR CENTER DISPLAY**ENTERING AND TERMINATING THE SERVICE MODE**

- (1) To enter the service mode, turn the ignition switch to the LOCK (OFF) position.
- (2) Turn the ignition switch to the ON position while pushing “A” button, and then push “H” button twice while pushing “A” button.
- (3) Now the center display has entered the service mode. Each mode is displayed when the “SET” button is pushed.
- (4) To terminate the service mode, press any button other than the “SET” button.

1. Check of vehicle information

The following screen is displayed first when the unit enters the service mode.



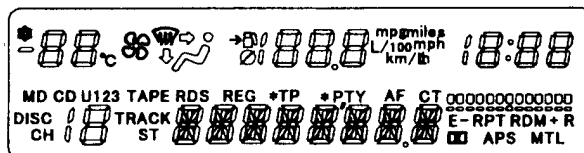
Parts No.	MR532881	MR532880	
Vehicle type	Diesel-powered vehicles	Petrol-powered vehicles	
		Short wheelbase	Long wheelbase
Display	435 – 2 CK	435 – 1 CK SHORT	435 – 1 CK LONG

When the “SET” button is pushed on this screen, the unit proceeds to the next service mode, Check of LCD segments.

2. Check of LCD segments

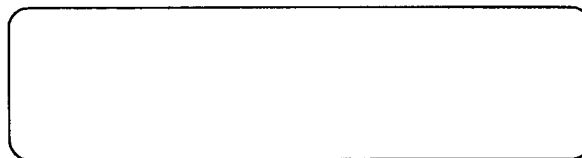
This service mode consists of 6 display screens; the screen where all segments are illuminated, the screen where all segments are extinguished, and four kind of screens where 1/4 of segments are illuminated. Each screen can be changed sequentially when pushing on the “SET” button.

All segments illuminated



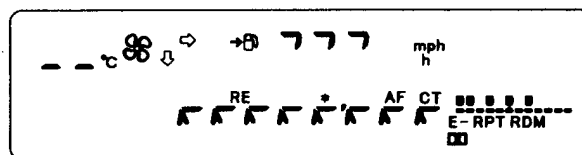
SET

All segments extinguished



SET

1/4 of segments illuminated



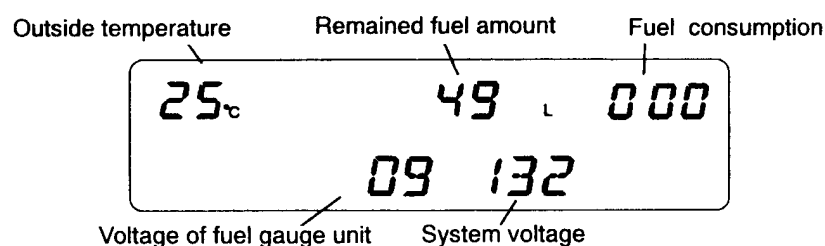
(4 displays)



When the “SET” button is pushed on this screen six times, the unit proceeds to the next service mode, Check of Sensors.

3. Check of Sensors

This service mode checks outside temperature, remained fuel amount, fuel consumption, system voltage, and fuel consumption after supply of fuel.



Fuel gauge unit characteristics (only petrol-powered vehicles)

Remained fuel amount [L]	MR532880	
	Petrol-powered vehicles	
	Short wheelbase	Long wheelbase
	Voltage of fuel gauge unit [V] +0.2/-0.2V	
80	–	0.3
70	–	0.7
60	0.4	0.9
50	0.8	1.2
40	1.2	1.5
30	1.6	1.9
20	2.0	2.3
10	2.5	2.7
5	2.8	2.9
0	3.0	3.1

The voltage of fuel gauge unit depends on the system voltage.

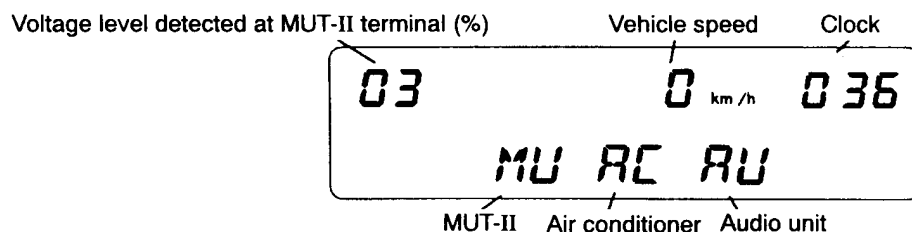
Battery	12.0 V	13.2 V	14.4 V
Fuel gauge unit	1.8 V	2.0 V	2.2 V

The remained fuel amount, which is displayed on the screen, is less than the actual amount. This will give the vehicle an extra amount of 5-Litre fuel in case of shortage of gasoline. Moreover, the fuel remaining under the fuel gauge unit (pump) cannot be sucked. Therefore, there is more than 5 Litre difference between the actual remaining fuel amount and the displayed amount of fuel.

When the “SET” button is pushed on this screen, the unit proceeds to the next service mode, Check of Unit connected Sensors.

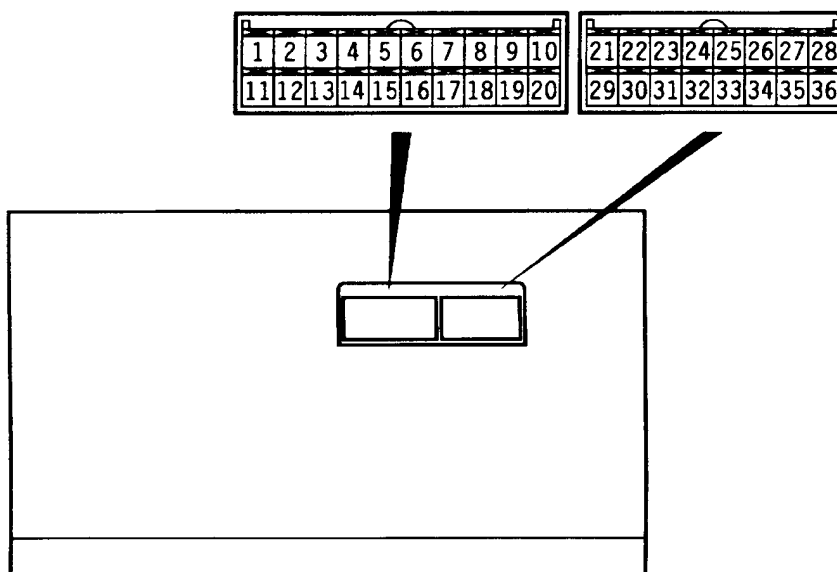
4. Check of units connected into the center display

The lower column of this screen shows whether an audio unit, air-conditioner or the MUT-II is connected. The upper column shows voltage level (%) detected at the MUT-II terminal, the vehicle speed and clock.



When the "SET" button is pushed on this screen, the unit returns to the first screen, Check of Vehicle Information.

VOLTAGE AT CENTER DISPLAY UNIT TERMINALS



V0844AE

Terminal No.	Input/Output	Signal symbol	Terminal voltage (V)	Wiring harness problem		Trouble symptom caused by wiring harness problem
				Open circuit	Short circuit	
1-4	–	–	–	–	–	
5	Input	ISOK	Hi: System voltage Lo: 0-1	Exists	Exists	MUT-II cannot be used to check the engine-ECU.
6	–	–	–	–	–	
7	Input/Output	M-DATA (AUDIO)	Hi: 4-5 Lo: 0-1	Exists	Exists	Audio display does not appear. Panel switch cannot be operated for audio unit. Nighttime illumination does not appear for audio unit.
8	Input/Output	M-CLOCK (AUDIO)	Hi: 4-5 Lo: 0-1	Exists	Exists	Audio display does not appear. Panel switch cannot be operated for audio unit. Nighttime illumination does not appear for audio unit.
9	Input/Output	M-DATA (A/C)	Hi: 4-5 Lo: 0-1	Exists	Exists	A/C display does not appear. Outside air temperature does not appear
10	Input/Output	M-CLOCK (AUDIO)	Hi: 4-5 Lo: 0-1	Exists	Exists	A/C display does not appear. Outside air temperature does not appear
11-14	–	–	–	–	–	–

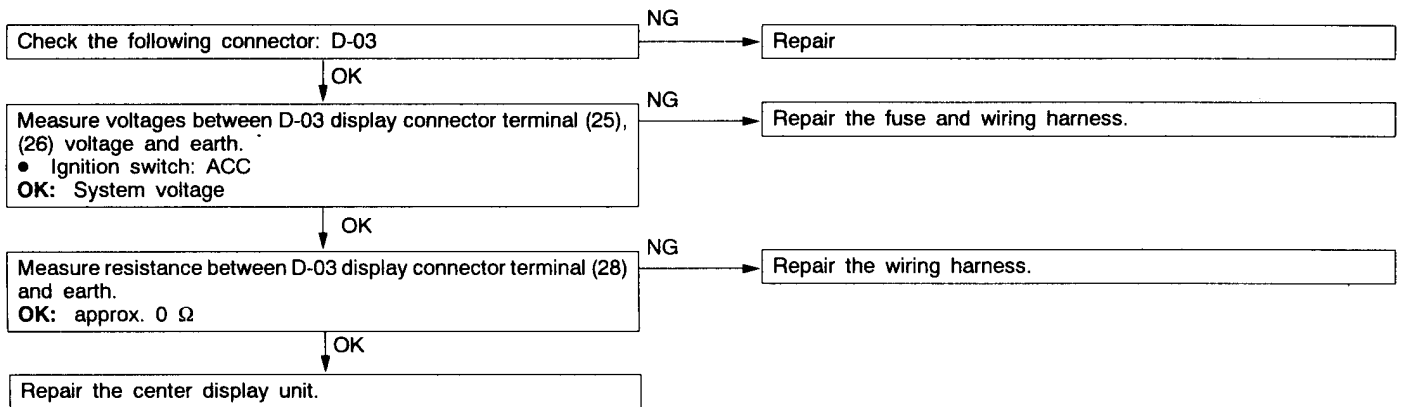
Terminal No.	Input/Output	Signal symbol	Terminal voltage (V)	Wiring harness problem		Trouble symptom caused by wiring harness problem
				Open circuit	Short circuit	
15	Input/Output	K	Hi: System voltage Lo: 0-1	Exists	Exists	Values on trip information screen (average vehicle speed, fuel consumption and cruising distance) are abnormal. Communication is impossible between the engine-ECU and the MUT-II.
16	–	–	–	–	–	–
17	Input/Output	M-BUSY (AUDIO)	Hi: 4-5 Lo: 0-1	Exists	Exists	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	Input/Output	M-BUSY (A/C)	Hi: 4-5 Lo: 0-1	Exists	Exists	A/C display does not appear. Outside air temperature does not appear
20	–	SHIELD-GND	–	–	–	–
21, 22	–	–	–	–	–	–
23	Input	EX-TEMP		Exists	Exists	Outside air temperature does not appear.
24	Input	ILL+	Hi: System voltage Lo: 0-1	Exists	–	Nighttime illumination does not appear for audio units.
				–	Exists	Blown multipurpose fuse.
25	Input	ACC (ACC power supply)	System voltage	Exists	–	Screen display does not appear.
				–	Exists	Blown multipurpose fuse.
26	Input	+B	System voltage	Exists	–	Screen display does not appear.
				–	Exists	Blown multipurpose fuse.
27	Input	VSS	Hi: System voltage Lo: 0-1	Exists	Exists	Abnormal outside air temperature appears. (only diesel-powered vehicles)
28	–	GND (earth)	–	Exists	–	Screen display does not appear.
29, 30	–	–	–	–	–	–
31	–	GND-TEMP		Exists	Exists	Outside air temperature does not appear.
32	Input	ILL–		Exists	Exists	The display screen can not be dimmed.
33	Input	FUEL GAUGE	–		Exists	Abnormal cruising distance appears.
34, 35	–	–	–	–	–	–
36	Input	IG1	Hi: System voltage	Exists	–	Communication with engine-ECU is impossible. Abnormal driving data values appear.
				–	Exists	Communication with engine-ECU is impossible. Abnormal driving data values appear. Blown multipurpose fuse.

INSPECTION CHART CLASSIFIED BY TROUBLE SYMPTOMS

Related unit	Trouble Symptom	Inspection procedure No.	Reference page
Malfunction of center display, related sensors, and wiring harnesses	No display appears after the ignition key is turned to the ACC position.	1	54A-62
	Outside air temperature does not appear or abnormal outside air temperature appears.	2	54A-62
	Abnormal vehicle speed is displayed on the service mode.	3	54A-63
	Abnormal driving data are displayed: • Abnormal average fuel consumption (momentary fuel consumption) and average vehicle speed • Abnormal cruising distance	4	54A-64
	Clock runs fast or slow.	5	54A-64
	The display screen is dim.	6	54A-65
	Air conditioning display does not appear.	7	54A-66

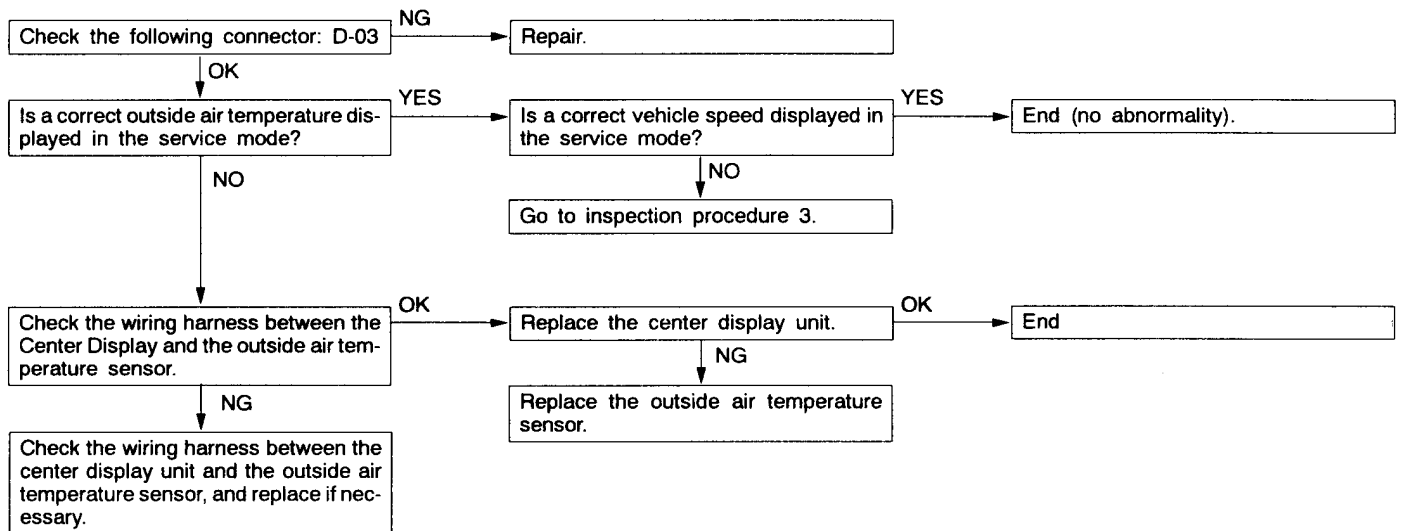
INSPECTION PROCEDURE 1

No display appears after the ignition key is turn to the ACC position.

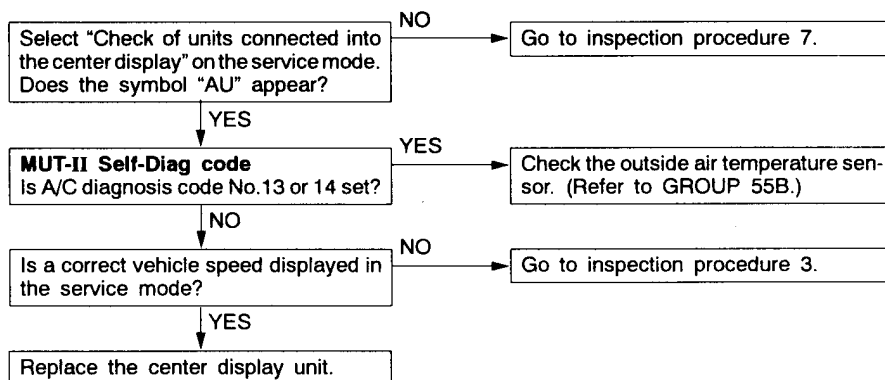
**INSPECTION PROCEDURE 2**

Outside air temperature does not appear or abnormal outside air temperature appears.

<Vehicles without automatic air conditioner system>



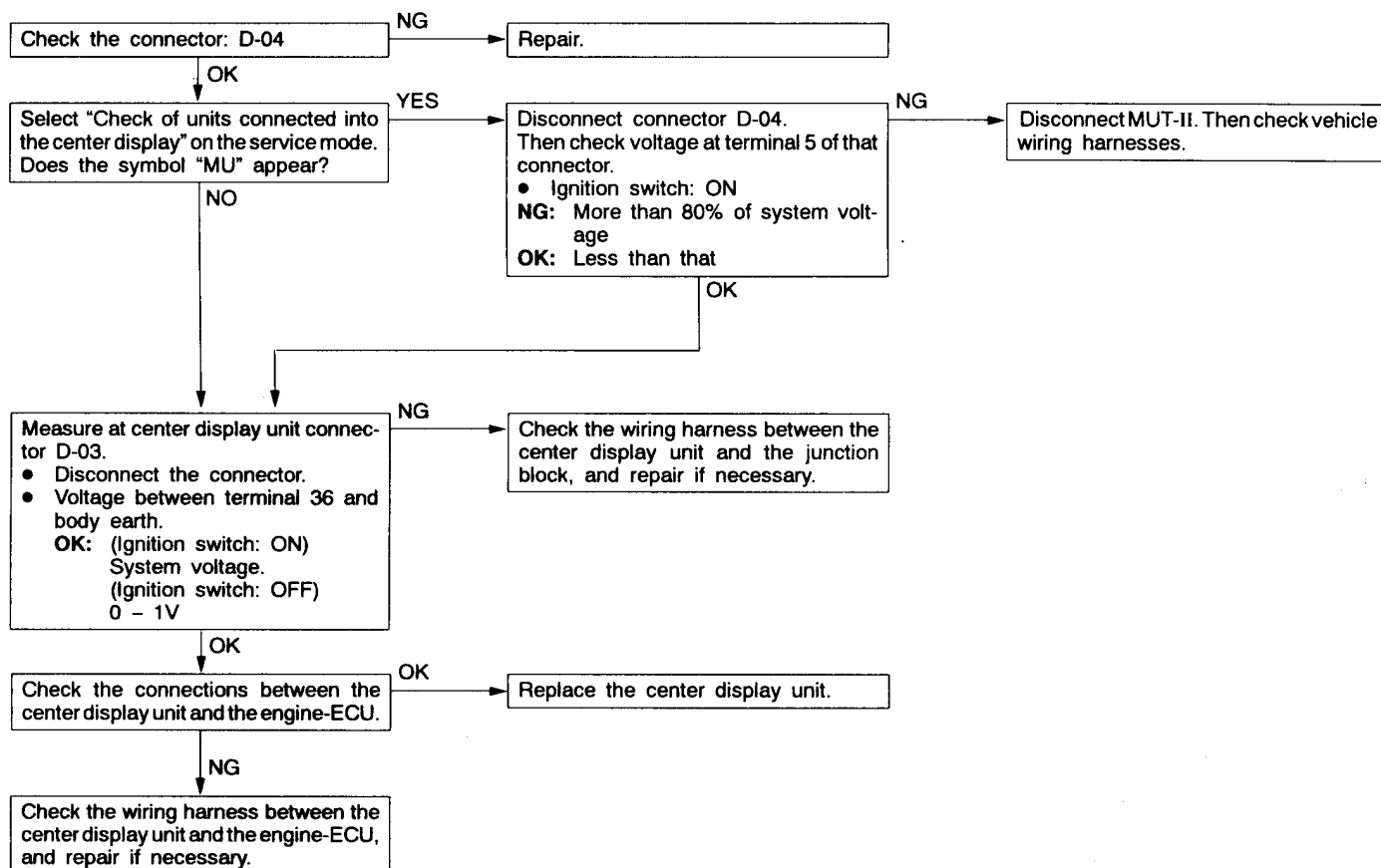
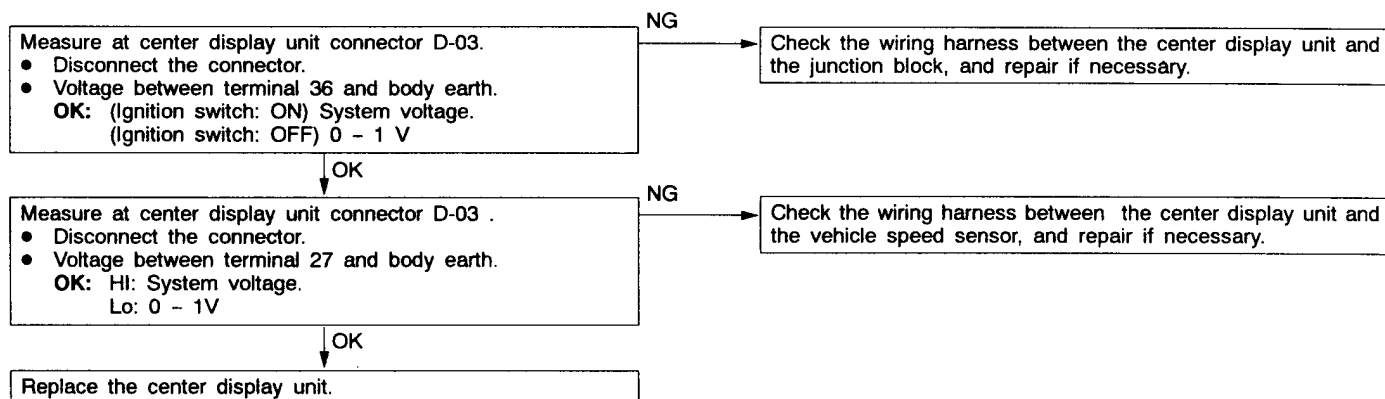
<Vehicles with automatic air conditioning system>



NOTE: It is necessary to drive for a while and get accurate temperature in display if you pass a area in which temperature is much different. It might show high temperature on display in case it is high around sensor due to high temperature of engine after battery is exchanged, or a display unit is reinstalled.

INSPECTION PROCEDURE 3

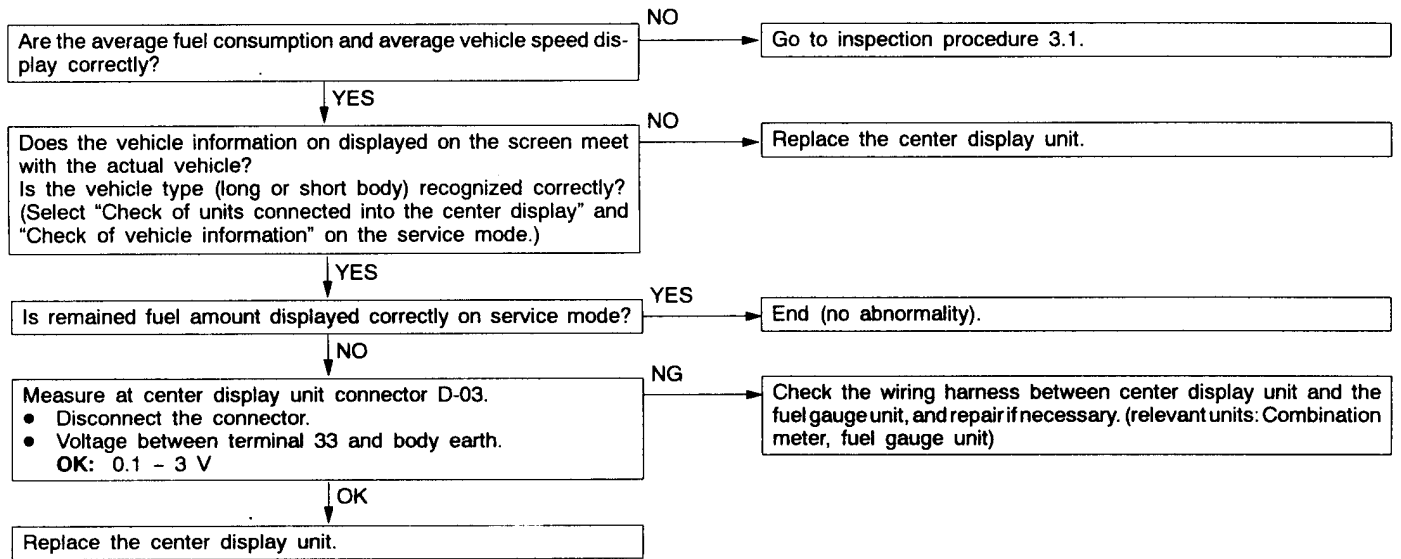
Abnormal vehicle speed is displayed on the service mode.

<Petrol-powered vehicles>**<Diesel-powered vehicles>**

INSPECTION PROCEDURE 4

Abnormal driving data are displayed:

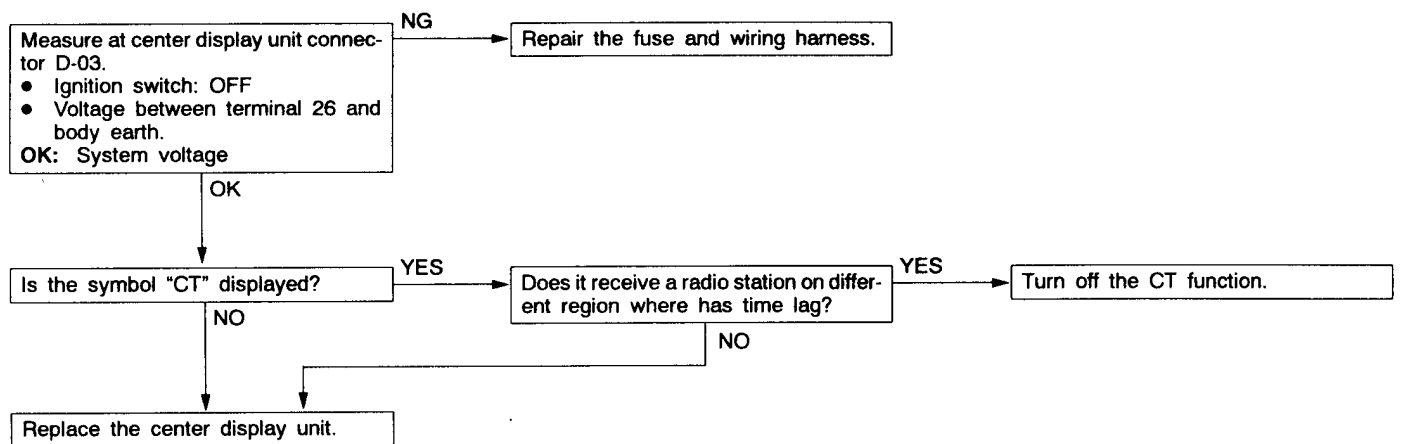
- Abnormal average fuel consumption (momentary fuel consumption) and average vehicle speed
- Abnormal cruising distance

**NOTE**

- (1) If the remained fuel amount is so small that the fuel gauge unit can not detect a correct amount, incorrect cruising range may be displayed.
- (2) Fuel consumption is updated each time fuel is supplied. Furthermore, the cruising range depends on road and driving conditions.

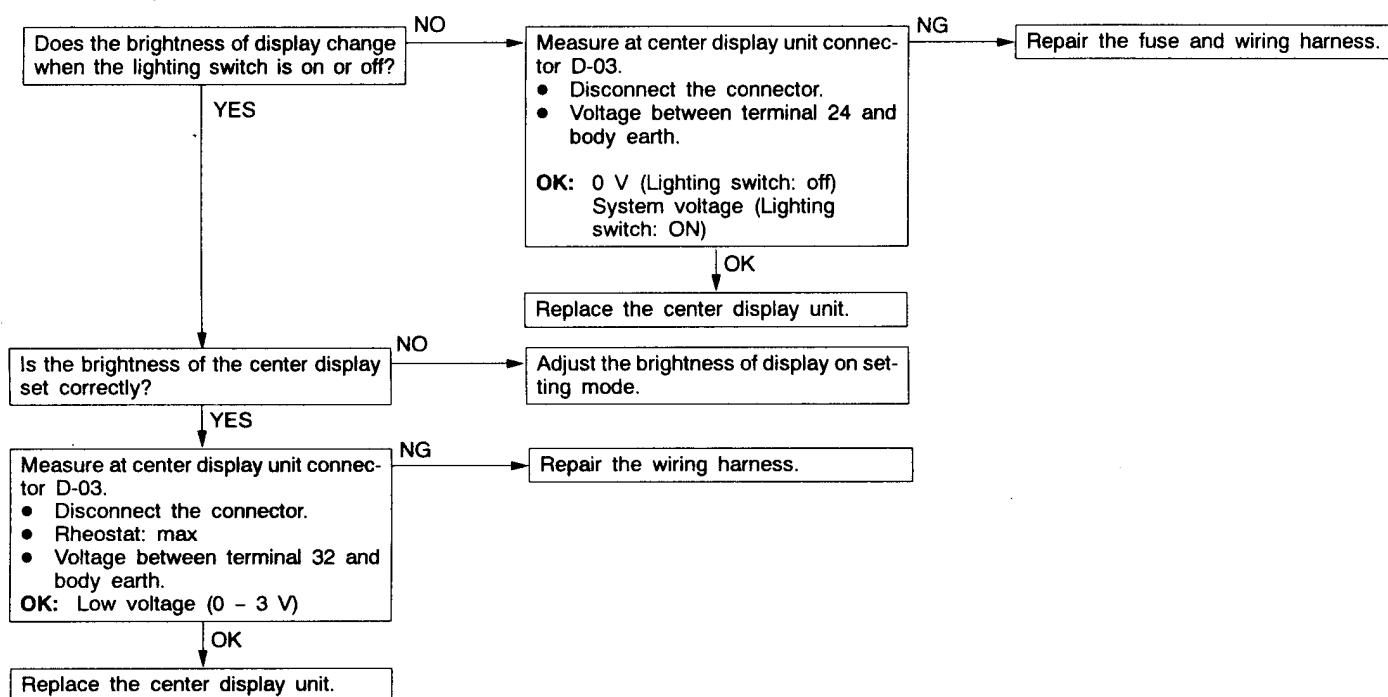
INSPECTION PROCEDURE 5

Clock runs fast or slow.



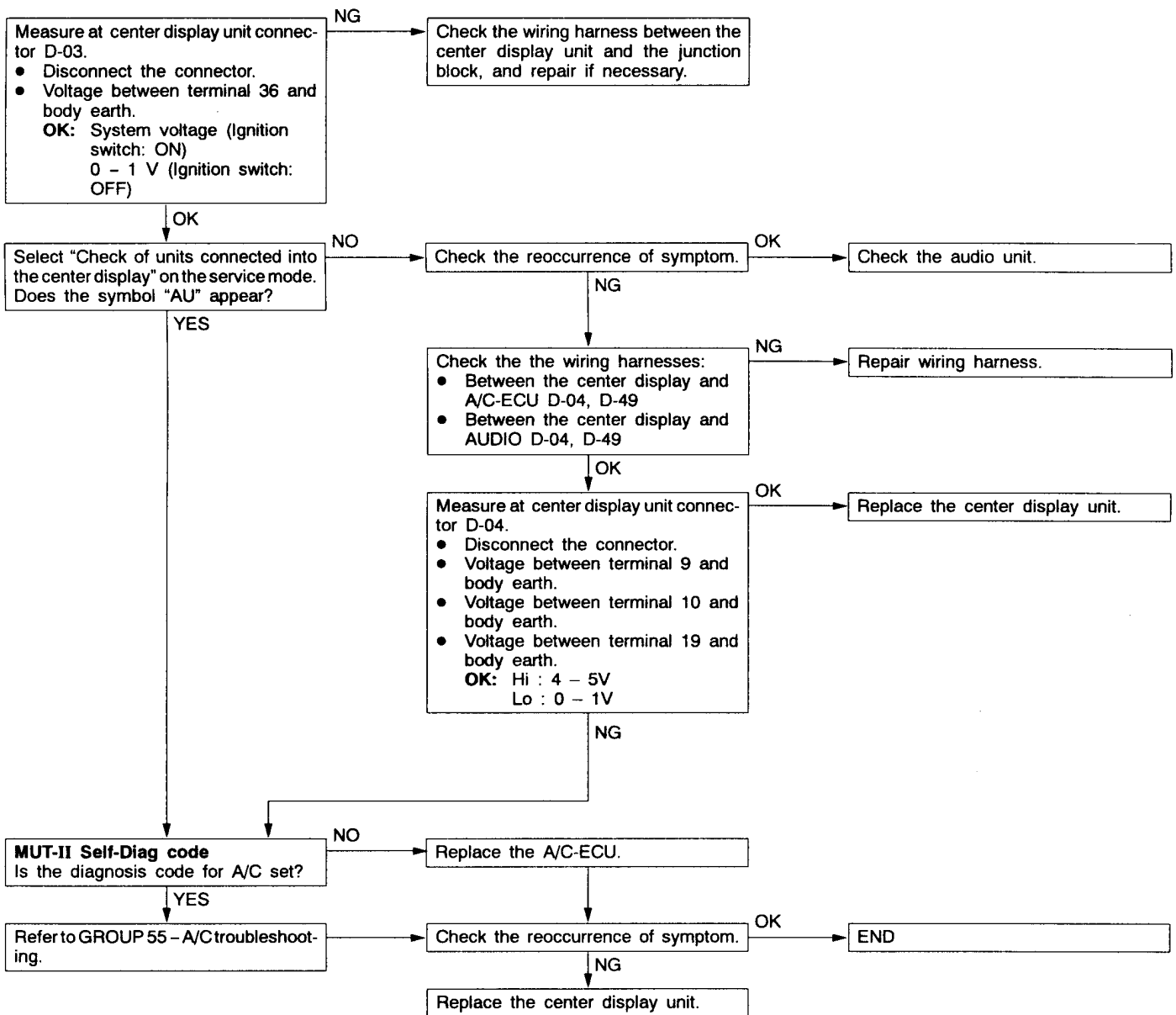
INSPECTION PROCEDURE 6

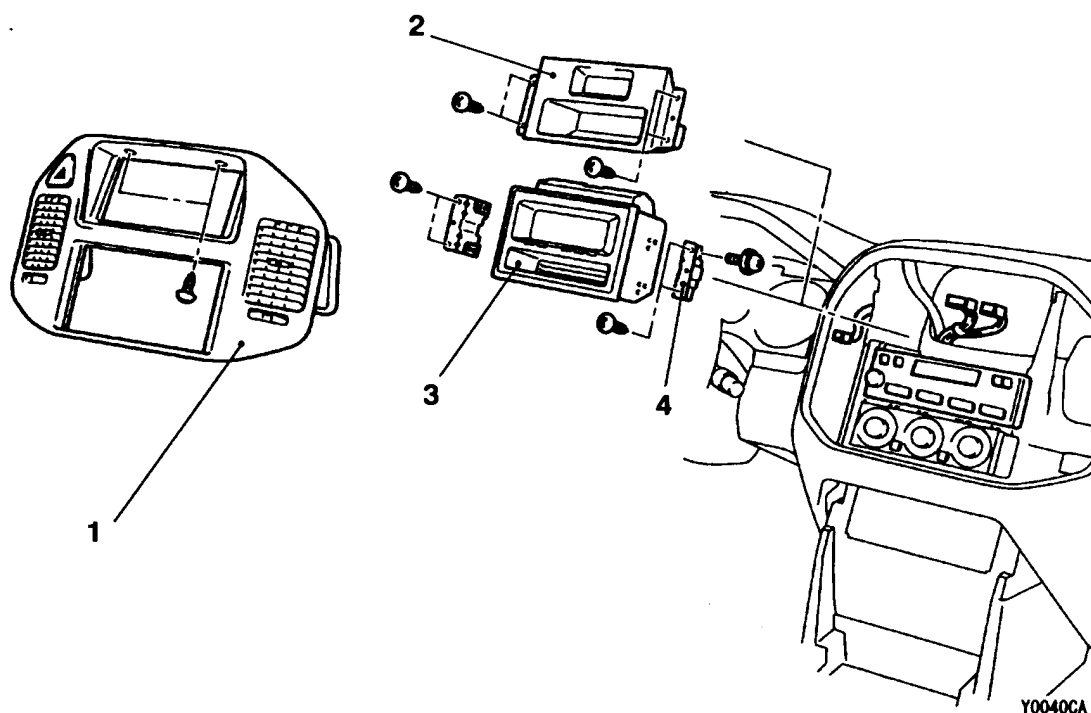
The display screen is dim.



INSPECTION PROCEDURE 7

Air conditioning display is not available.



