

PAJERO

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. Use the following manuals in combination with this manual as required.

TECHNICAL INFORMATION MANUAL

PYJE0002
PYJE0002-1

WORKSHOP MANUAL

ENGINE GROUP

PWEE□□□□
(Looseleaf edition)

CHASSIS GROUP

PWJE0005
PWJE0005-1
PWJE0005-2

ELECTRICAL WIRING

PHJE0005
PHJE0005-1
PHJE0005-2
PHJE0005-3
PHJE0005-4
PHJE0005-5
PHJE0005-6

BODY REPAIR MANUAL

PBJE0001

PARTS CATALOGUE

B803H204A□
B803H404A□
BNB3H604A□
BFA3H604A□

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.

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 **MITSUBISHI MOTORS CORPORATION**

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

00 GENERAL

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VEHICLE IDENTIFICATION

MODELS

VEHICLES FOR GENERAL EXPORT (Except BRAZIL, TAIWAN, HONG KONG, SOUTH AFRICA and ARGENTINA)

<Short wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V66W	MNDFL/R	4M40 Intercooler Turbo-charger (2,835 mL)	V5M31 <5M/T>	Injection
	MNXFL			
V63W	MRXVL	6G72-SOHC (2,972 mL)	V4A51 <4A/T>	MPI
V67W	MYXVL	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	
	MYXVQL			

<Long wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V76W	LNDFL/R	4M40 Intercooler Turbocharger (2,835 mL)	V5M31 <5M/T>	Injection
	LNHFL/R			
	LNXFL/R		V4A51 <4A/T>	
	LRXFL/R			
	LNDFQL		V5M31 <5M/T>	
	LNHFQL/R			
	LNXFQL		V4A51 <4A/T>	
	LRXFQL			

Model code		Engine model	Transmission model	Fuel supply system
V73W	LNDVL/R	6G72-SOHC (2,972 mL)	V5M31 <5M/T>	MPI
	LNHVL/R			
	LNXL			
	LRXL/R		V4A51 <4A/T>	
	LNDVQL		V5M31 <5M/T>	
	LNHVQR			
	LNXLQL			
	LRXLQL/R		V4A51 <4A/T>	
V75W	LNXL/R	6G74-SOHC (3,496 mL)	V5M31 <5M/T>	GDI
	LNXLQL			
	LYXCQR	6G74GDI (3,496 mL)	V5A51 <5A/T>	
V77W	LYXL/R	6G75-SOHC (3,828 mL)		MPI
	LYXLQL			
V78W	LNXLQL	4M41-DOHC Intercooler Turbocharger (3,200 mL)	V5M31 <5M/T>	Electronically-controlled high pressure fuel distribution
	LYXLQL/R		V5A51 <5A/T>	

(BRAZIL)**<Short wheelbase>**

Model code		Engine model	Transmission model	Fuel supply system
V67W	MYXLQL1B	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	MPI

<Long wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V76W	LNXLQL1B	4M40 Intercooler Turbocharger (2,835 mL)	V5M31 <5M/T>	Injection
	LRXLQL1B		V4A51 <4A/T>	
V77W	LYXLQL1B	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	MPI
V78W	LNXLQL1B	4M41-DOHC Intercooler Turbocharger (3,200 mL)	V5M31 <5M/T>	Electronically-controlled high pressure fuel distribution
	LYXLQL1B		V5A51 <5A/T>	

(TAIWAN)**<Long wheelbase>**

Model code		Engine model	Transmission model	Fuel supply system
V77W	LYXLQL1Q	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	MPI

(HONG KONG)**<Long wheelbase>**

Model code		Engine model	Transmission model	Fuel supply system
V73W	LNDVQR1D	6G72-SOHC (2,972 mL)	V5M31 <5M/T>	MPI
	LRUVQR1D		V4A51 <4A/T>	
V75W	LYXCQR1D	6G74 GDI (3,496 mL)	V5A51 <5A/T>	GDI

(SOUTH AFRICA)**<Short wheelbase>**

Model code		Engine model	Transmission model	Fuel supply system
V68W	MNXFR6S	4M41-DOHC Intercooler Turbochar- ger (3,200 mL)	V5M31 <5M/T>	Electronically-con- trolled high pres- sure fuel distribution
	MYXFR6S		V5A51 <5A/T>	
V67W	MYXVR6S	6G75-SOHC (3,828 mL)		MPI

<Long wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V78W	LNFR6S	4M41-DOHC Intercooler Turbochar- ger (3,200 mL)	V5M31 <5M/T>	Electronically-con- trolled high pres- sure fuel distribution
	LYXFR6S		V5A51 <5A/T>	
V75W	LNVR6S	6G74-SOHC (3,496 mL)	V5M31 <5M/T>	MPI
V77W	LYXVR6S	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	

(ARGENTINA)**<Long wheelbase>**

Model code		Engine model	Transmission model	Fuel supply system
V76W	LNFL6A	4M40 Intercooler Turbo- charger (2,835 mL)	V5M31 <5M/T>	Injection
V78W	LNFL6A	4M41-DOHC Intercooler Turbochar- ger (3,200 mL)		Electronically-con- trolled high pres- sure fuel distribution

VEHICLES FOR GCC

<Short wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V63W	MRXVLW	6G72-SOHC (2,972 mL)	V4A51 <4A/T>	MPI
V65W	MNDVLW	6G74-SOHC (3,496 mL)	V5M31 <5M/T>	
V67W	MYXVLW	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	

<Long wheelbase>

Model code		Engine model	Transmission model	Fuel supply system	
V73W	LNDVLW	6G72-SOHC (2,972 mL)	V5M31 <5M/T>	MPI	
	LRDVLW		V4A51 <4A/T>		
	LNXLVLW		V5M31 <5M/T>		
	LRXVLW		V4A51 <4A/T>		
V75W	LNDVLW	6G74-SOHC (3,496 mL)	V5M31 <5M/T>		MPI
	LNXLVLW				
	LYXVLW		V5A51 <5A/T>		
V77W	LYXVLW	6G75-SOHC (3,828 mL)			

VEHICLES FOR AUSTRALIA



<Long wheelbase>

Model code		Engine model	Transmission model	Fuel supply system
V78W	LNHFR8	4M41-DOHC Intercooler Turbocharger (3,200 mL)	V5M31 <5M/T>	Electronically-controlled high pressure fuel distribution
	LYHFR8		V5A51 <5A/T>	
	LNXFR8		V5M31 <5M/T>	
	LYXFR8		V5A51 <5A/T>	
	LNPFR8		V5M31 <5M/T>	
	LYPFR8		V5A51 <5A/T>	
V75W	LNHVR8	6G74-SOHC (3,496 mL)	V5M31 <5M/T>	MPI
	LNXVR8			
V77W	LYHVR8	6G75-SOHC (3,828 mL)	V5A51 <5A/T>	
	LYXVR8			
	LYPVR8			

CHASSIS NUMBER

Model Year has been updated.

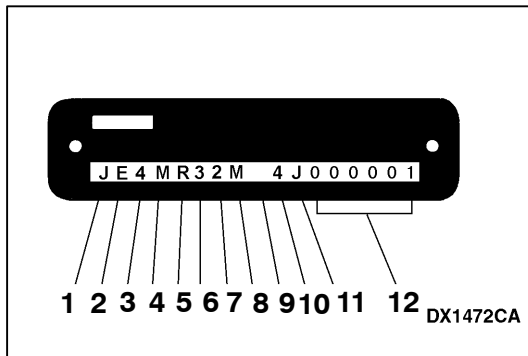
VEHICLES FOR GENERAL EXPORT, GCC AND AUSTRALIA


J **M** **Y** **M** **N** **V6** **3** **W** **4** **J** **000001** 

1 2 3 4 5 6 7 8 9 10 11

CX1467CA

No.	Item		Contents
1	Fixed figure	J	Asia
2	Distribution channel	M	Japan channel
3	Destination	Y	For General Export and GCC
		F	For Australia
4	Body style	M	2-door
		L	4-door
5	Transmission type	N	5-speed manual transmission
		R	4-speed automatic transmission
		Y	5-speed automatic transmission
6	Development order	V6	MITSUBISHI PAJERO short wheelbase
		V7	MITSUBISHI PAJERO long wheelbase
7	Engine	3	6G72: 2,972 mL petrol engine
		5	6G74: 3,496 mL petrol engine
		7	6G75: 3,828 mL petrol engine
		6	4M40: 2,835 mL diesel engine
		8	4M41: 3,200 mL diesel engine
8	Sort	W	Station wagon
9	Model year	4	2004
10	Plant	J	Pajero Manufacturing Co., Ltd.
11	Serial number	–	000001: Genera Export (Except BRAZIL), Australia 100001: since January, 2001 (BRAZIL) 700001 to 799999: GCC



VEHICLE IDENTIFICATION CODE CHART PLATE (GCC ONLY)

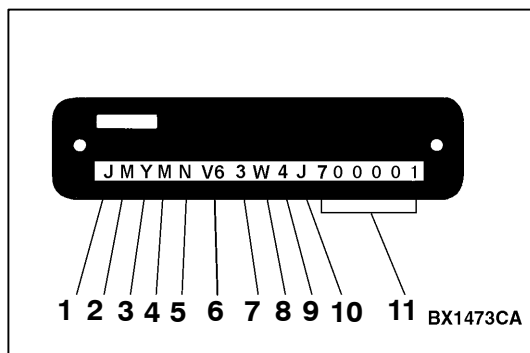
Model year has been updated.

<Except for UAE, Kuwait and Oman>

No.	Item	Contents
1	Country	J: Japan
2	Make	E: Mitsubishi
3	Vehicle type	4: Multi-purpose passenger vehicle (MPV)
4	Others	M: 2,268kg – 2,722kg/HYDRAULIC
5	Car line	R: PAJERO
6	Price class	3: GL 6: GLS
7	Body	2: 4-door 3: 2-door
8	Engine	M: 3.0L MPI N: 3.5L MPI R: 3.8L MPI
9	Check digits* ¹	1, 2, 3,9, X
10	Model year	4: 2004 year
11	Plants	J: Pajero Manufacturing Co., Ltd.
12	Serial number	700001 to 799999

NOTE

*¹: Check digit means a single number or letter X used to verify the accuracy of transcription of vehicle identification number.

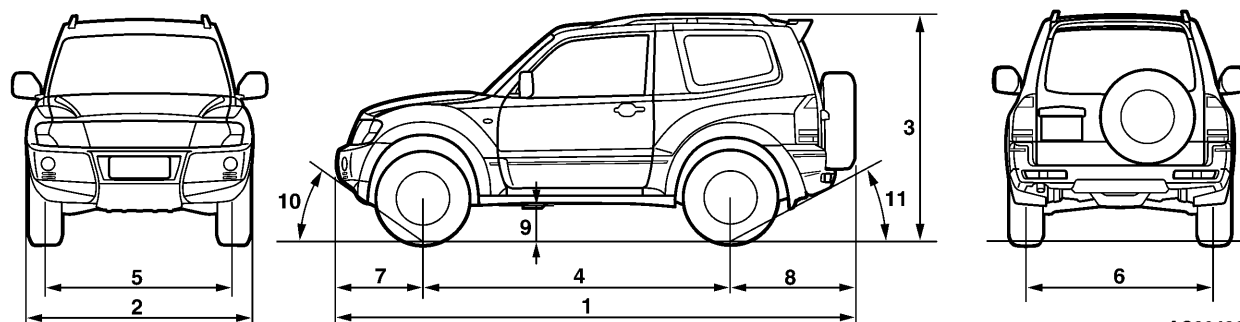


<UAE, Kuwait and Oman>

No.	Items		Contents
1	Fixed figure	J	Asia
2	Distribution channel	M	Japan channel
3	Destination	Y	For GCC
4	Body style	M	2-door
		L	4-door
5	Transmission type	N	5-speed manual transmission
		R	4-speed automatic transmission
		Y	5-speed automatic transmission
6	Development order	V6	PAJERO short wheelbase
		V7	PAJERO long wheelbase
7	Engine	3	6G72: 2,972 mL petrol engine
		5	6G74: 3,496 mL petrol engine
		7	6G75: 3,828 mL petrol engine
8	Sort	W	Station wagon
9	Model year	4	2004
10	Plant	J	Pajero Manufacturing Co., Ltd.
11	Serial number	–	700001 to 799999

MAJOR SPECIFICATIONS

<Short wheelbase>



AC204807AB

- The major specifications are newly added. <Vehicles with 6G75 engine>

Item			V67W			
			MYXVL, MYXVQL	MYXVQL1B	MYXVR6S	MYXVLW
Vehicle dimensions mm	Overall length	1	4,315			
	Overall width	2	1,895			
	Overall height (unladen)	3	1,845, 1,875* ¹			
	Wheelbase	4	2,545			
	Track-front	5	1,560			
	Track-rear	6	1,560			
	Overhang-front	7	745			
	Overhang-rear	8	1,025			
	Ground clearance (unladen)	9	235			
	Angle of approach degrees	10	39°			
	Angle of departure degrees	11	33.5°			
Vehicle weight kg	Kerb weight		1,940		1,930	1,940
	Max. gross vehicle weight		2,510			
	Max. axle weight rating-front		1,200			
	Max. axle weight rating-rear		1,600			
Seating capacity			5			
Engine	Model No.		6G75-SOHC			
	Total displacement mL		3,828			
Transmission	Model No.		V5A51			
	Type		5-speed automatic			
Fuel system	Fuel supply system		MPI			

NOTE:

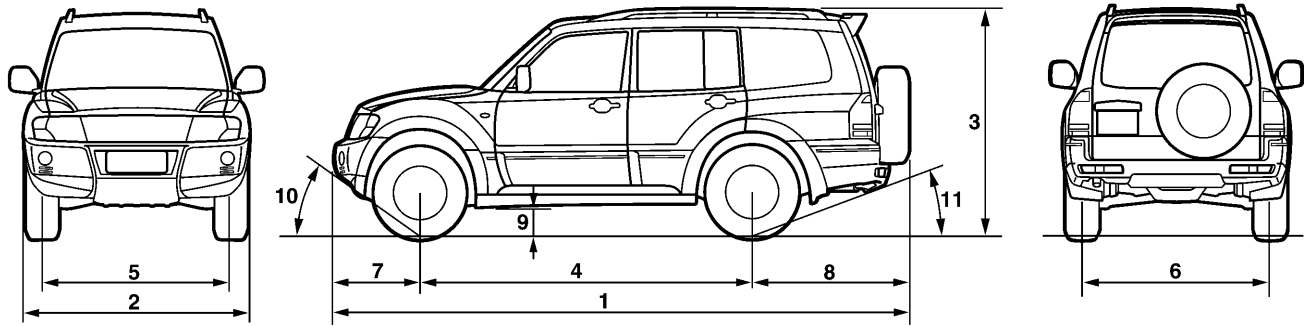
*¹: Vehicles with roof rails

- The items other than listed below are the same as before. <Vehicles without 6G75 engine>

Item		V66W		V63W	V68W
		MNDFL/R	MNXFL	MRXVL	MNXFR6S MYXFR6S
Vehicle weight kg	Kerb weight	1,870	1,955	1,915	2,010

Item		V63W	V65W
		MRXVLW	MNDVLW
Vehicle weight kg	Kerb weight	1,915	1,855

<Long wheelbase>



AC204542

- The major specifications are newly added. <Vehicles with 6G75 engine>

Item			V77W				
			LYXVL/R, LYXVQL	LYXFQL1B	LYXVQL1Q	LYXVR6S	LYXVLW
Vehicle dimensions mm	Overall length	1	4,830				
	Overall width	2	1,895				
	Overall height (unladen)	3	1,855,1,885* ¹				
	Wheelbase	4	2,780				
	Track-front	5	1,560				
	Track-rear	6	1,560				
	Overhang-front	7	745				
	Overhang-rear	8	1,305				
	Ground clearance (unladen)	9	235				
	Angle of approach degrees	10	39°				
	Angle of departure degrees	11	24°				
Vehicle weight kg	Kerb weight		2,090		2,105	2,090	2,105
	Max. gross vehicle weight		2,650				
	Max. axle weight rating-front		1,200				
	Max. axle weight rating-rear		1,650				
Seating capacity			7				
Engine	Model No.		6G75-SOHC				
	Total displacement mL		3,828				
Transmission	Model No.		V5A51				
	Type		5-speed automatic				
Fuel system	Fuel supply system		MPI				

NOTE:

*¹: Vehicles with roof rails

Item			V77W		
			LYHVR8	LYXVR8	LYPVR8
Vehicle dimensions mm	Overall length	1	4,810* ¹ , 4,830* ²	4,830	
	Overall width	2	1,885, 1,895* ³	1,895	
	Overall height (unladen)	3	1,855, 1,885* ⁴		
	Wheelbase	4	2,780		
	Track-front	5	1,560		
	Track-rear	6	1,560		
	Overhang-front	7	745		
	Overhang-rear	8	1,285* ¹ , 1,305* ²	1,305	
	Ground clearance (unladen)	9	235		
	Angle of approach degrees	10	39°		
	Angle of departure degrees	11	24°		
Vehicle weight kg	Kerb weight		2,085	2,105	2,135
	Max. gross vehicle weight		2,760		
	Max. axle weight rating-front		1,200		
	Max. axle weight rating-rear		1,650		
Seating capacity			7		
Engine	Model No.		6G75-SOHC		
	Total displacement mL		3,828		
Transmission	Model No.		V5A51		
	Type		5-speed automatic		
Fuel system	Fuel supply system		MPI		

NOTE:

*¹: Vehicles with 235/80R16 Tyre*²: Vehicles with 265/70R16 Tyre*³: Vehicles with wheel cut moulding*⁴: Vehicles with roof rails

- The items other than listed below are the same as before. <Vehicles without 6G75 engine>

Item		V76W				V73W
		LNDFL/R, LNDFQL	LNHFL/R, LNHFQL/R	LNXFRL/R, LNXFQL	LRXFL/R, LRFQL	LNDVL/R, LNDVQL
Vehicle weight kg	Kerb weight	2,020	2,065	2,125		1,960

Item		V73W			V75W	
		LNHVL/R, LNHVQR	LNXLV, LNXLVQL	LRXLV/R, LRXLVQL/R	LNXLV/R, LNXLVQL	LYXCQR
Vehicle weight kg	Kerb weight	2,005	2,065		2,090	2,115

Item		V78W		V76W		V78W
		LNXFQL	LYXFQL/R	LNXFQL1B	LRXFQL1B	LNXFQL1B
Vehicle weight kg	Kerb weight	2,145		2,135		2,145

Item		V78W	V73W		V75W	V78W
		LYXFQL1B	LNDVQR1D	LRUVQR1D	LYXCQR1D	LNXFR6S
Vehicle weight kg	Kerb weight	2,145	2,030	2,110	2,165	2,170

Item		V78W	V75W	V76W	V78W	V73W
		LYXFR6S	LNVR6S	LNFL6A	LNFL6A	LNDVLW
Vehicle weight kg	Kerb weight	2,170	2,080	2,135	2,180	1,960

Item		V73W			V75W	
		LRDVLW	LNVLW	LRVLW	LNDVLW	LNVLW
Vehicle weight kg	Kerb weight	1,960	2,080		1,985	2,105

Item		V75W	V78W			
		LYXVLW	LNHFR8	LYHFR8	LNFR8	LYFR8
Vehicle weight kg	Kerb weight	2,105	2,130		2,150	

Item		V78W		V75W	
		LNPFR8	LYPFR8	LNHVR8	LNVR8
Vehicle weight kg	Kerb weight	2,190		2,080	2,100

11 ENGINE

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11A ENGINE

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GENERAL

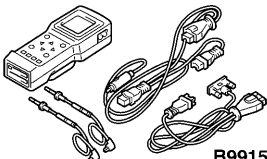
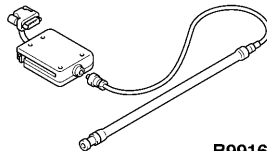
OUTLINE OF CHANGE

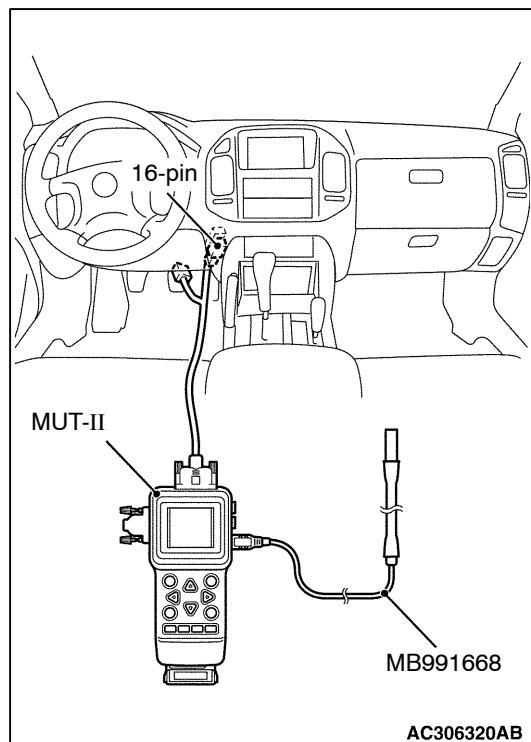
Since the material of the drive belt has been changed, inspection procedures for the drive belt have been established.

SERVICE SPECIFICATIONS

Item		Standard value
Drive belt tension	Vibration frequency Hz (Reference)	88 – 121
	Tension N (Reference)	197 – 371

SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	Drive belt tension check
 B991668	MB991668	Belt tension meter set	



ON-VEHICLE SERVICE

DRIVE BELT TENSION CHECK

<Reference>

1. Use the following procedure to check the drive belt tension.

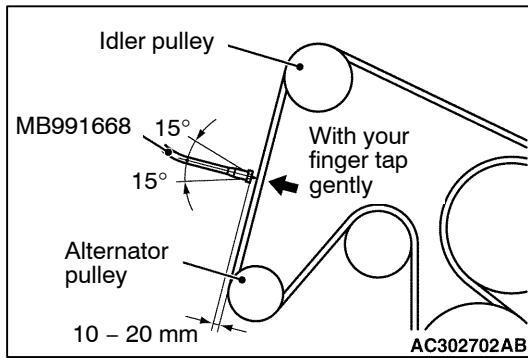
<When using MUT-II>

- (1) Connect special tool belt tension meter set (MB991668) to the MUT-II.
- (2) Connect the MUT-II to the diagnosis connector.

Caution

Connection and disconnection of the MUT-II must be carried out after turning the ignition switch to the “LOCK” (OFF) position.

- (3) Turn the ignition switch to the “ON” position and select “Belt Tension Measurement” from the menu screen.

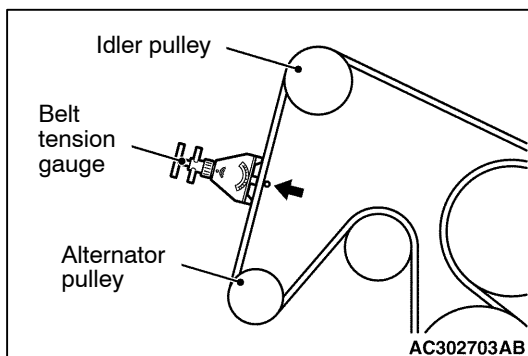


- (4) Hold special tool belt tension meter set (MB991668) to the middle of the belt between the pulleys (at the place indicated by the arrow) about 10 – 20 mm away from the rear surface and so that it is perpendicular to the belt (within an angle of $\pm 15^\circ$).
- (5) Gently tap the middle of the belt between the pulleys (at the place indicated by the arrow) with your finger as shown in the illustration, and check that the vibration frequency of the belt is within the standard value.

Standard value: 88 – 121 Hz

Caution

- 1) Check the vibration frequency of the belt when the temperature of the surface of the belt is as close as possible to normal temperature.
- 2) Do not let any contaminants such as water or oil get onto the microphone.
- 3) If strong gusts of wind blow against the microphone or if there are any loud sources of noise nearby, the values measured by the microphone may not correspond to actual values.
- 4) If the microphone is touching the belt while the measurement is being made, the values measured by the microphone may not correspond to actual values.
- 5) Do not take the measurement while the vehicle's engine is running.



<When using a belt tension gauge>

Use a belt tension gauge in the middle of the belt between the pulleys (at the place indicated by the arrow) to measure that the belt tension is within the standard value.

Standard value: 197 – 371 N

2. If not within the standard value, replace the drive belt.

11B ENGINE

<6G7-MPI>

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GENERAL

OUTLINE OF CHANGE

Due to the following changes, service procedures have been established. The other service procedures are the same as conventional 6G74 engine.

- The material of the drive belt has been changed.
- Vehicles with 6G75-MPI engine have been added.

GENERAL INFORMATION

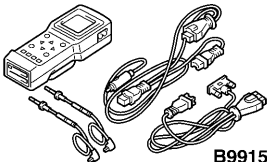
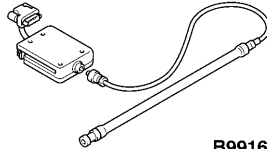
Item		6G75 engine
Total displacement mL		3,828
Bore x Stroke mm		95.0 x 90.0
Compression ratio		9.5
Combustion chamber		Pentroof type
Camshaft arrangement		SOHC
Number of valve	Intake	12
	Exhaust	12
Valve timing	Intake opening	BTDC 5°
	Intake closing	ABDC 55°
	Exhaust opening	BBDC 51°
	Exhaust closing	ATDC 17°
Fuel system		Electronic control multipoint fuel injection
Rocker arm		Roller type
Auto-lash adjuster		Equipped

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SERVICE SPECIFICATIONS

Item		Standard value	Limit
Drive belt tension	Vibration frequency Hz (Reference)	88 – 121	–
	Tension N (Reference)	197 – 371	–
Basic ignition timing mm		5° BTDC \pm 3°	–
Ignition timing		Approx. 10° BTDC	–
Idle speed r/min		700 \pm 100	–
CO contents %	Vehicles without catalytic converter	1.5 \pm 0.5	–
	Vehicles with catalytic converter	0.5 or less	–
Compression pressure (at engine speed of 200 r/min) kPa		1,520	Min. 1,080
Compression pressure difference of all cylinder kPa		–	Max. 98
Intake manifold vacuum kPa		–	Min. 60

SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	Drive belt tension check
 B991668	MB991668	Belt tension meter set	

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ON-VEHICLE SERVICE

DRIVE BELT TENSION CHECK

<Reference>

1. Use the following procedure to check the drive belt tension.

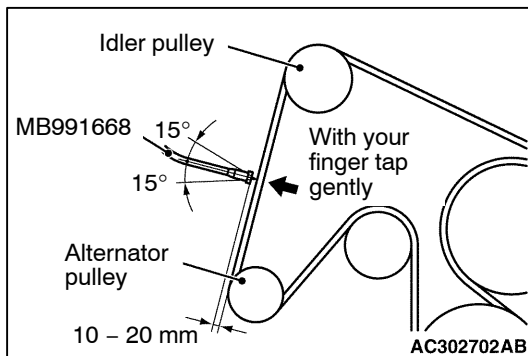
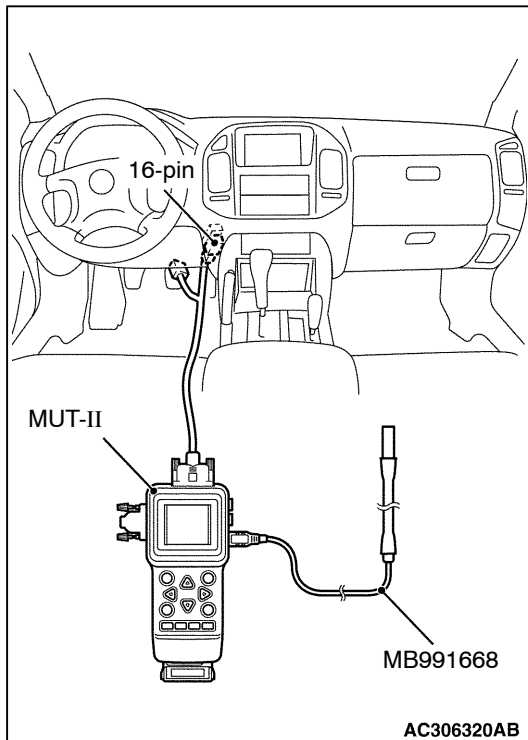
<When using MUT-II>

- (1) Connect special tool belt tension meter set (MB991668) to the MUT-II.
- (2) Connect the MUT-II to the diagnosis connector.

Caution

Connection and disconnection of the MUT-II must be carried out after turning the ignition switch to the "LOCK" (OFF) position.

- (3) Turn the ignition switch to the "ON" position and select "Belt Tension Measurement" from the menu screen.

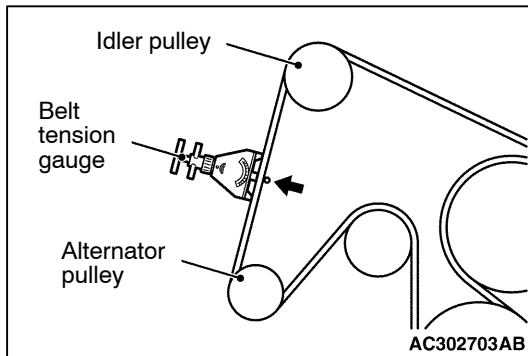


- (4) Hold special tool belt tension meter set (MB991668) to the middle of the belt between the pulleys (at the place indicated by the arrow) about 10 – 20 mm away from the rear surface and so that it is perpendicular to the belt (within an angle of $\pm 15^\circ$).
- (5) Gently tap the middle of the belt between the pulleys (at the place indicated by the arrow) with your finger as shown in the illustration, and check that the vibration frequency of the belt is within the standard value.

Standard value: 88 – 121 Hz

Caution

- 1) Check the vibration frequency of the belt when the temperature of the surface of the belt is as close as possible to normal temperature.
- 2) Do not let any contaminants such as water or oil get onto the microphone.
- 3) If strong gusts of wind blow against the microphone or if there are any loud sources of noise nearby, the values measured by the microphone may not correspond to actual values.
- 4) If the microphone is touching the belt while the measurement is being made, the values measured by the microphone may not correspond to actual values.
- 5) Do not take the measurement while the vehicle's engine is running.

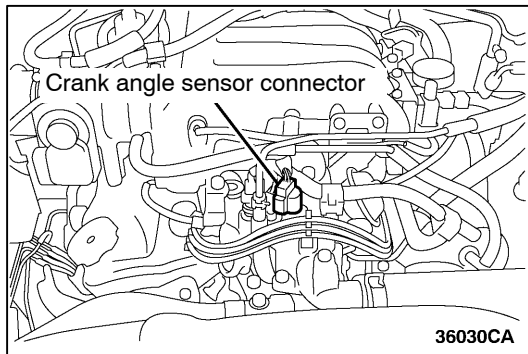
**<When using a belt tension gauge>**

Use a belt tension gauge in the middle of the belt between the pulleys (at the place indicated by the arrow) to measure that the belt tension is within the standard value.

Standard value: 197 – 371 N

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[Group TOC](#)

2. If not within the standard value, replace the drive belt.

**COMPRESSION PRESSURE CHECK**

1. Before inspection, check engine oil, the starter and battery are normal. Also, set the vehicle to the pre-inspection condition.
2. Remove all the spark plugs.
3. Disconnect the crank angle sensor connector.

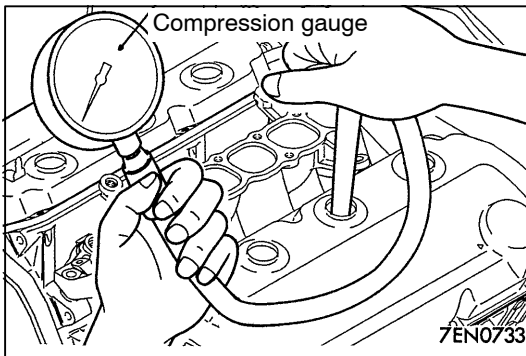
NOTE

Doing this will prevent the engine control unit from carrying out ignition and fuel injection.

4. Cover the spark plug hole with a shop towel etc. and crank the engine. Then check that no foreign material is adhering to the shop towel.

Caution

- (1) Keep away from the spark plug hole when cranking.
- (2) If compression is measured with water, oil, fuel, etc., that has come from cracks inside the cylinder, these materials will become heated and will gush out from the spark plug hole, which is dangerous.



5. Set compression gauge to one of the spark plug hole.
6. Crank the engine with the throttle valve fully open and measure the compression pressure.

Standard value (at engine speed of 200 r/min):
1,520 kPa

Limit (at engine speed of 200 r/min):
Min. 1,080 kPa

7. Measure the compression pressure for all the cylinders and check that the pressure differences of the cylinders are below the limit.

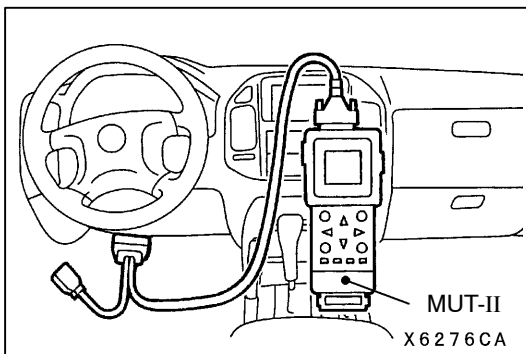
Limit: Max. 98 kPa

8. If there is a cylinder with compression or a compression difference that is outside the limit, pour a small amount of engine oil through the spark plug hole, and repeat the operations in step 6 and 7.
 - (1) If the compression increases after oil is added, the cause of the malfunction is a worn or damaged piston ring and/or cylinder inner surface.
 - (2) If the compression does not rise after oil is added the cause is a burnt or defective valve seat, or pressure is leaking from the gasket.
9. Connect the crank angle sensor connector.
10. Install the spark plugs.

Use the MUT-II to erase the self-diagnosis codes or disconnect the battery cable from the battery (-) terminal for 10 seconds or more and then reconnect the cable.

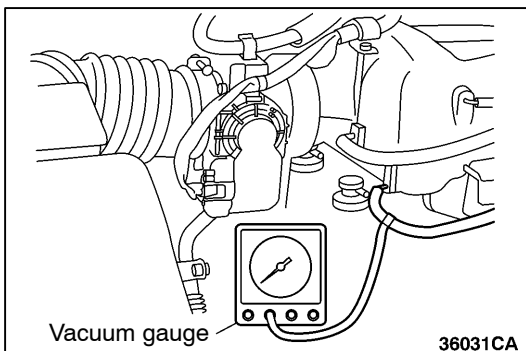
NOTE

This will erase the diagnosis code resulting from the crankshaft angle sensor connector being disconnected.



MANIFOLD VACUUM CHECK

1. Start the engine and allow it to warm up until the temperature of the engine coolant reaches 85 to 95°C.
2. Turn the ignition switch to LOCK (OFF) position.
3. Connect the tachometer or connect the MUT-II to the diagnosis connector.



4. Attach a three-way union to the vacuum hose between the fuel pressure regulator and the air intake plenum, and connect a vacuum gauge.
5. Start the engine and check that idle speed is within the standard value.

Standard value: 700 ± 100 r/min

6. Check the intake manifold vacuum.

Limit: Min. 60 kPa

ENGINE ASSEMBLY

REMOVAL AND INSTALLATION

<6G75-MPI>

Caution

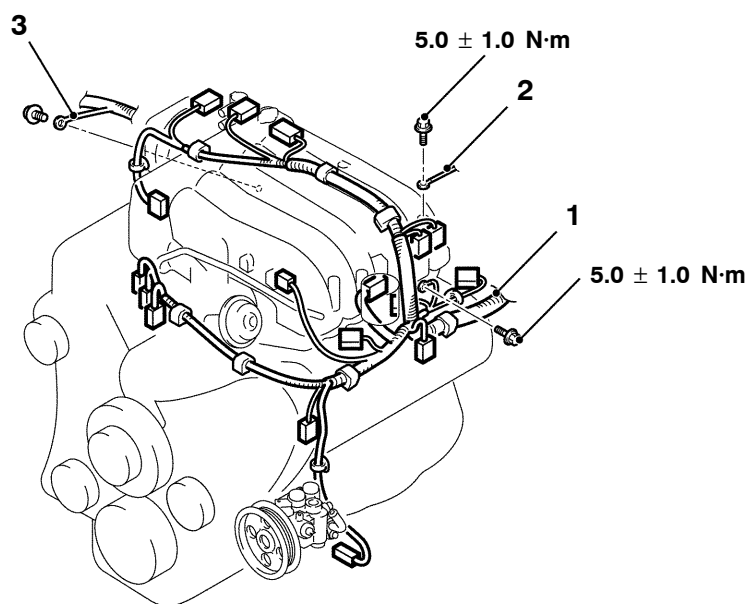
*: Indicates parts which should be initially tightened, and then fully tightened after placing the vehicle horizontally and loading the full weight of the engine on the vehicle body.

Pre-removal Operation

- Skid Plate and Under Cover Removal
- Engine Oil Draining
- Engine Coolant Draining
- Fuel Line Pressure Reduction
- Hood Removal
- Battery Removal
- Air Cleaner and Air Intake Hose Removal (Refer to GROUP 15 – Air Cleaner.)
- Radiator Removal
- Cooling Fan and Clutch Assembly Removal
- Front Exhaust Pipe Removal
- Transmission Assembly Removal

Post-installation Operation

- Transmission Assembly Installation
- Front Exhaust Pipe Installation
- Radiator Installation
- Cooling Fan and Clutch Assembly Installation
- Air Cleaner and Air Intake Hose Installation (Refer to GROUP 15 – Air Cleaner.)
- Battery Installation
- Hood Installation
- Engine Oil Refilling
- Engine Coolant Refilling
- Fuel Leak Check
- Skid Plate and Under Cover Installation



AC204398

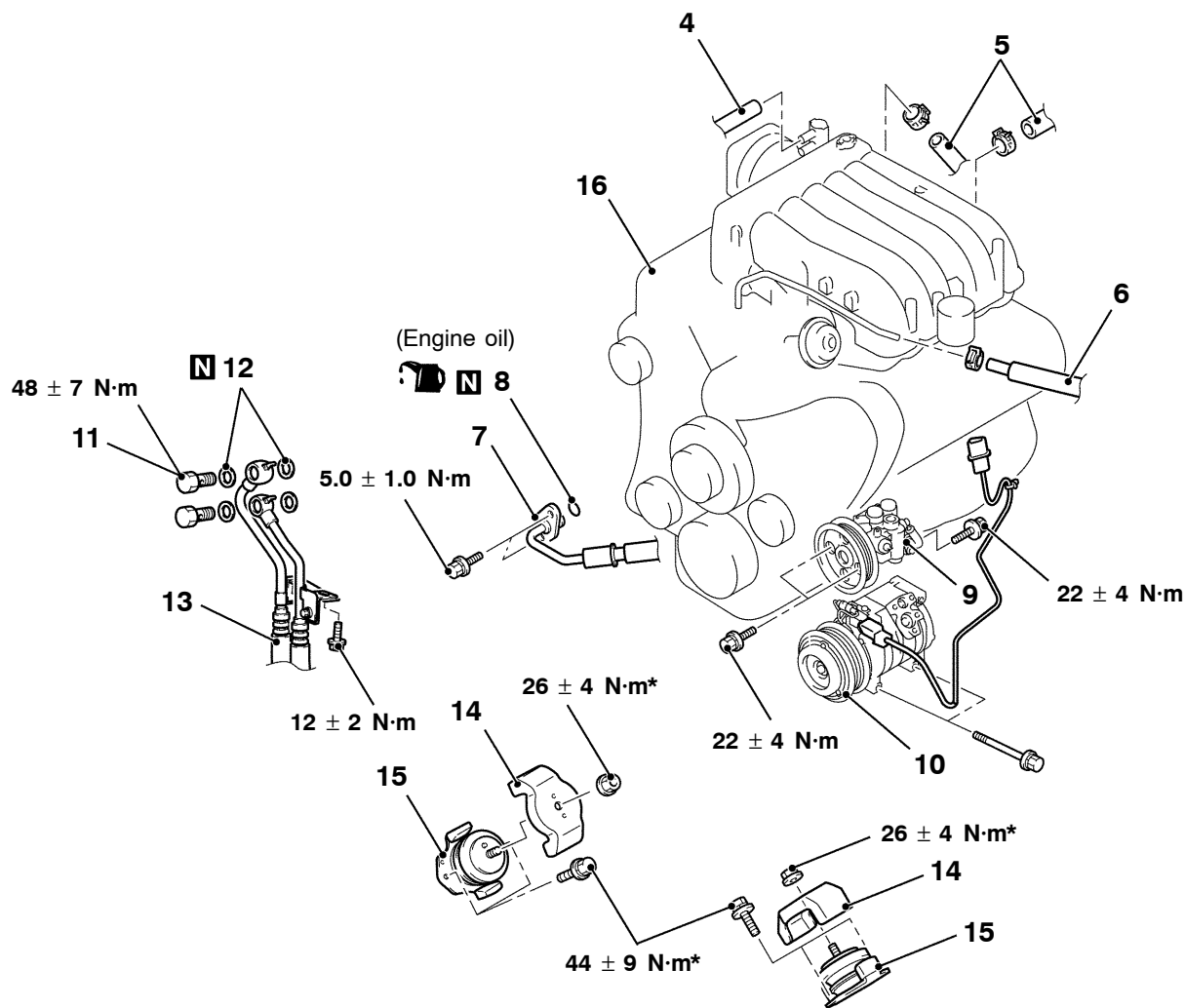
Removal steps

1. Control wiring harness connection
2. Earth cable connection
3. Battery wiring harness connection

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AC204056



- 4. Vacuum hose connection
- 5. Heater hoses connection
- 6. Fuel return hose connection
- 7. Fuel high-pressure hose connection
- 8. O-ring
- 9. Power steering oil pump assembly
- 10. A/C compressor assembly



- 11. Eye bolts
- 12. Gaskets
- 13. Engine oil cooler hoses connection
- 14. Heat protectors
- 15. Engine front mount insulators
- 16. Engine assembly

NOTE

Removal and installation service points are the same as before.

13B MULTIPoint FUEL INJECTION (MPI)

CONTENTS

GENERAL	2	Accelerator Pedal Position Sensor (APS) Adjustment	106
Outline of Change	2	Accelerator Pedal Position Sensor (APS) Check	107
GENERAL INFORMATION	2	Accelerator Pedal Position Switch Check	107
SERVICE SPECIFICATIONS	6	Oxygen Sensor Check <Vehicles for Taiwan>	108
SPECIAL TOOL	6	Throttle Valve Control Servo Relay Check	114
TROUBLESHOOTING	6	Throttle Valve Control Servo Check	114
ON-VEHICLE SERVICE	106	THROTTLE BODY	115

GENERAL

OUTLINE OF CHANGE

Due to the addition of vehicles with 6G75-MPI engine, the following service procedures have been established. The other service procedures are the same as conventional vehicles with 6G72/74-MPI engine.

GENERAL INFORMATION

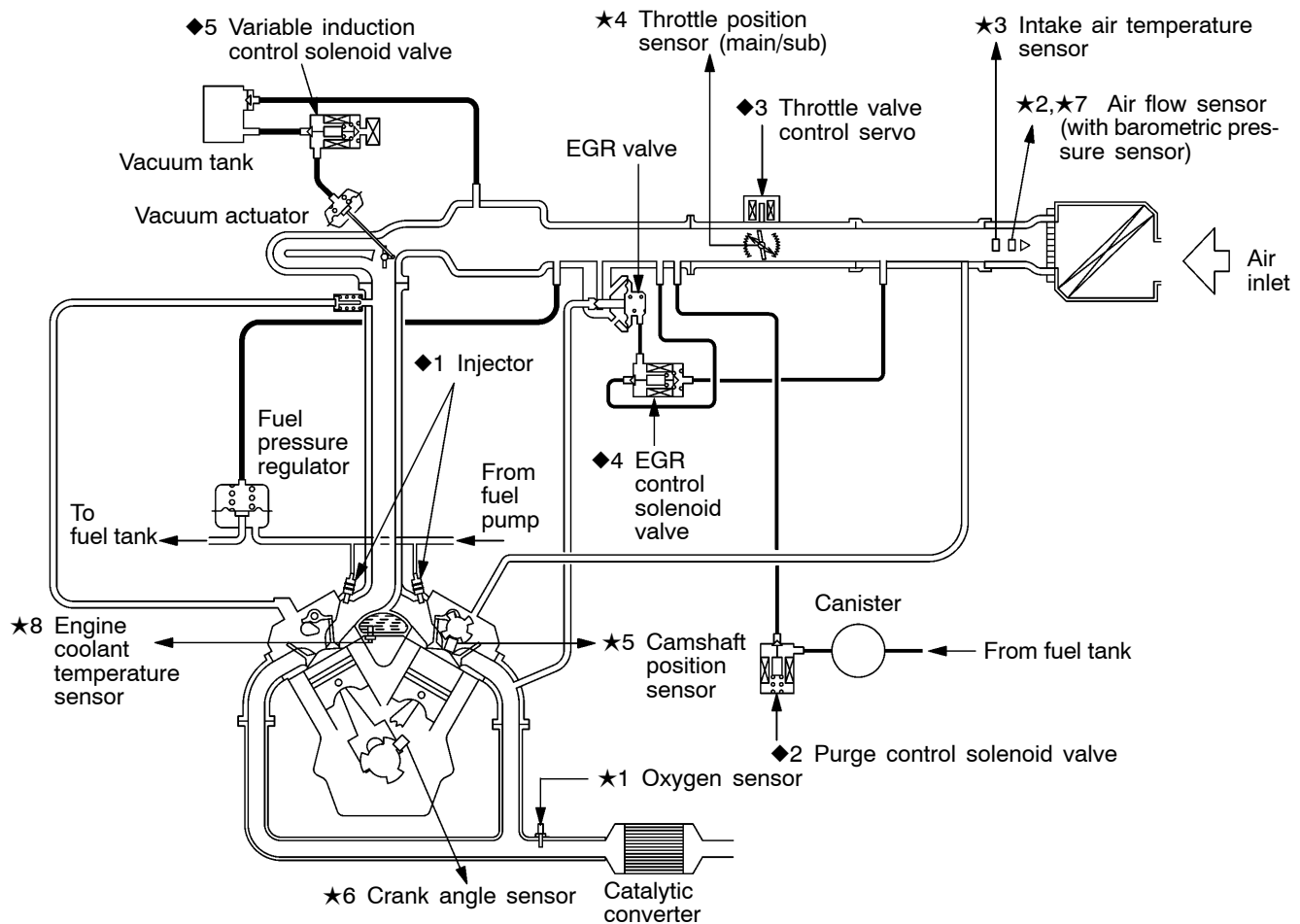
GENERAL SPECIFICATIONS

Item		Specifications
Throttle body	Throttle bore mm	65
	Throttle position sensor	Contactless type
	Throttle valve control servo	DC motor type with brush
Engine-A/T-ECU	Identification model No.	E6T383388 <Vehicles for General Export>
		E6T383389 <Vehicles for GCC, Australia, South Africa>
		E6T383390 <Vehicles for Brazil>
		E6T383391 <Vehicles for Taiwan>
Sensor	Accelerator pedal position sensor	Variable resistor type
	Accelerator pedal position switch	Rotary contact type, within accelerator pedal position sensor (main)
	Detonation sensor <Vehicles for Taiwan>	Piezoelectric type
Actuators	Injector identification mark	GDH305

SYSTEM DIAGRAM

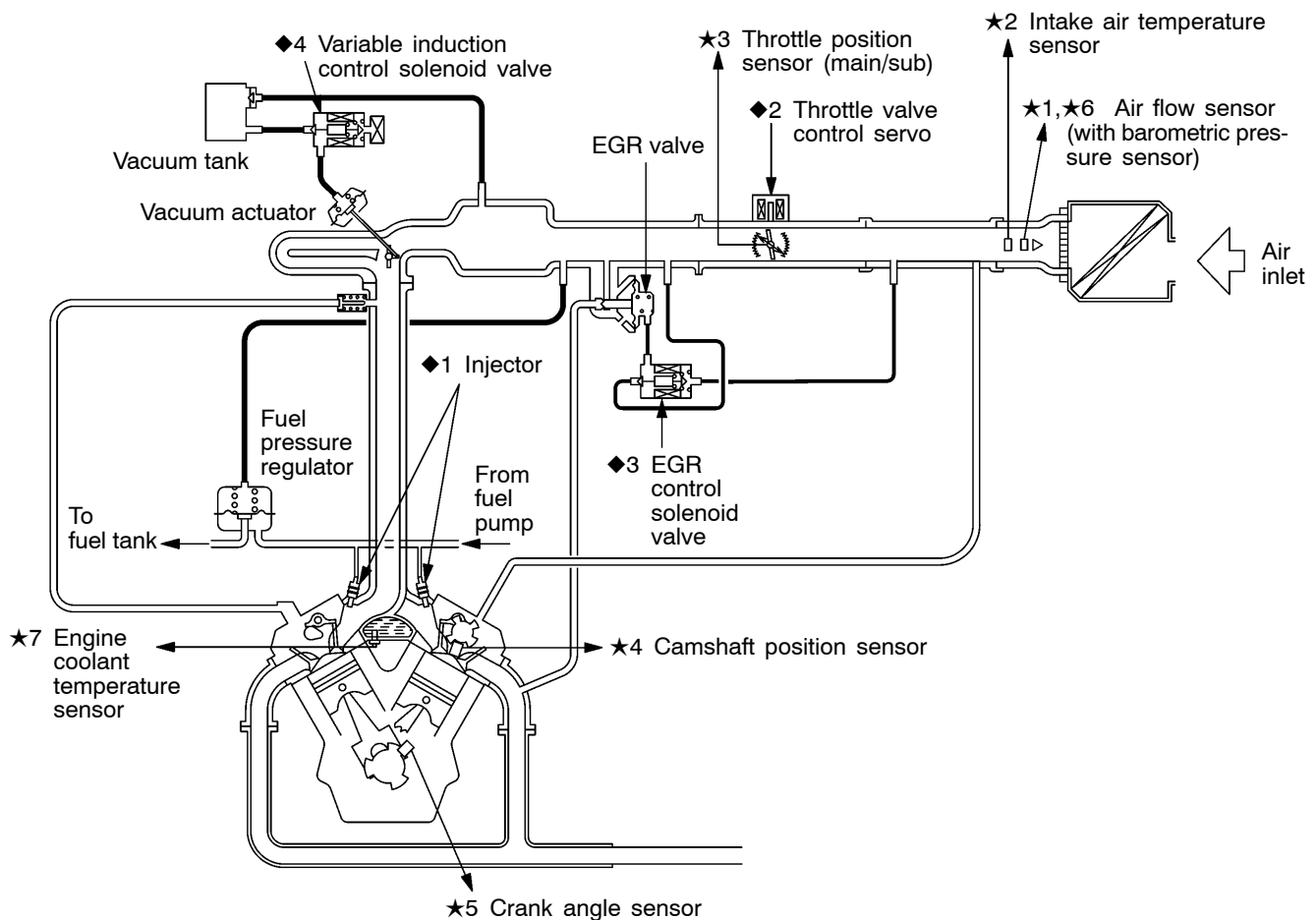
<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>

<ul style="list-style-type: none"> ★1 Oxygen sensor ★2 Air flow sensor ★3 Intake air temperature sensor ★4 Throttle position sensor (main/sub) ★5 Camshaft position sensor ★6 Crank angle sensor ★7 Barometric pressure sensor ★8 Engine coolant temperature sensor 	<ul style="list-style-type: none"> • Power supply • Accelerator pedal position sensor (main/sub) • Accelerator pedal position switch • Vehicle speed sensor • A/C switch • A/C load signal • Inhibitor switch • Power steering fluid pressure switch • Ignition switch-ST • Ignition switch-IG 	<div style="text-align: center;">⇒ Engine-A/T-ECU ⇒</div>	<ul style="list-style-type: none"> ◆1 Injector ◆2 Purge control solenoid valve ◆3 Throttle valve control servo ◆4 EGR control solenoid valve ◆5 Variable induction control solenoid valve 	<ul style="list-style-type: none"> • Fuel pump relay • Engine control relay • Throttle valve control servo relay • A/C relay • Engine warning lamp • Diagnosis output • Ignition coil, power transistor
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<Vehicles for General Export without catalytic converter, South Africa>

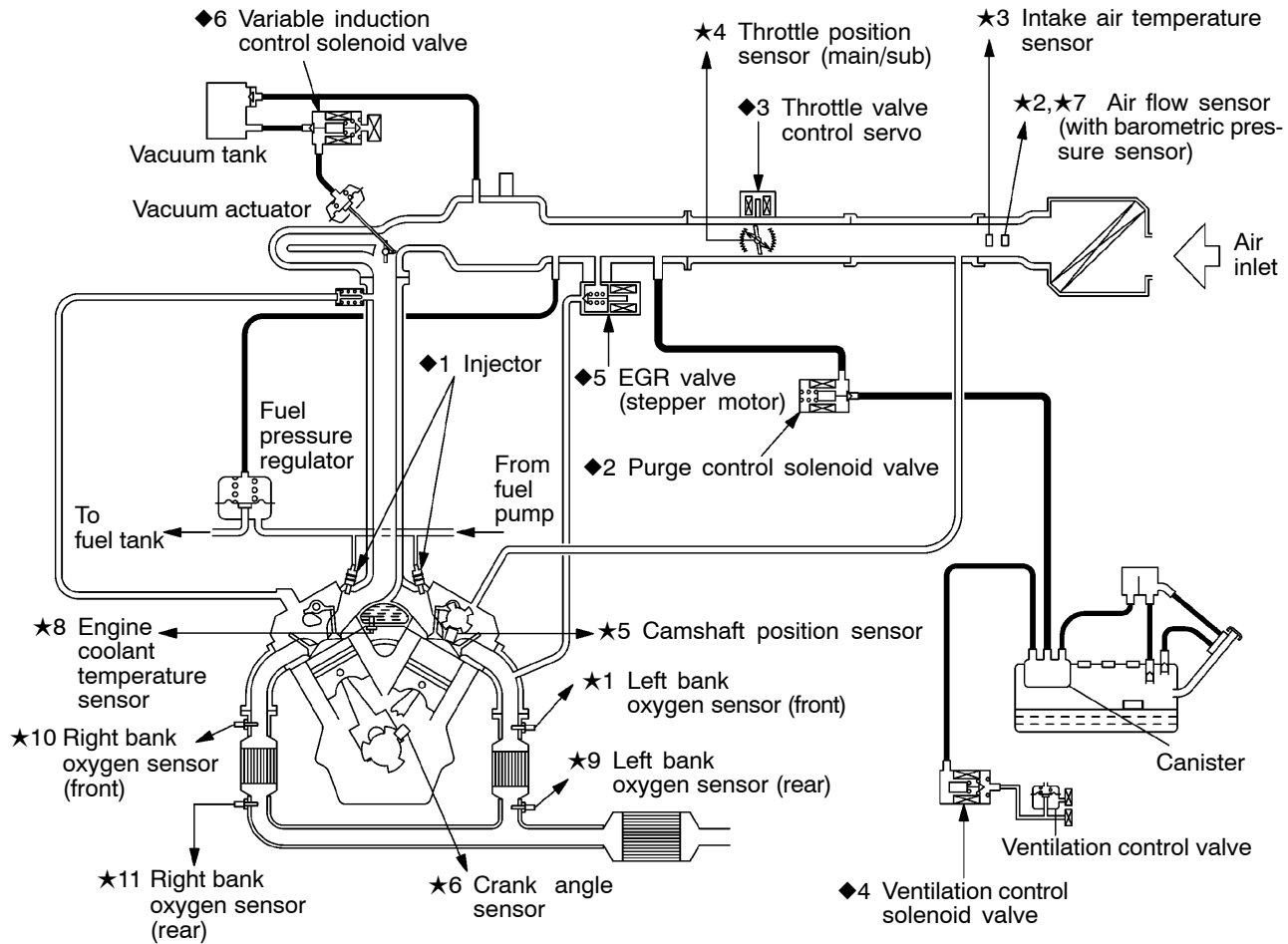
<ul style="list-style-type: none"> ★1 Air flow sensor ★2 Intake air temperature sensor ★3 Throttle position sensor (main/sub) ★4 Camshaft position sensor ★5 Crank angle sensor ★6 Barometric pressure sensor ★7 Engine coolant temperature sensor 	<ul style="list-style-type: none"> • Power supply • Accelerator pedal position sensor (main/sub) • Accelerator pedal position switch • Vehicle speed sensor • A/C switch • A/C load signal • Inhibitor switch • Power steering fluid pressure switch • Ignition switch-ST • Ignition switch-IG 	⇒ Engine-A/T-ECU ⇒	<ul style="list-style-type: none"> ◆1 Injector ◆2 Throttle valve control servo ◆3 EGR control solenoid valve ◆4 Variable induction control solenoid valve 	<ul style="list-style-type: none"> • Fuel pump relay • Engine control relay • Throttle valve control servo relay • A/C relay • Engine warning lamp • Diagnosis output • Ignition coil, power transistor
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36039CA

<Vehicles for Taiwan>

<ul style="list-style-type: none"> ★1 Left bank oxygen sensor (right) ★2 Air flow sensor ★3 Intake air temperature sensor ★4 Throttle position sensor (main/sub) ★5 Camshaft position sensor ★6 Crank angle sensor ★7 Barometric pressure sensor ★8 Engine coolant temperature sensor ★9 Left bank oxygen sensor (rear) ★10 Right bank oxygen sensor (front) ★11 Right bank oxygen sensor (rear) 	<ul style="list-style-type: none"> ● Power supply ● Accelerator pedal position sensor (main/sub) ● Accelerator pedal position switch ● Vehicle speed sensor ● A/C switch ● A/C load signal ● Inhibitor switch ● Power steering fluid pressure switch ● Ignition switch-ST ● Ignition switch-IG ● Detonation sensor 	⇒ Engine-A/T-ECU ⇒	<ul style="list-style-type: none"> ◆1 Injector ◆2 Purge control solenoid valve ◆3 Throttle valve control servo ◆4 Ventilation control solenoid valve ◆5 EGR valve (stepper motor) ◆6 Variable induction control solenoid valve 	<ul style="list-style-type: none"> ● Fuel pump relay ● Engine control relay ● Throttle valve control servo relay ● A/C relay ● Engine warning lamp ● Diagnosis output ● Ignition coil, power transistor
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36040CA

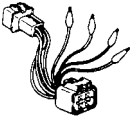
NOTE:

The fuel tank differential pressure sensor, fuel tank temperature sensor, fuel level sensor and manifold absolute pressure sensor are not used for engine control.

SERVICE SPECIFICATIONS

Item		Standard value
Adjustment voltage of accelerator pedal position sensor (main and sub) V		0.985 – 1.085
Resistance of accelerator pedal position sensor (main and sub) kΩ		3.5 – 6.5
Oxygen sensor heater resistance (at 20 °C) Ω <Vehicles for Taiwan>	Left bank oxygen sensor (front)	4.5 – 8.0
	Right bank oxygen sensor (front)	
	Left bank oxygen sensor (rear)	11 – 18
	Right bank oxygen sensor (rear)	

SPECIAL TOOL

Tools	Number	Name	Use
	MB991316	Test harness (4-pin, square)	Oxygen sensor check

TROUBLESHOOTING

DIAGNOSIS FUNCTION

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

Engine warning lamp inspection items

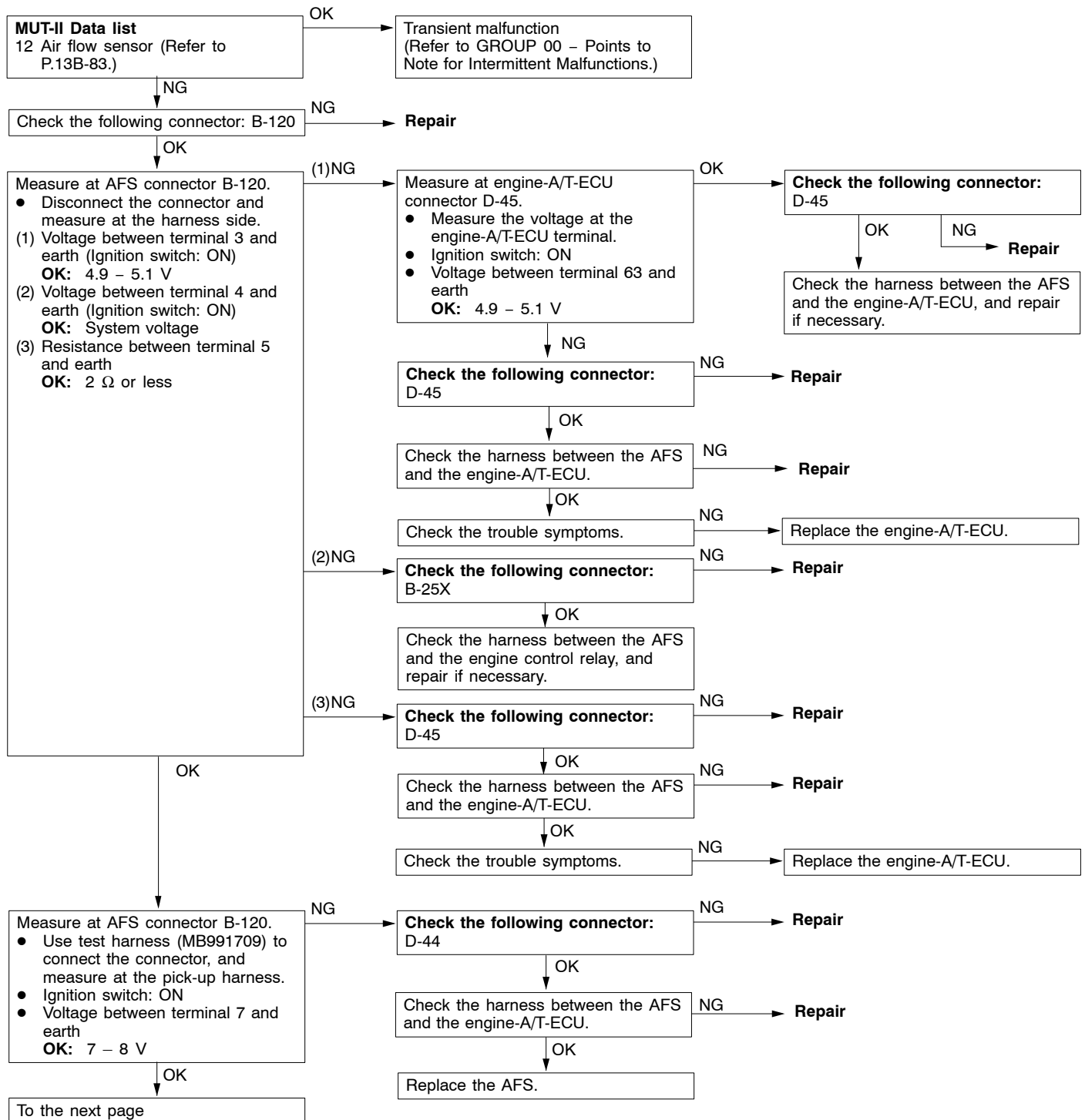
Engine-A/T-ECU
Air flow sensor
Intake air temperature sensor
Engine coolant temperature sensor
Throttle position sensor
Crank angle sensor
Camshaft position sensor
Injector
Barometric pressure sensor
Immobilizer system
Detonation sensor <Vehicles for Taiwan>

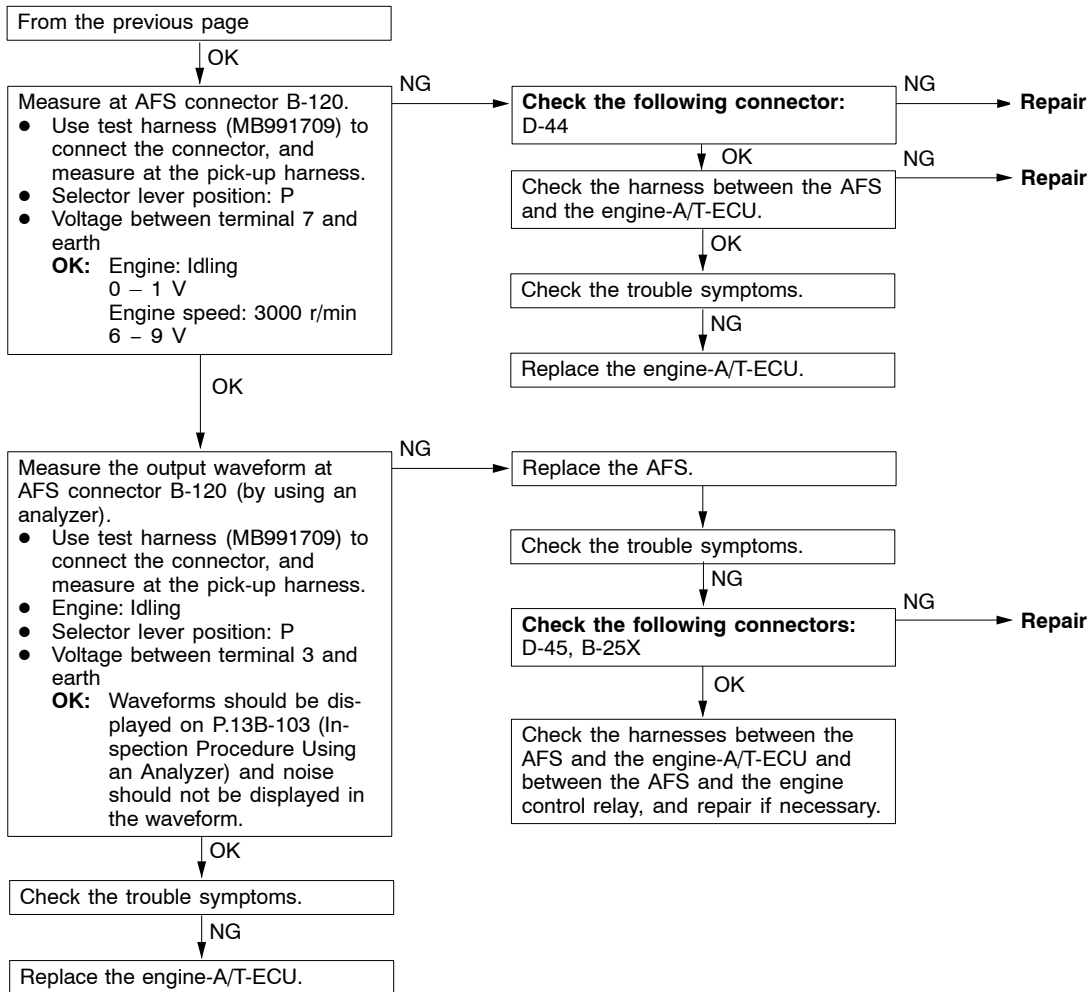
INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
P0100	Air flow circuit malfunction	13B-8
P0110	Intake air temperature malfunction	13B-10
P0115	Engine coolant temperature circuit malfunction	13B-11
P0122	Throttle position sensor (main) circuit low input	13B-14
P0123	Throttle position sensor (main) circuit high input	13B-15
P0105	Barometric pressure circuit malfunction	13B-37
P0201	Injector circuit – Cylinder 1	13B-16
P0202	Injector circuit – Cylinder 2	13B-16
P0203	Injector circuit – Cylinder 3	13B-16
P0204	Injector circuit – Cylinder 4	13B-16
P0205	Injector circuit – Cylinder 5	13B-16
P0206	Injector circuit – Cylinder 6	13B-16
P0222	Throttle position sensor (sub) circuit low input	13B-17
P0223	Throttle position sensor (sub) circuit high input	13B-18
P0325	Detonation sensor circuit <Vehicles for Taiwan>	13B-19
P0335	Crank angle sensor circuit	13B-19
P0340	Camshaft position sensor circuit	13B-21
P0500	Vehicle speed sensor malfunction ● A/T DTC No.29 (Vehicle speed sensor system)	23-11
P0606	Powertrain control module main processor malfunction	13B-22
P0638	Throttle valve control servo circuit range/performance problem	13B-23
P0642	Throttle position sensor power supply	13B-23
P0657	Throttle valve control servo relay circuit malfunction	13B-24
P1601	Communication malfunction (between Engine-A/T-ECU and throttle valve control system)	13B-25
P1610	Immobilizer malfunction	13B-25
P2100	Throttle valve control servo circuit (open)	13B-26
P2101	Throttle valve control servo magneto malfunction	13B-27
P2102	Throttle valve control servo circuit (shorted low)	13B-27
P2103	Throttle valve control servo circuit (shorted high)	13B-28
P2108	Throttle valve control servo processor malfunction	13B-28
P2121	Accelerator pedal position sensor (main) circuit range/performance problem	13B-29
P2122	Accelerator pedal position sensor (main) circuit low input	13B-30
P2123	Accelerator pedal position sensor (main) circuit high input	13B-31
P2126	Accelerator pedal position sensor (sub) circuit range/performance problem	13B-32
P2127	Accelerator pedal position sensor (sub) circuit low input	13B-33
P2128	Accelerator pedal position sensor (sub) circuit high input	13B-34
P2135	Throttle position sensor (main and sub) range/performance problem	13B-35
P2138	Accelerator pedal position sensor (main and sub) range/performance problem	13B-36

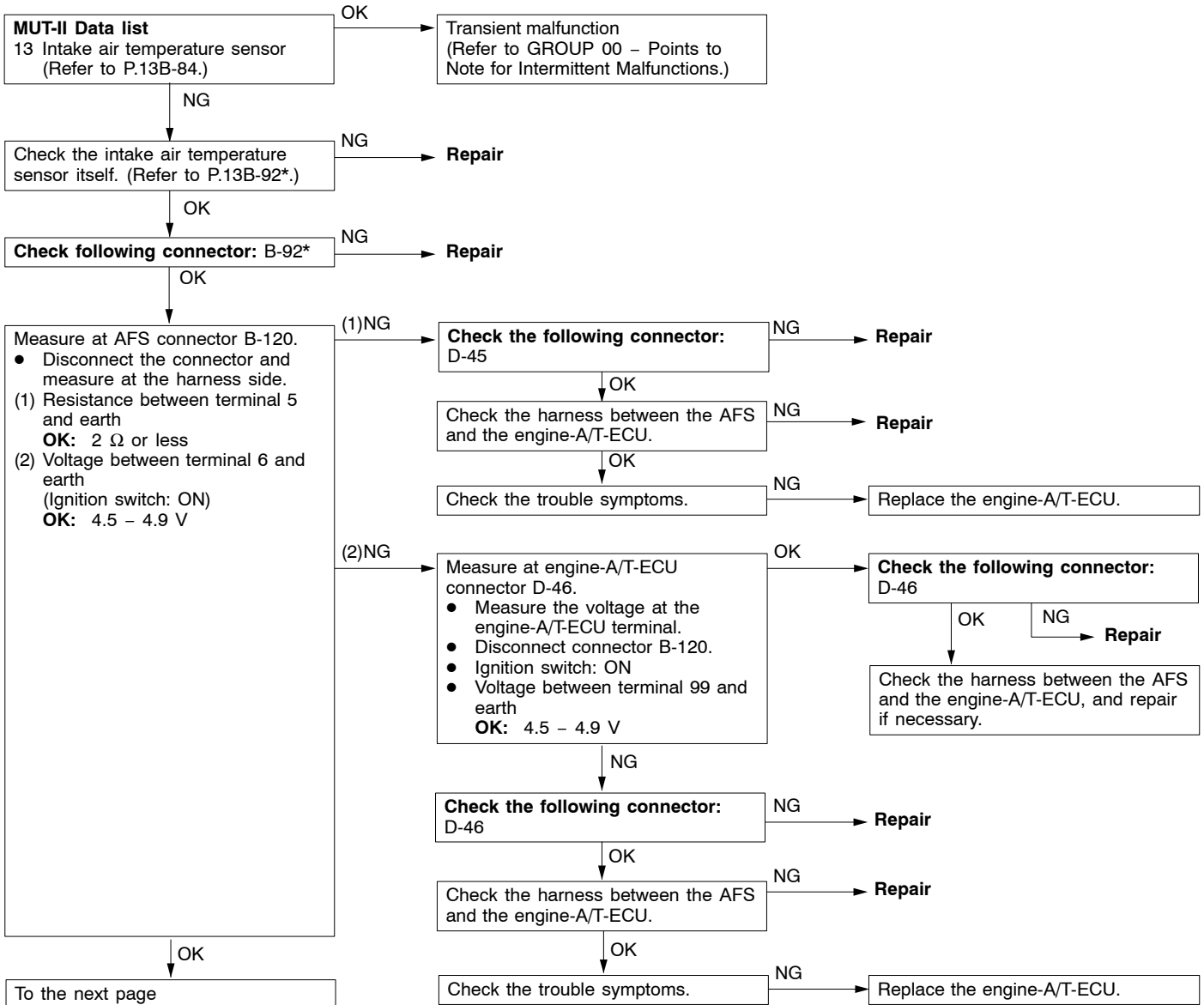
INSPECTION PROCEDURE FOR DIAGNOSIS CODE

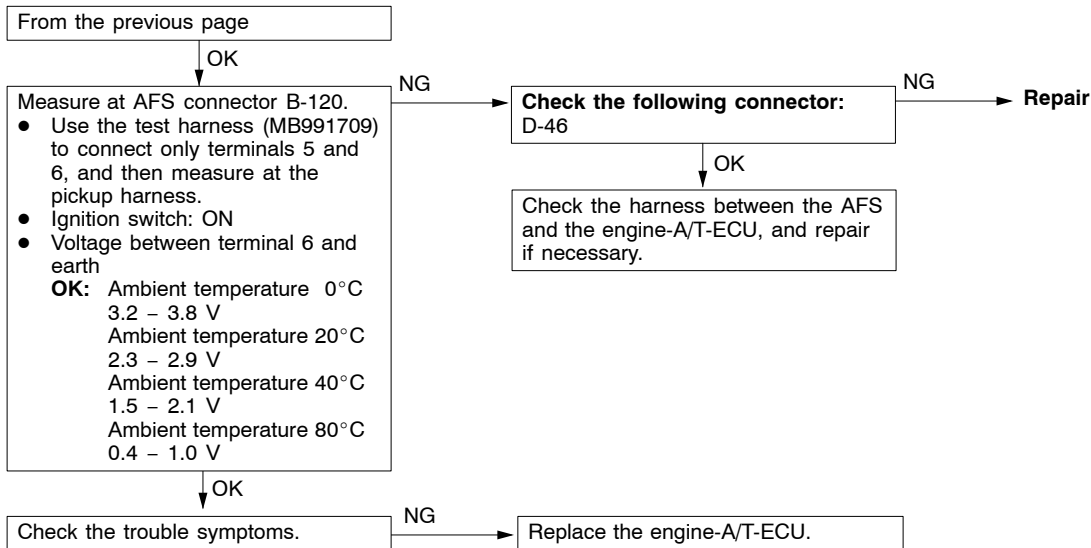
Code No. P0100 Air flow sensor circuit malfunction	Probable cause
Range of Check • Engine speed: 500 r/min or more Set Conditions • The sensor output frequency is 3.3 Hz or less for two seconds.	• Malfunction of AFS • Open or short circuit in AFS circuit or loose connector contact • Malfunction of engine-A/T-ECU





Code No. P0110 Intake air temperature circuit malfunction	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Two seconds have passed since the engine starting process is completed. <p>Set Conditions</p> <ul style="list-style-type: none"> The sensor output voltage is 4.6V or more for two seconds (equivalent to intake air temperature less than -45°C) <p>or</p> <ul style="list-style-type: none"> The sensor output voltage is 0.2V or less for two seconds (equivalent to intake air temperature more than 120°C) 	<ul style="list-style-type: none"> Malfunction of intake air temperature sensor Open or short circuit in intake air temperature sensor or loose connector contact Malfunction of engine-A/T-ECU

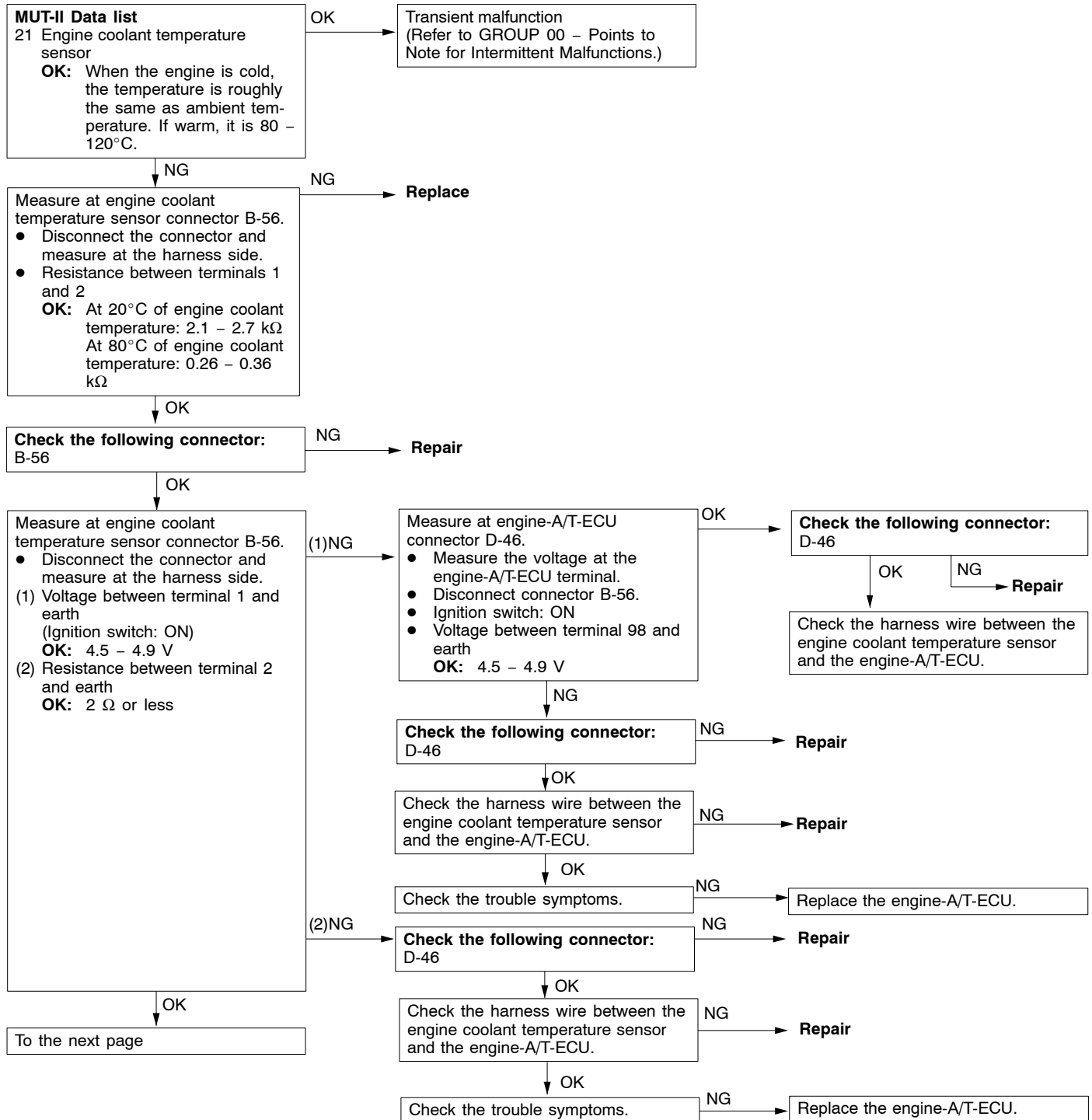


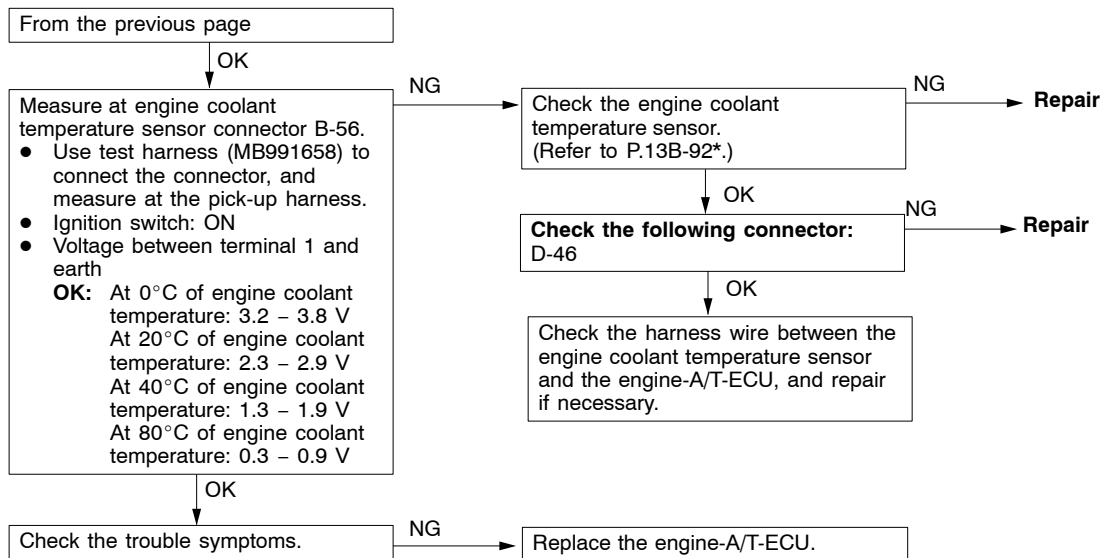


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

Code No. P0115 Engine coolant temperature circuit malfunction	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> • Engine: Two seconds after the engine has been started <p>Set Conditions</p> <ul style="list-style-type: none"> • The sensor output voltage is 4.6V or more for two seconds (equivalent to engine coolant temperature less than -45°C) <p>or</p> <ul style="list-style-type: none"> • The sensor output voltage is 0.1V or less for two seconds (equivalent to engine coolant temperature more than 140°C) 	<ul style="list-style-type: none"> • Malfunction of engine coolant temperature sensor • Open or short circuit in the engine coolant temperature sensor circuit or loose connector contact • Malfunction of engine-A/T-ECU



**NOTE**

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

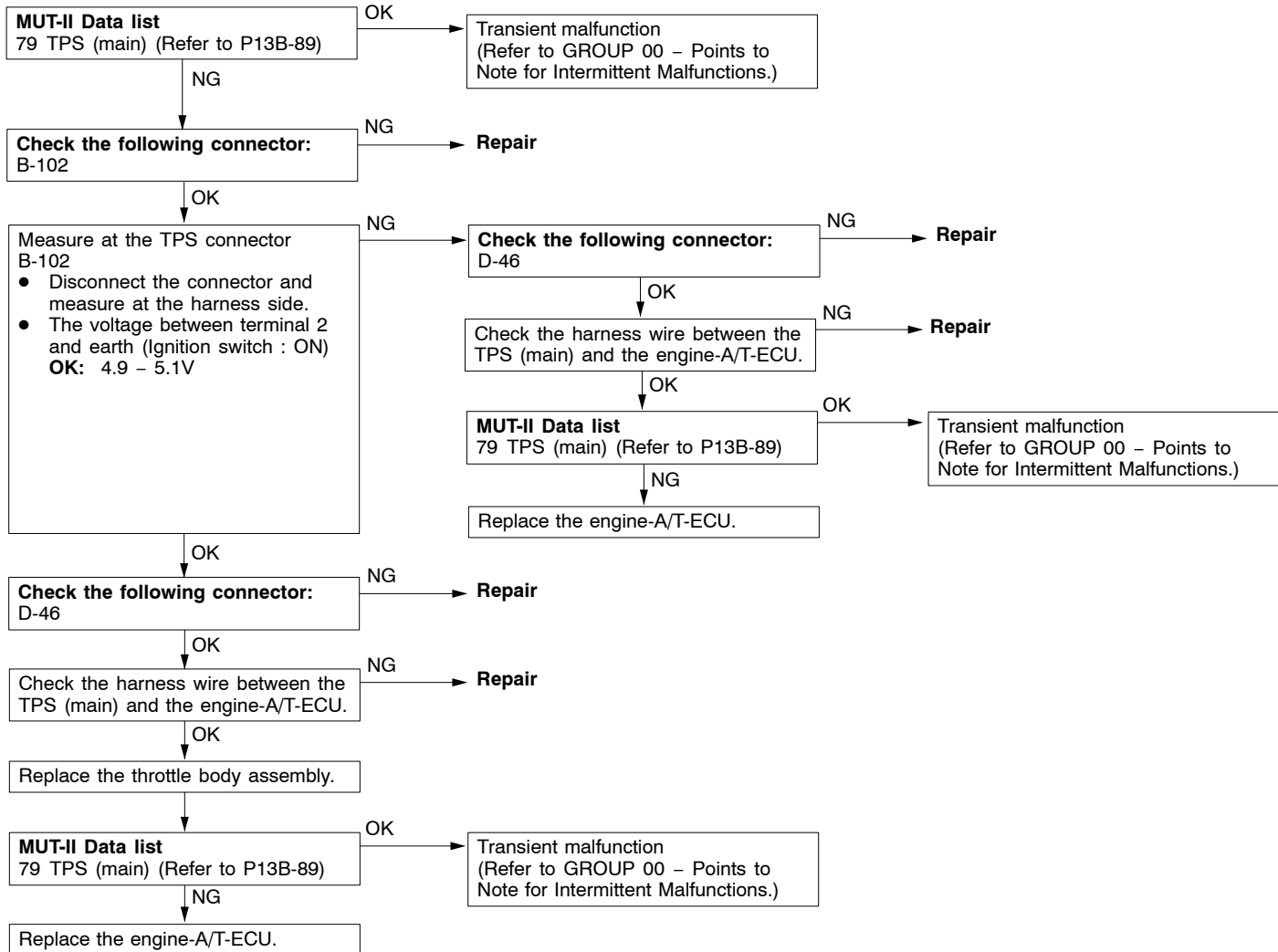
Code No. P0122 Throttle position sensor (main) circuit low input**Probable cause****Range of Check**

- Ignition switch: ON

Set Conditions

- The TPS (main) output voltage is 0.35V or less for 0.5 seconds.

