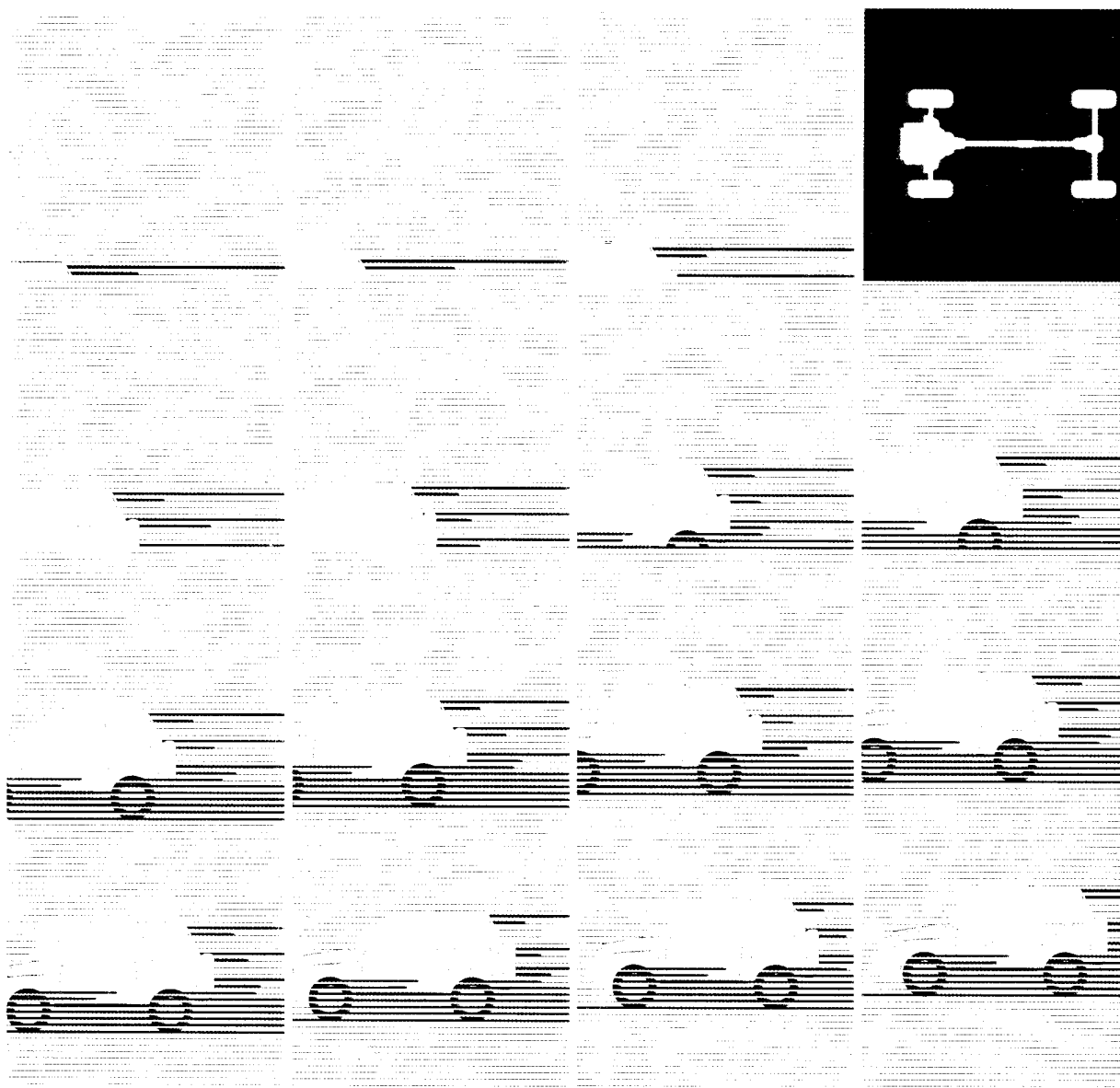




Workshop Manual

chassis SUPPLEMENT

PAJERO PININ '01



Pub. No. CKRE00E1-A

PAJERO PININ

WORKSHOP MANUAL SUPPLEMENT

FOREWORD

This manual outlines changes in servicing procedures related to the chassis including vehicle inspections, adjustments and improvements in the newly added models.

Please read this manual carefully so that it will be of assistance for your service activities.

Please note that the following service manuals are also available and should be used in conjunction with this manual.

TECHNICAL INFORMATION MANUAL

IKRE00E1

WORKSHOP MANUAL

CHASSIS

CKRE00E1

CKRX00E1CD(CD-ROM)

ELECTRICAL WIRING

EKRE00E1

EKRE00E1-A

BODY REPAIR MANUAL

BKRE00E1

BKRE00E1-A

ENGINE GROUP

PWEE9502-E

PARTS CATALOGUE

I603F509D□

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All information, illustrations and product descriptions contained in this manual are current as at the time of publication. We, however, reserve the right to make changes at any time without prior notice or obligation.



MITSUBISHI MOTOR SALES

Europe B.V.

“GDI” is a trade mark of Mitsubishi Motors Corporation.

WARNING REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLE

WARNING!

- (1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).**
- (2) The SRS components should not be subjected to temperature of 93°C or more. So, remove the SRS-ECU, driver's and front passenger's air bag modules, clock spring, side impact sensors and front seat assemblies (side air bag modules) before drying or baking the vehicle after painting.**
- (3) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.**
- (4) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS), before beginning any service or maintenance of any SRS component or any SRS-related component.**

NOTE

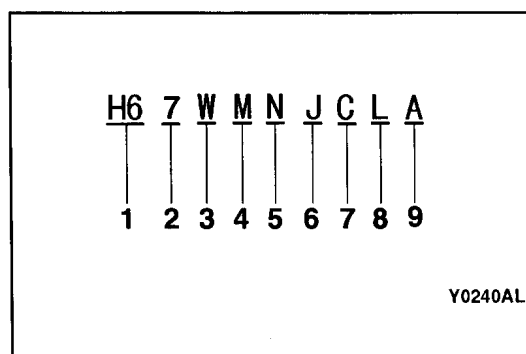
Section titles with asterisks (*) in the table of contents in each group indicate operations requiring warnings.

GROUP 00 GENERAL

VEHICLE IDENTIFICATION

MODELS

Model code		Engine model	Transmission model	Fuel supply system
H67	WMNJCLA	4G94-DOHC (1,999 mL)	V5M21 <5M/T>	GDI
	WMNJCRA			
	WMRJCLA		V4AW4 <4A/T>	
	WMRJCRA			
H77	WLNJCLA		V5M21 <5M/T>	
	WLNJCRA			
	WRNJCLA		V4AW4 <4A/T>	
	WRNJCRA			



MODEL CODE

No.	Items	Contents
1	Development	H6: MITSUBISHI PAJERO PININ Short wheelbase H7: MITSUBISHI PAJERO PININ Long wheelbase
2	Engine type	7: 2,000 mL petrol engine
3	Sort	W: Wagon
4	Body style	M: 3-door L: 5-door
5	Transmission type	N: 5-speed manual transmission R: 4-speed automatic transmission
6	Trim level	J: GL
7	Specification engine feature	C: GDI-DOHC

No.	Items	Contents
8	Steering wheel location	L: Left hand R: Right hand
9	Destination	A: For Europe

CHASSIS NUMBER

* J M P 0 N H6 7 W 1 X 000001 *

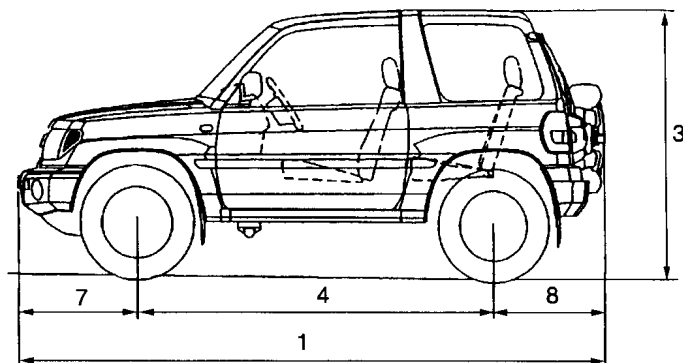
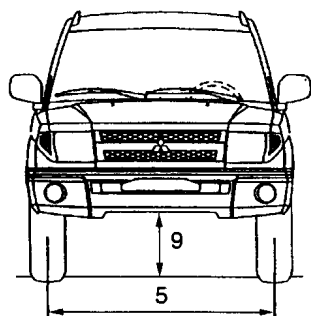
1 2 3 4 5 6 7 8 9

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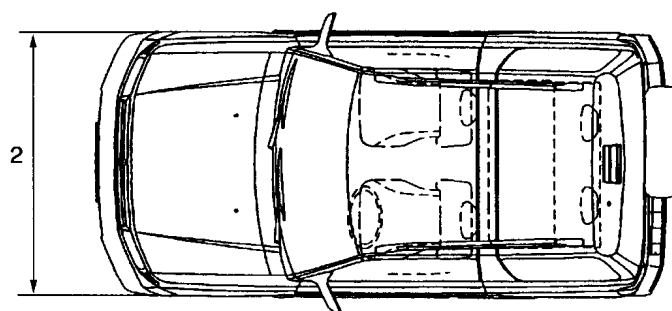
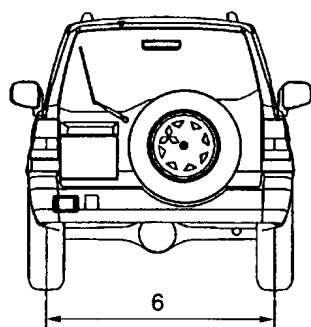
No.	Items		Contents
1	Steering wheel location	JMP	Left hand drive
		JMR	Right hand drive
2	Body style	0	Standard roof
3	Transmission type	N	5-speed manual transmission
		R	4-speed automatic transmission
4	Development order	H6	PAJERO PININ Short wheelbase
		H7	PAJERO PININ Long wheelbase
5	Engine	7	4G94: 1,999 mL petrol engine
6	Sort	W	Wagon
7	Model year	1	2001
8	Plant	X	IPF
9	Serial number	—	—

MAJOR SPECIFICATIONS

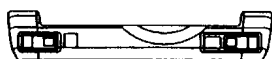
<3-door model>



<L.H.drive vehicles>



<R.H.drive vehicles>



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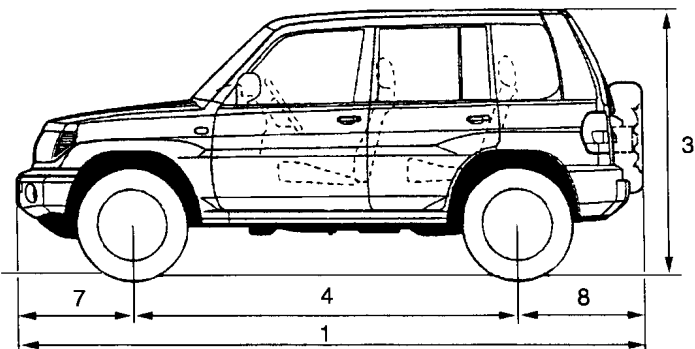
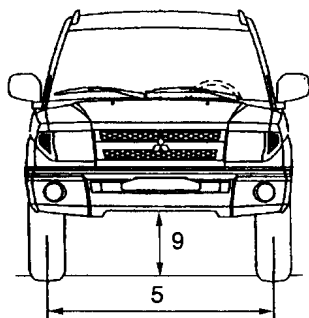
Items			H67WMNJCLA	H67WMNJCRA	H67WMRJCLA	H67WMRJCRA
Vehicle dimensions mm	Overall length	1	3,735			
	Overall width	2	1,695			
	Overall height (unladen)	3	1,690/1,725* ¹ /1,700* ²			
	Wheelbase	4	2,280			
	Track-front	5	1,435			
	Track-rear	6	1,445			
	Overhang-front	7	755			
	Overhang-rear	8	700			
	Ground clearance (unladen)	9	200			
Vehicle weight kg	Kerb weight	1,300			1,320	
	Max. gross vehicle weight	1,725				
	Max. axle weight rating-front	745			755	
	Max. axle weight rating-rear	555			565	
Seating capacity		4				
Engine	Model No.	4G94				
	Total displacement mL	1,999				
Transmis- sion	Model No.	V5M21			V4AW4	
	Type	5-speed manual			4-speed automatic	
Fuel system	Fuel supply system	Gasoline Dirrect Injection				

NOTE:

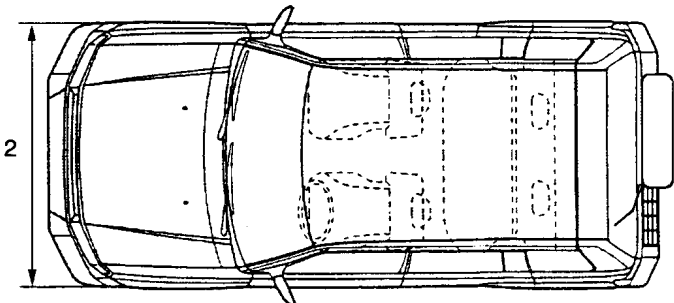
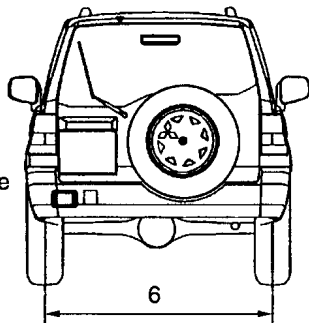
*1: Vehicles with roof rails

*2: Vehicles with roof spoiler

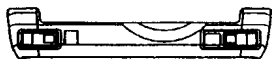
<5-door model>



<L.H.drive vehicles>



<R.H.drive vehicles>



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Items			H77WLNJCLA	H77WLNJCRA	H77WRNJCLA	H77WRNJCRA
Vehicle dimensions mm	Overall length	1	4,035			
	Overall width	2	1,695			
	Overall height (unladen)	3	1,700/1,735*1/1,720*2			
	Wheelbase	4	2,450			
	Track-front	5	1,435			
	Track-rear	6	1,445			
	Overhang-front	7	755			
	Overhang-rear	8	830			
	Ground clearance (unladen)	9	200			
Vehicle weight kg	Kerb weight		1,390		1,410	
	Max. gross vehicle weight		1,890			
	Max. axle weight rating-front		770		785	
	Max. axle weight rating-rear		620		625	
Seating capacity			5			
Engine	Model No.		4G94			
	Total displacement mL		1,999			
Transmission	Model No.		V5M21		V4AW4	
	Type		5-speed manual		4-speed automatic	
Fuel system	Fuel supply system		Gasoline Direct Injection			

NOTE:

*1: Vehicles with roof rails

*2: Vehicles with roof spoiler

ENGINE <4G9>

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Outline of Changes	2	Idle Mixture Check	3
GENERAL INFORMATION	2	Compression Pressure Check	3
SERVICE SPECIFICATIONS	2	Manifold Vacuum Check	3
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SPECIAL TOOLS	3	CYLINDER HEAD GASKET	10
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GENERAL

OUTLINE OF CHANGES

Due to the new addition of the 4G94 engine vehicles, the following service procedures have been established regarding the sections which differ from that of the previous models with the 4G93 engine. The same procedures as before are applied except for the items shown below.

- Change in the CO and HC concentration
- Change in compression pressure
- Change of the limits in the intake manifold negative pressure
- Removal and installation of camshaft and camshaft oil seal
- Removal and installation of cylinder head gasket
- Change in the protrusion of the auto tensioner rod

GENERAL INFORMATION

Items	4G94-GDI
Total displacement mL	1,999
Bore × Stroke mm	81.5 × 95.8
Compression ratio	11.0

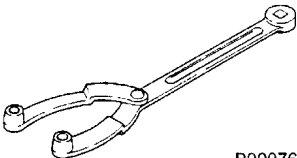
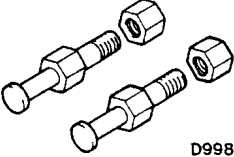
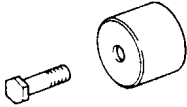
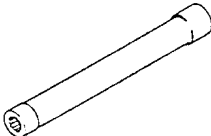
SERVICE SPECIFICATIONS

Item	Standard value	Limit
CO concentration %	0.5 or less	–
HC concentration ppm	100 or less	–
Compression pressure kPa – r/min	1,800 – 200	1,320 – 200
Intake manifold negative pressure kPa	–	56
Shank length of cylinder head bolt mm	–	96.4
Protrusion of auto tensioner rod mm	4.8 – 5.5	–

SEALANT AND ADHESIVE

Application location	Specified sealants	Remarks
Beam camshaft cap	MITSUBISHI GENUINE PART MD970389 or equivalent	Semi-drying sealant
Cylinder head		
Camshaft position sensor support		
Camshaft thrust cover	3M Stud Locking 4170 or equivalent	–

SPECIAL TOOLS

Tools	Number	Name	Use
 B990767	MB990767	Front hub and flange yolk holder	Camshaft sprocket held
 D998719	MD998719	Crankshaft pulley holder pin	
	MD998713	Camshaft oil seal installer	Press-fitting camshaft oil seal
	MB991653	Cylinder head bolt wrench	Removal and installation of cylinder head bolt

ON-VEHICLE SERVICE**IDLE MIXTURE CHECK**

Standard value

CO contents: 0.5% or less

HC contents: 100 ppm or less

COMPRESSION PRESSURE CHECKStandard value (at engine speed of 200 r/min):
1,800 kPaLimit (at engine speed of 200 r/min):
Min. 1,320 kPa**MANIFOLD VACUUM CHECK**

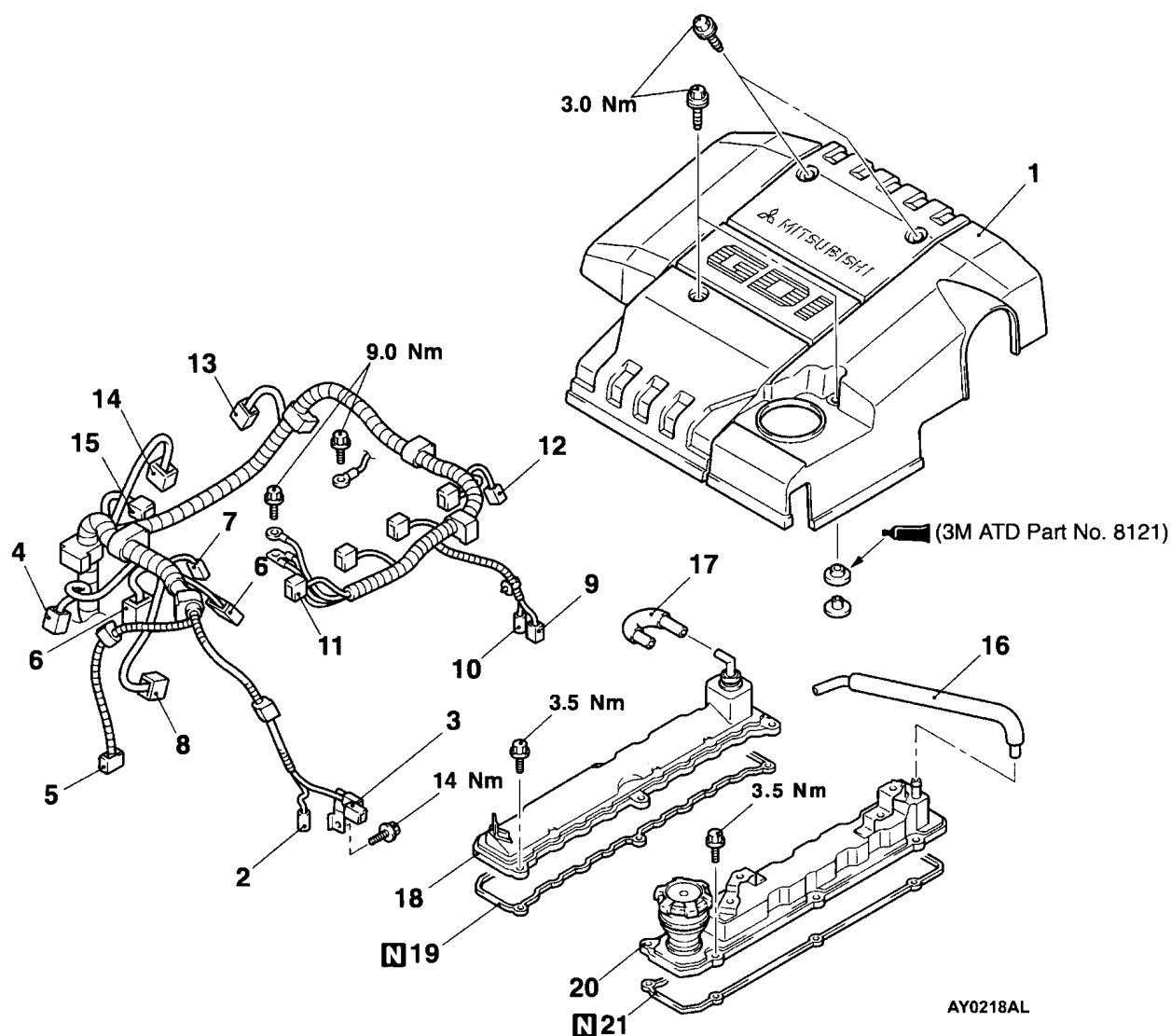
Limit: Min. 56 kPa

CAMSHAFT AND CAMSHAFT OIL SEAL

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations

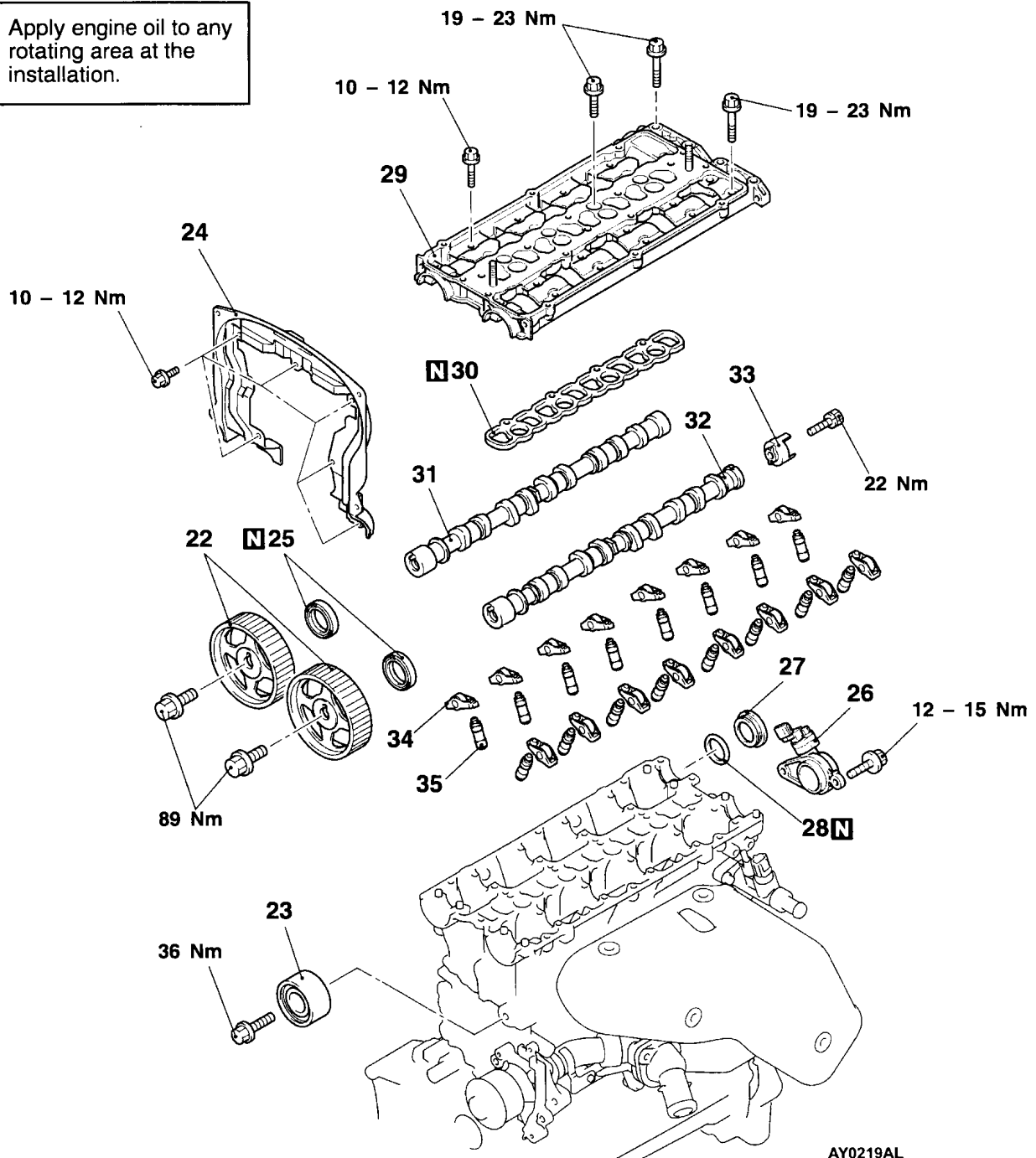
- Fuel Overflow Prevention Operation <only for pre-removal>
- Fuel Leak Check <only for post-installation>
- Air Bleeding The High-pressure Fuel Line <only for post-installation>
[Refer to GROUP 13A – Fuel Pump (High-pressure).]
- Removal and Installation of Under Cover
- Check and Adjustment of Drive Belt Tension <only for post-installation>
- Draining and Filling of Engine Coolant
- Removal and Installation of Air Intake Hose and Resonance Tank



Removal steps

- | | |
|---|--|
| 1. Engine cover | 11. Ignition coil connector |
| 2. Power steering oil pressure switch connector | 12. Camshaft position sensor connector |
| 3. A/C compressor magnetic clutch connector | 13. Throttle control servo connector |
| 4. Ignition failure sensor connector | 14. Throttle position sensor connector |
| 5. Crank angle sensor connector | 15. Purge control solenoid valve connector |
| 6. Front wiring harness and injector/EGR wiring harness combination connector | 16. Breather hose |
| 7. Fuel pressure sensor connector | 17. PCV hose |
| 8. Detonation sensor connector | • Ignition coil |
| 9. Engine coolant temperature sensor connector | • Intake manifold |
| 10. Engine coolant temperature gauge unit connector | • Timing belt |
| | 18. Intake rocker cover |
| | 19. intake rocker cover gasket |
| | 20. Exhaust rocker cover |
| | 21. Exhaust rocker cover gasket |

Apply engine oil to any rotating area at the installation.



AY0219AL

◀A▶

▶D◀

- 22. Camshaft sprocket
- 23. Idler pulley
- 24. Timing belt rear upper cover
- 25. Camshaft oil seal
 - Fuel pump (high-pressure)
(Refer to GROUP 13A.)
- 26. Camshaft position sensor support
- 27. Camshaft thrust cover

▶C◀

▶B◀

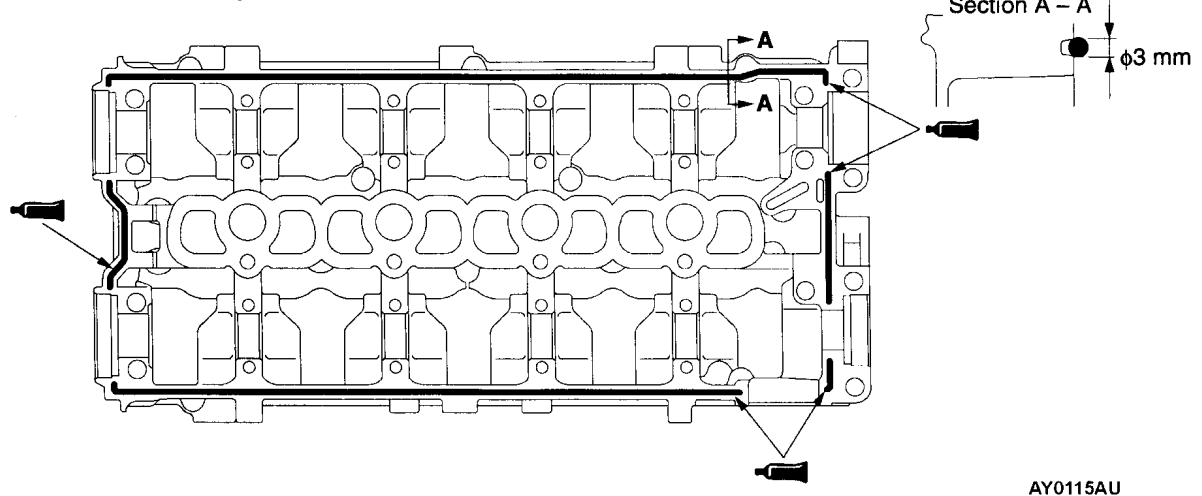
▶B◀

▶A◀

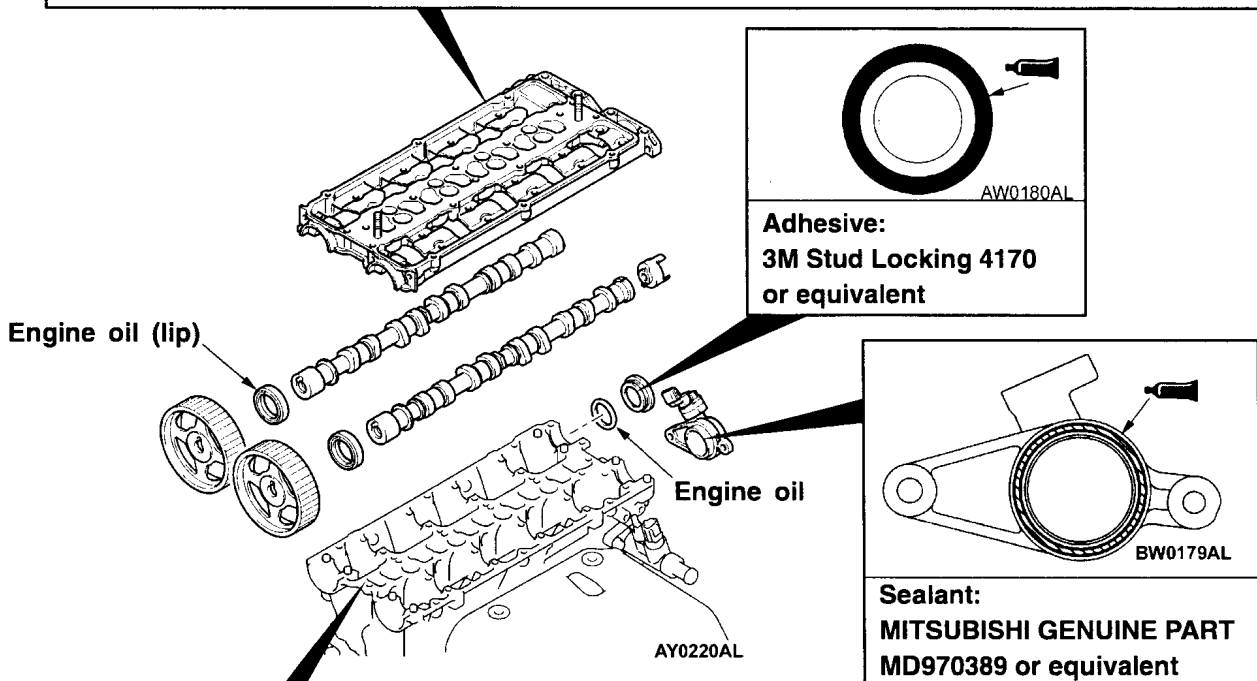
- 28. O-ring
- 29. Beam camshaft cap
- 30. Beam camshaft cap gasket
- 31. Intake camshaft
- 32. Exhaust camshaft
- 33. Camshaft position sensing cylinder
- 34. Rocker arm
- 35. Lash adjuster

LUBRICANT AND SEALANT APPLICATION LOCATIONS

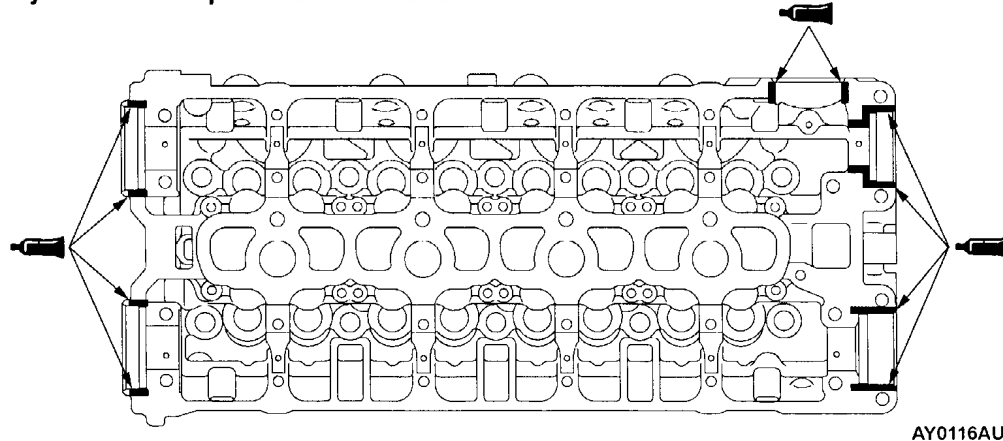
<Beam camshaft cap bottom surface observation>



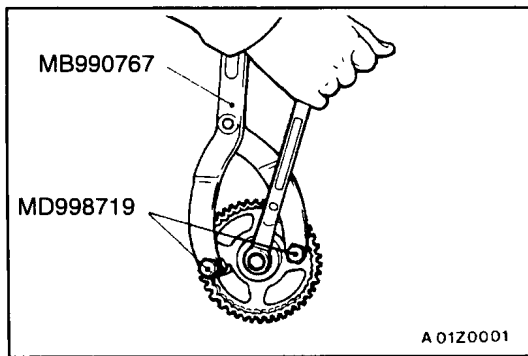
Sealant: MITSUBISHI GENUINE PART MD970389 or equivalent



<Cylinder head top surface observation>



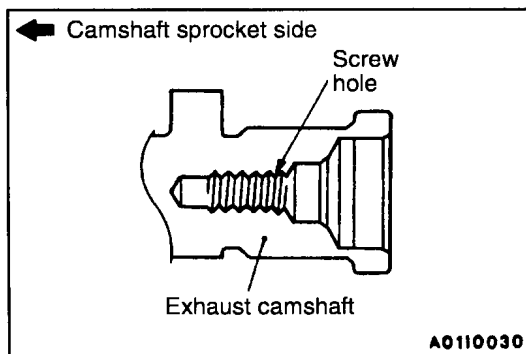
Sealant: MITSUBISHI GENUINE PART MD970389 or equivalent

**REMOVAL SERVICE POINT****◀A▶ CAMSHAFT SPROCKET REMOVAL****Caution**

To avoid the danger of damage caused by interference of the valve and the piston, rotate the crankshaft from No.1 cylinder compression top dead centre to 90° in the forward direction (clockwise).

INSTALLATION SERVICE POINTS**▶A◀ LASH ADJUSTER INSTALLATION****Caution**

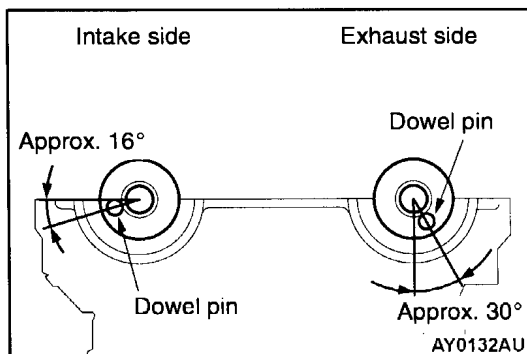
To use the lash adjuster again, be sure to clean and check it before installation.
(Refer to Engine Workshop Manual.)

**▶B◀ EXHAUST CAMSHAFT/INTAKE CAMSHAFT INSTALLATION**

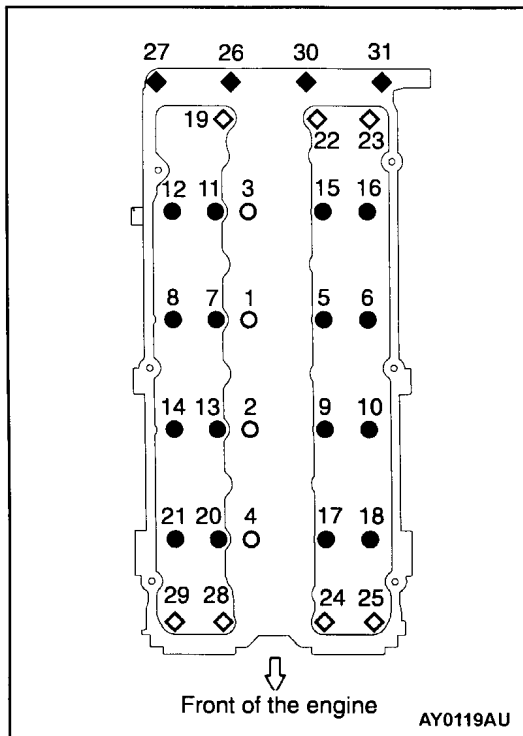
1. Apply engine oil to the cam and the journal of the camshaft.
2. Install the camshaft to the cylinder head.

Caution

Do not mistake the intake side for the exhaust side. There is a screw hole for the camshaft position sensing cylinder mounting bolt at the exhaust side of the camshaft.

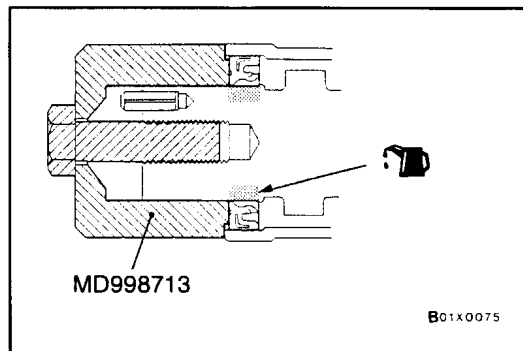
**▶C◀ BEAM CAMSHAFT CAP INSTALLATION**

1. Set the dowel pin of the camshaft at the position shown in the illustration.



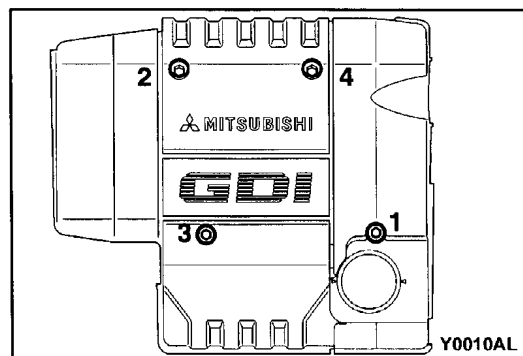
2. Tighten the beam camshaft cap mounting bolt to the specified torque in the order of the numbers shown in the illustration.

Symbol	Number of unit	Dimensions mm (Nominal diameter × nominal length)	Tightening torque Nm
○	4	8 × 32	19 – 23
●	16	6 × 35	10 – 12
◇	7	8 × 40	19 – 23
◆	4	8 × 40	



►D◄ CAMSHAFT OIL SEAL INSTALLATION

1. Apply engine oil to the circumference of the oil seal lip.
2. Press-fit the oil seal as shown in the illustration.



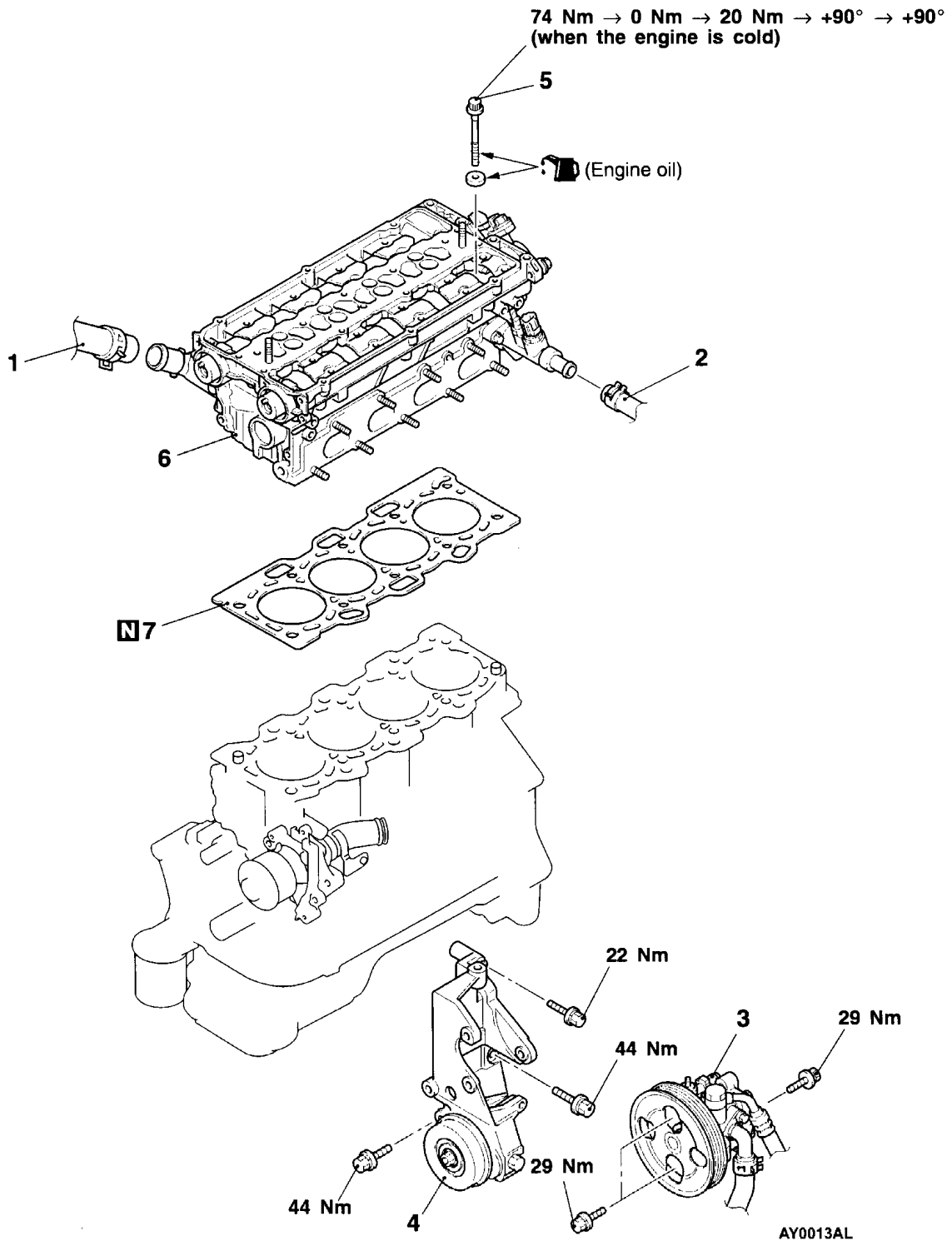
►E◄ ENGINE COVER INSTALLATION

1. Tighten the mounting bolt temporarily in the order of the numbers shown in the illustration so that the engine cover can be moved by hand.
2. Tighten the mounting bolt to the specified torque in the order of the numbers shown in the illustration.

Tightening torque: 3.0 Nm

CYLINDER HEAD GASKET**REMOVAL AND INSTALLATION****Pre-removal and Post-installation Operations**

- Removal and Installation of Engine Cover (Refer to P.11A-5.)
- Fuel Overflow Prevention Operation <only for pre-removal>
- Fuel Leak Check <only for post-installation>
- Air Bleeding the High-pressure Fuel Line <only for post-installation>
[Refer to GROUP 13A – Fuel Pump (High-pressure).]
- Removal and Installation of Under Cover
- Check and Adjustment of Drive Belt Tension <only for post-installation>
- Draining and Filling of Engine Coolant
- Removal and Installation of Timing Belt Rear Upper Cover (Refer to P.11A-6.)
- Removal and Installation of Fuel Pump (High-pressure) (Refer to GROUP 13A.)
- Removal and Installation of Exhaust Manifold
- Removal and Installation of Water Pipe
- Removal and Installation of EGR Valve and Support Assembly

**Removal steps**

- ◀A▶ ▶C▶ 1. Connection of radiator upper hose
 ▶B▶ 2. Connection of heater hose
 ▶B▶ 3. Power steering oil pump
 4. Power steering oil pump bracket

- ◀C▶ ▶B▶ 5. Cylinder head bolt
 ▶A▶ 6. Cylinder head assembly
 ▶A▶ 7. Cylinder head gasket

REMOVAL SERVICE POINTS**◀A▶ RADIATOR UPPER HOSE REMOVAL**

Put mating marks on the radiator upper hose and the hose clamp for removal.

◀B▶ POWER STEERING OIL PUMP REMOVAL

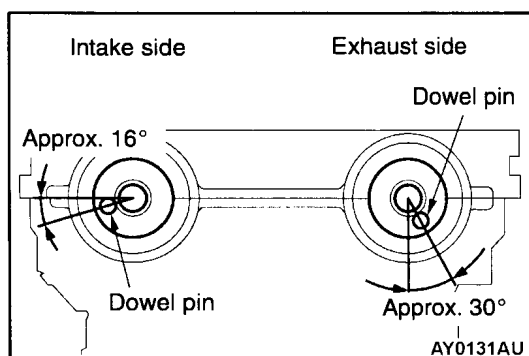
Remove the power steering oil pump with the hose attached from the bracket.

NOTE

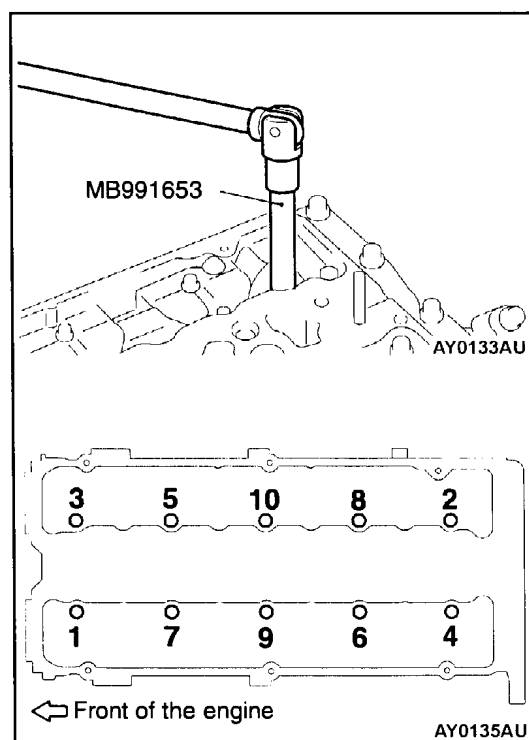
Tie the removed power steering oil pump and the A/C compressor with strings to set aside so that they will not hinder the removal and installation of the engine assembly.

◀C▶ CYLINDER HEAD BOLT REMOVAL

1. Set the dowel pin of the camshaft at the position shown in the illustration.



2. Use the special tool to loosen the bolt in the order of the numbers shown in the illustration in two to three stages for removal.



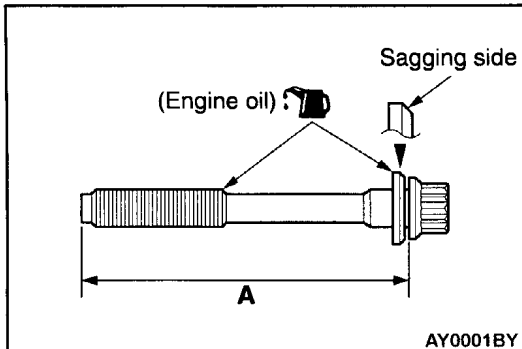
INSTALLATION SERVICE POINTS**►A◄ CYLINDER HEAD GASKET INSTALLATION**

1. Remove gasket attached on the mounting surface of the gasket.

Caution

Be careful not to let foreign objects get inside the engine coolant and the oil line.

2. Install so that the each hole of the cylinder head is aligned with each hole of the cylinder head gasket.

**►B◄ CYLINDER HEAD BOLT INSTALLATION**

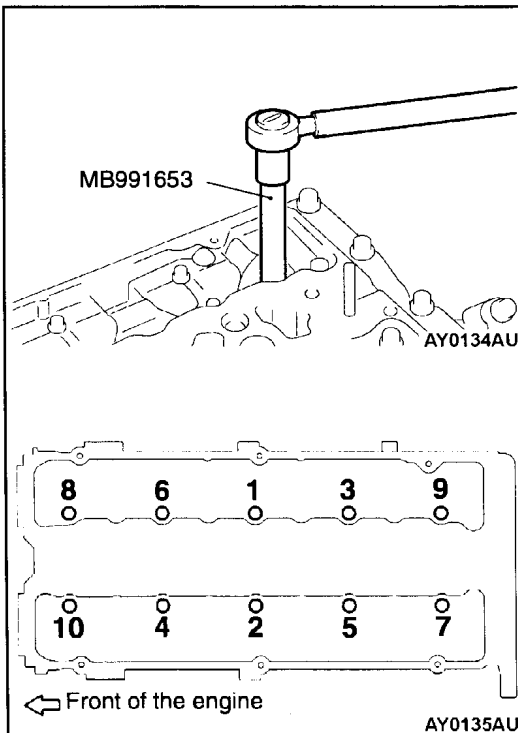
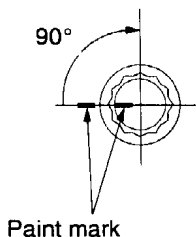
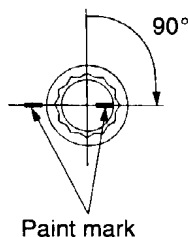
1. Check that the neck down length of the cylinder head bolt is within the limit. If it is outside the limit value, replace the bolt with a new one.

Limit (A): 96.4 mm

2. Face the sagging side of the bored cylinder head bolt washer towards the direction shown in the illustration to install to the cylinder head bolt.
3. Apply a little amount of engine oil to the cylinder head bolt thread and the washer.
4. Use the special tool to tighten the bolt according to the following procedure (plasticity tightening).
 - (1) Tighten the bolt to 74 Nm in the order of the numbers shown in the illustration.
 - (2) Loosen the bolt completely in the reverse order of the numbers shown in the illustration.
 - (3) Tighten the bolt to 20 Nm in the order of the numbers shown in the illustration.
- (4) Put the paint mark on the head of the cylinder head bolt and the cylinder to tighten to the 90° in the order of the numbers shown in the illustration.
- (5) Tighten to the 90° in the order of the numbers shown in the illustration so that the paint marks on the head of the cylinder head bolt and cylinder head are aligned.

Caution

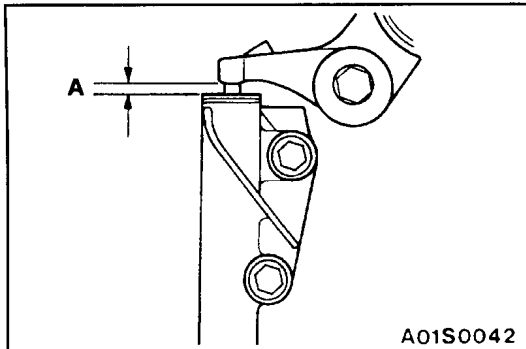
1. If the tightening angle is less than 90°, the bolt is not sufficiently tightened.
2. If the tightening angle is beyond the limit, remove the bolt and start from step 1 again.

**Step (4)****Step (5)**

01X0270

►C◄ RADIATOR UPPER HOSE INSTALLATION

1. Insert the radiator upper hose to the convex section of the water outlet fitting.
2. Align the mating mark on the radiator upper hose with that of the hose clamp to install.

**TIMING BELT****INSTALLATION SERVICE POINT**

Timing belt tension adjustment

Standard value (A): 4.8 – 5.5 mm

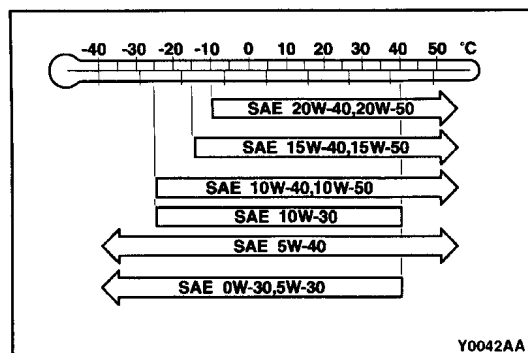
GROUP 12

ENGINE LUBRICATION

GENERAL

OUTLINE OF CHANGE

A quality of the engine oil has been changed.



ON-VEHICLE SERVICE

Specified Engine Oil (ACEA and API classification):
ACEA A1, A2, A3/API SG or higher

FUEL

CONTENTS

GASOLINE DIRECT INJECTION (GDI) 13A

GASOLINE DIRECT INJECTION (GDI)

CONTENTS

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GENERAL

OUTLINE OF CHANGES

Due to the changes shown below, the service procedures regarding the different description from the previous version have been established.

- On-board Diagnostics System has been adopted to expand the diagnostic items and to change diagnosis code numbering system.
- Fuel pressure regulator (high-pressure) incorporate fuel pump (high-pressure) has been adopted.
- An oxygen sensor (rear) has been added.
- A ignition failure sensor has been added.

GENERAL INFORMATION

SELF-DIAGNOSIS FUNCTION

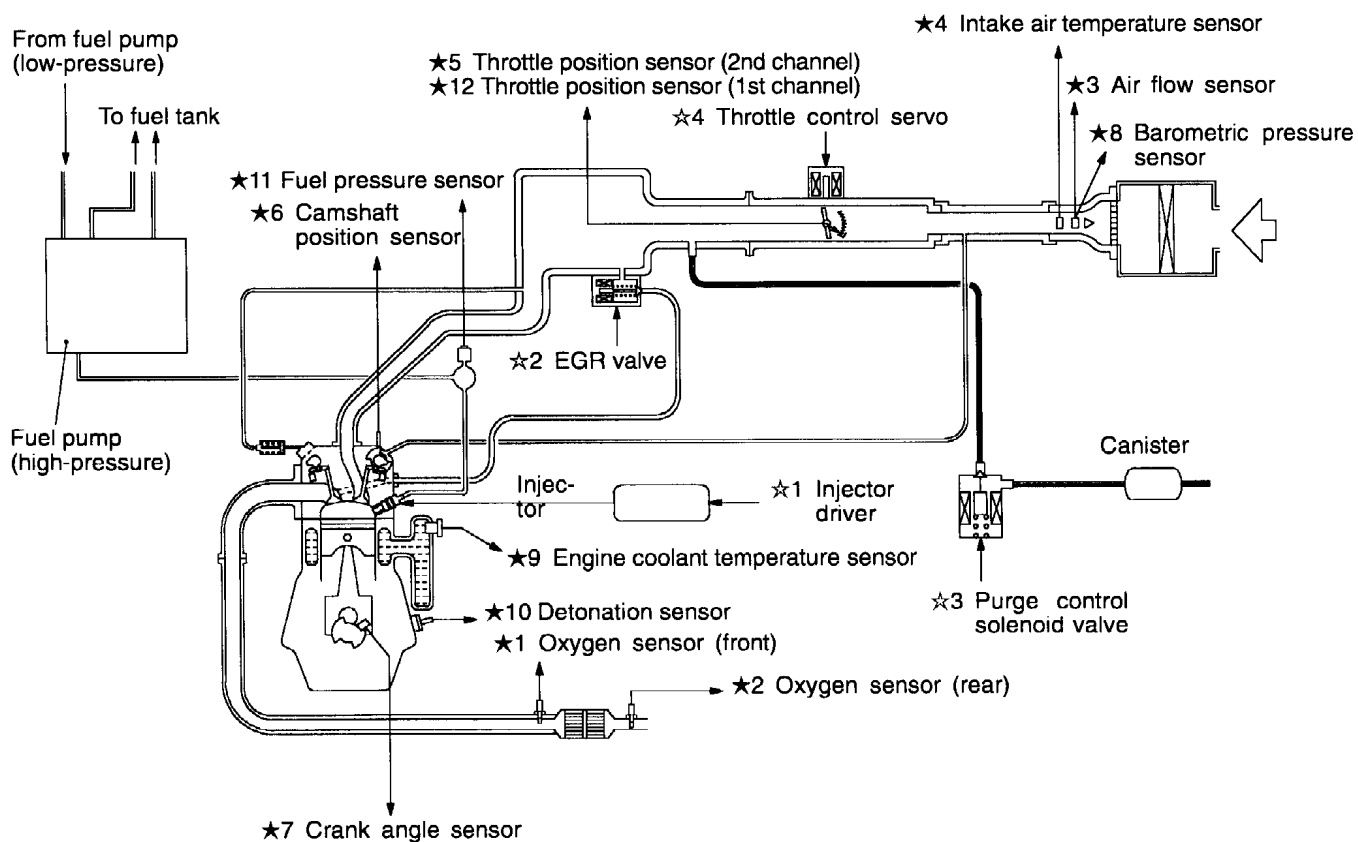
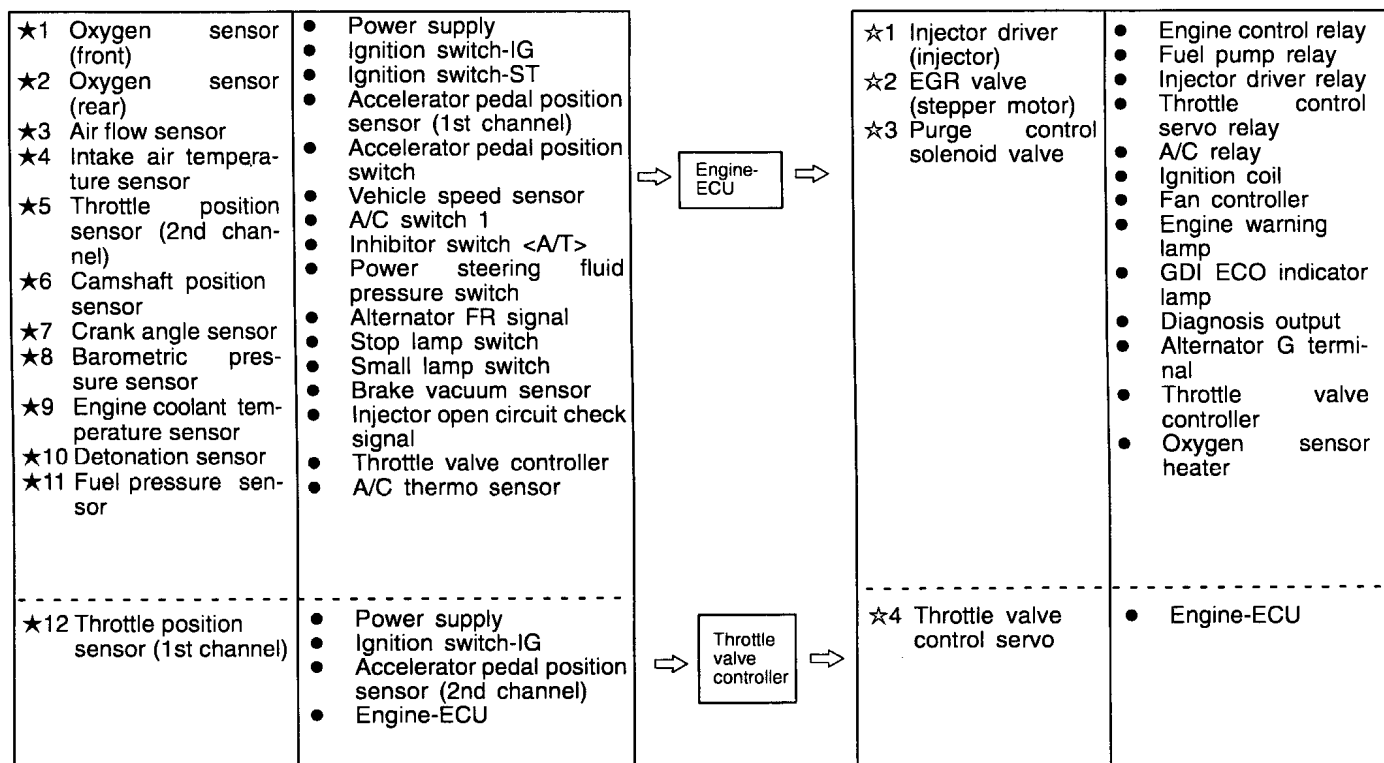
Following functions have been added.

- The engine-ECU records the engine operating condition when the diagnosis code is set.
This data is called “freeze frame” data.
This data can be read by using the MUT-II, are can then be used in simulation tests for troubleshooting.

GENERAL SPECIFICATION

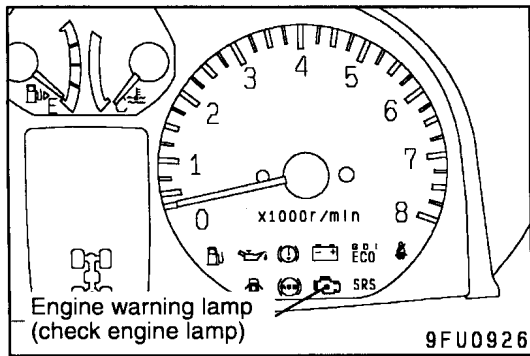
Items		Specification
Engine-ECU	Identification No.	E2T71582

GASOLINE DIRECT INJECTION SYSTEM DIAGRAM



SERVICE SPECIFICATIONS

Items		Standard value
Fuel pressure	High-pressure side MPa	4 – 6.9
	Low-pressure side kPa	Approximately 324
Oxygen sensor output voltage (during revving) V		0.6 – 1.0
Oxygen sensor heater resistance (at 20°C) Ω	Front	4.5 – 8.0
	Rear	11 – 18



TROUBLESHOOTING

DIAGNOSIS FUNCTION

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

If an abnormality occurs in any of the following items related to the GDI system, the engine warning lamp will illuminate or flash. If the lamp remains illuminated or if the lamp illuminates while the engine is running, check the diagnosis code output. However, the warning lamp will illuminate as bulb check for five seconds whenever the ignition switch is turned to the ON position.

Engine warning lamp inspection items

Code No.	Diagnosis item
–	Engine-ECU
P0100	Air flow sensor system
P0105	Barometric pressure sensor system
P0110	Intake air temperature sensor system
P0115	Engine coolant temperature sensor system
P0120★	Throttle position sensor (1st channel) system
P0125	Feedback system
P0130	Oxygen sensor (front) system <sensor 1>
P0135	Oxygen sensor heater (front) system <sensor 1>
P0136	Oxygen sensor (rear) system <sensor 2>
P0141	Oxygen sensor heater (rear) system <sensor 2>
P0170	Abnormal fuel system
P0190★	Abnormal fuel pressure
P0201	No. 1 injector system
P0202	No. 2 injector system
P0203	No. 3 injector system
P0204	No. 4 injector system
P0220★	Accelerator pedal position sensor (1st channel) system
P0225★	Throttle position sensor (2nd channel) system
P0300★	Ignition coil (power transistor) system
P0301	No. 1 cylinder misfire detected
P0302	No. 2 cylinder misfire detected
P0303	No. 3 cylinder misfire detected
P0304	No. 4 cylinder misfire detected

Code No.	Diagnosis item
P0335	Crank angle sensor system
P0340	Camshaft position sensor system
P0403	EGR valve system
P0420	Catalyst malfunction
P0443	Purge control solenoid valve system
P1200	Injector driver system
P1220★	Electronic-controlled throttle valve system
P1221★	Throttle valve position feedback system
P1223★	Communication line with throttle valve controller
P1224★	Throttle valve control servo motor (motor 1st phase malfunction) system
P1225★	Accelerator pedal position sensor (2nd channel) system
P1228★	Throttle valve control servo motor (motor 2nd phase malfunction) system
P1515	Brake vacuum sensor system

NOTE

1. If the engine warning lamp illuminates because of a malfunction of the engine-ECU, communication between MUT-II and the engine-ECU is impossible. In this case, the diagnosis code cannot be read.
2. After the engine-ECU has detected a malfunction, the engine warning lamp illuminates when the engine is next turned on and the same malfunction is re-detected. However, for items marked with a "★" in the diagnosis code number column, the engine warning lamp illuminates only on the first detection of the malfunction.
As for P1220, P1221, P1223, P1224, and P1228, the engine warning lamp flashes. If malfunctions are detected at the throttle position sensor (1st channel) and the throttle position sensor (2nd channel) at the same time, or malfunctions are detected at the accelerator pedal position sensor (1st channel) and the accelerator pedal position sensor (2nd channel) at the same time, the engine warning lamp will flash.
3. After the engine warning lamp illuminates, it will be switched off under the following conditions.
 - (1) When the engine-ECU monitored the power train malfunction three times* and met set condition requirements, it detected no malfunction.
*: In this case, "one time" indicates from engine start to stop.
 - (2) For misfiring malfunction, when driving conditions (engine speed, engine coolant temperature, etc.) are similar to those when the malfunction was first recorded.
4. Sensor 1 indicates the sensor mounted at a position closest to the engine, and sensor 2 indicates the sensor mounted at the position second closest to the engine.

METHOD OF READING AND ERASING DIAGNOSIS CODES

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

DIAGNOSIS USING DIAGNOSIS 2 MODE

1. Switch the diagnosis mode of the engine control unit to DIAGNOSIS 2 mode using the MUT-II.
2. Carry out a road test.
3. Take a reading of the diagnosis code and repair the problem location.
4. Turn the ignition switch to OFF and then back to ON again.

NOTE

By turning the ignition switch to OFF, the engine-ECU will switch the diagnosis mode from DIAGNOSIS 2 mode to DIAGNOSIS 1 mode.

5. Erase the diagnosis codes.

INSPECTION USING MUT-II DATA LIST AND ACTUATOR TESTING

1. Carry out inspection by means of the data list and the actuator test function. If there is an abnormality, check and repair the chassis harnesses and components.
2. After repairing, re-check using the MUT-II and check that the abnormal input and output have returned to normal as a result of the repairs.
3. Erase the diagnosis code memory.
4. Remove the MUT-II, and then start the engine again and carry out a road test to confirm that the problem has disappeared.

FREEZE FRAME DATA

When the engine-ECU detects a malfunction and stores a diagnosis code, it also stores a current status of the engine. This function is called "Freeze frame data." By analyzing this "freeze frame" data with the MUT-II, an effective troubleshooting can be performed.

The display items of freeze frame data are shown below.

Display item list

Data item		Unit
Engine coolant temperature sensor		°C
Engine speed		r/min
Vehicle speed		km/h
Long-term fuel compensation (long-term fuel trim)		%
Short-term fuel compensation (short-term fuel trim)		%
Fuel control condition	Open loop	OL
	Closed loop	CL
	Open loop owing to drive condition	OL-DRV.
	Open loop owing to system malfunction	OL-SYS.
	Closed loop based on one oxygen sensor	CL-H02S
Calculation load value		%
Diagnosis code during data recording		—

NOTE

If malfunctions have been detected in multiple systems, store one malfunction only, which has been detected first.

READINESS TEST STATUS

The engine-ECU monitors the following main diagnosis items, judges if these items are in good condition or not, and stores its history. This history can be read out by using MUT-II. (If the ECU has judged a item before, the MUT-II displays "Complete.")

In addition, if diagnosis codes are erased or the battery cable is disconnected, this history will also be erased (the memory will be reset).

- Catalyst: P0420
- Oxygen sensor: P0130
- Oxygen sensor heater: P0135, P0141

FAIL-SAFE FUNCTION REFERENCE TABLE

When the main sensor malfunctions are detected by the diagnosis function, the vehicle is controlled by means of the pre-set control logic to maintain safe conditions for driving.

Malfunctioning item	Control contents during malfunction
Air flow sensor	1. Suspends lean burn operation. 2. Uses the throttle position sensor signal and engine speed signal (crank angle sensor signal) to take reading of the basic injector drive time and basic ignition timing from the pre-set mapping.
Intake air temperature sensor	Controls as if the intake air temperature is 25°C.
Throttle position sensor (2nd channel)	1. Suspends lean burn operation. 2. Controls the throttle opening angle feedback (half as much as the opening rate in the normal condition) by using signals from the throttle position sensor (1st channel). However, this controlling system is not applied if the throttle position sensor (1st channel) and throttle position sensor (2nd channel) combination output voltage is outside 4 – 6 V. 3. Refrains from controlling the throttle opening angle feedback if the throttle position sensor (1st channel) is also defective.
Engine coolant temperature sensor	Controls as if the engine coolant temperature is 80°C. (Moreover, the control system is working until the ignition switch is turned OFF if the sensor signal returns to normal.)
Camshaft position sensor	Controls maintaining the condition before determined as failure. Fuel will be cut-off 4 seconds after a malfunction is detected. (However, only if No. 1 cylinder TDC has never been detected after the ignition switch is turned to the ON position)
Vehicle speed sensor	1. Suspends lean burn operation. However, the control is cancelled as a certain time passes by with the engine speed of 1,500 r/min or more. 2. Suspends lean burn operation during the engine idling.
Barometric pressure sensor	Controls as if the barometric pressure is 101 kPa.
Detonation sensor	Fixes the ignition timing as that for standard petrol.
Injector	1. Suspends lean burn operation. 2. Suspends the exhaust gas recirculation.
Communication line with A/T-ECU	Disable ignition timing retard control (engine and transmission total control) during shift change.
Ignition coil (incorporating power transistor)	1. Suspends lean burn operation. 2. Cuts off the fuel supply to cylinders with an abnormal ignition signal.
Fuel pressure sensor	1. Controls as if the fuel pressure is 5 MPa. (In case of open/short circuit) 2. Turns the fuel pump relay off. (In case of abnormality in high pressure) 3. Suspends fuel injection. (when the low pressure is detected and the engine speed is more than 3,000 r/min)
Alternator FR terminal	Refrains from controlling to suppress the alternator output to electrical load. (Operated as a normal alternator)
Accelerator pedal position sensor (2nd channel)	1. Suspends lean burn operation. 2. Controls the throttle valve position by using signals from the accelerator pedal position sensor (1st channel). (However, the control system is not applicable if the difference from the accelerator pedal position sensor (1st channel) output voltage is 1.0 V or higher.) 3. Suspends the electronic controlled throttle valve system if accelerator pedal position sensor (1st channel) is also defective.

Malfunctioning item	Control contents during malfunction
Accelerator pedal position sensor (1st channel)	1. Suspends lean burn operation. 2. Controls the throttle valve position by using signals from the accelerator pedal position sensor (2nd channel). (However, this control is not applicable if the voltage difference between the accelerator pedal position sensor (1st channel) and accelerator pedal position sensor (2nd channel) is 1.0 V or higher.) 3. Also suspends the electronic-controlled throttle valve system when the accelerator pedal position sensor (2nd channel) is defective.
Throttle position sensor (1st channel)	1. Suspends lean burn operation. 2. Controls throttle opening angle feedback by using signals from throttle position sensor (2nd channel). (However, the controlling system is not applied when the throttle position sensor (1st channel) and throttle position sensor (2nd channel) combination output voltage is outside 4 – 6 V.) 3. Refrains from controlling the throttle opening angle feedback when throttle position sensor (2nd channel) is also defective.
Electronic-controlled throttle valve system	1. Suspends the electronic controlled throttle valve system. 2. Suspends lean burn operation. 3. Suspends the idle speed feedback control.
Throttle valve position feedback	1. Suspends the electronic controlled throttle valve system. 2. Suspends lean burn operation. 3. Suspends the engine speed feedback control.
Communication line between the throttle valve controller and the engine-ECU	1. Communication error between the throttle valve controller and the engine-ECU • Suspends lean burn operation. • Cuts the fuel supply when the engine speed reaches 3,000 r/min or more. • Suspends the cruise-control. 2. Communication error between the throttle valve controller and the engine-ECU • Suspends lean burn operation. • Cuts the fuel supply when the engine speed reaches 3,000 r/min or more. • Suspends the cruise-control. • The throttle valve controller controls the throttle valve opening angle by using signals from accelerator pedal position sensor (2nd channel).
Throttle control servo motor 1st phase malfunction	Bans lean burn operation.
Throttle control servo motor 2nd phase malfunction	1. Suspends electronic control throttle valve system. 2. Bans lean burn operation. 3. Bans engine speed feed back control.
Misfiring	If the detected misfiring causes damage to the catalyst, the misfiring cylinder will be shut down.

NOTE

If the electronic-controlled throttle valve system is suspended, the engine warning lamp will illuminate.

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
P0100	Air flow sensor system	13A-14
P0105	Barometric pressure sensor system	13A-16
P0110	Intake air temperature sensor system	13A-18
P0115	Engine coolant temperature sensor system	13A-19
P0120★	Throttle position sensor 1 (1st channel) system	13A-22
P0125	Feedback system	13A-24
P0130	Oxygen sensor (front) system <sensor 1>	13A-25
P0135	Oxygen sensor heater (front) system <sensor 1>	13A-27
P0136	Oxygen sensor (rear) system <sensor 2>	13A-28
P0141	Oxygen sensor heater (rear) system <sensor 2>	13A-30
P0170	Abnormal fuel system	13A-31
P0190★	Abnormal fuel pressure	13A-33
P0201	No. 1 injector system	13A-34
P0202	No. 2 injector system	13A-36
P0203	No. 3 injector system	13A-37
P0204	No. 4 injector system	13A-38
P0220★	Accelerator pedal position sensor (1st channel) system	13A-40
P0225★	Throttle position sensor (2nd channel) system	13A-43
P0300★	Ignition coil (power transistor) system	13A-44
P0301	No. 1 cylinder misfire detected	13A-46
P0302	No. 2 cylinder misfire detected	13A-46
P0303	No. 3 cylinder misfire detected	13A-46
P0304	No. 4 cylinder misfire detected	13A-46
P0325	Detonation sensor system	13A-47
P0335	Crank angle sensor system	13A-47
P0340	Camshaft position sensor system	13A-59
P0403	EGR valve system	13A-50
P0420	Catalyst malfunction	13A-51
P0443	Purge control solenoid valve system	13A-52
P0500	Vehicle speed sensor system	13A-53
P1200	Injector driver system	13A-53
P1220★	Electronic-controlled throttle valve system	13A-54

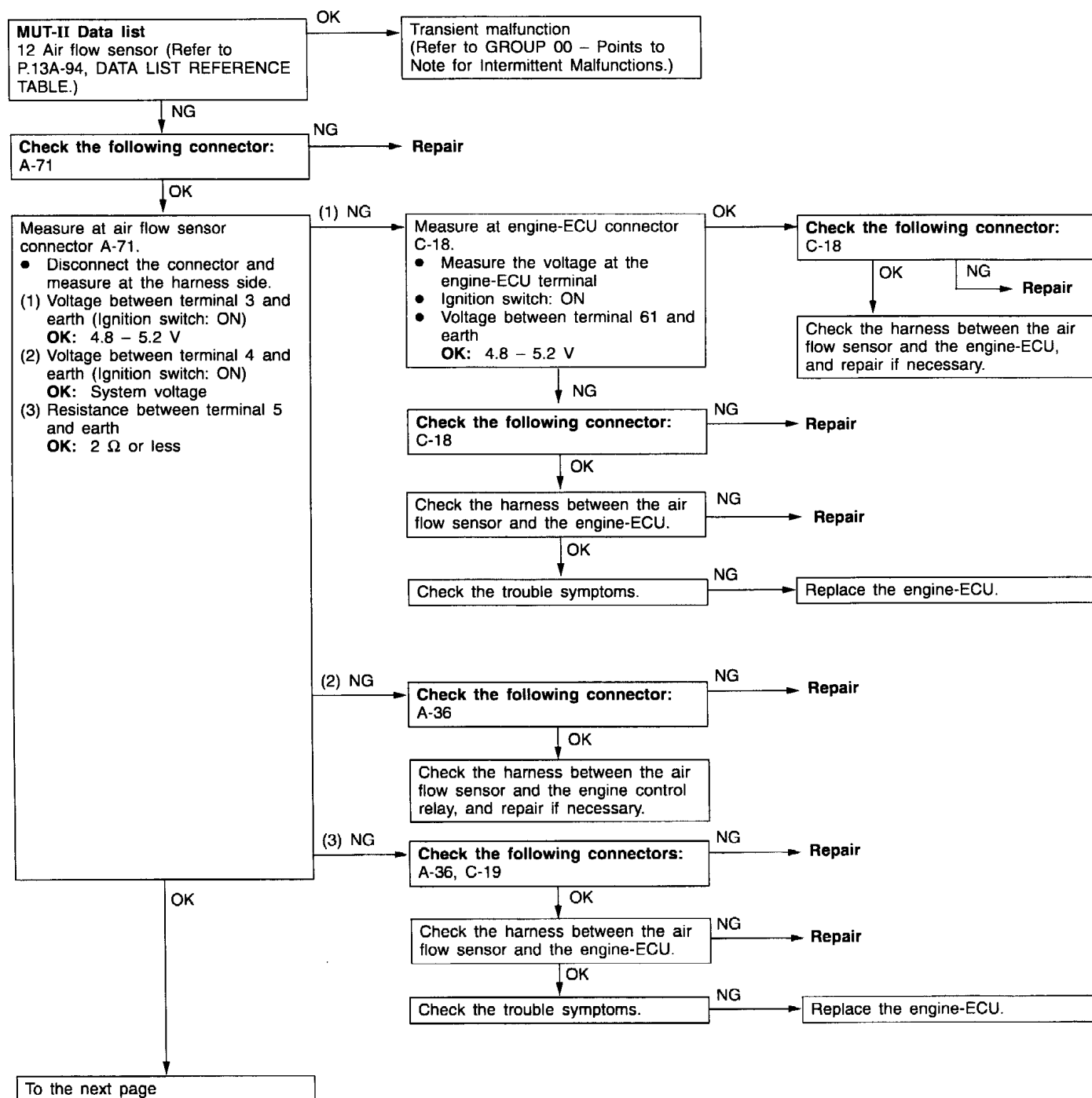
Code No.	Diagnosis item	Reference page
P1221★	Throttle valve position feedback system	13A-55
P1223★	Communication line with throttle valve controller	13A-56
P1224★	Throttle valve control servo motor (motor 1st phase malfunction) system	13A-57
P1225★	Accelerator pedal position sensor (2nd channel) system	13A-58
P1228★	Throttle valve control servo motor (motor 2nd phase malfunction) system	13A-60
P1500	Alternator FR terminal system	13A-61
P1515	Brake vacuum sensor system	13A-62
P1600	Communication wire with A/T-ECU system	13A-64
P1610	Immobilizer system	13A-64

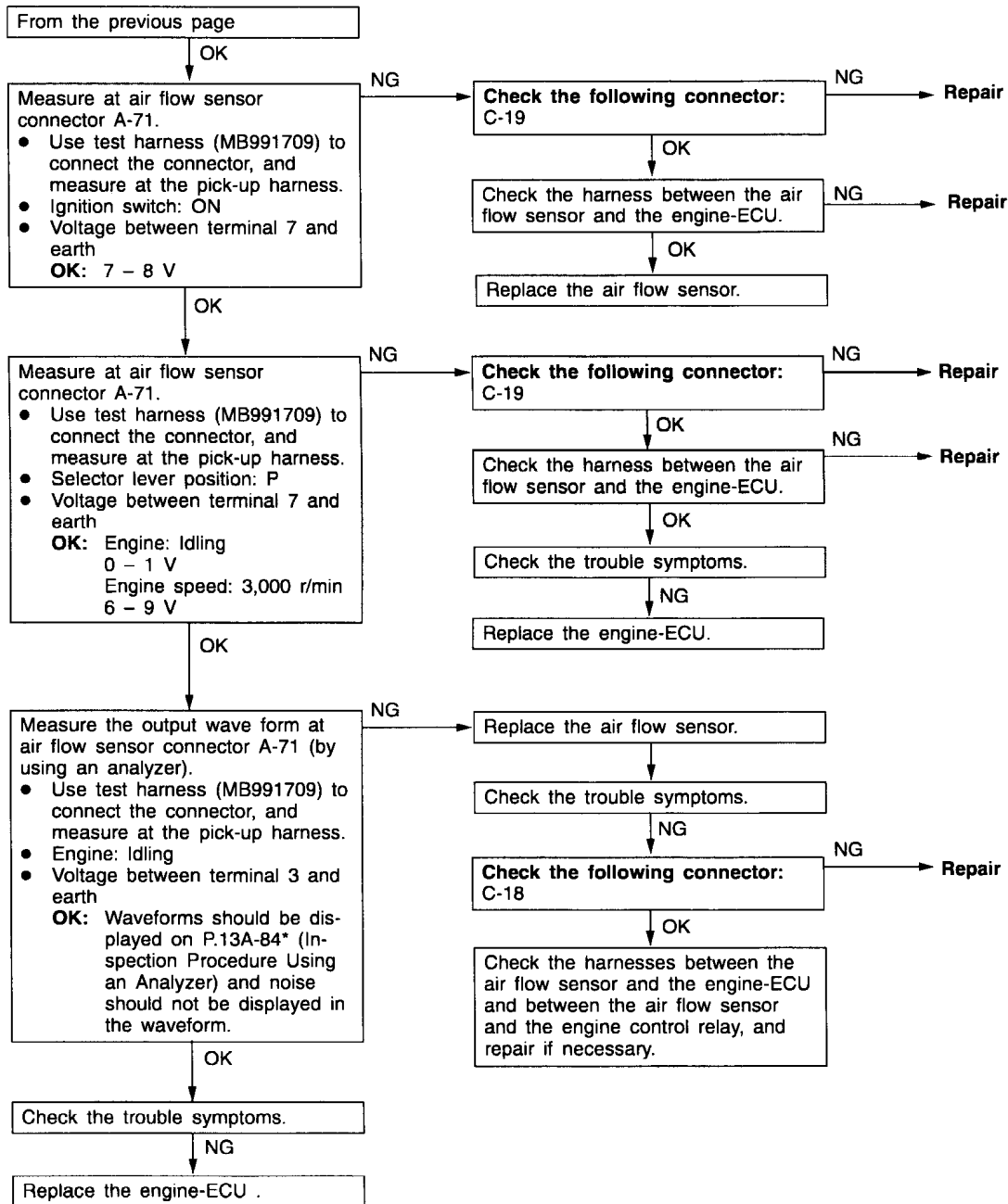
NOTE

1. Do not replace the engine-ECU until a through terminal check reveals there are no short/open circuit.
2. Check that the engine-ECU earth circuit is normal before checking for the cause of the problem.
3. After the engine-ECU has detected a malfunction, a diagnosis code is recorded the next time the engine is started and the same malfunction is re-detected. However, for items marked with a "★", the diagnosis code is recorded on the first detection of the malfunction.
4. Sensor 1 indicates the sensor mounted at a position closest to the engine, and sensor 2 indicates the sensor mounted at the position second closest to the engine.

INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

Code No. P0100 Air flow sensor system	Probable cause
Range of Check • Engine speed: 500 r/min or more Set Conditions • The sensor output frequency is 3.3 Hz or less for four seconds.	• Malfunction of air flow sensor • Open or short circuit in air flow sensor circuit or loose connector contact • Malfunction of engine-ECU

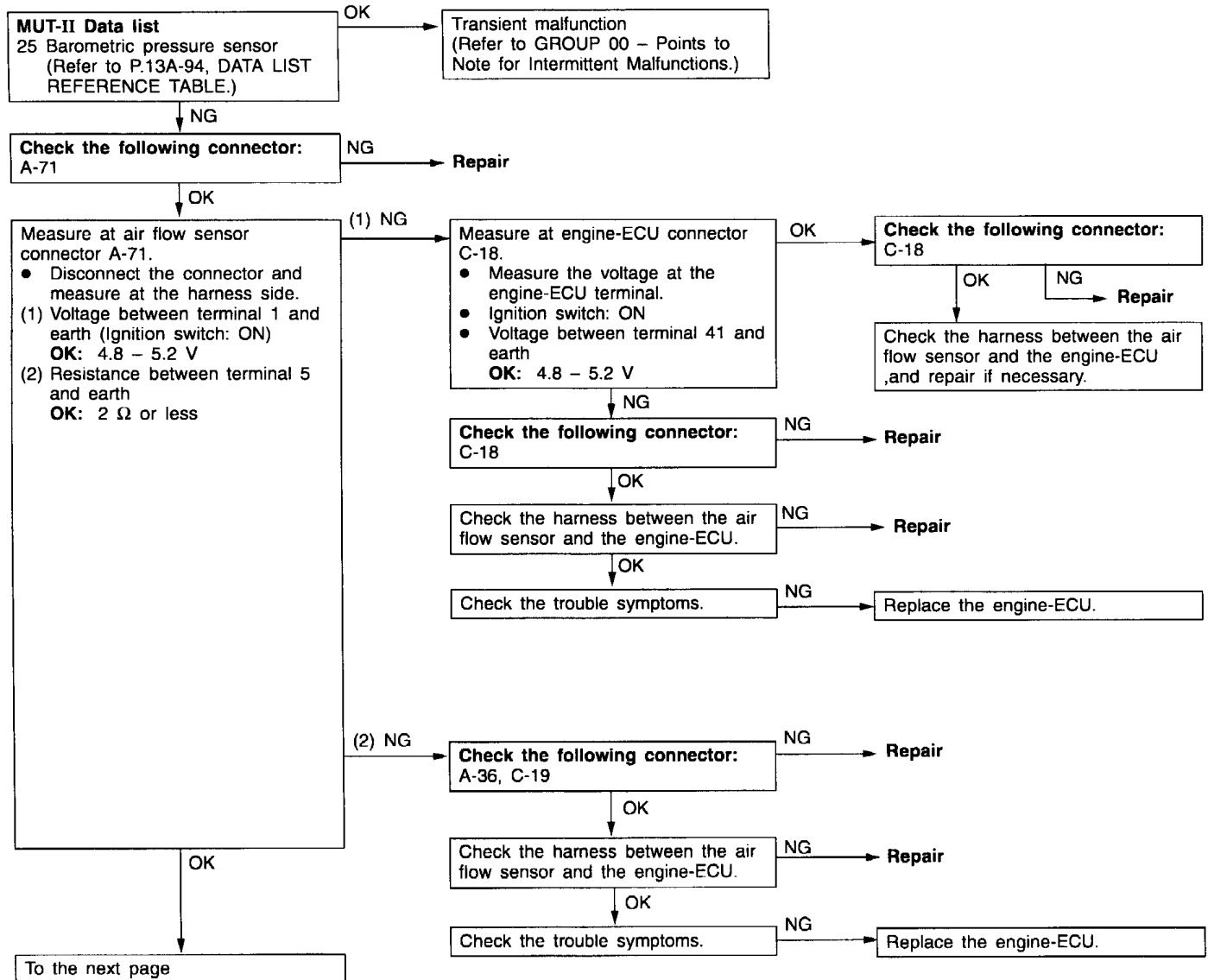


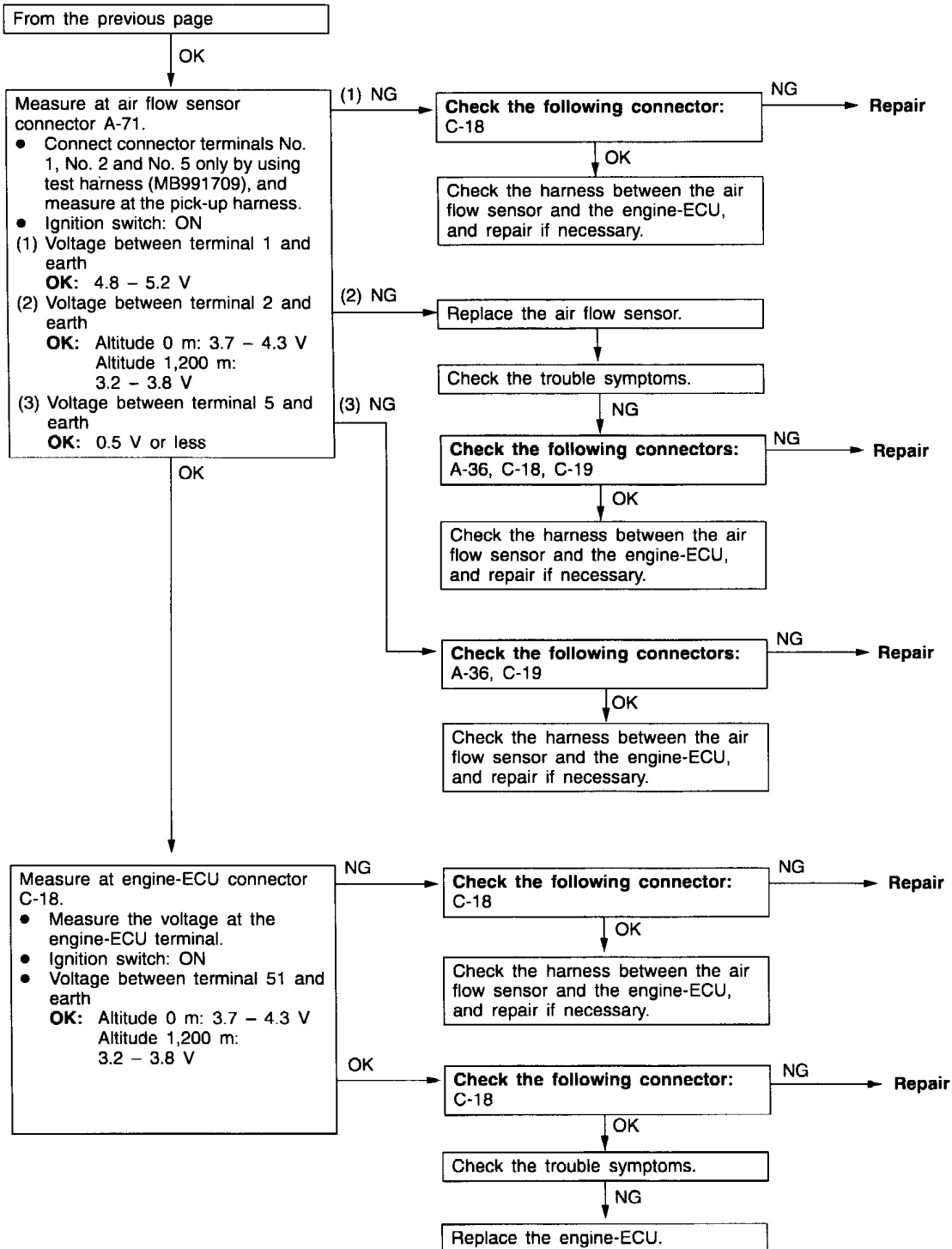


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).