CLOCK OR CENTER DISPLAY**REMOVAL AND INSTALLATION****Removal steps**

1. Center panel
(Refer to GROUP 52A – Instrument Panel.)
2. Clock
3. Center display
4. Bracket

RADIO/TAPE PLAYER

TROUBLESHOOTING

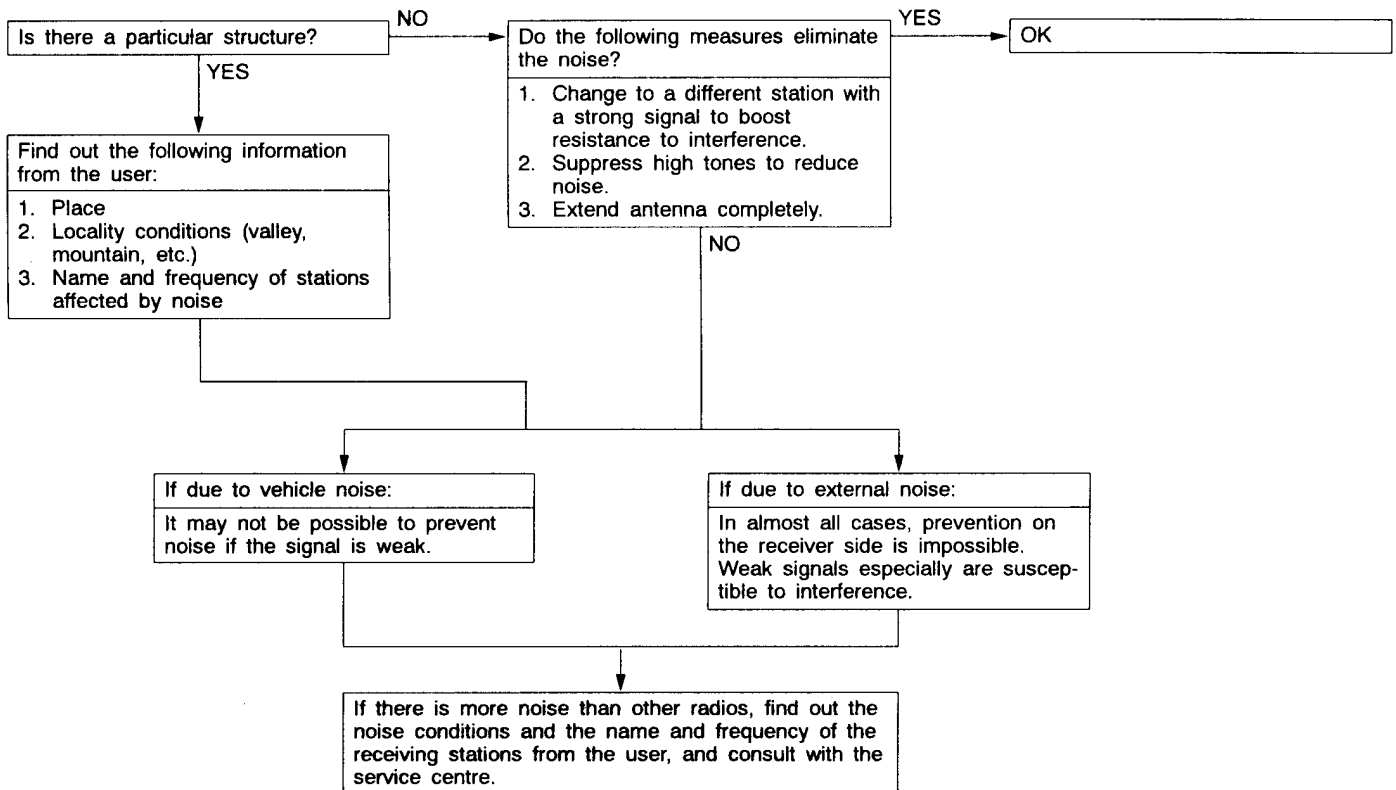
QUICK-REFERENCE TROUBLESHOOTING CHART

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 UKW/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 UKW/MW/LW or no sound from UKW/MW/LW.	B-3
	Insufficient sensitivity.	B-4
	Distortion on UKW/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.



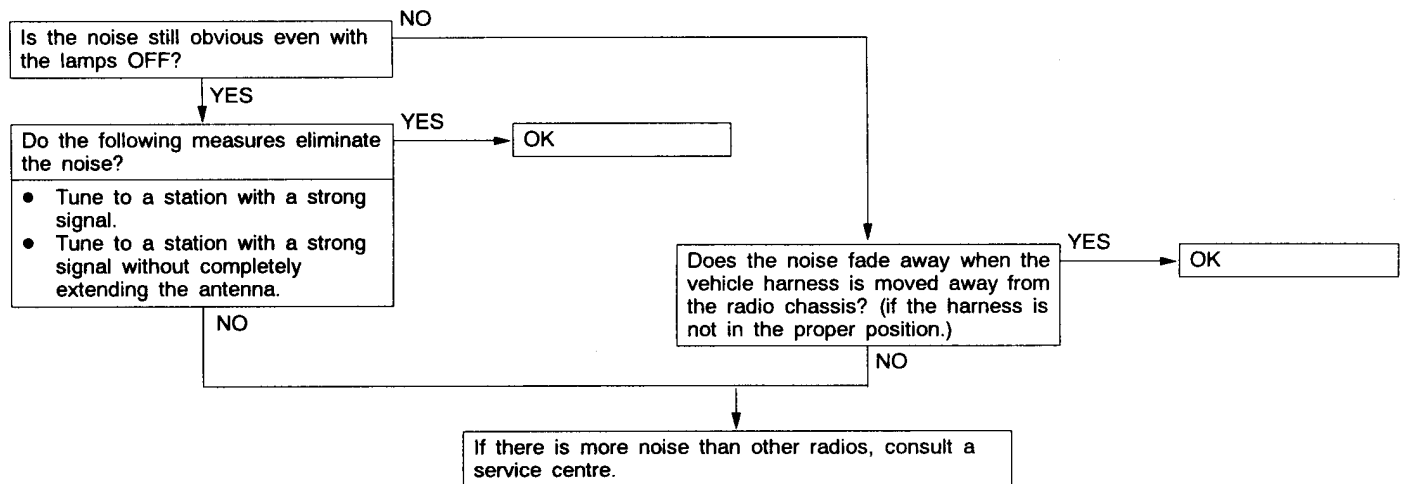
A-2 Mixed with noise, only at night.

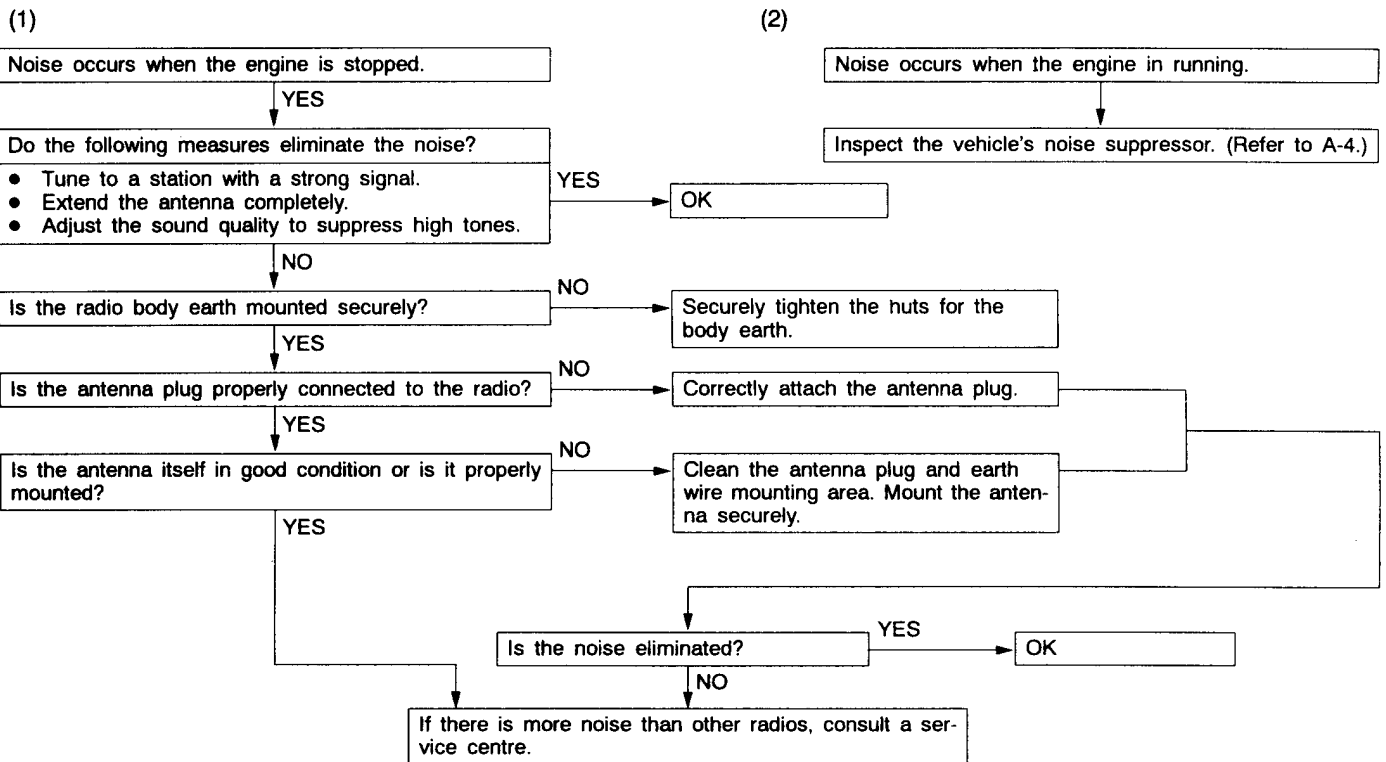
The following factors can be considered as possible causes of noise appearing at night.

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 UKW/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
UKW/MW/LW: Ignition noise (Popping, snapping, cracking, buzzing)	- Increasing the engine speed causing the popping sound to speed up, and volume decreases. - Disappears when the ignition switch is turned to ACC.	- Mainly due to the spark plugs. - Due to the engine noise.	- Check or replace the earth cable. (Refer to Fig. 1, 2, 3 and 4 on P.54-58 and 54-59.) - 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)	- 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.
	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.

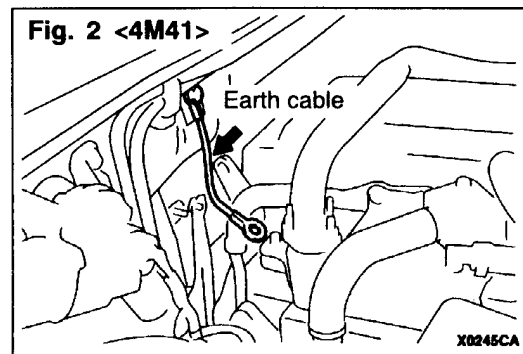
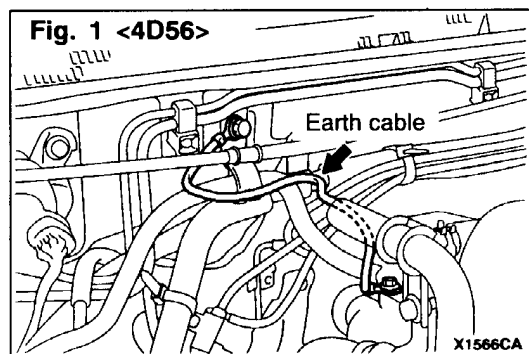
NOTE

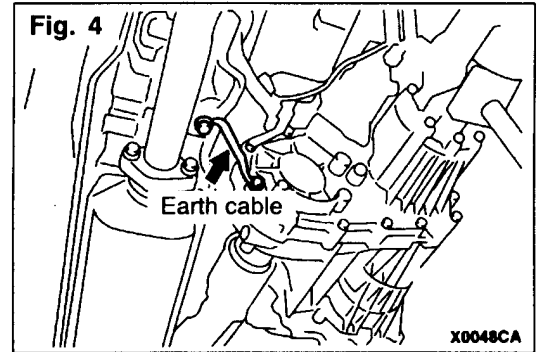
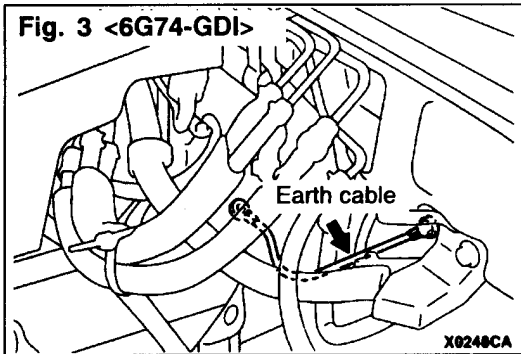
1. Capacitor
The capacitor does not pass D.C. current, but as the number of waves increases when it

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.

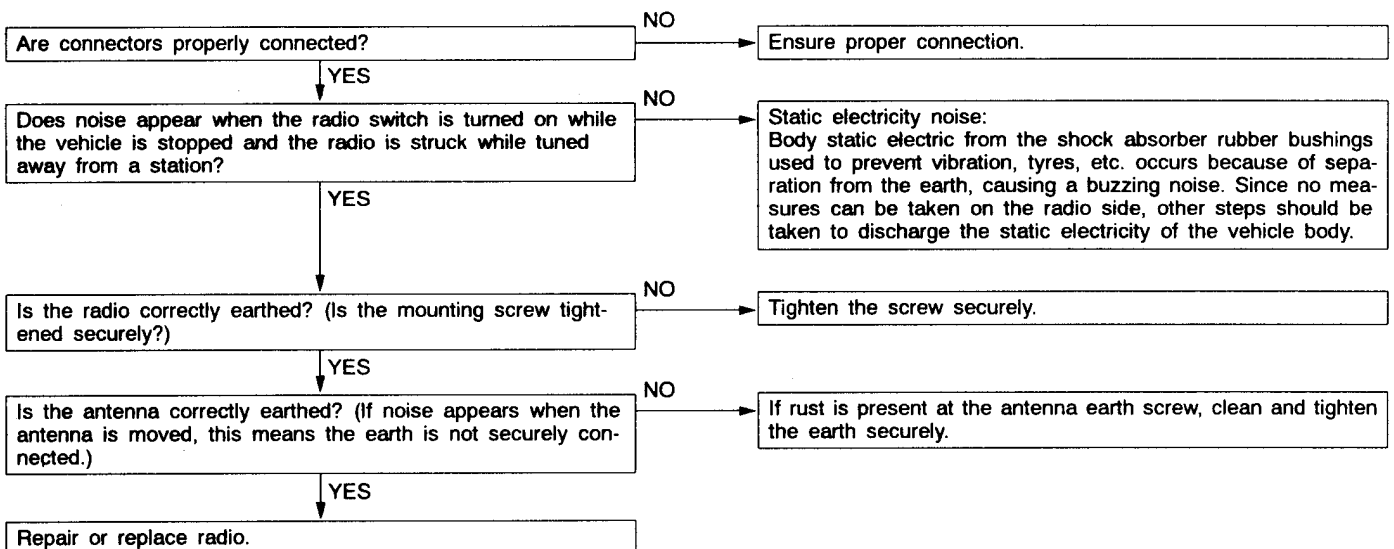
2. Coil

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.



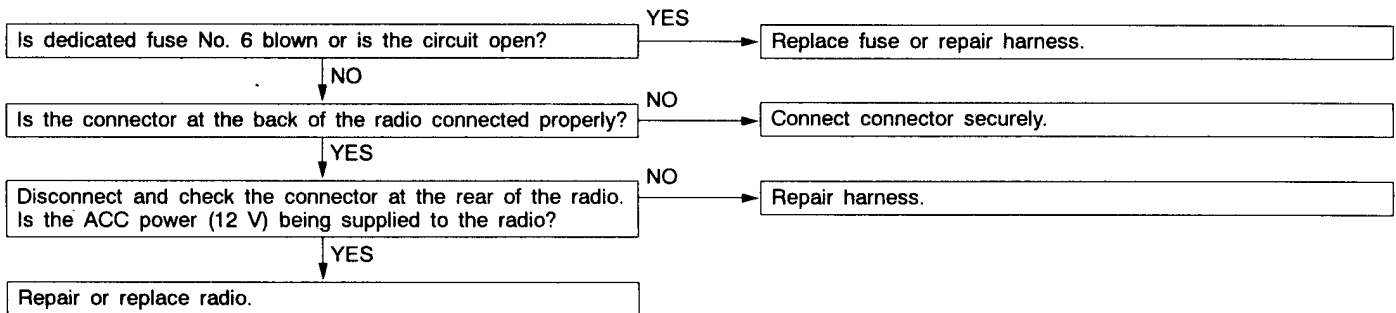
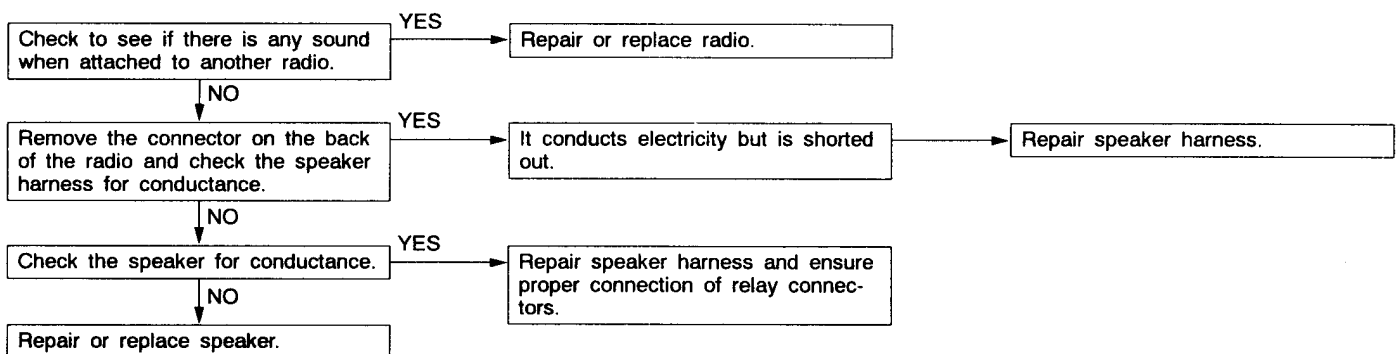
A-6 Ever-present noise.

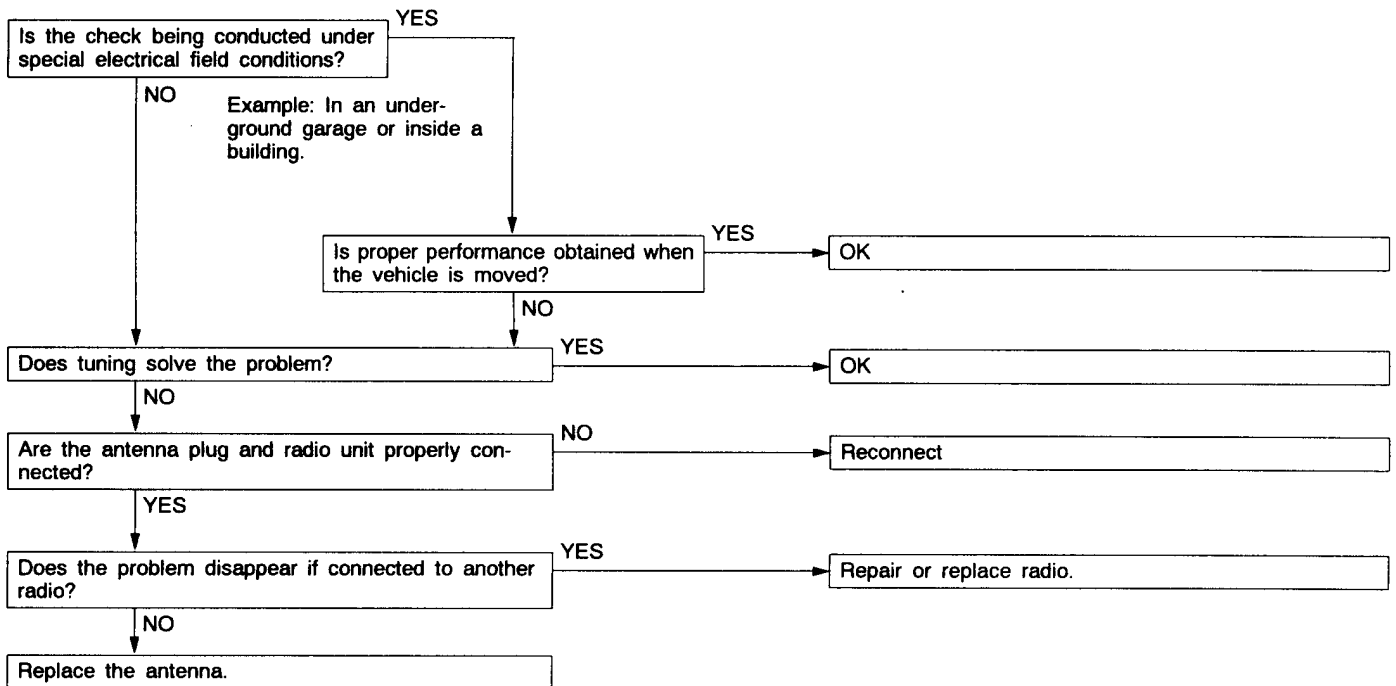
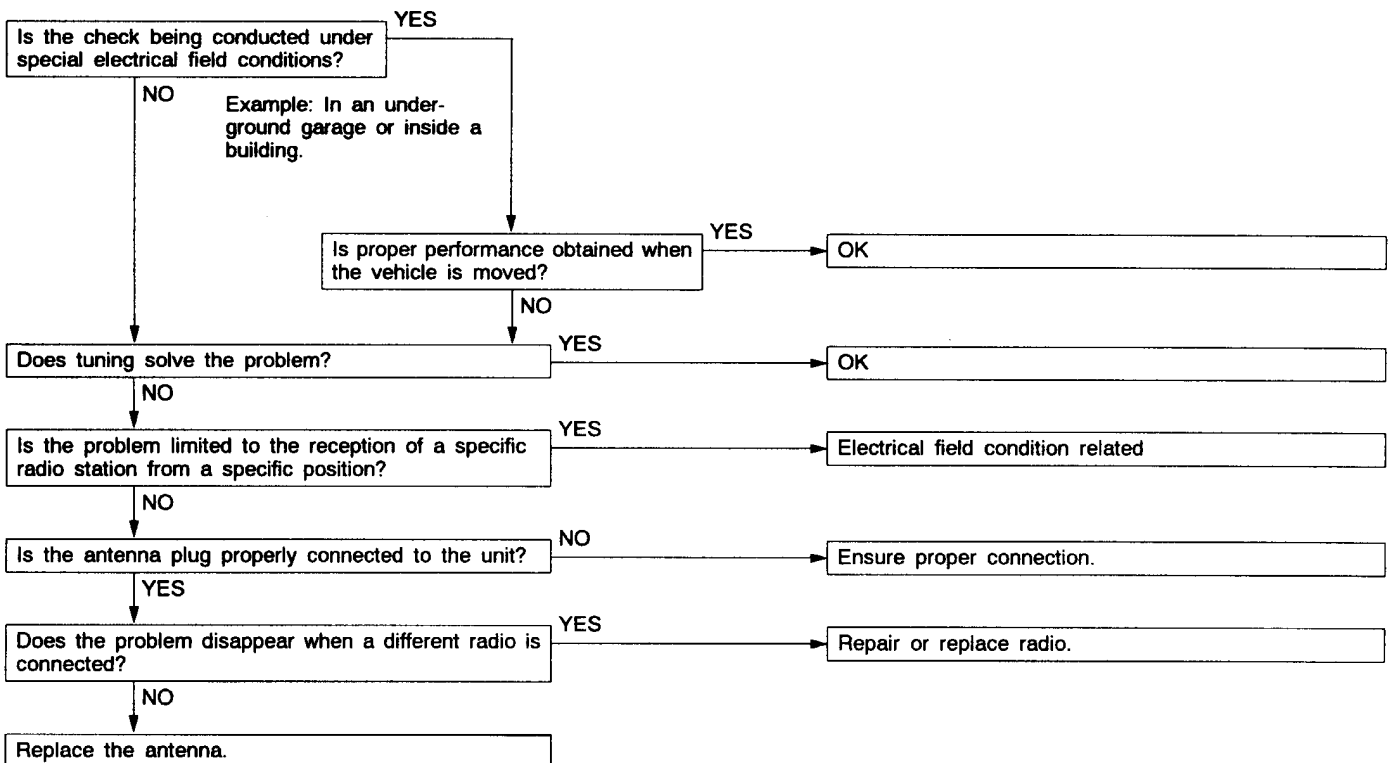
Noise is often created by the following factors, and often the radio is OK when it is checked individually.

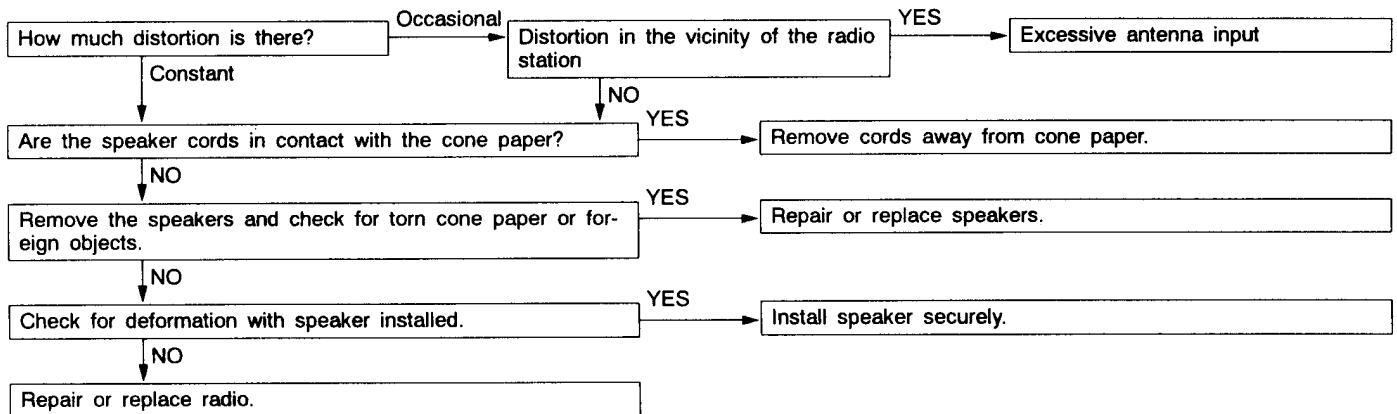
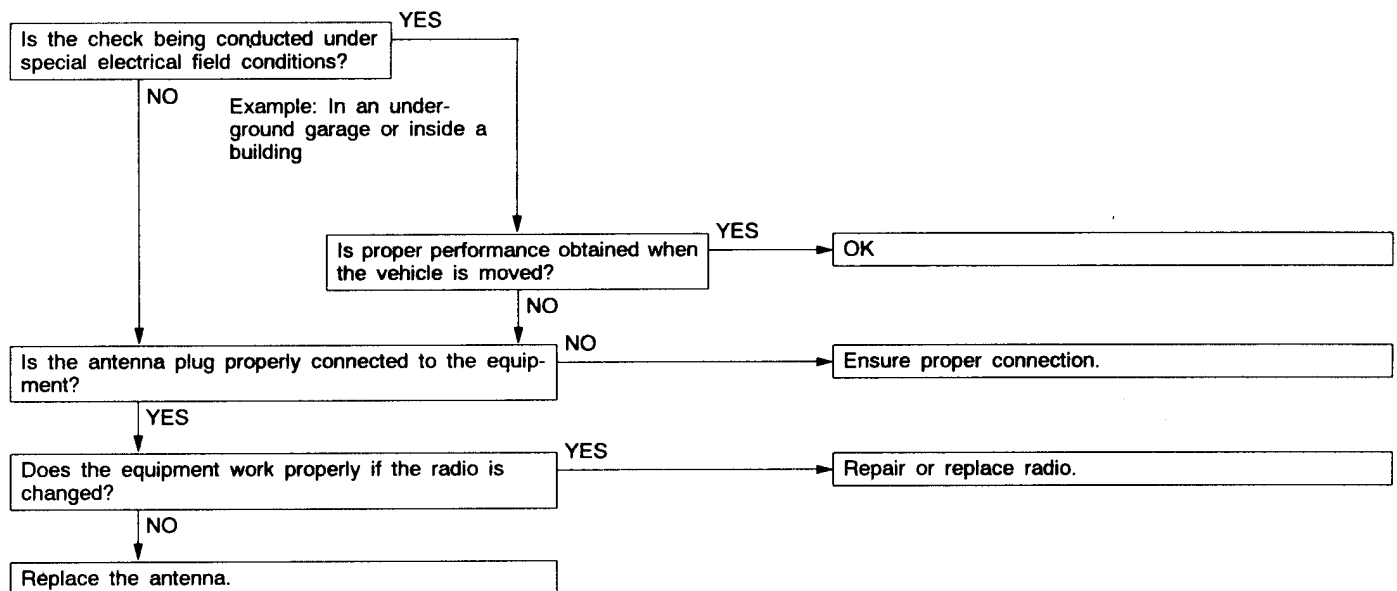
- Travelling conditions of the vehicle
- Terrain of area travelled through
- Surrounding buildings
- Signal conditions
- Time period

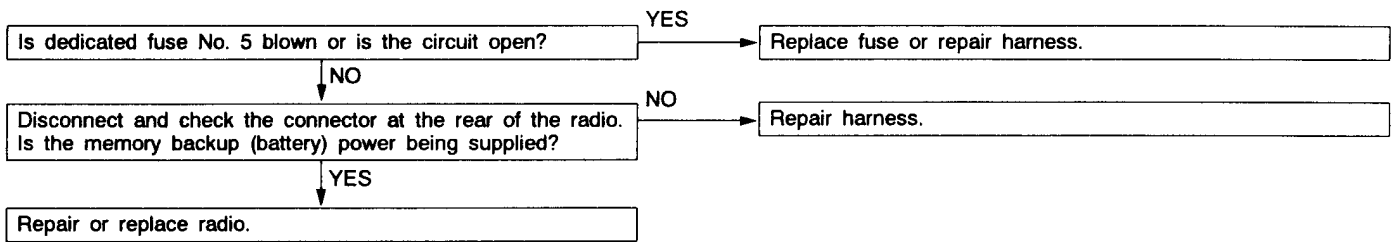
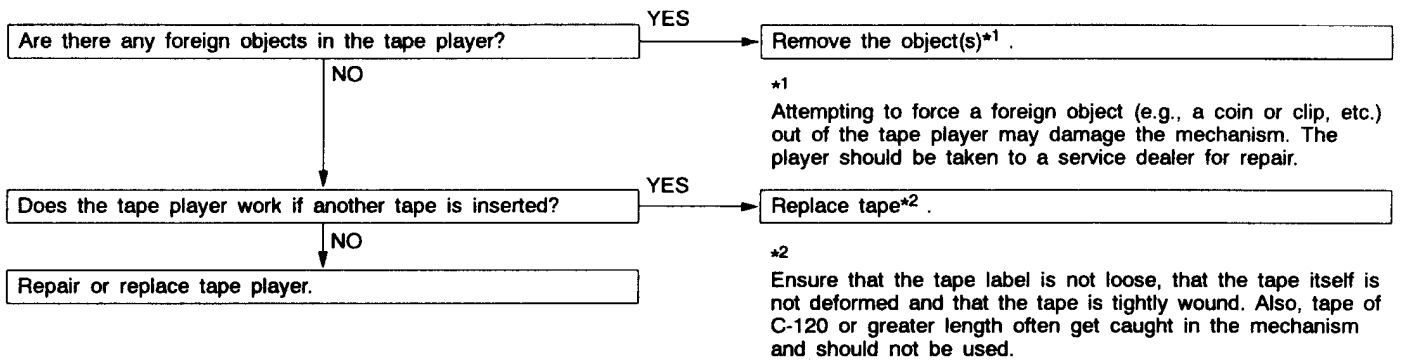
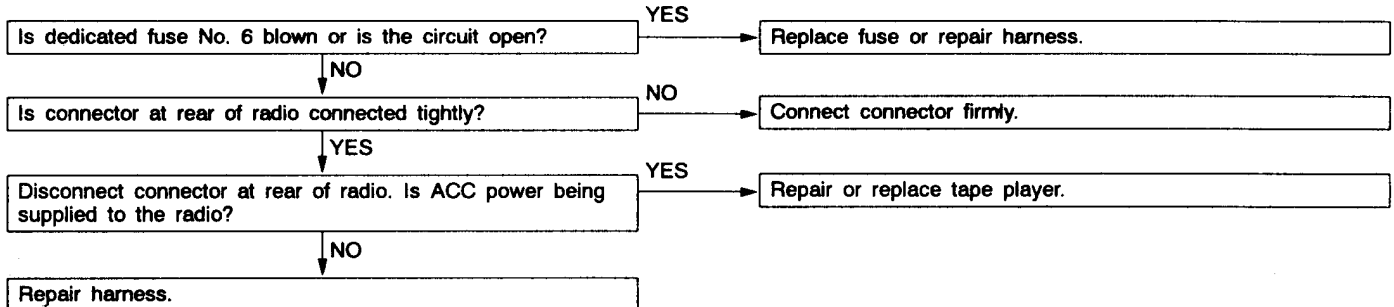
For this reason, if there are still problems with noise even after the measures described in steps A-1 to A-8 have been taken, get information on the factors listed above as well as determining whether the problem occurs with UKW/MW/LW, the station names, frequencies, etc., and contact a service centre.

