CHASSIS ELECTRICAL

CONTENTS

GENERAL

OUTLINE OF CHANGES

- The electronic compass has been changed. With this, the troubleshooting has been changed.
- The immobiliser system has been used as option. With this, the service procedure has been added.

METERS AND GAUGES

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

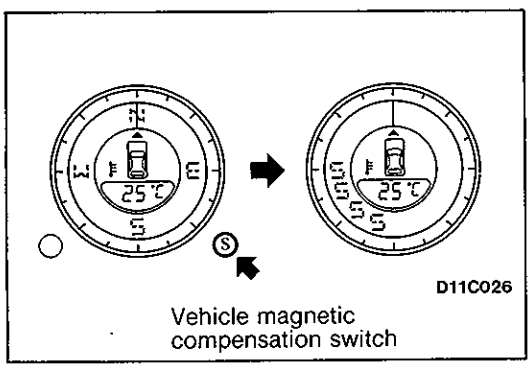
Get an understanding of the trouble symptoms and check according to the inspection procedure chart.

Trouble symptom	Inspection procedure No.	Reference page
Bearing indicator is off when moving forward	1	54-2
Vehicle magnetic compensation cannot be made	2	54-3
Discrepancy between the outside temperature and display temperature	3	54-3
Display is hard to see or no display appears	4	54-4

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

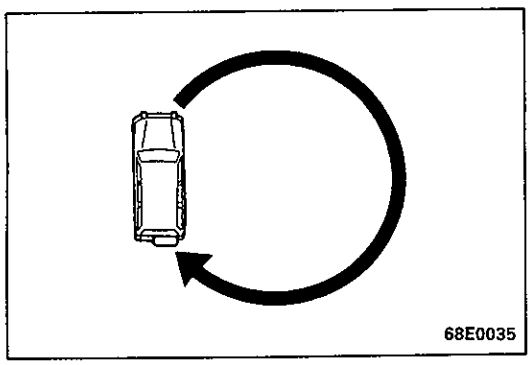
Bearing indicator is off when moving forward	**Probable cause**
The vehicle magnetism tends to be disturbed particularly at such places as tunnel, railway crossing, area along railway, elevated road, urban area crowded with high-storied buildings, area above subway, etc. If disturbed, the driving direction marker will fluctuate.	• Vehicle magnetic compensation failed



Vehicle magnetic compensation switch

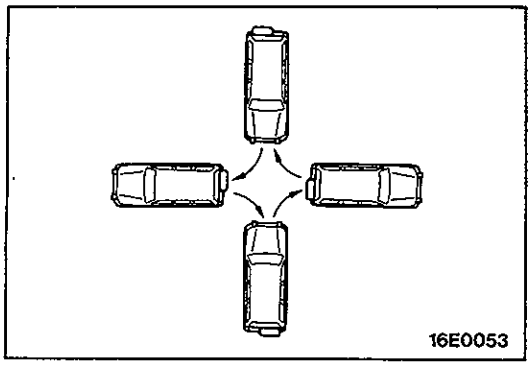
Vehicle magnetic compensation

(1) If the vehicle magnetic compensation (azimuth adjustment) switch is pressed, the letters "S" are displayed around the scale. Then when the switch is pressed 0.5 seconds or more further, the letters "S" will move clockwise and anticlockwise. This turns on the magnetic compensation mode.



(2) If the vehicle is driven slowly in a 360° circle, compensation is automatically completed.

NOTE
Compensation is possible if the turn is made to either the left or right.



(3) If there is no place to turn the vehicle in a circle, turn the vehicle around by moving it backwards and forwards.
(4) After compensation is completed, a dot showing the current direction of movement will be illuminated.

INSPECTION PROCEDURE 2

Vehicle magnetic compensation cannot be made.	Probable cause
The multi-meter may be defective.	• Defective multi-meter

When the vehicle magnetic compensation switch (azimuth adjustment) is pressed 0.5 seconds or more, do the letters "S" move clockwise and anticlockwise? Is the magnetic compensation mode turned on? (Refer to P.54-2.)
- NO → Replace the multi-meter.
- YES → When the initial compensation direction is changed, or the vehicle position is changed, and the compensation restarts, can compensation be achieved?
  - YES → • Sometimes compensation is difficult because of the magnetic direction or the vehicle direction at the time compensation begins.
    • Compensation is difficult in places where the magnetic field is being influenced by surrounding objects.
  - NO → Check trouble symptom.
    - NG → Replace the multi-meter.

INSPECTION PROCEDURE 3

Discrepancy between the outside temperature and the display temperature	Probable cause
The outside thermo sensor, multi-meter, harness, or connector may be defective.	• Defective outside thermo sensor • Defective multi-meter • Defective harness or connector

Check internal resistance value in the outside thermo sensor. [Refer to Basic Manual (Looseleaf edition) Group 54 – Meter and Gauges.]
- NG → **Replace**
- OK → Measure at the multi-meter connector D-04.
  - Connect the connector and measure voltage when the outside thermo sensor is at the following temperatures.
  - Voltage between (5) and (13)
    OK:
    2.90V (when 0°C is displayed)
    1.86V (when 20°C is displayed)
    1.10V (when 40°C is displayed)
  - NG → **Check the following connectors.** D-01, C-28 <LHD>, C-10 <RHD> and A-41
    - NG → **Repair**
    - OK → Check trouble symptom.
      - NG → Check the harness between the outside thermo sensor and the multi-meter. Repair, if necessary.
  - OK → Replace the multi-meter.

INSPECTION PROCEDURE 4

Display is hard to see or no display appears.	Probable cause
The multi-meter, harness, or connector may be defective.	• Defective multi-meter • Defective harness or connector

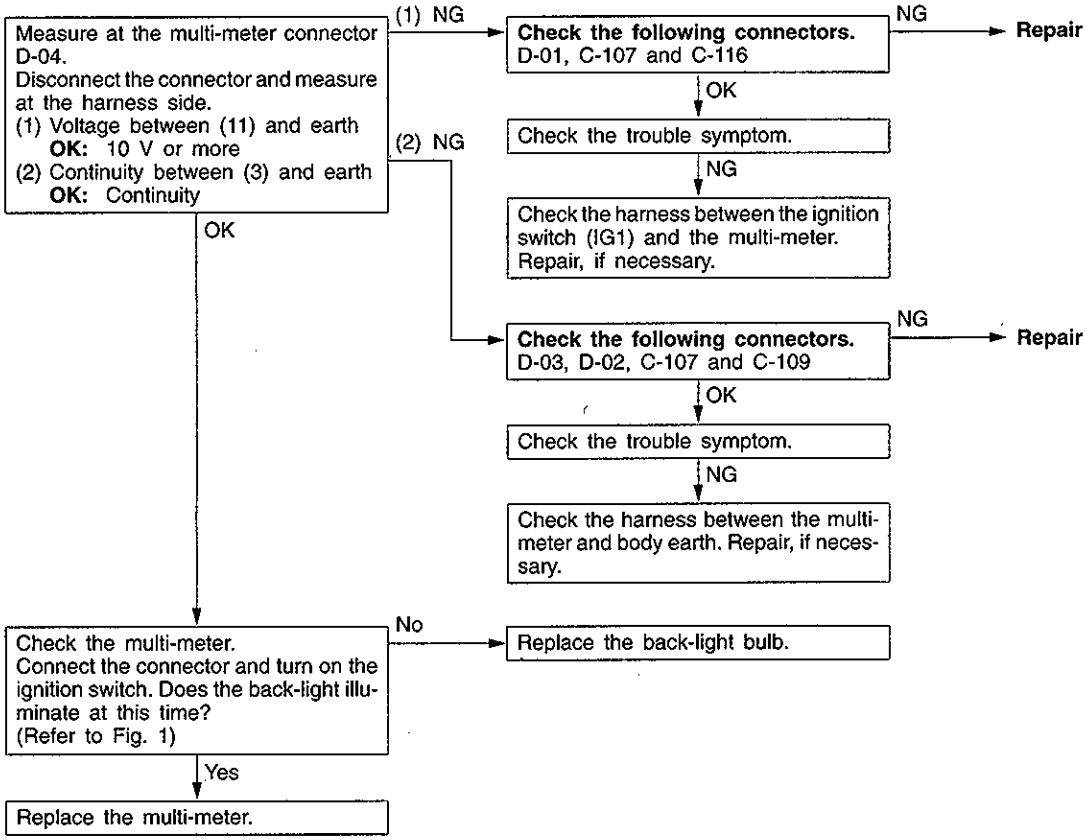
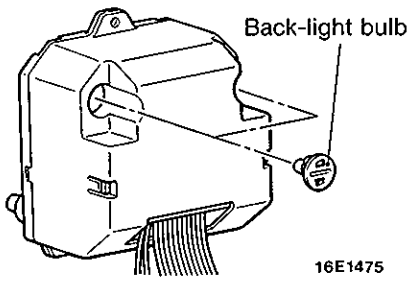
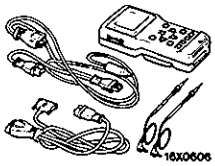