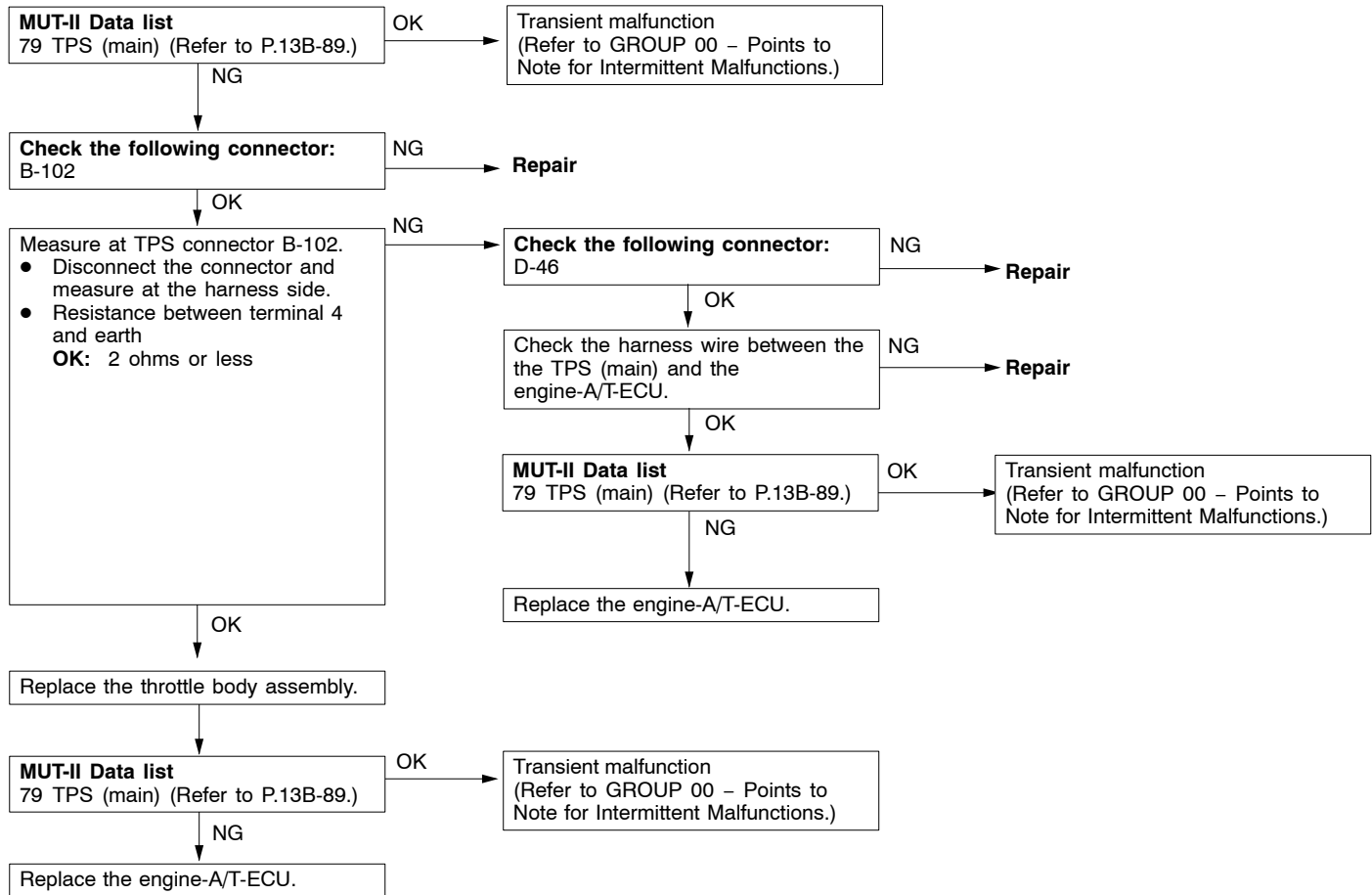
- Malfunction of TPS
- Open or short circuit in TPS (main) circuit or loose connector contact
- Malfunction of engine-A/T-ECU



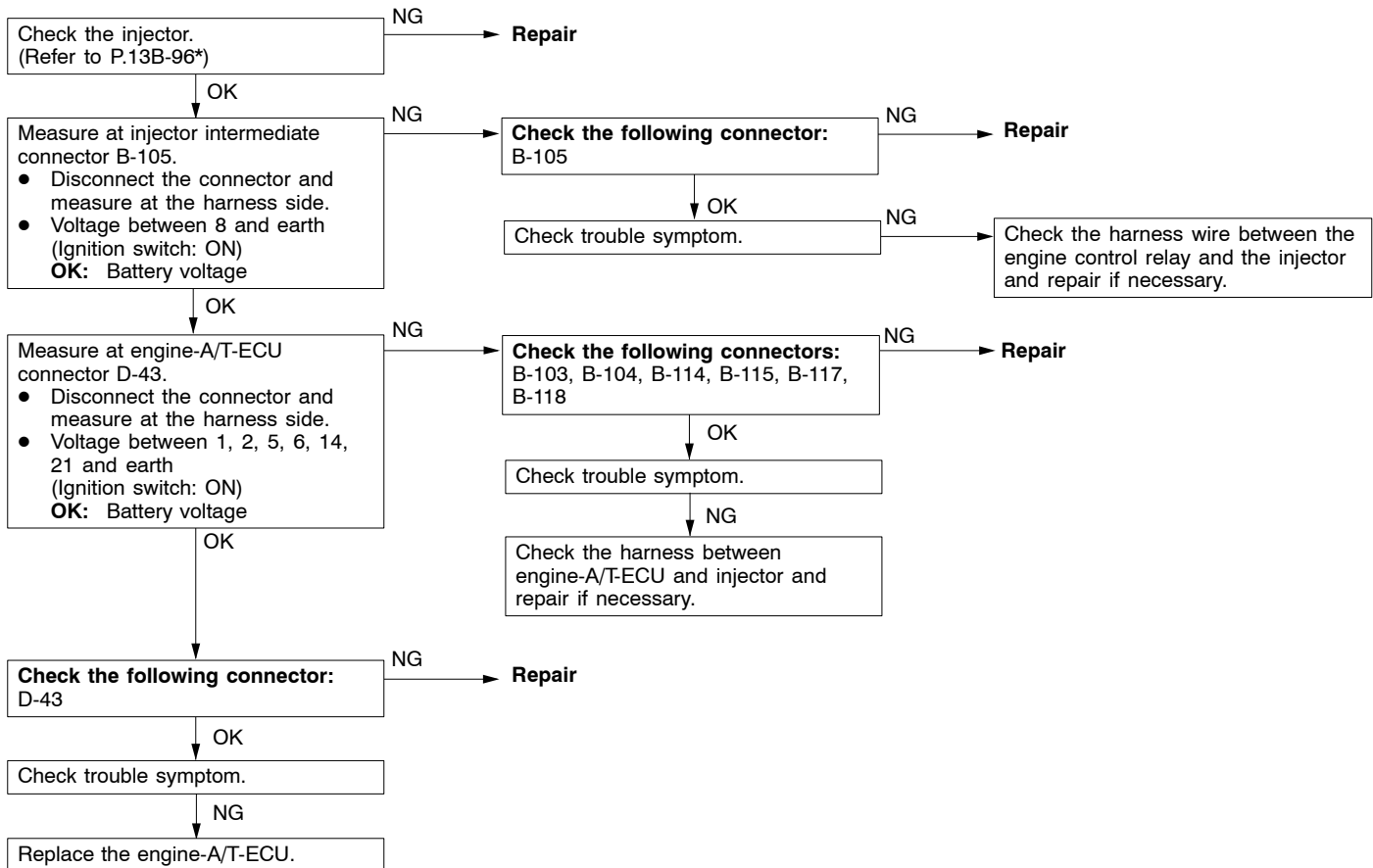
Code No. P0123 Throttle position sensor (main) circuit high input**Probable cause**

- Range of Check
- Ignition switch: ON
- Set Conditions
- The TPS (main) output voltage is 4.8 V or more for 0.5 seconds.

- Malfunction of TPS
- Open or short circuit in the TPS (main) circuit or loose connector contact
- Malfunction of engine-A/T-ECU



Code No. P0201 – P0206 Injector circuit	Probable cause
Range of Check <ul style="list-style-type: none"> Engine speed is approx. 1,000 r/min or less. The TPS output voltage is 1.16 V or less. Set conditions <ul style="list-style-type: none"> Surge voltage of injector coil is not detected for 2 seconds. 	<ul style="list-style-type: none"> Malfunction of the injector Open or short circuit in injector circuit or loose connector contact Malfunction of the engine-A/T-ECU

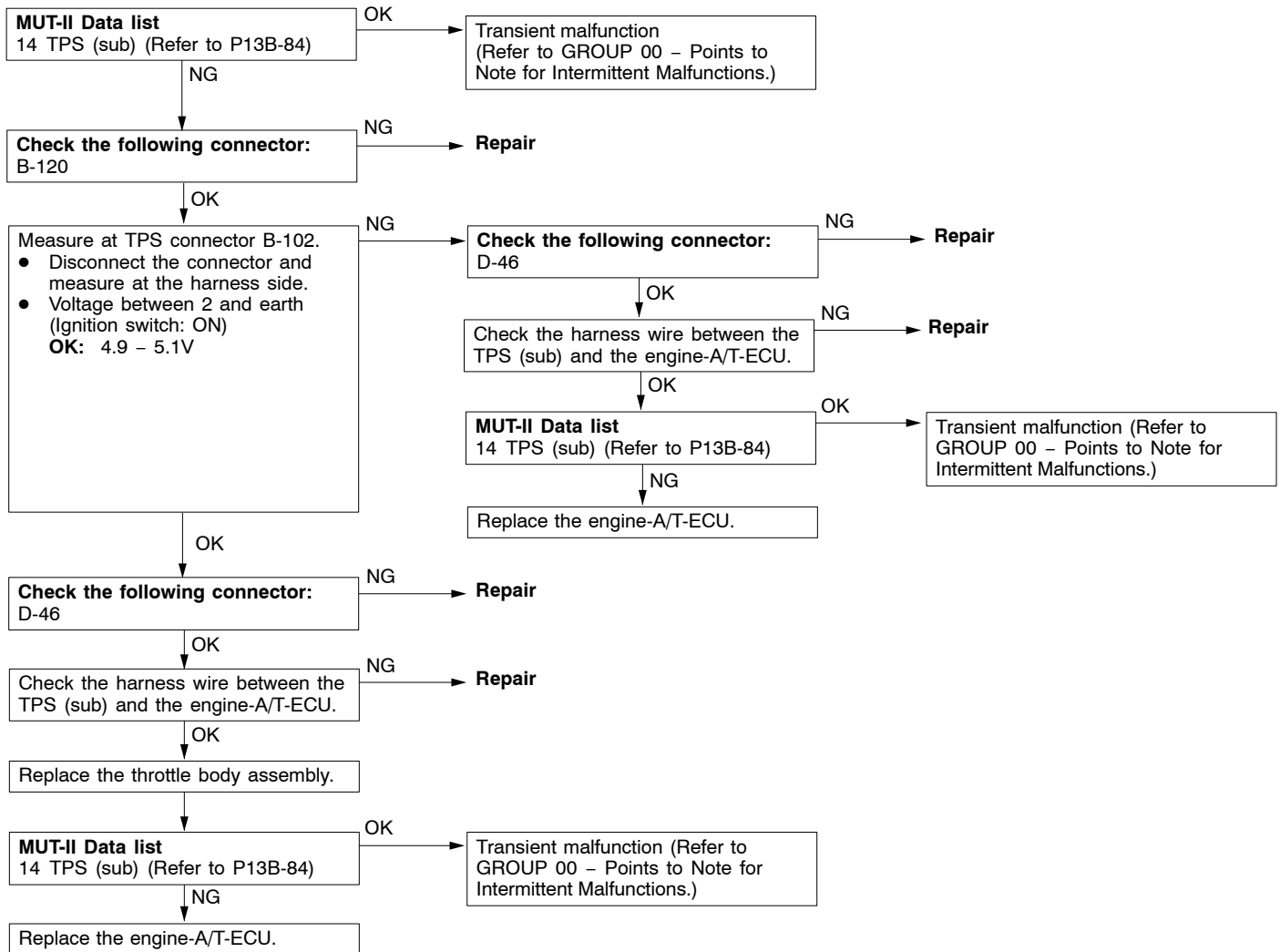
**NOTE**

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

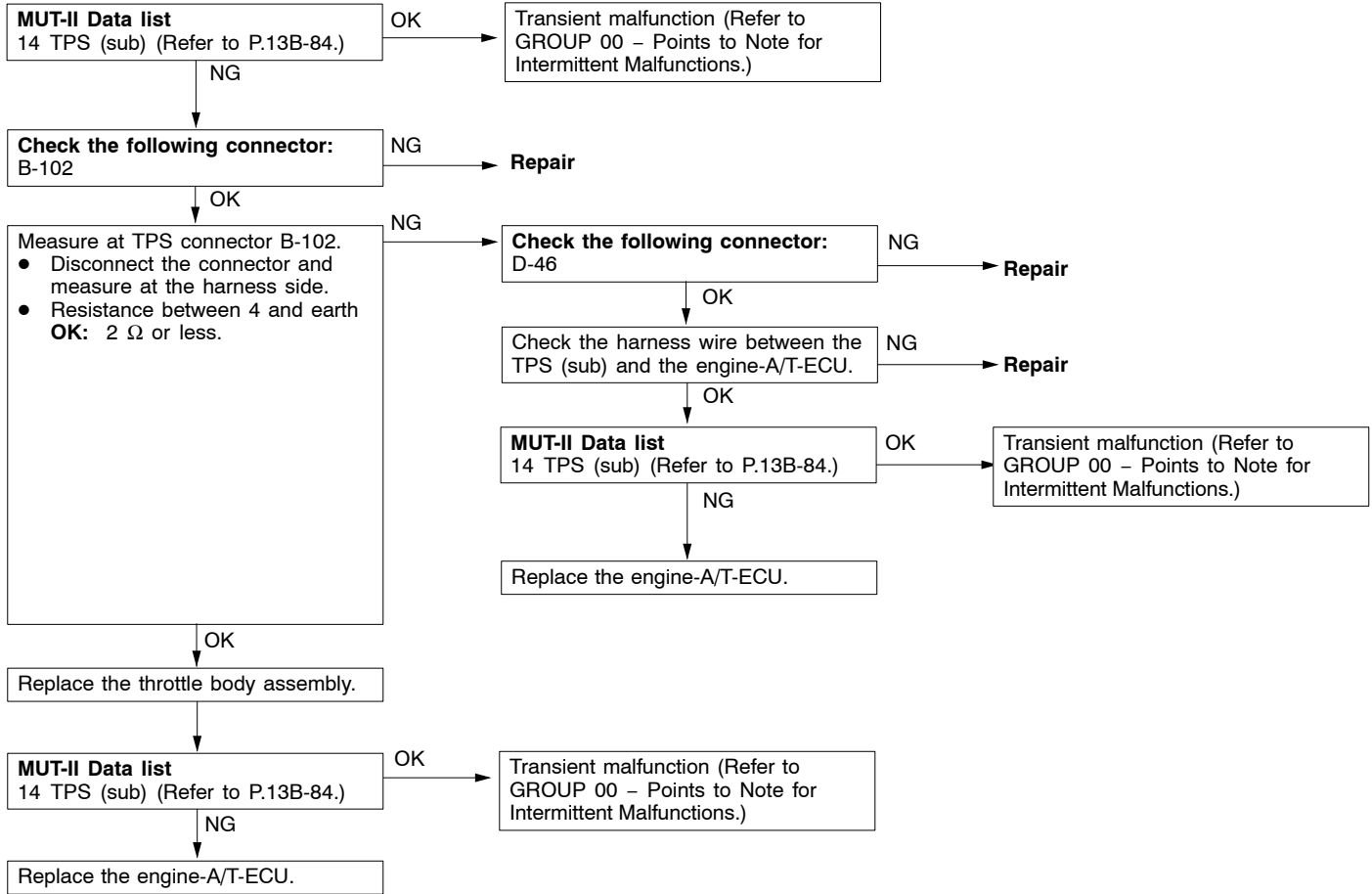
Code No. P0222 Throttle position sensor (sub) circuit low input**Probable cause**

- Range of Check
- Ignition switch: ON
- Set Conditions
- The TPS (sub) output voltage remains 0.35 V or less for 0.5 seconds.

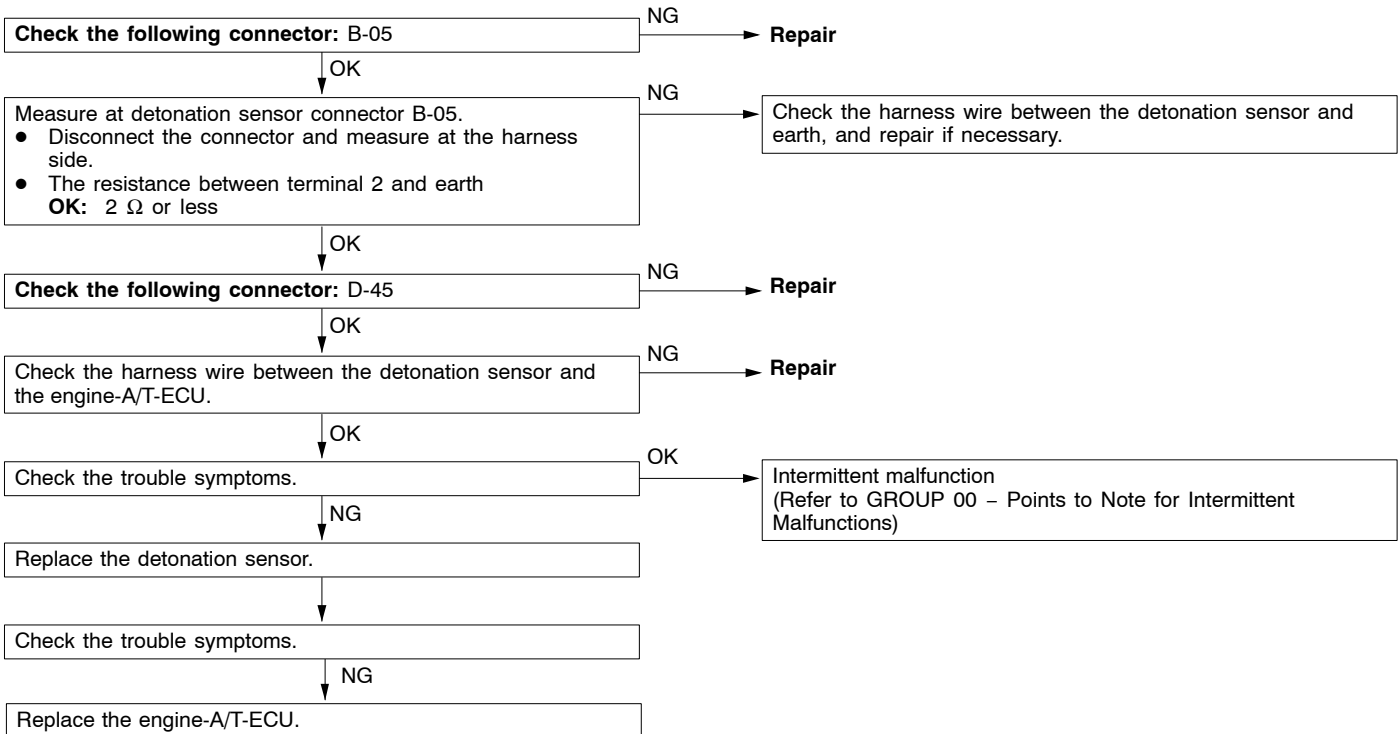
- Malfunction of TPS
- Open or short circuit in TPS (sub) circuit or loose connector contact
- Malfunction of engine-A/T-ECU



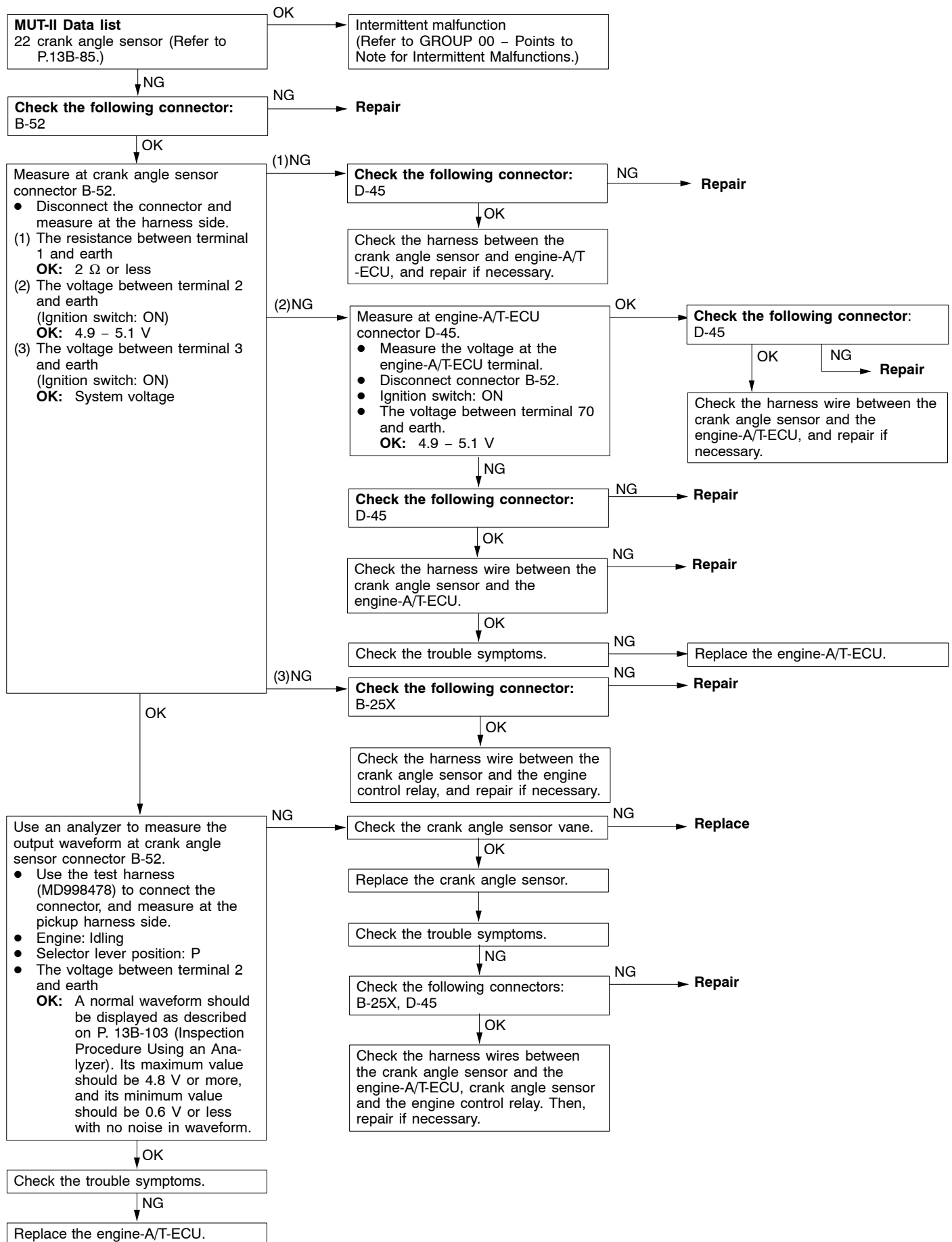
Code No. P0223 Throttle position sensor (sub) circuit high input	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Ignition switch: ON <p>Set Conditions</p> <ul style="list-style-type: none"> The TPS (sub) output voltage remains 4.8 V or more for 0.5 seconds. 	<ul style="list-style-type: none"> Malfunction of TPS Open or short circuit in the TPS (sub) circuit or loose connector contact Malfunction of engine-A/T-ECU



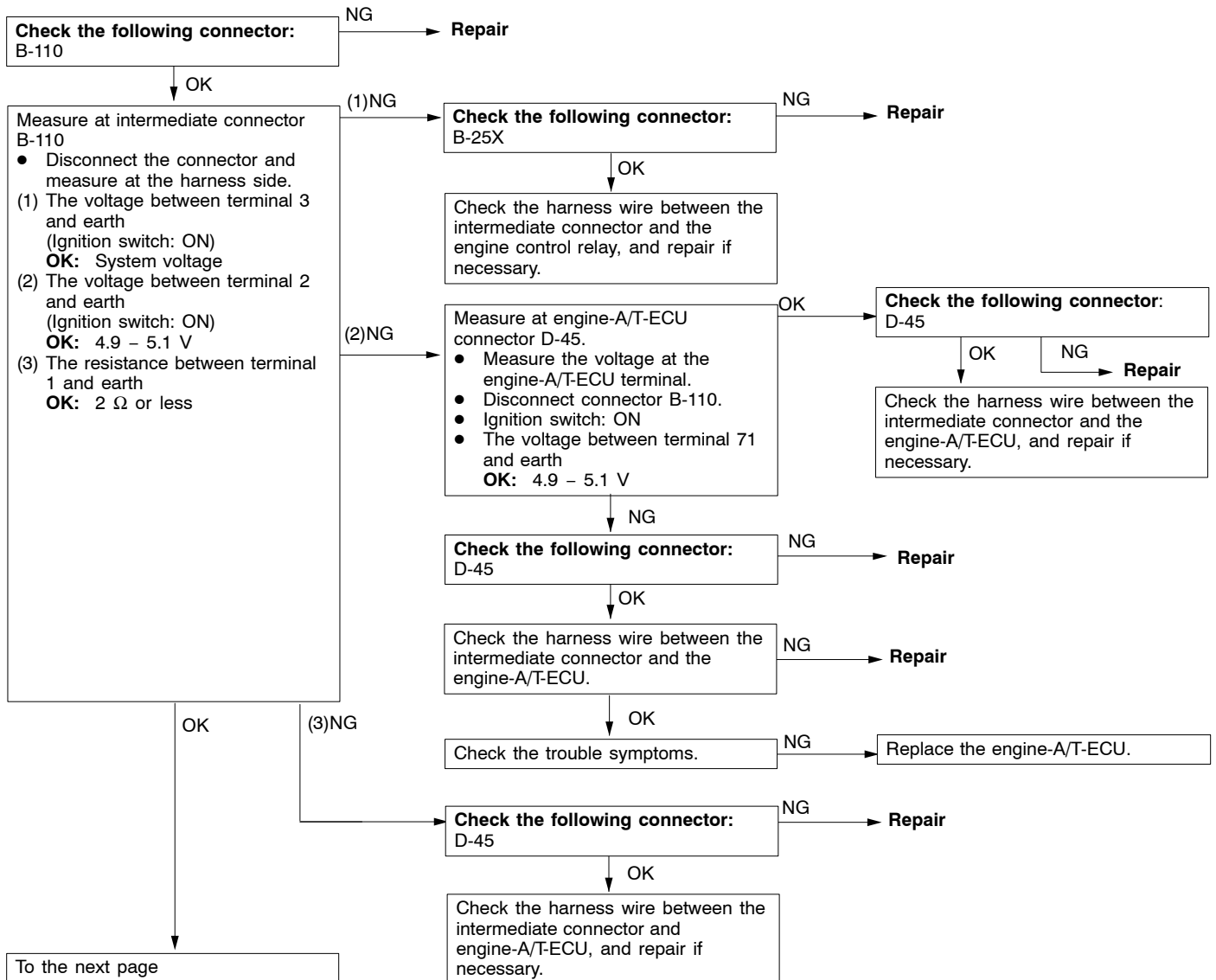
Code No. P0325 Detonation sensor circuit <Vehicles for Taiwan>	Probable cause
Range of Check <ul style="list-style-type: none"> Engine: Two seconds after the engine has been started Engine speed: 3,000 r/min or more Set Conditions <ul style="list-style-type: none"> Changes in sensor output voltage (detonation sensor peak voltage per 1/3 crankshaft rotation) in 200 consecutive cycles are 0.06 V or less. 	<ul style="list-style-type: none"> Malfunction of the detonation sensor Open or short circuit in the detonation sensor circuit or loose connector contact Malfunction of engine-A/T-ECU

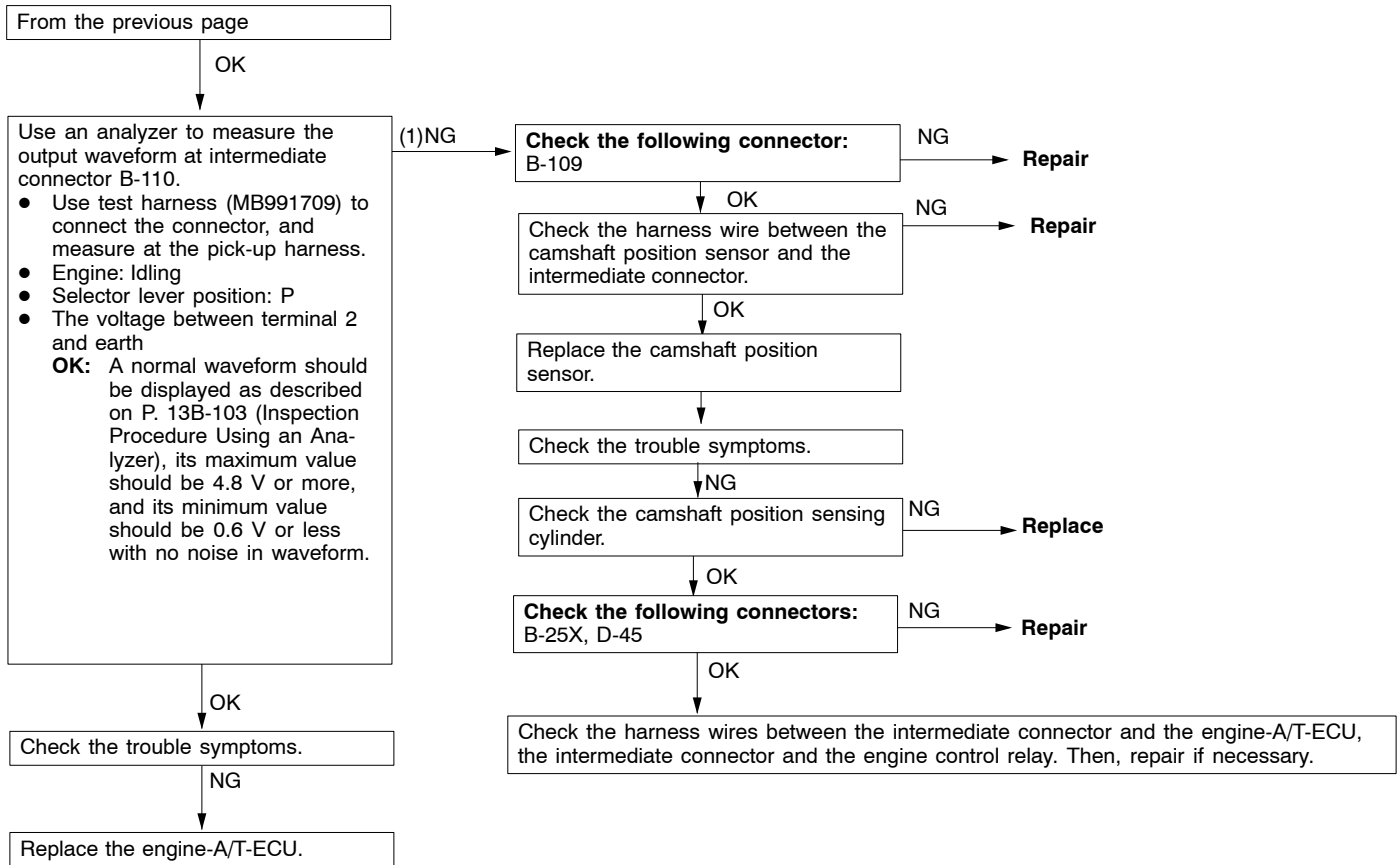


Code No. P0335 Crank angle sensor system	Probable cause
Range of Check <ul style="list-style-type: none"> Engine is cranking Set Conditions <ul style="list-style-type: none"> Sensor output voltage does not change for two seconds (no pulse signal input). 	<ul style="list-style-type: none"> Malfunction of the crank angle sensor. Open or short circuit in the crank angle sensor circuit or loose connector contact. Malfunction of engine-A/T-ECU



Code No. P0340 Camshaft position sensor circuit	Probable cause
Range of Check <ul style="list-style-type: none"> Engine speed is higher than 50 r/min Set Conditions <ul style="list-style-type: none"> The sensor output voltage does not change for two seconds (no pulse signal input). 	<ul style="list-style-type: none"> Malfunction of the camshaft position sensor Open or short circuit in the camshaft position sensor circuit or loose connector contact. Malfunction of engine-A/T-ECU

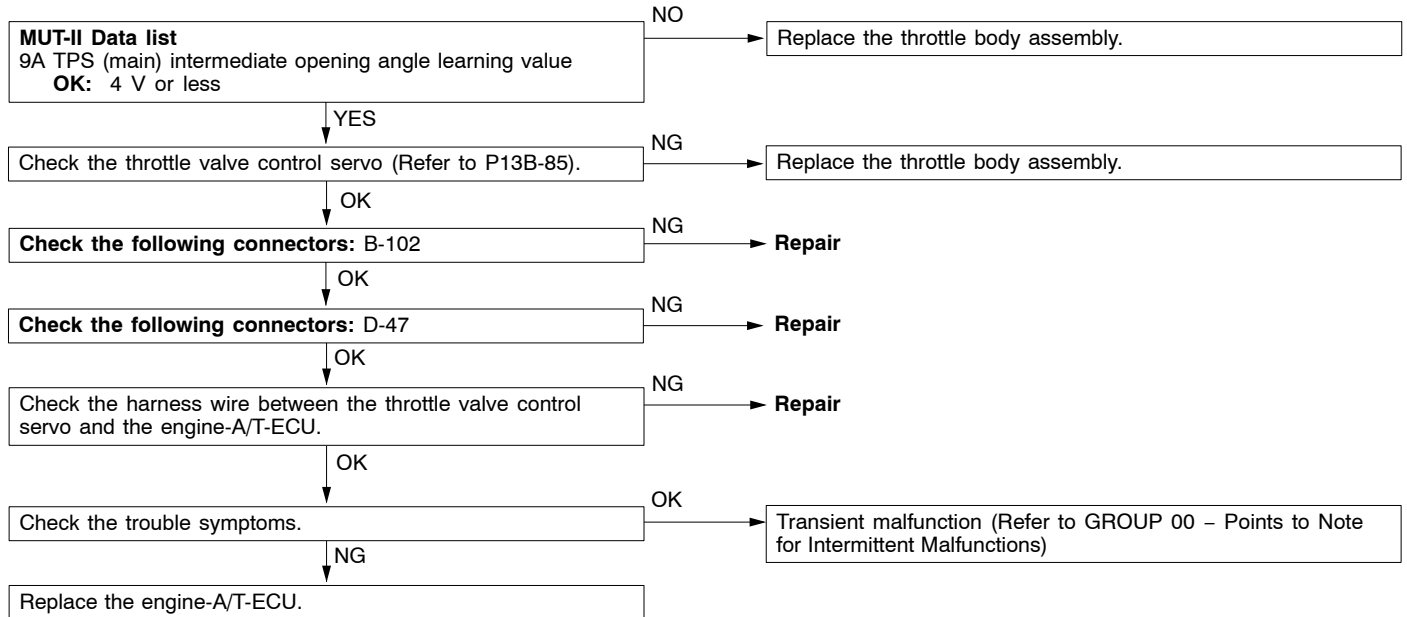




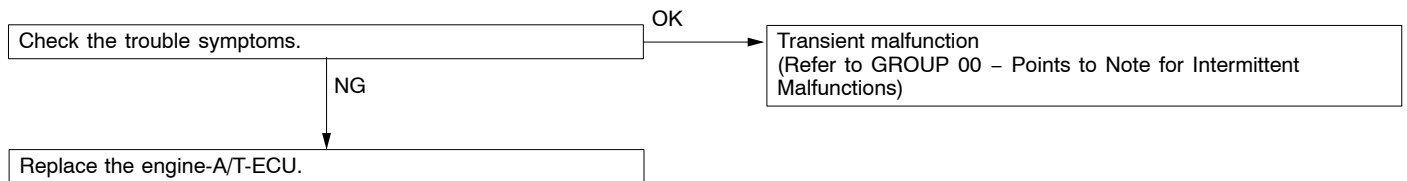
Code No. P0606 Powertrain control module main processor malfunction	Probable cause
Range of Check <ul style="list-style-type: none"> • Ignition switch: ON Set Conditions <ul style="list-style-type: none"> • Monitor pulse signal has not been received for 0.5 second. 	<ul style="list-style-type: none"> • Malfunction of engine-A/T-ECU

Replace the engine-A/T-ECU

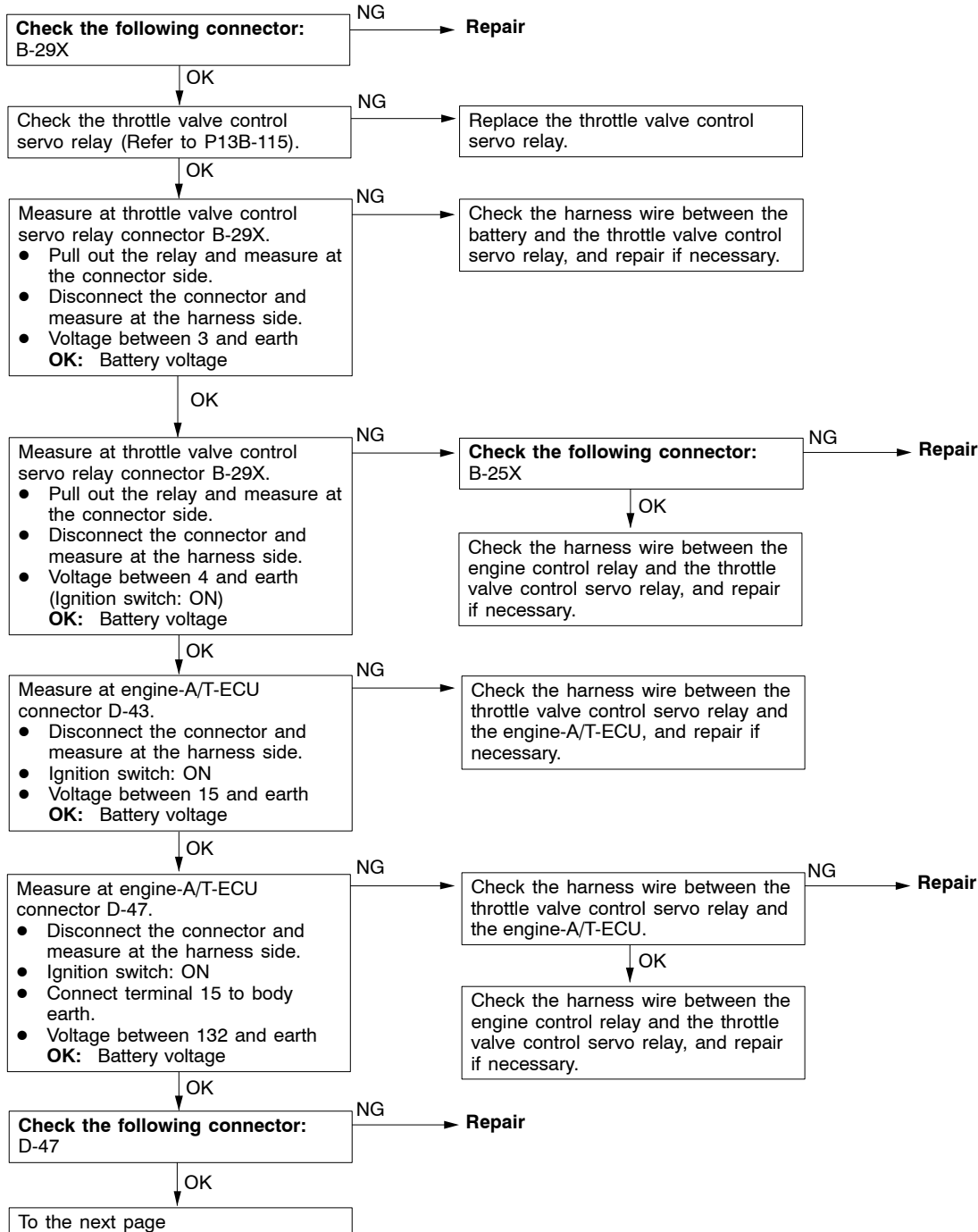
Code No. P0638 Throttle valve control servo circuit range/performance problem	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Battery voltage: 8.3 V or more TPS (main) output voltage: 0.35 – 4.8 V Deviation in the TPS (main) output voltage: 0.4 V or more per 100 ms <p>Set Conditions</p> <ul style="list-style-type: none"> The TPS (main) output voltage is different from its target by 0.5 V or more for 0.5 seconds. <p>Range of Check</p> <ul style="list-style-type: none"> Battery voltage: 8.3 V or more TPS (main) output voltage: 0.35 – 4.8 V <p>Set Conditions</p> <ul style="list-style-type: none"> The TPS (main) output voltage is different from its target by 1 V or more for 4 seconds. 	<ul style="list-style-type: none"> Malfunction of the throttle valve return spring Malfunction of the throttle valve Malfunction of the throttle valve control servo Open or short circuit in the throttle valve control servo circuit or loose connector contact Malfunction of engine-A/T-ECU

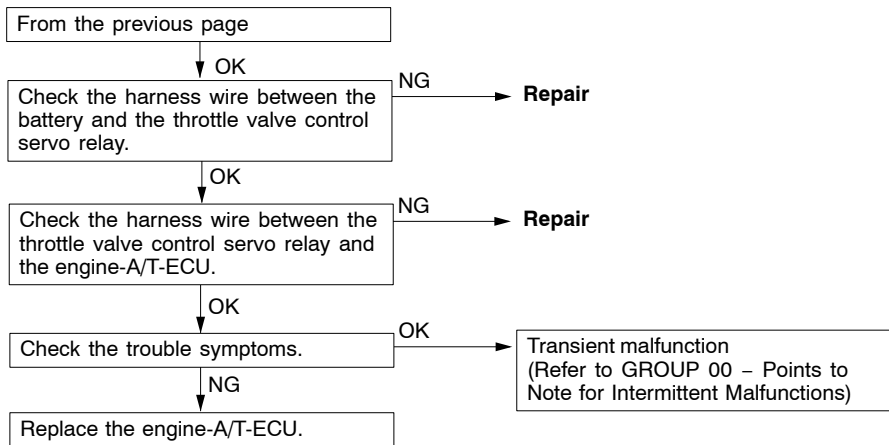


Code No. P0642 Throttle position sensor power supply	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Battery voltage: 6.3 V or more <p>Set Conditions</p> <ul style="list-style-type: none"> The TPS power supply voltage is 4.1 V or less for 0.5 seconds. 	<ul style="list-style-type: none"> Malfunction of engine-A/T-ECU

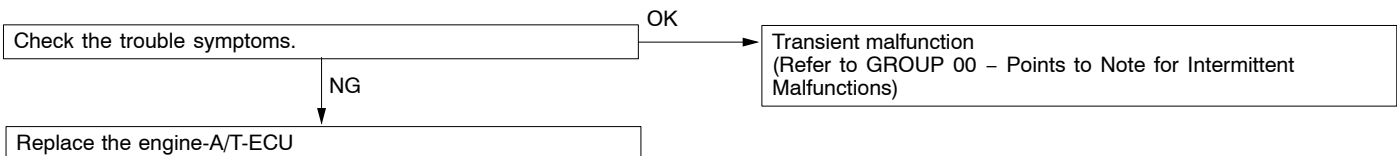


Code No. P0657 Throttle valve control servo relay circuit malfunction	Probable cause
Range of Check <ul style="list-style-type: none"> Ignition switch: ON Set Conditions <ul style="list-style-type: none"> Voltage in the electric controlled throttle system power supply line remains 4.9 V or less for 0.8 second. 	<ul style="list-style-type: none"> Malfunction of the throttle valve control servo relay Open or short circuit in the throttle valve control servo relay circuit or loose connector contact Malfunction of engine-A/T-ECU





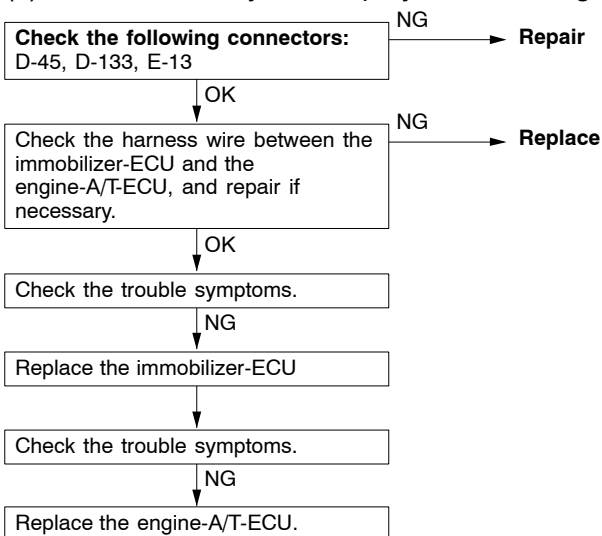
Code No. P1601 Communication malfunction (between engine-A/T-ECU and throttle valve control system)	Probable cause
Range of Check <ul style="list-style-type: none"> Battery voltage: 6.3 V or more Set Conditions <ul style="list-style-type: none"> The engine-A/T-ECU detects an error in communication line to the throttle valve control system for 0.05 seconds. The throttle valve control system detects an error in communication line to the engine-A/T-ECU for 0.125 seconds. 	<ul style="list-style-type: none"> Malfunction of engine-A/T-ECU



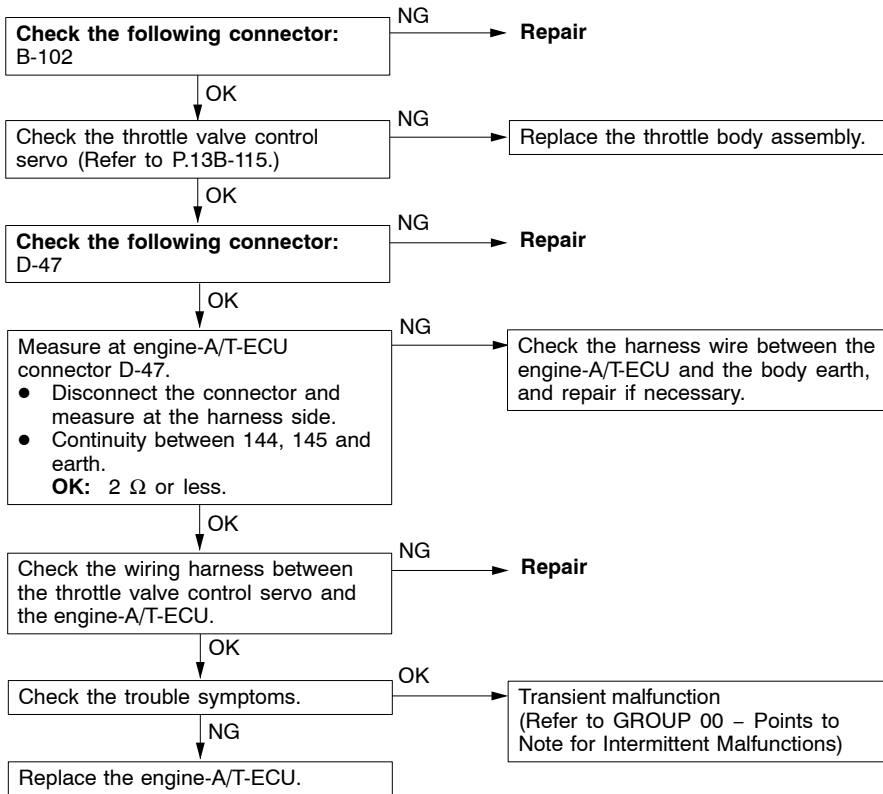
Code No. P1610 Immobilizer system	Probable cause
Range of Check <ul style="list-style-type: none"> Ignition switch: ON Set Conditions <ul style="list-style-type: none"> Improper communication between the engine-A/T-ECU and the immobilizer-ECU 	<ul style="list-style-type: none"> Open or short circuit, or loose connector contact Malfunction of the immobilizer-ECU Malfunction of the engine-A/T-ECU

NOTE

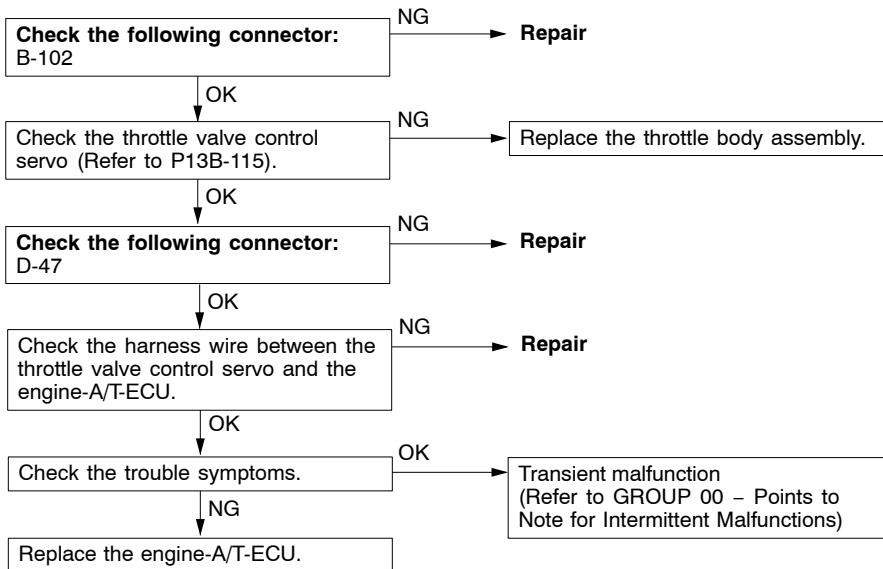
- If the registered ignition keys are close each other when starting the engine, radio interference may cause this code to be displayed.
- This code may be displayed when registering the key encrypted code.



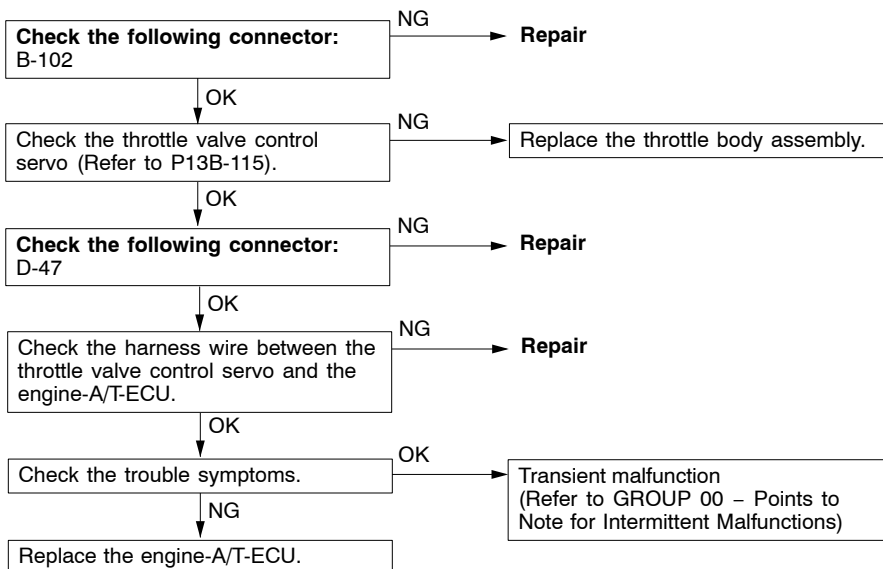
Code No. P2100 Throttle valve control servo circuit (open)	Probable cause
Range of Check <ul style="list-style-type: none"> Battery voltage: 8.3 V or more Set Conditions <ul style="list-style-type: none"> Throttle valve control servo current is 0.1 A or less for 0.72 seconds. 	<ul style="list-style-type: none"> Malfunction of the throttle control servo Open or short circuit in the throttle valve control servo circuit or loose connector contact Malfunction of the engine-A/T-ECU



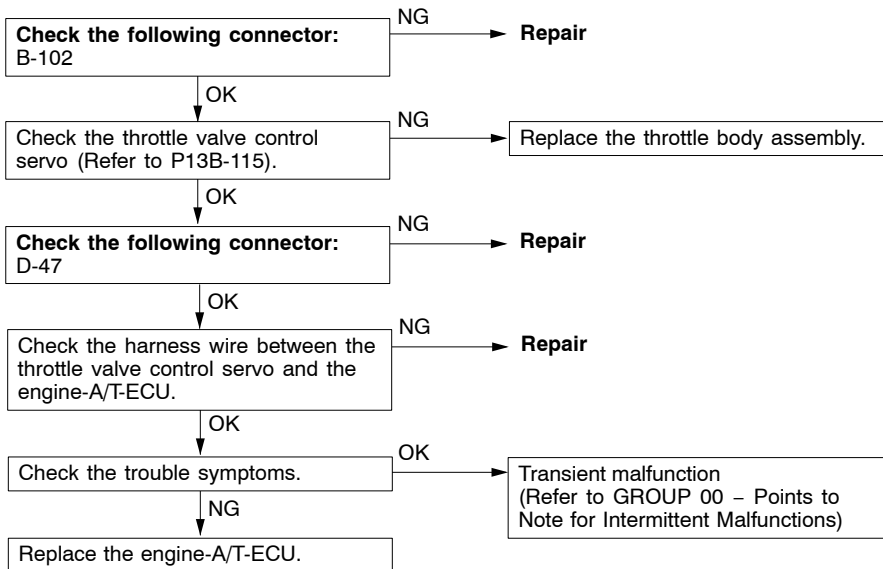
Code No. P2101 Throttle valve control servo magneto malfunction	Probable cause
Range of Check • Battery voltage: 8.3 V or more Set Conditions • The temperature of the throttle valve control servo coil remains 180 °C or more for 0.16 seconds.	• Malfunction of the throttle valve control servo • Short circuit in the throttle valve control servo circuit or loose connector contact • Malfunction of the engine-A/T-ECU



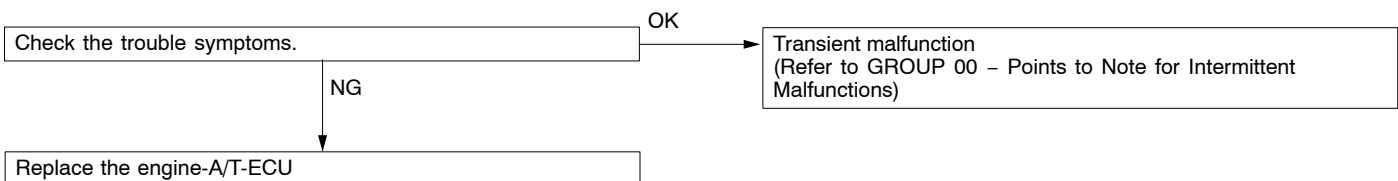
Code No. P2102 Throttle valve control servo circuit (shorted low)	Probable cause
Range of Check • Battery voltage: 8.3 V or more Set Conditions • The throttle valve control servo current remains 12 A or more for 0.16 seconds.	• Malfunction of the throttle valve control servo • Short circuit in the throttle valve control servo circuit or loose connector contact • Malfunction of the engine-A/T-ECU



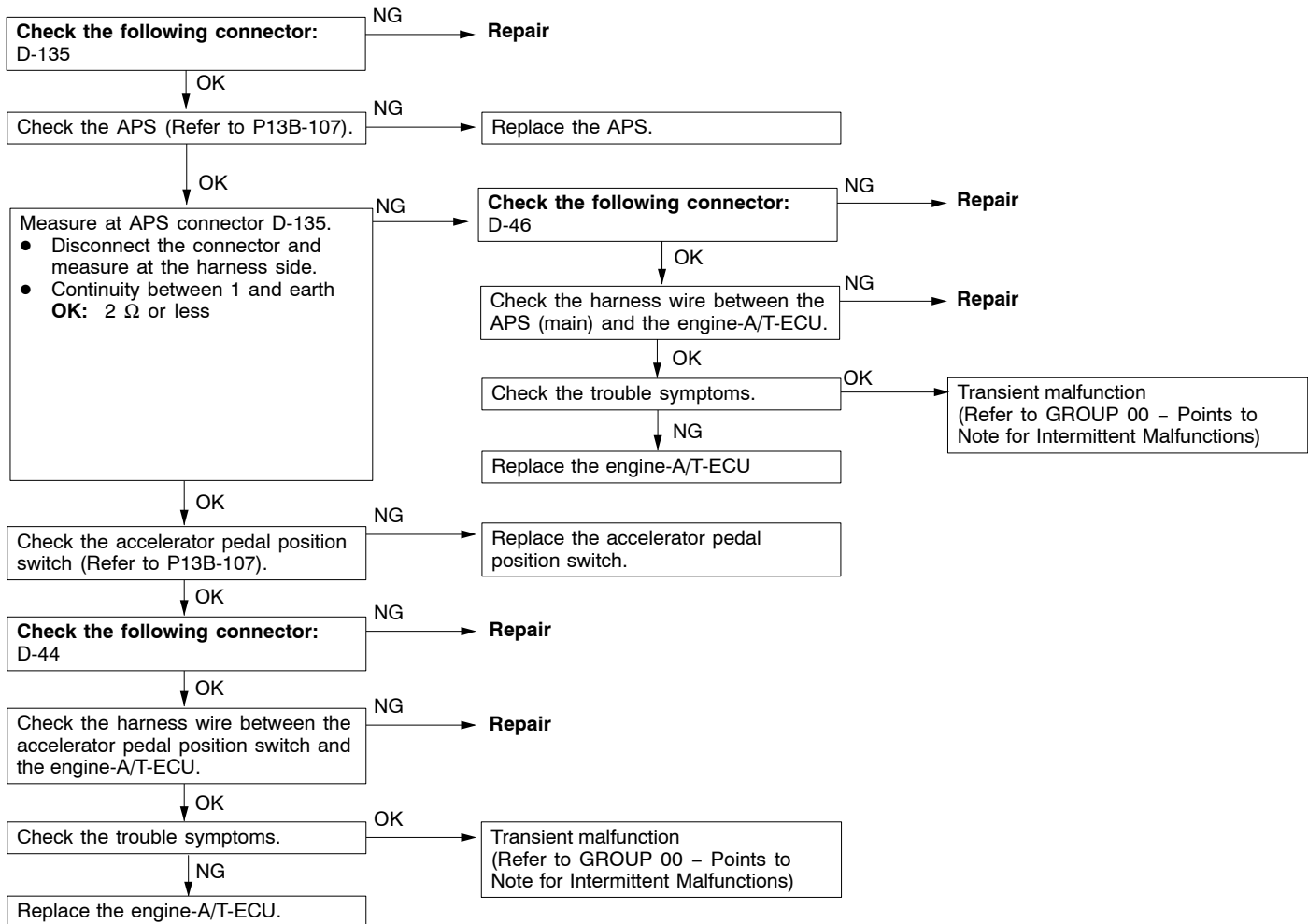
Code No. P2103 Throttle valve control servo circuit (shorted high)	Probable cause
Range of Check <ul style="list-style-type: none"> Battery voltage: 8.3 V or more Set Conditions <ul style="list-style-type: none"> The throttle valve control servo current remains 8 A or more for 0.16 seconds. 	<ul style="list-style-type: none"> Malfunction of the throttle valve control servo Short circuit in the throttle valve control servo circuit or loose connector contact Malfunction of the engine-A/T-ECU



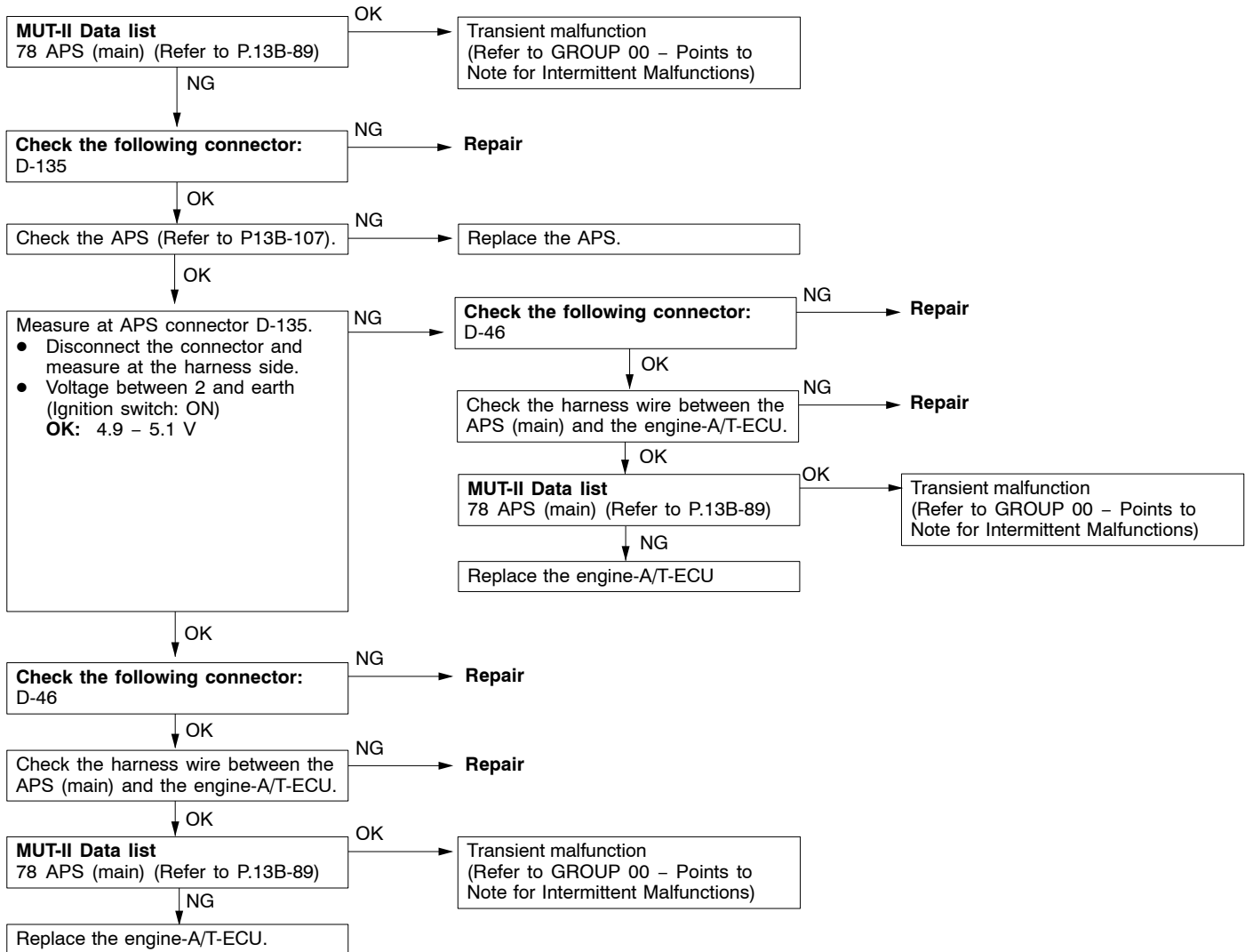
Code No. P2108 Throttle valve control servo module processor malfunction	Probable cause
Range of Check <ul style="list-style-type: none"> Ignition switch: ON Set Conditions <ul style="list-style-type: none"> Monitor pulse signal has not been received for 0.5 second. Range of Check <ul style="list-style-type: none"> TPS (main) output voltage: 0.35 – 4.8 V APS (main) is normal. TPS is normal. Set Conditions <ul style="list-style-type: none"> The TPS (main) output voltage is different from its target by 1 V or more for 10 seconds. 	<ul style="list-style-type: none"> Malfunction of engine-A/T-ECU