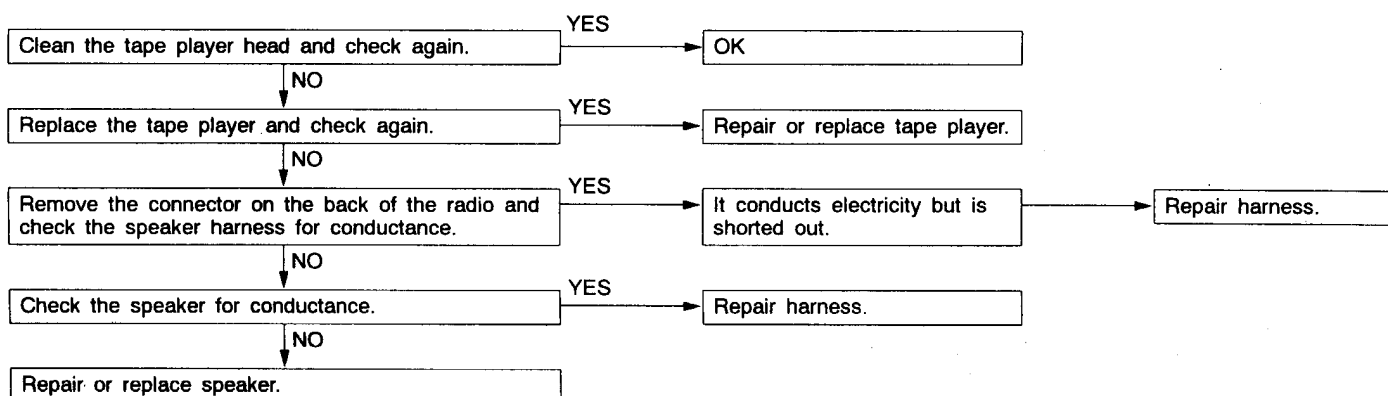
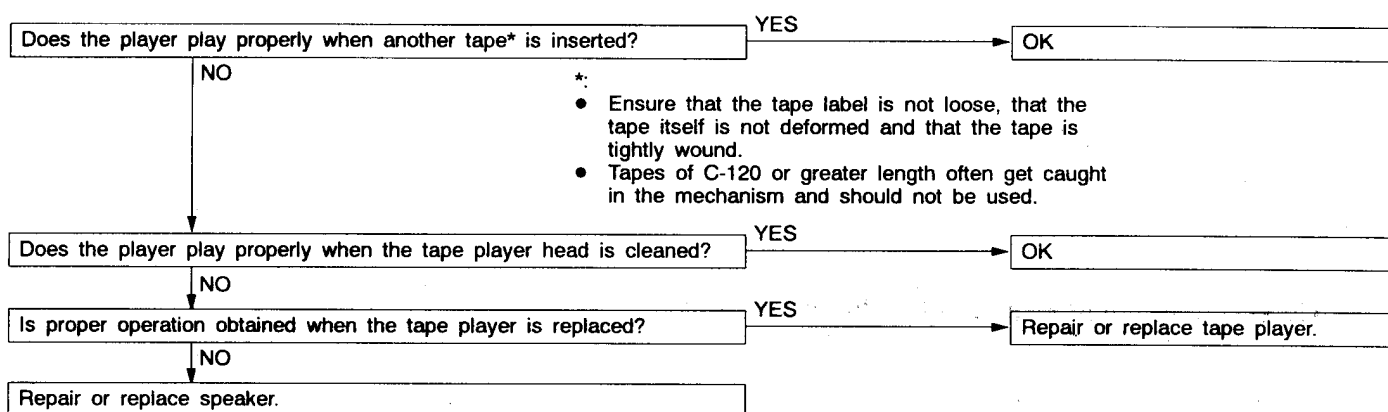
B. RADIO

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 UKW/MW/LW or no sound from UKW/MW/LW.**B-4 Insufficient sensitivity.**

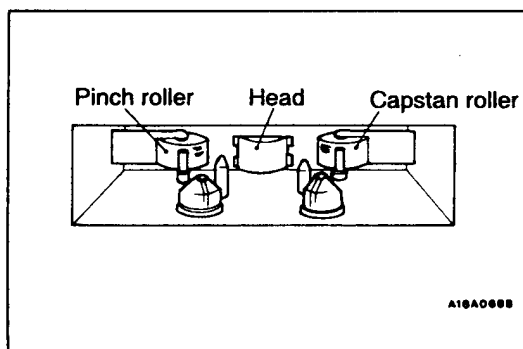
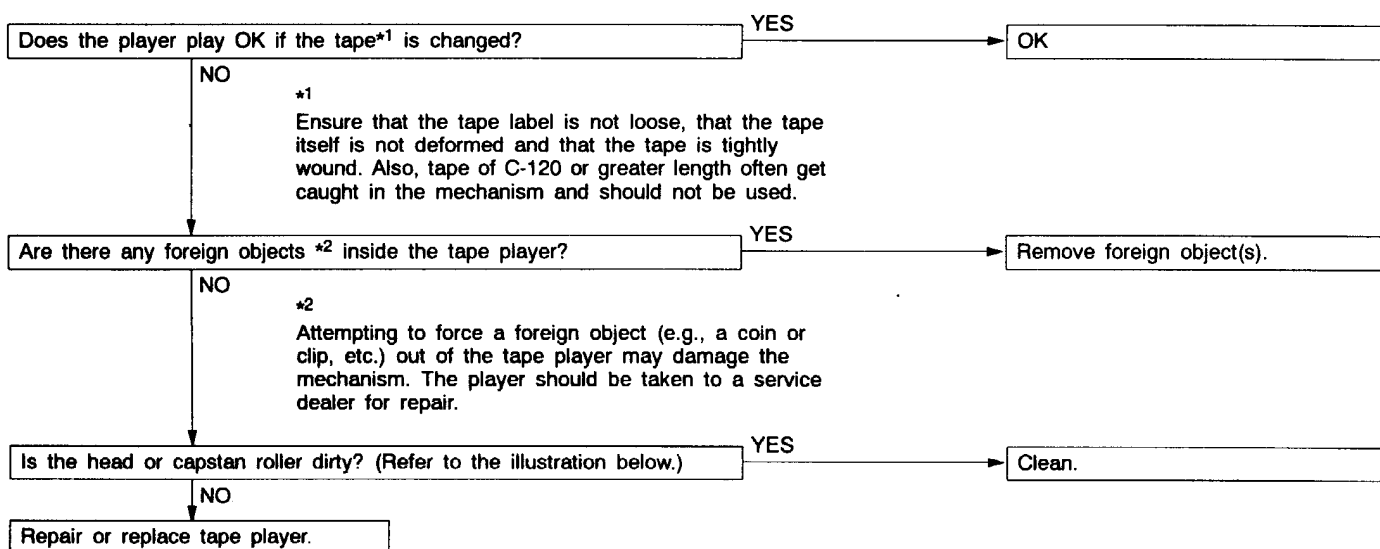
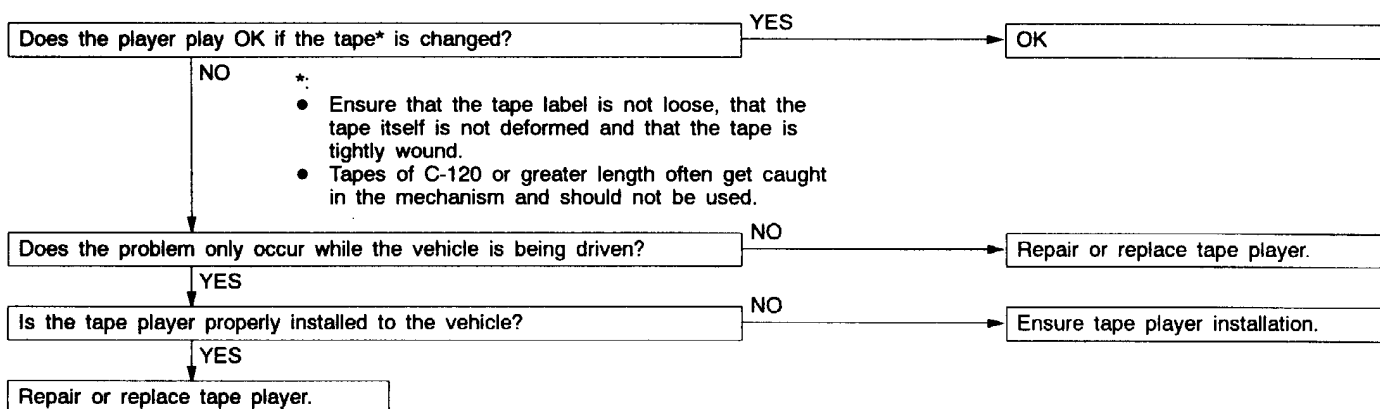
B-5 Distortion on UKW/MW/LW.**B-6 Too few automatic select stations.**

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.

YES

Tape used is bad.

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

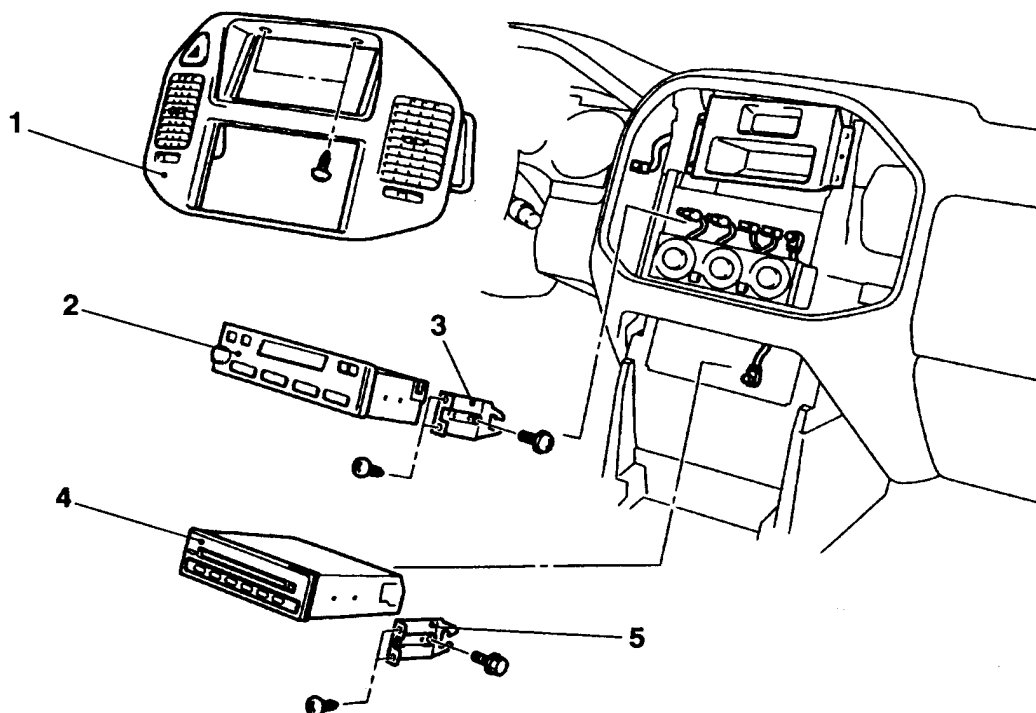
NO

*2

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

Repair or replace tape player.

RADIO AND CD AUTO CHANGER REMOVAL AND INSTALLATION



Y0041CA

Radio removal steps

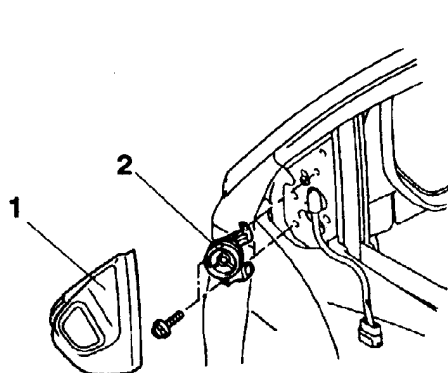
1. Center panel
(Refer to GROUP 52A – Instrument Panel.)
2. Radio/tape player
3. Radio/tape player bracket

CD auto changer removal steps

- Lower center panel
(Refer to GROUP 52A – Instrument Panel.)
- 4. CD auto changer
- 5. CD auto changer bracket

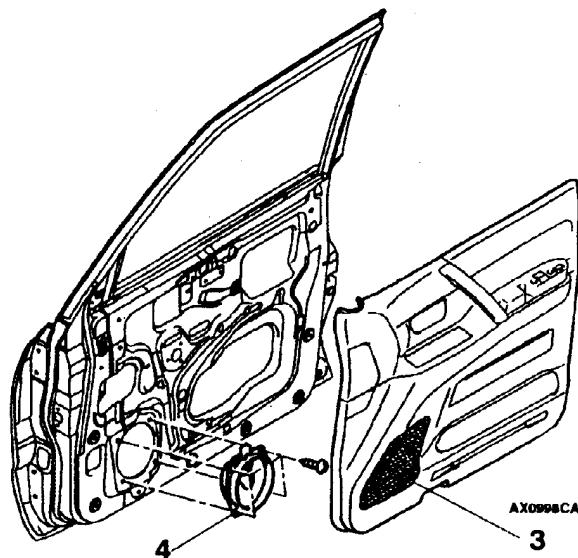
FRONT SPEAKERS

REMOVAL AND INSTALLATION



Tweeter removal steps

1. Delta inner cover
2. Tweeter



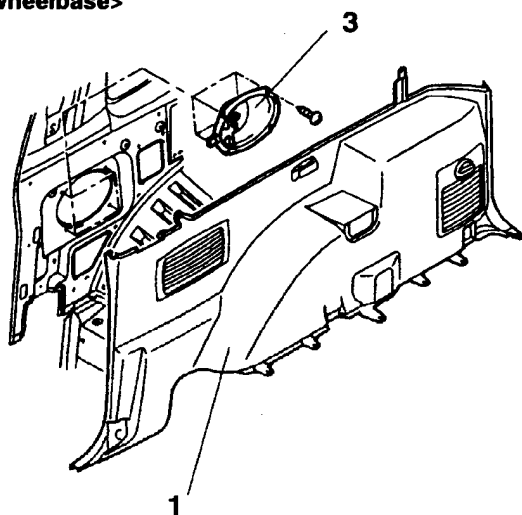
Front door speaker removal steps

3. Front door trim (Refer to GROUP 42.)
4. Front door speaker

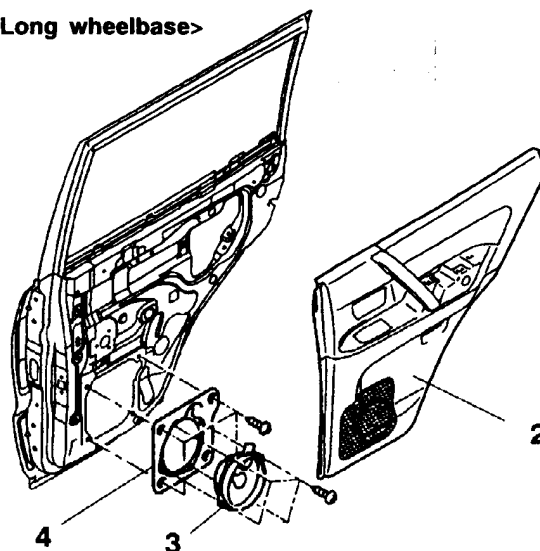
REAR SPEAKERS

REMOVAL AND INSTALLATION

<Short wheelbase>



<Long wheelbase>



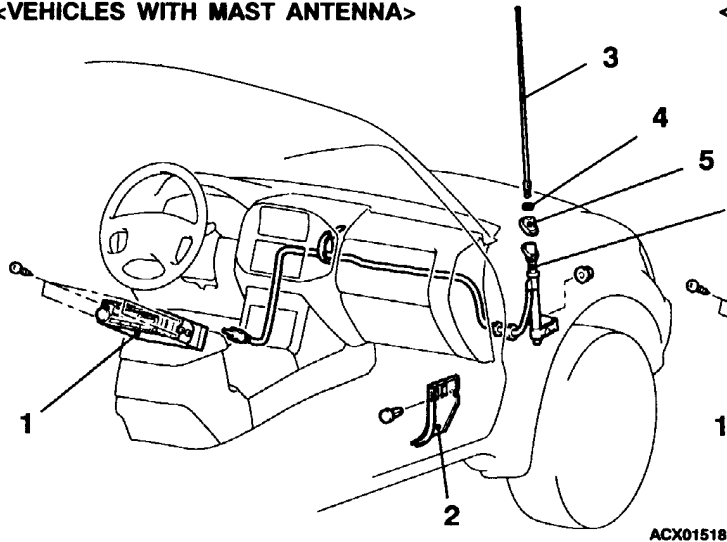
Removal steps

1. Lower quarter trim (Refer to GROUP 52A – Instrument Panel.)
2. Rear door trim (Refer to GROUP 52A – Instrument Panel.)
3. Rear speakers
4. Rear speaker bracket

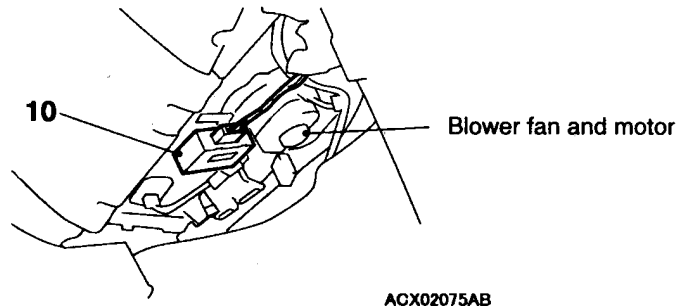
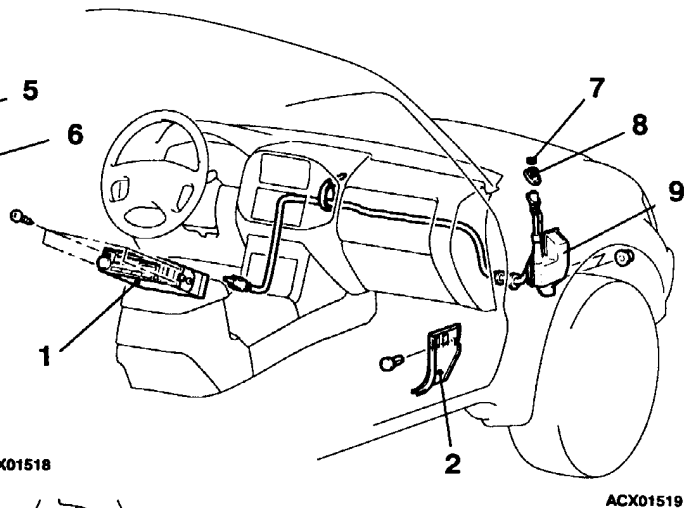
ANTENNA

REMOVAL AND INSTALLATION

<VEHICLES WITH MAST ANTENNA>



<VEHICLES WITH MOTOR ANTENNA>

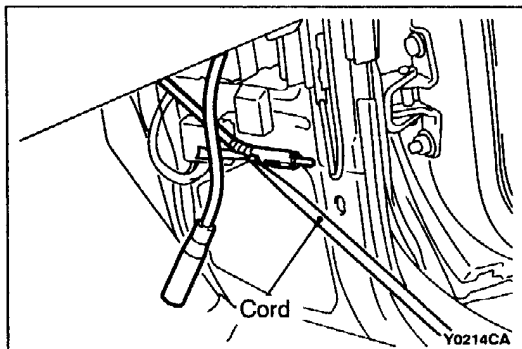


Mast antenna removal steps

- Center panel (Refer to GROUP 52A – Instrument Panel.)
- 1. Radio/tape player (Refer to P.54-81.)
- 2. Scuff plate, cowl side trim (Refer to GROUP 52A.)
- 3. Mast antenna
- 4. Mounting nut
- 5. Base
- 6. Mast antenna body

Motor antenna removal steps

- Center panel (Refer to GROUP 52A – Instrument Panel.)
- 1. Radio/tape player (Refer to P.54-81.)
- 2. Scuff plate, cowl side trim (Refer to GROUP 52A.)
- 7. Ring nut
- 8. Base
- 9. Motor antenna body
- 10. Motor antenna-ECU



REMOVAL SERVICE POINTS

◀A▶ MAST ANTENNA BODY REMOVAL

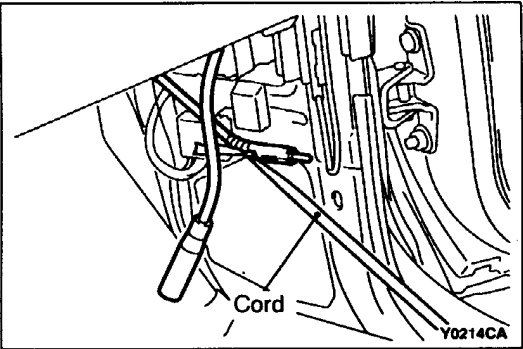
Carry out the following procedure to allow the feeder cable of the base antenna assembly for an easy installation.

1. Tie the cord with the end of the feeder cable.
2. Pull out the base antenna assembly slowly until the pipe end appears.
3. Insert the cord into the hole of the pipe end to wrap the cord around with a plastic tape.

Caution

Ensure that the cord is wrapped tightly to prevent it from coming off.

- 4. Pull out the base antenna assembly slowly to remove.



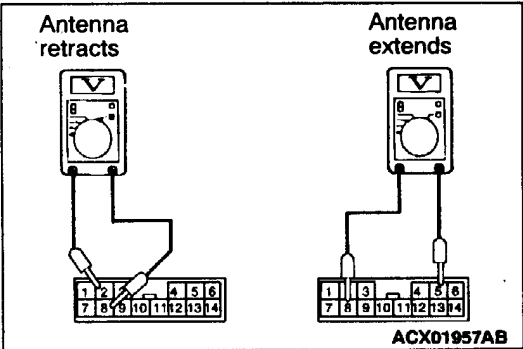
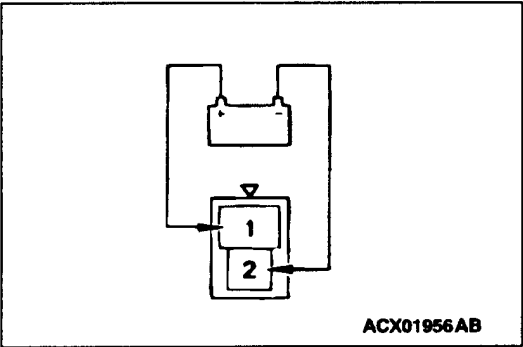
◀A▶ MOTOR ANTENNA BODY REMOVAL

Pull out the cord after tying it with the feeder cable of the base antenna ass'y for an easy installation.

INSPECTION

MOTOR ANTENNA CHECK

Check the antenna for extension if the connector of the motor antenna-ECU is disconnected, the (+) terminal of the battery is connected to terminal No.1, and the (-) terminal of the battery is connected to terminal No. 2. Check the antenna for retraction if the connection is reversed.



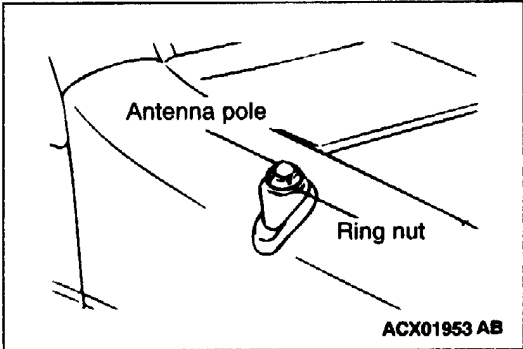
MOTOR ANTENNA-ECU CHECK

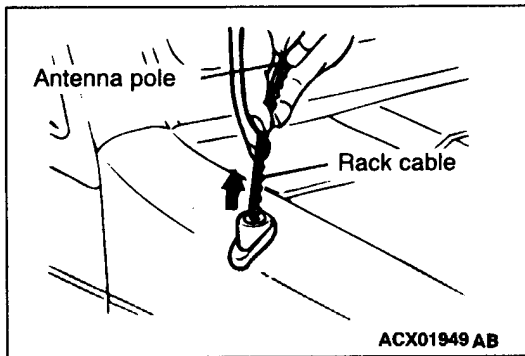
- 1. Remove the motor antenna-ECU mounting bolt.
- 2. With the ignition switch at the ACC or the ON position, check the voltage between the terminals during extension or retraction of the antenna by operating the radio switch.

Direction of antenna movement	Measurement terminal	Voltage (V)
Retracting	2 – 8	10 – 13
Extending	8 – 5	10 – 13

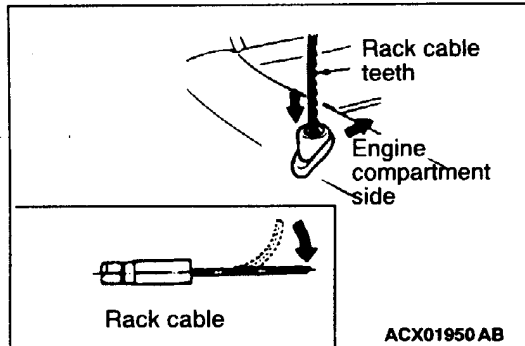
ANTENNA POLE REPLACEMENT

- 1. Remove ring nut.





2. After the ignition switch is turned to the ACC or ON position, turn on the radio and extend the antenna pole to remove it with the rack cable.

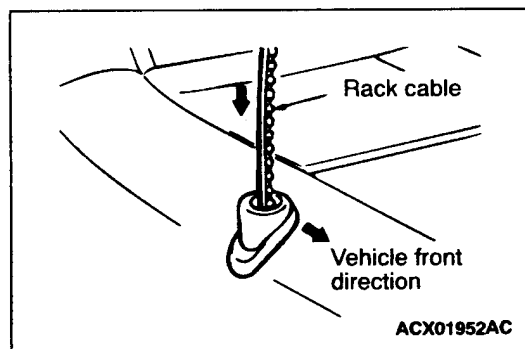


3. Extend the antenna pole completely.

NOTE

If there is any bend at the motor end of the rack cable, repair the bend.

4. Face the teeth of the rack cable to the engine room side to push the rack cable into the motor assembly.



5. Rotate the teeth of the rack cable to the front of the vehicle (90° to the right) to engage the cable with the motor gears.
6. If the rack cable comes off easily by pulling it out slightly, it indicates that the rack cable does not engage with the motor gears. In that case, carry out the above-mentioned procedures in (3) and (4) after checking the end of the rack cable for bend again.
7. Set the antenna pole perpendicular and turn off the radio to wind the rack cable. Insert the antenna pole into the motor antenna side corresponding with winding the rack cable.

DEFOGGER

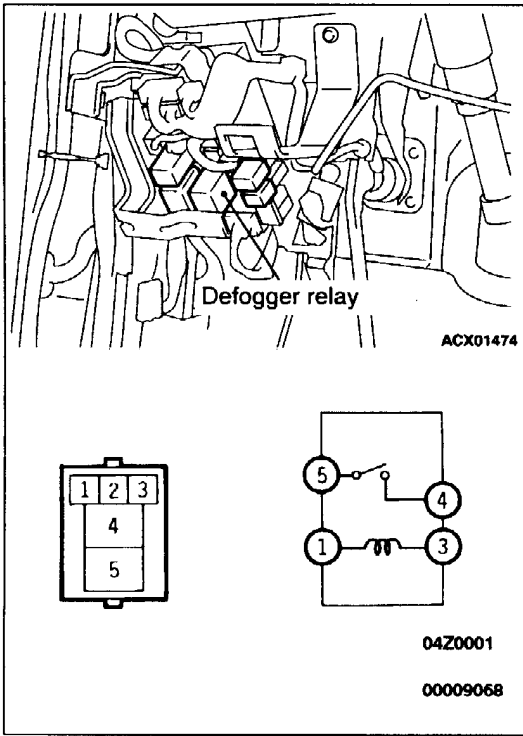
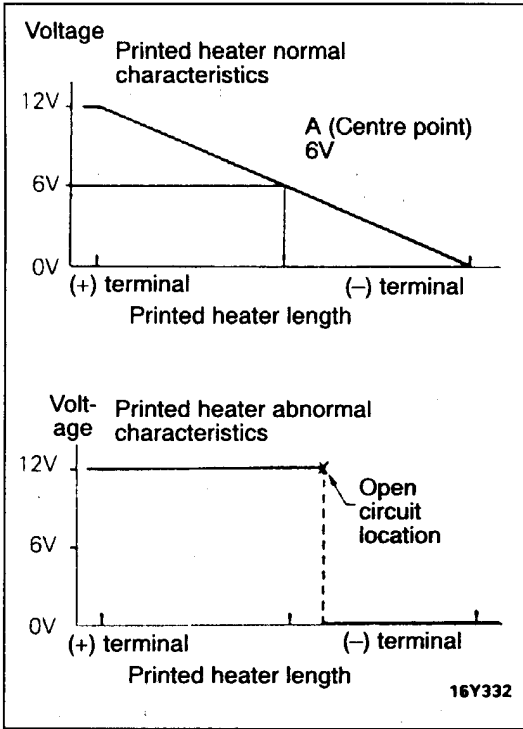
TROUBLESHOOTING <VEHICLE WITH AUTOMATIC AIR CONDITIONER>

Refer to GROUP 55B.

ON-VEHICLE SERVICE

PRINTED HEATER CHECK

- 1. Run the engine at a speed of 2000 r/min to fully charge the battery, and then check the printed heater.
- 2. With the defogger switch turned on, use a multimeter to measure the voltages of each printed heater at centre point A on the window glass. The printed heater is okay if 6 V is displayed.
- 3. If a voltage of 12 V is indicated at point A, the open circuit location is between point A and the (-) terminal. Move the test bar gradually towards the (-) terminal to find the point where the voltage suddenly changes (0 V). The point where the voltage changes is the location of the open circuit.
- 4. In addition, if a voltage of 0 V is indicated at point A, the open circuit location is between point A and the (+) terminal. Use the same procedure as described above to find the point where the voltage changed to 12 V.



DEFOGGER RELAY CONTINUITY CHECK

Switch position	Terminal No.			
	1	3	4	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○

DEFOGGER SWITCH
<VEHICLE WITH MANUAL AIR
CONDITIONER>

REMOVAL AND INSTALLATION

Refer to GROUP 55A – Heater Control Assembly, A/C Switch,
Ventilation Switch.

INSPECTION

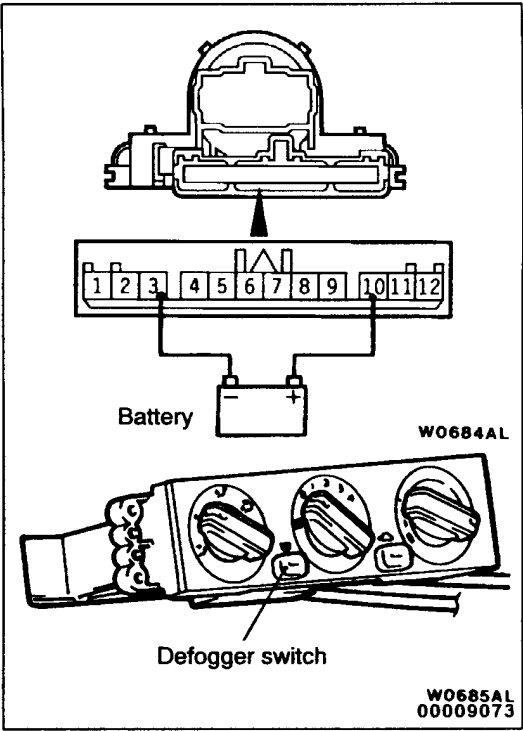
DEFOGGER SWITCH CONTINUITY CHECK

Check the battery voltage between terminal 3 and 10 while
being energized.

Switch position	Terminal No.				
	3	10	–	11	12
OFF			IND 		
ON			IND 		

NOTE

After turning the defogger switch to the ON position, check
the continuity between terminal 3 and 12 for 9 to 13 minutes.
Afterwards, the switch is turned to the OFF position.



SMART WIRING SYSTEM (SWS)

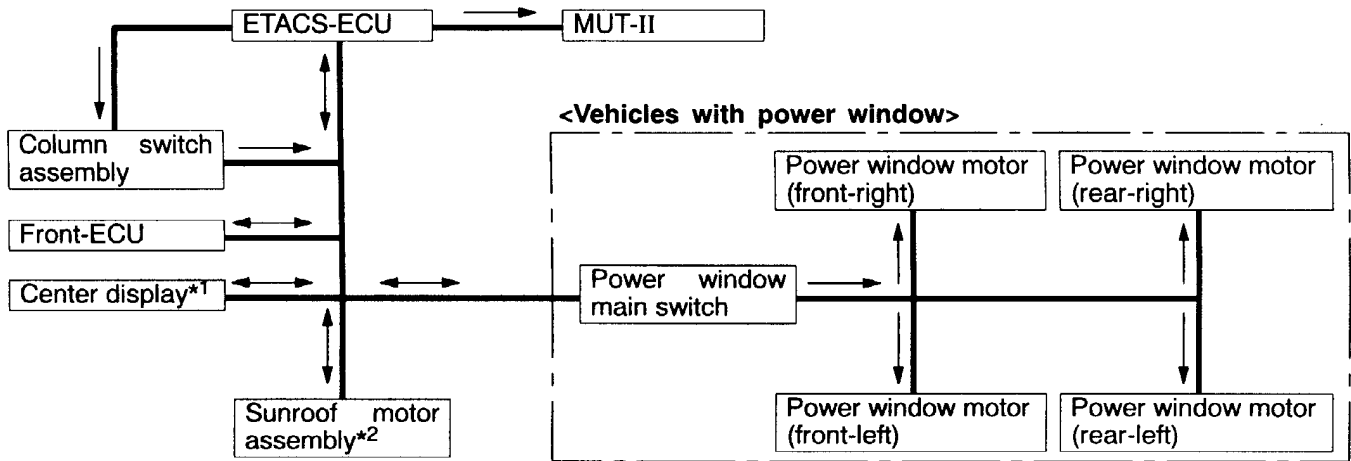
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GENERAL INFORMATION

COMMUNICATION LINE

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



NOTE

→ : Uni-directional communication line
 ↔ : Bi-directional communication line

*1: Vehicles with center display

*2: Vehicles with sunroof

OPERATION

BUZZER

Light Reminder Warning Buzzer Function

When the driver's door is opened with lighting switch in the ON (tail lamp switch or headlamp switch) position and ignition switch in the LOCK (OFF) or ACC position, the buzzer will sound continuously to remind the driver that the lamps (tail lamps or headlamps) are ON.

This function does not work if the lighting switched off through the headlamp automatic shutdown

function. In addition, the ignition key reminder warning buzzer function has a priority over this function.

Center Display Operation Annunciation Function <Vehicles with Center Display>

On vehicles with center display, the buzzer (peeps) sounds when the operation switch of the audio and navigation system is pressed.

CENTRAL DOOR LOCKING SYSTEM <Vehicles with Central Door Locking System>

Central Door Locking System Operation

When the lock switch is turned ON after the unlock switch on the driver's door lock actuator switch is OFF, the ETACS-ECU gives a lock output for 0.5 second. When the unlock switch is turned ON after the lock switch on the driver's door lock actuator switch is OFF, the ETACS-ECU gives an unlock output for 0.5 second.

When the front passenger's door key or back door key is operated, the ETACS-ECU gives a lock or unlock output for 0.5 second.

Forgotten Key Prevention Function

If, with the key reminder switch OFF and the driver's door switch ON, the driver's door lock switch is turned ON after the door unlock switch in the front door lock actuator is turned OFF, the ETACS-ECU waits 0.3 second then give an unlock relay output for 0.5 second, there by preventing the doors from being locked. This operation prevents the ignition key from being locked inside the vehicle. This function takes precedence over the central door locking control function.

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.

Power Window Timer Function

With the ignition switch in the ON position, the power window relay and power window switch receipt permission signal (a SWS signal transmitted from the ETACS-ECU) 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.

If the driver's door is opened during timer operation, the receipt permission signal goes ON for additional 30 seconds. If the driver's door is subsequently closed during this period, the receipt permission signal goes OFF ten seconds after the receipt permission signal goes OFF.

KEYLESS ENTRY SYSTEM <Vehicles with Keyless Entry System>

Keyless Entry System Operation

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.

Keyless Entry Answerback Function

The keyless entry hazard answerable function facilitates confirmation of door locking and unlocking operations even in daylight. When a LOCK

signal from the keyless entry transmitter is applied to the ETACS-ECU, all of the turn-signal lamps flash twice. When an UNLOCK signal from the keyless entry transmitter is applied to the ETACS-ECU, all of the turn-signal lamps flash four times. Note that an unlock switch has change from OFF to ON.

NOTE

The hazard answer back is enabled or disabled by the configuration function.

SUNROOF <Vehicles with Sunroof>

Sunroof Operation

All of the slide open/close, tilt up/down, and stop operations can be performed by a single switch. When the roof lid glass is tilted up, the sunshade opens approximately 98 mm in combined operation with the roof lid glass for better ventilation.

A jam preventing mechanism has been adopted. When a slide-close or tilt-down operation is blocked by an external force, the roof lid glass moves back and stops.

Sunroof Timer Function

When the ignition switch is turned from ON position to LOCK (OFF) or ACC position, the sunroof will be ready to work for 30 seconds.

If the driver's door is opened during the timer operation, the timer operates for another 30 seconds starting from that point. However, the timer operation discontinues if the door is closed during that period.

WINDSHIELD WIPER AND WASHER**Windshield Low-speed/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. 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.

REAR WIPER AND WASHER <Vehicles with 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 turns ON the rear wiper drive signal for three seconds (approx. two operations). 7.4 seconds later, the wiper begins the intermittent operation with 8 seconds' cycle.

If the shift lever <M/T> or 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 turns ON the rear wiper drive signal for three seconds (approx. two operations) to clear the rear field of view. 7.4 seconds later, the wiper returns to the intermittent operation with 8 seconds' cycle.

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 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 is in intermittent operation when the rear washer switch is turned ON, the rear wiper again continues the intermittent operation with 8 seconds' cycle from 7.4 seconds later since the rear drive signal is turned OFF.

HEADLAMP WASHER <Vehicles with Headlamp Washer>

If the headlamp washer switch at the steering column is placed in the ON position when the ignition switch is in the ACC or ON position and the

headlamp switch is in the ON position, the headlamp washer drive signal is turned ON for 0.5 second.

IGNITION KEY HOLE ILLUMINATION LAMP

When the ignition switch is turned to LOCK (OFF) or ACC position with the driver's door opened, the ignition key hole illumination lamp is illuminated. If the door is closed in that state, the lamp goes out after 30 seconds. Vehicles with keyless entry

system, it illuminates for 30 seconds after the ignition key is removed. In either case the lamp goes out when the ignition switch is turned to ON position.

HEADLAMP**Headlamp Automatic Shutdown 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.

Headlamp Dimmer Switch Automatic 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 <Vehicles with DRL>

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.

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.

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).

FRONT FOG LAMP <Vehicles with Front Fog Lamp>

If the front fog lamp switch is turned ON at the condition that the headlamp or the tail lamp is turned ON (including the illumination by the automatic lighting function), the front fog lamp is turned ON.

Whenever the tail lamps are turned on at the next time, the front fog lamps will always be off regardless of the switch positions. In addition, if the tail lamp is switched off by the automatic lighting system, the front fog lamp will also be switched off. However, the front fog lamp will be illuminated when the tail lamp is switched on.

REAR FOG LAMP

If the fog lamp switch is turned ON when the headlamp or the front fog lamp is turned On, the rear fog lamp is switched ON and OFF alternatively.

If the headlamp and the front fog lamp are turned OFF during lighting of the rear fog lamp, the rear fog lamp is turned OFF at the same time.