Fig. 1



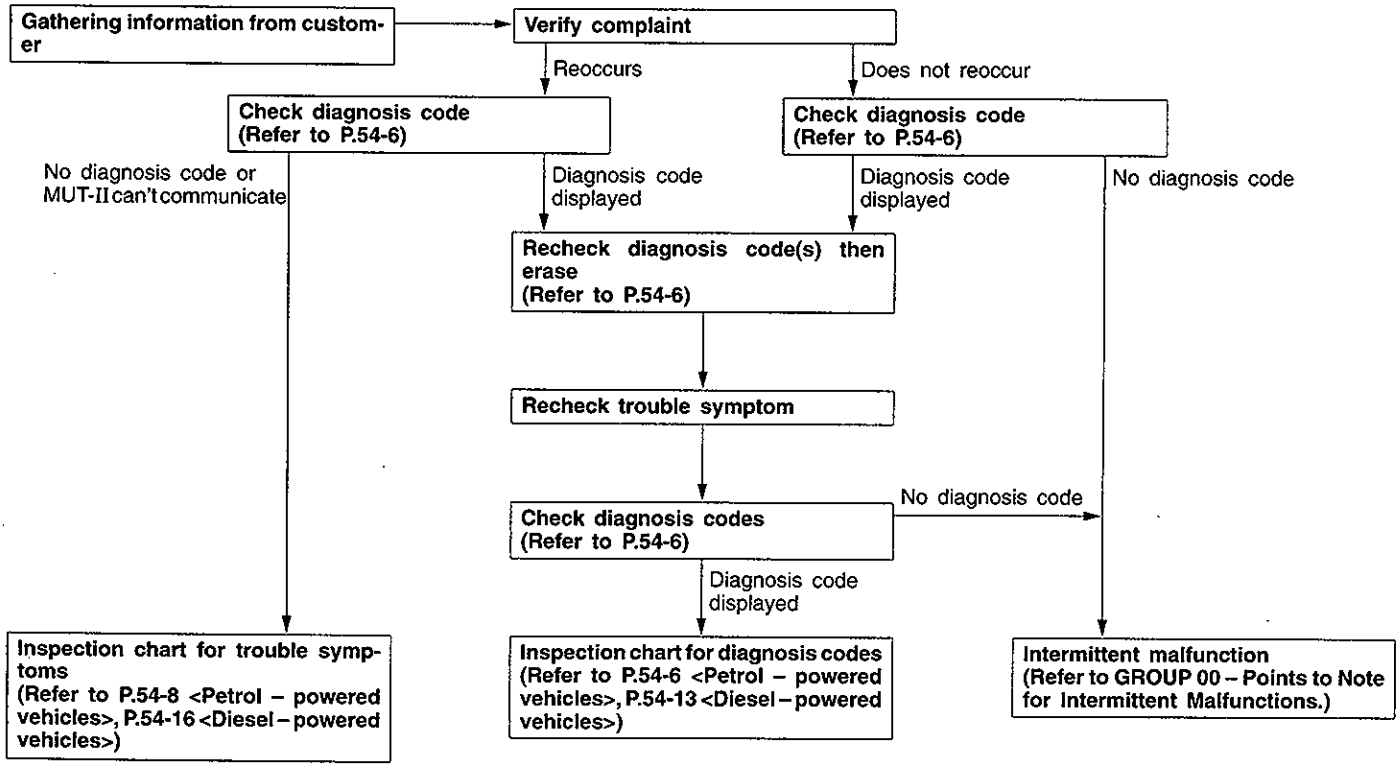
IMMOBILIZER SYSTEM

SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	• Immobilizer system check (Diagnosis display using the MUT-II) • Registration of the ID code.
 16X0607		ROM pack	

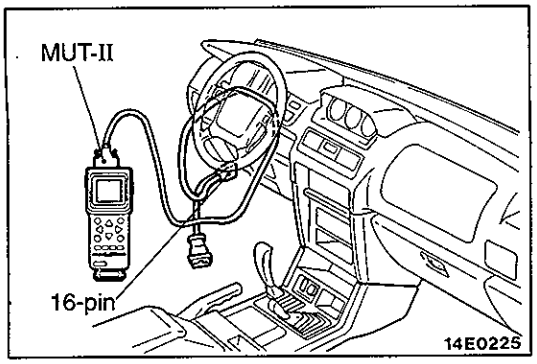
TROUBLESHOOTING <PETROL-POWERED VEHICLES>

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING



Caution

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



DIAGNOSTIC FUNCTION

DIAGNOSIS CODES CHECK

Connect the MUT-II to the diagnosis connector (16-pin), then check diagnosis codes.

Caution
Turn the ignition switch off before connecting or disconnecting the MUT-II.

ERASING DIAGNOSIS CODES

Connect the MUT-II to the diagnosis connector (16-pin), and then erase the diagnosis codes.

Caution
- **Turn the ignition switch off before connecting or disconnecting the MUT-II.**
- **The diagnosis codes which result from disconnecting the battery cables cannot be erased.**