Code No. P0105 Barometric pressure sensor system	Probable cause
Range of Check - Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. - Battery voltage: 8 V or more Set Conditions - The sensor output voltage is 4.5 V or more for four seconds (equivalent to 114 kPa of barometric pressure) or - The sensor output voltage is 0.2 V or less (equivalent to 53 kPa of barometric pressure)	- Malfunction of barometric pressure sensor - Open or short circuit in barometric pressure sensor circuit or loose connector contact - Malfunction of engine-ECU

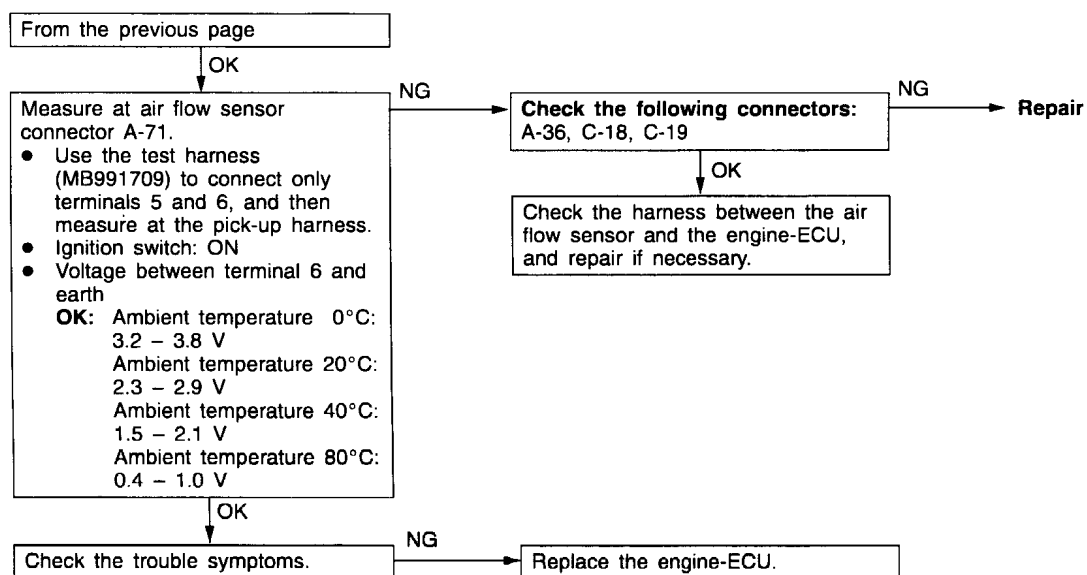




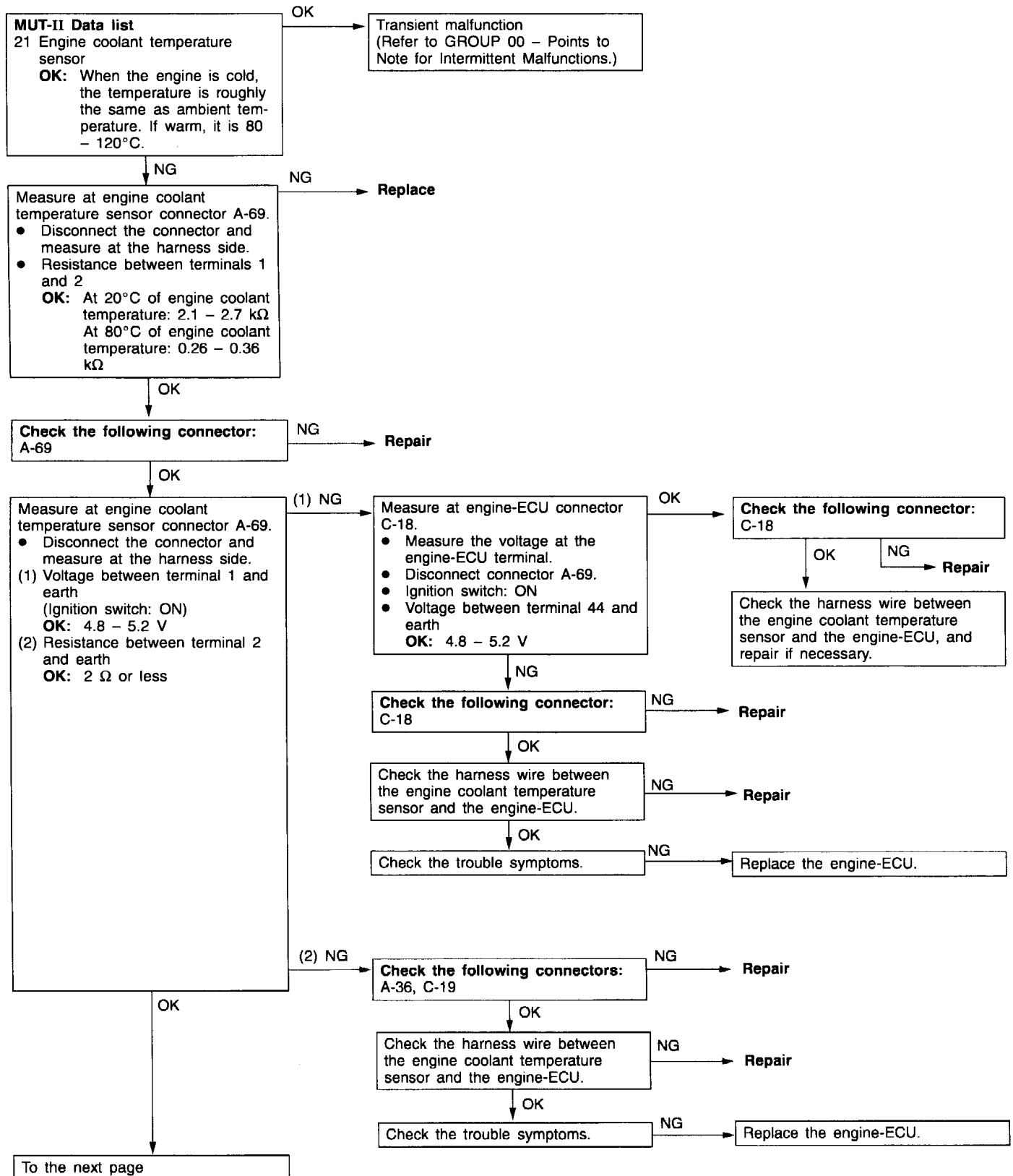
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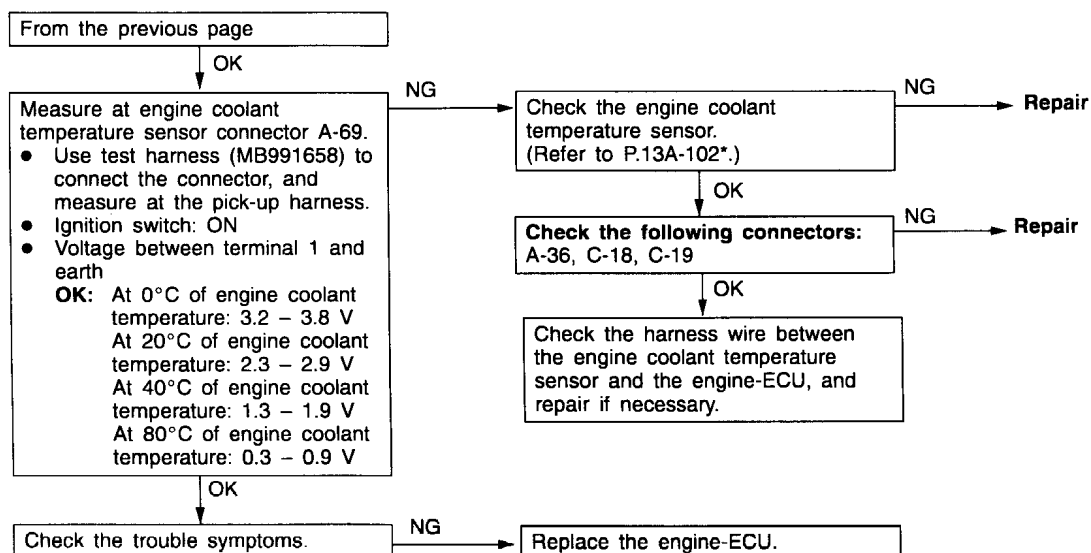
graph TD
    Start([MUT-II Data list  
13 Intake air temperature sensor  
OK: Roughly the same as ambient temperature.]) -- OK --> Transient[Transient malfunction  
(Refer to GROUP 00 – Points to Note for Intermittent Malfunctions.)]
    Start -- NG --> CheckSensor[Check the intake air temperature sensor itself.  
(Refer to P.13A-102*.)]
    CheckSensor -- NG --> Repair1[Repair]
    CheckSensor -- OK --> CheckConnectorA71[Check following connector: A-71]
    CheckConnectorA71 -- NG --> Repair2[Repair]
    CheckConnectorA71 -- OK --> MeasureA71[Measure at air flow sensor connector A-71.  
• Disconnect the connector and measure at the harness side.  
(1) Resistance between terminal 5 and earth  
OK: 2 Ω or less  
(2) Voltage between terminal 6 and earth  
(Ignition switch: ON)  
OK: 4.8 – 5.2 V]
    MeasureA71 -- "(1) NG" --> CheckConnectorsA36C19[Check the following connectors: A-36, C-19]
    CheckConnectorsA36C19 -- NG --> Repair3[Repair]
    CheckConnectorsA36C19 -- OK --> CheckHarnessA71[Check the harness between the air flow sensor and the engine-ECU.]
    CheckHarnessA71 -- NG --> Repair4[Repair]
    CheckHarnessA71 -- OK --> CheckTroubleSymptoms1[Check the trouble symptoms.]
    CheckTroubleSymptoms1 -- NG --> ReplaceECU1[Replace the engine-ECU.]
    MeasureA71 -- "(2) NG" --> MeasureECUC18[Measure at engine-ECU connector C-18.  
• Measure the voltage at the engine-ECU terminal.  
• Disconnect connector A-71.  
• Ignition switch: ON  
• Voltage between terminal 62 and earth  
OK: 4.8 – 5.2 V]
    MeasureECUC18 -- OK --> CheckConnectorC18[Check the following connector: C-18]
    CheckConnectorC18 -- NG --> Repair5[Repair]
    CheckConnectorC18 -- OK --> CheckHarnessECU[Check the harness between the air flow sensor and the engine-ECU.]
    CheckHarnessECU -- NG --> Repair6[Repair]
    CheckHarnessECU -- OK --> CheckTroubleSymptoms2[Check the trouble symptoms.]
    CheckTroubleSymptoms2 -- NG --> ReplaceECU2[Replace the engine-ECU.]
    MeasureA71 -- OK --> NextPage[To the next page]
  
```

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



Code No. P0115 Engine coolant temperature sensor system	Probable cause
Range of Check • Engine: Two seconds after the engine has been started Set Conditions • The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of engine coolant temperature) or • The sensor output voltage is 0.1 V or less for four seconds (equivalent to 140°C of engine coolant temperature) Range of Check • Engine: After starting Set Conditions • The engine coolant temperature has reduced from over 40°C to less than 40°C, and that condition has lasted for five minutes or more.	• Malfunction of engine coolant temperature sensor • Open or short circuit in the engine coolant temperature sensor circuit or loose connector contact • Malfunction of engine-ECU





NOTE

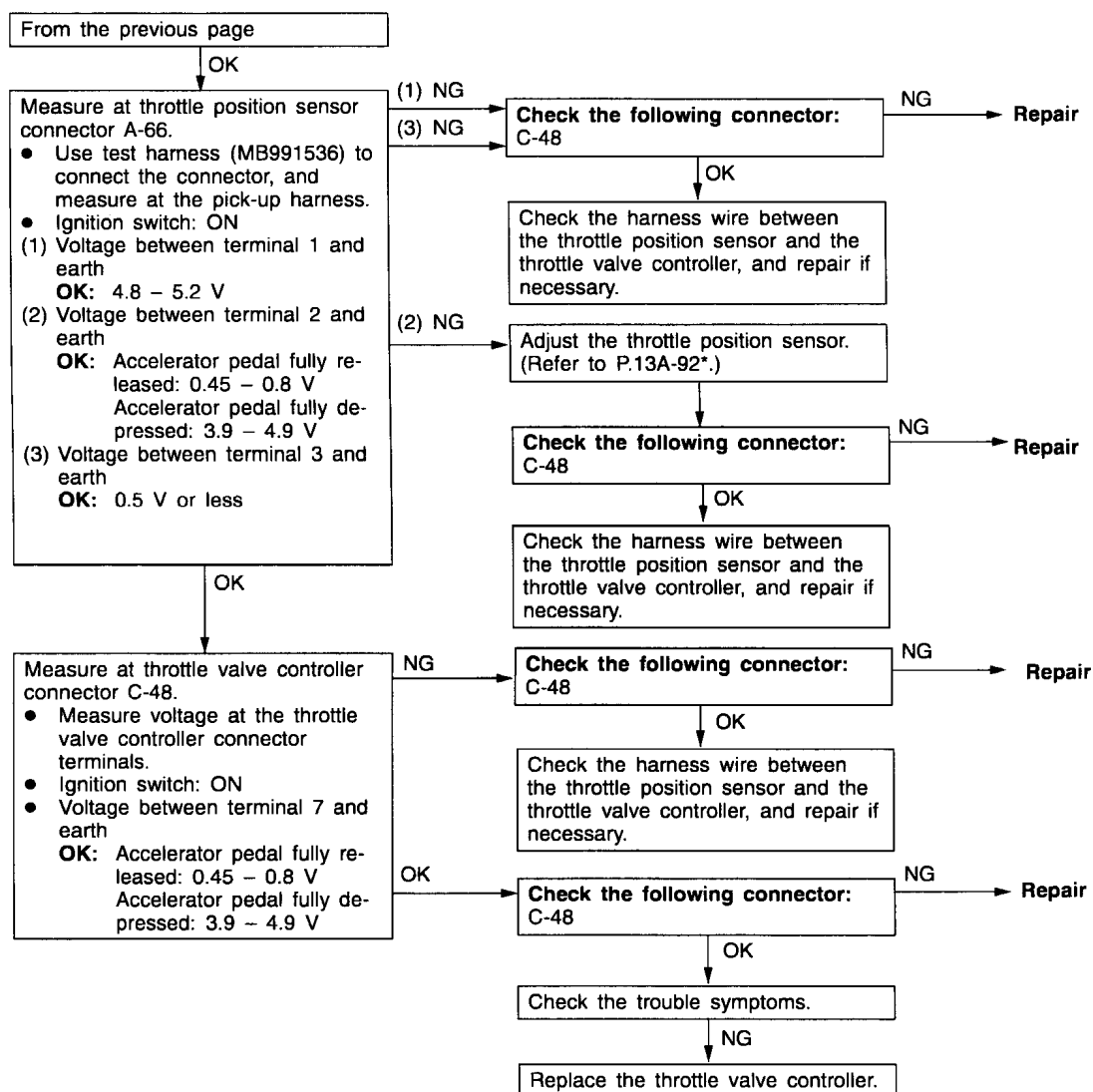
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).

```

graph TD
    Start([Start]) --> MUTII[MUT-II Data list  
79 Throttle position sensor (1st channel)  
(Refer to P.13A-94, DATA LIST REFERENCE TABLE.)]
    MUTII -- OK --> Tmf[Transient malfunction  
(Refer to GROUP 00 – Points to Note for Intermittent Malfunctions.)]
    MUTII -- NG --> Tps[Check the throttle position sensor.  
(Refer to P.13A-103*.)]
    Tps -- NG --> Replace[Replace]
    Tps -- OK --> A06[Check the following connector:  
A-06]
    A06 -- NG --> Repair1[Repair]
    A06 -- OK --> Measure1[Measure at throttle position sensor connector A-06.  
• Disconnect the connector and measure at the harness side.  
(1) Voltage between terminal 1 and earth  
(Ignition switch: ON)  
OK: 4.8 – 5.2 V  
(2) Resistance between terminal 3 and earth  
OK: 2 Ω or less]
    Measure1 -- (1) NG --> Measure2[Measure at throttle valve controller connector C-48.  
• Measure voltage at the throttle valve controller connector terminals.  
• Ignition switch: ON  
• Voltage between terminal 6 and earth  
OK: 4.8 – 5.2 V]
    Measure1 -- (2) NG --> C48_2[Check the following connector:  
C-48]
    Measure1 -- OK --> NextPage[To the next page]
    Measure2 -- OK --> C48_1[Check the following connector:  
C-48]
    Measure2 -- NG --> C48_2
    C48_1 -- OK --> Repair2[Repair]
    C48_1 -- NG --> Repair3[Repair]
    C48_2 -- OK --> Repair3
    C48_2 -- NG --> Repair4[Repair]
    Repair4 --> CheckWire1[Check the harness wire between the throttle position sensor and the throttle valve controller, and repair if necessary.]
    CheckWire1 -- OK --> Repair5[Repair]
    CheckWire1 -- NG --> Repair6[Repair]
    Repair6 --> CheckWire2[Check the harness wire between the throttle position sensor and the throttle valve controller, and repair if necessary.]
    CheckWire2 -- OK --> Repair5
    CheckWire2 -- NG --> Repair7[Replace the throttle valve controller.]
    Repair7 --> CheckWire3[Check the harness wire between the throttle position sensor and the throttle valve controller, and repair if necessary.]
    CheckWire3 -- OK --> Repair5
    CheckWire3 -- NG --> Repair8[Replace the throttle valve controller.]
    Repair8 --> End([End])

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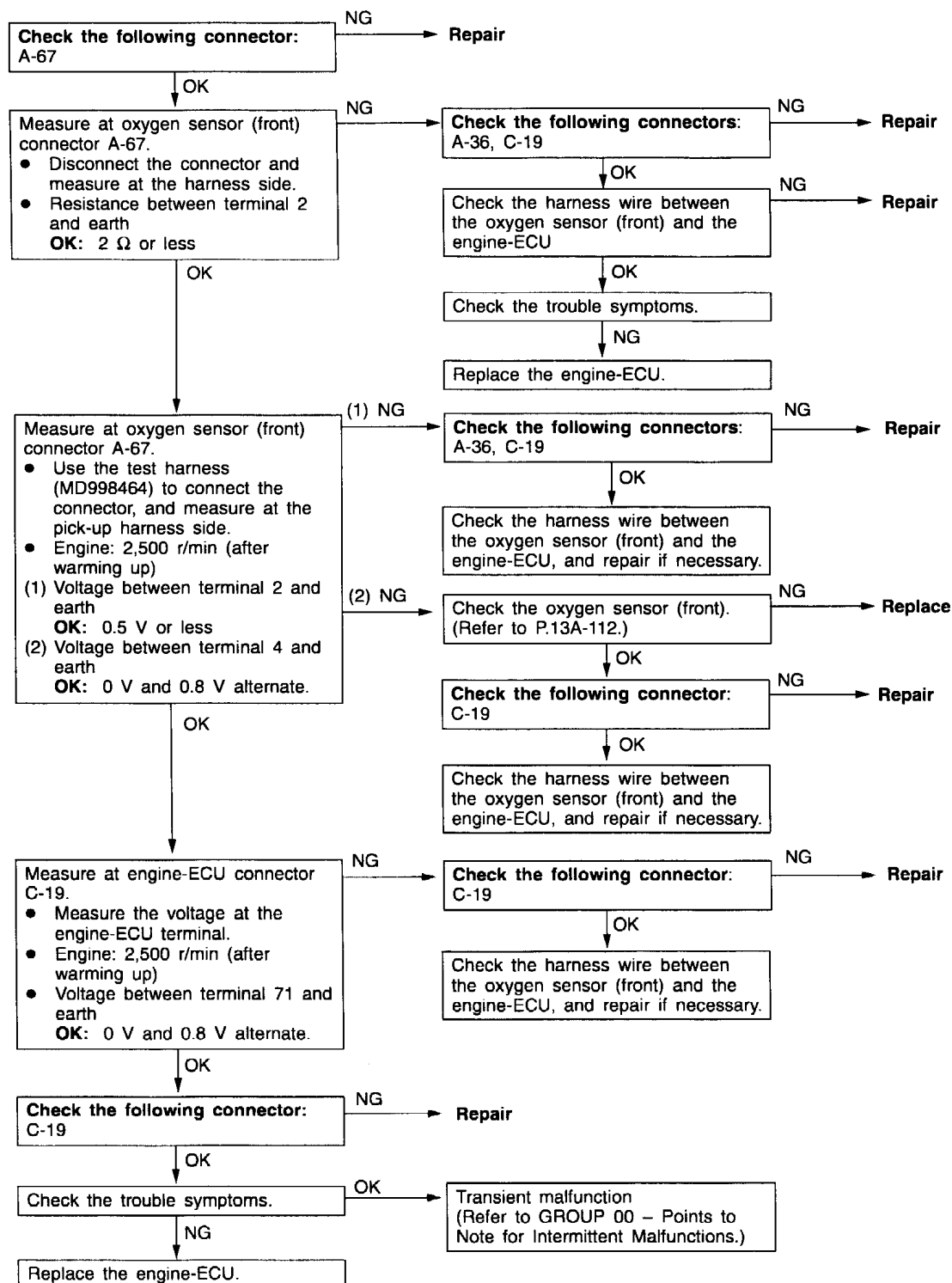
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKPE00E1)



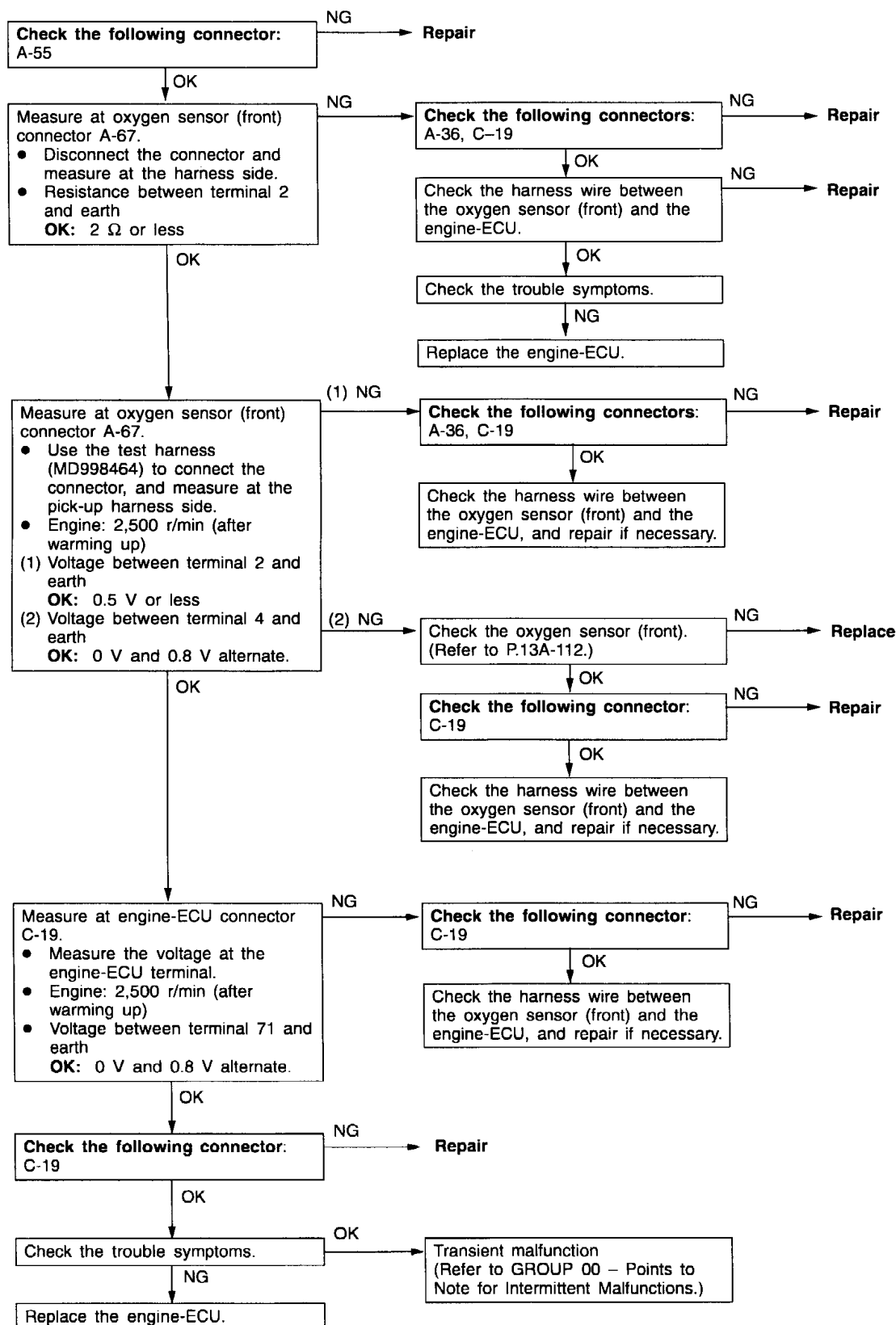
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

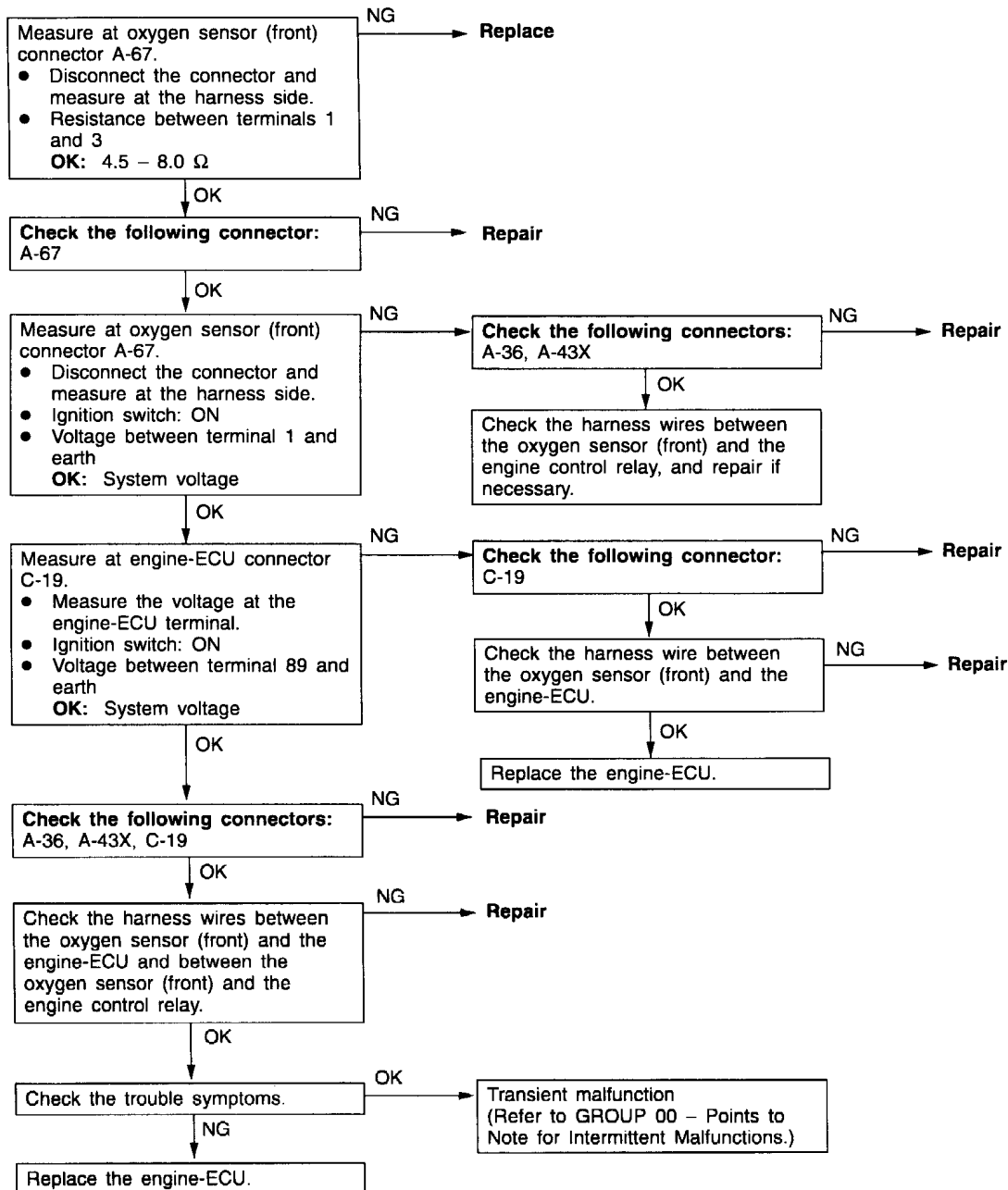
Code No. P0125 Feedback system	Probable cause
Range of Check • The engine coolant temperature is approx. 80°C or more. • During stoichiometric feedback control • The vehicle is not being decelerated. Set Conditions • Oxygen sensor (front) output voltage has been higher or lower than 0.5 V for at least thirty seconds.	• Malfunction of oxygen sensor (front) • Open or short circuit in the oxygen sensor (front) circuit or loose connector contact • Malfunction of engine-ECU



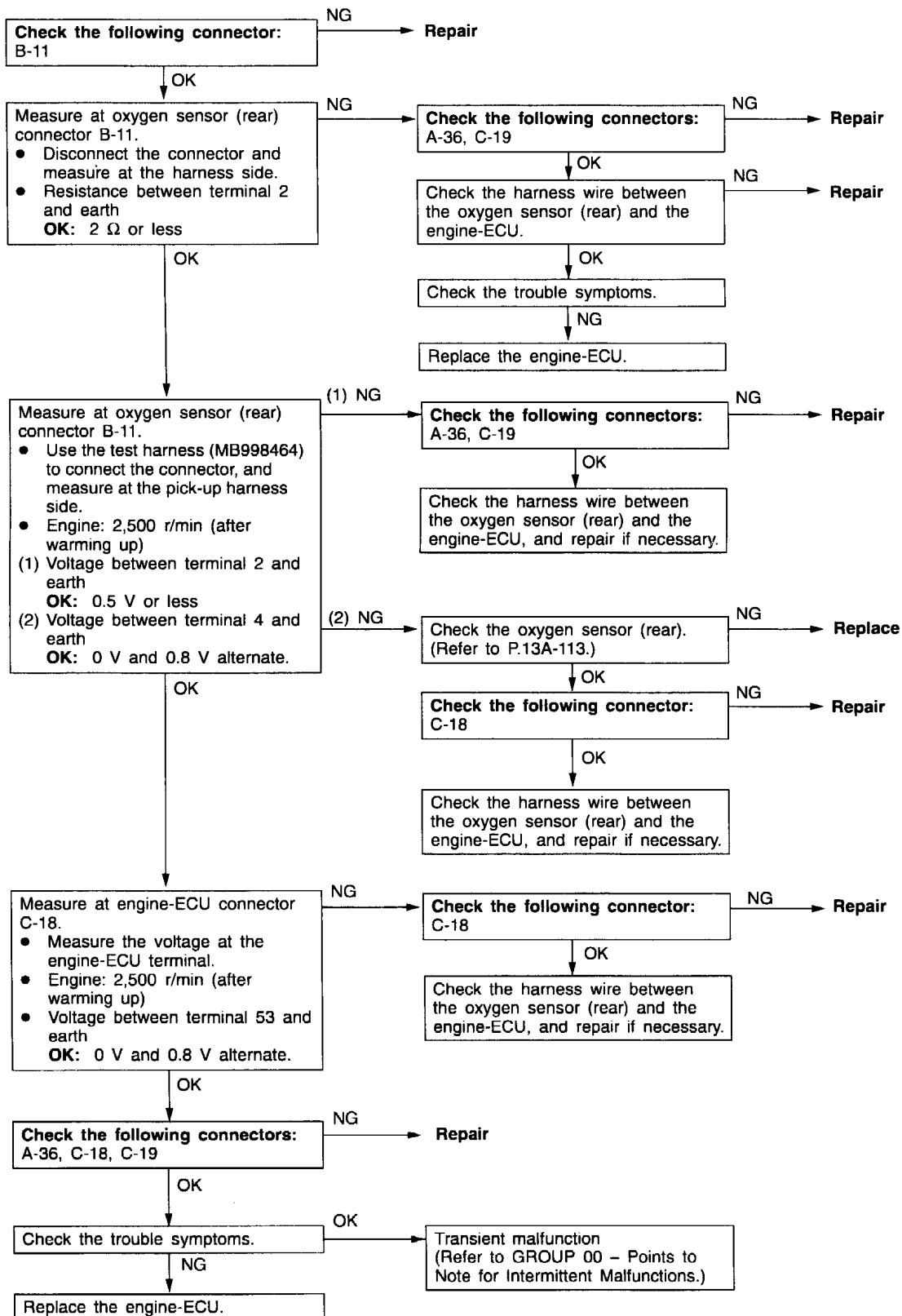
Code No. P0130 Oxygen sensor (front) system <sensor 1>	Probable cause
Range of Check • Three minutes have been passed since the engine has been started. • The engine coolant temperature is approx. 80°C or more. • Intake air temperature is 20 – 50°C • Engine speed is 1,200 r/min or more • Driving on a level surface at constant speed. Set Conditions • The oxygen sensor (front) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the oxygen sensor (front) inside the engine-ECU.	• Malfunction of oxygen sensor (front) • Open or short circuit in the oxygen sensor (front) circuit or loose connector contact • Malfunction of engine-ECU
Range of Check • Engine speed is 3,000 r/min or less • During driving • During air/fuel ratio feedback control Set Conditions • The oxygen sensor (front) output frequency is five or less per 12 seconds on average.	



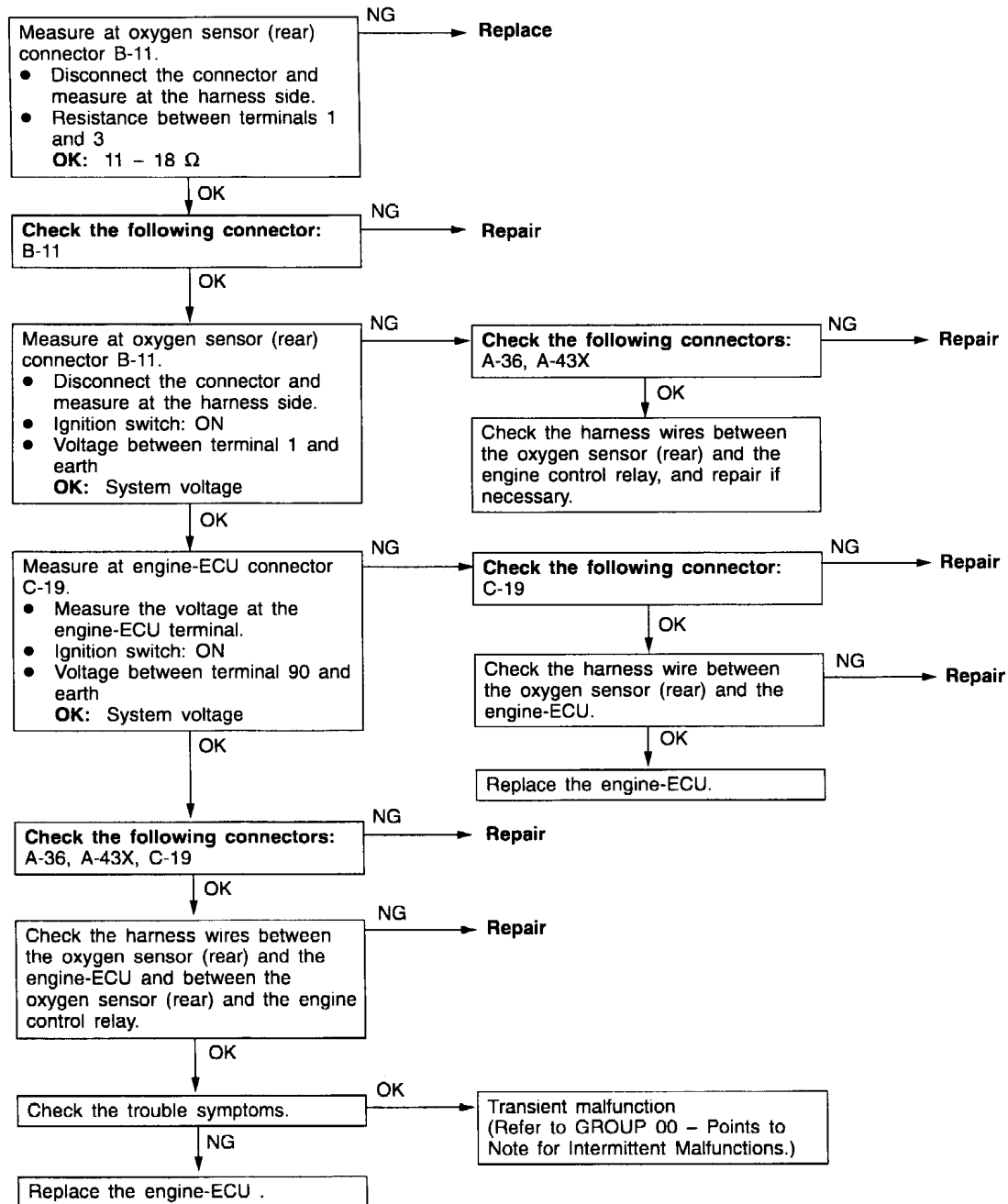
Code No. P0135 Oxygen sensor heater (front) system <sensor 1>	Probable cause
Range of Check • The engine coolant temperature is approx. 20°C or more. • The oxygen sensor heater (front) remains on. • The engine speed is 50 r/min or more. • Battery voltage is 11 – 16 V. Set Conditions • The current, which flows through the oxygen sensor heater (front), is 0.2 A or less or 3.5 A or more for six seconds.	• Malfunction of oxygen sensor heater (front) • Open or short circuit in the oxygen sensor heater (front) circuit or loose connector contact • Malfunction of engine-ECU



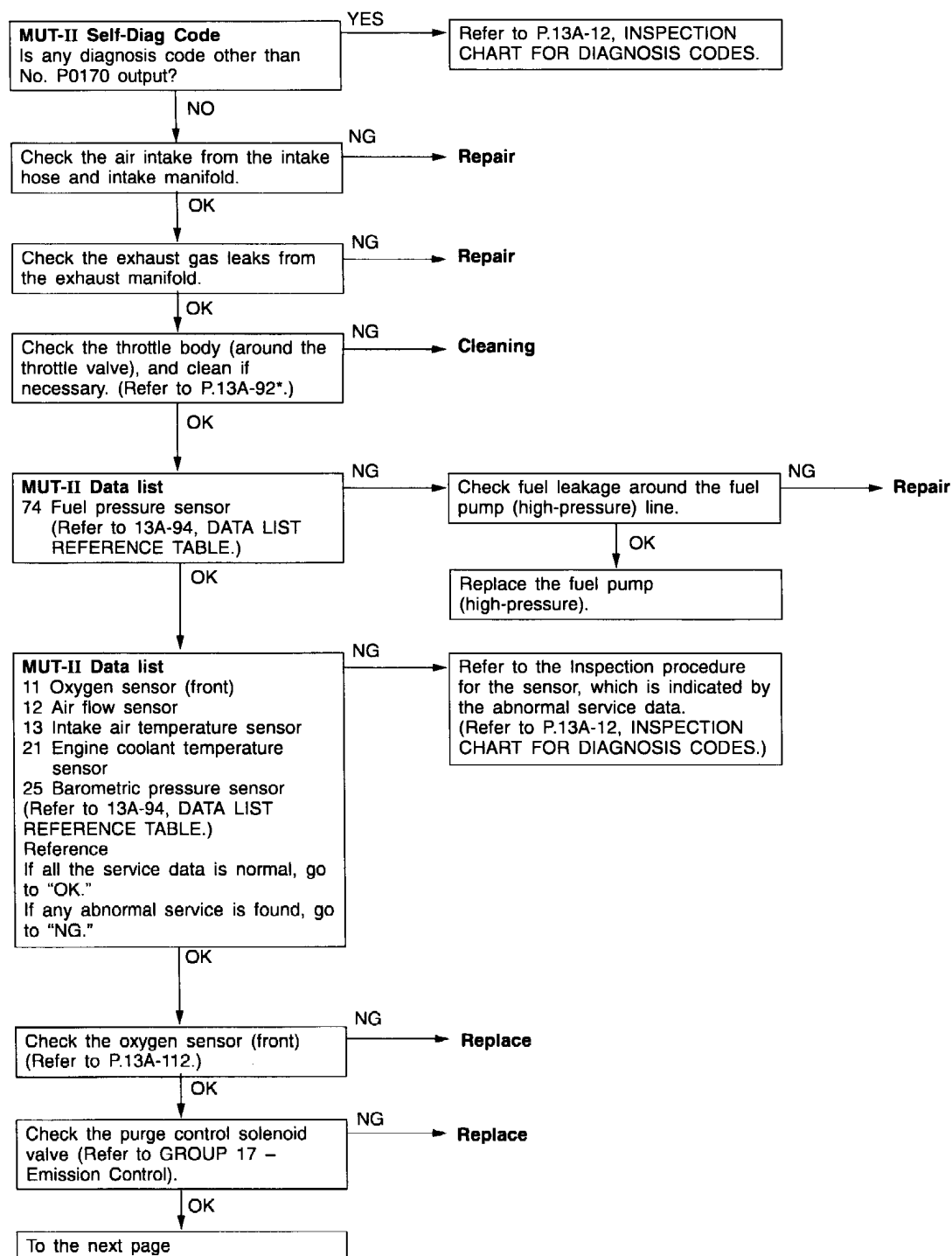
Code No. P0136 Oxygen sensor (rear) system <sensor 2>	Probable cause
Range of Check • Three minutes have been passed since the engine has been started. • The engine coolant temperature is approx. 80°C or more. • Intake air temperature is 20 – 50°C • Engine speed is 1,200 r/min or more • Driving on a level surface at constant speed. Set Conditions • The oxygen sensor (rear) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the oxygen sensor (rear) inside the engine-ECU.	• Malfunction of oxygen sensor (rear) • Open or short circuit in the oxygen sensor (rear) circuit or loose connector contact • Malfunction of engine-ECU
Range of Check • Two seconds have passed after the engine-ECU detected an open circuit. • When the oxygen sensor (front) is in good condition. Set Conditions • When the air/fuel ratio is rich, the oxygen sensor (front) output voltage is 0.5 V or more, the oxygen sensor (rear) output voltage is less than 0.1 V, and the oxygen sensor (rear) output voltage fluctuates within 0.078 V.	



Code No. P0141 Oxygen sensor heater (rear) system <sensor 2>	Probable cause
Range of Check • The engine coolant temperature is approx. 20°C or more. • The oxygen sensor heater (rear) remains on. • The engine speed is 50 r/min or more. • Battery voltage is 11 – 16 V. Set Conditions • The current, which flows through the oxygen sensor heater (rear), is 0.2 A or less or 3.5 A or more for six seconds.	• Malfunction of oxygen sensor heater (rear) • Open or short circuit in the oxygen sensor heater (rear) circuit or loose connector contact • Malfunction of engine-ECU

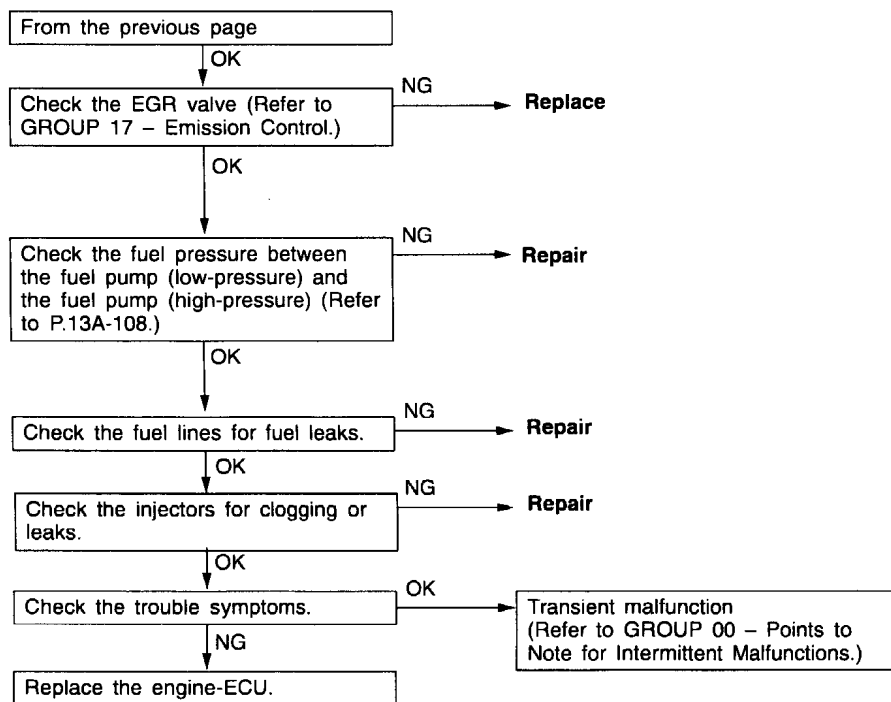


Code No. P0170 Abnormal fuel system	Probable cause
Range of Check • Engine: Being learning the air-fuel ratio Set Conditions • Ten seconds or more have been passed while the fuel injection amount compensation value is too low. or • Ten seconds or more have been passed while the fuel injection amount compensation value is too high.	• Malfunction of fuel supply system • Malfunction of oxygen sensor (front) • Malfunction of intake air temperature sensor • Malfunction of barometric pressure sensor • Malfunction of air flow sensor • Malfunction of engine-ECU

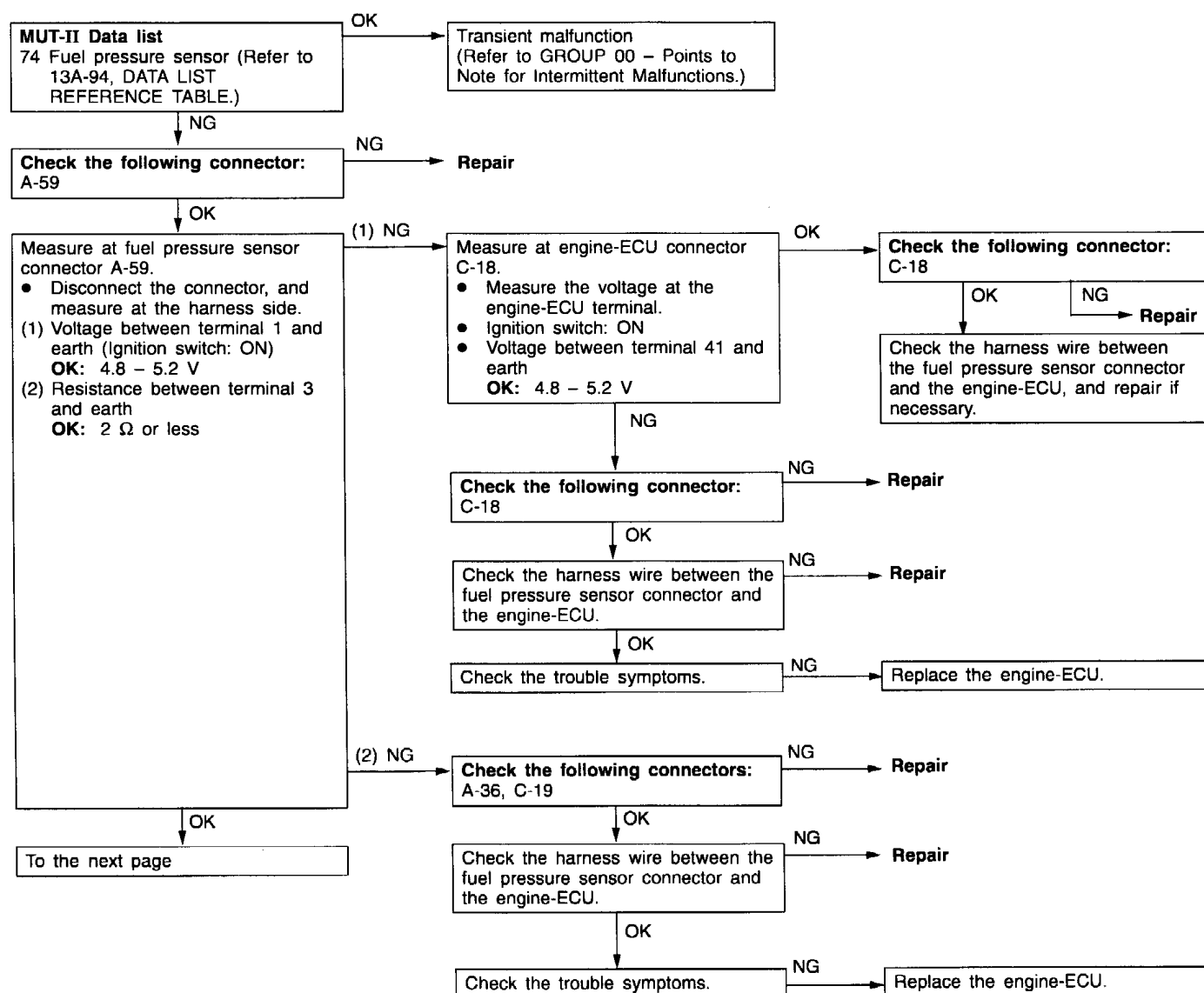


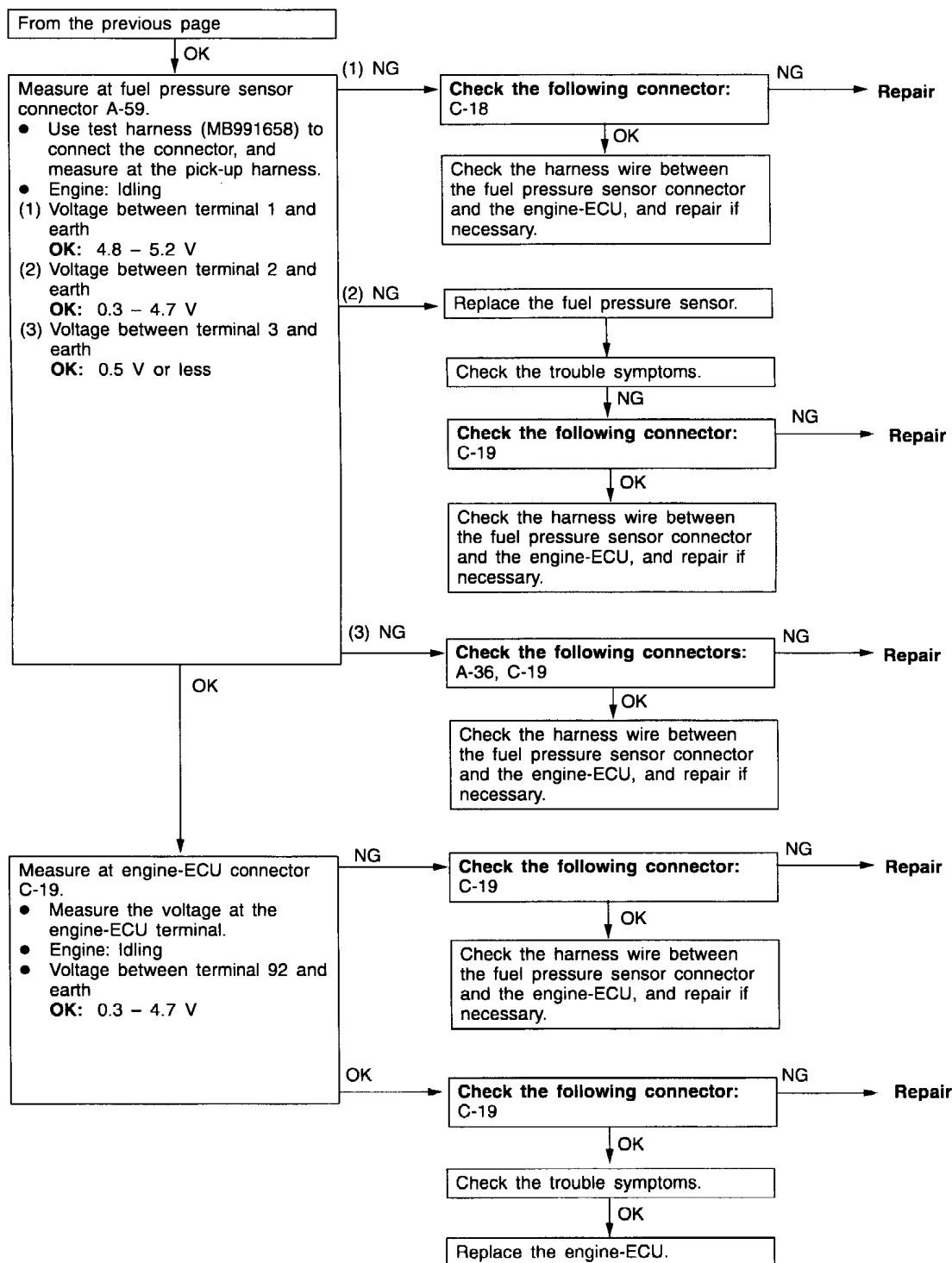
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)



Code No. P0190 Abnormal fuel pressure	Probable cause
Range of Check • Ignition switch: ON Set Conditions • The sensor output voltage is 4.8 V or more, or 0.2 V or less for four seconds.	• Malfunction of fuel pressure sensor • Open or short circuit in the fuel pressure sensor circuit or loose connector contact • Malfunction of engine-ECU
Range of Check • The following conditions are detected temporarily after the engine has been started. (1) Engine speed: 1,000 r/min or more (2) Fuel pressure: 2 MPa or more • Engine running Set Conditions • The fuel pressure is 6.9 MPa or more, or 2 MPa or less for four seconds.	• Malfunction of high-pressure fuel pump • Clogging of high-pressure fuel lines
This diagnosis code will also be output when air is trapped into the high-pressure fuel lines (such as poor fuel level). In that case, the air can be evacuated by operating the engine for at least 15 seconds at 2,000 r/min. After the repair, use the MUT-II to erase the diagnosis code.	• Air trapped due to poor fuel level



**Code No. P0201 No. 1 injector system****Range of Check**

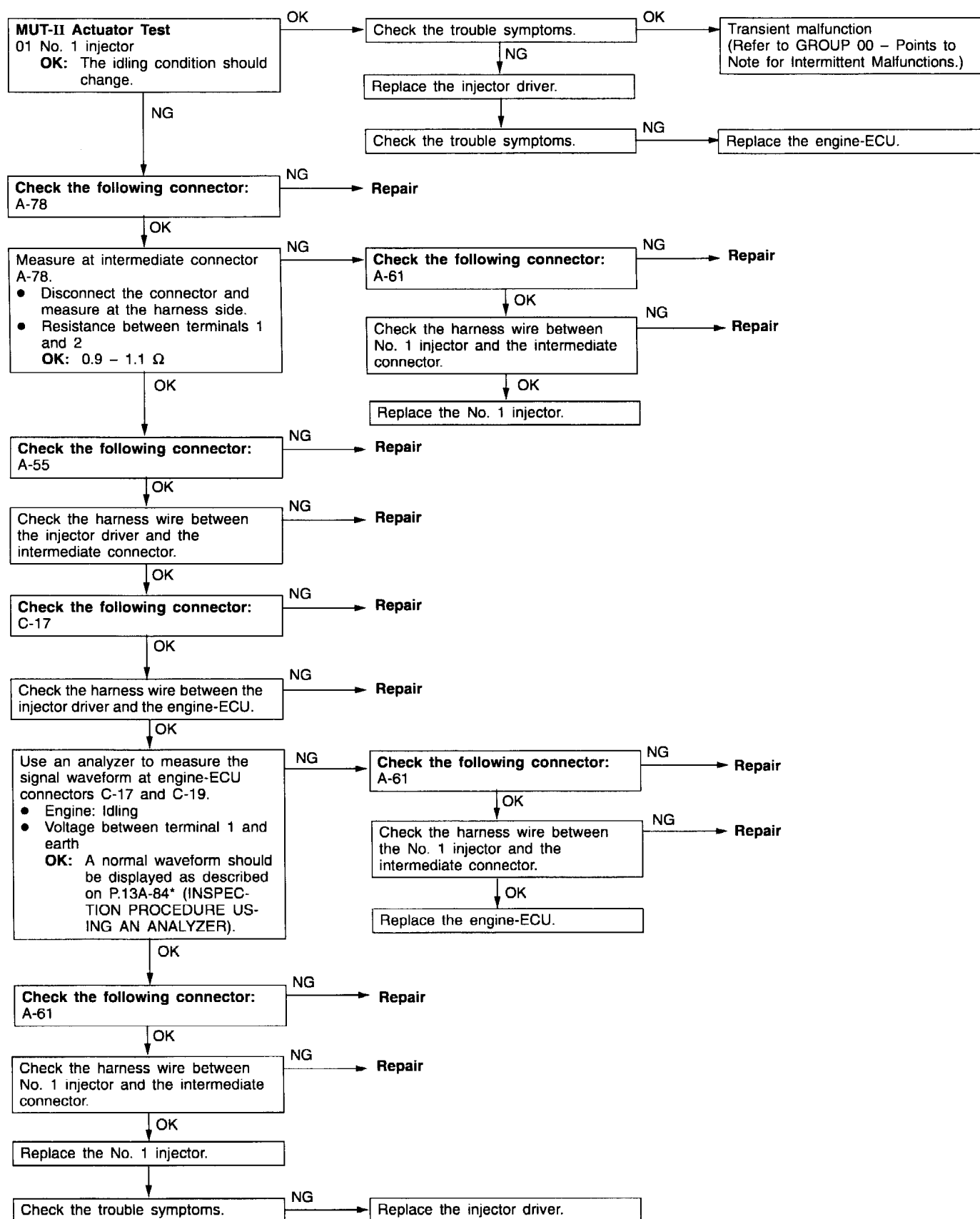
- The engine speed is 4,000 r/min or less.
- The battery voltage is 10 V or more.
- The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress.

Set Conditions

- The injector driver is not transmitting a injector open circuit check signal for four seconds.

Probable cause

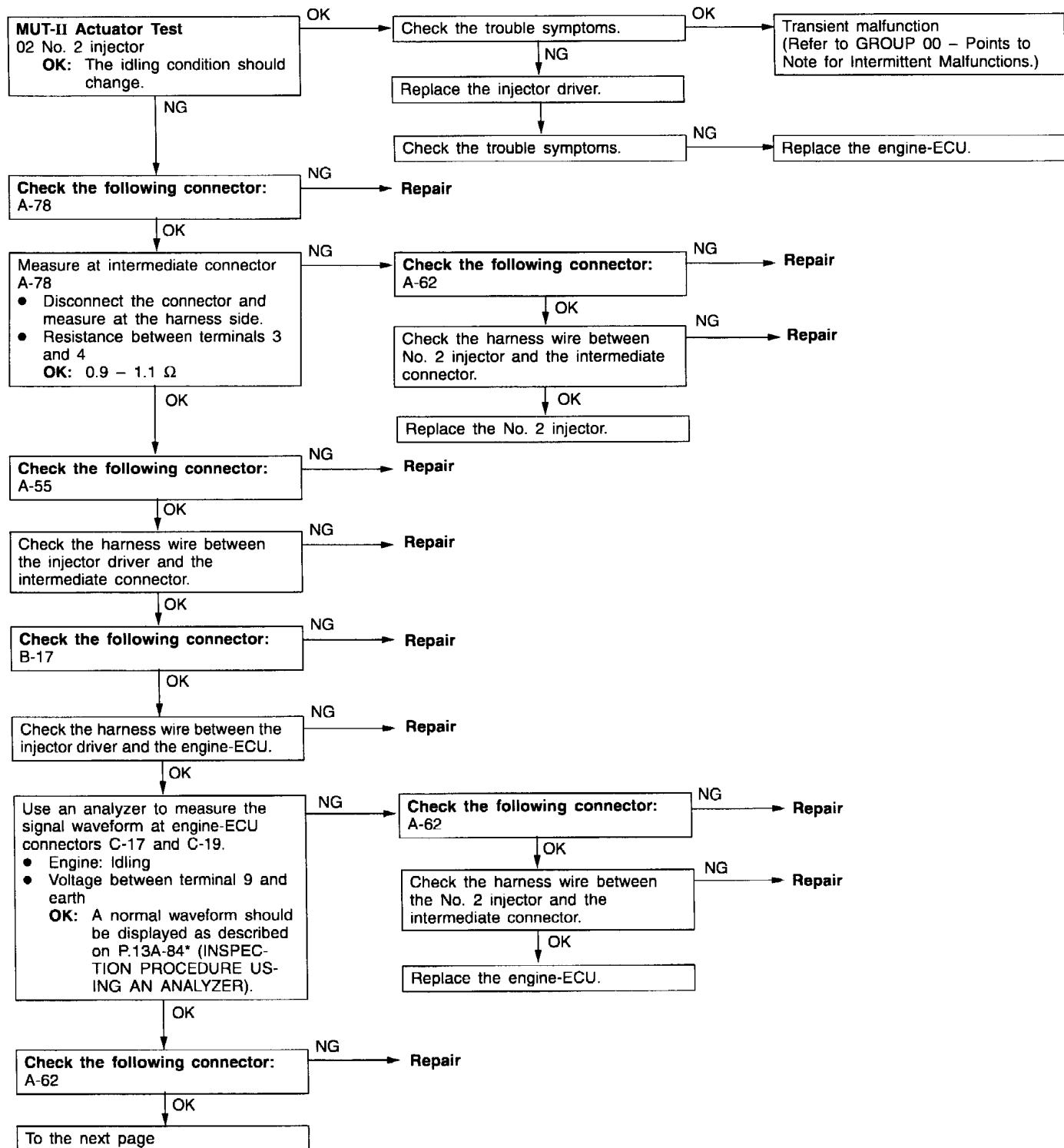
- Malfunction of No. 1 injector
- Open or short circuit in the No. 1 injector circuit or loose connector contact
- Malfunction of engine-ECU



NOTE

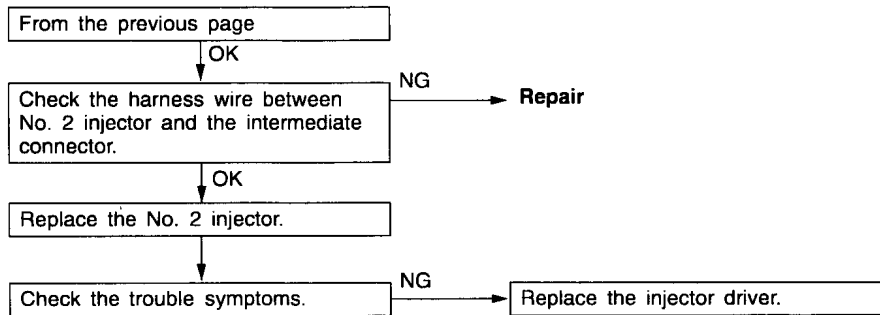
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P0202 No. 2 injector system	Probable cause
Range of Check - The engine speed is 4,000 r/min or less. - The battery voltage is 10 V or more. - The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions - The injector driver is not transmitting a injector open circuit check signal for four seconds.	- Malfunction of No. 2 injector - Open or short circuit in the No. 2 injector circuit or loose connector contact - Malfunction of engine-ECU



NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

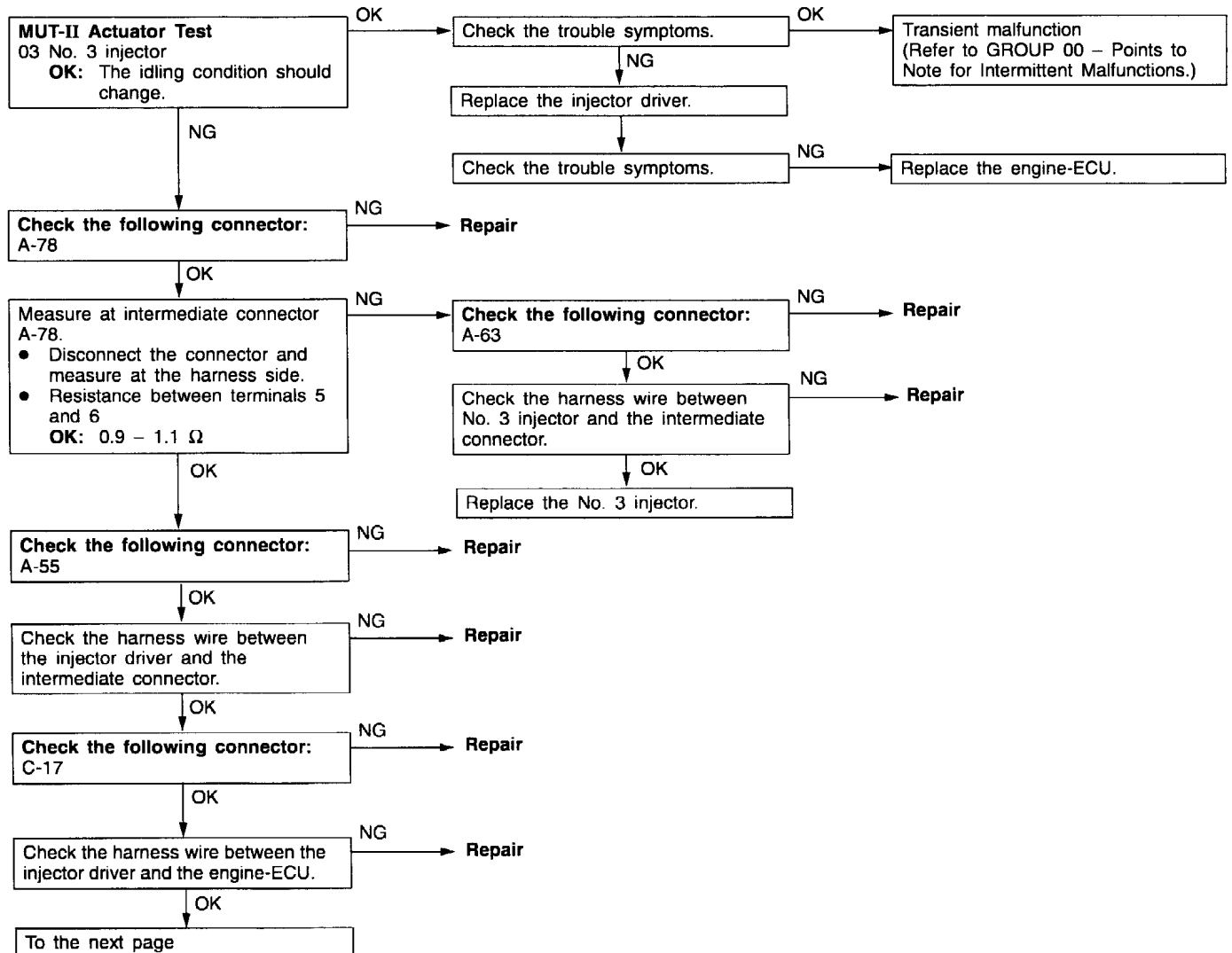
**Code No. P0203 No. 3 injector system****Probable cause****Range of Check**

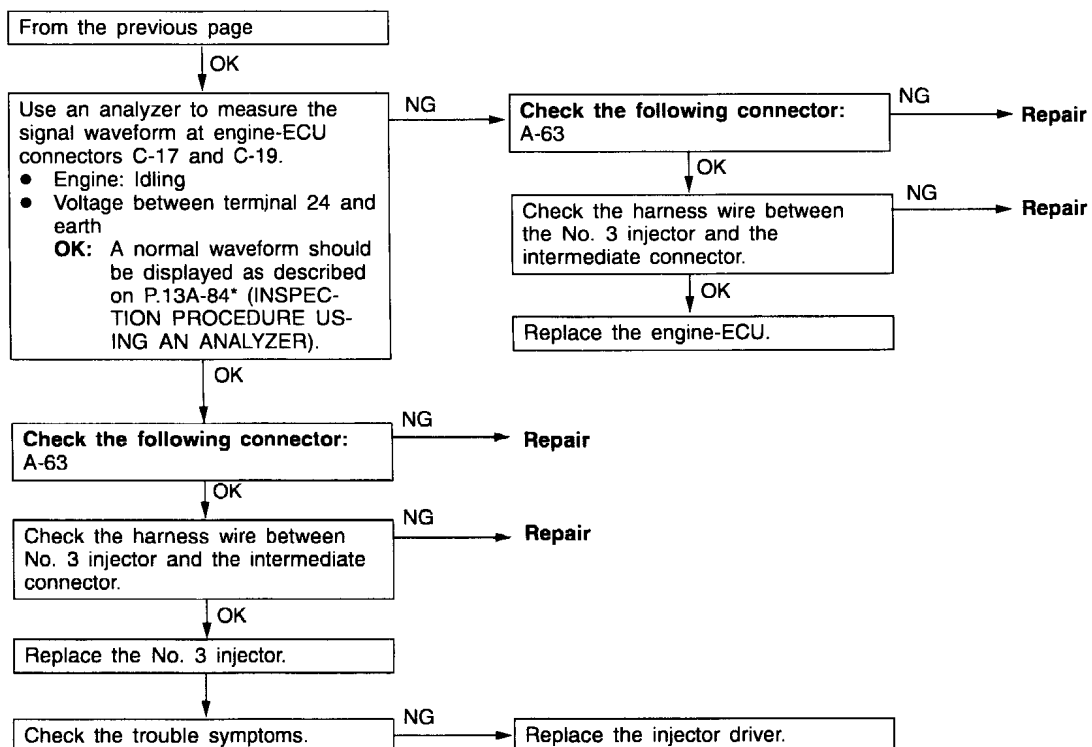
- The engine speed is 4,000 r/min or less.
- The battery voltage is 10 V or more.
- The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress.

Set Conditions

- The injector driver is not transmitting a injector open circuit check signal for four seconds.

- Malfunction of No. 3 injector
- Open or short circuit in the No. 3 injector circuit or loose connector contact
- Malfunction of engine-ECU

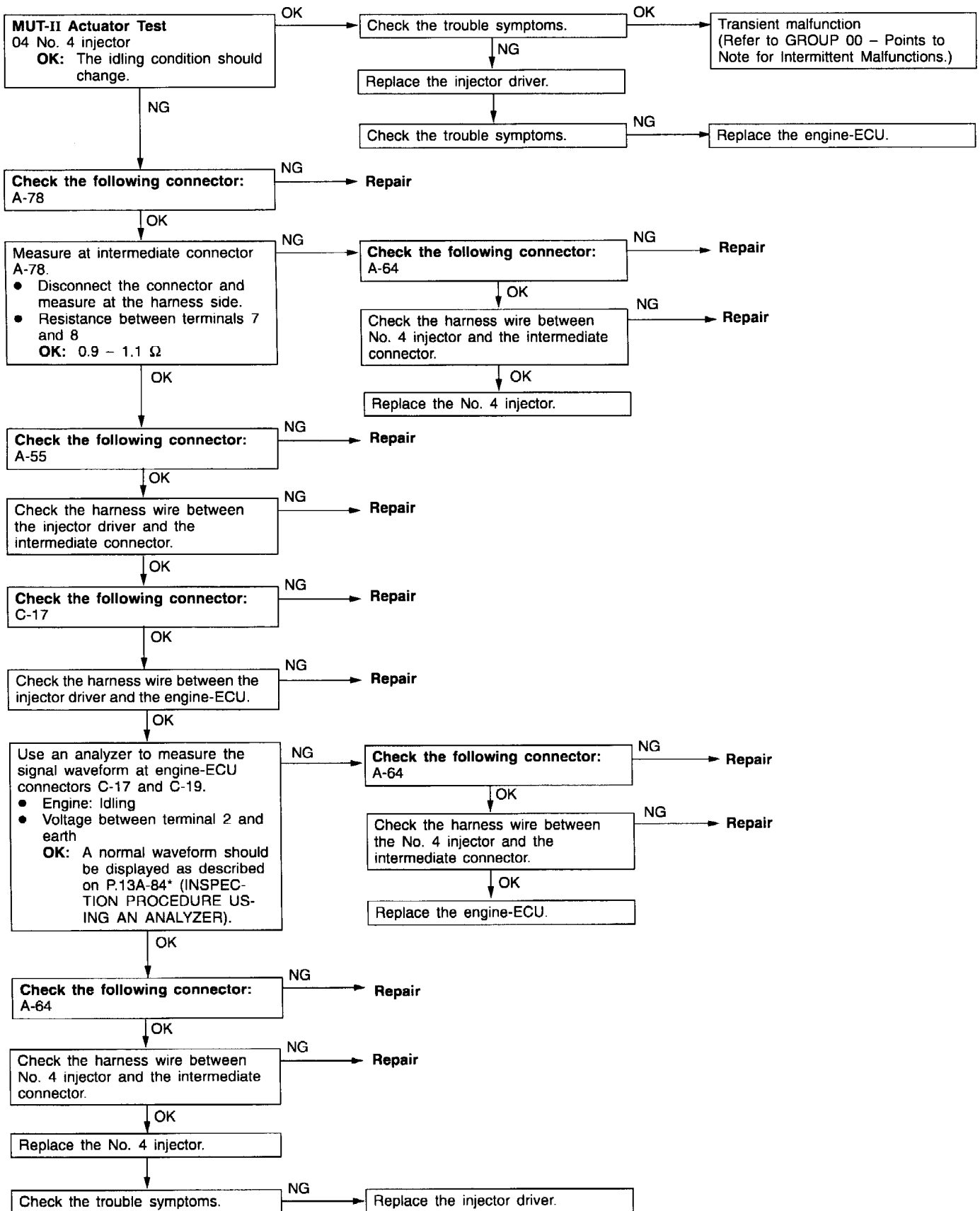




NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

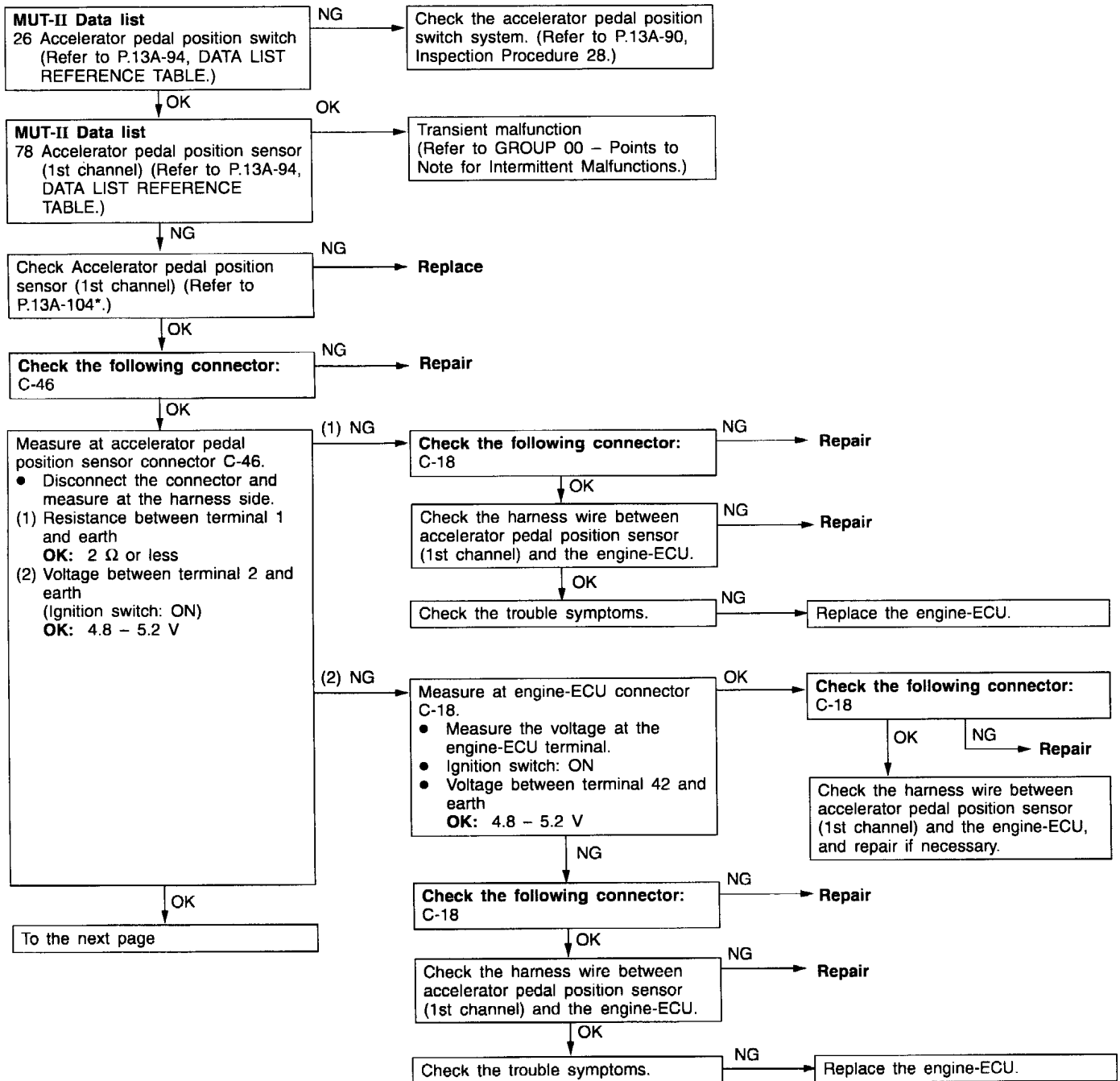
Code No. P0204 No. 4 injector system	Probable cause
Range of Check - The engine speed is 4,000 r/min or less. - The battery voltage is 10 V or more. - The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions - The injector driver is not transmitting a injector open circuit check signal for four seconds.	- Malfunction of No. 4 injector - Open or short circuit in the No. 4 injector circuit or loose connector contact - Malfunction of engine-ECU



NOTE

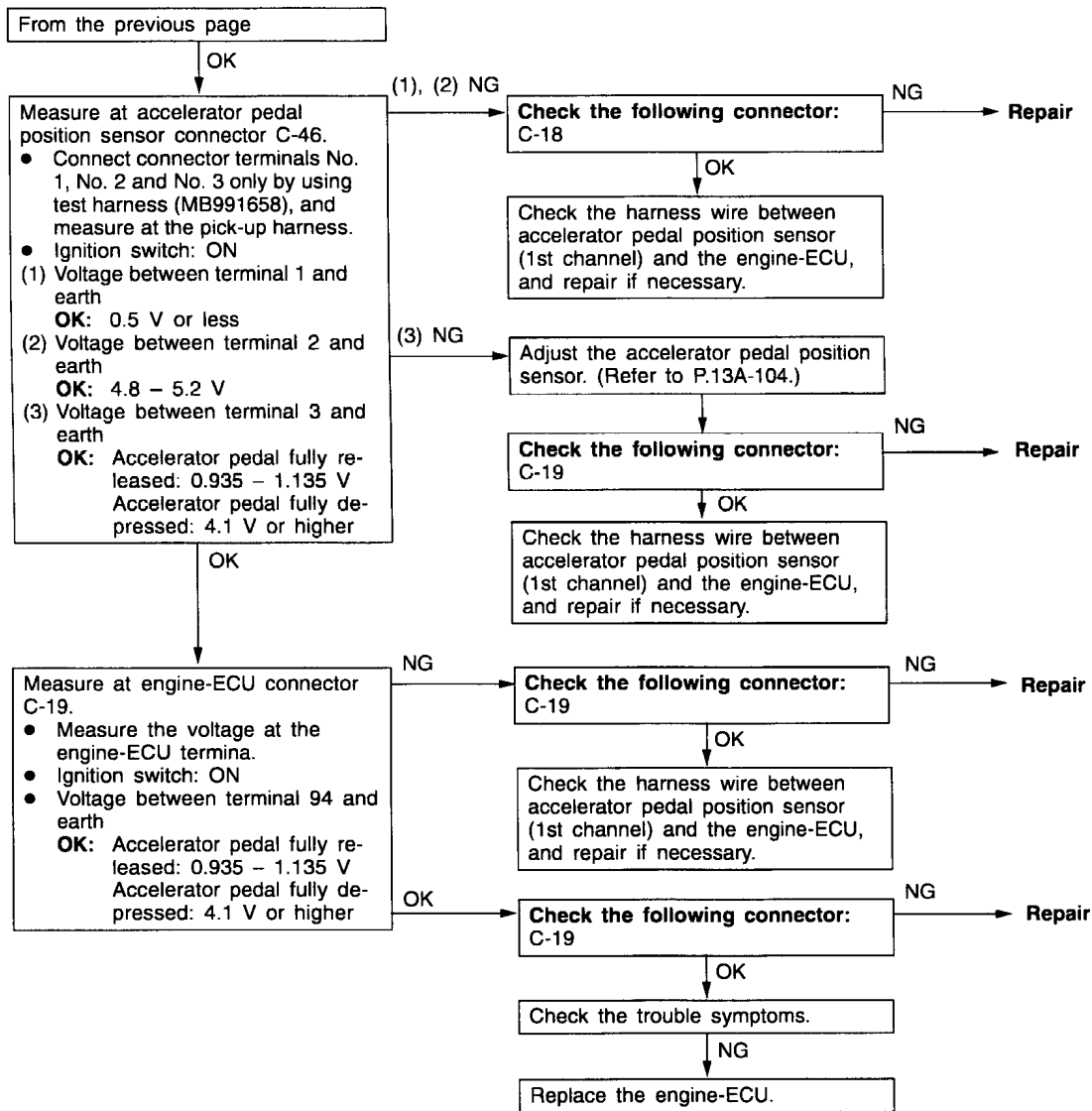
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P0220 Accelerator pedal position sensor (1st channel) system	Probable cause
Range of Check - Accelerator pedal position sensor (2nd channel) is normal. - Communication between the engine-ECU and the throttle valve controller is normal. Set Conditions - The output voltage of accelerator pedal position sensor (1st channel) is 0.2 V or less for one second. or - The output voltage of accelerator pedal position sensor (2nd channel) is 2.5 V or less, and that of accelerator pedal position sensor (1st channel) is 4.5 V or more for one second or - The difference between accelerator pedal position sensor (1st channel) and accelerator pedal position sensor (2nd channel) output voltages is 1.0 V or more (i.e. the throttle opening angle changes slightly). or - The output voltage of accelerator pedal position sensor (1st channel) is 1.875 V or more for one second when the accelerator pedal position switch is turned on.	- Malfunction of accelerator pedal position sensor (1st channel) - Open or short circuit in the accelerator pedal position sensor (1st channel) circuit or loose connector contact - Accelerator pedal position switch seized ON - Malfunction of throttle valve controller - Malfunction of engine-ECU



NOTE

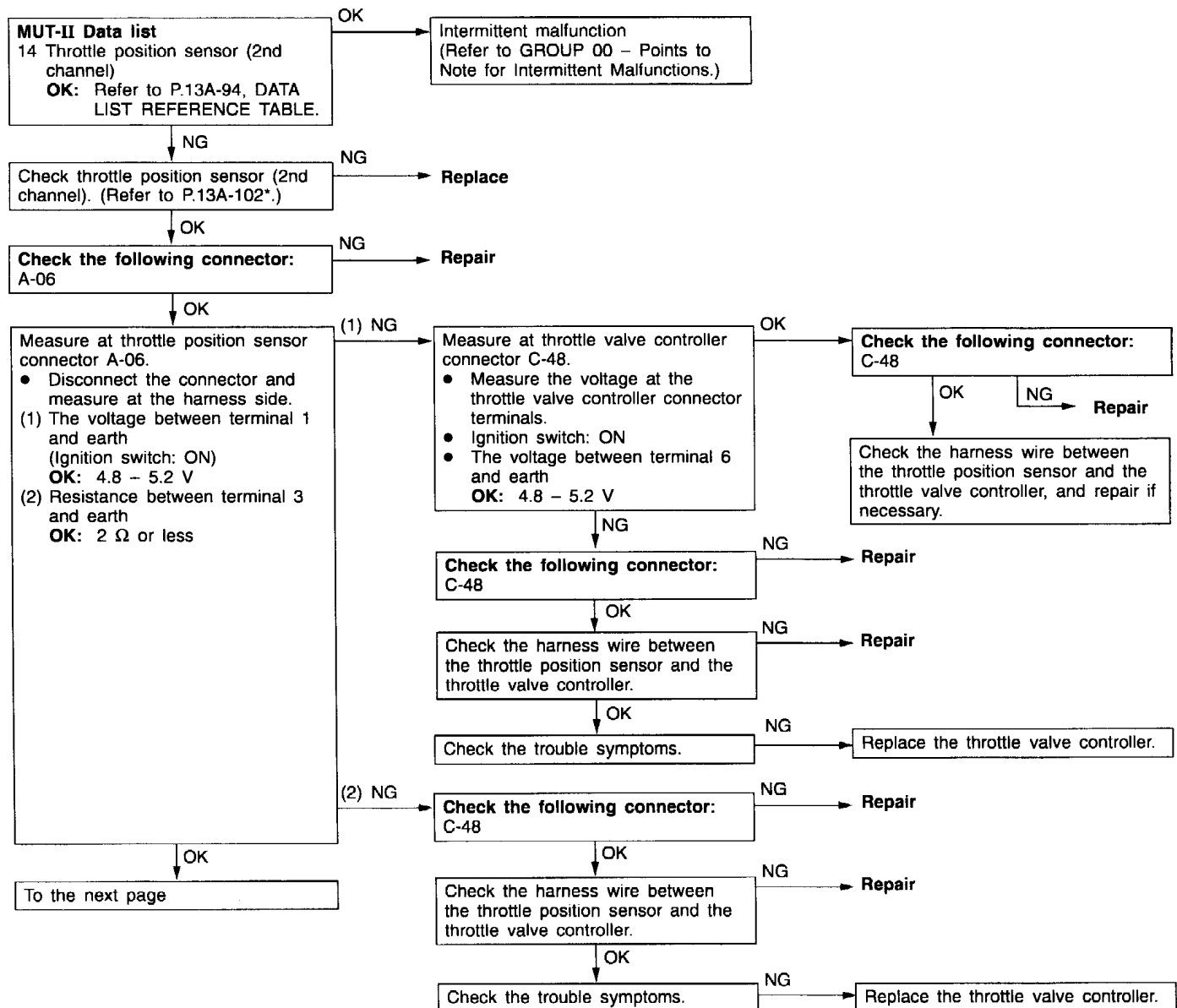
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)