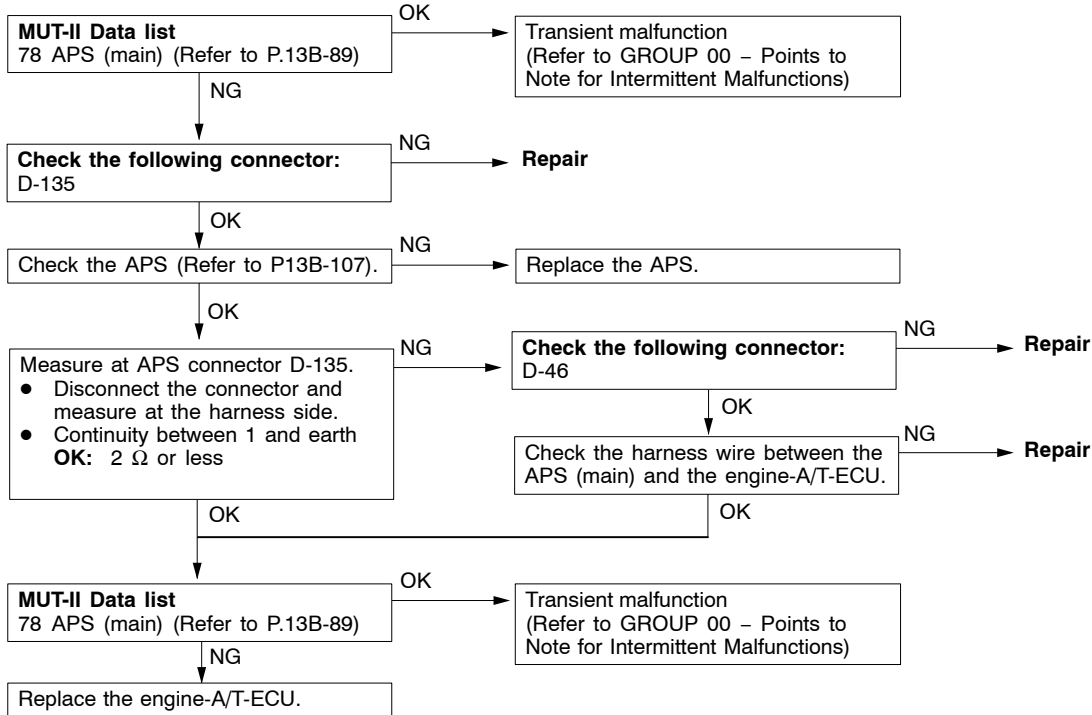
Code No. P2121 Accelerator pedal position sensor (main) circuit range/performance problem	Probable cause
Range of Check <ul style="list-style-type: none"> Ignition switch: ON Accelerator position switch: ON The APS (sub) output voltage is 1.88 V or less Set conditions <ul style="list-style-type: none"> The APS (main) output voltage remains 1.88 V or more for 1 second. 	<ul style="list-style-type: none"> Malfunction of APS Open or short circuit in the APS (main) circuit or loose connector contact Malfunction of the accelerator pedal position switch Short circuit in the accelerator pedal position switch circuit or loose connector contact Malfunction of the engine-A/T-ECU



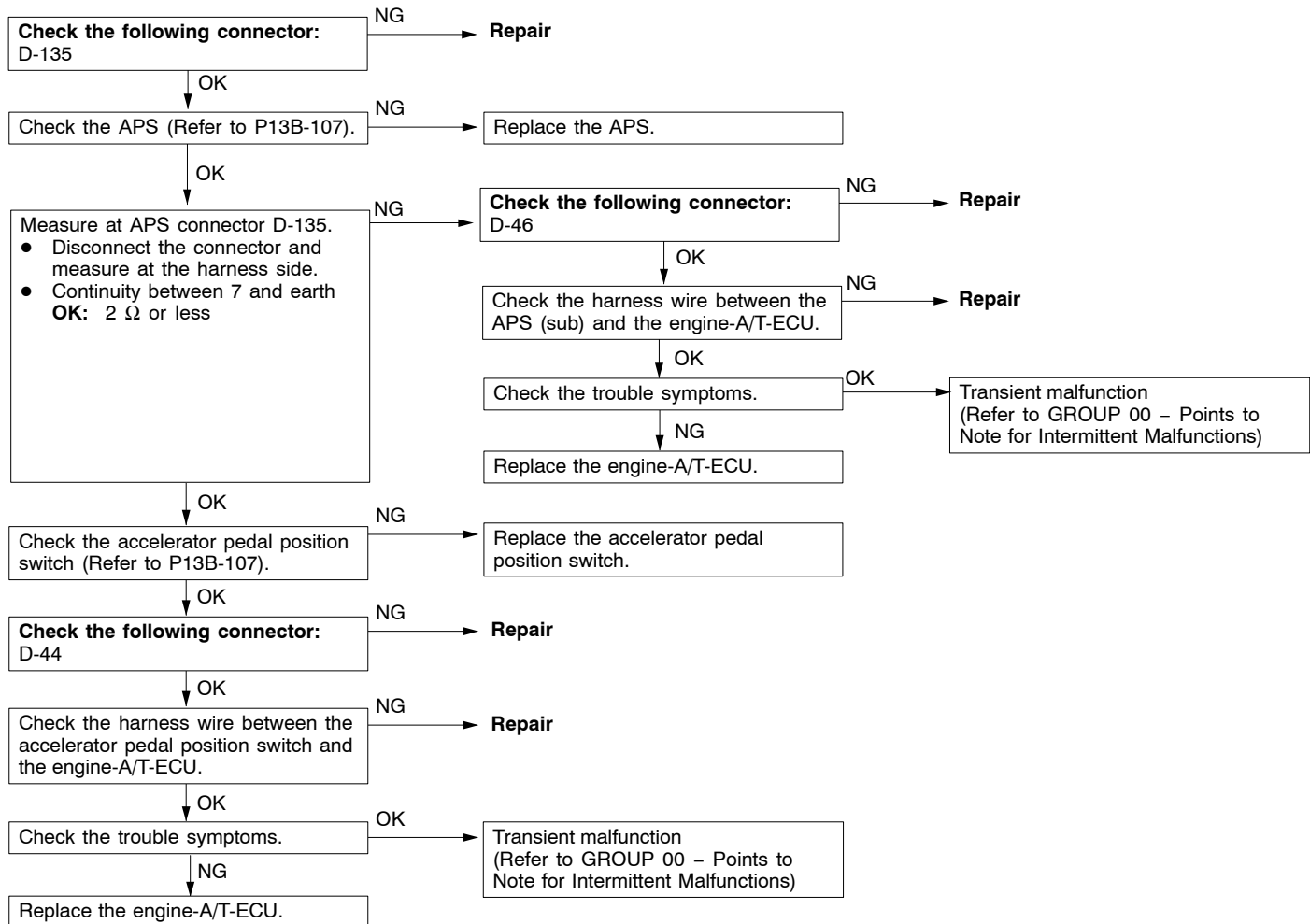
Code No. P2122 Accelerator pedal position sensor (main) circuit low input	Probable cause
Range of Check • Ignition switch: ON Set conditions • The APS (main) output voltage remains 0.2 V or less for 1 second.	• Malfunction of APS • Open or short circuit in the APS (main) circuit or loose connector contact • Malfunction of the engine-A/T-ECU



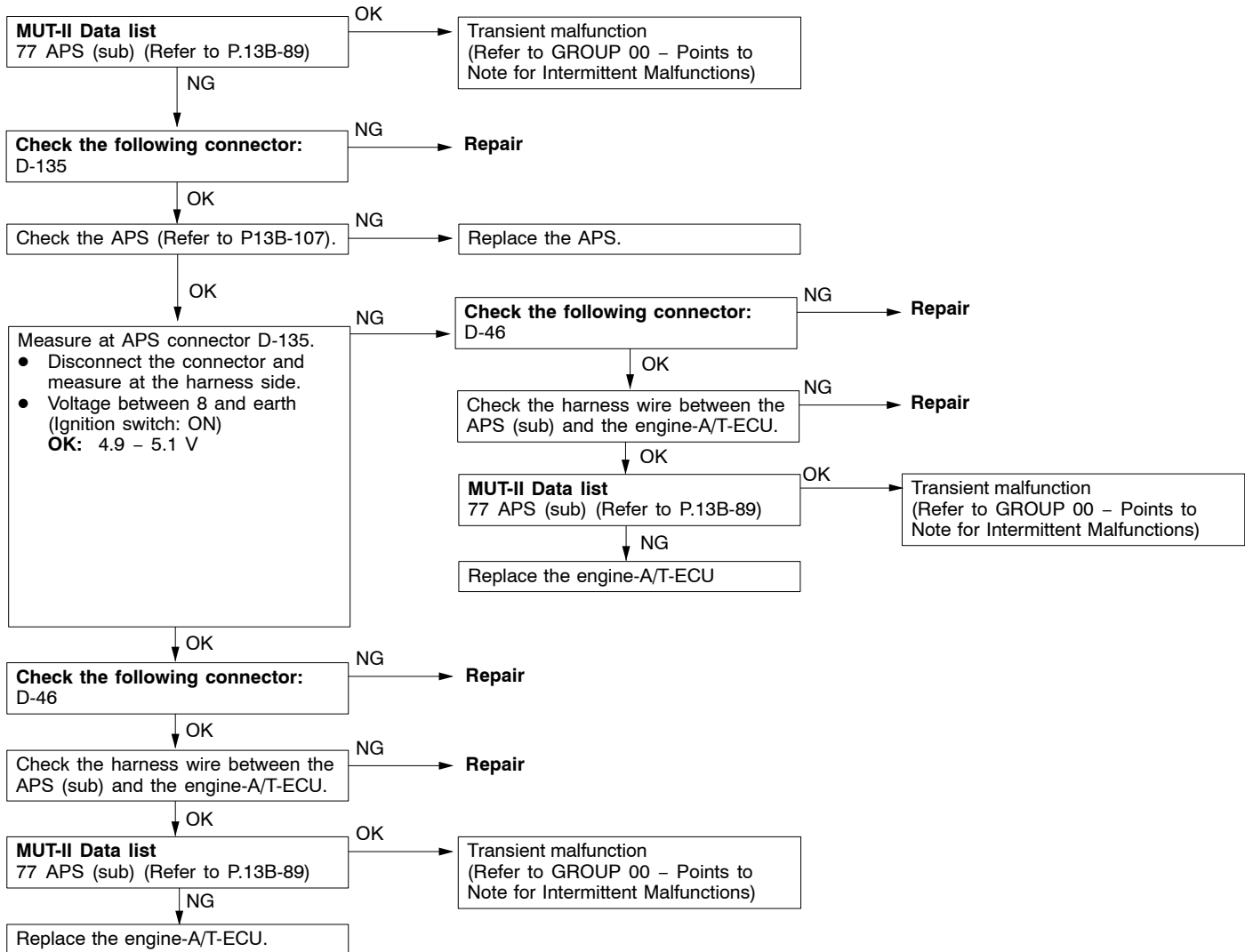
Code No. P2123 Accelerator pedal position sensor (main) circuit high input	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Ignition switch: ON APS (sub) output voltage : 0.2 – 2.5 V <p>Set conditions</p> <ul style="list-style-type: none"> The APS (main) output voltage remains 4.5 V or more for one second. 	<ul style="list-style-type: none"> Malfunction of APS Open or short circuit in the APS (main) circuit or loose connector contact Malfunction of the engine-A/T-ECU



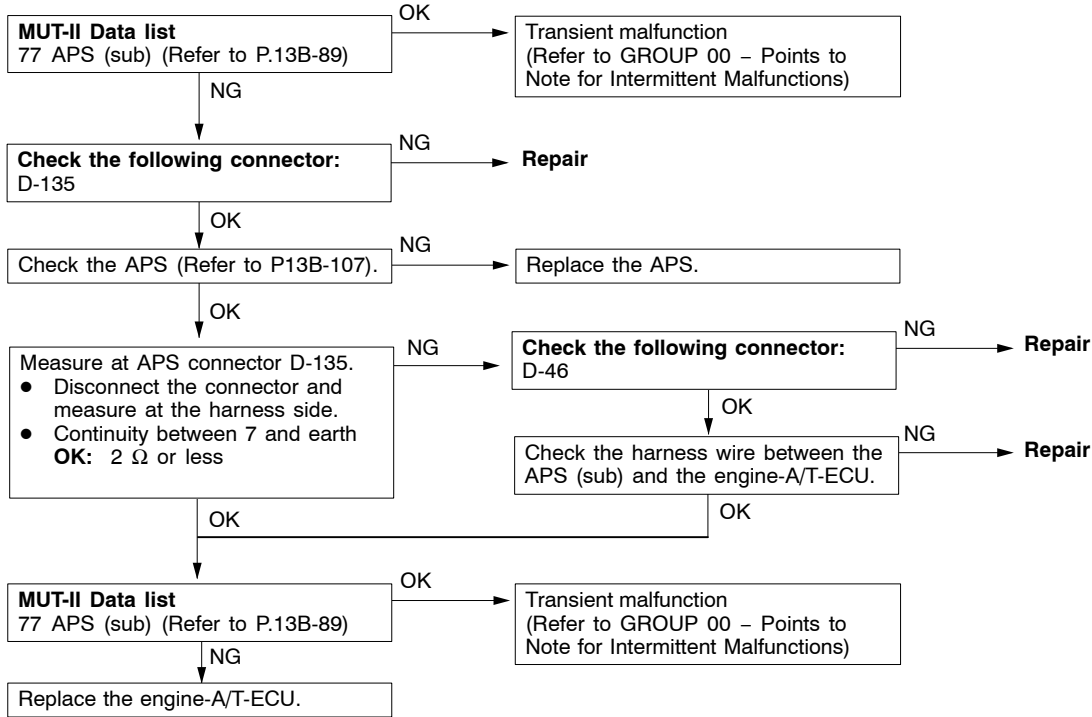
Code No. P2126 Accelerator pedal position sensor (sub) circuit range/performance problem	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Ignition switch: ON Accelerator position switch: ON The APS (main) is being judged to be defective. <p>Set conditions</p> <ul style="list-style-type: none"> The APS (sub) output voltage remains 2.5 V or more for 1 second 	<ul style="list-style-type: none"> Malfunction of APS Open or short circuit in the APS (main) circuit or loose connector contact Malfunction of the accelerator pedal position switch Short circuit in the accelerator pedal position switch circuit or loose connector contact Malfunction of the engine-A/T-ECU



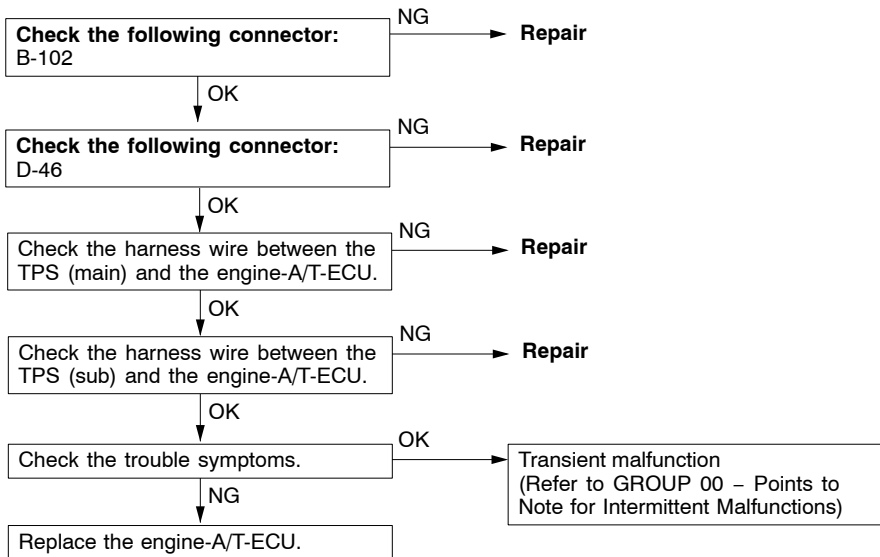
Code No. P2127 Accelerator pedal position sensor (sub) circuit low input	Probable cause
Range of Check • Ignition switch: ON Set conditions • The APS (sub) output voltage remains 0.2 V or less for 1 second.	• Malfunction of APS • Open or short circuit in the APS (sub) circuit or loose connector contact • Malfunction of the engine-A/T-ECU



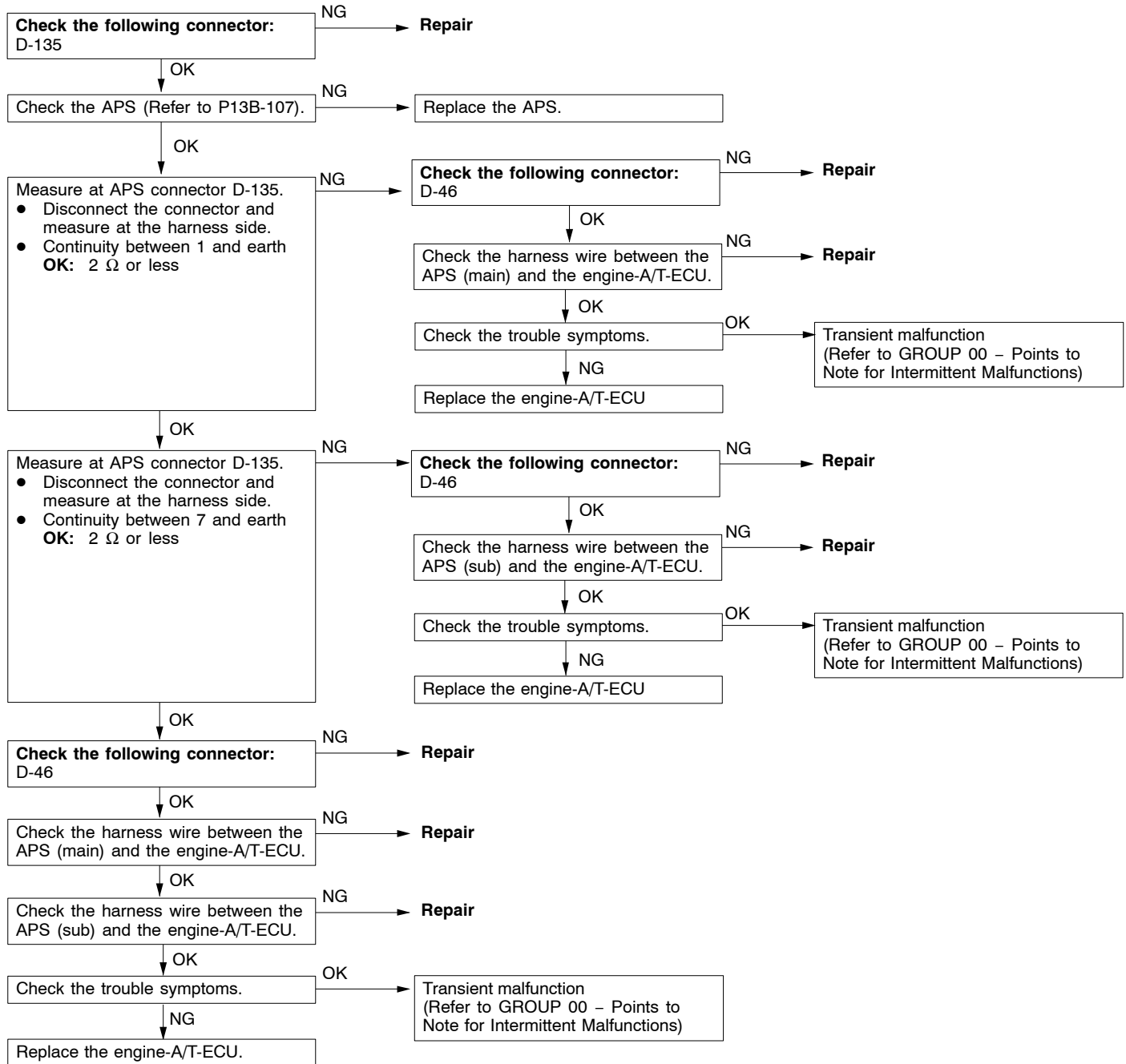
Code No. P2128 Accelerator pedal position sensor (sub) circuit high input	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Ignition switch: ON APS (main) output voltage : 0.2 – 2.5 V <p>Set conditions</p> <ul style="list-style-type: none"> The APS (sub) output voltage remains 4.5 V or more for 1 second. 	<ul style="list-style-type: none"> Malfunction of APS Open or short circuit in the APS (sub) circuit or loose connector contact Malfunction of the engine-A/T-ECU



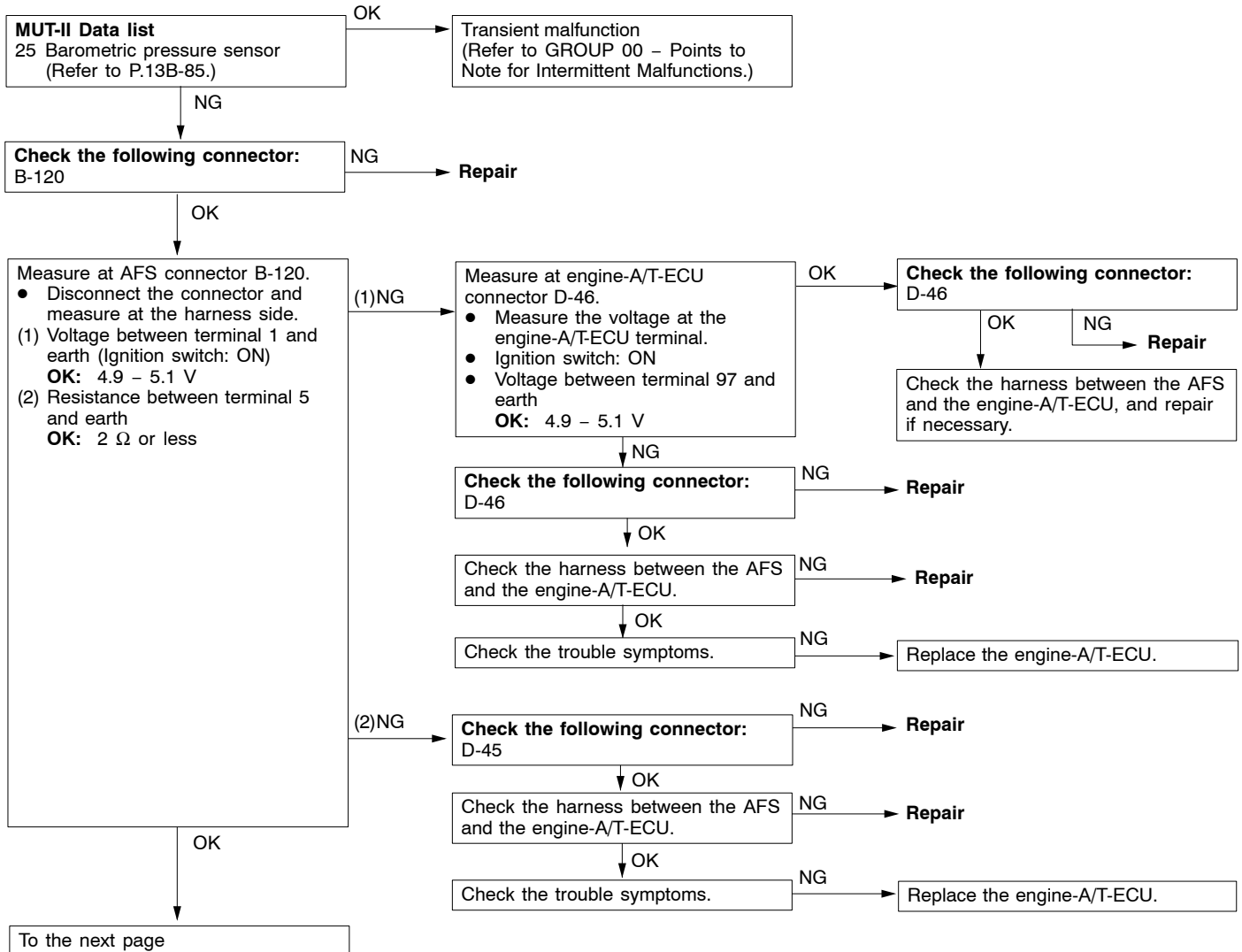
Code No. P2135 Throttle position sensor (main and sub) range/performance problem	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Ignition switch: ON TPS (main) output voltage: 0.35 – 2.5 V TPS (sub) output voltage: 2.25 – 4.8 V <p>Set Conditions</p> <ul style="list-style-type: none"> The voltage, which is calculated according to the formula below, remains 0.3 V or more for 0.5 second. 	<ul style="list-style-type: none"> Malfunction of TPS Short circuit in the TPS (main) circuit or loose connector contact Malfunction of the engine-A/T-ECU

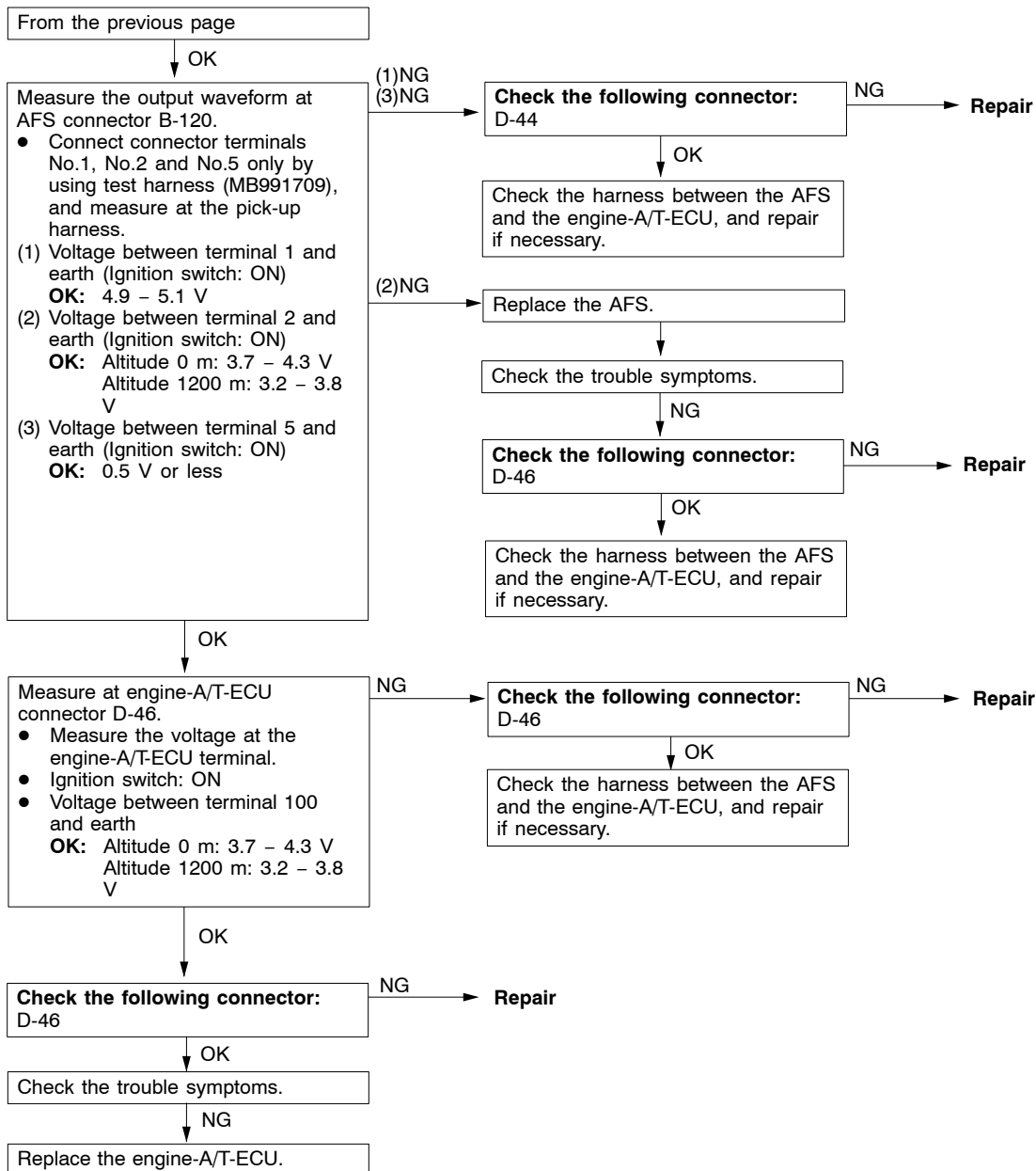


Code No. P2138 Accelerator pedal position sensor (main and sub) range/performance problem	Probable cause
Range of Check <ul style="list-style-type: none"> Ignition switch: ON APS (main) output voltage : 0.5 – 4.5 V APS (sub) output voltage : 0.5 – 4.5 V Set conditions <ul style="list-style-type: none"> When the APS (main) output voltage is subtracted from the APS (sub) output voltage, the calculated voltage remains 1 V or more for one second. When the APS (sub) output voltage is subtracted from the APS (main) output voltage, the calculated voltage remains 1 V or more for 0.2 second. 	<ul style="list-style-type: none"> Malfunction of APS Short circuit in the APS circuit or loose connector contact Malfunction of the engine-A/T-ECU



Code No. P0105 Barometric pressure circuit malfunction	Probable cause
<p>Range of Check</p> <ul style="list-style-type: none"> Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. Battery voltage: 8 V or more <p>Set Conditions</p> <ul style="list-style-type: none"> The barometric sensor output voltage is 4.5 V or more for two seconds (equivalent to 114 kPa or more of barometric pressure) <p>or</p> <ul style="list-style-type: none"> The barometric sensor output voltage is 0.2 V or less (equivalent to 50 kPa or less of barometric pressure) 	<ul style="list-style-type: none"> Malfunction of barometric pressure sensor Open or short circuit in barometric pressure sensor circuit or loose connector contact Malfunction of engine-A/T-ECU



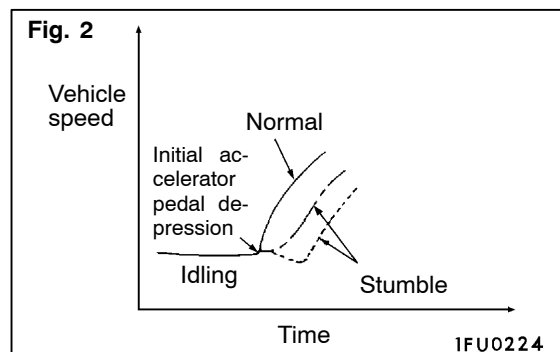
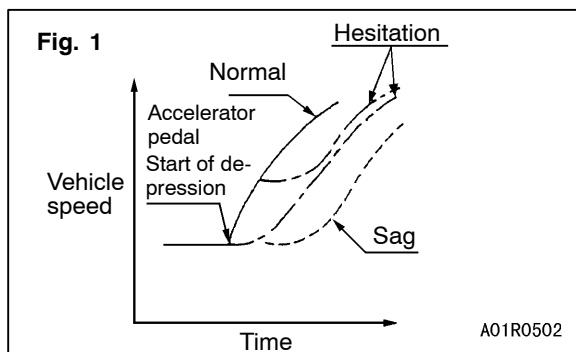


INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13B-41
	Communication with engine-A/T-ECU only is not possible.	2	13B-41
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	13B-42
	The engine warning lamp remains illuminating and never goes out.	4	13B-43
Starting	No initial combustion (starting impossible)	5	13B-43
	Initial combustion but no complete combustion (starting impossible)	6	13B-44
	Long time to start (improper starting)	7	13B-45
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	8	13B-46
	Idling speed is high. (Improper idling speed)	9	13B-47
	Idling speed is low. (Improper idling speed)	10	13B-47
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	11	13B-48
	When the engine becomes hot, it stalls at idling. (Die out)	12	13B-49
	The engine stalls when starting the car. (Pass out)	13	13B-50
	The engine stalls when decelerating.	14	13B-50
Driving	Hesitation, sag or stumble	15	13B-51
	The feeling of impact or vibration when accelerating	16	13B-51
	The feeling of impact or vibration when decelerating	17	13B-52
	Surge	18	13B-52
	Knocking <Vehicles except for Taiwan>	19	13B-52
	Knocking <Vehicles for Taiwan>	20	13B-53
Dieseling		21	13B-53
Too high CO and HC concentration when idling		22	13B-54
Idling speed is improper when A/C is operating		23	13B-55
A/C condenser fan is inoperative		24	13B-56

PROBLEM SYMPTOMS TABLE (FOR YOUR INFORMATION)

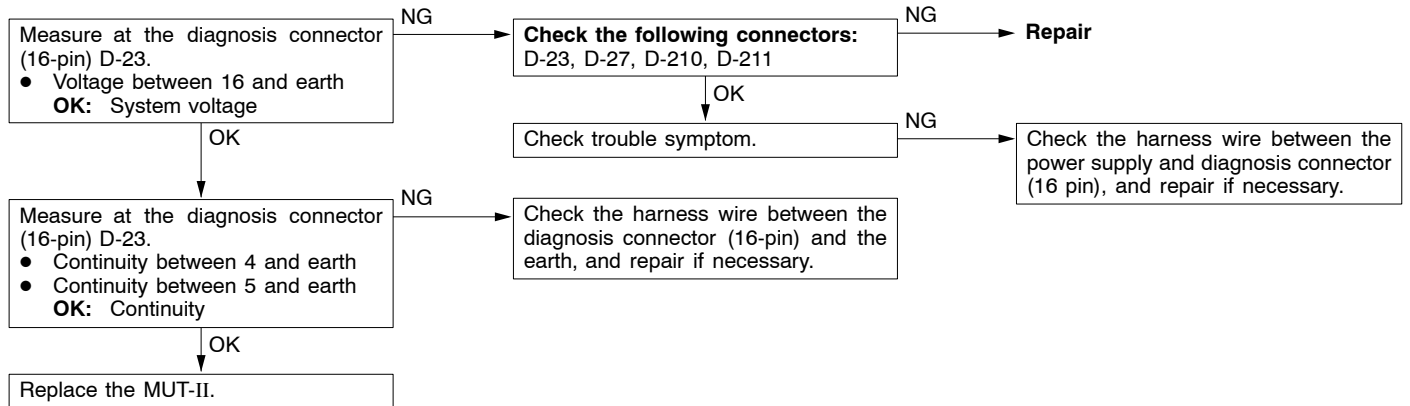
Item		Symptom
Starting	Won't start	The starter is used to crank the engine, but there is no combustion within the cylinders, and the engine won't start.
	Fires up and dies	There is combustion within the cylinders, but then the engine soon stalls.
	Hard starting	Engine starts after cranking a while.
Idling stability	Hunting	Engine speed doesn't remain constant; changes at idle.
	Rough idle	Usually, a judgement can be based upon the movement of the tachometer pointer, and the vibration transmitted to the steering wheel, shift lever, body, etc. This is called rough idle.
	Incorrect idle speed	The engine doesn't idle at the usual correct speed.
	Engine stall (Die out)	The engine stalls when the foot is taken from the accelerator pedal, regardless of whether the vehicles is moving or not.
	Engine stall (Pass out)	The engine stalls when the accelerator pedal is depressed or while it is being used.
Driving	Hesitation Sag	"Hesitation" is the delay in response of the vehicle speed (engine speed) that occurs when the accelerator is depressed in order to accelerate from the speed at which the vehicle is now traveling, or a temporary drop in vehicle speed (engine speed) during such acceleration. Serious hesitation is called "sag". (See figure 1.)
	Stumble	Engine speed increase is delayed when the accelerator pedal is initially depressed for acceleration. (See figure 2.)
	Shock	The feeling of a comparatively large impact or vibration when the engine is accelerated or decelerated.
	Surge	This is repeated surging ahead during constant speed travel or during variable speed travel.
	Knocking	A sharp sound like a hammer striking the cylinder walls during driving and which adversely affects driving.
Stopping	Run on ("Dieseling")	The condition in which the engine continues to run after the ignition switch is turned to OFF. Also called "Dieseling".



INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

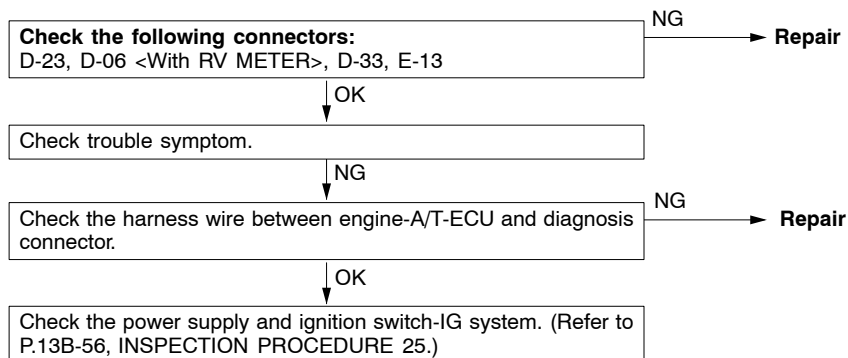
INSPECTION PROCEDURE 1

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.	<ul style="list-style-type: none"> • Malfunction of the connector • Malfunction of the harness wire • Malfunction of the MUT-II



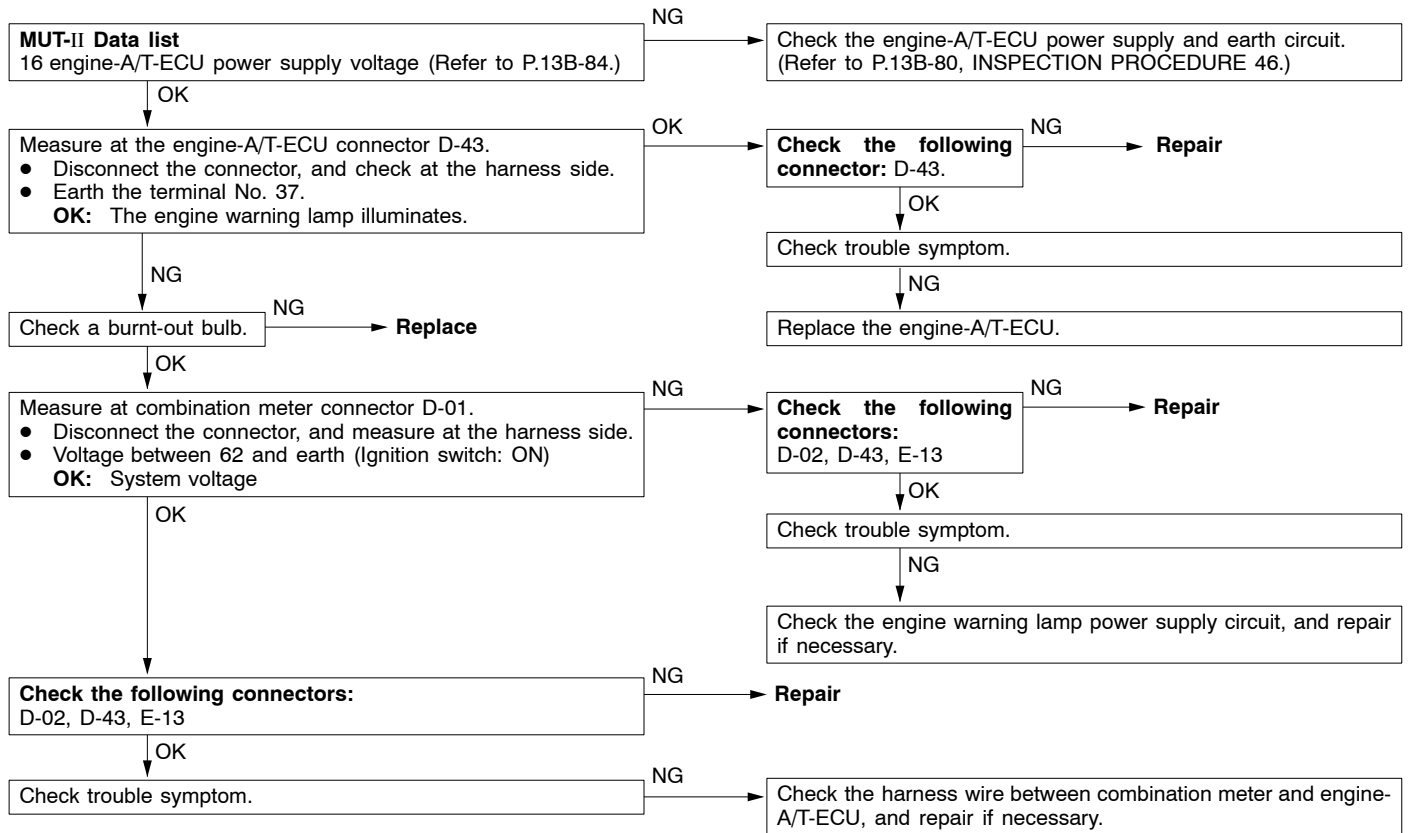
INSPECTION PROCEDURE 2

MUT-II communication with engine-A/T-ECU is not possible.	Probable cause
One of the following causes may be suspected. <ul style="list-style-type: none"> • No power supply to engine-A/T-ECU. • Defective earth circuit of engine-A/T-ECU. • Defective engine-A/T-ECU. • Improper communication line between engine-A/T-ECU and MUT-II 	<ul style="list-style-type: none"> • Malfunction of engine-A/T-ECU power supply circuit • Malfunction of engine-A/T-ECU • Open circuit between the engine-A/T-ECU and diagnosis connector



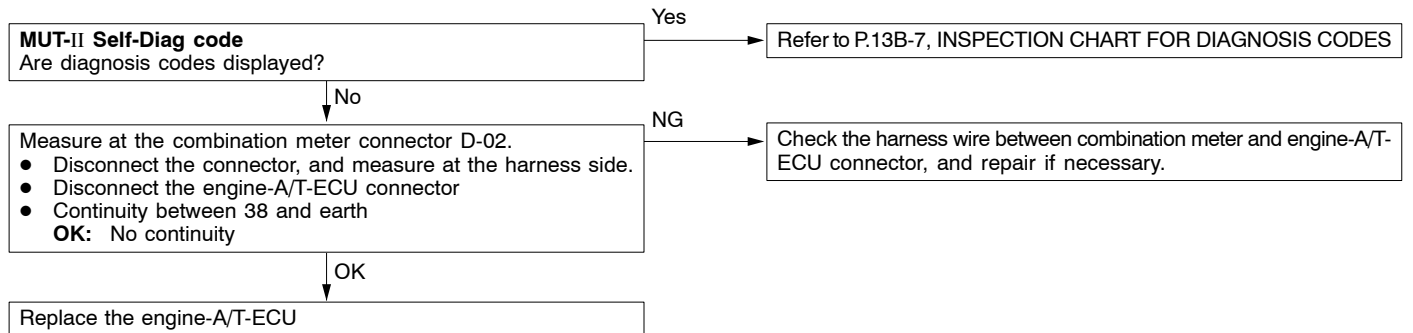
INSPECTION PROCEDURE 3

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-A/T-ECU 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.	<ul style="list-style-type: none"> • Burnt-out bulb • Defective warning lamp circuit • Malfunction of the engine-A/T-ECU



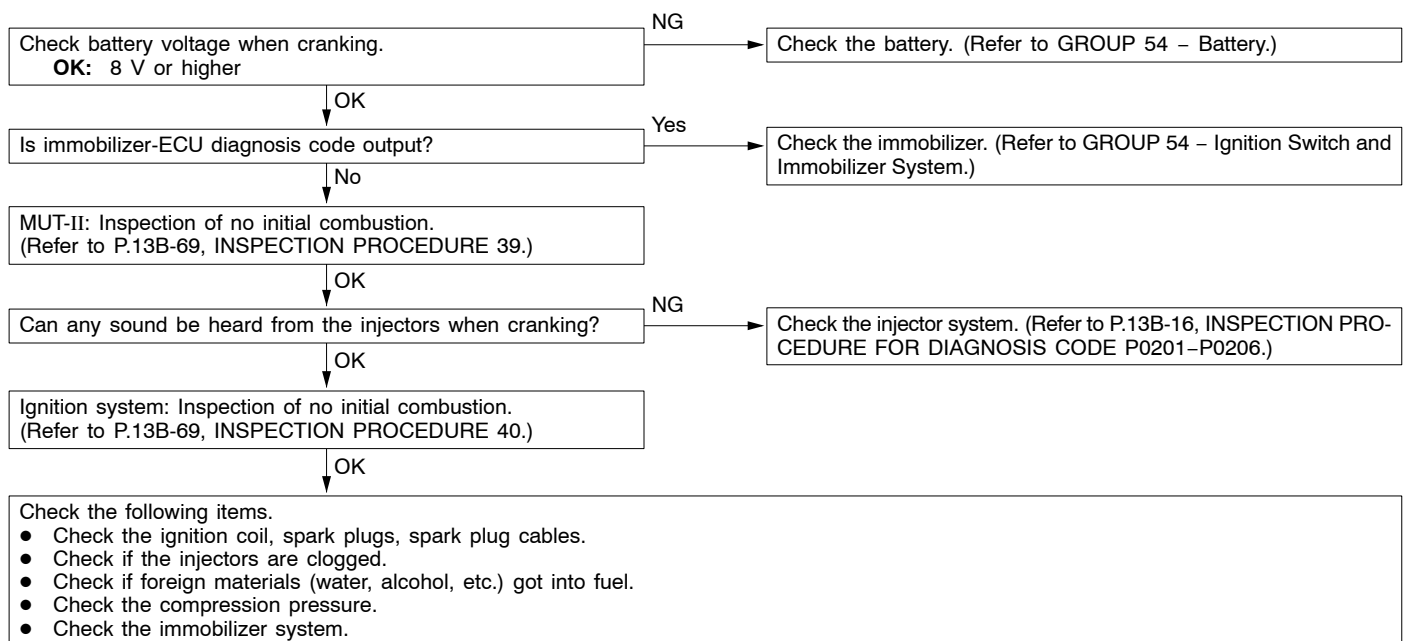
INSPECTION PROCEDURE 4

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-A/T-ECU is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has occurred.	<ul style="list-style-type: none"> Short-circuit between the engine warning lamp and engine-A/T-ECU Malfunction of the engine-A/T-ECU



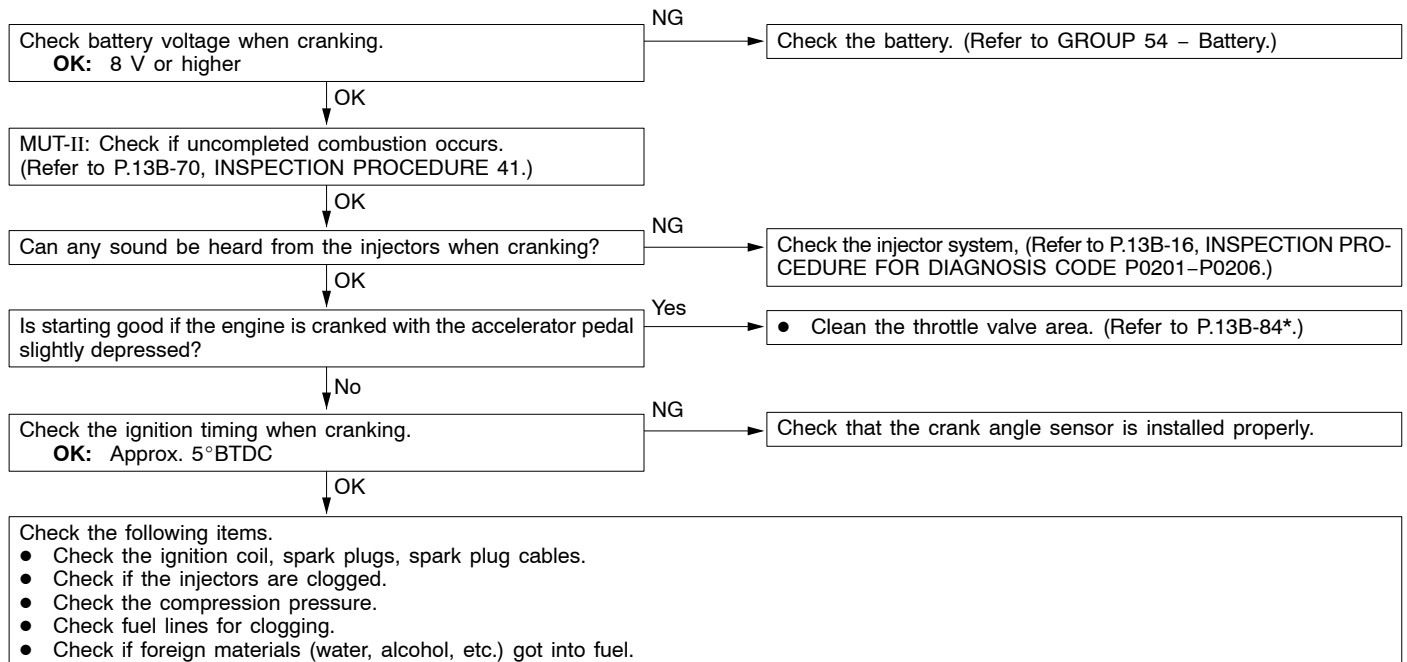
INSPECTION PROCEDURE 5

No initial combustion (starting impossible)	Probable cause
In cases such as the above, the cause is probably that a spark plug is defective, or that the supply of fuel to the combustion chamber is defective. In addition, foreign materials (water, kerosene, etc.) may be mixed with the fuel.	<ul style="list-style-type: none"> Malfunction of the ignition system Malfunction of the fuel pump system Malfunction of the injectors Malfunction of the engine-A/T-ECU Malfunction of the immobilizer system Foreign materials in fuel



INSPECTION PROCEDURE 6

Initial combustion but no complete combustion (starting impossible)	Probable cause
In such cases as the above, the cause is probably that the spark plugs are generating sparks but the sparks are weak, or the initial mixture for starting is not appropriate.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of the injector system • Foreign materials in fuel • Poor compression • Malfunction of the electronic-controlled throttle valve system • Malfunction of the engine-A/T-ECU

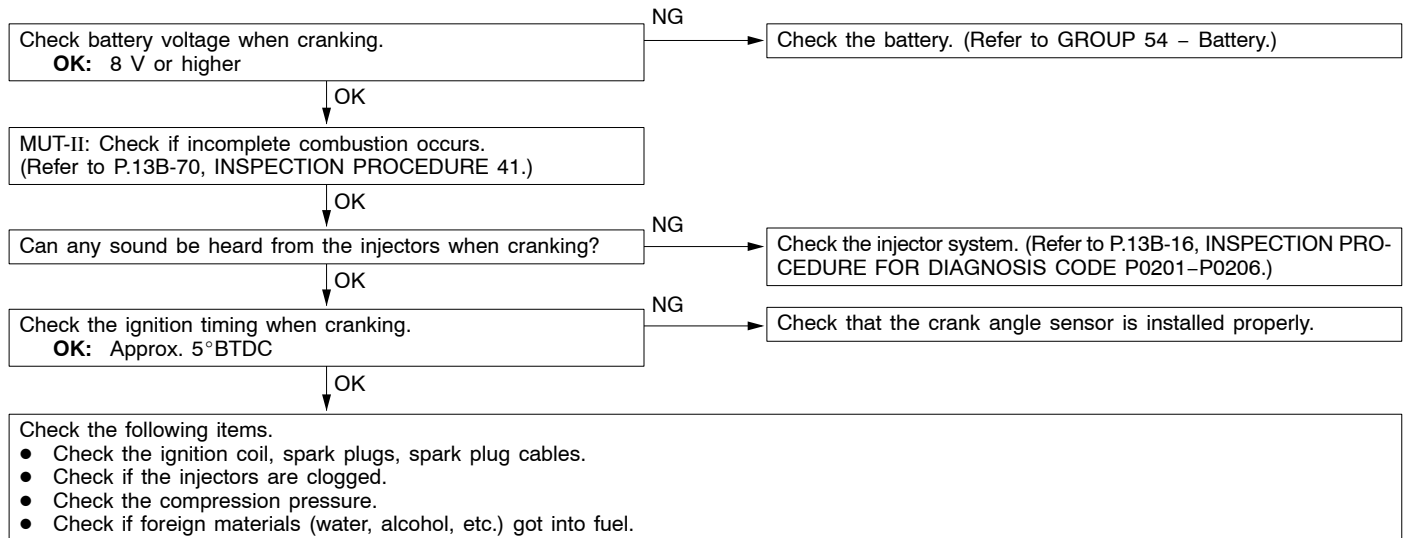


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

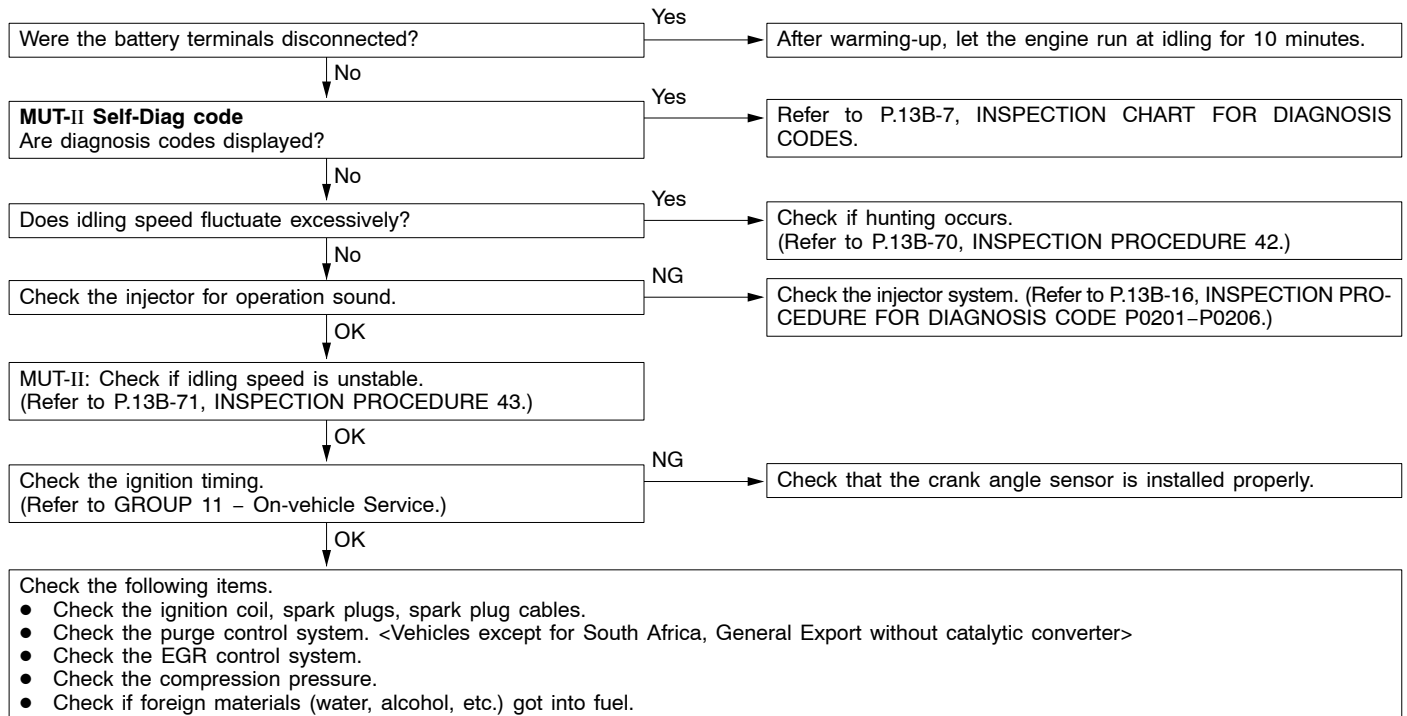
INSPECTION PROCEDURE 7

It takes too long time to start. (Improper starting)	Probable cause
In cases such as the above, the cause is probably that the spark is weak and ignition is difficult, the initial mixture for starting is not appropriate, or sufficient compression pressure is not being obtained.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of the injector system • Inappropriate gasoline use • Malfunction of the electronic-controlled throttle valve system • Poor compression



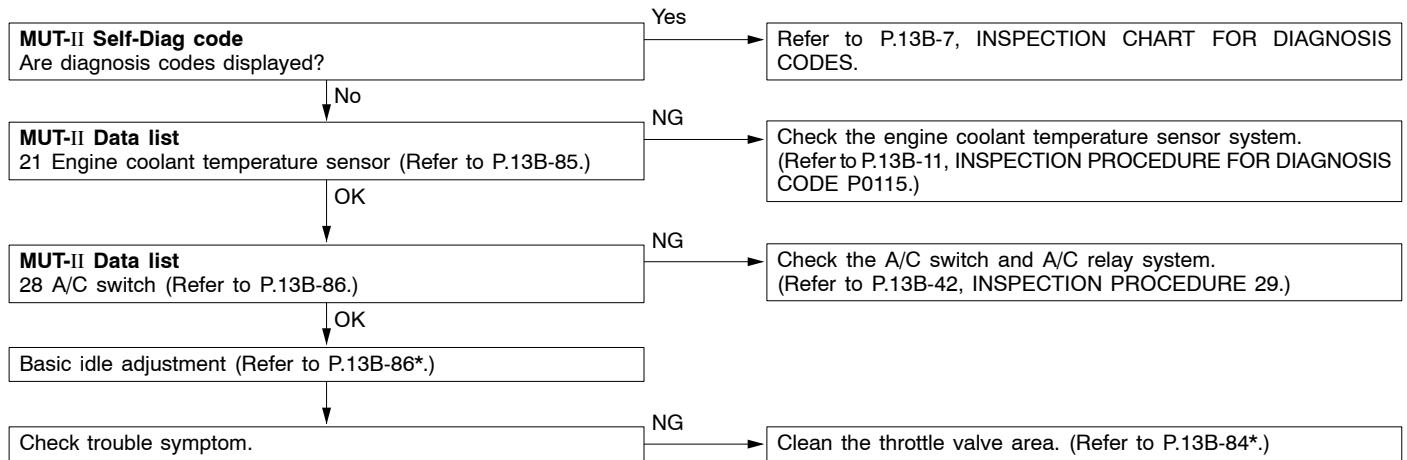
INSPECTION PROCEDURE 8

Unstable idling (Rough idling, hunting)	Probable cause
In cases as the above, the cause is probably that the ignition system, air/fuel mixture, compression pressure is defective. Because the range of possible causes is broad, inspection is narrowed down to simple items.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of air-fuel ratio control system • Malfunction of the purge control solenoid valve system <Vehicles except for South Africa, General Export without catalytic converter> • Malfunction of the EGR control system • Poor compression • Malfunction of the electronic-controlled throttle valve system • Drawing air into exhaust system



INSPECTION PROCEDURE 9

Idling speed is high. (Improper idling speed)	Probable cause
In such cases as the above, the cause is probably that the intake air volume during idling is too great.	<ul style="list-style-type: none"> Malfunction of the electronic control throttle valve system Malfunction of the throttle body

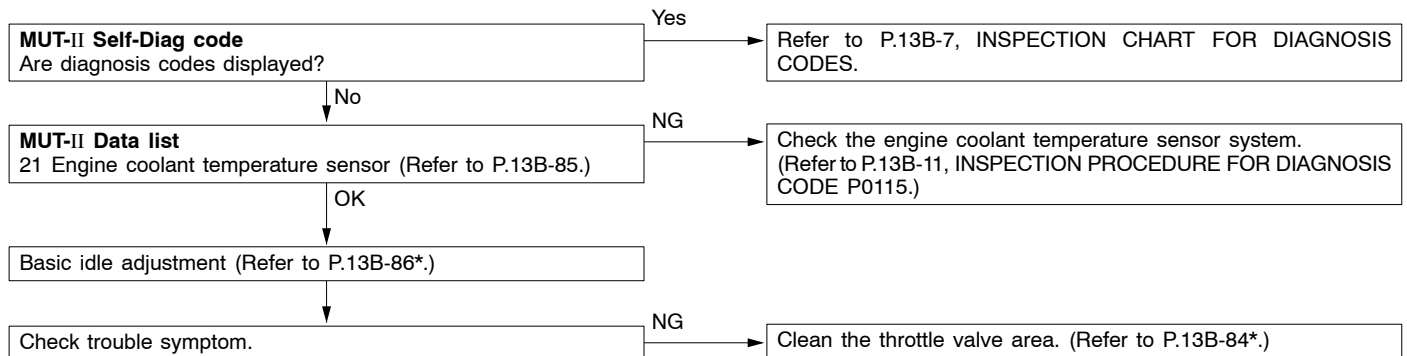


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 10

Idling speed is low. (Improper idling speed)	Probable cause
In cases such as the above, the cause is probably that the intake air volume during idling is too small.	<ul style="list-style-type: none"> Malfunction of the electronic control throttle valve system Malfunction of the throttle body

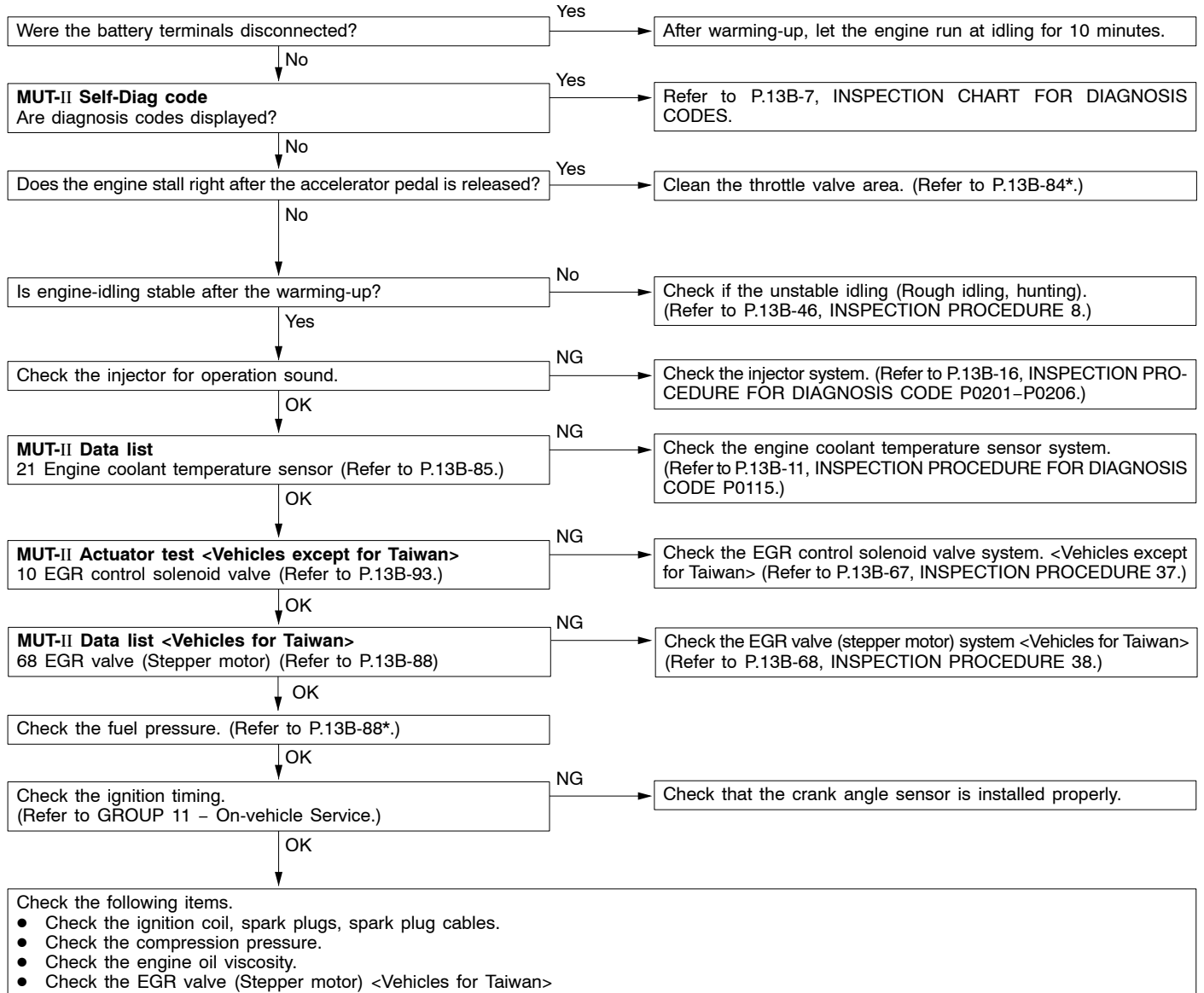


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 11

When the engine is cold, it stalls at idling. (Die out)	Probable cause
In such cases as the above, the cause is probably that the air/fuel mixture is inappropriate when the engine is cold.	<ul style="list-style-type: none"> • Malfunction of the electronic control throttle valve system • Malfunction of the throttle body • Malfunction of the injector system • Malfunction of the ignition system

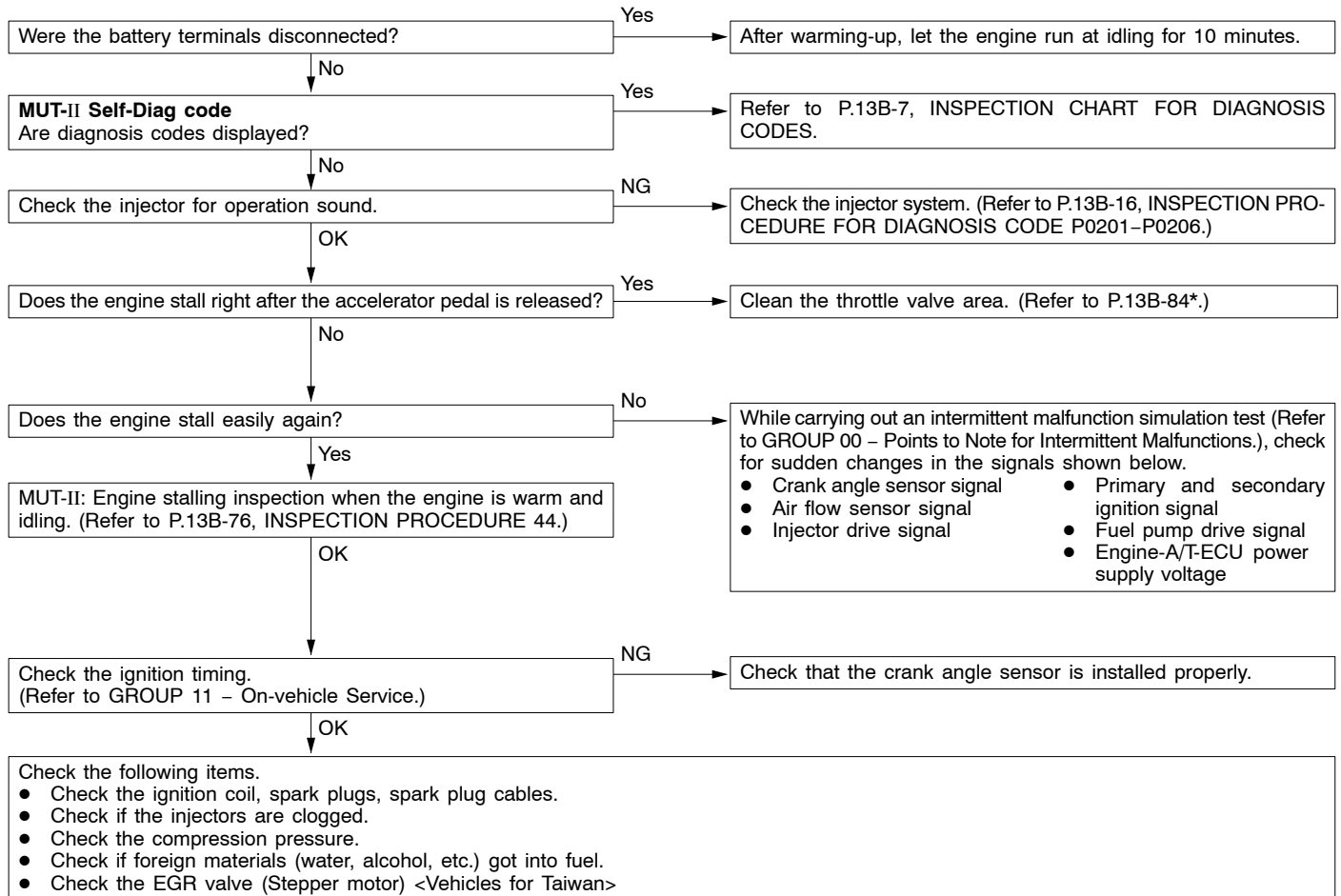


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 12

When the engine becomes hot, it stalls at idling. (Die out)	Probable cause
In such cases as the above, the cause is probably that ignition system, air/fuel mixture, electronic control throttle valve system or compression pressure is defective. In addition, if the engine suddenly stalls, the cause may also be a defective connector contact.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of air-fuel ratio control system • Malfunction of the electronic control throttle valve system • Drawing air into intake system • Improper connector contact

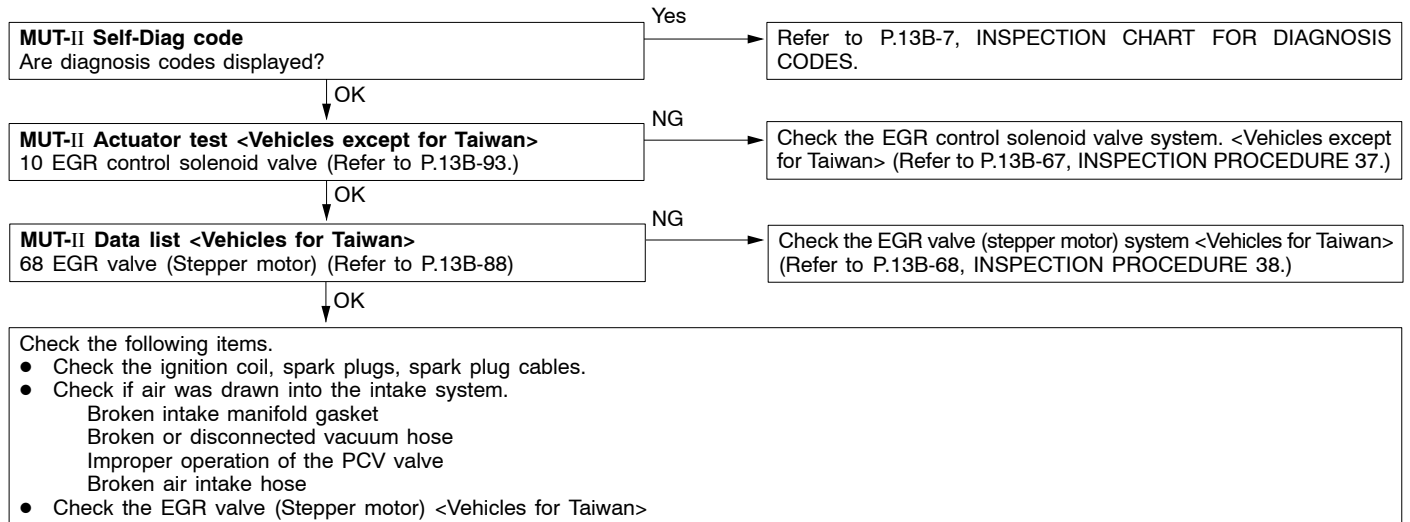


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

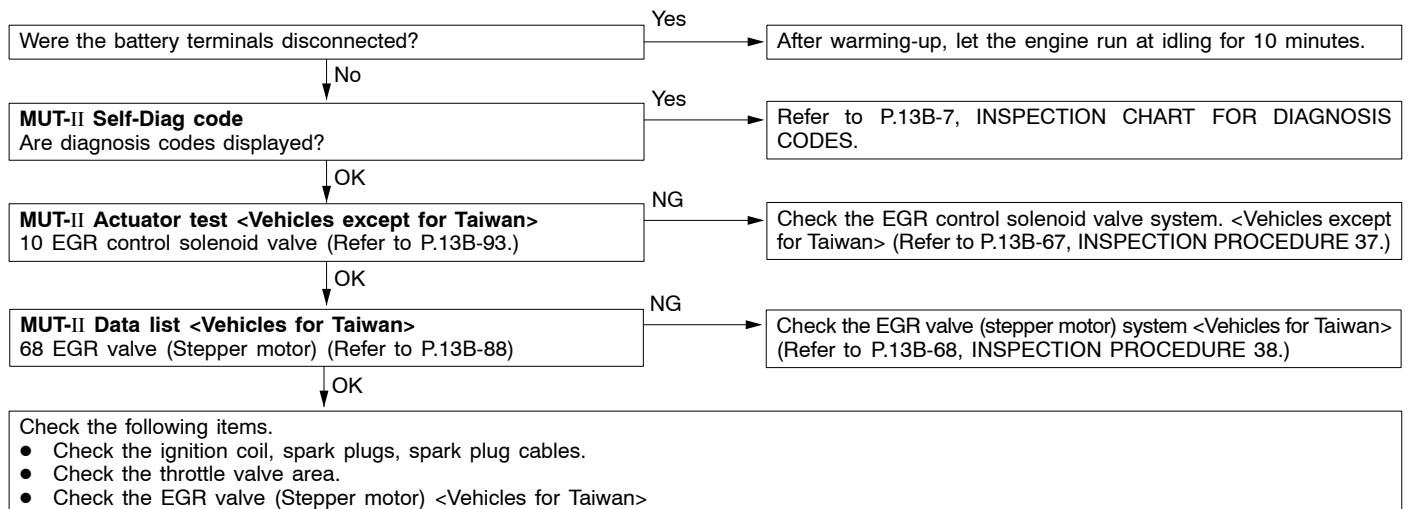
INSPECTION PROCEDURE 13

The engine stalls when starting the car. (Pass out)	Probable cause
In cases such as the above, the cause is probably misfiring due to a weak spark, or an inappropriate air/fuel mixture when the accelerator pedal is depressed.	<ul style="list-style-type: none"> Drawing air into intake system Malfunction of the ignition system



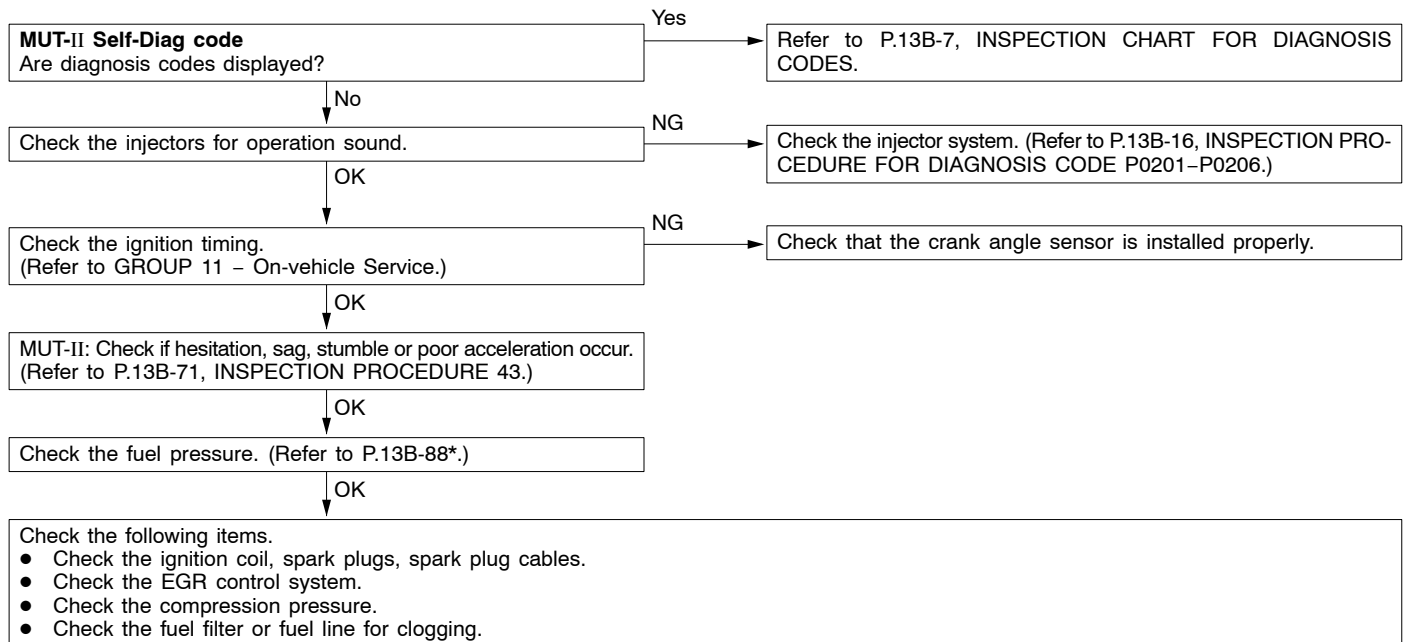
INSPECTION PROCEDURE 14

The engine stalls when decelerating.	Probable cause
In cases such as the above, the cause is probably that the intake air volume is insufficient due to a defective electronic control throttle valve system.	<ul style="list-style-type: none"> Malfunction of the electronic control throttle valve system



INSPECTION PROCEDURE 15

Hesitation, sag or stumble	Probable cause
In cases such as the above, the cause is probably that ignition system, air/fuel mixture or compression pressure is defective.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of air-fuel ratio control system • Malfunction of the fuel supply system • Malfunction of the EGR control solenoid valve system <Vehicles except for Taiwan> • Malfunction of the EGR valve (Stepper motor) system <Vehicles for Taiwan> • Poor compression

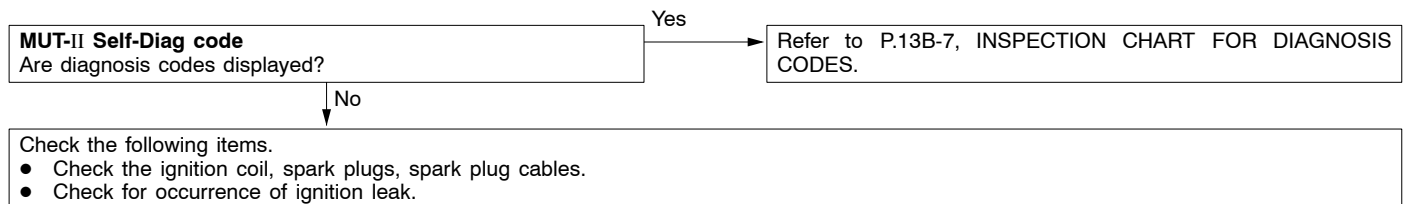


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

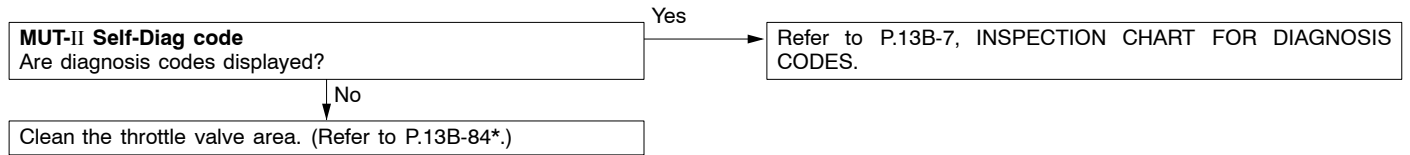
INSPECTION PROCEDURE 16

The feeling of impact or vibration when accelerating	Probable cause
There may be an ignition leak accompanying the increase in the spark plug demand voltage during acceleration or the electronic control throttle valve system failed.	<ul style="list-style-type: none"> • Malfunction of the ignition system • Malfunction of the electronic control throttle valve system



INSPECTION PROCEDURE 17

The feeling of impact or vibration when decelerating.	Probable cause
There may be a sudden change in air-flow through the throttle valve, causing the vehicle to decelerate for an instant.	<ul style="list-style-type: none"> Malfunction of the electronic control throttle valve system

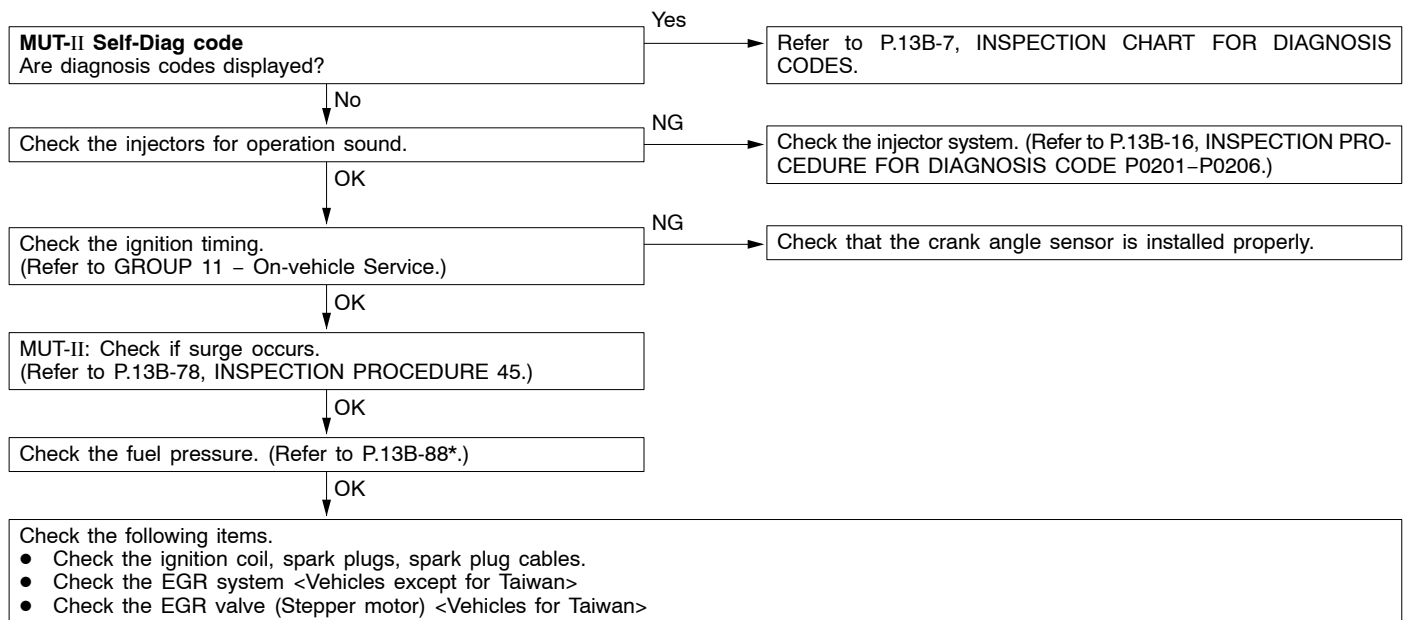


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 18

Surge	Probable cause
Defective ignition system, abnormal air-fuel ratio, etc. are suspected.	<ul style="list-style-type: none"> Malfunction of the ignition system Malfunction of air-fuel ratio control system Malfunction of the EGR control solenoid valve system <Vehicles except for Taiwan> Malfunction of the EGR valve (Stepper motor) <Vehicles for Taiwan>

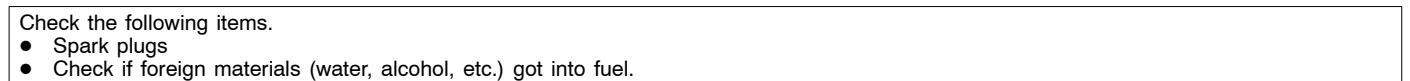


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

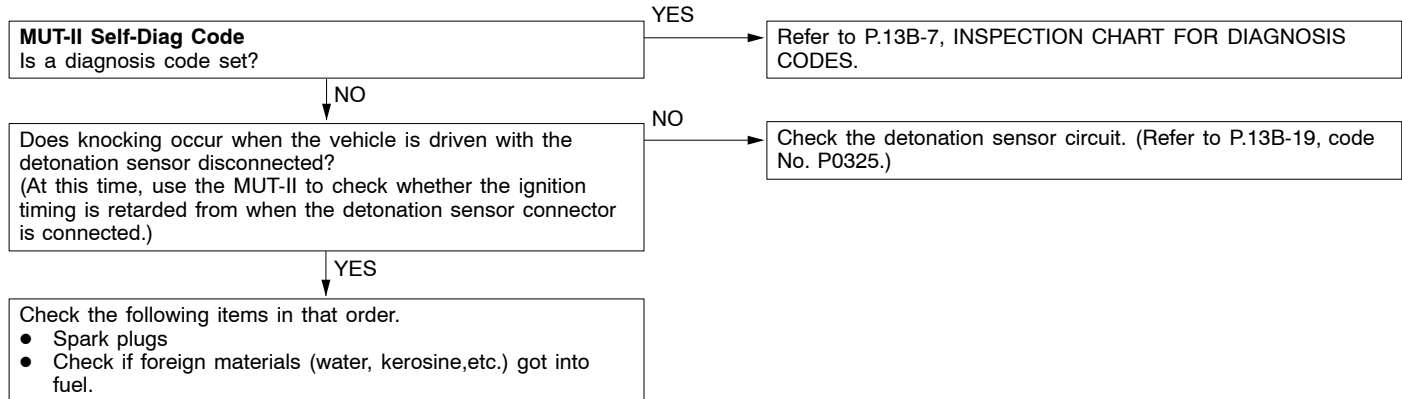
INSPECTION PROCEDURE 19

Knocking <Vehicles except for Taiwan>	Probable cause
In cases as the above, the cause is probably that the heat value of the spark plug is inappropriate.	<ul style="list-style-type: none"> Inappropriate heat value of the spark plug



INSPECTION PROCEDURE 20

Knocking <Vehicles for Taiwan>	Probable cause
In case as the above, the cause is probably that the heat value of the spark plug is inappropriate.	<ul style="list-style-type: none"> • Malfunction of the detonation sensor • Improper heat range of the spark plugs.