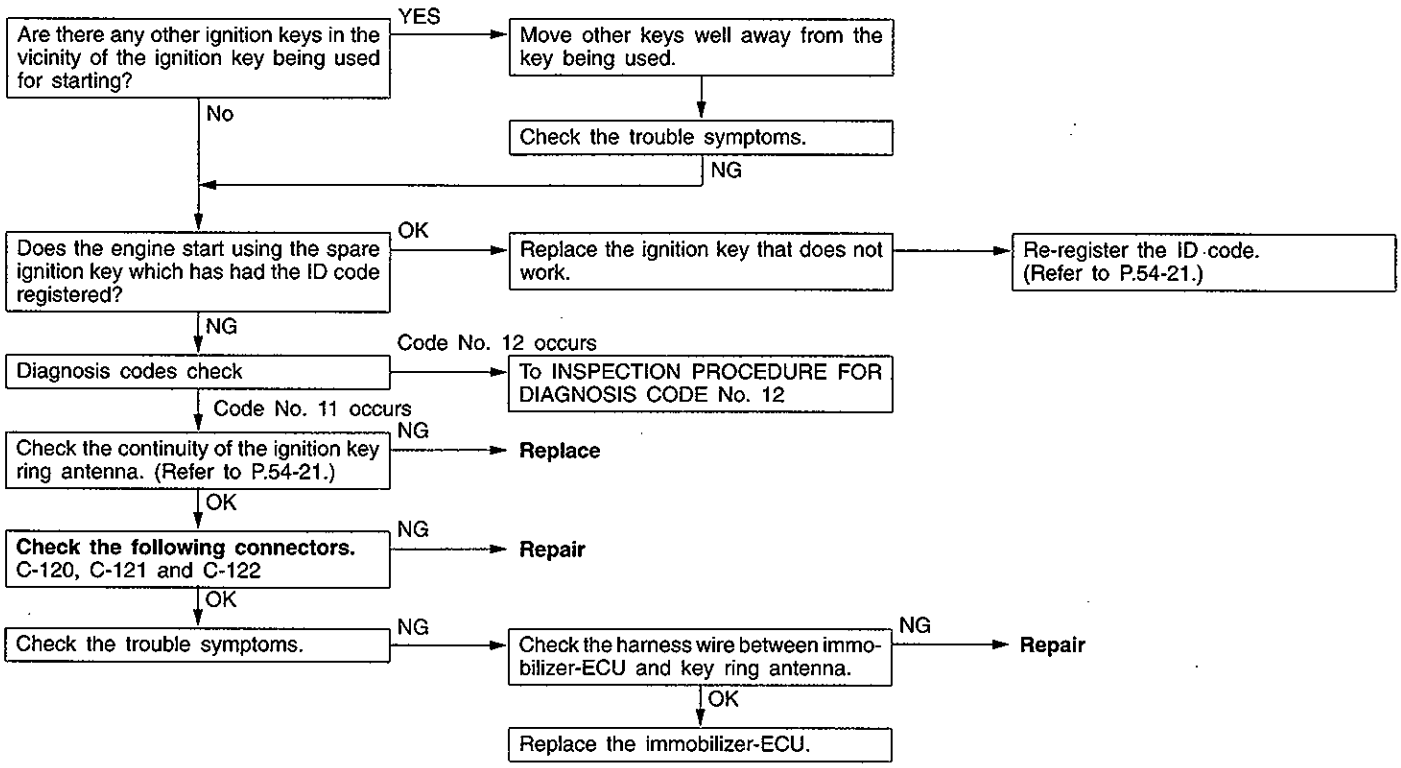
INSPECTION CHART FOR DIAGNOSIS CODES

Diagnosis code No.	Inspection items	Reference page
11	Transponder communication system	54-7
12*	ID code are not the same or are not registered	54-7
21	Communication system between MUT-II and engine-ECU	54-8
31	EEPROM abnormality inside immobilizer-ECU	54-8
32	Ignition switch IG signal circuit system	54-9

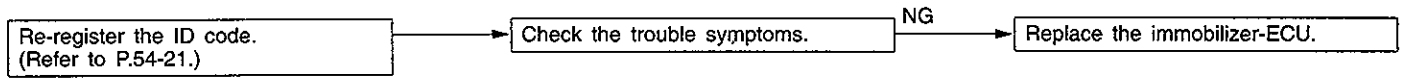
NOTE
*: Diagnosis code No. 12 is not recorded.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

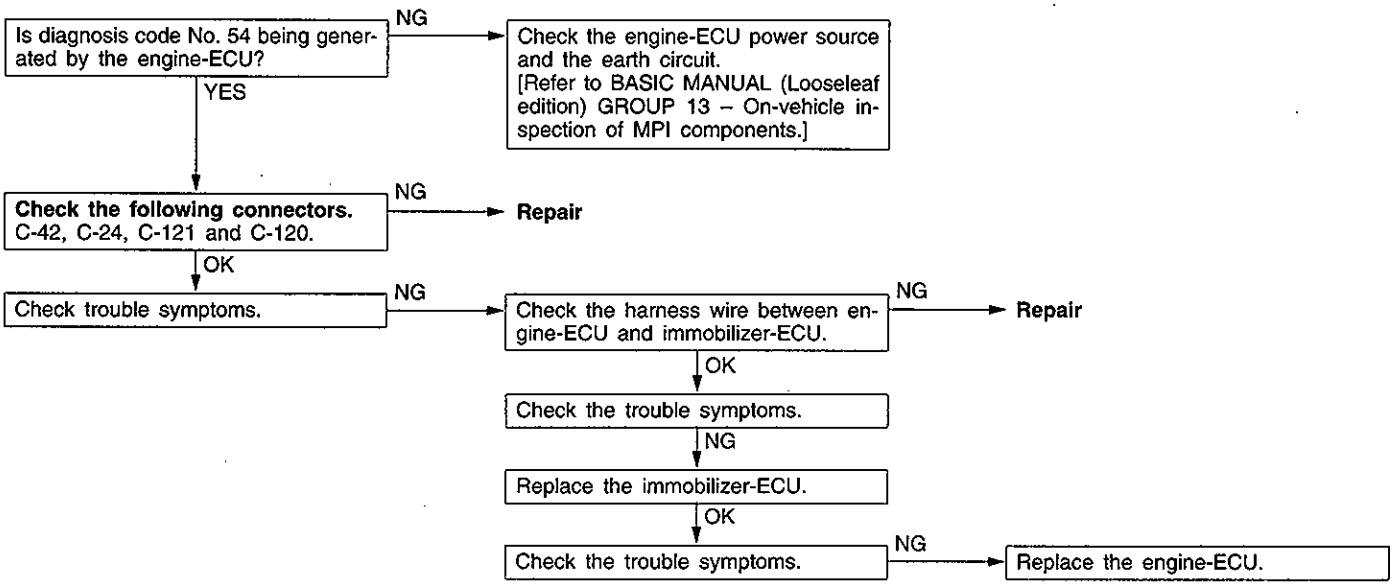
Code No. 11 Transponder communication system	Probable cause
• The ID code of the transponder is not sent to the immobilizer-ECU immediately after the ignition switch is turned to the ON position. • If the engine is started while several ignition keys are in the vicinity, then interference between the different keys may occur, which will cause this code to be generated.	• ID code interference • Malfunction of the transponder • Malfunction of the ignition key ring antenna • Malfunction of harness or connector • Malfunction of the immobilizer-ECU



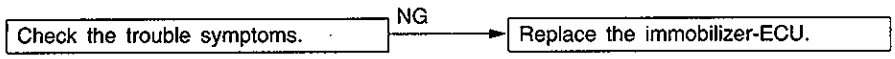
Code No. 12 ID code are not the same or are not registered	Probable cause
The ID code which is sent from the transponder is not the same as the ID code which is registered in the immobilizer-ECU.	• The ID code in the igniton key being used has not been properly registered. • Malfunction of the immobilizer-ECU.



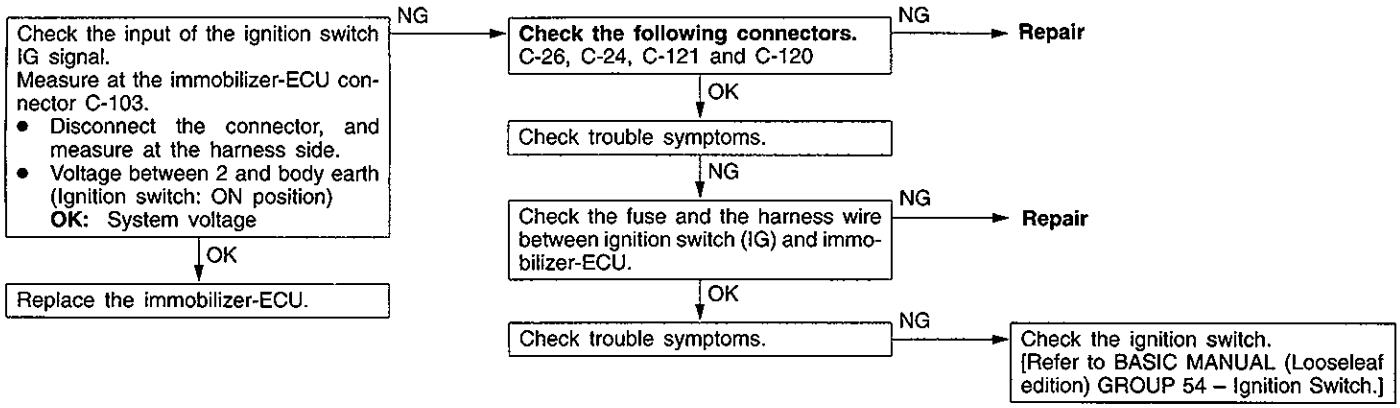
Code No. 21 Communication system between MUT-II and engine-ECU	Probable cause
After the ignition switch is turned to the ON position, the confirmation code is not received from the engine-ECU within the allowable time, or an abnormal code is received.	• Malfunction of harness or connector • Malfunction of the engine-ECU • Malfunction of the immobilizer-ECU.