NOTE

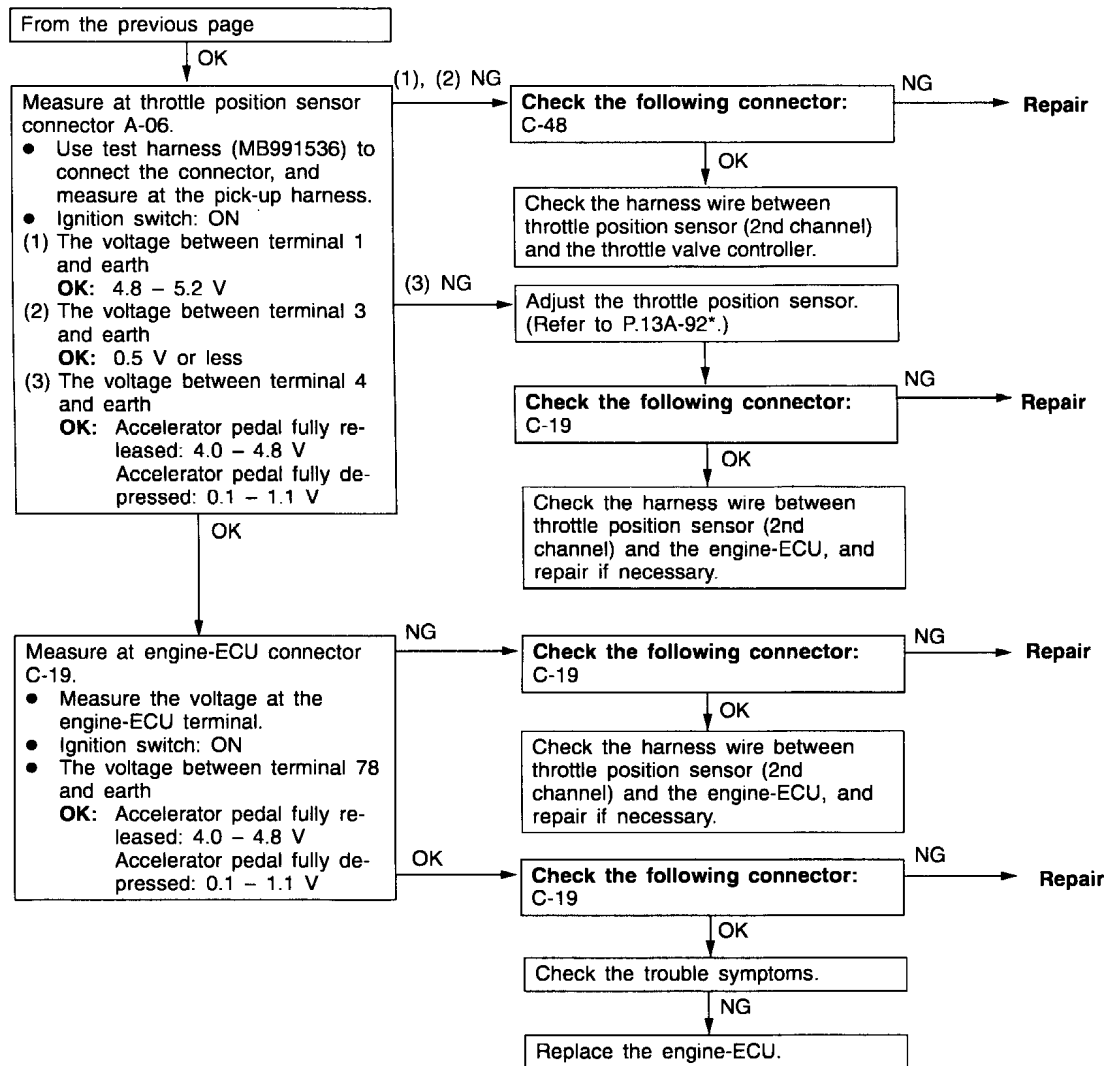
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. 0225 Throttle position sensor (2nd channel) system	Probable cause
The throttle valve controller judges a malfunction, and then transmit the result to the engine-ECU Range of Check ● Ignition switch: ON ● The throttle position sensor (1st channel) is normal. Set Conditions ● The sensor output voltage is 0.2 V or less for four seconds. or ● The sensor output voltage is 4.85 V or more for four seconds, and the output voltage of the throttle position sensor (1st channel) is 1.2 V or more. or ● The throttle position sensor (1st channel) and throttle position sensor (2nd channel) combination output voltage is outside 4 – 6 V.	● Malfunction of throttle position sensor (2nd channel) ● Open or short circuit in the throttle position sensor (2nd channel) circuit or loose connector contact ● Malfunction of the throttle valve controller ● Malfunction of the engine-ECU



NOTE

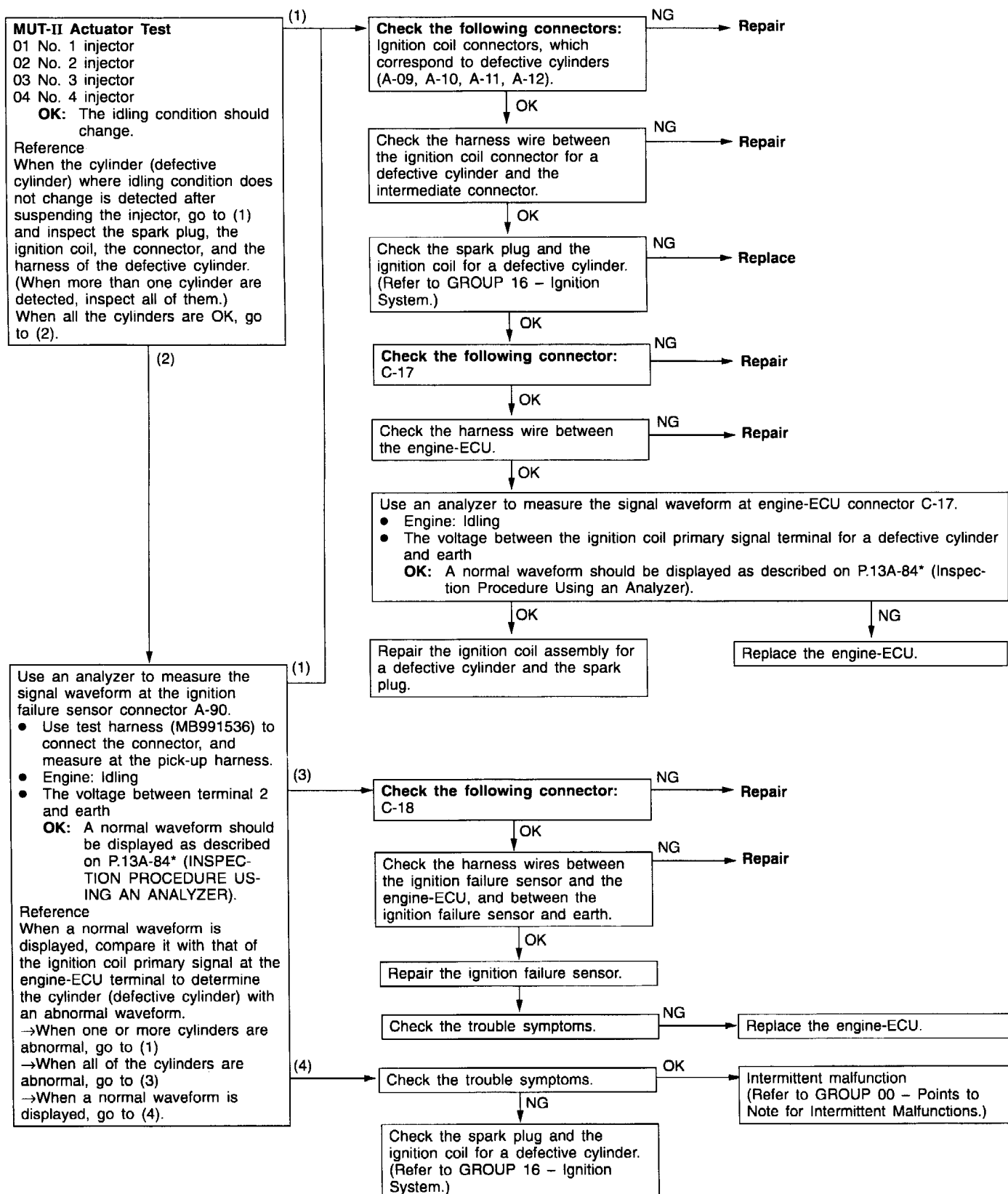
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)



NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

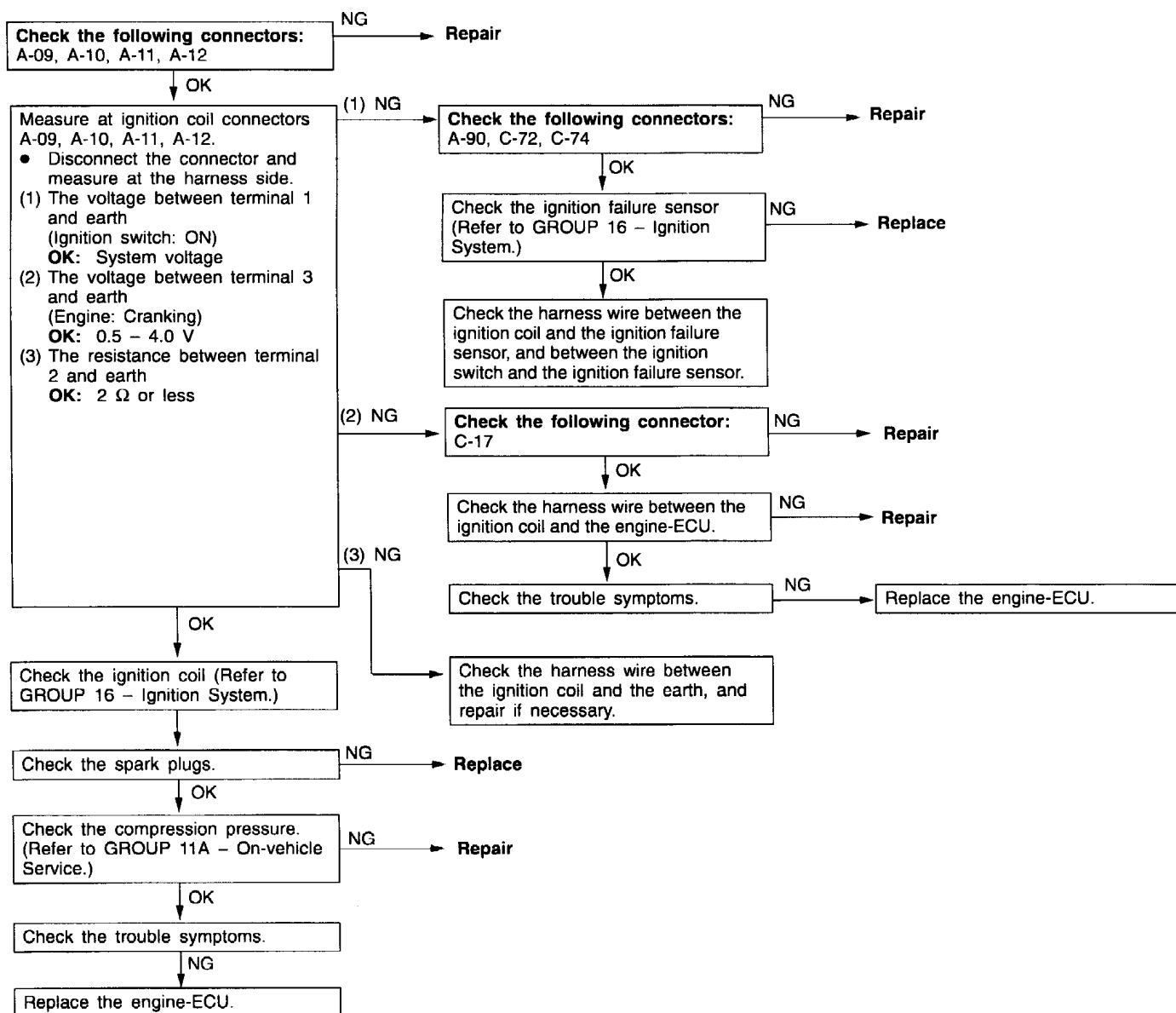
Code No. P0300 Ignition coil (power transistor) system	Probable cause
Range of Check • Engine speed is approx. 50 – 4,000 r/min. • Engine is not cranking. Set Conditions • The ignition failure sensor does not send a signal about a certain cylinder for four seconds.	• Malfunction of the ignition coil • Malfunction of the ignition failure sensor • Malfunction of spark plug • Open or short circuit in the primary ignition circuit or loose connector contact • Malfunction of engine-ECU



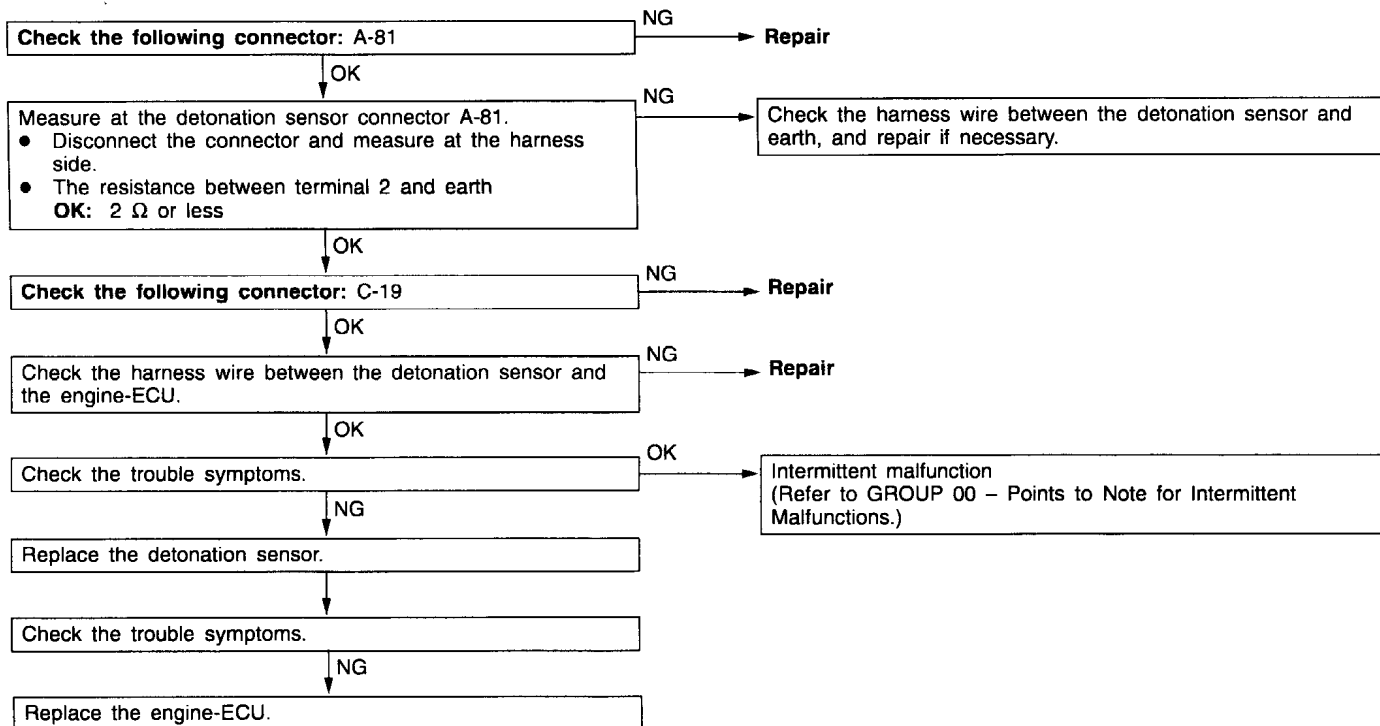
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

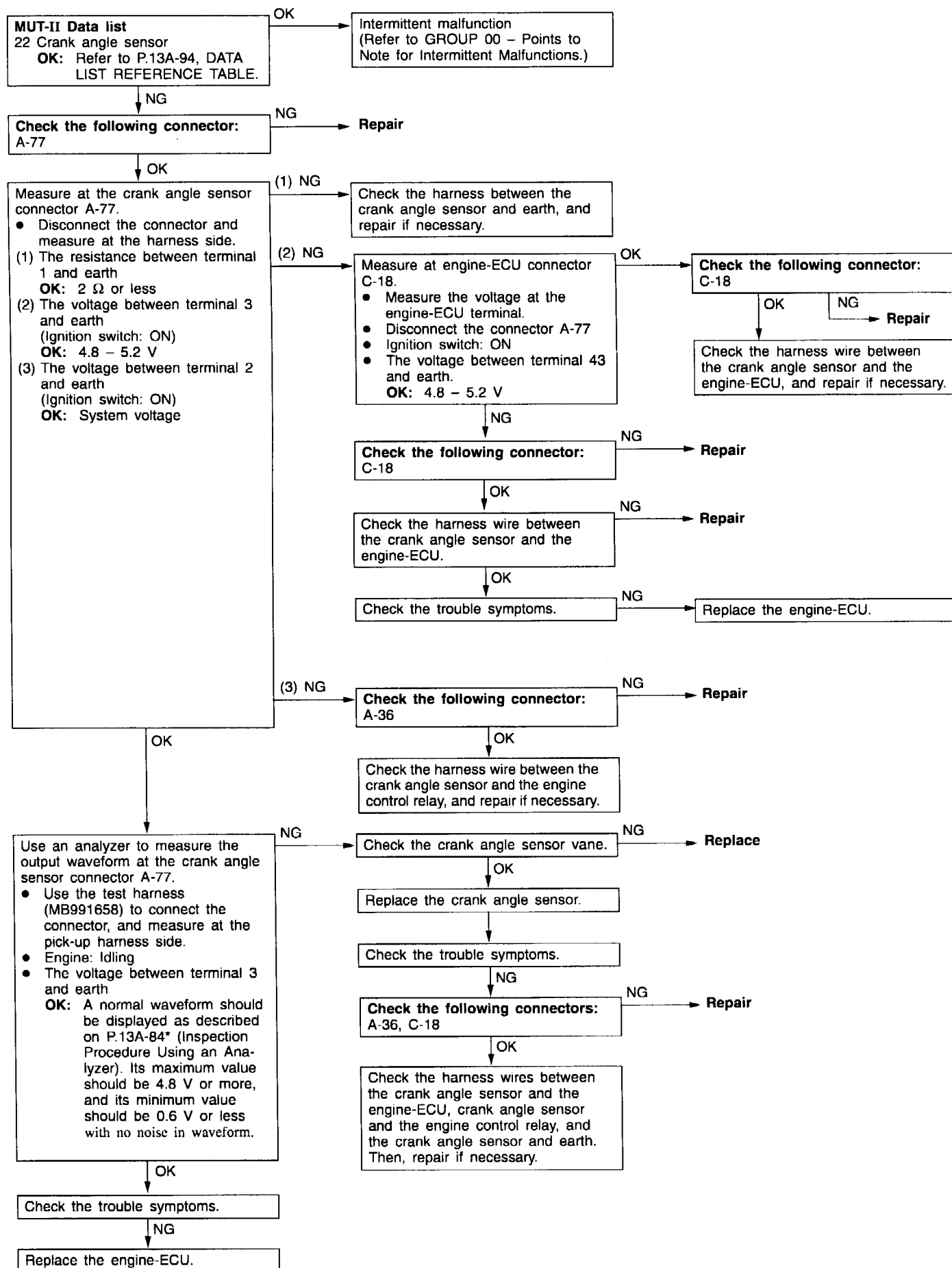
Code No. P0301 No. 1 cylinder misfire detected Code No. P0302 No. 2 cylinder misfire detected Code No. P0303 No. 3 cylinder misfire detected Code No. P0304 No. 4 cylinder misfire detected	Probable cause • Malfunction of the ignition system • Abnormal compression • Malfunction of injector • Malfunction of engine-ECU
Range of Check • The engine speed is 500 – 4,500 r/min. • While the engine is running except deceleration and sudden acceleration. Set Conditions • The number of misfires exceeds a predetermined number per 200 engine revolutions (Misfire has occurred in only one cylinder). or • The number of misfires exceeds a predetermined number per 100 engine revolutions (Misfire has occurred in only one cylinder).	



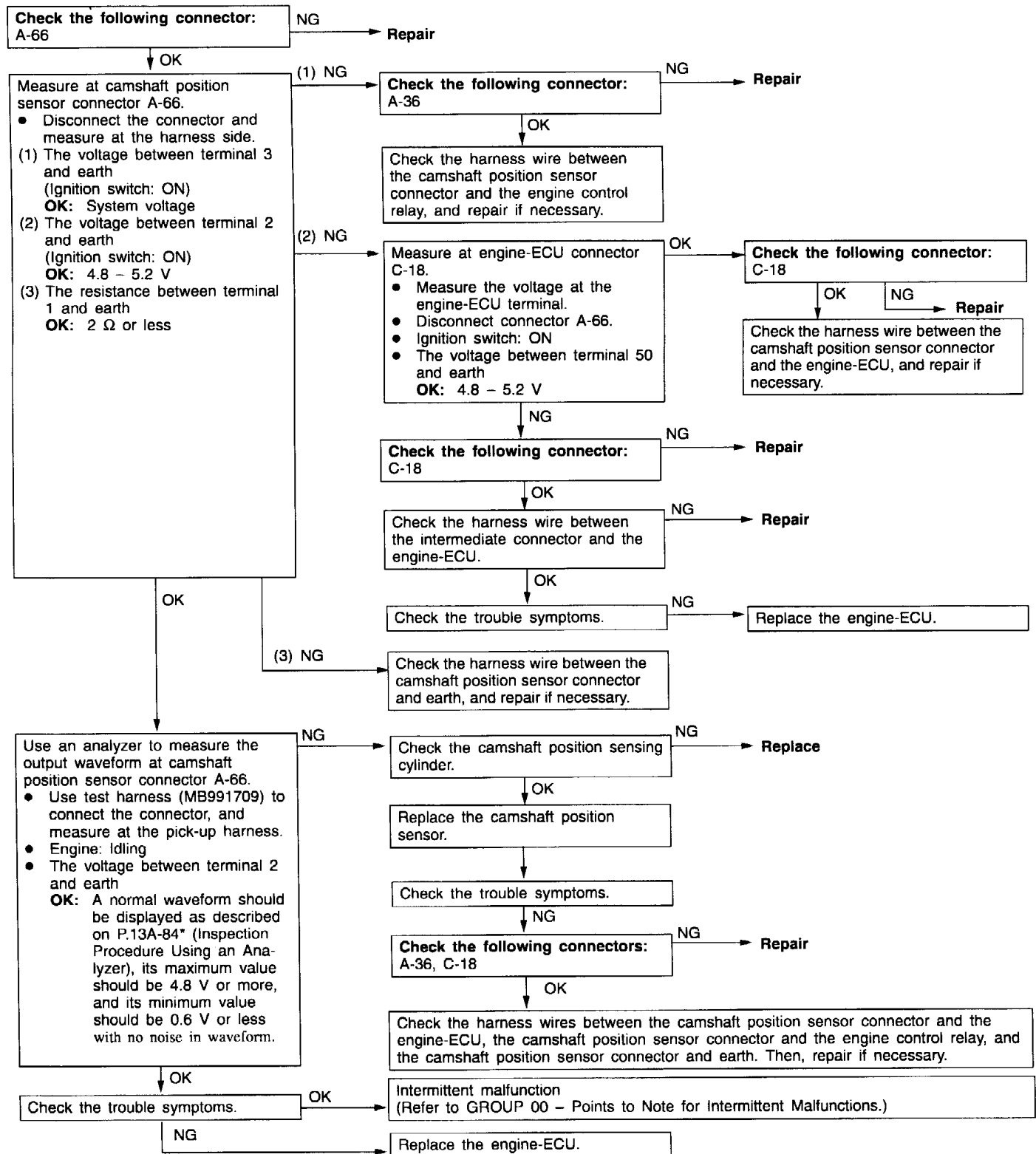
Code No. P0325 Detonation sensor system	Probable cause
Range of Check • Engine: Two seconds after the engine has been started Set Conditions • Changes in sensor output voltage (detonation sensor peak voltage per 1/3 crankshaft rotation) in 200 consecutive cycles are 0.08 V or less.	• Malfunction of the detonation sensor • Open or short circuit in the detonation sensor circuit or loose connector contact • Malfunction of engine-ECU



Code No. P0335 Crank angle sensor system	Probable cause
Range of Check • Engine is cranking Set Conditions • Sensor output voltage does not change for 4 seconds (no pulse signal input).	• Malfunction of the crank angle sensor. • Open or short circuit in the crank angle sensor circuit or loose connector contact. • Malfunction of engine-ECU



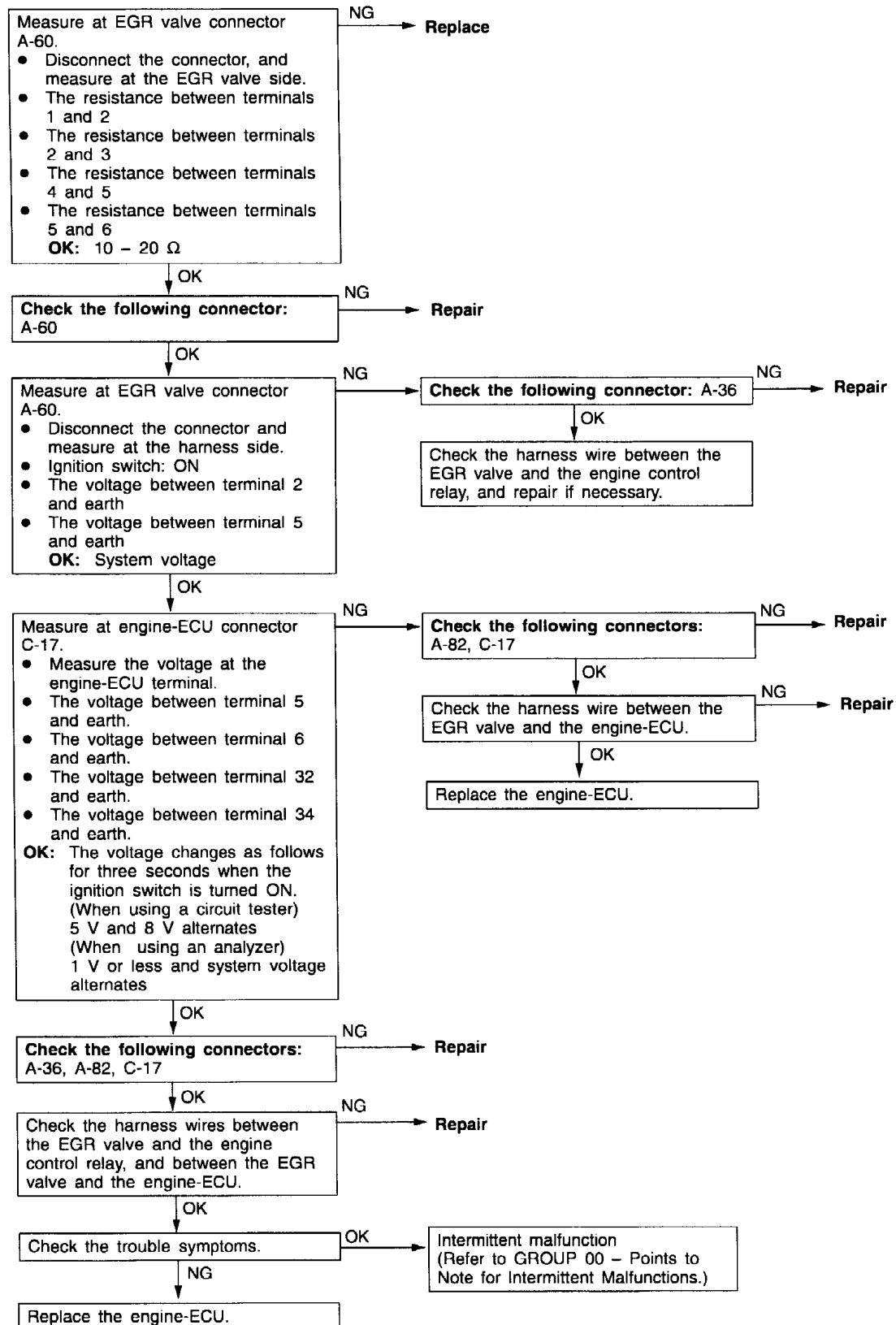
Code No. P0340 Camshaft position sensor system	Probable cause
Range of Check • After the engine was started Set Conditions • The sensor output voltage does not change for 4 seconds (no pulse signal input).	• Malfunction of the camshaft position sensor • Open or short circuit in the camshaft position sensor circuit or loose connector contact. • Malfunction of engine-ECU



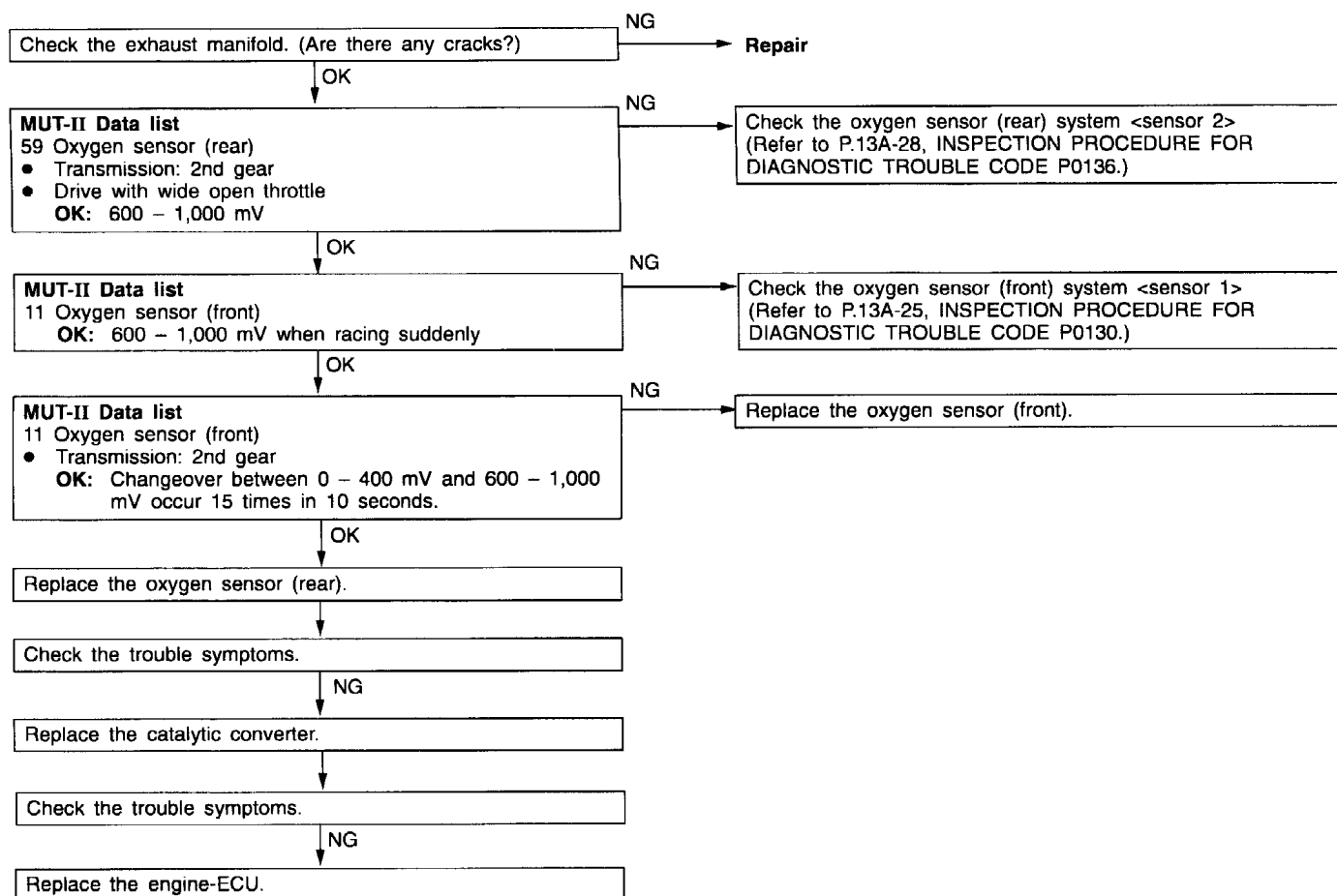
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

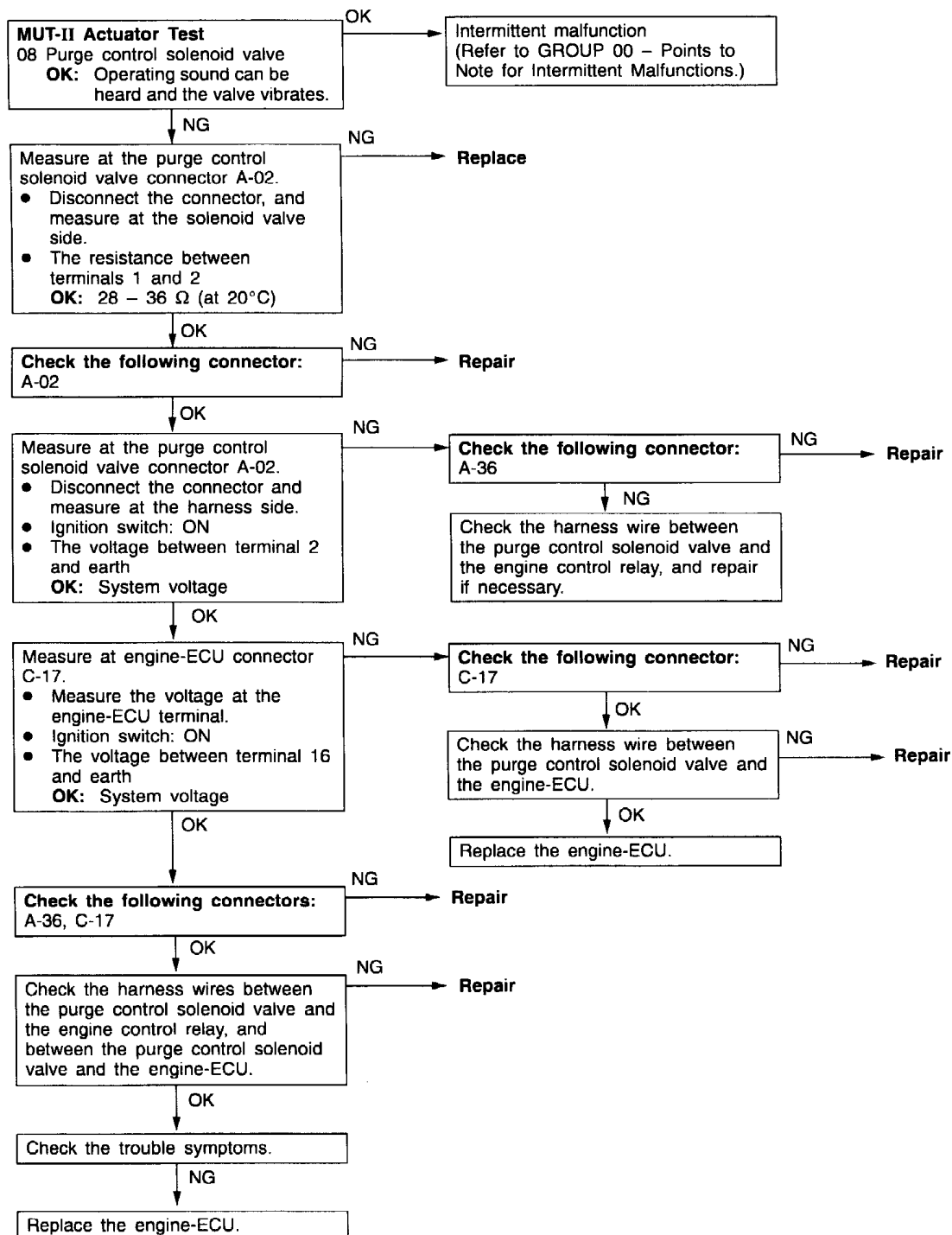
Code No. P0403 EGR valve system	Probable cause
Range of Check • Ignition switch: OFF to ON • EGR valve is in operation after the engine starting process is complete. Set Conditions • Off-surge voltage is not generated from the motor coil while the EGR valve control motor is running.	• Malfunction of the EGR valve • Open or short circuit in the EGR valve circuit or loose connector contact • Malfunction of engine-ECU



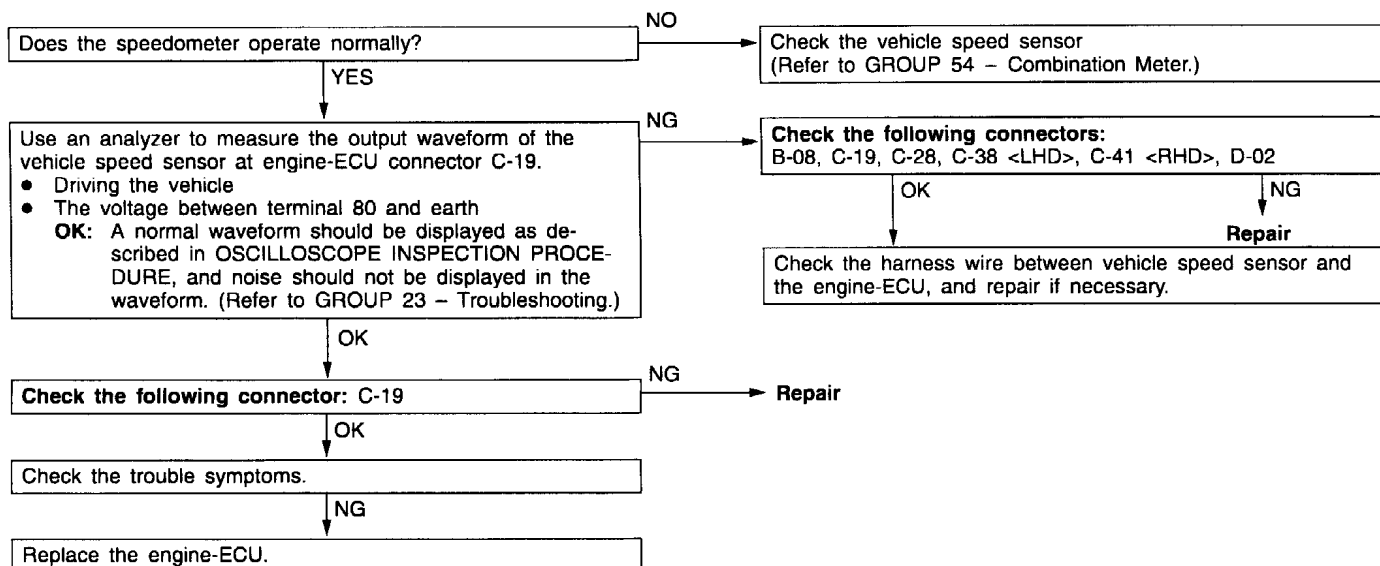
Code No. P0420 Catalyst malfunction	Probable cause
Range of Check • The engine speed is 3,000 r/min or less. • During driving • During air/fuel ratio feedback control Set Conditions • The ratio between the oxygen sensor (rear) and the oxygen sensor (front) output frequencies reaches 0.8 per 12 seconds on average.	• Malfunction of catalyst • Malfunction of the oxygen sensor (front) • Malfunction of the oxygen sensor (rear) • Malfunction of engine-ECU



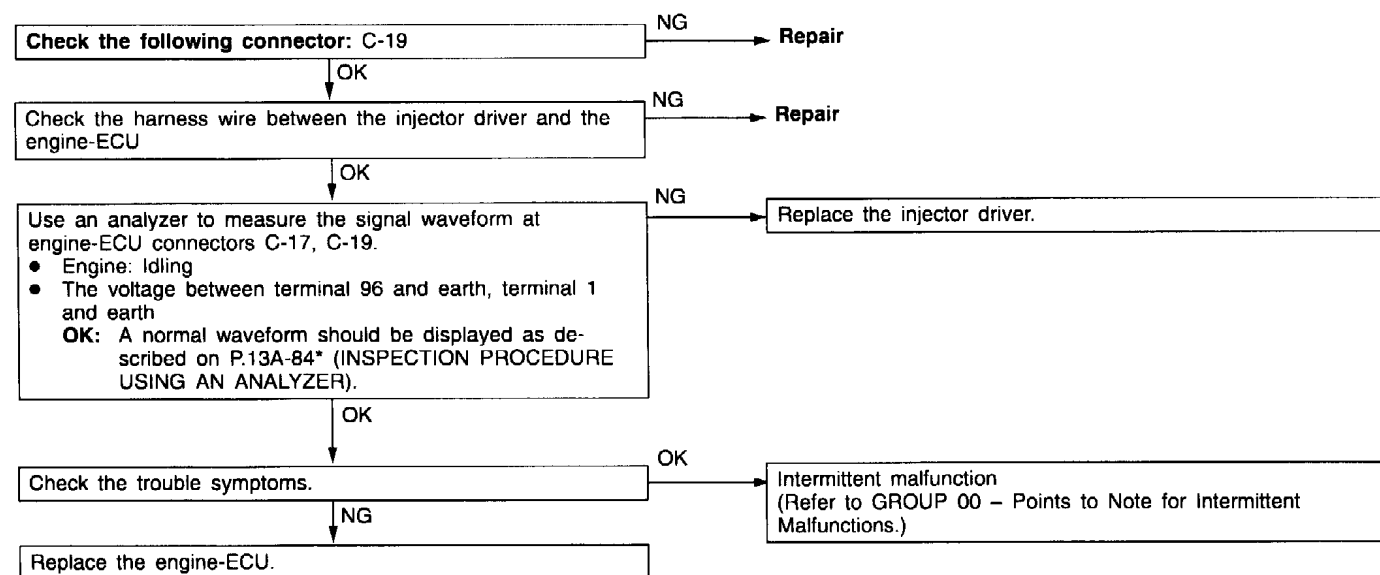
Code No. P0443 Purge control solenoid valve system	Probable cause
Range of Check - Ignition switch: ON - Battery voltage is 10 V or more. Set Conditions - The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	- Malfunction of the purge control solenoid valve - Open or short circuit in the purge control solenoid valve circuit or loose connector contact - Malfunction of engine-ECU



Code No. P0500 Vehicle speed sensor system	Probable cause
Range of Check - Engine: Two seconds after the engine was started - Idle switch: OFF - Engine speed: 2,500 r/min or more - During high engine load Set Conditions - The sensor output voltage does not change for 4 seconds (no pulse signal input).	- Malfunction of the vehicle speed sensor - Open or short circuit in the vehicle speed sensor circuit or loose connector contact - Malfunction of engine-ECU



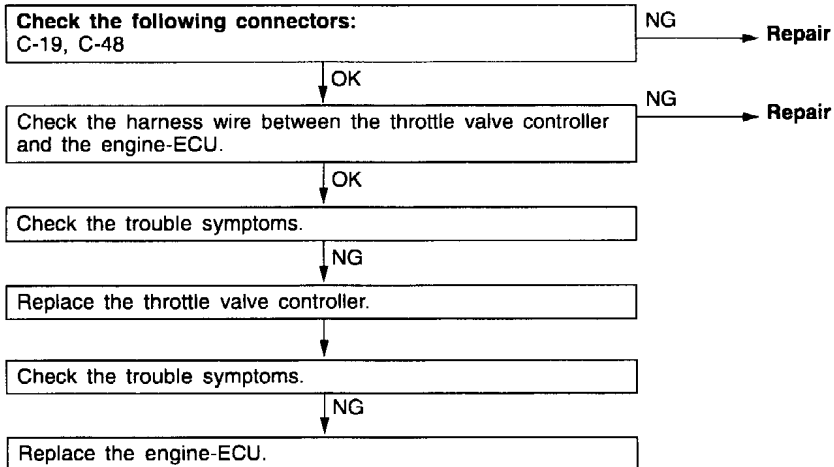
Code No. P1200 Injector driver system	Probable cause
Range of Check - Engine speed: 4,000 r/min or less - Battery voltage: 10 V or more - The fuel cut operation and the injector operation (by carrying out the Actuator test) are not in progress. - During high engine load Set Conditions - Injector open circuit check signal is not output from the injector driver.	- Malfunction of the injector driver - Open or short circuit, or loose connector contact - Malfunction of engine-ECU



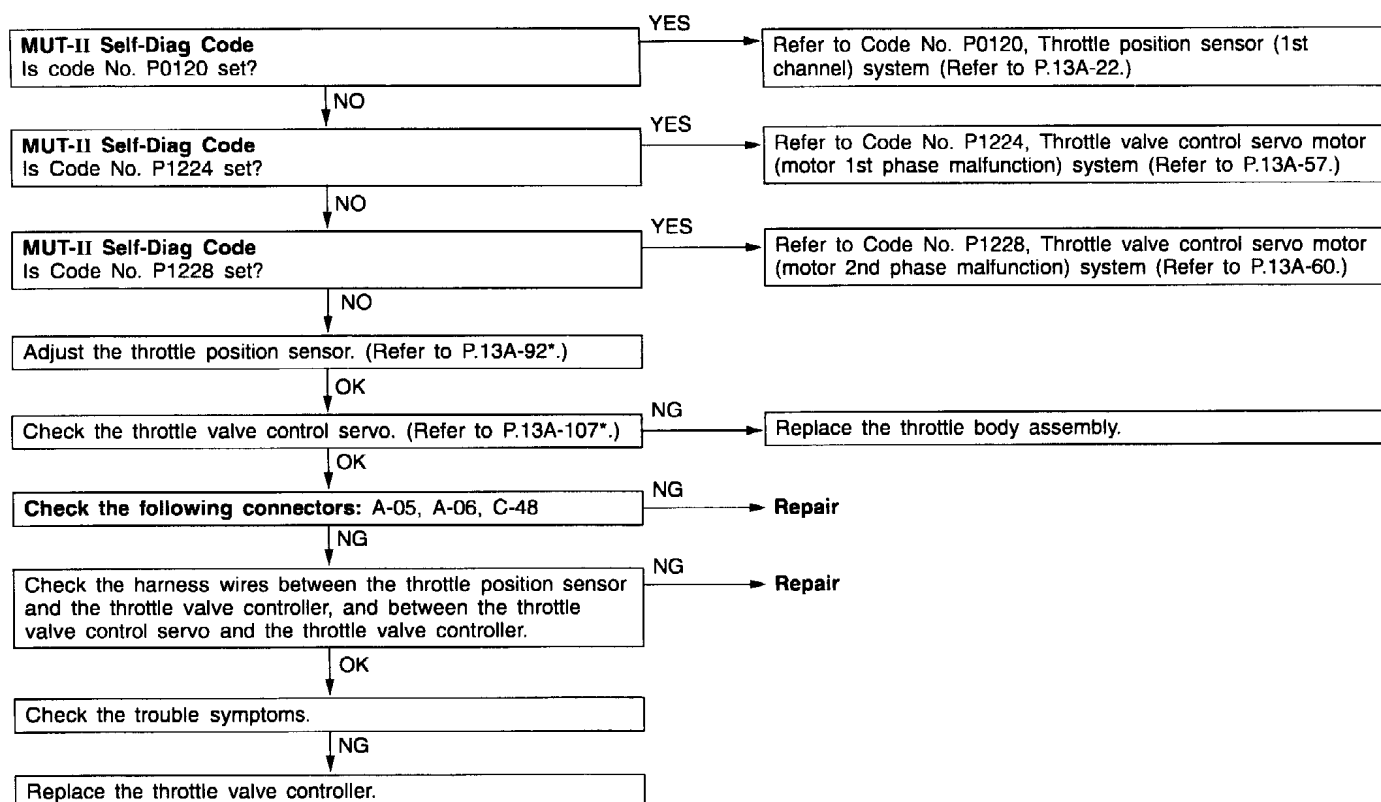
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P1220 Electronic-controlled throttle valve system	Probable cause
Range of Check - Ignition switch: ON - Error in communication between the engine-ECU and the throttle valve controller Set Conditions - Output voltage of throttle position sensor (2nd channel) fluctuates significantly (approx. 1 V or more) from an expected value, based on that of the accelerator pedal position sensor (2nd channel). Range of Check - Ignition switch: ON - Error in communication between the throttle valve controller and the engine-ECU Set Conditions - The output voltage of the throttle position sensor (2nd channel) is significantly different (approx. 1 V) from the throttle valve opening angle (voltage), which the engine-ECU request the throttle valve controller.	- Short in communication line - Malfunction of the engine-ECU - Malfunction of the throttle valve controller



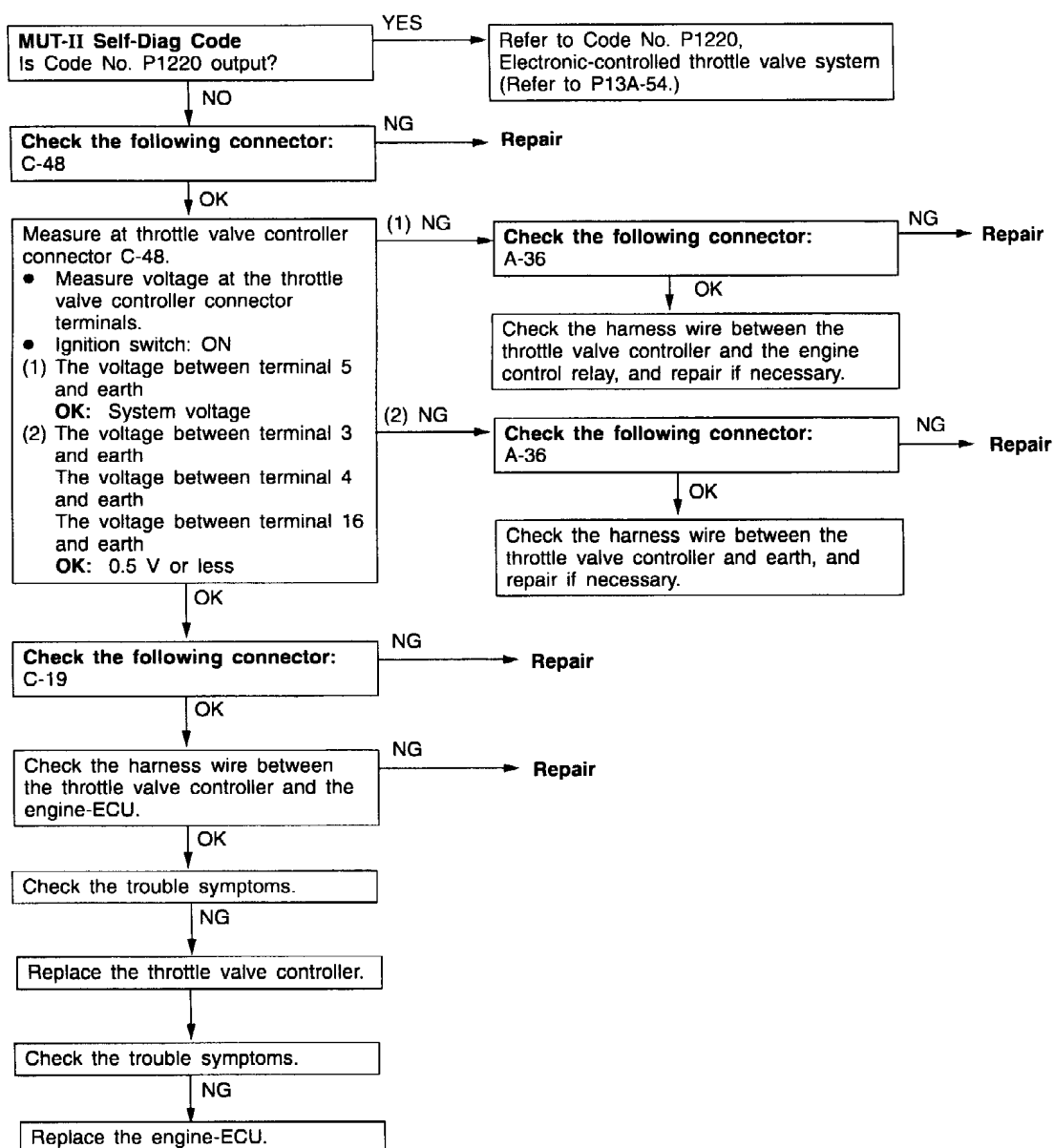
Code No. P1221 Throttle valve position feedback system	Probable cause
The throttle valve controller judges a malfunction, and then transmit the result to the engine-ECU. Range of Check - Ignition switch: ON - Battery voltage: 10 V or more Set Conditions - Failure in the motor position feedback (The engine-ECU detects that the current in the motor is excessive and the opening angle difference between the target value of throttle position sensor (1st channel) and the actual value of throttle position sensor (1st channel) is 1.0 V or more)	- Malfunction of throttle position sensor (1st channel) - Open or short circuit in the throttle position sensor (1st channel) circuit or loose connector contact - Malfunction of the throttle valve controller



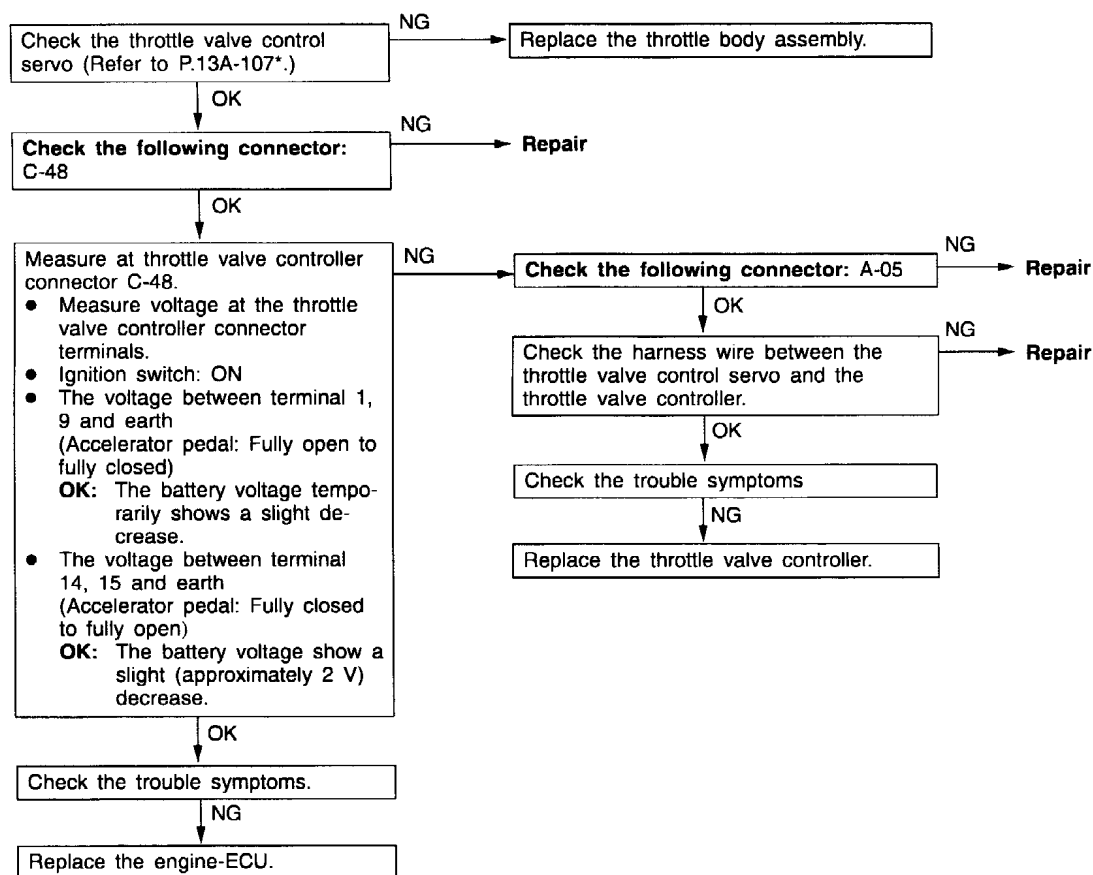
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P1223 Communication line system with the throttle valve controller	Probable cause
Range of Check - Ignition switch: ON - Battery voltage: 8 V or more. - Engine: Not cranking Set Conditions - System detects an error in communication line between the engine-ECU and the throttle valve controller, and between the throttle valve controller and the engine-ECU.	- Short in communication line - Malfunction of engine-ECU - Malfunction of throttle valve controller

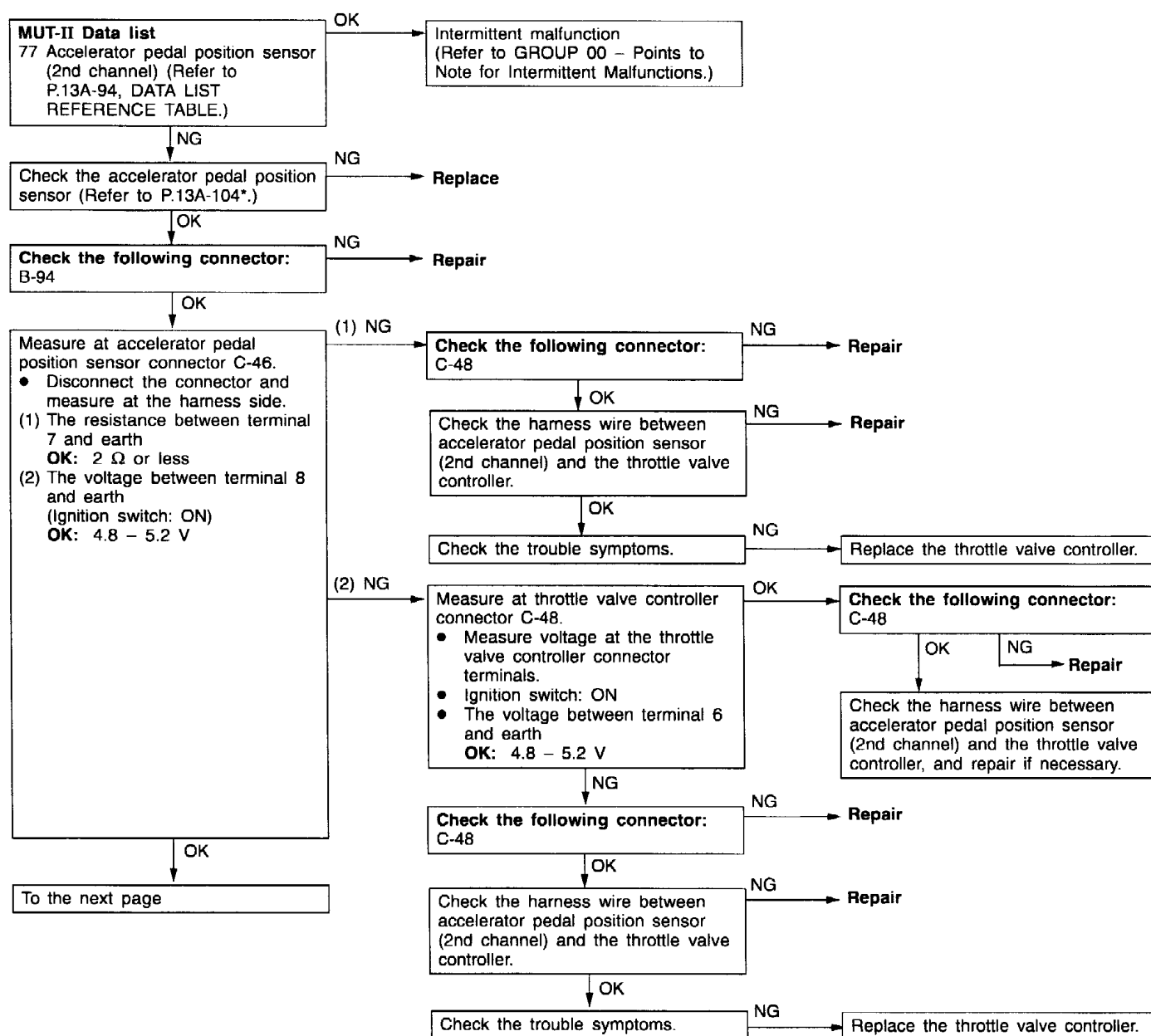


Code No. P1224 Throttle valve control servo (Motor 1st phase malfunction) system	Probable cause
Range of Check - Throttle valve control servo relay: ON - System voltage: 8 V or more. Set Conditions - Throttle valve control servo drive circuit is shorted to earth. - Other power source interferences with throttle valve control servo drive circuit. - Throttle valve control servo drive circuit is open circuit.	- Malfunction of the throttle valve control servo - Open circuit or short-circuited harness wire in throttle valve control servo system, or poor connector contact - Malfunction of the throttle valve controller

**NOTE**

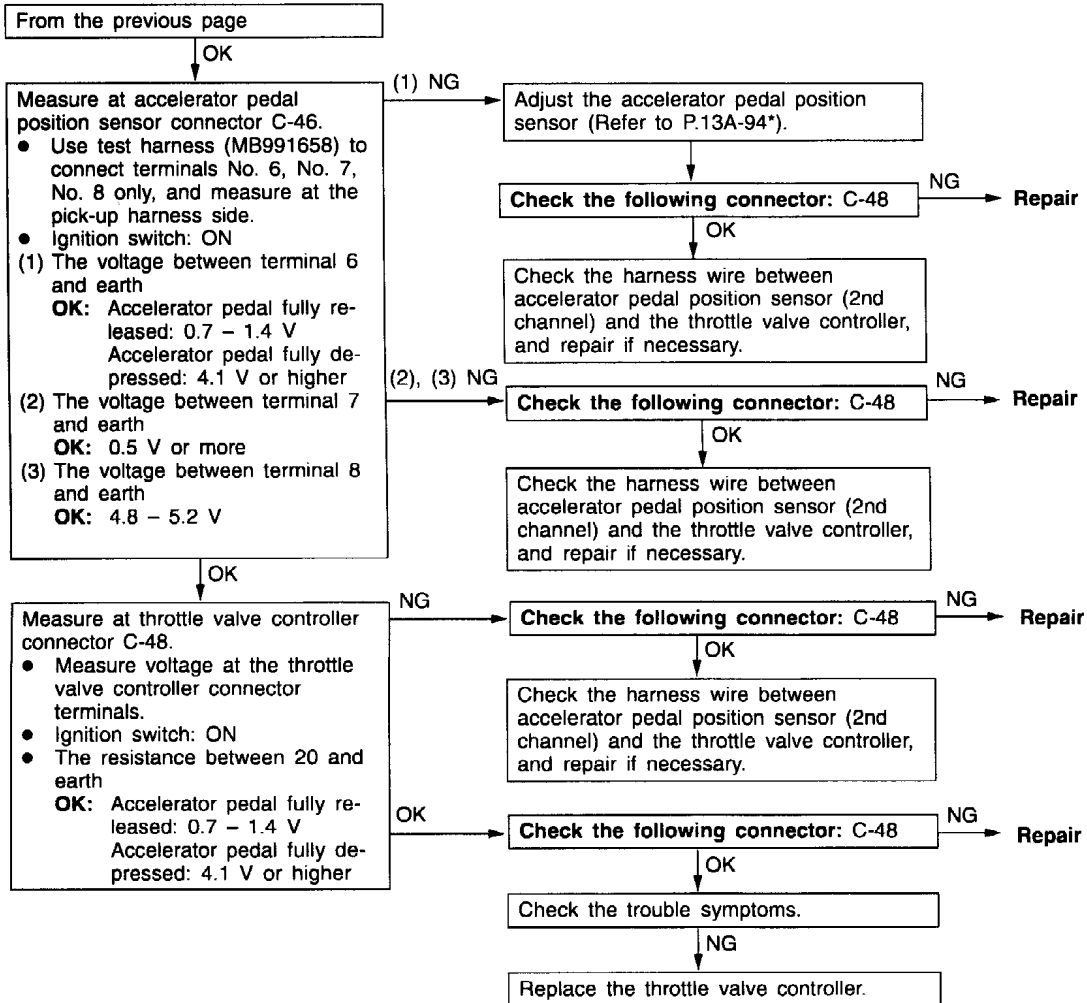
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P1225 Accelerator pedal position sensor (2nd channel) system	Probable cause
Range of Check - Accelerator pedal position sensor (2nd channel) is normal. - Communication between the engine-ECU and the throttle valve controller is normal. Set Conditions - Output voltage of the accelerator pedal position sensor (2nd channel) is 0.2 V or less for one second or - Output voltage of the accelerator pedal position sensor (1st channel) is 2.5 V or less, and output voltage of the accelerator pedal position sensor (2nd channel) is 4.5 V or more for one second. or - Difference between the accelerator pedal position sensor (1st and 2nd channels) output voltages exceeds 1.0 V (i.e. when the throttle valve opening angle changes slightly).	- Malfunction of accelerator pedal position sensor (2nd channel) - Open or short circuit in accelerator pedal position sensor (2nd channel) circuit or loose connector contact - Malfunction of the throttle valve controller - Malfunction of engine-ECU

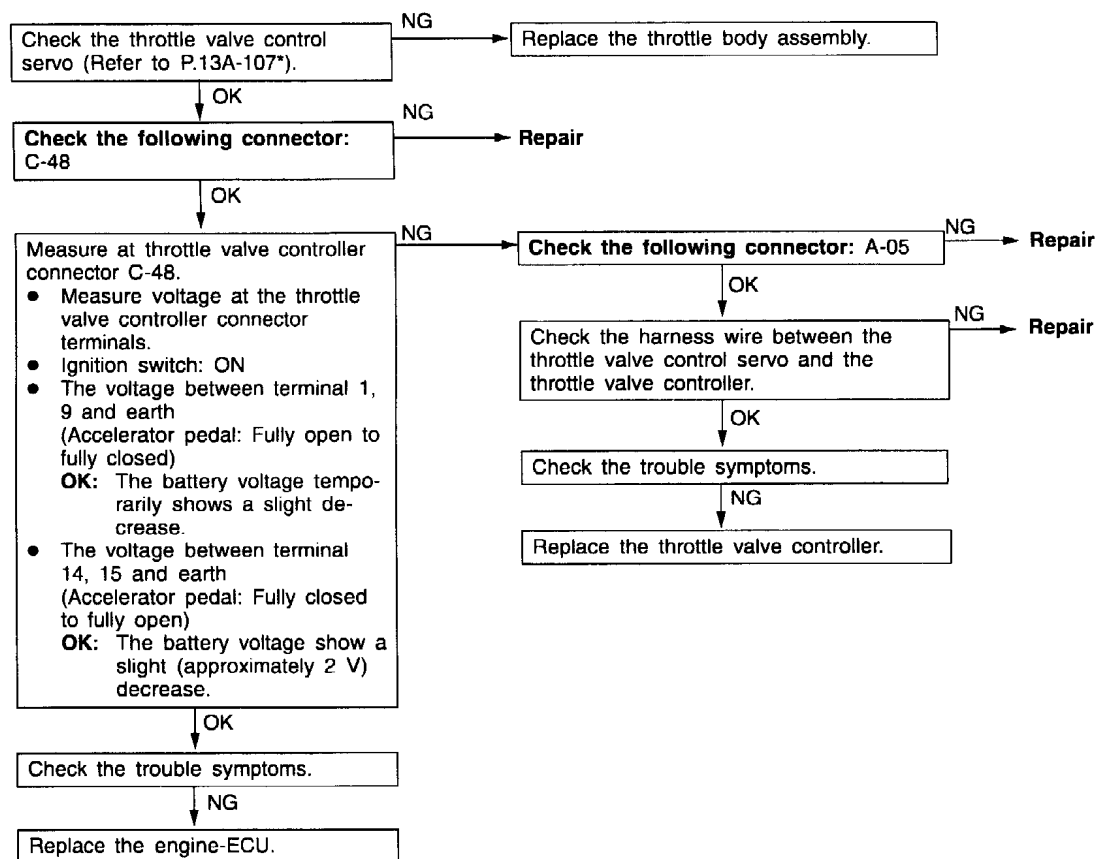


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)



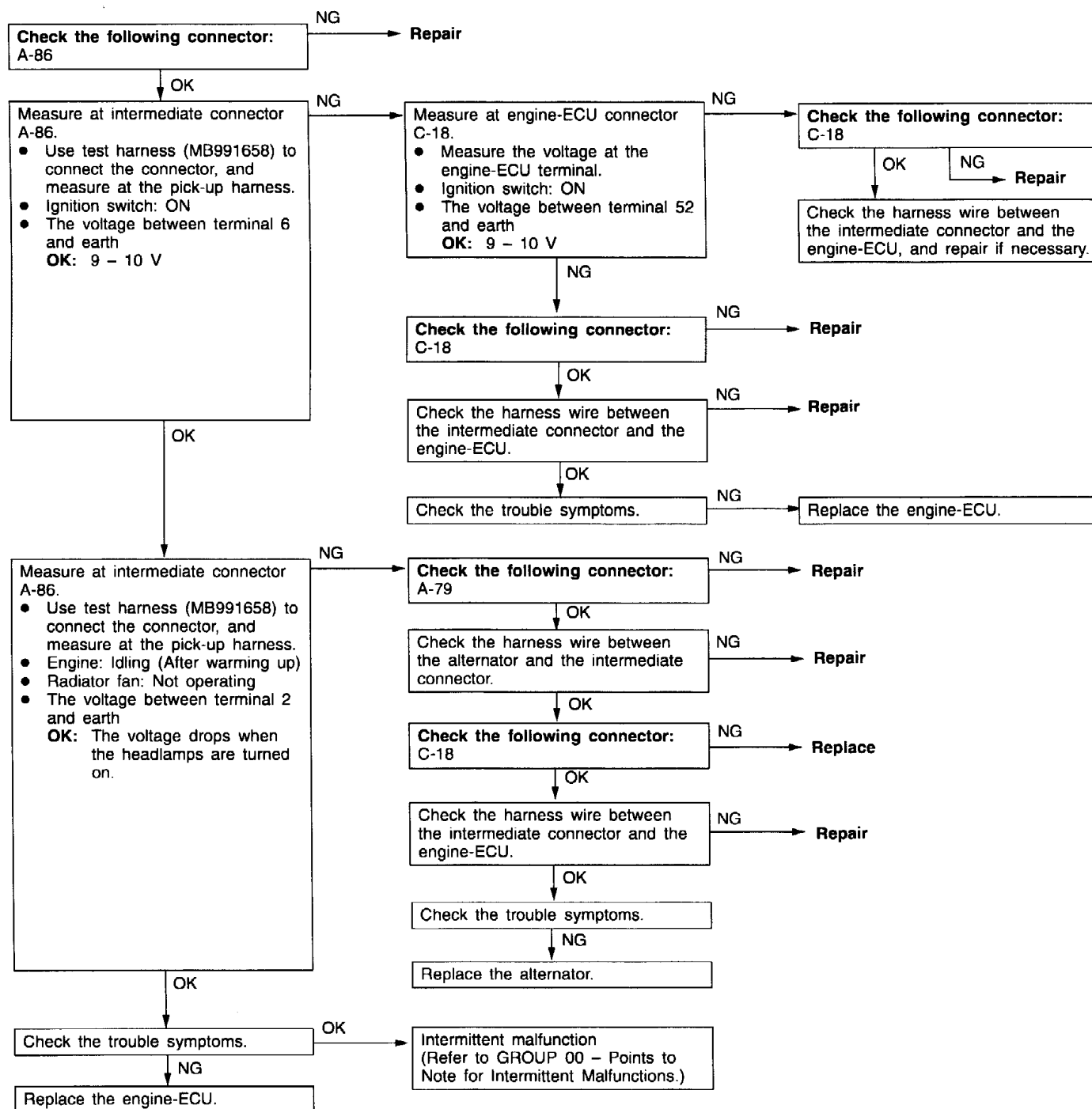
Code No. P1228 Throttle valve control servo (Motor 2nd phase malfunction) system	Probable cause
Range of Check - Throttle valve control servo relay: ON - System voltage: 8 V or more Set Conditions - Throttle valve control servo drive circuit is shorted to earth. - Other power source interferes with throttle valve control servo drive circuit. - Throttle valve control servo drive circuit is open-circuit.	- Malfunction of the throttle valve control servo - Open circuit or short-circuited harness wire in throttle valve control servo system, or poor connector contact - Malfunction of the throttle valve controller



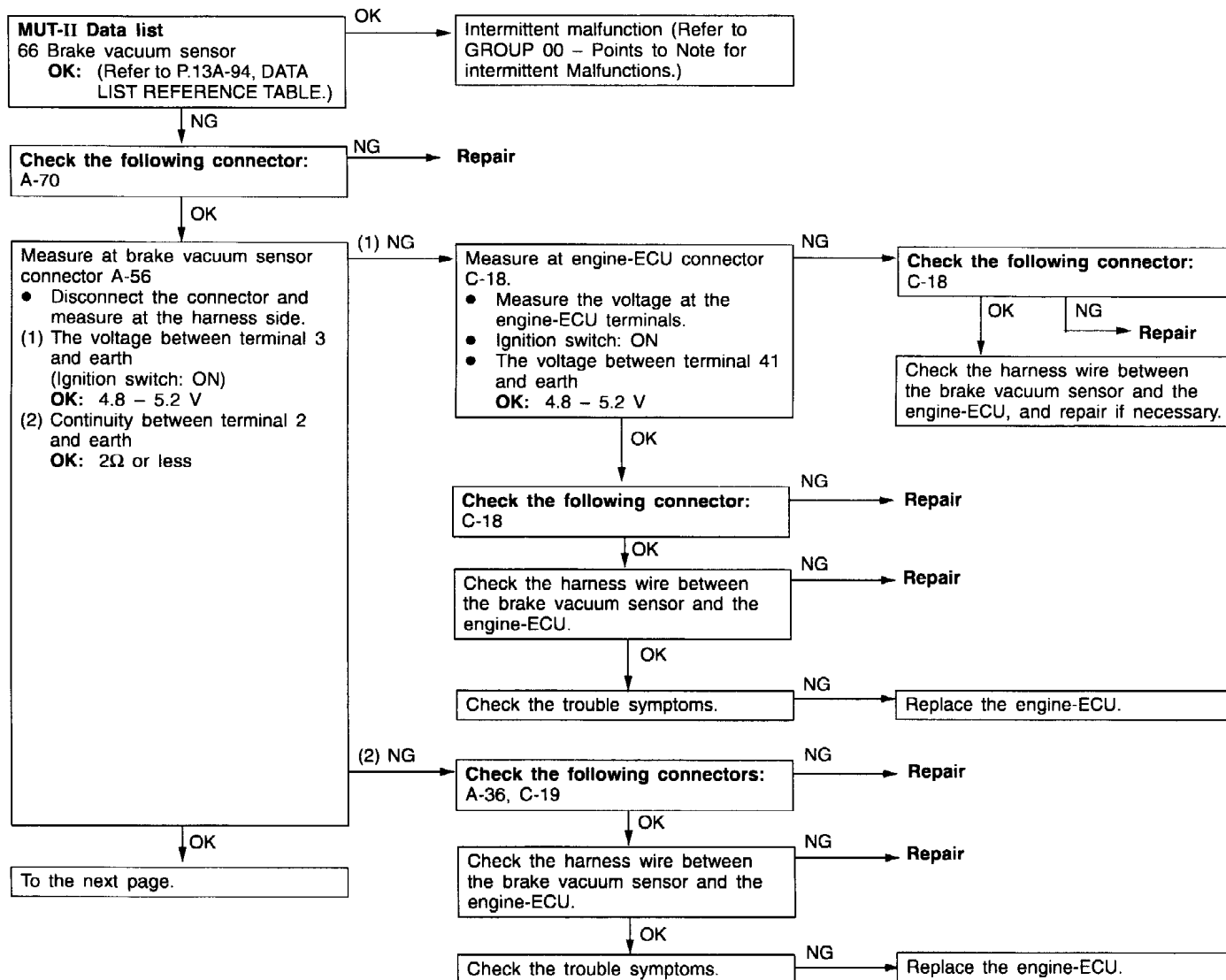
NOTE

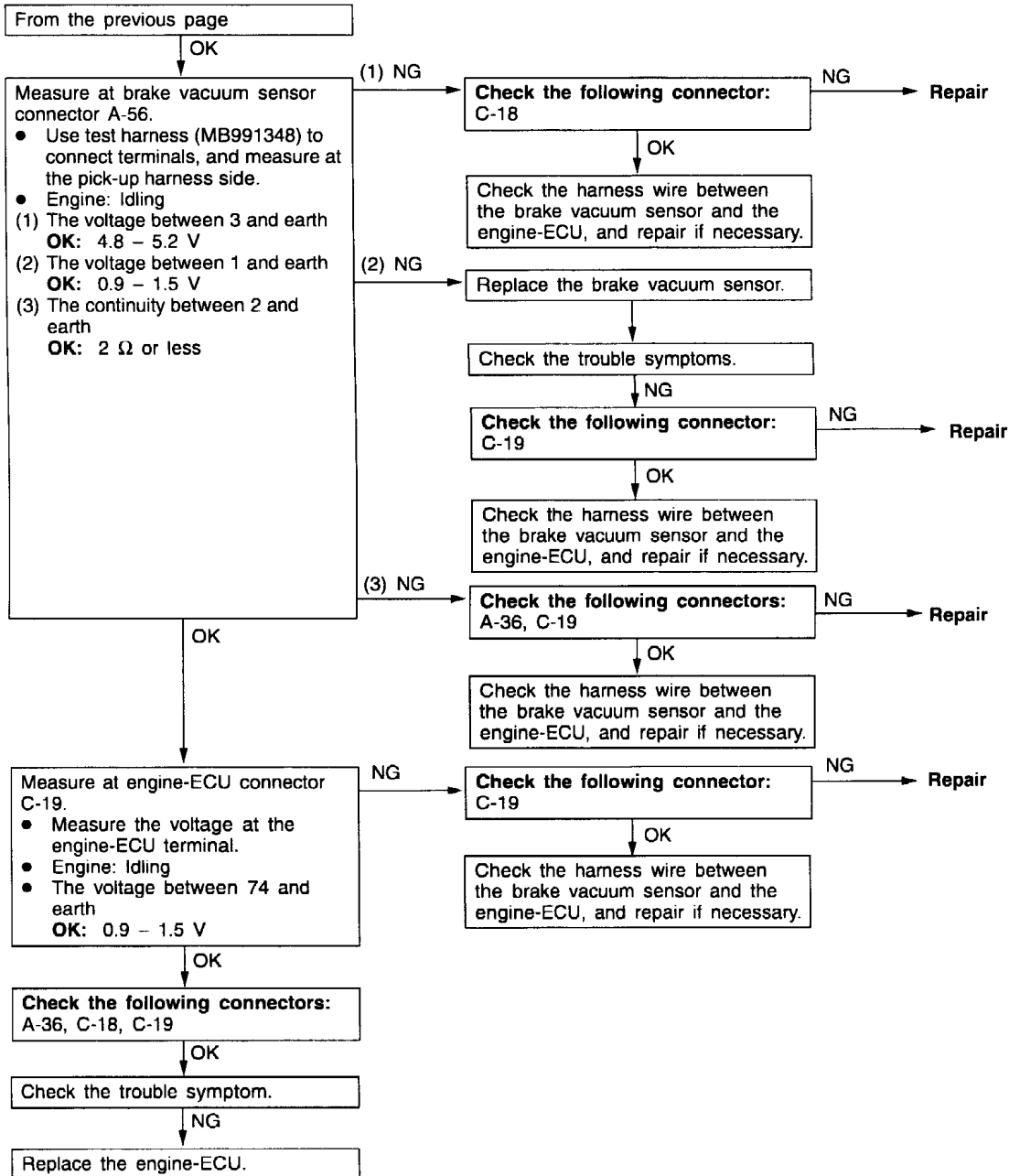
*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

Code No. P1500 Alternator FR terminal system	Probable cause
Range of Check • Engine speed: 50 r/min or more Set Conditions • Input voltage from the alternator FR terminal is system voltage for 20 seconds.	• Open circuit in alternator FR terminal circuit • Malfunction of engine-ECU

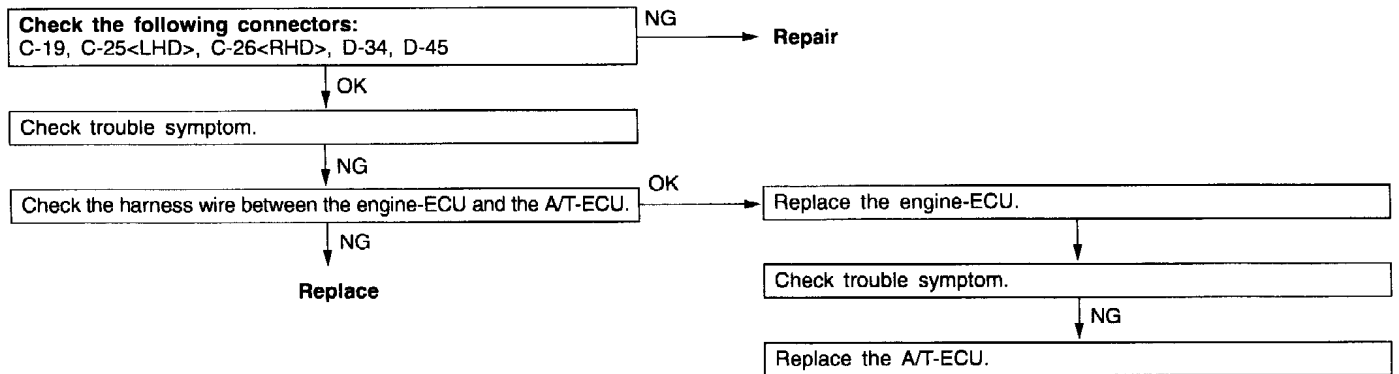


Code No. P1515 Brake vacuum sensor system	Probable cause
Range of Check • Ignition switch: ON Set Conditions • Sensor output voltage is 4.8 V or more. or • Sensor output voltage is 0.2 V or less.	• Malfunction of the brake vacuum sensor • Improper connector contact, open circuit or short-circuited harness wire of the brake vacuum sensor • Malfunction of the engine-ECU





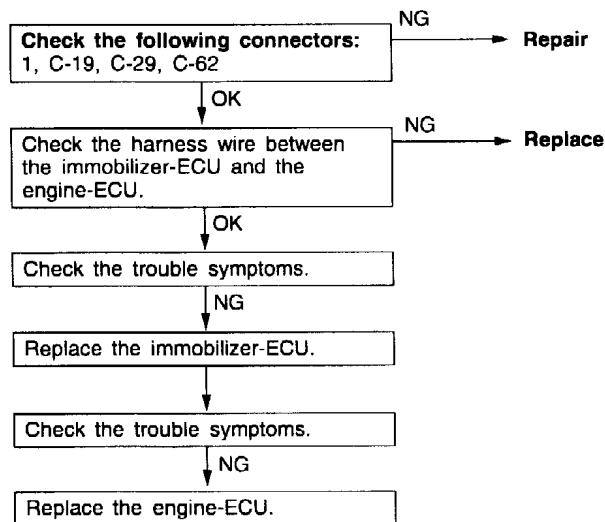
Cord No. P1600 Communication wire with A/T-ECU system	Probable cause
Range of Check • After 60 seconds have passed since the engine have started Set Conditions • Torque reduction request signal from A/T-ECU is input continuously for 1.5 seconds or more.	• Short circuit in ECU communication circuit • Malfunction of the engine-ECU • Malfunction of the A/T-ECU



Cord No. P1610 Immobilizer system	Probable cause
Range of Check • Ignition switch: ON Set Conditions • Improper communication between the engine-ECU and the immobilizer-ECU	• Open or short circuit, or loose connector contact • Malfunction of the immobilizer-ECU • Malfunction of the engine-ECU

NOTE

- (1) If the registered ignition keys are close each other when starting the engine, radio interference may cause this code to be displayed.
- (2) This code may be displayed when registering the key ID code.