ROOM LAMP <Vehicles with Keyless Entry System>

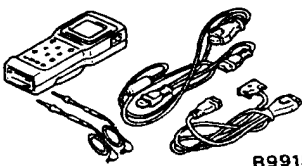
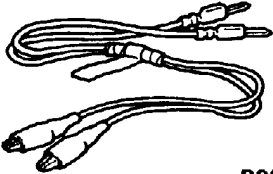
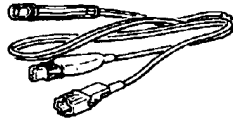
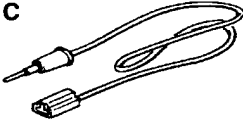
With the room lamp switch in the DOOR position, the ETACS-ECU controls the room lamp operation as follows:

- 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 goes 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 100% and turned out approx. 30 seconds later. During that time (timer-controlled period), the room lamp goes 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 <Vehicles with keyless entry system>	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, vehicles with rear wiper and washer>	Shift lever moved to R position
Inhibitor switch (reverse) <A/T, vehicles with rear wiper and washer>	Selector lever moved to R position
Rear wiper motor auto-stop signal <Vehicles with rear wiper and washer>	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
Front passenger's or back door lock key cylinder switch <Vehicles with central door locking system>	Turn the key to the locked or unlock
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	Rotate the windshield intermittent wiper interval adjusting knob from FAST to SLOW when the ignition switch is in ON position (The ETACS-ECU sends a signal around the medium knob position)
	Windshield washer switch	Turned from OFF to ON
	Rear wiper switch <Vehicles with rear wiper and washer>	
	Rear washer switch <Vehicles with rear wiper and washer>	
	Headlamp washer switch <Vehicles with headlamp washer>	
Power window main switch	Any switch <Vehicles with power window>	Turned from OFF to ON
Transmitter	Any switch <Vehicles with keyless entry system>	Turned from OFF to ON
Sunroof switch	Any switch <Vehicles with sunroof>	Turned from OFF to ON
Center display	Any switch <Vehicles with center display>	Turned from OFF to ON

DIAGNOSIS CODE CHART

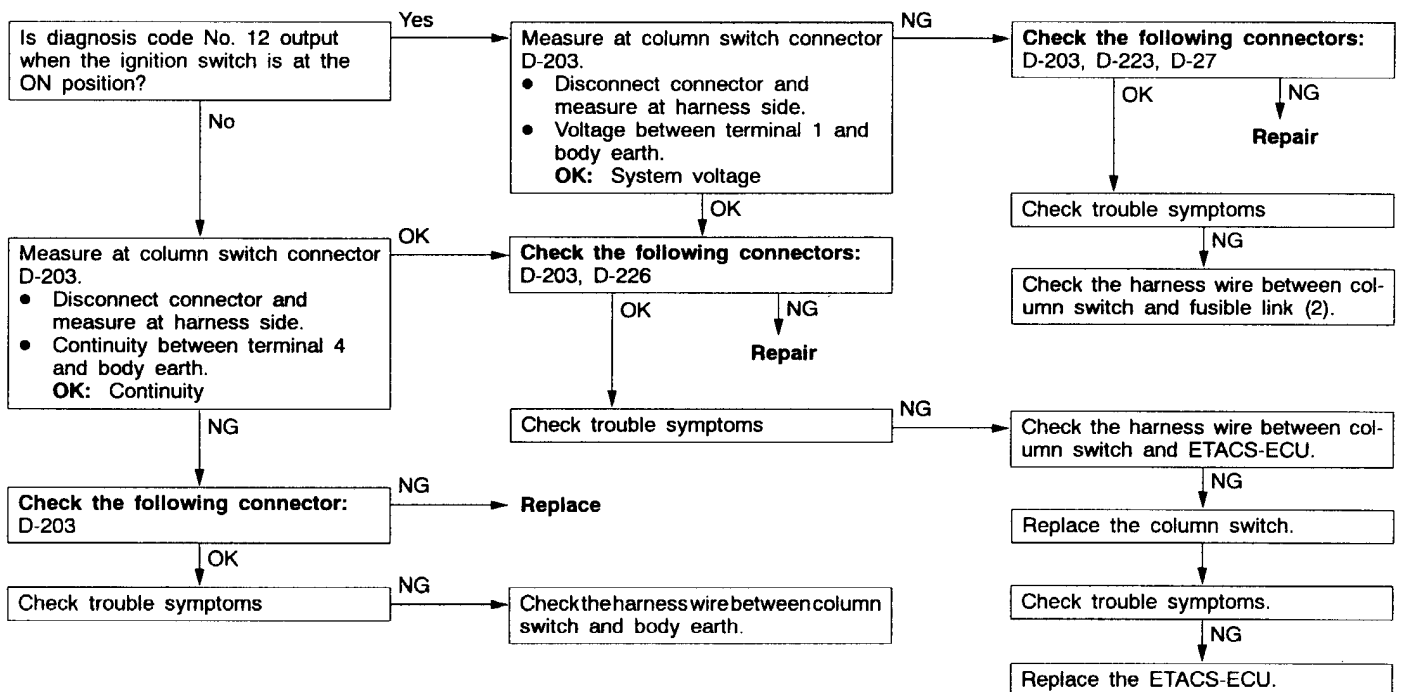
Code No.	Diagnosis item	Reference page
11	Failure concerning the ETACS-ECU	54B-10
12	Failure concerning the column switch or improper connecting with the ETACS-ECU	54B-10
13	Failure concerning the front-ECU	54B-11
21	Short circuit in communication line	54B-12

DIAGNOSIS CODE INSPECTION PROCEDURES

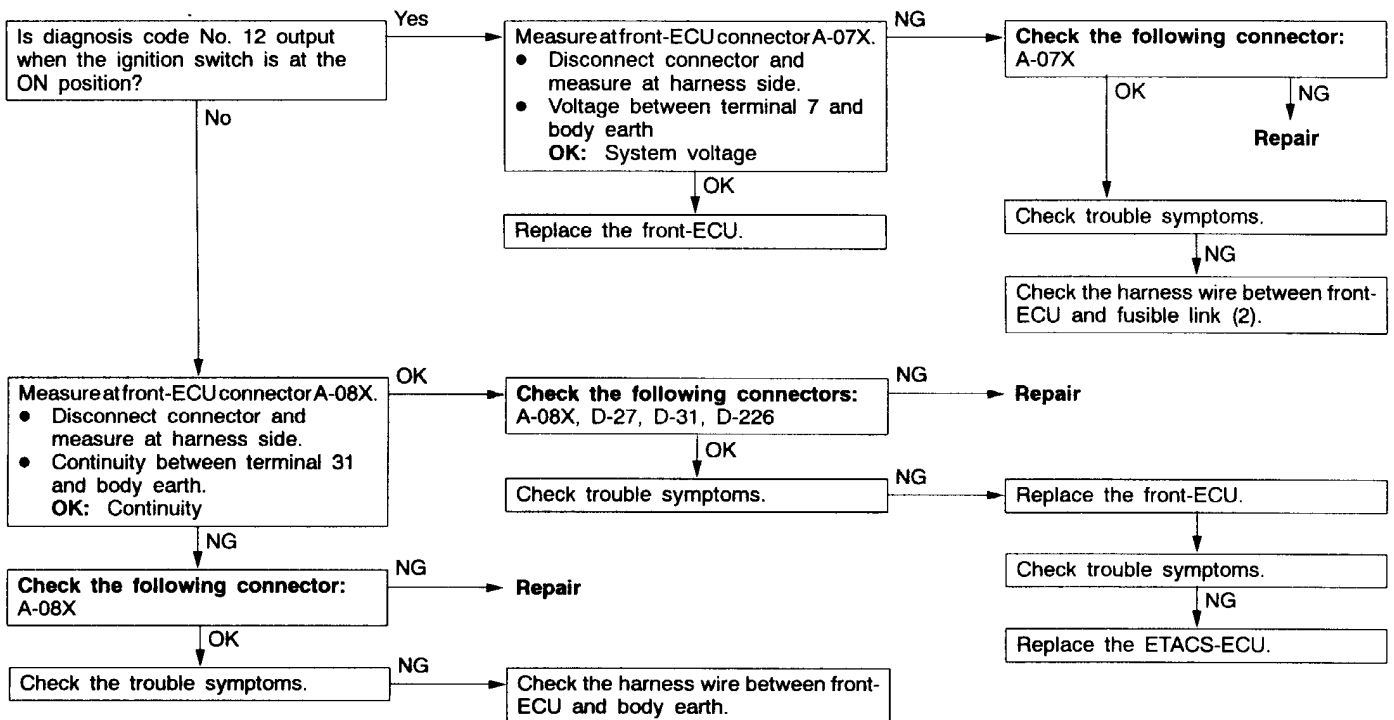
Code No.11 Failure concerning the ETACS-ECU	Probable cause
The ETACS-ECU monitors its own communication data, and sends a diagnosis code when an error takes place consecutive fifteen times in 0.6 second. The diagnosis code will be erased when the ETACS-ECU determines that its own communication data is sent consecutive 15 times in 0.6 second.	Malfunction of ETACS-ECU

Replace the ETACS-ECU.

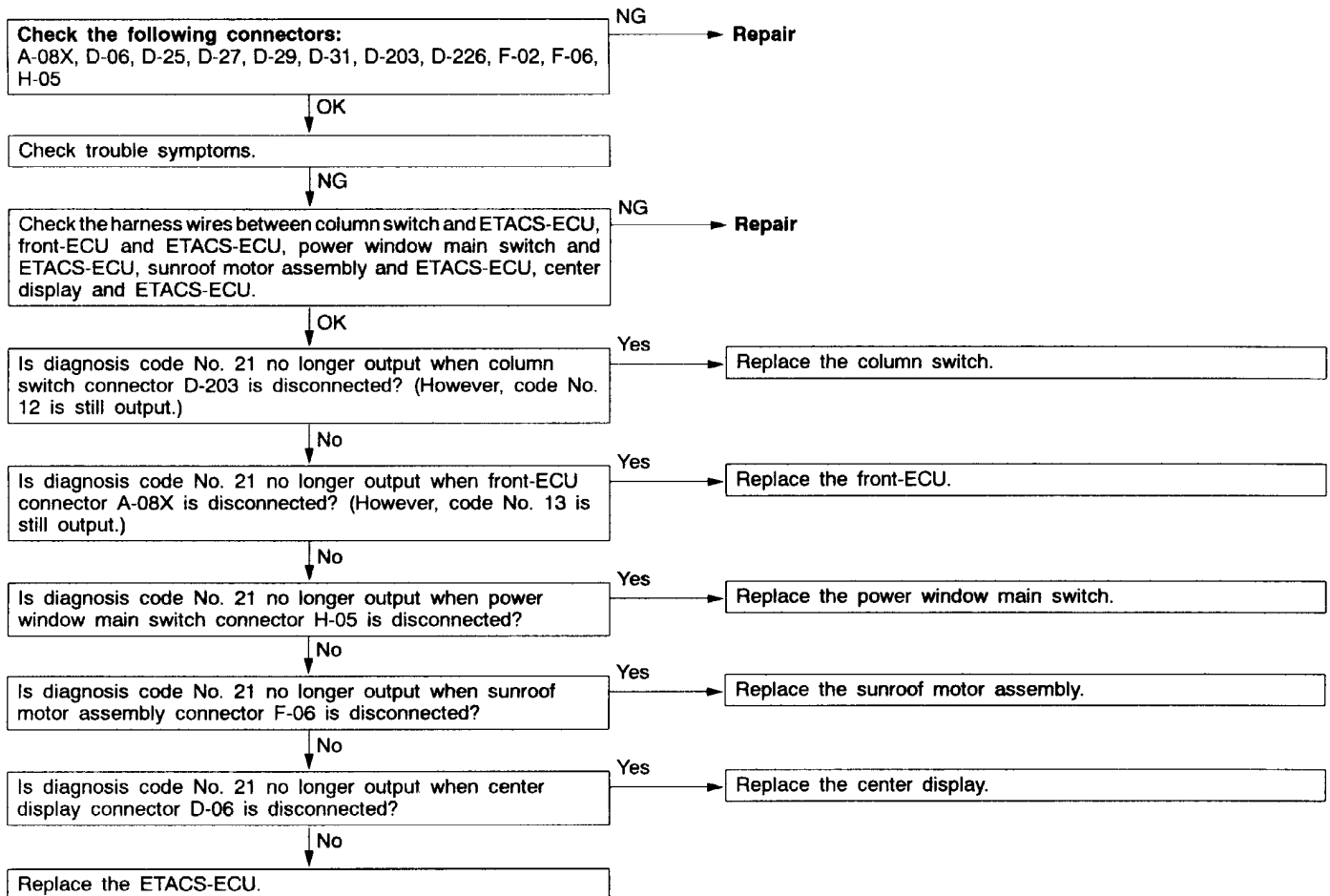
Code No.12 Failure concerning the column switch or improper connection with the ETACS-ECU	Probable cause
This diagnosis code is displayed when the column switch sends a signal regardless of the transmission request signal from the ETACS-ECU (three times or more in one second). The diagnosis code is erased when the column switch continues to send a signal according to the transmission request signal from the ETACS-ECU for one second.	• Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of wiring harness or connector



Code No.13 Failure concerning the front-ECU	Probable cause
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. The diagnosis code will be erased when the front-ECU sends normal signals to the ETACS-ECU consecutive 15 times in 0.6 second.	• 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.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of power window main switch <vehicles with power window> • Malfunction of sunroof motor assembly <vehicles with sunroof> • Malfunction of center display <vehicles with 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-17
Buzzer	Light reminder warning buzzer function does not work normally.	B-1	54B-17
	Center display operation annunciation function does not work normally.	B-2	54B-18
Central door locking system	Central door locking system does not work normally.	C-1	54B-18
	Some doors does not lock or unlock.	C-2	54B-19
	Some functions of central locking system do not work.	C-3	54B-19
	Forgotten key prevention function does not work.	C-4	54B-20
Power window	Power window does not work at all.	D-1	54B-20
	Power window main switch can not operate driver's window.	D-2	54B-21
	Power window sub switch can not operate front passenger's or rear window.	D-3	54B-22
	Power window main switch can not operate front passenger's or rear window.	D-4	54B-23
	Power window timer function does not work normally.	D-5	54B-23
	When the glass is raised, it then lowers automatically.	D-6	54B-24
	The glass is not lowered when something is jammed in the window.	D-7	54B-24
	When the glass is fully raised, it then lowers automatically.	D-8	54B-24
Keyless entry system	Keyless entry system does not operate.	E-1	54B-24
	The room lamp and hazard warning lamps do not operate through the answerback function.	E-2	54B-25
	The encrypted code cannot be registered.	E-3	54B-25
Sunroof	Sunroof does not work at all.	F-1	54B-26
	Sunroof timer function does not work normally.	F-2	54B-27
	Safety mechanism does not function.	F-3	54B-27

Trouble symptom		Inspection procedure	Reference page
Windshield wiper and washer	Windshield wiper does not operate.	G-1	54B-28
	Windshield wiper does not stop at the predetermined park position.	G-2	54B-29
	Any of the windshield wiper switch positions is defective.	G-3	54B-29
	Windshield intermittent wiper interval cannot be adjusted.	G-4	54B-30
	Windshield washer does not work.	G-5	54B-30
Rear wiper and washer	Rear wiper does not work at all.	H-1	54B-31
	Rear wiper does not stop at the predetermined park position.	H-2	54B-31
	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.	H-3	54B-32
	Rear washer does not work.	H-4	54B-32
Headlamp washer	Headlamp washer does not work.	I-1	54B-33
Ignition key hole illumination lamp	Ignition key hole illumination lamp does not work normally.	J-1	54B-34
Headlamp, tail lamp	Tail lamp do not illuminate.	K-1	54B-34
	Headlamps (low-beam) do not illuminate.	K-2	54B-35
	Headlamps (high-beam) do not illuminate.	K-3	54B-35
	Headlamps do not illuminate when the passing switch is operated.	K-4	54B-36
	The headlamp automatic shutdown function does not work normally.	K-5	54B-36
	Headlamp dimmer switch automatic reset function does not work normally.	K-6	54B-37
	Daytime running lamp (DRL) function does not work.	K-7	54B-37
Flasher timer	Turn-signal lamp do not flash when the turn-signal lamp switch is turned on.	L-1	54B-37
	Hazard warning lamps do not flash when the hazard warning lamp switch is turned on.	L-2	54B-38
Front fog lamp	Front fog lamps do not illuminate when the front fog lamp switch is turned on.	M-1	54B-39
	Front fog lamp do not go out when the tail lamps are turned off while the front fog lamps are on.	M-2	54B-39

Trouble symptom		Inspection procedure	Reference page
Rear fog lamp	Rear fog lamp do not illuminate when the rear fog lamp switch is turned on.	N-1	54B-40
	Rear fog lamp do not go out when the headlamps and front fog lamps are turned off while the rear fog lamp is on.	N-2	54B-40
Room lamp	Room lamp does not illuminate.	O-1	54B-41
	Room lamp dimming function does not work normally.	O-2	54B-41
Center display	Center display does not work normally.	–	GROUP 54A – Center Display.

DEFECTS FOUND BY INPUT SIGNAL CHECK

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

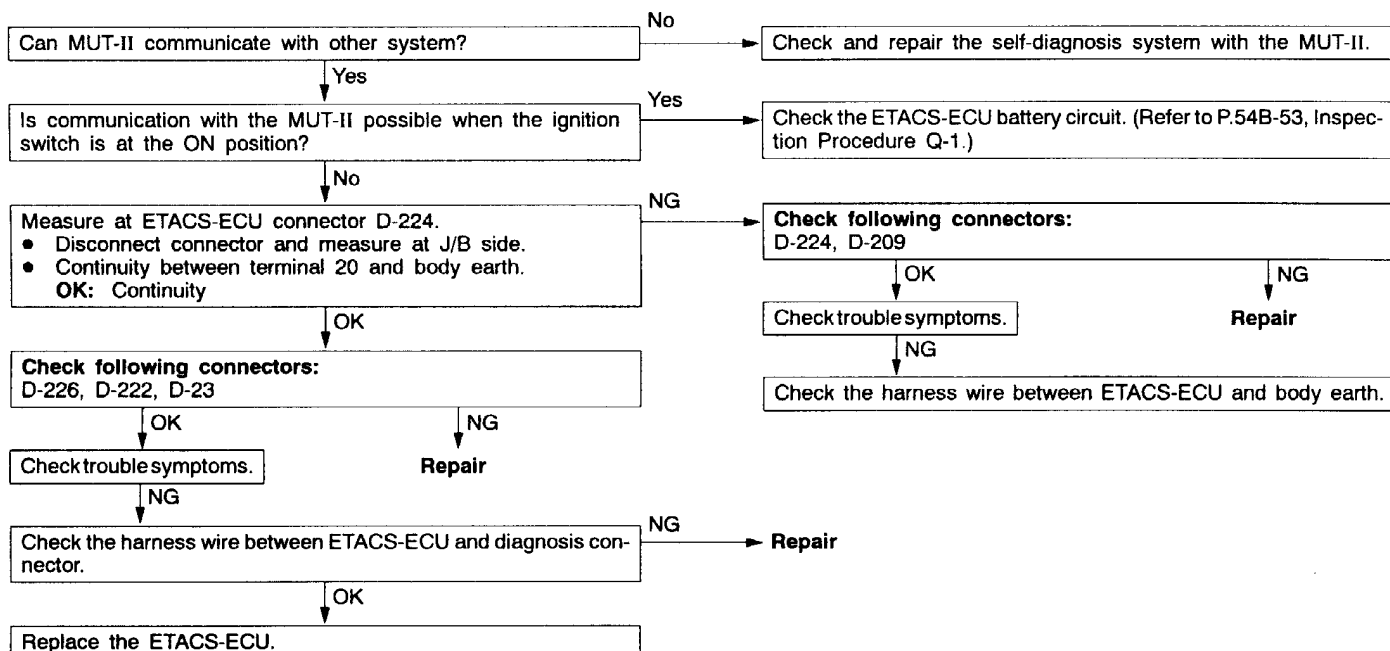
Trouble symptom	Inspection procedure	Reference page
Ignition switch (ACC) signal is not sent to the ETACS-ECU.	P-1	54B-42
Ignition switch (IG1) signal is not sent to the ETACS-ECU.	P-2	54B-42
Key reminder switch signal is not sent to the ETACS-ECU.	P-3	54B-43
Hazard warning lamp switch signal is not sent to the ETACS-ECU.	P-4	54B-43
Front fog lamp switch signal is not sent to the ETACS-ECU.	P-5	54B-44
Rear fog lamp switch signal is not sent to the ETACS-ECU.	P-6	54B-45
Back-up lamp switch signal is not sent to the ETACS-ECU. <M/T>	P-7	54B-45
Inhibitor switch (reverse) signal is not sent to the ETACS-ECU. <A/T>	P-8	54B-46
Rear wiper motor auto-stop signal is not sent to the ETACS-ECU.	P-9	54B-46
Driver's door switch signal is not sent to the ETACS-ECU.	P-10	54B-47
Door switches signal is not sent to the ETACS-ECU.		
Front passenger's or back door lock key cylinder switch signal is not sent to the ETACS-ECU.	P-11	54B-48
Driver's door lock actuator switch signal is not sent to the ETACS-ECU.	P-12	54B-48

Trouble symptom		Inspection procedure	Reference page
Column switch	Tail lamp switch signal is not sent to the ETACS-ECU.	P-13	54B-49
	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.	P-14	54B-50
	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.	P-15	54B-50
	Windshield washer switch signal is not sent to the ETACS-ECU.	P-14	54B-50
	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.	P-13	54B-49
Power window main switch	Any switch signal is not sent to the ETACS-ECU.	P-16	54B-51
Transmitter	Any switch signal is not sent to the ETACS-ECU.	P-17	54B-52
Sunroof switch	Any switch signal is not sent to the ETACS-ECU.	P-18	54B-52
Center display	Any switch signal is not sent to the ETACS-ECU.	P-19	54B-53

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

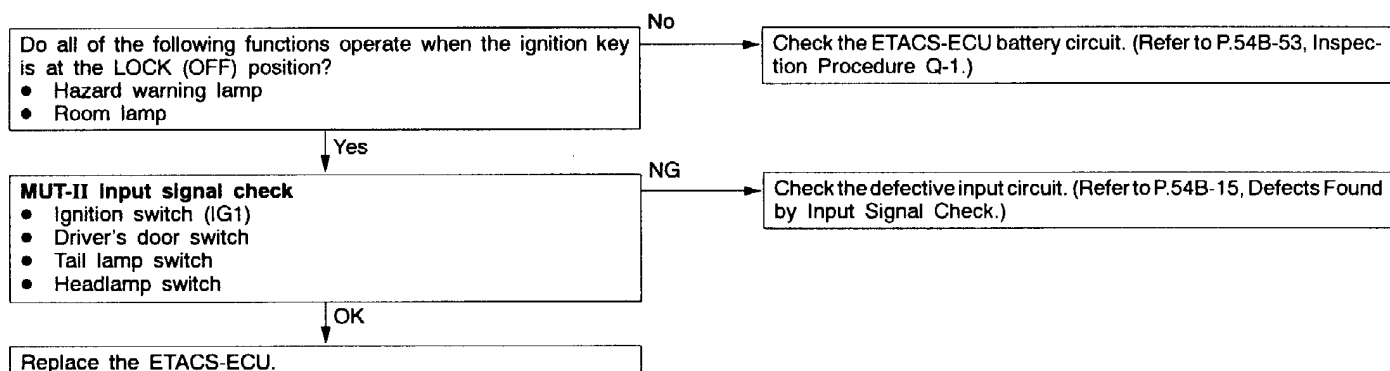
Inspection Procedure A-1

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.	• Malfunction of ETACS-ECU • Malfunction of harness wire or connector



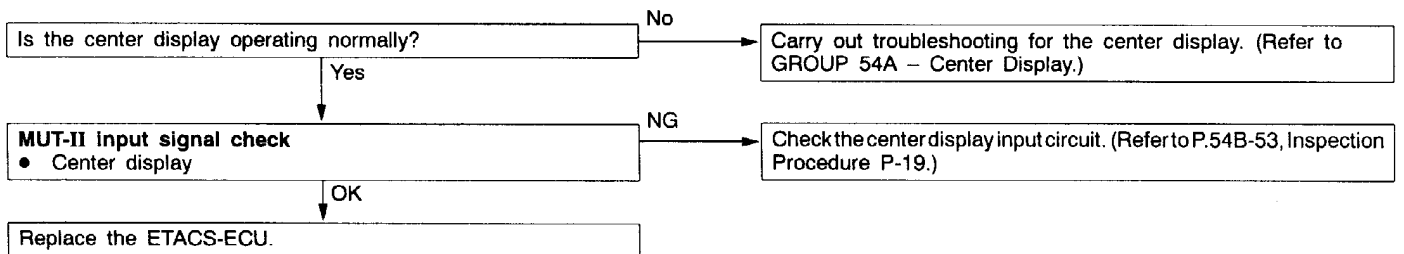
Inspection Procedure B-1

Buzzer: Light reminder warning buzzer function does not work normally.	Probable cause
The ETACS-ECU operates the light reminder warning buzzer function, based on input signals from the following switches: • Ignition switch (IG1) • Driver's door switch • Tail lamp switch • Headlamp switch If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.	• Malfunction of driver's door switch • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



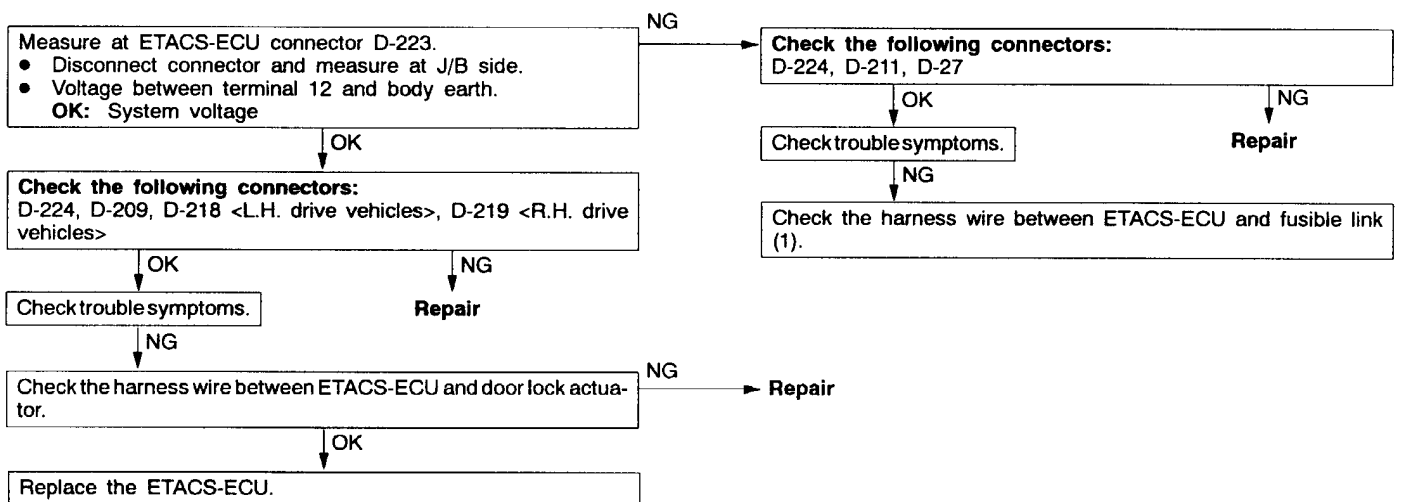
Inspection Procedure B-2

Buzzer: Center display operation annunciation function does not work normally.	Probable cause
If the center display is operating normally, the cause is probably a malfunction in the harness between the center display and the ETACS-ECU or in the ETACS-ECU itself.	• Malfunction of center display • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



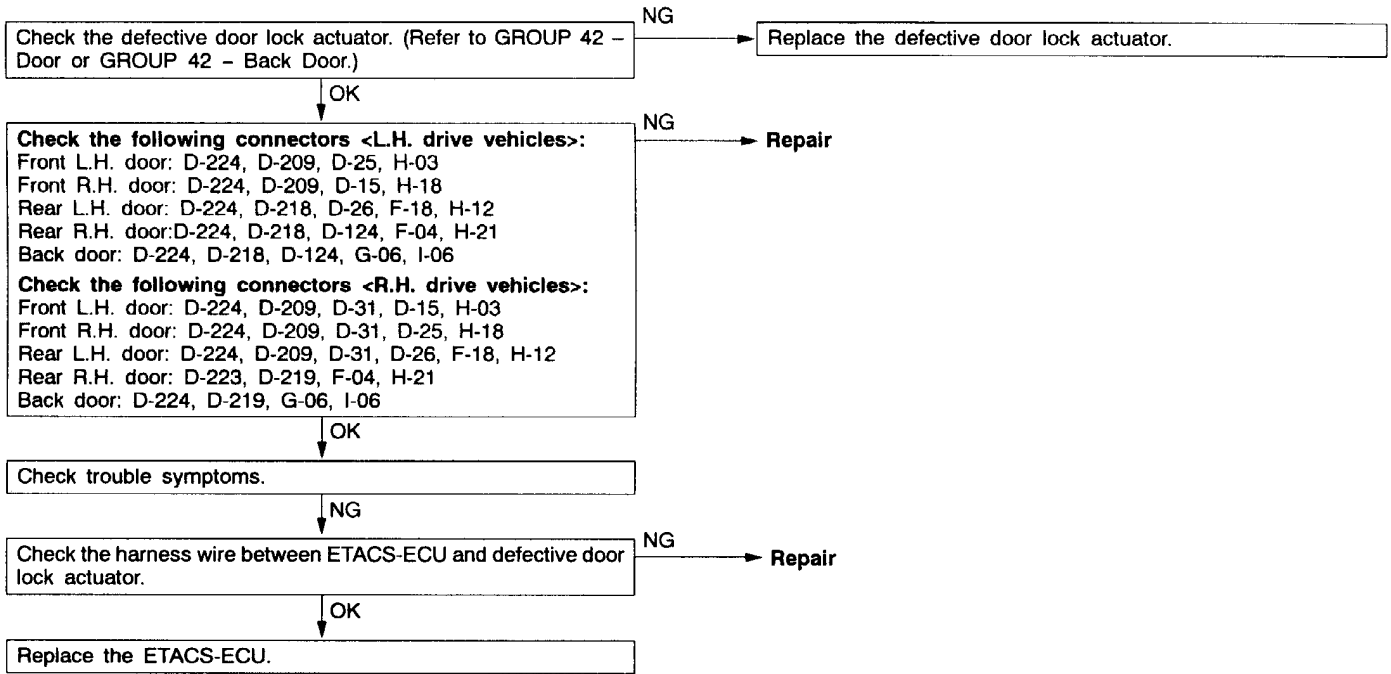
Inspection Procedure C-1

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.	• Malfunction of ETACS-ECU • Malfunction of harness wire or connector



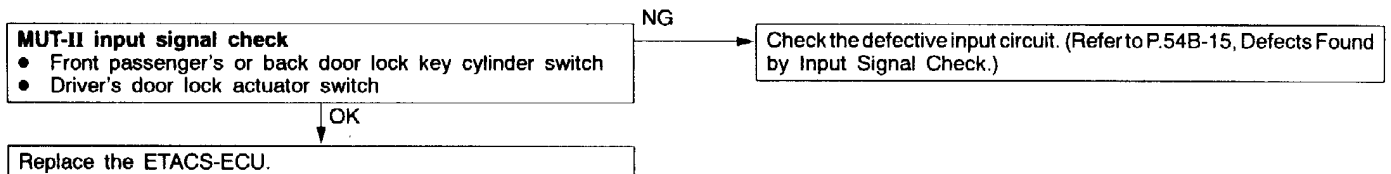
Inspection Procedure C-2

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.	• Malfunction of driver's, front passenger's, rear or back door lock actuator • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



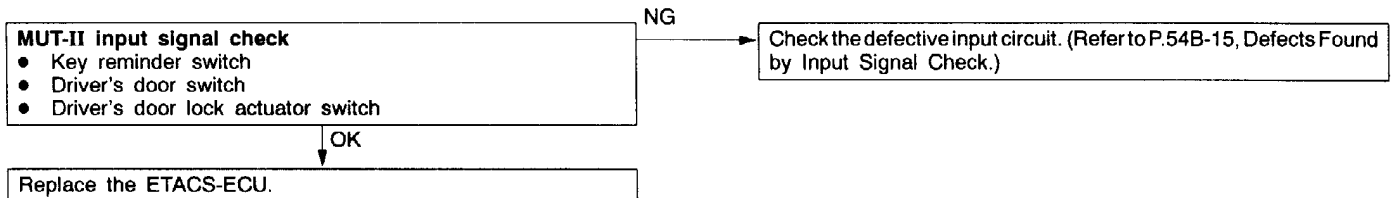
Inspection Procedure C-3

Central door locking system: Some functions of central locking system do not work.	Probable cause
The ETACS-ECU operates the central door locking system, based on input signals from the following switches: • Front passenger's or back door lock key cylinder switch • Driver's door lock actuator switch If the system does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.	• Malfunction of front passenger's or back door lock key cylinder switch • Malfunction of driver's door lock actuator switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



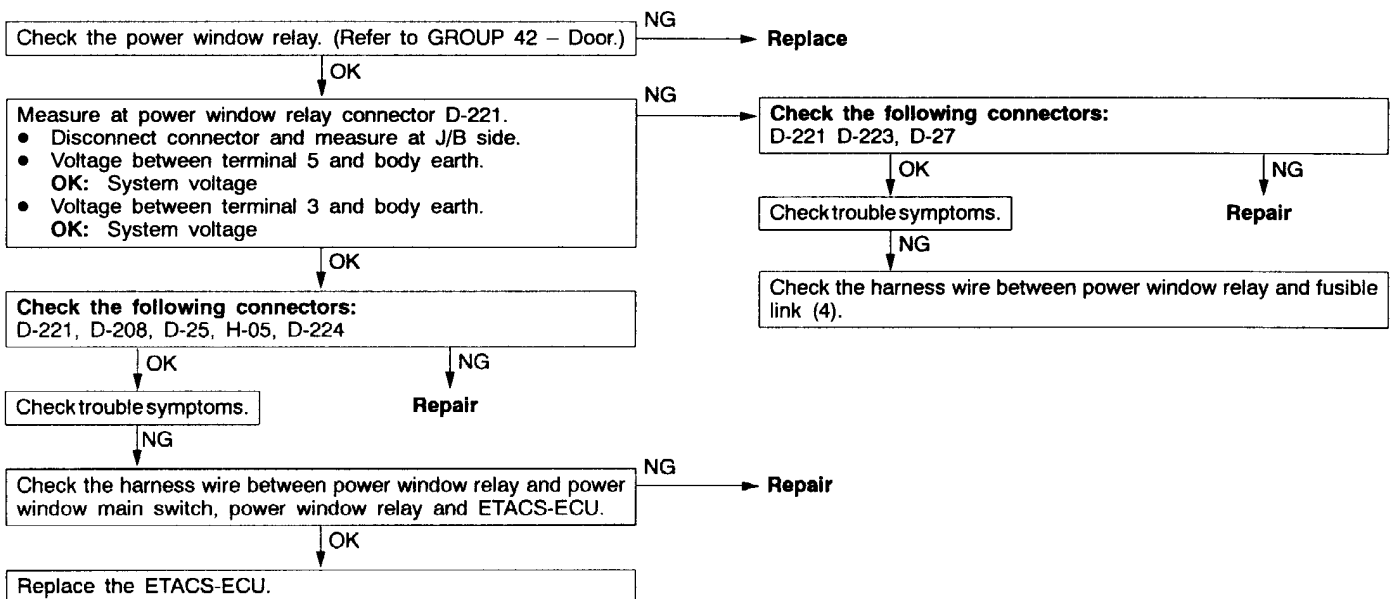
Inspection Procedure C-4

Central door locking system: Forgotten key prevention function does not work.	Probable cause
The ETACS-ECU operates the forgotten key prevention function, based on the input signals from the following switches: • Key reminder switch • Driver's door switch • Driver's door lock actuator switch If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.	• 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



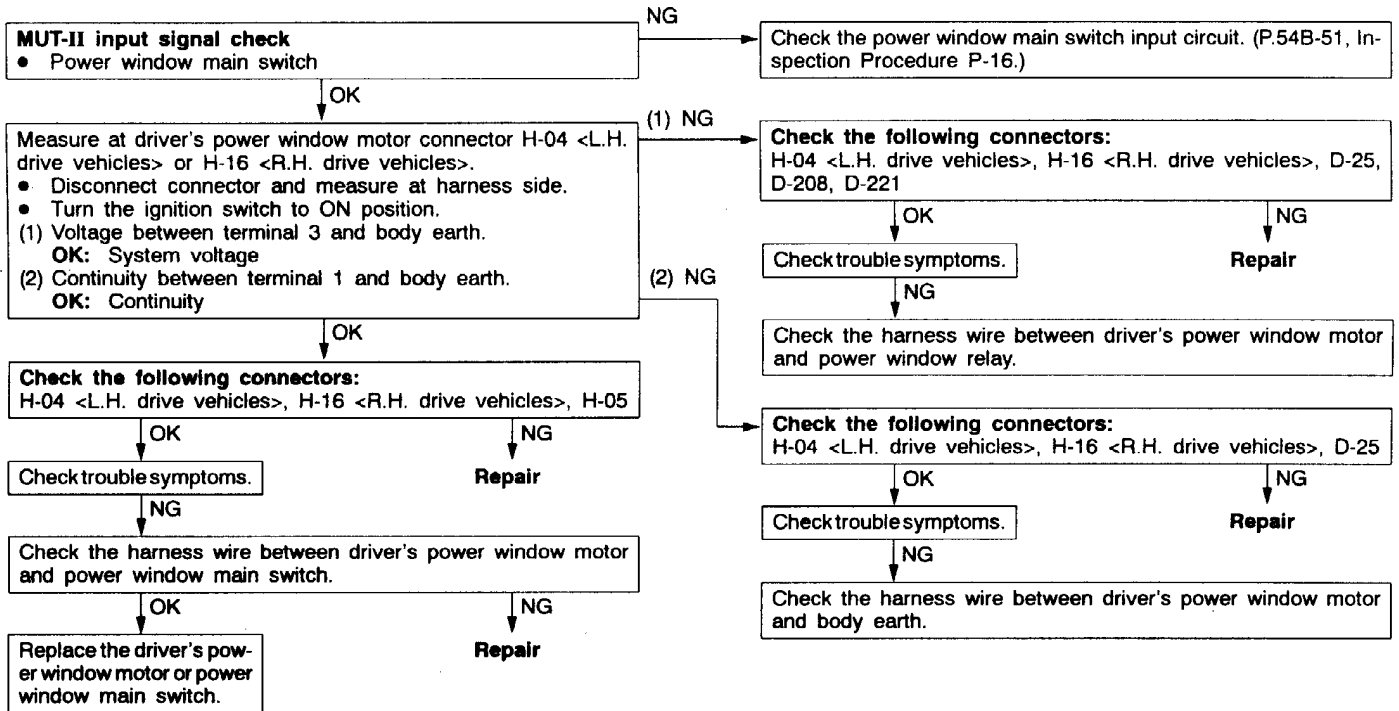
Inspection Procedure D-1

Power window: Power window do not work at all.	Probable cause
The power window relay or the ETACS-ECU may be defective.	• Malfunction of power window relay • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