Code No. 31 EEPROM abnormality inside immobilizer-ECU	Probable cause
No data has been written to the EEPROM inside the immobilizer-ECU.	• Malfunction of the immobilizer-ECU.



Code No. 32 Ignition switch IG signal circuit system	Probable cause
The ignition switch signal is not being input to the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of the ignition switch • Malfunction of the immobilizer-ECU



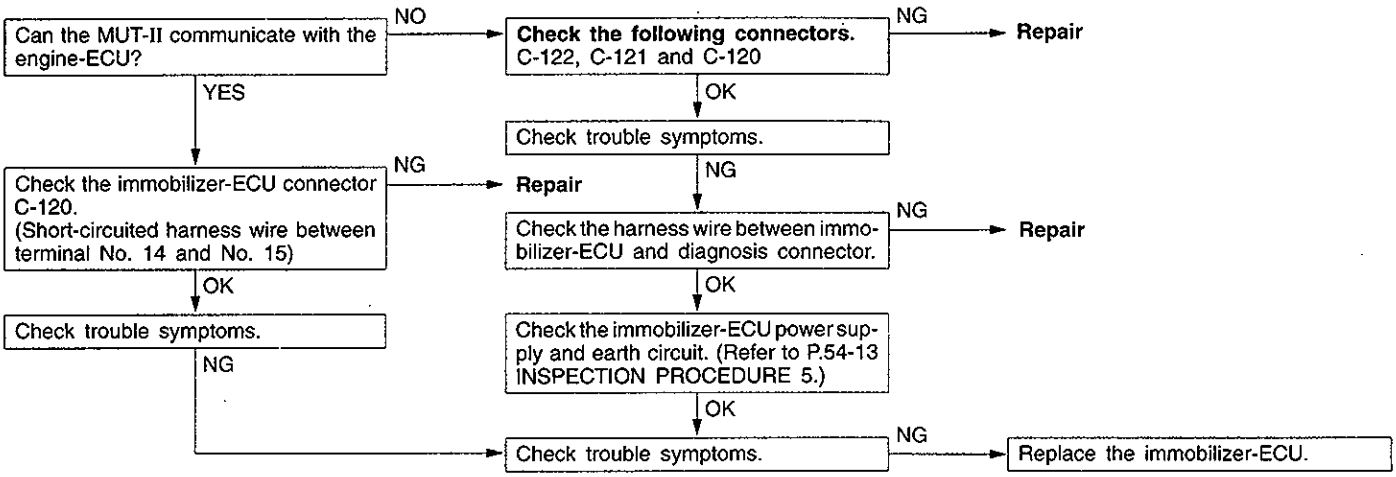
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	1	54-10
Diagnosis code No. 54 has been generated by the engine-ECU.	2	54-11
ID code cannot be registered using the MUT-II.	3	54-11
Engine does not start (Cranking but no initial combustion).	4	54-12
Malfunction of the immobilizer-ECU power supply and earth circuit	5	54-13

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

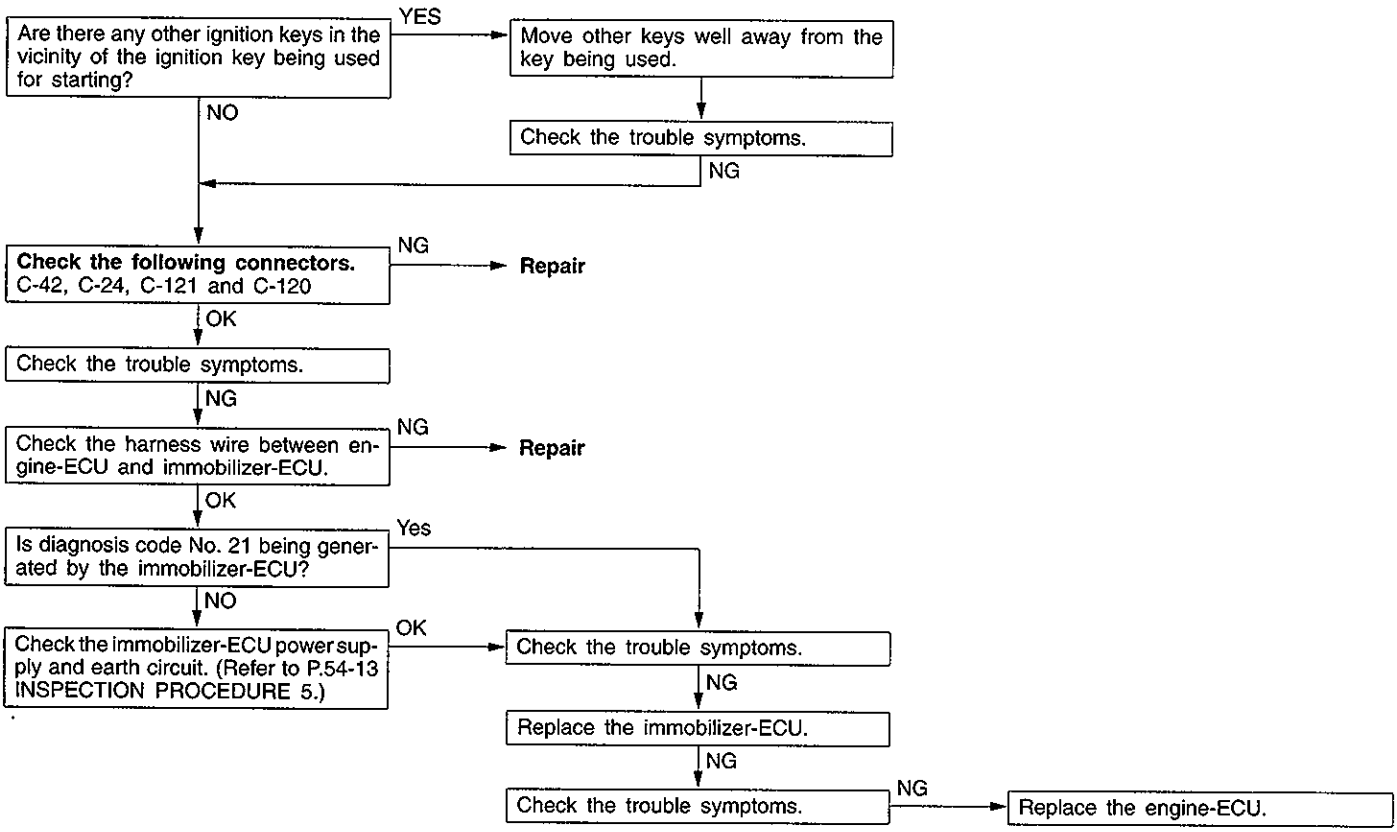
Inspection Procedure 1

Communication with MUT-II is impossible.	Probable cause
The cause is probably that a malfunction of the diagnosis line or the immobilizer-ECU is not functioning.	• Malfunction of the diagnosis line • Malfunction of harness or connector • Malfunction of the immobilizer