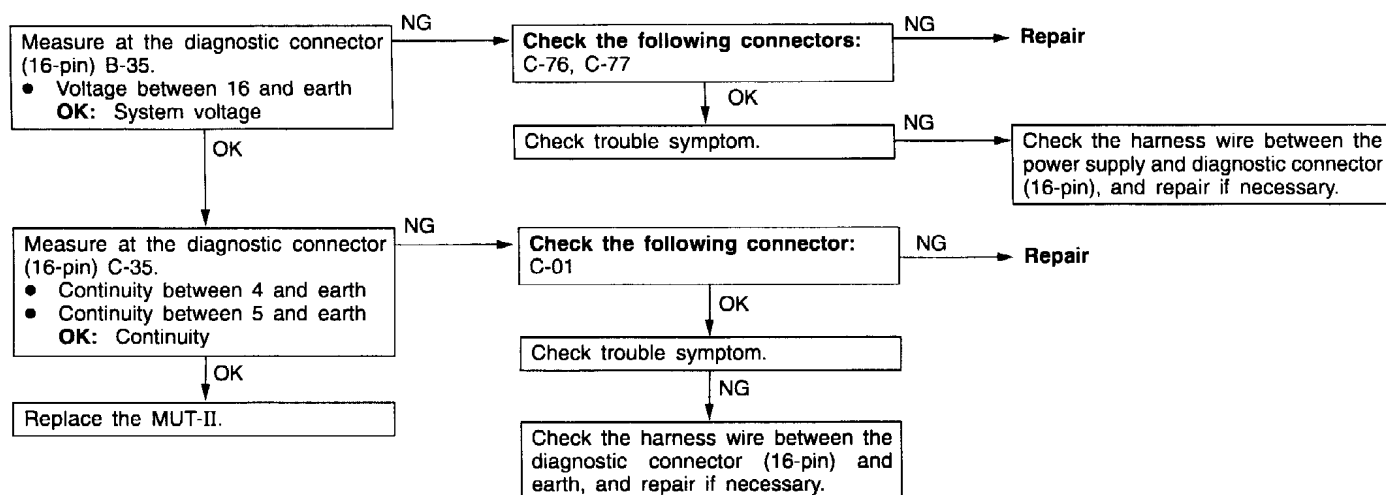
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13A-66
	Communication with engine-ECU only is not possible.	2	13A-66
Engine warning lamp and related parts	The engine warning lamp does not illuminate right after the ignition switch is turned to the ON position.	3	13A-67
	The engine warning lamp remains illuminating and never goes out.	4	13A-67
Starting	No initial combustion (starting impossible)	5	13A-78
	Initial combustion but no complete combustion (starting impossible)	6	13A-70
	Long time to start (improper starting)		
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	7	13A-71
	Idling speed is high. (Improper idling speed)	8	13A-73
	Idling speed is low. (Improper idling speed)		
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	9	13A-74
	When the engine is hot, it stalls at idling. (Die out)	10	13A-75
	The engine stalls when starting the car. (Pass out)	11	13A-77
	The engine stalls when decelerating.	12	13A-78
Driving	Hesitation, sag or stumble	13	13A-79
	Poor acceleration		
	Surge		
	The feeling of impact or vibration when accelerating	14	13A-80
	The feeling of impact or vibration when decelerating	15	13A-81
	Knocking	16	13A-81
Dieseling		17	13A-81
Too high CO and HC concentration when idling		18	13A-82
Low alternator output voltage (approx. 12.3 V)		19	13A-83
Fans (radiator fan, A/C condenser fan) are inoperative		20	13A-84
GDI ECO indicator lamp system	GDI ECO indicator lamp does not illuminate.	21	13A-85
	GDI ECO indicator lamp remains illuminated and does not go off.	22	13A-85

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

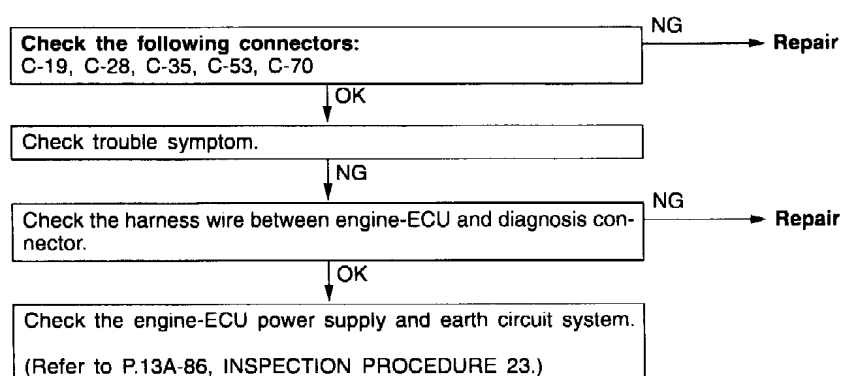
INSPECTION PROCEDURE 1

Communication with MUT-II is not possible. (Communication with all systems is not possible.)	Probable cause
The cause is probably a defect in the power supply system (including earth) for the diagnosis line.	• Malfunction of the connector • Malfunction of the harness wire • Malfunction of MUT-II



INSPECTION PROCEDURE 2

MUT-II communication with engine-ECU (engine-A/T-ECU) is impossible.	Probable cause
One of the following causes may be suspected. • No power supply to engine-ECU • Defective earth circuit of engine-ECU • Defective engine-ECU • Improper communication line between engine-ECU and MUT-II	• Malfunction of engine-ECU power supply circuit • Malfunction of engine-ECU • Open circuit between the engine-ECU and diagnosis connector



NOTE

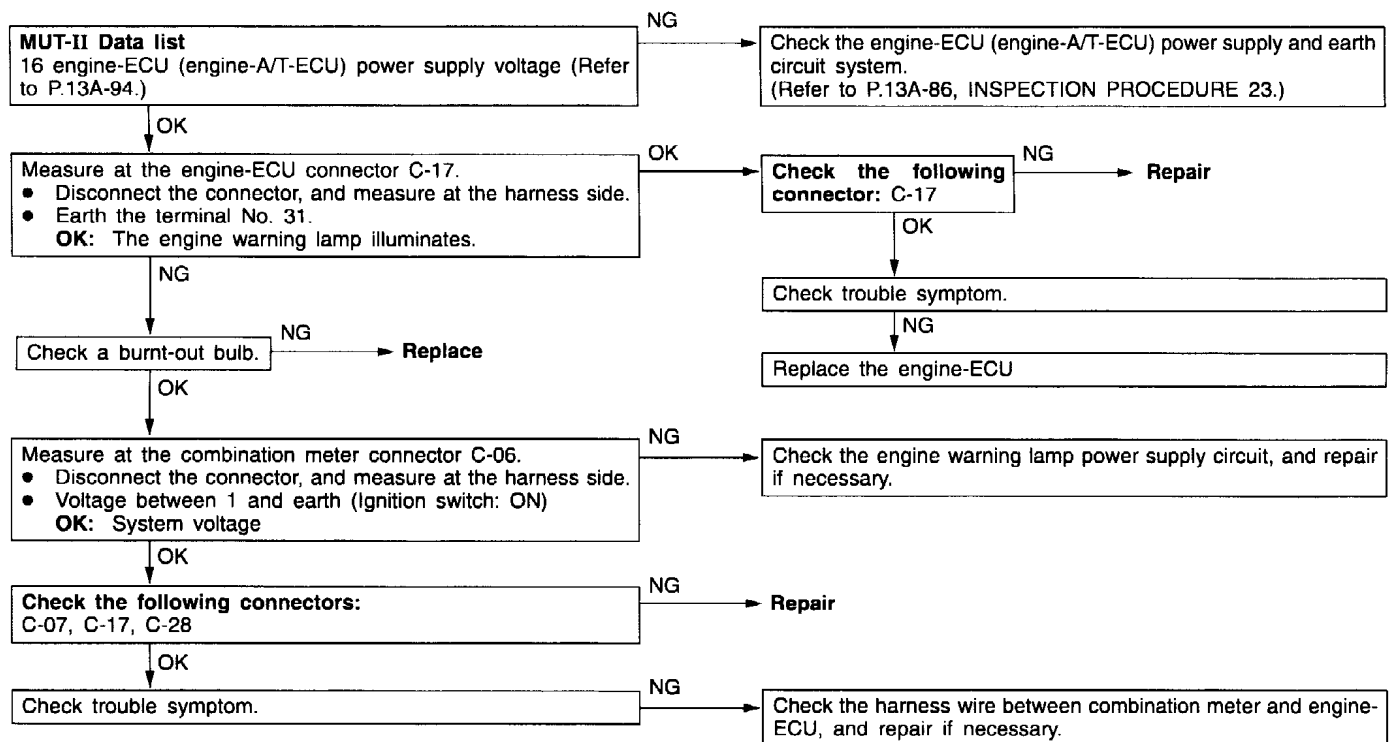
On vehicles with multi center display, if a malfunction cannot be resolved after the procedure above, check the multi center display and replace if necessary. (Refer to GROUP 54 – Multi Center display.)

INSPECTION PROCEDURE 3

The engine warning lamp does not illuminate right after the ignition switch is turned to the ON position.**Probable cause**

Because there is a burnt-out bulb, the engine-ECU <M/T> or engine-A/T-ECU <A/T> causes the engine warning lamp to illuminate for five seconds immediately after the ignition switch is turned to ON. If the engine warning lamp does not illuminate immediately after the ignition switch is turned to ON, one of the malfunctions listed at right has probably occurred.

- Burnt-out bulb
- Defective warning lamp circuit
- Malfunction of the engine-ECU <M/T>
- Malfunction of the engine-A/T-ECU <A/T>

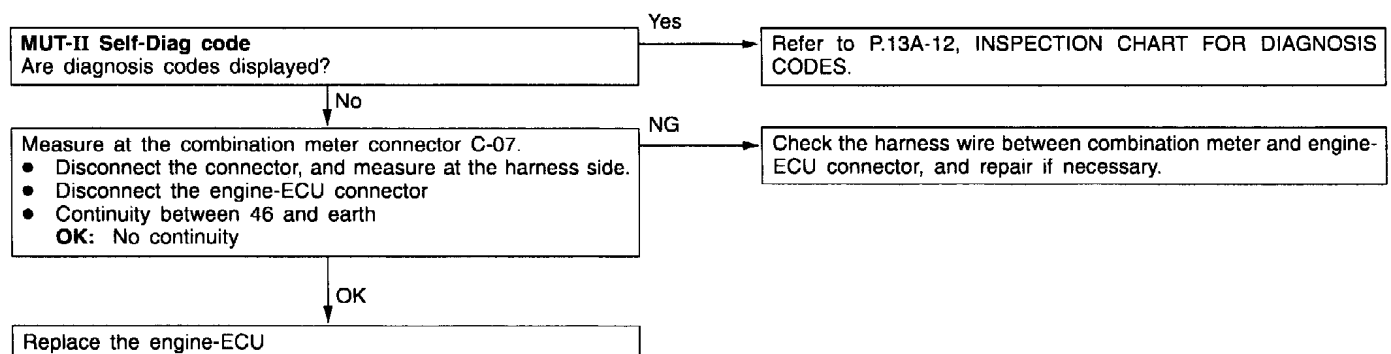


INSPECTION PROCEDURE 4

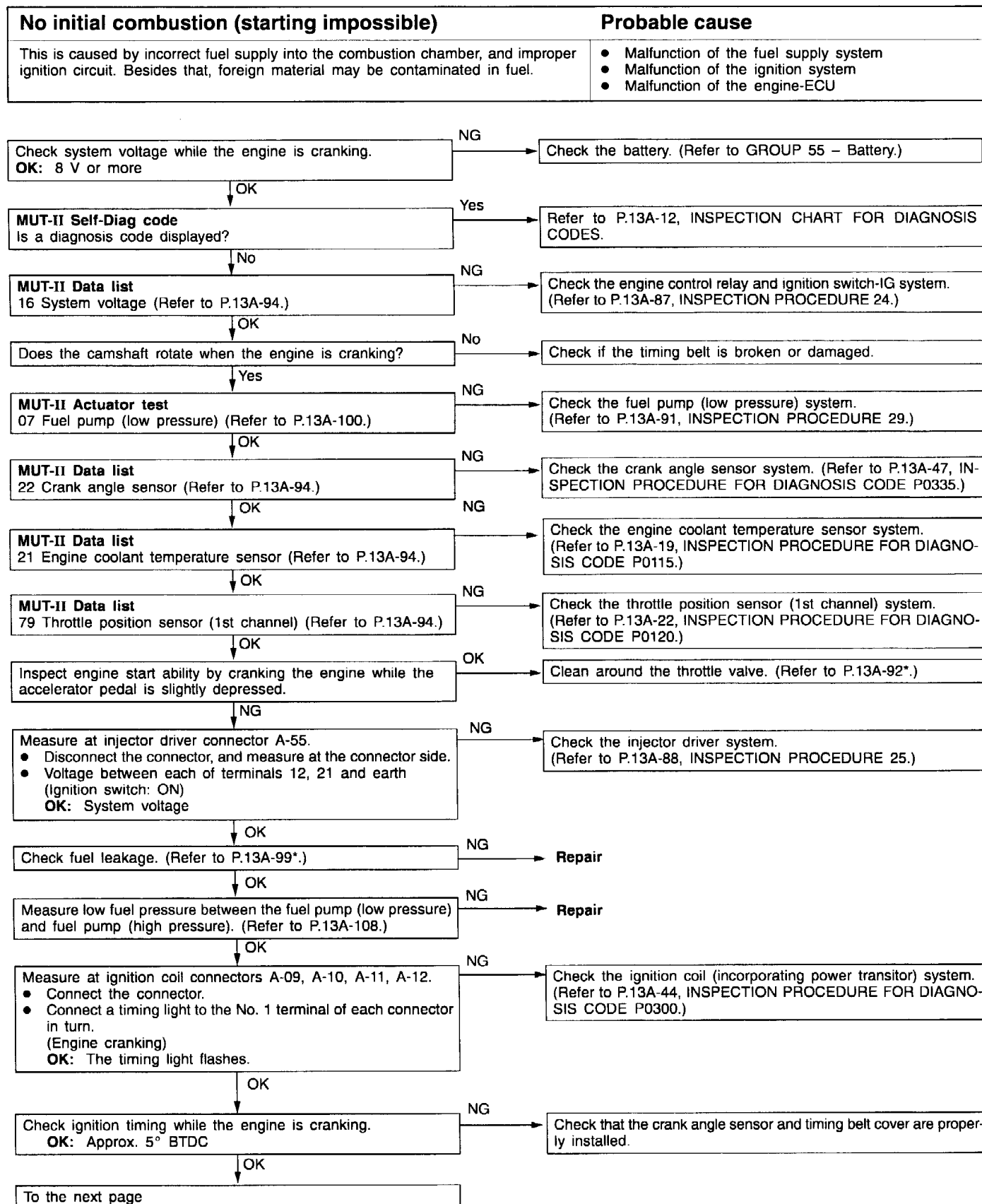
The engine warning lamp remains illuminating and never goes out.**Probable cause**

In cases such as the above, the cause is probably that the engine-ECU is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has occurred.

- Short-circuit between the engine warning lamp and engine-ECU
- Malfunction of the engine-ECU

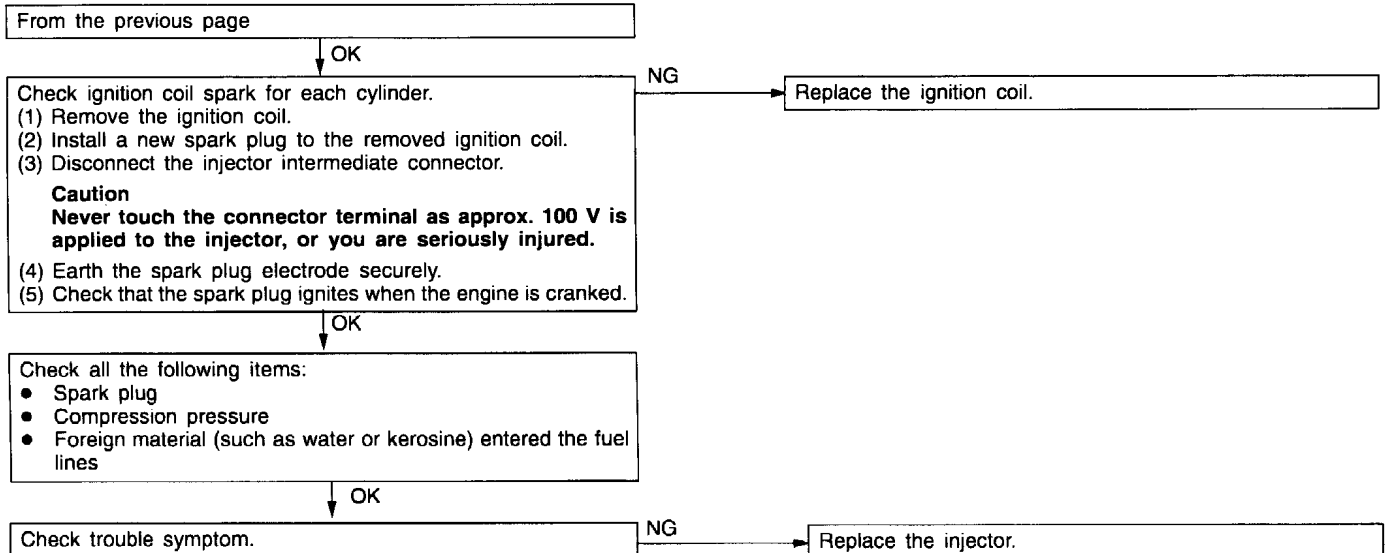


INSPECTION PROCEDURE 5



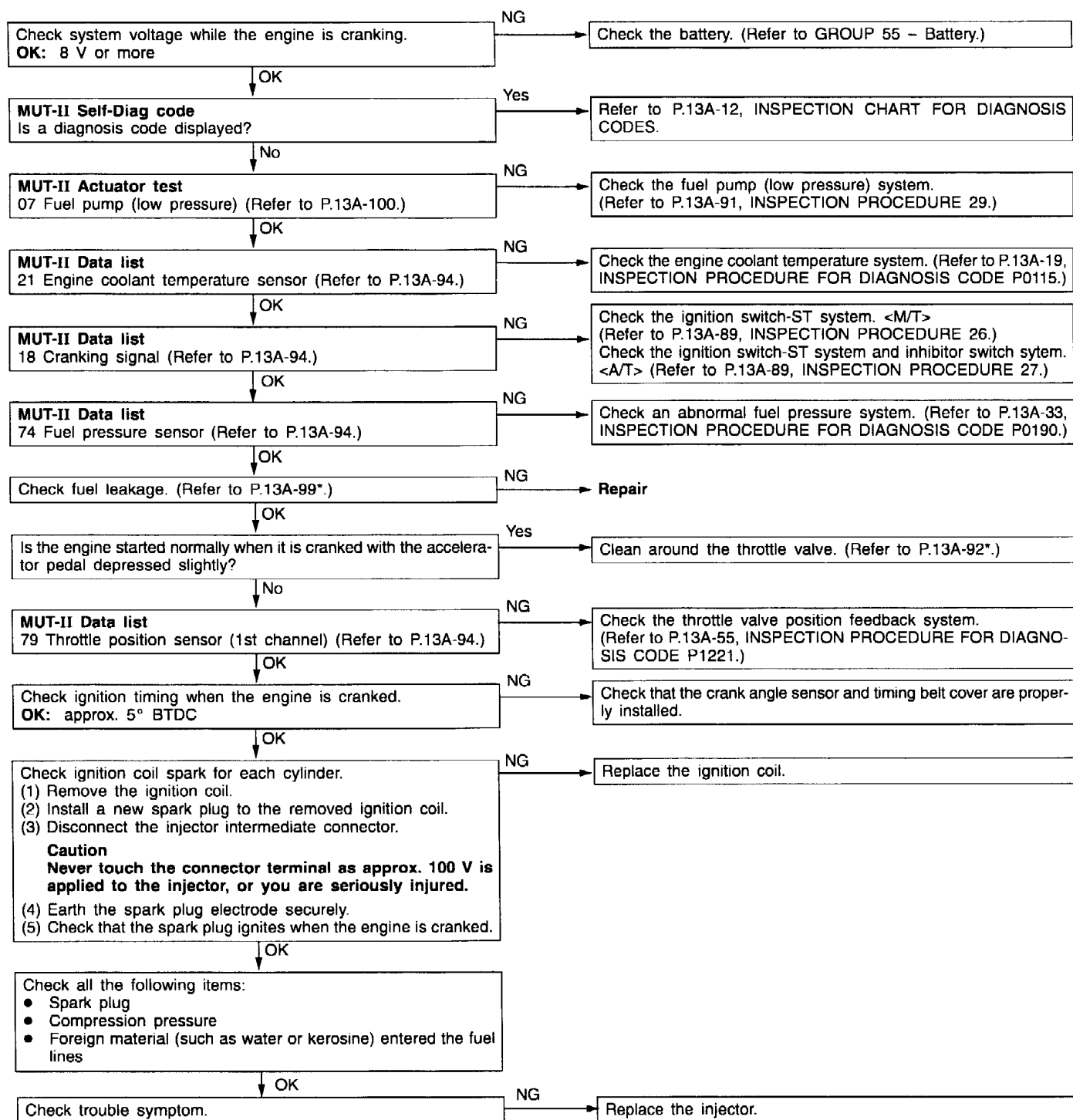
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)



INSPECTION PROCEDURE 6

Initial combustion takes place, but does not complete (start impossible), too long time to start (poor start)	Probable cause
This may be caused by improper spark plug ignition (poor spark), improper mixture during engine cranking, improper fuel pressure.	• Malfunction of the fuel supply system • Malfunction of the fuel pressure sensor • Malfunction of the ignition system • Malfunction of the electronic-controlled throttle valve system • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>

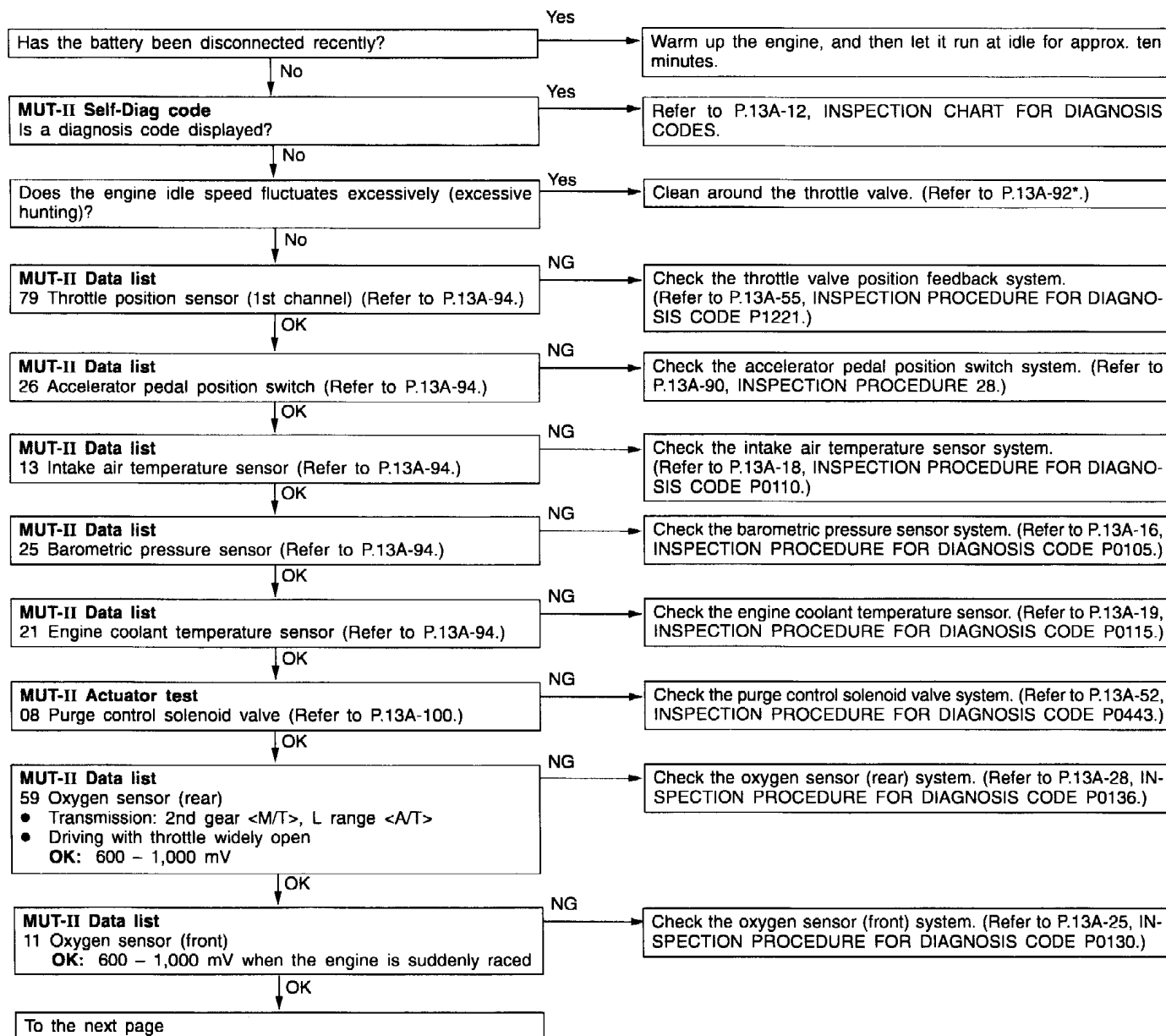


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

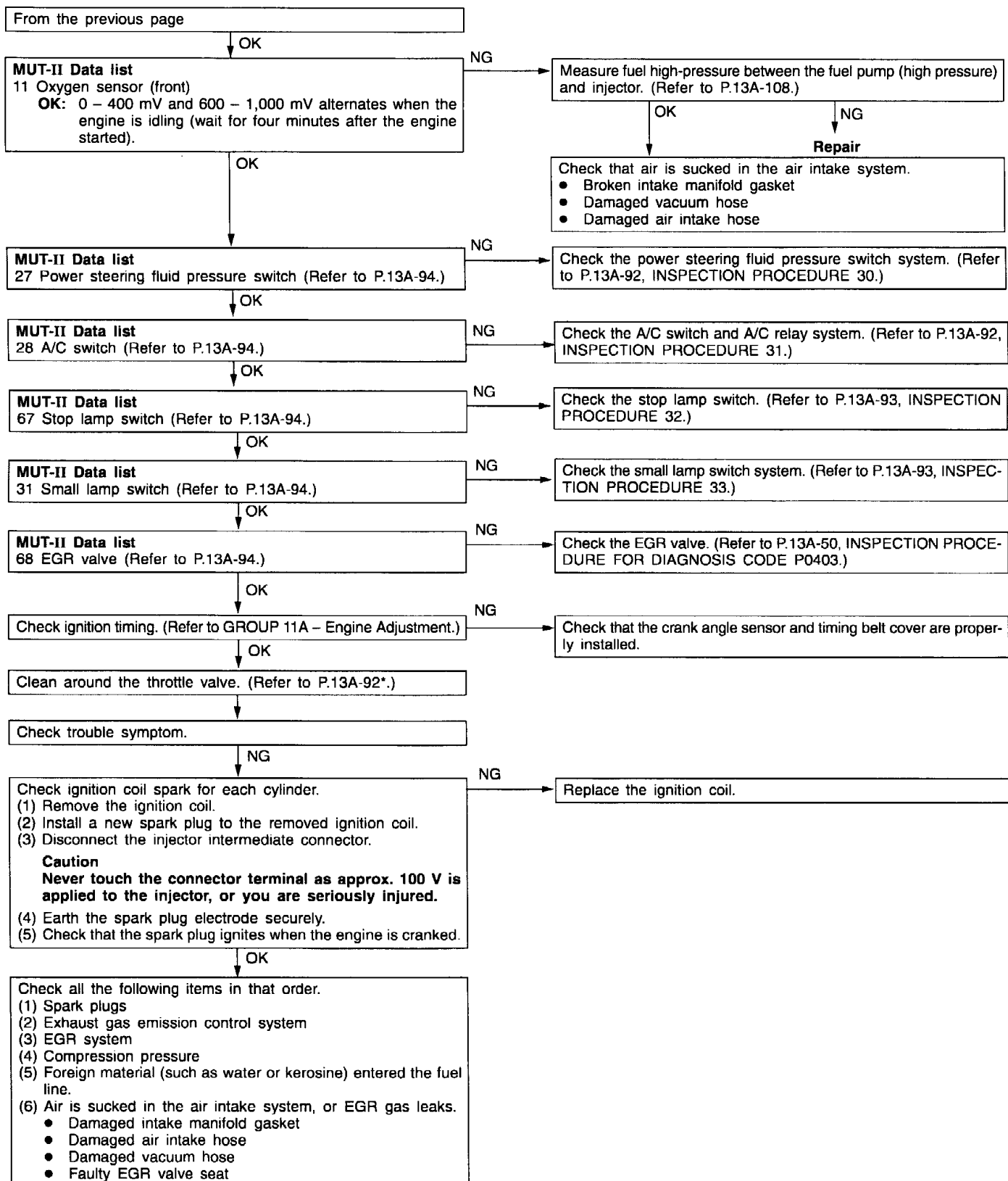
INSPECTION PROCEDURE 7

Unstable idling (rough idle, hunting)	Probable cause
This malfunction is probably caused by a faulty ignition system, improper air/fuel ratio, a faulty electronic-controlled throttle valve system, improper compression pressure, etc. As many causes can be suspected, diagnose from easier items.	• Malfunction of the ignition system • Malfunction of the air/fuel ratio control system • Malfunction of the electronic-control throttle valve system • Improper compression pressure • Air sucking into the air intake system



NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

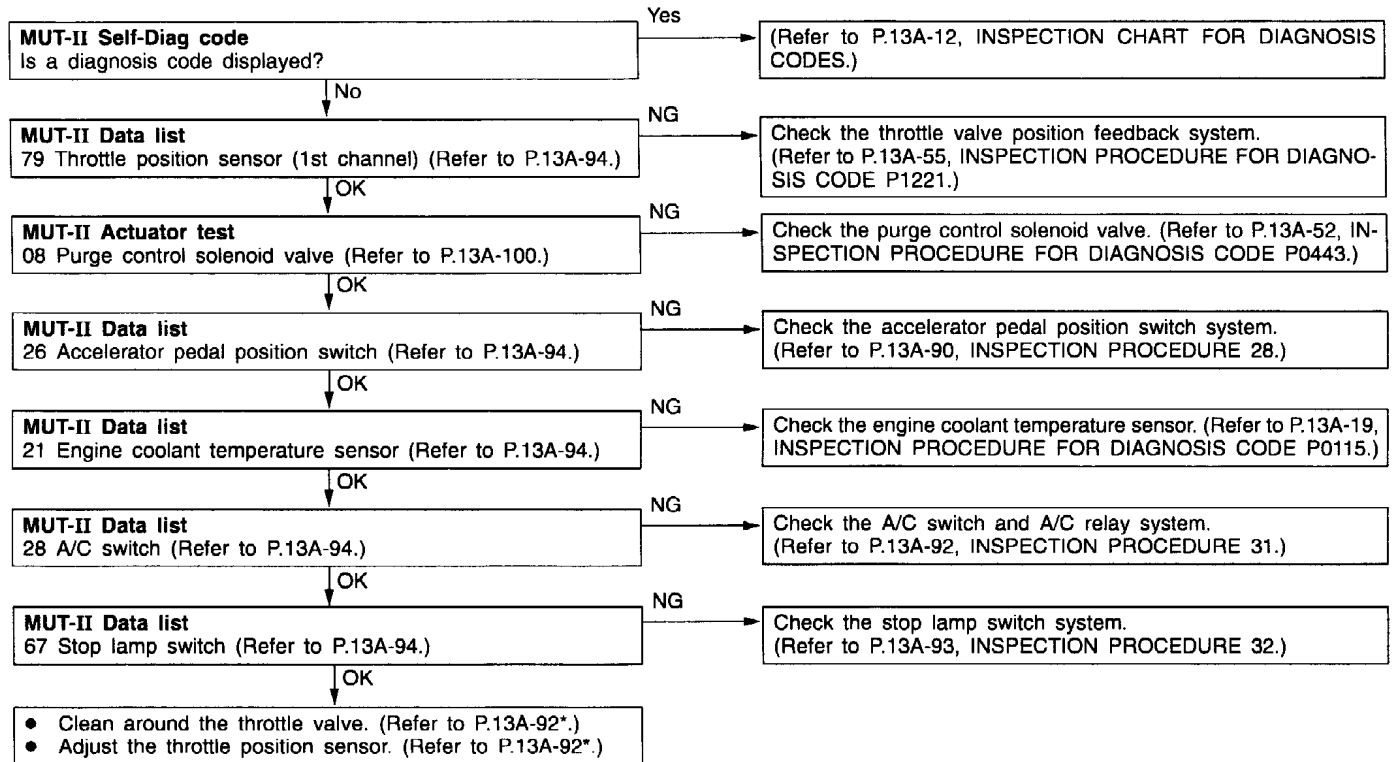


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 8

Idle speed is high or low (Improper idling)	Probable cause
The cause is probably that the intake air amount during idling is too great or too small.	- Malfunction of the electronic-controlled throttle valve system - Malfunction of the throttle body

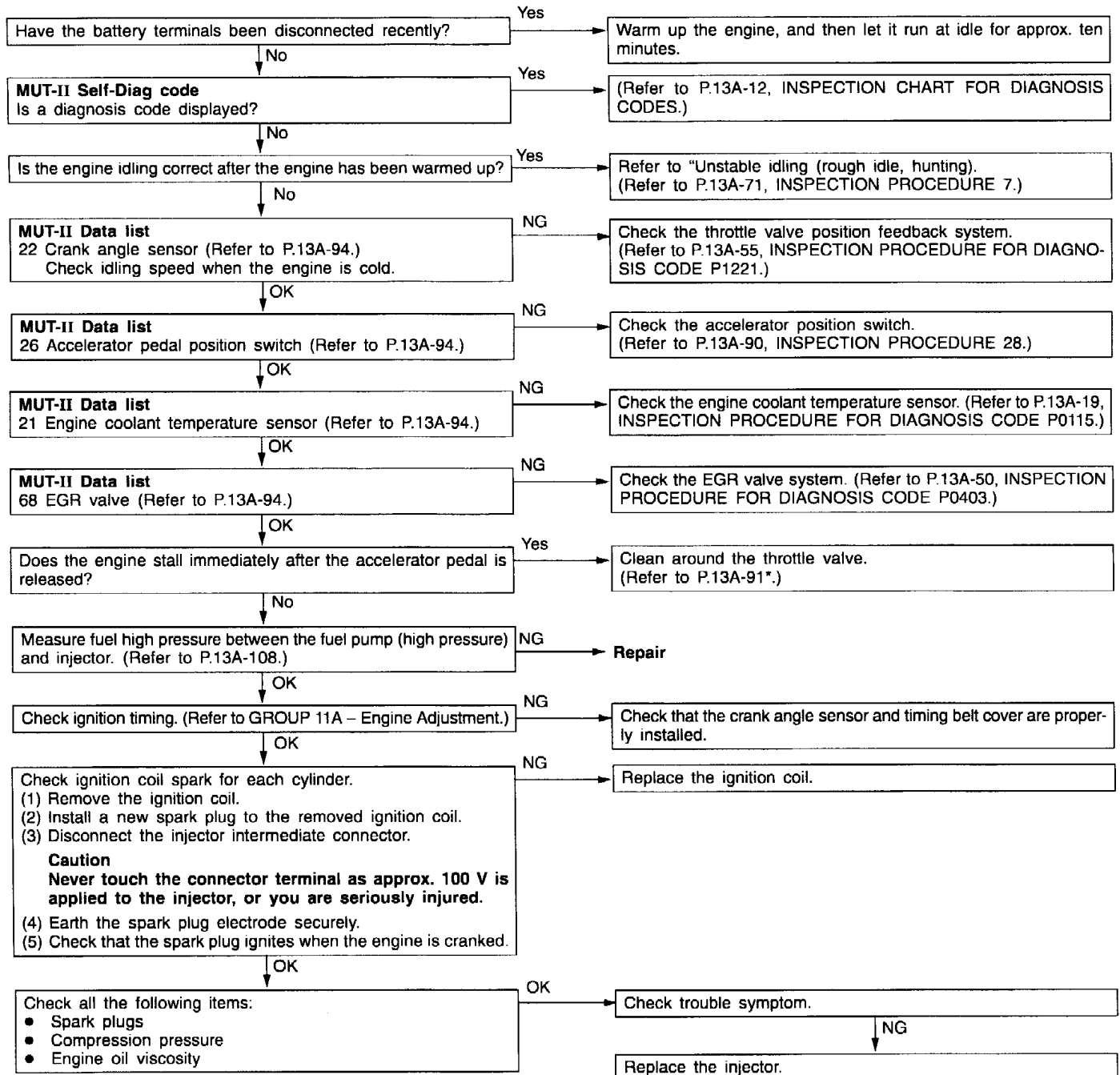


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 9

When the engine is cold, it stalls at idling. (Die out)	Probable cause
The cause is probably an incorrect air/fuel ratio or poor intake air amount when the engine is cold.	- Malfunction of the electronic-control throttle valve system - Malfunction of the throttle body

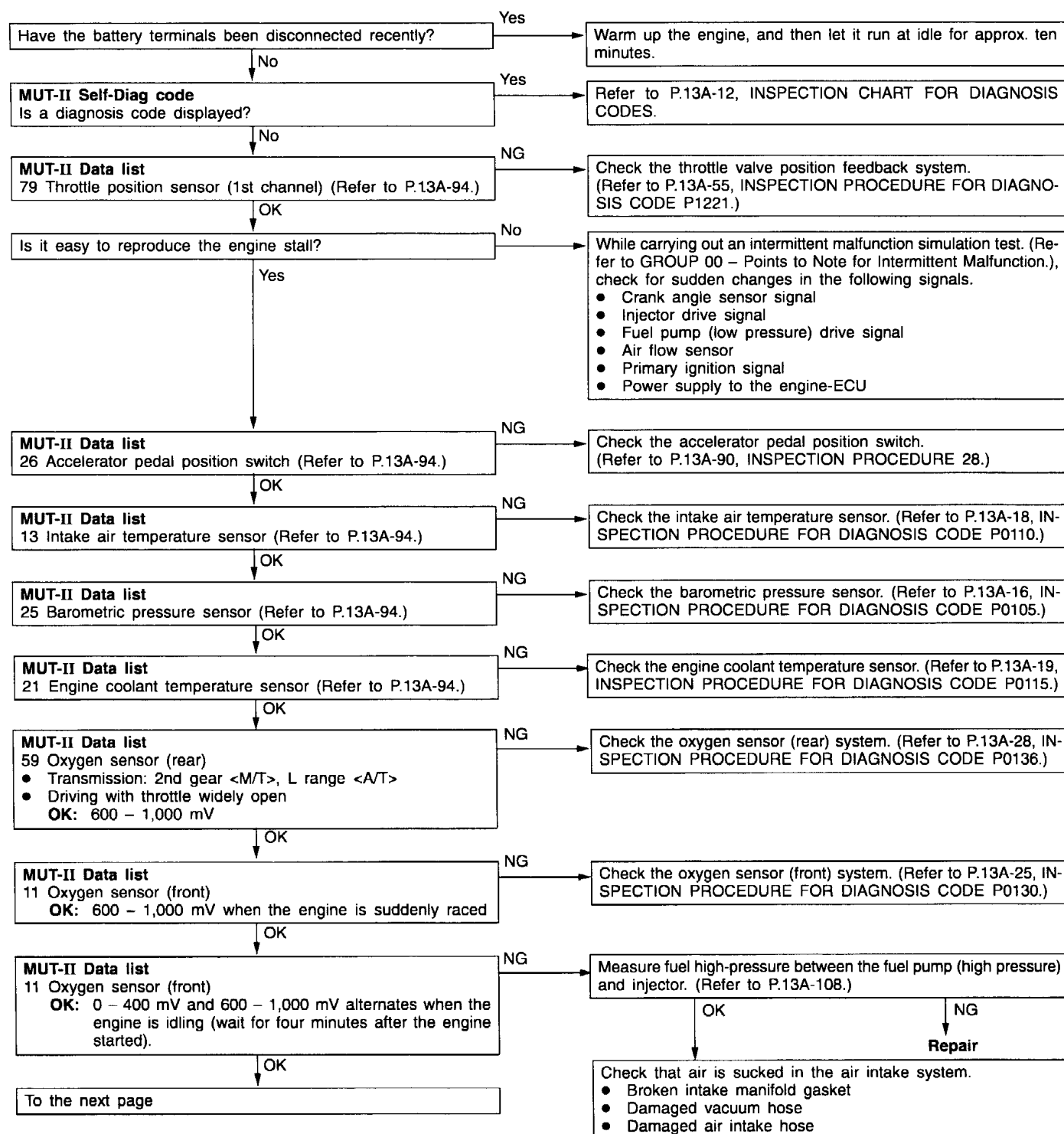


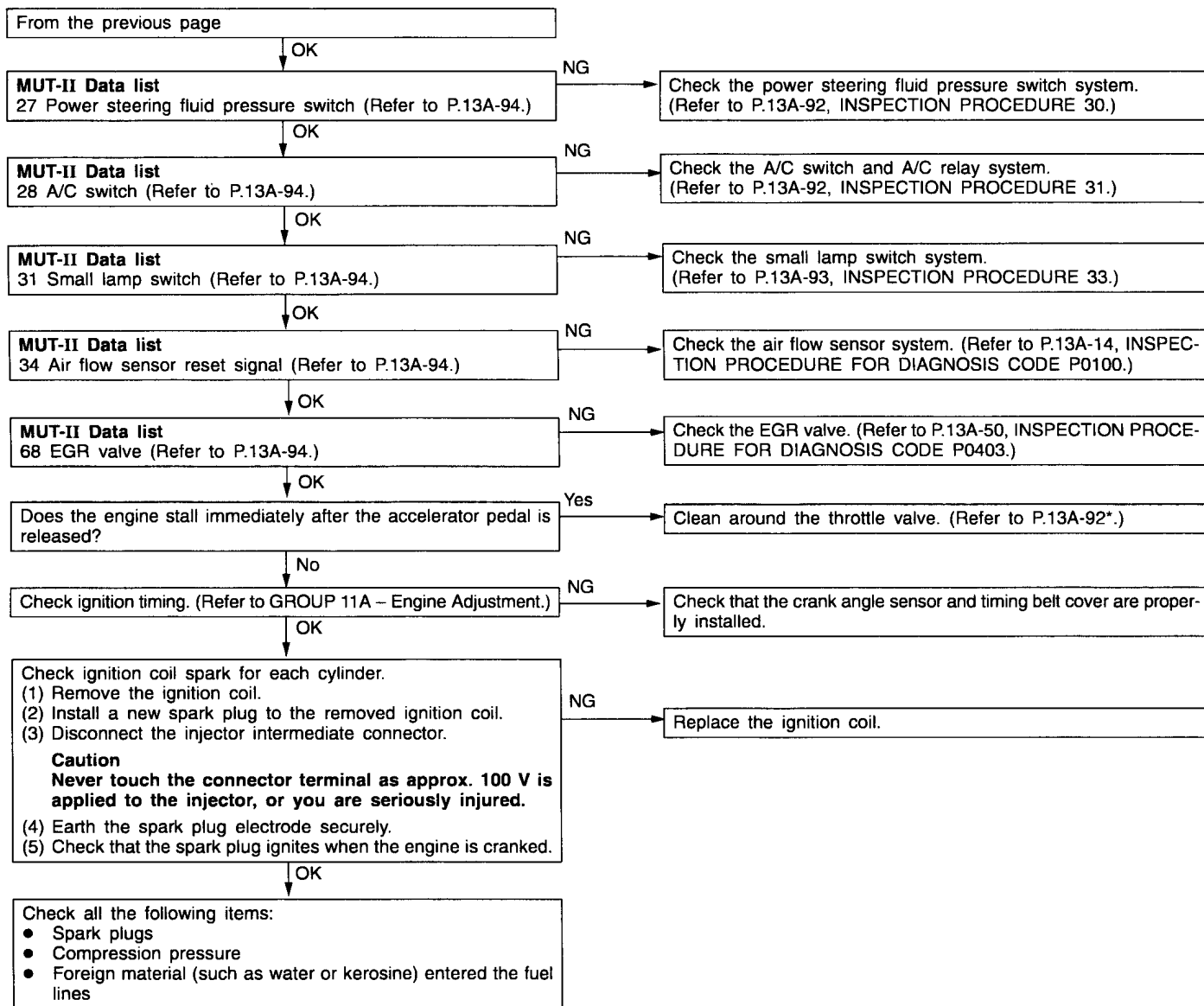
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 10

When the engine is hot, it stalls at idling. (Die out)	Probable cause
The cause is probably an improper air/fuel ratio, faulty electronic-controlled throttle valve system, compression pressure. In addition, if the engine stalls suddenly, another possible cause might be a poor connector contact.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of electronic-controlled throttle valve system • Malfunction of the throttle body • Poor connector contact • Improper compression pressure • Air stuck in the air intake system



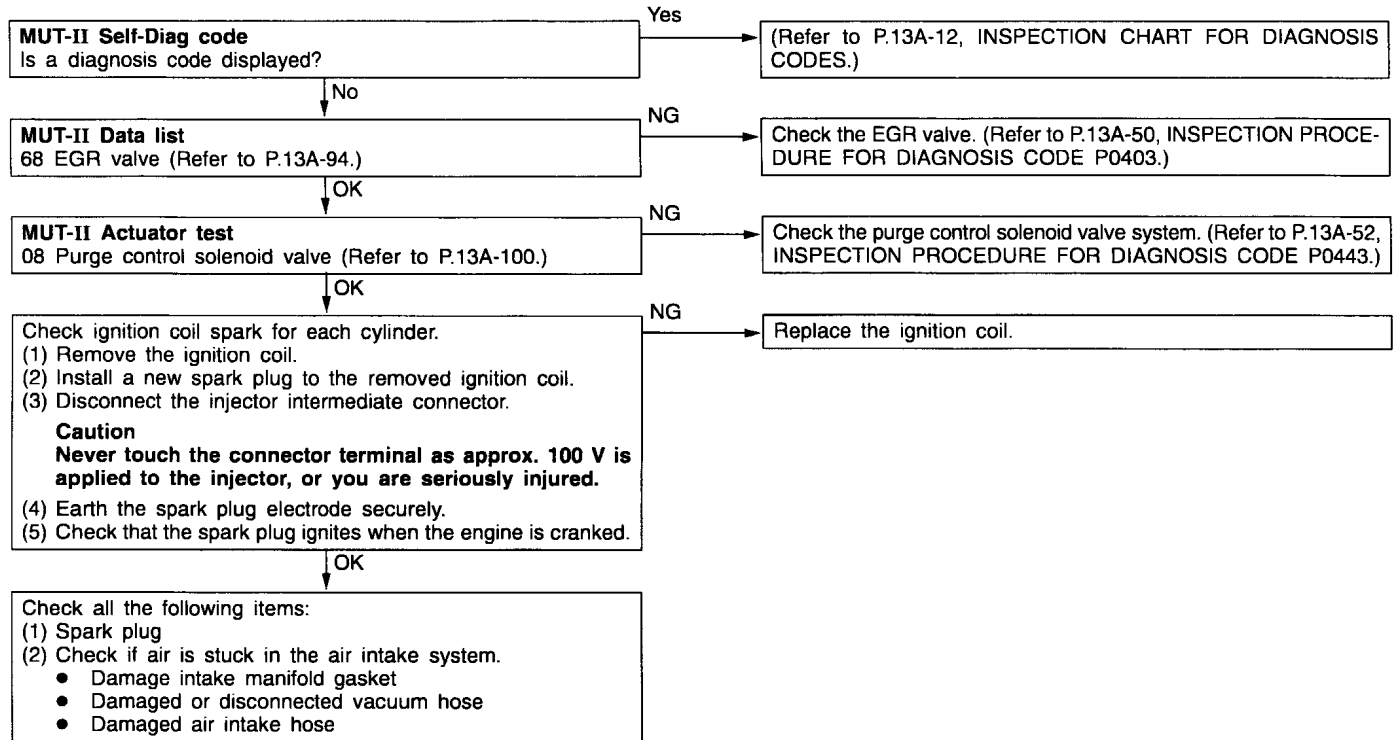


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

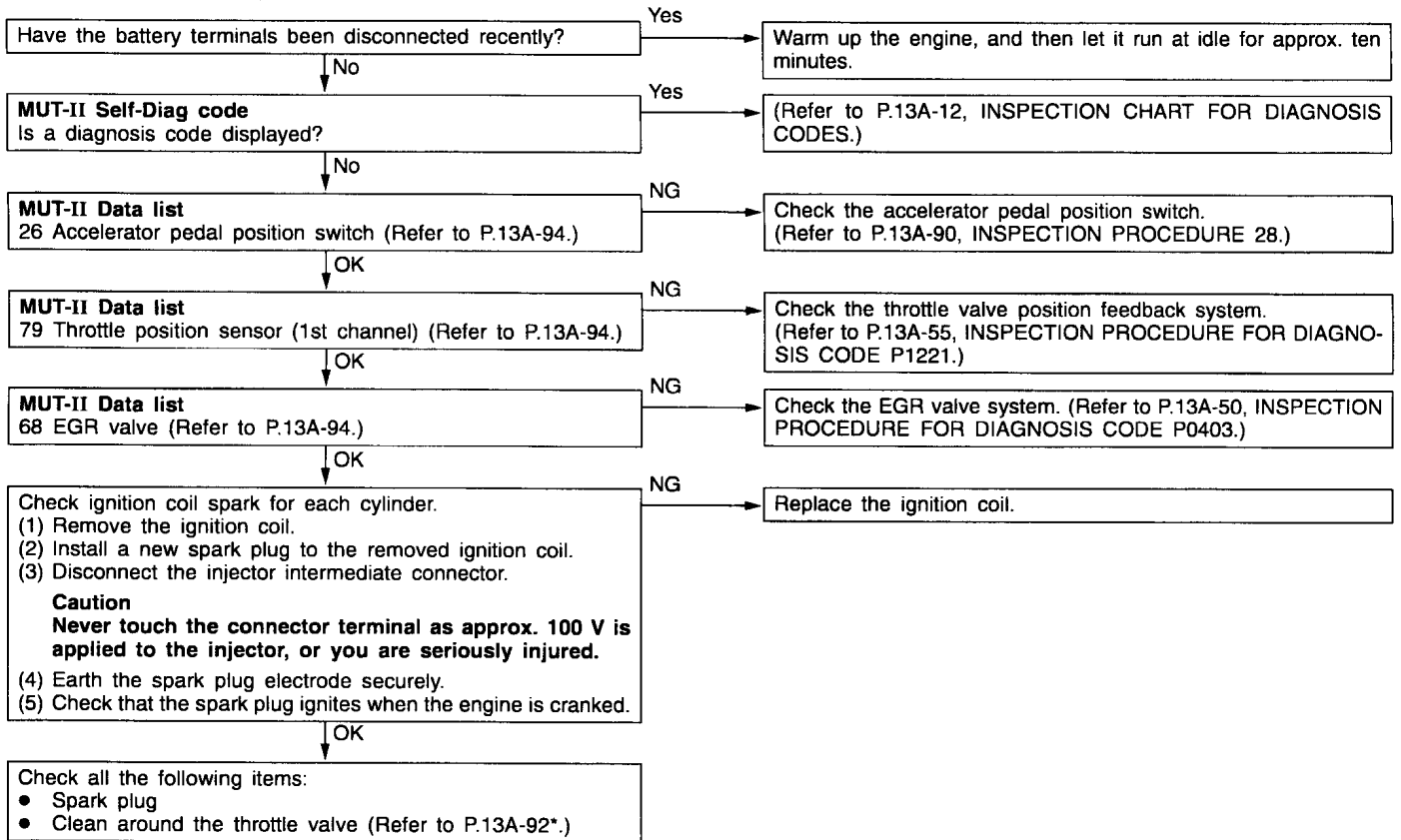
INSPECTION PROCEDURE 11

The engine stalls when starting the car. (Pass out)	Probable cause
The cause is probably poor ignition due to a malfunctioning spark plug (weak spark), or an incorrect air/fuel ratio when the accelerator is depressed.	• Malfunction of the ignition system • Malfunction of the EGR valve • Air stuck in the air intake system



INSPECTION PROCEDURE 12

The engine stalls when decelerating.	Probable cause
The cause is probably an improper air/fuel ratio due to a faulty EGR system, or poor intake air volume due to a faulty electronic-controlled throttle valve system.	• Malfunction of the electronic-controlled throttle valve system • Malfunction of the EGR valve



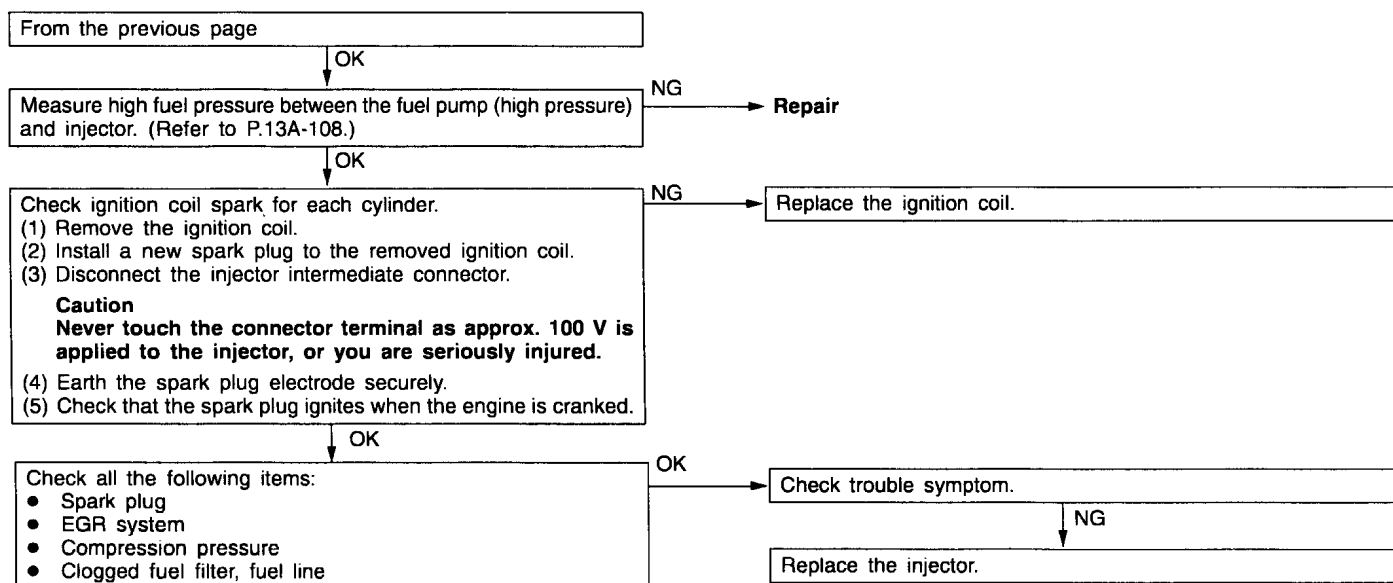
NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 13

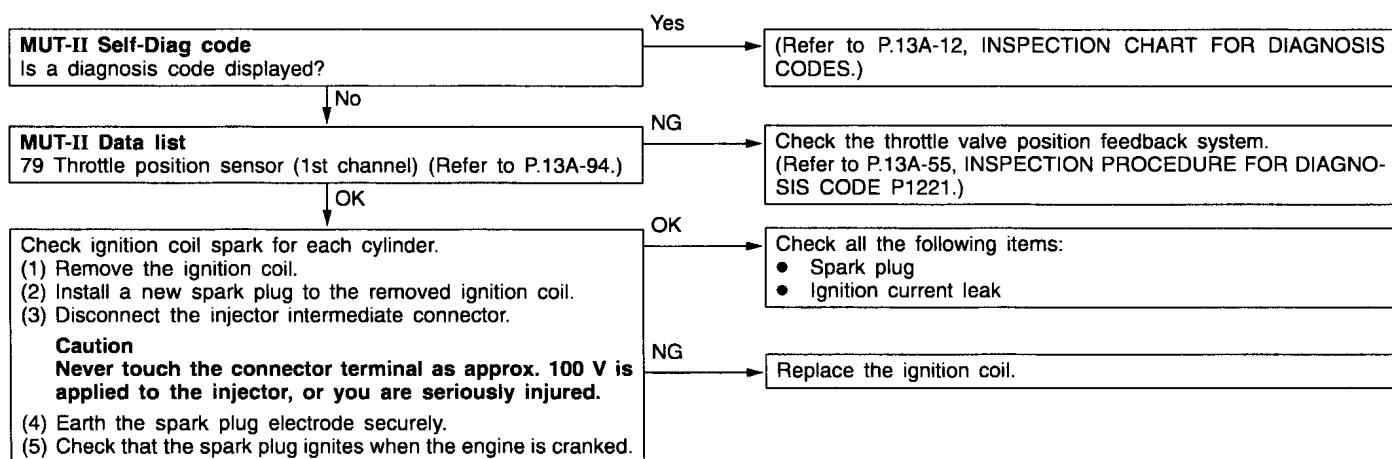
Hesitation, sag, stumble, poor acceleration or surge	Probable cause
The cause is probably a malfunction of the ignition system, electronic-controlled throttle valve system, compression pressure, etc.	• Malfunction of the ignition system • Malfunction of the air/fuel ratio control system • Malfunction of the electronic-controlled throttle valve system • Improper compression pressure • Air stuck in the air intake system

MUT-II Self-Diag code Is a diagnosis code displayed?	Yes	(Refer to P.13A-12, INSPECTION CHART FOR DIAGNOSIS CODES.)
Check ignition timing. (Refer to GROUP 11A – Engine Adjustment.)	NG	Check that the crank angle sensor and timing belt cover are properly installed.
MUT-II Data list 26 Accelerator pedal position switch (Refer to P.13A-94.)	NG	Check the accelerator pedal position switch. (Refer to P.13A-90, INSPECTION PROCEDURE 28.)
MUT-II Data list 13 Intake air temperature sensor (Refer to P.13A-94.)	NG	Check the intake air temperature sensor. (Refer to P.13A-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
MUT-II Data list 25 Barometric pressure sensor (Refer to P.13A-94.)	NG	Check the barometric pressure sensor. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
MUT-II Data list 21 Engine coolant temperature sensor (Refer to P.13A-94.)	NG	Check the engine coolant temperature sensor. (Refer to P.13A-19, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
MUT-II Data list 79 Throttle position sensor (1st channel) (Refer to P.13A-94.)	NG	Check the throttle valve position feedback system. (Refer to P.13A-55, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
MUT-II Data list 59 Oxygen sensor (rear) • Transmission: 2nd gear <M/T>, L range <A/T> • Driving with throttle widely open OK: 600 – 1,000 mV	NG	Check the oxygen sensor (rear) system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
MUT-II Data list 11 Oxygen sensor (front) OK: 600 – 1,000 mV when the engine is suddenly raced	NG	Check the oxygen sensor (front) system. (Refer to P.13A-25, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
MUT-II Data list 11 Oxygen sensor (front) OK: 0 – 400 mV and 600 – 1,000 mV alternates when the engine is idling (wait for four minutes after the engine started).	NG	Measure fuel high-pressure between the fuel pump (high pressure) and injector. (Refer to P.13A-108.)
	OK	Check that air is sucked in the air intake system. • Broken intake manifold gasket • Damaged vacuum hose • Damaged air intake hose
MUT-II Data list 68 EGR valve (Refer to P.13A-94.)	NG	Check the EGR valve. (Refer to P.13A-50, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
MUT-II Actuator test 08 Purge control solenoid valve (Refer to P.13A-100.)	NG	Check the purge control solenoid valve. (Refer to P.13A-52, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0443.)
To the next page	OK	



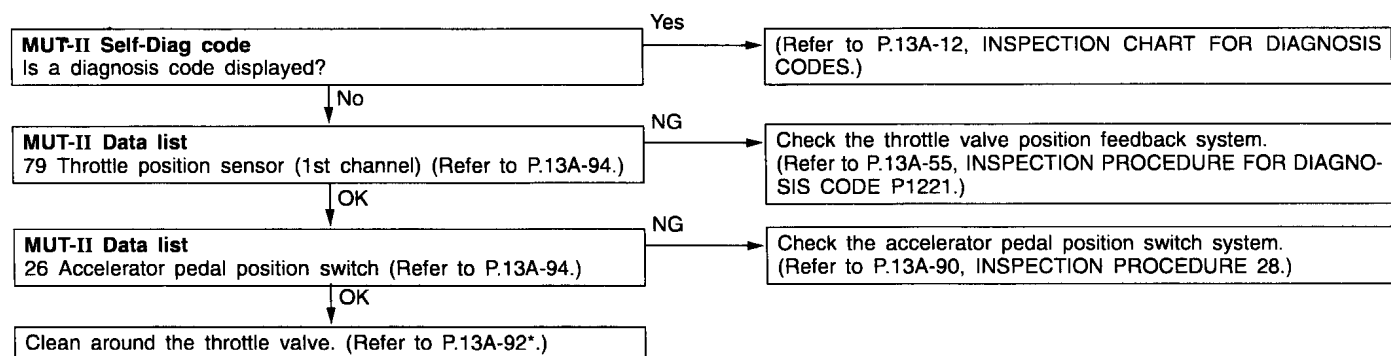
INSPECTION PROCEDURE 14

The feeling of impact when accelerating	Probable cause
The cause is probably an ignition leak being generated in line with an increase in the spark plug request voltage during acceleration.	Malfunction of the ignition system



INSPECTION PROCEDURE 15

The feeling of impact when decelerating	Probable cause
The cause is probably insufficient intake air due to a faulty electronic-controlled throttle valve system.	Malfunction of the electronic-controlled throttle valve system

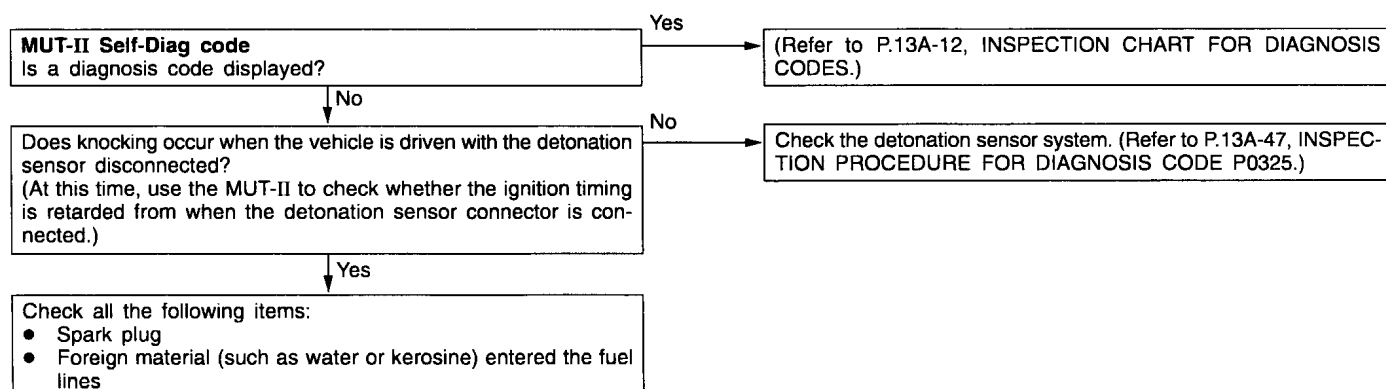


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 16

Knocking	Probable cause
The cause is probably incorrect detonation control or improper heat range of the spark plugs.	- Malfunction of the detonation sensor - Improper heat range of the spark plugs



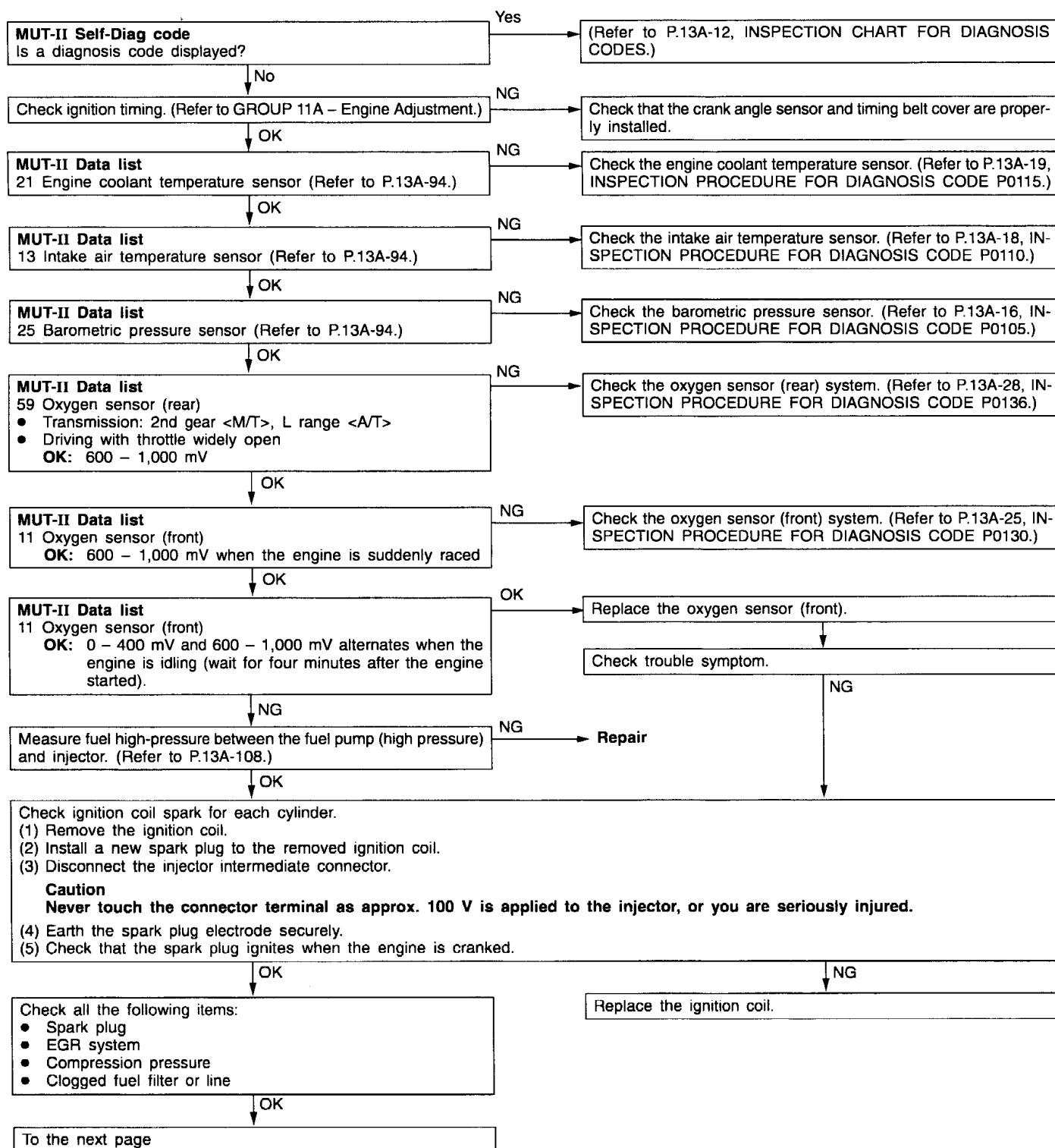
INSPECTION PROCEDURE 17

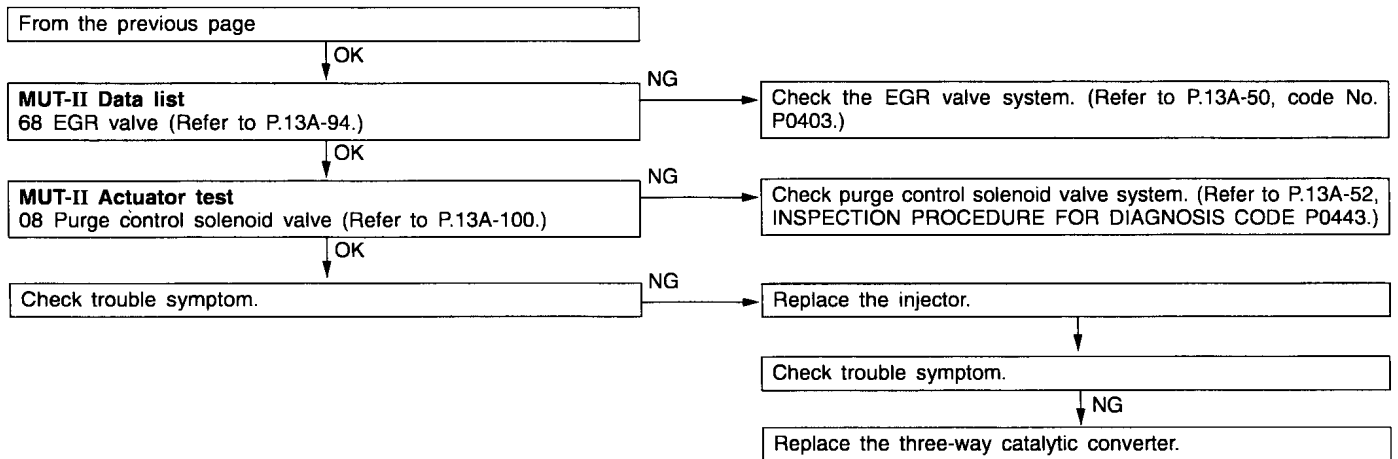
Run-on (dieseling)	Probable cause
The cause is probably fuel leak from injector(s)	Malfunction of the injector

Replace the injector.

INSPECTION PROCEDURE 18

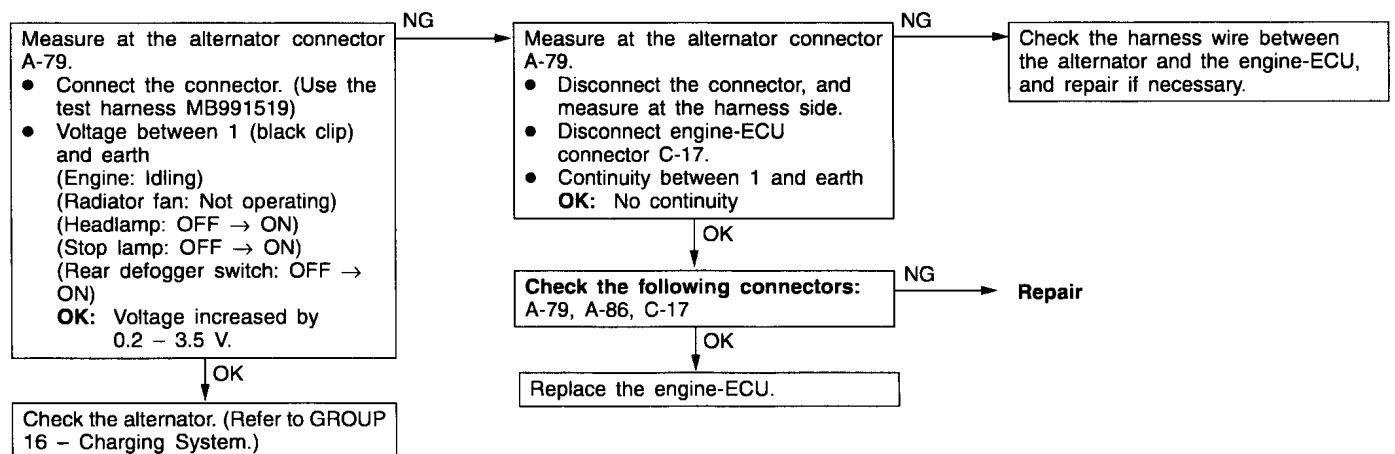
Too high CO and HC concentration when idling	Probable cause
The cause is probably an incorrect air/fuel ratio	• Malfunction of air/fuel ratio control system • Deterioration of the catalyst





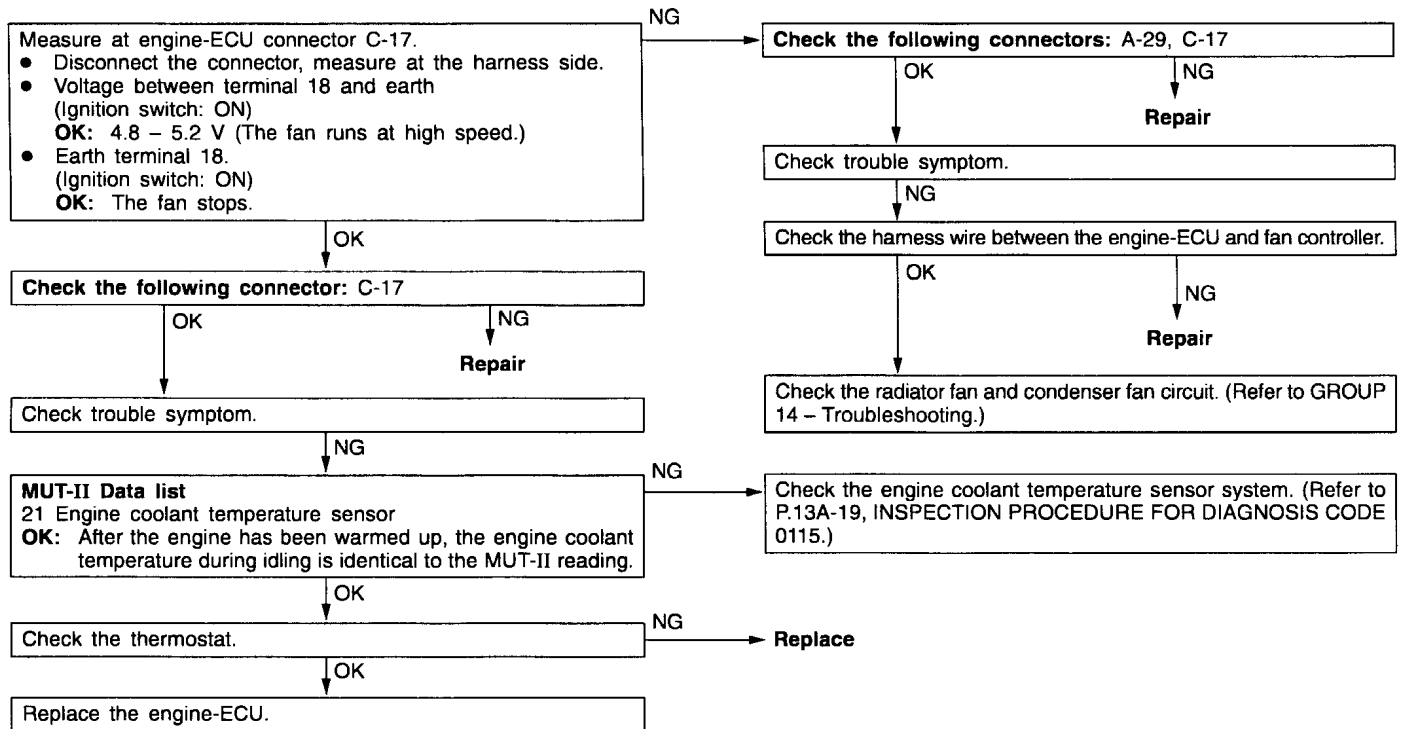
INSPECTION PROCEDURE 19

Low alternator output voltage (approx. 12.3 V)	Probable cause
The cause is probably a malfunction of the alternator or one of the problems listed at right.	- Malfunction of the charging system - Open circuit between the alternator G terminal and the engine-ECU - Malfunction of the engine-ECU



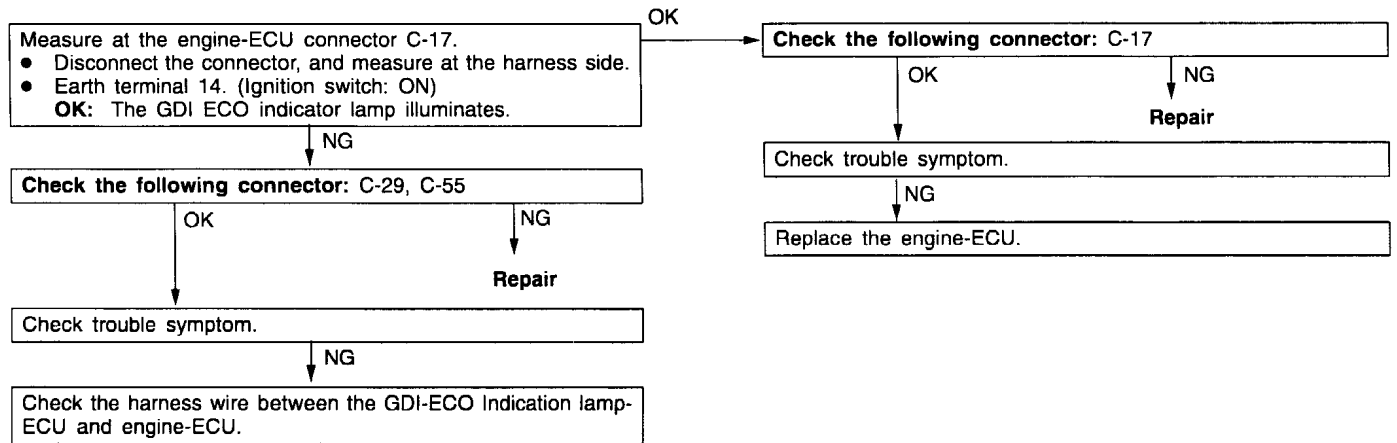
INSPECTION PROCEDURE 20

Fans (radiator fan, A/C condenser fan) are inoperative.	Probable cause
The engine-ECU sends a duty signal to the fan controller according to engine coolant temperature, vehicle speed, or A/C switch load. The fan controller controls radiator fan and condenser fan speeds, based on this signal. (The closer the terminal voltage comes to 5 V, the higher the fan speed becomes.)	• Malfunction of the fan motor relay • Malfunction of the fan motor • Malfunction of the fan controller • Open or short circuit, or poor connector contact • Malfunction of the engine-ECU



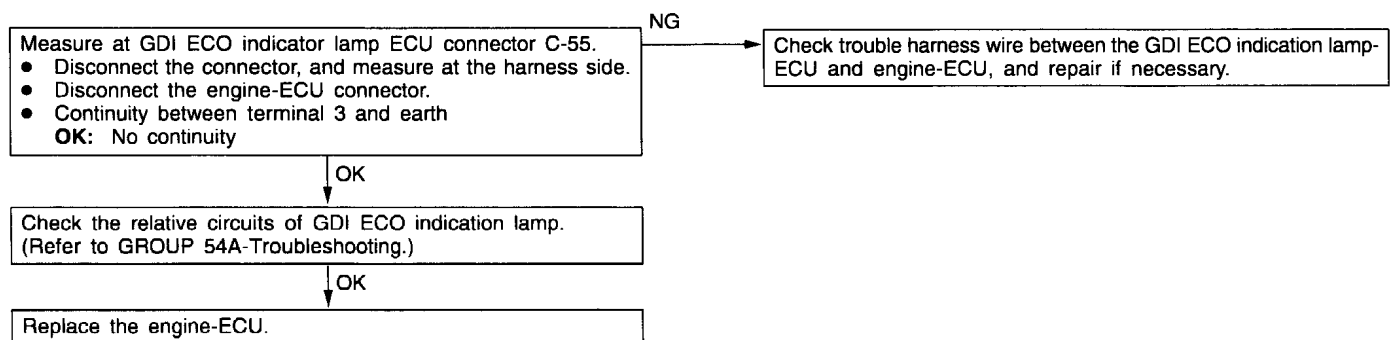
INSPECTION PROCEDURE 21

GDI ECO indicator lamp does not illuminate.	Probable cause
If the GDI ECO indicator lamp does not illuminate after turning switch, the causes listed in the right column are suspected.	• Burned-out GDI ECO indicator lamp bulb • Open circuit or short-circuited harness wire in the GDI ECO indicator lamp circuit • Malfunction of the engine-ECU • Malfunction of the GDI ECO indicator lamp ECU



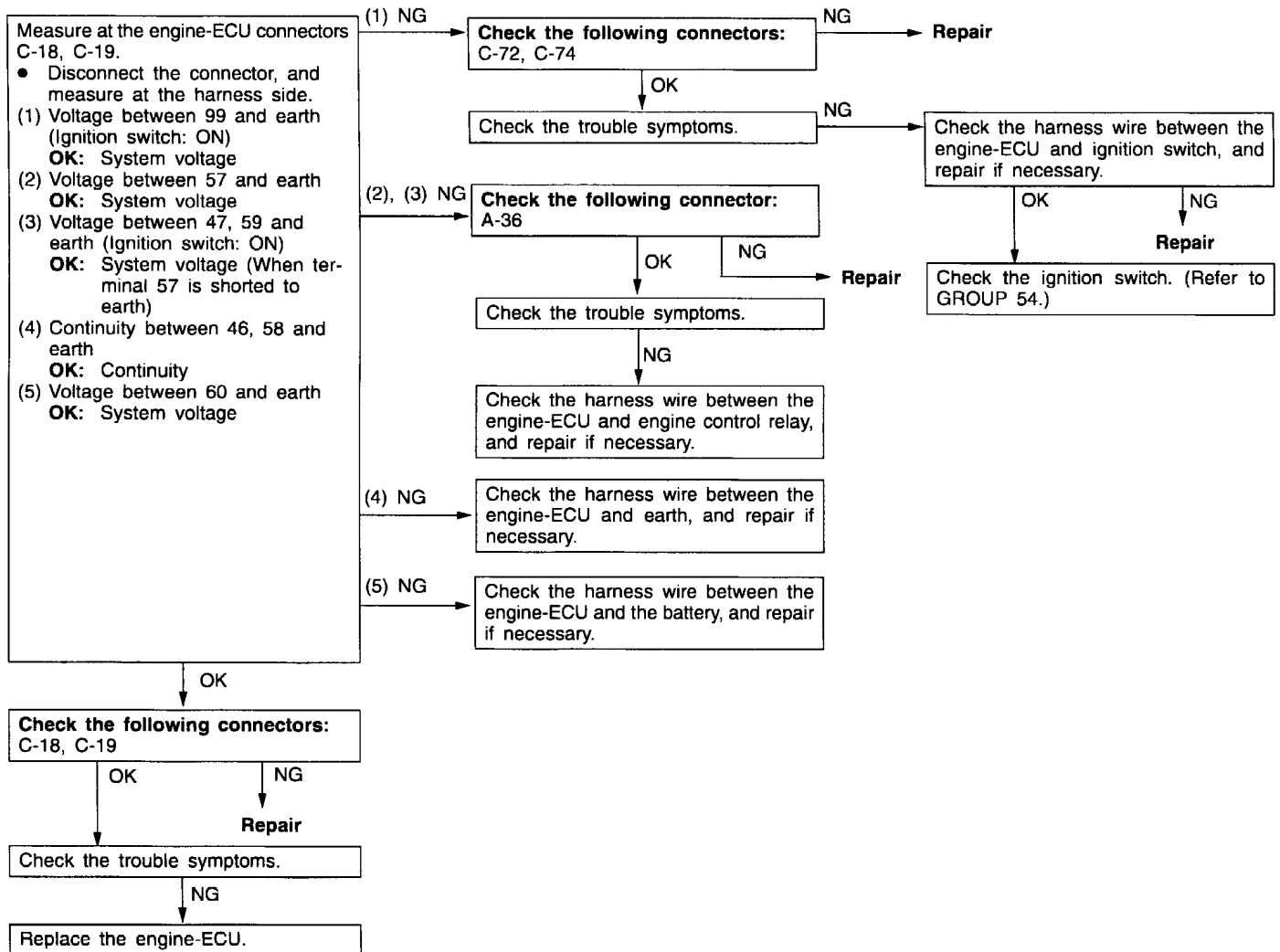
INSPECTION PROCEDURE 22

GDI ECO indicator lamp remains illuminated and does not go off.	Probable cause
If the GDI ECO indicator lamp does not go off during high load operation, the causes listed in the right column are suspected.	• Short circuit between the GDI ECO indicator lamp and engine-ECU • Malfunction of the engine-ECU • Malfunction of the GDI ECO indicator lamp ECU



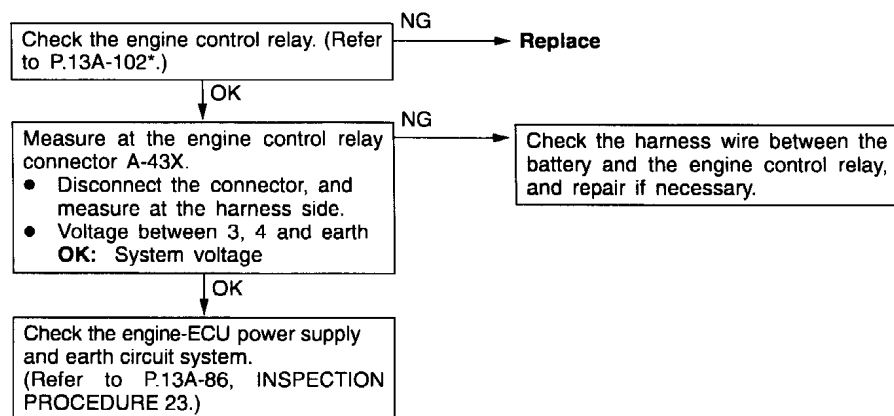
INSPECTION PROCEDURE 23

Engine-ECU power supply and earth circuit system	Probable cause
The cause is probably a malfunction of the engine-ECU or one of the problems listed at right.	• Open circuit or short-circuited harness wire in the engine-ECU power supply circuit • Open circuit or short-circuited harness wire in the engine-ECU earth circuit • Malfunction of the engine-ECU



INSPECTION PROCEDURE 24

Engine control relay and ignition switch-IG system	Probable cause
When the ignition switch ON signal is input to the engine-ECU, the engine-ECU turns on the engine control relay. This causes system voltage to be supplied to the engine-ECU and to the sensors and actuators.	• Malfunction of the ignition switch • Malfunction of the engine control relay • Open circuit or short-circuited harness wire of the engine control relay circuit • Malfunction of the engine-ECU

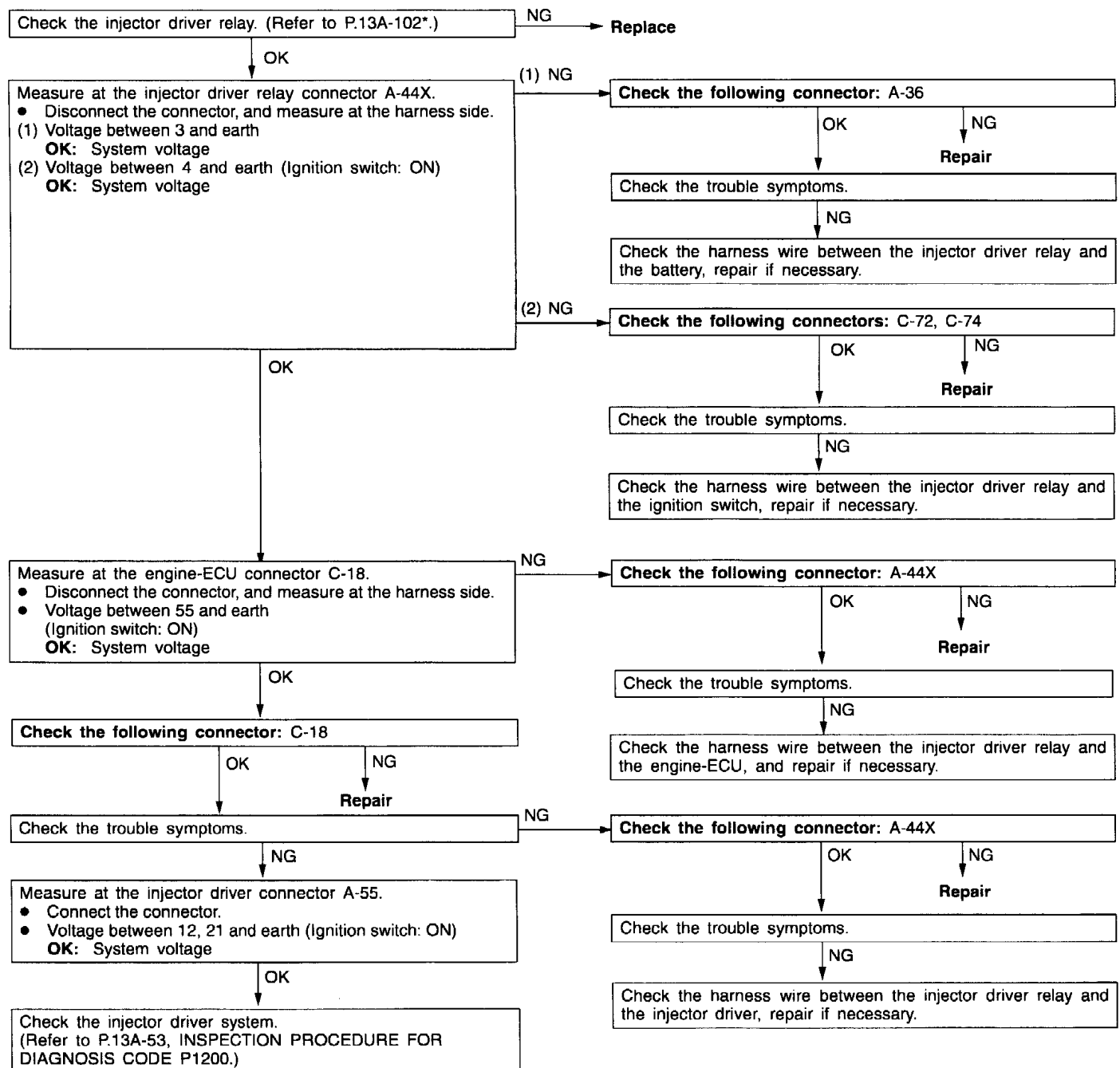


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

INSPECTION PROCEDURE 25

Injector driver relay system	Probable cause
When the ignition switch ON signal is input to the engine-ECU, engine-ECU turns on the injector driver relay. This causes system voltage to be supplied to the injector driver.	- Malfunction of the injector driver relay - Improper connector contact, open circuit or short-circuited harness wire - Malfunction of the engine-ECU

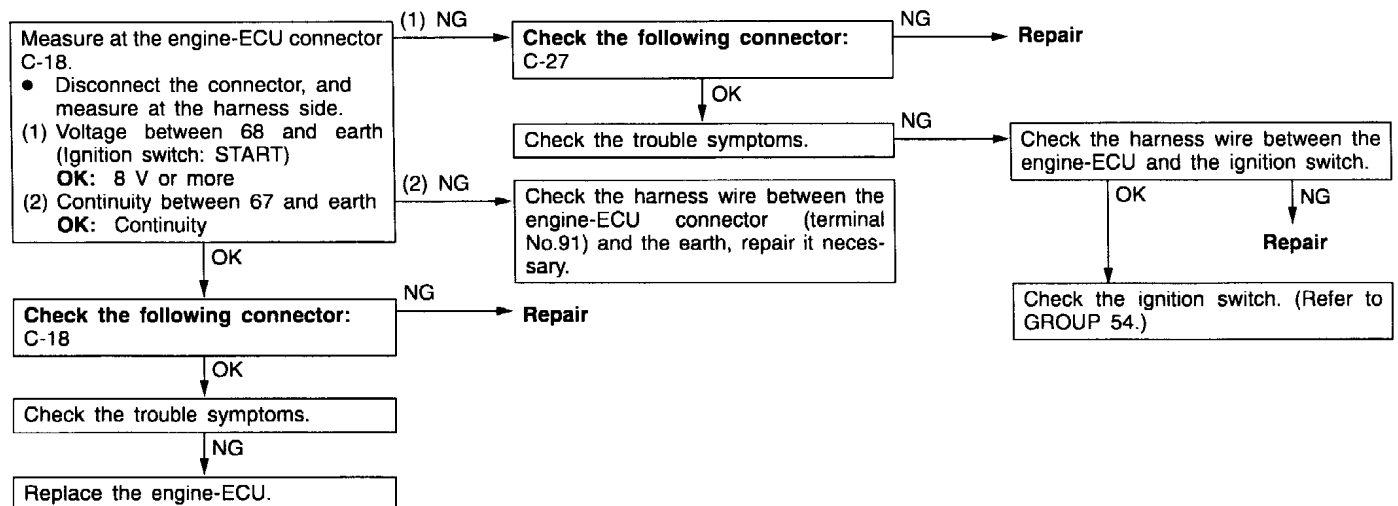


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE99E1)