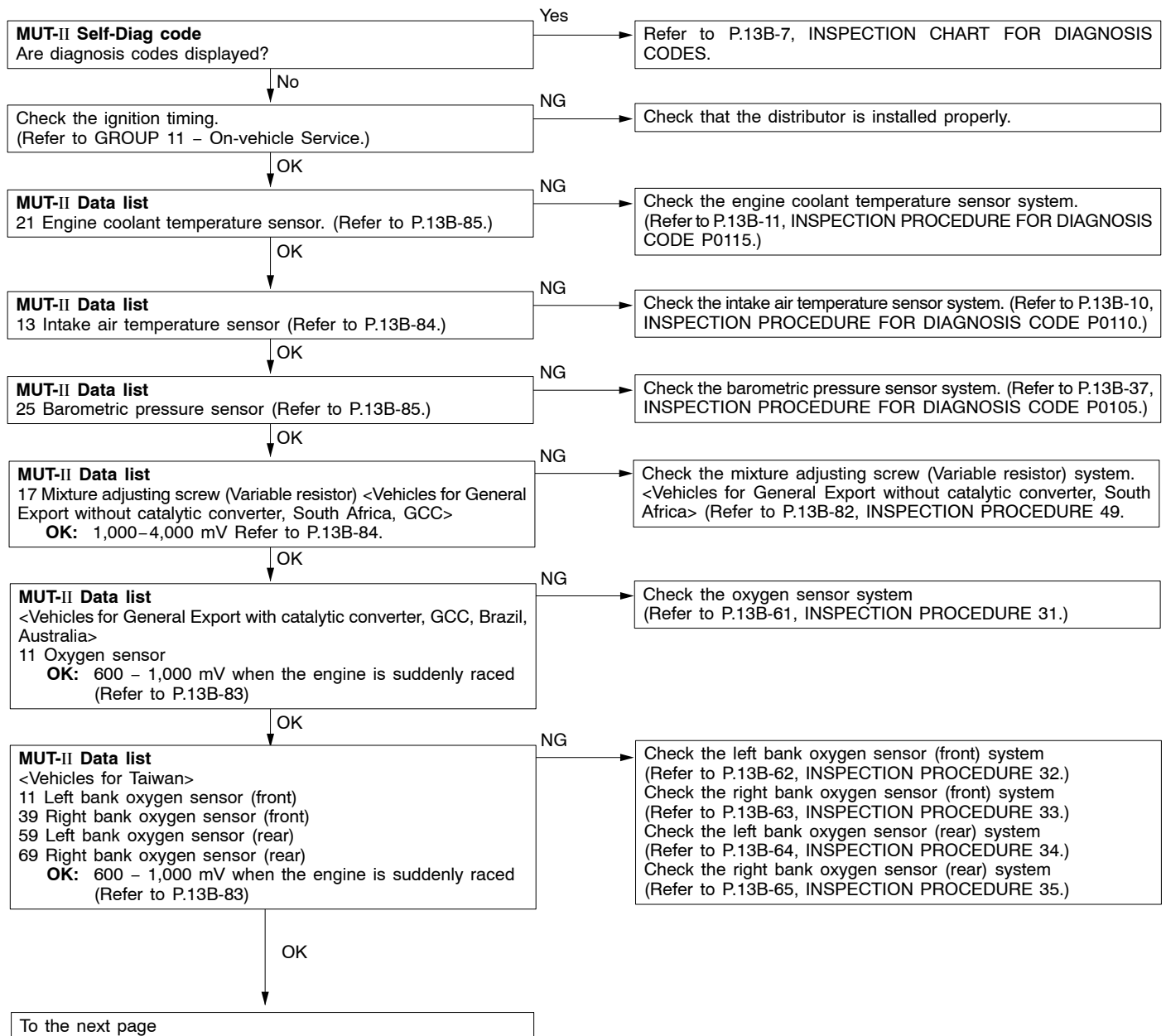
INSPECTION PROCEDURE 21

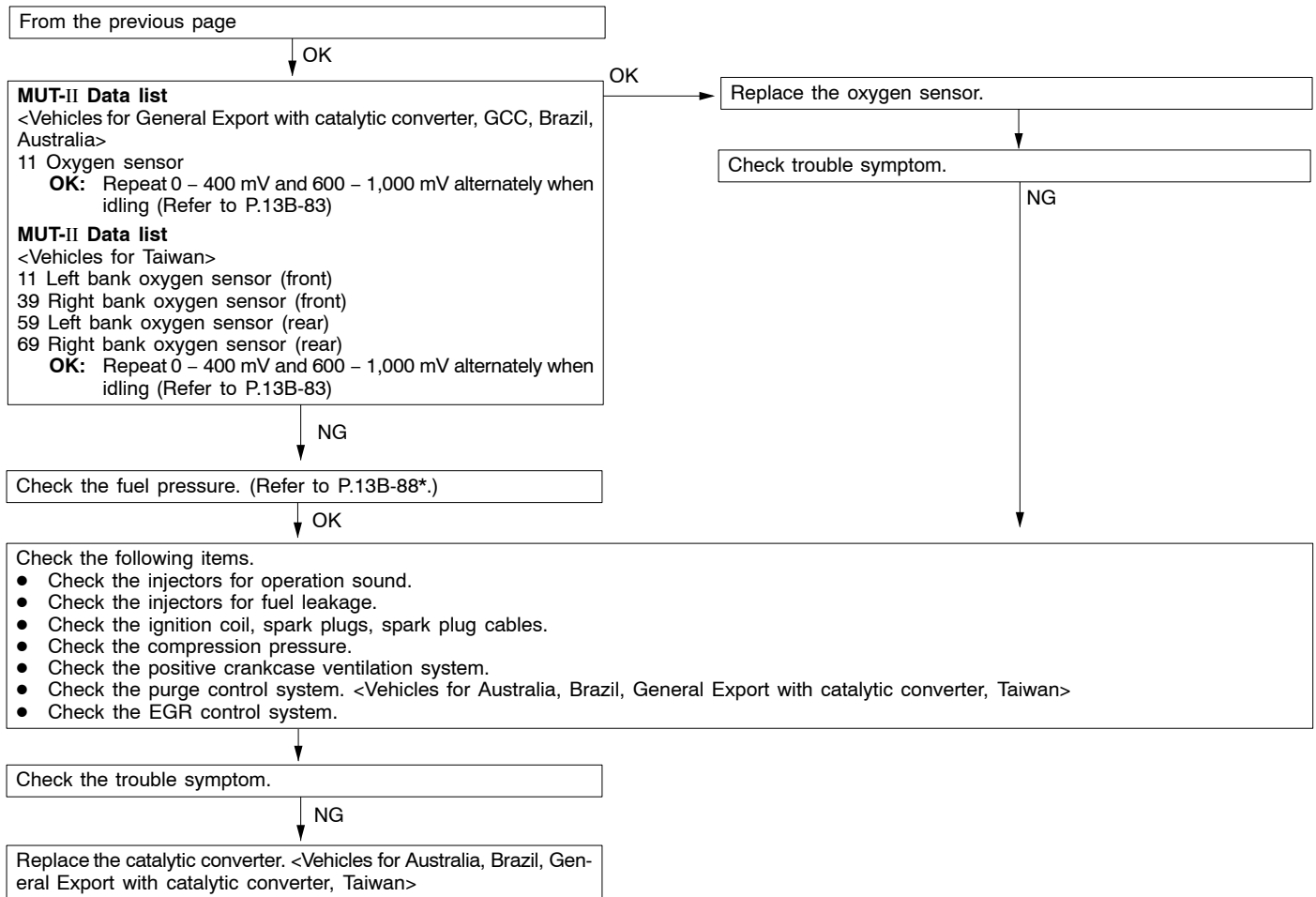
Dieseling	Probable cause
Fuel leakage from injectors is suspected.	<ul style="list-style-type: none"> • Fuel leakage from injectors

Check the injectors for fuel leakage.

INSPECTION PROCEDURE 22

Too high CO and HC concentration when idling	Probable cause
Abnormal air-fuel ratio is suspected.	<ul style="list-style-type: none"> Malfunction of the air-fuel ratio control system Deteriorated catalyst



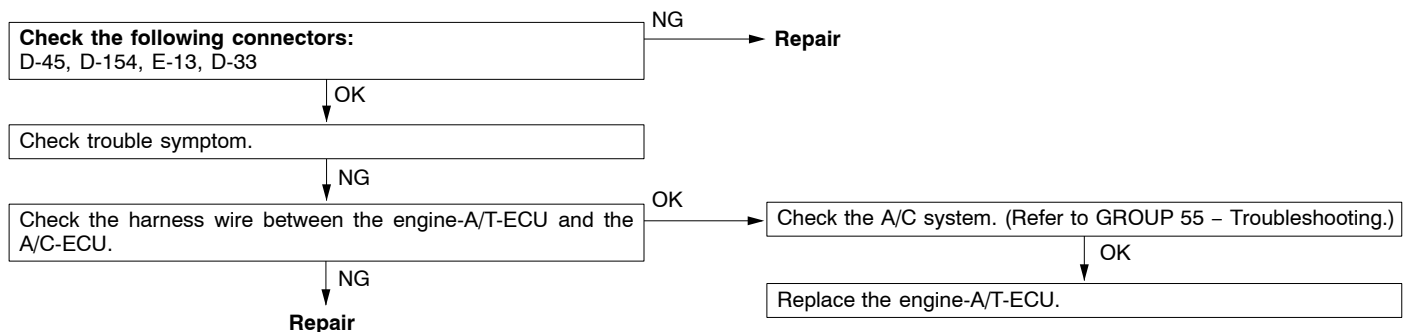


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

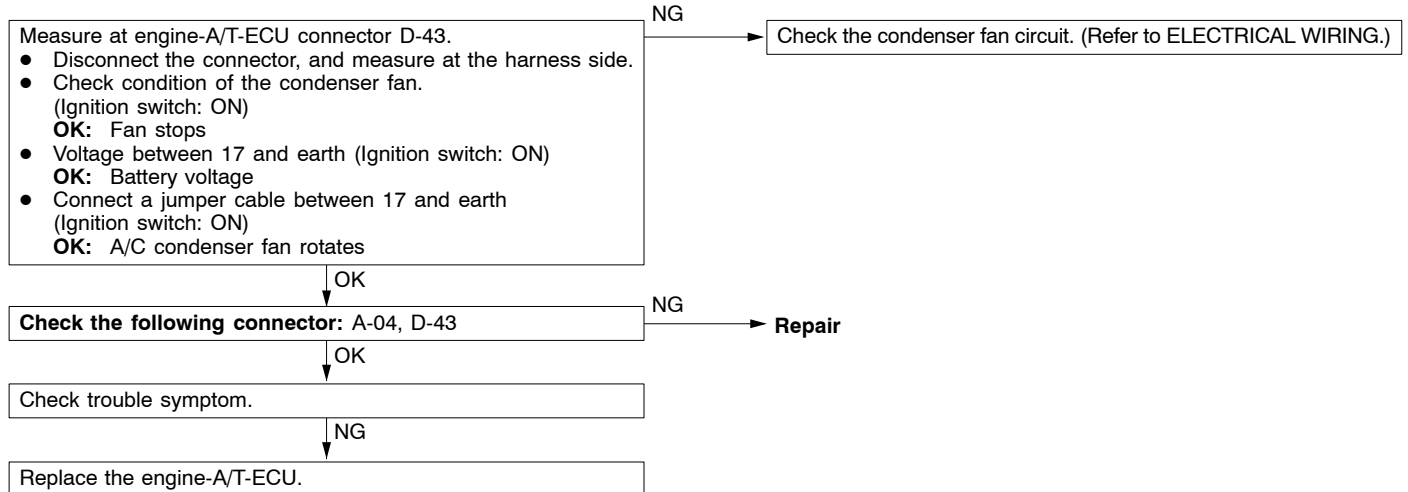
INSPECTION PROCEDURE 23

Idling speed is improper when A/C is operating (A/C load signal)	Probable cause
The A/C-ECU judges if load caused by air conditioner is high or low, and converts it to A/C load signal to send the engine-A/T-ECU it. Based on this signal, the engine-A/T-ECU operates the throttle control servo to control the idle-up speed. If the load is lower than usual, the engine-A/T-ECU decreases the idle-up speed.	<ul style="list-style-type: none"> • Malfunction of the A/C control system • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-A/T-ECU



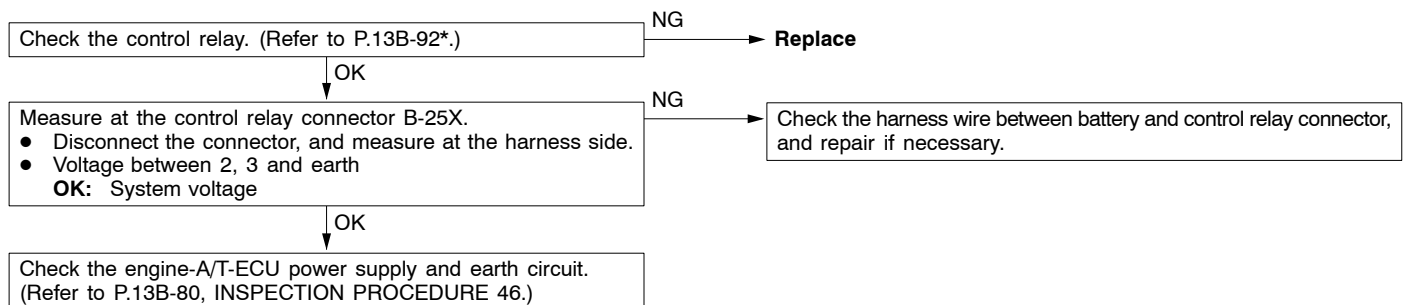
INSPECTION PROCEDURE 24

A/C condenser fan is inoperative	Probable cause
The fan motor relay is controlled by turning on and off the power transistor in the engine-A/T-ECU.	<ul style="list-style-type: none"> • Malfunction of the A/C condenser fan relay • Malfunction of the condenser fan motor • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-A/T-ECU



INSPECTION PROCEDURE 25

Power supply system and ignition switch-IG system	Probable cause
When an ignition switch ON signal is input to the engine-A/T-ECU, the engine-A/T-ECU turns the control relay ON. This causes battery voltage to be supplied to the engine-A/T-ECU, injectors and air flow sensor.	<ul style="list-style-type: none"> • Malfunction of the ignition switch • Malfunction of the control relay • Improper connector contact, open circuit or short-circuited harness wire • Disconnected engine-A/T-ECU earth wire • Malfunction of the engine-A/T-ECU

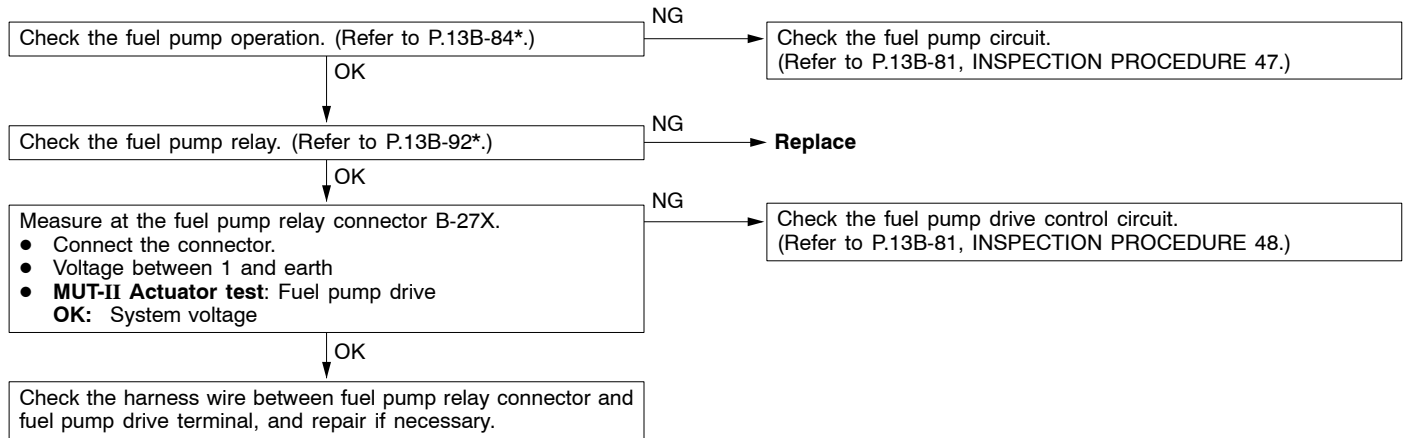


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 26

Fuel pump system	Probable cause
The engine-A/T-ECU turns the control relay ON when the engine is cranking or running, and this supplies power to drive the fuel pump.	<ul style="list-style-type: none"> • Malfunction of the fuel pump relay • Malfunction of the fuel pump • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-A/T-ECU

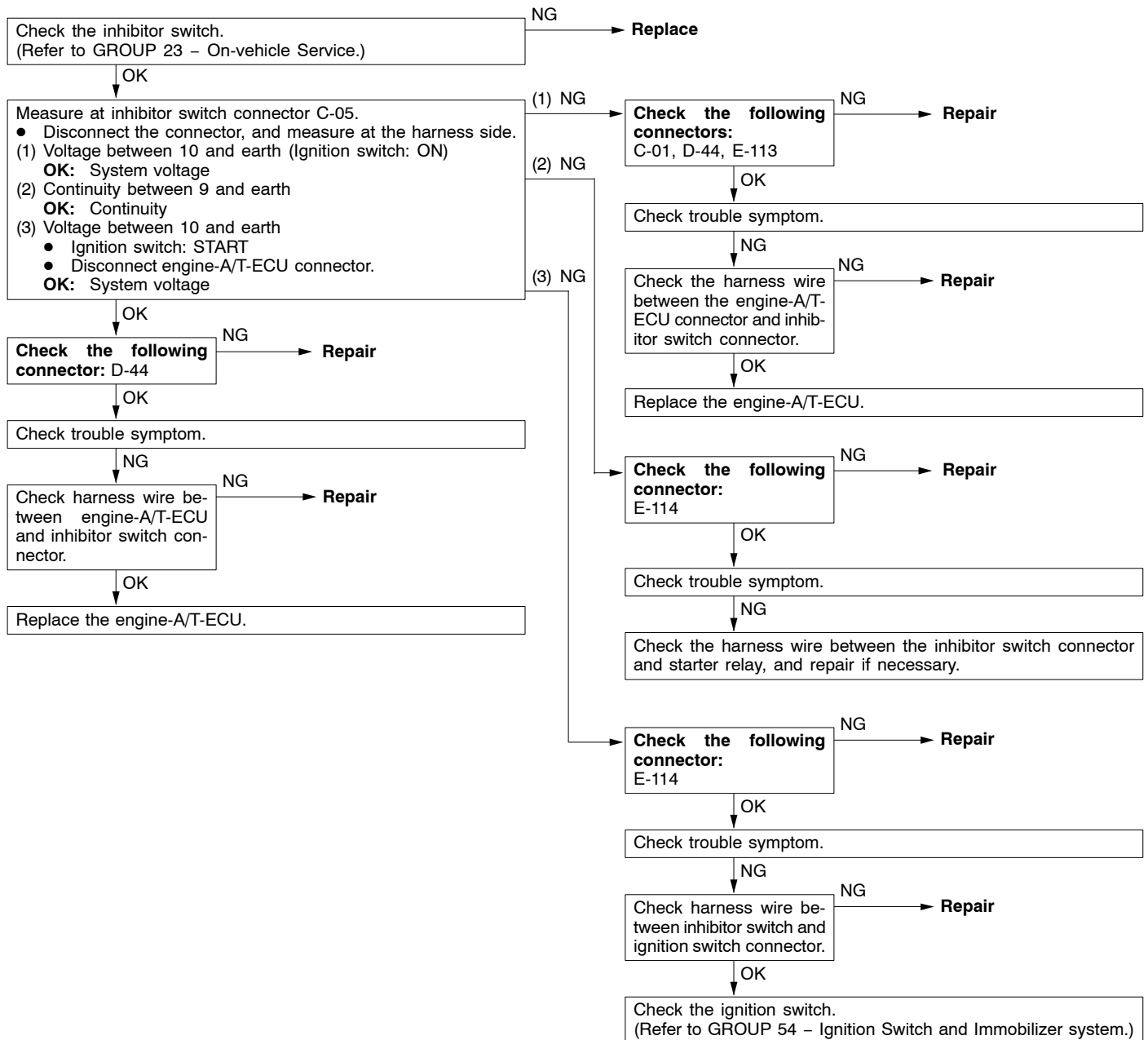


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

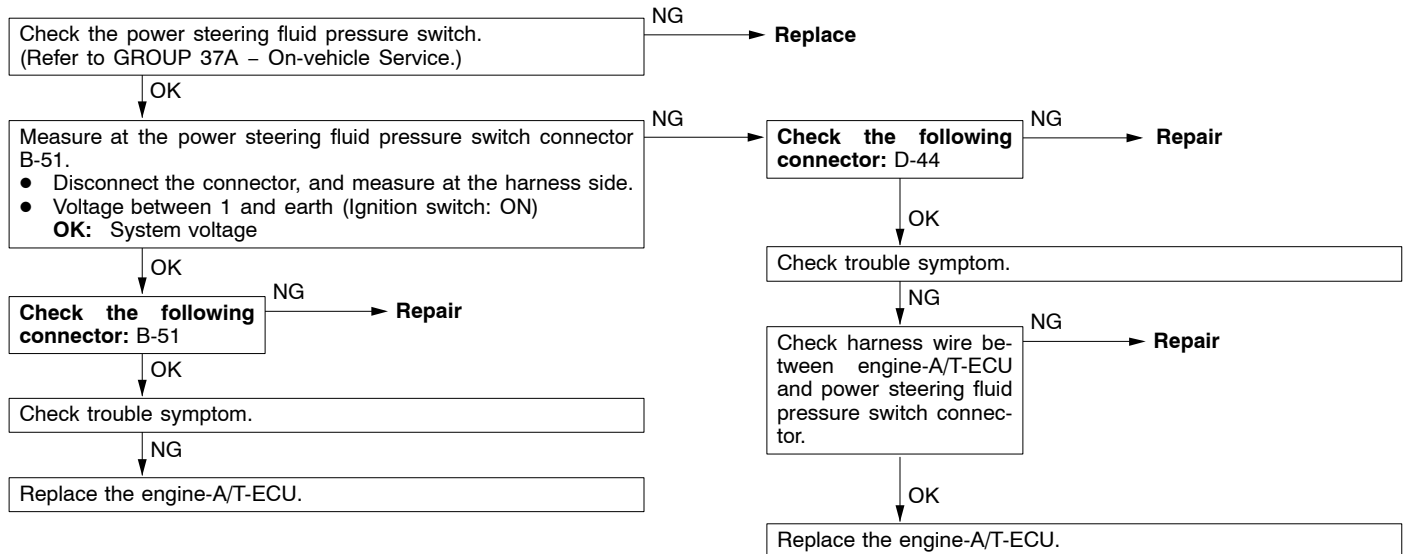
INSPECTION PROCEDURE 27

Ignition switch-ST and inhibitor switch system	Probable cause
<ul style="list-style-type: none"> The ignition switch-ST inputs a HIGH signal to the engine-A/T-ECU while the engine is cranking. The engine-A/T-ECU controls fuel injection, etc. during starting based on this input. The inhibitor switch inputs the condition of the select lever, i.e. whether it is in P or N range or in some other range, to the engine-A/T-ECU. The engine-A/T-ECU controls the electronic control throttle valve based on this input. 	<ul style="list-style-type: none"> Malfunction of ignition switch Malfunction of inhibitor switch Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU



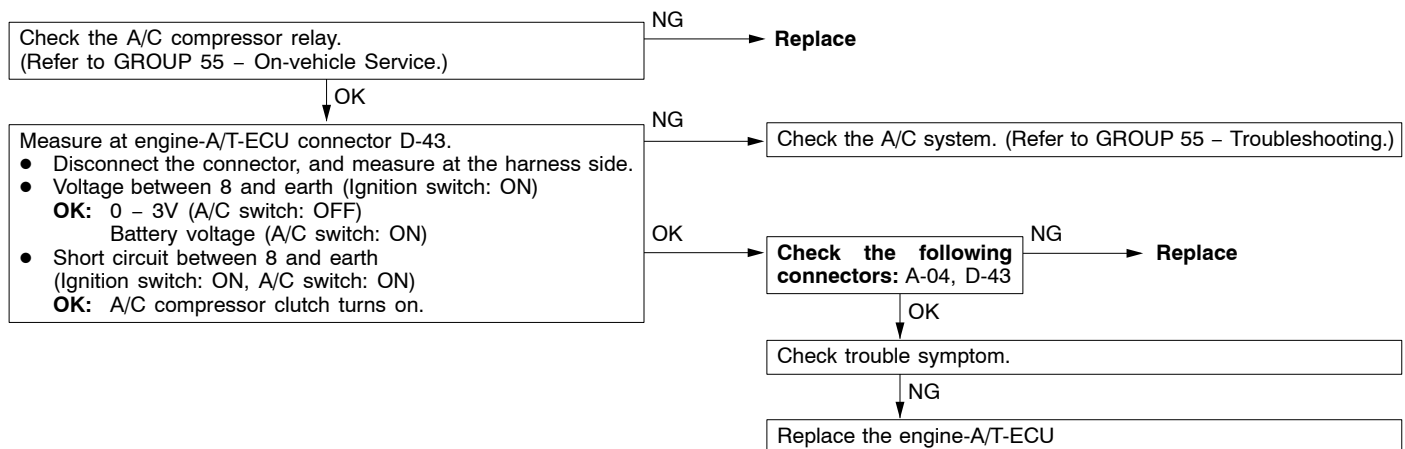
INSPECTION PROCEDURE 28

Power steering fluid pressure switch system	Probable cause
The presence or absence of power steering load is input to the engine-A/T-ECU. The engine-A/T-ECU controls the electronic control throttle valve based on this input.	<ul style="list-style-type: none"> Malfunction of power steering fluid pressure switch Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU



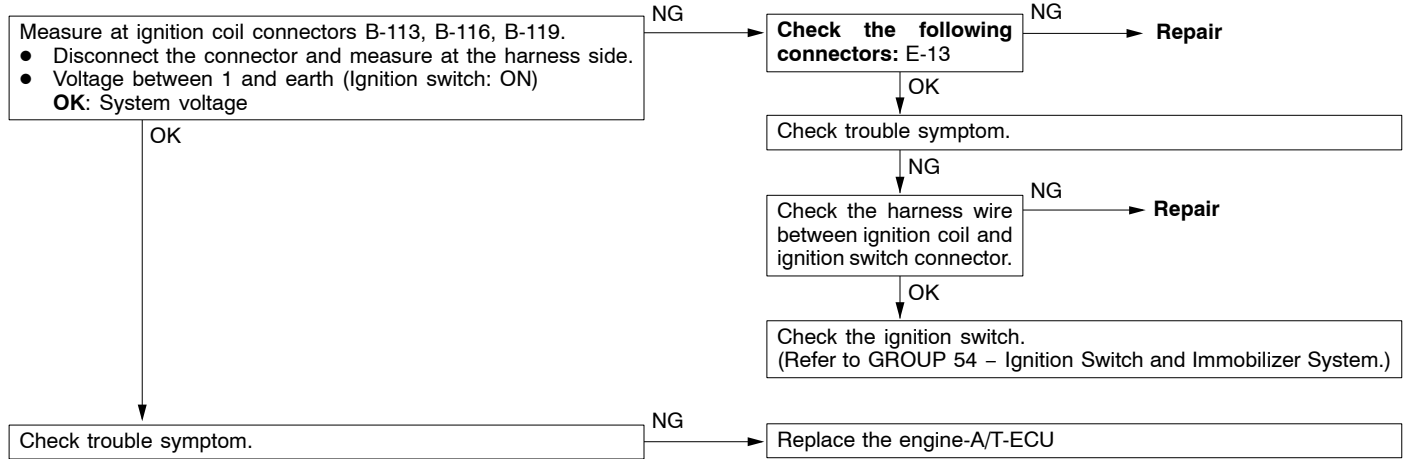
INSPECTION PROCEDURE 29

A/C switch and A/C relay system	Probable cause
When an A/C ON signal is input to the engine-A/T-ECU, the engine-A/T-ECU carries out control of the electronic control throttle valve, and also operates the A/C compressor magnetic clutch.	<ul style="list-style-type: none"> Malfunction of A/C control system Malfunction of A/C switch Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU



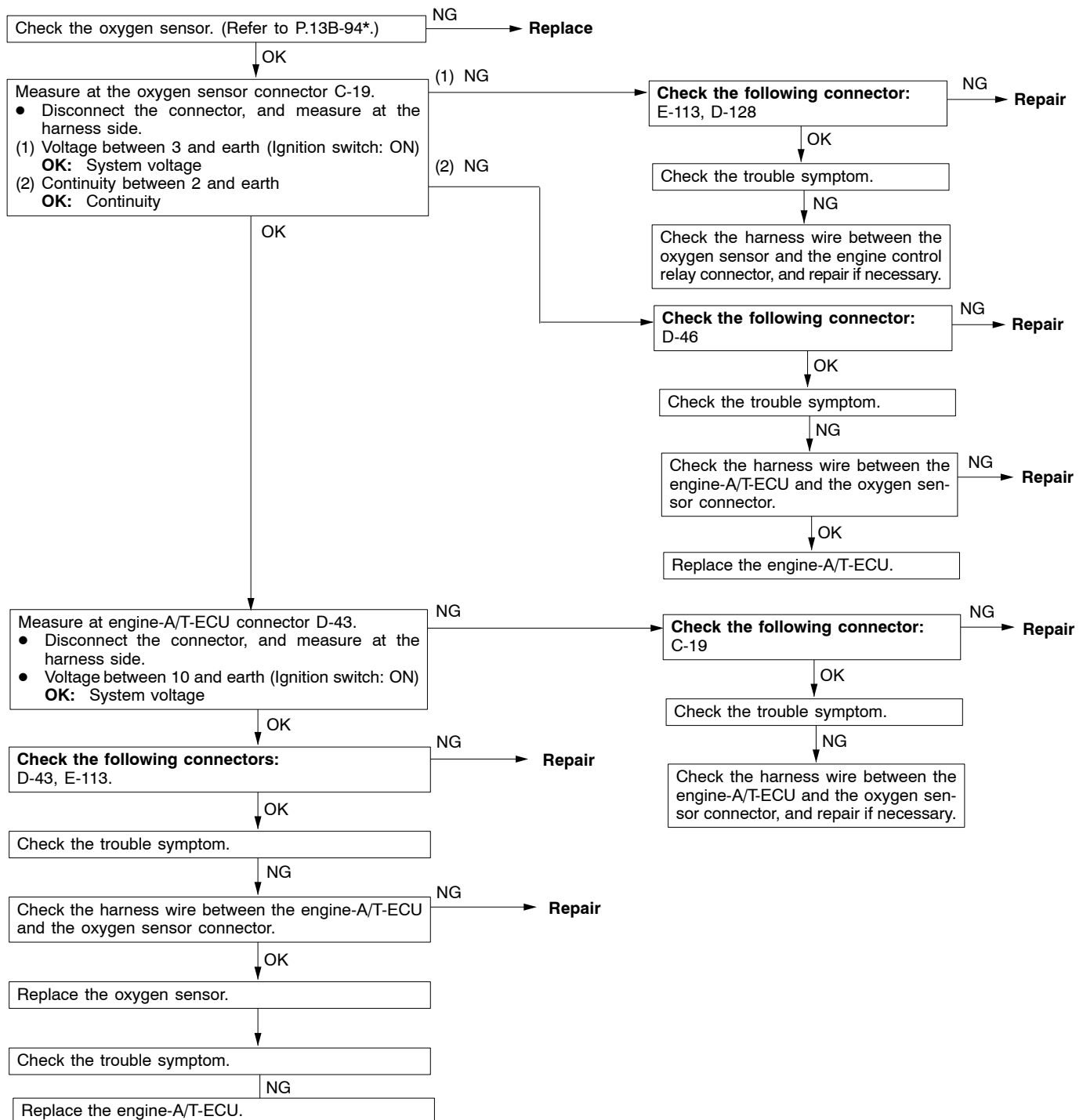
INSPECTION PROCEDURE 30

Ignition circuit system	Probable cause
The engine-A/T-ECU interrupts the ignition coil primary current by turning the engine-A/T-ECU ON and OFF.	<ul style="list-style-type: none"> • Malfunction of ignition switch. • Malfunction of power transistor unit • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-A/T-ECU



INSPECTION PROCEDURE 31

Oxygen sensor system <Vehicles except for Taiwan, South Africa, General Export without catalytic converter>	Probable cause
<ul style="list-style-type: none"> The oxygen sensor detects the oxygen content in exhaust gas, converts it to voltage, and sends the voltage to the engine-A/T-ECU. The engine-A/T-ECU controls the fuel injection amount to adjust the air/fuel ratio to theoretical one. 	<ul style="list-style-type: none"> Malfunction of the oxygen sensor Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU

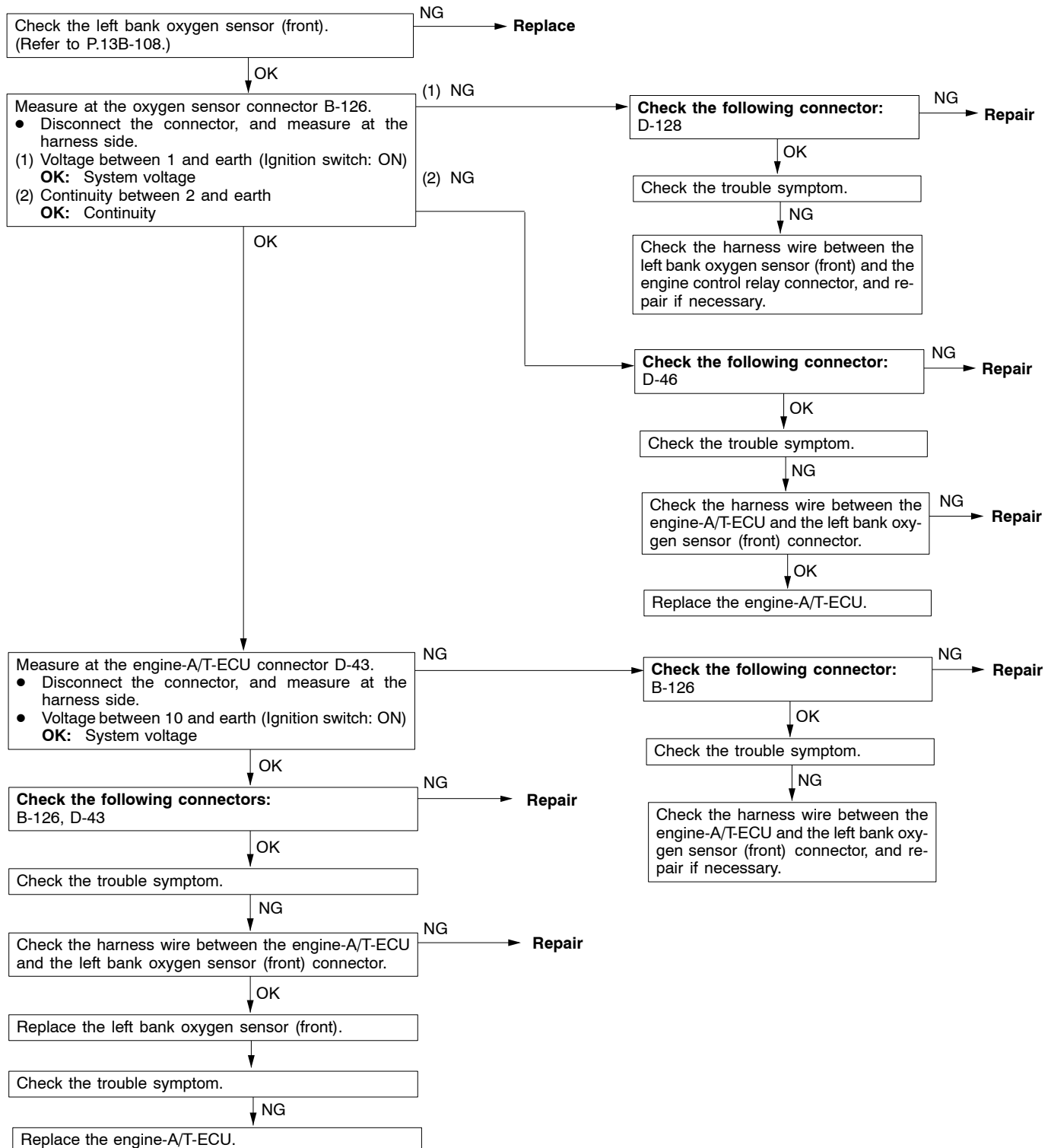


NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

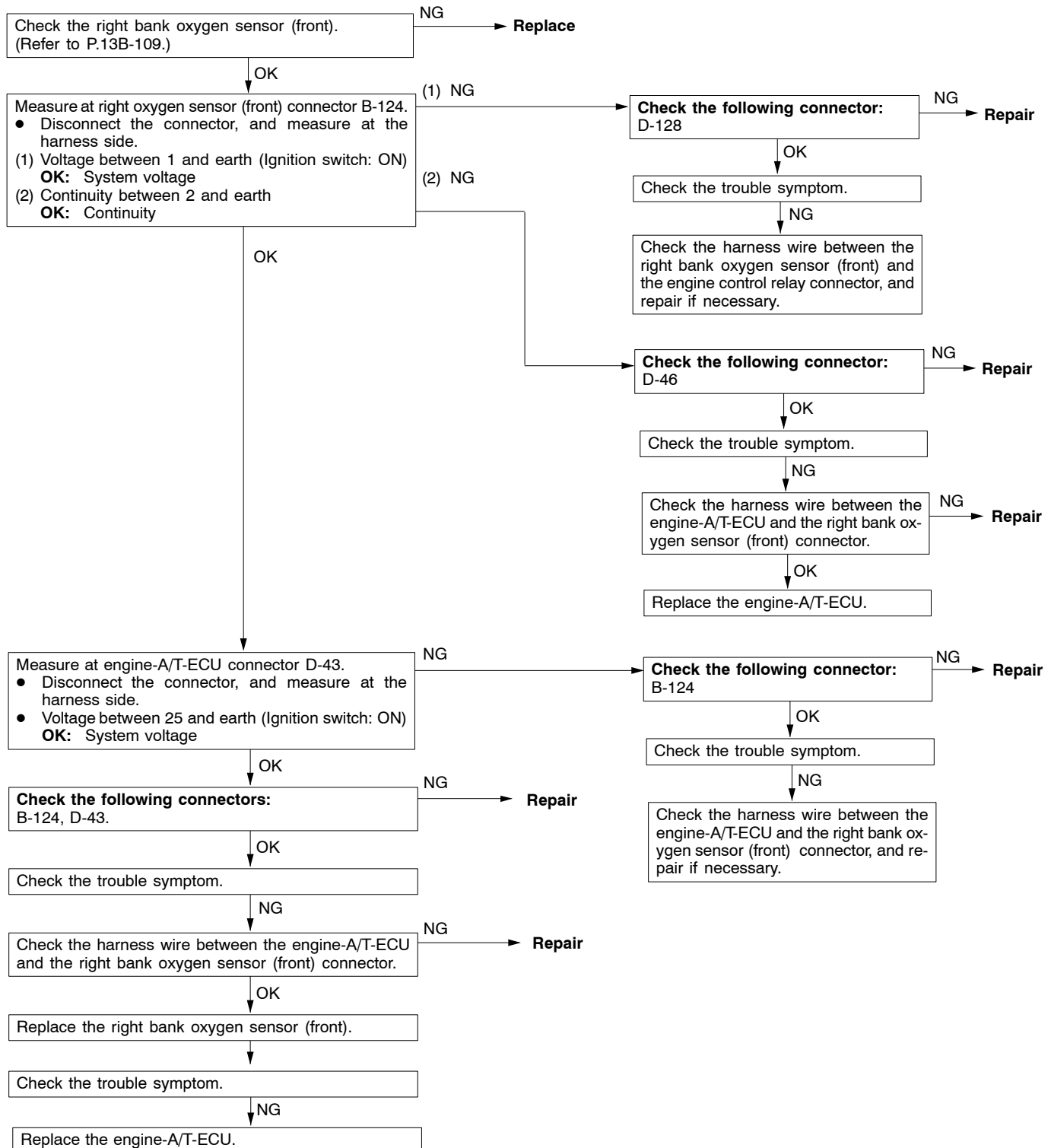
INSPECTION PROCEDURE 32

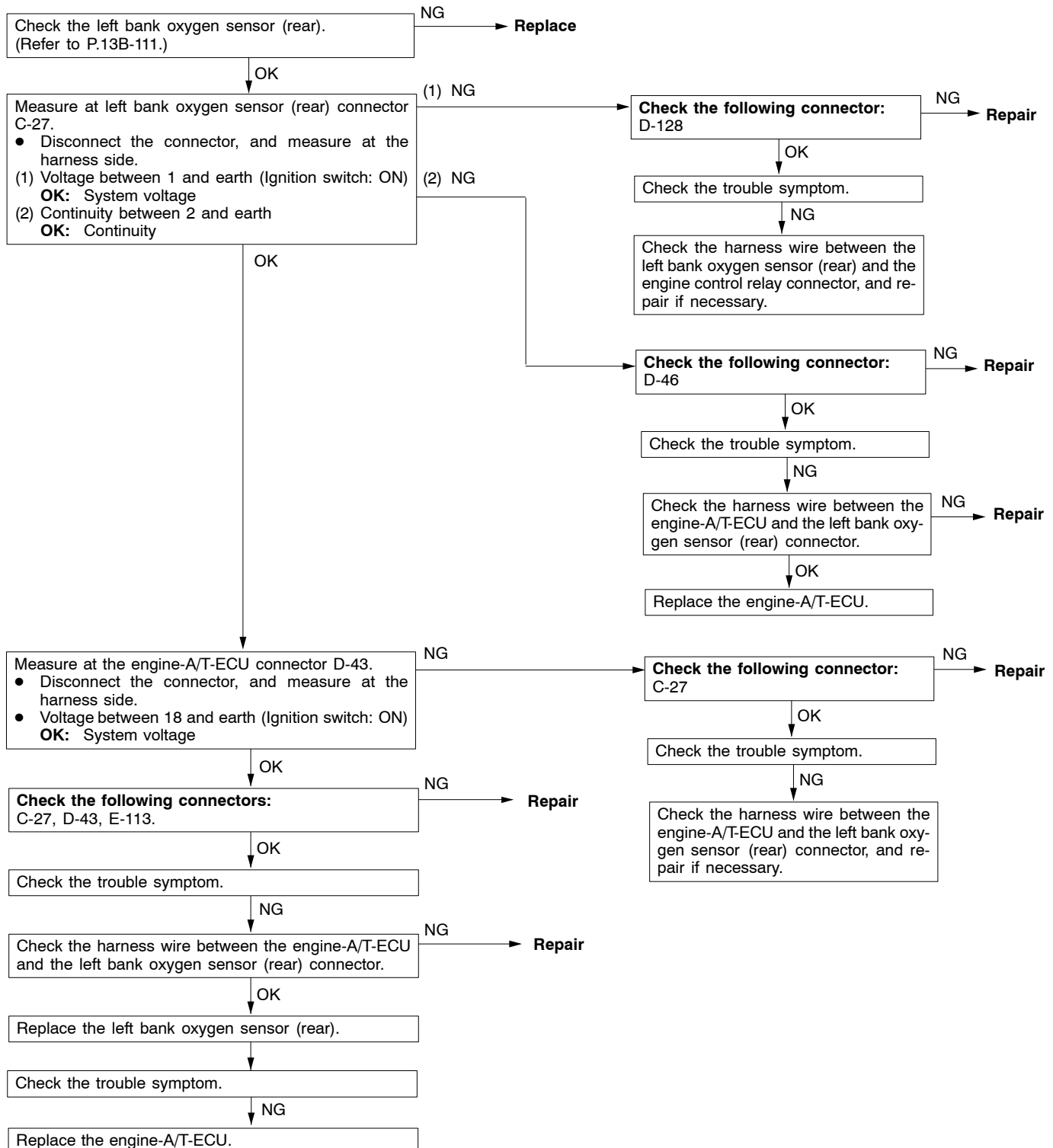
Left bank oxygen sensor (front) system <Vehicles for Taiwan>	Probable cause
<ul style="list-style-type: none"> The oxygen sensor detects the oxygen content in exhaust gas, converts it to voltage, and sends the voltage to the engine-A/T-ECU. The engine-A/T-ECU controls the fuel injection amount to adjust the air/fuel ratio to theoretical one. 	<ul style="list-style-type: none"> Malfunction of the left bank oxygen sensor Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU



INSPECTION PROCEDURE 33

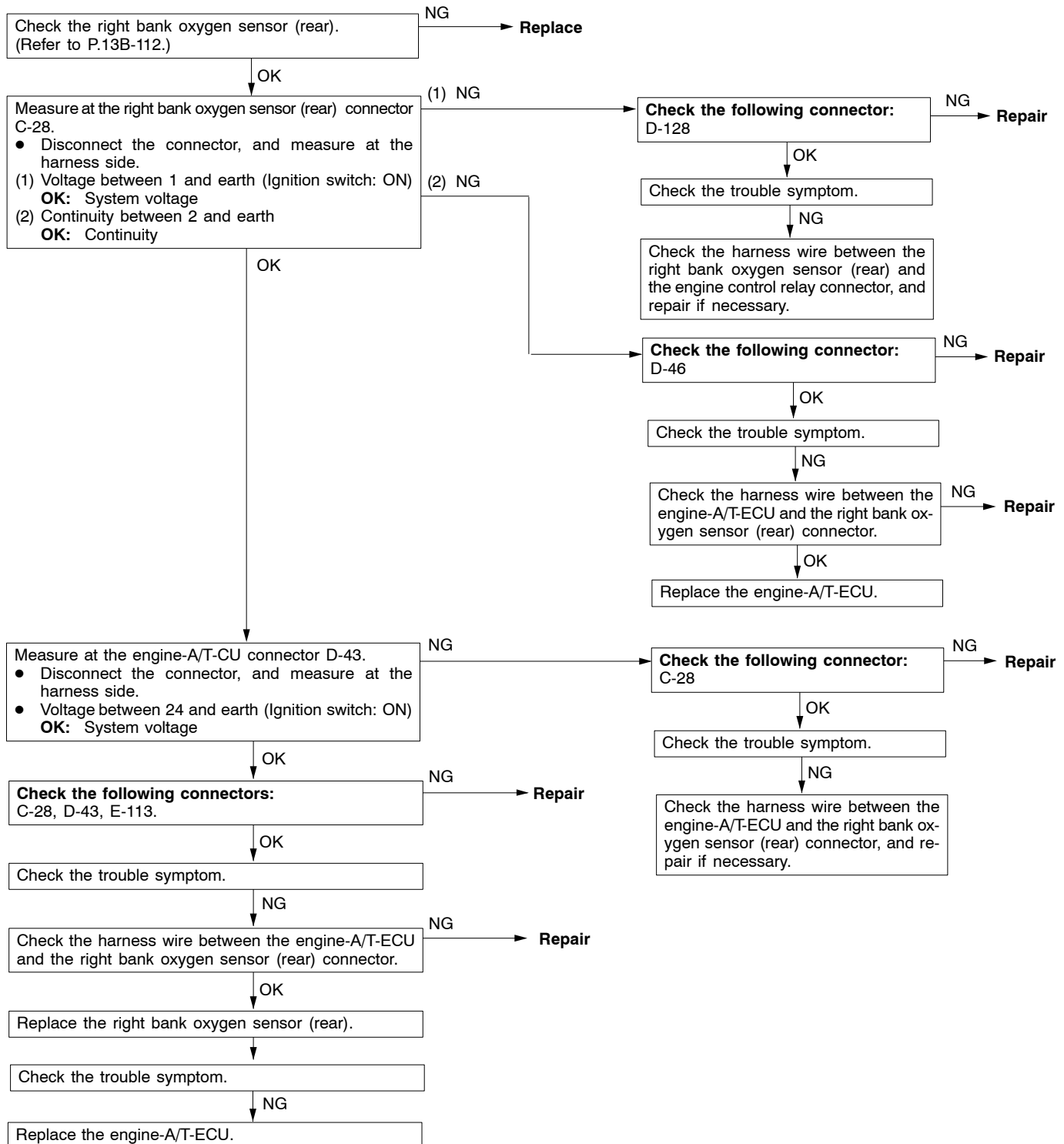
Right bank oxygen sensor (front) system <Vehicles for Taiwan>	Probable cause
<ul style="list-style-type: none"> The right bank oxygen sensor (front) detects the right bank oxygen content in exhaust gas, converts it to voltage, and sends the voltage to the engine-A/T-ECU. The engine-A/T-ECU controls the fuel injection amount to adjust the air/fuel ratio to theoretical one. 	<ul style="list-style-type: none"> Malfunction of the right bank oxygen sensor (front) Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU





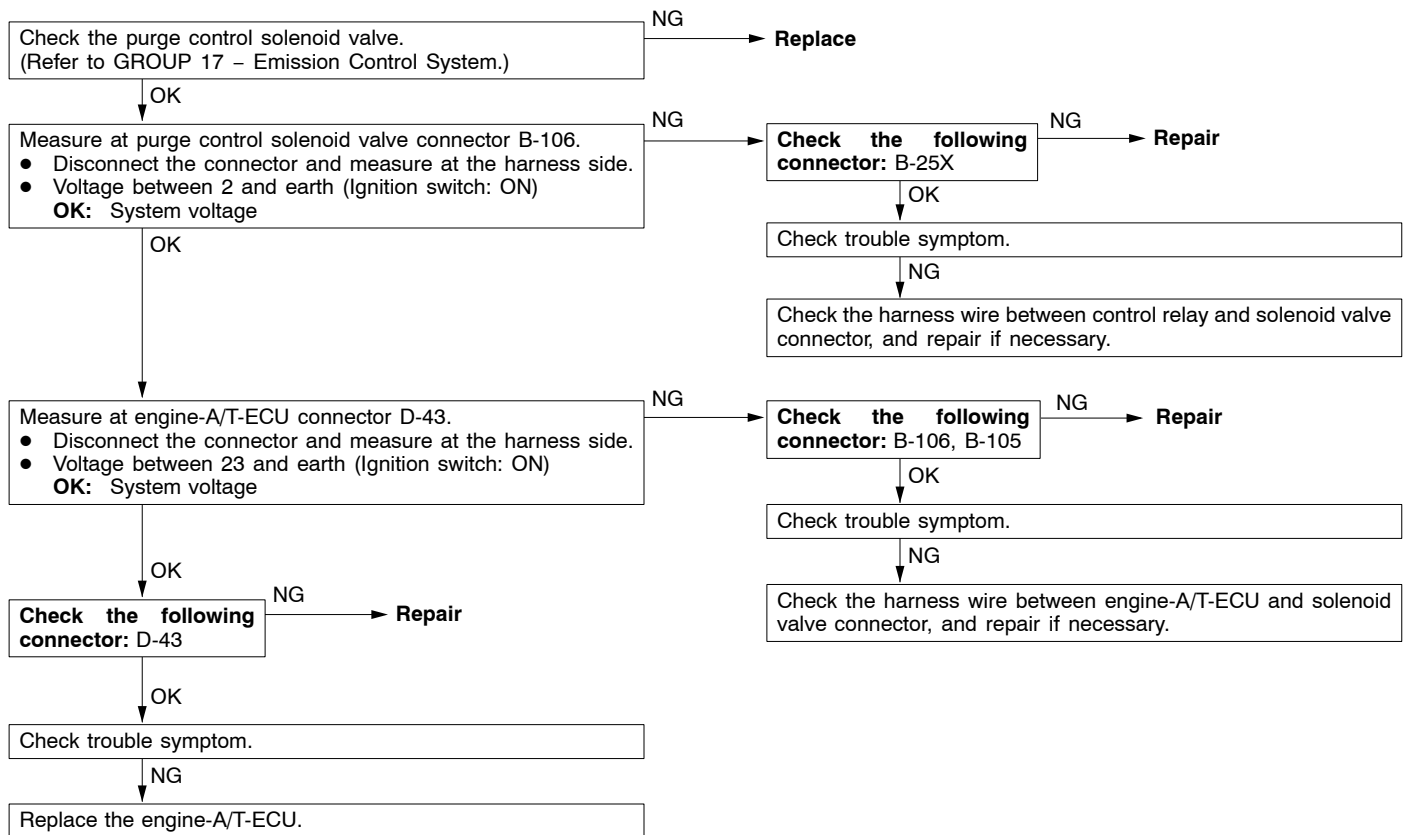
INSPECTION PROCEDURE 35

Right bank oxygen sensor (rear) system <Vehicles for Taiwan>	Probable cause
<ul style="list-style-type: none"> The oxygen sensor detects the right bank oxygen content in exhaust gas, converts it to voltage, and sends the voltage to the engine-A/T-ECU. The engine-A/T-ECU controls the fuel injection amount to adjust the air/fuel ratio to theoretical one. 	<ul style="list-style-type: none"> Malfunction of the right bank oxygen sensor (rear) Improper connector contact, open circuit or short-circuited harness wire Malfunction of the engine-A/T-ECU



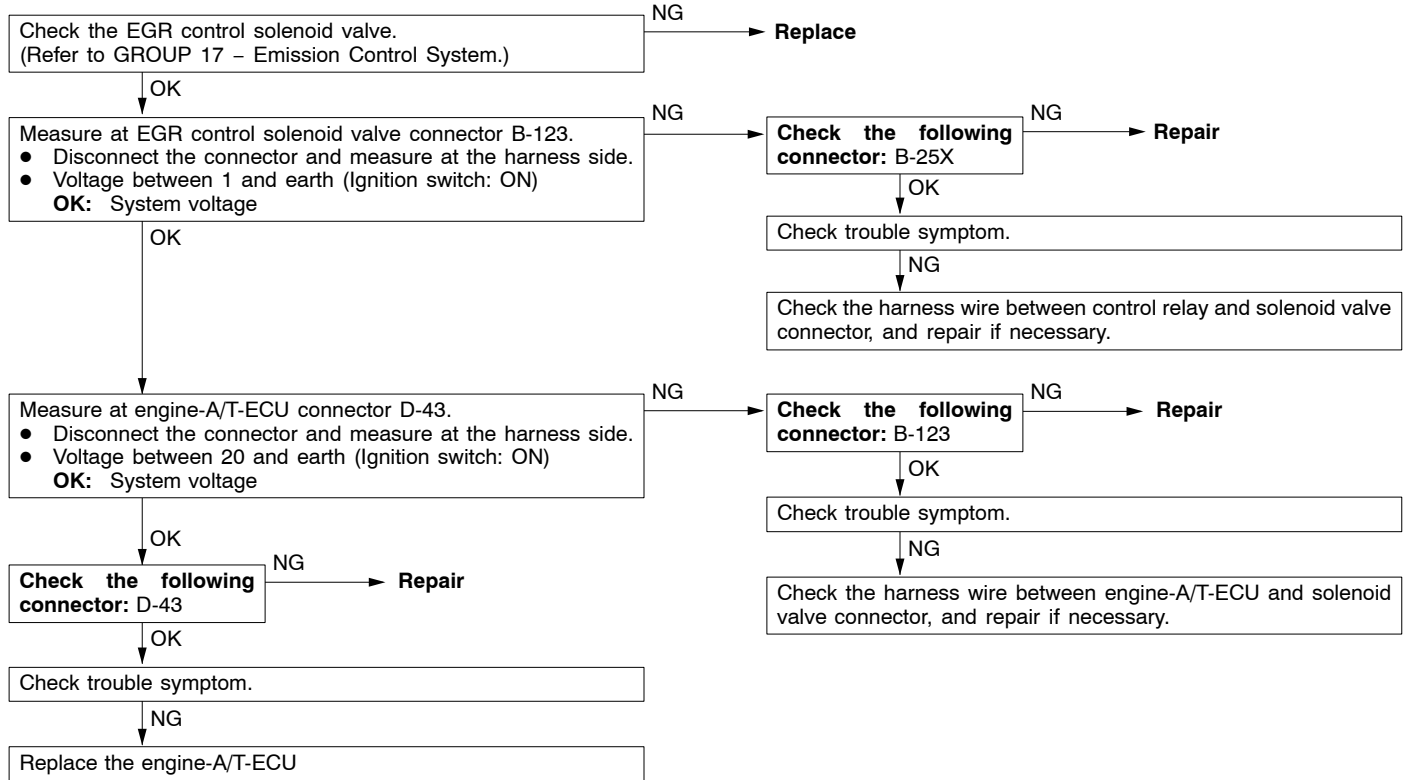
INSPECTION PROCEDURE 36

Purge control solenoid valve system <Vehicles except South Africa, General Export with catalytic converter>	Probable cause
The purge control solenoid valve controls the purging of air from the canister located inside the intake manifold.	<ul style="list-style-type: none"> Malfunction of solenoid valve Improper connector contact, open circuit or short-circuited harness wire. Malfunction of the engine-A/T-ECU



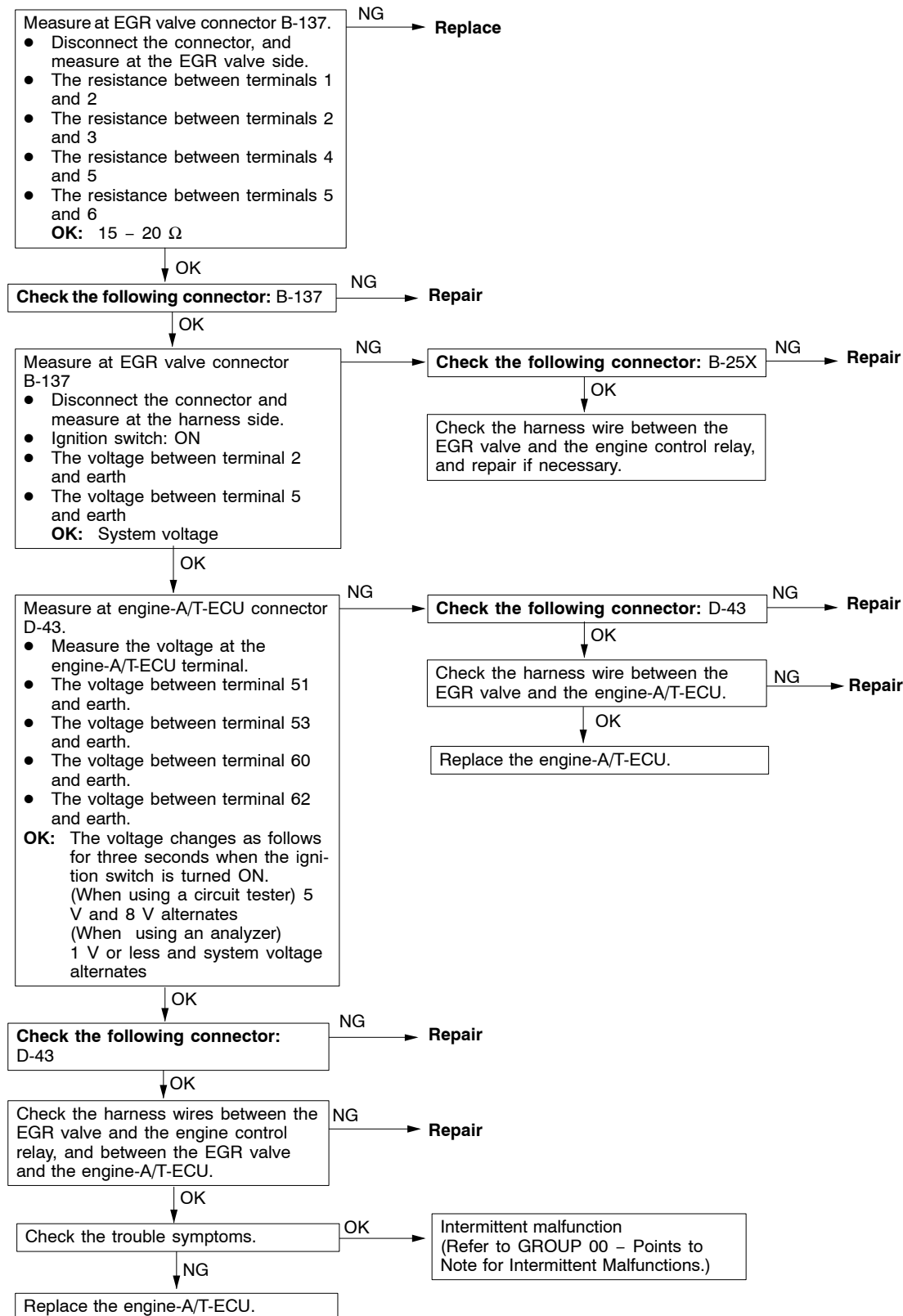
INSPECTION PROCEDURE 37

EGR control solenoid valve system <Vehicles except for Taiwan>	Probable cause
<p>The EGR control solenoid valve is controlled by the negative pressure resulting from EGR operation leaking to port "A" of the throttle body.</p>	<ul style="list-style-type: none"> • Malfunction of solenoid valve • Improper connector contact, open circuit or short-circuited harness wire. • Malfunction of the engine-A/T-ECU

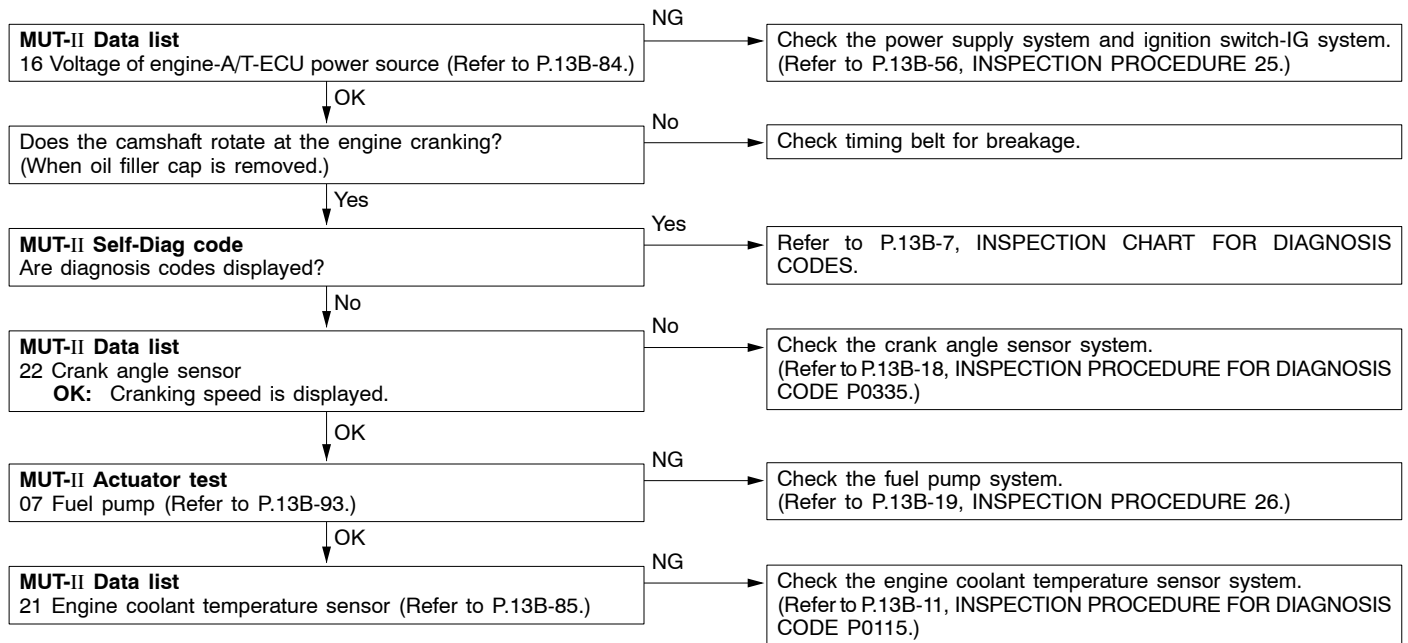


INSPECTION PROCEDURE 38

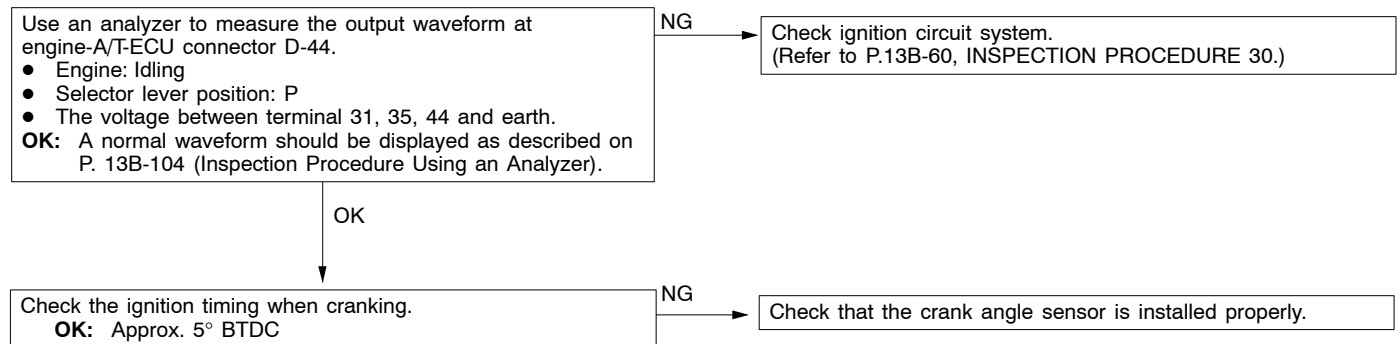
EGR valve system <Vehicles for Taiwan>	Probable cause
The stepper motor controls a diversion of the EGR.	<ul style="list-style-type: none"> Malfunction of the EGR valve Open or short circuit in the EGR valve circuit or loose connector contact Malfunction of engine-A/T-ECU



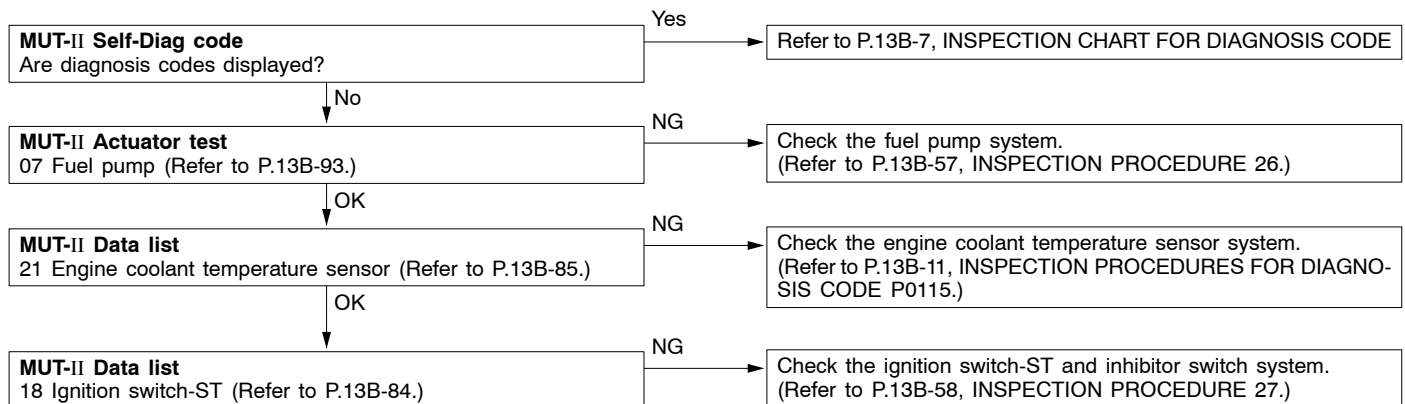
INSPECTION PROCEDURE 39

MUT-II: Inspection of no initial combustion

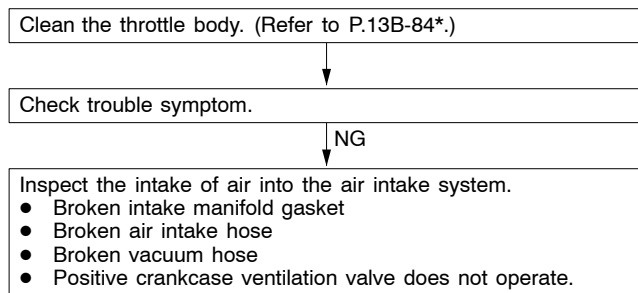
INSPECTION PROCEDURE 40

Ignition system: Inspection of no initial combustion.