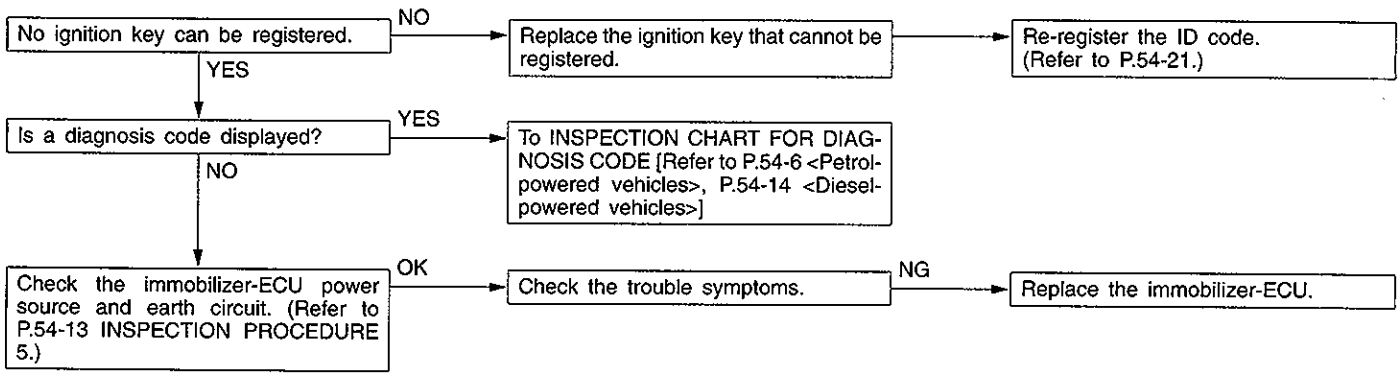
Inspection Procedure 2

Diagnosis code No. 54 has been generated by the engine-ECU.	Probable cause
• There is a problem with communication between the engine-ECU and the immobilizer-ECU. • If the engine is started while several ignition keys are in the vicinity, then interference between the different keys may occur, which will cause this code to be generated. • This code may be generated when registering the ID code.	• ID code interference • Non-identical ID codes • Malfunction of harness or connector • Malfunction of the immobilizer-ECU • Malfunction of the engine-ECU



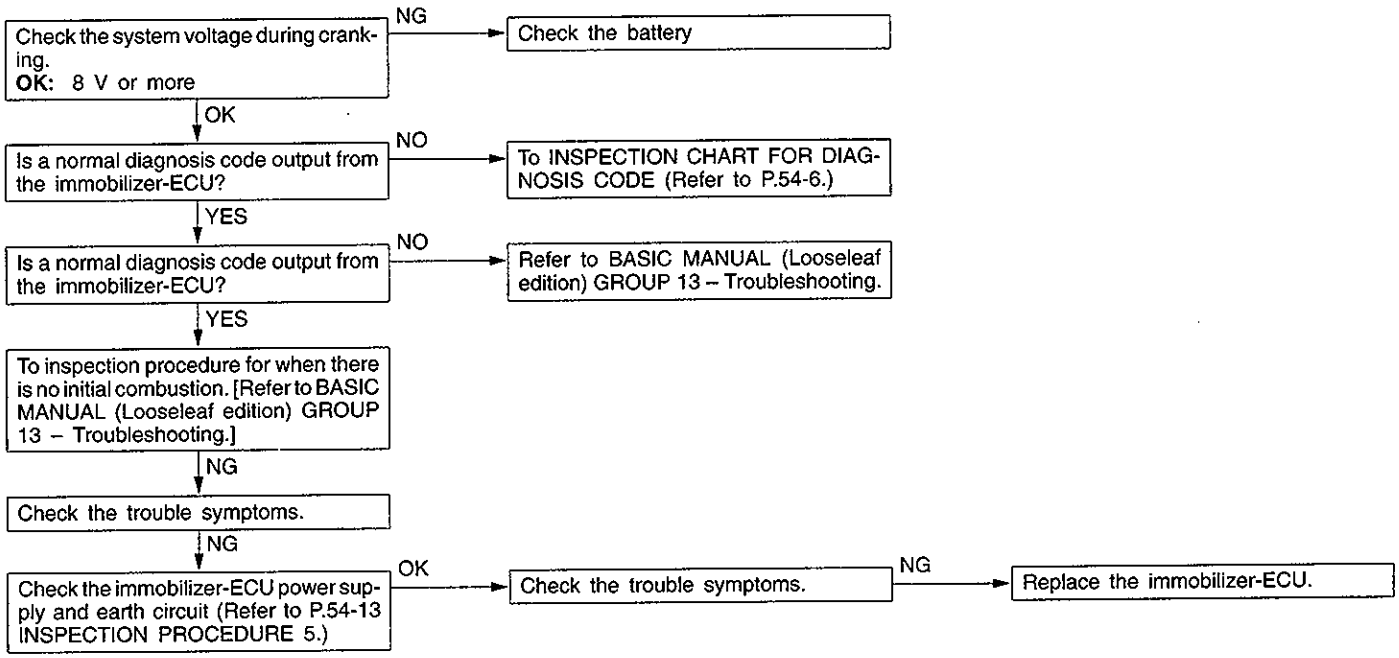
Inspection Procedure 3

ID code cannot be registered using the MUT-II.	Probable cause
The cause is probably that there is no ID code registered in the immobilizer-ECU, or there is a malfunction of the immobilizer-ECU.	• Malfunction of the transponder • Malfunction of the ignition key ring antenna • Malfunction of the harness or connector • Malfunction of the immobilizer-ECU



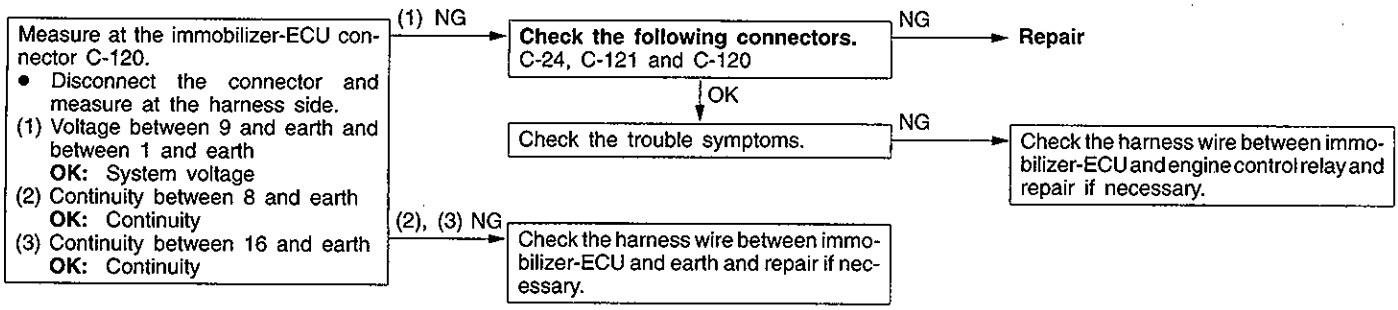
Inspection Procedure 4

Engine does not start (cranking but no initial combustion).	Probable cause
If the fuel injectors are not operating, there might be a problem with the MPI system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.	• Malfunction of the MPI system • Malfunction of the immobilizer-ECU



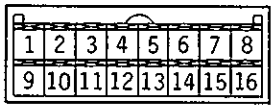
Inspection Procedure 5

Malfunction of the immobilizer-ECU power supply and earth circuit



CHECK AT IMMOBILIZER-ECU

TERMINAL VOLTAGE CHECK CHART



16W0390

Terminal No.	Signal	Check requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	Ignition switch-IG	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
8	Immobilizer-ECU earth	–	0 V
9	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
16	Immobilizer-ECU earth	–	0 V

TROUBLESHOOTING <DIESEL-POWERED VEHICLES>

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

Refer to 54-5.

Caution

- **If the immobilizer-ECU has been replaced, you will need to re-register the ignition key ID codes and to reset the code for the fuel cut valve-ECU to the factory setting.**
- **If the fuel cut valve-ECU has been replaced with another ECU that is not a new part, you will need to re-register the ignition key ID codes and to reset the code for the fuel cut valve-ECU to the factory setting.**

DIAGNOSIS FUNCTION

Refer to 54-6.