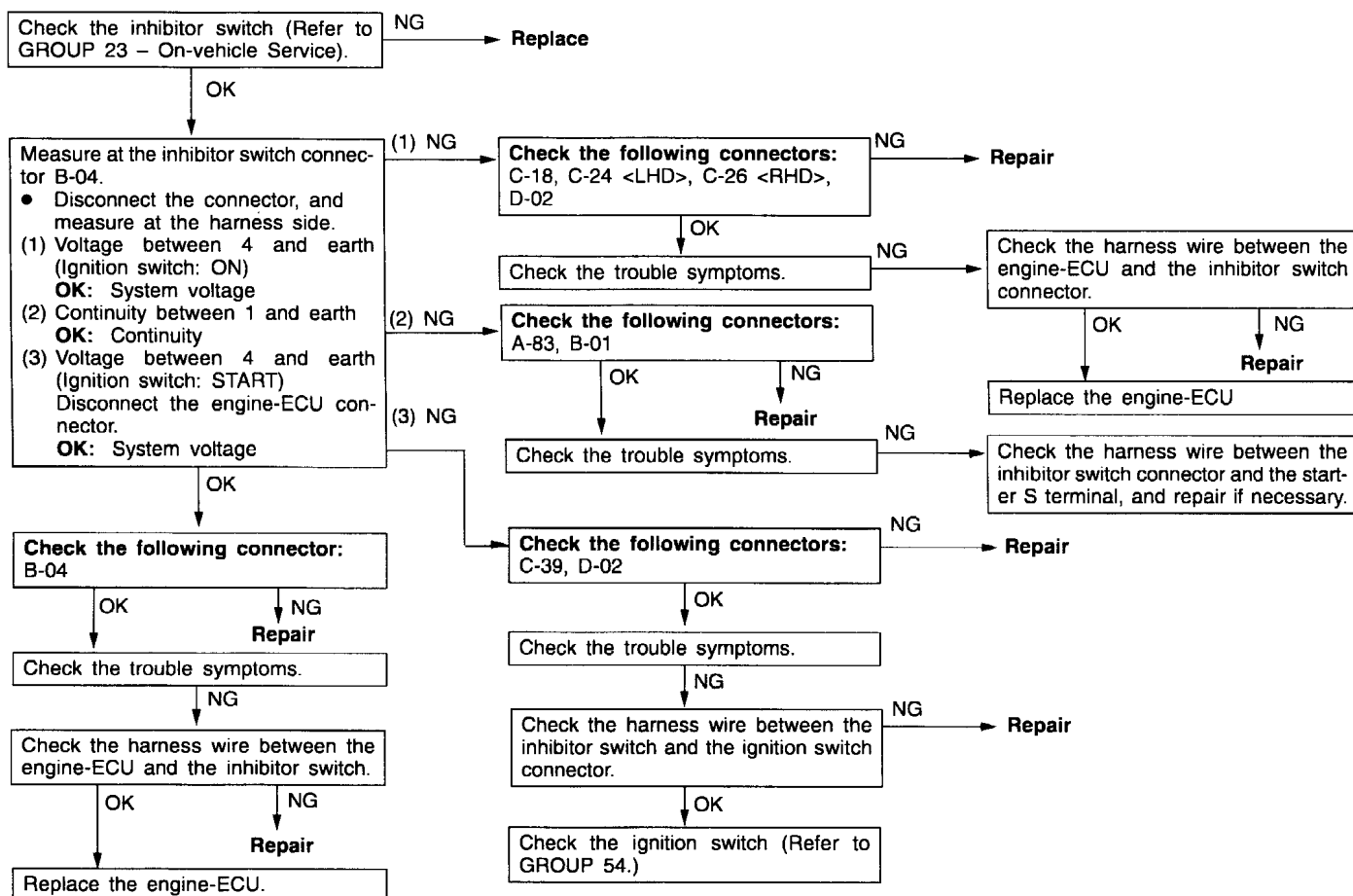
INSPECTION PROCEDURE 26

Ignition switch-ST system <M/T>	Probable cause
The ignition switch-ST outputs a HIGH signal to the engine-ECU while the engine is cranking. The engine-ECU uses this signal to carry out functions such as fuel injection control during starting.	- Malfunction of the ignition switch - Open circuit or short-circuited harness wire of the ignition switch circuit - Malfunction of the engine-ECU



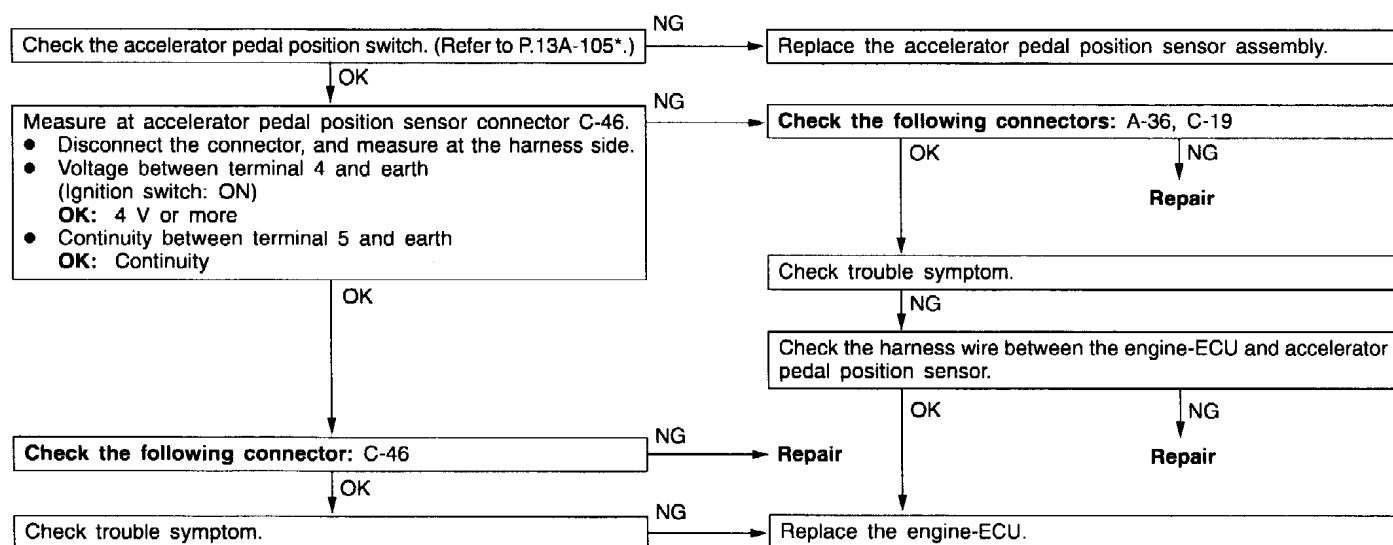
INSPECTION PROCEDURE 27

Ignition switch-ST and inhibitor switch system <A/T>	Probable cause
The ignition switch-ST outputs a HIGH signal to the engine-ECU while the engine is cranking, and the engine-ECU uses this signal to carry out functions such as fuel injection control during starting. The inhibitor switch inputs the position of the selector lever to the engine-ECU. The engine-ECU uses this signal to carry out idle speed control.	- Malfunction of the ignition switch - Malfunction of the inhibitor switch - Open circuit or short-circuited harness wire between ignition switch and inhibitor switch - Malfunction of the engine-ECU



INSPECTION PROCEDURE 28

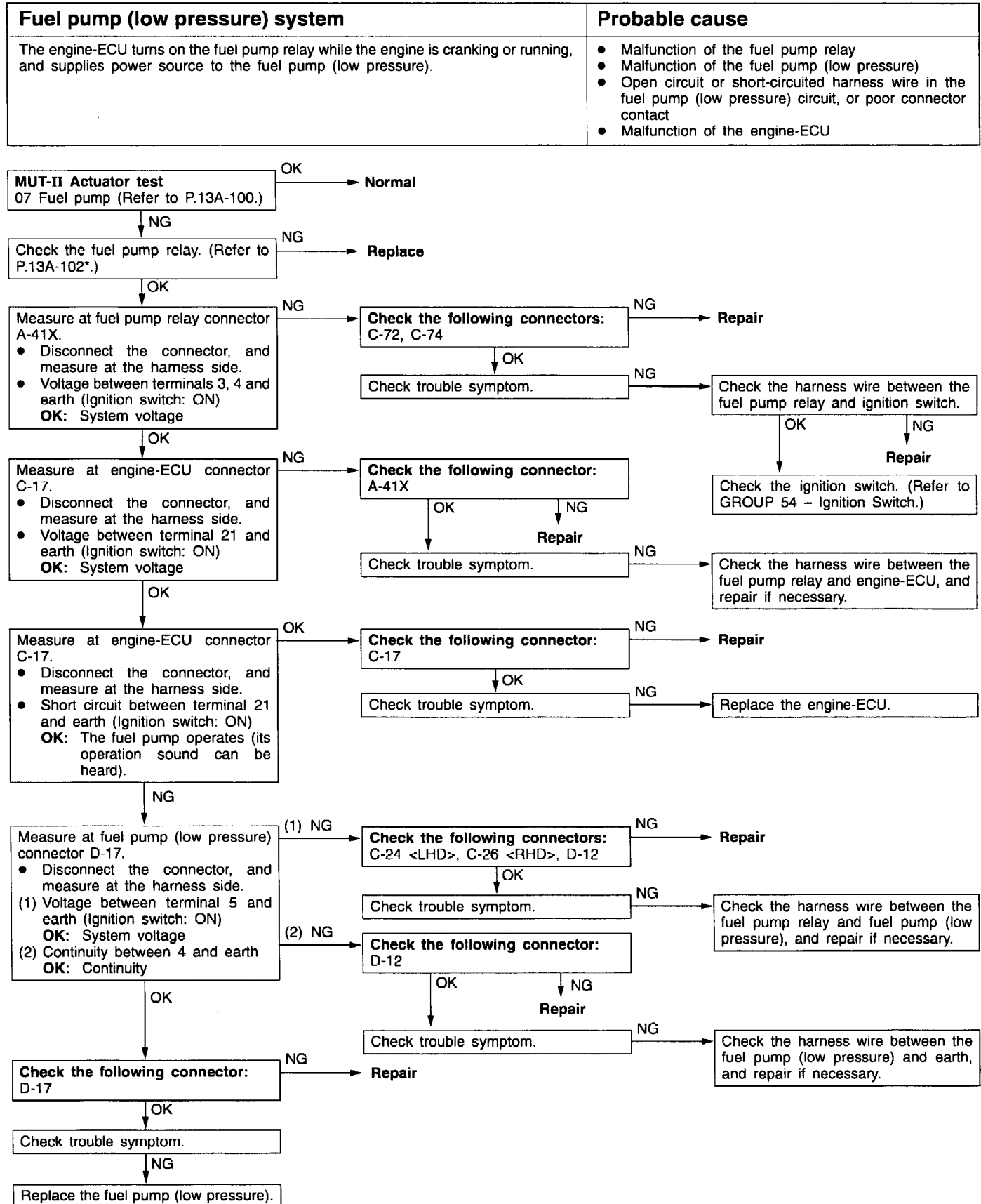
Accelerator pedal position switch system	Probable cause
The accelerator pedal position switch detects that the accelerator pedal is fully closed, and sends a signal to the engine-ECU. The engine-ECU controls idle speed, based on this signal.	- Maladjustment of the accelerator cable - Maladjustment of the accelerator pedal position switch - Open circuit or short-circuited harness wire in the accelerator pedal position switch system, or poor connector contact - Malfunction of the engine-ECU



NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE99E1)

INSPECTION PROCEDURE 29

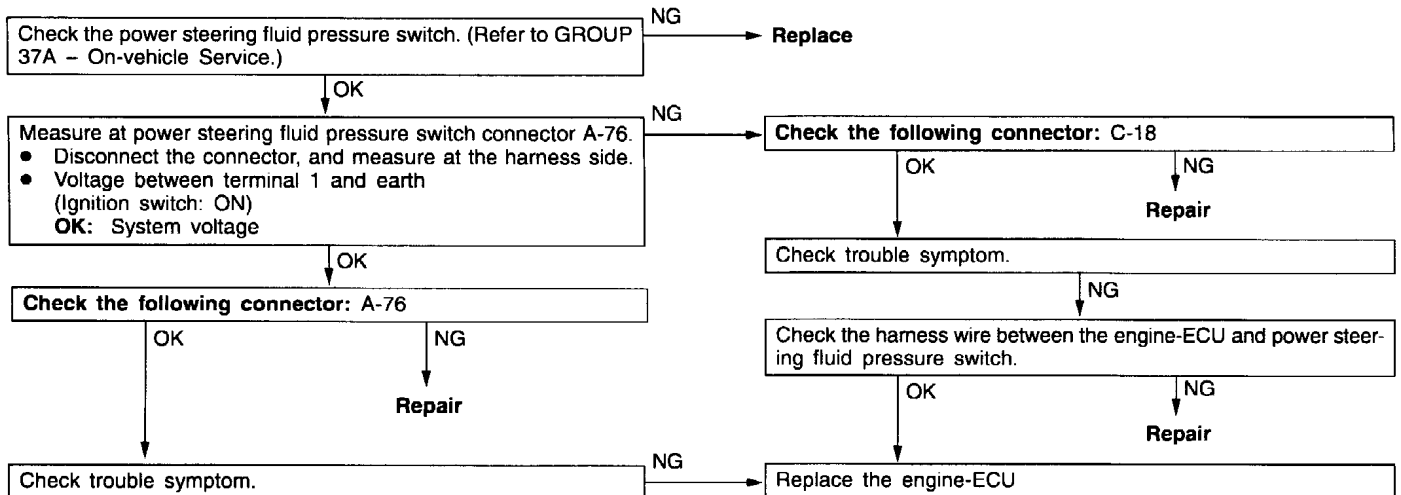


NOTE

*: Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1)

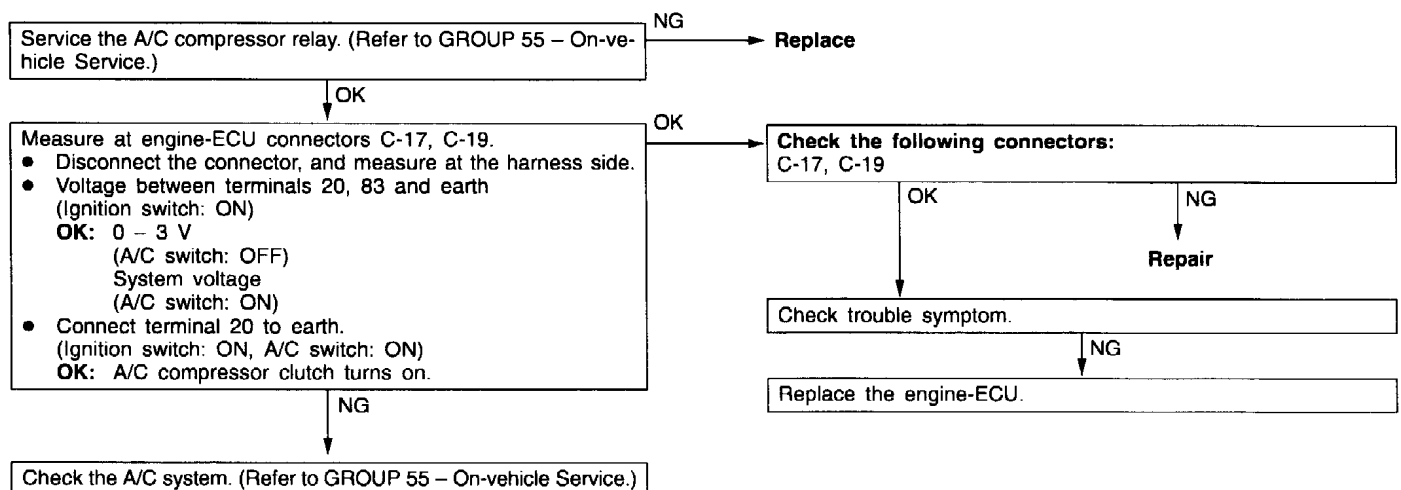
INSPECTION PROCEDURE 30

Power steering fluid pressure switch system	Probable cause
The power steering fluid pressure switch sends a signal to the engine-ECU according to power steering load. Based on this signal, the engine-ECU controls the throttle control servo so that idle speed increases when the power steering is in operation.	• Malfunction of the power steering fluid pressure switch • Open circuit or short-circuited harness wire in the power steering fluid pressure switch circuit, or poor connector contact • Malfunction of the engine-ECU



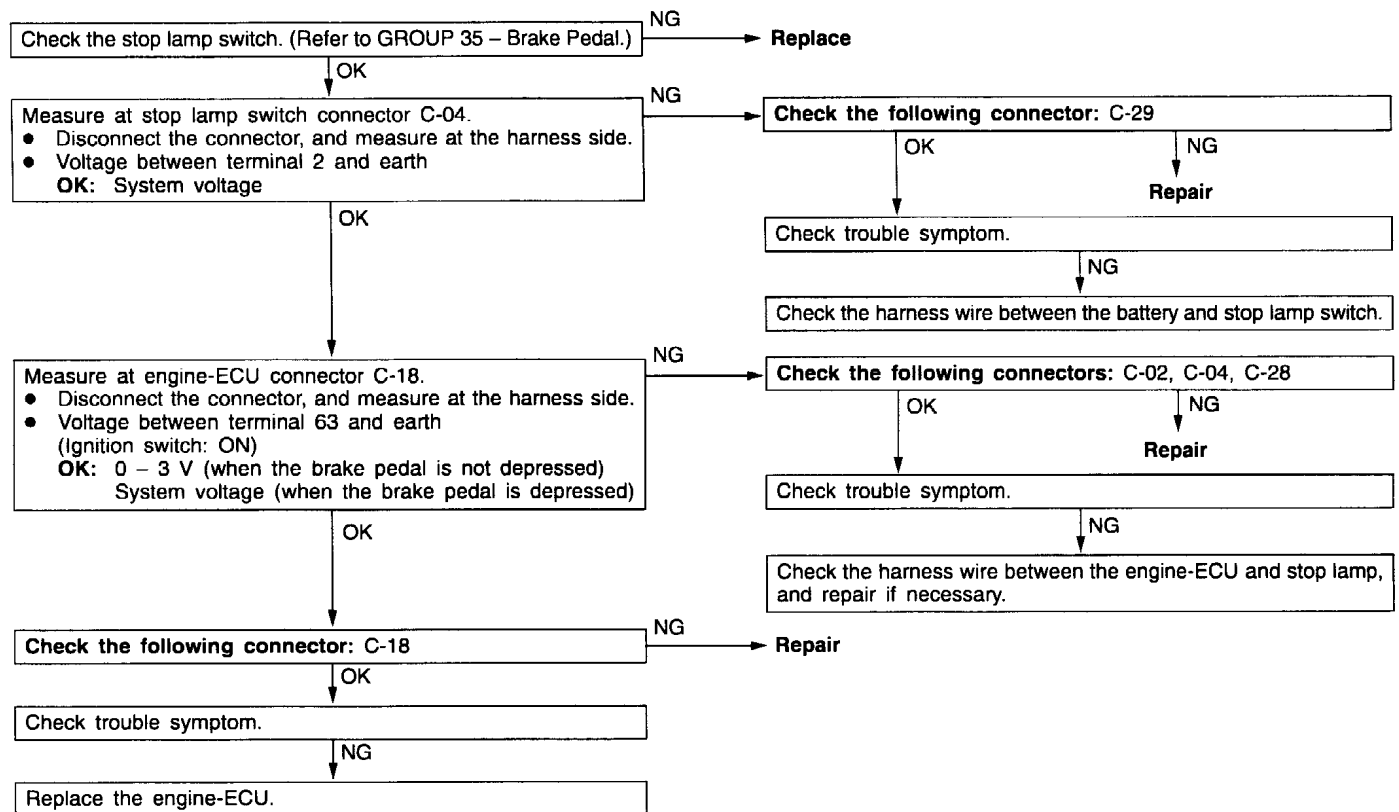
INSPECTION PROCEDURE 31

A/C switch and A/C relay system	Probable cause
If the engine-ECU receives a 'A/C on' signal, it operates the throttle control servo and A/C compressor magnetic clutch so that idle speed increases.	• Malfunction of the A/C control system • Malfunction of the A/C switch • Open circuit or short-circuited harness wire in the A/C switch circuit, or poor connector contact • Malfunction of the engine-ECU



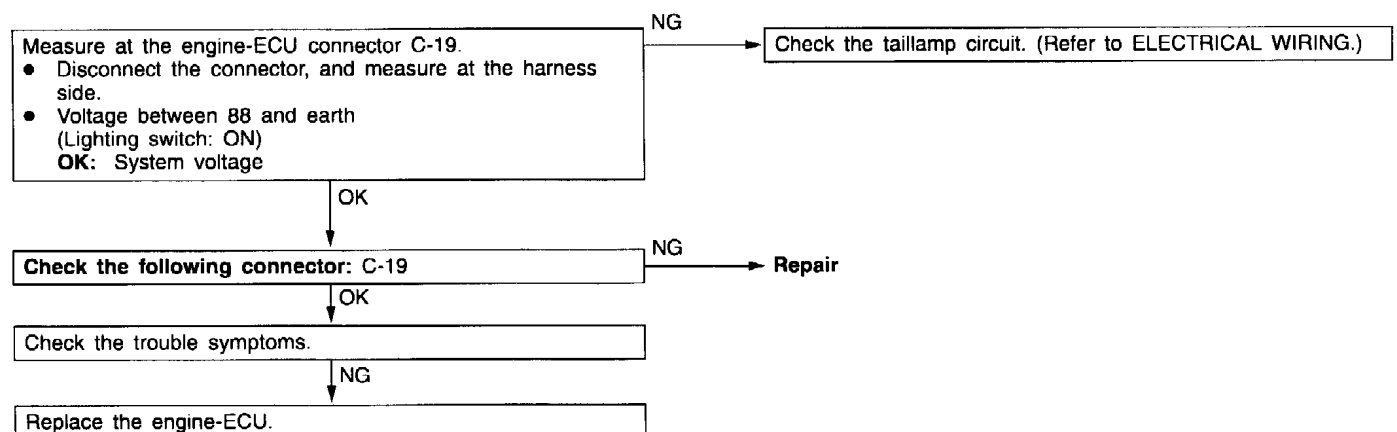
INSPECTION PROCEDURE 32

Stop lamp switch system	Probable cause
The engine-ECU determines whether the brake pedal is depressed or not, by means of the stop lamp switch input signal.	- Malfunction of the stop lamp switch - Open circuit or short-circuited harness wire in the stop lamp circuit, or poor connector contact - Malfunction of the engine-ECU



INSPECTION PROCEDURE 33

Small lamp switch system	Probable cause
The engine-ECU determines whether the small lamp switch is on or off. According to that information, the engine-ECU controls alternator output current when the vehicle is started.	- Improper connector contact, open circuit or short-circuited harness wire in the taillamp circuit - Malfunction of the engine-ECU



DATA LIST REFERENCE TABLE

Caution

When shifting the select lever to D range, the brakes should be applied so that the vehicle does not move forward.

NOTE

*1: Within four minutes after starting the engine

*2: In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10 % longer than the standard time.

*3: The accelerator pedal position switch normally turns off when the voltage of the accelerator pedal position sensor (1st channel) is 200 – 600 mV higher than the voltage at the idle position. If the accelerator pedal position switch turns back on after the accelerator pedal position sensor voltage has risen by 100 mV and the throttle valve has opened, the accelerator pedal position switch and the accelerator pedal position sensor (1st channel) need to be adjusted.

Item No.	Check items	Requirements	Normal condition	Inspection procedure No.	Reference page
11	Oxygen sensor (front)	Engine: warm-up After	Idling	0 mV*1	Code No. P0130 13A-25
			Sudden racing	600 – 1,000 mV	
			2,500 r/min	400 mV or less and 600 – 1,000 mV alternates.	
12	Air flow sensor	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Idling	24 – 50 Hz	Code No. P0100 13A-14
			2,500 r/min	70 – 90 Hz	
			Racing	Frequency increases in response to racing.	
13	Intake air temperature sensor	Ignition switch: ON	Intake air temperature: –20°C	–20°C	Code No. P0110 13A-18
			Intake air temperature: 0°C	0°C	
			Intake air temperature: 20°C	20°C	
			Intake air temperature: 40°C	40°C	
			Intake air temperature: 80°C	80°C	

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
14	Throttle position sensor (2nd channel)	- Engine coolant temperature: 80 – 95°C - Ignition switch: ON (Engine stopped)	Release the accelerator pedal.	4,000 – 4,800	Code No. P0225	13A-43
			Depress the accelerator pedal gradually.	Voltage decreases in response to the pedal depression.		
			Depress the accelerator pedal fully.	100 – 1,100 mV		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 23	13A-86
18	Cranking signal (Ignition switch – ST)	Transmission: Neutral (A/T: P range)	Engine: Stopped	OFF	Procedure No.26 <M/T> Procedure No.27 <A/T>	13A-89 <M/T> 13A-89 <A/T>
			Engine: Cranking	ON		
21	Engine coolant temperature sensor	Ignition switch: ON	Engine coolant temperature: –20°C	–20°C	Code No. P0115	13A-19
			Engine coolant temperature: 0°C	0°C		
			Engine coolant temperature: 20°C	20°C		
			Engine coolant temperature: 40°C	40°C		
			Engine coolant temperature: 80°C	80°C		
22	Crank angle sensor	- Engine: Cranking - Tachometer: Connected	Compare the engine speed readings on the tachometer and the MUT-II.	Accord	Code No. P0335	13A-47
		- Engine: Idling - Accelerator pedal position switch: ON	Engine coolant temperature: –20°C	1,200 – 1,400 r/min		
			Engine coolant temperature: 0°C	1,100 – 1,300 r/min		
			Engine coolant temperature: 20°C	1,000 – 1,200 r/min		
			Engine coolant temperature: 40°C	850 – 1,050 r/min		
			Engine coolant temperature: 80°C	550 – 750 r/min*1		
24	Vehicle speed sensor	Drive at 40 km/h		Approximately 40 km/h	Code No. P0500	13A-53

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
25	Barometric pressure sensor	Ignition switch: ON	Altitude: 0 m	101 kPa	Code No. P0105	13A-16
			Altitude: 600 m	95 kPa		
			Altitude: 1,200 m	88 kPa		
			Altitude: 1,800 m	81 kPa		
26	Accelerator pedal position switch	Ignition switch: ON (Depress and release the accelerator pedal several times)	Release the accelerator pedal.	ON	Procedure No. 28	13A-90
			Depress the accelerator pedal slightly.	OFF		
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Procedure No. 30	13A-92
			Steering wheel turning	ON		
28	A/C switch	Engine: Idling (The A/C compressor is running when the A/C switch is on.)	A/C switch: OFF	OFF	Procedure No. 31	13A-92
			A/C switch: ON	ON		
29	Inhibitor switch <A/T>	Ignition switch: ON	Selector lever: P or N	P, N	Procedure No. 27	13A-89
			Selector lever: D, 2, L or R	D, 2, L, R		
31	Small lamp switch	Engine: Idling	Lighting switch: OFF	OFF	Procedure No. 33	13A-93
			Lighting switch: ON	ON		
34	Air flow sensor reset signal	Engine: After having warmed up	Engine is idling	ON	Code No. P0100	13A-14
			3,000 r/min	OFF		
37	Volumetric efficiency	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Engine is idling	30 – 50 %	—	—
			2,500 r/min	10 – 30 %		
			Engine is suddenly raced	Volumetric efficiency increases in response to racing		
38	Crank angle sensor	- Engine: Cranking [reading is possible at 2,000 r/min or less] - Tachometer: Connected	Engine speeds displayed on the MUT-II and tachometer are identical.		—	—

Item No.	Check items	Requirements	Normal condition	Inspection procedure No.	Reference page
41	Injector drive time*2	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Idling	0.35 – 0.55 ms*1	–
			2,500 r/min	0.4 – 0.6 ms	
			Sudden racing	Increases	
44	Ignition advance	- Engine: After warm-up - Set a timing light.	Idling	8 – 24° BTDC*1	Code No. P0300
			2,500 r/min	15 – 35° BTDC	
49	A/C relay	Engine: After warm-up, idling	A/C switch: OFF	OFF (compressor clutch is not operating)	Procedure No. 31
			A/C switch: ON	ON (compressor clutch is operating)	
59	Oxygen sensor (rear)	- Transmission: 2nd gear (A/T: L range) - Drive with throttle widely open	3,500 r/min	600 – 1,000 mV	Code No. P0136
66	Brake vacuum sensor	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Stop the engine from idling speed, and then depress the brake pedal several times with the ignition switch on.	Displayed pressure increases.	Code No. P1515
67	Stop lamp switch	Ignition switch: ON	Brake pedal: Depressed	OFF	Procedure No. 32
			Brake pedal: Released	ON	
68	EGR valve	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Idling	2 – 17 STEP	Code No. P0403
			2,500 r/min	0 – 9 STEP	

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
74	Fuel pressure sensor	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Engine: Idling	4 – 6.9 MPa	Code No. P0190	13A-33
77	Accelerator pedal position sensor (2nd channel)*3	Ignition switch: ON	Release the accelerator pedal.	700 – 1,400 mV	Code No. P1225	13A-58
			Depress the accelerator pedal gradually.	Increases in response to the pedal depression stroke.		
			Depress the accelerator pedal fully.	4,100 mV or more		
78	Accelerator pedal position sensor (1st channel)*3	Ignition switch: ON	Release the accelerator pedal.	985 – 1,135 mV	Code No. P0220	13A-40
			Depress the accelerator pedal gradually.	Increases in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	4,100 mV or more		
79	Throttle position sensor (1st channel)	- Engine coolant temperature: 80 – 95°C - Ignition switch: ON (Engine stopped)	Release the accelerator pedal.	450 – 800 mV	Code No. P0120	13A-22
			Depress the accelerator pedal gradually.	Increases in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	3,900 – 4,900 mV		
		Engine: After warm-up, idling	No load	450 – 1,000 mV		
			A/C switch: OFF → ON	Increases by 100 – 600 mV.		
			Selector lever: N → D range	Increases by 0 – 200 mV.		
81	Long-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		–10 – 10 %	Code No. P0170	13A-31
82	Short-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		–25 – 25 %	Code No. P0170	13A-31

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
85	Fuel pressure sensor	- Engine coolant temperature: 80 – 95°C - Lamps, electric cooling fan and all accessories: OFF - Transmission: Neutral (A/T: P range)	Engine: Idling	4,000 – 6,900 kPa	Code No.P0190	13A-33
87	Calculation load value	Engine: Warm	Engine: Idling	15 – 35 %	–	–
			2,500 r/min	15 – 35 %		
88	Fuel control condition	Engine: Warm	2,500 r/min	Closed loop	Code No. P0125	13A-24
			When engine is suddenly raced	Open loop – drive condition		
99	Fuel injection mode	Engine: After warm up	Idling (after four minutes or more have passed since engine start)	Lean compression	–	–
			2,500 r/min	Stoichiometric metric feedback		
			Sudden racing after idle position	Open loop		
A1	Oxygen sensor (front)	Engine: After warm-up	Idling	0 V	Code No. P0130	13A-25
			Sudden racing	0.6 – 1.0 V		
			2,500 r/min	0.4 V or less and 0.6 – 1.0 V alternates		
A2	Oxygen sensor (rear)	- Transmission: 2nd gear <M/T>, L range <A/T> - Drive with throttle widely open	3,500 r/min	0.6 – 1.0 V	Code No. P0136	13A-28
8A	Throttle position sensor (1st channel) (Throttle valve opening angle)	- Engine coolant temperature: 80 – 95°C - Ignition switch: ON (Engine: stopped)	Release the accelerator pedal.	8 – 16 %	Code No. P0120	13A-22
			Depress the accelerator pedal gradually.	Increase in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	80 – 100 %		
		Engine: After warm-up, idling	No load	8 – 18 %		
		A/C switch: OFF → ON	Rises by 2 – 10 %			

ACTUATOR TEST REFERENCE TABLE

Item No.	Inspection item	Drive contents	Inspection contents	Normal condition	Inspection procedure No.	Reference page
01	Injectors	Cut fuel to No. 1 injector	Engine: After having warmed up/Engine is idling (Cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)	Idling condition becomes different (becomes unstable).	Code No. P0201	13A-34
02		Cut fuel to No. 2 injector			Code No. P0202	13A-36
03		Cut fuel to No. 3 injector			Code No. P0203	13A-37
04		Cut fuel to No. 4 injector			Code No. P0204	13A-38
07	Fuel pump (low pressure)	Fuel pump operates and fuel is recirculated.	Ignition switch: ON	Sound of operation is heard.	Procedure No. 29	13A-91
08	Purge control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON	Sound of operation can be heard when solenoid valve is driven.	Code No. P0443	13A-52
17	Basic ignition timing	Set the engine-ECU to ignition timing adjustment mode	Idling after engine warm up	5° BTDC	—	—
21	Fan controller	Drive the fan motor	Ignition switch: ON	The fan motor operates	Procedure No. 20	13A-84
34	Electronic-controlled throttle valve system	Stop the throttle control servo.	Ignition switch: ON	Throttle valve is opened slightly.	Code No. P1220	13A-54

CHECK AT THE ENGINE-ECU TERMINALS**TERMINAL VOLTAGE CHECK CHART****Engine-ECU Connector Terminal Arrangement**

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	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Terminal No.	Check item	Check requirements (engine condition)		Normal condition
1	No. 1 injector	Engine: Warm up, and then depress the accelerator pedal suddenly from the idle speed.		Decreases slightly for short time from 9 – 13 V
9	No. 2 injector			
24	No. 3 injector			
2	No. 4 injector			
3	No. 1 ignition coil	Engine: 3,000 r/min		0.3 – 3.0 V
13	No. 2 ignition coil			
12	No. 3 ignition coil			
4	No. 4 ignition coil			
5	EGR valve (D)	Ignition switch: Immediately after turning ON		5 – 8 V (fluctuates for approx. three seconds)
6	EGR valve (C)			
32	EGR valve (B)			
34	EGR valve (A)			
8	Alternator G terminal	- Engine: Warm up, and then idling - Radiator fan: Not operating - Headlamp: OFF → ON - Stop lamp: OFF → ON - Rear defogger switch: OFF → ON		Voltage increases by 0.2 – 3.5 V
14	GDI ECO indication lamp	Ignition switch: OFF → ON		0 – 3 V (System voltage after five seconds)
		Engine: When the accelerator pedal is suddenly depressed while the engine is idling		System voltage
16	Purge control solenoid valve	- Engine coolant temperature: 80 – 95°C - Ignition switch: ON	Engine: Stopped	System voltage
			Engine: Start the engine, and then increase engine speed up to 3,500 r/min.	Voltage decreases

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
18	Fan controller	Radiator and condenser fans are not operating.		0 – 0.3 V
		Radiator and condenser fans are operating.		0.7 V or more
20	A/C relay	- Engine: Idling - A/C switch: OFF → ON (Compressor is operating)		System voltage, or changes from momentarily 6 V or more to 0 → 3 V
21	Fuel pump relay	Ignition switch: ON	Engine: Stopped	System voltage
			Engine: Idling	0 – 3 V
31	Engine warning lamp	Ignition switch: OFF → ON		0 – 3 V → System voltage (after several seconds)
41	Sensor power supply	Ignition switch: ON		4.5 – 5.5 V
42	Power supply to accelerator pedal position sensor (1st channel)	Ignition switch: ON		4.5 – 5.5 V
43	Crank angle sensor	Engine: Cranking		0.4 – 4.0 V
		Engine: Idling		1.5 – 2.5 V
44	Engine coolant temperature sensor	Ignition switch: ON	Engine coolant temperature: 0°C	3.2 – 3.5 V
			Engine coolant temperature: 20°C	2.3 – 2.9 V
			Engine coolant temperature: 40°C	1.5 – 2.1 V
			Engine coolant temperature: 80°C	0.4 – 1.0 V
45	Engine ignition signal	Engine: 3,000 r/min		0.3 – 3.0 V
47	Power supply	Ignition switch: ON		System voltage
59				
50	Camshaft position sensor	Engine: Cranking		0.4 – 3.0 V
		Engine: Idling		0.5 – 2.0 V
51	Barometric pressure sensor	Ignition switch: ON	Altitude: 0 m	3.7 – 4.3 V
			Altitude: 1,200 m	3.2 – 3.8 V
52	Alternator FR terminal	- Engine: Warm up, and then idling - Radiator fan: Not operating - Headlamp: OFF → ON - Stop lamp: OFF → ON - Rear defogger: OFF → ON		Voltage decreases

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
53	Oxygen sensor (rear)	• Transmission: 2nd gear • Engine speed: 3,500 r/min or more • Driving with the throttle valve widely open		0.6 – 1.0 V
54	Power steering fluid pressure switch	Engine: Warm up, and then idling	Steering wheel stationary	System voltage
			Steering wheel turning	0 – 3 V
55	Injector driver relay	Ignition switch: OFF		0 – 0.1 V
		Ignition switch: ON		0.5 – 1.0 V
56	Throttle valve control servo relay	Ignition switch: OFF		0 – 0.3 V
		Ignition switch: ON		0.5 – 1.0 V
57	Engine control relay	Ignition switch: OFF		0 – 3 V
		Ignition switch: ON		System voltage
60	Back-up power source	Ignition switch: OFF		System voltage
61	Air flow sensor	Engine: Idling		2.2 – 3.2 V
		Engine: 2,500 r/min		
62	Intake air temperature sensor	Ignition switch: ON	Intake air temperature: 0°C	3.2 – 3.8 V
			Intake air temperature: 20°C	2.3 – 2.9 V
			Intake air temperature: 40°C	1.5 – 2.1 V
			Intake air temperature: 80°C	0.4 – 1.0 V
63	Stop lamp switch	Depress the brake pedal.		System voltage
		Release the brake pedal.		0 – 3 V
68	Ignition switch-ST	Engine: Cranking		8 V or more
71	Oxygen sensor (front)	Engine: Warm up, and then hold the engine speed at 2,500 r/min (Use a digital voltmeter).		0 ↔ 0.8 V alternates.
74	Brake vacuum sensor	Engine: Stop the engine from idle speed, turn the ignition switch ON, and then depress the brake pedal several times.		Voltage increases
76	Air flow sensor reset signal	Engine: Idling		0 – 1 V
		Engine: 3,000 r/min		6 – 9 V

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
78	Throttle position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	4.0 – 4.8 V
			Depress the accelerator pedal fully.	0.1 – 1.1 V
79	Accelerator pedal position switch	Ignition switch: ON	Release the accelerator pedal.	0 – 1 V
			Depress the accelerator pedal fully.	4 V or more
80	Vehicle speed sensor	- Ignition switch: ON - Move the vehicle forward.		0 ↔ system voltage alternates.
83	A/C switch	Engine: Idling	A/C switch: OFF	0 – 3 V
			A/C switch: ON (Compressor is operating)	System voltage
88	Small lamp switch	Lighting switch: OFF		0 – 3 V
		Lighting switch: ON (Taillamp: ON)		System voltage
89	Oxygen sensor heater (front)	Engine: Idling		0 – 3 V
		Engine: 3,500 r/min		System voltage
90	Oxygen sensor heater (rear)	Engine: Idling		0 – 3 V
		Engine: 3,500 r/min		System voltage
92	Fuel pressure sensor	Engine: Idling		0.3 – 4.7 V
94	Accelerator pedal position sensor (1st channel)	Ignition switch: ON	Release the accelerator pedal.	0.935 – 1.135 V*1
			Depress the accelerator pedal fully.	4.1 V or more*2
96	Injector open circuit check signal	Engine: Increase engine speed from idle speed to 4,000 r/min.		Decreases slightly (approx. 0.7 V) from 4.5 V – 5.0 V.
97	A/C thermo sensor	- Temperature at sensing portion: Approx 25°C - Ignition switch: ON		2.0 – 2.9 V
99	Ignition switch-IG	Ignition switch: ON		System voltage

NOTE

Check if the difference in output between *1 and *2 is 4 V or more.

**CHECK CHART FOR RESISTANCE AND CONTINUITY
BETWEEN TERMINALS**

1. Turn the ignition switch to OFF.
2. Disconnect the engine-ECU connector.
3. Measure the resistance and check for continuity between the terminals of the engine-ECU harness-side connector while referring to the check chart.

NOTE

- (1) When measuring resistance and checking continuity, a harness for checking contact pin pressure should be used instead of inserting a test probe.
- (2) Checking need not be carried out in the order given in the chart.

Caution

**If the terminals that should be checked are mistaken, or if connector terminals are not correctly shorted to earth, damage may be caused to the vehicle wiring, sensors, engine-ECU and/or ohmmeter.
Be careful to prevent this!**

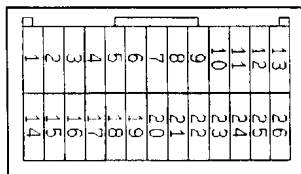
4. If the ohmmeter shows any deviation from the standard value, check the corresponding sensor, actuator and related electrical wiring, and then repair or replace.
5. After repair or replacement, recheck with the ohmmeter to confirm that the repair or replacement has corrected the problem.

Engine-ECU Harness Side Connector Terminal Arrangement

1	9	24
2	10	25
3	11	
4	12	26
5	13	27
6	14	28
7	15	29
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11	19	32
12	20	33
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14	22	34
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18	26	37
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23	31	41
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26	34	44
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35	43	53
36	44	54
37	45	55
38	46	56
39	47	57
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46	54	64
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49	57	67
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67	75	85
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71	79	89
72	80	90
73	81	91
74	82	92
75	83	93
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77	85	95
78	86	96
79	87	97
80	88	98
81	89	99
82	90	100

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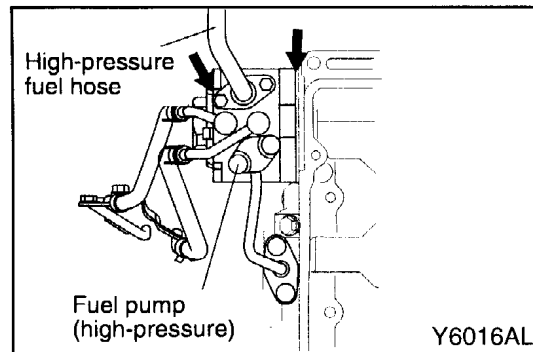
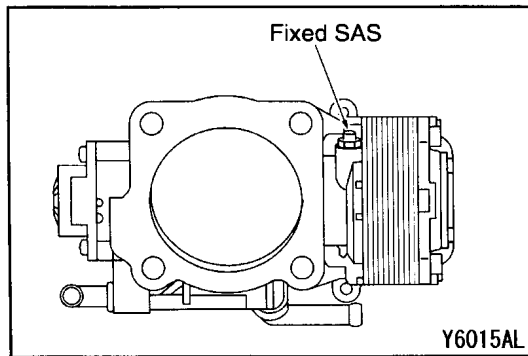
Terminal No.	Check item	Standard value, normal condition (check requirements)
5 – 47	EGR valve (D)	15 – 20 Ω (at 20°C)
6 – 47	EGR valve (C)	
32 – 47	EGR valve (B)	
34 – 47	EGR valve (A)	
16 – 47	Purge control solenoid valve	30 – 34 Ω (at 20°C)
44 – 72	Engine coolant temperature sensor	5.1 – 6.5 k Ω (when engine coolant temperature is 0°C)
		2.1 – 2.7 k Ω (when engine coolant temperature is 20°C)
		0.9 – 1.3 k Ω (when engine coolant temperature is 40°C)
		0.26 – 0.36 k Ω (when engine coolant temperature is 80°C)
46 – Body earth	Earth	Continuity (0 Ω)
58 – Body earth		
62 – 72	Intake air temperature sensor	5.3 – 6.7 k Ω (when intake air temperature is 0°C)
		2.3 – 3.0 k Ω (when intake air temperature is 20°C)
		1.0 – 1.5 k Ω (when intake air temperature is 40°C)
		0.30 – 0.42 k Ω (when intake air temperature is 80°C)
79 – 49	Accelerator pedal position switch	Continuity (when the accelerator pedal is released)
		No continuity (when the accelerator pedal is slightly depressed)
89 – 47	Oxygen sensor heater control (front)	4.5 – 8.0 Ω (at 20°C)
90 – 47	Oxygen sensor heater (rear)	11 – 18 Ω (at 20°C)

CHECK AT THE THROTTLE VALVE CONTROLLER TERMINALS**TERMINAL VOLTAGE CHECK CHART****Throttle Valve Controller Terminal Arrangement**

7FU2121

Terminal No.	Check items	Requirements		Normal value
1	Throttle valve control servo (A+)	● Ignition switch: ON ● Accelerator pedal: Fully opened → fully closed		Decreases slightly from system voltage.
9	Throttle valve control servo (B+)			
14	Throttle valve control servo (A−)	● Ignition switch: ON ● Accelerator pedal: Fully closed → fully opened		Decreases slightly (approx. 2 V) from system voltage.
15	Throttle valve control servo (B−)			
2	Power supply to throttle valve control servo	Ignition switch: ON		System voltage
19				
5	Power supply	Ignition switch: ON		System voltage
6	Sensor voltage	Ignition switch: ON		4.5 – 5.5 V
7	Throttle position sensor (1st channel)	Ignition switch: ON	Release the accelerator pedal.	0.45 – 0.8 V
			Depress the accelerator pedal fully.	3.9 – 4.9 V
20	Accelerator pedal position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	0.7 – 1.4 V* ¹
			Depress the accelerator pedal fully.	4.1 V or more* ¹

NOTE:Check that the voltage difference between *¹ and *² is 4 V or more.



ON-VEHICLE SERVICE

Caution

- (1) Never attempt to tamper the fixed SAS. The fixed SAS is precisely adjusted at factory.
- (2) Should it be tampered, the full closed position of the throttle valve will be changed. This causes the engine-ECU to learn a wrong position of the throttle valve.

FUEL PRESSURE TEST

MEASUREMENT OF FUEL LOW PRESSURE BETWEEN FUEL PUMP (LOW PRESSURE) AND FUEL PUMP (HIGH PRESSURE)

1. Release residual pressure from the fuel pipe line to prevent fuel gush out.

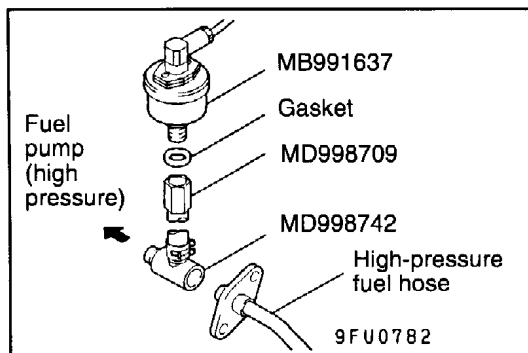
NOTE

Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1) GROUP 13A – On-vehicle Service.

2. Disconnect the high-pressure fuel hose at the fuel pump (high pressure) side.

Caution

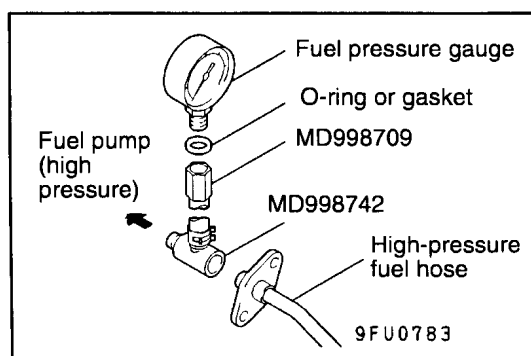
Cover the hose connection with rags to prevent splash of fuel that could be caused by some residual pressure in the fuel pipe line.



3. Remove the union joint and bolt from the special tool (adapter hose) and instead attach the special tool (hose adapter) to the adapter hose.
4. Install the special tool (for measuring the fuel pressure) that was set up in step 3.

<When using the fuel pressure gauge set (special tool)>

- (1) Install the special tool (for measuring the fuel pressure) between the high-pressure fuel hose and the fuel pump (high pressure).
- (2) Install the fuel pressure gauge set (special tool) on the special tool (for measuring the fuel pressure) putting the gasket between them.
- (3) Connect the lead wire of the fuel pressure gauge set (special tool) to the power supply (cigarette lighter socket) and to the MUT-II.



<When using the fuel pressure gauge>

- (1) Install the fuel pressure gauge on the special tool (for measuring the fuel pressure) putting a suitable O-ring or gasket between them.
- (2) Install the special tool which was set up in step (1) between the high-pressure fuel hose and the fuel pump (high pressure).

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

Caution

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

6. Turn the ignition switch to ON. (But do not start the engine.)
7. Select "Item No. 07" from the MUT-II Actuator test to drive the fuel pump (low pressure) at the fuel tank side. Check that there are no fuel leaks from any parts.
8. Finish the actuator test or turn the ignition switch to OFF.
9. Start the engine and run at idle.
10. Measure fuel pressure while the engine is running at idle.

Standard value: approximately 324 kPa

11. Check to see that fuel pressure at idle does not drop even after the engine has been raced several times.
12. If fuel pressure is out of the standard value, troubleshoot and repair according to the table below.

Symptom	Probable cause	Remedy
• Fuel pressure too low • Fuel pressure drops after racing	Clogged fuel filter	Replace fuel filter
	Fuel leaking to return side due to poor fuel pressure regulator (low pressure) valve seating or settled spring	Replace fuel pressure regulator (low pressure)
	Low fuel pump (low pressure) delivery pressure	Replace the fuel pump (low pressure)
Fuel pressure too high	Binding valve in fuel pressure regulator (low pressure)	Replace fuel pressure regulator (low pressure)
	Clogged fuel return hose or pipe	Clean or replace hose or pipe

13. Stop the engine and check change of fuel pressure gauge reading. Normal if the reading does not drop within 2 minutes. If it does, observe the rate of drop and troubleshoot and repair according to the table below.

Symptom	Probable cause	Remedy
Fuel pressure drops gradually after engine is stopped	Leaky fuel pressure regulator (low pressure) valve seat	Replace fuel pressure regulator (low pressure)
Fuel pressure drops sharply immediately after engine is stopped	Check valve in fuel pump (low pressure) is held open	Replace the fuel pump (low pressure)

14. Release residual pressure from the fuel pipe line.

NOTE

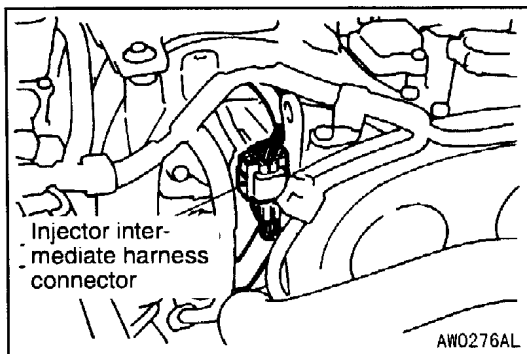
Refer to the '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1) GROUP 13A – On-vehicle Service.

15. Remove the fuel pressure gauge and special tools from the fuel pump (high pressure).

Caution

Cover the hose connection with rags to prevent splash of fuel that could be caused by some residual pressure in the fuel pipe line.

16. Replace the O-ring at the end of the high-pressure fuel hose with a new one. Furthermore, apply engine oil to the new O-ring before replacement.
17. Fit the high-pressure fuel hose to the fuel pump (high pressure) and tighten the mounting bolt to specified torque.
18. Check for any fuel leaks by following the procedure in step 7.
19. Disconnect the MUT-II.



MEASUREMENT OF FUEL HIGH PRESSURE BETWEEN FUEL PUMP (HIGH PRESSURE) AND INJECTORS

NOTE

Measurement of the fuel pressure between the fuel pump (high pressure) and the injectors should be carried out after checking that the fuel pressure between the fuel pump (low pressure) and the fuel pump (high pressure) is normal.

1. Connect the MUT-II to the diagnosis connector.
2. Disconnect the injector intermediate harness connector.
3. Turn the ignition switch to ON.
4. Select "Item No. 74" from the MUT-II Data list.
5. Crank the engine continuously for 2 seconds or more, and visually check that there are no fuel leaks from any parts.

Caution

If any fuel leaks appear, stop cranking immediately and repair the source of the leak.

6. Check if the fuel pressure is more than 1 MPa immediately after 20 seconds have passed since cranking was finished.
7. If the fuel pressure is lower than 1 MPa, it means that there is likely to be a leak in the high-pressure fuel system, so this system should be checked.

8. Turn the ignition switch to OFF.
9. Connect the injector intermediate harness connector.
10. Start the engine and run at idle.
11. Measure fuel pressure while the engine is running at idle.

Standard value: 4 – 6.9 MPa

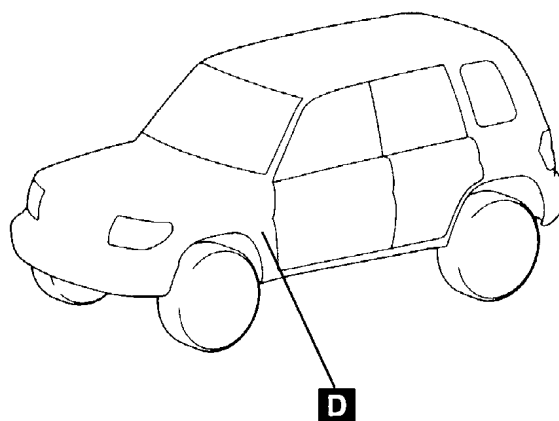
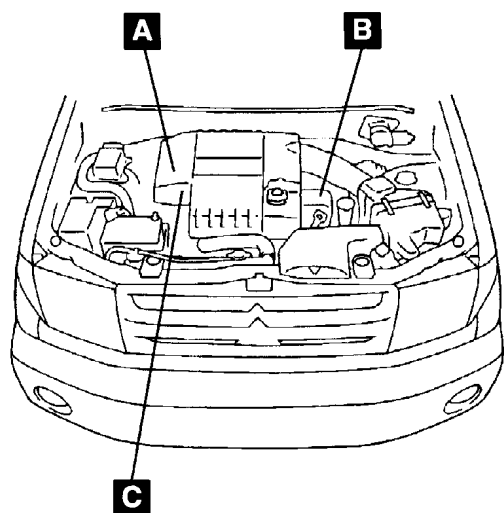
12. Check to see that fuel pressure at idle does not drop even after the engine has been raced several times.
13. If fuel pressure is out of the standard value, troubleshoot and repair according to the table below.

Symptom	Probable cause	Remedy
- Fuel pressure too low - Fuel pressure drops after racing	Fuel leaking to return side due to poor fuel pressure regulator valve seating or settled spring in the fuel pump (high pressure).	Replace the fuel pump (high pressure)
	Low fuel pump (high pressure) delivery pressure	Replace the fuel pump (high pressure)
Fuel pressure too high	Clogged fuel pressure regulator valve in the fuel pump (high pressure)	Replace the fuel pump (high pressure)
	Clogged fuel return hose or pipe	Clean or replace hose or pipe

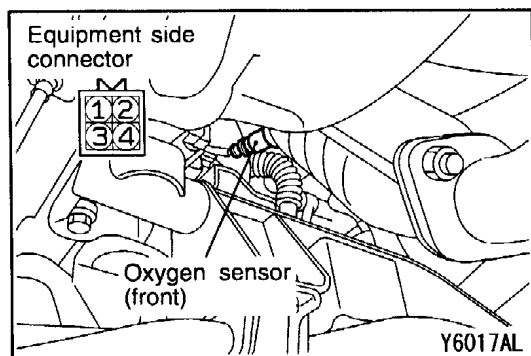
14. Stop the engine and turn the ignition switch to OFF.
15. Disconnect the MUT-II.

COMPONENT LOCATION

Name	Symbol	Name	Symbol
Fuel pressure sensor	C	Oxygen sensor (front)	B
Ignition failure sensor	A	Oxygen sensor (rear)	D



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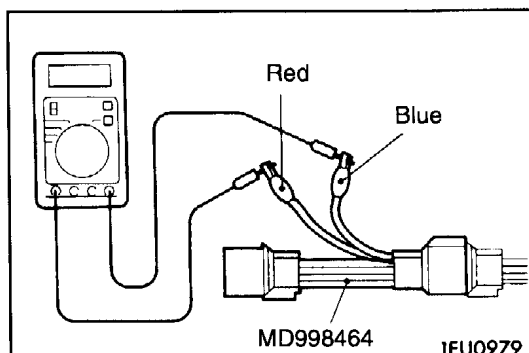


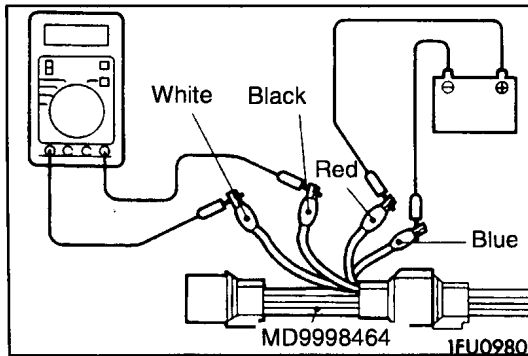
Y6017AL

OXYGEN SENSOR CHECK

<Oxygen sensor (front)>

1. Disconnect the oxygen sensor connector and connect the special tool (test harness) to the connector on the oxygen sensor side.
2. Make sure that there is continuity ($4.5 - 8.0 \Omega$ at 20°C) between terminal 1 (red clip of special tool) and terminal 3 (blue clip of special tool) on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until engine coolant is 80°C or higher.





5. Use a jumper wire to connect terminal 1 (red clip) of the oxygen sensor connector to the battery (+) terminal and terminal 3 (blue clip) to the battery (-) terminal.

Caution

Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.

6. Connect a digital voltage meter between terminal 2 (black clip) and terminal 4 (white clip).
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

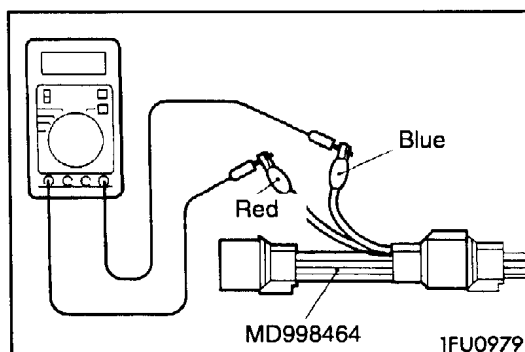
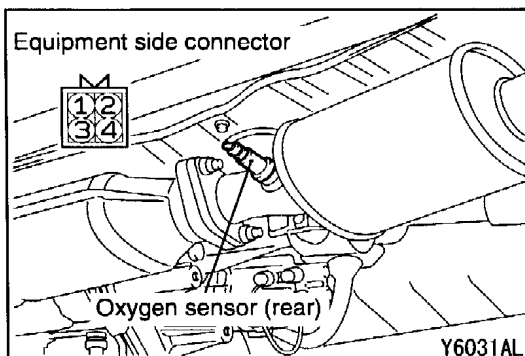
Standard value:

Engine	Oxygen sensor output voltage	Remarks
When racing the engine	0.6 – 1.0 V	If you make the air/fuel ratio rich by racing the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

8. If the sensor is defective, replace the oxygen sensor.

NOTE

For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Pipe and Main Muffler.



<Oxygen sensor (rear)>

1. Disconnect the oxygen sensor connector and connect the special tool (test harness set) to the connector on the oxygen sensor side.
2. Make sure that there is continuity (11 – 18 Ω at 20°C) between terminal 1 (red clip of special tool) and terminal 3 (blue clip of special tool) on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.

NOTE

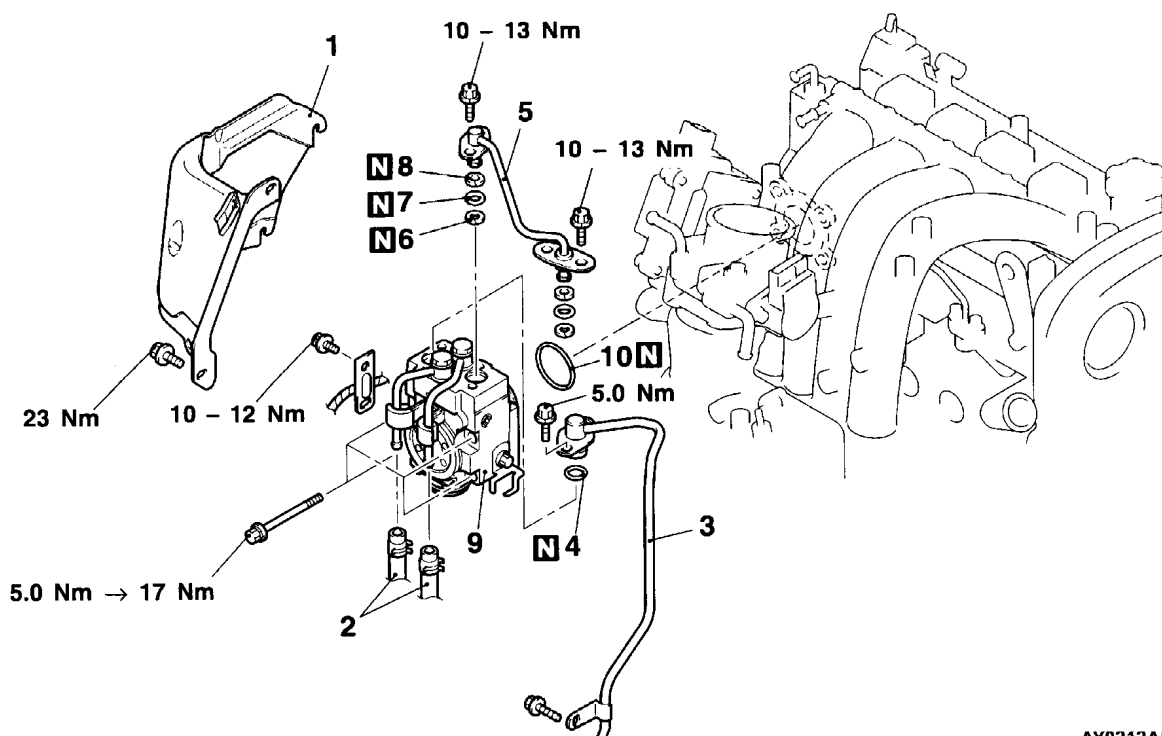
- (1) If the MUT-II does not display the standard value although no abnormality is found by the above mentioned continuity test and harness check, replace the oxygen sensor (rear).
- (2) For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Pipe and Main Muffler.

FUEL PUMP (HIGH PRESSURE)**REMOVAL AND INSTALLATION****Pre-removal and Post-installation Operation**

- Engine Cover Removal and Installation (Refer to GROUP 11A – Camshaft and Camshaft Oil Seal.)
- Prevention of Fuel Discharge <before removal only>
- Fuel Leak Check <after installation only>
- High-pressure Fuel Line Air Bleeding <after installation only> (P.13A-116.)
- Resonance Tank Removal and Installation



Apply engine oil to all O-rings during installation.



AY0212AL

Removal steps

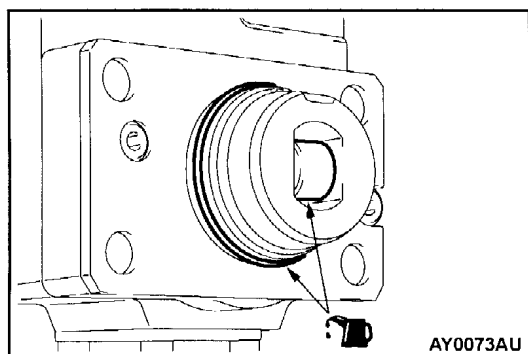
1. Fuel pump protector
2. Fuel return hose connection
3. Fuel pressure hose connection
4. O-ring
5. Fuel pipe



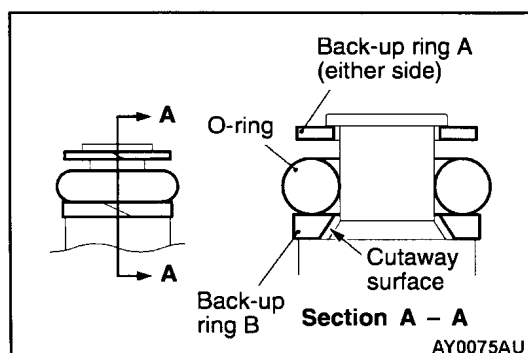
6. Back-up ring A
7. O-ring
8. Back-up ring B
9. Fuel pump (high-pressure)
10. O-ring

REMOVAL SERVICE POINT**◀A▶ FUEL PUMP PROTECTOR REMOVAL**

Jack up the transmission, and create sufficient clearance between the engine and the front deck. Then remove the fuel pump protector.

**INSTALLATION SERVICE POINTS****▶A◀ FUEL PUMP (HIGH-PRESSURE) INSTALLATION**

1. Apply clean engine oil to the O-ring and the roller of the fuel pump (high-pressure).
2. Insert the fuel pump (high-pressure) into the cylinder head mounting hole squarely, and finger-tighten the mounting bolts. The mounting bolts should be tightened securely at step ▶B◀.

**▶B◀ BACK-UP RING B/O-RING/BACK-UP RING A/FUEL PIPE INSTALLATION**

1. Install the back-up rings and the O-ring as shown in the illustration.

Caution

(1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.

(2) Confirm the outer diameter of the back-up ring A. Take care not to install the back-up ring for the fuel pressure sensor by mistake. (Outer diameter of the back-up ring A: 14.8 mm)

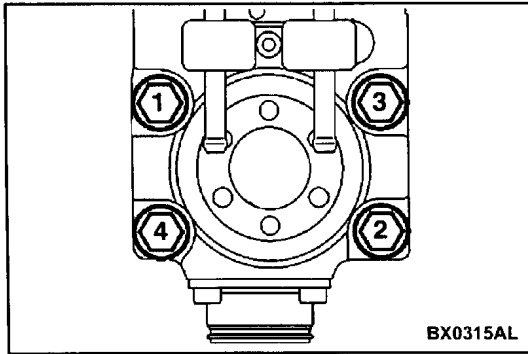
2. Apply a small amount of fresh engine oil to the O-ring.

Caution

Take care not to let any of the engine oil get inside the fuel pump (high-pressure) or the delivery pipe assembly.

3. Install the fuel pipe into the fuel pump (high pressure) and the delivery pipe ports squarely. Insert the pipe securely, being careful not to twisting it, and then tighten the mounting bolts to the specified torque.

Tightening torque: 10 – 13 Nm



4. Tighten the fuel pump (high-pressure) mounting bolts to 5.0 Nm in the order shown.
5. Tighten the mounting bolts to 17 Nm in the sequence shown as second stage. The final tightening torques should not vary more than 2.0 Nm.

►C◀ O-RING/FUEL PRESSURE HOSE INSTALLATION

1. Apply a small amount of fresh engine oil to the O-ring.

Caution

Take care not to let any of the engine oil get inside the fuel pump (high pressure).

2. While being careful not to damage the O-ring, turn the fuel pressure hose to the left and right and connect it to the fuel pump (high pressure). After connecting, check that the hose turns smoothly.
3. If the hose does not turn smoothly, the cause may be that the O-ring is getting caught. Disconnect the hose, check the O-ring for damage and re-connect the hose to the fuel pump (high pressure) and then re-check.
4. Tighten the fuel pressure hose mounting bolts to the specified torque.

Tightening torque: 5.0 Nm

AIR-BLEEDING HIGH-PRESSURE FUEL LINE

1. Run the engine at 2000 r/min for at least 15 seconds in order to bleed air from the high-pressure fuel line.

NOTE

If air is trapped in the high-pressure fuel line due to the removal of fuel pipe, diagnosis code No. P.0190 will be set as abnormal fuel pressure.

2. Finally confirm diagnosis code by using the MUT-II. If diagnosis code, which indicates defective fuel pressure sensor system, has been set, erase the code.

INJECTOR

REMOVAL AND INSTALLATION

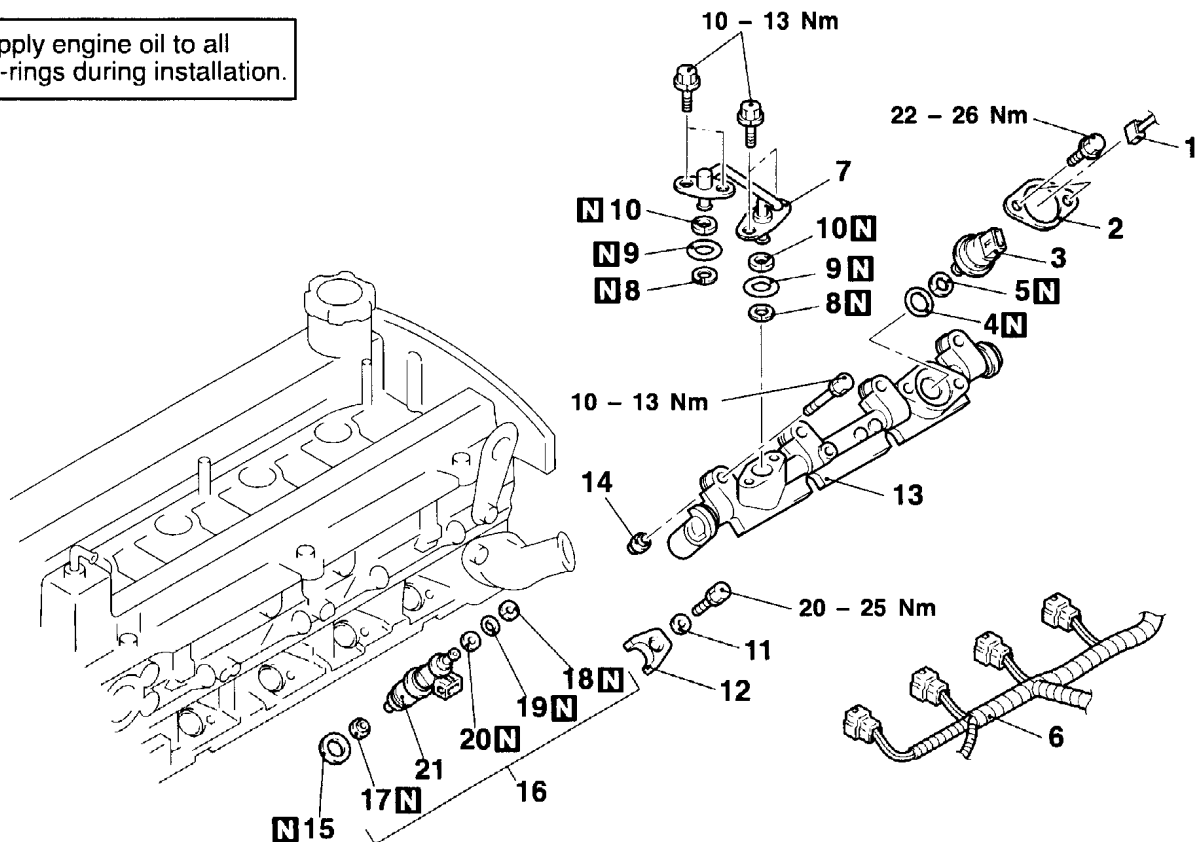
Caution

1. Disconnect the negative battery cable prior to the service work.
2. The injector driver may be hot immediately after each operation, and high voltage and current flows between the injector driver and the injectors while the engine is running. Handle the injector driver carefully.

Pre-removal and Post-installation Operation

- Engine Cover Removal and Installation (Refer to GROUP 11A – Camshaft and Camshaft Oil Seal.)
- Prevention of Fuel Discharge <before removal only>
- Fuel Leak Check <after installation only>
- High-pressure Fuel Line Air Bleeding <after installation only> (P.13A-116.)

 Apply engine oil to all O-rings during installation.



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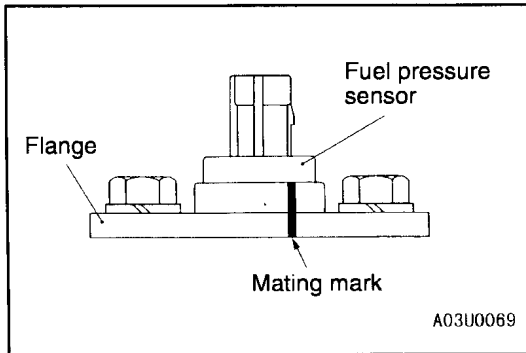
Fuel pressure sensor removal steps

- ◀A▶ ▶E▶
▶E▶
▶D▶
▶D▶
1. Fuel pressure sensor connector
 2. Flange
 3. Fuel pressure sensor
 4. O-ring
 5. Back-up ring

Injector removal steps

- ▶C▶
▶C▶
▶C▶
- Intake manifold (Refer to GROUP 15.)
6. Injector connector
 7. Fuel pipe
 8. Back-up ring A
 9. O-ring

- ▶C▶
▶B▶
▶B▶
▶B▶
▶B▶
▶B▶
▶B▶
▶A▶
▶A▶
▶A▶
▶A▶
10. Back-up ring B
 11. Injector washer
 12. Injector holder
 13. Delivery pipe assembly
 14. Insulator
 15. Injector gasket
 16. Injector assembly
 17. Corrugated washer
 18. Back-up ring A
 19. O-ring
 20. Back-up ring B
 21. Injector



REMOVAL SERVICE POINT

◀A▶ FLANGE REMOVAL

If the fuel pressure sensor is reused, make mating marks on the sensor and the flange before removal.

NOTE

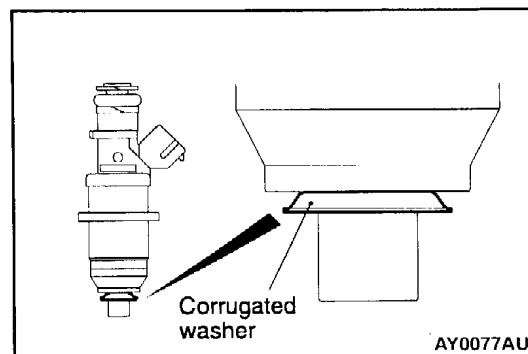
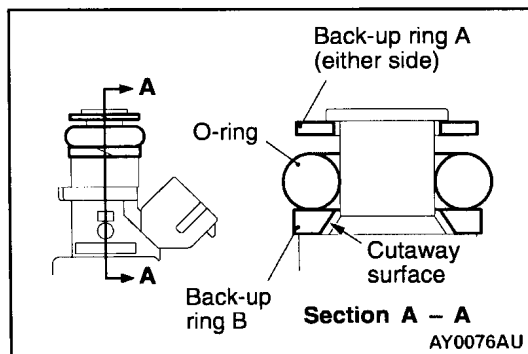
The sealing performance and the installation rigidity of the fuel pressure sensor can be secured by deforming the flange when the sensor is installed. Therefore, the flange must be reinstalled on the same side and phase as it is removed. In addition, if the fuel pressure sensor is replaced, it should be always replaced together with the flange.

◀B▶ DELIVERY PIPE ASSEMBLY/INJECTOR ASSEMBLY REMOVAL

Remove the delivery pipe assembly with the injector assembly still attached.

Caution

Be careful not to drop the injector assembly when removing the delivery pipe assembly.



INSTALLATION SERVICE POINTS

▶A◀ BACK-UP RING B/O-RING/BACK-UP RING A /CORRUGATED WASHER INSTALLATION

1. Install the back-up rings and the O-ring as shown in the illustration.

Caution

(1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.

(2) Confirm the outer diameter of the back-up ring A. Take care not to install the back-up ring for the fuel pressure sensor by mistake. (Outer diameter of the back-up ring A: 14.8 mm)

2. Apply petroleum jelly to the corrugated washer to prevent it from falling off, and install it in the direction shown.

Caution

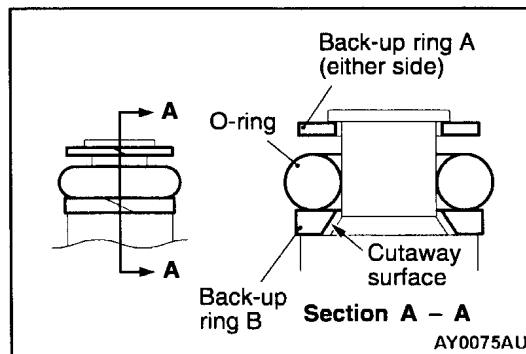
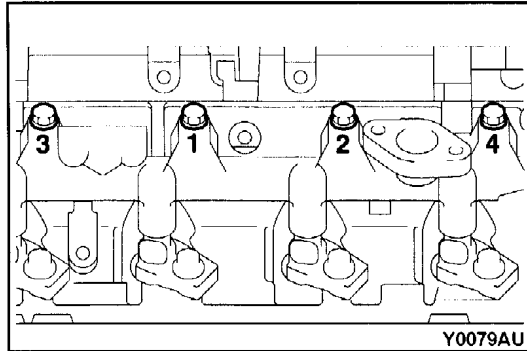
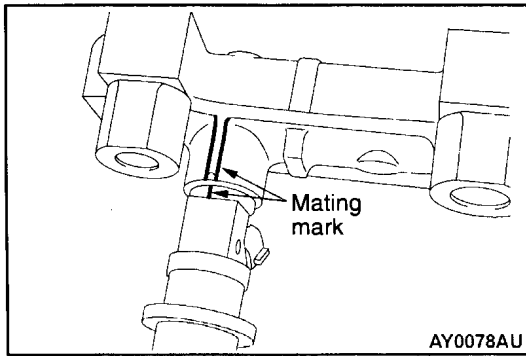
The corrugated washer should always be replaced with a new part. If the corrugated washer is reused, fuel or gas leak may occur.

▶B◀ FUEL INJECTOR ASSEMBLY/INJECTOR GASKET/INSULATOR/DELIVERY PIPE ASSEMBLY/INJECTOR HOLDER/INJECTOR WASHER INSTALLATION

1. Apply a small amount of fresh engine oil to the O-ring.

Caution

Take care not to let any of the engine oil get inside the delivery pipe assembly.



2. Insert the injector assembly into the mounting hole on the delivery pipe squarely. Then check that the fuel injector turns smoothly.
3. If the injector does not turn smoothly, the cause may be that the O-ring is getting caught. Remove the fuel injector, check the O-ring for damage and re-connect the injector to the delivery pipe assembly and then re-check.
4. Align the injector assembly mating mark with the delivery pipe mating mark.
5. Install the injector gasket and the insulator to the cylinder head.
6. Assemble the delivery pipe and injector assembly to the cylinder head, then finger-tighten the mounting bolts.
7. Assemble the injector holder and the injector washer, then tighten the mounting bolts to the specified torque.

Tightening torque: 20 – 25 Nm

8. Tighten the delivery pipe and injector assembly mounting bolts to the specified torque in the order shown.

Tightening torque: 10 – 13 Nm

►C◄ BACK-UP RING B/O-RING/BACK-UP RING A/FUEL PIPE INSTALLATION

1. Install the back-up rings and the O-ring as shown in the illustration.

Caution

(1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.

(2) Confirm the outer diameter of the back-up ring A. Take care not to install the back-up ring for the fuel pressure sensor by mistake. (Outer diameter of the back-up ring A: 14.8 mm)

2. Apply a small amount of fresh engine oil to the O-ring.

Caution

Take care not to let any of the engine oil get inside the fuel pump (high-pressure) or the delivery pipe assembly.

3. Install the fuel pipe into the fuel pump (high pressure) and the delivery pipe ports squarely. Insert the pipe securely, being careful not to twisting it, and then tighten the mounting bolts to the specified torque.

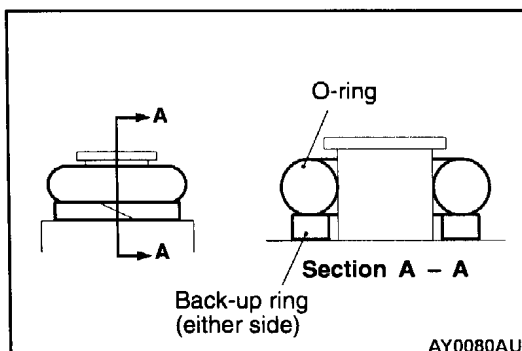
Tightening torque: 10 – 13 Nm

►D◄ BACK-UP RING/O-RING INSTALLATION

Assemble the back-up ring and the O-ring as shown.

Caution

Be careful not to confuse this back-up ring with back-up ring A for the injector or the fuel pipe. (Back-up ring outer diameter: 15.1 mm)

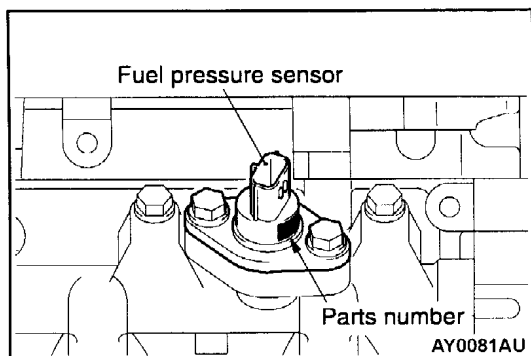


**►E◄ FUEL PRESSURE SENSOR/FLANGE
INSTALLATION**

1. Apply a small amount of fresh engine oil to the O-ring.

Caution

Be careful not to allow the engine oil to enter the delivery pipe.



2. Make the part number on the fuel pressure sensor face as shown.
If the fuel pressure sensor is reused, align the mating marks to install it to the delivery pipe.

Caution

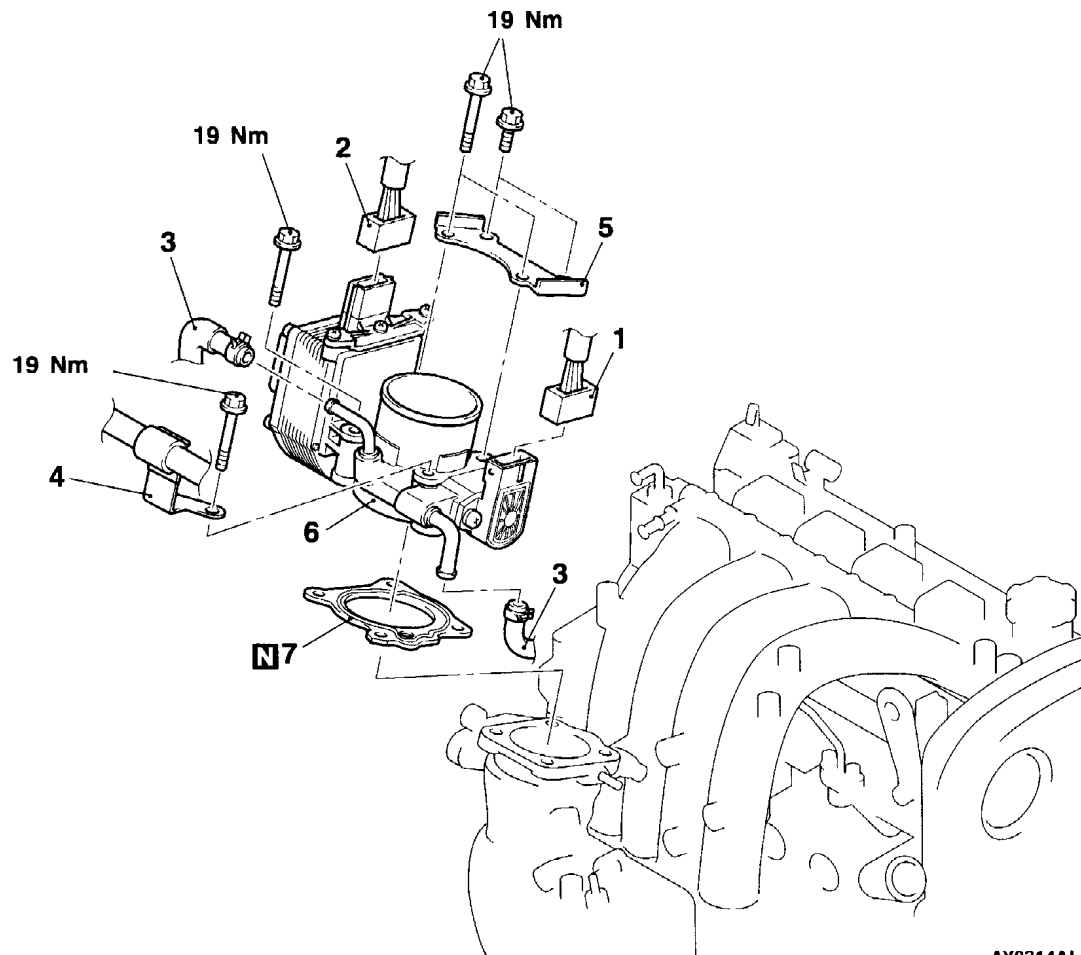
If the fuel pressure sensor is replaced, always replace it together with the flange.

THROTTLE BODY

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying
- Resonance Tank Removal and Installation



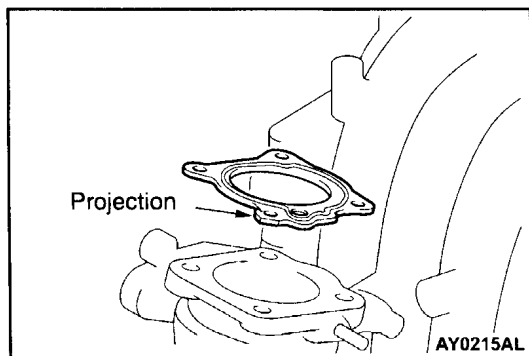
AY0214AL

Removal steps

1. Throttle position sensor connector
2. Throttle control servo connector
3. Water hose connection
4. Brake booster vacuum hose connection



5. Throttle body stay
6. Throttle body assembly
7. Throttle body gasket



INSTALLATION SERVICE POINTS

►A◄ THROTTLE BODY GASKET INSTALLATION

Install the throttle body gasket with its projection facing as shown in the illustration.

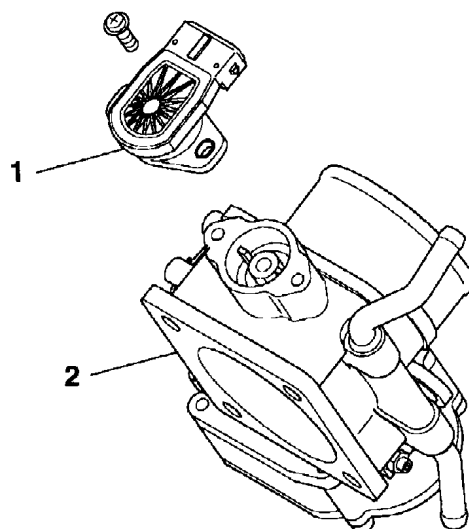
►B◄ THROTTLE BODY ASSEMBLY INSTALLATION

If the throttle body assembly is replaced, initialize the electronic-controlled throttle valve system.

Initialization

Turn on the ignition switch, and turn it to LOCK (OFF) position within one second. Then leave it for at least ten seconds with the ignition switch in LOCK (OFF) position.

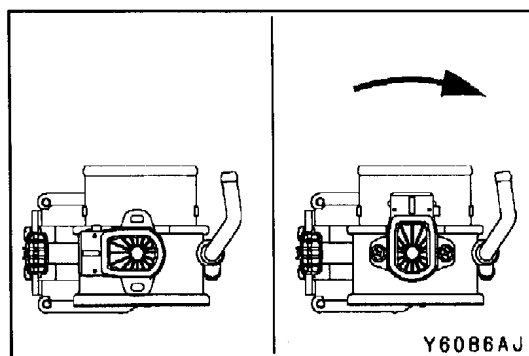
DISASSEMBLY AND REASSEMBLY



Y6085AJ

Disassembly steps

- A◄
1. Throttle position sensor
 2. Throttle body



Y6086AJ

REASSEMBLY SERVICE POINT

►A◄ THROTTLE POSITION SENSOR INSTALLATION

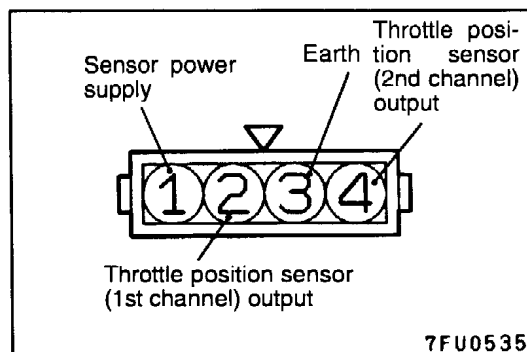
1. Position the throttle position sensor on the throttle body along the dotted line as shown in the illustration.
2. Rotate the throttle position sensor anticlockwise as shown in the illustration, and then tighten the screws.
3. Measure resistance value between terminal Nos. 1 (sensor power supply) and 2 (throttle position sensor 1st-channel output) as well as 1 (sensor power supply) and 4 (throttle position sensor 2nd-channel output).