INSPECTION PROCEDURE 41

MUT-II: Check if incomplete combustion occurs.

INSPECTION PROCEDURE 42

Check if hunting occurs.

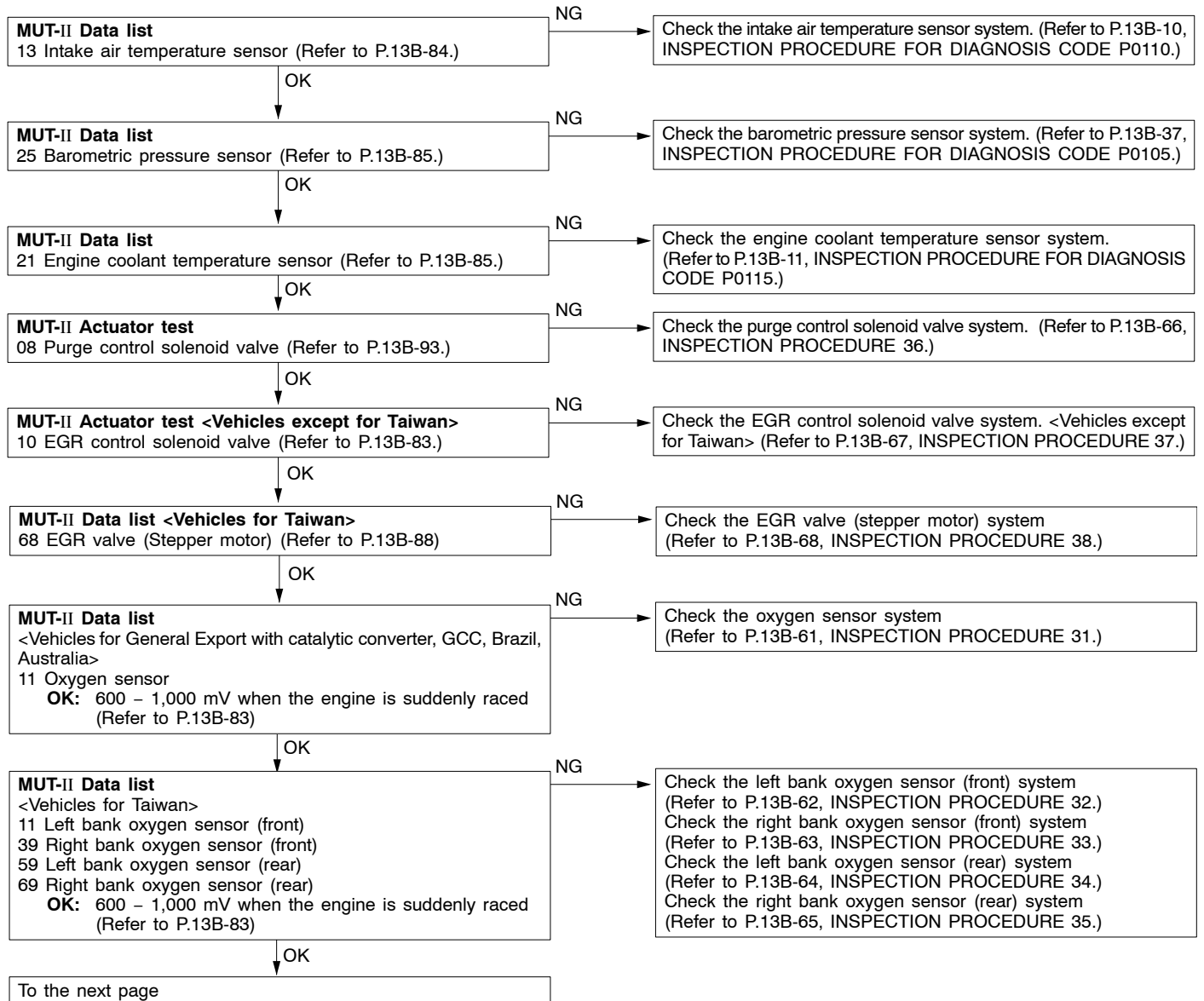
NOTE

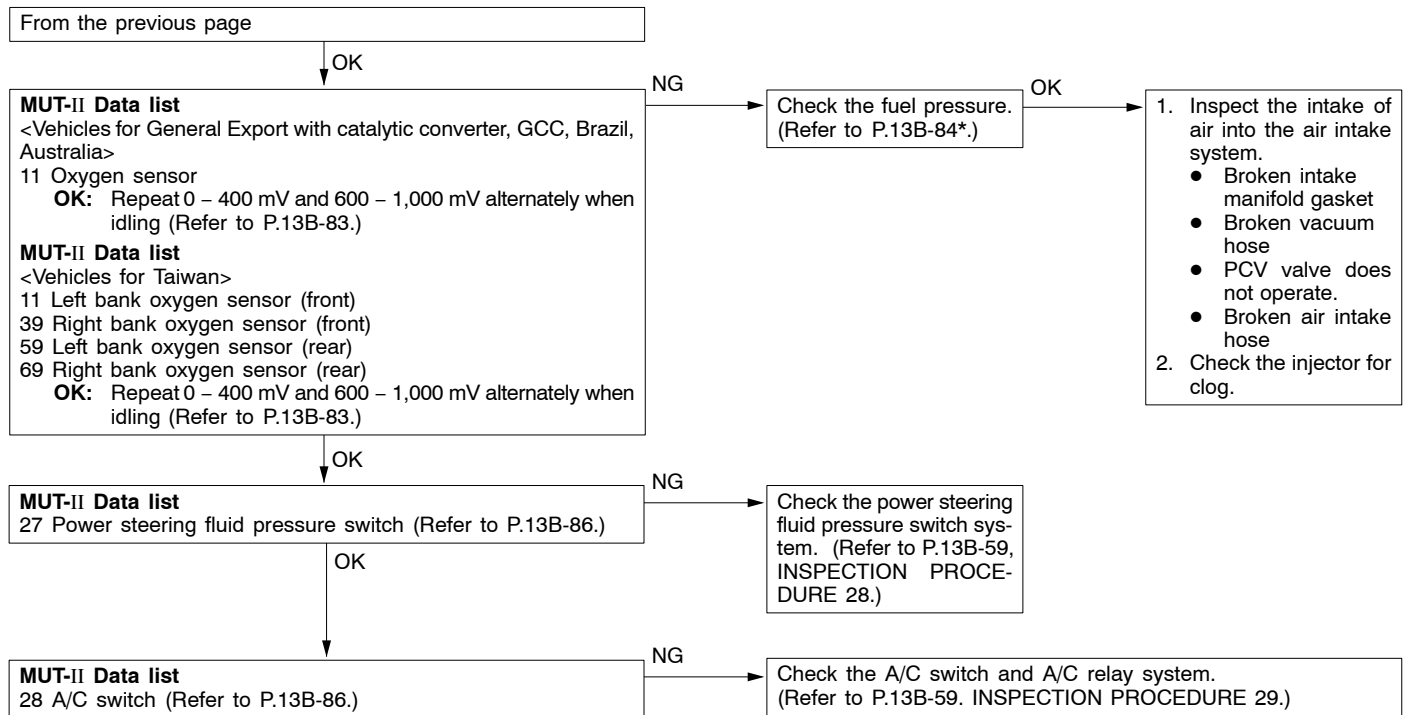
*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 43

MUT-II: Check if idling speed is unstable.

<Vehicles for Australia, Brazil, Taiwan, GCC, General Export with catalytic converter>

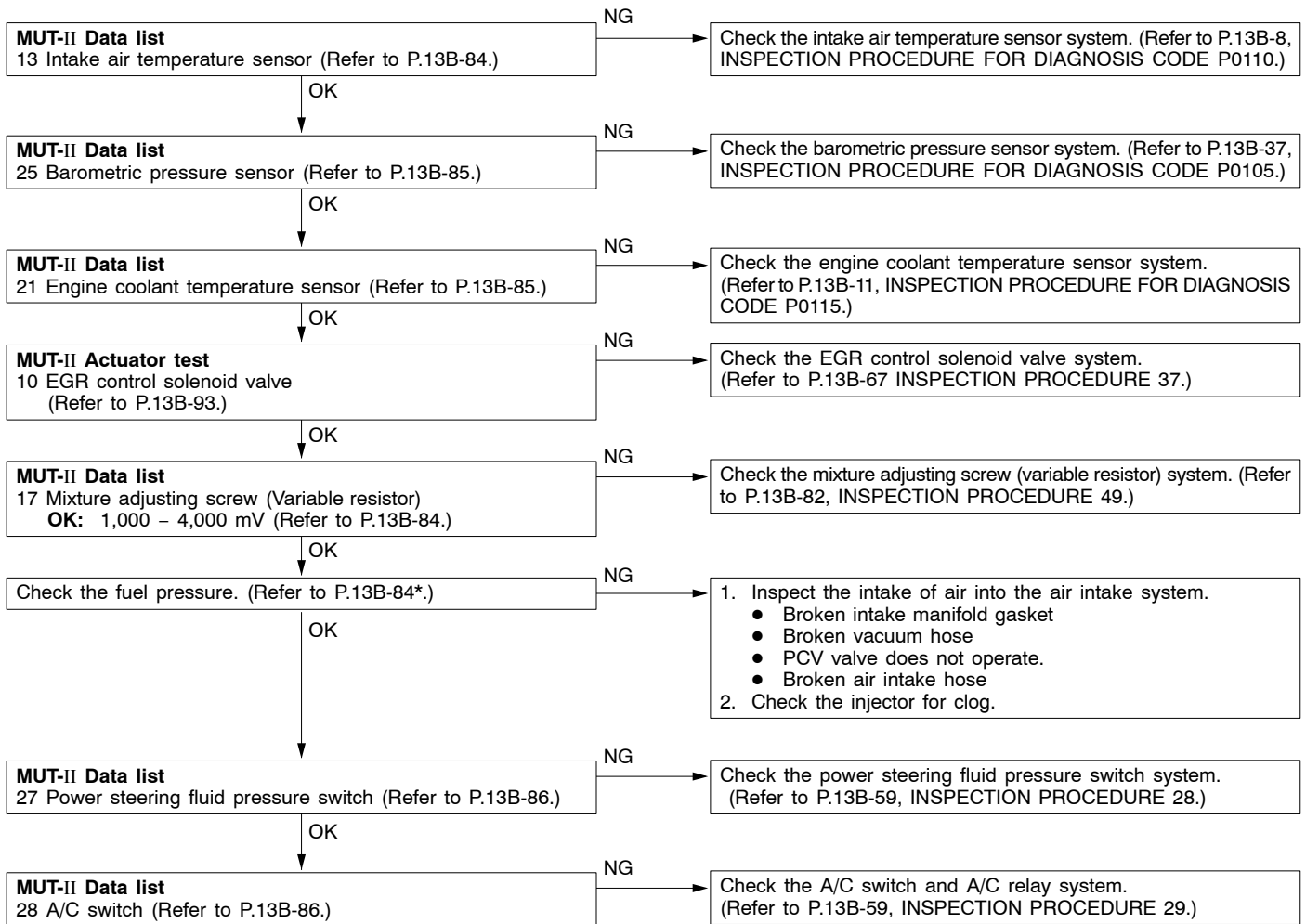




NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

<Vehicles for General Export without catalytic converter, South Africa>



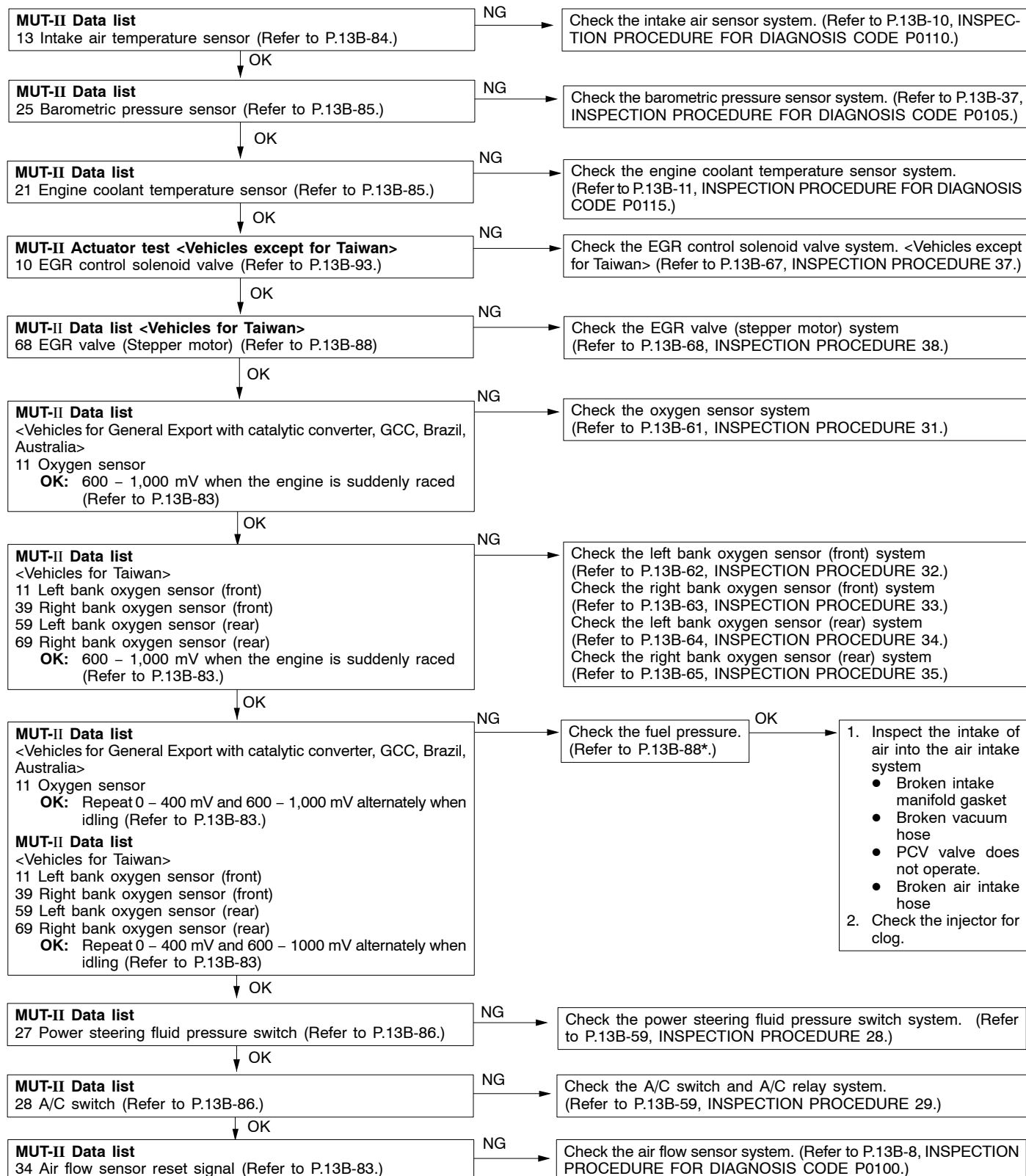
NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 44

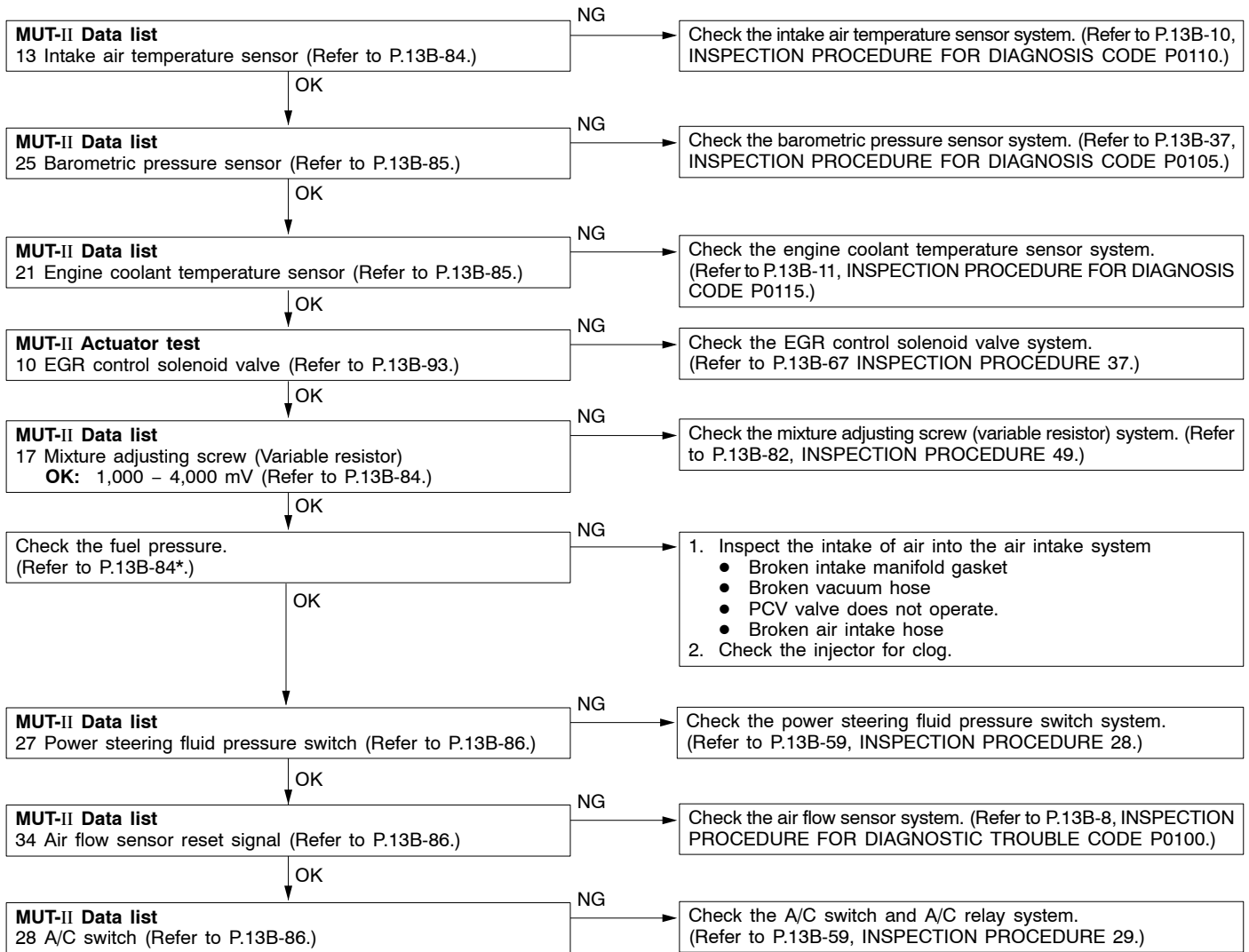
MUT-II: Engine stalling inspection when the engine is warmed up and idling.

<Vehicles for Australia, Brazil, Taiwan, General Export with catalytic converter>



NOTE *: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

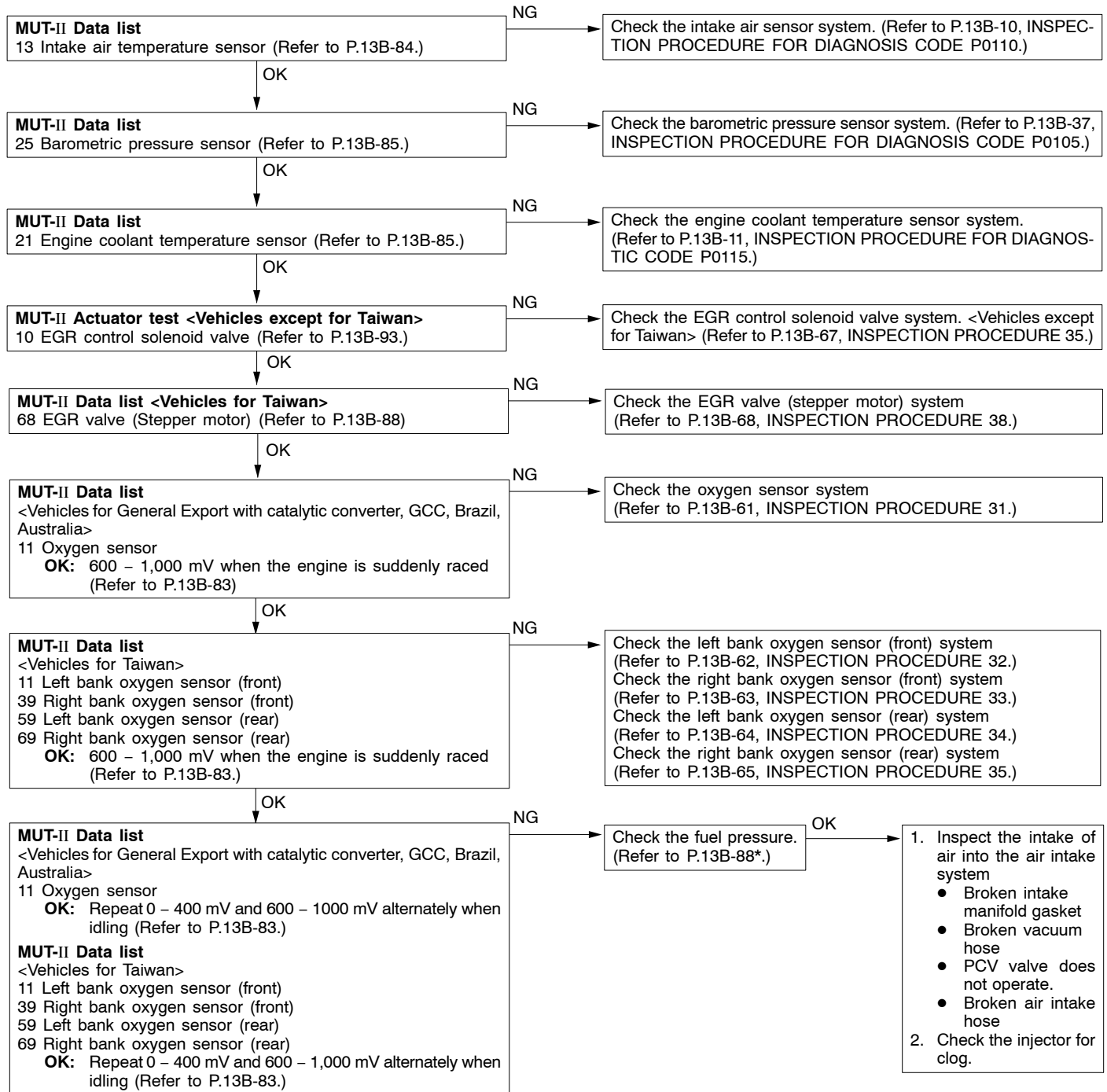
<Vehicles for general Export without catalytic converter, South Africa>



INSPECTION PROCEDURE 43

MUT-II: Check if hesitation, sag, stumble or poor acceleration occurs.

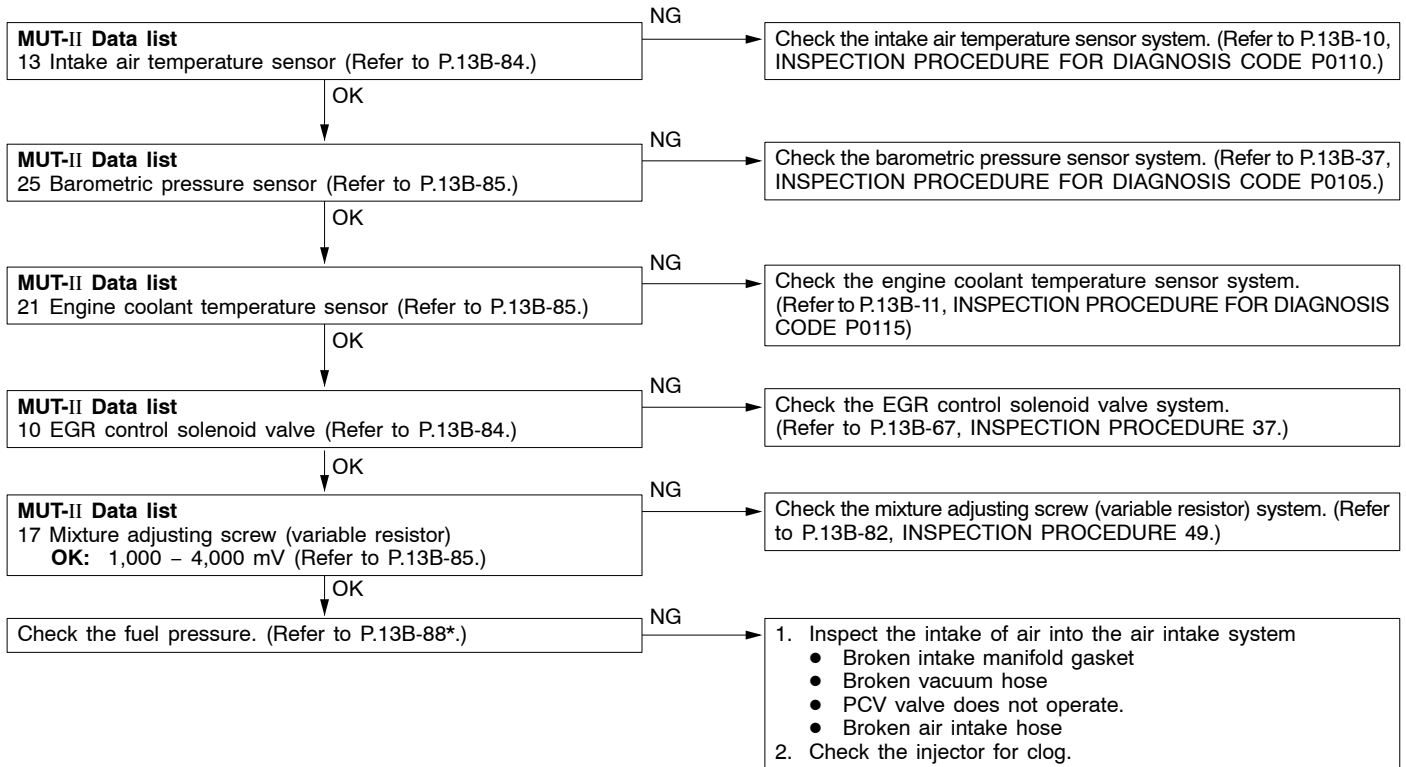
<Vehicles for Australia, Brazil, Taiwan, GCC, General Export with catalytic converter>



NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

<Vehicles for General Export without catalytic converter, South Africa>



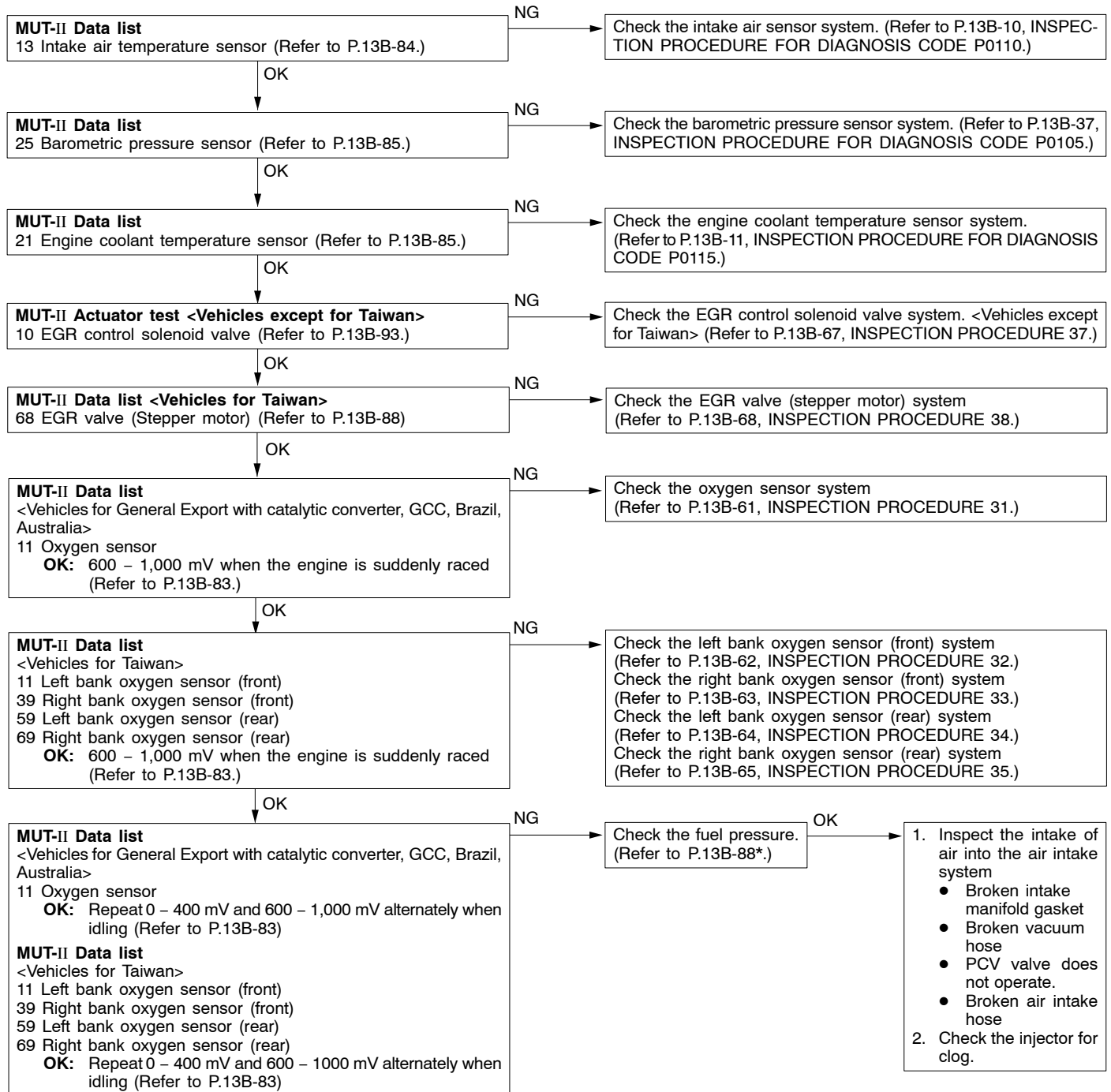
NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 45

MUT-II: Check if surge occurs.

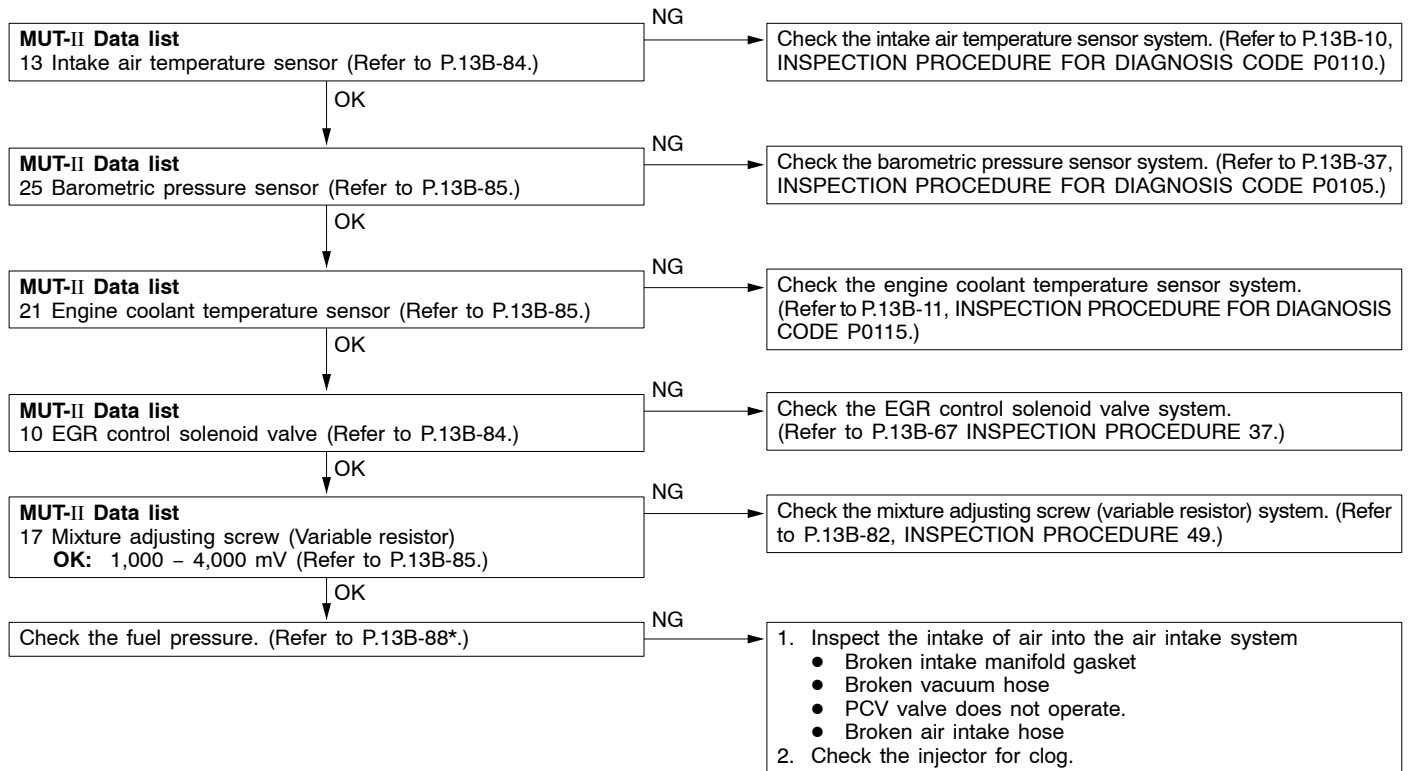
<Vehicles for Australia, Brazil, Taiwan, GCC, General Export with catalytic converter>



NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

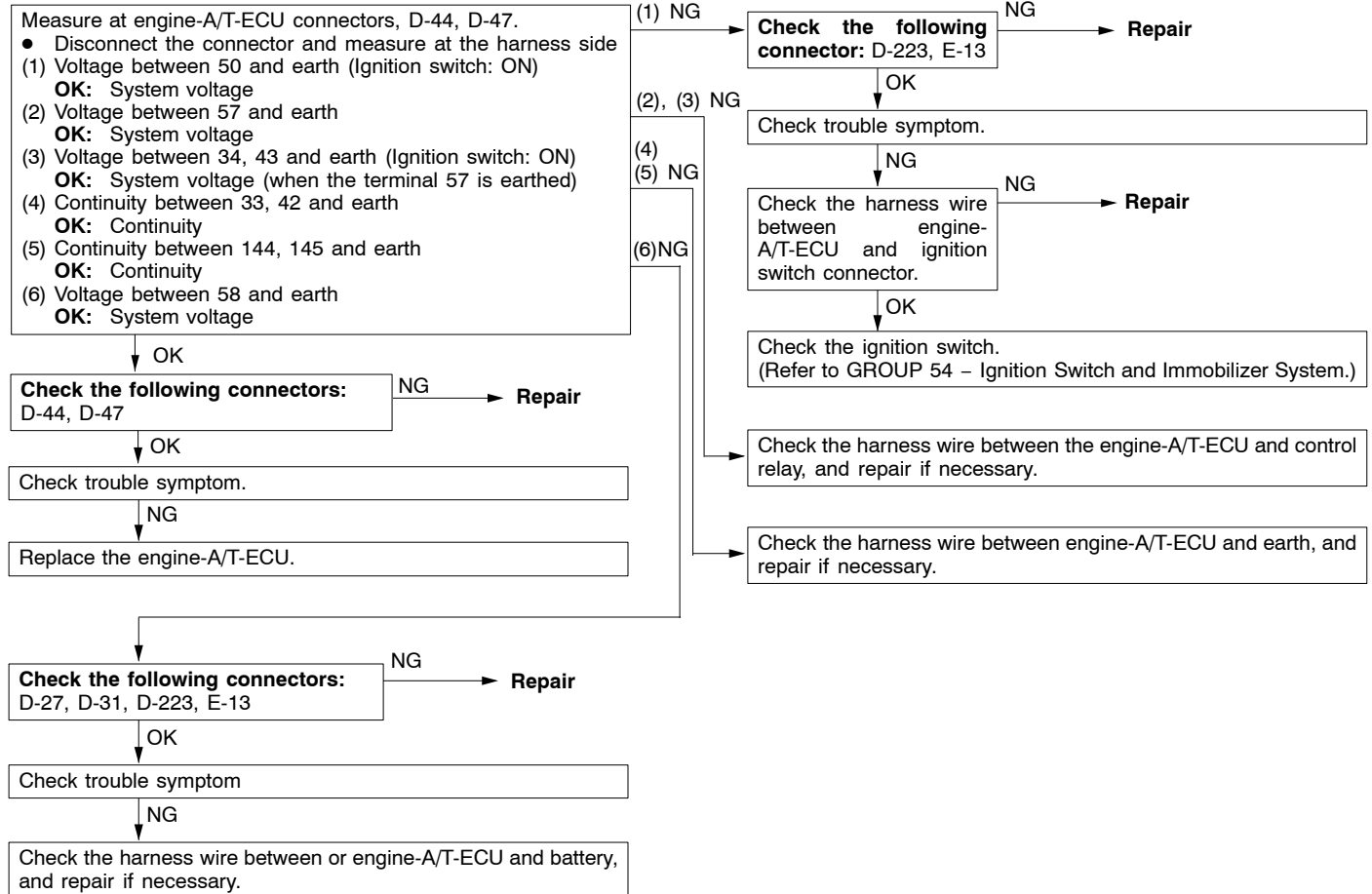
<Vehicles for General Export without catalytic converter, South Africa>



NOTE

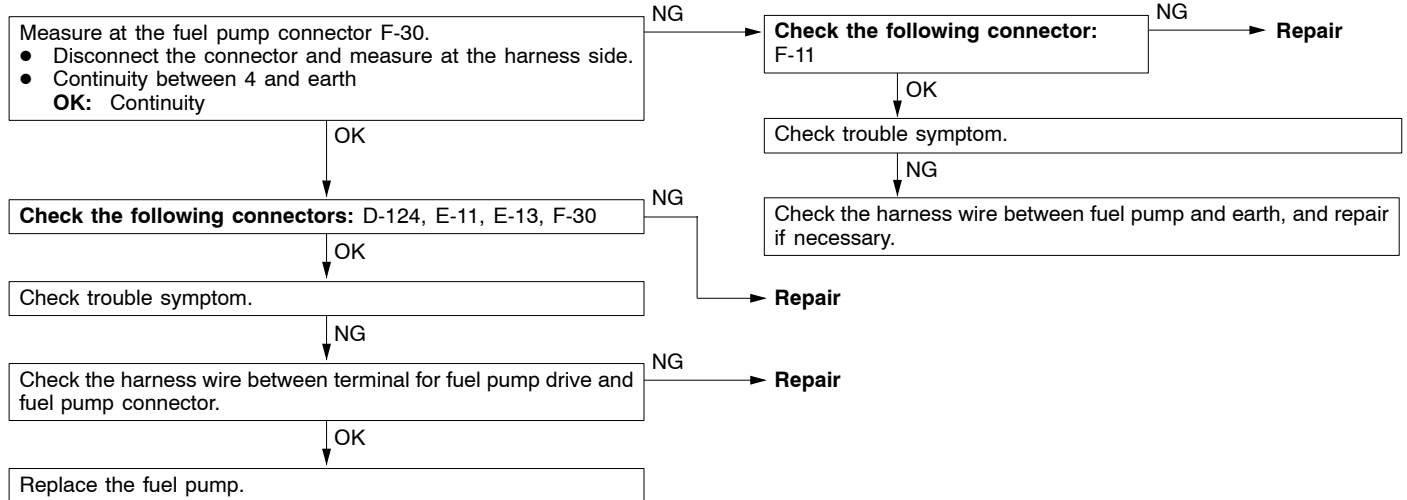
*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

INSPECTION PROCEDURE 46

Check the engine-A/T-ECU power supply and earth circuit.

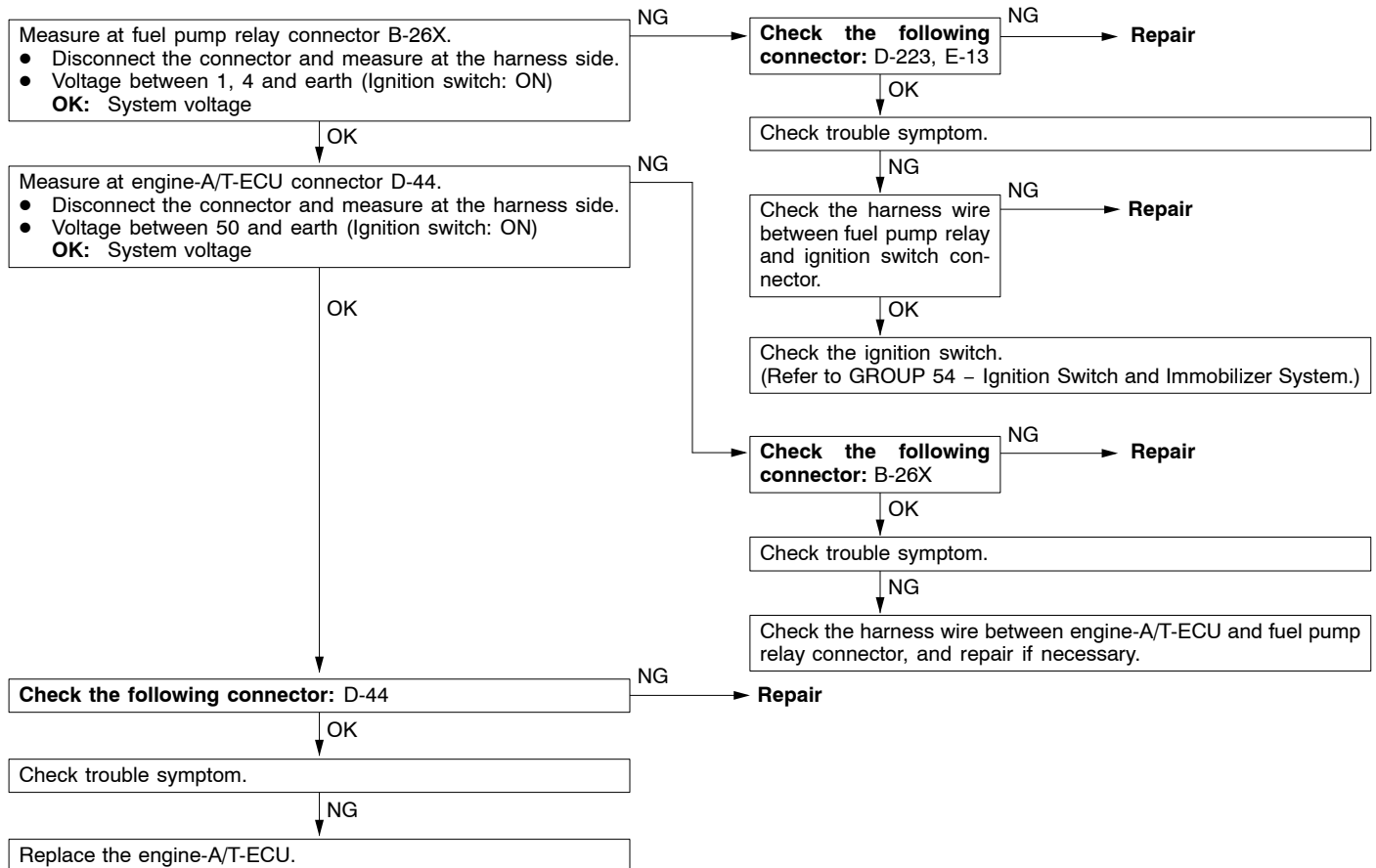
INSPECTION PROCEDURE 47

Check the fuel pump circuit.



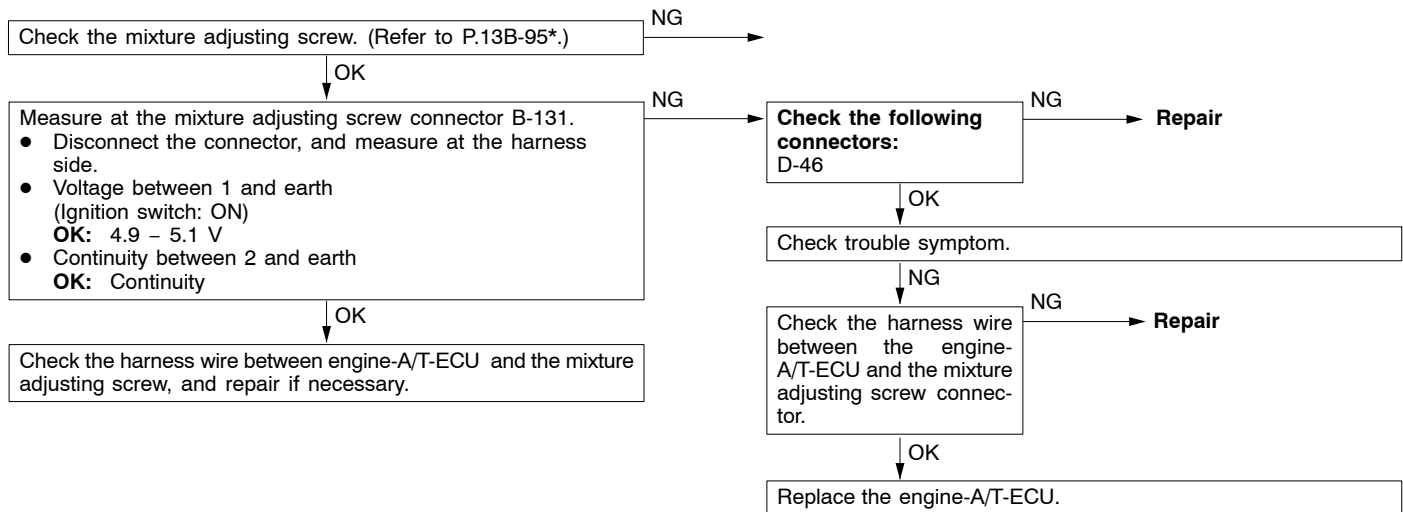
INSPECTION PROCEDURE 48

Check the fuel pump drive control circuit.



INSPECTION PROCEDURE 49

Mixture adjusting screw (variable resistor) system <Vehicles for General Export without catalytic converter, South Africa>	Probable cause
<ul style="list-style-type: none"> • The mixture adjusting screw is a variable resistor for manually adjusting the idling fuel mixture. • When the shaft of the mixture adjusting screw is turned, the resistance between the output terminal and the earth terminal changes. Because of this, the output voltage also changes in accordance with the turning of the shaft. • The engine-A/T-ECU controls the injectors to produce a richer idling fuel mixture in accordance with the increase in the output voltage. 	<ul style="list-style-type: none"> • Malfunction of the mixture adjusting screw • Improper connector contact, open circuit or short circuit • Malfunction of the engine-A/T-ECU



NOTE

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

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

- Sensor 1 indicates the sensor mounted at a position closest to the engine, and sensor 2 indicates the sensor mounted at the position second close to the engine.
- Bank 1 indicates the right bank cylinder, and bank 2 indicates the left bank cylinder.
- *1. In a new vehicle [driven approximately 500 km or less], the air flow sensor output frequency is sometimes 10% higher than the standard frequency.
- *2. The injector drive time represents the time when the cranking speed is at 250 r/min or below when the power supply voltage is 11 V.
- *3. In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10% longer than the standard time.
- *4. Disconnect the throttle valve control servo connector, and then delete the diagnosis code that was recorded during the inspection with the use of the MUT-II after the inspection has been completed.
- *5. When service data in check mode is selected, the data is not displayed.

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
11	Oxygen sensor <Vehicles for General Export with catalytic converter, GCC, Brazil, Australia> Left bank oxygen sensor (front) <Vehicles for Taiwan>	Engine:Warming up (Air/fuel mixture is made leaner when decelerating, and is made richer when racing.)	When the engine is running at 4,000 r/min, decelerate suddenly.	200 mV or less	Procedure No. 31 <Vehicles for General Export with catalytic converter, GCC, Brazil, Australia> Procedure No.32 <Vehicles for Taiwan>	13B-61, 13B-62
			When engine is suddenly raced.	600 – 1,000 mV		
		Engine:Warming up (The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the engine-A/T-ECU.)	Engine is idling	Voltage changes repeatedly between 400 mv or less and 600 – 1,000 mV		
			2,500 r/min	Voltage changes repeatedly between 400 mv or less and 600 – 1,000 mV		
12	Air flow sensor*1	<ul style="list-style-type: none"> ● Engine coolant temperature: 80 – 95°C ● Lamps, electric cooling fan and all accessories: OFF ● Transmission: P range 	Engine is idling	17 – 43 Hz	–	–
			2,500 r/min	64 – 104 Hz		
			Engine is raced	Frequency increases in response to racing		

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
13	Intake air temperature sensor	Ignition switch: ON or with engine running	When intake air temperature is -20°C	-20°C	Code No. P0110	13B-10
			When intake air temperature is 0°C	0°C		
			When intake air temperature is 20°C	20°C		
			When intake air temperature is 40°C	40°C		
			When intake air temperature is 80°C	80°C		
14	Throttle position sensor (sub)	<ul style="list-style-type: none"> Ignition switch: ON (Engine is stopped) Remove the intake air hose at the throttle body side. Disconnect the throttle position sensor connector, and then connect terminal No.1, No.2, No.3 and No. 4 with the use of the special tool: MB991348 	Close the throttle valve with a finger fully.	200 – 800 mV	Code No. P0222, P0223	13B-17, 13B-18
			Open the throttle valve with a finger fully.	3,800 – 4,900 mV		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 25	13B-57
17	Mixture adjusting screw (ignition switch-ST) <Vehicles for General Export without catalytic converter, South Africa>	Ignition switch: ON		1,000 – 4,000 mV	Procedure No. 49	13B-82
18	Cranking signal (ignition switch-ST)	Ignition switch: ON	Engine: Stopped	OFF	Procedure No. 27	13B-58
			Engine: Cranking	ON		

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
21	Engine coolant temperature sensor	Ignition switch: ON or with engine running	When engine coolant temperature is -20°C	-20°C	Code No. P0115	13B-11
			When engine coolant temperature is 0°C	0°C		
			When engine coolant temperature is 20°C	20°C		
			When engine coolant temperature is 40°C	40°C		
			When engine coolant temperature is 80°C	80°C		
22	Crank angle sensor	<ul style="list-style-type: none"> Engine: Cranking Tachometer: Connected 	Compare the engine speed readings on the tachometer and the MUT-II.	Matched	Code No. P0335	13B-19
		Engine: Idling	When engine coolant temperature is -20°C	1,300 – 1,500 r/min		
			When engine coolant temperature is 0°C	1,300 – 1,500 r/min		
			When engine coolant temperature is 20°C	1,300 – 1,500 r/min		
			When engine coolant temperature is 40°C	1,040 – 1,240 r/min		
			When engine coolant temperature is 80°C	600 – 800 r/min		
25	Barometric pressure sensor	Ignition switch: ON	At altitude of 0 m	101 kPa	Code No. P0105	13B-37
			At altitude of 600 m	95 kPa		
			At altitude of 1,200 m	88 kPa		
			At altitude of 1,800 m	81 kPa		

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Procedure No. 28	13B-59
			Steering wheel turning	ON		
28	A/C switch	Engine: Warming up, idling		OFF	Procedure No. 29	13B-59
		<ul style="list-style-type: none"> Engine: After having warming up/Engine idling A/C switch: ON 	A/C compressor clutch is not operating	OFF		
			A/C compressor clutch is operating	ON		
34	Air flow sensor reset signal	Engine: After having warming up	Engine is idling	ON	Code No. P0100	13B-8
			2,500 r/min	OFF		
37	Volumetric efficiency	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95 °C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Engine is idling	15 – 35 %	—	—
			2,500 r/min	15 – 35 %		
			Racing	Volumetric efficiency increases according to amount of racing.		
38	Crank angle sensor	<ul style="list-style-type: none"> Engine: Cranking (at less than 2,000 r/min) Tachometer: Connected 		The speeds indicated by the MUT-II and tachometer match.	—	—

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
39	Right bank oxygen sensor (front) <Vehicles for Taiwan>	Engine: Warming up (Air/fuel mixture is made leaner when decelerating, and is made richer when racing.)	When the engine is running at 4,000 r/min decelerate suddenly.	200 mV or less	Procedure No.33	13B-63
			When engine is suddenly raced.	600 – 1,000 mV		
		Engine: Warming up (The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the engine-A/T-ECU.)	Engine is idling	Voltage changes repeatedly between 400 mV or less and 600 – 1,000 mV		
			2,500 r/min			
41	Injectors*2	Engine: Cranking	When engine coolant temperature is 0°C	100 – 160 ms	–	–
			When engine coolant temperature is 20°C	37 – 67 ms		
			When engine coolant temperature is 80°C	9.5 – 11.5 ms		
	Injectors*3	<ul style="list-style-type: none">● Engine coolant temperature: 80 – 95°C● Lamps, electric cooling fan and all accessories: OFF● Transmission: P range	Engine is idling	2.2 – 3.4 ms		
			2,500 r/min	2.0 – 3.2 ms		
			Racing	Increases		
44	Ignition coils and power transistor	<ul style="list-style-type: none">● Engine: After having warming up● Timing lamp is set. (to check actual ignition timing)	Engine is idling	2 – 47° BTDC	–	–
			2,500 r/min	27 – 47° BTDC		

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
47	Injectors*2 <Vehicles for Taiwan>	Engine: Cranking	When engine coolant temperature is 0°C	100 – 160 ms	–	–
			When engine coolant temperature is 20°C	37 – 67 ms		
			When engine coolant temperature is 80°C	9.5 – 11.5 ms		
	Injectors*3 <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamps, electric cooling fan and all accessories: OFF Transmission: P range 	Engine is idling	2.2 – 3.4 ms		
			2,500 r/min	2.0 – 3.2 ms		
			Racing	Increases		
49	A/C relay	Engine: Warming up, idling		OFF	Procedure No.29	13B-59
		<ul style="list-style-type: none"> Engine: After having warming up/Engine idling A/C switch: ON 	A/C compressor clutch is not operating	OFF		
			A/C compressor clutch is operating	ON		
59	Left bank oxygen sensor (rear) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine: After having warming up 	Racing	0 and 600 – 1,000 mV alternate.	Procedure No.34	13B-64
68	EGR valve (stepper motor) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lamp and all accessories: "OFF" Transmission: "P" range 	Engine is idling	0 – 5 STEP	Procedure No.38	13B-68
			2,500 r/min	0 – 10 STEP		
69	Right bank oxygen sensor (rear) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine: After having warming up 	Racing	0 and 600 – 1,000 mV alternate.	Procedure No.35	13B-65

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
77	Accelerator pedal posi- tion sensor (sub)	Ignition switch: ON	Release the acceler- ator pedal	905 – 1,165 mV	Code No. P2126 P2127 P2128	13B-29, 13B-33, 13B-34
			Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke		
			Depress the accelerator pedal fully	4,035 mV or more		
78	Accelerator pedal posi- tion sensor (main)	Ignition switch: ON	Release the acceler- ator pedal	905 – 1,165 mV	Code No. P2121 P2122 P2123	13B-29, 13B-30, 13B-31
			Depress the accelerator pedal gradually	Increases in response to the pedal depression stroke		
			Depress the accelerator pedal fully	4,035 mV or more		
79	Throttle position sensor (main)*4	<ul style="list-style-type: none">Ignition switch: ON (Engine is stopped)Remove the in- take air hose at the throttle body side.Disconnect the throttle position sensor connec- tor, and then connect termi- nal No.1, No.2, No.3 and No.4 with the use of the special tool: MB991348	Close the throttle valve with a finger fully.	200 – 800 mV	Code No. P0122, P0123	13B-14, 13B-15
			Open the throttle valve with a finger fully.	3,800 – 4,900 mV		
		No load		450 – 1,000 mV		
		A/C switch: “OFF” to “ON”		Voltage rises		
		<ul style="list-style-type: none">A/C switch: “OFF”Shift lever: “ON” to “D”				
9A	Throttle position sensor (main) mid opening learning value	Ignition switch: ON		500 – 2,000 mV	Code No. P0122, P0123	13B-14, 13B-15

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
A1*5	Right bank oxygen sensor (front) <Vehicles for Taiwan>	Engine: Warming up (Air/fuel mixture is made leaner when decelerating, and is made richer when racing.)	When the engine is running at 4,000 r/min, decelerate suddenly.	200 mV or less	Procedure No.33	13B-63
			When engine is suddenly raced.	600 – 1,000 mV		
		Engine: Warming up (The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the engine-A/T-ECU.)	Engine is idling	Voltage changes repeatedly between 400 mV or less and 600 – 1,000 mV.		
			2,500 r/min			
A2*5	Right bank oxygen sensor (rear) <Vehicles for Taiwan>	● Engine: After having warming up	Racing	0 and 600 – 1,000 mV alternate.	Procedure No.35	13B-65
A3*5	Oxygen sensor <Vehicles for General Export with catalytic converter, GCC, Brazil, Australia> Left bank oxygen sensor (front) <Vehicles for Taiwan>	Engine: Warming up (Air/fuel mixture is made leaner when decelerating, and is made richer when racing.)	When the engine is running at 4,000 r/min, decelerate suddenly.	200 mV or less	Procedure No.31 <Vehicles for General Export with Catalytic converter, GCC, Brazil, Australia> Procedure No.32 <Vehicles for Taiwan>	13B-61, 13B-62
			When engine is suddenly raced.	600 – 1,000 mV		
		Engine: Warming up (The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the engine-A/T-ECU.)	Engine is idling	Voltage changes repeatedly between 400 mV or less and 600 – 1,000 mV.		
			2,500 r/min			

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page
A4*5	Left bank oxygen sensor (rear) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine: After having warming up 	Racing	0 and 600 – 1,000 mV alternate.	Procedure No.32	13B-62
12*5	Air flow sensor *1	<ul style="list-style-type: none"> Engine coolant temperature: 80 – 95°C Lights, electric cooling fan and all accessories: "OFF" Transmission: P range 	Engine is idling	3.5 – 7.5 gm/s	–	–
			2,500 r/min	13.6 – 19.6 gm/s		
			Engine is raced	Frequency increases in response to racing		
13*5	Intake air temperature sensor	Ignition switch: "ON" or with engine running	When intake air temperature is –20°C	–20°C	Code No. P0110	13B-10
			When intake air temperature is 0°C	0°C		
			When intake air temperature is 20°C	20°C		
			When intake air temperature is 40°C	40°C		
			When intake air temperature is 80°C	80°C		
21*5	Engine coolant temperature sensor	Ignition switch: "ON" or with engine running	When engine coolant temperature is –20°C	–20°C	Code No. P0115	13B-11
			When engine coolant temperature is 0°C	0°C		
			When engine coolant temperature is 20°C	20°C		
			When engine coolant temperature is 40°C	40°C		
			When engine coolant temperature is 80°C	80°C		

Item No.	Inspection item	Inspection condition		Normal condition	Code No./ Inspection procedure No.	Reference page	
22*5	Crank angle sensor	<ul style="list-style-type: none">Engine: CrankingTachometer: Connected		Compare the engine speed readings on the tachometer and the MUT-II	Code No. P0335	13B-19	
		Engine: Idling	When engine coolant temperature is -20°C	1,300 – 1,500 r/min			
			When engine coolant temperature is 0°C	1,300 – 1,500 r/min			
			When engine coolant temperature is 20°C	1,300 – 1,500 r/min			
			When engine coolant temperature is 40°C	1,040 – 1,240 r/min			
			When engine coolant temperature is 80°C	300 – 800 r/min			
44*5	Ignition coil and power transistor	<ul style="list-style-type: none">Engine: After having warming upTiming lamp is set (to check actual ignition timing)	Engine is idling	2 – 18° deg	–	–	
			2,500 r/min	27 – 47° deg			
87*5	Engine load	Engine: After having warming up	Engine is idling	12 – 27%	–	–	
			2,500 r/min	12 – 25%			
8A*5	Throttle position sensor (main)*4	<ul style="list-style-type: none">Ignition switch: ON (Engine is stopped)Remove the intake air hose at the throttle body side.Disconnect the throttle position sensor connector, and then connect terminal No.1, No.2, No.3 and No.4 with the use of the special tool: MB991348.	Close the throttle valve with a finger fully.	0 – 10%	Code No. P0122, P0123	13B-14, 13B-15	
			Open the throttle valve with a finger fully.	80 – 100%			
		No load		450 – 1,000 mV			
		A/C switch: “OFF” to “ON”		Voltage rises			
		<ul style="list-style-type: none">A/C switch: “OFF”Shift lever: “N” to “D”					

ACTUATOR TEST REFERENCE TABLE

Item No.	Inspection item	Drive content	Inspection conditions		Normal condition	Code No./ Inspection procedure No.	Reference page
01	Injectors	Cut off No. 1 injector	Engine: After having warmed up/ Engine is idle (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	13B-16
02		Cut off No. 2 injector				Code No. P0202	
03		Cut off No. 3 injector				Code No. P0203	
04		Cut off No. 4 injector				Code No. P0204	
05		Cut off No. 5 injector				Code No. P0205	
06		Cut off No. 6 injector				Code No. P0206	
07	Fuel pump	Fuel pump operates and fuel is recirculated.	Ignition switch: ON	Pinch the return hose with fingers to feel the pulse of the fuel being recirculated.	Pulse is felt.	Procedure No. 26	13B-57
				Listen near the fuel tank for the sound of fuel pump operation.	Sound of operation is heard.		
08	Purge control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Clicks when solenoid valve is driven.	Procedure No.36	13B-66
10	EGR control solenoid valve <Vehicles except Taiwan>	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Clicks when solenoid valve is driven.	Procedure No.37	13B-67
11	Variable induction control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Clicks when solenoid valve is driven.	–	–
17	Basic ignition timing	Set to ignition timing adjustment mode	Engine: Idling Timing light is set		5° BTDC	–	–

Engine-A/T-ECU Connector Terminal Arrangement

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Terminal No.	Check item	Check condition (Engine condition)	Normal condition
1	No. 1 injector	While engine is idling after having warmed up, suddenly depress the accelerator pedal.	From 11 – 14 V, momentarily drops slightly
5	No. 2 injector		
14	No. 3 injector		
21	No. 4 injector		
2	No. 5 injector		
6	No. 6 injector		
3	EGR valve (Stepper motor coil <A1>) <Vehicles for Taiwan>	Ignition switch: OFF to ON	5 – 8 V (Repeatedly change for approx. 3 seconds)
12	EGR valve (Stepper motor coil <A2>) <Vehicles for Taiwan>		
19	EGR valve (Stepper motor coil <B1>) <Vehicles for Taiwan>		
26	EGR valve (Stepper motor coil <B2>) <Vehicles for Taiwan>		
20	EGR control solenoid valve <Vehicles except Taiwan>	Ignition switch: ON	System Voltage
		While engine is idling, suddenly depress the accelerator pedal.	From system voltage, momentarily drops
8	Fuel pump relay <Vehicles for General Export, Brazil>	Ignition switch: ON	System voltage
		Engine: Idle speed	0 – 3 V
	A/C relay <Vehicles except for General Export, Brazil>	<ul style="list-style-type: none"> Engine: Idle speed A/C switch: OFF → ON (A/C compressor is operating) 	System voltage or momentarily 6 V or more → 0 – 3 V

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
34	Power supply	Ignition switch: ON		System voltage
43				
37	Air flow sensor reset signal	Engine: Idle speed		0 – 1 V
		Engine r/min: 3,000 r/min		6 – 9 V
17	Fan relay	When the condenser fan is not operating		System voltage
		When the radiator fan and condenser fan are operating		0 – 3 V
16	A/C relay <Vehicles for General Export, Brazil>	<ul style="list-style-type: none"> Engine: Idle speed A/C switch: OFF → ON (A/C compressor is operating) 		System voltage or momentarily 6 V or more → 0 – 3 V
	Fuel pump relay <Vehicles except for General Export, Brazil>	Ignition switch: ON		System voltage
		Engine: Idle speed		0 – 3 V
23	Purge control solenoid valve <Vehicles with catalytic converter>	Ignition switch: ON		System voltage
		Running at 3,000 r/min while engine is warming up after having been started.		Approx. 9 V
7	Engine warning lamp	Ignition switch: OFF → ON		0 – 3 V → 9 – 13 V (After several seconds have elapsed)
47	Power steering fluid pressure switch	Engine: Idling after warming up	When steering wheel is stationary	System voltage
			When steering wheel is turned	1 V or less
57	Control relay (Power supply)	Ignition switch: OFF		System voltage
		Ignition switch: ON		1 V or less
69	A/C switch	Engine: Idle speed	Turn the A/C switch OFF	1 V or less
			Turn the A/C switch ON (A/C compressor is operating)	System voltage

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
78	A/C load signal	<ul style="list-style-type: none"> Engine: Idling Outside air temperature: 25°C or more 	When A/C is MAX. COOL condition (when the load by A/C is high)	0 – 3 V
			When A/C is MAX. HOT condition (When the load by A/C is low)	System voltage
51	Ignition switch – ST	Engine: Cranking		8 V or more
99	Intake air temperature sensor	Ignition switch: ON	When intake air temperature is 0°C	3.2 – 3.8 V
			When intake air temperature is 20°C	2.3 – 2.9 V
			When intake air temperature is 40°C	1.5 – 2.1 V
			When intake air temperature is 80°C	0.4 – 1.0 V
108	Mixture adjusting screw (variable resistor) <Vehicles with catalytic converter>	Ignition switch: ON		1 ↔ 4 V
	Oxygen sensor <Vehicles without catalytic converter>	Engine: Running at 2,500 r/min after warmed up (Check using a digital type voltmeter)		0 ↔ 0.8 V (Changes repeatedly)
58	Backup power supply	Ignition switch: OFF		System voltage
97	Sensor impressed voltage	Ignition switch: ON		4.5 – 5.5 V
50	Ignition switch – IG	Ignition switch: ON		System voltage

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
98	Engine coolant temperature sensor	Ignition switch: ON	When engine coolant temperature is −20°C	3.9 – 4.5 V
			When engine coolant temperature is 0°C	3.2 – 3.8 V
			When engine coolant temperature is 20°C	2.3 – 2.9 V
			When engine coolant temperature is 40°C	1.3 – 1.9 V
			When engine coolant temperature is 60°C	0.7 – 1.3 V
			When engine coolant temperature is 80°C	0.3 – 0.9 V
100	Barometric pressure sensor	Ignition switch: ON	When altitude is 0 m	3.7 – 4.3 V
			When altitude is 600 m	3.4 – 4.0 V
			When altitude is 1,200 m	3.2 – 3.8 V
			When altitude is 1,800 m	2.9 – 3.5 V
79	Vehicle speed sensor	<ul style="list-style-type: none">Ignition switch: ONMove the vehicle slowly forward		0 ↔ 8 – 12 V (Changes repeatedly)
70	Crank angle sensor	Engine: Cranking		0.4 – 4.0 V
		Engine: Idling		1.5 – 2.5 V
63	Air flow sensor	Engine: Idling		2.2 – 3.2 V
		Engine r/min: 2,500r/min		

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
4	Variable induction control valve	Engine: Idling		1 V or less
		Engine: 4,500 r/min		System voltage
10	Left bank oxygen sensor heater (front) <Vehicles for Taiwan>	Engine: Warming up, idling (15 seconds after starting engine)		9 – 11 V
		Engine: Racing		9 – 11 V → System voltage (momentarily)
15	Throttle valve control servo relay	Ignition switch: OFF		System voltage
		Ignition switch: ON		1 V or less
18	Left bank oxygen sensor heater (rear) <Vehicles for Taiwan>	Engine: Idling, warming up		1 V or less
		Engine: Racing		System voltage
24	Right bank oxygen sensor heater (rear) <Vehicles for Taiwan>	Engine: Idling, warming up		1 V or less
		Engine: Racing		System voltage
25	Right bank oxygen sensor heater (front) <Vehicles for Taiwan>	Engine: Warming up, idling (15 seconds after starting engine)		9 – 11 V
		Engine: Racing		9 – 11 V → System voltage (momentarily)
31	Ignition coil – No.1, No.4 (ignition power transistor)	Engine: 3,000 r/min		0.3 – 3.0 V
35	Ignition coil – No.2, No.5 (ignition power transistor)			
44	Ignition coil – No.3, No.6 (ignition power transistor)			
38	Accelerator pedal position switch	Ignition switch: ON	Closed throttle	0 – 1 V
			Open throttle slightly	4 V or more
71	Camshaft position sensor	Engine: Cranking		0.4 – 3.0 V
		Engine: Idling		0.5 – 0.2 V
87	Tachometer signal	Engine: 3,000 r/min		0.3 – 3.0 V

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
92	Power supply for the accelerator pedal position sensor (main)	Ignition switch: ON		4.5 – 5.5 V
106	Power supply for the throttle position sensor	Ignition switch: ON		4.5 – 5.5 V
107	Accelerator pedal position sensor (sub)	Ignition switch: ON	Release the accelerator pedal	0.905 – 1.165 V
			Depress the accelerator pedal fully	4.035 V or more
108	Oxygen sensor heater	Engine: Warming up, 2,500 r/min (Check using a digital voltmeter)		0 and 0.8 V alternates (changes repeatedly)
109	Right bank oxygen sensor (front) <Vehicles for Taiwan>	Engine: Warming up, 2,500 r/min (Check using a digital voltmeter)		0 and 0.8 V alternates (changes repeatedly)
113	Throttle position sensor (sub)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body. Remove the intake air hose at the throttle body. Disconnect the throttle position sensor, and then connect terminal numbers No.1, No.2, No.3 and No.4 with the use of the MUT-II. Ignition switch: ON 	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	3.8 – 4.9 V
114	Accelerator pedal position sensor (main)	Ignition switch: ON	Release the accelerator pedal	0.905 – 1.165 V
			Depress the accelerator pedal fully	4.035 V or more

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
115	Throttle position sensor (main)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body. Remove the intake air hose at the throttle body. Disconnect the throttle position sensor, and then connect terminal numbers No.1, No.2, No.3 and No.4 with the use of the MUT-II. Ignition switch: ON 	Fully close the throttle valve with your finger	0.2 – 0.8 V
			Fully open the throttle valve with your finger	3.8 – 4.9 V
116	Left bank oxygen sensor (rear) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine: Warming up Engine: Racing 		0 and 0.6 – 1.0 V alternates
117	Right bank oxygen sensor (rear) <Vehicles for Taiwan>	<ul style="list-style-type: none"> Engine: Warming up Engine: Racing 		0 and 0.6 – 1.0 V alternates
133	Throttle valve control servo (+)	<ul style="list-style-type: none"> Ignition switch: ON Accelerator pedal: Fully opened → fully closed 		Decreases slightly (approx. 2V) from battery voltage.
141	Throttle valve control servo (–)	<ul style="list-style-type: none"> Ignition switch: ON Accelerator pedal: Fully opened → fully closed 		Decrease slightly (approx. 2V) from battery voltage.