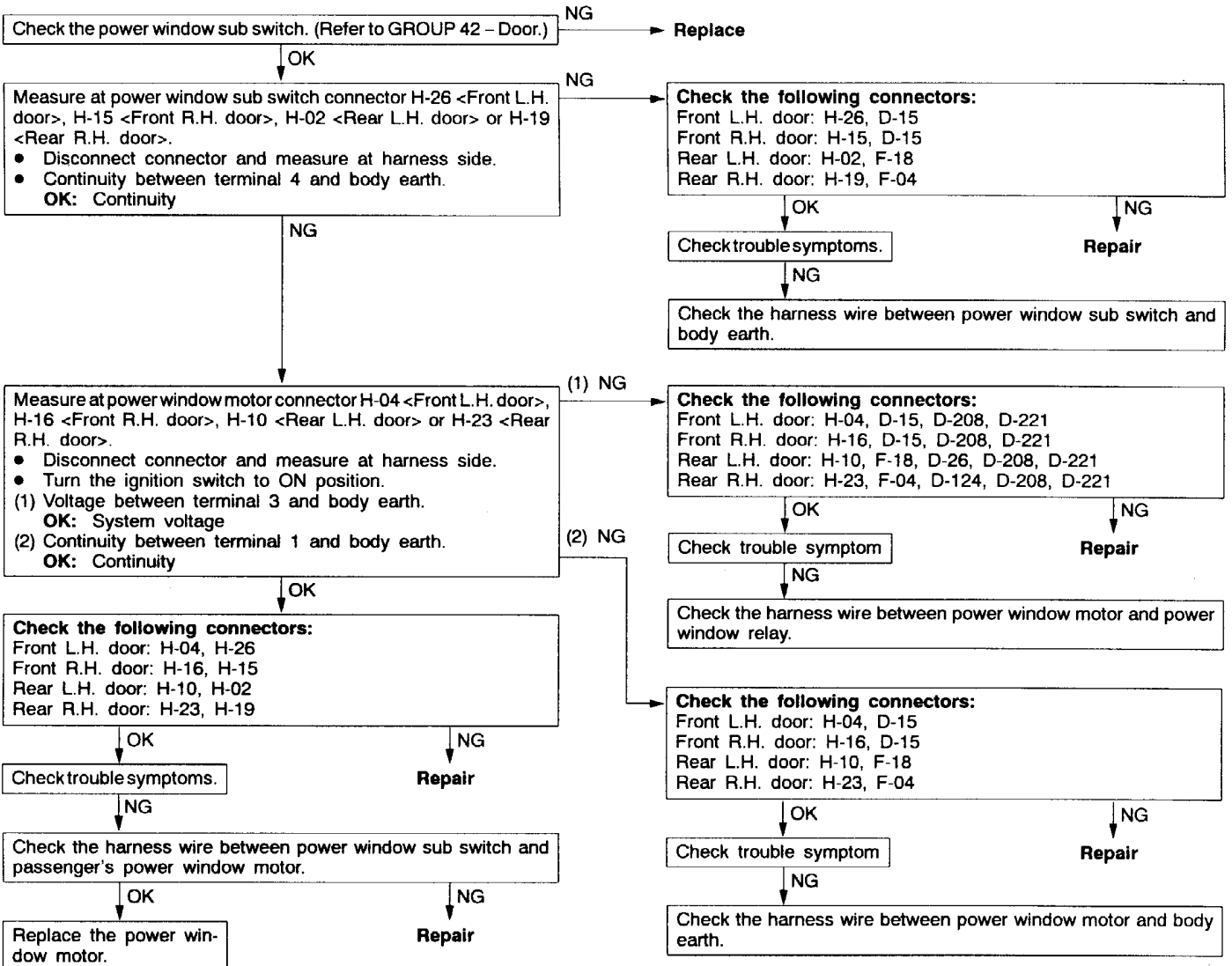
Inspection Procedure D-2

Power window: Power window main switch can not operate driver'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.	• Malfunction of power window main switch • Malfunction of driver's power window motor • Malfunction of harness wire or connector



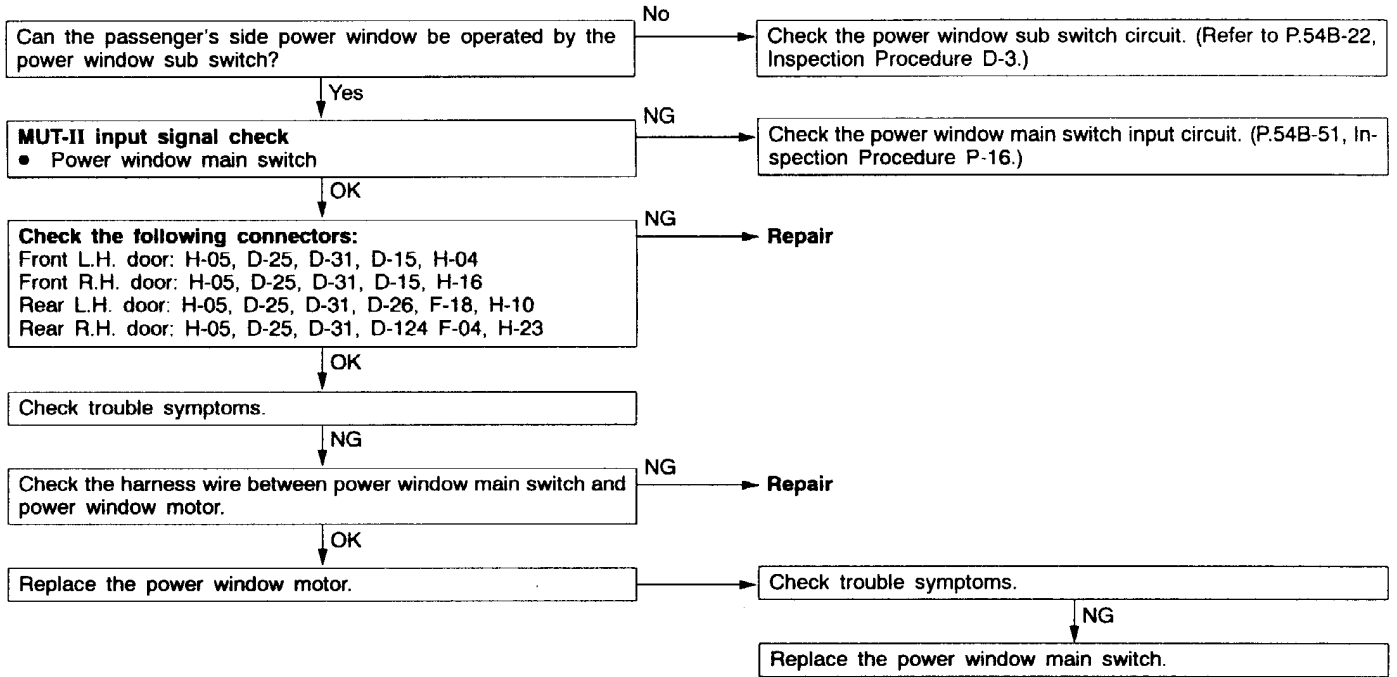
Inspection Procedure D-3

Power window: Power window sub switch can not operate front passenger's or rear window.	Probable cause
The cause is probably a malfunction of the power window sub switch or front passenger's or rear power window motor, or an abnormality in the power supply circuit.	• Malfunction of power window sub switch • Malfunction of front passenger's or rear power window motor • Malfunction of harness wire or connector



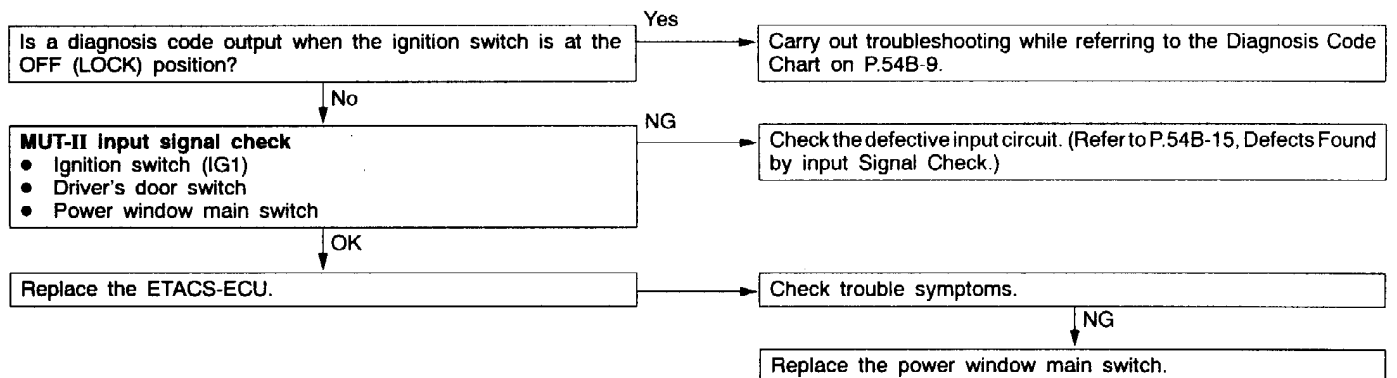
Inspection Procedure D-4

Power window: Power window main switch can not operate front passenger's or rear window.	Probable cause
The cause is probably a malfunction of the power window main switch or front passenger's or rear power window motor, or an abnormality in the power supply circuit.	• Malfunction of power window main switch • Malfunction of front passenger's or rear power window motor • Malfunction of harness wire or connector



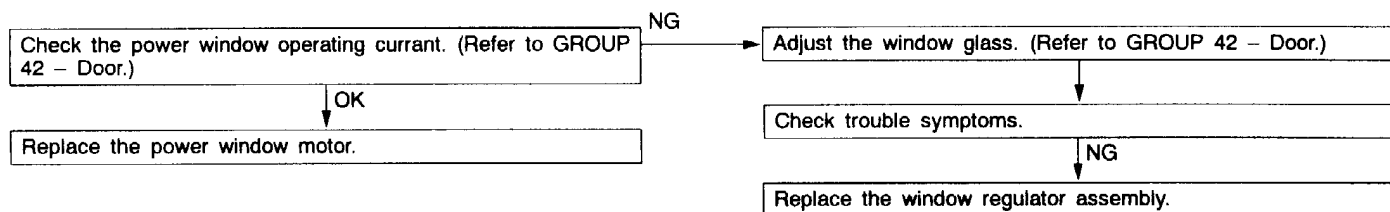
Inspection Procedure D-5

Power window: Power window timer function does not work normally.	Probable cause
The ETACS-ECU operates the power window timer function, based on the input signals from the following switches: • Ignition switch (IG1) • Driver's door switch If the function does not work normally, a defect on the relevant circuit, power window main switch or the ETACS-ECU may be suspected.	• Malfunction of driver's door switch • Malfunction of power window main 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.	• Incorrect window glass adjustment • Glass slider is incorrectly installed or warped • Malfunction of power window motor



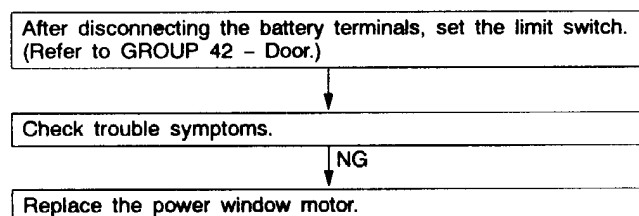
Inspection Procedure D-7

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.	• Malfunction of power window motor

Replace the power window motor.

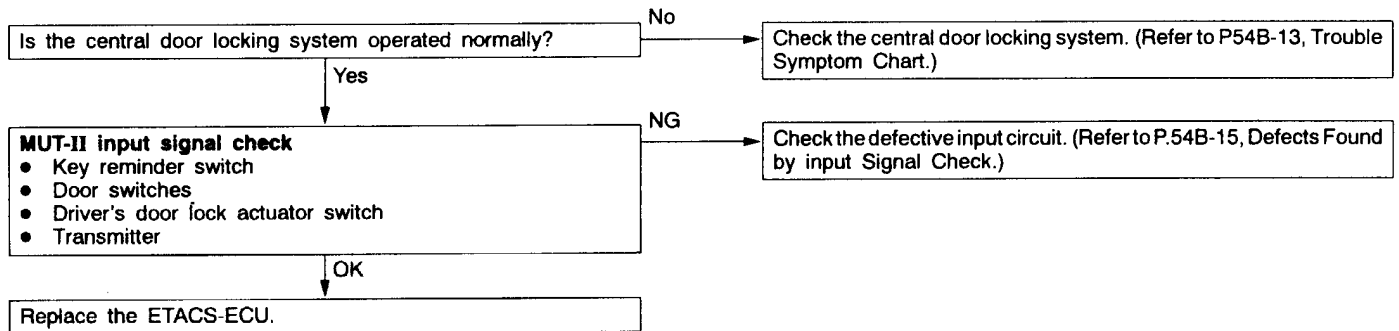
Inspection Procedure D-8

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.	• Malfunction of power window motor



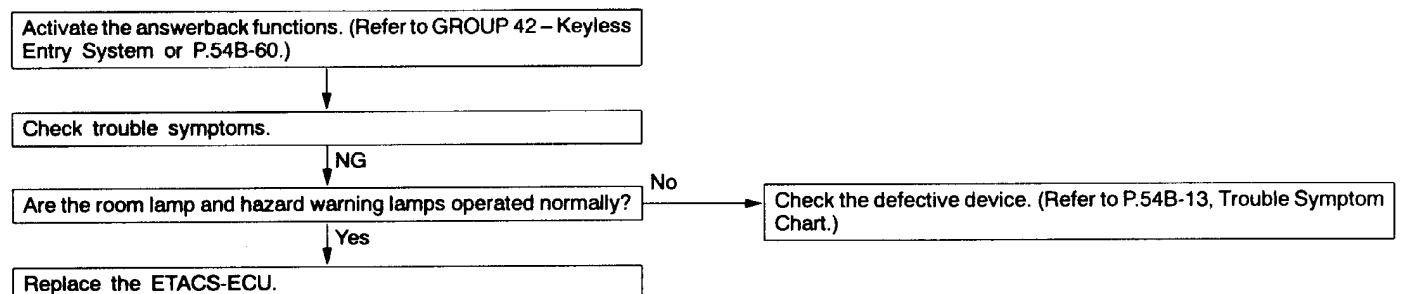
Inspection Procedure E-1

Keyless entry system: Keyless entry system does not operate.	Probable cause
The ETACS-ECU operates the keyless entry system, based on the input signals from the following switches: • Key reminder switch • Door switches • Driver's door lock actuator switch • Transmitter If the function does not work normally, a defect on the relevant circuit or the ETACS-ECU may be suspected.	• Malfunction of key reminder switch • Malfunction of door switches • Malfunction of driver's door lock actuator switch • Malfunction of transmitter • Malfunction of ETACS-ECU



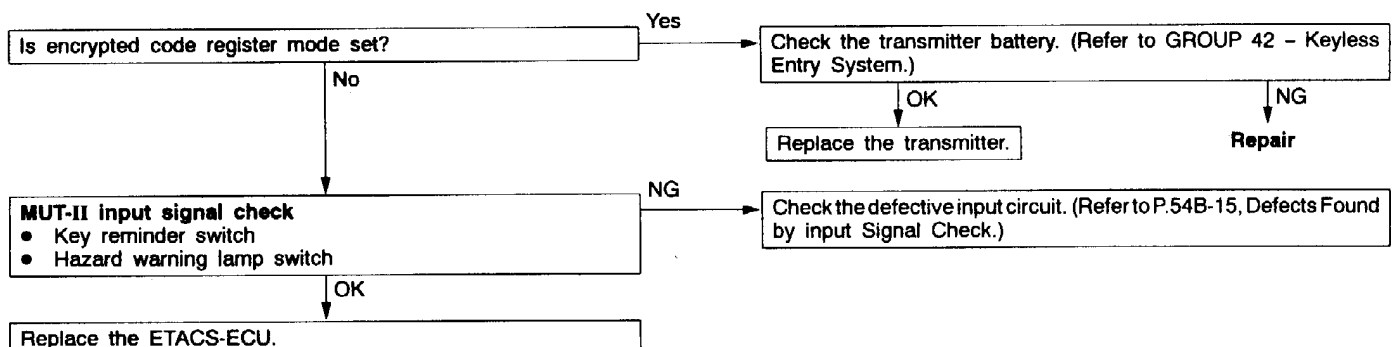
Inspection Procedure E-2

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.	• Malfunction of turn-signal lamp • Malfunction of room lamp • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



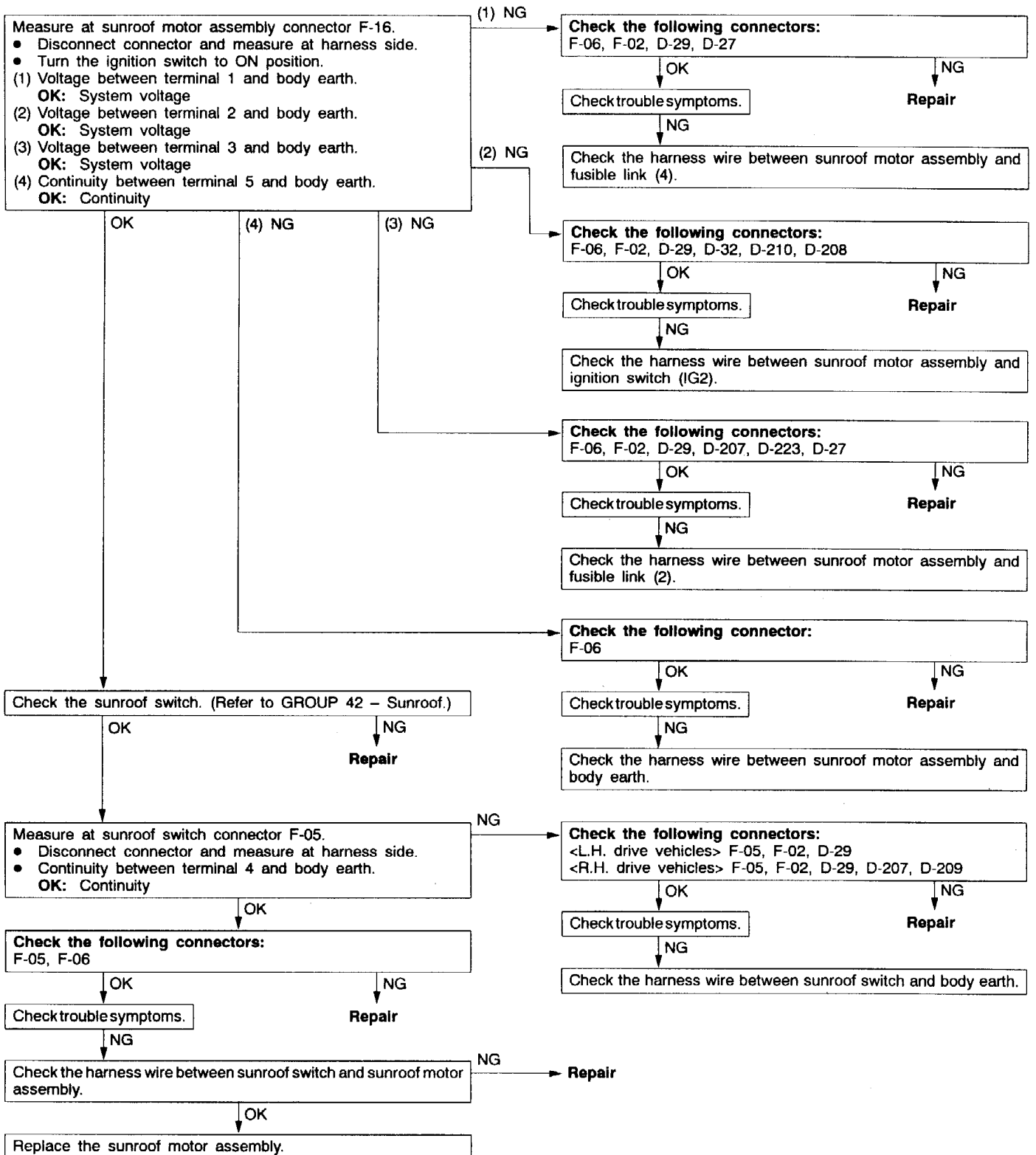
Inspection Procedure E-3

Keyless entry system: The encrypted code cannot be registered.	Probable cause
The ETACS-ECU activates the encrypted code register mode according to the following switch signals. • Key reminder switch • Hazard warning lamp switch If the encrypted code register mode is not set, the relevant input signal circuit or the ETACS-ECU may be defective. If a transmitter can not be registered although the encrypted code register mode is set, the transmitter or the ETACS-ECU may be defective.	• Malfunction of key reminder switch • Malfunction of hazard warning lamp switch • Malfunction of transmitter • Malfunction of ETACS-ECU • Malfunction of harness wire or connector

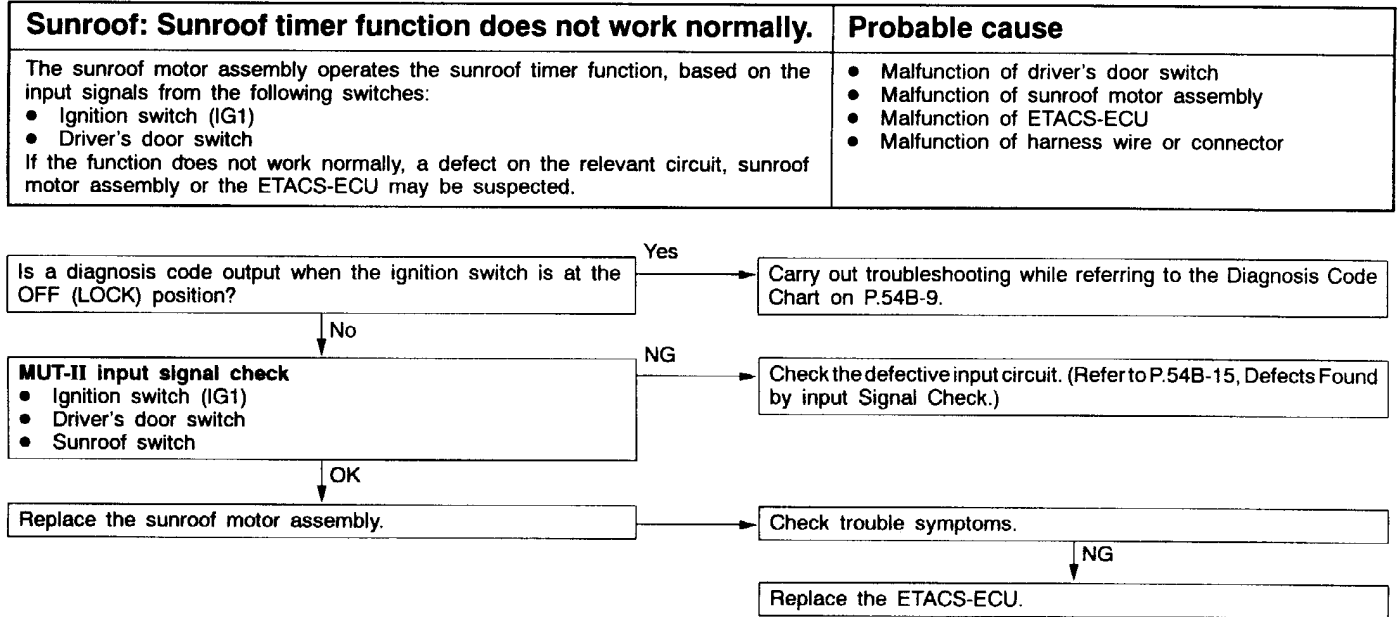


Inspection Procedure F-1

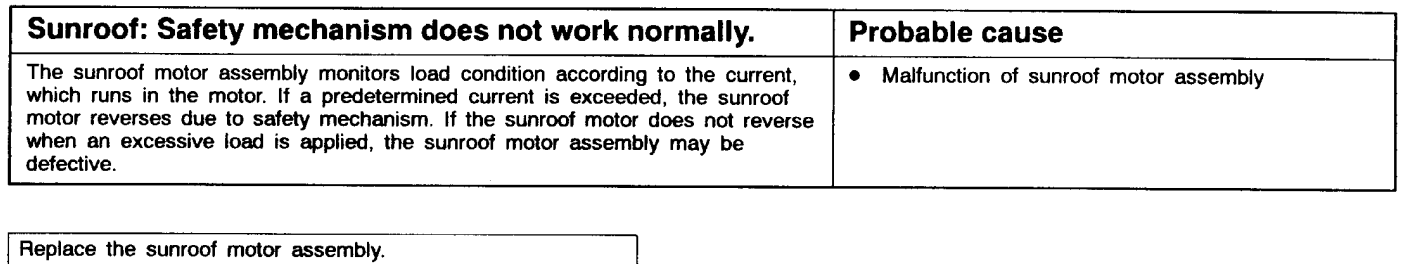
Sunroof: Sunroof does not work at all.	Probable cause
The power supply circuit of the sunroof motor assembly, the sunroof switch ground circuit, or the sunroof motor assembly may be defective.	• Malfunction of sunroof switch • Malfunction of sunroof motor assembly • Malfunction of harness wire or connector



Inspection Procedure F-2

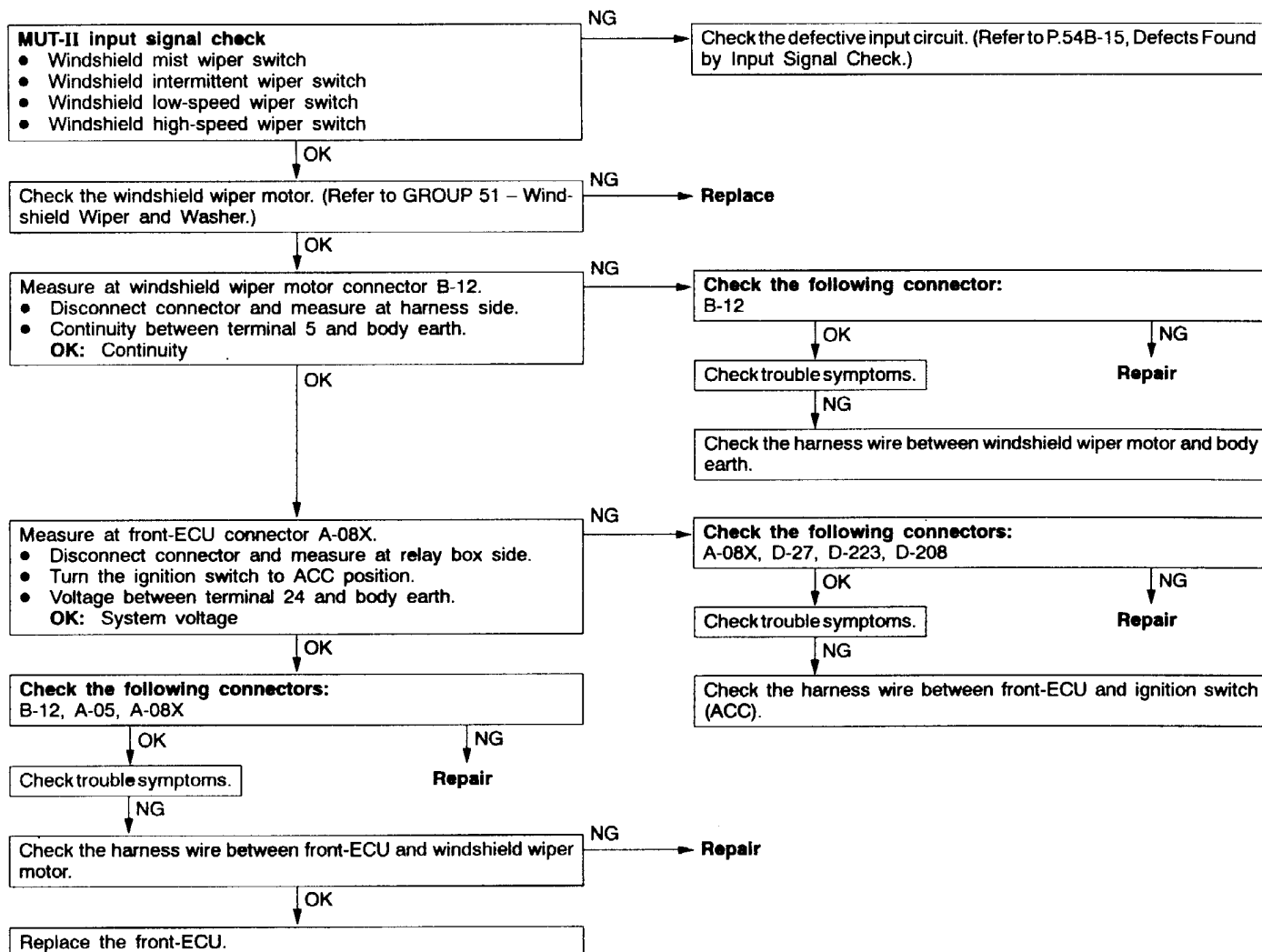


Inspection Procedure F-3



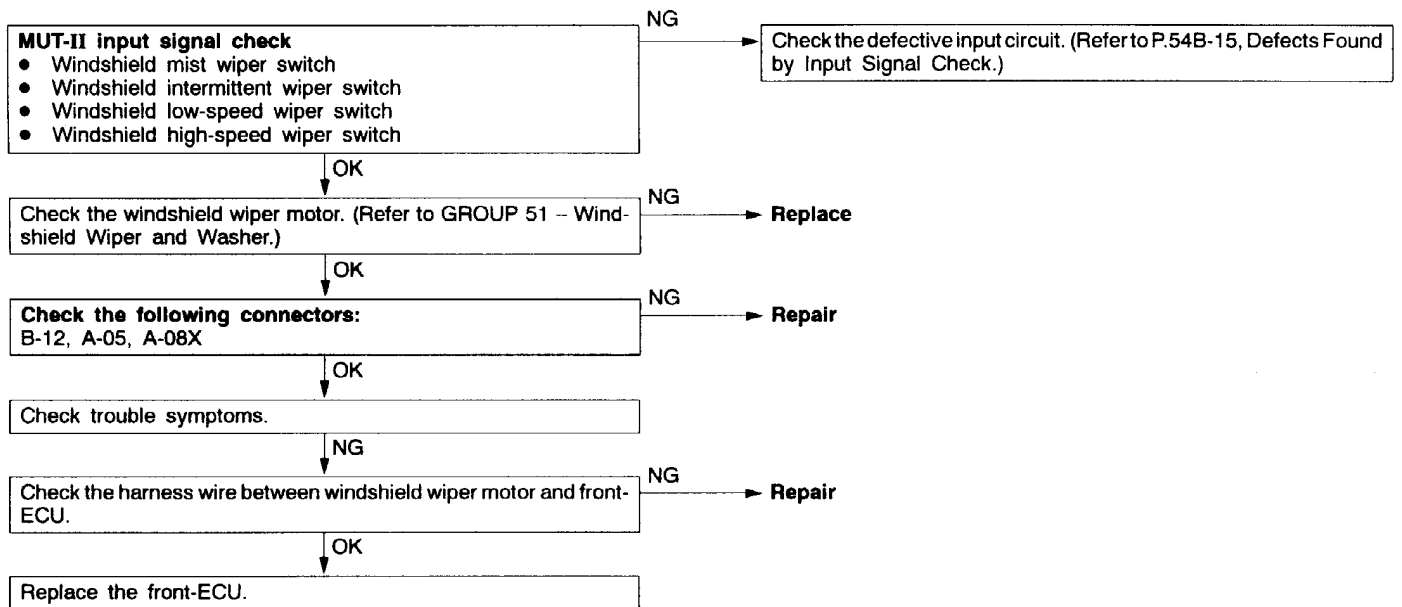
Inspection Procedure G-1

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.	• Malfunction of windshield wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



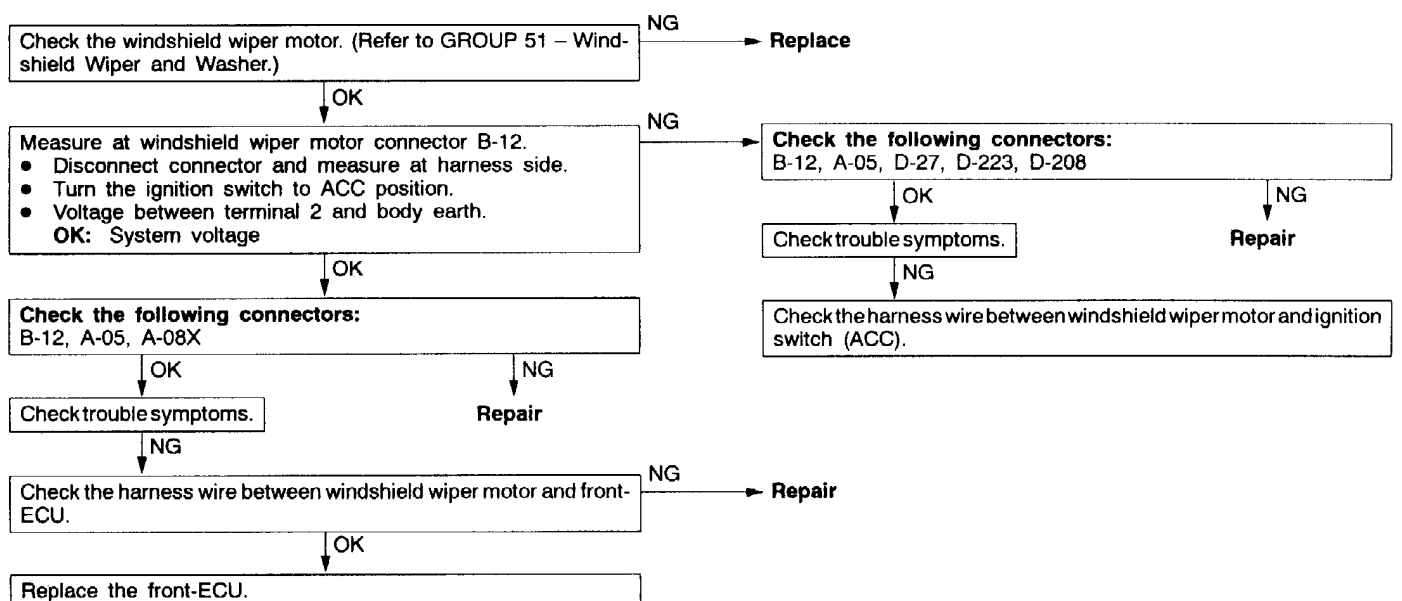
Inspection Procedure G-2

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.	• Malfunction of windshield wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



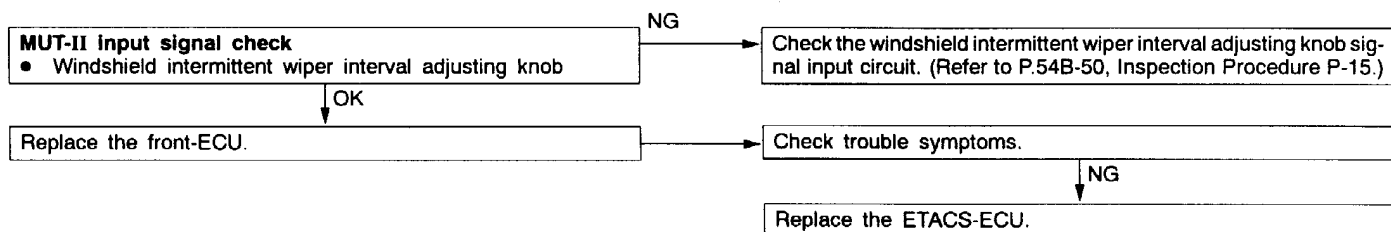
Inspection Procedure G-3

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.	• Malfunction of windshield wiper motor • Malfunction of front-ECU • Malfunction of harness wire or connector