Normal condition

Open the throttle valve slowly from the idle position to full-open position.

Resistance value changes smoothly in response to throttle valve opening angle.

4. If the resistance value does not change smoothly, replace the throttle position sensor.



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GROUP 15

INTAKE AND EXHAUST

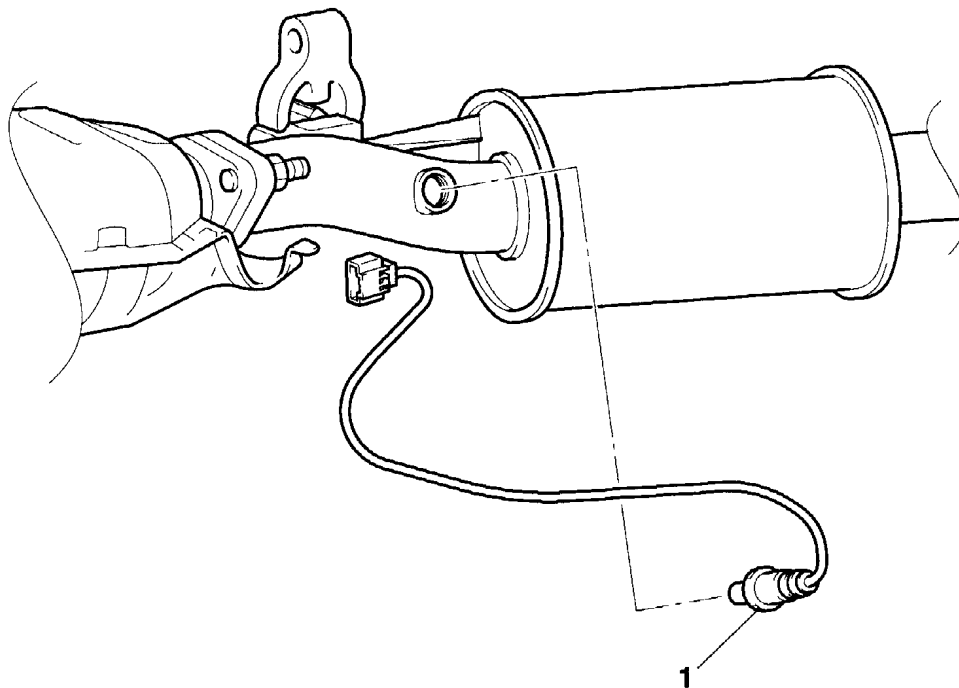
GENERAL

OUTLINE OF CHANGE

Due to the introduction of the oxygen sensor (rear), the following service procedure has been added. The other service procedures are the same as before.

EXHAUST PIPE AND MAIN MUFFLER

REMOVAL AND INSTALLATION

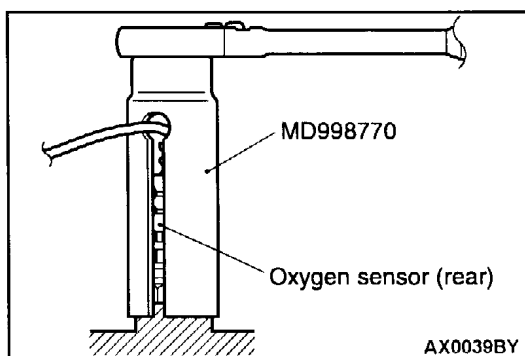


AY0211AL

Removal step



1. Oxygen sensor (rear)



REMOVAL SERVICE POINT

◀▶ OXYGEN SENSOR (REAR) REMOVAL

GROUP 16

ENGINE ELECTRICAL

IGNITION SYSTEM

GENERAL

OUTLINE OF CHANGES

The 4G93-GDI engine has been replaced with the 4G94-GDI engine. Due to this, the following service adjustment procedures have been changed. Other procedures are the same as the conventional 4G93-GDI engine.

- An ignition failure sensor has been added.
- The spark plug type has been changed.

GENERAL INFORMATION

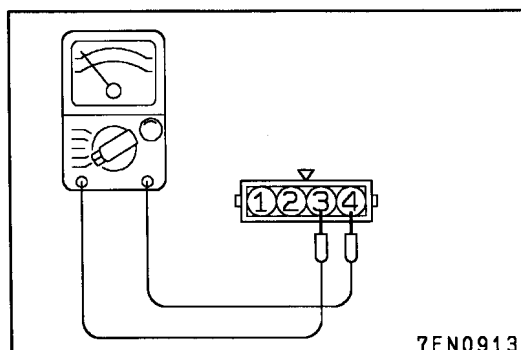
SPARK PLUG SPECIFICATION

Items	Specifications
NGK	IZFR5B

SERVICE INFORMATION

IGNITION FAILURE SENSOR

Items	4G94-GDI
Resistance Ω	0.1 or less



ON-VEHICLE SERVICE

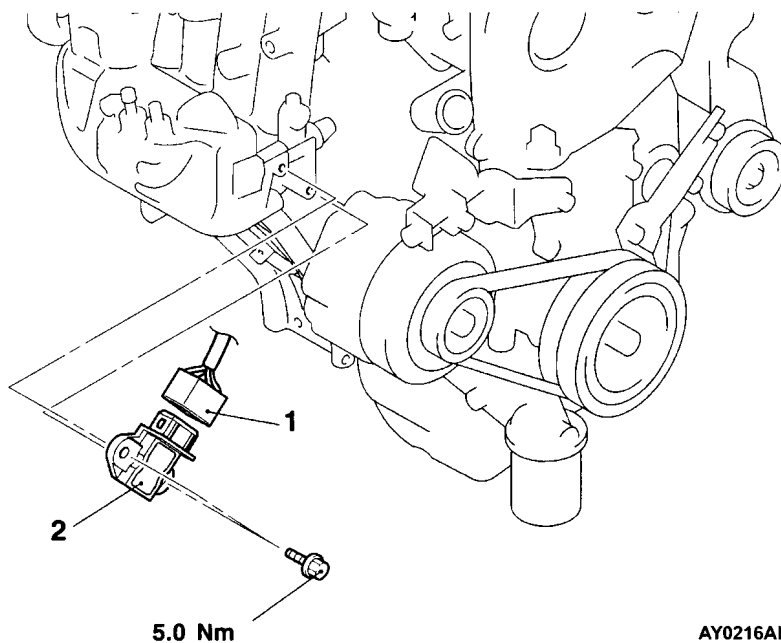
IGNITION FAILURE SENSOR CHECK

NOTE

An analog-type circuit tester should be used.

Check that the resistance between terminals 3 and 4 is at the standard value.

Standard value: 0.1 Ω or less

IGNITION FAILURE SENSOR**REMOVAL AND INSTALLATION**

AY0216AL

Removal steps

1. Ignition failure sensor connector
2. Ignition failure sensor

ENGINE AND EMISSION CONTROL

CONTENTS

EMISSION CONTROL SYSTEM

GENERAL 2

Outline of Change 2

SERVICE SPECIFICATIONS 2

VACUUM HOSE 2

Vacuum Hose Piping Diagram 2

Vacuum Circuit Diagram 3

EVAPORATIVE EMISSION CONTROL SYSTEM 3

Purge Control System Check 3

Purge Port Vacuum Check 4

Purge Control Solenoid Valve Check 4

EMISSION CONTROL SYSTEM

GENERAL

OUTLINE OF CHANGE

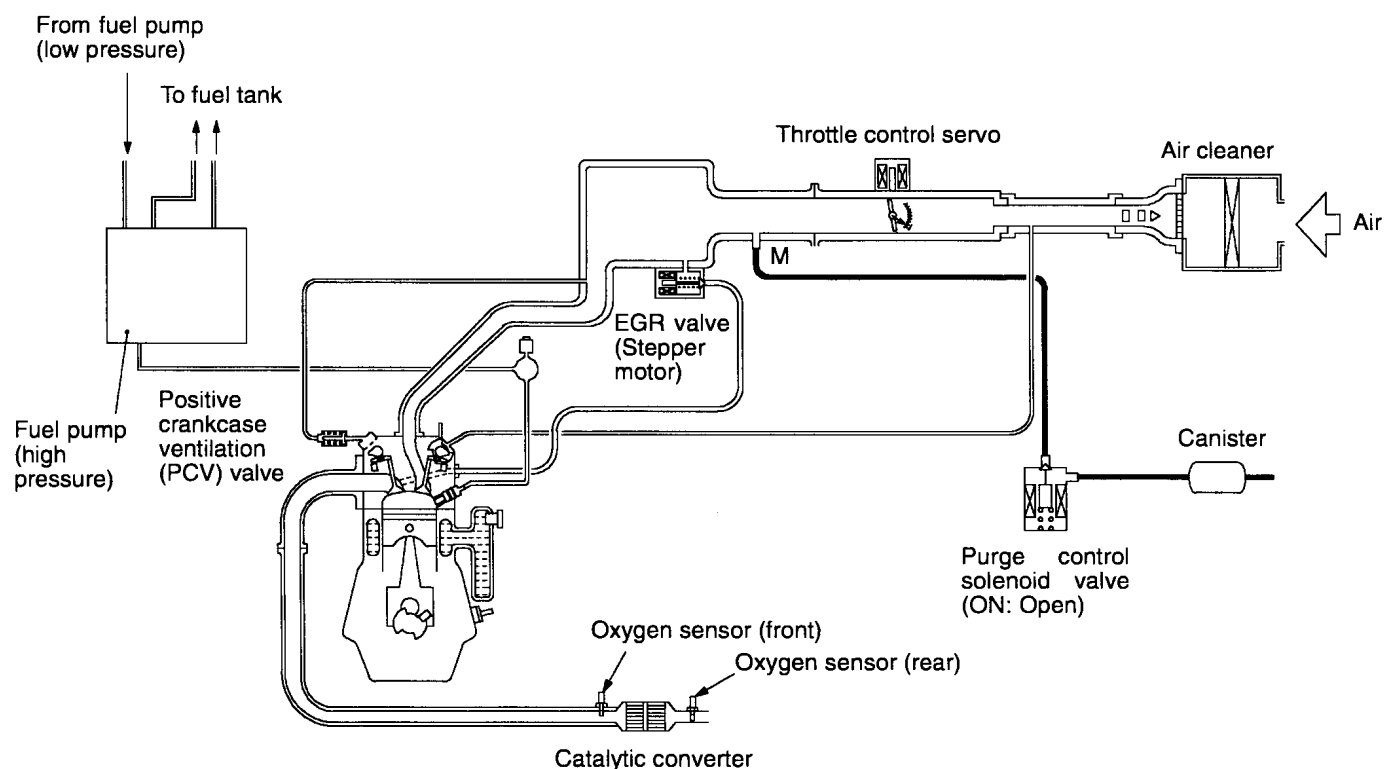
The flow rate of the purge control solenoid valve has been increased and the vacuum line routing has been changed. Due to these changes, the following service procedures have been established. Other items are the same as before.

SERVICE SPECIFICATION

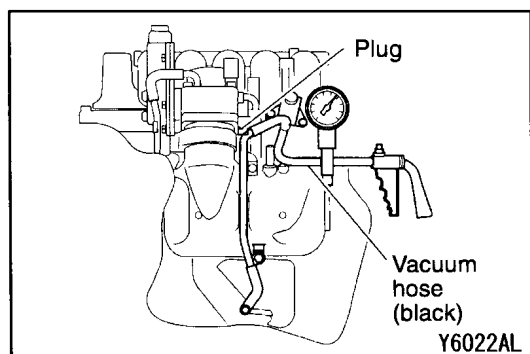
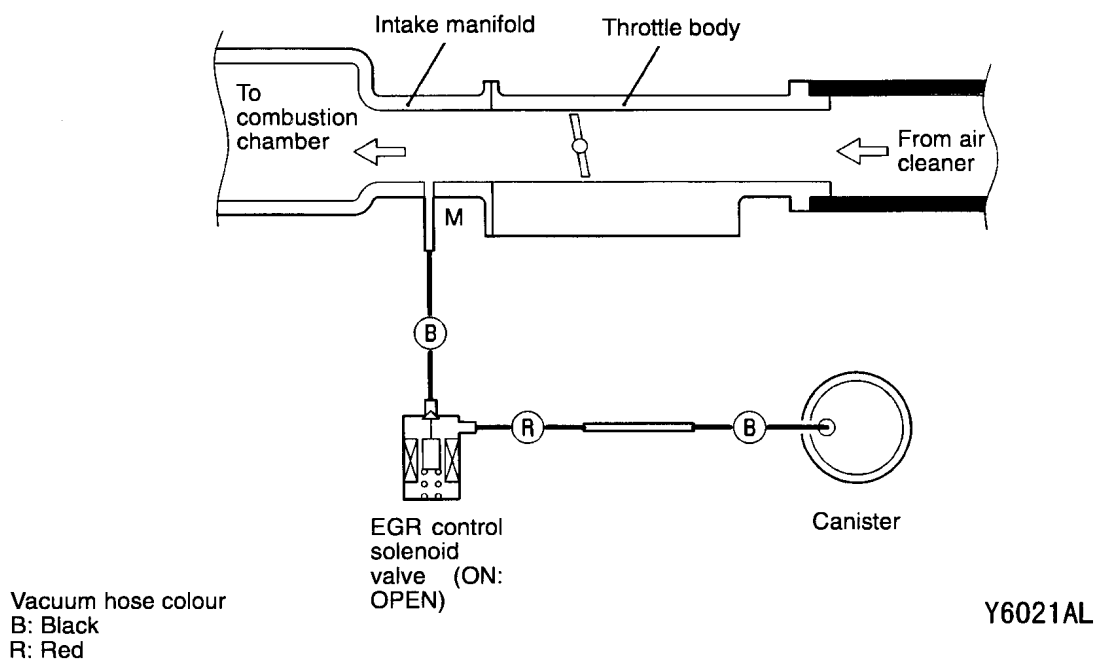
Items	Standard value
EGR control solenoid valve coil resistance (at 20 °C) Ω	30 – 34

VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM



VACUUM CIRCUIT DIAGRAM



EVAPORATIVE EMISSION CONTROL SYSTEM

PURGE CONTROL SYSTEM CHECK

1. Disconnect the vacuum hose (black) from the intake manifold and connect it to a hand vacuum pump.
2. Plug the nipple from which the vacuum hose was removed.
3. When the engine is cold or hot, apply a vacuum of 53 kPa, and check the condition of the vacuum.

When engine is cold

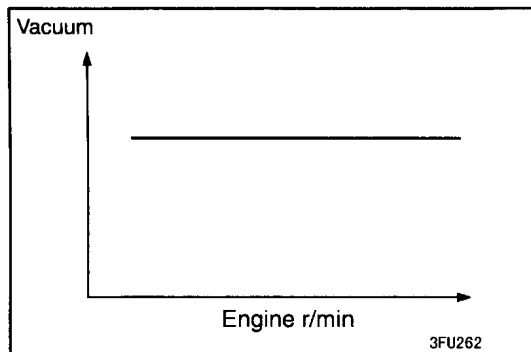
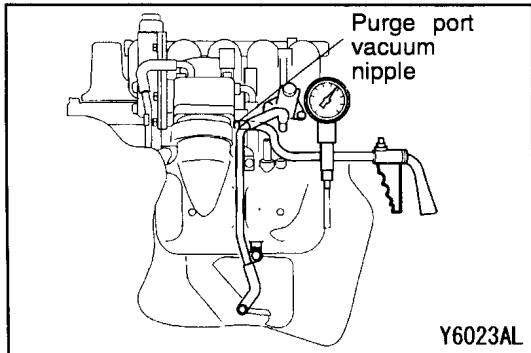
(Engine coolant temperature: 40°C or less)

Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min	

When engine is hot

(Engine coolant temperature: 80°C or higher)

Engine condition	Normal condition
• At idle • Within 4 minutes after the engine has been started	Vacuum is maintained
• 3,000 r/min • Within 3 minutes after the engine has been started	Vacuum will leak.



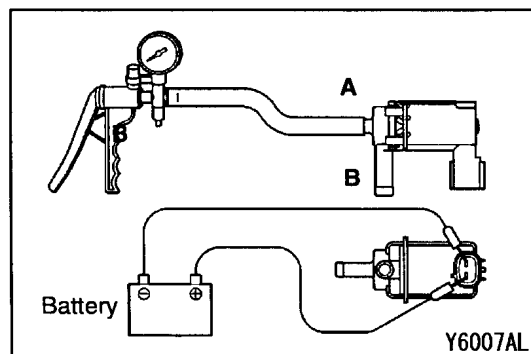
PURGE PORT VACUUM CHECK

1. Disconnect the vacuum hose (black) from the intake manifold purge vacuum nipple and connect a hand vacuum pump to the nipple.

2. Start the engine and check that the vacuum remains fairly constant after racing the engine.

NOTE

If vacuum changes, it is possible that the intake manifold purge port may be clogged and require cleaning.



PURGE CONTROL SOLENOID VALVE CHECK

NOTE

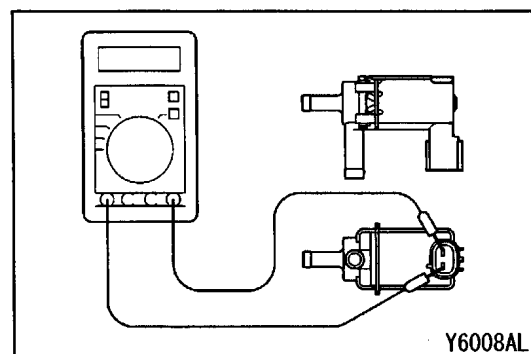
When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

1. Disconnect the vacuum hose (black stripe, red stripe) from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the solenoid valve (refer to the illustration at left).
4. Check airtightness by applying a vacuum with voltage applied directly from the battery to the purge control solenoid valve and without applying voltage.

Battery voltage	Normal condition
Applied	Vacuum leaks
Not applied	Vacuum maintained

5. Measure the resistance between the terminals of the solenoid valve.

Standard value: 30 – 34 Ω (at 20°C)



AUTOMATIC TRANSMISSION

CONTENTS

GENERAL	2	TROUBLESHOOTING <A/T>	2
Outline of Changes	2		

GENERAL

OUTLINE OF CHANGES

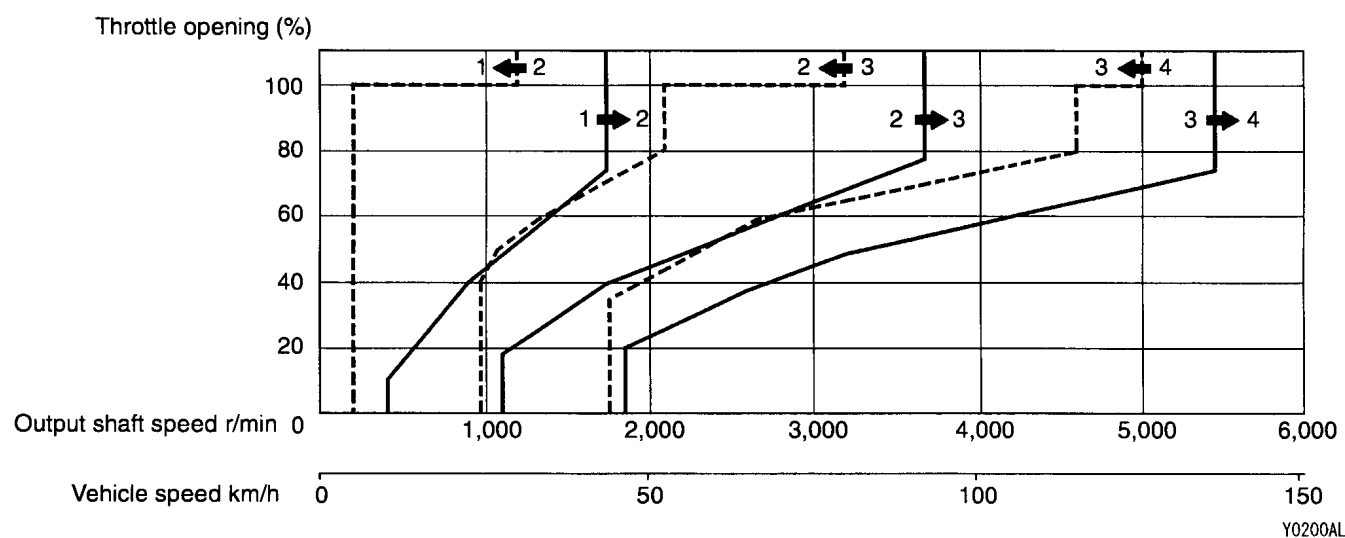
The following service procedures for items which are different from before have been established to correspond to the following changes:

- The A/T-ECU has been changed.
- The shift pattern has been changed.

TROUBLESHOOTING <A/T>

SHIFT PATTERN

D range (Overdrive switch: ON)



INSPECTION CHART FOR DIAGNOSIS CODE

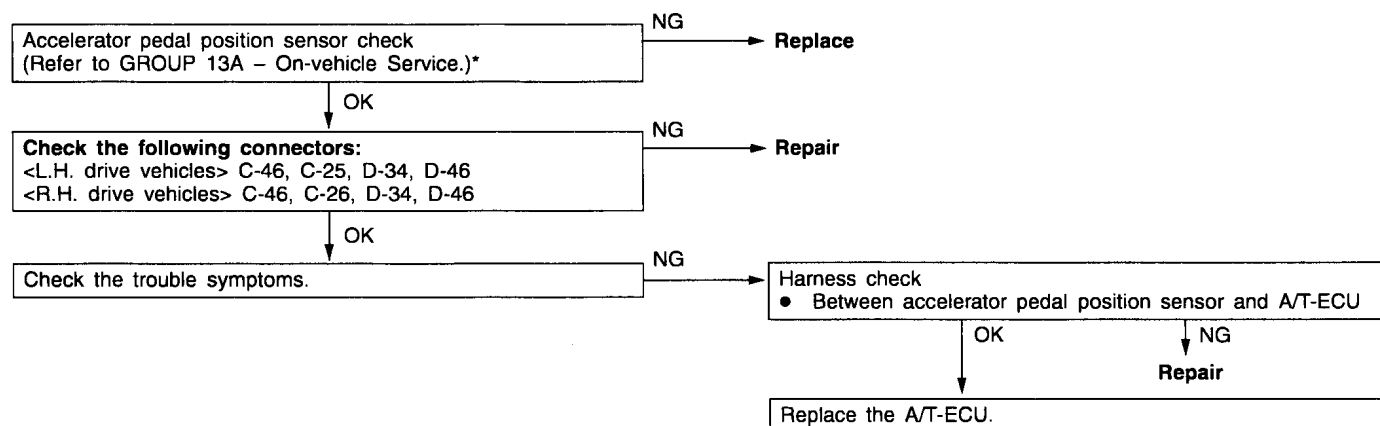
Code	Diagnosis item		Reference page
13	Accelerator pedal position sensor system (Throttle opening voltage)	Sensor malfunction/ open circuit/short circuit	23-3
14	Accelerator pedal position sensor system (Throttle power supply voltage)	Open circuit/short circuit	23-3
15	A/T fluid temperature sensor system	Open circuit	23-4
16	A/T fluid temperature sensor system	Short circuit	23-4
22	Wide open throttle system	Open circuit/short circuit	23-4
29	Inhibitor switch system	Open circuit	23-5
30	Inhibitor switch system	Short circuit	23-5
31	Input shaft speed sensor system	Open circuit	23-6
32	Output shaft speed sensor system	Open circuit	23-6
38	Vehicle speed sensor system	Open circuit	23-7
41	Solenoid valve No. 1 system	Open circuit	23-8
42	Solenoid valve No. 1 system	Short circuit	23-8

Code	Diagnosis item		Reference page
43	Solenoid valve No. 2 system	Open circuit	23-8
44	Solenoid valve No. 2 system	Short circuit	23-8
47	Solenoid valve No. 3 system	Open circuit	23-8
48	Solenoid valve No. 3 system	Short circuit	23-8
55	Abnormal communication with engine-ECU	Open circuit	23-9

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

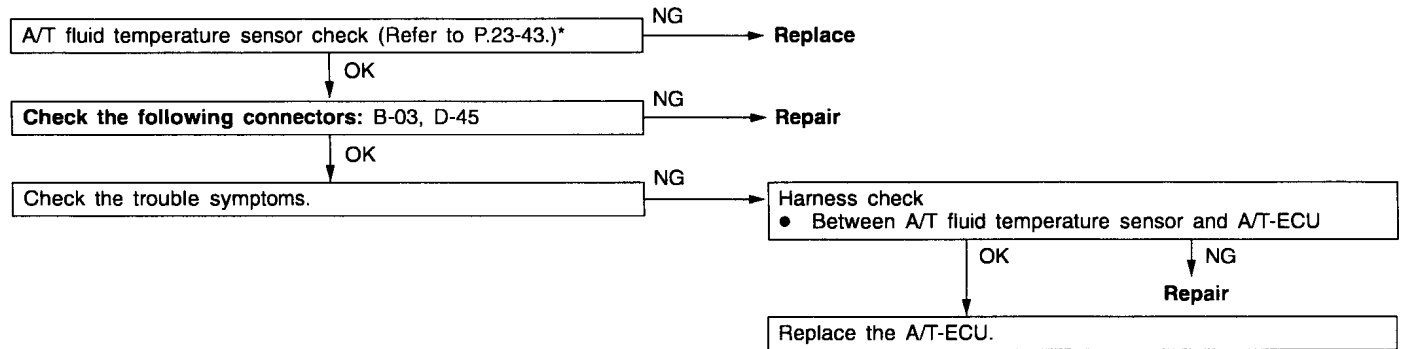
Code No. 13, 14 Accelerator pedal position sensor (APS)	Probable cause
If the APS output voltage (APS opening voltage) is 4.8 V or higher when the engine is idling, the output voltage is judged to be too high and diagnosis code No. 13 is output. If the APS output voltage (APS opening voltage) is 0.335 V or lower when the engine is idling, the output voltage is judged to be too low and diagnosis code No. 14 is output. If the APS output voltage (APS power supply voltage) is 3.0 V or lower or if it is 5.7 V or higher when the engine is idling, the APS is judged to be faulty and diagnosis code No. 14 is output.	• Malfunction of the accelerator pedal position sensor • Malfunction of harness or connector • Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



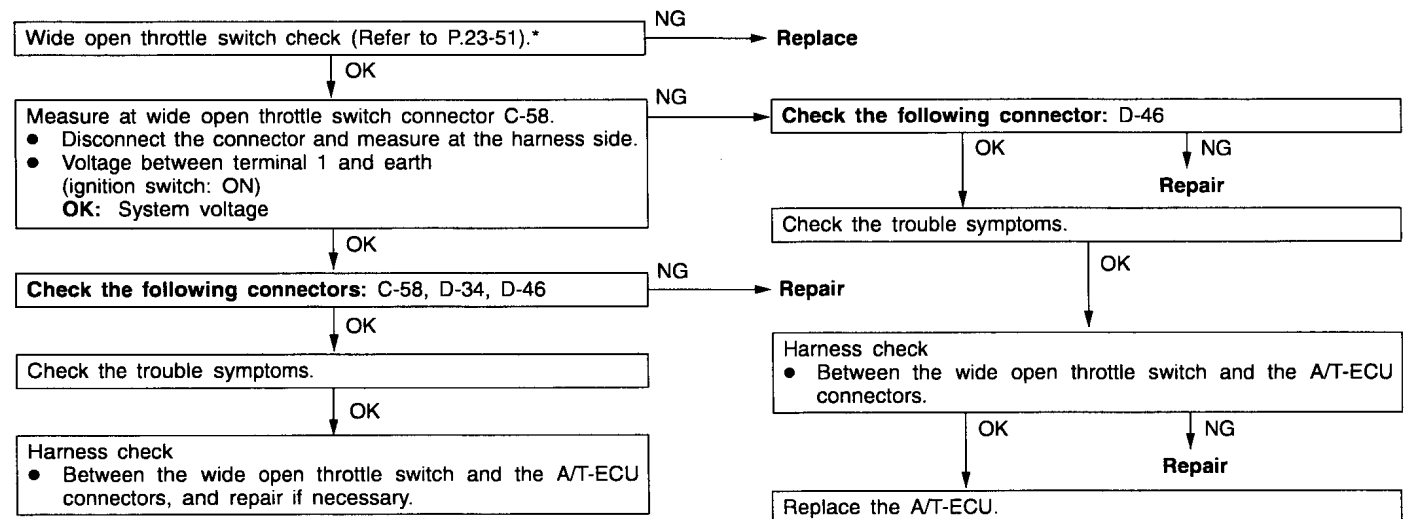
Code No. 15, 16 A/T fluid temperature sensor system	Probable cause
If the A/T fluid temperature sensor output is 10°C or less (5.6 kΩ or more) even after running the engine for 15 minutes or more, it is judged that there is an open circuit in the A/T fluid temperature sensor and diagnosis code No. 15 is output. If the A/T fluid temperature sensor output is 240°C or more (10 kΩ or less), it is judged that there is a short circuit in the A/T fluid temperature sensor and diagnosis code No. 16 is output.	• Malfunction of the A/T fluid temperature sensor • Malfunction of harness or connector • Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



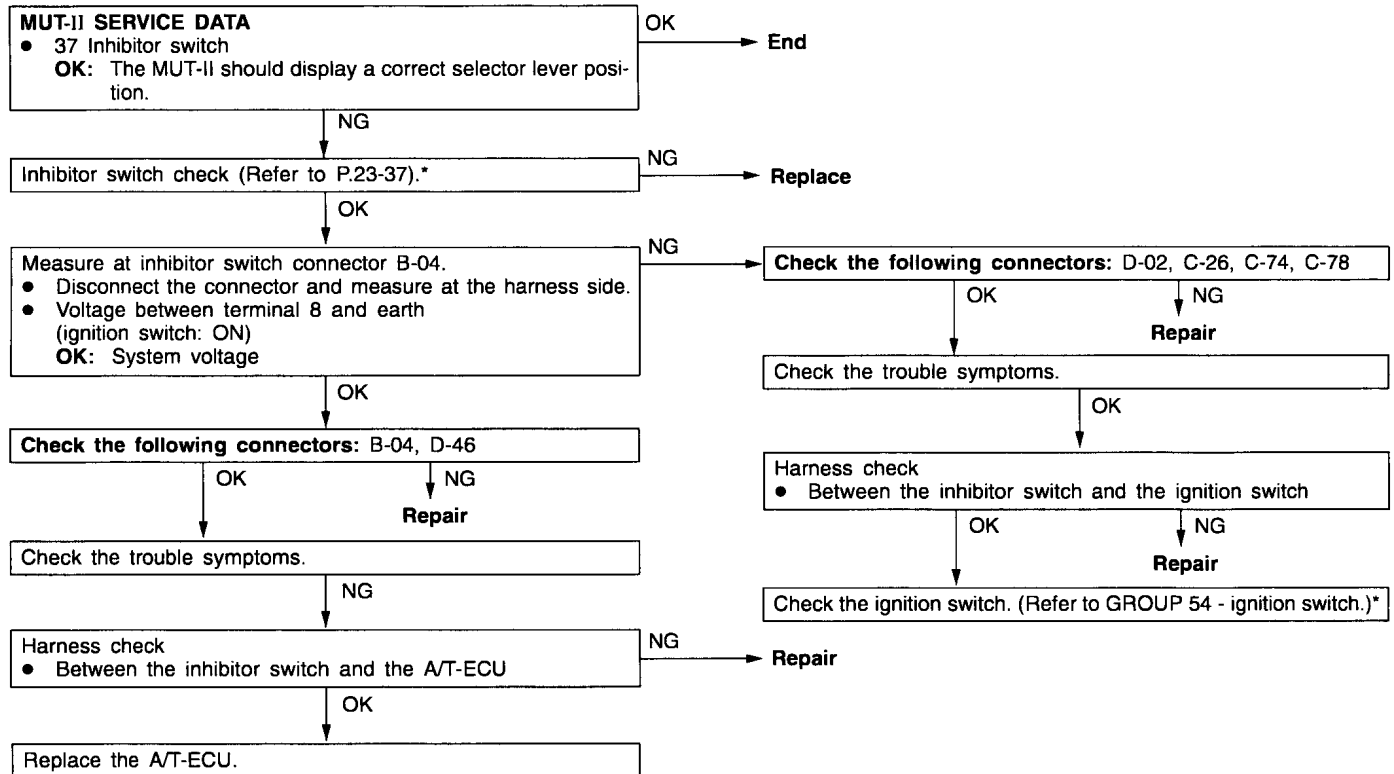
Code No. 22 Wide open throttle switch system	Probable cause
If the wide open throttle switch dose not turn OFF with the accelerator pedal is not depressed, there is a short circuit in the wide open throttle switch and diagnosis code No. 22 is output.	• Malfunction of the wide open throttle switch • Malfunction of harness or connector • Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



Code No. 29, 30 Inhibitor switch system	Probable cause
If the inhibitor switch has not sent any signal for 2 seconds while the ignition switch is on, it is judged that there is an open circuit in the inhibitor switch and diagnosis code No.29 is set. If the inhibitor switch has sent at least two signals simultaneously for 2 seconds while the ignition switch is on, it is judged that there is a short circuit in the inhibitor switch and diagnosis code No.30 is set.	● Malfunction of the inhibitor switch ● Malfunction of harness or ● Malfunction of the A/T-ECU

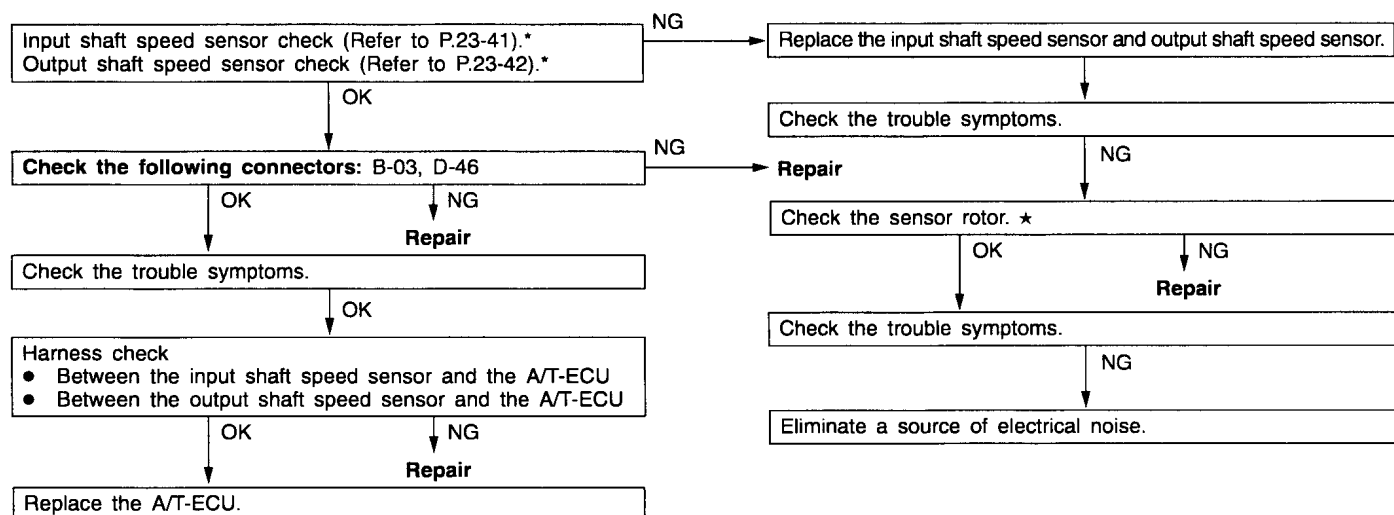
*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



Code No. 31, 32 Input shaft speed sensor system, output shaft speed sensor system	Probable cause
If no output pulse is detected from the input shaft speed sensor for 120 seconds or more while driving in 3rd gear at a speed of 60 km/h or more, there is judged to be an open circuit in the input shaft speed sensor and diagnosis code No. 31 is output. If not output pulse is detected from the output shaft speed sensor for 120 seconds or more while driving in 3rd gear at a speed of 60 km/h or more, there is judged to be an open circuit in the output shaft speed sensor and diagnosis code No. 32 is output.	● Malfunction of the input shaft speed sensor ● Malfunction of the output shaft speed sensor ● Malfunction of harness or connector ● Malfunction of the sensor rotor ● Malfunction of A/T-ECU ● Electrical noise

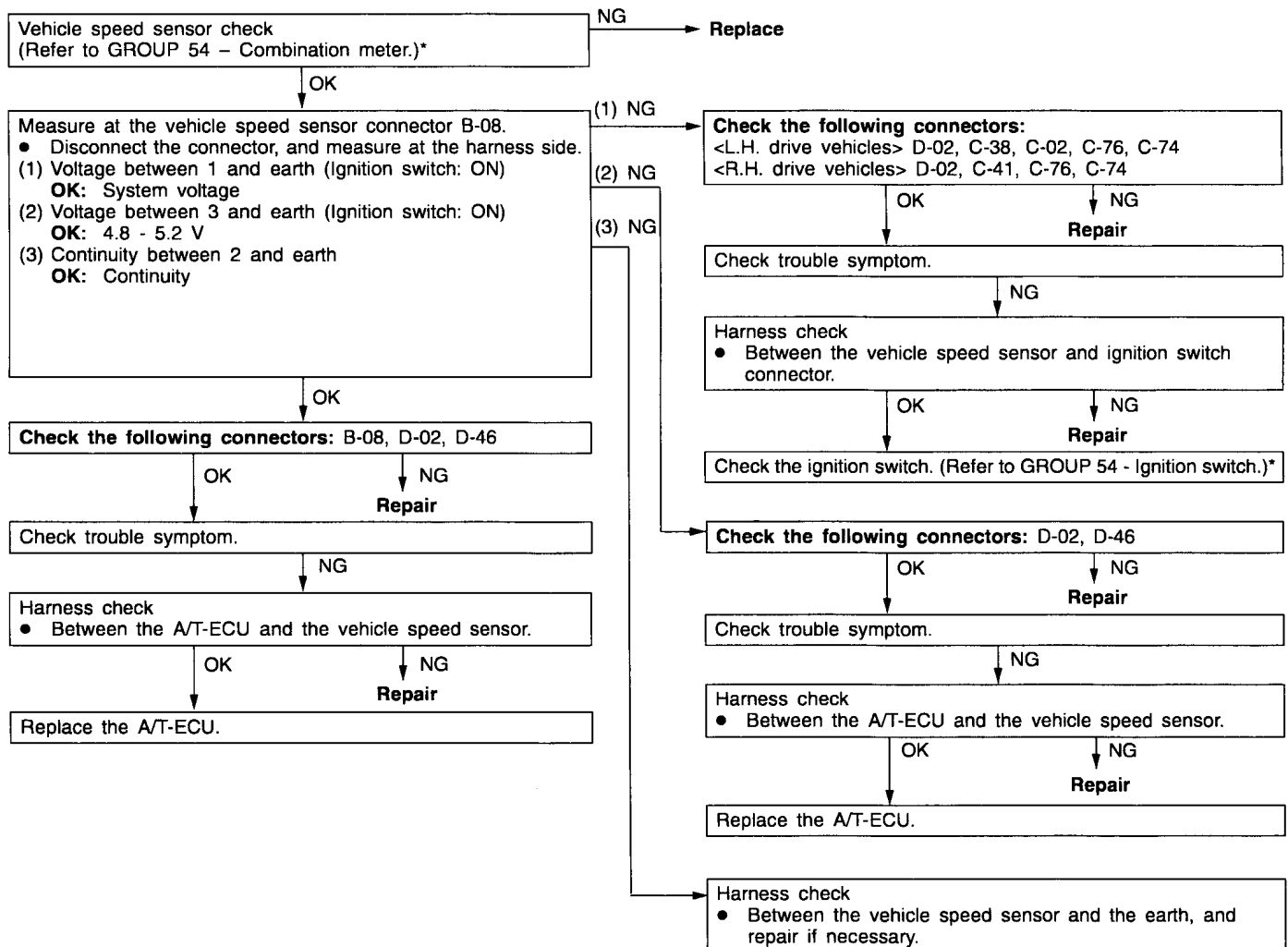
*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).

★: Refer to the Transmission Workshop Manual



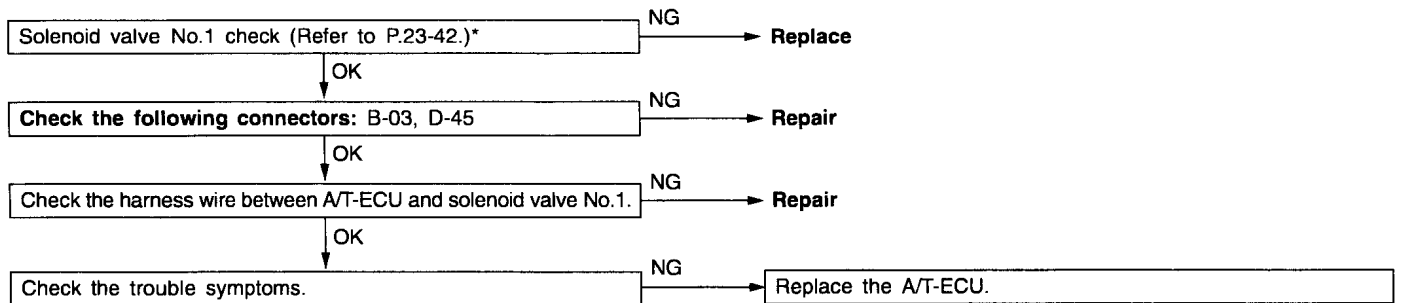
Code No. 38 Vehicle speed sensor system	Probable cause
If no output pulse is detected from the vehicle speed sensor for 120 seconds or more continuously while driving at a speed of 60 km/h or more, there is judged to be an open circuit in the vehicle speed sensor and diagnosis code No. 38 is output.	● Malfunction of the vehicle speed sensor ● Malfunction of harness or connector ● Malfunction of the A/T-ECU ● Malfunction of the ignition switch

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



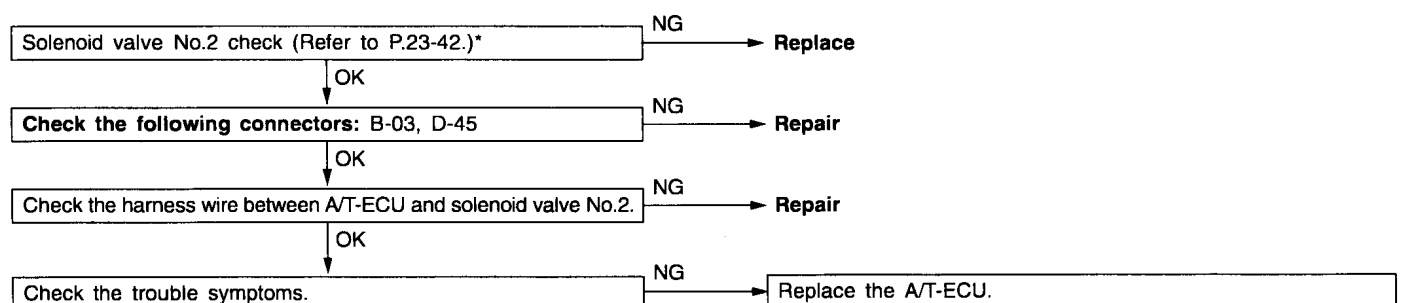
Code No. 41, 42 Solenoid valve No.1 system	Probable cause
If the resistance value for a solenoid valve No.1 is too large, it is judged that there is an open circuit in the solenoid valve No.1 and the diagnosis code No.41 is output. If the resistance value for a solenoid valve No.1 is too small, it is judged that there is a short-circuit in the solenoid valve No.1 and the diagnosis code No.42 is output.	● Malfunction of solenoid valve No.1 ● Malfunction of harness or connector ● Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



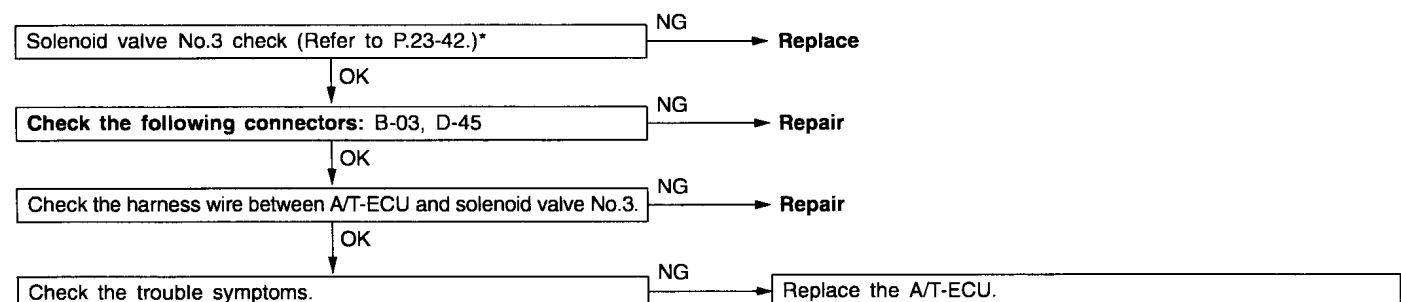
Code No. 43, 44 Solenoid valve No.2 system	Probable cause
If the resistance value for a solenoid valve No.2 is too large, it is judged that there is an open circuit in the solenoid valve No.2 and the diagnosis code No.43 is output. If the resistance value for a solenoid valve No.2 is too small, it is judged that there is a short-circuit in the solenoid valve No.2 and the diagnosis code No.44 is output.	● Malfunction of solenoid valve No.2 ● Malfunction of harness or connector ● Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).

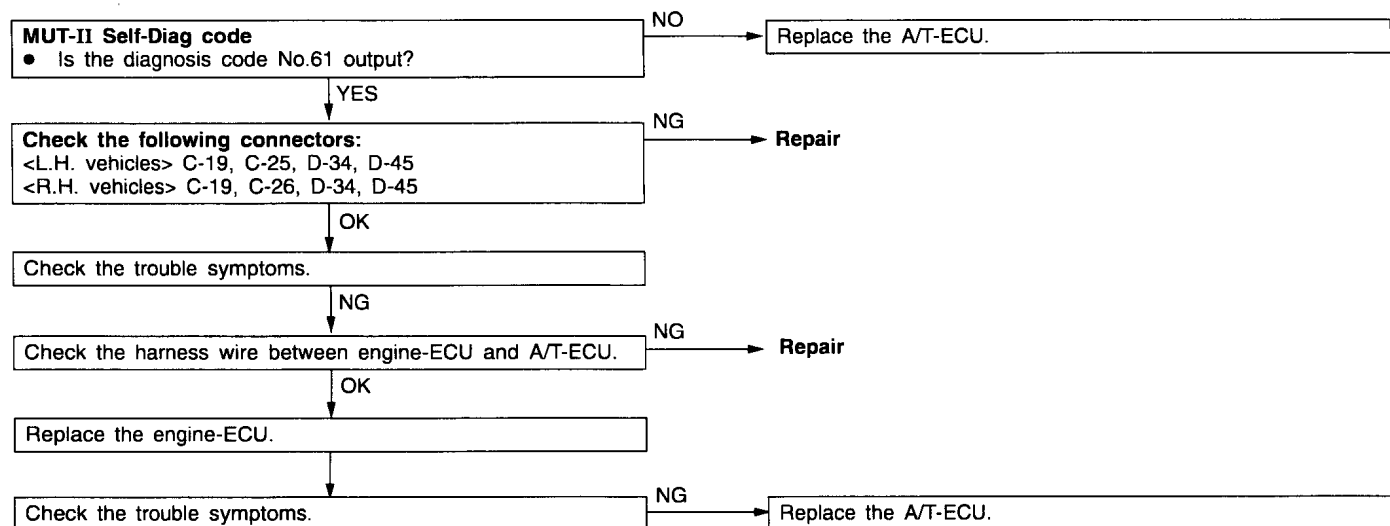


Code No. 47, 48 Solenoid valve No.3 system	Probable cause
If the resistance value for a solenoid valve No.3 is too large, it is judged that there is an open circuit in the solenoid valve No.3 and the diagnosis code No.47 is output. If the resistance value for a solenoid valve No.3 is too small, it is judged that there is a short-circuit in the solenoid valve No.3 and the diagnosis code No.48 is output.	● Malfunction of solenoid valve No.3 ● Malfunction of harness or connector ● Malfunction of the A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



Code No. 55 Abnormal communication with engine-ECU	Probable cause
If normal communication is not possible for a continuous period of 1 second or more when the ignition switch is at the ON position and the battery voltage is 10 V or more, diagnosis code No. 55 is output. Diagnosis code No. 55 is also output if the data being received is abnormal for a continuous period of 1 second under the same conditions.	- Malfunction of harness or connector - Malfunction of the engine-ECU - Malfunction of the A/T-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

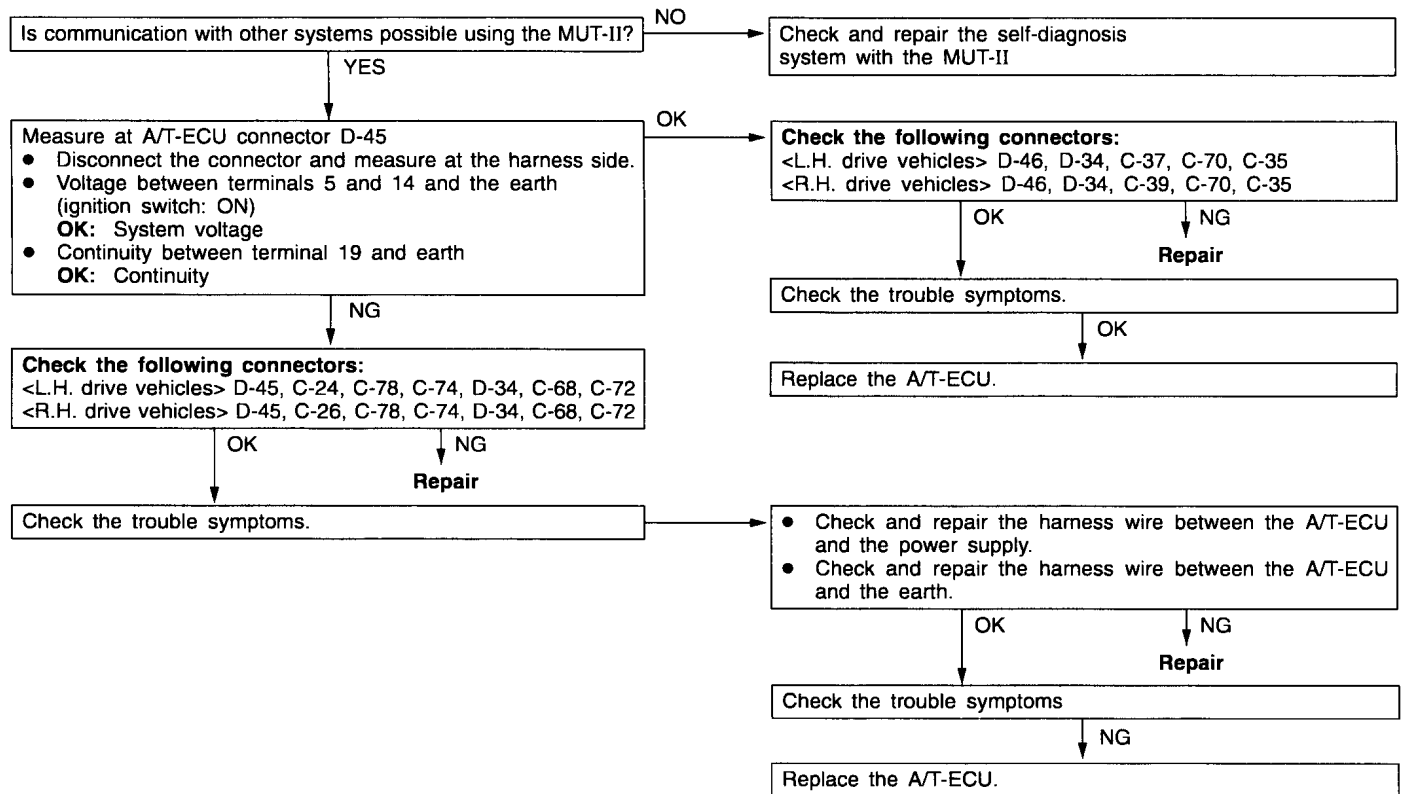
*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).

Trouble symptom		Inspection procedure No.	Reference page
Communication with the MUT-II is not possible		1	23-10
Does not move	Does not move forward and reverse	2	23-17*
	Does not move forward only	3	23-18*
	Does not reverse only	4	23-18*
Malfunction when shifting	Upshifting does not occur	5	23-19*
	Downshifting does not occur	6	23-20*
	Shifting point abnormality	7	23-20*
	Upshifting occurs spontaneously	8	23-21*
	Incorrect drive gear position	9	23-21*
Large shocks		10	23-22*
Slippage (vibration)		11	23-23*
Lockup malfunction		12	23-24*
Abnormal engine braking		13	23-24*
Electronic circuit systems	Overdrive switch system	14	23-11
	Stop lamp switch system	15	23-11

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

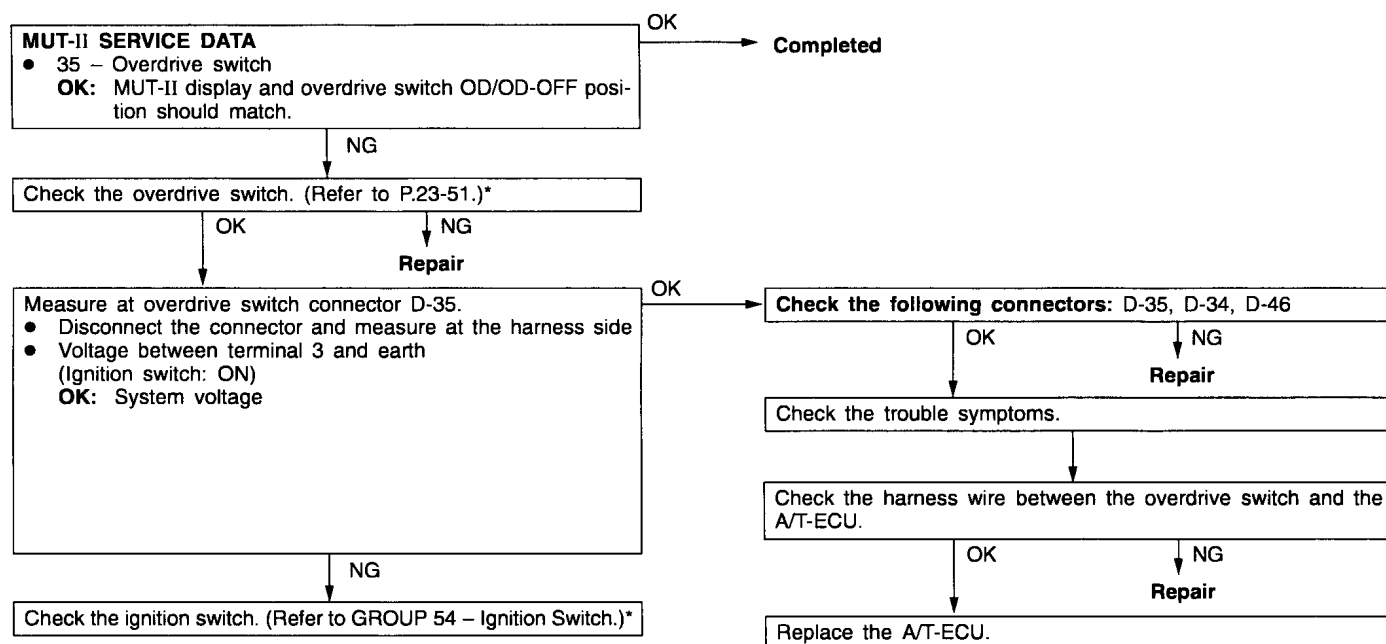
Communication with the MUT-II is not possible	Probable cause
If communication with the MUT-II is not possible, the cause is probably a malfunction in the self-diagnosis system or the A/T-ECU is not functioning.	• Malfunction of self-diagnosis system • Malfunction of A/T-ECU power circuit • Malfunction of A/T-ECU earth circuit • Malfunction of A/T-ECU • Malfunction of harness and connector



INSPECTION PROCEDURE 14

Overdrive switch system	Probable cause
If downshifting does not occur when overdrive switch is turned off while driving in 4th gear, or if shifting to 4th gear is not possible, the cause is probably a problem in the overdrive switch system.	• Malfunction of overdrive switch • Malfunction of harness or connector • Malfunction of A/T-ECU • Malfunction of ignition switch

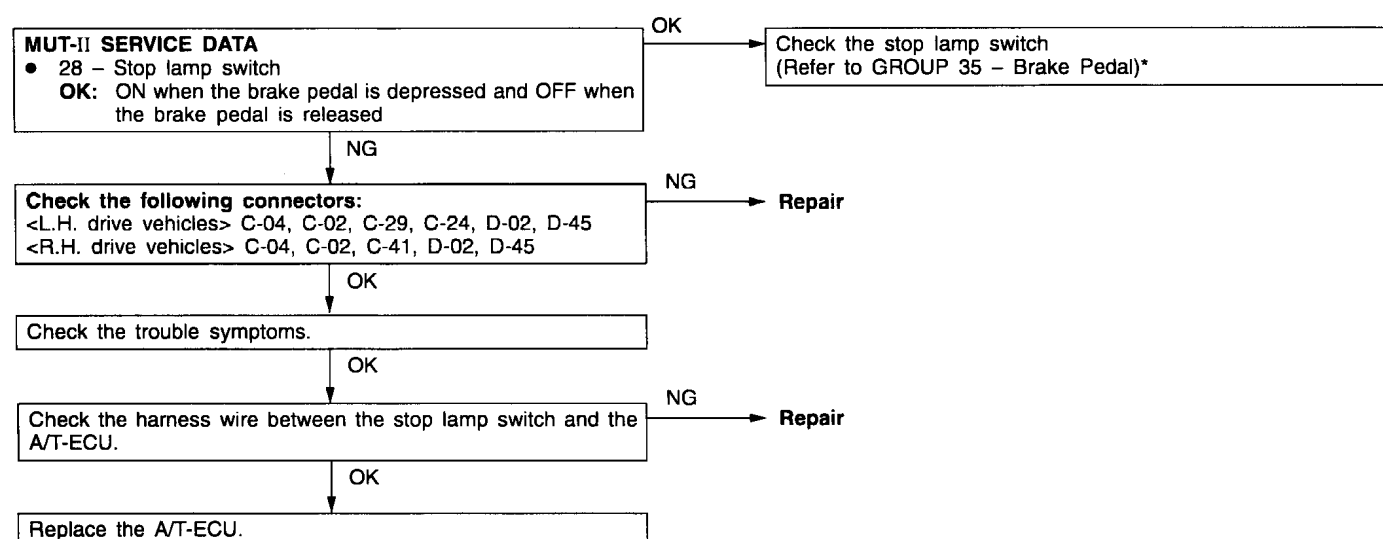
*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



INSPECTION PROCEDURE 15

Stop lamp switch system	Probable cause
If large shocks occur during squat control, the cause is probably a problem with the stop lamp switch.	• Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of A/T-ECU

*: Refer to '00 PAJERO PININ Workshop Manual (Pub. No. CKRE00E1).



SERVICE DATA REFERENCE TABLE

Item No. 37 has been changed since the A/T-ECU has been changed. The other SERVICE DATA are the same as before.

Item No.	Inspection item	Inspection conditions		Normal value
37	Inhibitor switch	Ignition switch: ON Engine: Stopped	Selector lever position: P	P
			Selector lever position: R	R
			Selector lever position: N	N
			Selector lever position: D	D
			Selector lever position: 2	2
			Selector lever position: L	L

A/T-ECU TERMINAL VOLTAGE REFERENCE CHART

1	2						3	4	21	22	23	24						25	26	27				
5	6	7	8	9	10	11	12	13	28	29	30	31	32	33	34	35	36	37	38	39				
14	15				16	17	18	19	20	40	41			42	43	44			45	46			47	48

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Terminal No.	Inspection item	Inspection conditions	Standard value
1	Solenoid valve No. 1	When in 1st or 2nd gear	System voltage
		When in 3rd or 4th gear	0 V
2	Solenoid valve No. 2	When in 2nd or 3rd gear	System voltage
		When in 1st or 4th gear	0 V
3	Free-wheeling engage switch	Transfer lever position: Other than 4WD	System voltage
		Transfer lever position: 4WD	0 V
5	Back-up power supply	Ignition switch: OFF	System voltage
6	Solenoid valve No. 3	When lockup clutch is operating	System voltage
		When lockup clutch is not operating	0 V
11	Communication with input signals from engine-ECU	Engine: Idling Selector lever position: D	Other than 0 V
13	A/T fluid temperature sensor	ATF temperature: 120°C	Approx. 0.3 V
		ATF temperature: 150°C	Approx. 0.15 V
14	Power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
17	Communication with output signals to engine-ECU	Engine: Idling Selector lever position: D	Other than 0 V

Terminal No.	Inspection item	Inspection conditions	Standard value
18	Stop lamp switch	Brake pedal: Depressed	System voltage
		Brake pedal: Released	0 V
19	Earth	Engine: Idling	0 V
20	A/T fluid temperature sensor earth	–	–
21	Diagnostic output terminal	–	–
23	Input shaft speed sensor	Ignition switch: OFF	0 V
		Ignition switch: ON	2.5 V
24	Output shaft speed sensor	Vehicle: Stopped	Approx. 2.5 V
		Vehicle: Driving	Other than 2.5 V
25	Overdrive switch	Overdrive switch: ON	System voltage
		Overdrive switch: OFF	0 V
26	Inhibitor switch P	Selector lever position: P	System voltage
		Selector lever position: Other than P	0 V
27	Inhibitor switch R	Selector lever position: R	System voltage
		Selector lever position: Other than R	0 V
30	Input shaft speed sensor earth	–	–
31	Output shaft speed sensor earth	–	–
33	Wide open throttle switch	Accelerator pedal: Released	4.5 – 5.5 V
		Accelerator pedal: Depressed	Less than 0.4 V
34	Dual-pressure switch	A/C switch: OFF	0 V
		A/C switch: ON	System voltage
37	N range lamp	Ignition switch: ON	System voltage
		Ignition switch: OFF	0 V
38	Inhibitor switch N	Selector lever position: N	System voltage
		Selector lever position: Other than N	0 V
39	Inhibitor switch D	Selector lever position: D	System voltage
		Selector lever position: Other than D	0 V
41	Diagnosis control terminal	–	–
42	Accelerator pedal position sensor (power supply voltage)	Ignition switch: ON	Approx. 5 V
		Ignition switch: OFF	0 V

Terminal No.	Inspection item	Inspection conditions	Standard value
43	Accelerator pedal position sensor (throttle opening voltage)	Accelerator pedal: Released	Approx. 1 V
		Accelerator pedal: Fully depressed	Approx. 4 V
44	Vehicle speed sensor	Vehicle: Slowly moving forward	Alternates between 0↔Approx. 5 V
47	Inhibitor switch 2	Selector lever position: 2	System voltage
		Selector lever position: Other than 2	0 V
48	Inhibitor switch L	Selector lever position: L	System voltage
		Selector lever position: Other than L	0 V

GROUP 25

PROPELLER SHAFT

GENERAL

OUTLINE OF CHANGE

Specifications for 5 door models have been added.

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Propeller shaft runout mm	Front	–	0.5
	Rear	–	0.4
Length of rear propeller shaft mm		790 ± 1.5	–
Clearance of snap ring groove mm	Front	0 – 0.06	–
	Rear	0.02 – 0.06	–

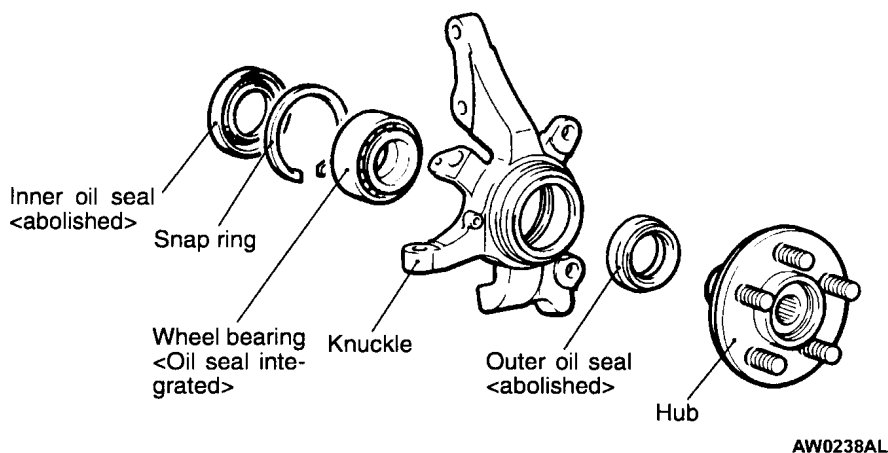
GROUP 26

FRONT AXLE

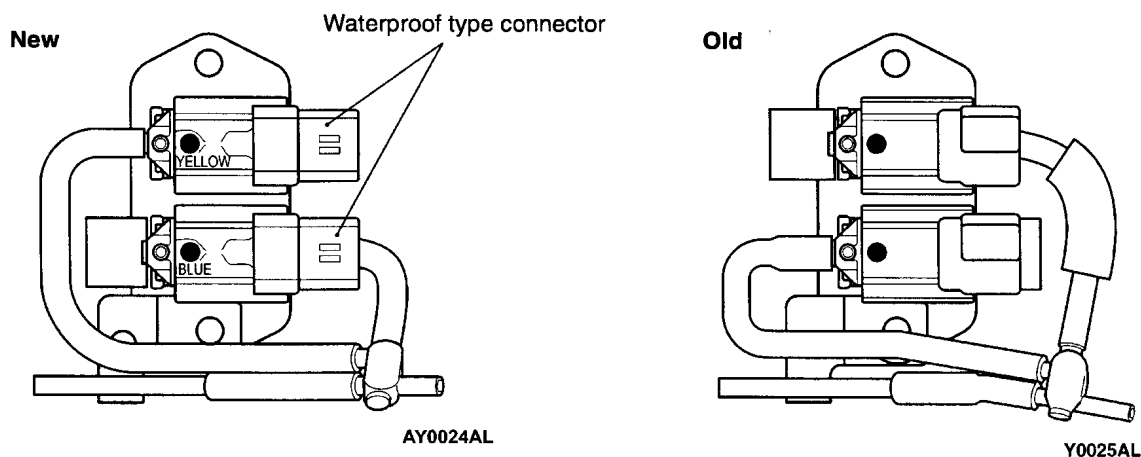
GENERAL

OUTLINE OF CHANGE

- The front differential reduction gear ratio has been changed due to the introduction of 2000-mL engine.
- The service procedure has been changed since the wheel bearing has been changed from the previous oil seal separate type to the integrated type.



- The solenoid valve for the free-wheeling mechanism has been changed.



GENERAL INFORMATION

FRONT DIFFERENTIAL

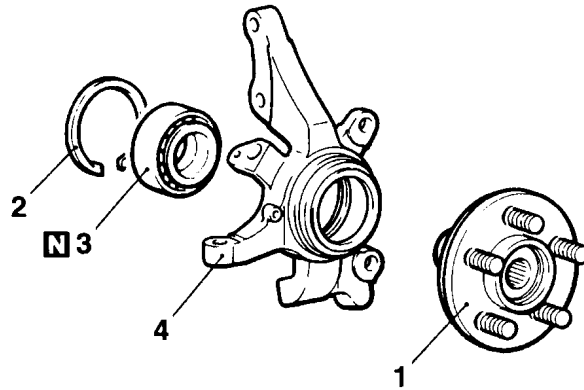
Item		New	Old
Reduction ratio		4.636* ¹ , 4.900* ²	4.875
Number of teeth	Drive gear	51* ¹ , 49* ²	39
	Drive pinion	11* ¹ , 10* ²	8

NOTE

*1: M/T, *2: A/T

HUB AND KNUCKLE ASSEMBLY

DISASSEMBLY AND REASSEMBLY



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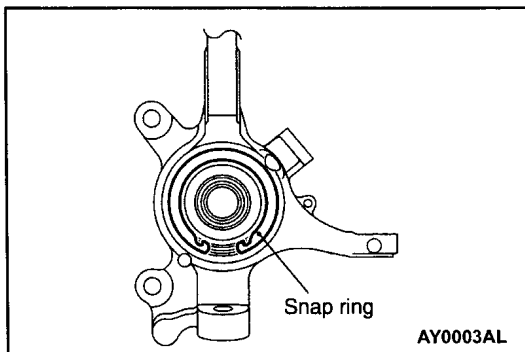
Disassembly steps

- ▶D◀ • Hub rotation starting torque check
- ▶C◀ • Wheel bearing axial play check
- ◀A▶ 1. Hub
- ▶B◀ 2. Snap ring

- ◀B▶ ▶A◀ 3. Wheel bearing
- 4. Knuckle

NOTE

The disassembly service points are the same as before.



REASSEMBLY SERVICE POINTS

Only the service procedure below has been added. The other service procedures are the same as before.

▶B◀ SNAP RING INSTALLATION

The notch in the snap ring should face down.

Caution

The sealing performance between the snap ring and the bearing seal can be ensured by making the snap ring face down. If the snap ring notches face toward the different direction, the sealing performance may be impaired.

GROUP 27

REAR AXLE

GENERAL

OUTLINE OF CHANGE

- The rear differential reduction gear ratio has been changed due to the introduction of 2000-mL engine.
- A rear stabilizer bracket has been added to the rear axle housing due to the introduction of the rear stabilizer bar. Because of this, the service procedure has been added. <5-door models>

GENERAL INFORMATION

REAR DIFFERENTIAL

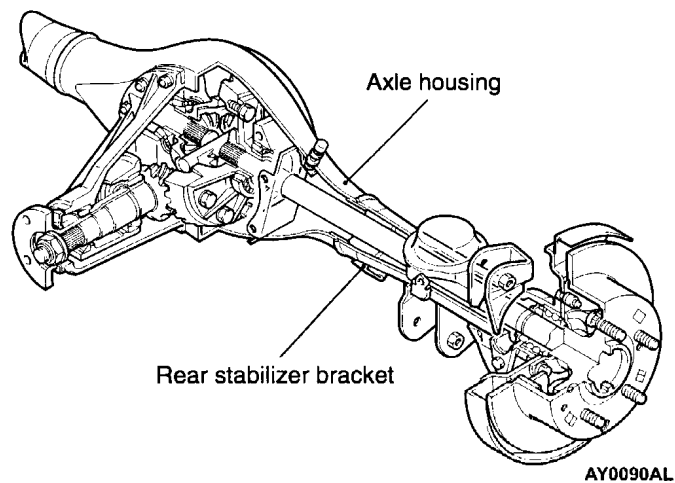
Item		New	Old
Reduction ratio		4.636*1, 4.900*2	4.875
Number of teeth	Drive gear	51*1, 49*2	39
	Drive pinion	11*1, 10*2	8

NOTE

*1: M/T

*2: A/T

CONSTRUCTION DIAGRAM



AXLE ASSEMBLY<5-DOOR MODELS>

REMOVAL AND INSTALLATION

Caution

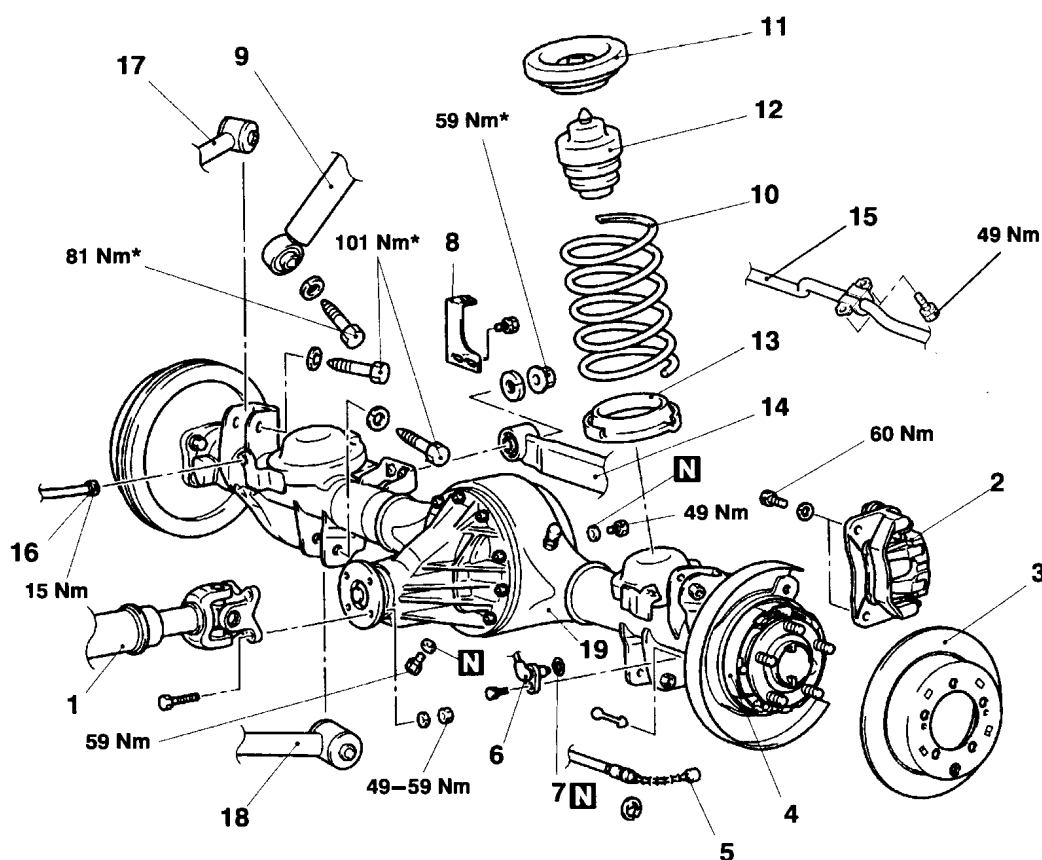
1. To prevent bushings from breakage, the parts indicated by * should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.
2. Be careful not to strike the pole piece at the tip of the wheel speed sensor against the other parts when removing and installing the wheel speed sensor.

Pre-removal Operation

- Brake Fluid Draining (Refer to GROUP 35A – On-vehicle Service.)
- Differential Gear Oil Draining

Post-installation Operation

- Brake Fluid Filling and Air Bleeding (Refer to GROUP 35A – On-vehicle Service.)
- Parking Brake Lever Stroke Adjustment (Refer to GROUP 36 – On-vehicle Service.)
- Differential Gear Oil Filling



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Removal steps

- | | |
|---|---|
| <p>◀A▶</p> <ol style="list-style-type: none"> 1. Rear propeller shaft connection 2. Caliper assembly 3. Brake disc 4. Parking brake shoe assembly (Refer to GROUP 36 – Parking Brake Drum.) 5. Parking brake cable connection 6. Wheel speed sensor <Vehicles with ABS> 7. O-ring <Vehicles with ABS> 8. Spring support <Vehicles without ABS> <p>◀B▶</p> <ol style="list-style-type: none"> 9. Shock absorber connection 10. Coil spring (Refer to GROUP 34 – Rear Suspension Assembly.) | <p>◀C▶</p> <ol style="list-style-type: none"> 11. Silencer sheet 12. Bump stopper 13. Lower spring pad 14. Lateral rod connection 15. Rear stabilizer bar connection (Refer to GROUP 34 – Rear stabilizer.) 16. Rear brake pipe and hose connection 17. Upper arm connection 18. Lower arm connection 19. Axle assembly <p>◀D▶</p> <p>NOTE
The removal service points are the same as before.</p> |
|---|---|

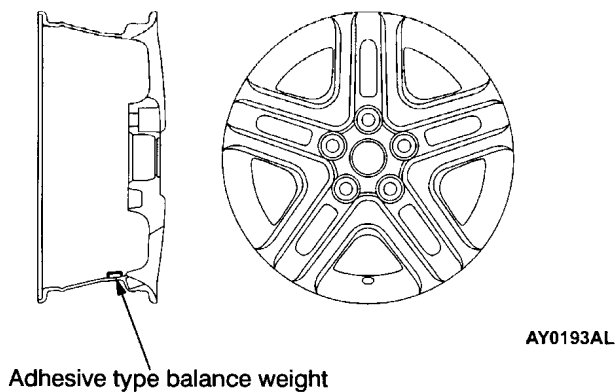
GROUP 31

WHEEL AND TYRE

GENERAL

OUTLINE OF CHANGE

A newly designed aluminium wheel has been added. Its appearance has been improved by attaching a balance weight on the rim inside surface.



GENERAL INFORMATION

SPECIFICATIONS

Items		Specification
Wheel	Type	Aluminium type*
	Size	16 × 6J
	Amount of wheel offset mm	46
	Pitch circle diameter (P.C.D.) mm	114.3

NOTE

*: Optional items

GROUP 32

POWER PLANT MOUNT

GENERAL

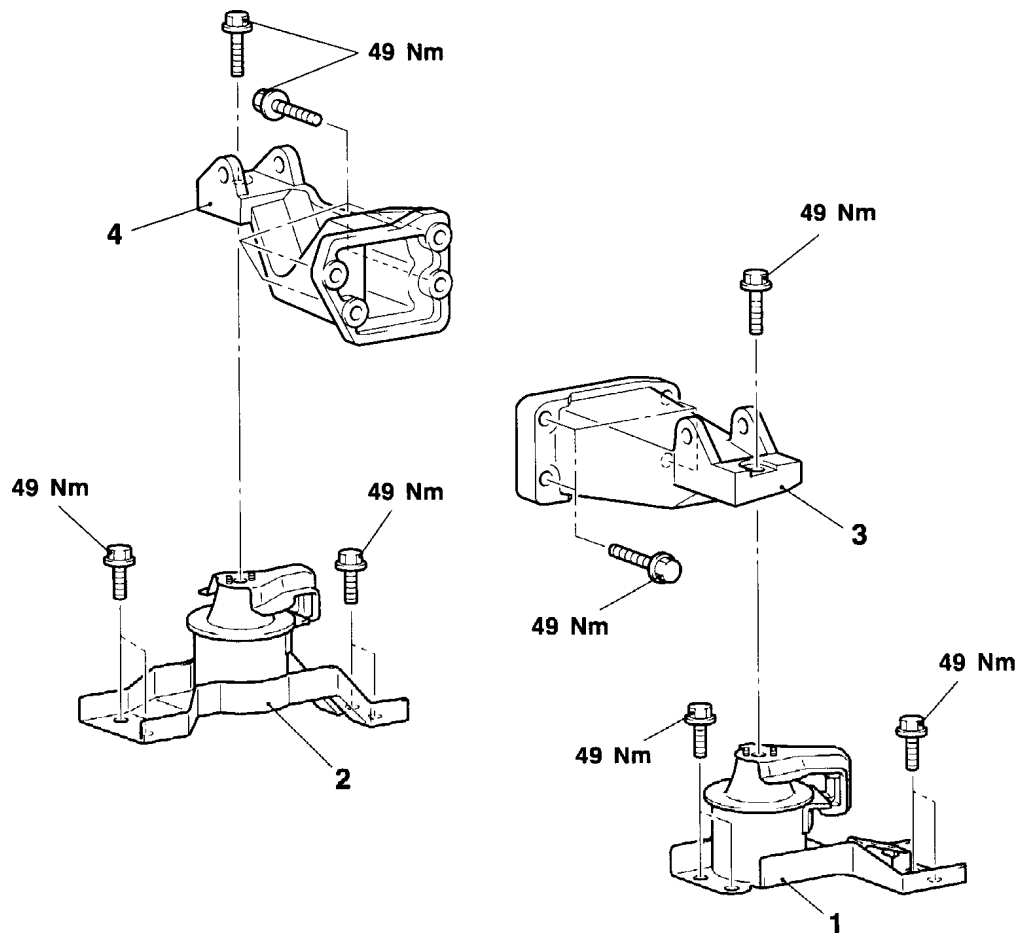
OUTLINE OF CHANGE

The following service procedures have been added due to the change of the engine mount and transmission mount.

ENGINE MOUNTING

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Crossmember Removal and Installation



BY0067AL

Removal steps

1. Engine mount insulator Assembly (L.H.)
2. Engine mount insulator Assembly (R.H.)

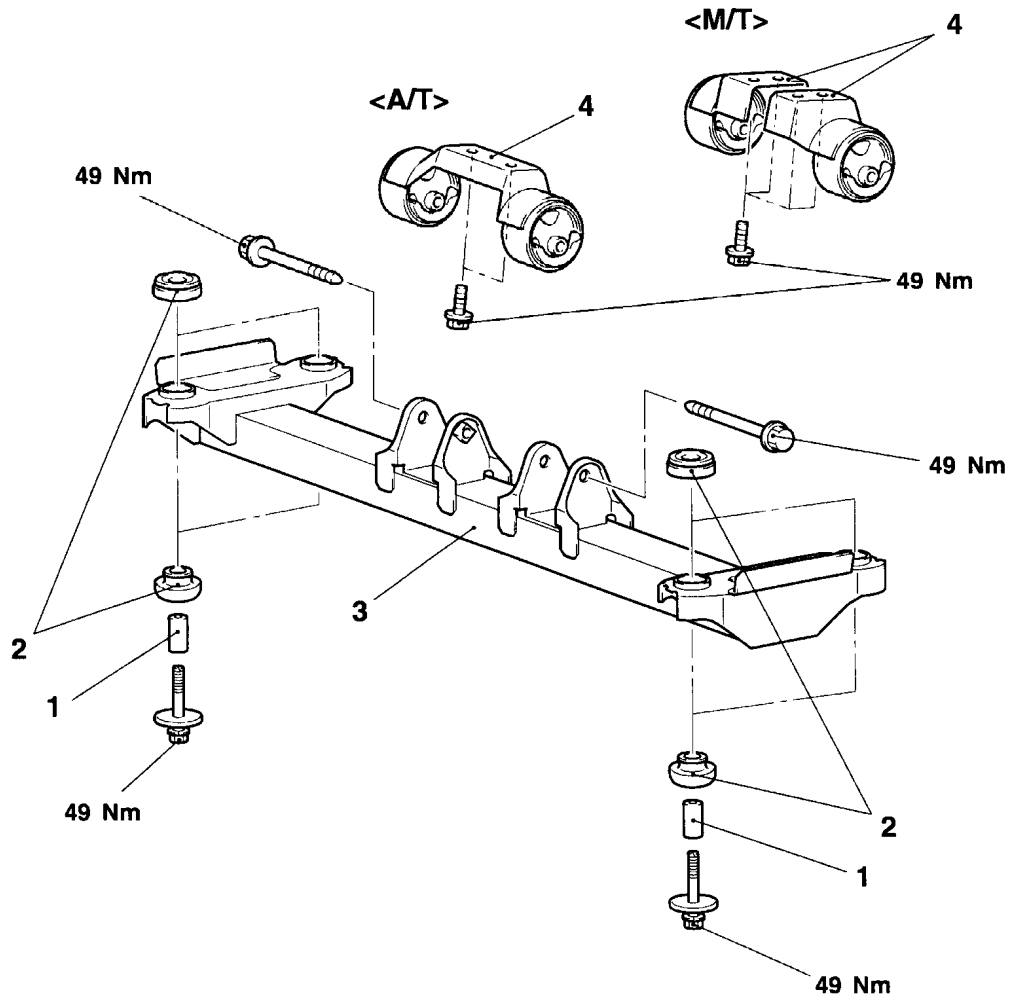
3. Engine mount bracket (L.H.)
4. Engine mount bracket (R.H.)

TRANSMISSION MOUNTING

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

Jack up the Engine and Transmission Assembly until there is no weight on the Engine Mount Bracket Insulator.



AY0068AL

Removal steps

1. Collar
2. Transmission mount bushing
3. Transmission mount crossmember Assembly

4. Transmission mount insulator Assembly

GROUP 33A

FRONT SUSPENSION

GENERAL

OUTLINE OF CHANGE

- The coil spring specifications have been changed. <3-door models>
- The coil spring specifications have been added. <5-door models>

GENERAL INFORMATION

COIL SPRING<3-door models>

Items	New	Old
Wire diameter × average diameter × free length mm	14 × 160 × 365* ¹	14 × 160 × 365
	14 × 160 × 376* ²	14 × 160 × 365

COIL SPRING<5-door models>

Items	Specifications
Wire diameter × average diameter × free length mm	14 × 160 × 376* ¹
	14 × 160 × 386* ²

NOTE

*1: L.H.D. Vehicles, R.H.D. Vehicles L.H. side

*2: R.H.D. Vehicles R.H. side

GROUP 34

REAR SUSPENSION

GENERAL

OUTLINE OF CHANGE

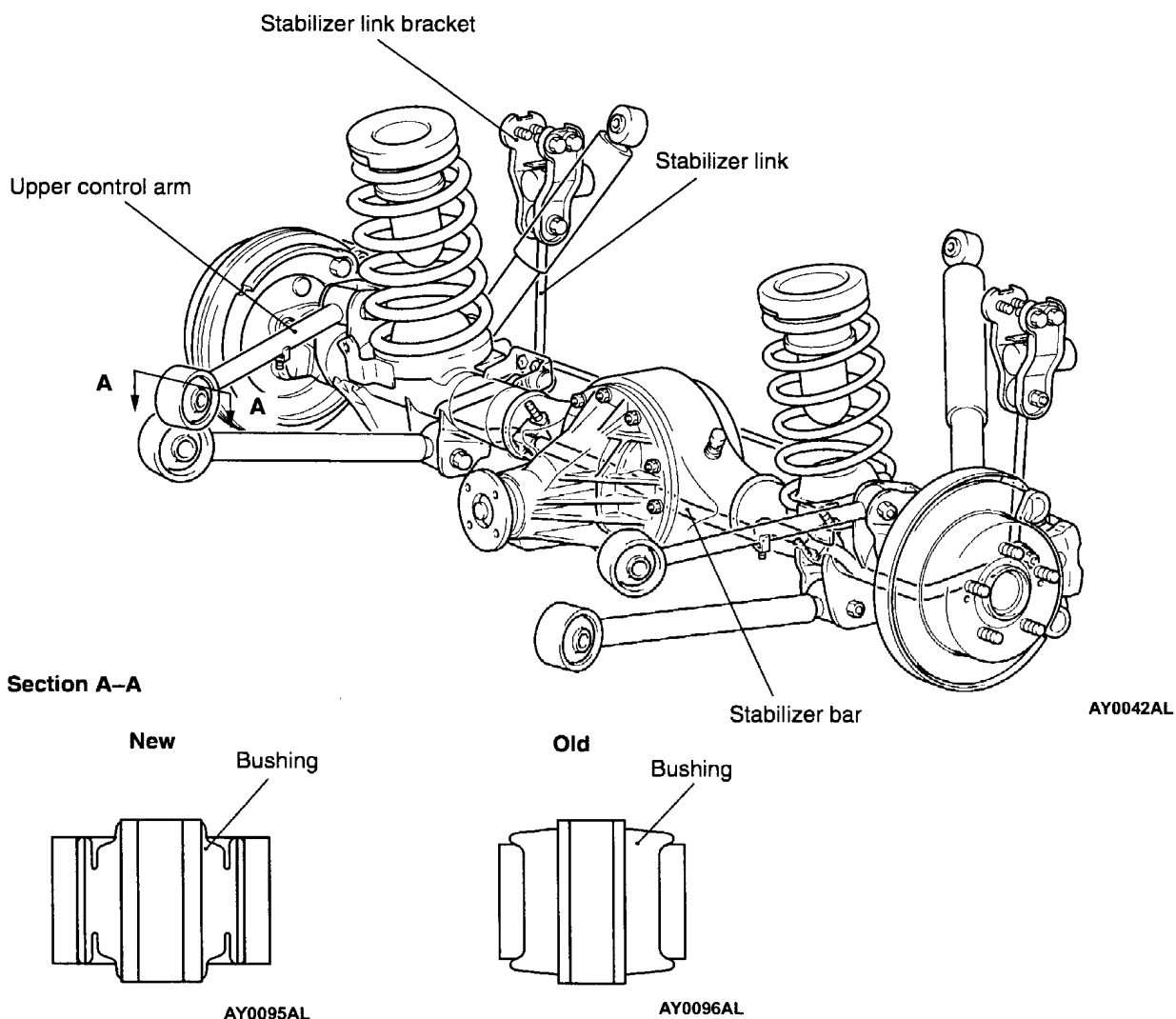
- The coil spring specification has been added. <5-door models>
- The service procedures have been added due to the introduction of the rear stabilizer. <5-door models>
- The bushing of the upper control arm has been reshaped.