CHECK CHART FOR RESISTANCE AND CONTINUITY BETWEEN TERMINALS

Engine-A/T-ECU Harness Side Connector Terminal Arrangement

124	123				122	121	95	94	93			92	91	64	63			62	61	34	33			32	31	4	3			2	1													
133	132	131	130	129	128	127	126	125	104	103	102	101	100	99	98	97	96	73	72	71	70	69	68	67	66	65	43	42	41	40	39	38	37	36	35	13	12	11	10	9	8	7	6	5
141	140	139	138	137	136		135	134	112	111	110		109	108	107	106	105	82	81	80	79	78	77	76	75	74	51	50	49	48	47	46	45	44	20	19	18	17	16		15	14		
146	145				144		143	142	120	119	118		117	116	115		114	113	89	88	87	86	85	84	83	58	57	56	55	54	53	52	27	26	25	24	23	22	21					

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Terminal No.	Inspection item	Normal condition (Check condition)
1 – 34	No. 1 injector	13 – 16 Ω (At 20°C)
5 – 34	No. 2 injector	
14 – 34	No. 3 injector	
21 – 34	No. 4 injector	
2 – 34	No. 5 injector	
25 – 34	No. 6 injector	
3 – 34	EGR Valve [Stepper motor coil (A1)] <Vehicles for Taiwan>	20 – 24 Ω (At 20°C)
12 – 34	EGR Valve [Stepper motor coil (A2)] <Vehicles for Taiwan>	
19 – 34	EGR Valve [Stepper motor coil (B1)] <Vehicles for Taiwan>	
26 – 34	EGR Valve [Stepper motor coil (B2)] <Vehicles for Taiwan>	
20 – 34	EGR control solenoid valve <Vehicles except for Taiwan>	36 – 44 Ω (At 20°C)
23 – 34	Purge control solenoid valve <Vehicles with catalytic converter>	30 – 34 Ω (At 20°C)
33 – Body earth	Engine-A/T-ECU earth	Continuity (0 Ω)
42 – Body earth	Engine-A/T-ECU earth	

Terminal No.	Inspection item	Normal condition (Check condition)
99 – 96	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)
98 – 96	Engine coolant temperature sensor	5.1 – 6.5 k Ω (When coolant temperature is 0°C)
		2.1 – 2.7 k Ω (When coolant temperature is 20°C)
		0.9 – 1.3 k Ω (When coolant temperature is 40°C)
		0.26 – 0.36 k Ω (When coolant temperature is 80°C)
10 – 34	Oxygen sensor heater <Vehicles export for Taiwan> or Left bank oxygen sensor heater (front) <Vehicles for Taiwan>	4.5 – 8.0 Ω (at 20°C)
25 – 34	Right bank oxygen sensor heater (front) <Vehicles for Taiwan>	4.5 – 8.0 Ω (at 20°C)
4 – 34	Variable induction control valve	29 – 35 Ω (at 20°C)
18 – 34	Left bank oxygen sensor heater (rear) <Vehicles for Taiwan>	11 – 18 Ω (at 20°C)
24 – 34	Right bank oxygen sensor heater (rear) <Vehicles for Taiwan>	11 – 18 Ω (at 20°C)
144 – Body earth	Engine-A/T-ECU earth	Continuity (0 Ω)
145 – Body earth	Engine-A/T-ECU earth	
133 – 141	Throttle valve control servo	0.3 – 100 Ω (at 20°C)

INSPECTION PROCEDURE USING AN ANALYZER**AIR FLOW SENSOR (AFS)**

The measurement method at the engine-A/T-ECU side has been changed.

The other inspection procedures are the same as before.

Alternate Method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 63.

CAMSHAFT POSITION SENSOR AND CRANK ANGLE SENSOR

The measurement method at the engine-A/T-ECU side has been changed.

The other inspection procedures are the same as before.

Alternate Method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 71. (When checking the camshaft position sensor signal wave pattern.)
2. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 70. (When checking the crank angle sensor signal wave pattern.)

INJECTOR

The measurement method has been changed.

The other inspection procedures are the same as before.

Measurement Method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 1. (When checking the No. 1 cylinder.)
2. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 5. (When checking the No. 2 cylinder.)
3. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 14. (When checking the No. 3 cylinder.)
4. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 21. (When checking the No. 4 cylinder.)
5. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 2. (When checking the No. 5 cylinder.)
6. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 6. (When checking the No. 6 cylinder.)

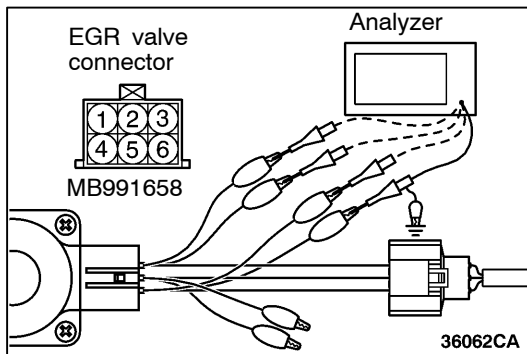
IGNITION COIL AND POWER TRANSISTOR

The measurement method at the engine-A/T-ECU side has been changed.

The other inspection procedures are the same as before.

Alternate Method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 31 (No.1 – No.2 ignition coil), terminal 35 (No.2 – No.5 ignition coil), terminal 44 (No.3 – No.6 ignition coil) respectively.

**EGR VALVE (STEPPER MOTOR)****<VEHICLES FOR TAIWAN>****Measurement Method**

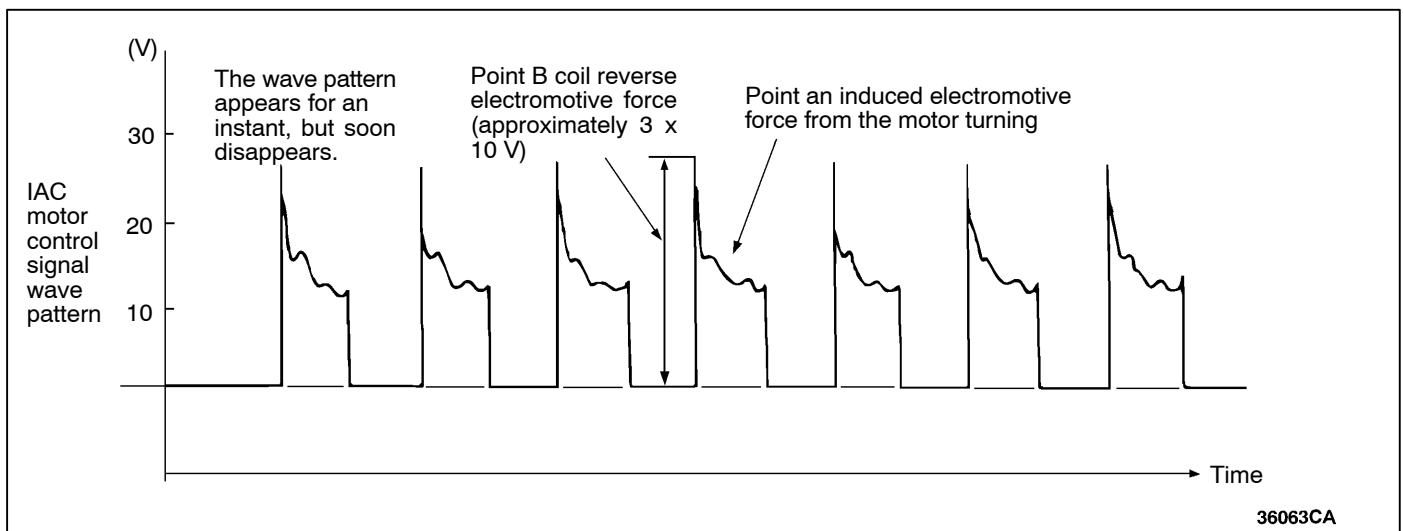
1. Disconnect the EGR valve connector, and connect the test harness special tool (MB991658) in between. (All terminals should be connected.)
2. Connect the analyzer probe to the EGR valve connector terminal 1, terminal 3, terminal 4 and terminal 6 respectively.

Alternate Method (Test harness not available)

1. Connect the analyzer probe to engine-A/T-ECU terminals 3, 12, 19, 26.

Standard Wave Pattern**Observation conditions**

Function	Special patterns
Pattern height	High
Pattern selector	Display
Engine condition	Racing

Standard wave pattern

Wave Pattern Observation Points

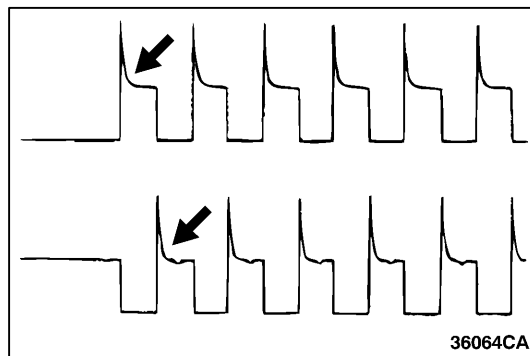
Check that the standard wave pattern appears when the EGR valve is operating.

Point A: Presence or absence of induced electromotive force from the motor turning. (Refer to the abnormal wave pattern.)

Contrast with standard wave pattern	Probable cause
Induced electromotive force does not appear or is extremely small.	Malfunction of motor

Point B: Height of coil back electromotive force

Contrast with standard wave pattern	Probable cause
Coil reverse electromotive force does not appear or is extremely small.	Short in the coil

**Examples of Abnormal Wave Pattern**

- Example 1

Cause of problem

Malfunction of motor. (Motor is not operating.)

Wave pattern characteristics

Induced electromotive force from the motor turning does not appear.

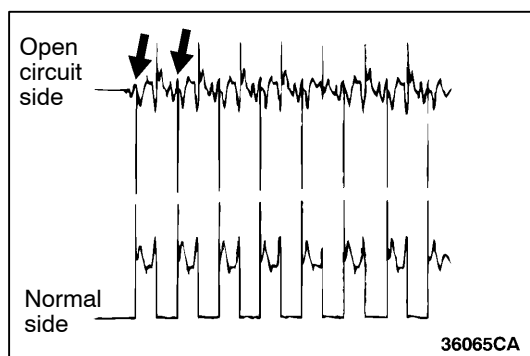
- Example 2

Cause of problem

Open circuit in the line between the EGR valve and the engine-A/T-ECU.

Wave pattern characteristics

Current is not supplied to the motor coil on the open circuit side. (Voltage does not drop to 0 V.) Furthermore, the induced electromotive force wave pattern at the normal side is slightly different from the normal wave pattern.

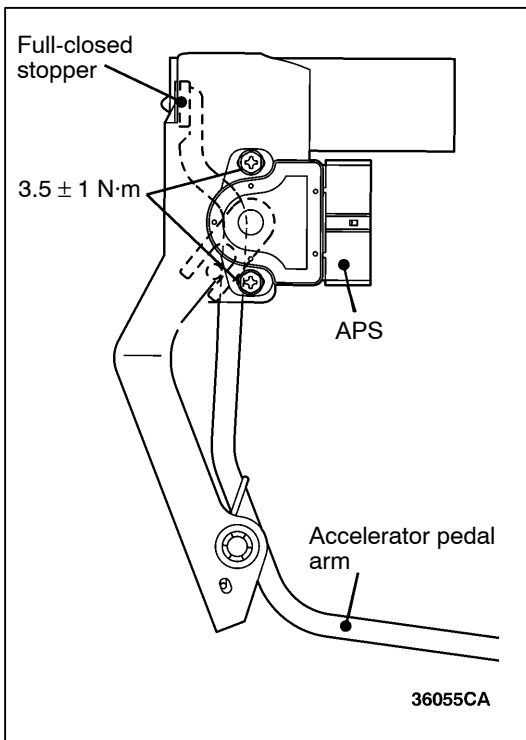
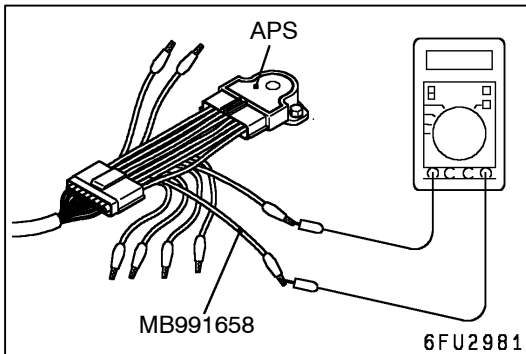
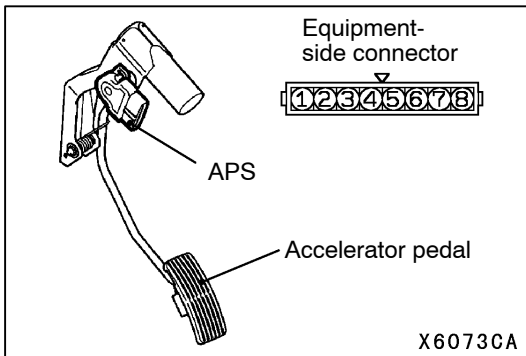


ON-VEHICLE SERVICE

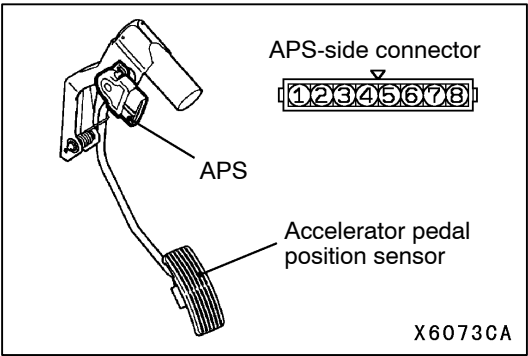
ACCELERATOR PEDAL POSITION SENSOR (APS) ADJUSTMENT

Caution

1. The APS should not be moved unnecessarily; it has been precisely adjusted by the manufacturer.
2. If the adjustment is disturbed for any reason, readjust as follows.



1. Remove the accelerator pedal complete.
2. Connect the MUT-II to the diagnosis connector. If the MUT-II is not used, carry out the following steps.
 - (1) Disconnect the APS connector, and connect the special tool (test harness: MB991658) to that connector.
(Be careful not to confuse the terminal numbers.)
 - (2) Connect a digital voltmeter between APS connector terminal 3 [output of APS (main)] and terminal 3 [earth of APS (main)].
3. Loosen the APS mounting bolts, and hold the APS temporarily.
4. Check that the accelerator pedal arm touches the full-closed stopper.
5. Turn the ignition switch to the ON position. (but do not start the engine.)
6. Turn the APS until the output from APS (main) satisfies the standard value.
Standard value: 0.985 – 1.085 V
7. Tighten the APS mounting bolts to the specified torque.
Tightening torque: $3.5 \pm 1 \text{ N}\cdot\text{m}$
8. Install the accelerator pedal complete.



ACCELERATOR PEDAL POSITION SENSOR (APS) CHECK

1. Disconnect the APS connector.
2. Measure the resistances between APS connector terminal 2 [power supply of APS (main)] and terminal 1 [earth of APS (main)] and between terminal 8 [power supply of APS (sub)] and terminal 7 [earth of APS (sub)].

Standard value: 3.5 – 6.5 kΩ

3. Measure the resistances between APS connector terminal 2 [power supply of APS (sub)] and terminal 3 [output of APS (main)] and between terminal 8 [power supply of APS (sub)] and terminal 6 [output of APS (sub)].

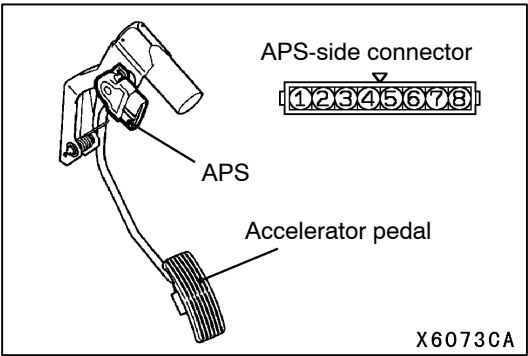
Normal condition:

Depress the accelerator pedal slowly.	Changes smoothly in proportion to the pedal stroke.
---------------------------------------	---

4. If the resistance is outside the standard value, or if it doesn't change smoothly, replace the APS.

NOTE

For the accelerator pedal position sensor adjustment procedure, refer to P.13A-106.



ACCELERATOR PEDAL POSITION SWITCH CHECK

1. Disconnect the accelerator pedal position sensor (APS) connector.
2. Check the continuity between APS connector terminal No.4 (accelerator pedal position switch) and terminal No.5 (earth).

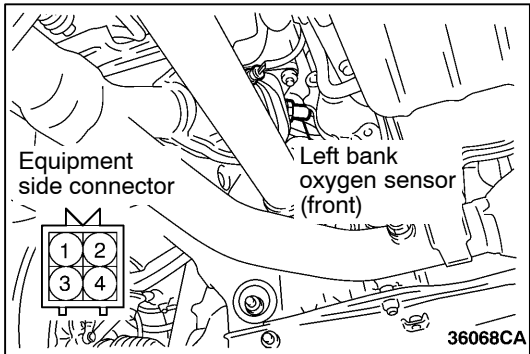
Normal condition:

Accelerator pedal	Continuity
Depress	No continuity
Release	Continuity

3. If defective, replace the accelerator pedal position sensor.

NOTE

For the accelerator pedal position sensor adjustment procedure, refer to P.13A-106.

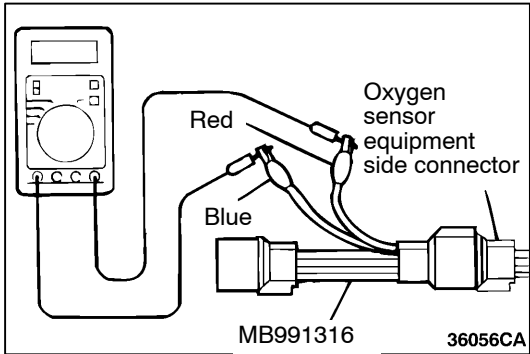


OXYGEN SENSOR CHECK

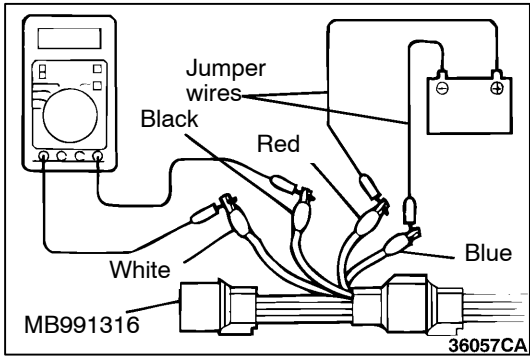
<VEHICLES FOR TAIWAN>

<Left bank oxygen sensor (front)>

1. Disconnect the oxygen sensor connector, and connect the special tool (test harness) to the connector on the heated oxygen sensor side.



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



5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.
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 revving the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

Caution

- Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.
- Be careful the heater is broken when voltage of beyond 8 V is applied to the oxygen sensor heater.

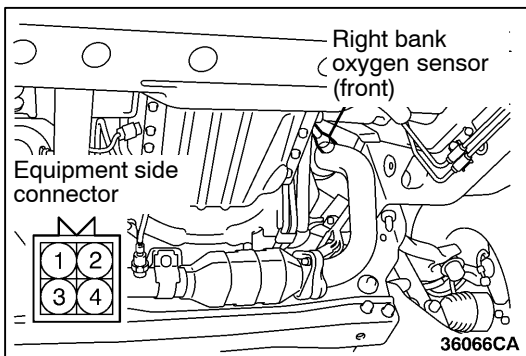
NOTE

If the sufficiently high temperature (of approximate 400°C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No.1 (red clip of special tool) and the terminal No.3 (blue clip of special tool) of the oxygen sensor with a (+) terminal and (-) terminal of 8 V power supply respectively, then check again.

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

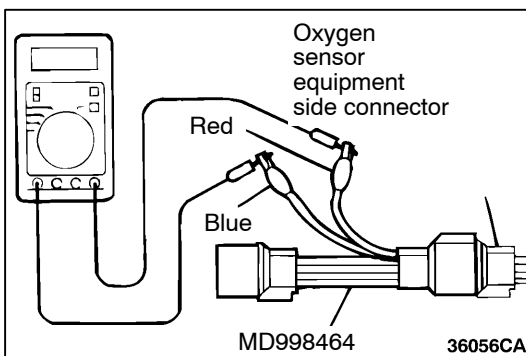
NOTE

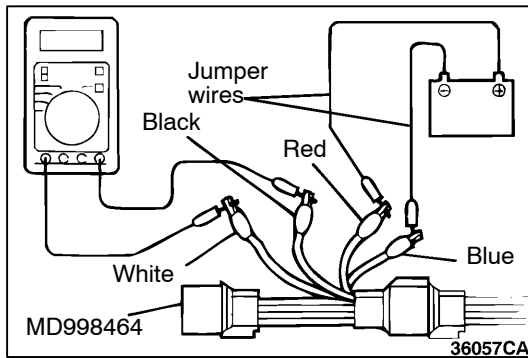
For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Pipe and Main Muffler.



<Right bank oxygen sensor (front)>

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





5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.
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 revving the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

Caution

- **Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.**
- **Be careful the heater is broken when voltage of beyond 8 V is applied to the oxygen sensor heater.**

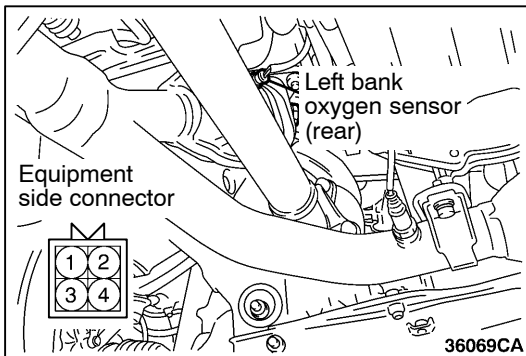
NOTE

If the sufficiently high temperature (of approximate 400°C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No.1 (red clip of special tool) and the terminal No.3 (blue clip of special tool) of the oxygen sensor with a (+) terminal and (-) terminal of 8 V power supply respectively, then check again.

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

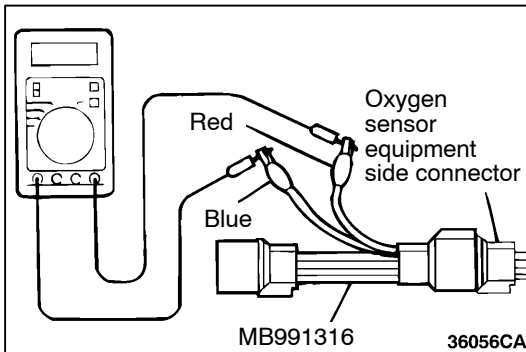
NOTE

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

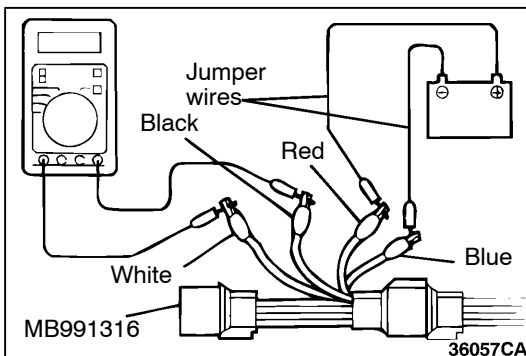


<Left bank oxygen sensor (rear)>

1. Disconnect the oxygen sensor connector, and connect the special tool (test harness) to the connector on the heated oxygen sensor side.



2. Make sure that there is continuity ($11 - 18 \Omega$ at 20°C) between terminal 1 (red clip of the special tool) and terminal 3 (blue clip of the special tool) on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until the engine coolant is 80°C or higher.



5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.
6. Connect a digital voltage meter between terminal 2 (black clip) and terminal 4 (white clip).
7. While repeatedly revving 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 revving the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

Caution

- Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.
- Be careful the heater is broken when voltage of beyond 12 V is applied to the oxygen sensor heater.

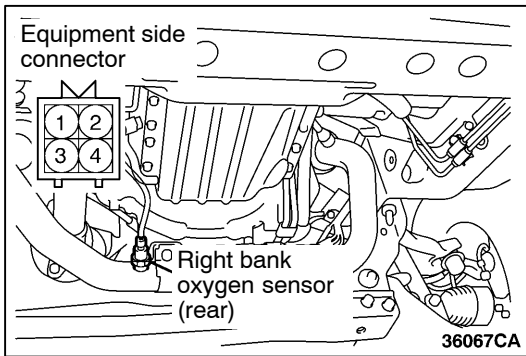
NOTE

If the sufficiently high temperature (of approximate 400°C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No.1 (red clip of special tool) and the terminal No.3 (blue clip of special tool) of the oxygen sensor with a (+) terminal and (-) terminal of 12 V power supply respectively, then check again.

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

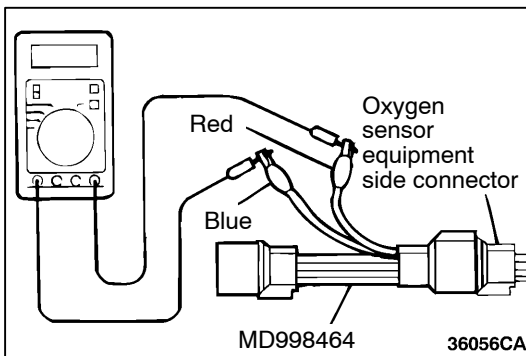
NOTE

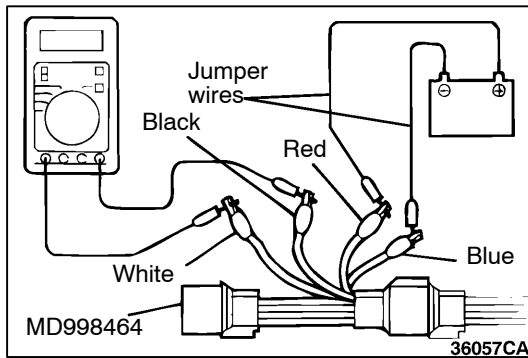
For removal and installation of the oxygen sensor, refer to GROUP 15 – Exhaust Pipe and Main Muffler.



<Right bank oxygen sensor (rear)>

1. Disconnect the oxygen sensor connector, and connect the special tool (test harness) to the connector on the heated oxygen sensor side.
2. Make sure that there is continuity (11 – 18 Ω at 20°C) between terminal 1 (red clip of the special tool) and terminal 3 (blue clip of the special tool) on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until the engine coolant 80°C or higher.





5. Perform a tracing for 5 minutes or more with the engine speed of 4,500 r/min.
6. Connect a digital voltage meter between terminal 2 (black clip) and terminal 4 (white clip).
7. While repeatedly revving 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 revving the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 – 1.0 V.

Caution

- **Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.**
- **Be careful the heater is broken when voltage of beyond 12 V is applied to the oxygen sensor heater.**

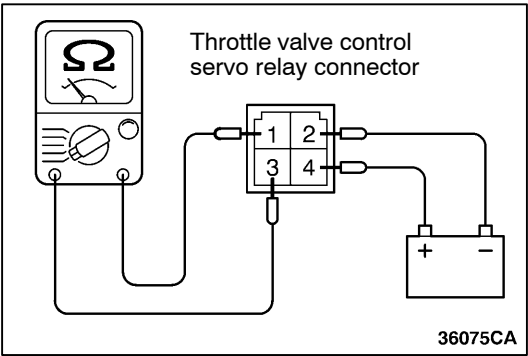
NOTE

If the sufficiently high temperature (of approximate 400°C or more) is not reached although the oxygen sensor is normal, the output voltage would be possibly low although the rich air-fuel ratio. Therefore, if the output voltage is low, use a jumper wire to connect the terminal No.1 (red clip of special tool) and the terminal No.3 (blue clip of special tool) of the oxygen sensor with a (+) terminal and (-) terminal of 12 V power supply respectively, then check again.

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

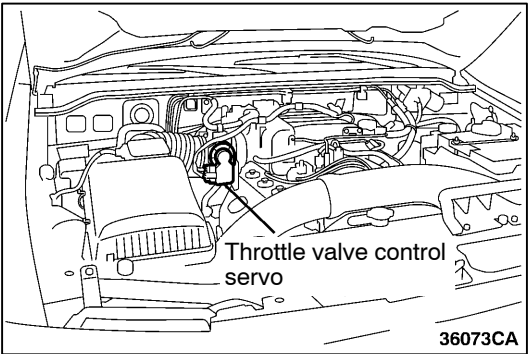
NOTE

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



THROTTLE VALVE CONTROL SERVO RELAY CHECK

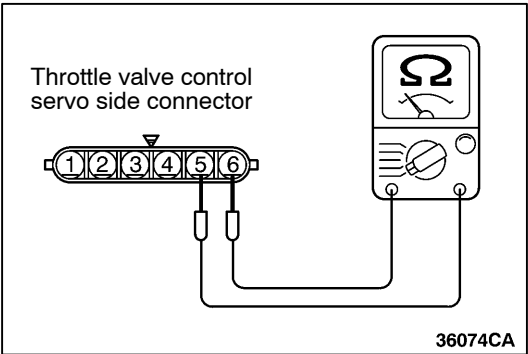
Battery voltage	Terminal No.			
	1	2	3	4
Not supplied		○		○
Supplied	○	⊖	○	⊕



THROTTLE VALVE CONTROL SERVO CHECK

<Operation Inspection>

1. Disconnect the air intake hose from the throttle body.
2. Set the ignition switch to the ON position.
3. Operate the accelerator pedal and confirm that the throttle valve is opening and closing accordingly.



<Checking the Terminal Resistance>

1. Disconnect the throttle position sensor connector.
2. Measure the resistance between terminal No. 5 and No. 6.

Standard value: 0.3 – 100 Ω (at 20°C)

3. If the resistance is outside the standard value, replace the throttle body assembly.

THROTTLE BODY

REMOVAL AND INSTALLATION

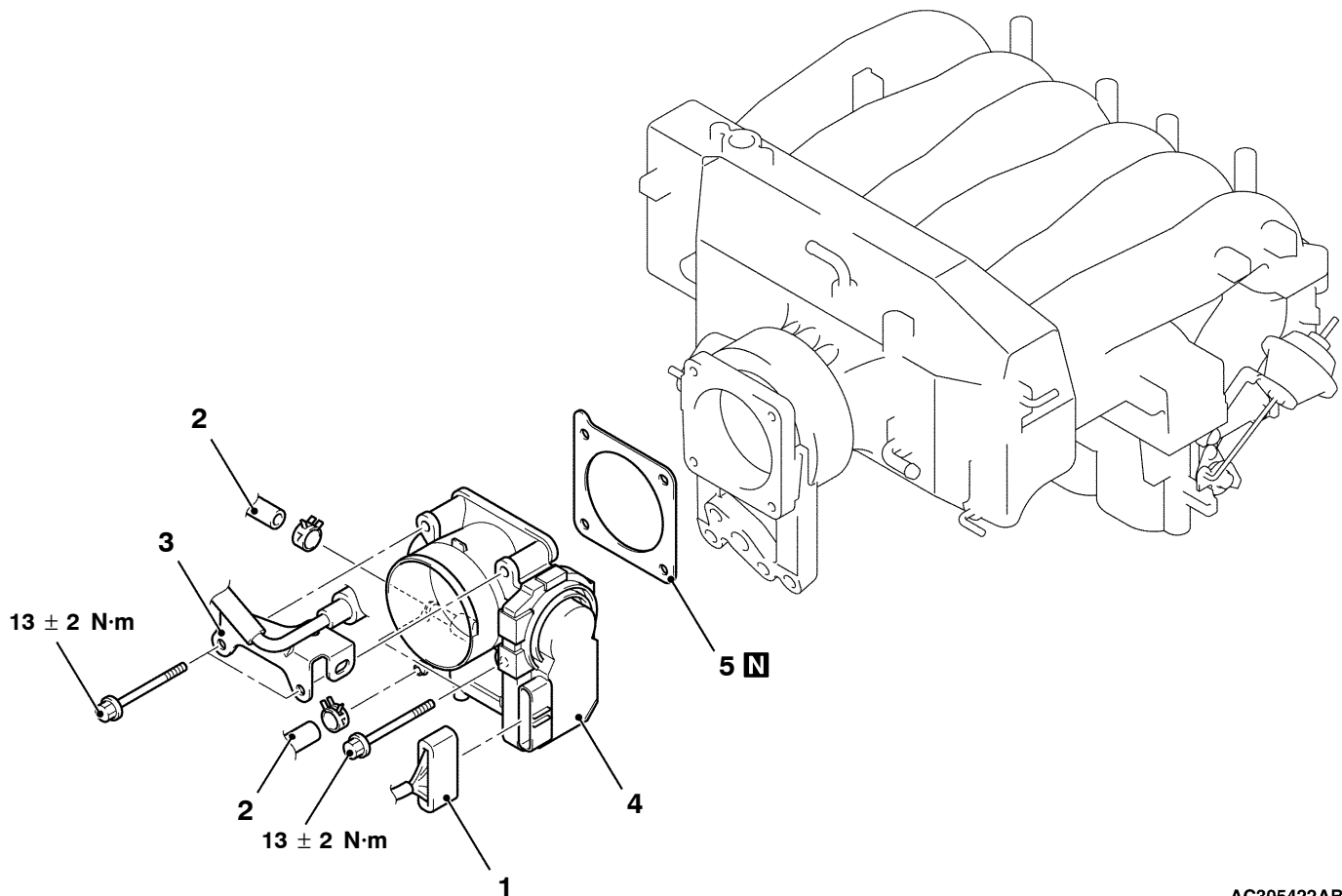
<6G75-MPI>

Pre-removal Operation

- Engine Coolant Draining
- Air Cleaner Removal
(Refer to GROUP 15 – Air Cleaner.)

Post-installation Operation

- Air Cleaner Installation
(Refer to GROUP 15 – Air Cleaner.)
- Engine Coolant Refilling

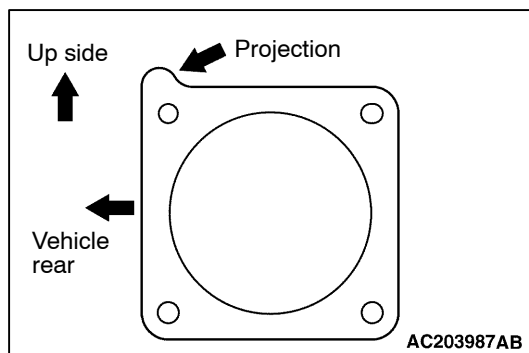


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Removal steps

1. Throttle position sensor connector
2. Water hoses connection
3. Purge hose bracket

- A◄ 4. Throttle body
5. Throttle body gasket



INSTALLATION SERVICE POINT

►A◄ THROTTLE BODY GASKET INSTALLATION

Install the throttle body gasket as shown in the illustration.

Caution

Poor idling etc. may result if the throttle body gasket is installed incorrectly.

14

ENGINE COOLING

CONTENTS

GENERAL	1
OUTLINE OF CHANGE	1
GENERAL INFORMATION	1

GENERAL

OUTLINE OF CHANGE

Due to the addition of the vehicles with 6G75-MPI engine, the radiator specification has been established.

GENERAL INFORMATION

Item			Specification
Radiator	Performance kJ/h	6G75-MPI	239,000

15 INTAKE & EXHAUST

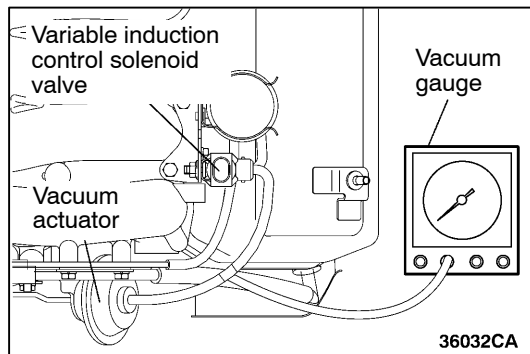
CONTENTS

GENERAL	2	Vacuum Tank Check	3
Outline of Change	2	AIR CLEANER	4
SERVICE ADJUSTMENT PROCEDURES	2	INTAKE MANIFOLD	5
Variable Induction Control System Check	2	EXHAUST MANIFOLD	8
Variable Induction Control Solenoid Valve Check	2		

GENERAL

OUTLINE OF CHANGE

Due to the addition of vehicles with 6G75-MPI engine, the following service procedures have been established.



SERVICE ADJUSTMENT PROCEDURES

VARIABLE INDUCTION CONTROL SYSTEM CHECK

1. Warm up the engine.
2. Disconnect the vacuum hose from the vacuum actuator, and then connect a vacuum gauge via the three-way joint.
3. Start the engine and verify that a vacuum is applied to the vacuum gauge.
4. As described in the chart below, vary the engine speed to inspect the vacuum conditions. During this inspection, verify that the rod of the vacuum actuator is operating.

Engine speed	Normal condition	Control valve
3,800 r/min or less	Vacuum maintained	Closed
Within 3,800 r/min or less, engine is suddenly raced	Vacuum not changed	Closed
4,000 r/min or more	Vacuum leaks	Open

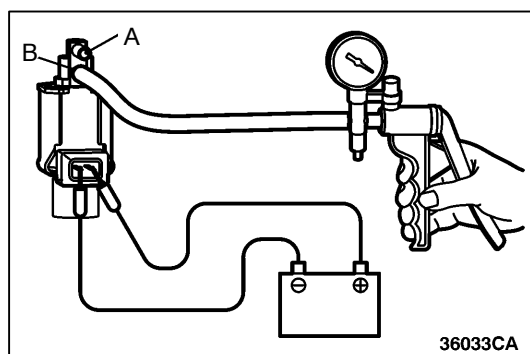
VARIABLE INDUCTION CONTROL SOLENOID VALVE CHECK

1. Disconnect the vacuum hoses from the variable induction control solenoid valve.

NOTE

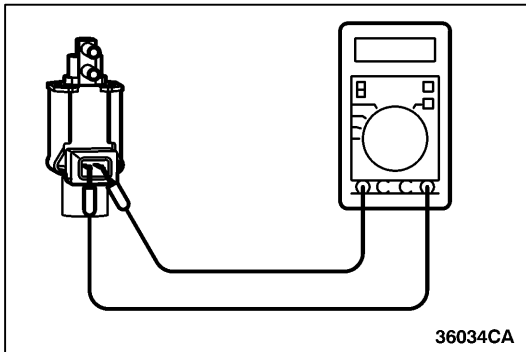
When disconnecting the vacuum hose, always make sure that it can be reconnected at its original position.

2. Disconnect the harness connector.



3. Connect a hand vacuum pump to nipple (B) of the variable induction control solenoid valve.
4. As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the variable induction control solenoid valve, and without applying voltage.

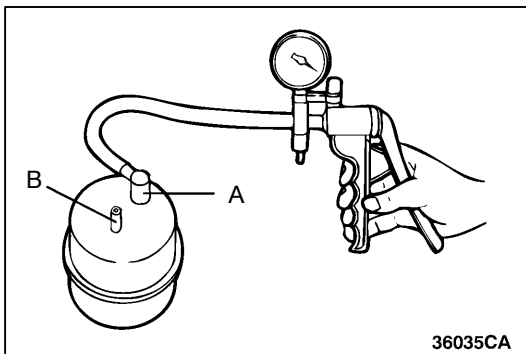
Battery positive voltage	Nipple (A) condition	Normal condition
Applied	Open	Vacuum leaks
	Closed	Vacuum maintained
Not applied	Open	Vacuum leaks



- Measure the resistance between the terminals of the variable induction control solenoid valve.

Standard value: 29 – 35 Ω [at 20°C]

- Replace the solenoid valve if resistance is out of specification.



VACUUM TANK CHECK

- Disconnect the vacuum hoses from the vacuum tank.

NOTE

When disconnecting the vacuum hose, always make sure that it can be reconnected at its original position.

- Connect a hand vacuum pump to nipple "A" of the vacuum tank, apply a vacuum of 67 kPa, and verify that the vacuum is maintained.
- Disconnect the hand vacuum pump from nipple "A" and connect it to nipple "B".
- Block nipple "A" with your finger and apply a vacuum of 67 kPa to nipple "B". Release your finger from nipple "A" and verify that the vacuum leaks immediately.
- Replace the vacuum tank if it is faulty.

AIR CLEANER

REMOVAL AND INSTALLATION

<6G75-MPI>

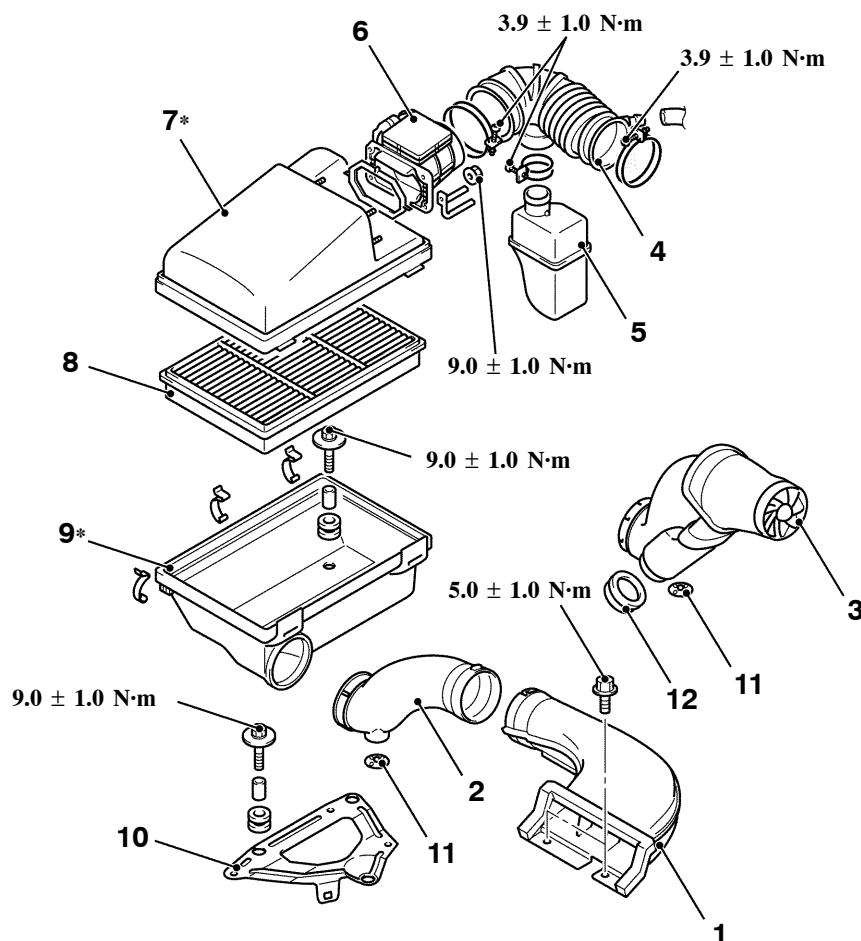
Caution

Parts marked by * are made of recycled-paper mixed plastic material, so observe the following precautions.

1. Avoid any shock or load to these parts when removing and installing them.
2. Engage the case hinges securely when assembling these parts.

NOTE

Parts marked by * are made of recycled-paper mixed plastic material, so can be disposed of by incineration.



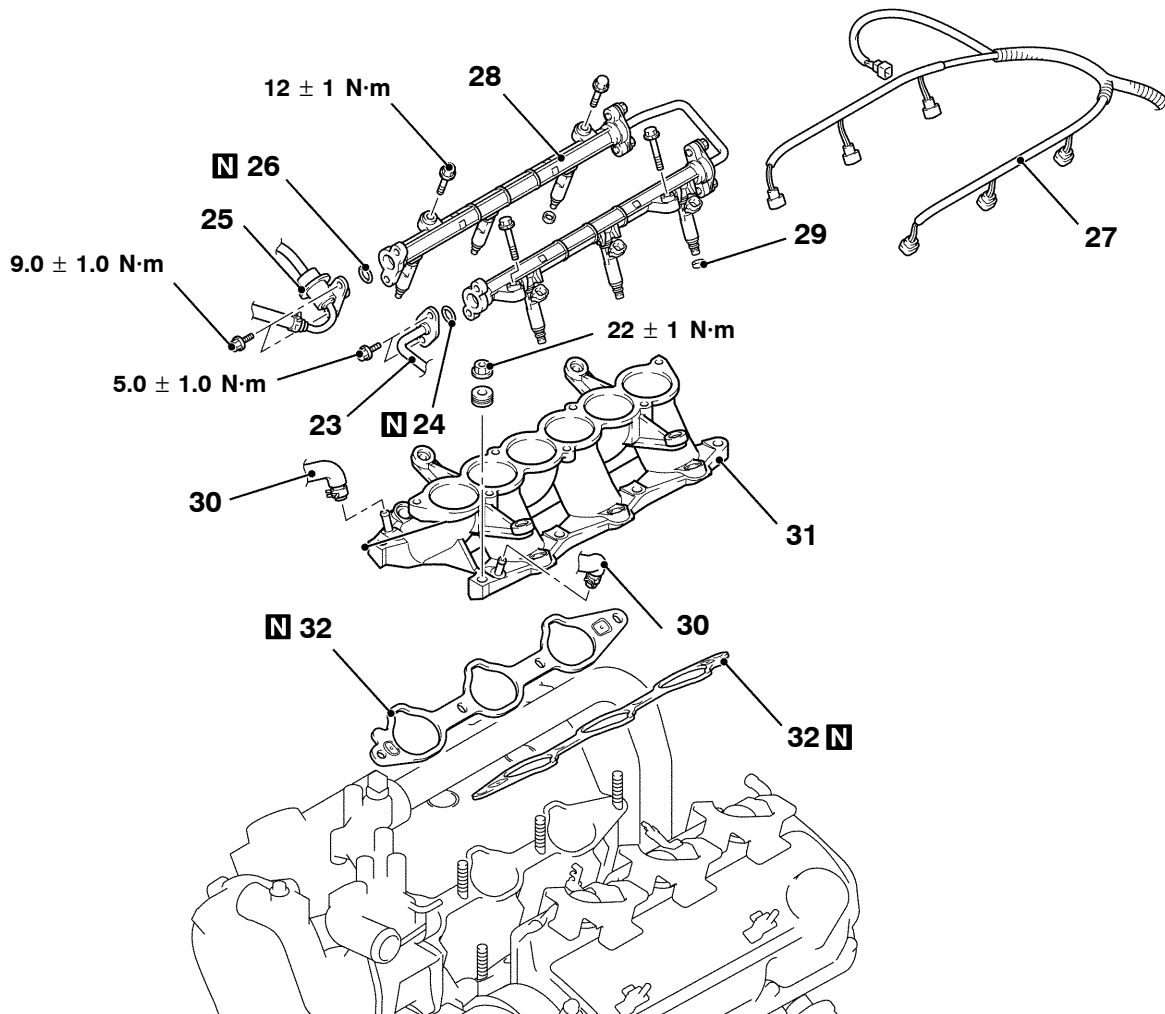
AC305407AB

Removal steps

1. Air duct (A)
2. Air duct (B)
<Vehicles without Pre-cleaner>
3. Pre-cleaner assembly
4. Air intake hose
5. Resonator
6. Air flow sensor assembly
7. Air cleaner cover
8. Air cleaner element
9. Air cleaner body
10. Air cleaner bracket
11. Unloader valve
12. Unloader valve

Removal steps

1. Control wiring harness connection
2. PCV hose connection
3. Fuel pipe
4. Vacuum hose connection
5. Water outlet fitting bracket
6. EGR pipe
7. EGR pipe gasket
8. Surge tank stay
9. Surge tank
- ▶ **D** ◀ 10. Surge tank gasket
11. Manifold differential pressure sensor <Vehicles for Taiwan>
12. O-ring <Vehicles for Taiwan>
13. Solenoid valve and vacuum hose assembly
14. EGR valve <Except for Taiwan>
15. EGR valve gasket <Except for Taiwan>
16. EGR valve <Vehicles for Taiwan>
17. EGR valve gasket <Vehicles for Taiwan>
18. Solenoid valve
19. Solenoid valve
20. Intake manifold tuning valve assembly
21. Intake manifold tuning valve gasket (P)
22. Intake manifold tuning valve gasket (S)



AC204059

- | | |
|---|--|
| ▶ C ◀ 23. Fuel high-pressure hose connection | ◀ A ▶ 28. Injector and delivery pipe assembly |
| ▶ C ◀ 24. O-ring | 29. Insulators |
| ▶ C ◀ 25. Fuel pressure regulator | 30. Water hoses connection |
| ▶ C ◀ 26. O-ring | ▶ B ◀ 31. Intake manifold |
| 27. Injector wiring harness connection | ▶ A ▶ 32. Intake manifold gaskets |

REMOVAL SERVICE POINT

►A► INJECTOR AND DELIVERY PIPE ASSEMBLY REMOVAL

Remove the delivery pipe with the injector assembly attached to it.

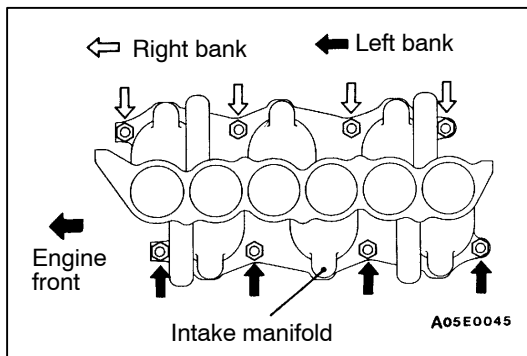
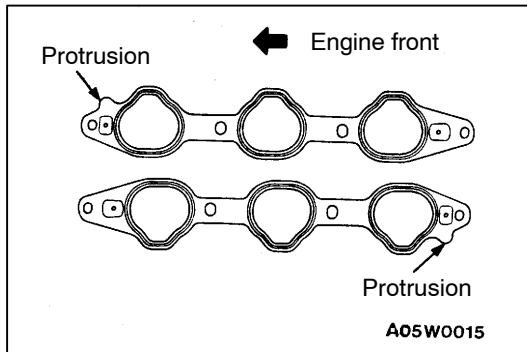
Caution

Do not drop the injector.

INSTALLATION SERVICE POINTS

►A► INTAKE MANIFOLD GASKETS INSTALLATION

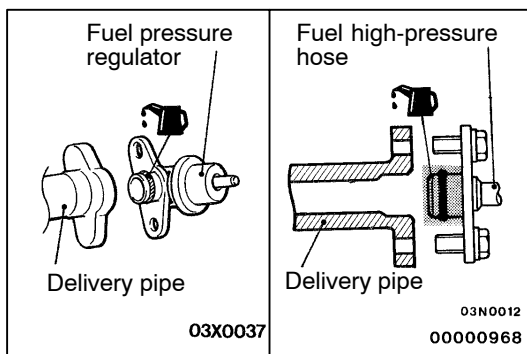
Install the gasket with the protrusions in the position illustrated.



►B► INTAKE MANIFOLD INSTALLATION

Tighten the nuts by the following procedure.

Order	Mounting Nut	Tightening Torque N·m
1	Right-bank nuts	6.5 ± 1.5
2	Left-bank nuts	22 ± 1
3	Right-bank nuts	22 ± 1
4	Left-bank nuts	22 ± 1
5	Right-bank nuts	22 ± 1



►C► O-RING/FUEL PRESSURE REGULATOR/FUEL HIGH-PRESSURE HOSE INSTALLATION

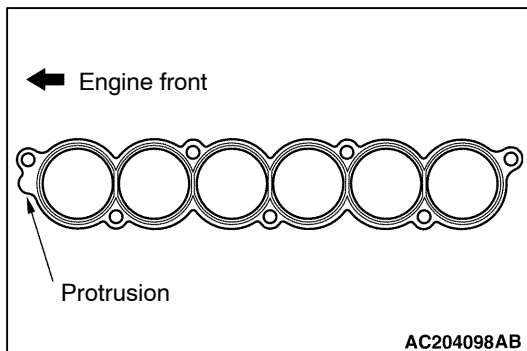
When connecting the fuel pressure regulator and the fuel high-pressure hose to the delivery pipe, apply a small amount of new engine oil to the O-ring. Then insert the fuel high-pressure hose, being careful not to damage the O-ring.

Caution

Be careful not to let any engine oil get into the delivery pipe.

►D► SURGE TANK GASKET INSTALLATION

Install the gasket with the protrusion in the position illustrated.



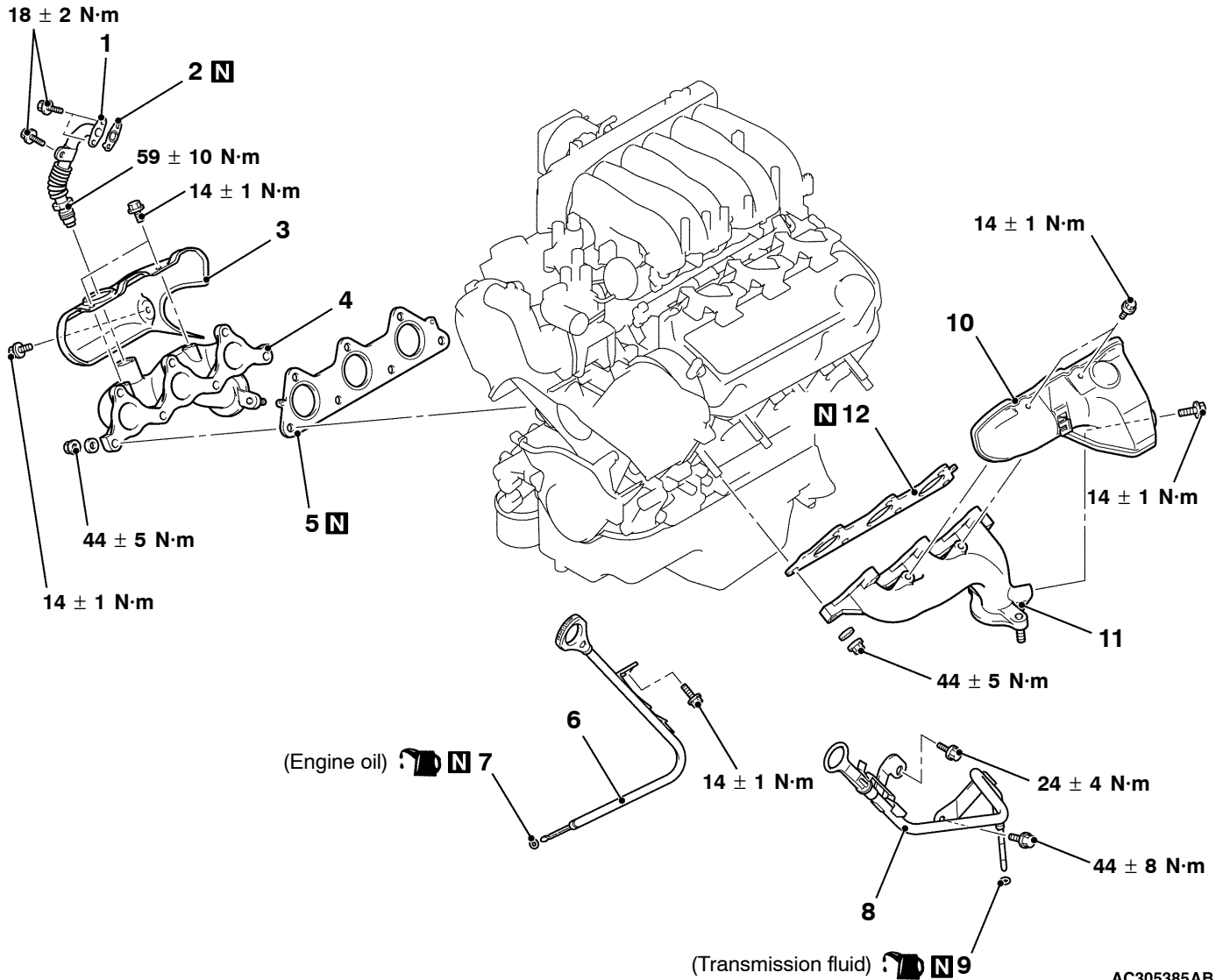
EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

<6G75-MPI>

Pre-removal and Post-installation Operation

- Front Exhaust Pipe Removal and Installation
- Air Cleaner Removal and Installation
(Refer to P.15-4.)
- Battery and Battery Tray Removal and Installation



AC305385AB

Removal steps

1. EGR pipe
2. EGR pipe gasket
3. Heat protector (R.H.)
4. Exhaust manifold (R.H.)
5. Exhaust manifold gasket
6. Engine oil level gauge and guide assembly
7. O-ring
8. Transmission fluid level gauge and guide assembly
9. O-ring
10. Heat protector (L.H.)
11. Exhaust manifold (L.H.)
12. Exhaust manifold gasket

16 ENGINE ELECTRICAL

CONTENTS

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STARTING SYSTEM	2	Resistive Cord Check	5
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CHARGING SYSTEM

GENERAL

OUTLINE OF CHANGE

- The alternator output for vehicles with 6G72, 6G74 engine has been changed.
- Due to the addition of the vehicles with 6G75-MPI engine, the following alternator output has been established. The service procedures for the alternator are the same as conventional 6G7-GDI engine.

GENERAL INFORMATION

ALTERNATOR SPECIFICATIONS

Item	6G72, 6G74-MPI	6G74-GDI, 6G75-MPI
Type	Battery voltage sensing	Battery voltage sensing (power generation control function)
Rated output V/A	12/110	12/110
Voltage regulator	Electronic built-in type	Electronic built-in type

STARTING SYSTEM

GENERAL

OUTLINE OF CHANGE

- The starter output for vehicles with 6G72,74-MPI-A/T engine has been changed.
- Due to the addition of the vehicles with 6G75-MPI engine, the following starter rated output has been set to 1.4kW. The service procedures for the starter are the same as conventional 6G7 engine.

GENERAL INFORMATION

STARTER MOTOR SPECIFICATIONS

Item	6G7
Type	Reduction drive with planetary gear
Rated output kW/V	1.4/12
No. of pinion teeth	8

IGNITION SYSTEM

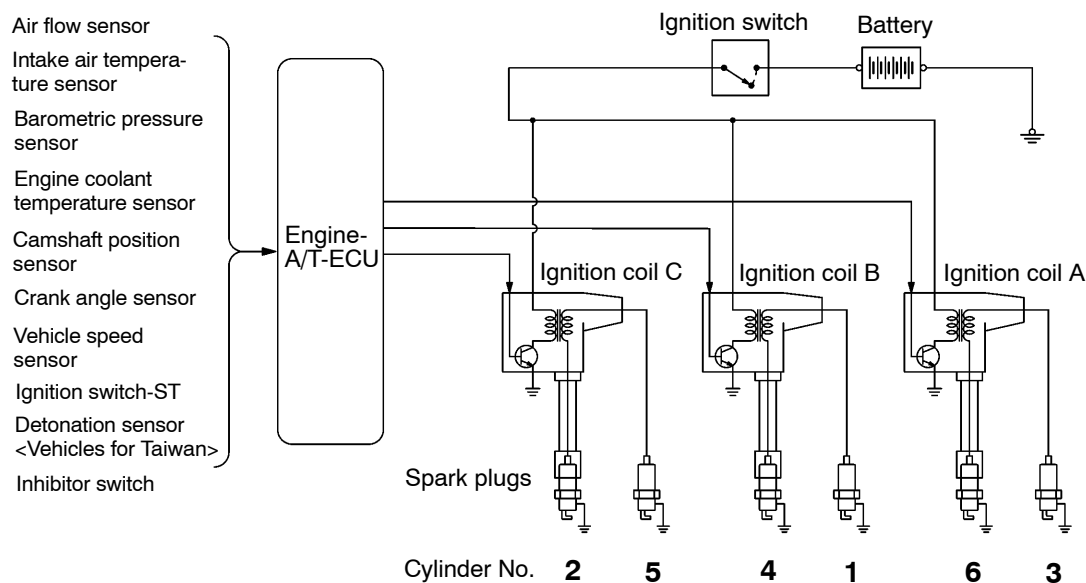
GENERAL

OUTLINE OF CHANGE

- The spark plug of the vehicles with 6G72,74-MPI engine has been changed. The service procedures are the same as conventional 6G74-GDI engine.
- Due to the addition of the vehicles with 6G75-MPI engine, the following service procedures have been established. The other service procedures are the same as conventional 6G7-MPI engine.

GENERAL INFORMATION

SYSTEM DIAGRAM



36036CA

SPARK PLUG SPECIFICATION

Item	6G72, 6G74, 6G75 <Except Taiwan>	6G75 <Taiwan>
NGK	BKR6ETUB	IFR6F
DENSO	–	SK20PR-A8

SERVICE SPECIFICATIONS**IGNITION COIL**

Item	Standard value
Secondary coil resistance k Ω	8.5 – 11.5

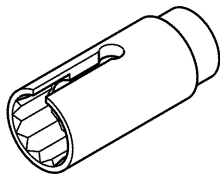
SPARK PLUG

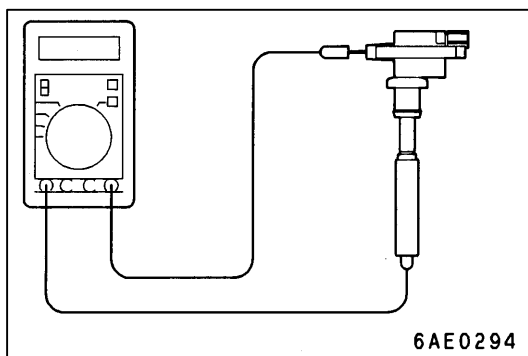
Item		Standard value	Limit
Spark plug gap mm	Except Taiwan	0.5 – 0.7	–
	Taiwan	0.7 – 0.8	1.0

RESISTIVE CORD

Item	Limit
Resistance k Ω	Max. 8.5

SPECIAL TOOL

Tool	Number	Name	Use
	MD998773	Detonation sensor wrench	Detonation sensor removal and installation

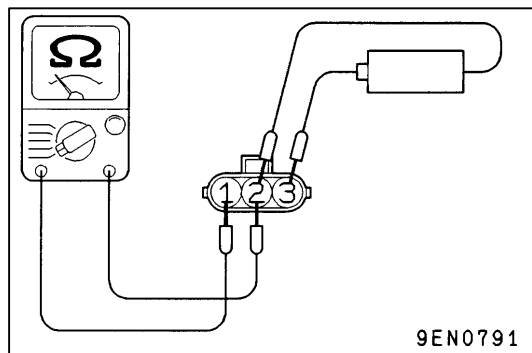
ON-VEHICLE SERVICE**IGNITION COIL (WITH BUILT-IN POWER TRANSISTOR) CHECK**

Check by the following procedure, and replace if there is a malfunction.

SECONDARY COIL RESISTANCE CHECK

Measure the resistance between the high-voltage terminals of the ignition coil.

Standard value: 8.5 – 11.5 k Ω



PRIMARY COIL AND POWER TRANSISTOR CONTINUITY CHECK

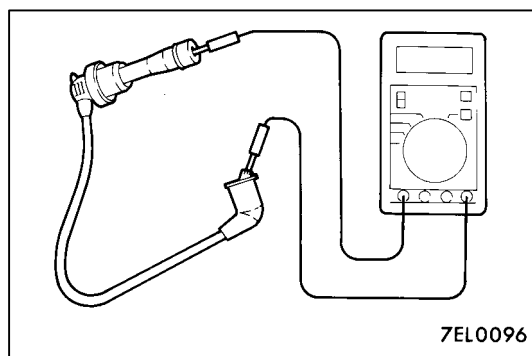
NOTE

1. An analogue-type circuit tester should be used.
2. Connect the negative (–) probe of the circuit tester to terminal 1.

Caution

This test must be performed quickly (in less than 10 seconds) to prevent coil from burning and power transistor from breakage.

Voltage: 1.5V	Terminal No.		
	1	2	3
When current is flowing		⊖	⊕
When current is not flowing	○	○	

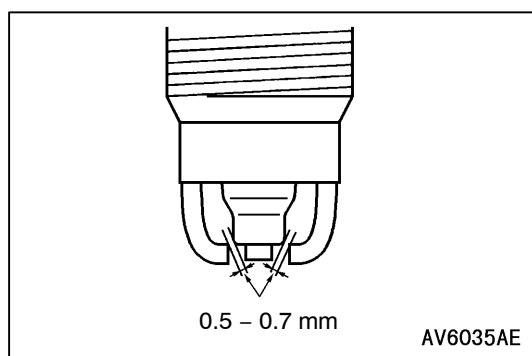


RESISTIVE CORD CHECK

Measure the resistance of the all spark plug cables.

1. Check cap and coating for cracks.
2. Measure resistance.

Limit: Max. 8.5 kΩ



SPARK PLUG CHECK AND CLEANING <Except Taiwan>

1. Remove the ignition coils.
2. Remove the spark plugs.
3. Check the spark plug gap. Adjust or replace it if the gap is not within the standard value.

Standard value: 0.5 – 0.7 mm

4. Remove carbon deposits with wire brush or plug cleaner.
5. Clean the spark plug holes.
6. Install the spark plugs.
7. Install the ignition coils.

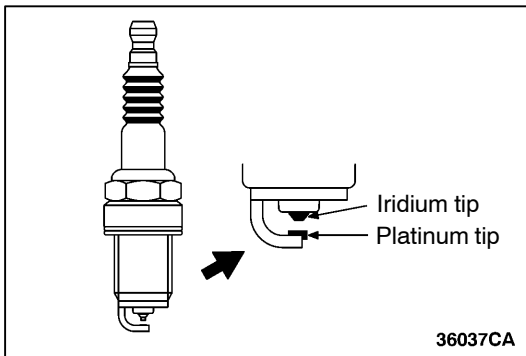
SPARK PLUG CHECK <Taiwan>

1. Remove the air intake plenum.
2. Remove the spark plug cables.

Caution

When pulling off the spark plug cable from the plug always hold the cable cap, not the cable.

3. Remove the spark plugs.



4. Check the plug gap and replace if the limit is exceeded.

Standard value: 0.7 – 0.8 mm

Limit: 1.0 mm

Caution

- (1) **Do not attempt to adjust the gap of the platinum plug.**
- (2) **Always use a plug cleaner and finish cleaning within 20 seconds. Do not use wire brushes. Otherwise, the platinum tip or iridium tip may be damaged.**

5. Clean the engine plug holes.

Caution

Be careful not to allow foreign matter in cylinders.

6. Install the spark plugs.

WAVEFORM CHECK USING AN ANALYZER

Ignition Secondary Voltage Waveform Check

MEASUREMENT METHOD

1. Clamp the spark plug cable (Number 1, 3 or 5) with the secondary pickup.

NOTE

- (1) Because of the two-cylinder simultaneous ignition system, the waves for two cylinders in each group appear during wave observation.
However, wave observation is carried out for the cylinder (Number 1, 3 or 5) with the spark plug cable, which has been clamped by the secondary pickup.
- (2) Identification of which cylinder wave pattern is displayed can be difficult, but the wave pattern of the cylinder, which is clamped by the secondary pickup, will be stable, so this can be used as a reference.

2. Clamp the spark plug cable (Number 1, 3 or 5) with the trigger pickup.

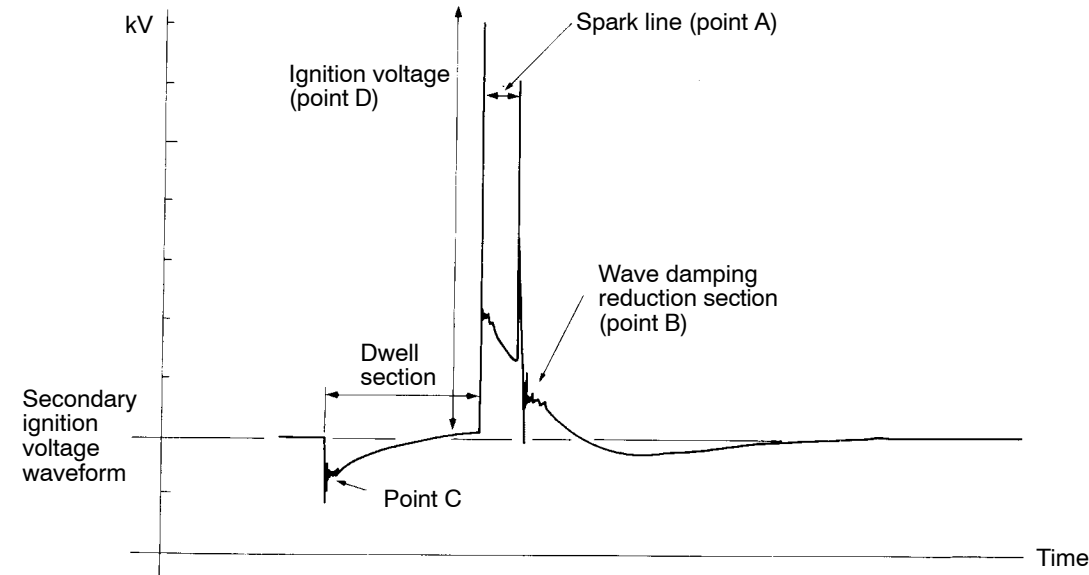
NOTE

Clamp the same spark plug cable as the one, which has been clamped by the secondary pickup.

STANDARD WAVEFORM

Observation Conditions

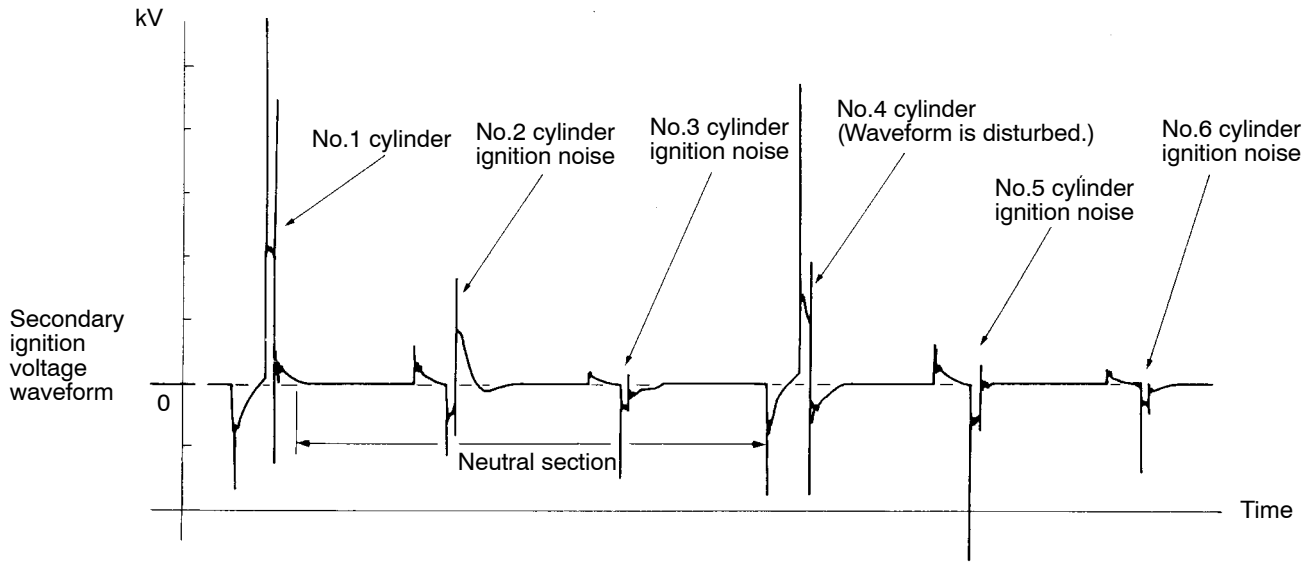
FUNCTION	SECONDARY
PATTERN HEIGHT	HIGH (or LOW)
PATTERN SELECTOR	RASTER
Engine Speed	Curb idle speed



7EL0147

Observation Condition (The only change from previous condition is the pattern selector.)

PATTERN SELECTOR	DISPLAY
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7EL0148

WAVEFORM OBSERVATION POINTS

Point A: The height, length and slope of the spark line show the following trends (Refer to abnormal waveform examples, 1, 2, 3 and 4).

Spark line		Plug gap	Condition of electrode	Compression force	Concentration of air mixture	Ignition timing	Spark plug cable
Length	Long	Small	Normal	Low	Rich	Advanced	Leak
	Short	Large	Large wear	High	Lean	Retarded	High resistance
Height	High	Large	Large wear	High	Lean	Retarded	High resistance
	Low	Small	Normal	Low	Rich	Advanced	Leak
Slope		Large	Plug is fouled	–	–	–	–

Point B: Number of vibration in reduction vibration section (Refer to abnormal waveform example 5)

Number of vibrations	Coil and condenser
Three or more	Normal
Except above	Abnormal


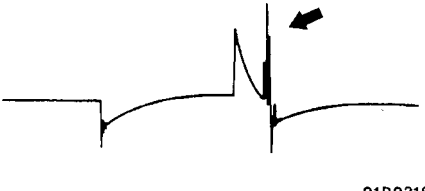
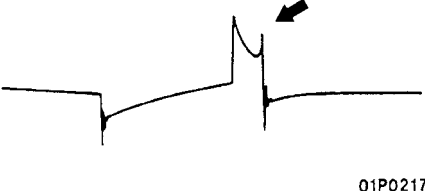

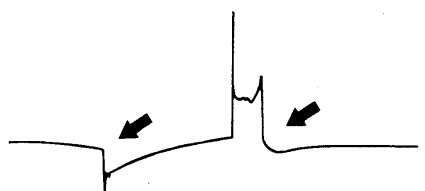
Point C: Number of vibrations at beginning of dwell section (Refer to abnormal waveform example 5)

Number of vibrations	Coil
5–6 or higher	Normal
Except above	Abnormal

Point D: Ignition voltage height (distribution per each cylinder) shows the following trends.