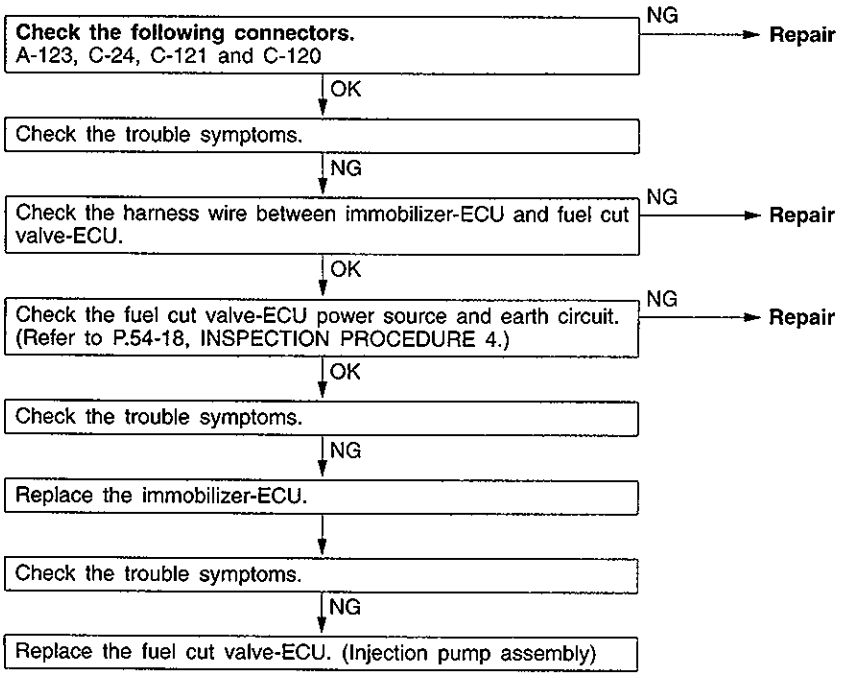
INSPECTION CHART FOR DIAGNOSIS CODES

Diagnosis code	Inspection items	Reference page
11	Transponder communication system	54-7
12*	ID codes are not the same or are not registered.	54-7
21	Communication system between fuel cut valve-ECU and immobilizer-ECU	54-15
22	Fuel cut valve-ECU system	54-16
23	Starting permission codes are not identical	54-16
31	EEPROM abnormality inside the immobilizer-ECU	54-8

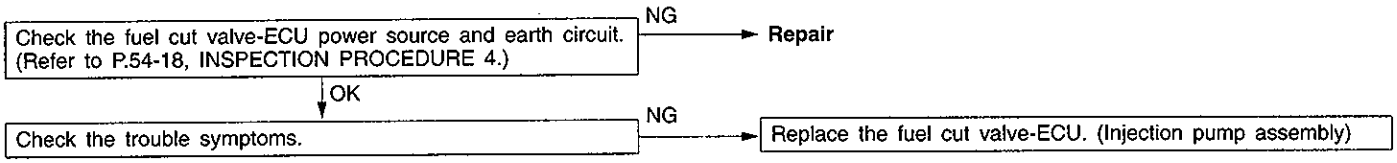
NOTE
*: Diagnosis code No. 12 is not recorded.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

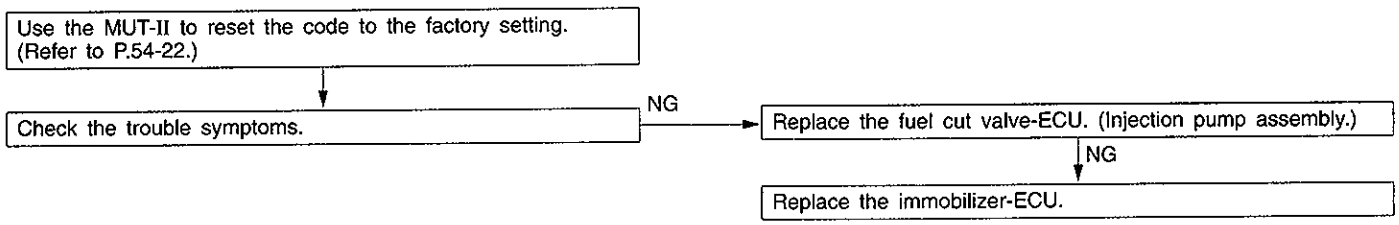
Code No. 21 Communication system between fuel cut valve-ECU and immobilizer-ECU	Probable cause
The confirmation code is not sent from the fuel cut valve-ECU within the specified time after the ignition key is turned to ON, or an incorrect code is sent.	• Open or short communication line, poor contact of connector • Malfunction of fuel cut valve-ECU • Malfunction of immobilizer-ECU



Code No. 22 Fuel cut valve-ECU system	Probable cause
The immobilizer-ECU is receiving an abnormal signal from the fuel cut valve ECU.	• Malfunction of fuel cut valve-ECU.



No. 23 Starting permission codes are not identical	Probable cause
The starting permission code received from the immobilizer-ECU is not identical to the starting permission code that has been recorded in the fuel cut valve ECU.	• Resetting the code to the factory setting is not made using the MUT-II. • Malfunction of fuel cut valve-ECU.



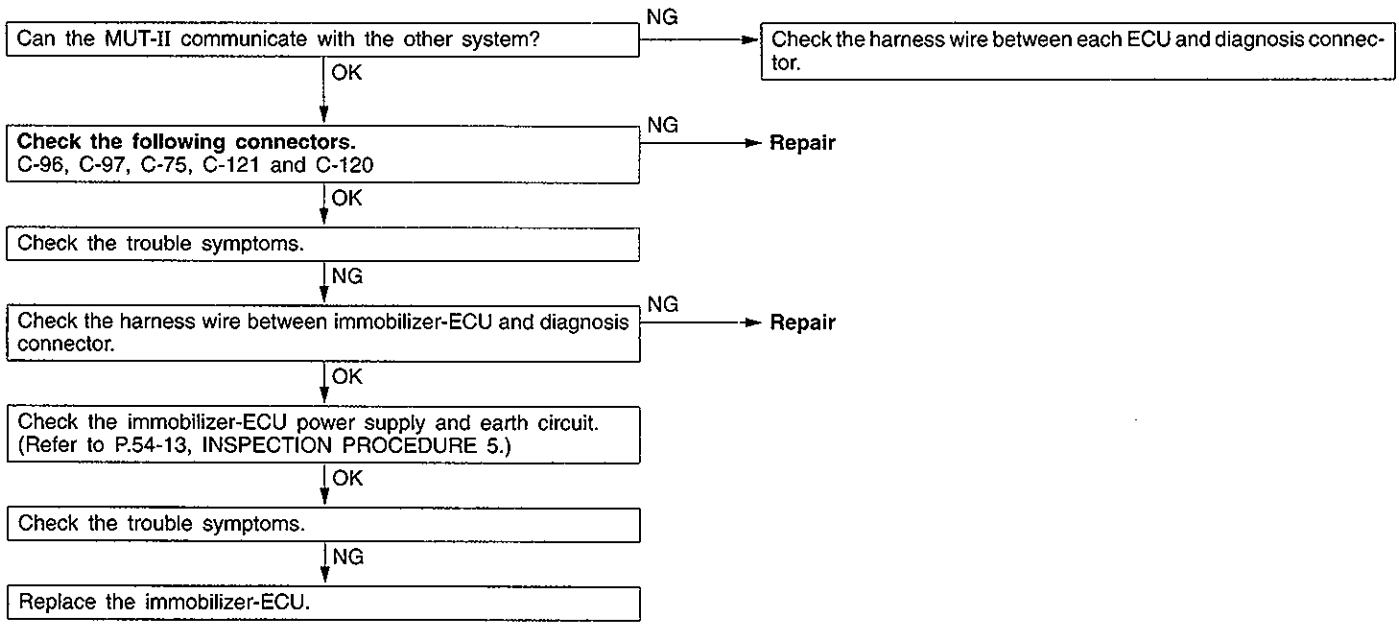
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure	Reference page
Communication with MUT-II is impossible.	1	54-17
Engine does not start. (Engine stops after firing momentarily. Cranking but no initial combustion.)	2	54-18
ID code cannot be registered using the MUT-II.	3	54-11
Fuel cut valve-ECU power supply and earth circuit	4	54-18