GENERAL INFORMATION

COIL SPRING<5-door models>

Items	Specification
Wire diameter × average diameter × free length mm	11 × 131 × 305

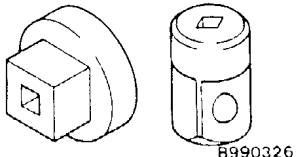
CONSTRUCTION DIAGRAM



SERVICE SPECIFICATION

Items	Standard value
Stabilizer link ball joint turning torque Nm	1.7 – 3.1

SPECIAL TOOL

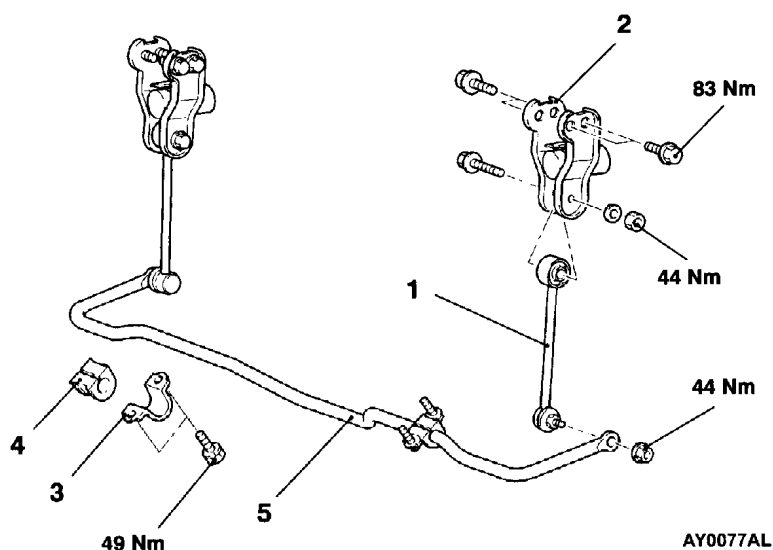
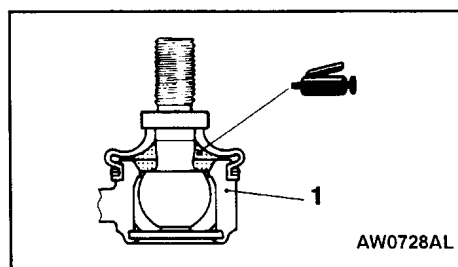
Tool	Number	Name	Use
	MB990326	Preload socket	Stabilizer link ball joint turning torque measurement

STABILIZER BAR

REMOVAL AND INSTALLATION

Post-installation Operations

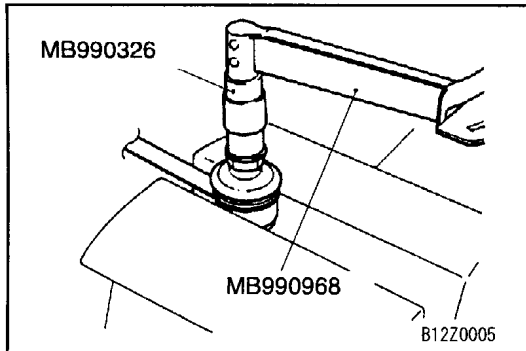
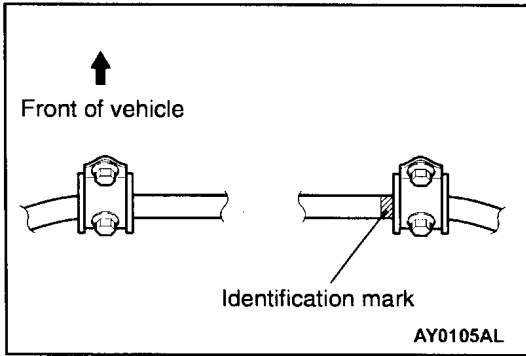
Press the dust cover with your finger to check that there are no cracks or damage in the dust cover.



Removal steps

1. Stabilizer link assembly
2. Stabilizer link bracket
3. Stabilizer bracket
4. Bushing
5. Stabilizer bar





INSTALLATION SERVICE POINT

►A◄ STABILIZER BAR/BUSHING/STABILIZER BRACKET INSTALLATION

Align the identification mark of stabilizer bar with the left end of the bushing, before tightening the mounting bolts.

INSPECTION

STABILIZER LINK BALL JOINT TURNING TORQUE CHECK

1. After shaking the ball joint stud several times, install the nut to the stud and use the special tools to measure the turning torque of the ball joint.

Standard value: 1.7 – 3.1 Nm

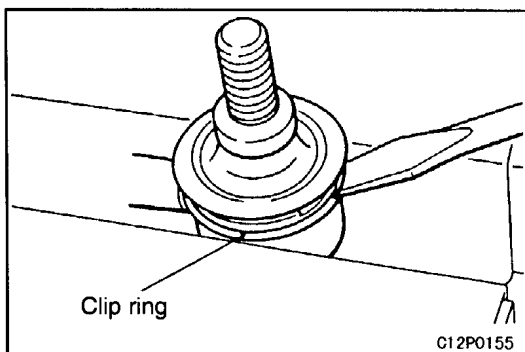
2. When the measured value exceeds the standard value, replace the stabilizer link.
3. When the measured value is lower than the standard value, check that the ball joint turns smoothly without excessive play. If so, it is possible to reuse that ball joint.

STABILIZER LINK BALL JOINT DUST COVER CHECK

1. Check the dust cover for cracks or damage by pushing it with finger.
2. If the dust cover is cracked or damaged, replace the stabilizer link.

NOTE

Cracks or damage of the dust cover may cause damage of the ball joint. When it is damaged during service work, replace the dust cover.



STABILIZER LINK BALL JOINT DUST COVER REPLACEMENT

Only when the dust cover is damaged accidentally during service work, replace the dust cover as follows:

1. Remove the clip ring and the dust cover.
2. Apply multipurpose grease to the inside of the dust cover.
3. Wrap plastic tape around the stabilizer link stud, and then install the dust cover to the stabilizer link.
4. Secure the dust cover by the clip ring.
5. Check the dust cover for cracks or damage by pushing it with finger.

ANTI-SKID BRAKING SYSTEM (ABS) <4WD>

CONTENTS

GENERAL	2	ON-VEHICLE SERVICE	14
Outline of Changes	2	Wheel Speed Sensor Output Voltage Check	14
GENERAL INFORMATION	2		
TROUBLESHOOTING	5	HYDRAULIC UNIT AND ABS-ECU	15

GENERAL

OUTLINE OF CHANGES

- The hydraulic unit (integrated with the ABS-ECU) has been reshaped. In addition, the troubleshooting has been changed due to the change on the ABS-ECU connector.
- The Electronic Brake-force Distribution (EBD) has been adopted. The EBD makes it possible to maintain the maximum amount of braking force for the rear wheels even when the vehicle's load is unevenly distributed

GENERAL INFORMATION

EBD CONTROL

In ABS, electronic control method is used whereby the rear wheel brake hydraulic pressure during braking is regulated by rear wheel control solenoid valves in accordance with the vehicle's rate of deceleration and the front and rear wheel slippage which are calculated from the signals received from the various wheel sensors. EBD control is a control system which provides a high level of control for both vehicle braking force and vehicle stability. The system has the following features.

- Because the system provides the optimum rear wheel braking force regardless of the vehicle

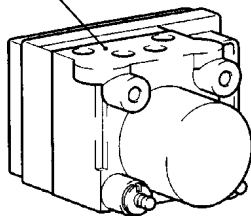
laden condition and the condition of the road surface, the system reduces the required pedal depression force, particularly when the vehicle is heavily laden or driving on road surfaces with high frictional coefficients.

- Because the duty placed on the front brakes has been reduced, the increases in pad temperature can be controlled during front brakes applying to improve the wear resistance characteristics of the pad.
- Control valves such as the proportioning valve are no longer required.

HYDRAULIC UNIT

New

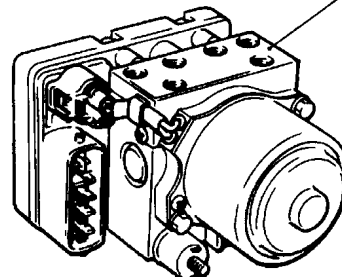
Hydraulic unit



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Old

Hydraulic unit

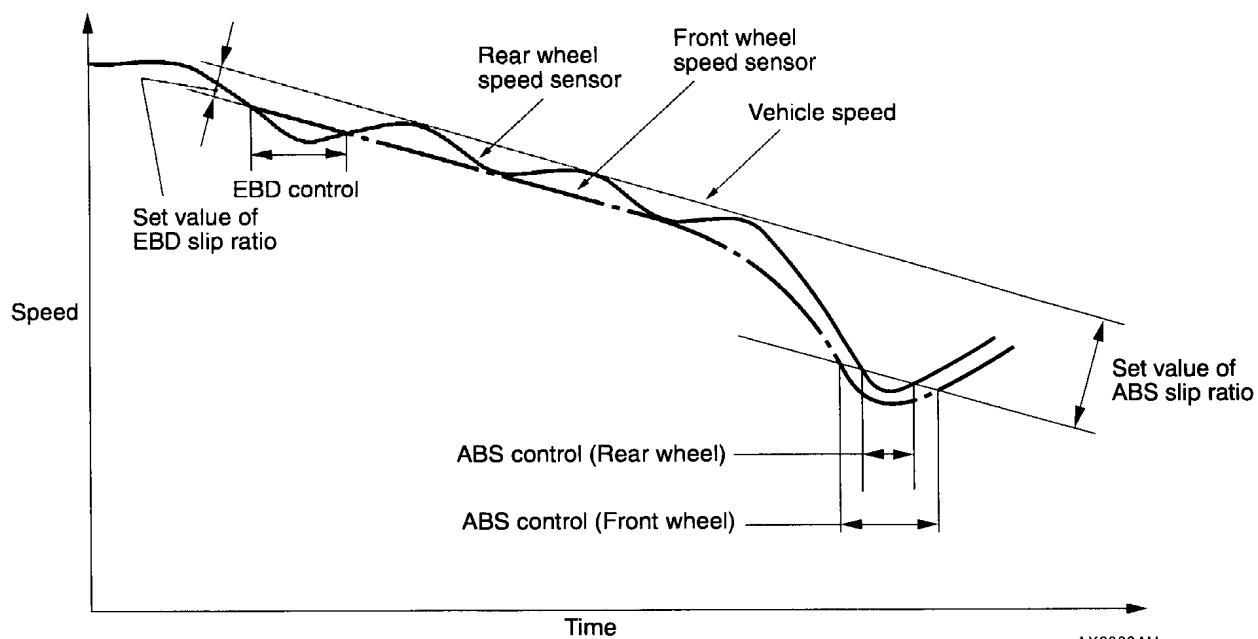
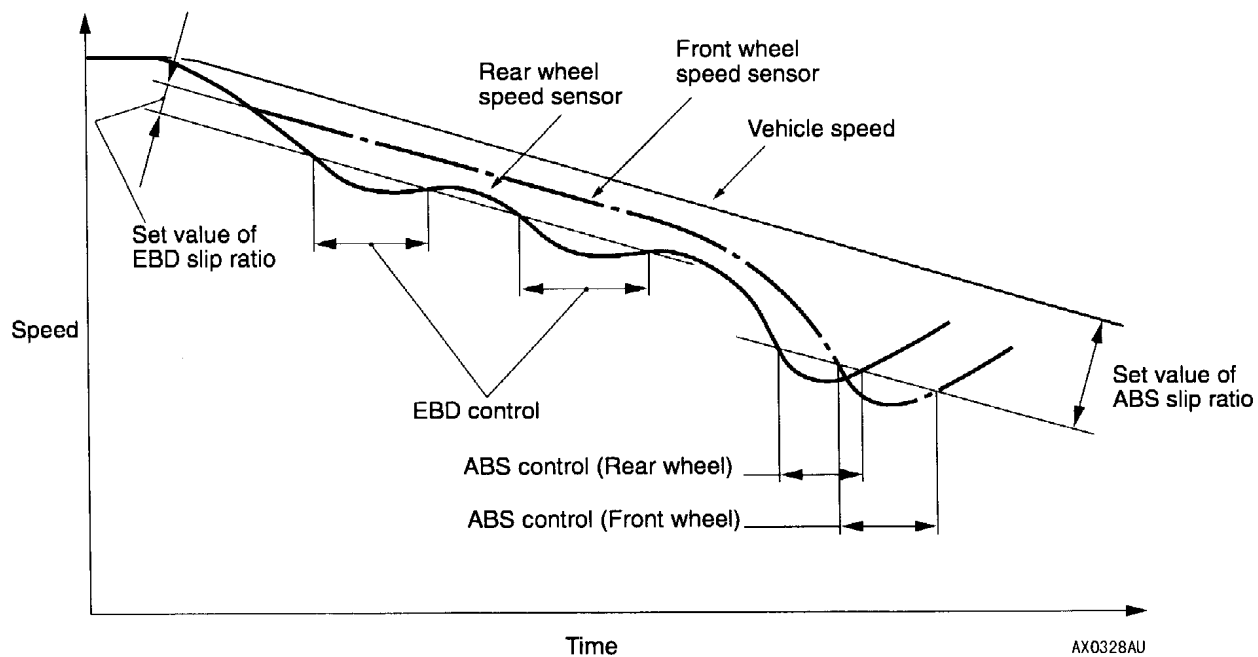


AW0134AL

ABS-ECU**EBD HYDRAULIC PRESSURE CONTROL**

The procedures are the same as that used in PAJERO except for the items shown below.

Item	PAJERO-PININ	PAJERO
EBD control condition	When the difference between the rear wheel speed and the vehicle speed exceeds the set value.	When the difference between the rear wheel speed and the front wheel speed exceeds the set value.

<PAJERO-PININ>**<PAJERO>**

FAIL-SAFE FUNCTION

The procedures are the same as that used in PAJERO except for the items shown below.

Item	PAJERO-PININ	PAJERO
Warning lamp during fail-safe operation	ABS warning lamp	Brake warning lamp

Diagnosis code No.	Item	Action during fail-safe operation		
		ABS control	EBD control	ABS warning lamp
11	Open circuit or short-circuit in wheel speed sensor (FR)	If faulty wheels include two rear wheels: Control stopped in all wheels Other than the above: Control stopped in faulty wheels	If faulty wheels include two rear wheels: Control stopped Other than the above: Control carried out	Illuminated
12	Open circuit or short-circuit in wheel speed sensor (FL)			
13	Open circuit or short-circuit in wheel speed sensor (RR)			
14	Open circuit or short-circuit in wheel speed sensor (RL)			
15	Problem with any one of the four wheel speed sensors			
16	Abnormal drop or rise in ABS-ECU power supply voltage	Control stopped	Control stopped	Illuminated
21	Wheel speed sensor (FR) system	If faulty wheels include two rear wheels: Control stopped in all wheels Other than the above: Control stopped in faulty wheels	If faulty wheels include two rear wheels: Control stopped Other than the above: Control carried out	Illuminated
22	Wheel speed sensor (FL) system			
23	Wheel speed sensor (RR) system			
24	Wheel speed sensor (RL) system			
32	G sensor system	Control stopped	Control carried out	Illuminated
33	Stop lamp switch system	Control stopped	Control carried out	Illuminated
41	Solenoid valve (FR) system	System interrupted	System interrupted	Illuminated
42	Solenoid valve (FL) system			
43	Solenoid valve (RR) system			
44	Solenoid valve (RL) system			
51	Valve relay ON problem	Control stopped	Control carried out	Illuminated
52	Valve relay OFF problem	System interrupted	System interrupted	Illuminated
53	Motor relay OFF problem	Control stopped	Control carried out	Illuminated
54	Motor relay ON problem	System interrupted	Control carried out	Illuminated
55	Motor system	Control stopped	Control carried out	Illuminated
63	ABS-ECU abnormality	System interrupted	System interrupted	Illuminated

NOTE

Control stopped: Control is not carried out until the ignition switch is turned to the "LOCK" (OFF) position. However, if the problem returns to normal, control is carried out again.

System interrupted: Control is not carried out until the valve relay turns off and the ignition switch is turned to the "LOCK" (OFF) position.

TROUBLESHOOTING

INSPECTION CHART FOR DIAGNOSIS CODES

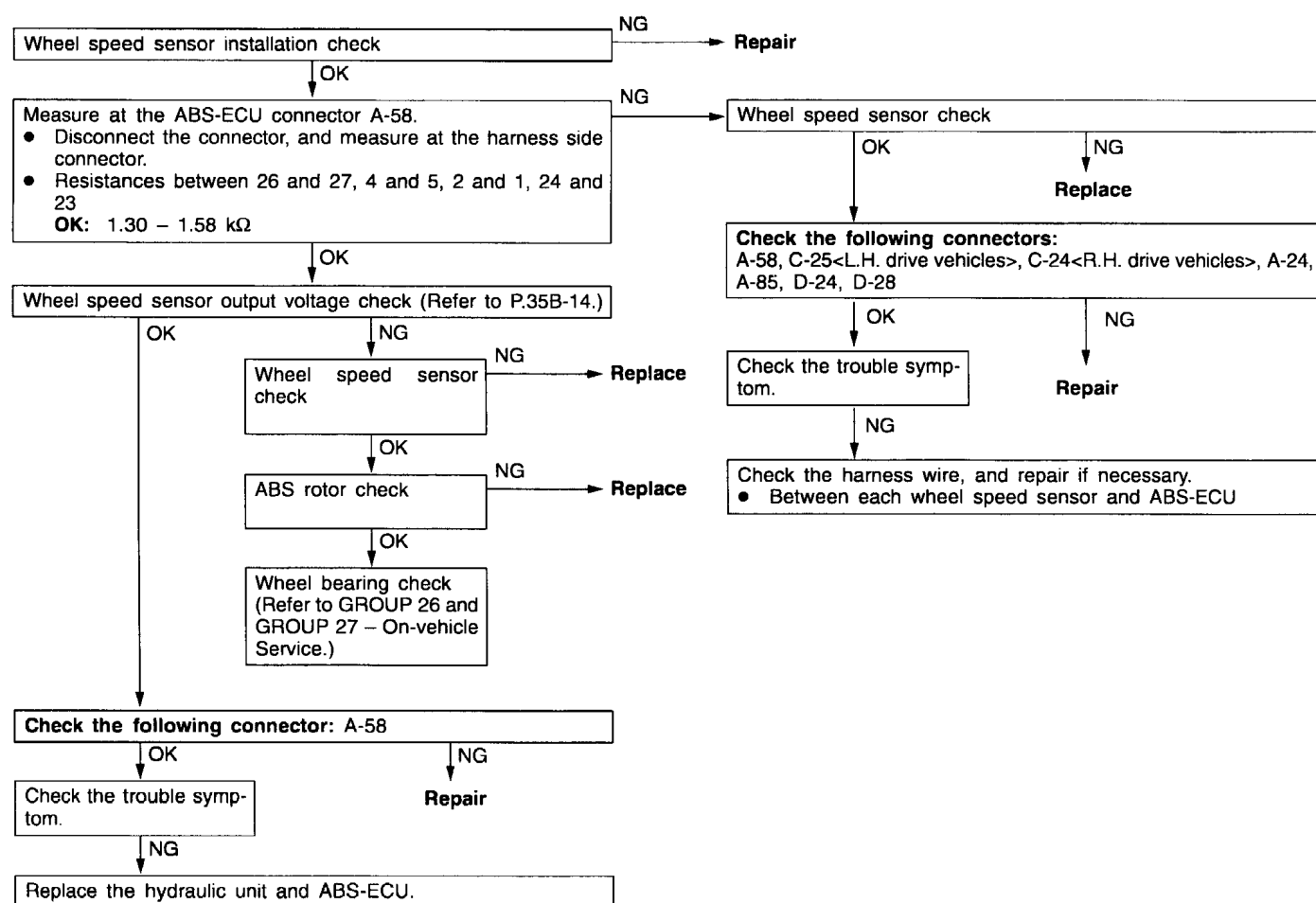
Diagnosis code No.	Inspection item		Reference page
11	Front right wheel speed sensor (Open circuit or short circuit)		35B-6
12	Front left wheel speed sensor (Open circuit or short circuit)		35B-6
13	Rear right wheel speed sensor (Open circuit or short circuit)		35B-6
14	Rear left wheel speed sensor (Open circuit or short circuit)		35B-6
15	Wheel speed sensor (Abnormal output signal)		—
16*	ABS-ECU power supply system (Abnormal voltage drop or rise)		35B-7
21	Front right wheel speed sensor		35B-6
22	Front left wheel speed sensor		35B-6
23	Rear right wheel speed sensor		35B-6
24	Rear left wheel speed sensor		35B-6
32	G sensor system		35B-7
33	Stop lamp switch system		—
41	Front right solenoid valve	The diagnosis codes are output when there is no response to the drive signals for respective solenoid valves or the ABS-ECU power supply system is defective.	35B-8
42	Front left solenoid valve		
43	Rear right solenoid valve		
44	Rear left solenoid valve		
51	Valve relay problem (stays on)		—
52	Valve relay problem (stays off) or ABS-ECU power supply system problem		35B-8
53	Motor relay problem (stays off) or ABS-ECU power supply system problem		
54	Motor relay problem (stays on)		
55	Motor system (seized pump motor) or ABS-ECU power supply system problem		35B-8
63	ABS-ECU		—

NOTE

*: Turning the ignition switch to ACC will erase the diagnosis code No.16.

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code Nos.11, 12, 13 and 14 Wheel speed sensor (open circuit or short circuit)	Probable cause
Code Nos.21, 22, 23 and 24 Wheel speed sensor	
Code Nos. 11, 12, 13 and 14 are output if the ABS-ECU detects an open circuit or short-circuit in the (+) wire or (–) wire in any one of the four wheel speed sensors.	• Malfunction of wheel speed sensor • Malfunction of wiring harness or connector • Malfunction of hydraulic unit and ABS-ECU
Code Nos. 21, 22, 23 and 24 are output in the following cases. • When there is no input from any one of the four wheel speed sensors when travelling at several km/h or more, even though open circuit can not be verified. • When a chipped or blocked-up ABS rotor is detected and if the anti-lock system operates continuously because a malfunctioning sensor or a warped ABS rotor is causing sensor output to drop.	• Malfunction of wheel speed sensor • Malfunction of wiring harness or connector • Malfunction of ABS rotor • Too much gap between the sensor and the ABS rotor • Malfunction of hydraulic unit and ABS-ECU • Malfunction of wheel bearing

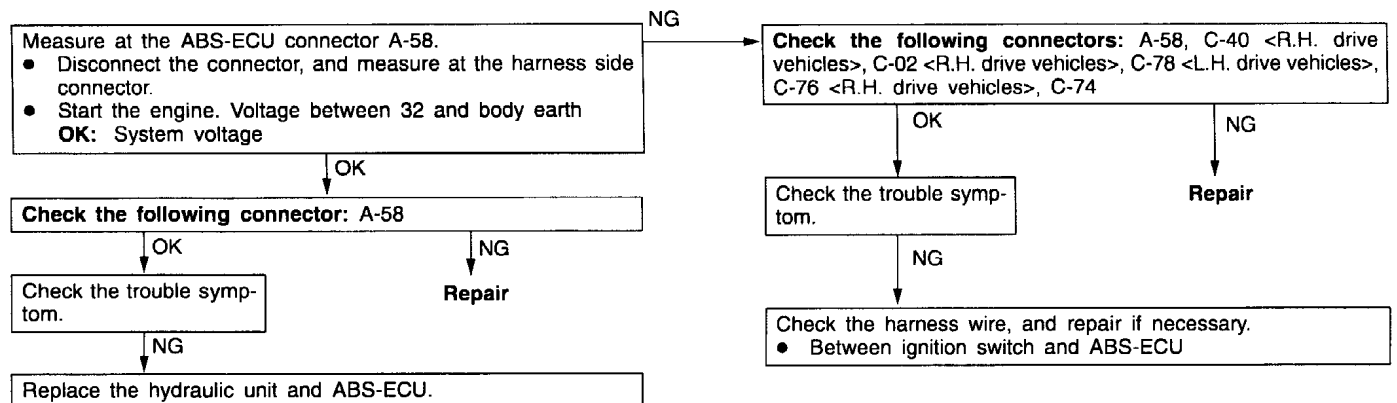


Code No.16 ABS-ECU power supply system (abnormal voltage drop or rise)	Probable cause
This code is output if the ABS-ECU power supply voltage drops below or rises above the rated values. Furthermore, turning the ignition switch to ACC will erase this code.	• Malfunction of battery • Malfunction of wiring harness or connector • Malfunction of hydraulic unit and ABS-ECU

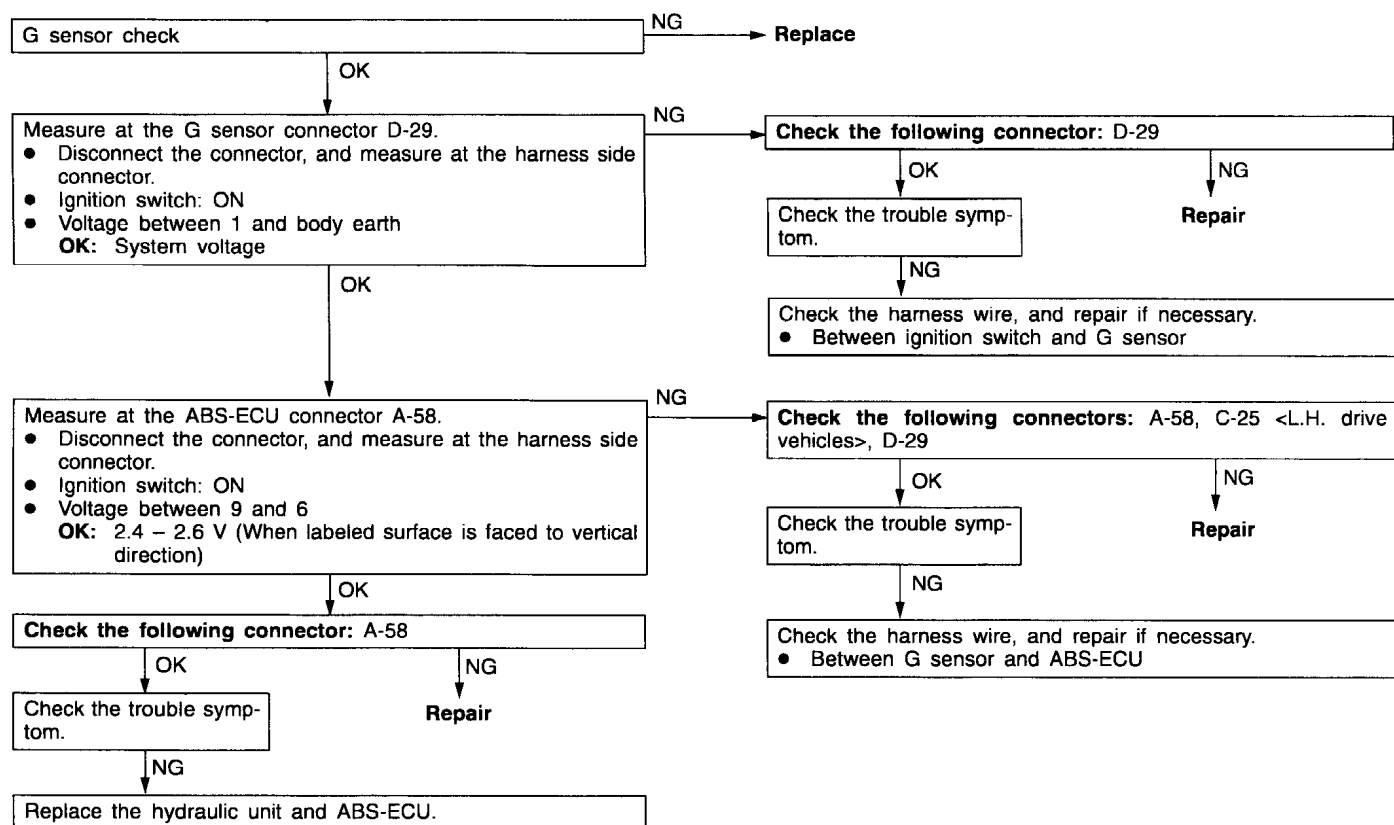
Caution

If battery voltage drops or rises during inspection, this code will be output as well. If the voltage returns to standard value, this code is no longer output.

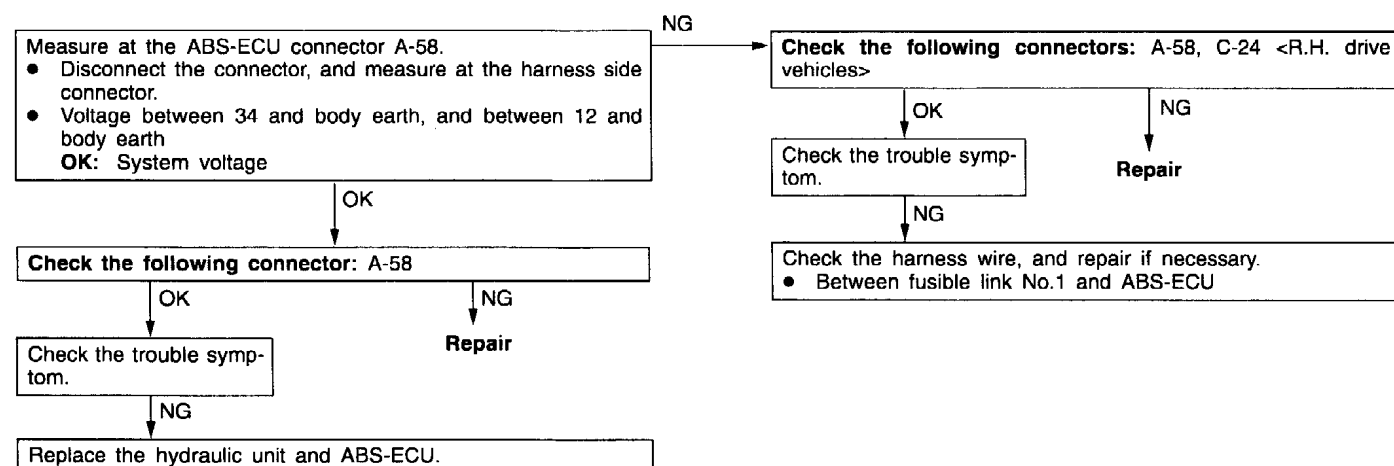
Before carrying out the following inspection, check the battery level, and refill it if necessary.



Code No.32 G sensor system	Probable cause
This code is output in the following cases. • G sensor output voltage is less than 0.5 V or more than 4.5 V. (An open or short circuit is present in the G sensor circuit.) • G sensor output voltage does not change. (G sensor output voltage is abnormal.)	• Malfunction of G sensor • Malfunction of wiring harness or connector • Malfunction of hydraulic unit and ABS-ECU



Code Nos.41, 42, 43 and 44 Solenoid valve	Probable cause
Code No.52 Valve relay problem (stays off)	
Code No.53 Motor relay problem (stays off)	
Code No.55 Motor system (seized pump motor)	
These codes are output if there is an open circuit or short-circuit in the ABS-ECU power supply circuit (power supply circuit for solenoid valve and motor), or the internal circuit in the hydraulic unit and ABS-ECU is defective.	• Malfunction of wiring harness or connector • Malfunction of hydraulic unit and ABS-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptoms	Inspection procedure No.	Reference page
Communication between the MUT-II and the whole system is not possible.	1	–
Communication between the MUT-II and the ABS-ECU is not possible.	2	35B-10
When the ignition key is turned to "ON" (engine stopped), the ABS warning lamp does not illuminate.	3	–
Even after the engine is started, the ABS warning lamp remains illuminated.	4	35B-11
Faulty ABS operation	5	35B-12

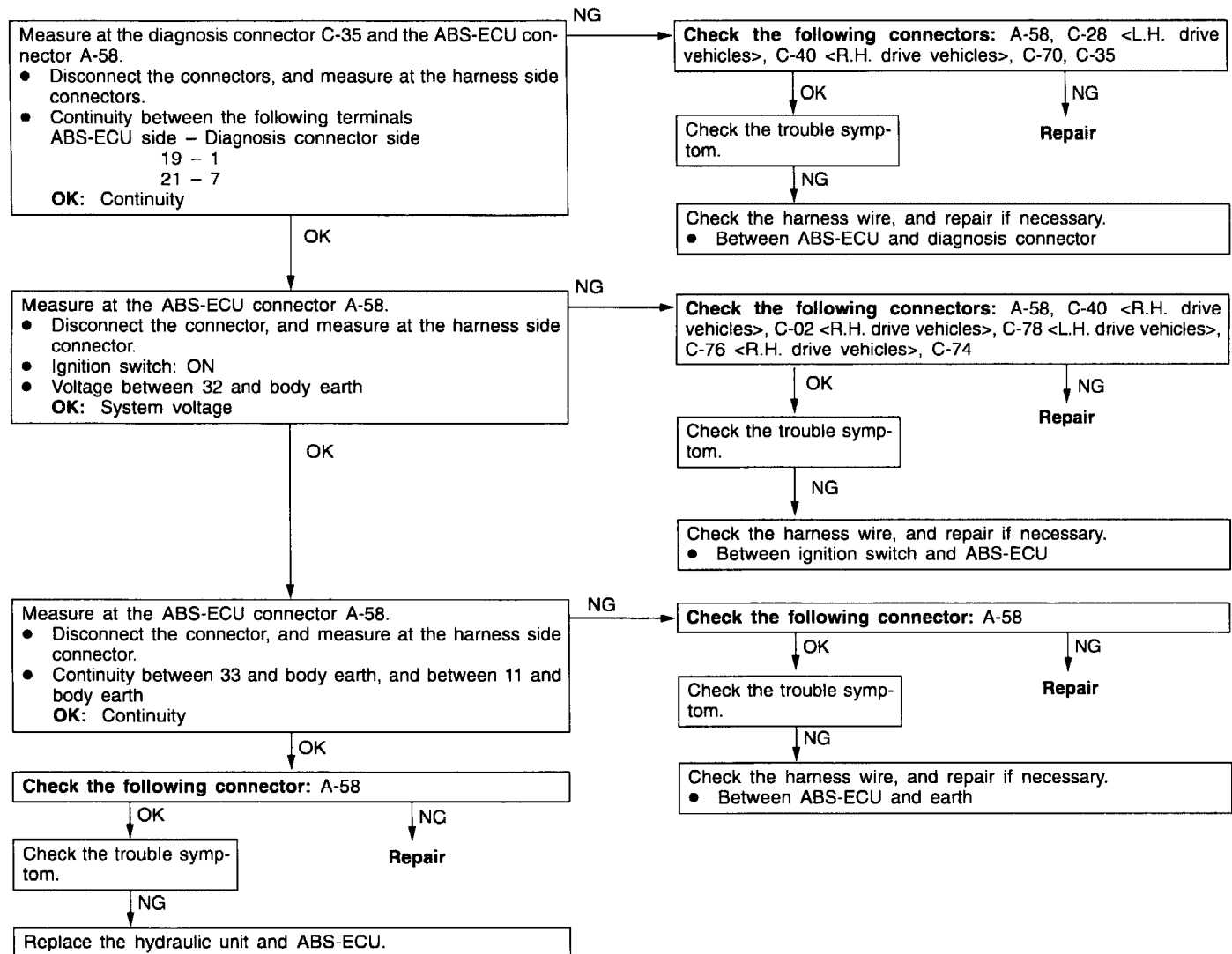
Caution

1. If steering movements are made when driving at high speed, or when driving on road surfaces with low frictional resistance, or when passing over bumps, the ABS may operate even though sudden braking is not being applied. Because of this, when getting information from the customer, check if the problem occurred while driving under such conditions as these.
2. During ABS operation, the brake pedal may vibrate or may not be able to be depressed. Such phenomena are due to intermittent changes in hydraulic pressure inside the brake line to prevent the wheels from locking and is not an abnormality.

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

Inspection Procedure 2

Communication between MUT-II and the ABS-ECU is not possible.	Probable cause
The cause may be an open circuit in the ABS-ECU power supply circuit or an open circuit in the diagnosis output circuit.	- Blown fuse - Malfunction of wiring harness or connector - Malfunction of hydraulic unit and ABS-ECU

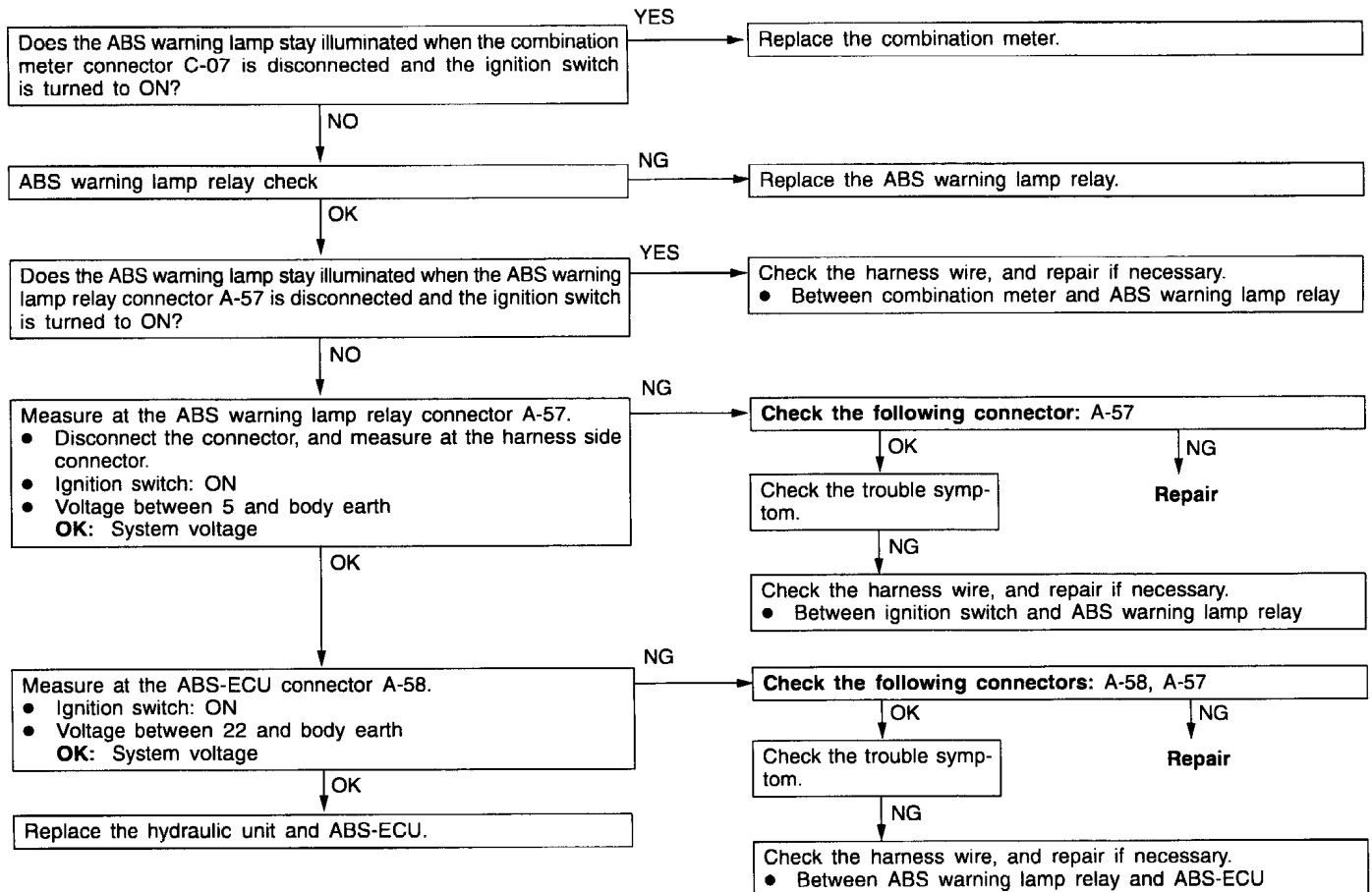


Inspection Procedure 4

Even after the engine is started, the ABS warning lamp remains illuminated.	Probable cause
The cause is probably a short-circuit in the ABS warning lamp illumination circuit.	• Malfunction of combination meter • Malfunction of ABS warning lamp relay • Malfunction of wiring harness (short circuit) • Malfunction of hydraulic unit and ABS-ECU

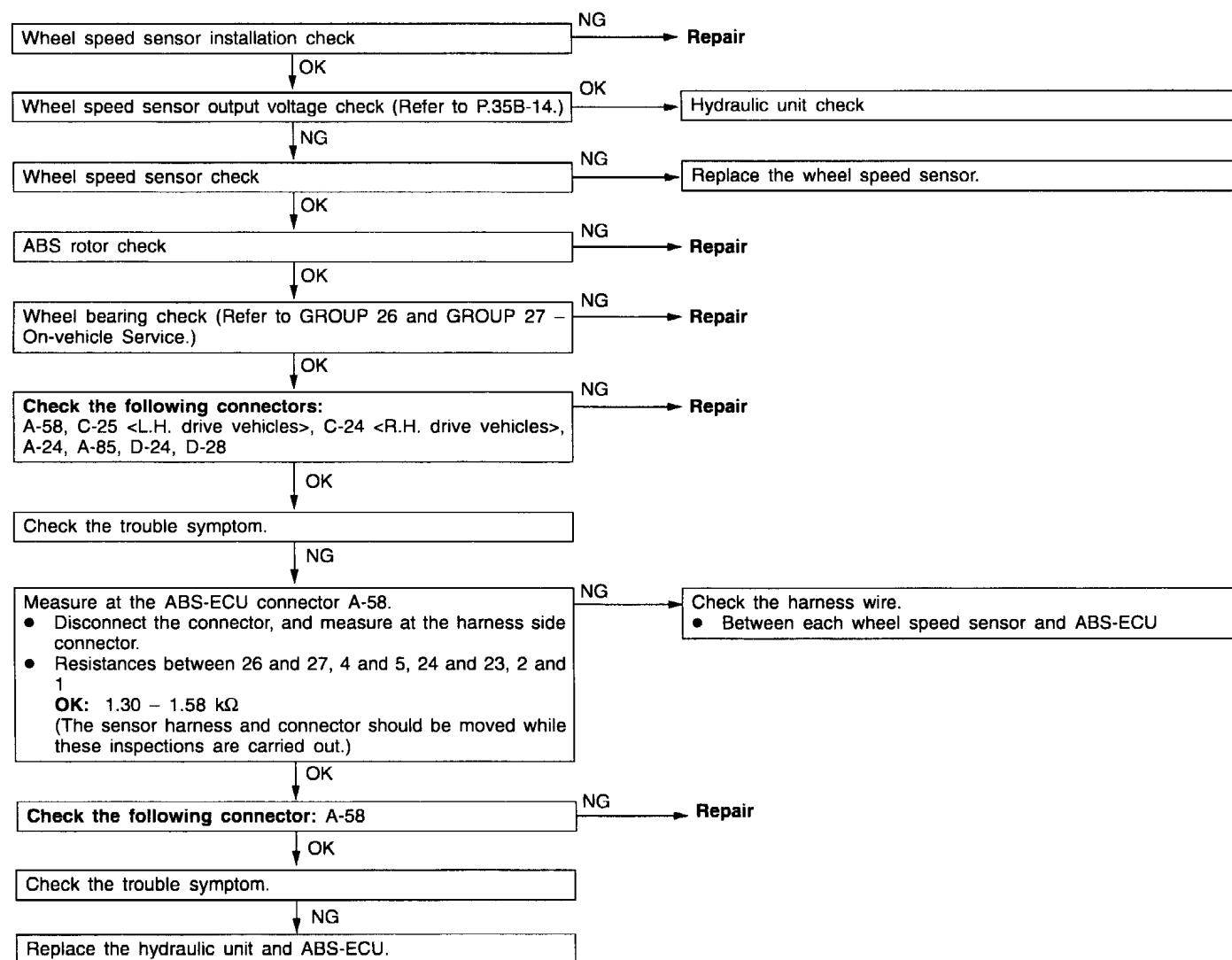
NOTE

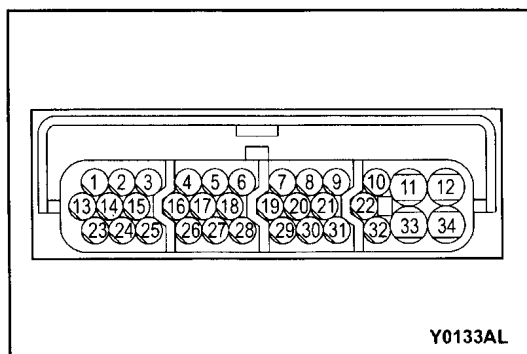
This trouble symptom is limited to cases where communication with the MUT-II is possible (ABS-ECU power supply is normal) and the diagnosis code is a normal diagnosis code.



Inspection Procedure 5

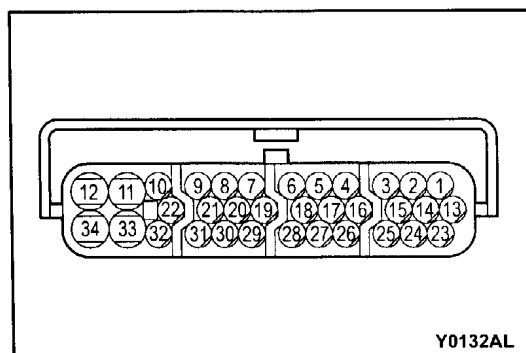
Faulty ABS operation	Probable cause
This varies depending on the driving conditions and the road surface conditions, so problem diagnosis is difficult. However, if a normal diagnosis code is displayed, carry out the following inspection.	● Improper installation of wheel speed sensor ● Malfunction of wiring harness or connector ● Malfunction of wheel speed sensor ● Malfunction of ABS rotor ● Foreign material adhering to wheel speed sensor ● Malfunction of wheel bearing ● Malfunction of hydraulic unit and ABS-ECU



**CHECK AT ABS-ECU****TERMINAL VOLTAGE CHECK CHART**

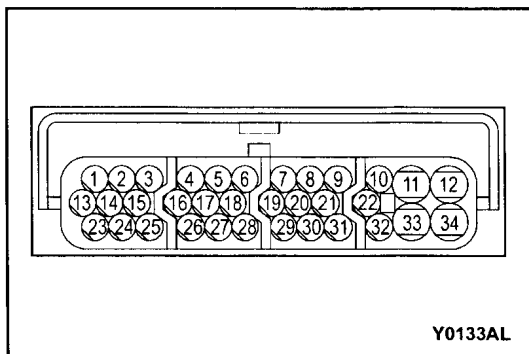
1. Measure the voltages between the respective terminal and earth.
2. The terminal layout is shown in the illustration.

Terminal No.	Check item	Checking requirements		Normal condition
3	Stop lamp switch input	Ignition switch: ON	Stop lamp switch: ON	System voltage
			Stop lamp switch: OFF	1 V or less
6	G sensor earth	Always		0 V
9	Input from G sensor	Ignition switch: ON Vehicle is horizontal		2.4 – 2.6 V
12	Solenoid valve power supply	Always		System voltage
19	Diagnosis changeover input	When the MUT-II is connected		0 V
		When the MUT-II is not connected		Approx. 12 V
21	MUT-II	When the MUT-II is connected		Serial communication with MUT-II
		When the MUT-II is not connected		1 V or less
22	ABS warning lamp relay transistor output	Ignition switch: ON	When the lamp is switched off	2 V or less
			When the lamp is illuminated	System voltage
32	ABS-ECU power supply	Ignition switch: ON		System voltage
		Ignition switch: START		0 V
34	Motor power supply	Always		System voltage

**RESISTANCE AND CONTINUITY BETWEEN HARNESS-SIDE CONNECTOR TERMINALS**

1. Turn the ignition key to the LOCK (OFF) position.
2. Disconnect the ABS-ECU connector.
3. Check the resistance and continuity between the terminals indicated in the table below.
4. The terminal layout is shown in the illustration.

ABS-ECU terminal No.	Signal	Normal condition
1 – 2	Wheel speed sensor (rear left)	1.30 – 1.58 kΩ
23 – 24	Wheel speed sensor (rear right)	
4 – 5	Wheel speed sensor (front left)	
26 – 27	Wheel speed sensor (front right)	
11 – Body earth	Earth	Continuity
33 – Body earth	Earth	



ON-VEHICLE SERVICE

WHEEL SPEED SENSOR OUTPUT VOLTAGE CHECK

1. Lift up the vehicle and release the parking brake.
2. Disconnect the ABS-ECU connector.
3. Rotate the wheel to be measured at approximately 1/2–1 rotation per second, and check the output voltage using a circuit tester or an oscilloscope.

Wheel speed sensor	Front left	Front right	Rear left	Rear right
Terminal No.	4	26	2	24
	5	27	1	23

Output voltage

When measuring with a circuit tester:
42 mV or more

When measuring with an oscilloscope:
120 mV p-p or more

4. The followings are suspected if the output voltage is lower than the value described above. Check the wheel speed sensor, and replace if necessary.
 - Too large clearance between the pole piece of the wheel speed sensor and ABS rotor
 - Faulty wheel speed sensor

HYDRAULIC UNIT AND ABS-ECU

REMOVAL AND INSTALLATION

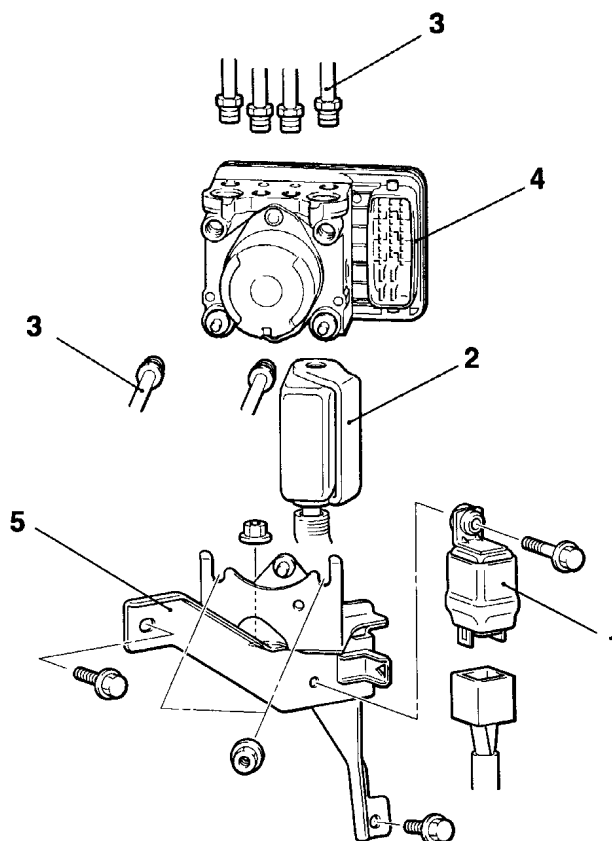
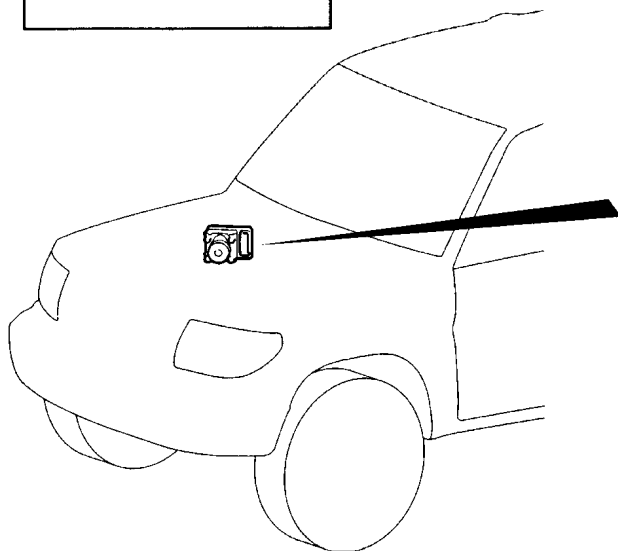
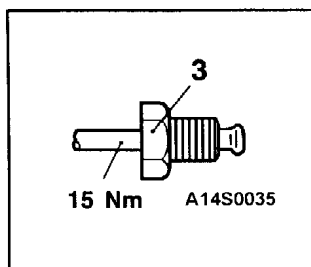
Pre-removal Operation

- Brake Fluid Draining
- Air Cleaner Removal (Refer to GROUP 15.)

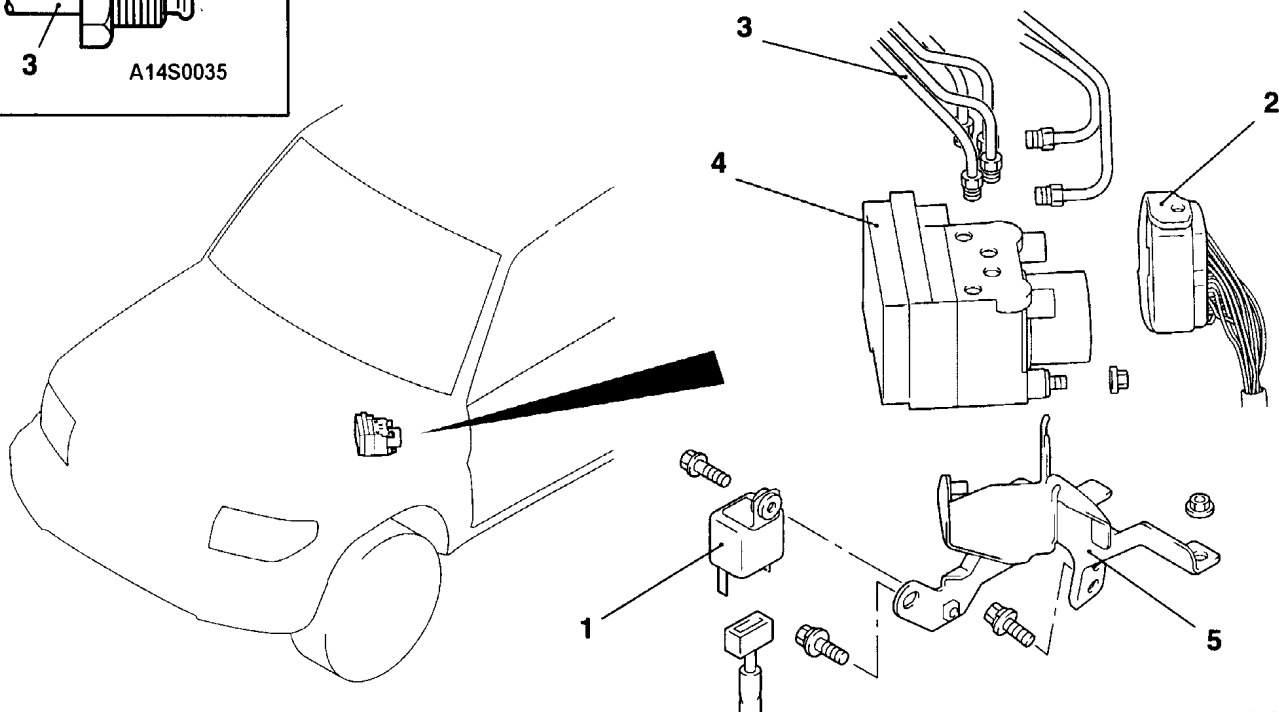
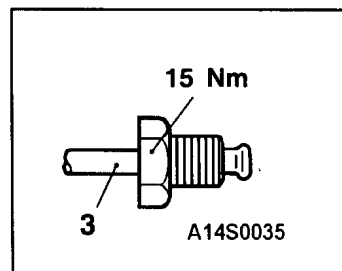
Post-installation Operation

- Brake Fluid Supplying and Brake Line Bleeding (Refer to GROUP 35A – On-vehicle Service.)
- Hydraulic Unit Inspection
- Air Cleaner Installation (Refer to GROUP 15.)

<L.H. drive vehicles>



<R.H. drive vehicles>



AY0117AL

Removal steps

◀A▶

▶A▶

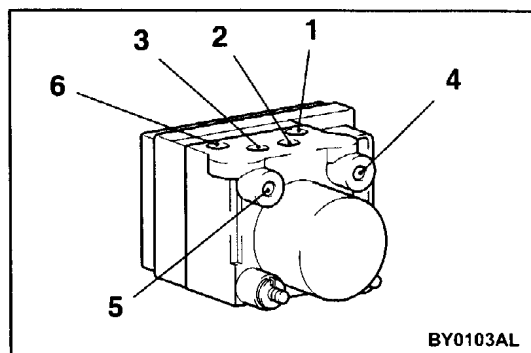
◀B▶

1. ABS warning lamp relay
2. Harness connector
3. Brake pipe connection
4. Hydraulic unit and ABS-ECU

5. Hydraulic unit bracket assembly

NOTE

The removal service points are the same as before.

**INSTALLATION SERVICE POINT****▶A◀ BRAKE PIPE CONNECTION**

Connect the pipes to the hydraulic unit assembly as shown in the illustration.

1. To the front brake (L.H.)
2. To the proportioning valve (Rear brake, R.H.)
3. To the proportioning valve (Rear brake, L.H.)
4. From the master cylinder (Primary)
5. From the master cylinder (Secondary)
6. To the front brake (R.H.)

BODY

CONTENTS

GENERAL	2	FRONT DOOR TRIM AND WATERPROOF	
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GENERAL

OUTLINE OF CHANGES

Due to the introduction of 5-door models, the following service procedures have been added. The other items are the same as before.

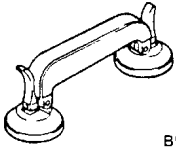
- Quarter window glass removal and installation
- Rear door assembly removal and installation
- Front door trim removal and installation
- Rear door trim and waterproof film removal and installation
- Front door glass and regulator installation service points
- Rear door glass and regulator removal and installation
- Rear door handle and latch removal and installation
- Sunroof removal and installation

WINDOW GLASS

ADHESIVE

Items	Specified adhesive
Quarter window glass	3M ATD Part No. 8609 Super Fast Urethane Auto Glass Sealant or equivalent

SPECIAL TOOLS

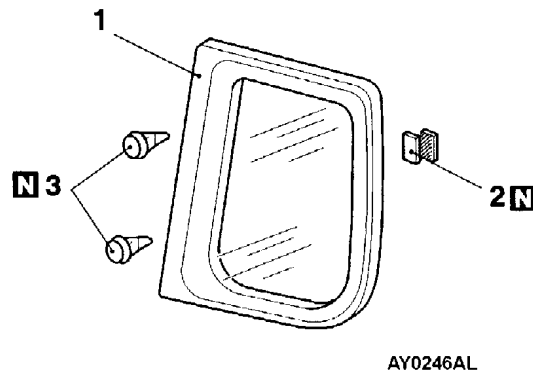
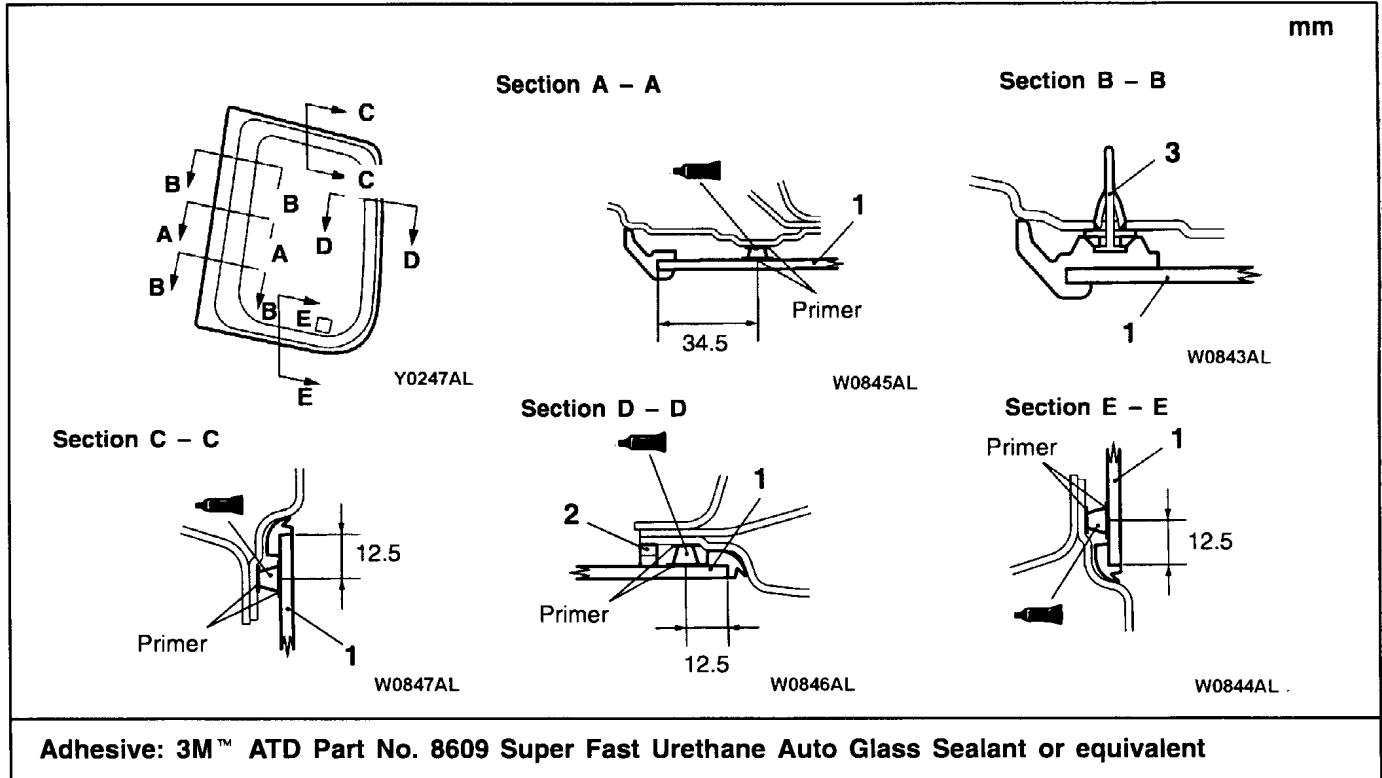
Tool	Number	Name	Use
 B990480	MB990480	Quarter window glass	Removal and installation of quarter window glass

QUARTER WINDOW GLASS

REMOVAL AND INSTALLATION

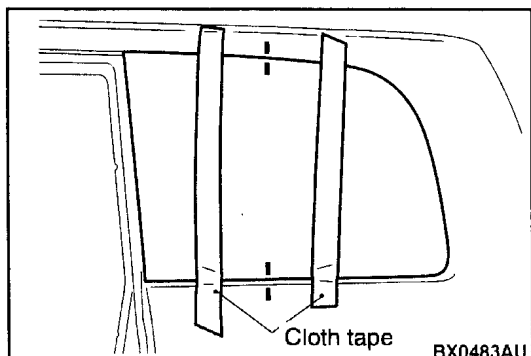
Pre-removal and Post-installation Operation

- Quarter Trim, Lower (R.H.) Removal and Installation (Refer to GROUP 52A.)
- Headlining Removal and Installation (Refer to GROUP 52A.)



Removal steps

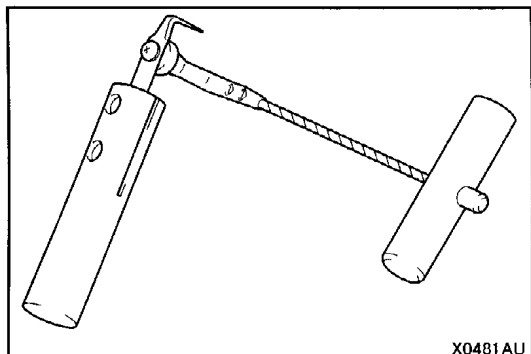
- ◀A▶ ▶A▶ 1. Quarter window glass
▶A▶ 2. Dual lock fastener
▶A▶ 3. Clip



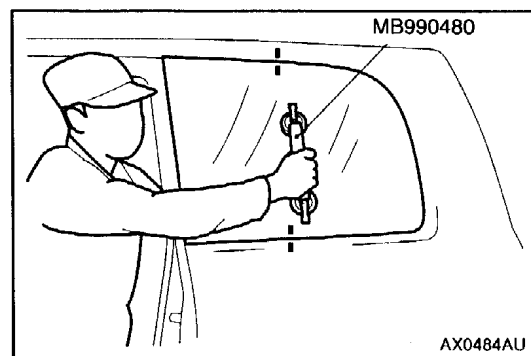
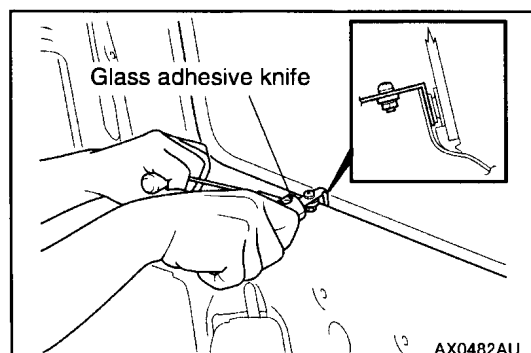
REMOVAL SERVICE POINT

◀A▶ QUARTER WINDOW GLASS REMOVAL

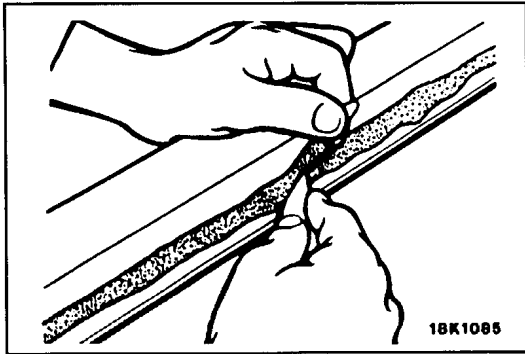
1. Apply cloth tape to protect quarter window glass.
2. Make mating marks on the quarter window glass and body.



3. Use glass adhesive knife to cut away adhesive. Keep glass adhesive knife at right angles with body flange (from inside the vehicle), and put the blade at body flange. Then cut away adhesive along the body flange.



4. Use special tool MB990480 to remove the quarter window glass.



5. Use a knife to cut away the remaining adhesive so that the thickness is within 2 mm around the entire circumference of the body flange.
6. Finish the flange surfaces so that they are smooth.

Caution

- (1) Use care not to remove more adhesive than necessary, or the adhesive could weaken.
- (2) Be careful also not to damage the paintwork on the body surface with the knife. If the paintwork is damaged, repair the damaged area with repair paint or anti-rust agent.

7. When reusing quarter window glass, remove the remaining adhesive on the quarter window glass completely. Then, decrease the windshield with isopropyl alcohol.
8. Decrease the body flange in the same way.

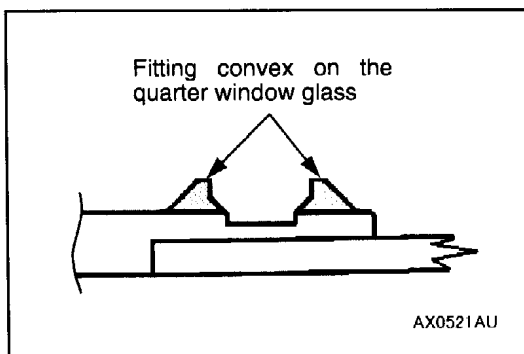
Caution

Before the next job, leave the decreased parts for 3 minutes or more to dry. Also, do not touch any cleaned surface.

INSTALLATION SERVICE POINT

**▶◀ CLIP/DUAL LOCK FASTENER/
QUARTER WINDOW GLASS INSTALLATION**

1. Carry out the following procedure to re-install quarter window glass.
 - (1) Fit the clip into the body.

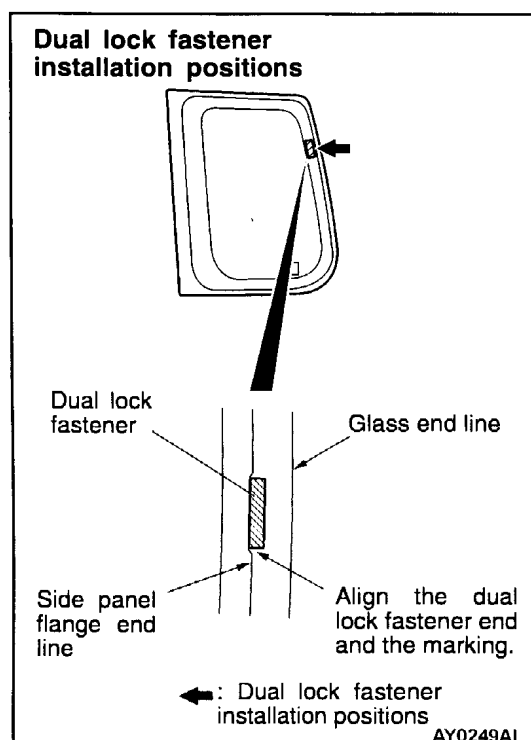


- (2) Cut away the clip fitting convex on the quarter window glass.

NOTE

If you fail to cut away the convexes, the glass may be fitted improperly.

2. Use a unleaded gasoline to degrease the glass and the vehicle body, which the dual-lock fasteners are adhered to.



3. Install the dual lock fasteners to the body flange in the specified positions.
4. Install the dual lock fasteners to the windshield in the positions corresponding to the ones on the body flange where the dual lock fasteners have been installed.
5. Apply the primer and adhesive.
6. Install the glass in the same manner as for the windshield.

DOOR

SERVICE SPECIFICATIONS

Items			Standard value
Glass pad and glass holder installation position mm	Between glass holder and glass rear end	Front	50.0
		Rear	–
	Between glass holders	Front	419.0 – 421.0
		Rear	–
	Between glass holder and glass front end	Front	45.0
		Rear	53.0

SEALANT

Items	Specified sealant	Remark
Waterproof film	3M™ ATD Part No. 8625 or equivalent	Ribbon sealer

SPECIAL TOOL

Tool	Number	Name	Use
B990784	MB990784	Ornament remover	Door trim removal

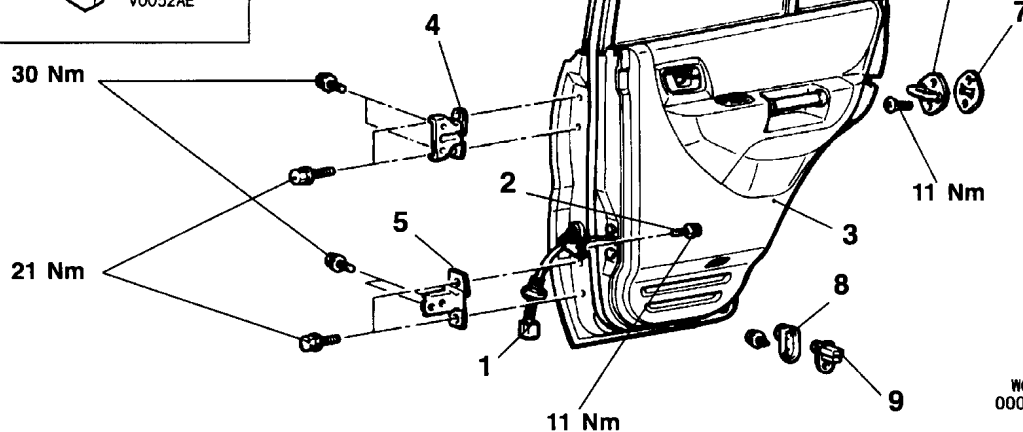
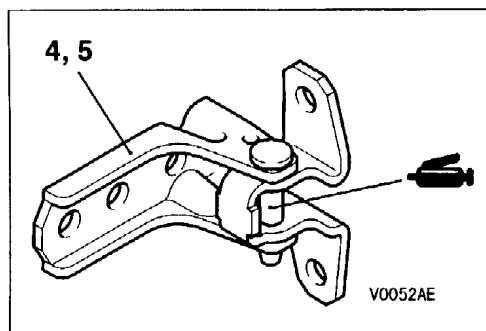
TROUBLESHOOTING

The power window and central door locking is controlled by ETACS-ECU. For troubleshooting, refer to GROUP 54B – Troubleshooting.

REAR DOOR ASSEMBLY

REMOVAL AND INSTALLATION

Post-installation Operation
Door Fit Adjustment



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Door assembly removal steps

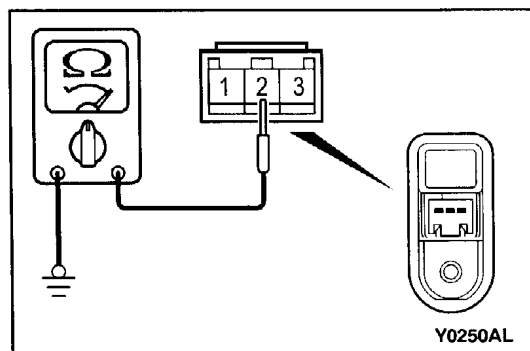
1. Harness connector
2. Door check connecting bolt
3. Door assembly
4. Door upper hinge
5. Door lower hinge

Striker removal steps

6. Striker
7. Striker shim

Door switch removal steps

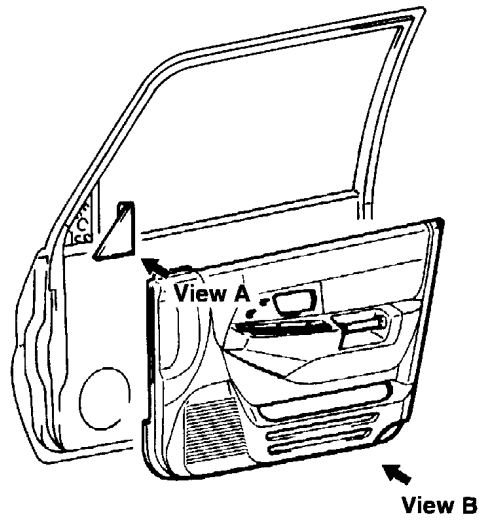
8. Door switch cap
9. Door switch



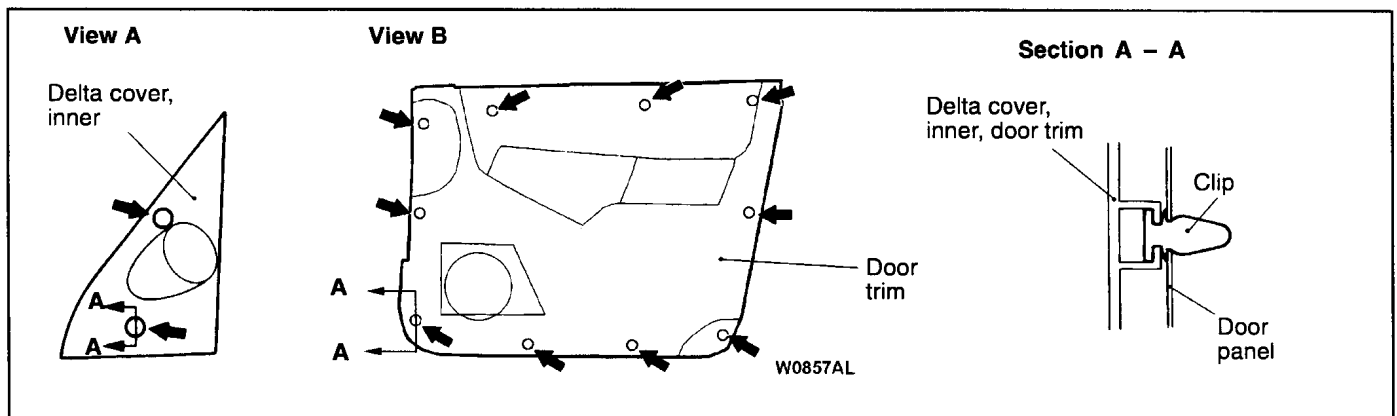
INSPECTION

DOOR SWITCH CONTINUITY CHECK

Switch position	Terminal number	
	2	Earth
Released (ON)		
Depressed (OFF)		

FRONT DOOR TRIM AND WATERPROOF FILM**CLIP AND CLAW POSITIONS**

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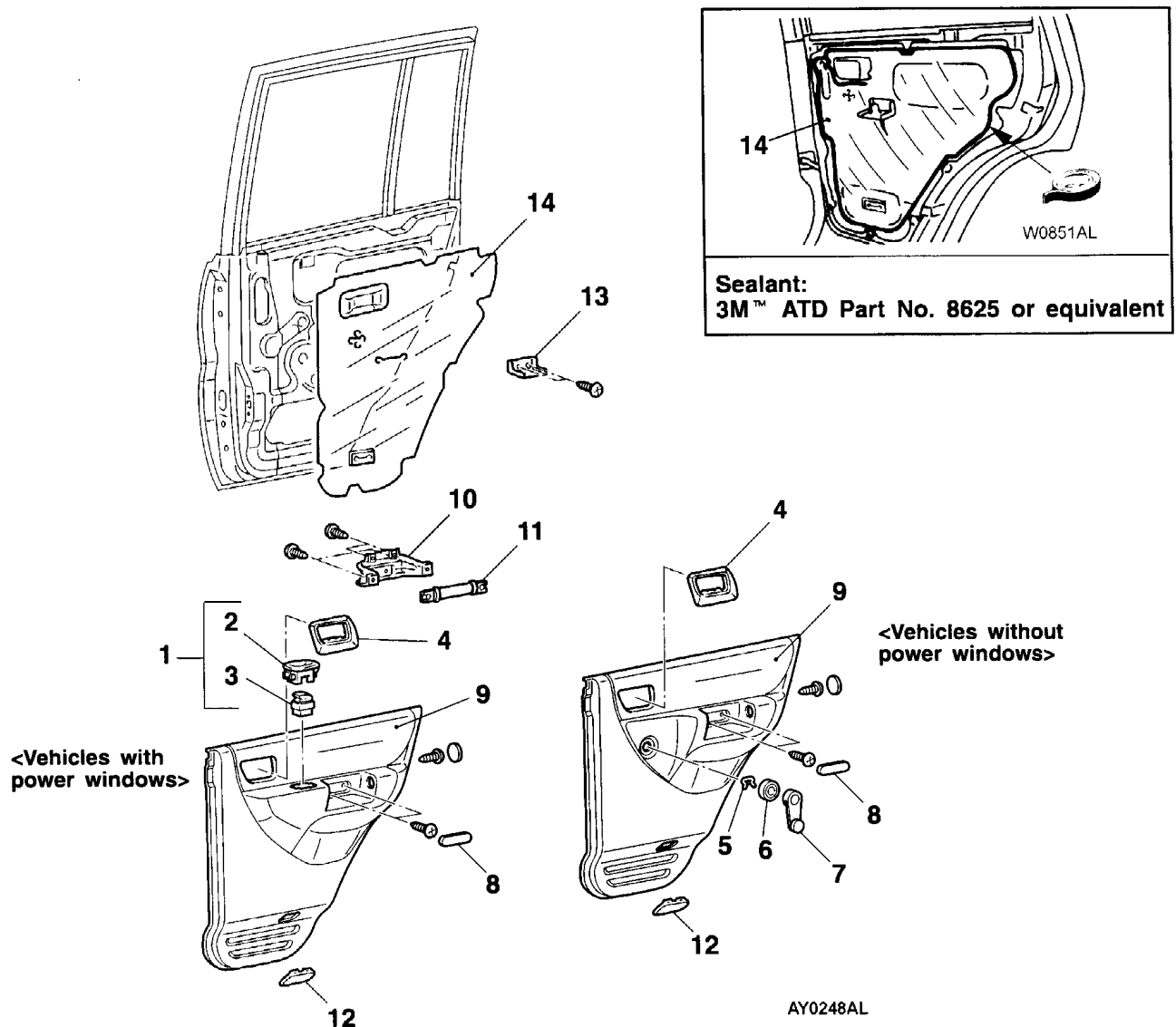
**NOTE**

➡ Clips

↪ Claws

REAR DOOR TRIM AND WATERPROOF FILM

REMOVAL AND INSTALLATION

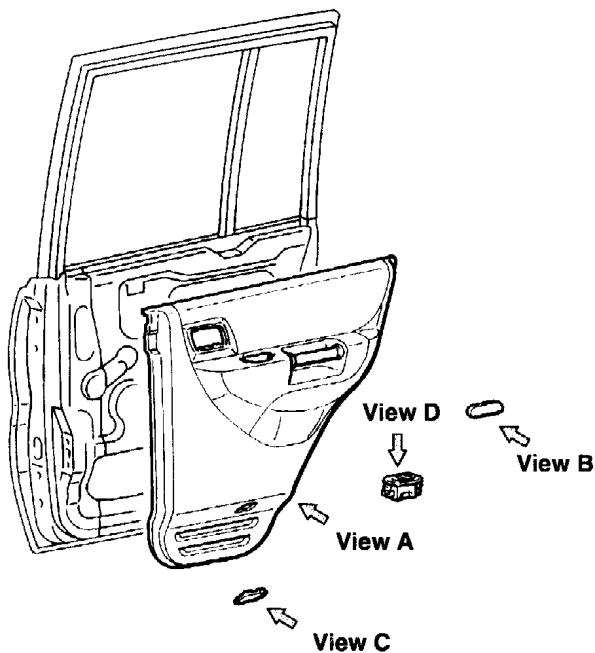


Removal steps

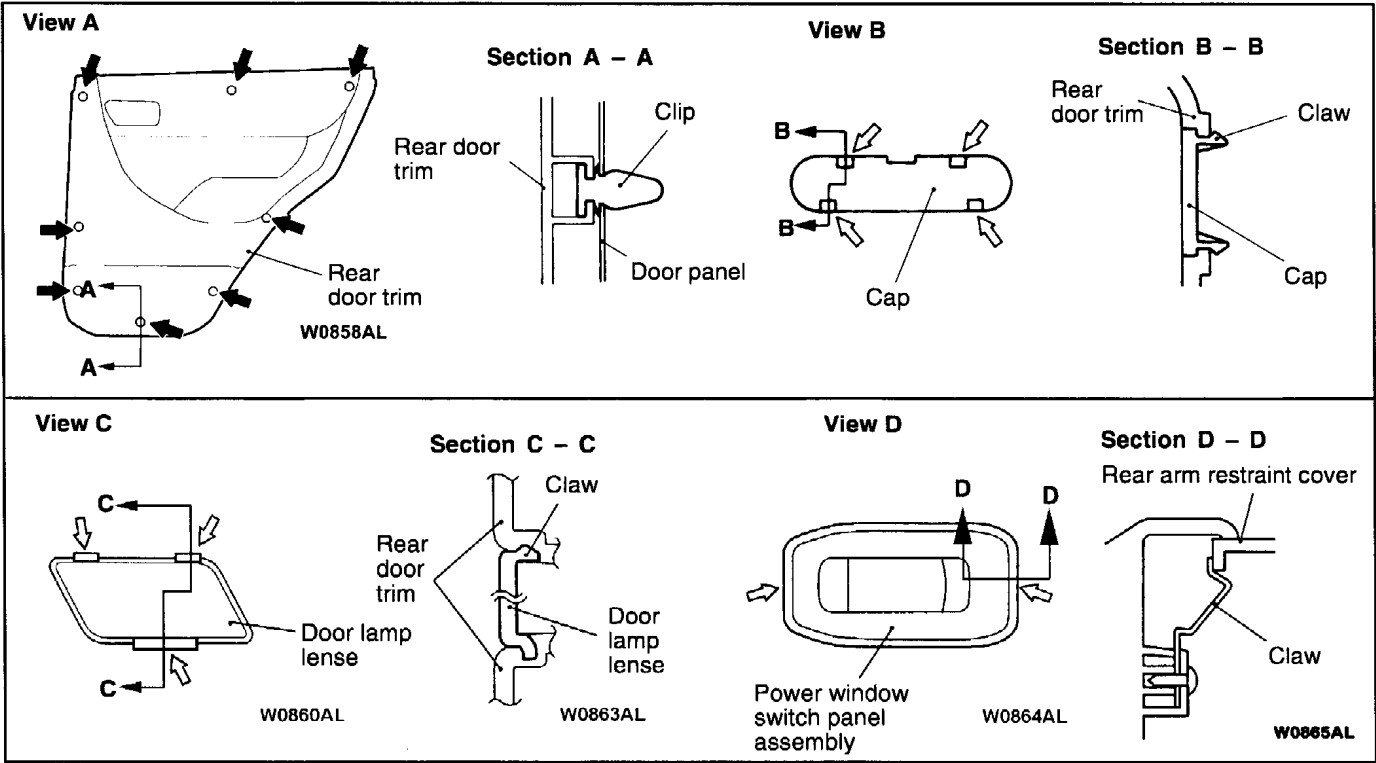
1. Power window switch panel assembly
2. Power window switch panel
3. Power window switch
4. Door inside handle cover
5. Clip
6. Escutcheon
7. Regulator handle

8. Cap
9. Door trim
10. Grip bracket
11. Door grip
12. Door lamp lense
13. Power window switch bracket
14. Waterproof film



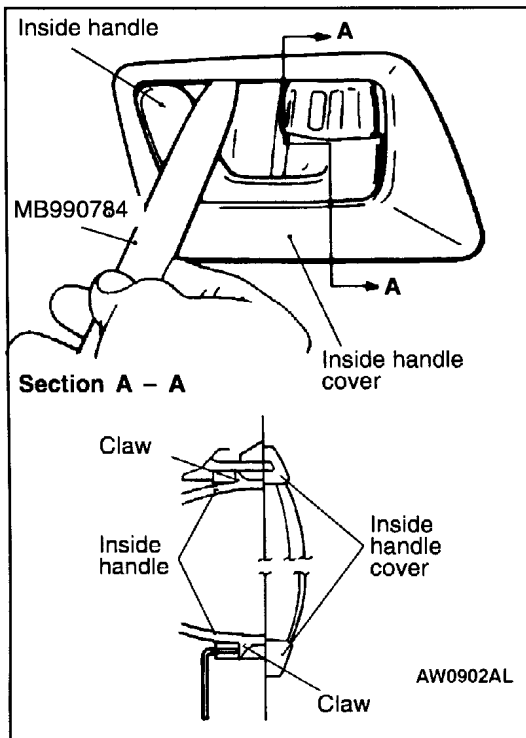


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NOTE
 Clips
 Claws

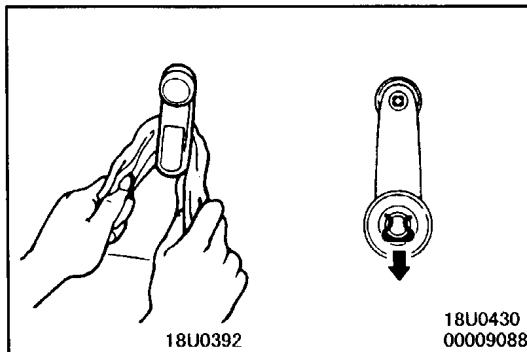
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REMOVAL SERVICE POINTS

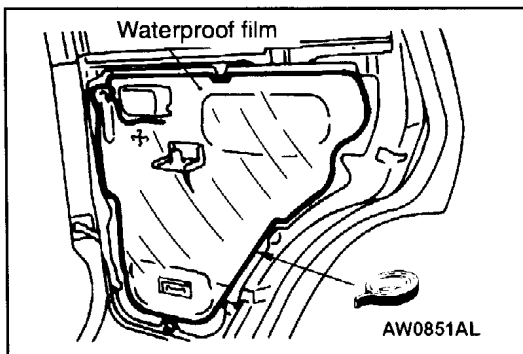
◀A▶ DOOR INSIDE HANDLE COVER REMOVAL

1. Insert the special tool between the inside handle upper part and the inside handle cover, and then disengage the upper claw of the inside handle.
2. Disengage the lower claw of the inside handle in the same manner as for the upper claw.
3. Remove the door trim.
4. Remove the inside handle cover from the door trim.