Ignition voltage	Plug gap	Condition of electrode	Compression force	Concentration of air mixture	Ignition timing	Spark plug cable
High	Large	Large wear	High	Lean	Retarded	High resistance
Low	Small	Normal	Low	Rich	Advanced	Leak

EXAMPLES OF ABNORMAL WAVEFORMS

Abnormal waveform	Wave characteristics	Cause of problem
<p>Example 1</p>  <p>01P0215</p>	Spark line is high and short.	Spark plug gap is too large.
<p>Example 2</p>  <p>01P0216</p>	Spark line is low and long, and is sloping. Also, the second half of the spark line is distorted. This could be a result of misfiring.	Spark plug gap is too small.
<p>Example 3</p>  <p>01P0217</p>	Spark line is low and long, and is sloping. However, there is almost no spark line distortion.	Spark plug gap is fouled.
<p>Example 4</p>  <p>01P0218</p>	Spark line is high and short. Difficult to distinguish between this and abnormal waveform example 1.	Spark plug cable is nearly falling off. (Causing a dual ignition)
<p>Example 5</p>  <p>01P0219</p>	No waves in wave damping section.	Layer short in ignition coil

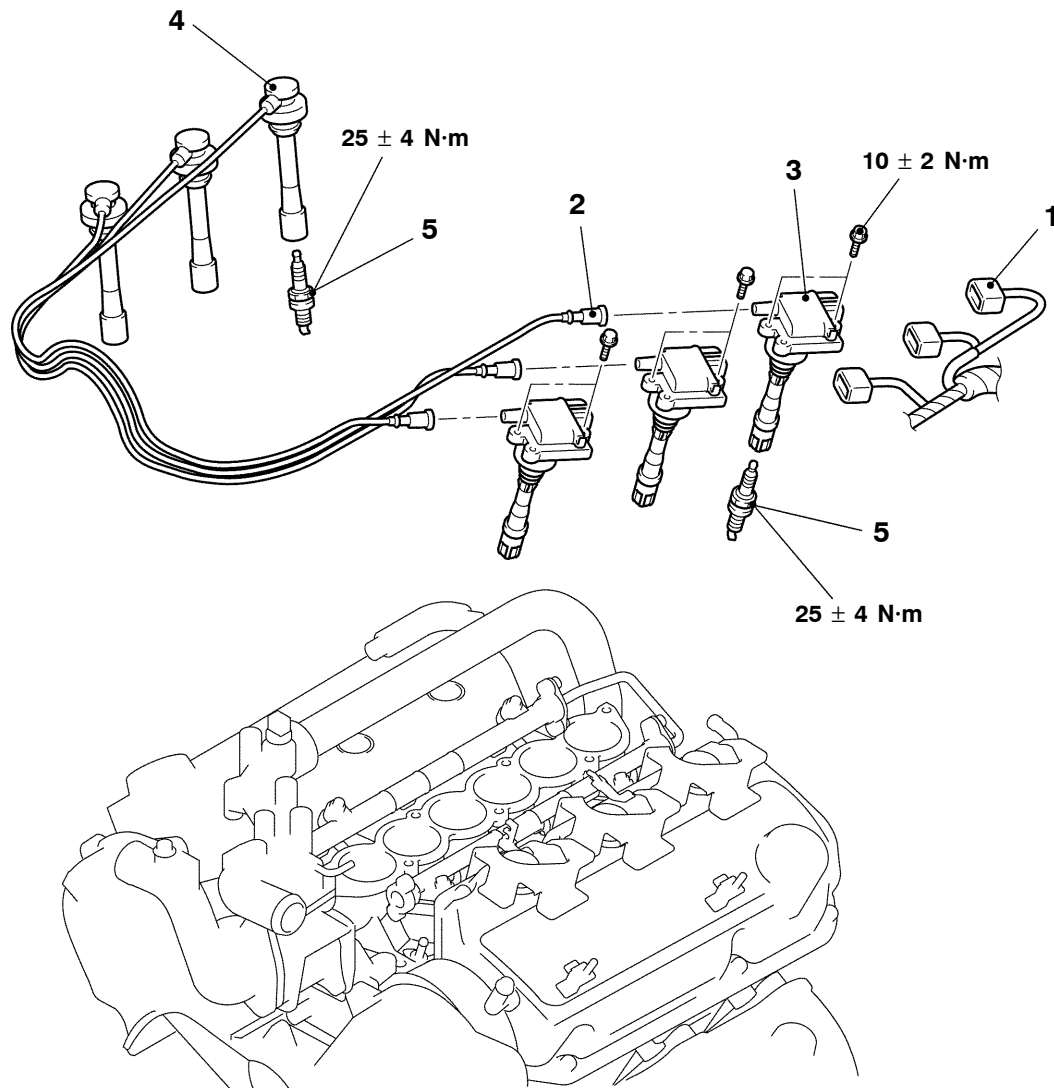
IGNITION COIL

REMOVAL AND INSTALLATION

<6G75-MPI>

Pre-removal and Post-installation Operation

- Air Cleaner Removal and Installation
(Refer to GROUP 15 – Air Cleaner.)



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Removal steps

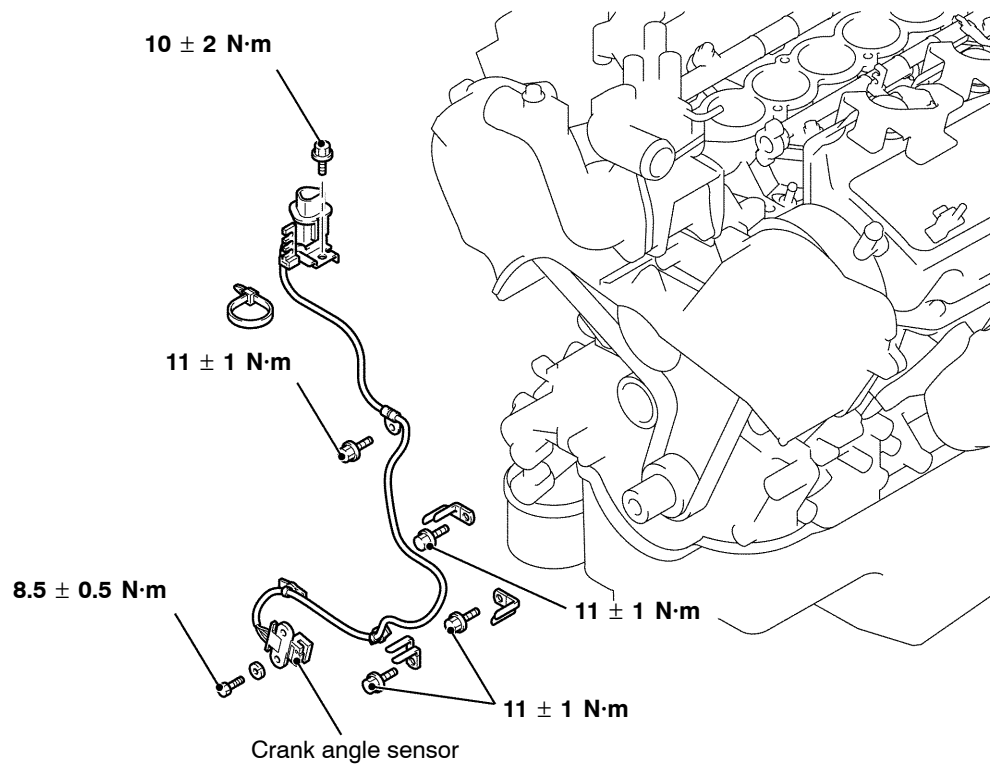
1. Ignition coil connectors
 2. Spark plug cables connection
 3. Ignition coils
 4. Spark plug cables
 5. Spark plugs
- Surge tank (Refer to GROUP 15 – Intake Manifold.)

CRANK ANGLE SENSOR

REMOVAL AND INSTALLATION

<6G75-MPI>

Pre-removal and Post-installation Operation
Timing Belt Lower Cover Removal and Installation

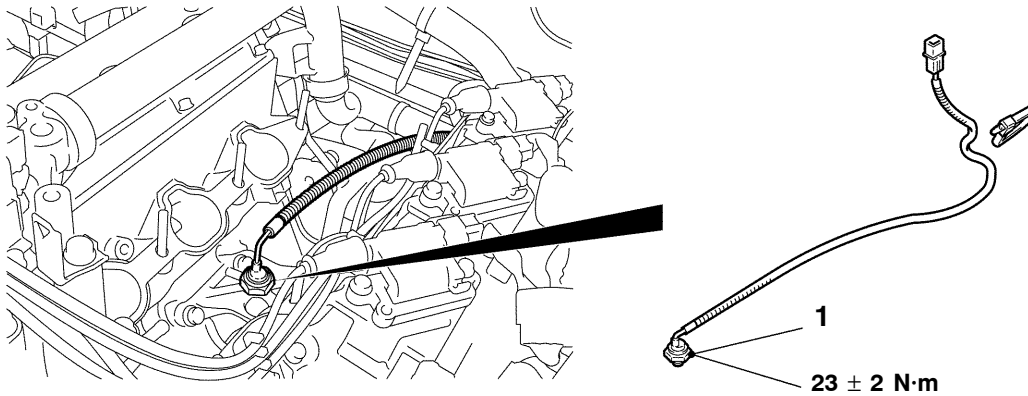


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DETONATION SENSOR <VEHICLES FOR TAIWAN>**REMOVAL AND INSTALLATION**

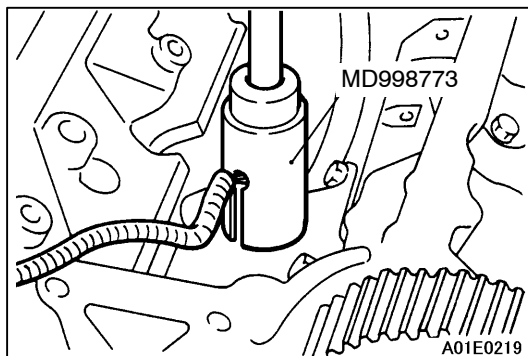
<6G75-MPI>

Pre-removal and Post-installation Operation
 Intake Manifold Removal and Installation
 (Refer to GROUP 15 – Intake Manifold.)

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◀A▶ ▶A◀ 1. Detonation sensor

**REMOVAL SERVICE POINT****◀A▶ DETONATION SENSOR REMOVAL**

Use special tool detonation sensor wrench (MD998773) to remove the detonation sensor.

INSTALLATION SERVICE POINT**▶A◀ DETONATION SENSOR INSTALLATION**

Use special tool detonation sensor wrench (MD998773) to tighten the detonation sensor to the specified torque.

Tightening torque: $23 \pm 2 \text{ N} \cdot \text{m}$

17 ENGINE & EMISSION CONTROL

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Accelerator Pedal Position Sensor Check	3	ON-VEHICLE SERVICE	16
Accelerator Pedal Position Switch Check	3	Auto-cruise Control Switch Check	16
ACCELERATOR PEDAL	4	Auto-cruise Control Component Check	18
		AUTO-CRUISE CONTROL*	19

continued on next page

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

WARNING!

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

NOTE

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

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<6G72/74-MPI> 20**

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**EMISSION CONTROL SYSTEM
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**EXHAUST GAS RECIRCULATION (EGR)
SYSTEM 31**

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ENGINE CONTROL SYSTEM <6G75-MPI>

GENERAL

OUTLINE OF CHANGE

Due to the addition of the vehicles with 6G75-MPI engine, the service procedures of the accelerator pedal have been established.

GENERAL INFORMATION

On vehicles with 6G75-MPI engine, an electronic controlled throttle valve system has been used instead of a conventional cable-type accelerator mechanism.

ON-VEHICLE SERVICE

ACCELERATOR PEDAL POSITION SENSOR ADJUSTMENT

Refer to GROUP 13B, On-vehicle Service – Accelerator Pedal Position Sensor Adjustment.

ACCELERATOR PEDAL POSITION SENSOR CHECK

Refer to GROUP 13B, On-vehicle Service – Accelerator Pedal Position Sensor Check.

ACCELERATOR PEDAL POSITION SWITCH CHECK

Refer to GROUP 13B, On-vehicle Service – Accelerator Pedal Position Switch Check.

ACCELERATOR PEDAL

REMOVAL AND INSTALLATION

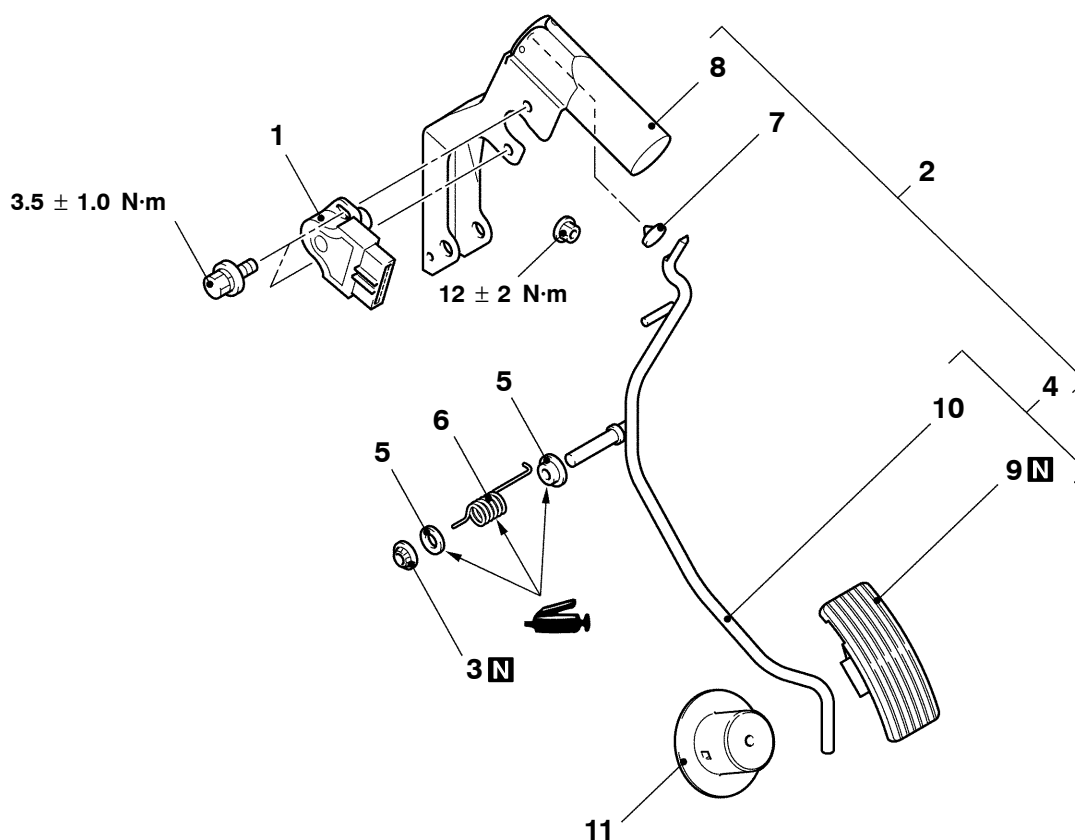
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Caution

The accelerator pedal position sensor is preadjusted precisely at factory. Whenever the accelerator pedal position sensor is removed and installed, it should be adjusted.

Post-installation Operation

Accelerator Pedal Position Sensor Check and Adjustment (Refer to GROUP 13B – On-vehicle Service.)



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Removal steps

1. Accelerator pedal position sensor
2. Accelerator pedal assembly
3. Push-on spring nut
4. Accelerator pedal pad and accelerator arm assembly
5. Bushings

6. Spring
7. Stopper
8. Accelerator pedal bracket
9. Accelerator pedal pad
10. Accelerator arm
11. Accelerator stopper

INSTALLATION SERVICE POINT**▶A◀ ACCELERATOR PEDAL PAD INSTALLATION**

To prevent damages to the accelerator pedal pad, warm the thumb area of the accelerator pedal pad with a dryer, etc. prior to assembling it.

NOTE

If it is difficult to assemble, apply soapy water to the thumb area to enhance the assembling process.

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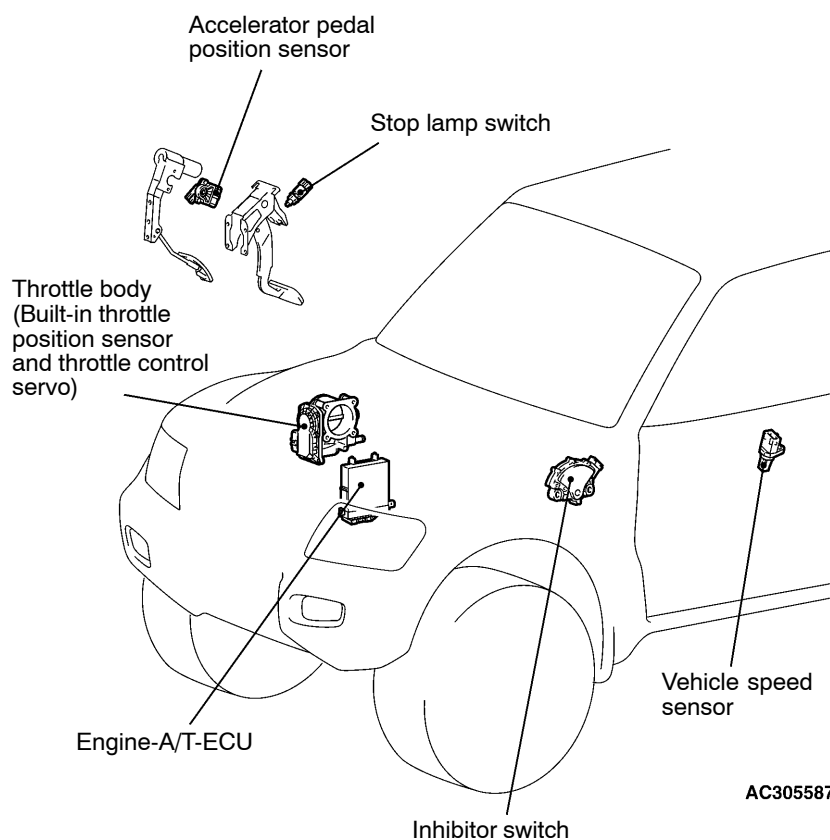
AUTO-CRUISE CONTROL SYSTEM <6G75-MPI>

GENERAL

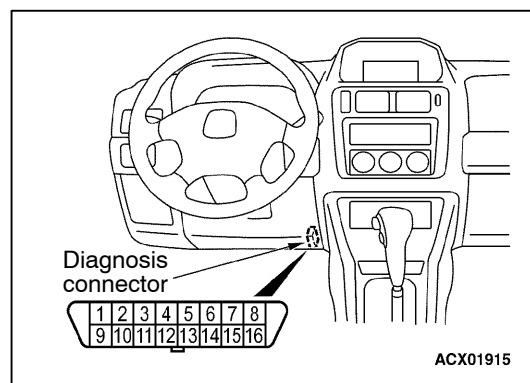
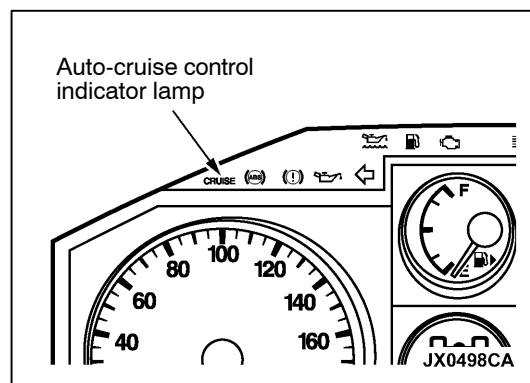
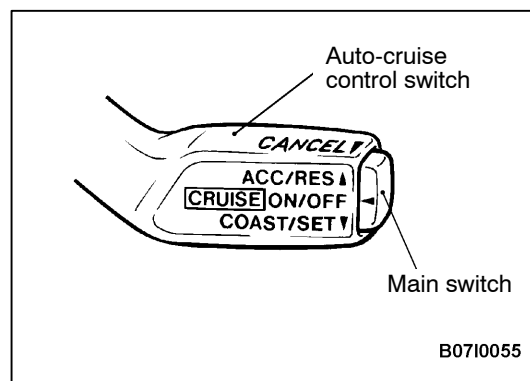
OUTLINE OF CHANGES

Due to the adoption of the 6G75-MPI engine using the electronic controlled throttle valve system, the following service procedures have been established.

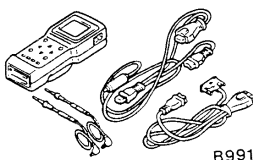
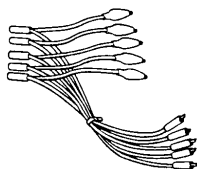
GENERAL INFORMATION

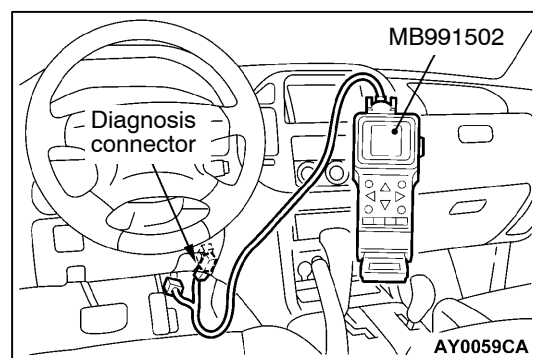


AC305587



SPECIAL TOOL

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	<ul style="list-style-type: none"> • Reading diagnosis codes • Auto-cruise control system check
	MB991348	Test harness set	Checking the throttle position sensor



TROUBLESHOOTING

DIAGNOSIS FUNCTION

METHOD OF READING THE DIAGNOSIS CODES

Using the MUT-II

1. Connect the MUT-II to the diagnosis connector (16-pin) under the instrument under cover.

Caution

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

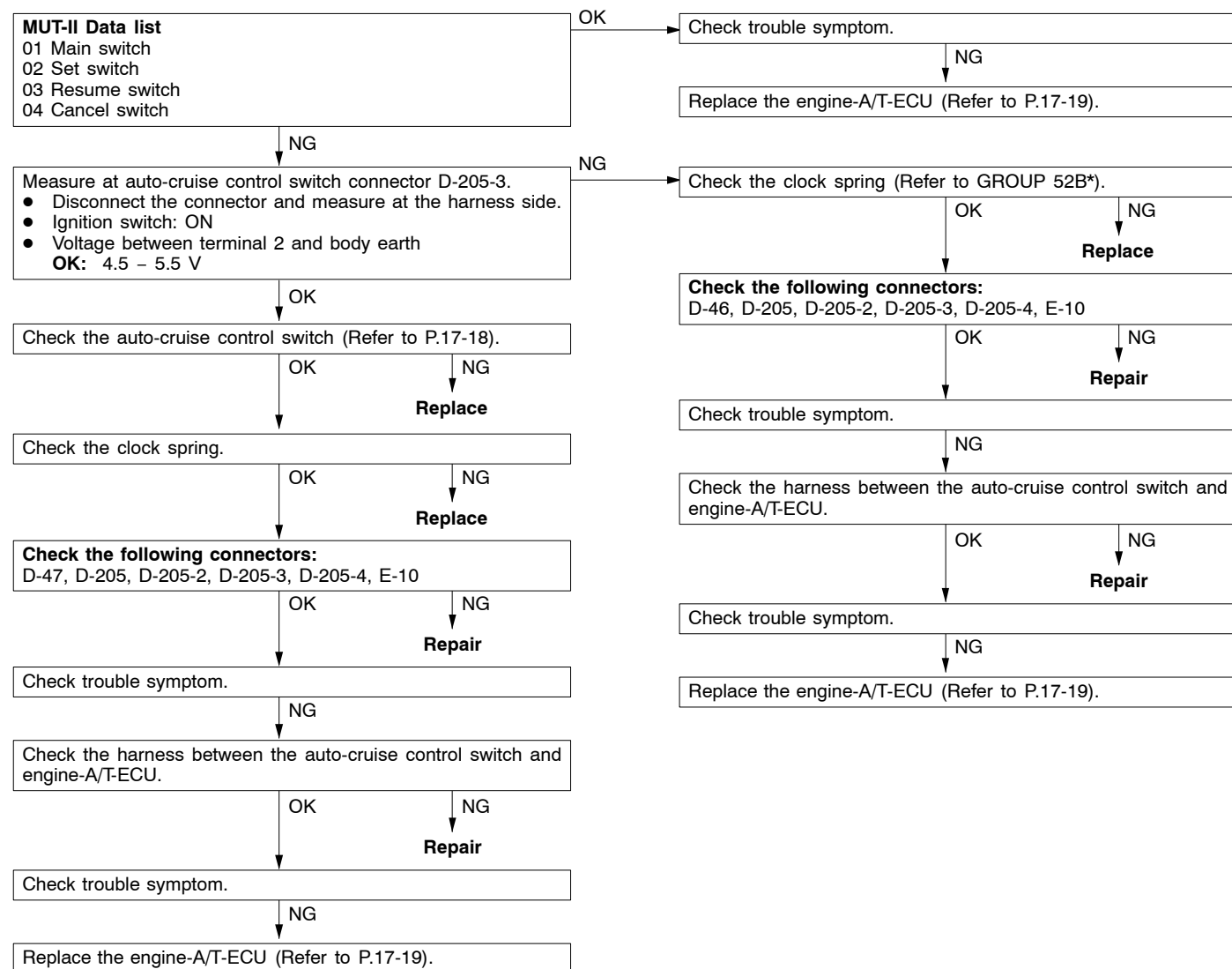
2. With the ignition switch in the ON position, take a reading of the diagnosis codes.

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
15	Auto-cruise control switch system	17-8
21	Cancel latch signal system	17-8
22	Stop lamp switch system	17-9
23	Engine-A/T-ECU system	17-10

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code No. 15 Auto-cruise control switch system	Probable cause
This diagnosis code is set if the engine-A/T-ECU terminal voltage differs from the standard value when the auto-cruise control switch is operated.	<ul style="list-style-type: none"> • Malfunction of the auto-cruise control switch • Malfunction of the connector • Malfunction of the harness • Malfunction of the engine-A/T-ECU



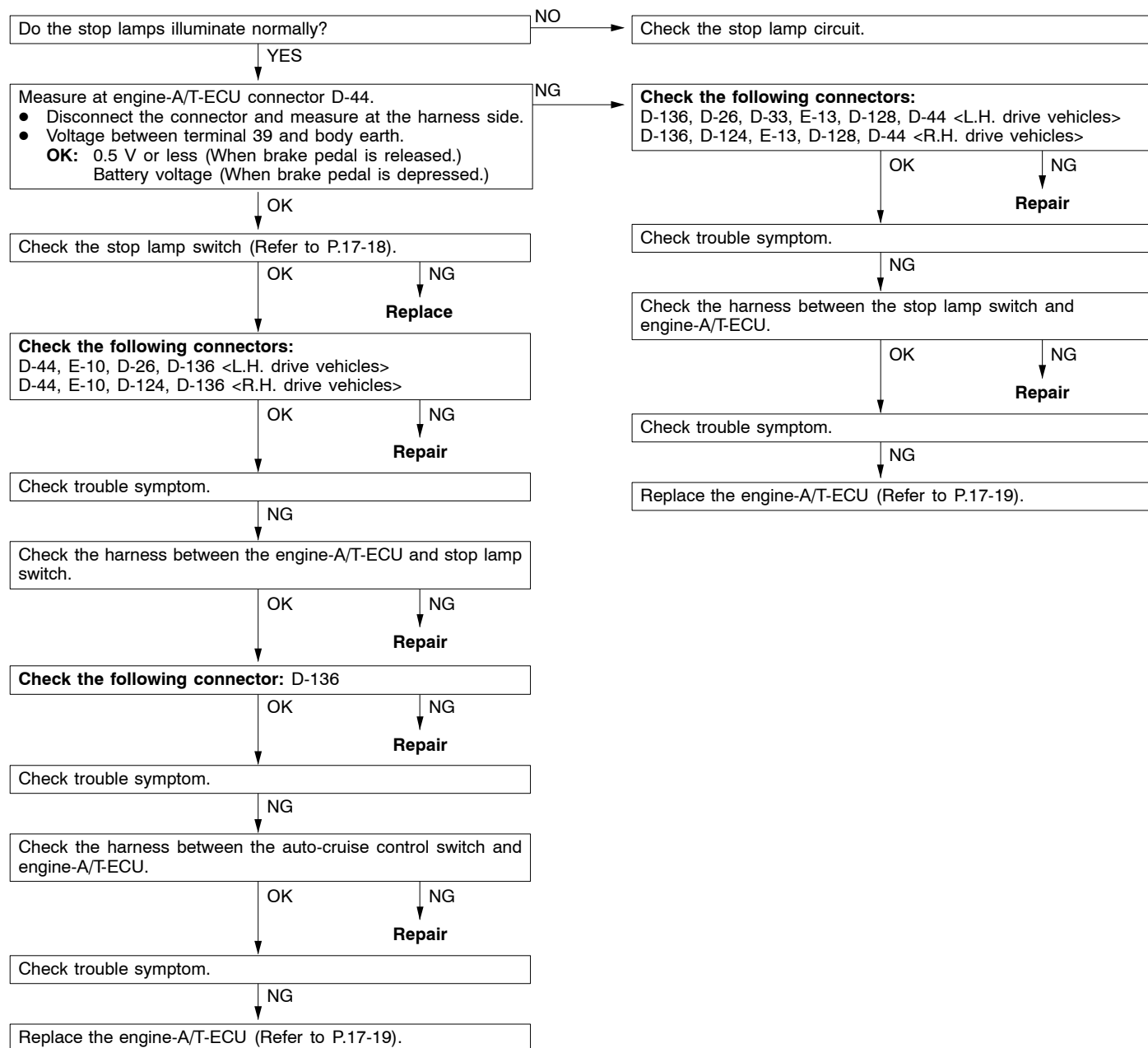
NOTE:

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005)

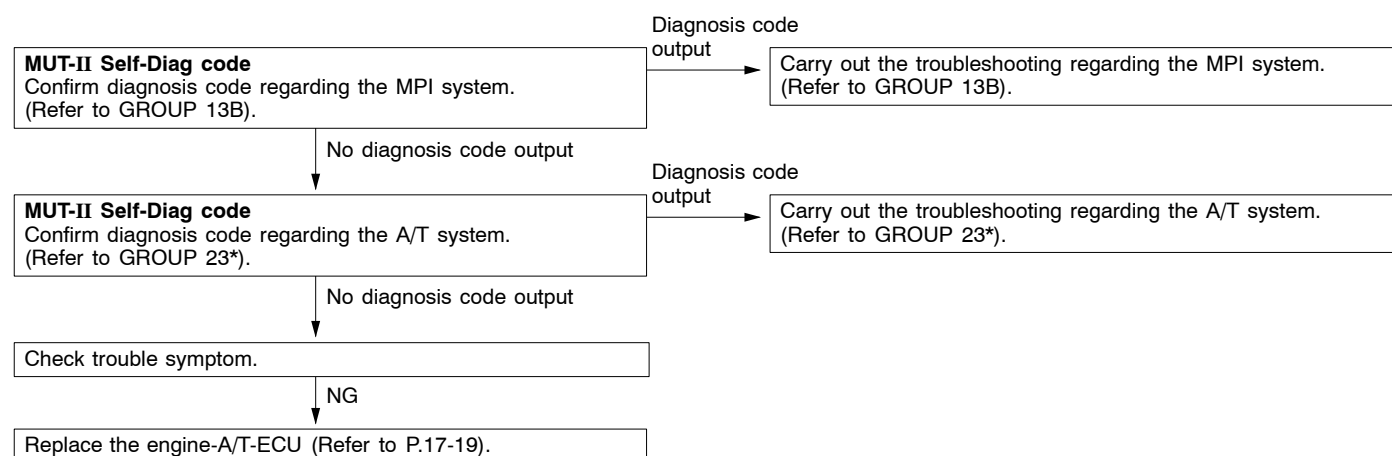
Code No. 21 Cancel latch signal system	Probable cause
The engine-A/T-ECU communicates cancellation retention information between the two microprocessors. This diagnosis code is output when cancellation retention information contains inconsistency.	<ul style="list-style-type: none"> • Malfunction of the engine-A/T-ECU

Replace the engine-A/T-ECU (Refer to P.17-19).

Code No. 22 Stop lamp switch system	Probable cause
This diagnosis code is set when the stop lamp switch circuit is shorted or open.	<ul style="list-style-type: none"> • Malfunction of the stop lamp switch • Malfunction of the connector • Malfunction of the harness • Malfunction of the engine-A/T-ECU



Code No. 23 Engine-A/T-ECU system	Probable cause
This diagnosis code is output when there is an failure in the engine-A/T-ECU and its related components.	<ul style="list-style-type: none"> • Malfunction of the MPI system • Malfunction of the A/T system • Malfunction of the engine-A/T-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible.		1	GROUP 13B
Auto-cruise control is not cancelled.	Even if brake pedal is depressed	2	17-11
	Even if select lever is set to N range	3	17-11
	Even if CANCEL switch is set to ON	4	17-11
Auto-cruise control cannot be set.		5	17-12
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.		6	17-12
When the MAIN switch of the auto-cruise control switch is turned ON, the auto-cruise control indicator lamp does not illuminate. (However, the auto-cruise control system is normal.)		7	17-13

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS**Inspection Procedure 2**

Even if brake pedal is depressed, auto-cruise control is not cancelled.	Probable cause
The cause is probably a malfunction of stop lamp switch or a malfunction of stop lamp circuit.	<ul style="list-style-type: none">• Malfunction of the stop lamp switch• Malfunction of the connector• Malfunction of the harness• Malfunction of the engine-A/T-ECU

Follow the INSPECTION PROCEDURE FOR DIAGNOSIS CODE No. 22 – Stop lamp switch system (Refer to P.17-9).

Inspection Procedure 3

Even if select lever is set to N range, auto-cruise control is not cancelled.	Probable cause
The cause is probably a defective inhibitor switch circuit.	<ul style="list-style-type: none">• Malfunction of the inhibitor switch• Malfunction of the connector• Malfunction of the harness• Malfunction of the throttle valve controller

Follow the A/T system INSPECTION PROCEDURE FOR DIAGNOSIS CODE No. 27 and 28. (Refer to GROUP 23).

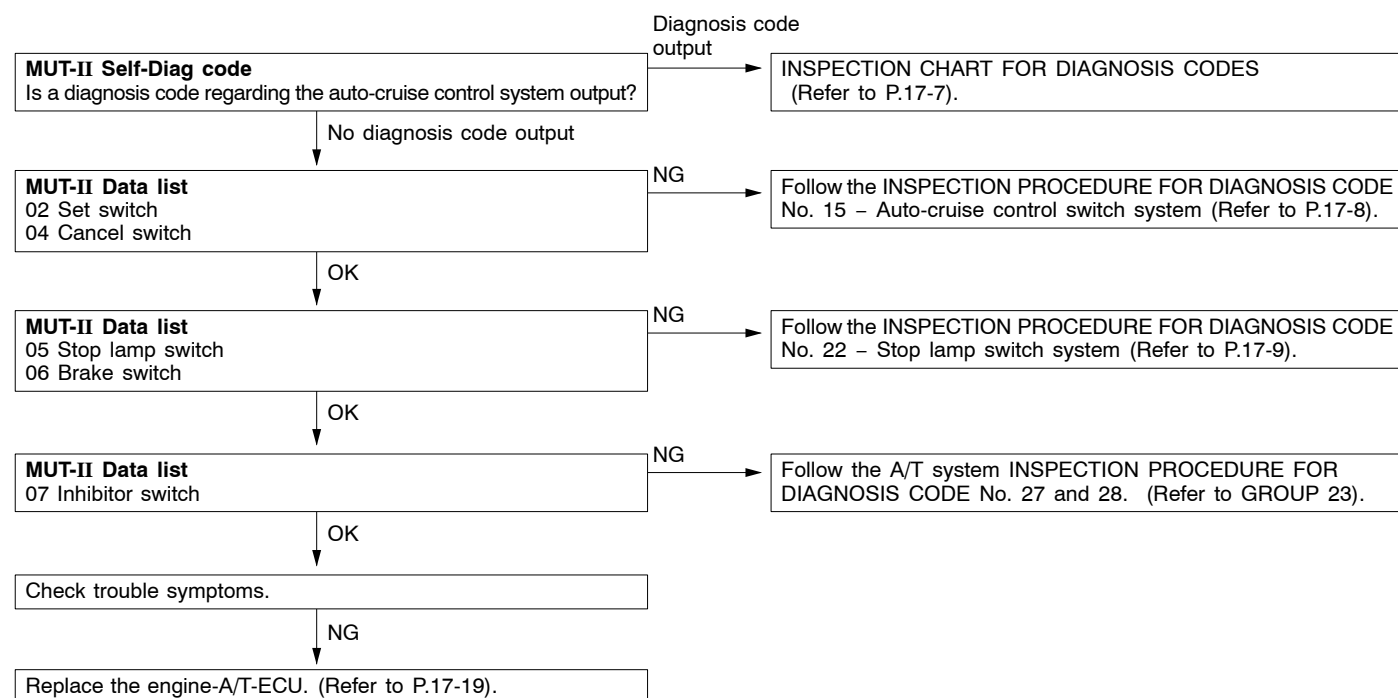
Inspection Procedure 4

Even if auto-cruise control CANCEL switch is set to ON, auto-cruise control is not cancelled.	Probable cause
The cause is probably an open-circuit in the circuit inside the CANCEL switch.	<ul style="list-style-type: none">• Malfunction of the auto-cruise control switch

Replace the auto-cruise control switch. (Refer to P.17-19).

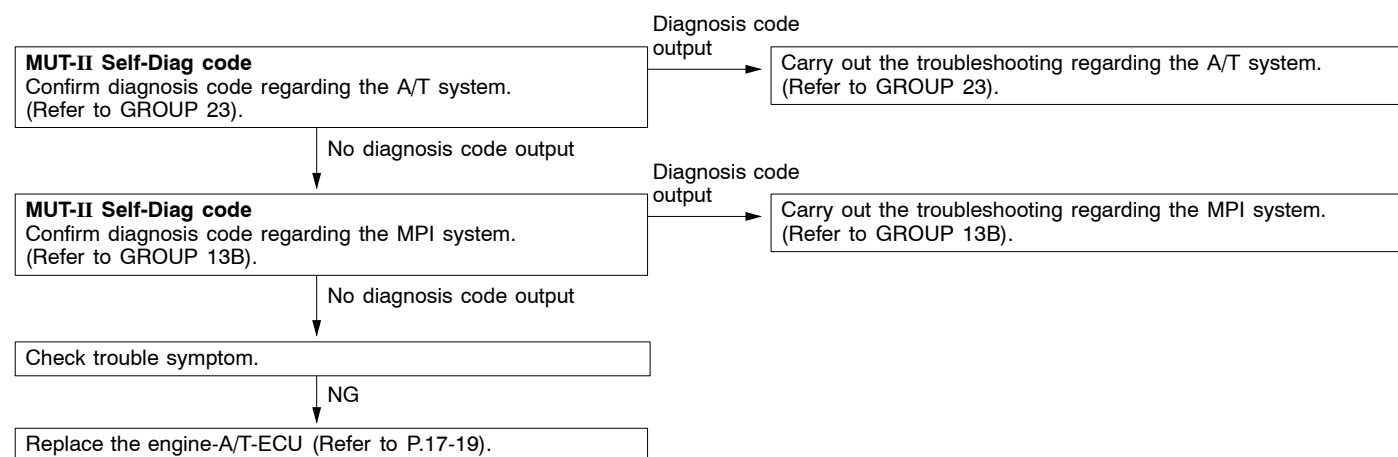
Inspection Procedure 5

Auto-cruise control cannot be set.	Probable cause
The cause is probably that the fail-safe function is cancelling auto-cruise control. In this case, the MUT-II can be used to check the trouble symptoms in each system by inspecting the diagnosis codes. The MUT-II can also be used to check if the circuits of each input switch are normal or not by inspecting the data list.	<ul style="list-style-type: none"> • Malfunction of the auto-cruise control switch • Malfunction of the harnesses • Malfunction of the connectors • Malfunction of the engine-A/T-ECU



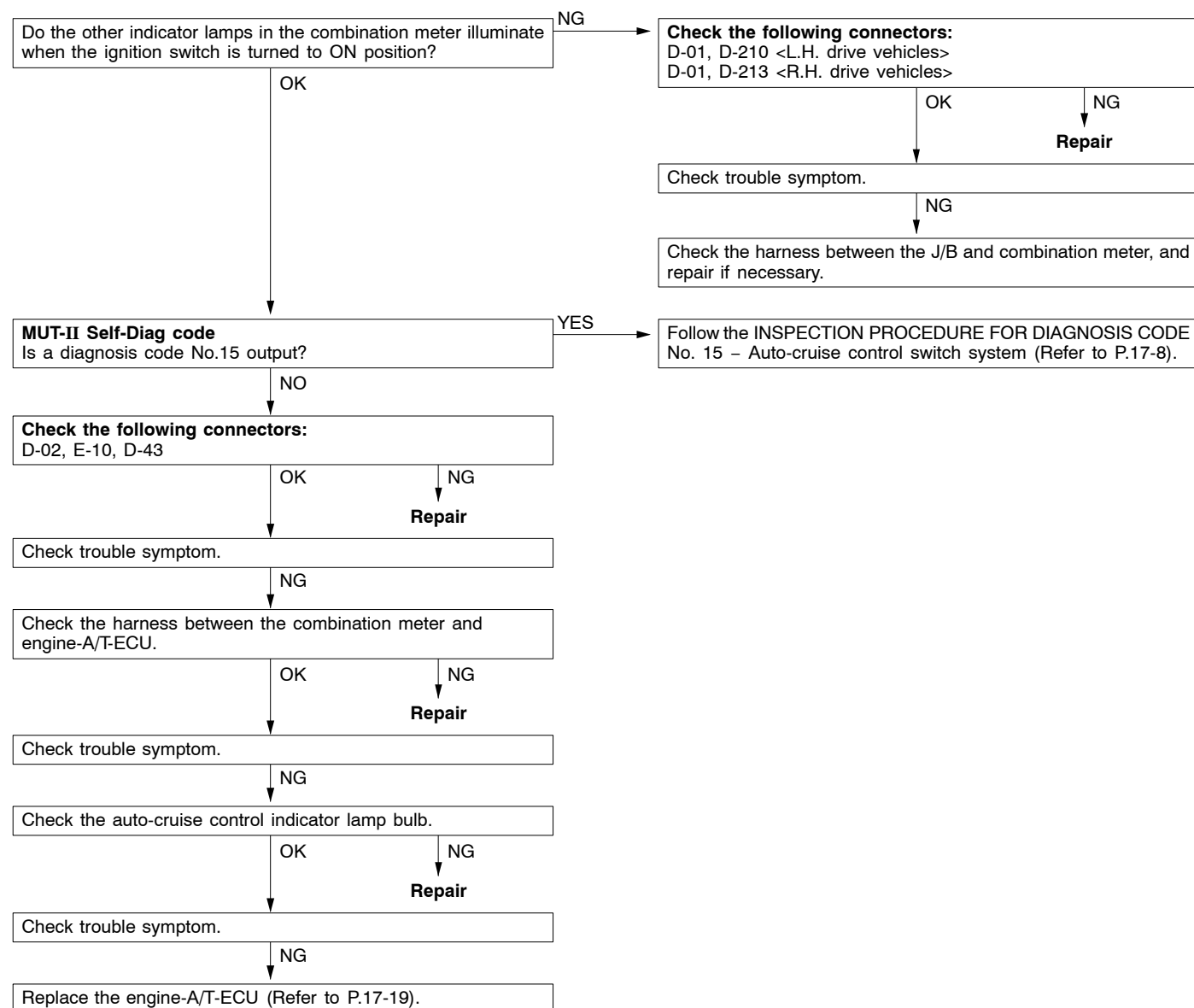
Inspection Procedure 6

Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.	Probable cause
The cause is probably a malfunction of vehicle speed sensor or throttle body. In either case, a diagnosis code regarding the A/T system or MPI system must be confirmed.	<ul style="list-style-type: none"> • Malfunction of the vehicle speed sensor • Malfunction of the throttle body • Malfunction of the engine-A/T-ECU



Inspection Procedure 7

When the MAIN switch of the auto-cruise control switch is turned on, the auto-cruise control indicator lamp does not illuminate. (However, the auto-cruise control in normal.)	Probable cause
There may be a burnt-out bulb or a malfunction of the auto-cruise control indicator lamp circuit.	<ul style="list-style-type: none"> • Burnt-out bulb • Malfunction of the harness • Malfunction of the connector • Malfunction of the auto-cruise control switch • Malfunction of the engine-A/T-ECU



DATA LIST REFERENCE TABLE

Terminal No.	Check item		Check conditions		Normal condition
01	Auto-cruise control switch	MAIN	MAIN switch: ON		ON
			MAIN switch: OFF		OFF
02		SET (COAST)	MAIN switch: ON	SET switch: ON	ON
				SET switch: OFF	OFF
03		RESUME (ACCEL)		RESUME switch: ON	ON
				RESUME switch: OFF	OFF
04		CANCEL		CANCEL switch: ON	ON
				CANCEL switch: OFF	OFF
05	Stop lamp switch (for stop lamp circuit)		Brake pedal: Depressed		ON
			Brake pedal: Released		OFF
06	Stop lamp switch (for auto-cruise control circuit)		Brake pedal: Depressed		OFF
			Brake pedal: Released		ON
07	Inhibitor switch		Selector lever: “N”, “P” position		ON
			Selector lever: Other than “N”, “P” position		OFF
08	Accelerator switch (Idle position switch)		Accelerator pedal: Released		ON
			Accelerator pedal: Depressed		OFF
09	Auto-cruise control system		Auto-cruise control system: Activated		ON
			Auto-cruise control system: Not activated		OFF
10	Vehicle speed sensor		Road test the vehicle		The speedometer and the MUT-II display the same value.
11	Throttle position sensor		Accelerator pedal: Release		2,200 – 2,800 mV
			Accelerator pedal: Depressed		The more deeply the pedal is depressed, the higher value the MUT-II display.
			Accelerator pedal: Fully depressed		3,800 – 4,900 mV
12	Accelerator pedal position sensor		Accelerator pedal: Release		905 – 1,165 mV
			Accelerator pedal: Depressed		The more deeply the pedal is depressed, the higher value the MUT-II display.
			Accelerator pedal: Fully depressed		4,035 mV or more

ENGINE-A/T-ECU TERMINAL VOLTAGE REFERENCE CHART FOR AUTO-CRUISE CONTROL SYSTEM OPERATION

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31	32	JAE				33	34
35	36	37	38	39	40	41	42
44	45	46	47	48	49	50	51
52	53	54	55	56	57	58	

61	62	JAE				63	64
65	66	67	68	69	70	71	72
74	75	76	77	78	79	80	81
83	84	85	86	87	88	89	

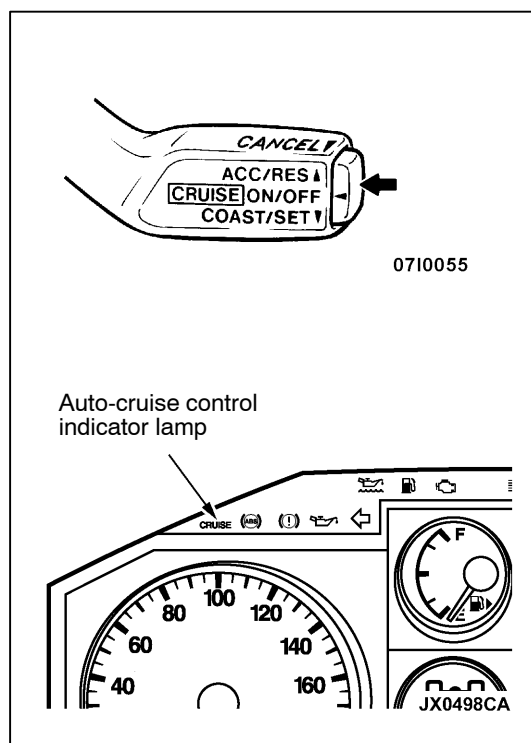
91	92	JAE				93	94
96	97	98	99	100	101	102	103
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120

121	122	JAE				123	124
125	126	127	128	129	130	131	132
134	135	136	137	138	139	140	141
142	143	144				145	146

AC304505

Terminal No.	Check item	Check conditions		Normal condition
13	Auto-cruise control indicator lamp input	When indicator lamp is illuminated		0.5 V or less
		When indicator lamp is switched off		System voltage
38	Idle switch	Ignition switch: ON	Accelerator pedal: Depressed	4.5 – 5.5 V
			Accelerator pedal: Released	0.5 V or less
39	Stop lamp switch (for stop lamp circuit)	Ignition switch: ON	Brake pedal: Depressed	System voltage
			Brake pedal: Released	0.5 V or less
54	Stop lamp switch (for auto-cruise control circuit)	Ignition switch: ON	Brake pedal: Depressed	System voltage
			Brake pedal: Released	0.5 V or less
92	Accelerator pedal position sensor (main) power supply	Ignition switch: ON		4.5 – 5.5 V
		Ignition switch: OFF (LOCK)		0.5 V or less
94	Auto-cruise control switch input	Ignition switch: ON	All switches: OFF	4.7 – 5.0 V
			MAIN switch: ON	0 – 0.3 V
			SET switch: ON	2.0 – 2.8 V
			RESUME switch: ON	3.3 – 4.1 V
			CANCEL switch: ON	0.8 – 1.5 V
97	Accelerator pedal position sensor (sub) power supply	Ignition switch: ON		4.5 – 5.5 V
		Ignition switch: OFF (LOCK)		0.5 V or less
106	Throttle position sensor power supply	Ignition switch: ON		4.5 – 5.5 V
		Ignition switch: OFF (LOCK)		0.5 V or less
107	Accelerator pedal position sensor (sub)	Ignition switch: ON	Accelerator pedal: Depressed	4.035 V or more
			Accelerator pedal: Released	905 – 1,165 mV
113	Throttle position sensor (sub)	<ul style="list-style-type: none">Remove the intake air hose at the throttle body.Disconnect the throttle position sensor connector, and then connect terminal numbers 1, 2, 3 and 4 with the use of the special tool: MB991348.Ignition switch: ON	Fully close the throttle valve with your finger	2.2 – 2.8 V
			Fully open the throttle valve with your finger	3.8 – 4.9 V

Terminal No.	Check item	Check conditions		Normal condition
114	Accelerator pedal position sensor (main)	Ignition switch: ON	Accelerator pedal: Depressed	4.035 V or more
			Accelerator pedal: Released	905 – 1,165 mV
115	Throttle position sensor (main)	<ul style="list-style-type: none"> Remove the intake air hose at the throttle body Disconnect the throttle position sensor connector, and then connect terminal numbers 1, 2, 3 and 4 with the use of the special tool: MB991348. Ignition switch: ON 	Fully close the throttle valve with your finger	200 – 800 mV
			Fully open the throttle valve with your finger	3.8 – 4.9 V
133	Throttle actuator control motor (+)	Ignition switch: ON	Accelerator pedal: fully opened to fully closed	Decreases slightly (approx. 2 V) from battery voltage
141	Throttle actuator control motor (–)	Ignition switch: ON	Accelerator pedal: fully closed to fully opened	Decreases slightly (approx. 2 V) from battery voltage

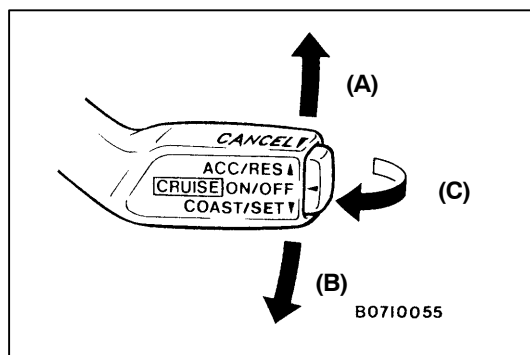


ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

AUTO-CRUISE MAIN SWITCH CHECK

1. Turn the ignition key to ON.
2. Check to be sure that the indicator lamp within the combination meter illuminates when the MAIN switch is switched ON.



AUTO-CRUISE CONTROL SETTING

1. Switch ON the MAIN switch.
2. Drive at the desired speed within the range of approximately 40 – 200 km/h.
3. Push the auto-cruise control switch in the direction of arrow (B).
4. Check to be sure that when the switch is released the speed is the desired constant speed.

NOTE

If the vehicle's speed decreases to approximately 15 km/h below the set speed because of climbing a hill for example, the auto-cruise control will be cancelled.

SPEED-INCREASE SETTING

1. Set to the desired speed.
2. Push the auto-cruise control switch in the direction of arrow (A).
3. Check to be sure that acceleration continues while the switch is held, and that when it is released the constant speed at the time when it was released becomes the driving speed.

NOTE

Acceleration can be continued even if the vehicle speed has passed the high-speed limit (approx. 200 km/h). But the speed when the auto-cruise control switch is released will be recorded as the high-speed limit.

SPEED-REDUCTION SETTING

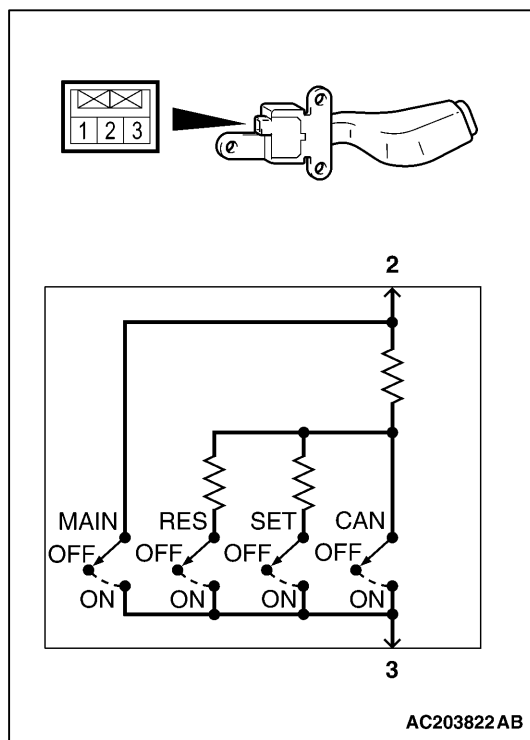
1. Set to the desired speed.
2. Push the auto-cruise control switch in the direction of arrow (B).
3. Check to be sure that deceleration continues while the switch is pressed, and that when it is released the constant speed at the time when it was released becomes the driving speed.

NOTE

When the vehicle speed reaches the low limit (approximately 40 km/h) during deceleration, the auto-cruise control will be cancelled.

RETURN TO THE SET SPEED BEFORE CANCELLATION AND AUTO-CRUISE CONTROL CANCELLATION

1. Set the auto-cruise speed control.
2. When any of the following operations are performed while at constant speed during auto-cruise control, check if normal driving is resumed and deceleration occurs.
 - a. The auto-cruise control switch is pushed in the direction of arrow (C).
 - b. The brake pedal is depressed.
 - c. The selector lever is moved to the "N" range.
3. When the auto-cruise control switch is pushed in the direction of arrow (A) at a vehicle speed of 40 km/h or higher, check if the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
4. When the MAIN switch is turned to OFF while driving at constant speed, check if normal driving is resumed and deceleration occurs.

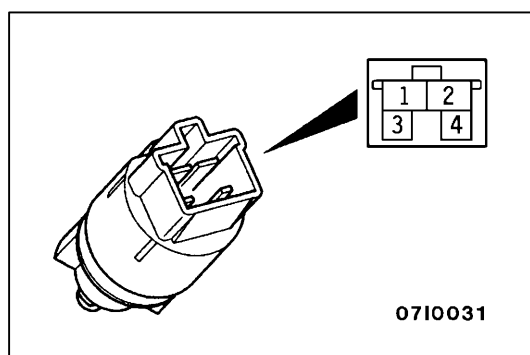


AUTO-CRUISE CONTROL COMPONENT CHECK

AUTO-CRUISE CONTROL SWITCH CHECK

Measure the resistance between the terminals when each of the SET, RESUME, CANCEL and MAIN switches is pressed. If the values measured at this time correspond to those in the table below, then there is no problem.

Switch position	Resistance between terminals	
MAIN switch: OFF	No continuity	
MAIN switch: ON	Terminals 2 and 3	Approx. 0 Ω
CANCEL switch: ON	Terminals 2 and 3	Approx. 100 Ω
RESUME switch: ON	Terminals 2 and 3	Approx. 887 Ω
SET switch: ON	Terminals 2 and 3	Approx. 300 Ω



STOP LAMP SWITCH

1. Disconnect the connector.
2. Check for continuity between the terminals of the switch.

Measurement conditions	Terminal No.			
	1	2	3	4
When brake pedal is depressed. (for stop lamp circuit)	○	○		
When brake pedal is depressed. (for auto-cruise control circuit)			○	○

THROTTLE POSITION SENSOR

Refer to GROUP 13B – On-vehicle Service.

THROTTLE CONTROL SERVO CHECK

Refer to GROUP 13B – On-vehicle Service.

ACCELERATOR PEDAL POSITION SENSOR

Refer to GROUP 13B – On-vehicle Service.

VEHICLE SPEED SENSOR

Refer to GROUP 54A – Combination meters*.

NOTE:

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005)

AUTO-CRUISE CONTROL

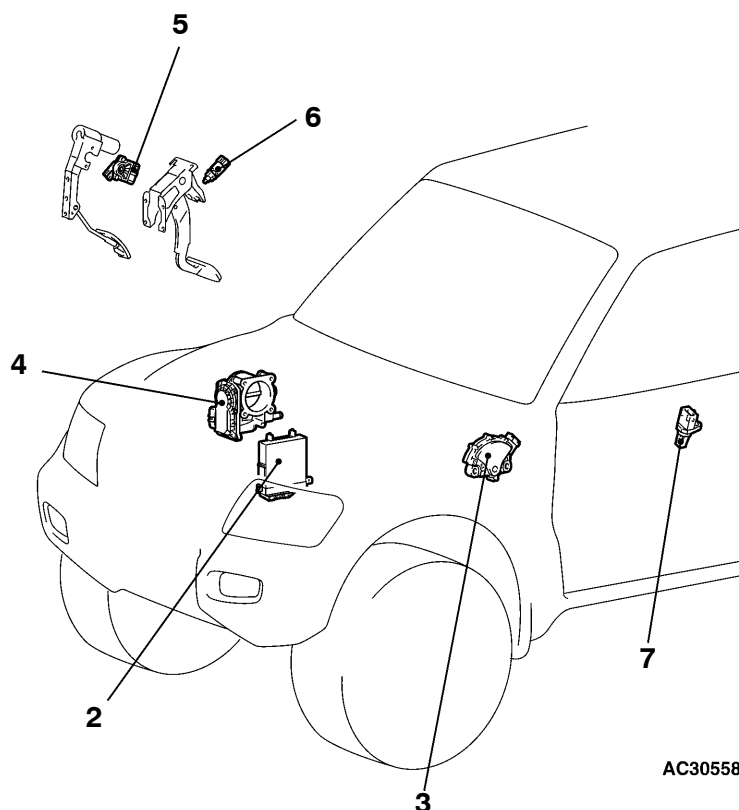
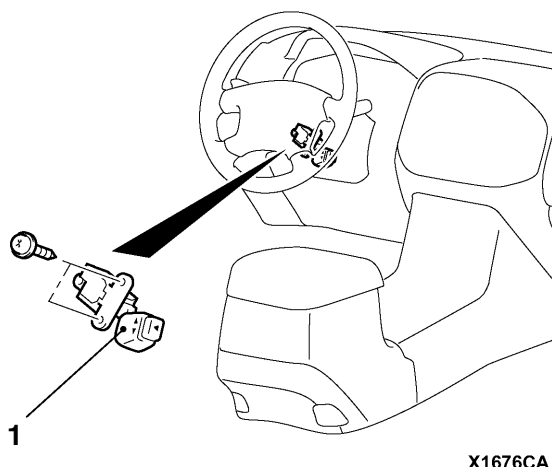
REMOVAL AND INSTALLATION

CAUTION: SRS

Before removal of air bag module, refer to GROUP 52B – SRS Service Precautions and Air Bag Modules and Clock Spring*.

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Control switch removal steps

- Air bag module
(Refer to GROUP 52B*).
- 1. Auto-cruise control switch

Control unit removal steps

- 2. Engine-A/T-ECU
(Refer to GROUP 13A*).

Sensor removal steps

- 3. Inhibitor switch
- 4. Throttle body (built-in throttle position sensor and throttle control servo, Refer to GROUP 13B).
- 5. Accelerator pedal position sensor (Refer to P.17-4).
- 6. Stop lamp switch (Refer to GROUP 35A – Brake pedal*).
- 7. Vehicle speed sensor (Refer to GROUP 52A – Combination meters*).

NOTE:

*: Refer to the 2001 PAJERO Workshop Manual (Pub. No. PWJE0005)

EMISSION CONTROL SYSTEM <6G72/74-MPI>

GENERAL

OUTLINE OF CHANGE

A catalytic converter has been added to the vehicles with 6G72/74-MPI engine for GCC and to the vehicles with 6G74 engine for Australia. Due to this, the service procedures are the same as conventional vehicles with 6G72/74-MPI engine for General Export (with catalytic converter).

EMISSION CONTROL SYSTEM <6G75-MPI>

GENERAL

OUTLINE OF CHANGE

Due to the addition of the vehicles with 6G75-MPI engine, the following service procedures have been established. The other service procedures are the same as conventional vehicles with 6G72/74-MPI engine.

GENERAL INFORMATION

The emission control system consists of the following subsystems:

- Crankcase emission control system
- Evaporative emission control system
- Exhaust emission control system

Item	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system*	Canister Purge control solenoid valve	Equipped Duty cycle type solenoid valve (Purpose: HC reduction)
Exhaust emission control system	Air-fuel ratio control device – MPI system*	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Exhaust gas recirculation system <ul style="list-style-type: none"> • EGR valve • EGR control solenoid valve*¹ 	Equipped Vacuum type* ¹ or stepper motor type* ² Duty cycle type solenoid valve* ¹ (Purpose: HC reduction)
	Catalytic converter*	Monolith type (Purpose: CO, HC, NOx reduction)

NOTE

*: Vehicles with catalytic converter

*¹: Vehicles except Taiwan

*²: Vehicles for Taiwan

EMISSION CONTROL DEVICE REFERENCE TABLE

Related parts	Crankcase emission control system	Evaporative emission control system	Air/fuel ratio control system	Catalytic converter	Exhaust gas recirculation system	Reference page
Purge control solenoid valve*	×					17-30
PCV valve		×				17-72* ³
MPI system component		×	×			GROUP 13
Catalytic converter*				×		17-102* ³
EGR valve					×	17-34* ¹ 17-35* ²
EGR control solenoid valve * ¹					×	17-34

NOTE

*: Vehicles with catalytic converter

*¹: Vehicles except Taiwan

*²: Vehicles for Taiwan

*³: Refer to 2001 PAJERO Workshop Manual (Pub. No. PWJE0005).

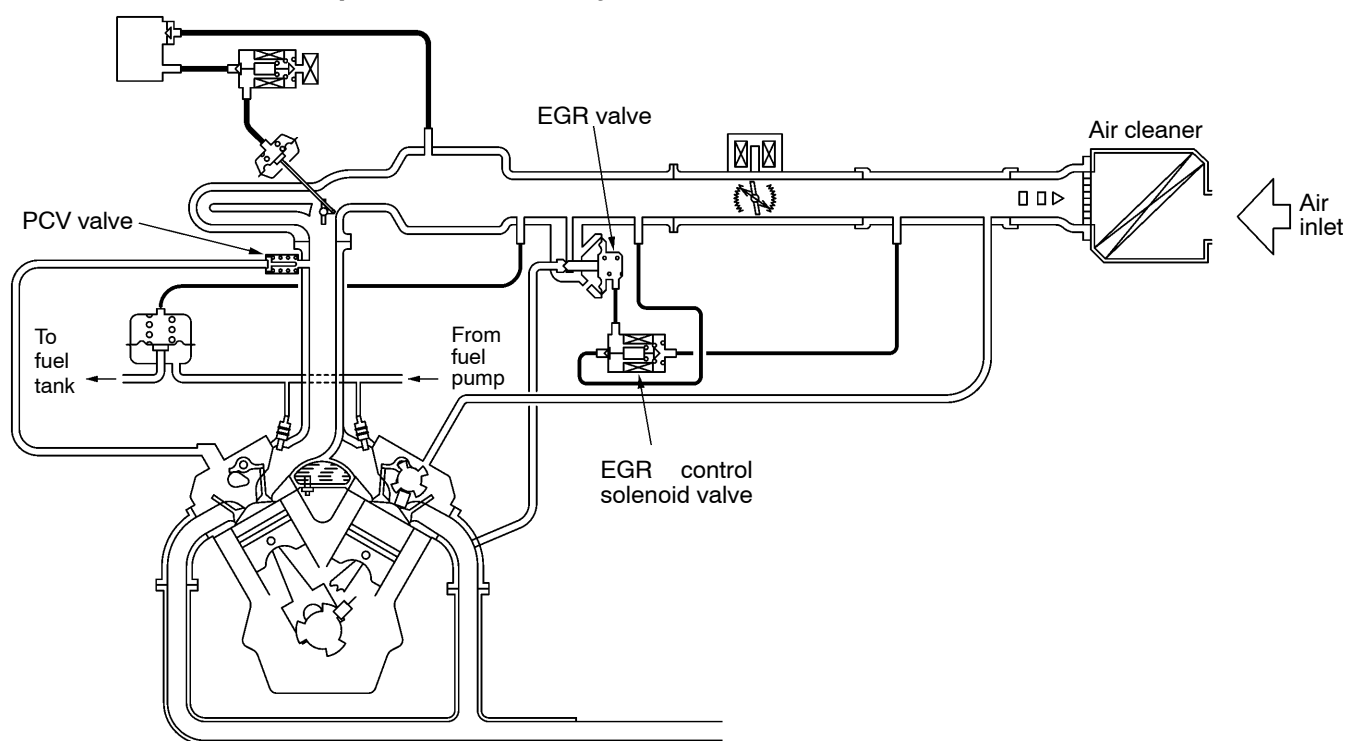
SERVICE SPECIFICATIONS

Item	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	30 – 34
EGR control solenoid valve coil resistance (at 20°C) Ω <Vehicles except Taiwan>	28 – 36
EGR valve (stepper motor) resistance (at 20°C) Ω <Vehicles for Taiwan>	20 – 24

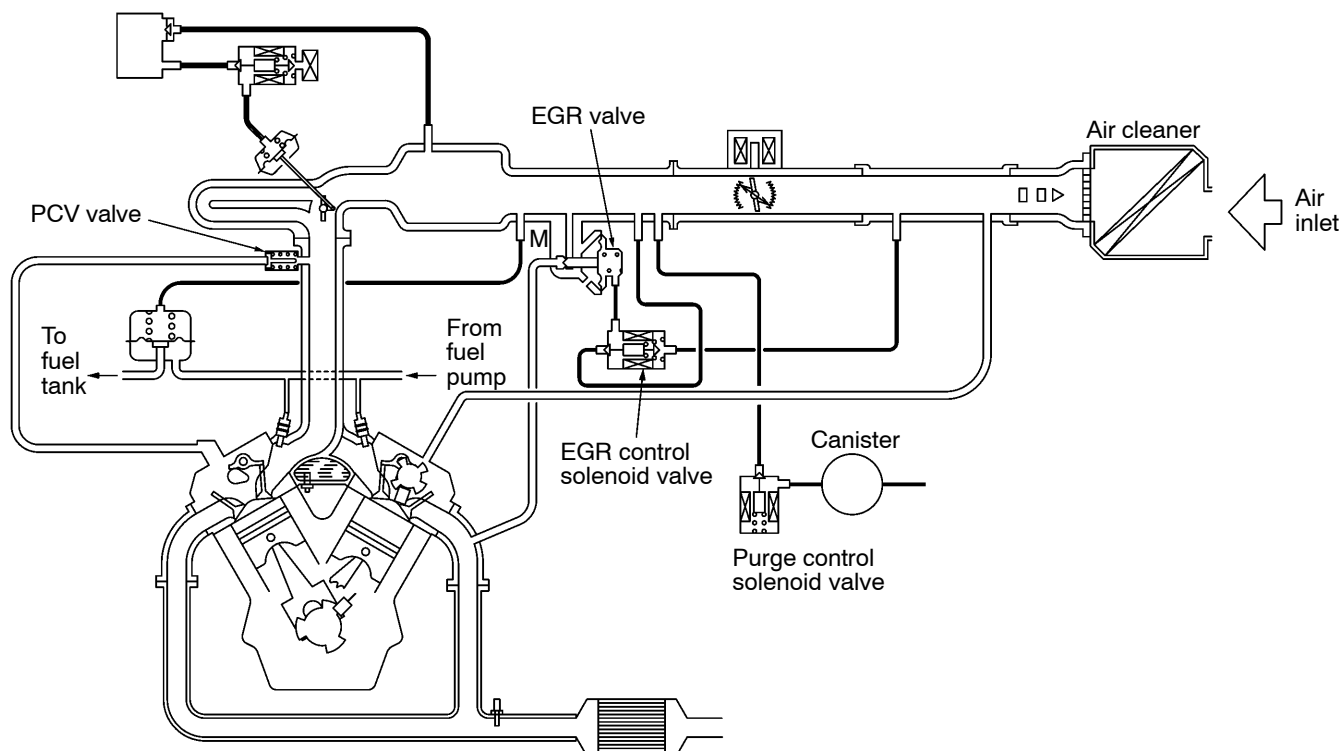
VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM

<Vehicles for General Export without catalytic converter, South Africa>

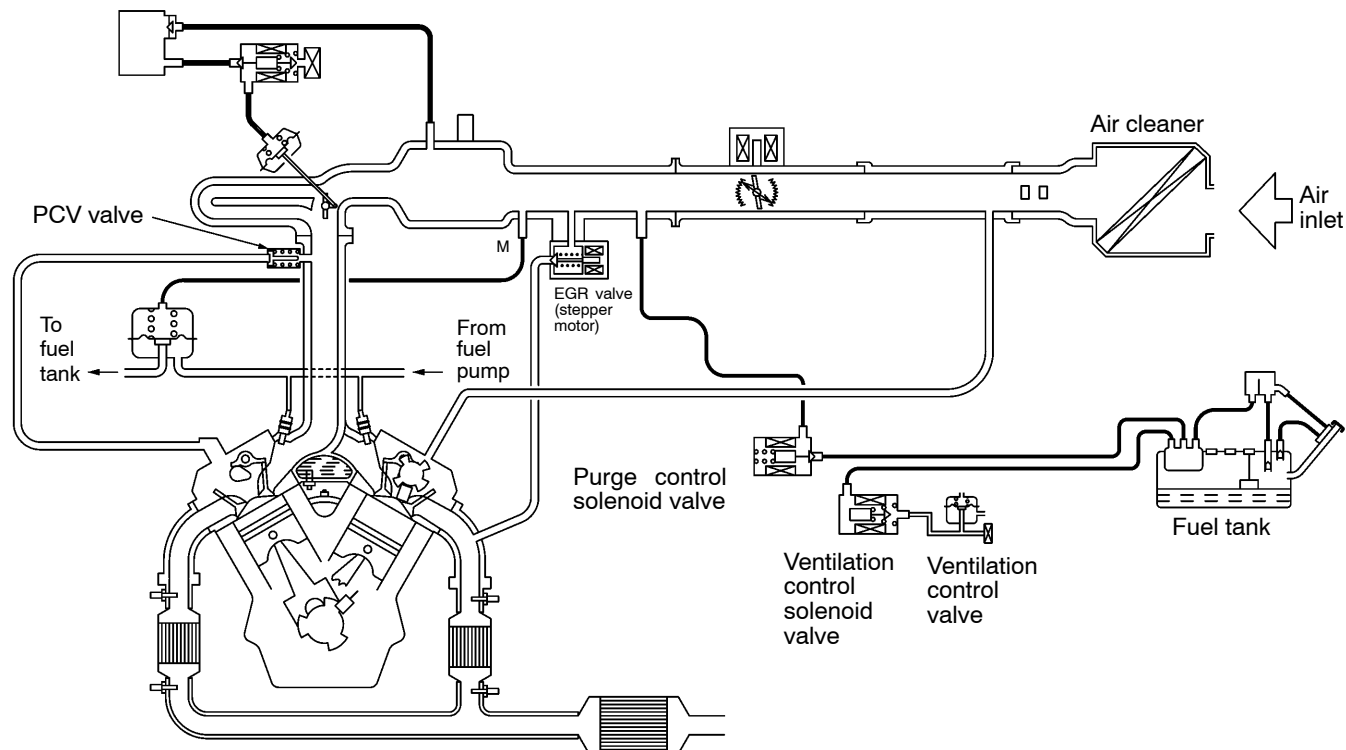


<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>



36009CA

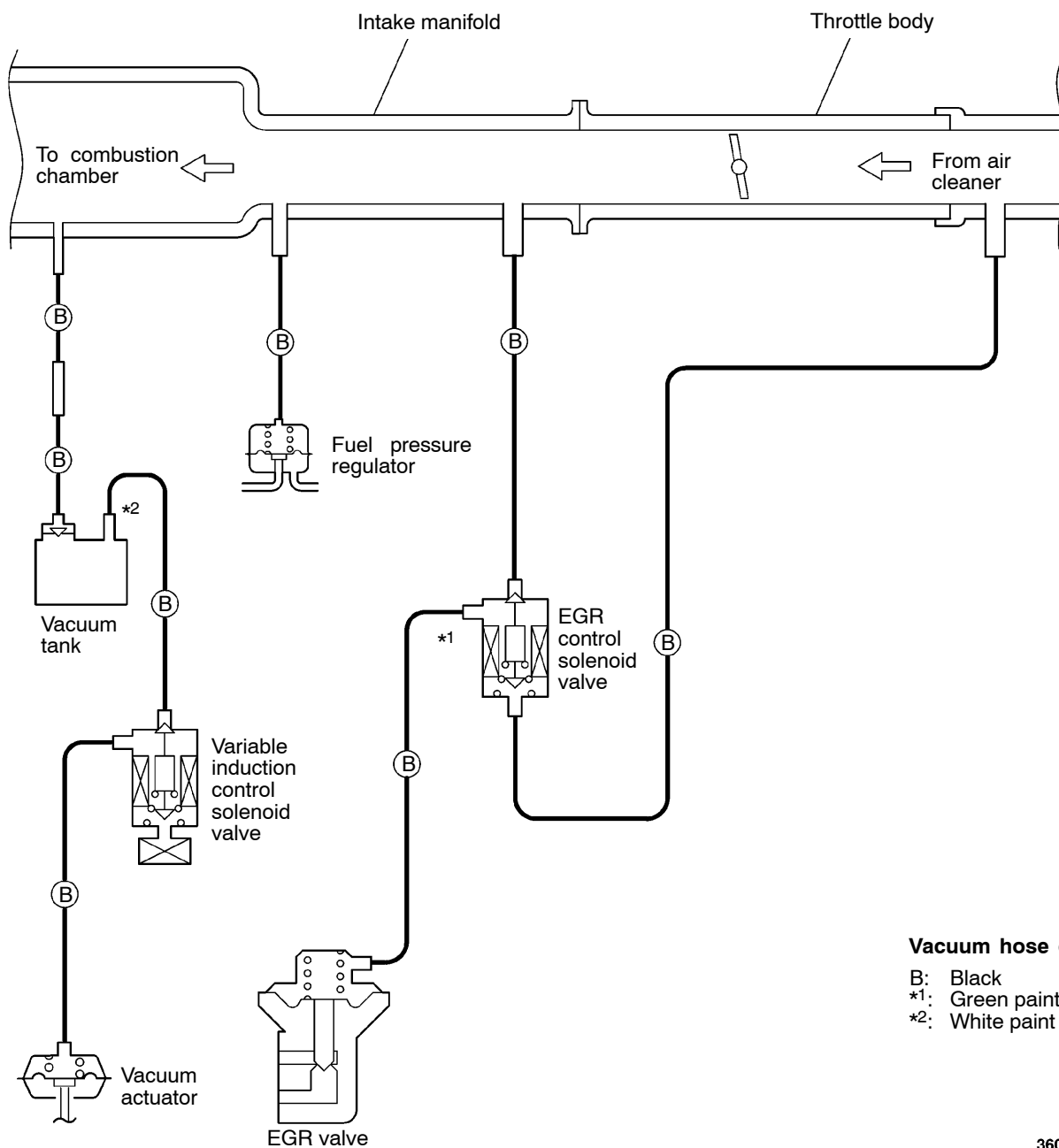
<Vehicles for Taiwan>



36011CA

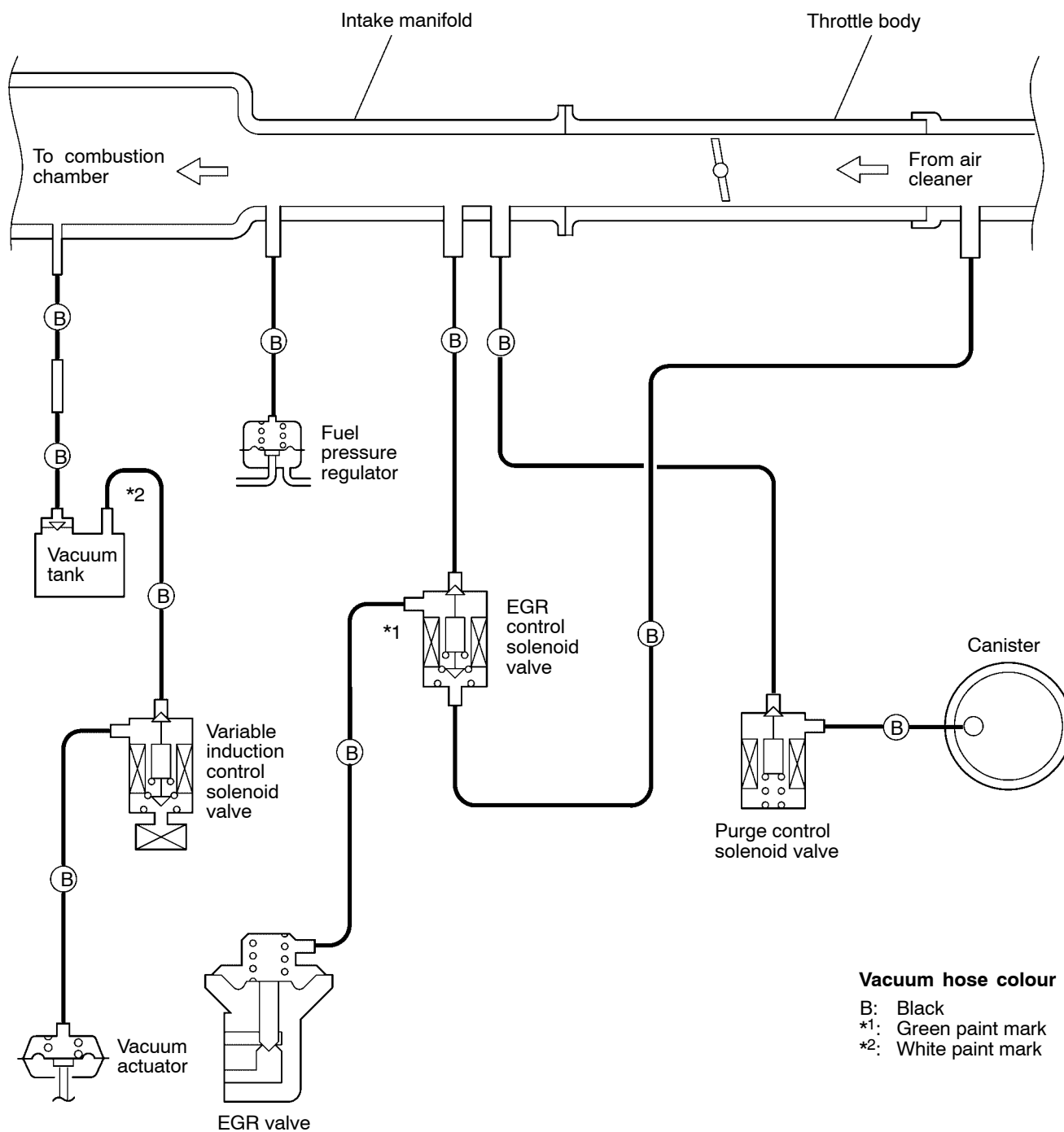
VACUUM CIRCUIT DIAGRAM

<Vehicles for General Export without catalytic converter, South Africa>

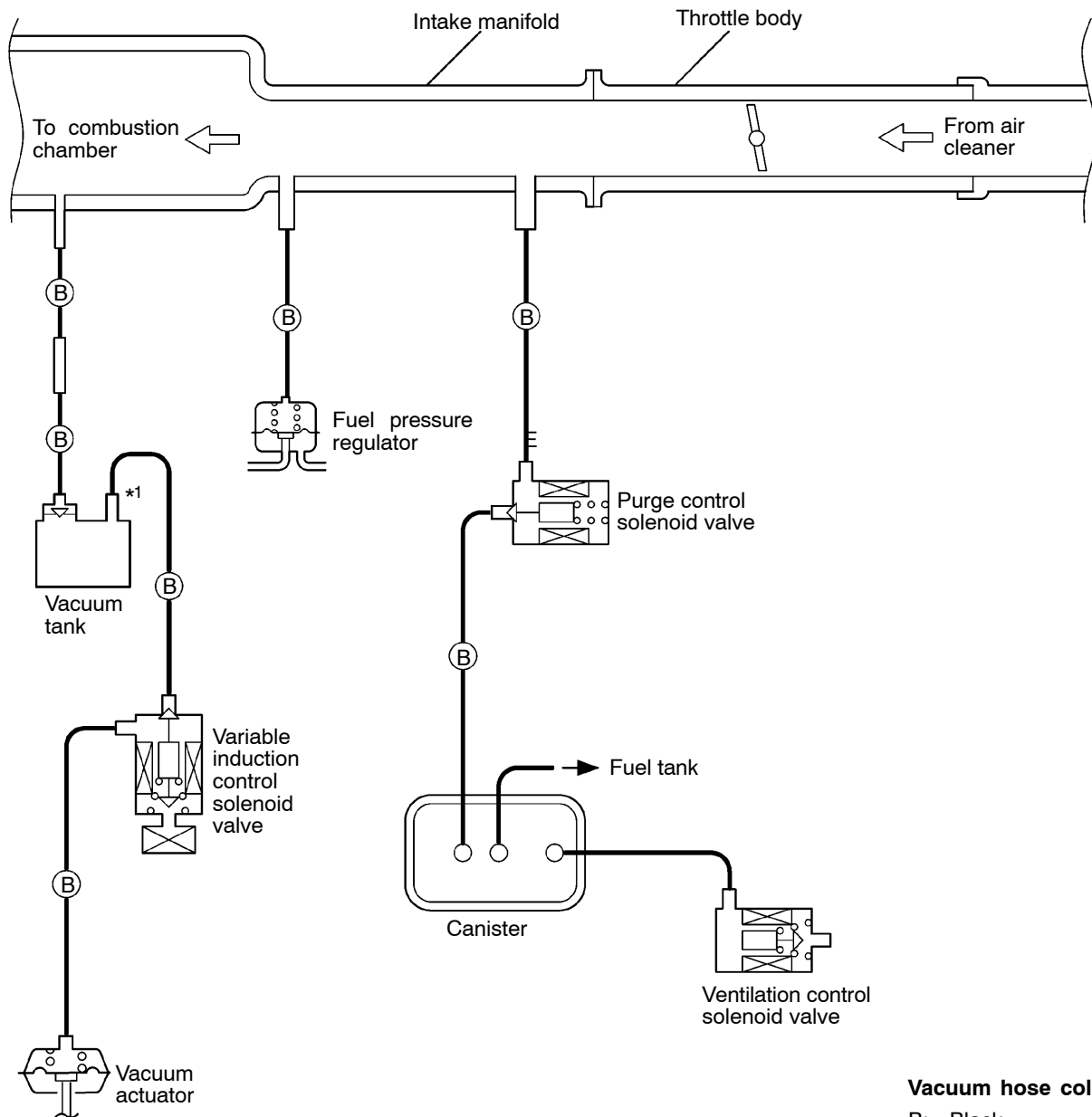


36012CA

<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>



<Vehicles for Taiwan>

**Vacuum hose colour**

B: Black

*1: White paint mark

EVAPORATIVE EMISSION CONTROL SYSTEM

<VEHICLES FOR GENERAL EXPORT WITH CATALYTIC CONVERTER, GCC, BRAZIL, AUSTRALIA, TAIWAN>

GENERAL INFORMATION

The evaporative emission control system prevents fuel vapours generated in the fuel tank from escaping into the atmosphere.