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

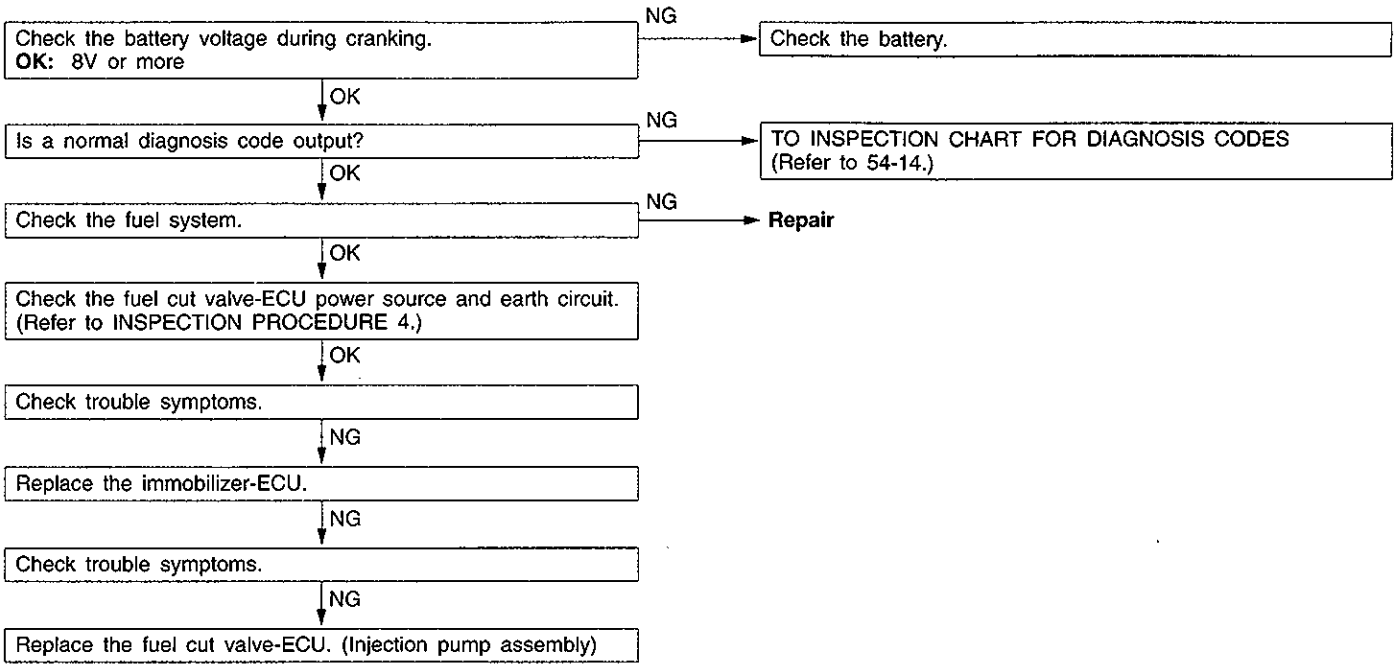
Inspection procedure 1

Communication with MUT-II is impossible.	Probable cause
The cause is probably that a malfunction of the diagnosis line or the immobilizer-ECU is not functioning.	• Malfunction of connector • Malfunction of diagnosis line • Malfunction of immobilizer-ECU power source • Malfunction of immobilizer-ECU



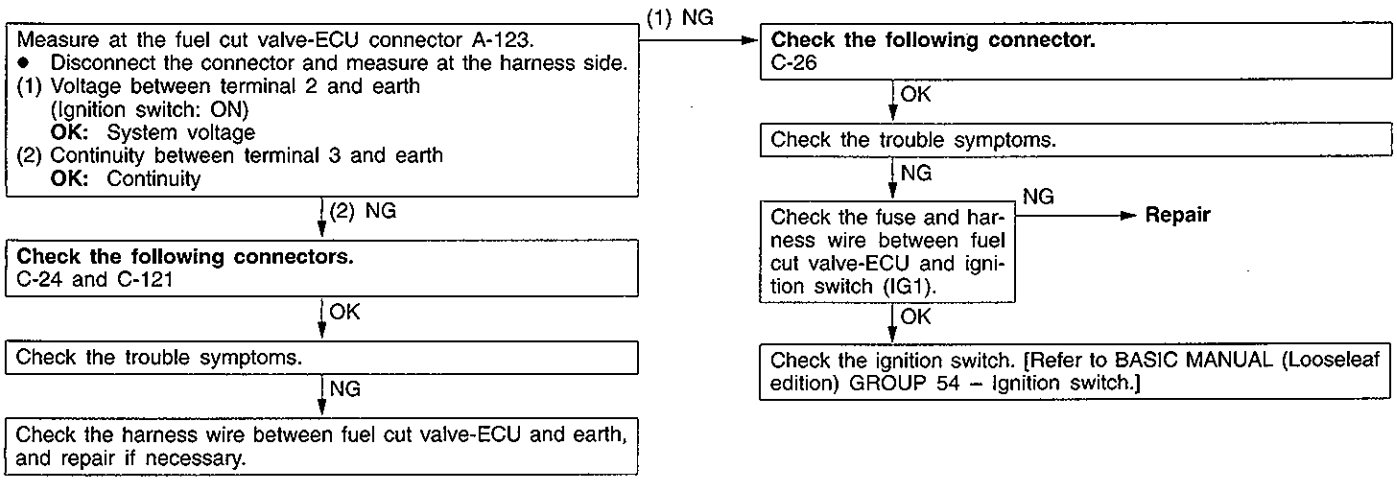
Inspection procedure 2

Engine does not start. (Engine stops after firing momentarily Cranking but no initial combustion.)	Probable cause
If the fuel injectors are not operating, there might be a problem with the fuel system in addition to a malfunction of the immobilizer system.It is normal for this to occur if an attempt is made to start the engine using the key that has not been properly registered.	• Malfunction of fuel system • Malfunction of immobilizer system



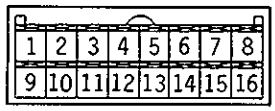
Inspection procedure 4

Fuel cut valve-ECU power supply and earth circuit



CHECK AT IMMOBILIZER-ECU

TERMINAL VOLTAGE CHECK CHART



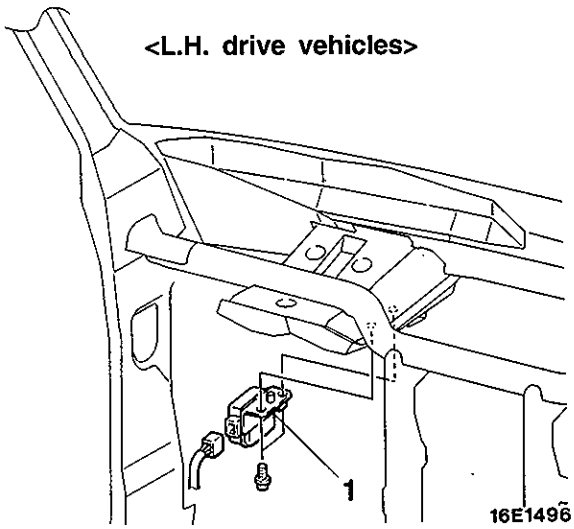
16W0390

Terminal No.	Signal	Check requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	Ignition switch-IG	Ignition switch: OFF	0V
		Ignition switch: ON	System voltage
8	Immobilizer-ECU earth	–	0V
9	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
16	Immobilizer-ECU earth	–	0V