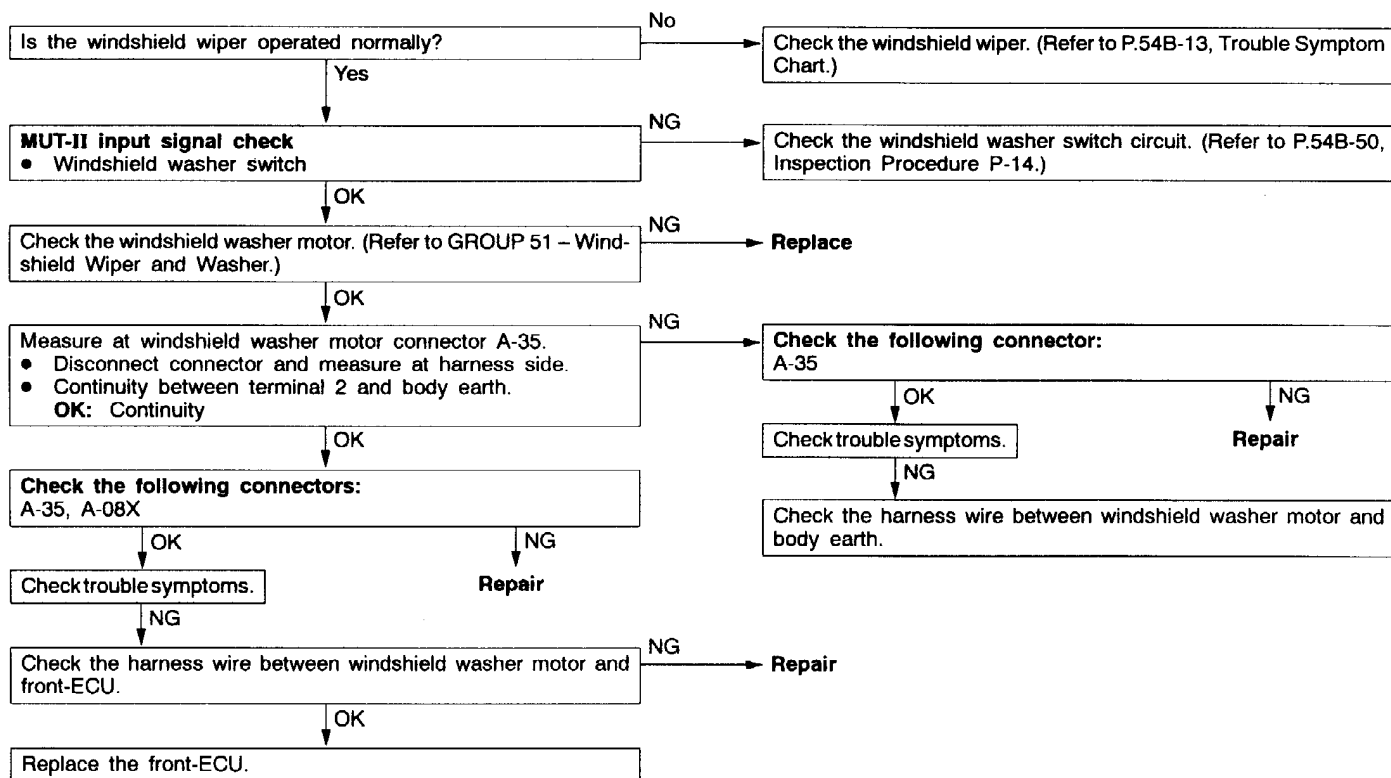
Inspection Procedure G-4

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.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



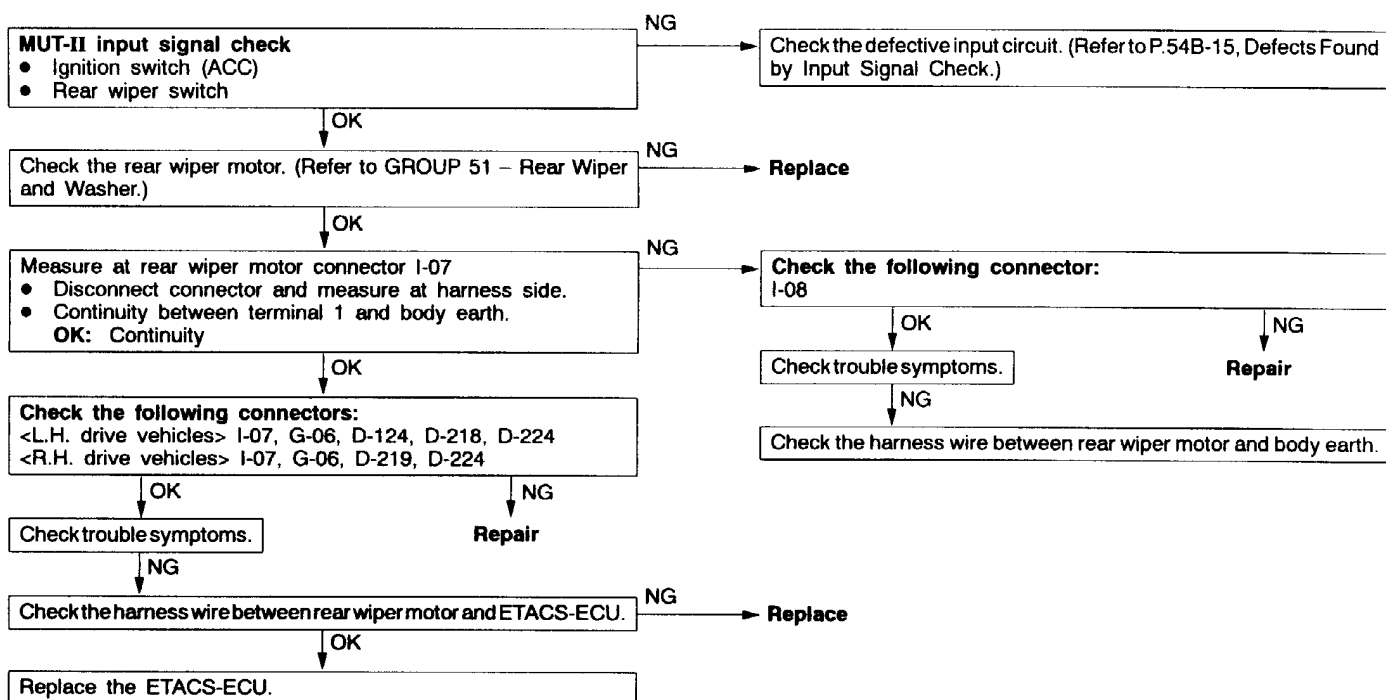
Inspection Procedure G-5

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.	• Malfunction of windshield washer motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



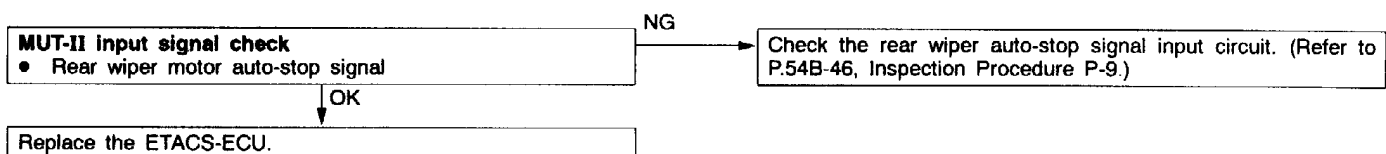
Inspection Procedure H-1

Rear wiper and washer: Rear wiper does not work normally.	Probable cause
The ETACS-ECU operates the rear wiper according to the input signals from the following switches: • Ignition switch (ACC) • Rear wiper switch 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.	• Malfunction of rear wiper motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



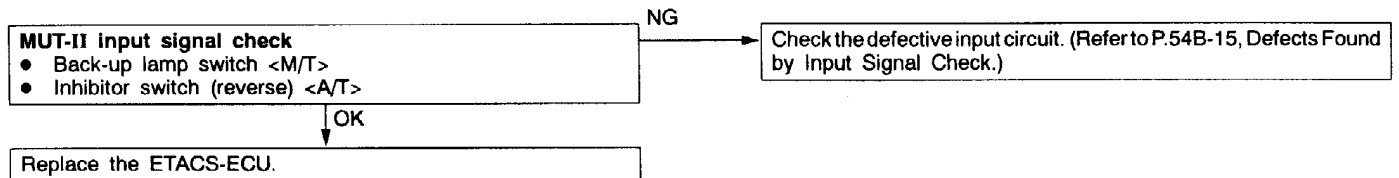
Inspection Procedure H-2

Rear wiper and washer: Rear wiper does not stop at the predetermined park position.	Probable cause
The rear wiper motor or the ETACS-ECU may be defective.	• Malfunction of rear wiper motor • Malfunction of front-ECU • Malfunction of harness wire or connector



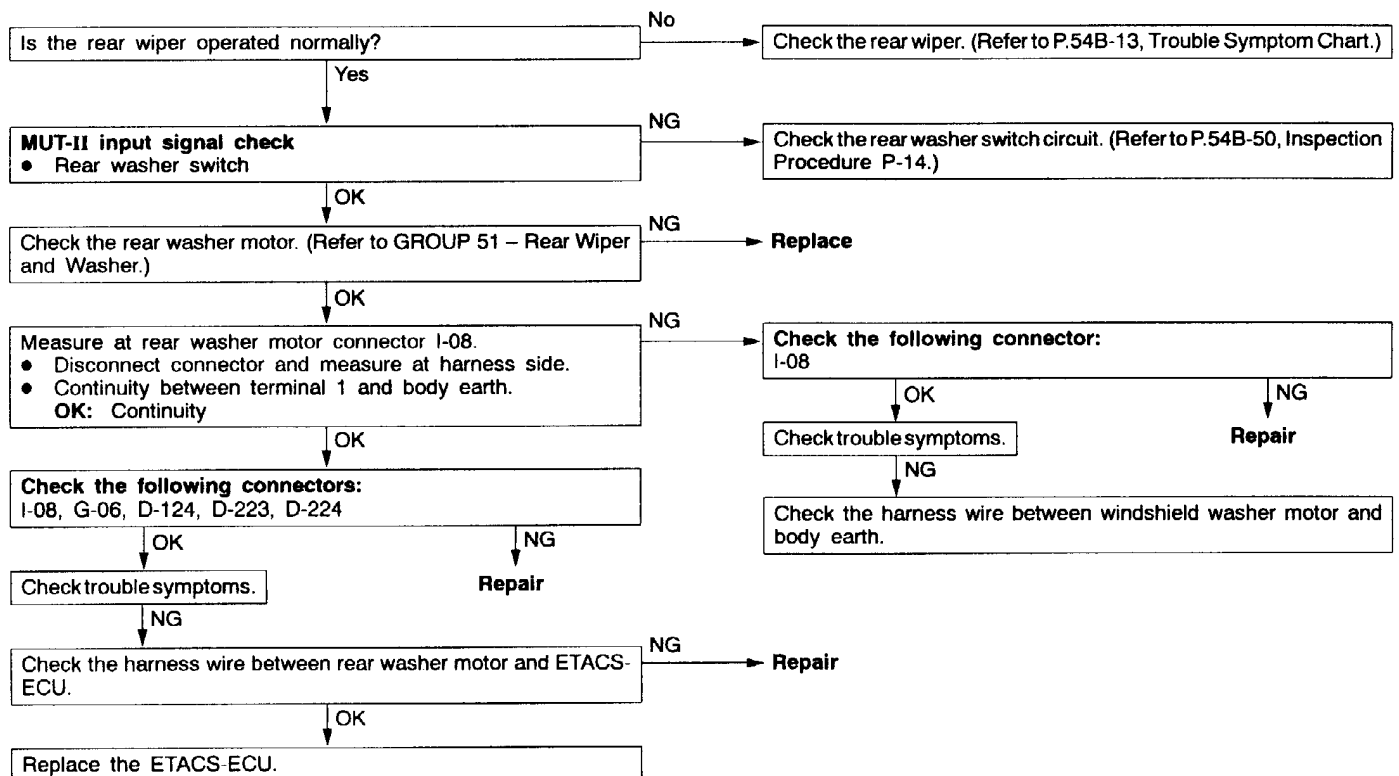
Inspection Procedure H-3

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.	• Malfunction of back-up lamp switch • Malfunction of inhibitor switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



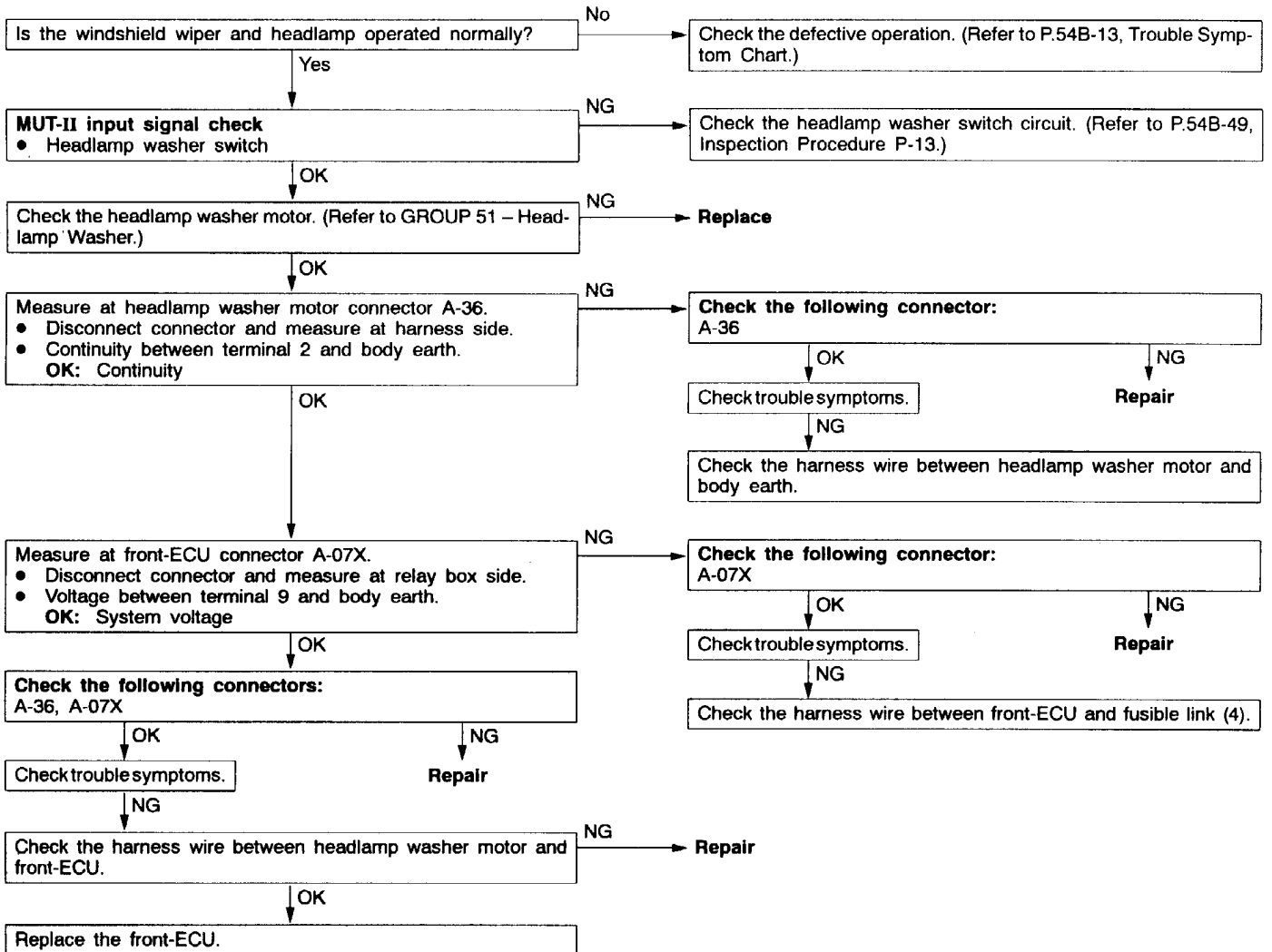
Inspection Procedure H-4

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.	• Malfunction of rear washer motor • Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



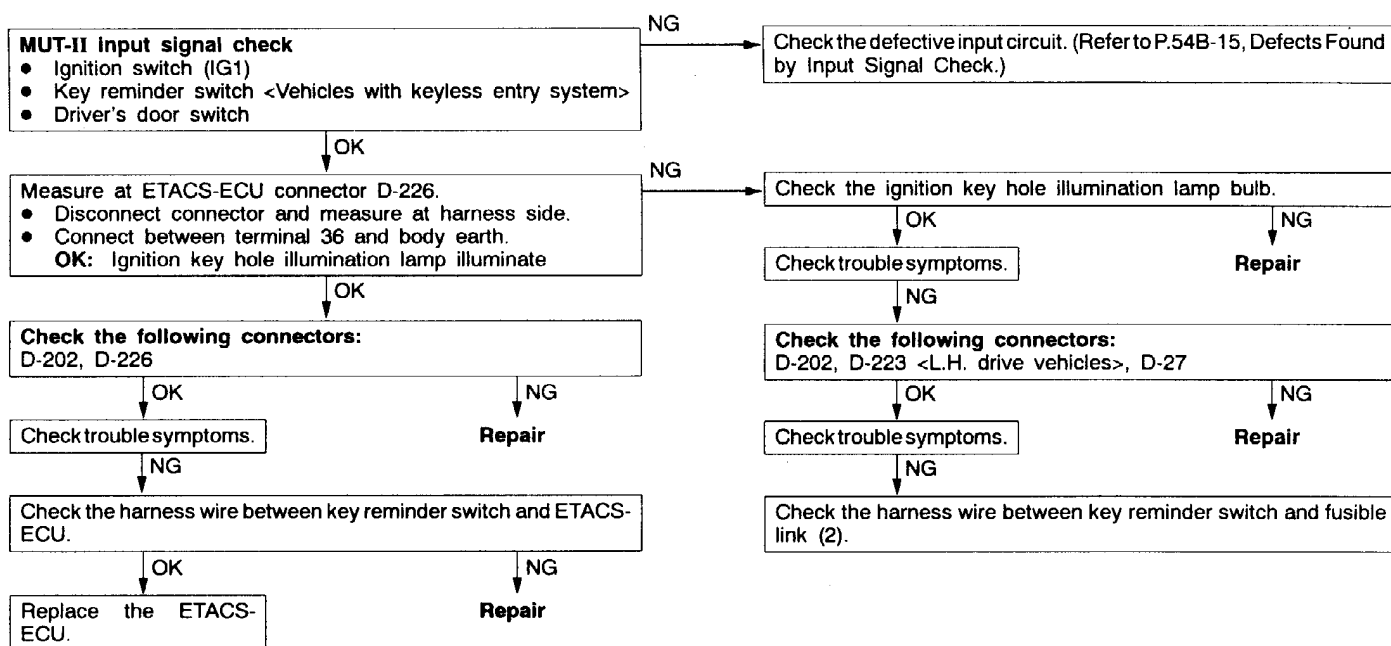
Inspection Procedure I-1

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.	• Malfunction of headlamp washer motor • Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



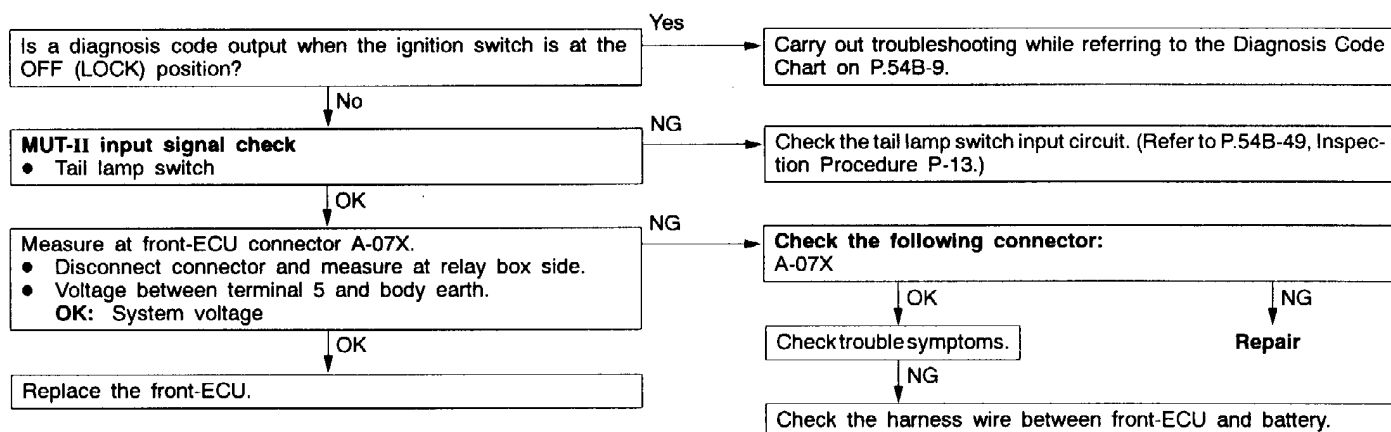
Inspection Procedure J-1

Ignition key hole illumination lamp: Ignition key hole illumination lamp does not work normally.	Probable cause
The ETACS-ECU operates the ignition key hole illumination lamp operation, based on input signals from the following switches: • Ignition switch (IG1) • Key reminder switch <Vehicles with keyless entry system> • Driver's door switch If the ignition key hole illumination lamp does not work normally, the relevant input signal circuit, the combination meter or the ETACS-ECU may be defective.	• Malfunction of key reminder switch <Vehicles with keyless entry system> • Malfunction of driver's door switch • Malfunction of combination meter • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



Inspection Procedure K-1

Headlamp, tail lamp: Tail lamp do not illuminate.	Probable cause
The column switch or the front-ECU may be defective.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

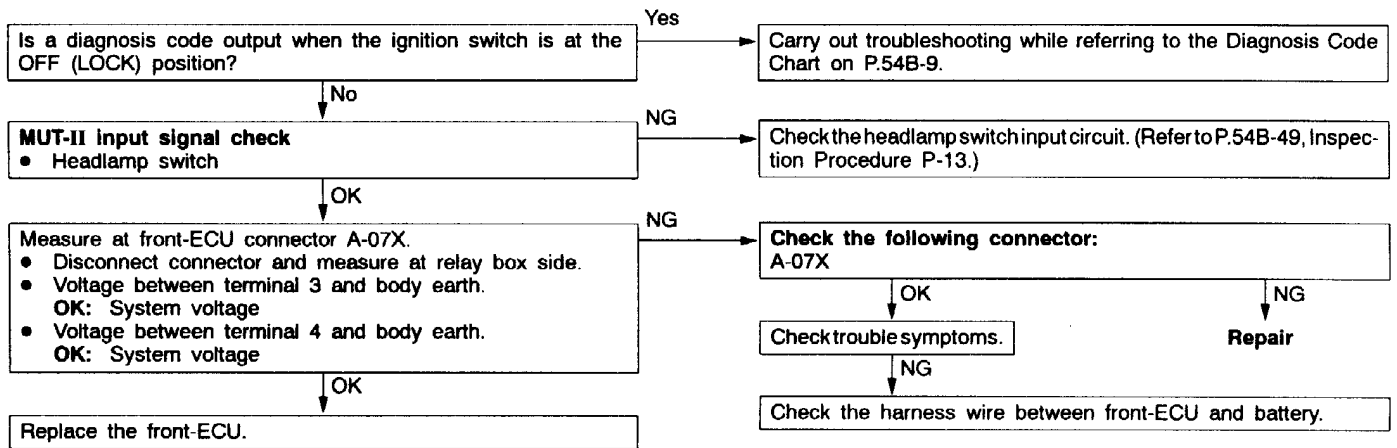


NOTE

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 K-2

Headlamp, tail lamp: Headlamps (low-beam) do not illuminate.	Probable cause
The column switch or the front-ECU may be defective.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

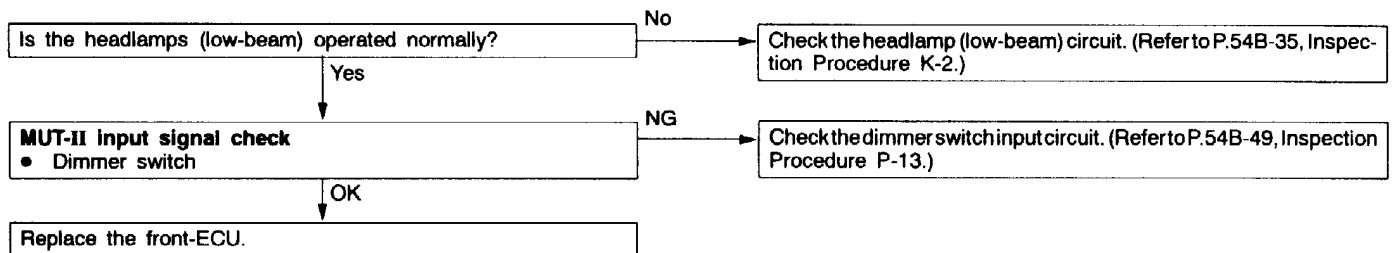


NOTE

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 K-3

Headlamp, tail lamp: Headlamps (high-beam) do not illuminate.	Probable cause
The column switch or the front-ECU is suspected to be defective.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector

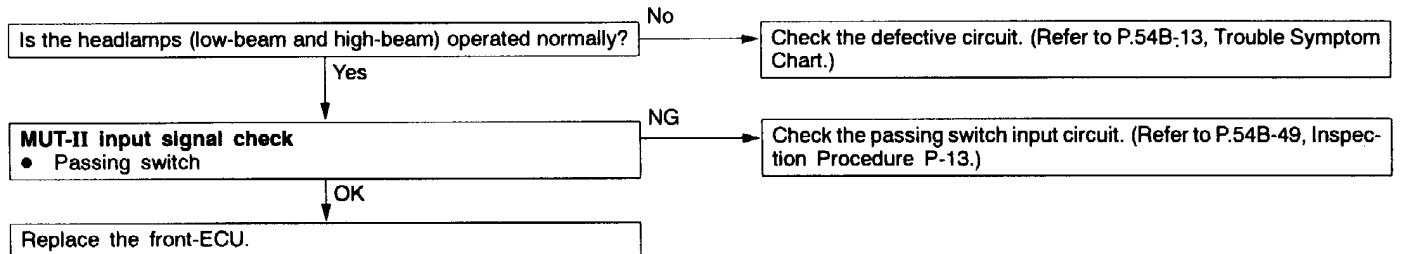


NOTE

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.

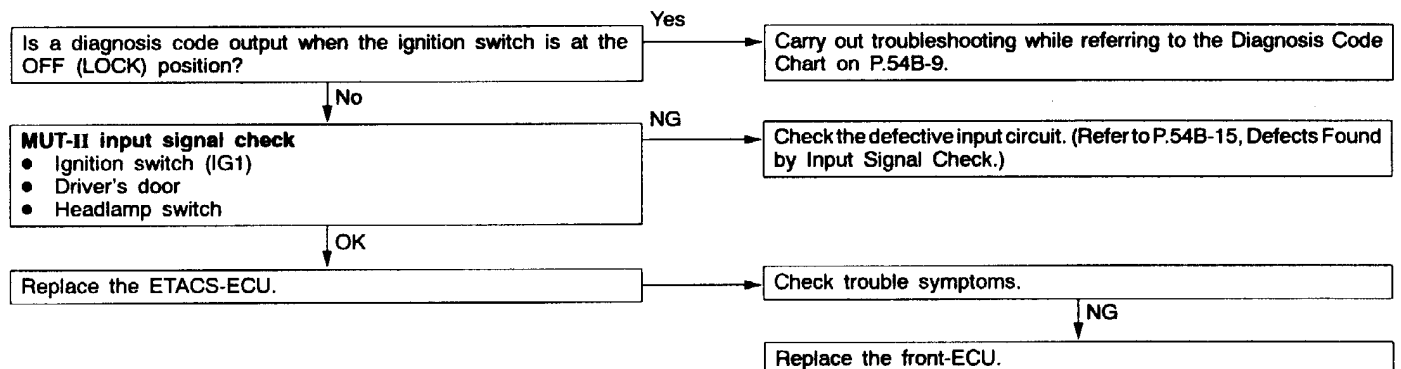
Inspection Procedure K-4

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.	• Malfunction of column switch • Malfunction of front-ECU • Malfunction of harness wire or connector



Inspection Procedure K-5

Headlamp, tail lamp: The headlamp automatic shutdown function does not work normally.	Probable cause
The ETACS-ECU operates the headlamp automatic shutdown function, based on the signals from the following switches • Ignition switch (IG1) • Driver's door switch • Headlamp switch If the head lamp automatic shutdown function does work normally, a defect on relevant input circuits, the ETACS-ECU or the front-ECU is suspected.	• Malfunction of driver's door switch • Malfunction of column switch. • Malfunction of front-ECU • Malfunction of harness wire or connector



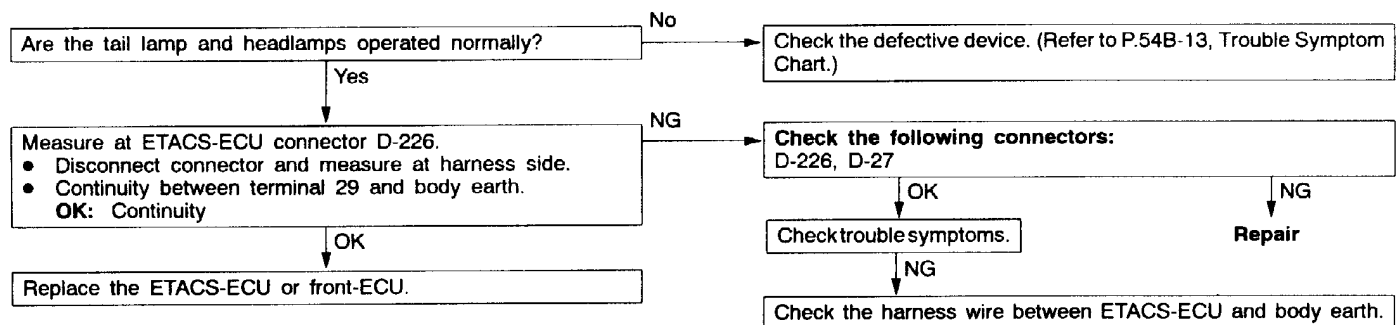
Inspection Procedure K-6

Headlamp, tail lamp: Headlamps dimmer switch automatic reset function does not work normally.	Probable cause
The headlamp dimmer switch automatic reset function is controlled by the front-ECU. If a defect appears, the front-ECU may be defective.	Malfunction of front-ECU

Replace the front-ECU.

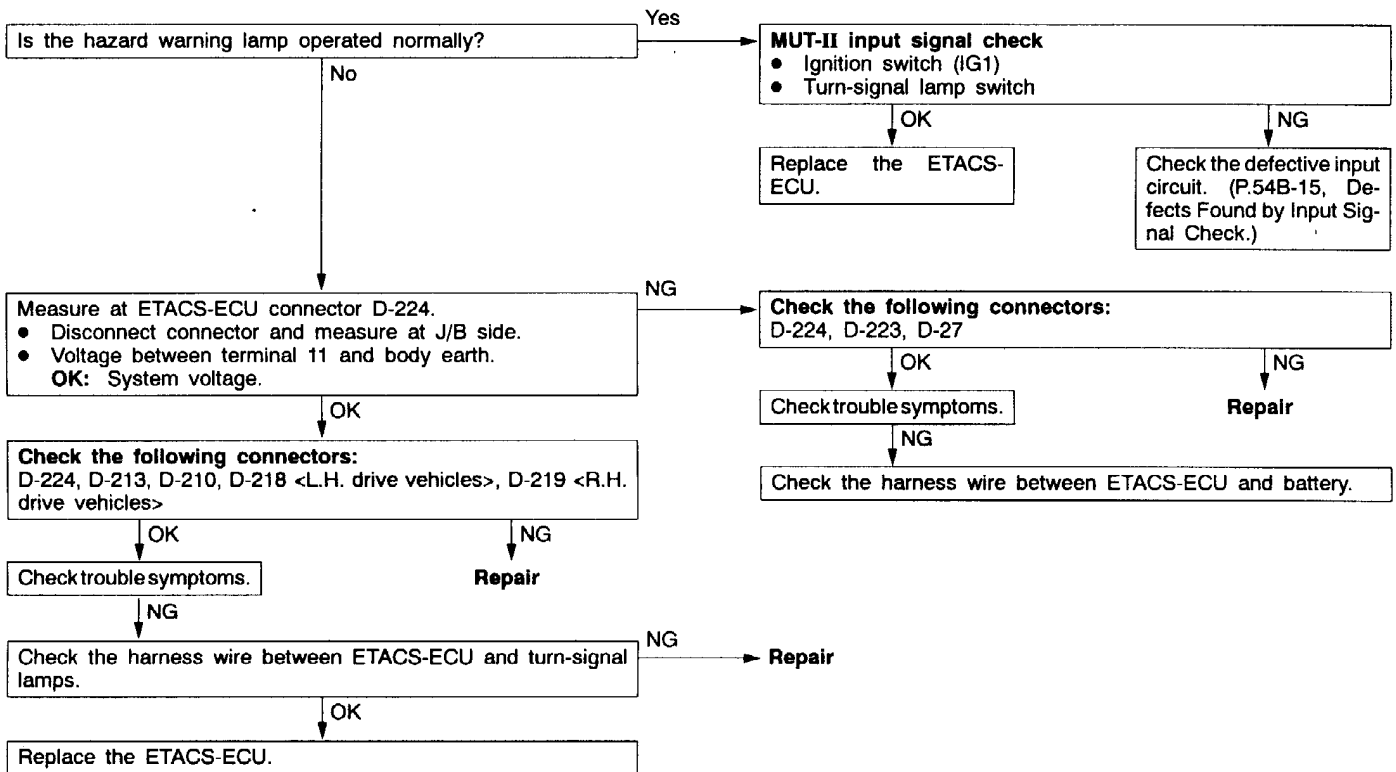
Inspection Procedure K-7

Headlamp, tail lamp: Daytime running lamp (DRL) function does not work.	Probable cause
The headlamp dimmer switch auto-reset function is controlled by the front-ECU. If a defect appears, the front-ECU may be defective.	- Malfunction of ETACS-ECU - Malfunction of front-ECU - Malfunction of harness wire or connector.



Inspection Procedure L-1

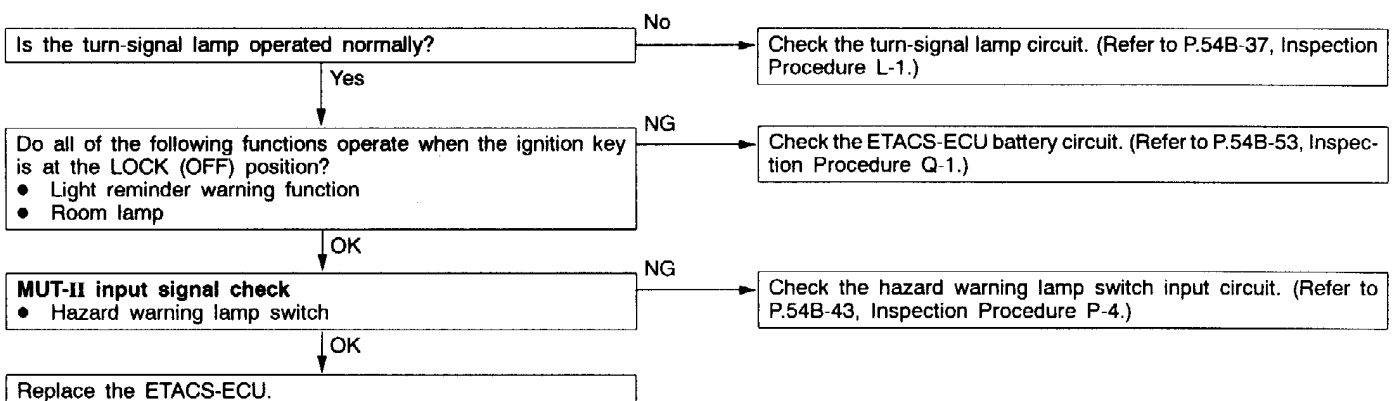
Flasher timer: Turn-signal lamp do not flash when the turn-signal lamp switch is turned on.	Probable cause
The ETACS-ECU makes the turn-signal lamps flash, based on the input signals from the following switches: - Ignition switch (IG1) - Turn-signal lamp switch If the turn-signal lamps do not flash normally, a defect on the relevant circuits or the ETACS-ECU may be suspected. 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.	- 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.