◀B▶ CLIP REMOVAL

Use a cloth to remove the clip as shown in the illustration.



INSTALLATION SERVICE POINTS

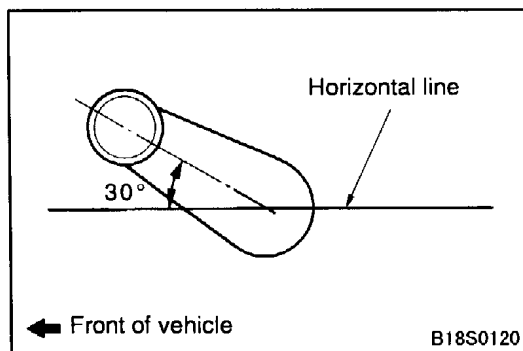
▶A◀ WATERPROOF FILM INSTALLATION

Apply the specified sealant to the shown positions of waterproof film, and then attach the waterproof film.

Specified sealant: 3M™ ATD Part No. 8625 or equivalent

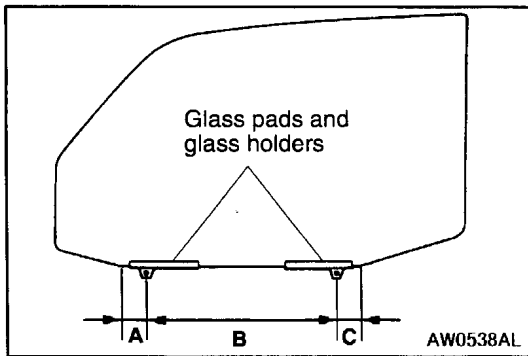
Caution

Be sure to apply the sealant below the inner panel water drain holes so as not to plug them.



▶B◀ REGULATOR HANDLE/ESCUTCHEON/CLIP INSTALLATION

1. Install the clip and escutcheon to the regulator handle.
2. Close the front door window glass fully, and then install the regulator handle as shown in the illustration.



FRONT DOOR GLASS AND REGULATOR

DOOR WINDOW GLASS/GLASS HOLDER/DOOR GLASS PAD INSTALLATION

1. Install the door glass pads and glass holders to the window glass in the positions shown.

Standard value (A): 50.0 mm

Standard value (B): 419.0 – 421.0 mm

Standard value (C): 45.0 mm

2. Install the glass to the window regulator assembly.

Caution

Do not activate the window regulator assemble before installing the glass as the resetting in the limit switch is cancelled.

INSPECTION

POWER WINDOW MAIN SWITCH CONTINUITY CHECK

NOTE

Since the power window main switch uses the SWS system, check the continuity with the input signal check method. Refer to GROUP 54B – Troubleshooting.

REAR DOOR GLASS AND REGULATOR

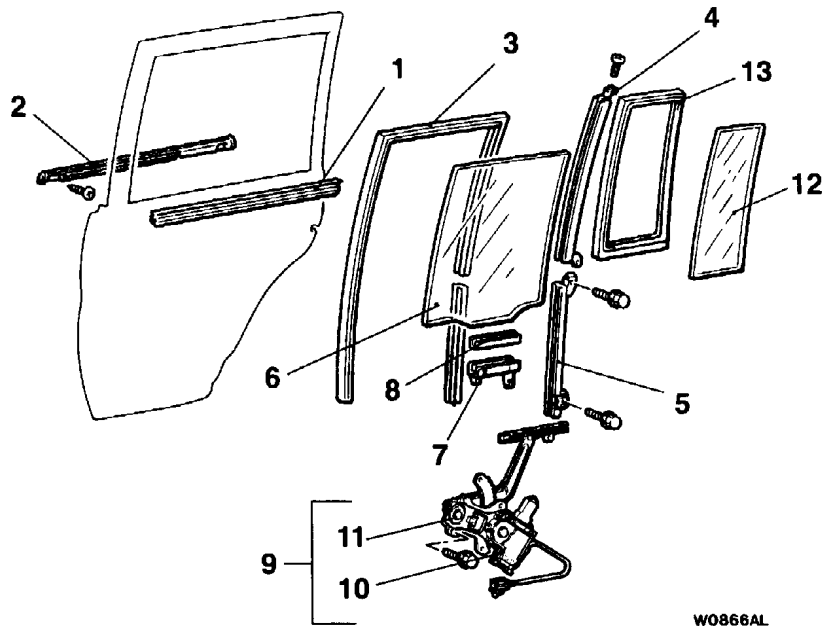
REMOVAL AND INSTALLATION

Pre-removal Operation

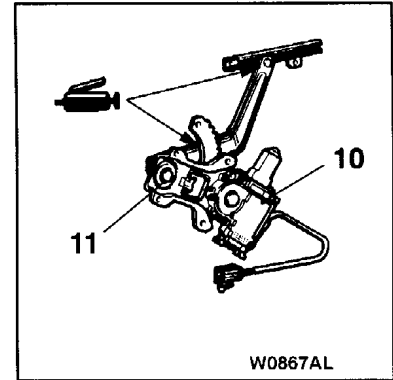
- Door Trim and Waterproof Film Removal (Refer to P.42-9.)

Post-installation Operation

- Door Window Glass Adjustment
- Door Trim and Waterproof Film Installation (Refer to P.42-9.)



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Door window glass removal steps

1. Door window inner weather strip
2. Door belt line moulding assembly
3. Door window glass runchannel
4. Rear center sash
5. Rear lower sash
6. Rear door window glass
7. Glass holder
8. Door glass pad



Power window regulator and motor assembly removal steps

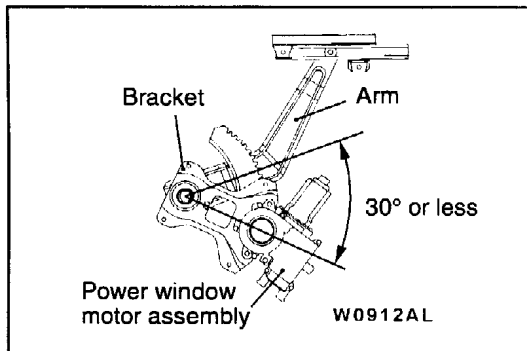
9. Power window regulator and motor assembly
10. Power window motor assembly
11. Power window regulator assembly
12. Stationary window glass
13. Stationary window glass weather strip



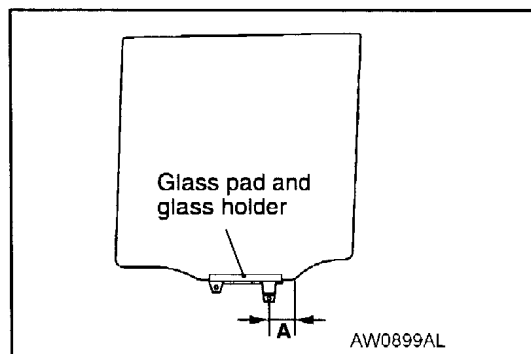
INSTALLATION SERVICE POINTS**►A◀ POWER WINDOW MOTOR ASSEMBLY/POWER WINDOW REGULATOR ASSEMBLY INSTALLATION**

Adjust the power window motor assembly and power window regulator assembly positions as follows:

1. Connect the power window motor assembly connector and the power window switch connector to the wiring harness of body side.
2. Turn on the power window switch to operate the power window motor for 3 seconds in the direction which the window glass closes.
3. Disconnect the power window motor assembly connector and the power window switch connector from the wiring harness of body side.
4. Assemble the power window motor assembly and the power window regulator so that the arm and bracket are positioned as shown in the illustration, and then install the power window motor assembly.

**Caution**

When installing the power window regulator, do not set it in the window glass fully-closed position. If installing the power window regulator in that condition, the window glass safety mechanism will not functions correctly.

**►B◀ REAR DOOR WINDOW GLASS/GLASS HOLDER/DOOR GLASS PAD INSTALLATION**

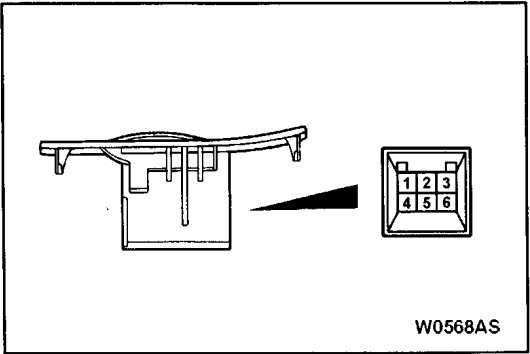
1. Install the door glass pad and glass holder to the window glass in the position shown.

Standard value (A): 53.0 mm

2. Install the glass to the window regulator assembly.

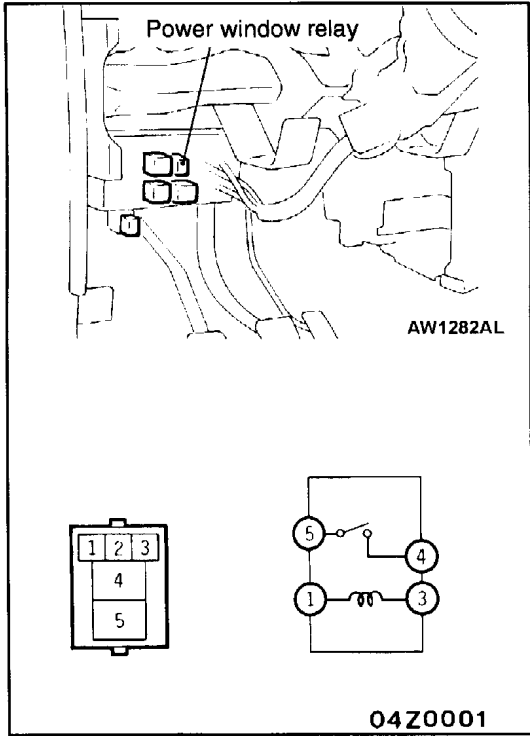
Caution

Do not activate the window regulator assemble before installing the glass as the resetting in the limit switch is cancelled.



INSPECTION
POWER WINDOW SUB SWITCH CONTINUITY CHECK

Switch position	Terminal No.		
	1	4	6
UP		○ — ○	○ — ○
DOWN	○ — ○	○ — ○	



POWER WINDOW RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Not applied	○ — ○	○ — ○		
Applied	⊕ — ⊖	⊕ — ⊖	○ — ○	○ — ○

REAR DOOR HANDLE AND LATCH

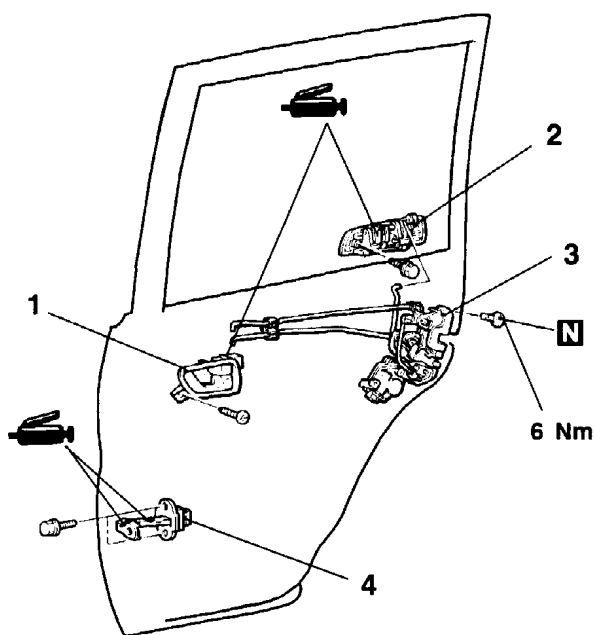
REMOVAL AND INSTALLATION

Pre-removal Operation

Door Trim Removal (Refer to P.42-9.)

Post-installation Operation

- Door Inside Handle Play Check
- Door Outside Handle Play Check
- Door Trim Installation (Refer to P.42-9.)

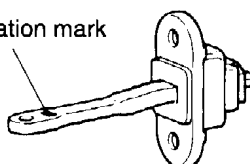

Door handle and door latch assembly removal steps


1. Door inside handle
 - Waterproof film (Refer to P.42-9.)
2. Door outside handle
3. Door latch assembly

Door check removal steps


- Waterproof film (Refer to P.42-9.)
- 4. Door check

Identification mark



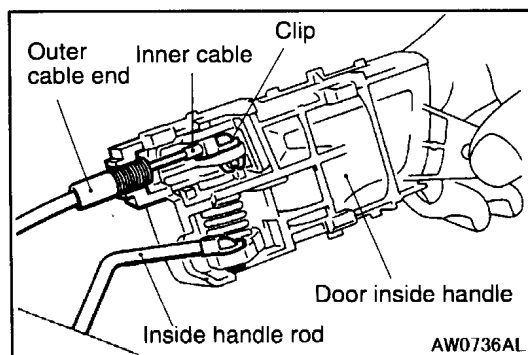
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INSTALLATION SERVICE POINTS

▶A◀ DOOR CHECK INSTALLATION

Install with the following identification marks upward.

Items	Identification mark
Left door	26L
Right door	26R



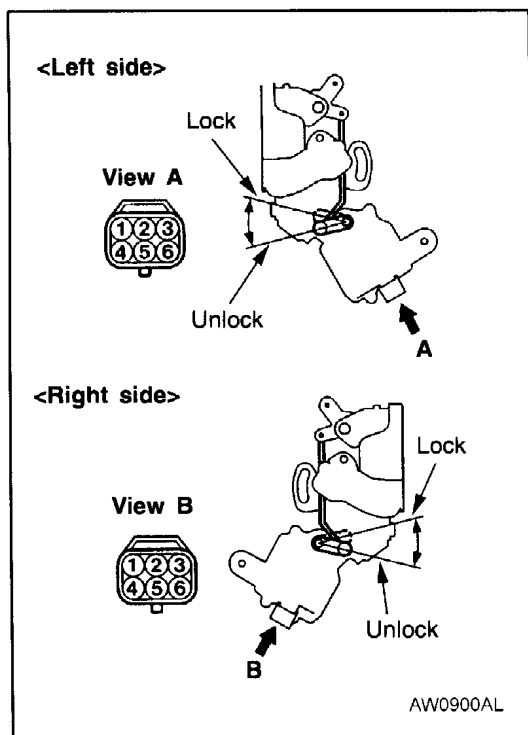
►B◄ DOOR INSIDE HANDLE INSTALLATION

1. Install the inside lock cable to the door inside handle as follows:
 - (1) Install the inner cable end in the inside lock cable to the clip in the door inside handle.
 - (2) Turn the inside lock knob to the door lock position.
 - (3) Install the outer cable end to the door inside handle securely.
 - (4) Install the clip to the inner cable.
2. Install the inside handle rod to the door inside handle.
3. Install the door inside handle to the door.

INSPECTION

DOOR LOCK ACTUATOR CHECK

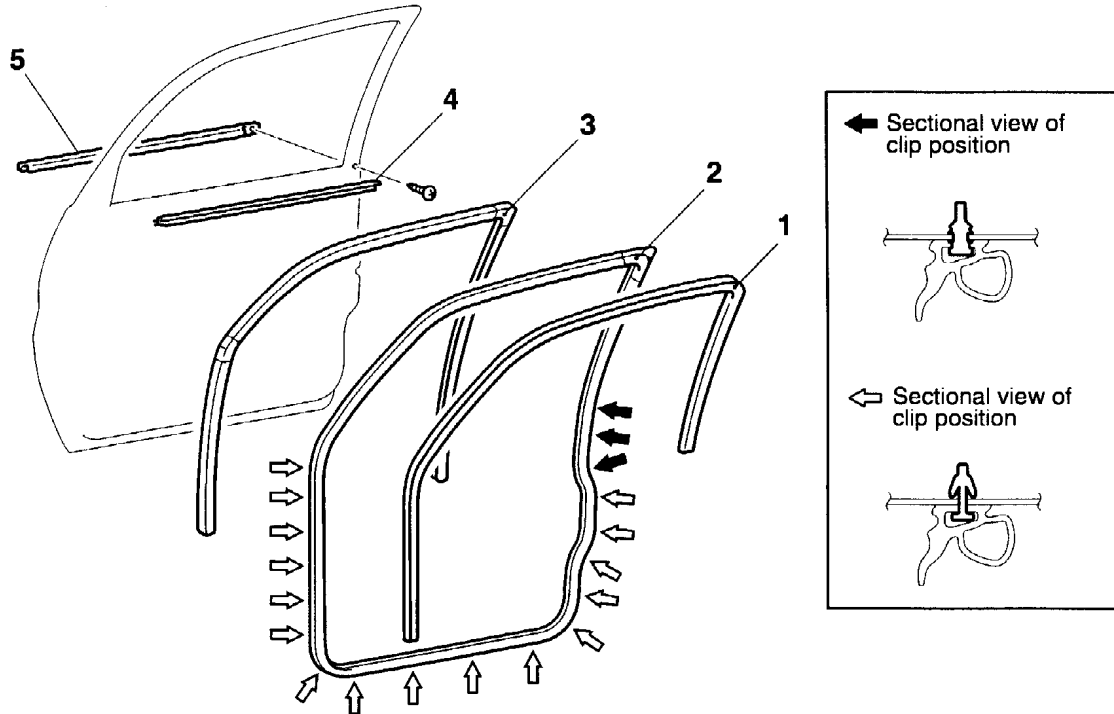
Rod position	Terminal No.		Rod operation
	2	3	
LOCK	⊖	⊕	LOCK to UNLOCK
UNLOCK	⊕	⊖	UNLOCK to LOCK



WINDOW GLASS RUNCHANNEL AND DOOR OPENING WHETHERSTRIP

REMOVAL AND INSTALLATION

<FRONT DOOR>



AY0245AL

Door inner opening weatherstrip removal steps

- Scuff plate (Refer to GROUP 52A.)
- Cowl side trim (Refer to GROUP 52A.)
- Center pillar lower trim (Refer to GROUP 52A.)

1. Door inner opening weatherstrip

Door outer opening weatherstrip removal

2. Door outer opening weatherstrip

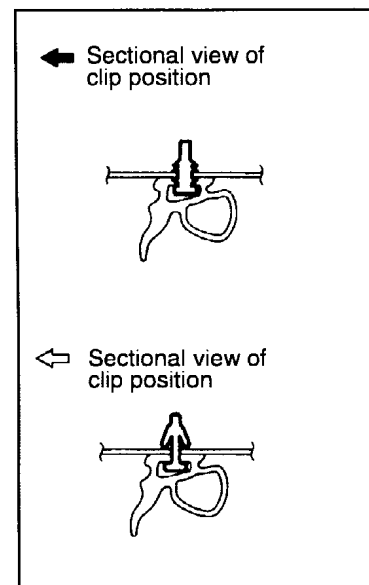
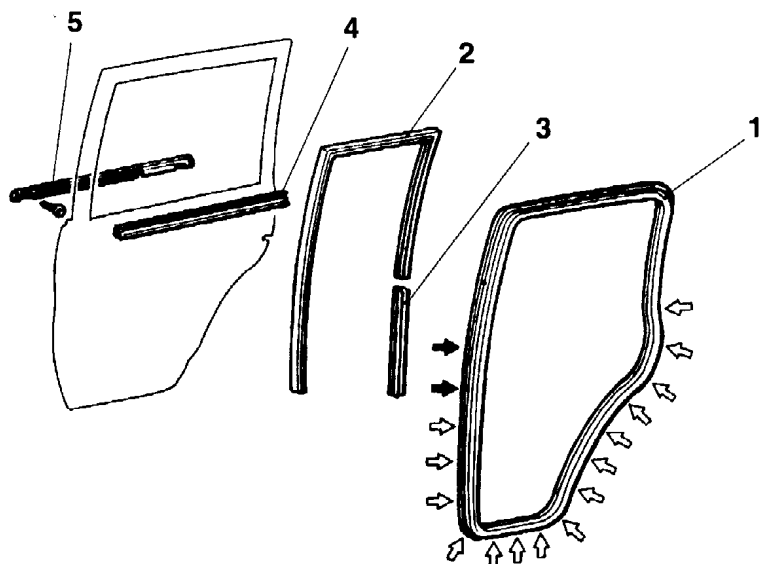
Door window glass runchannel removal steps

- 3. Door window glass runchannel
- 4. Door window glass lower runchannel

Door beltline moulding removal steps

- Outside rear view mirror
- 5. Door beltline moulding

<REAR DOOR>



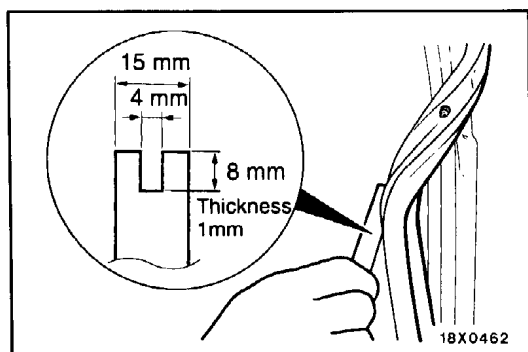
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1. Door outer opening weatherstrip
- Door window glass runchannel removal steps**
2. Door window glass runchannel
 - Door lower sash (Refer to P.42-13.)
 3. Door window glass lower runchannel

Door beltline inner weatherstrip removal steps

- Door trim (Refer to P.42-9.)
 - 4. Door beltline inner weatherstrip
- Door beltline moulding removal**
5. Door beltline moulding



REMOVAL SERVICE POINT

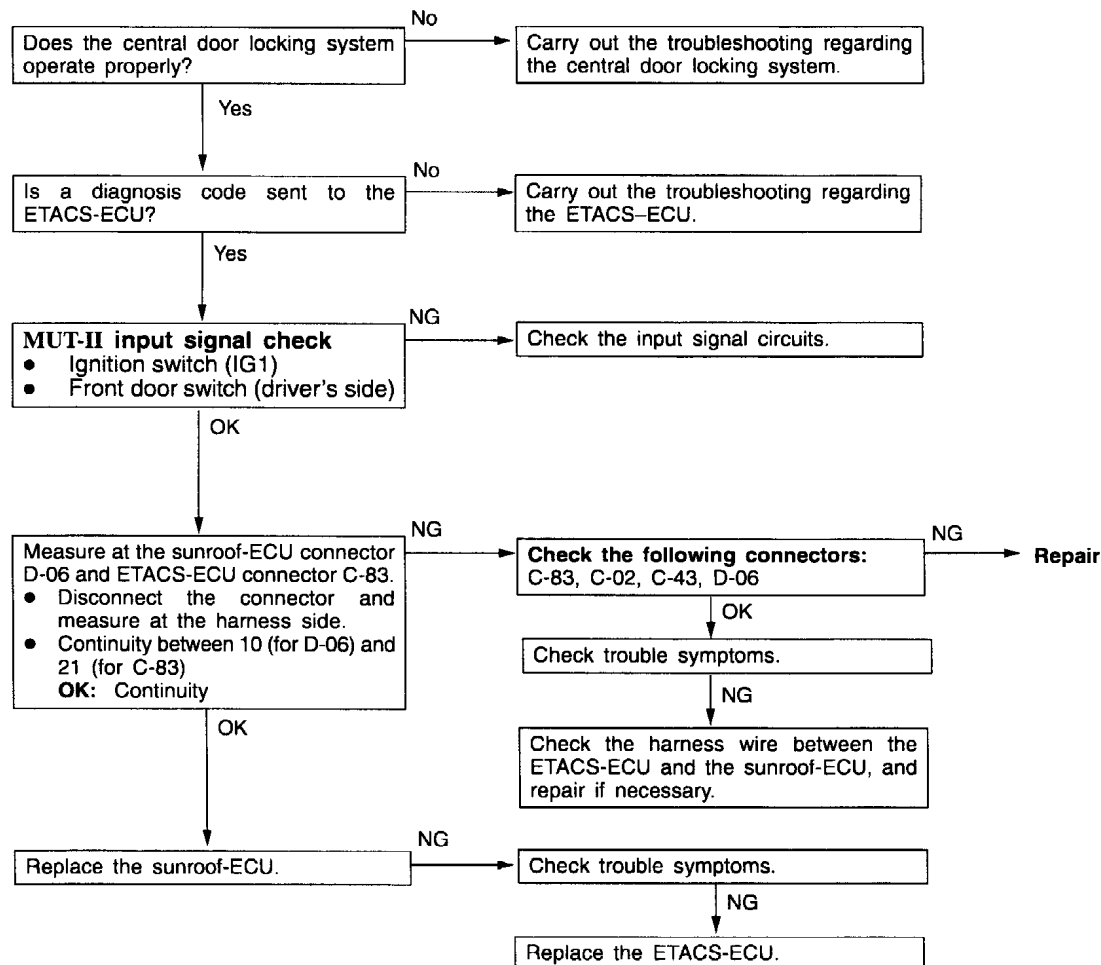
◀A▶ DOOR OUTER OPENING WEATHERSTRIP REMOVAL

Make a tool as shown and remove the door opening weatherstrip.

SUNROOF

TROUBLESHOOTING

The timer does not operate for 30 seconds after the ignition switch is turned to LOCK (OFF) position. (When the ignition switch is turned on, the sunroof operates.)	Probable cause
The sunroof-ECU has a timer function which operates during 30 seconds after the ignition switch is turned to LOCK (OFF) position. If the timer does not operate, the cause may be a malfunction of the ETACS-ECU, sunroof-ECU or of the wiring harness or connector.	• Malfunction of wiring harness or connector • Malfunction of sunroof-ECU • Malfunction of the ETACS-ECU

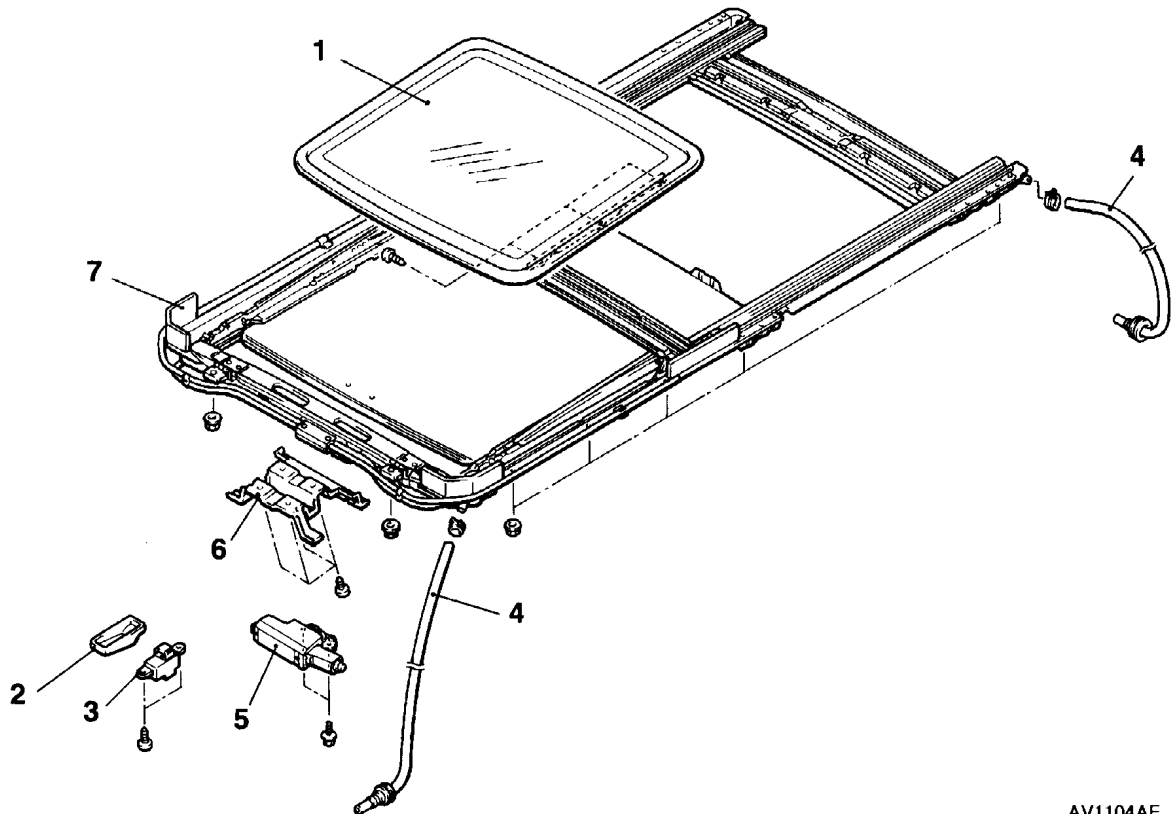


SUNROOF

REMOVAL AND INSTALLATION

Post-installation Operation

- Sunroof Water Test
- Sunroof Fit Adjustment



AV1104AE

1. Roof lid glass assembly

Sunroof switch removal steps

2. Sunroof switch cover
3. Sunroof switch

Drain hose removal steps

- Headlining
- Splash shield (Rear drain hose)
- Cowl side trim and instrument lower panel
- Engine-ECU, throttle valve control relay and throttle valve controller (Driver's-side drain hose)

◀A▶ ▶A◀ 4. Drain hose

Sunroof motor assembly removal steps

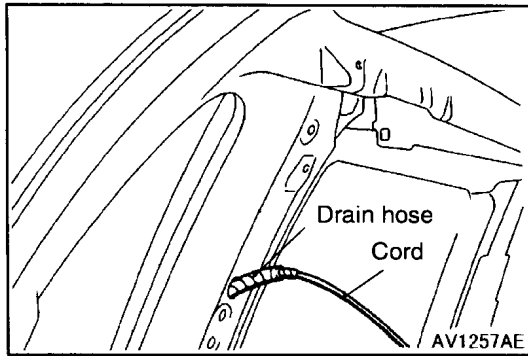
- Headlining
- 5. Sunroof motor assembly

◀B▶ ▶B◀

Sunroof assembly removal steps

- Headlining
- 4. Drain hose
- 6. Room lamp bracket
- 7. Sunroof assembly

◀A▶ ▶A◀



REMOVAL SERVICE POINTS

◀A▶ DRAIN HOSE REMOVAL

Tie a cord to the end of the drain hose, and wind tape around it so that there is no unevenness. Then pull the drain hose out from the passenger compartment.

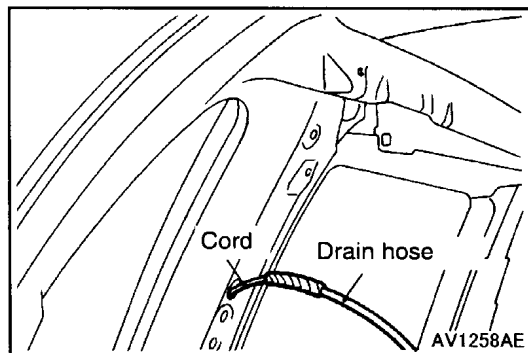
◀B▶ SUNROOF MOTOR ASSEMBLY REMOVAL

Caution

Always close the roof lid glass fully before removing the sunroof motor. If the fully-closed positions of the roof lid glass and the sunroof motor are not the same, the sunroof will not operate properly.

NOTE

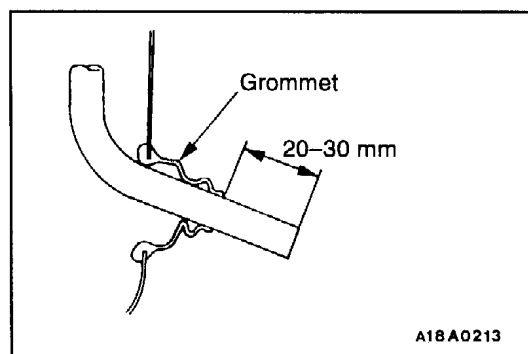
If there is a problem with the sunroof motor so that the roof lid glass cannot close fully, use an Allen key to turn the gear section of the sunroof motor to fully close the roof lid glass.



INSTALLATION SERVICE POINTS

▶A◀ DRAIN HOSE INSTALLATION

1. Tie the cord that was used during removal to the end of the drain hose, and wind tape around it so that there is no unevenness.
2. Pull the cord to pull through the drain hose
3. Install the grommet, and then position the drain hose so that it protrudes from the grommet as shown in the illustration.



►B◄ SUNROOF MOTOR ASSEMBLY INSTALLATION

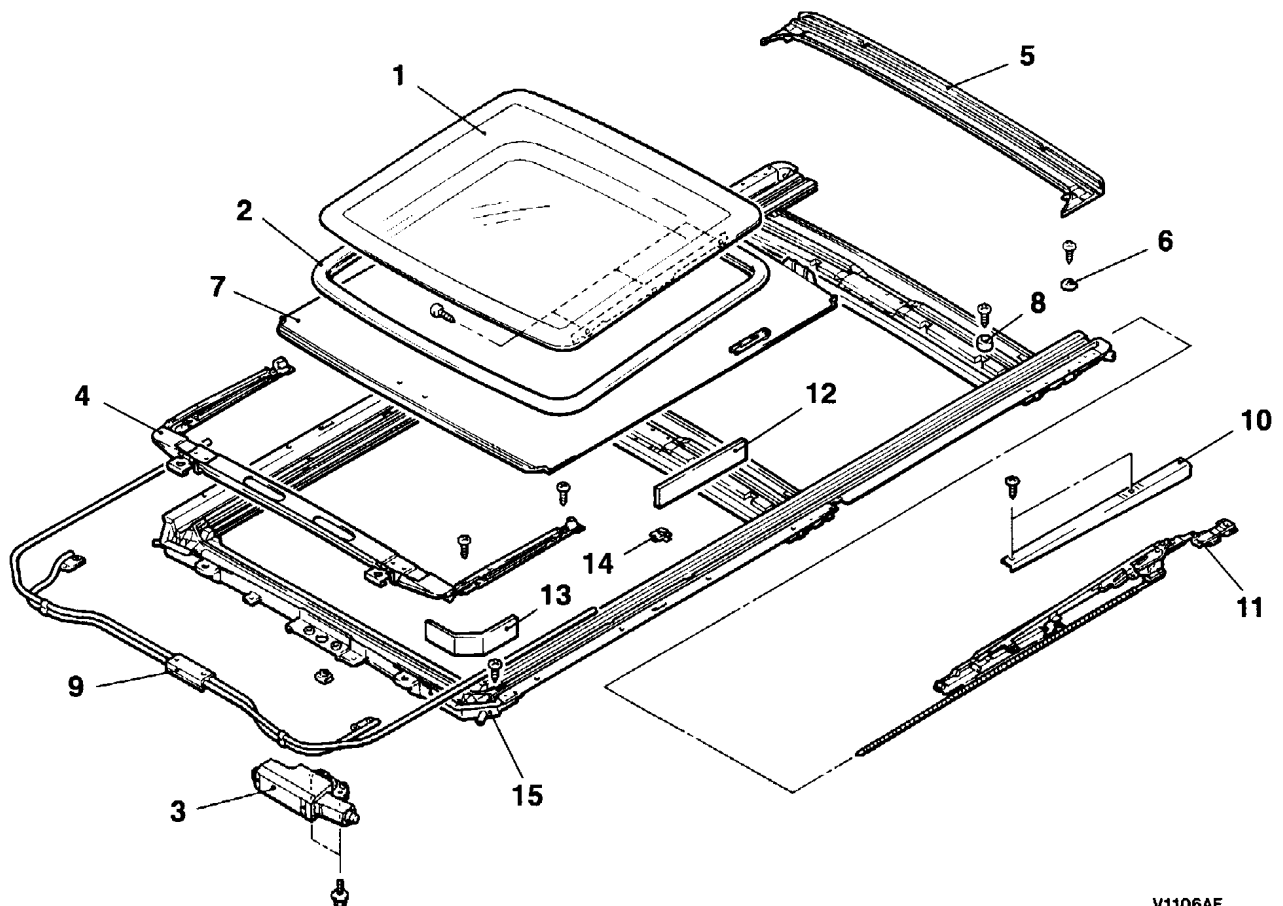
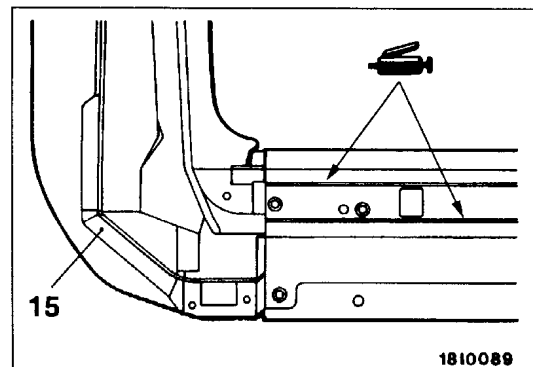
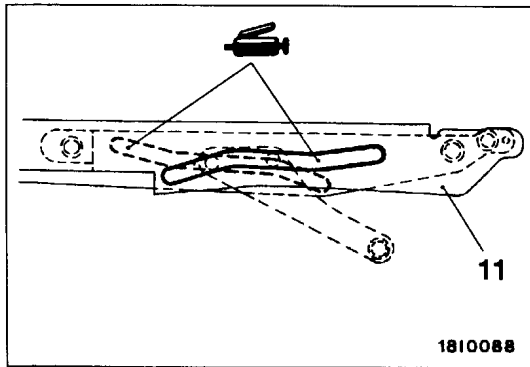
If the fully-closed position of the sunroof motor assembly is incorrect, set the sunroof motor to the fully-closed position by the following procedure, and then install the sunroof motor.

1. Remove the sunroof motor assembly with the connector still connected.
2. Set the roof lid glass to the fully-closed position.
3. Continue to push the sunroof close switch until the sunroof motor stops turning. Then install the sunroof motor assembly.

NOTE

Sunroof-ECU will initialize when the sunroof motor stops.

DISASSEMBLY AND REASSEMBLY



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Disassembly steps

- | | |
|------------------------------|-----------------------------|
| 1. Roof lid glass assembly | 9. Cable guide casing |
| 2. Weatherstrip | 10. Side deflector |
| 3. Sunroof motor | 11. Drive cable assembly |
| 4. Roof wind deflector panel | 12. Seal |
| 5. Roof drip channel | 13. Seal |
| 6. Panel stopper | 14. Clamp |
| 7. Sunshade assembly | 15. Guide rail sub assembly |
| 8. Guide rail stopper | |

GROUP 51

EXTERIOR

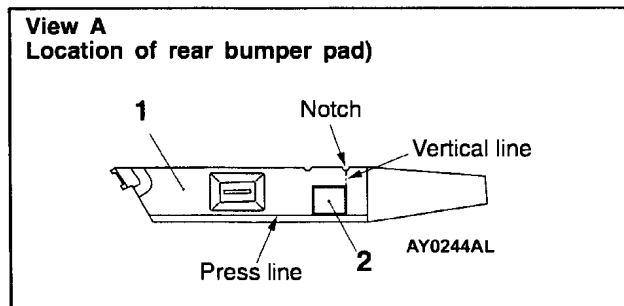
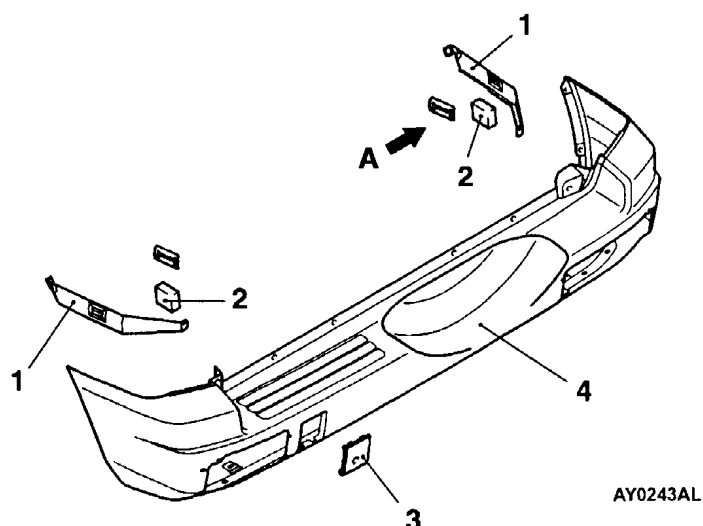
GENERAL

OUTLINE OF CHANGES

- Due to the introduction of 5-door models, the rear bumper service procedure has been added.
- Due to the introduction of 5-door models, the service procedures for the roof drip moulding and the side protector moulding have been added.
- Due to the change on the front deck garnish, the service procedure has been changed.
- The side protector moulding for 5-door models has a "Pininfarina" mark and "Pininfarina" logo mark. Due to this, the service procedure has been established.
- Due to the change on the GDI mark, the service procedure has been changed.

REAR BUMPER

DISASSEMBLY AND REASSEMBLY



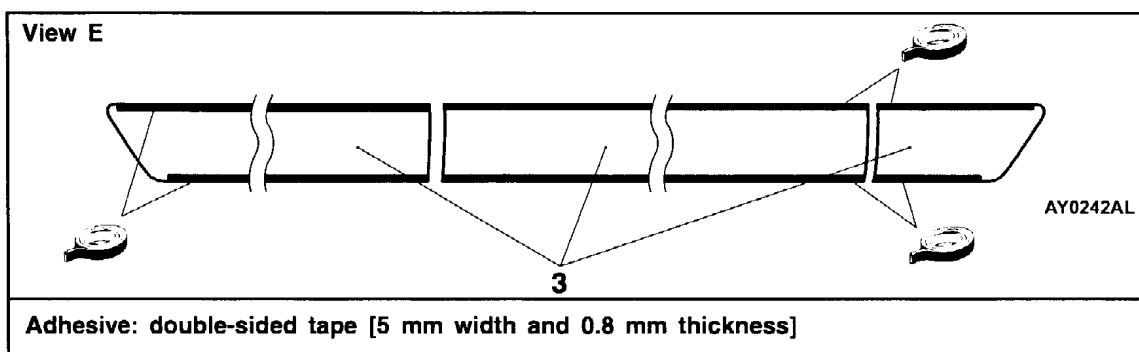
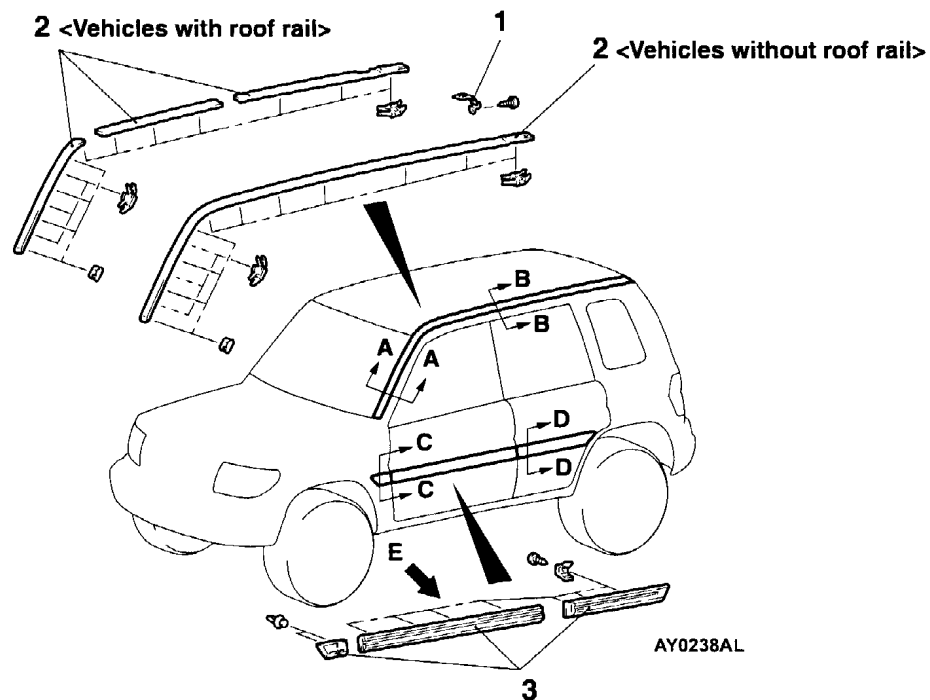
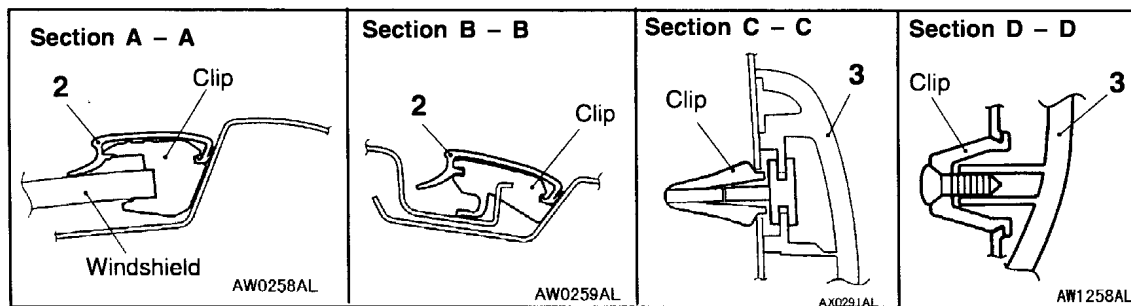
Disassembly steps

- Rear combination lamp assembly and rear combination lamp assembly bracket <R.H. drive vehicles>
- Rear fog assembly and rear fog assembly bracket <L.H. drive vehicles>

1. Rear bumper face side bracket
2. Rear bumper pad
3. Rear bumper cover
4. Rear bumper face

MOULDING

REMOVAL AND INSTALLATION



Roof drip moulding removal steps

- Roof rail assembly
- 1. Roof drip cover
- 2. Roof drip moulding

Side protector moulding removal

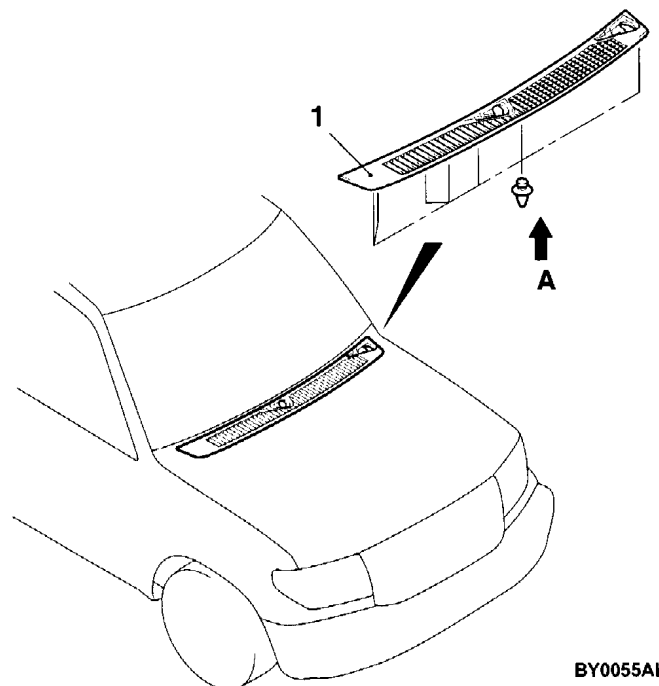
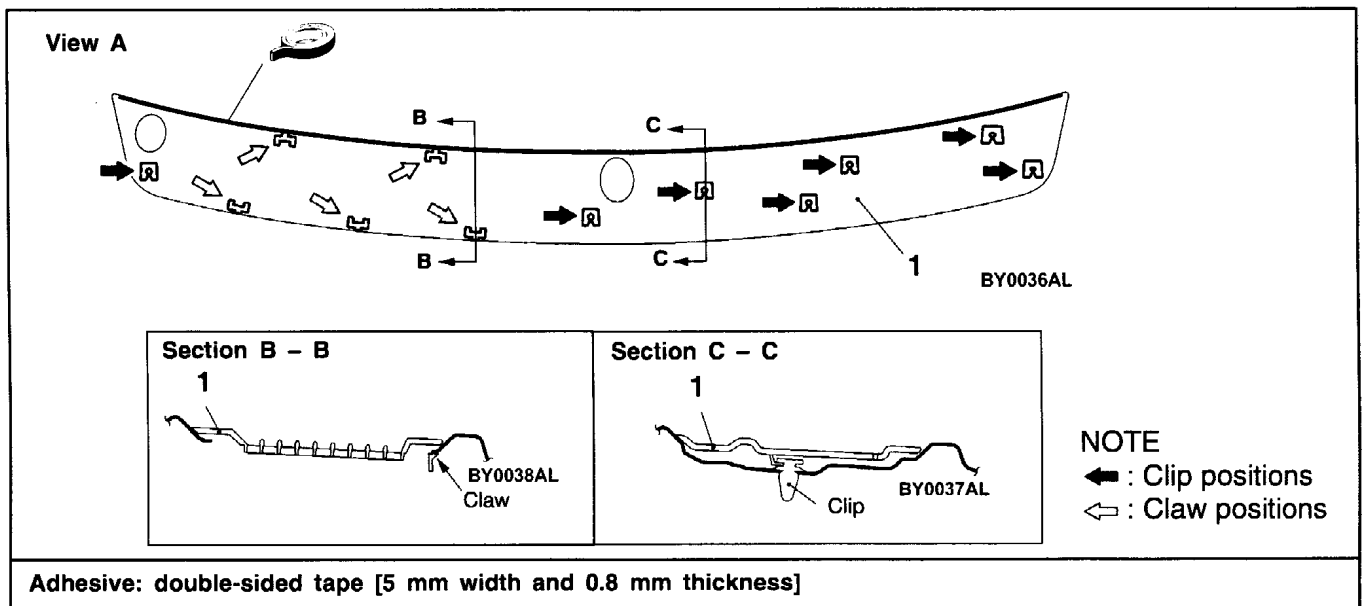
- 3. Side protector moulding

NOTE

For the removal and installation service points of the roof drip moulding and the side protector moulding, refer to the Basic Manual.

◀A▶

◀B▶ ▶A◀

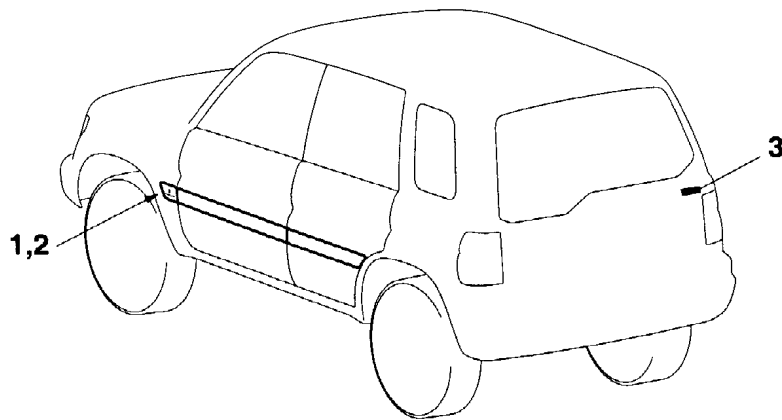
GARNISH**REMOVAL AND INSTALLATION****Front deck garnish removal steps**

- Wiper arm and blade assembly
- 1. Front deck garnish

◀A▶ ▶A◀

NOTE

For the removal and installation service points of the side protector moulding, refer to the Basic Manual.

MARKS**REMOVAL AND INSTALLATION**

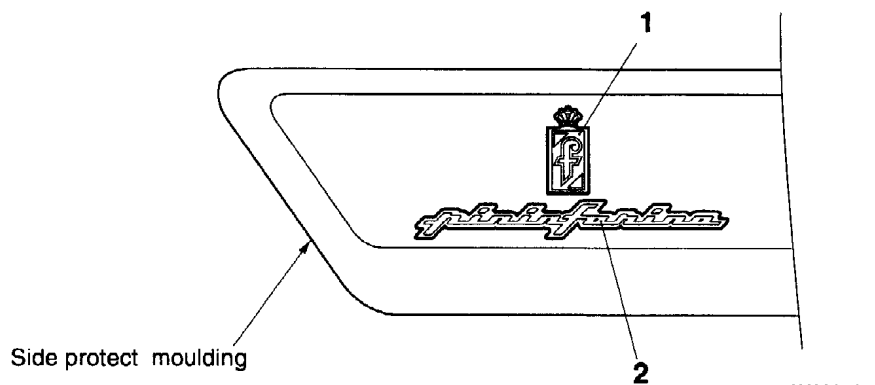
AY0239AL

- ▶A◀ 1. Pininfarina mark
▶A◀ 2. Pininfarina logo mark

- ▶A◀ 3. GDI mark

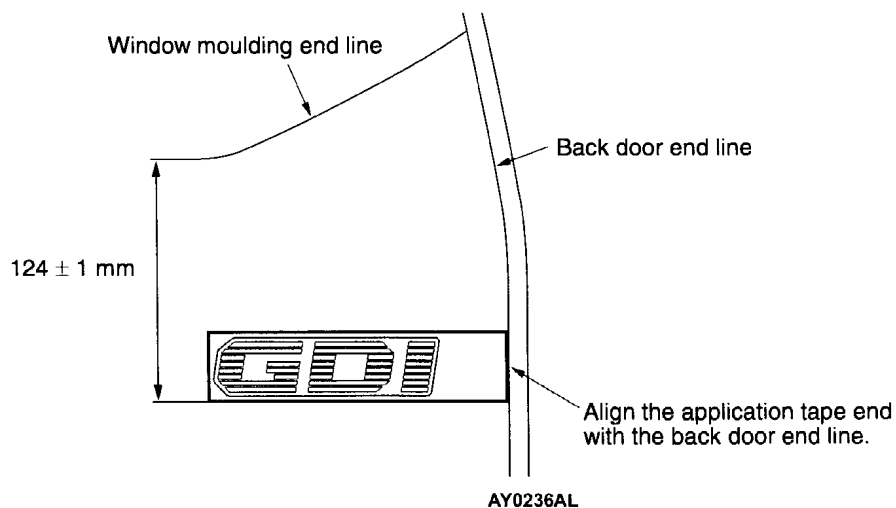
INSTALLATION SERVICE POINT**▶A◀ MARK INSTALLATION**

(1) PININFARINA MARK,(2) PININFARINA LOGO MARK



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(3) GDI MARK



1. Clean the mark installation surfaces on the body with unleaded petrol.
2. Peel off the backing paper from the reverse side of the marks, and then attach the marks to the vehicle body so that they fit properly into position.

Caution

When attaching the marks, the surrounding temperature should be 20 – 38°C and the air should be completely free from dust.

If the surrounding temperature is lower than 20°C, the marks and the places on the body where the marks are to be attached should be heated to 20 – 38°C.

GROUP 52A

INTERIOR

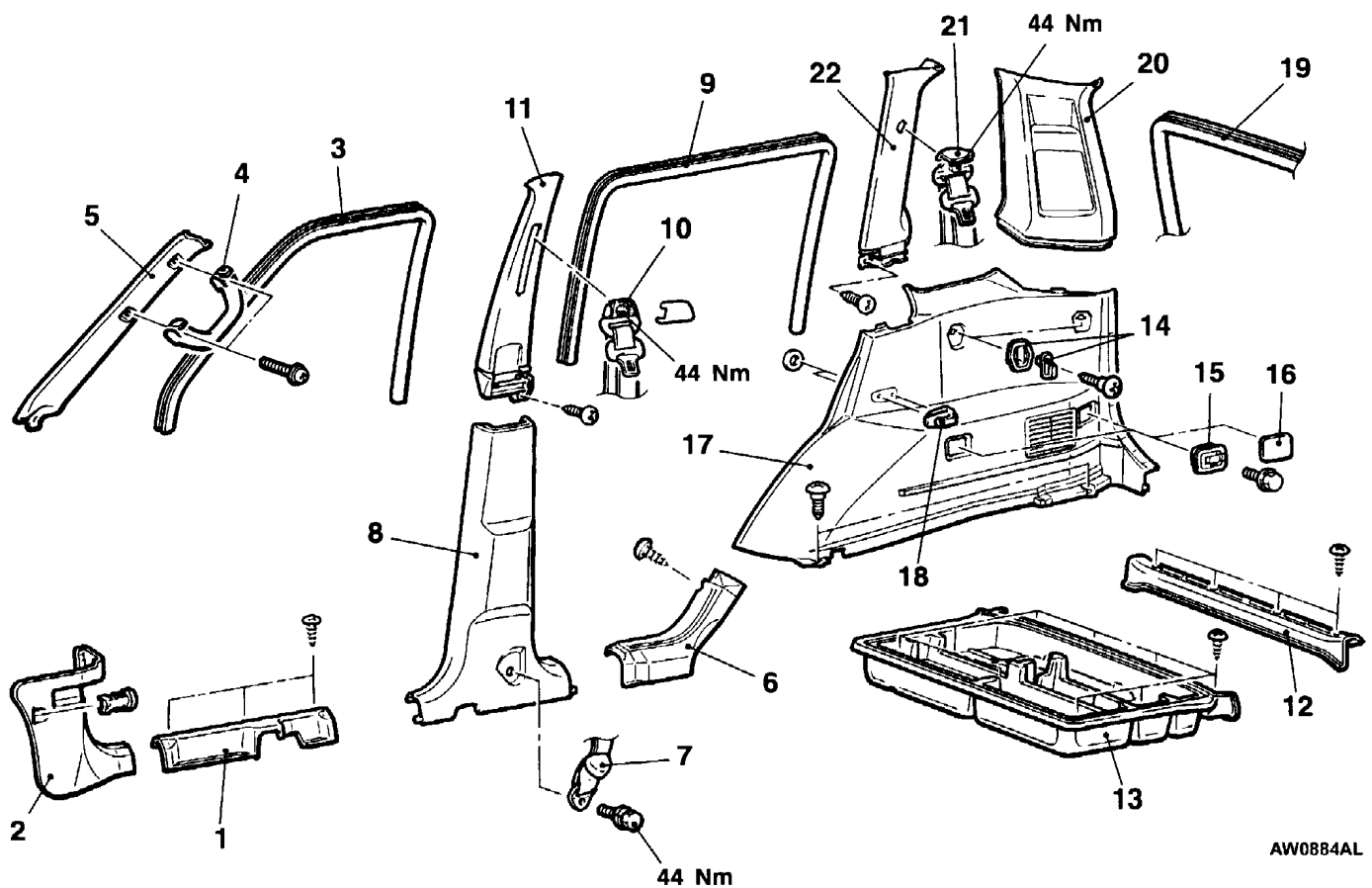
GENERAL

OUTLINE OF CHANGE

- Due to the introduction of 5-door models, the service procedures for the trims, the headlining, the seat and the seat belts have been added. The other items are the same as before.

TRIMS <5-DOOR MODELS>

REMOVAL AND INSTALLATION

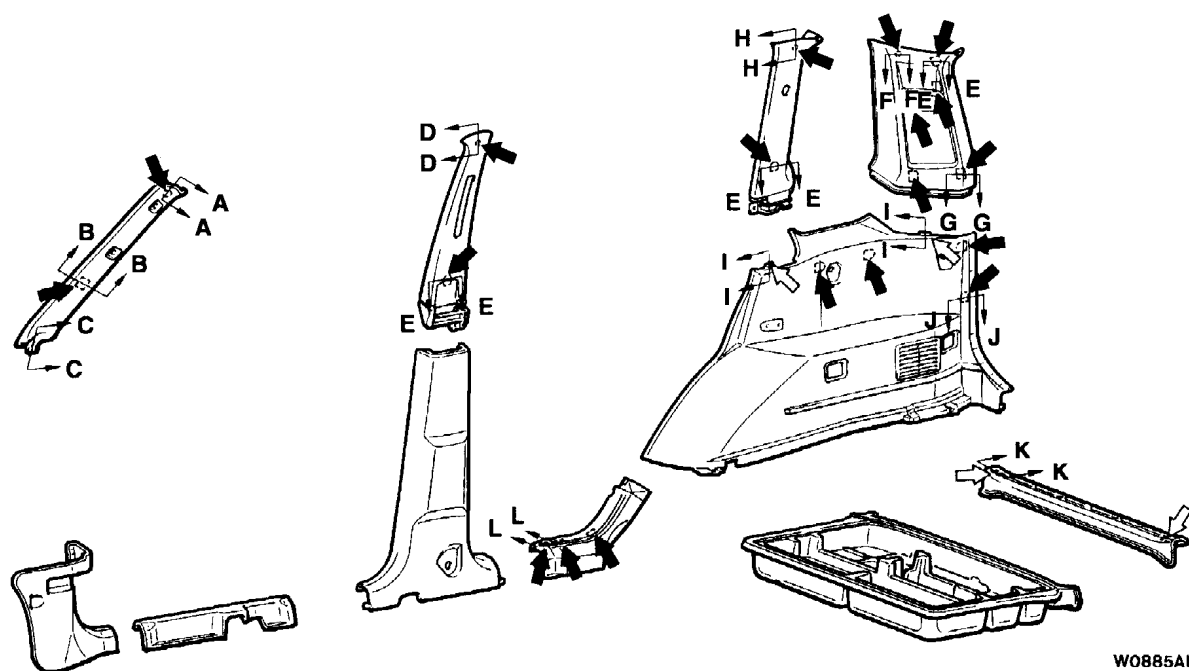


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1. Front scuff plate
2. Cowl side trim
3. Front door opening trim
4. Assist grip (front)
5. Front pillar trim
6. Rear scuff plate
7. Front seat belt connection
8. Center pillar lower trim
9. Rear door opening trim
10. Front seat belt connection
11. Center pillar upper trim
12. Rear step plate

- Rear seat (Refer to '00 PAJERO PININ Workshop Manual <pub.No. CKRE00E1> Group 52A)
- 13. Luggage floor box <Option>
- 14. Luggage room hook
- 15. Net hook <Option>
- 16. Cover
- 17. Quarter lower trim
- 18. Hook
- 19. Back door opening trim
- 20. Rear pillar trim
- 21. Rear seat belt connection
- 22. Quarter pillar upper trim

CLIP AND CLAW POSITIONS



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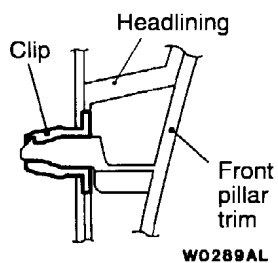
NOTE

➡ : Clip positions

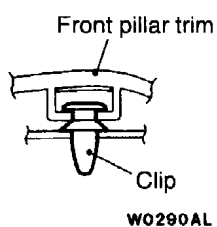
⇨ : Claw positions

For door trim, refer to GROUP 42.

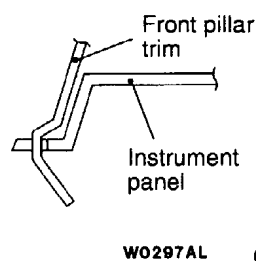
Section A – A



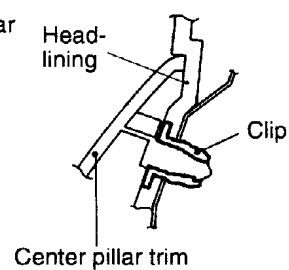
Section B – B



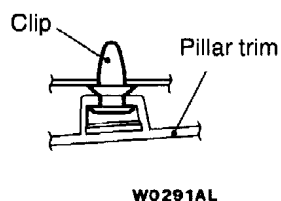
Section C – C



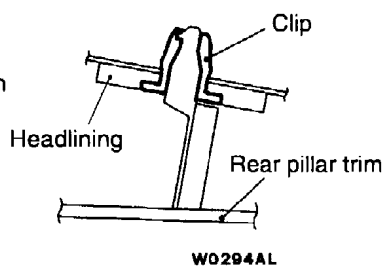
Section D – D



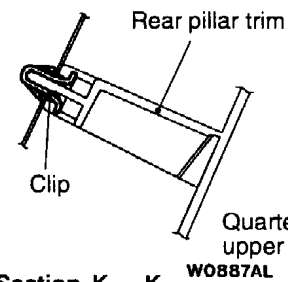
Section E – E



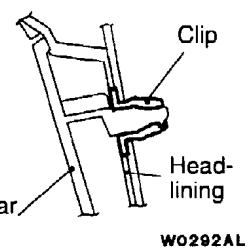
Section F – F



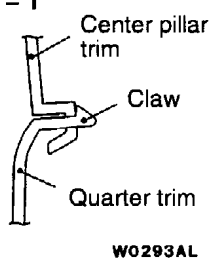
Section G – G



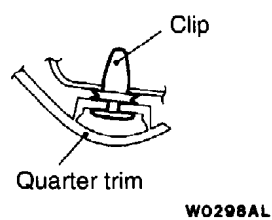
Section H – H



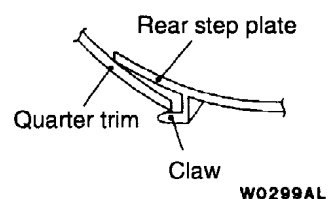
Section I – I



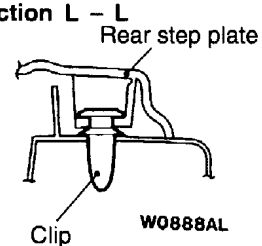
Section J – J



Section K – K

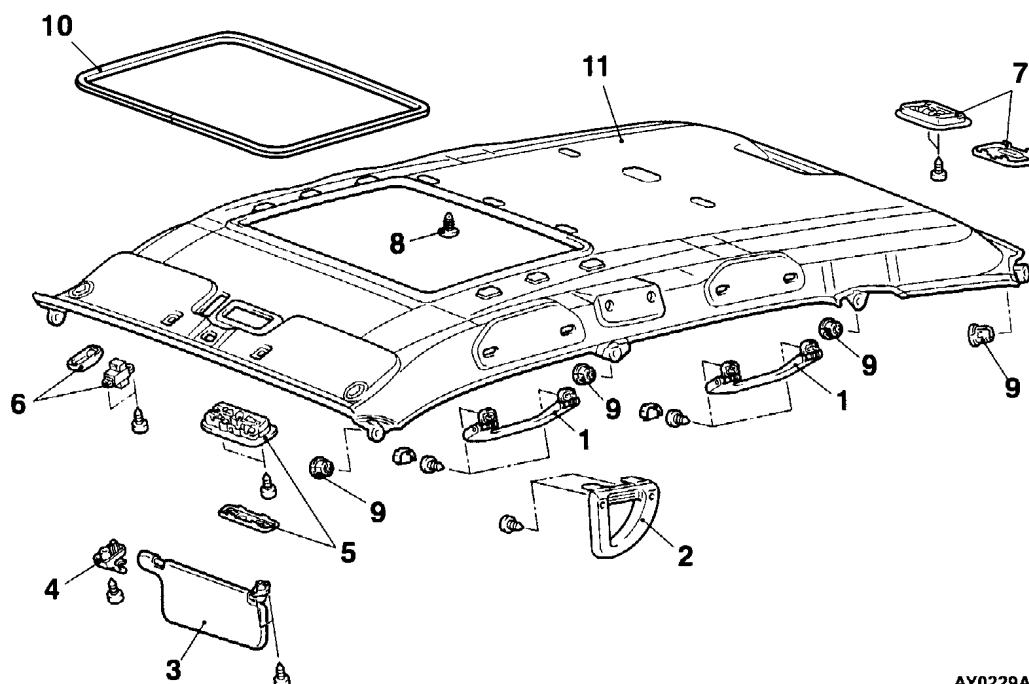


Section L – L



HEADLINING <5-DOOR MODELS>

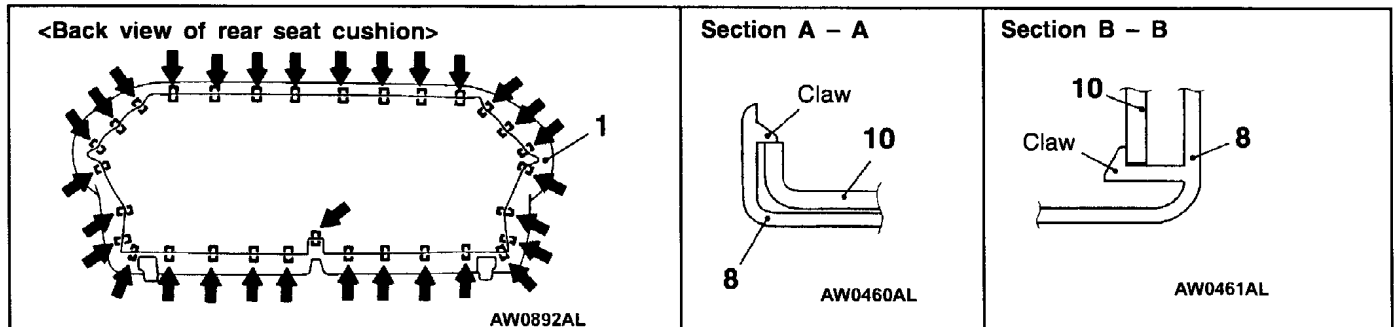
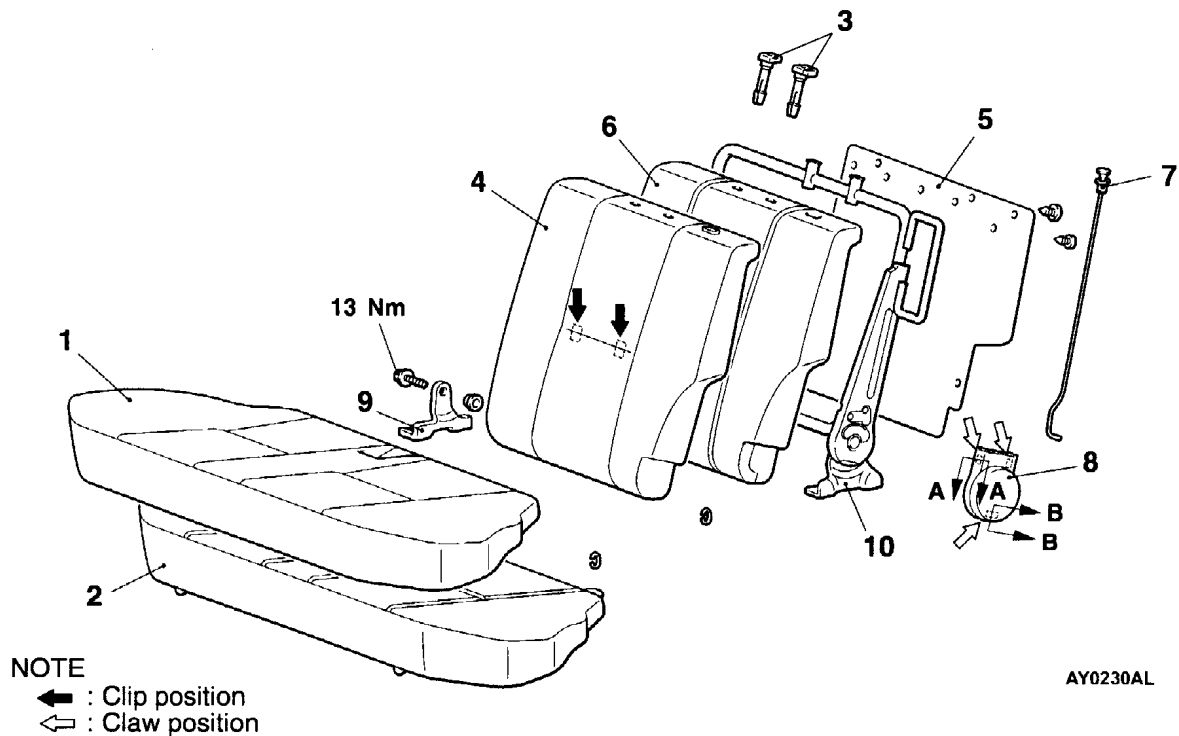
REMOVAL AND INSTALLATION



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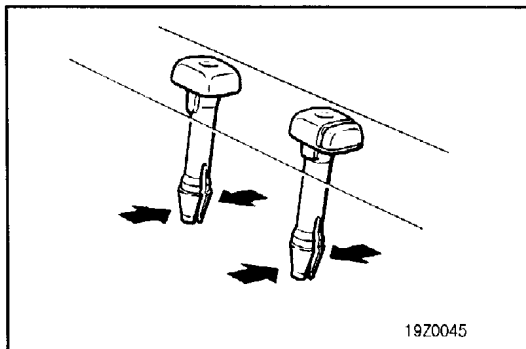
Removal steps

1. Assist grip
2. Grip (rear)
3. Sun visor assembly
4. Sun visor holder
5. Front room lamp assembly
6. Sunroof switch
<Vehicles with sunroof>
7. Rear room lamp assembly
- Front pillar trim (Refer to P.52A-1.)
- Center pillar trim (Refer to P.52A-1.)
- Quarter pillar upper trim (Refer to P.52A-1.)
- Rear pillar trim (Refer to P.52A-1.)
8. Trim clip <Vehicles without sunroof>
9. Clip
10. Sunroof drip moulding
<Vehicles with sunroof>
11. Headlining

SEAT <5-DOOR MODELS>**REAR SEAT****DISASSEMBLY AND REASSEMBLY****Disassembly steps**

1. Rear seat cushion cover
2. Rear seat cushion pad
3. Headrest guide
4. Rear seat back cover
5. Rear seat back panel

6. Rear seat back pad
7. Folding knob assembly
8. Reclining adjuster cover
9. Rear seat center hinge
10. Rear seat back frame assembly

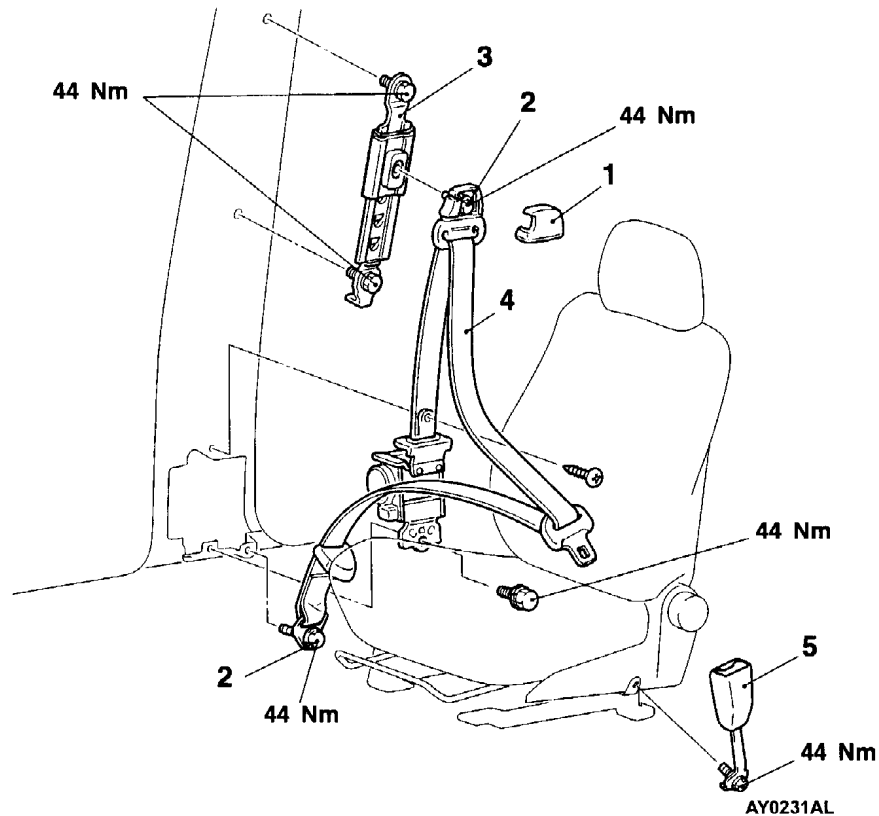
**REMOVAL SERVICE POINT****◀A▶ HEADRESTRAINT GUIDE REMOVAL**

SEAT BELT <5-DOOR MODELS>

FRONT SEAT BELT REMOVAL AND INSTALLATION

Caution: SRS

Before removal of the seat belt pre-tensioner, refer to GROUP 52B – SRS Service Precautions and Seat Belt with Pre-tensioner.



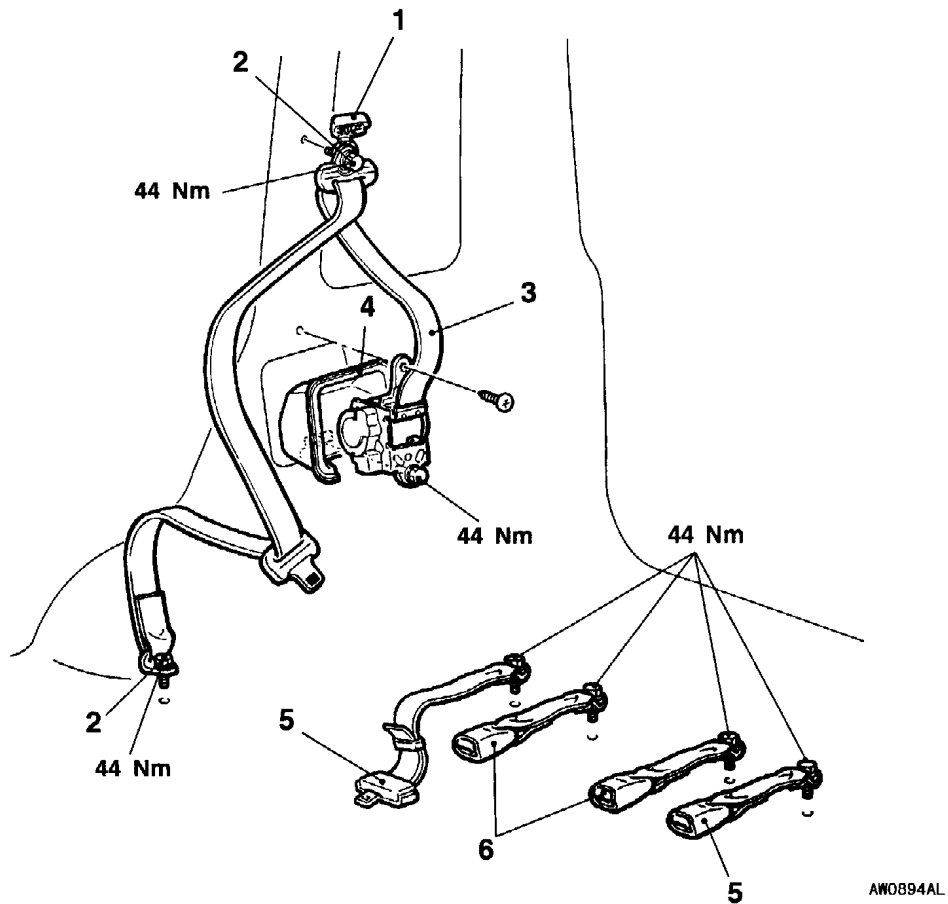
Outer seat belt removal steps

1. Sash guide cover
2. Outer seat belt connection
 - Center pillar lower trim (Refer to P.52A-1.)
 - Center pillar upper trim (Refer to P.52A-1.)
3. Adjustable seat belt anchor
4. Outer seat belt

Inner seat belt removal

5. Inner seat belt

REAR SEAT BELT REMOVAL AND INSTALLATION



Removal steps

- Rear seat cushion assembly (Refer to P.52A-1.)
- 1. Sash guide cover
- 2. Outer seat belt connection
- Luggage floor box <Option> (Refer to P.52A-1.)

- Quarter lower trim (Refer to P.52A-1.)
- Quarter pillar upper trim (Refer to P.52A-1.)
- 3. Outer seat belt
- 4. Rear noise protector
- 5. Rear center seat belt
- 6. Inner seat belt

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

GENERAL	2	SEAT BELT WITH PRE-TENSIONER	2
Outline of Change	2	SIDE IMPACT SENSOR	3

CAUTION

- Carefully read and observe the information in the SERVICE PRECAUTIONS (Refer to '00 PAJERO PININ Workshop Manual <Pub.No.CKRE00E1> P.52B-4.) prior to any service.
 - For information concerning troubleshooting or maintenance, always observe the procedures in the Troubleshooting (Refer to '00 PAJERO PININ Workshop Manual <Pub.No.CKRE00E1> P.52B-8.) section.
 - If any SRS components are removed or replaced in connection with any service procedures, be sure to follow the procedures in the INDIVIDUAL COMPONENT SERVICE section (Refer to '00 PAJERO PININ Workshop Manual <Pub.No.CKRE00E1> P.52B-30.) for the components involved.
 - If you have any questions about the SRS, please contact your local distributor.
-

GENERAL

OUTLINE OF CHANGE

- Due to the introduction of 5-door models, the removal and installation procedures for seat belt with pre-tensioner and side impact sensor have been added. The other items are the same as before.

SEAT BELT WITH PRE-TENSIONER

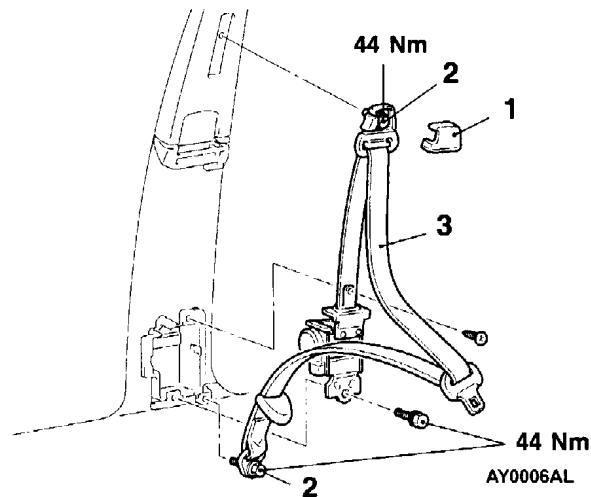
Caution

1. Never attempt to disassemble or repair the seat belt with pre-tensioner. If faulty, replace it.
2. Be extremely careful when handling the seat belt with pre-tensioner. Do not subject it to shocks, drop it, bring it close to strong magnets or allow contact with water, grease or oil. Always replace it with a new part if any dents, cracks or deformation is found.
3. Do not place anything on top of the seat belt pre-tensioner.
4. Do not expose the seat belt with pre-tensioner to temperatures over 90°C.
5. After operating the seat belt pre-tensioner, replace the seat belt pre-tensioner with a new part.
6. Gloves and protective goggles should be worn when handling a pre-tensioner once it has been used.
7. If disposing of a seat belt with pre-tensioner which has not yet been used, its pre-tensioner should be operated first before disposal. (Refer to '00 PAJERO PININ Workshop Manual <Pub. No. CKRE00E1> P.52B-48.)

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Turn Ignition Key to LOCK (OFF) Position
- Disconnect the Negative (–) Battery Terminal.



Removal steps

1. Sash guide cover
2. Outer seat belt connection
 - Center pillar lower trim (Refer to P.52A-1.)
3. Seat belt with pre-tensioner

Installation steps

- A◀
- Post-installation inspection
 - 3. Seat belt with pre-tensioner
 - Center pillar lower trim (Refer to P.52A-1.)
 - 2. Outer seat belt connection
 - 1. Sash guide cover
 - Negative (–) battery cable connection
- B◀
- Pre-installation inspection

NOTE

The figure shows the seat belt with pre-tensioner (R.H.).

For service points, refer to Basic Manual.

SIDE IMPACT SENSOR

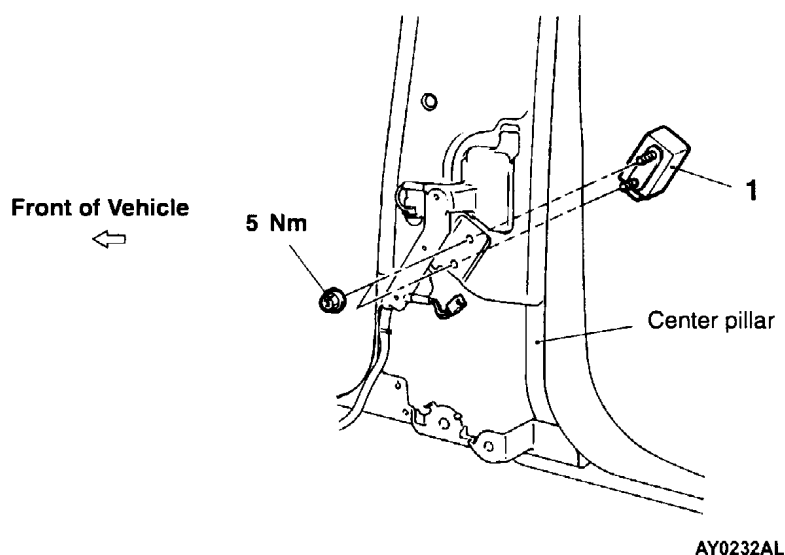
Caution

1. Disconnect the negative (–) battery terminal and wait for 60 seconds or more before starting work. Also, the disconnected battery terminal should be insulated with tape. (Refer to '00 PAJERO PININ Workshop Manual <Pub. No. CKRE00E1> P.52B-4.)
2. Never attempt to disassemble or repair the side impact sensors. If faulty, just replace with new ones.
3. Do not drop or subject the side impact sensors to impact or vibration. If denting, cracking, deformation, or rust are found in the side impact sensors, replace it with new ones. Discard the old ones.
4. After deployment of the air bags, replace the side impact sensors with new ones.
5. Never use an ohmmeter on or near the side impact sensors, and use only the special test equipment described on '00 PAJERO PININ Workshop Manual <Pub. No. CKRE00E1> P.52B-7.

REMOVAL AND INSTALLATION

Pre-removal Operation

- Turn Ignition Switch to LOCK (OFF) Position.
- Disconnect the Negative (–) Battery Terminal.



Removal steps

- Front seat belt (Refer to GROUP 52A.)
1. Side impact sensor

Installation steps

- Pre-installation inspection
- 1. Side impact sensor
- Front seat belt (Refer to GROUP 52A.)
- Negative (–) battery cable connection
- Post-installation inspection

NOTE

The figure shows the side impact sensor (R.H.).
For service points, refer to Basic Manual.

GROUP 54A

CHASSIS ELECTRICAL

GENERAL

OUTLINE OF CHANGE

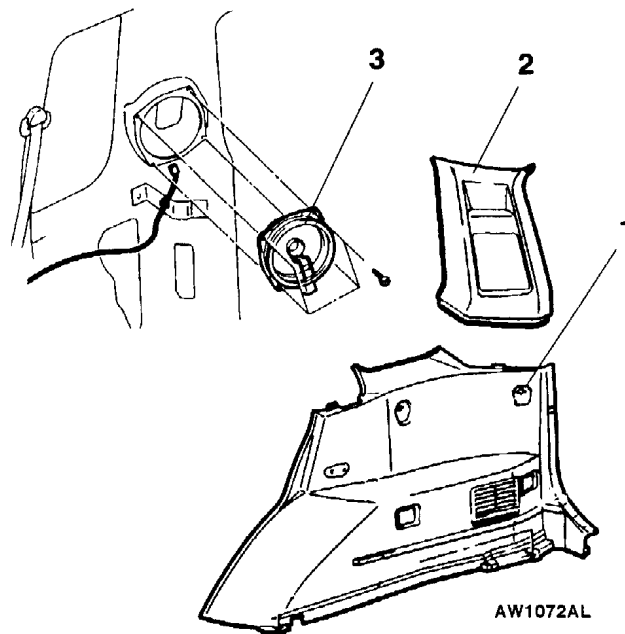
- Due to the introduction of 5-door models, the rear speaker service procedure has been changed.

SPEAKER

REMOVAL AND INSTALLATION

<Rear speaker>

5-door models



Rear speaker removal steps

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

GROUP 54B

SMART WIRING SYSTEM(SWS)

GENERAL

OUTLINE OF CHANGES

- Due to the introduction of 5-door models, the troubleshooting for the rear power windows have been added.

TROUBLESHOOTING

TROUBLE SYMPTOM CHART

Trouble symptom		Inspection procedure	Reference page
Power window	Rear power window sub-switches can not operate rear door windows. (However, power window main switch can operate rear door windows.)	D-9	54B-2

Inspection Procedure D-9

Power windows: Rear power window sub-switches can not operate rear door windows. (However, power window main switch can operate rear door windows.)	Probable cause
Power supply circuit or earth circuit of the rear power window motor, rear power window motor or rear power window sub-switches may be defective.	● Malfunction of rear power window sub-switches ● Malfunction of rear power window motors ● Malfunction of wiring harness or connector