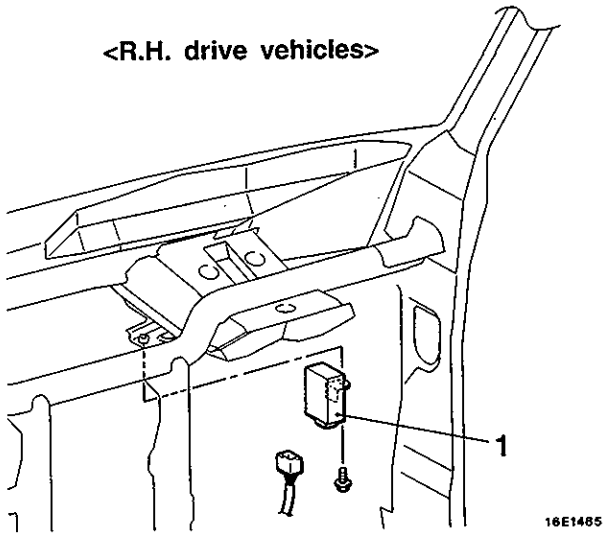
IMMOBILIZER SYSTEM

REMOVAL AND INSTALLATION

<L.H. drive vehicles>



<R.H. drive vehicles>

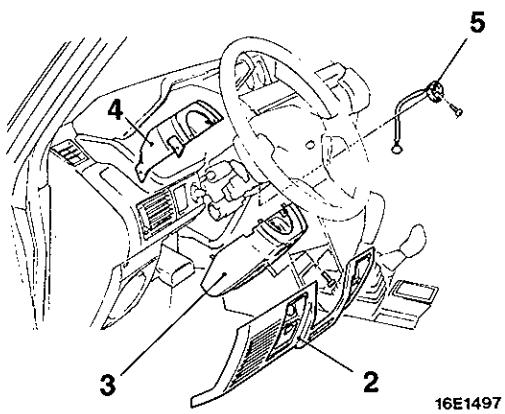


Immobilizer-ECU removal steps

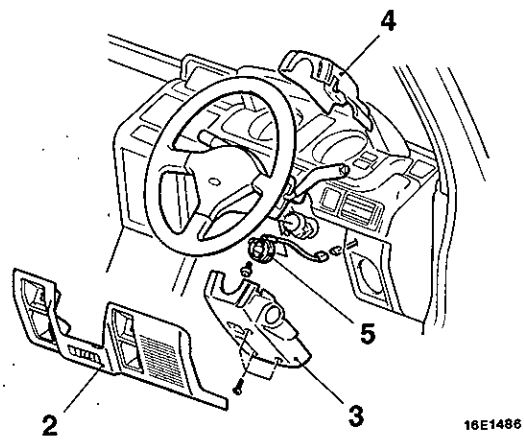
- Instrument panel [Refer to BASIC MANUAL (Looseleaf ediiton) GROUP 52A – Instrument Panel.]

1. Immobilizer-ECU

<L.H. drive vehicles>



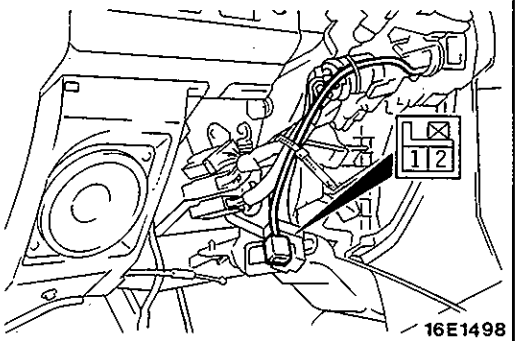
<R.H. drive vehicles>



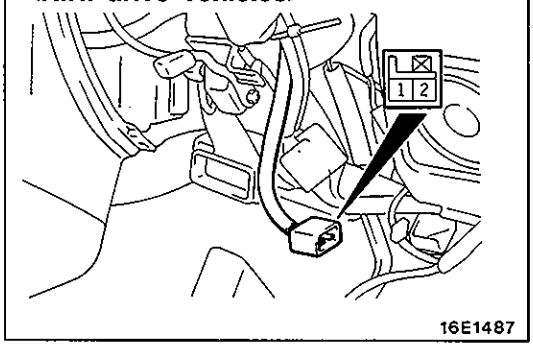
Ignition key ring antenna removal steps

2. Instrument under cover [Refer to BASIC MANUAL (Looseleaf edition) GROUP 52A – Instrument Panel.]
3. Column cover lower
4. Column cover upper
5. Ignition key ring antenna

<L.H. drive vehicles>



<R.H. drive vehicles>



INSPECTION

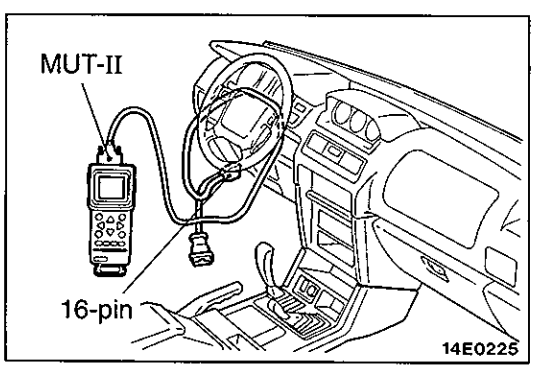
IGNITION KEY RING ANTENNA CONTINUITY CHECK

Use a circuit tester to measure the resistance between the terminals.

ID 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 ID codes for each ignition key being used into the immobilizer-ECU. (A maximum of eight different ID codes can be registered.)
Moreover, when the immobilizer-ECU has been replaced, you will need to use the MUT-II to input the vehicle secret code and to register the password (secret code) that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

Caution
Because registering of the ID 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.

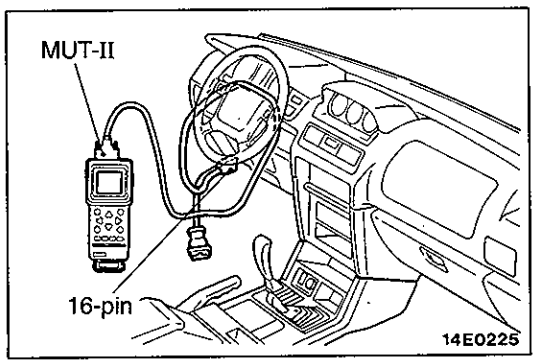
Caution
Turn the ignition switch off before connecting or disconnecting the MUT-II.

(2) Check that diagnosis code No. 54 is not being generated by the engine-ECU. If it is being generated, check according to the Troubleshooting procedures before continuing.
(3) Use the igniton key that is to be registered to turn the ignition switch to the ON position.
(4) Use the MUT-II to register the ID code. If you are registering two or more codes, use the next key to be registered to turn the ignition switch to the ON position without disconnecting the MUT-II.
(5) Disconnect the MUT-II. This completes the registration operation.
(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.

RESETTING THE CODE TO THE FACTORY SETTING <DIESEL-POWERED VEHICLES>

If the immobilizer-ECU in diesel-powered vehicles is replaced, it is necessary to reset the factory code that has been recorded in the fuel cut valve-ECU to make starting possible at all times, in addition to re-registering the ignition key ID code. This is also necessary if the fuel cut valve-ECU has been replaced with another ECU that is not a new part.

NOTE
It is necessary to re-register the ignition key ID code and to reset the factory code, but it does not matter which one is done first.



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

Caution
Connection and disconnection of the MUT-II should always be carried out with the ignition switch in the OFF position.

(2) Turn the ignition switch to the ON position.
(3) Use the MUT-II to reset the factory code.

NOTE
It takes a total of approximately 16 minutes for the factory code to be reset.