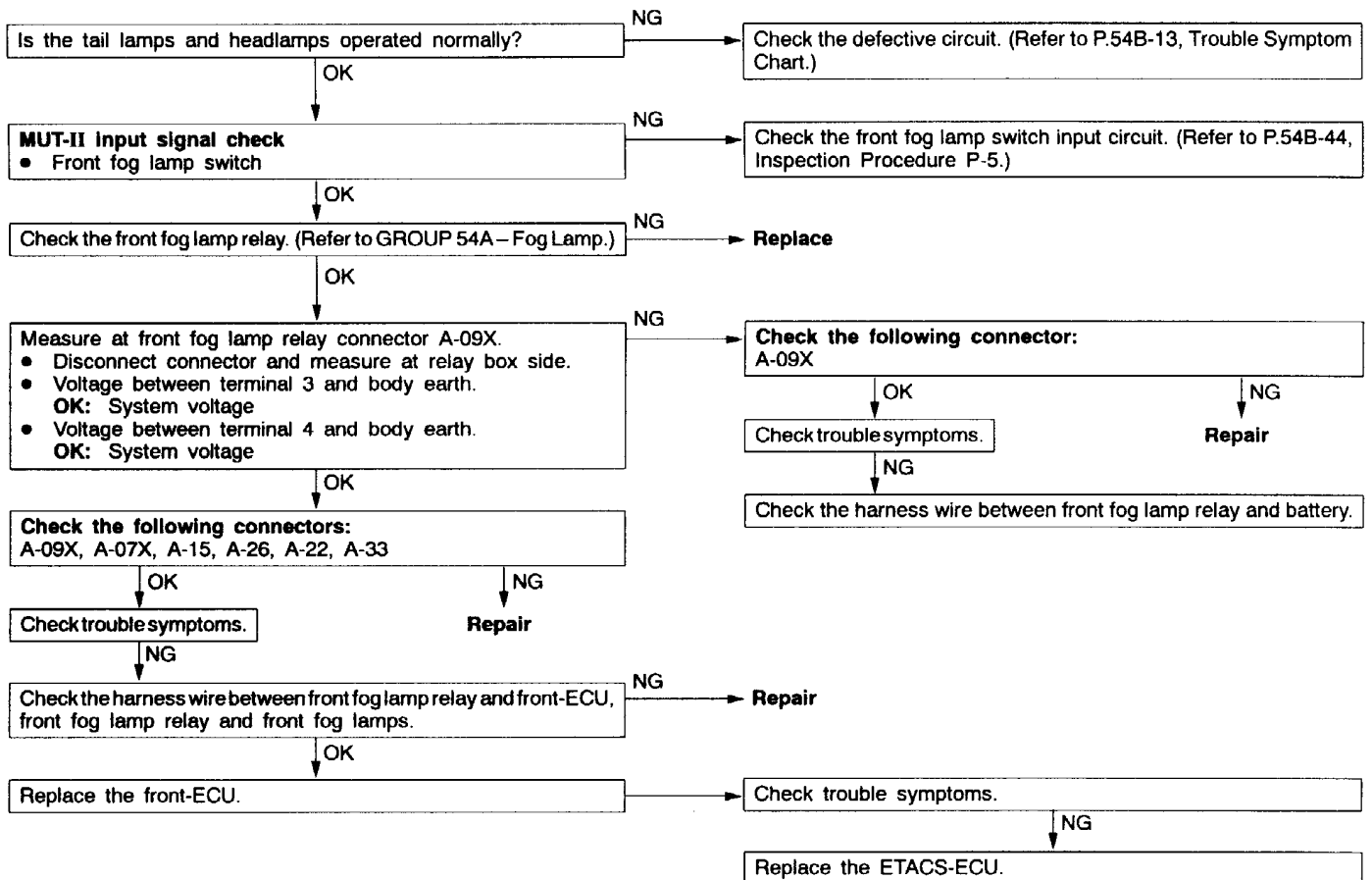
Inspection Procedure L-2

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.	• Malfunction of hazard warning lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



Inspection Procedure M-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 and headlamps illuminate normally, the front fog lamp switch, the front fog lamp relay, the front-ECU or the ETACS-ECU may be defective.	• 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 front 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.

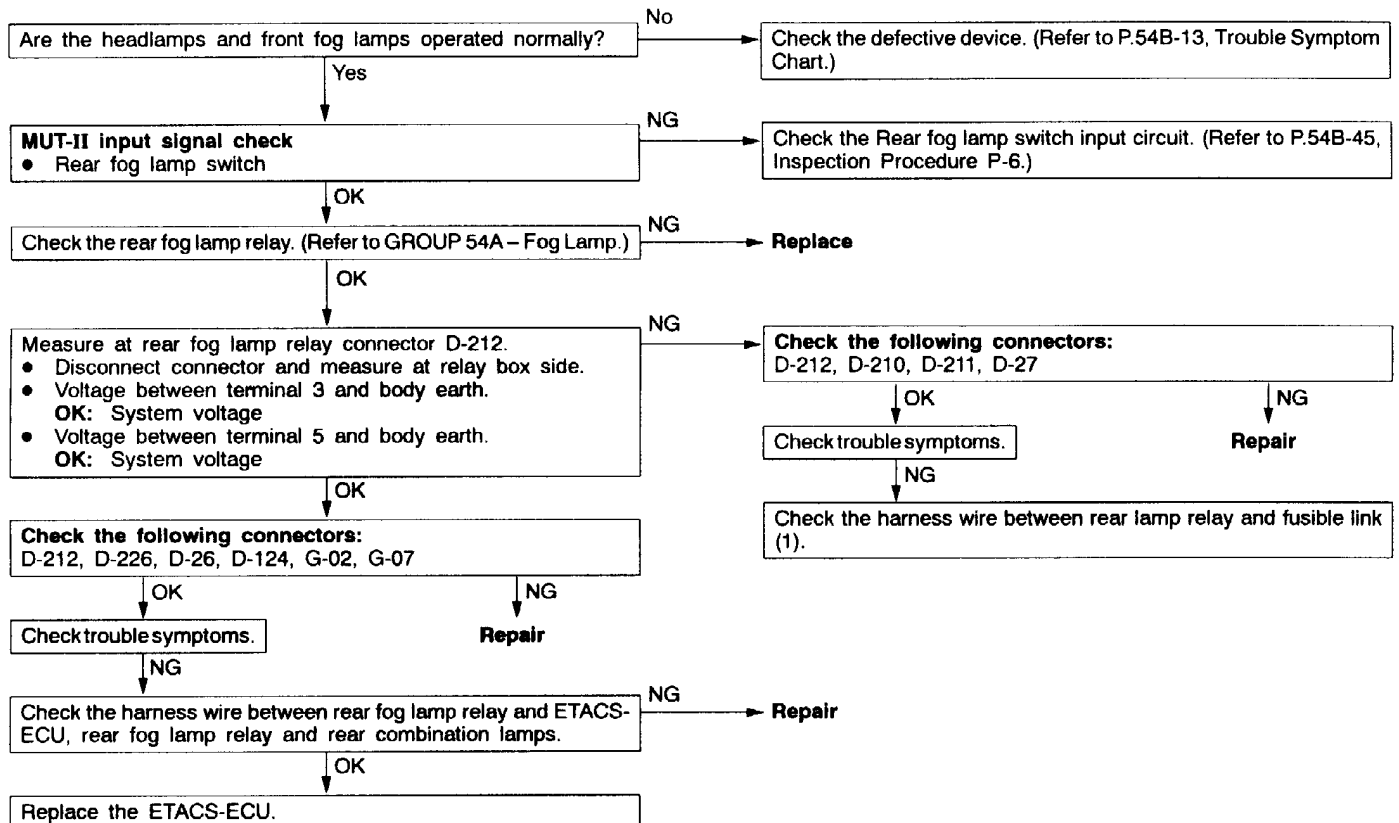
Inspection Procedure M-2

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.	• Malfunction of ETACS-ECU

Replace the ETACS-ECU.

Inspection Procedure N-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 rear fog lamps illuminate normally, the rear fog lamp switch, the rear fog lamp relay or the ETACS-ECU may be defective.	• Malfunction of rear fog lamp switch • Malfunction of rear fog lamp relay • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



NOTE

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

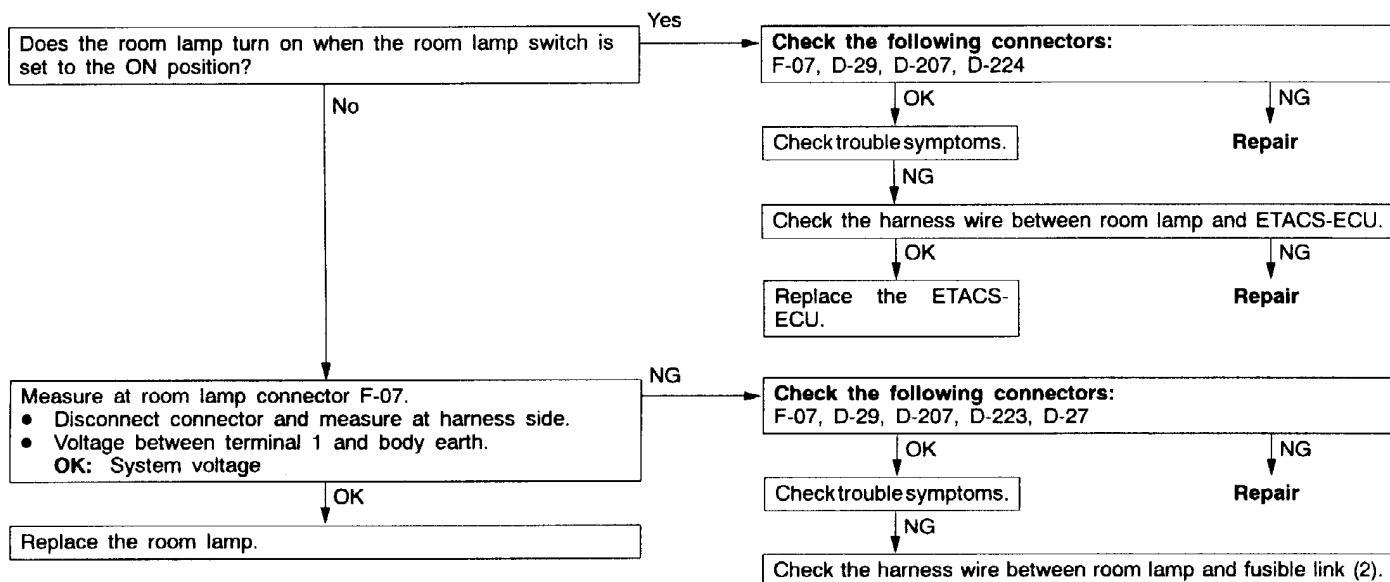
Inspection Procedure N-2

Rear fog lamp: Rear fog lamp do not go out when the headlamps and front fog lamps are turned off while the fog lamps are on.	Probable cause
If the malfunction above occurs, the ETACS-ECU may be defective.	• Malfunction of ETACS-ECU

Replace the ETACS-ECU.

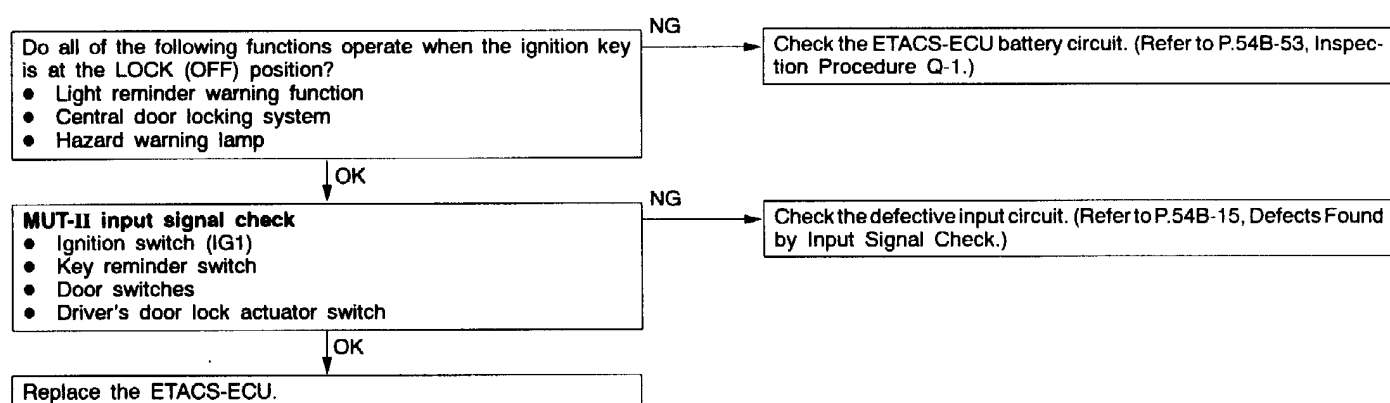
Inspection Procedure O-1

Room lamp: 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.	• Malfunction of room lamp • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



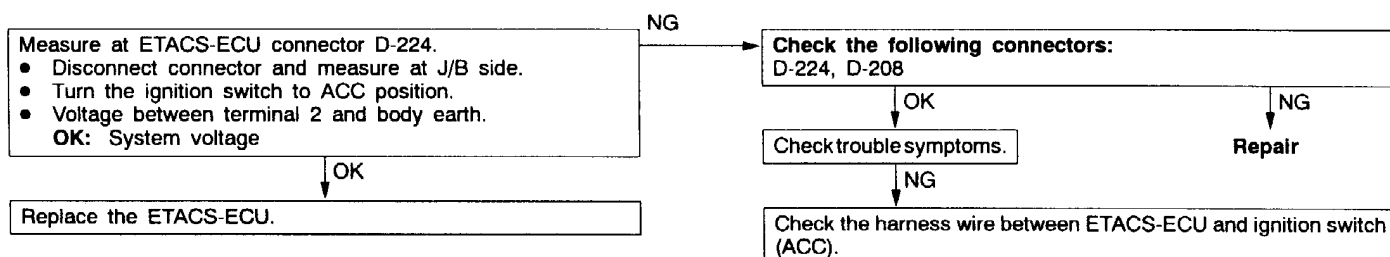
Inspection Procedure O-2

Room lamp: Room lamp dimming function does not work normally.	Probable cause
The ETACS-ECU dims the room lamp according to the input signals from the following switches: • Ignition switch (IG1) • Key reminder switch • Door switches • Driver's door lock actuator switch If the room lamp does not be dimmed normally, the relevant input signal circuit or the ETACS-ECU may be defective.	• 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



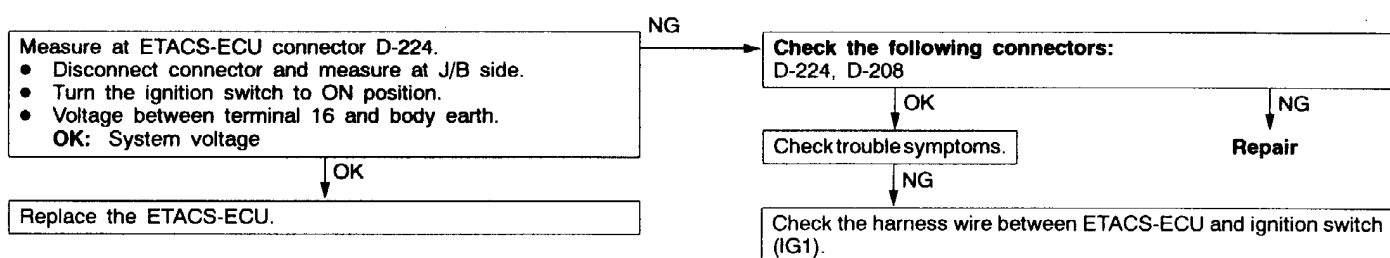
Inspection Procedure P-1

Ignition switch (ACC) signal is not sent to the ETACS-ECU.	Probable cause
The ignition switch (ACC) input signal is used to operate the following devices. If the signal fails, these devices will not work normally. • Windshield wiper and washer • Rear wiper and washer • Headlamp washer	• Malfunction of ETACS-ECU • Malfunction of harness wire or connector



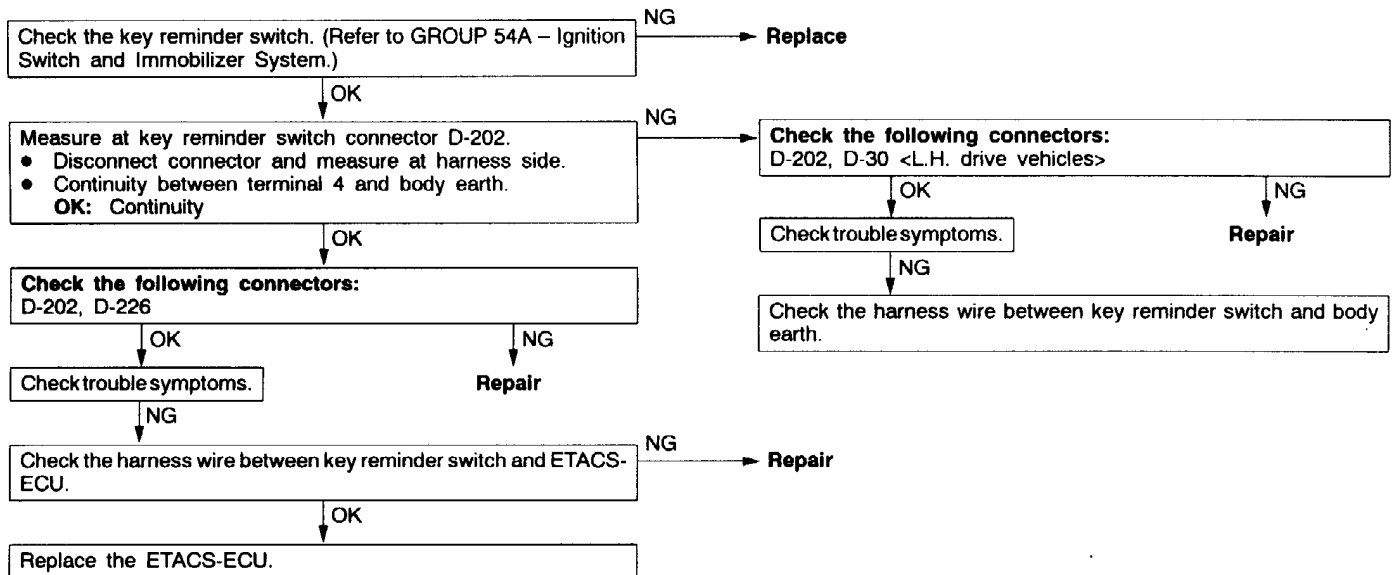
Inspection Procedure P-2

Ignition switch (IG1) signal is not sent to the ETACS-ECU.	Probable cause
The ignition switch (IG1) input signal is used to operate the following devices. If the signal fails, these devices will not work normally. • Light reminder warning buzzer function • Power window timer function • Sunroof timer function • Ignition key hole illumination lamp • Headlamp automatic shutdown function • Turn-signal lamp • Room lamp dimming function	• Malfunction of ETACS-ECU • Malfunction of harness wire or connector



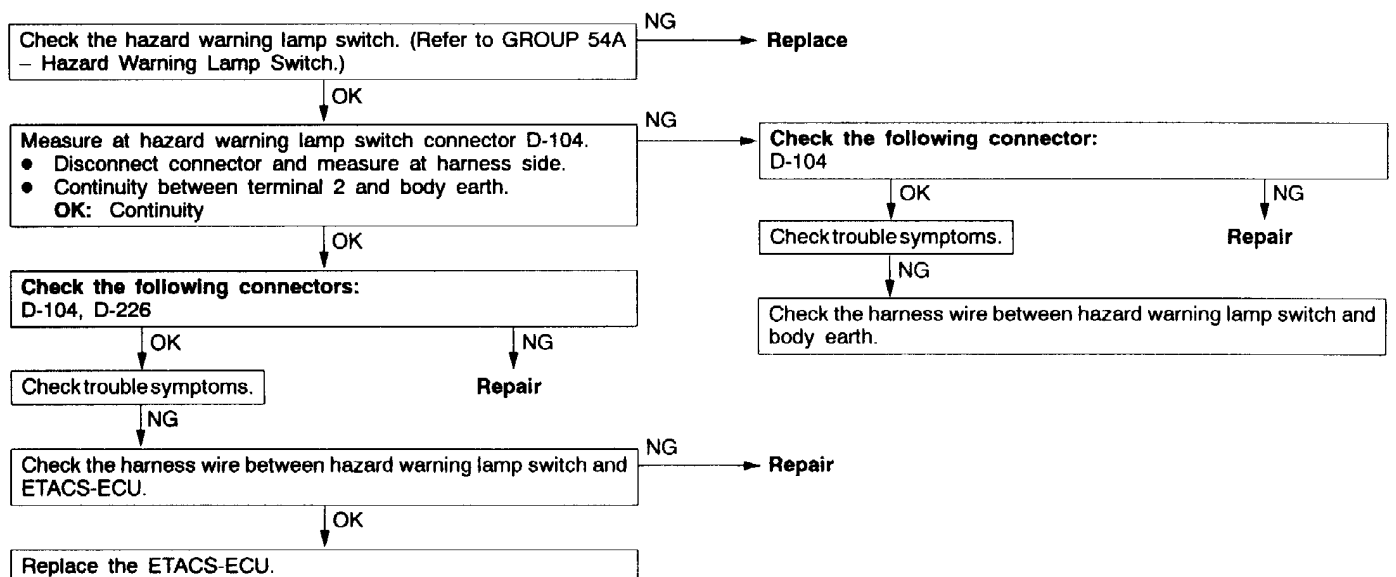
Inspection Procedure P-3

Key reminder switch signal is not sent to the ETACS-ECU.	Probable cause
The key reminder switch input signal is used to operate the following devices. If the signal fails, these devices will not work normally. • Forgotten key prevention function • Keyless entry system • Ignition key hole illuminaiton lamp • Room lamp dimming function	• Malfunction of key reminder switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



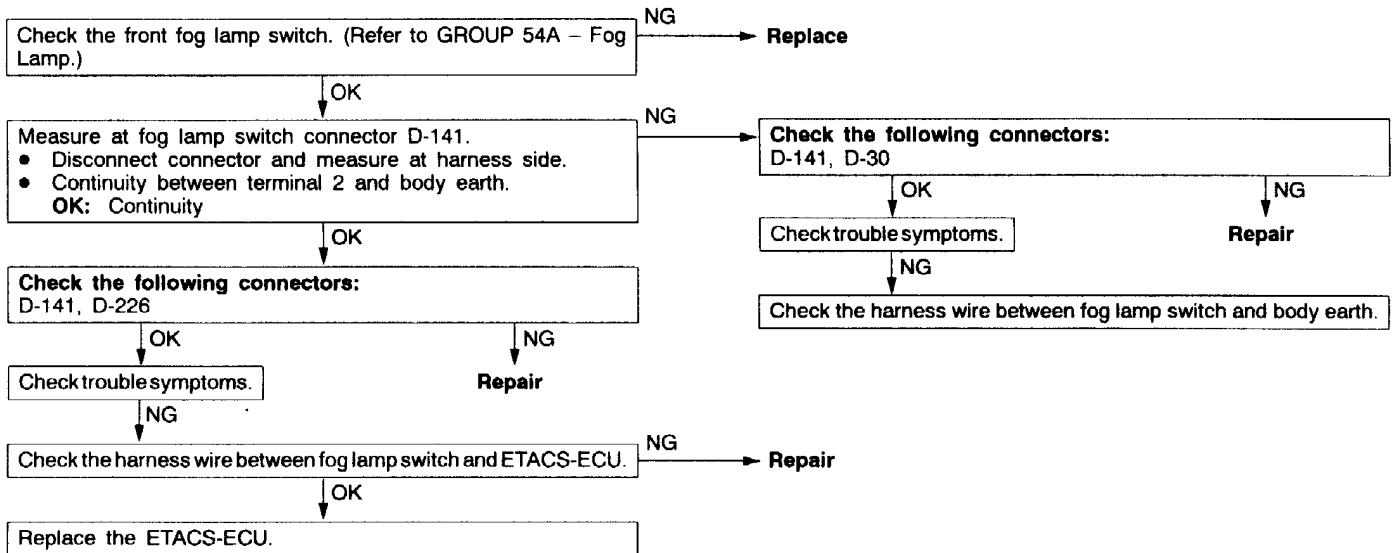
Inspection Procedure P-4

Hazard warning lamp switch signal is not sent to the ETACS-ECU.	Probable cause
The hazard warning lamp switch input signal is used to operate the following devices. If the signal fails, these devices will not work normally. • Hazard warning lamp • Keyless entry system (Registering the encrypted code)	• Malfunction of hazard warning lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



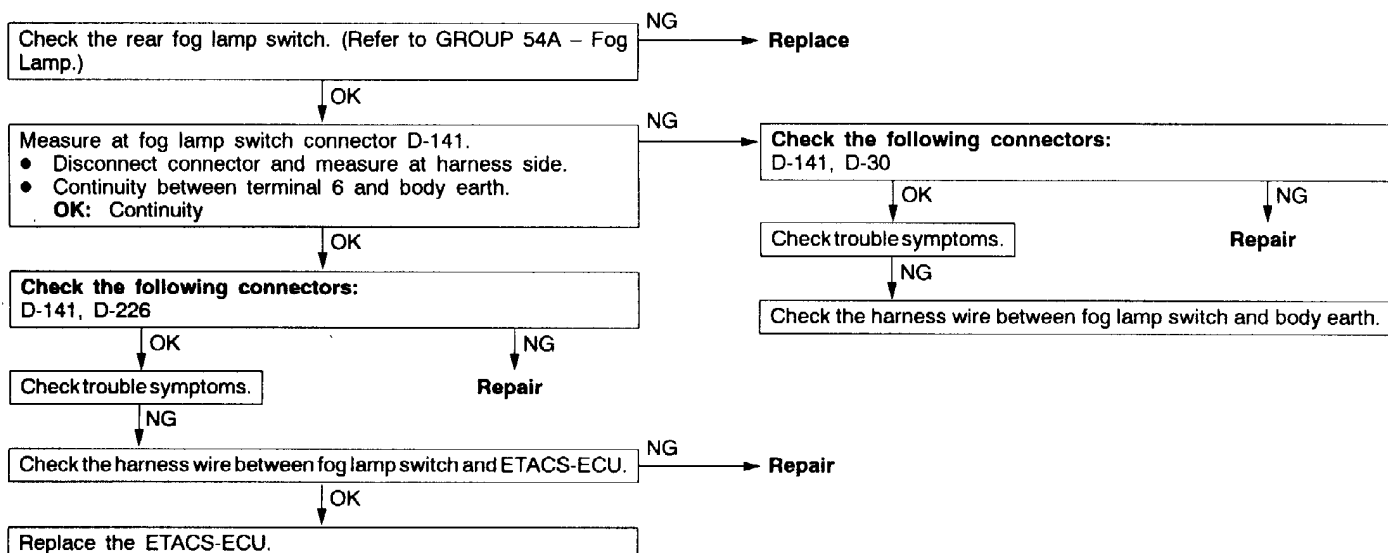
Inspection Procedure P-5

Front fog lamp switch signal is not sent to the ETACS-ECU.	Probable cause
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.	• Malfunction of fog lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



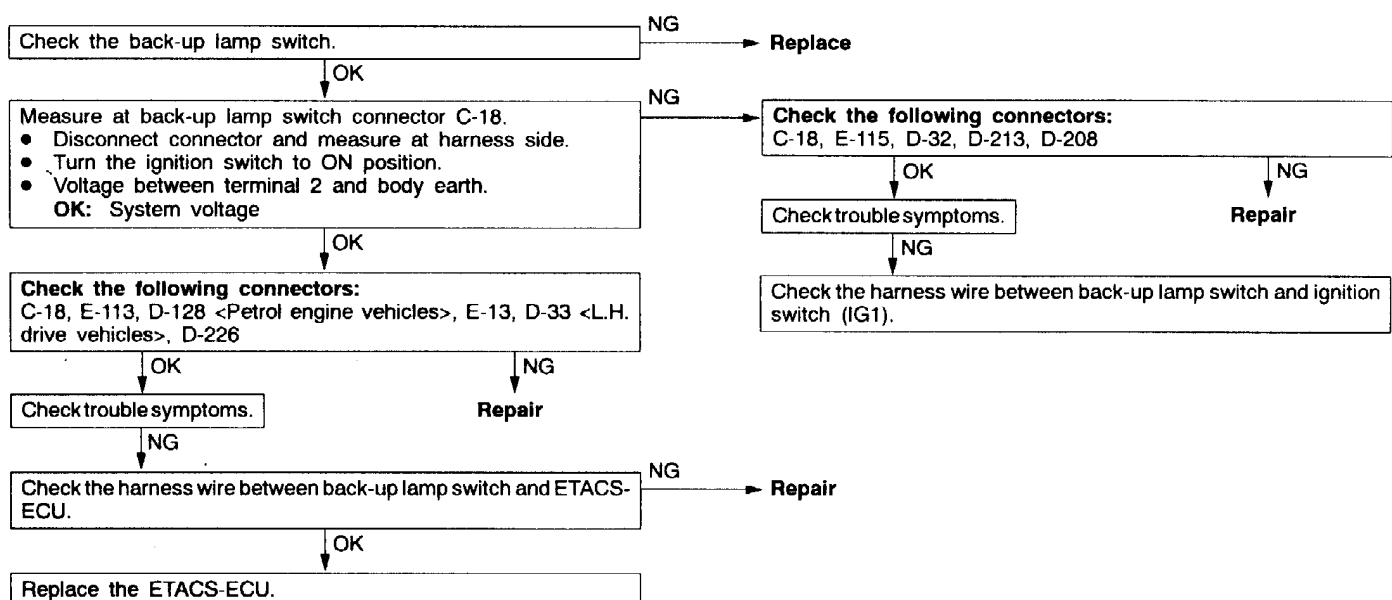
Inspection Procedure P-6

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.	• Malfunction of fog lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



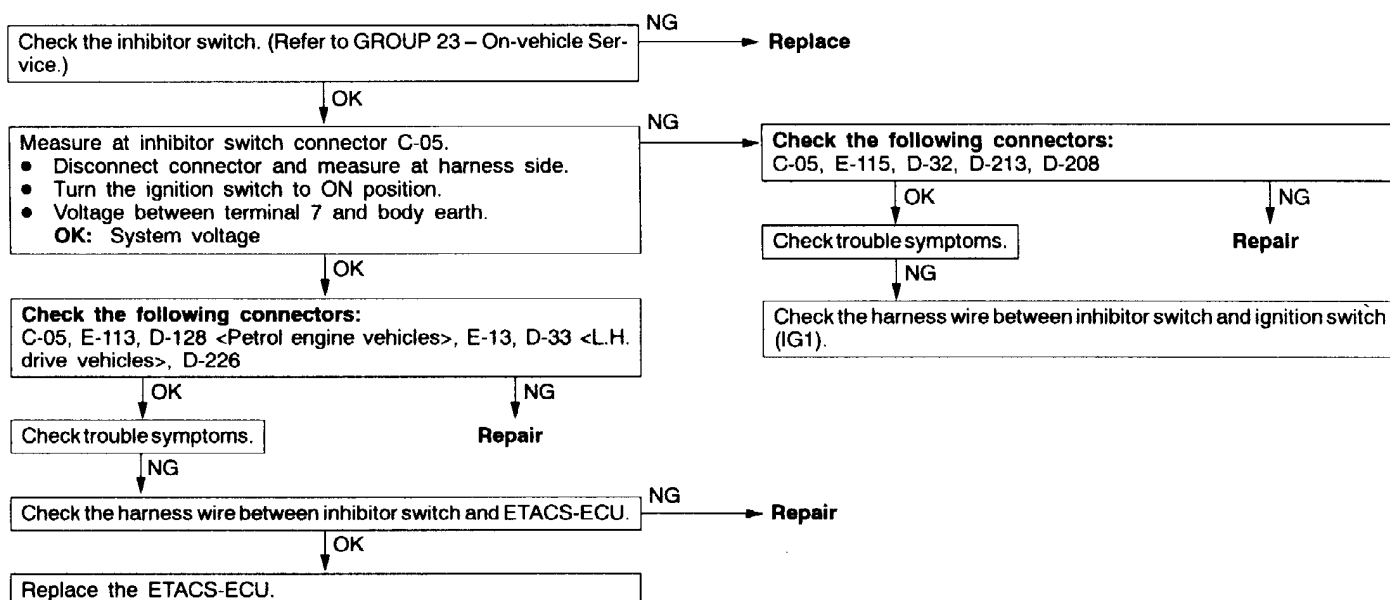
Inspection Procedure P-7

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.	• Malfunction of back-up lamp switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



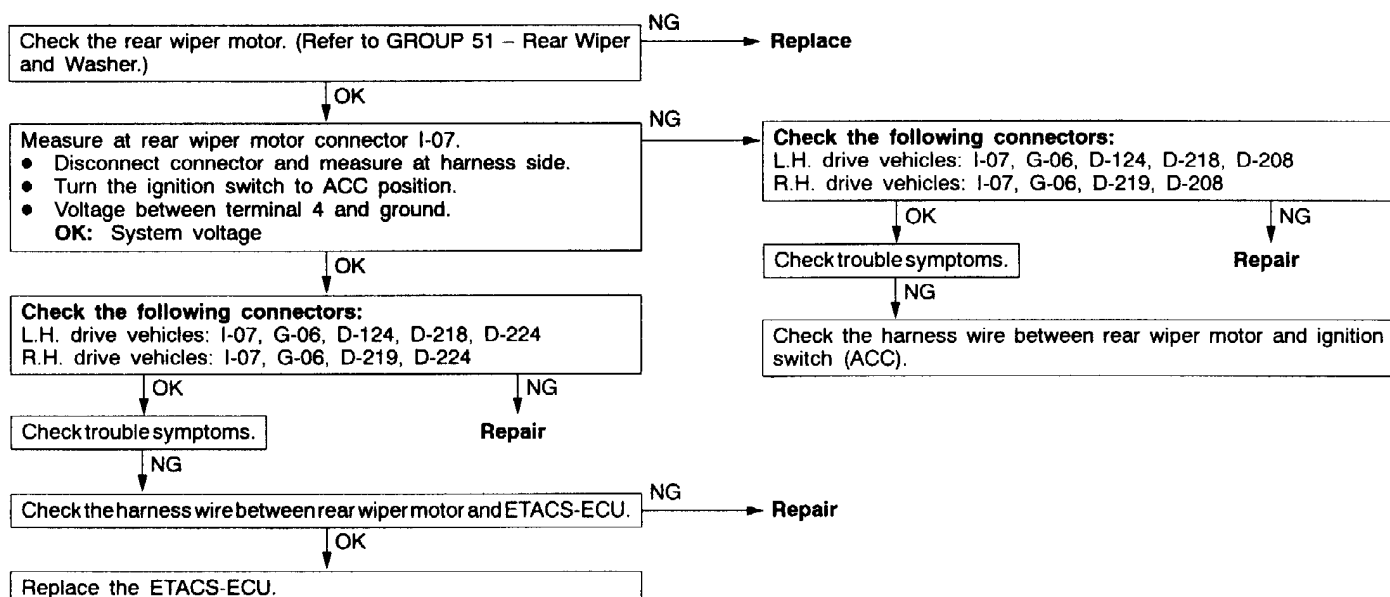
Inspection Procedure P-8

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.	• Malfunction of inhibitor switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



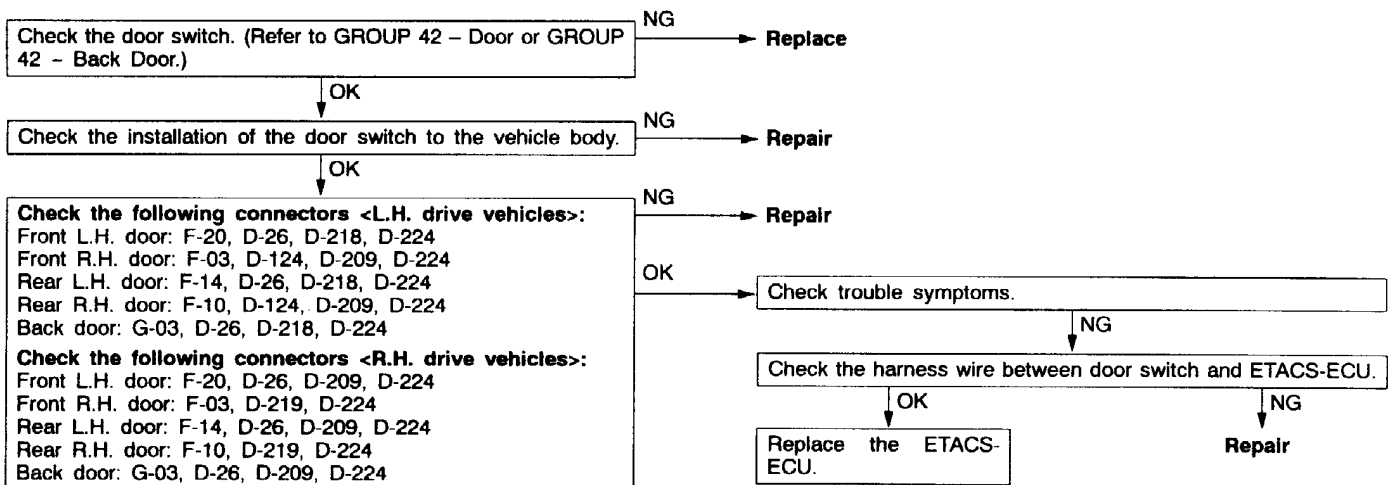
Inspection Procedure P-9

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.	• Malfunction of rear wiper motor • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



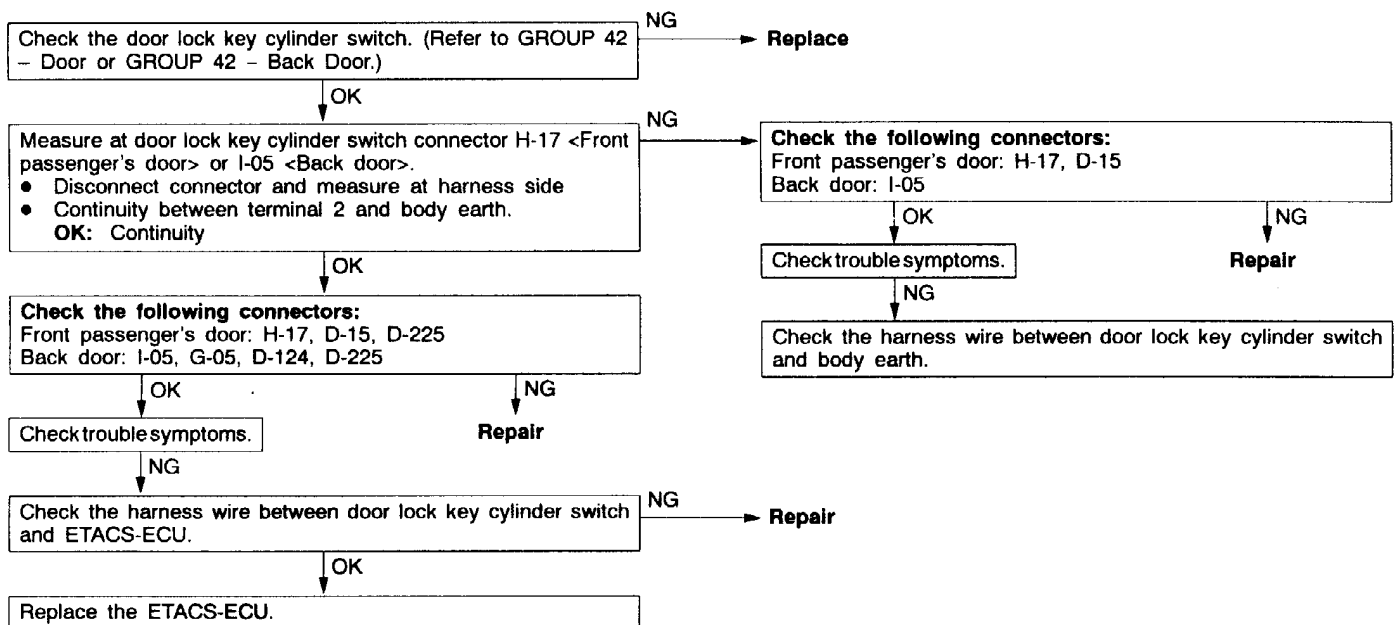
Inspection Procedure P-10

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. • Light reminder warning buzzer function • Forgotten key prevention function • Power window timer function • Ignition key hole illumination lamp • Headlamp automatic shutdown function <Door switches> The door switches is used to operate the following devices. If the signal fails, these devices will not work normally. • Keyless entry system • Room lamp dimming function	• Malfunction of driver's, front passenger's, rear or back door switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



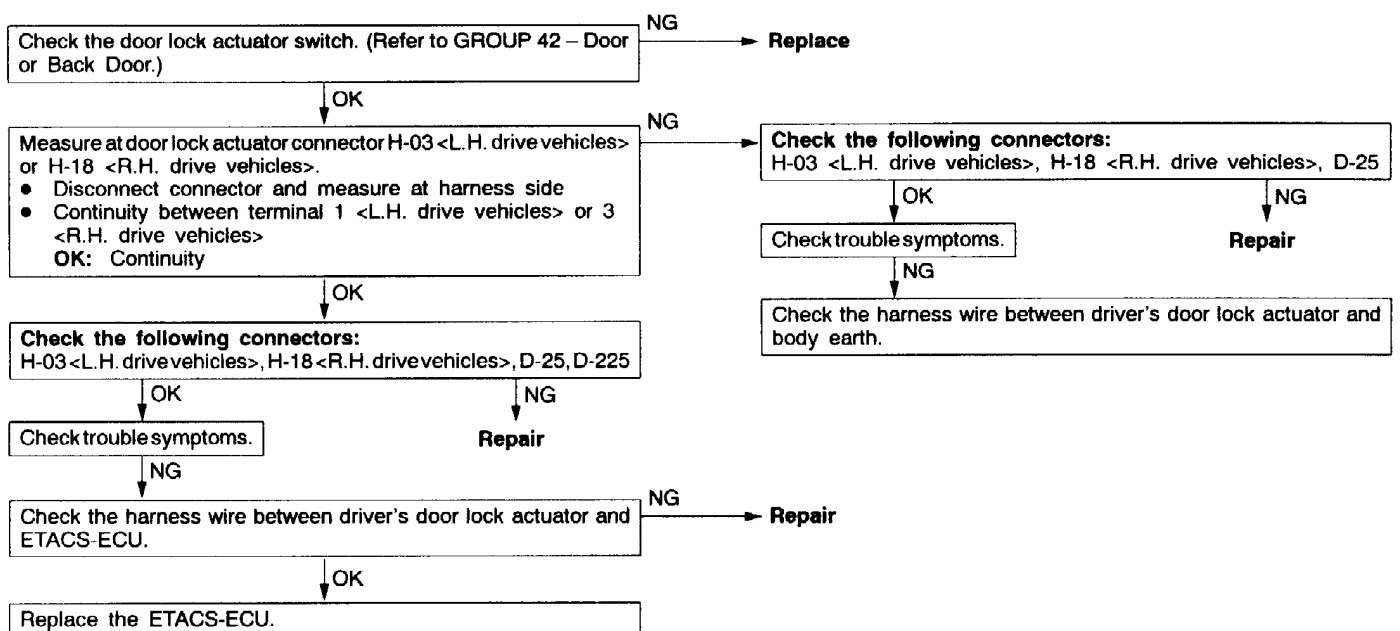
Inspection Procedure P-11

Front passenger's or back door lock key cylinder switch signal is not sent to the ETACS-ECU.	Probable cause
The front passenger's and back door lock key cylinder switch input signal is used to operate the central door locking system. If the signal fails, central door locking system will not work normally.	• Malfunction of front passenger's or back door lock key cylinder switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



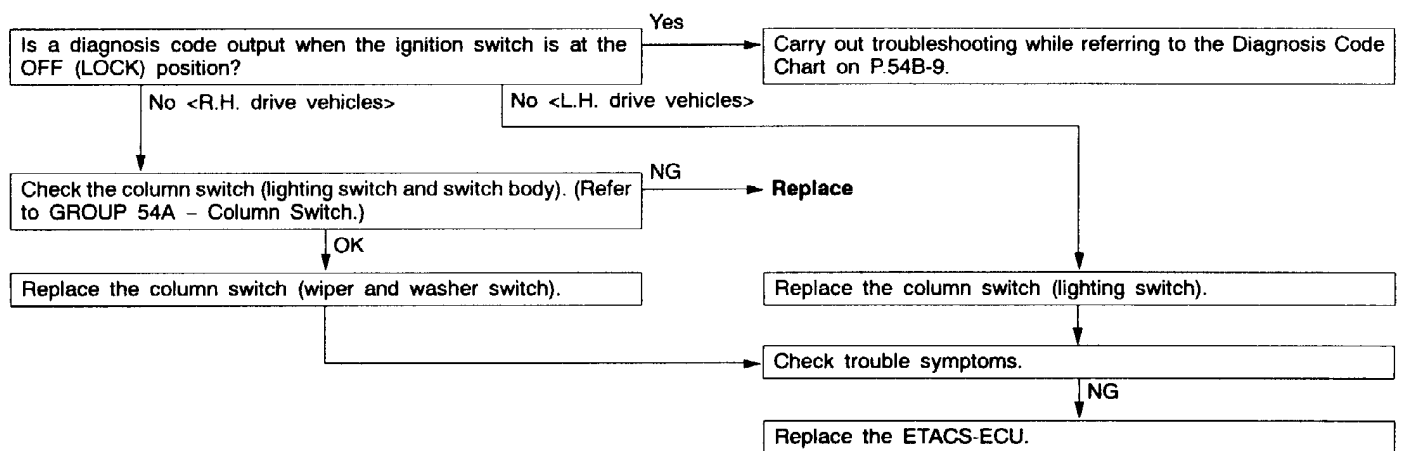
Inspection Procedure P-12

Driver's door lock actuator switch signal is not sent to the ETACS-ECU.	Probable cause
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. • Central door locking system • Forgotten key prevention function • Keyless entry system	• Malfunction of driver's door lock actuator • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



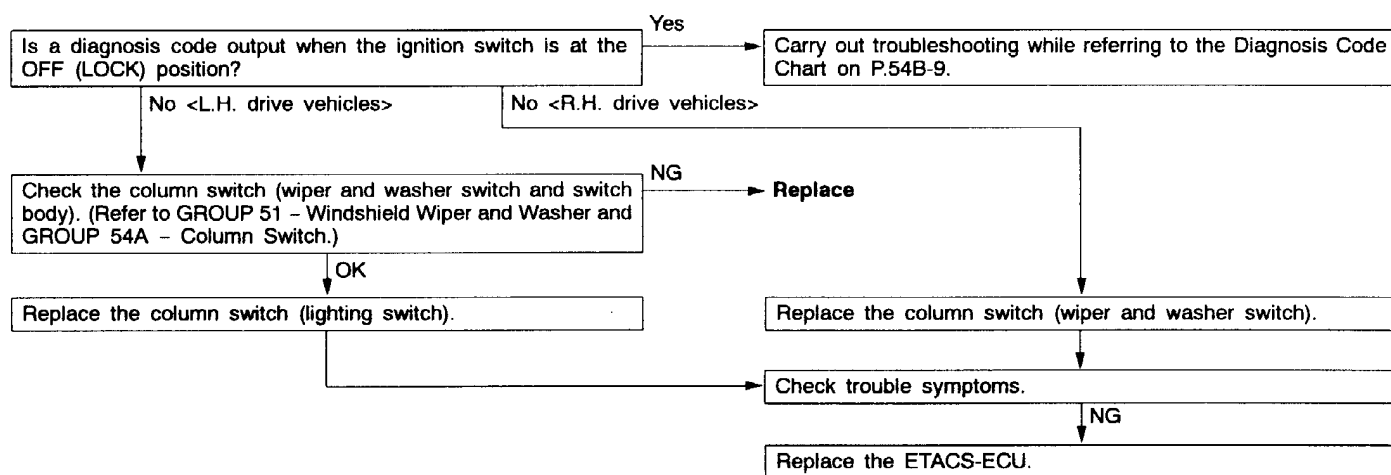
Inspection Procedure P-13

Column switch: • 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. • Headlamp washer switch is not sent to the ETACS-ECU.	Probable cause
The column switch (lighting switch) is used to operate the following systems or functions. If the signal fails, these systems or function will not work normally. • Headlamp washer • Headlamp, tail lamp • Turn-signal lamp • Front fog lamp • Rear fog lamp	• Malfunction of column switch • Malfunction of ETACS-ECU



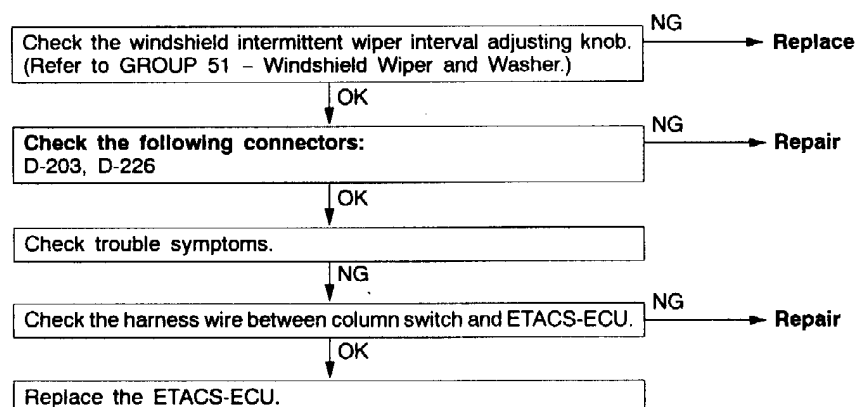
Inspection Procedure P-14

Column switch: • 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.	Probable cause
The column switch (wiper and washer switch) is used to operate the following systems or functions. If the signal fails, these systems or function will not work normally. • Windshield wiper and washer • Rear wiper and washer	• Malfunction of column switch • Malfunction of ETACS-ECU



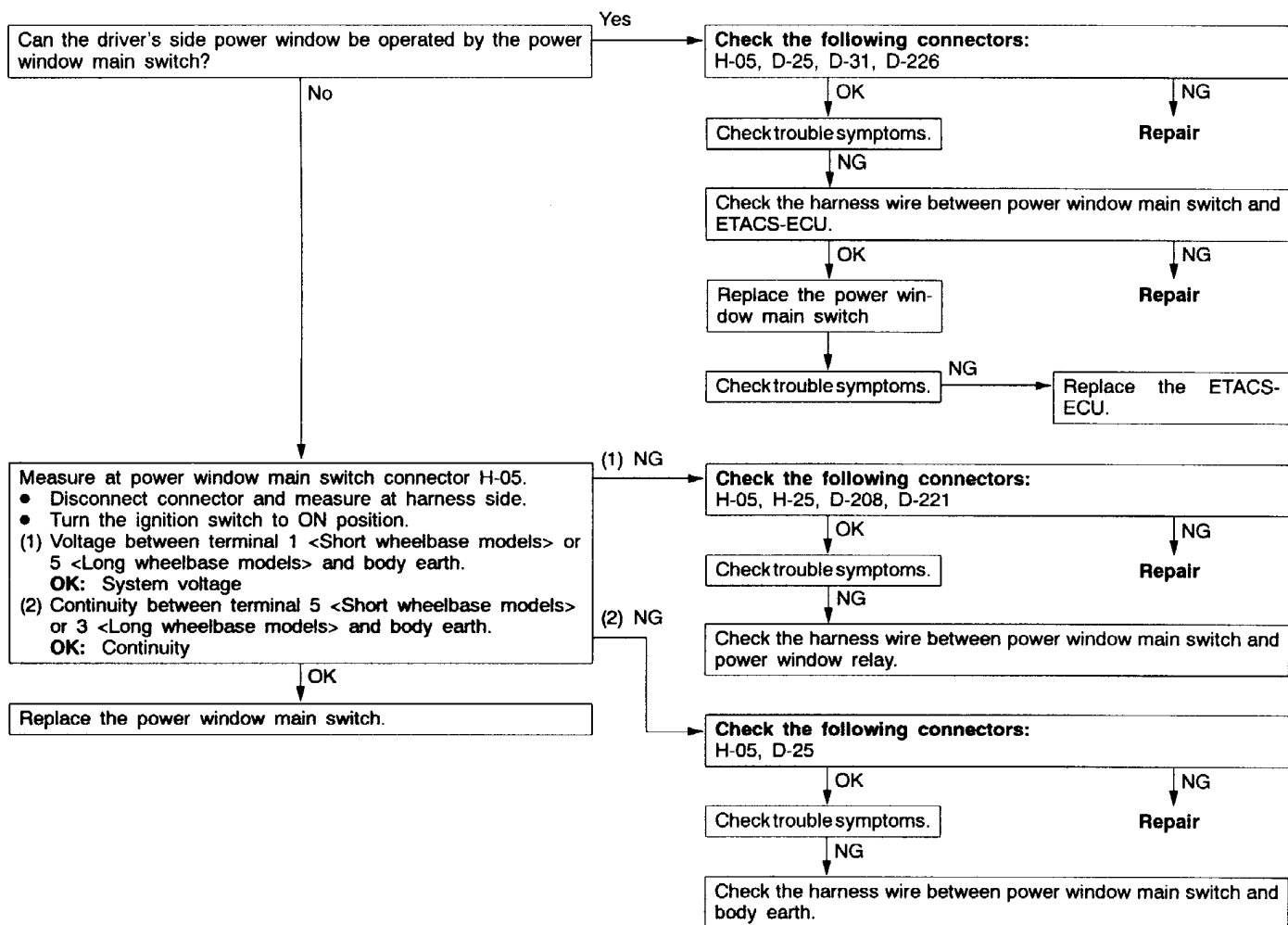
Inspection Procedure P-15

Column switch: Windshield intermittent wiper interval adjusting knob signal is not sent to the ETACS-ECU.	Probable cause
If the windshield intermittent wiper interval adjusting knob is defective the windshield intermittent wiper interval can not be adjusted.	• Malfunction of column switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



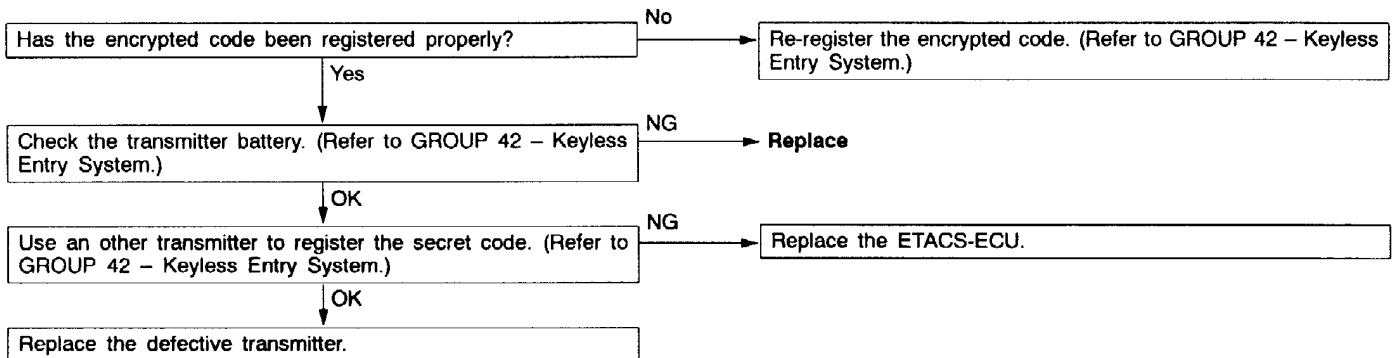
Inspection Procedure P-16

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.	• Malfunction of power window main switch • Malfunction of ETACS-ECU • Malfunction of harness wire or connector



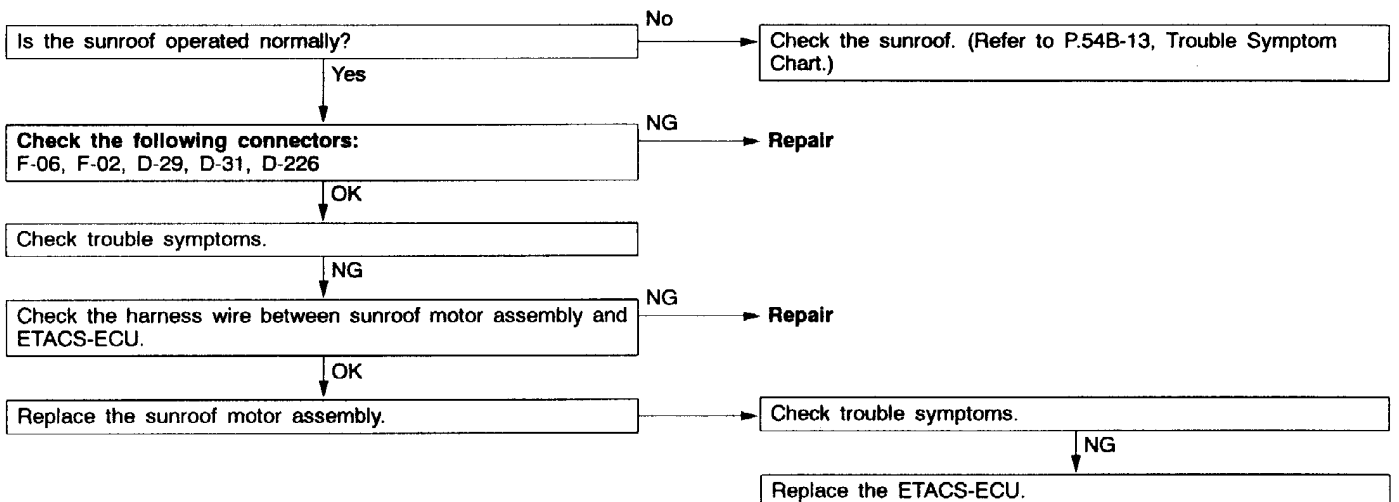
Inspection Procedure P-17

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.	• Malfunction of transmitter • Malfunction of ETACS-ECU

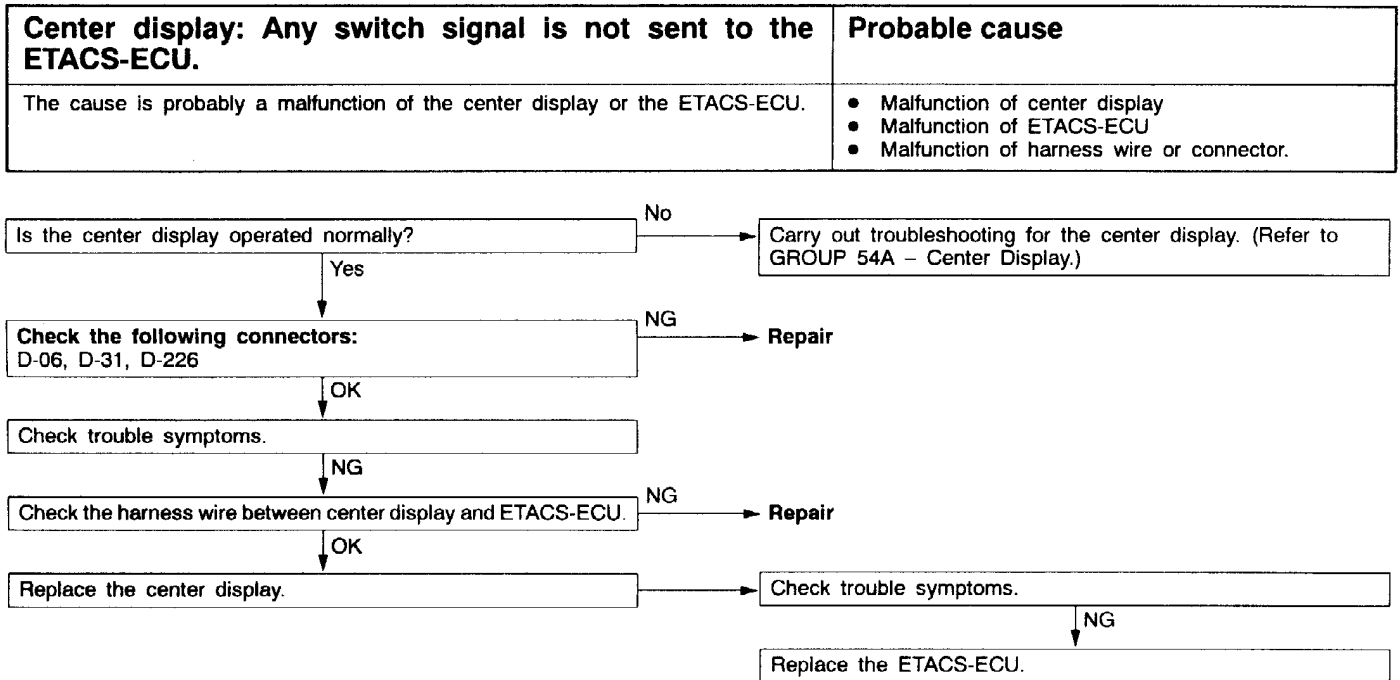


Inspection Procedure P-18

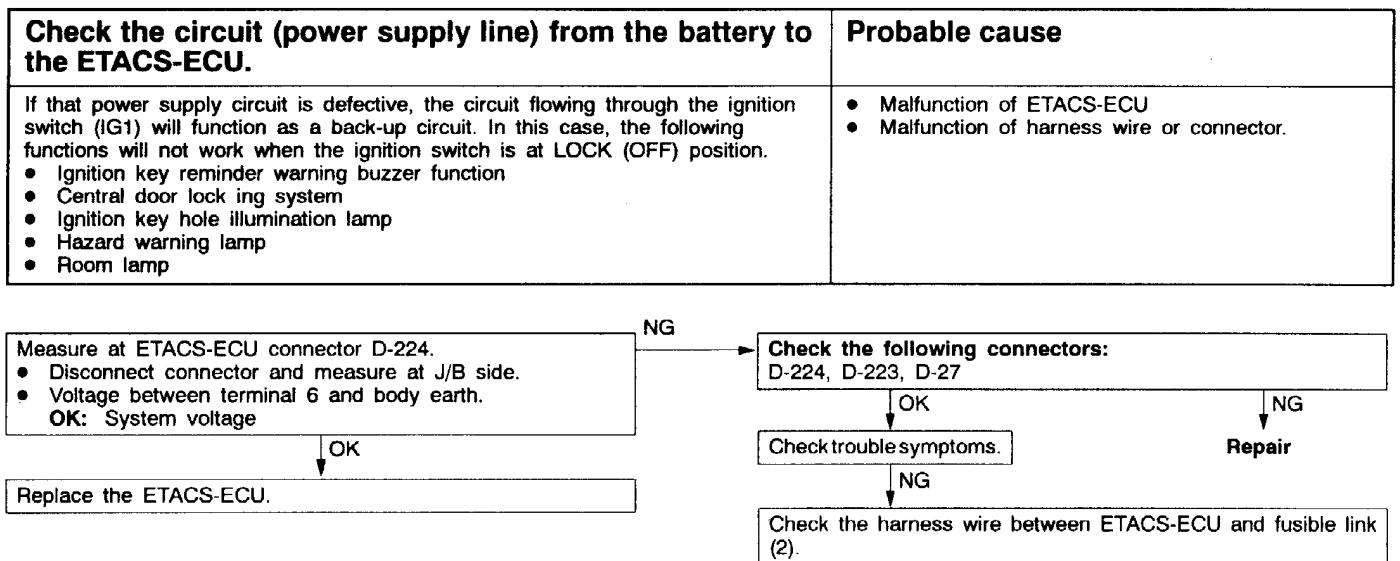
Sunroof switch: Any switch signal is not sent to the ETACS-ECU.	Probable cause
If there is a problem with communication between the sunroof motor assembly and the ETACS-ECU, the input signal check for the sunroof switch can no longer be carried out. In addition, the sunroof timer function will also stop working.	• Malfunction of sunroof switch • Malfunction of sunroof motor assembly • Malfunction of ETACS-ECU • Malfunction of harness wire or connector.



Inspection Procedure P-19



Inspection Procedure Q-1



CHECK AT ECU TERMINALS

1. ETACS-ECU

*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56

X1208CA

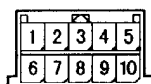
NOTE

*: Since the ETACS-ECU is directly mounted on the junction block and the measurement for connector of terminals No.1 to 20 is impossible, the values concerning these terminals are shown for reference only.

Terminal No.	Check items	Checking requirements	Normal condition
1	Rear wiper output	When rear wiper is operated	System voltage
2	Ignition switch (ACC) power supply	Ignition switch: ACC	System voltage
3	Rear washer output	When rear washer is operated	System voltage
4	Door lock output	When the door lock actuators are working to lock	System voltage
5	Rear wiper auto-stop signal input	When rear wiper is operated	System voltage
6	Battery power supply (for ECU)	Always	System voltage
7	Door switches signal input	Either door switch: ON (Door open)	0 V
8	Power window relay output	When power window can be operated	2 V or less
9	Driver's door switch signal input	Driver's door switch: ON (Driver's door open)	0 V
11	Battery power supply (for turn-signal lamp)	Always	System voltage
12	Battery power supply (for central door lock)	Always	System voltage
14	Turn-signal lamp (R.H.) output	When turn-signal lamp (L.H.) is lighted	System voltage
15	Turn-signal lamp (L.H.) output	When turn-signal lamp (R.H.) is lighted	System voltage
16	Ignition switch (IG1) power supply	Ignition switch: ON	System voltage
17	Door unlock output	When door lock actuators are working to unlock	System voltage
18	Room lamp output	When room lamp is lighted	2 V or less
20	Ground (for ECU)	Always	0 V
21	SWS communication line	Always	0 – 12 V (pulse signal)
22	Diagnosis indication selection input	When MUT-II is connected	0 V
23	Ground (for sensor)	Always	0 V
24	Front fog lamp switch signal input	Front fog lamp switch: ON	0 V
25	Rear fog lamp switch signal input	Rear fog lamp switch: ON	0 V

Terminal No.	Check items	Checking requirements	Normal condition
26	Key reminder switch signal input	Key reminder switch: ON (Ignition key removed)	0 V
27	Hazard warning lamp switch signal input	Hazard warning lamp switch: ON	0 V
29	Recognition line of daytime running lamp (DRL) <Vehicles with DRL>	Always	0 V
31	Data request signal output	Always	0 – 5 V (pulse signal)
34	Windshield intermittent wiper interval adjusting knob signal input	Ignition switch: ACC, Windshield intermittent wiper interval adjusting knob: FAST → SLOW	0 → 2.5 V
35	Back-up lamp switch signal input <M/T>	Ignition switch: ON, Shift lever: R	System voltage
	Inhibitor switch (reverse) signal input <A/T>	Ignition switch: ON, Selector lever: R	System voltage
36	Ignition key hole illumination lamp output	When ignition key hole illumination lamp is lighted	2 V or less
37	Diagnosis code or input signal check output	When diagnosis code is output	0 – 12 V (pulse signal)
		When input signal check is output	0, 12 V (When input pulse signal is changed)
40	Rear fog lamp relay output	When rear fog lamp is lighted	2 V or less
53	Front passenger's and back door lock key cylinder switch (LOCK) signal input	Front passenger's or back door lock key cylinder switch: LOCK	0 V
54	Front passenger's and back door lock key cylinder switch (UNLOCK) signal input	Front passenger's or back door lock switch: UNLOCK	0 V
55	Driver's door lock actuator switch (LOCK) signal input	Driver's door lock actuator switch: LOCK	0 V
56	Driver's door lock actuator switch (UNLOCK) signal input	Driver's door lock actuator switch: UNLCOK	0 V

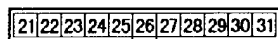
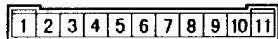
2. COLUMN SWITCH



X1209CA

Terminal No.	Check items	Checking requirements	Normal condition
1	Battery power supply	Always	System voltage
2	Data request signal input	Always	0 – 12 V (pulse signal)
3	SWS communication line	Always	0 – 5 V (pulse signal)
4	Ground	Always	0 V
6	Windshield intermittent wiper interval adjusting knob signal output	Ignition switch: ACC, Windshield intermittent wiper interval adjusting knob: FAST → SLOW	0 → 2.5 V
8	Windshield wiper switch backup output	Windshield low-speed wiper switch or windshield high-speed wiper switch: ON	0 V
9	Ignition switch (IG1) power supply	Ignition switch: ON	System voltage
10	Headlamp switch backup output	Headlamp switch: ON	0 V

3. FRONT-ECU



X1210CA

NOTE

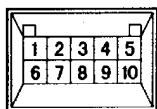
Since the front-ECU is directly mounted on the relay box and measurement is impossible, these values are shown for reference.

Terminal No.	Check items	Checking requirements	Normal condition
1	Front fog lamp relay output	When front fog lamp is lighted	2 V or less
2	Headlamp (high-beam) output	When headlamp (high-beam) is lighted	System voltage
3, 4	Battery power supply (for headlamp)	Always	System voltage
5	Battery power supply (for tail lamp)	Always	System voltage
6	Headlamp (low-beam) output	When headlamp (low-beam) is lighted	System voltage
7	Battery power supply (for ECU)	Always	System voltage
8	Tail lamp output	When tail lamp is lighted	System voltage
9	Battery power supply (for headlamp washer)	Always	System voltage
11	Headlamp washer output	When headlamp washer is operated	System voltage
21	Windshield washer output	When windshield washer is operated	System voltage

Terminal No.	Check items	Checking requirements	Normal condition
22	SWS communication line	Always	0 – 12 V (pulse signal)
23	Windshield wiper auto-stop signal input	When windshield wiper is operated	System voltage
24	Ignition switch (ACC) power supply	Ignition switch: ACC	System voltage
25	Headlamp switch backup input	Headlamp switch: ON	0 V
26	Windshield wiper backup input	Windshield low-speed wiper switch or windshield high-speed wiper switch: ON	0 V
27	Windshield wiper (low-speed) output	When windshield wiper is operated (at low-speed)	System voltage
28	Windshield wiper (high-speed) output	When windshield wiper is operated (at high-speed)	System voltage
30	Ignition switch (IG2) power supply	Ignition switch: ON	System voltage
31	Ground	Always	0 V

4. POWER WINDOW MAIN SWITCH

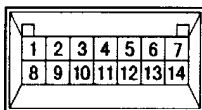
<Short wheelbase models>



X1211CA

Terminal No.	Check items	Checking requirements	Normal condition
1	Power supply	Power window relay: ON	System voltage
3	SWS communication line (between the main switch and the power window motor)	Power window relay: ON	0 – 12 V (pulse signal)
4	SWS communication line (between the main switch and the ETACS-ECU)	Always	0 – 12 V (pulse signal)
5	Ground	Always	0 V

<Long Wheelbase Models>



X1212CA

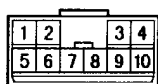
Terminal No.	Check items	Checking requirements	Normal condition
1	SWS communication line (between the main switch and the power window motor)	Power window relay: ON	0 – 12 V (pulse signal)
3	Ground	Always	0 V
5	Power supply	Power window relay: ON	System voltage
7	SWS communication line (between the main switch and the ETACS-ECU)	Always	0 – 12 V (pulse signal)

5. POWER WINDOW MOTOR



X1213CA

Terminal No.	Check items	Checking requirements	Normal condition
1	Ground	Always	0 V
2	Power window sub switch (DOWN) signal input <Except driver's door>	Power window sub switch: DOWN	0 V
3	Power supply	Power window relay: ON	System voltage
4	Power window sub switch (UP) signal input <Except driver's door>	Power window sub switch: UP	0 V
6	SWS communication line (between the power main switch and the power window motor)	Power window relay: ON	0 – 12 V (pulse signal)

6. SUNROOF MOTOR ASSEMBLY

X1214CA

Terminal No.	Check items	Checking requirements	Normal condition
1	Battery power supply (for motor)	Always	System voltage
2	Ignition switch (IG2) power supply	Ignition switch: ON	System voltage
3	Battery power supply (for ECU)	Always	System voltage
5	Ground	Always	0 V
6	Sunroof switch (CLOSE/DOWN) signal input	Sunroof switch: CLOSE/DOWN	0 V
7	Sunroof switch (UP) signal input	Sunroof switch: UP	0 V
8	Sunroof switch (OPEN) signal input	Sunroof switch: OPEN	0 V
6	SWS communication line	Always	0 – 12 V (pulse signal)

7. CENTER DISPLAY

Refer to GROUP 54A – Center Display.

ON-VEHICLE SERVICE

ADJUSTMENT PROCEDURES OF SWS FUNCTION

Through special operation of input switches, it is possible to disable and enable the functions listed below. Settings are retained even if the battery is disconnected.

- Keyless entry hazard answerback function
- Initialization of above mentioned functions

Configuration Mode Entry Conditions

1. Set each switch at the following condition.
 - Hazard warning lamp switch: OFF
 - Diagnosis control: ON (MUT-II connected or terminal 1 of diagnosis connector connected to earth)
 - Key reminder switch: OFF (ignition key inserted)
 - Ignition switch: LOCK (OFF)
 - Driver's door switch: OFF (driver's door closed)
2. When the windshield washer switch is continuously turned ON for more than 10 seconds, the buzzer integrated in the ETACS-ECU sounds once and the mode is switched to the configuration mode.

Configuration Mode Cancellation Conditions

The ETACS-ECU cancels the configuration mode when any of the conditions listed below is satisfied.

- Diagnosis control: OFF (MUT-II disconnected or terminal 1 of diagnosis connector disconnected from earth)
- Key reminder switch: ON (ignition key removed)
- Ignition switch: any position other than LOCK (OFF)
- Driver's door switch: ON (driver's door open)
- No configuration performed within three minutes of entry to configuration mode (If configuration is performed within first three minutes, monitoring continues for three minutes from that point.)

Configuration of Functions

Function	Configuration procedure
Keyless entry hazard answerback	If the transmitter's LOCK switch is turned ON twice within two seconds, the lock answerback function's enabled/disabled status is inverted. • When function is enabled, buzzer sounds once (initial status). • When function is disabled, buzzer sounds twice. If the transmitter's UNLOCK switch is turned ON twice within two seconds, the unlock answerback function's enabled/disabled status is inverted. • When function is enabled, buzzer sounds once (initial status). • When function is disabled, buzzer sounds twice.
Initialization of above mentioned functions	If the windshield washer switch is turned ON for more than 20 seconds, the buzzer sounds twice and all functions are initialized. (The configuration mode entry buzzer sounds after 10 seconds, but the switch must be kept ON for 20 seconds to achieve initialization.) IF the windshield washer switch ins kept ON for more than 20 seconds without prior entry of the configuration mode, the configuration mode is entered after 10 seconds and initialization does not take place.