Fuel vapours from the fuel tank flow through the fuel tank pressure control valve and vapour pipe/hose to be stored temporarily in the canister. When driving the vehicle, fuel vapours stored in the canister flow through the purge solenoid and purge port and go into the intake manifold to be

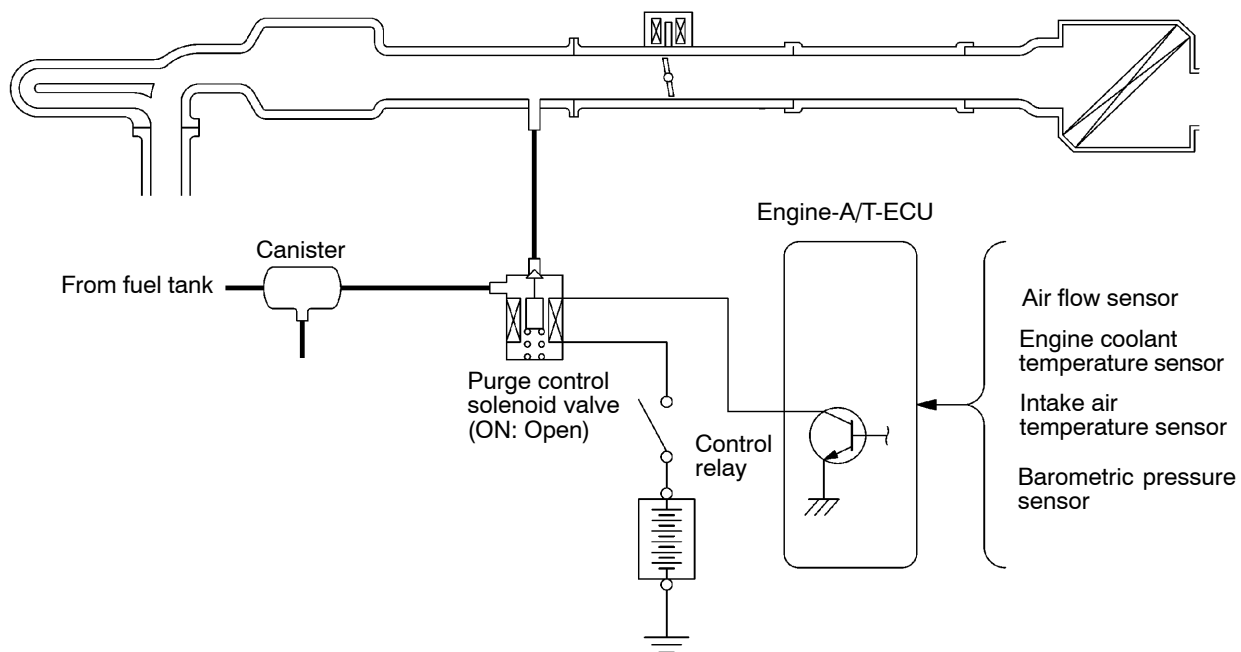
sent to the combustion chamber.

When the engine coolant temperature is low or when the intake air quantity is small (when the engine is at idle, for example), the engine control unit turns the purge solenoid off to shut off the fuel vapour flow to the intake manifold.

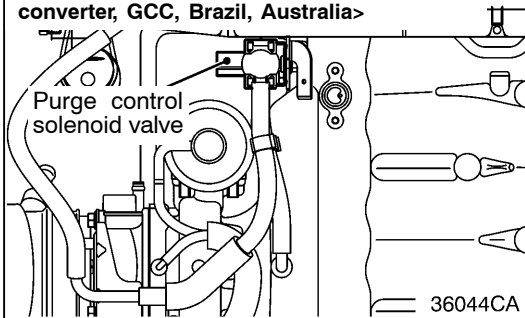
This does not only insure the driveability when the engine is cold or running under low load but also stabilize the emission level.

SYSTEM DIAGRAM

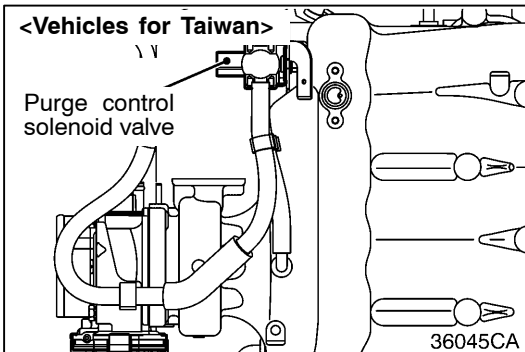
<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>



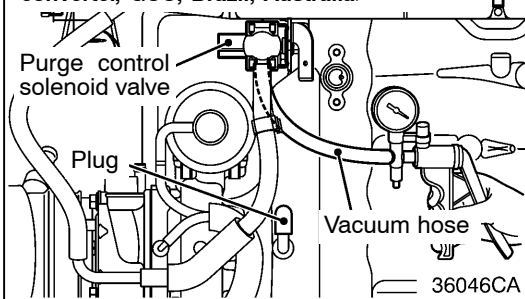
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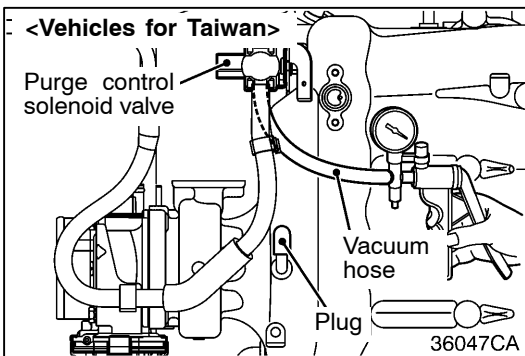
<Vehicles for Taiwan>



<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>



<Vehicles for Taiwan>



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)

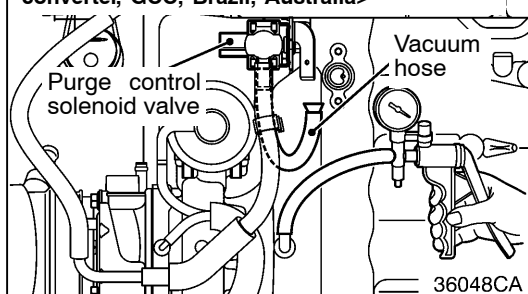
Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min	

When engine is hot

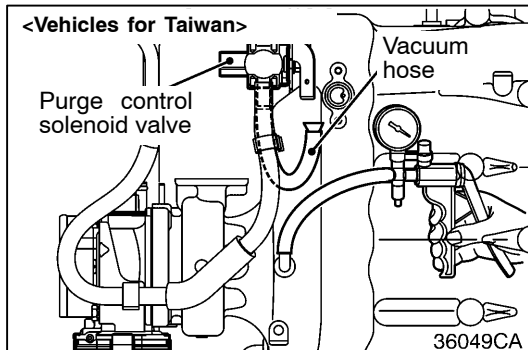
(Engine coolant temperature: 80°C or less)

Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min (for approximately 3 minutes after the engine is started.)	Vacuum will leak

<Vehicles for General Export with catalytic converter, GCC, Brazil, Australia>

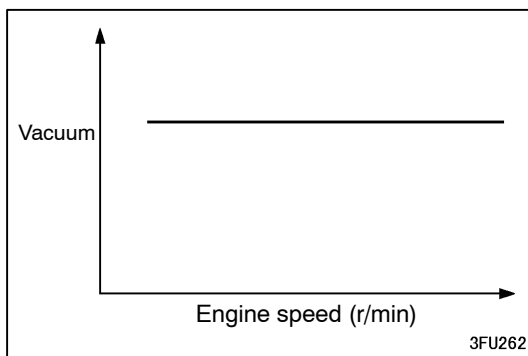


<Vehicles for Taiwan>



PURGE CONTROL SYSTEM CHECK

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



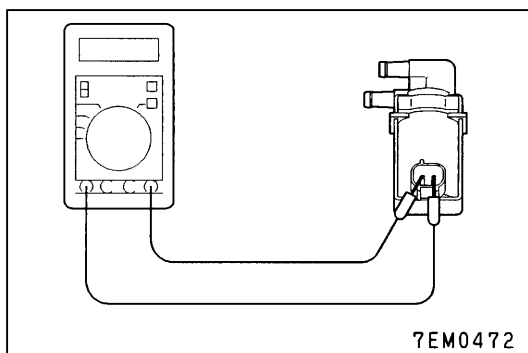
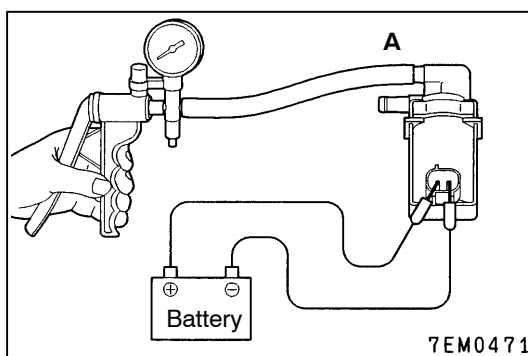
3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably blocked and should be cleaned.

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, red paint mark) 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)

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

GENERAL INFORMATION

The exhaust gas recirculation (EGR) system lowers the nitrogen oxide (NOx) emission level. When the air/fuel mixture combustion temperature is high, a large quantity of nitrogen oxides (NOx) is generated in the combustion chamber. Therefore, this system recirculates part of emission gas from

the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx. The EGR flow rate is controlled by the EGR valve so as not to decrease the driveability.

OPERATION

<Vehicles except for Taiwan>

The EGR valve is being closed and does not recirculate exhaust gases under one of the following conditions. Otherwise, the EGR valve is opened and recirculates exhaust gases.

- The engine coolant temperature is low.
- The engine is at idle.
- The throttle valve is widely opened.

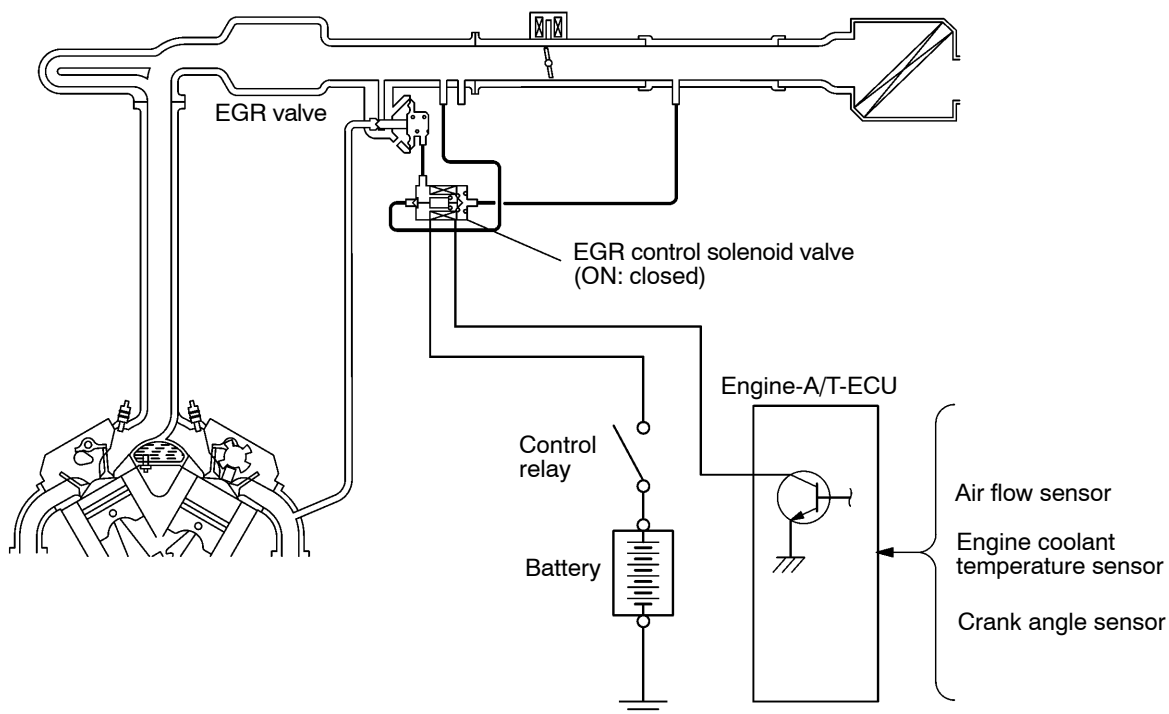
<Vehicles for Taiwan>

When the engine coolant temperature is low, when the engine is at idle or when a wide open throttle operation is performed, the EGR valve (stepper motor) is kept closed, achieving no EGR. After warming up of the engine, the EGR valve (stepper motor) can be opened by the powertrain control module.

The powertrain control module monitors the EGR system and illuminates the check engine/malfunction indicator lamp to indicate that there is a malfunction.

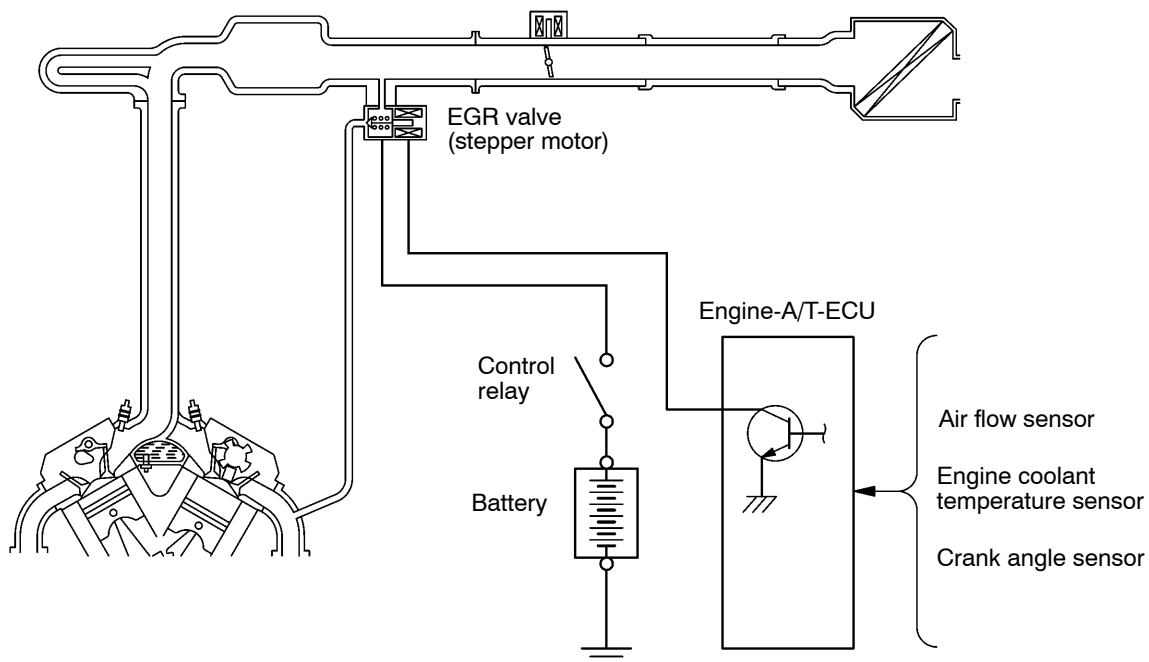
SYSTEM DIAGRAM

<Vehicles for General Export, GCC, Brazil, Australia, South Africa



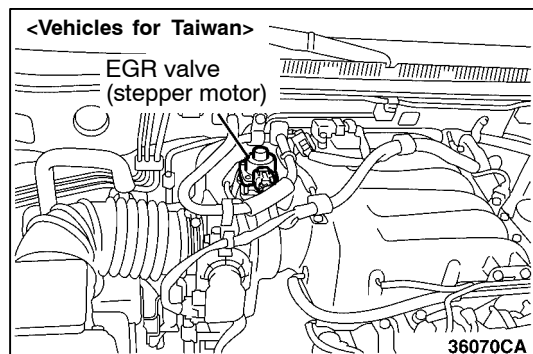
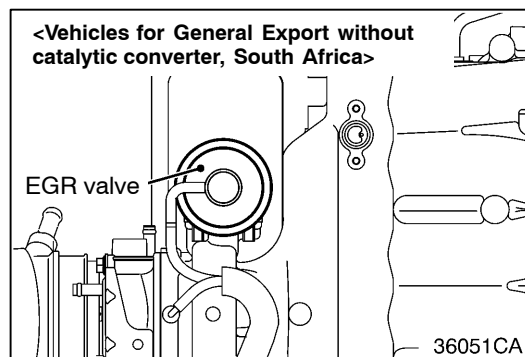
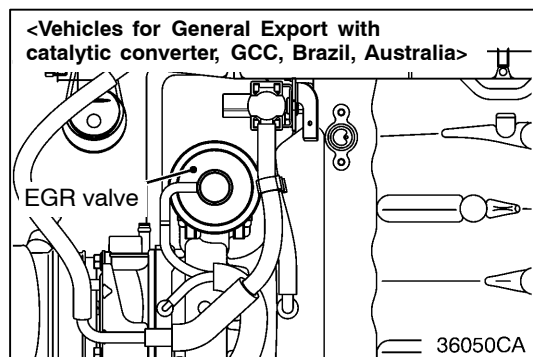
36027CA

<Vehicles for Taiwan>



36028CA

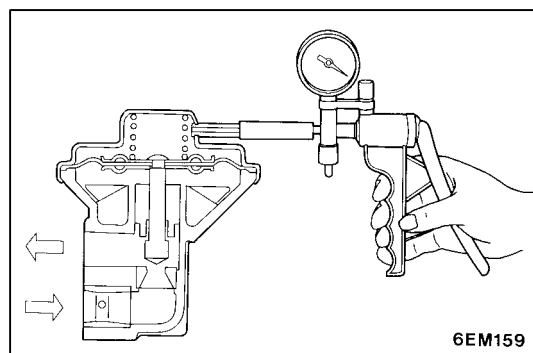
COMPONENT LOCATION



EGR VALVE CHECK

<VEHICLES EXCEPT FOR TAIWAN>

1. Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats correctly.
2. Connect a hand vacuum pump to the EGR valve.
3. Apply 67 kPa of vacuum, and check that the vacuum is maintained.

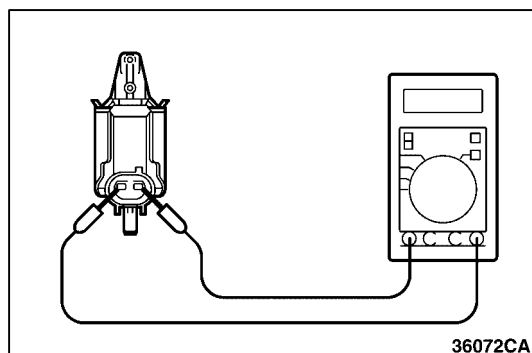
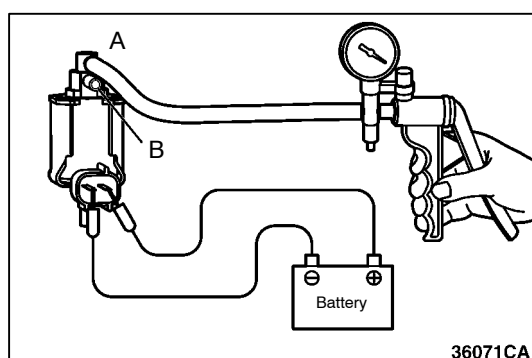
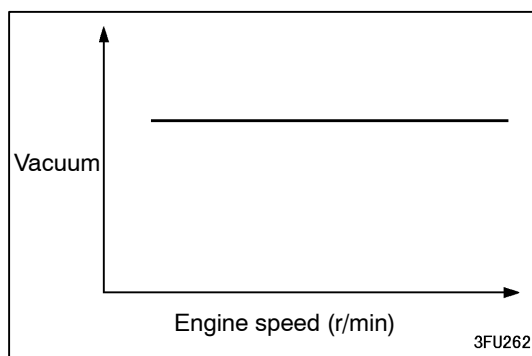
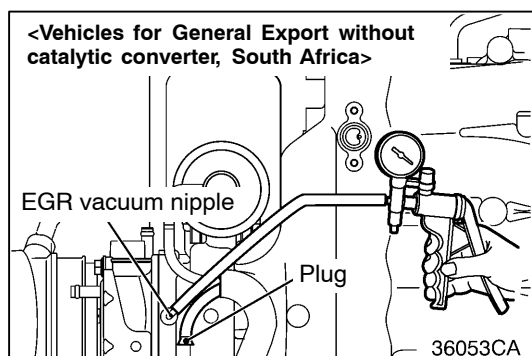
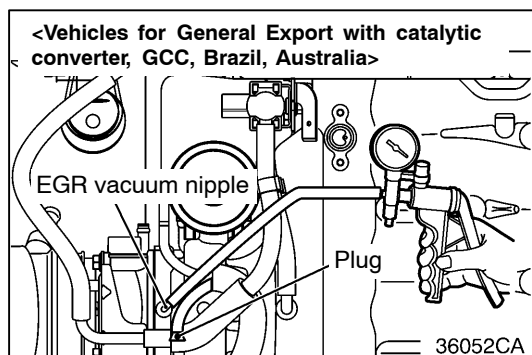


4. Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
5.3 kPa or less	Air is not blown out
29 kPa or more	Air is blown out

5. Replace the gasket, and tighten to the specified torque.

Tightening torque: 22 ± 3 Nm



EGR PORT VACUUM CHECK <VEHICLES EXCEPT FOR TAIWAN>

1. Disconnect the vacuum hose (black) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.
2. Plug the vacuum hose (black).
3. Start the engine.
4. Check that a fairly constant negative pressure is generated regardless of the engine speed.
5. If no negative pressure is generated, the port is probably blocked and should be cleaned.

EGR CONTROL SOLENOID VALVE CHECK <VEHICLES EXCEPT FOR TAIWAN>

NOTE

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

1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to the nipple (A) of the solenoid valve.
4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.

Battery voltage	B nipple condition	Normal condition
Not applied	Open	Vacuum maintained
Applied	Open	Vacuum leaks
	Closed	Vacuum maintained

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

Standard value: 29 – 34Ω (at 20°C)

EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM CHECK

Refer to GROUP 13 – Troubleshooting.

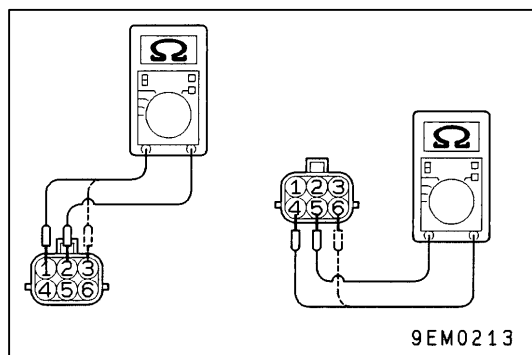
EGR VALVE (STEPPER MOTOR) CHECK <VEHICLES FOR TAIWAN>

Checking the Operation Sound

1. Check that the operation sound of the stepper motor can be heard from the EGR valve when the ignition switch is turned to ON (without starting the engine).
2. If the operation sound cannot be heard, check the stepper motor drive circuit.

NOTE

If the circuit is normal, the cause is probably a malfunction of the stepper motor or of the engine-A/T-ECU.



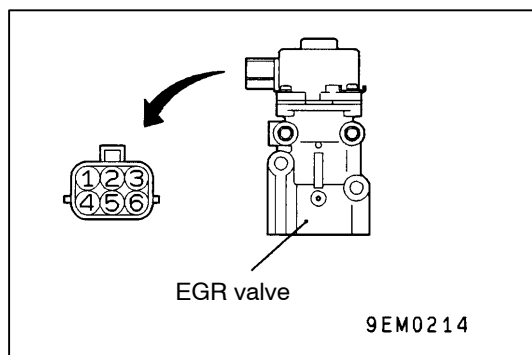
Checking the Coil Resistance

1. Disconnect the EGR valve connector.
2. Measure the resistance between the EGR valve-side connector terminal No.2 and terminal No.1 or terminal No.3.

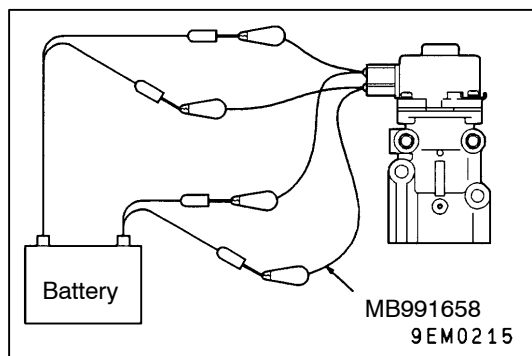
Standard value: 20 – 24 Ω (at 20°C)

3. Measure the resistance between the EGR valve-side connector terminal No.5 and terminal No.4 or terminal No.6.

Standard value: 20 – 24 Ω (at 20°C)

**Operation Check**

1. Remove the EGR valve.
2. Connect the special tool (test harness: MB991658) to the EGR valve-side connector.
3. Connect terminal No.2 to the positive (+) terminal of the battery.
4. Connect terminal No.1 and terminal No.3 to the negative (-) terminal of battery to test if any vibration occurs (as though the stepper motor is shaking slightly) due to the operation of the stepper motor.
5. Connect terminal No.5 to the positive (+) terminal of battery.



6. Connect terminal No.4 and terminal No.6 to the negative (-) terminal of battery to test if any vibration occurs (as though the stepper motor is shaking slightly) due to the operation of the stepper motor.
7. If the results of testing show that the vibration could be felt, the stepper motor is normal.

23 AUTOMATIC TRANSMISSION

CONTENTS

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

GENERAL

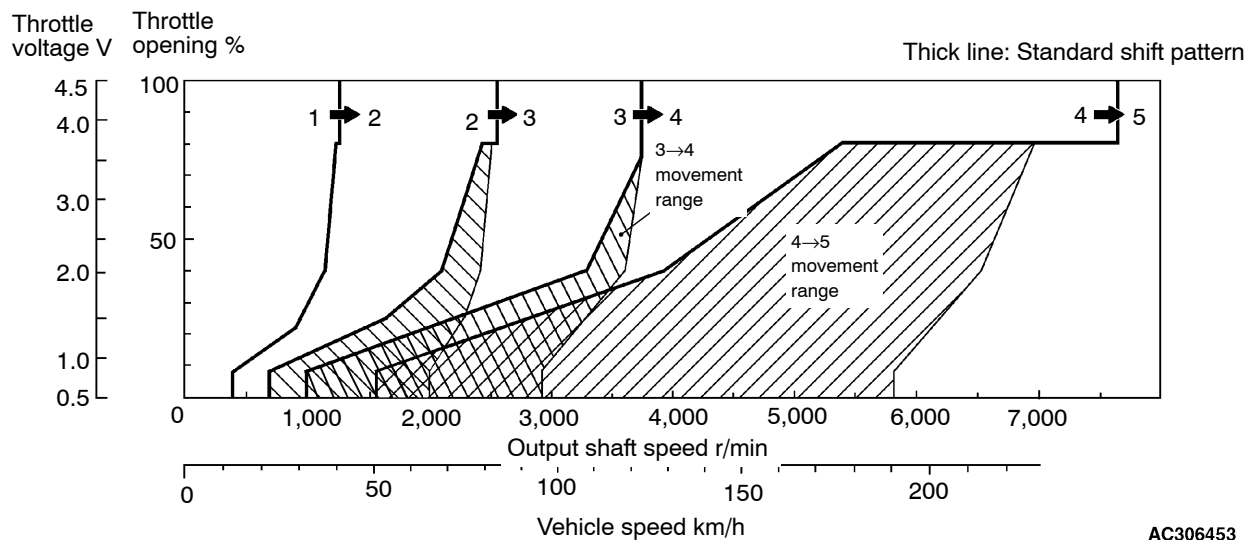
OUTLINE OF CHANGES

Due to the addition of the vehicles with 6G75-MPI engine, the service procedures which are different from those for the conventional vehicles with 6G74-MPI engine have been established as follows. Since the shift position of the vehicles with 4M40 engine has been changed from 7 positions to Sport mode, all the classifications have been changed to Sport mode. (The service procedures for the vehicles with Sport mode are the same as before.)

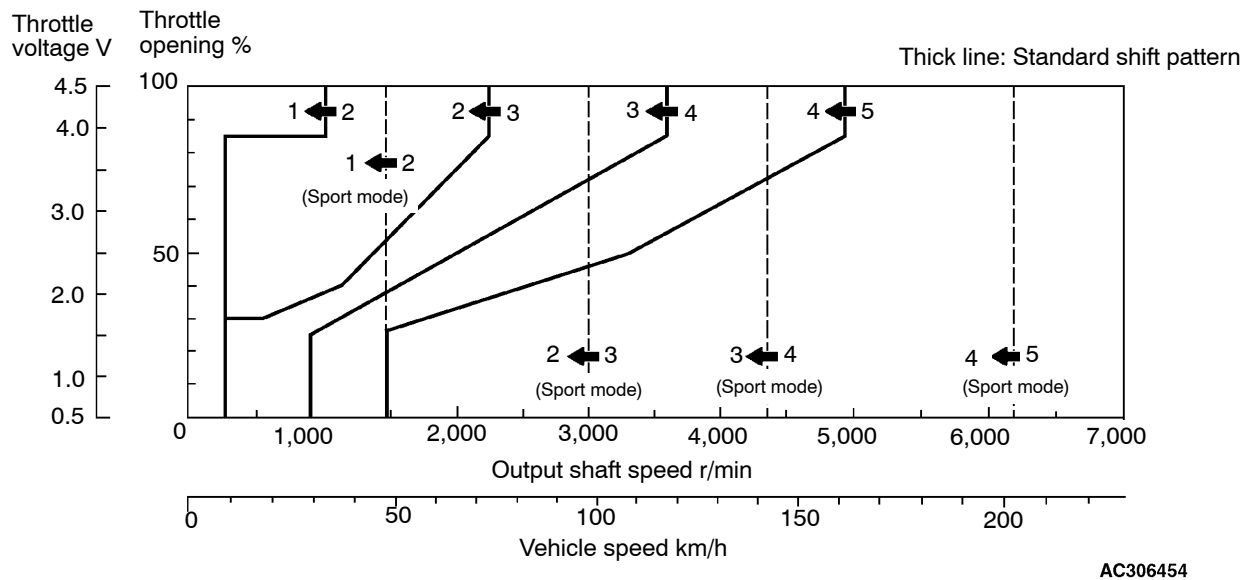
TROUBLESHOOTING <A/T>

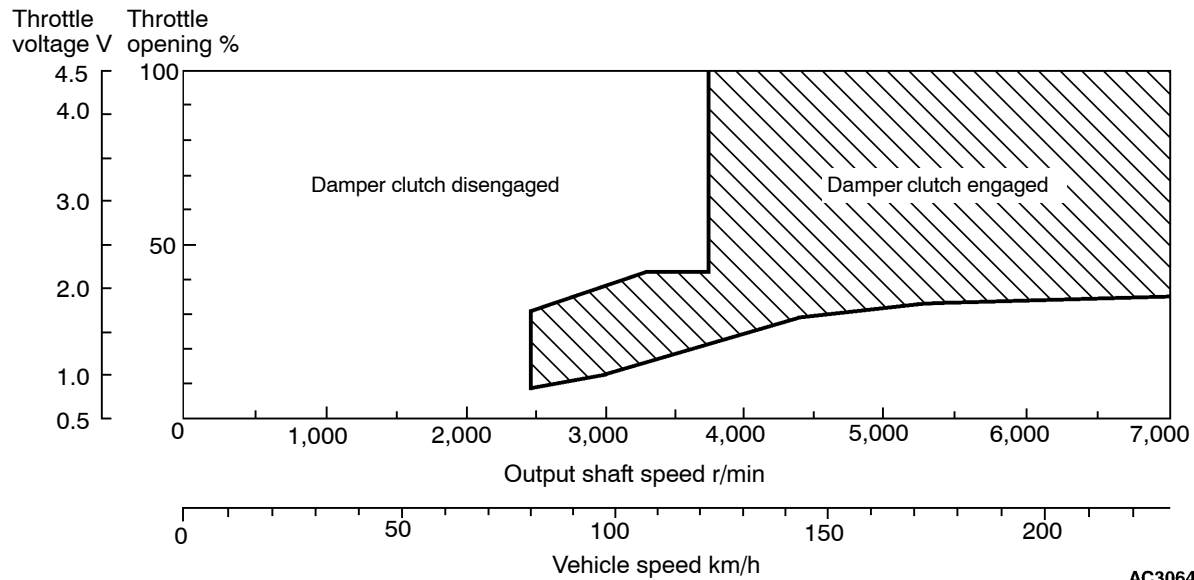
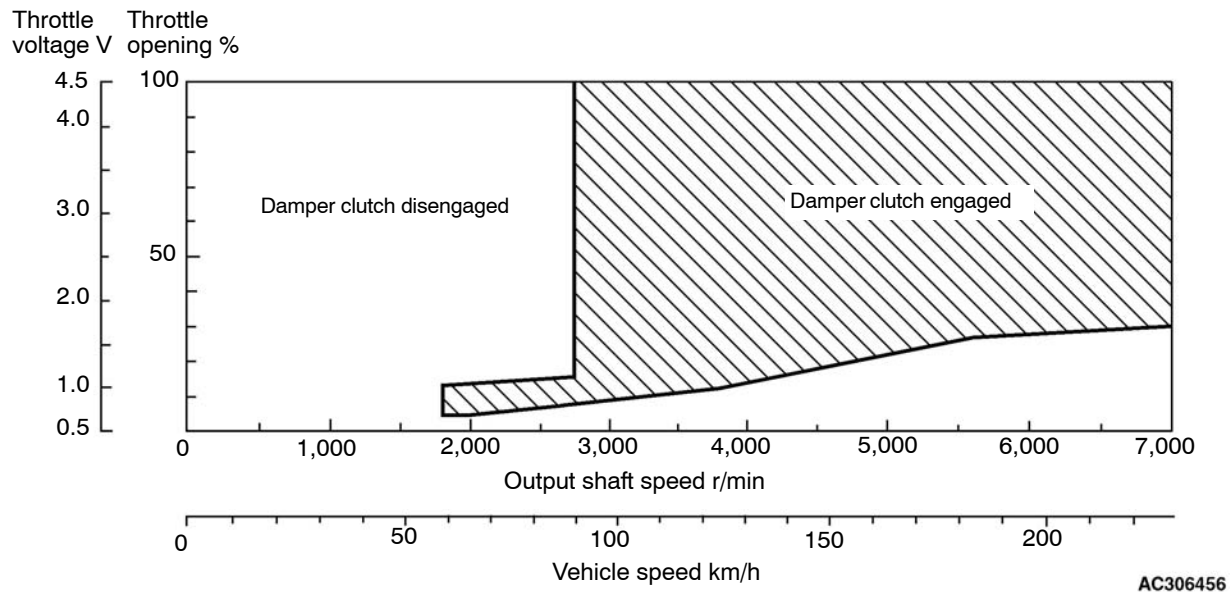
SHIFT PATTERN

UPSHIFT PATTERN



DOWNSHIFT PATTERN



DAMPER CLUTCH CONTROL**5TH GEAR****4TH GEAR**

INSPECTION CHART FOR DIAGNOSIS CODE

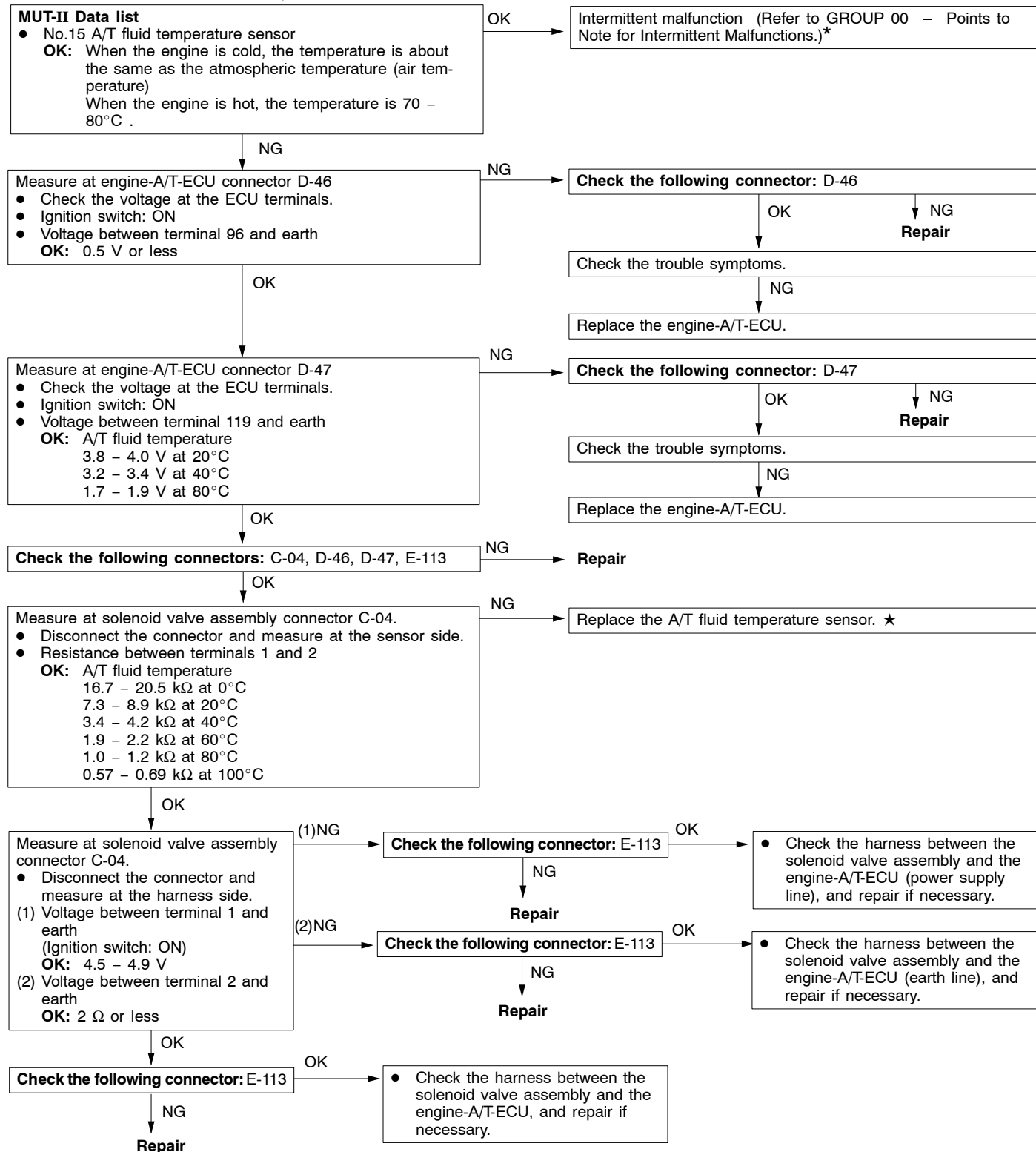
Diagnosis code	Diagnosis item		Reference page
15	A/T fluid temperature sensor system	Open circuit	23-5
21	Crank angle sensor system	Open circuit	23-6
22	Input shaft speed sensor system	Short-circuit/Open circuit	23-7
23	Output shaft sensor system	Short-circuit/Open circuit	23-8
26	Stop lamp switch system	Short-circuit	23-10
29	Vehicle speed sensor system	Short-circuit/Open circuit	23-11
31	LR solenoid valve system	Short-circuit/Open circuit	23-12
32	UD solenoid valve system	Short-circuit/Open circuit	23-13
33	2nd solenoid valve system	Short-circuit/Open circuit	23-14
34	OD solenoid valve system	Short-circuit/Open circuit	23-15
35	RED solenoid valve system	Short-circuit/Open circuit	23-16
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43	3rd without completion of shifting		23-21
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52	Damper clutch control system	System malfunction	23-27
54	A/T control relay system	Short-circuit to earth/Open circuit	23-28
56	N range lamp system	Short-circuit to earth	23-29

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

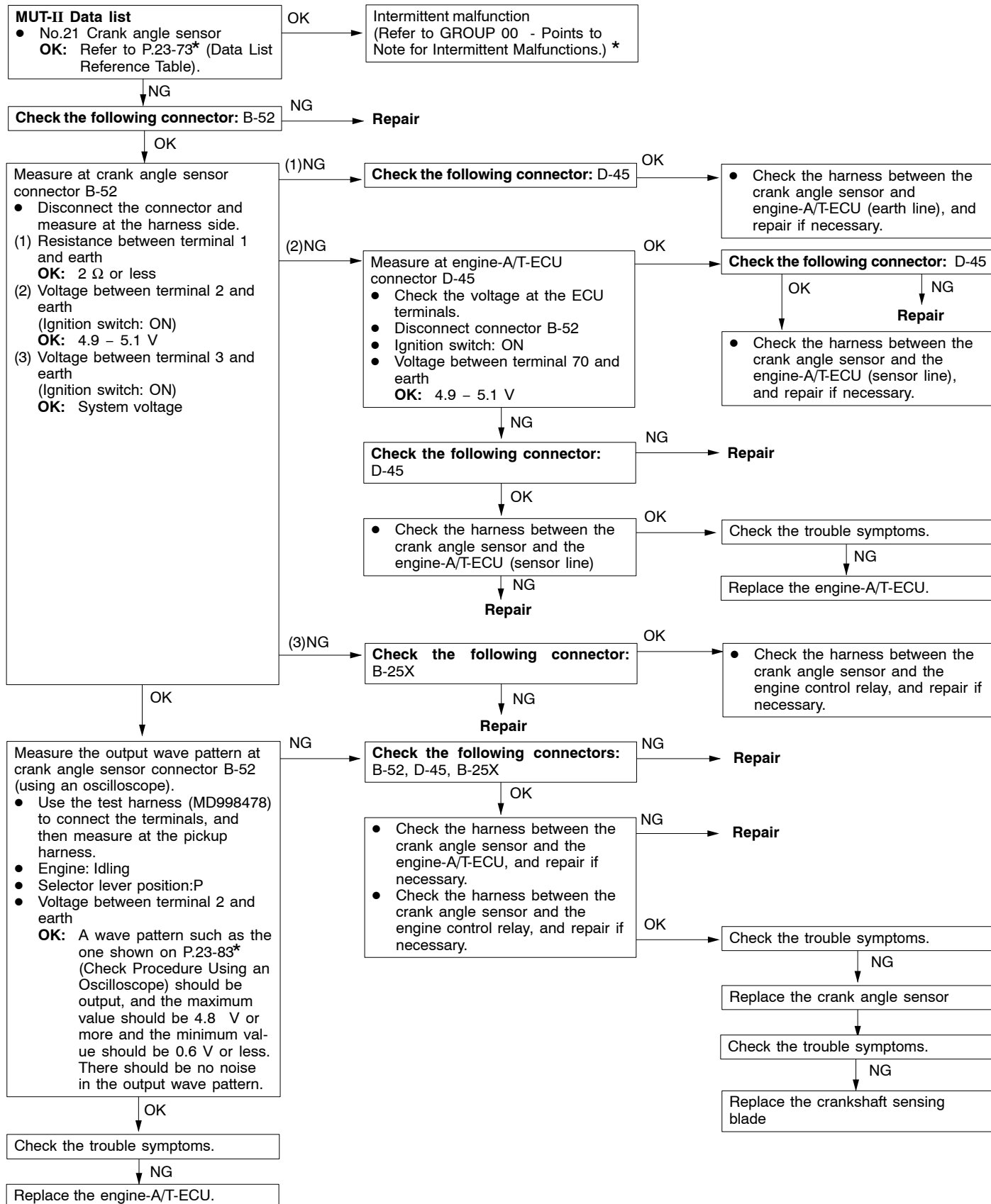
★: Refer to 2001 PAJERO Workshop Manual chassis Volume 1 (Pub. No. PWJE0005 1/2).

Code No.15 A/T fluid sensor system	Probable cause
If the A/T fluid temperature sensor output is 4.5 V or higher even after driving for 10 minutes or more (fluid temperature does not rise), it is judged that there is an open circuit in the A/T fluid temperature sensor and code No.15 is output.	<ul style="list-style-type: none"> • Malfunction of A/T fluid temperature sensor • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual

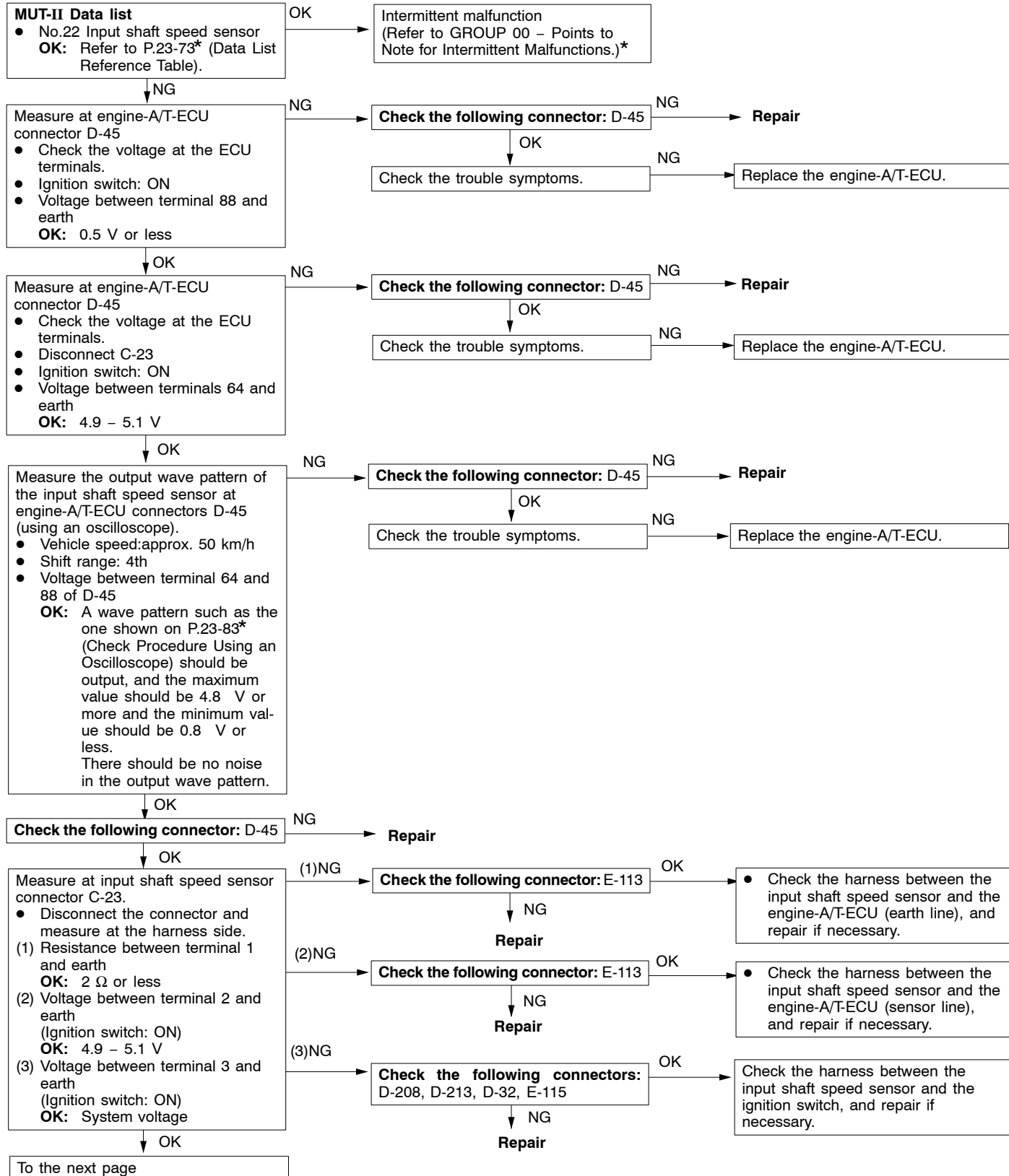


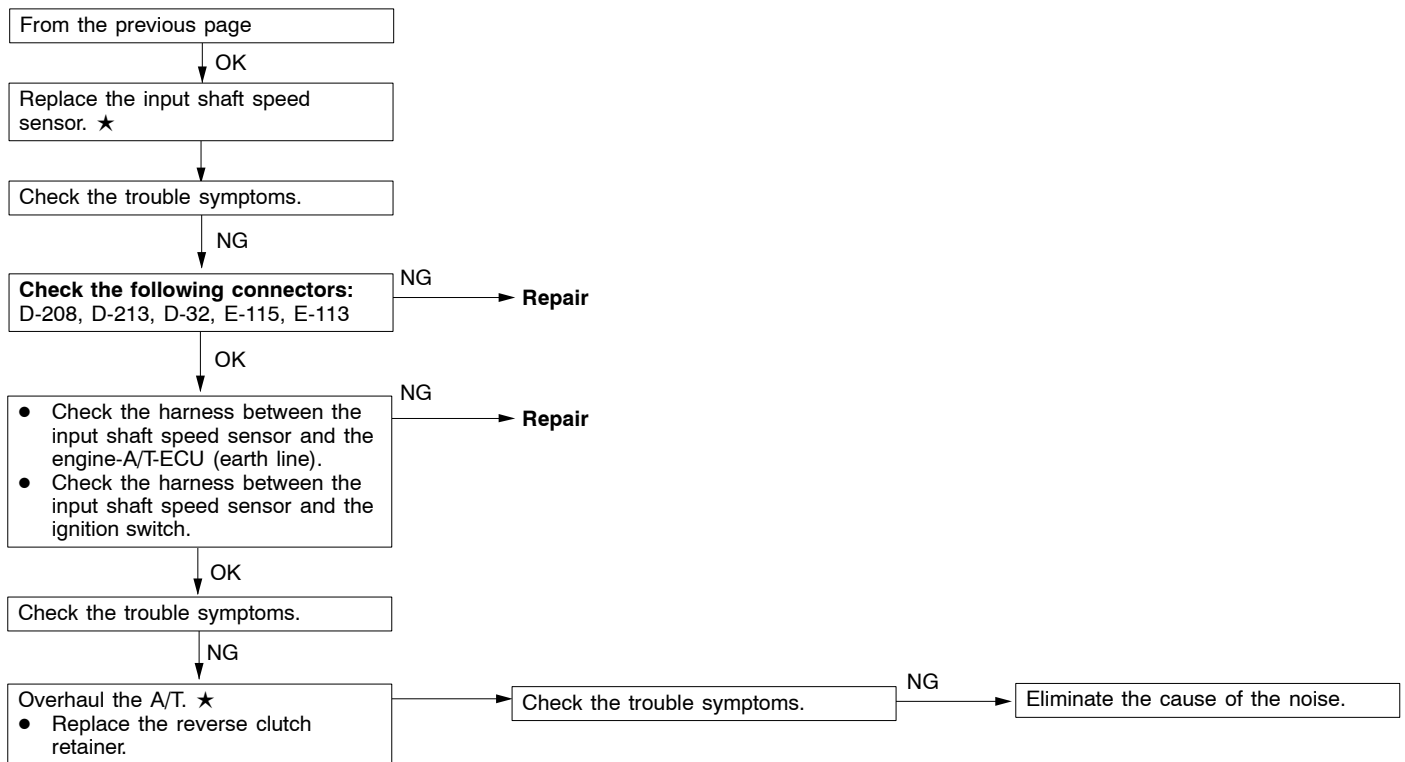
Code No.21 Crank angle sensor	Probable cause
If no output pulse from the crank angle sensor, engine speed sensor is detected for 5 seconds or more when the vehicle speed is 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor or an open circuit in the engine speed sensor, and code No.21 is output.	<ul style="list-style-type: none"> Malfunction of crankshaft sensing blade Malfunction of crank angle sensor Malfunction of harness or connector Malfunction of engine-A/T-ECU



Code No.22 Input shaft speed sensor system	Probable cause
<p>If no output pulse from the input shaft speed sensor is detected for 1 second or more while the vehicle is driving at 30 km/h or more in 4th, it is judged that there is a short-circuit or open circuit in the input shaft speed sensor, and code No.22 is output.</p> <p>If code No.22 is output 4 times, the transmission is locked at 3rd gear (D) or 2nd gear (downshift operation in Sport mode) as a fail-safe measure, and the N range indicator lamp flashes at 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of reverse clutch retainer • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

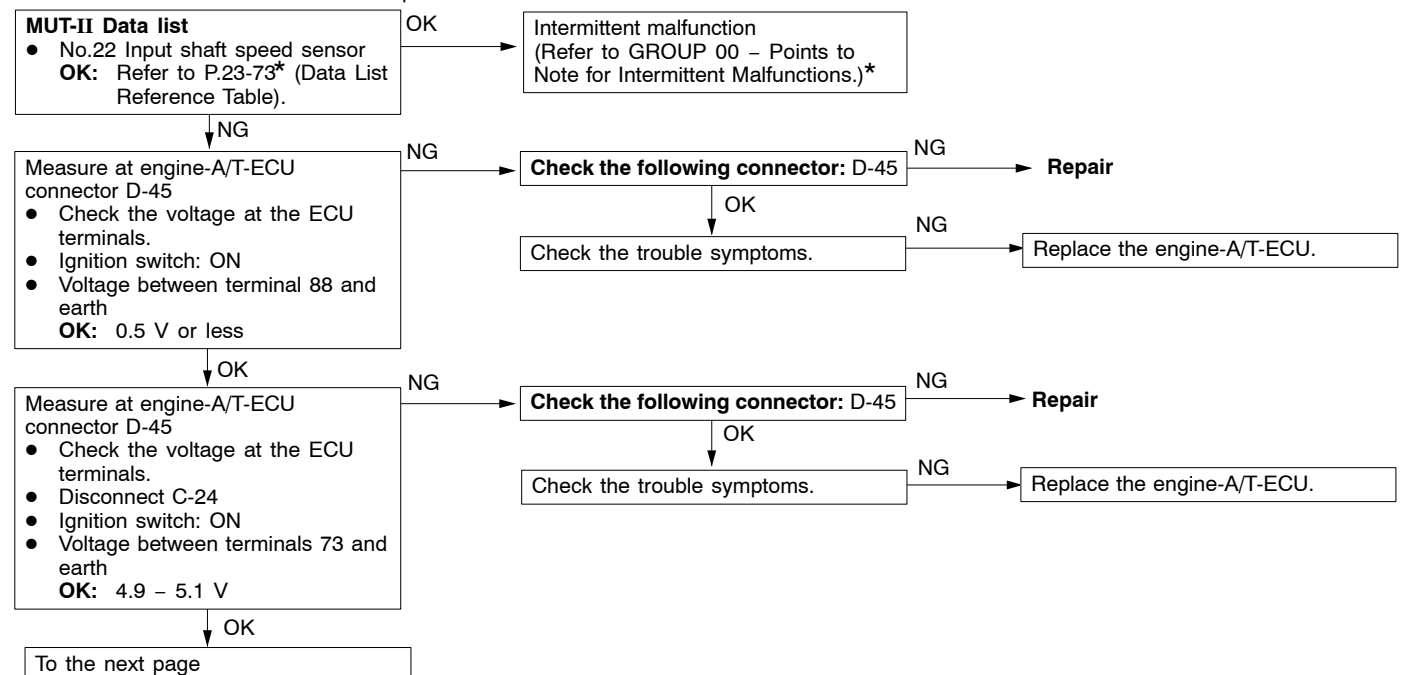
★ Refer to the Transmission Workshop Manual

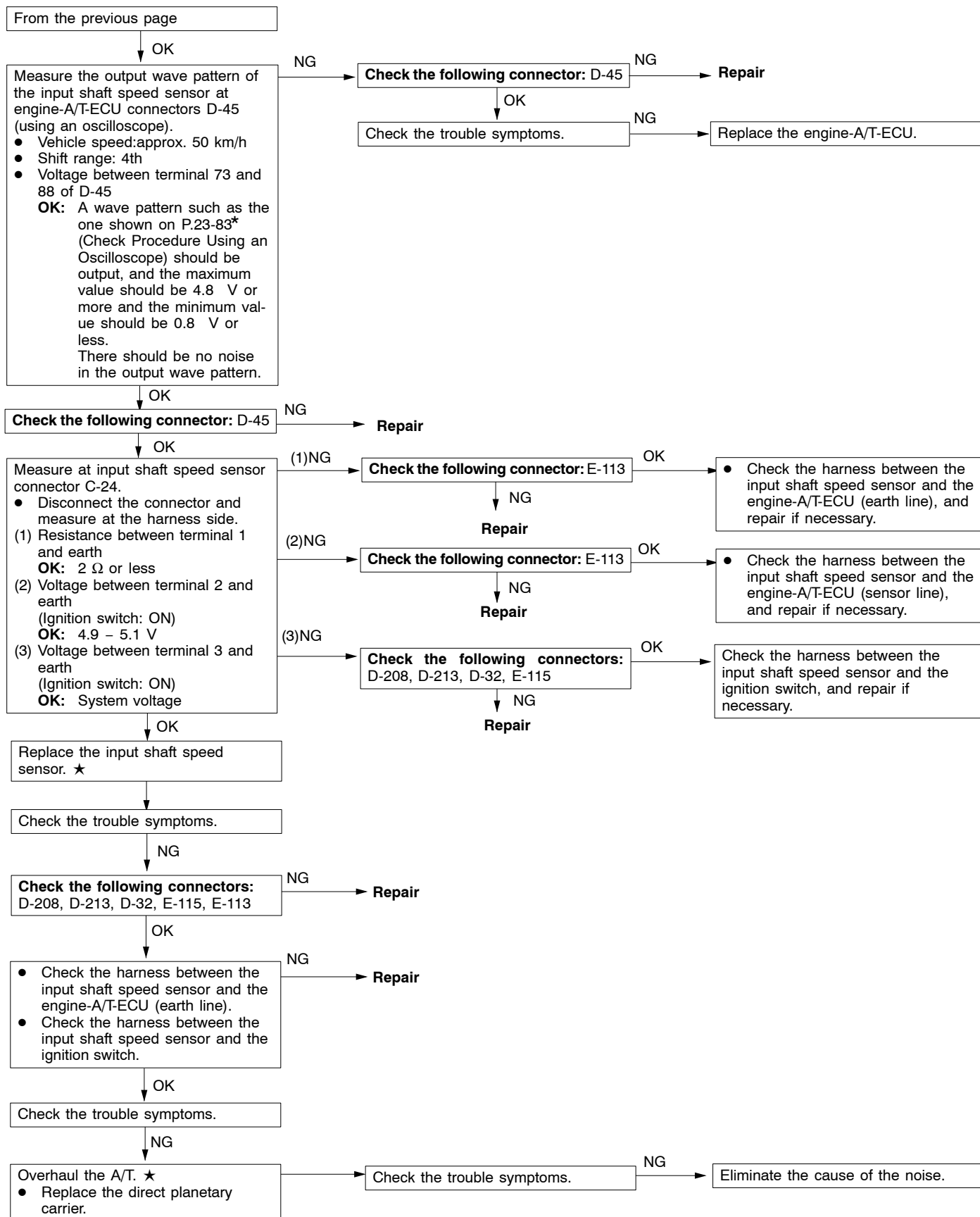




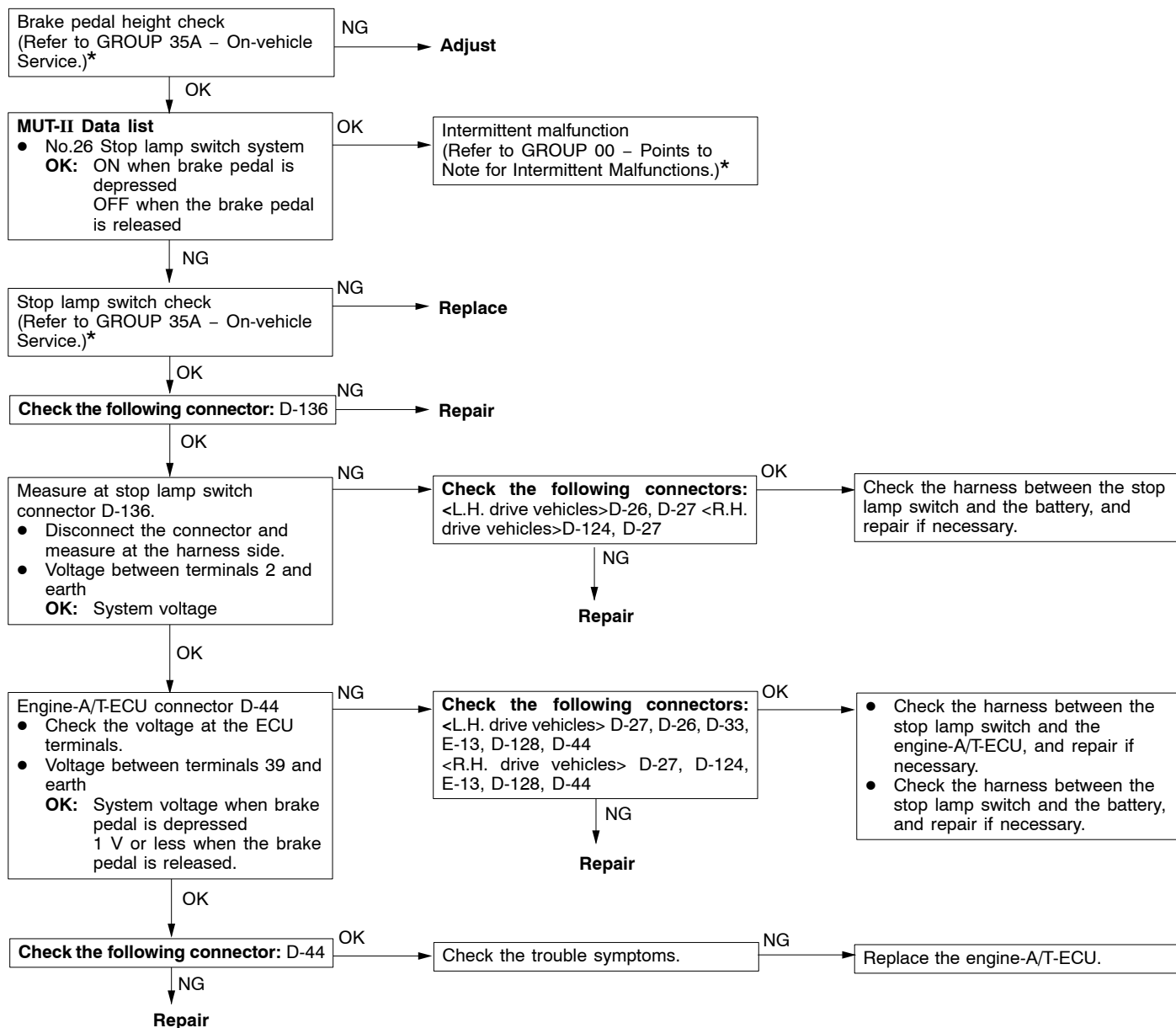
Code No.23 Output shaft speed sensor system	Probable cause
<p>If the output from the output shaft speed sensor is 50% or less continuously for 1 second or more while the vehicle is driving at 30 km/h or more in 4th, it is judged that there is a short-circuit or open circuit in the output shaft speed sensor, and code No.23 is output.</p> <p>If code No.23 is output 4 times, the transmission is locked at 3rd gear (D) or 2nd gear (downshift operation in Sport mode) as a fail-safe measure, and the N range indicator lamp flashes at 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of output shaft speed sensor • Malfunction of direct planetary carrier • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual

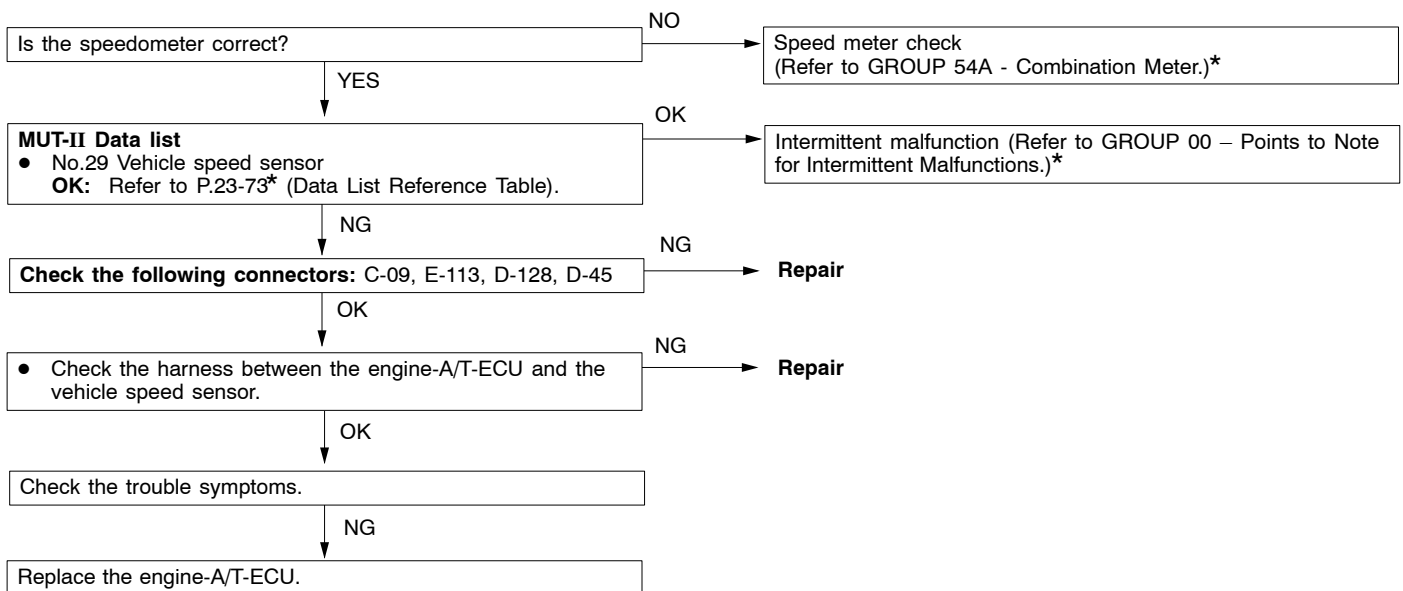




Code No.26 Stop lamp switch system	Probable cause
If the stop lamp switch is continuously on for 5 minutes or more while the vehicle is being driven, it is judged that there is a short-circuit in the stop lamp switch and code No.26 is output.	<ul style="list-style-type: none"> • Malfunction of brake pedal • Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

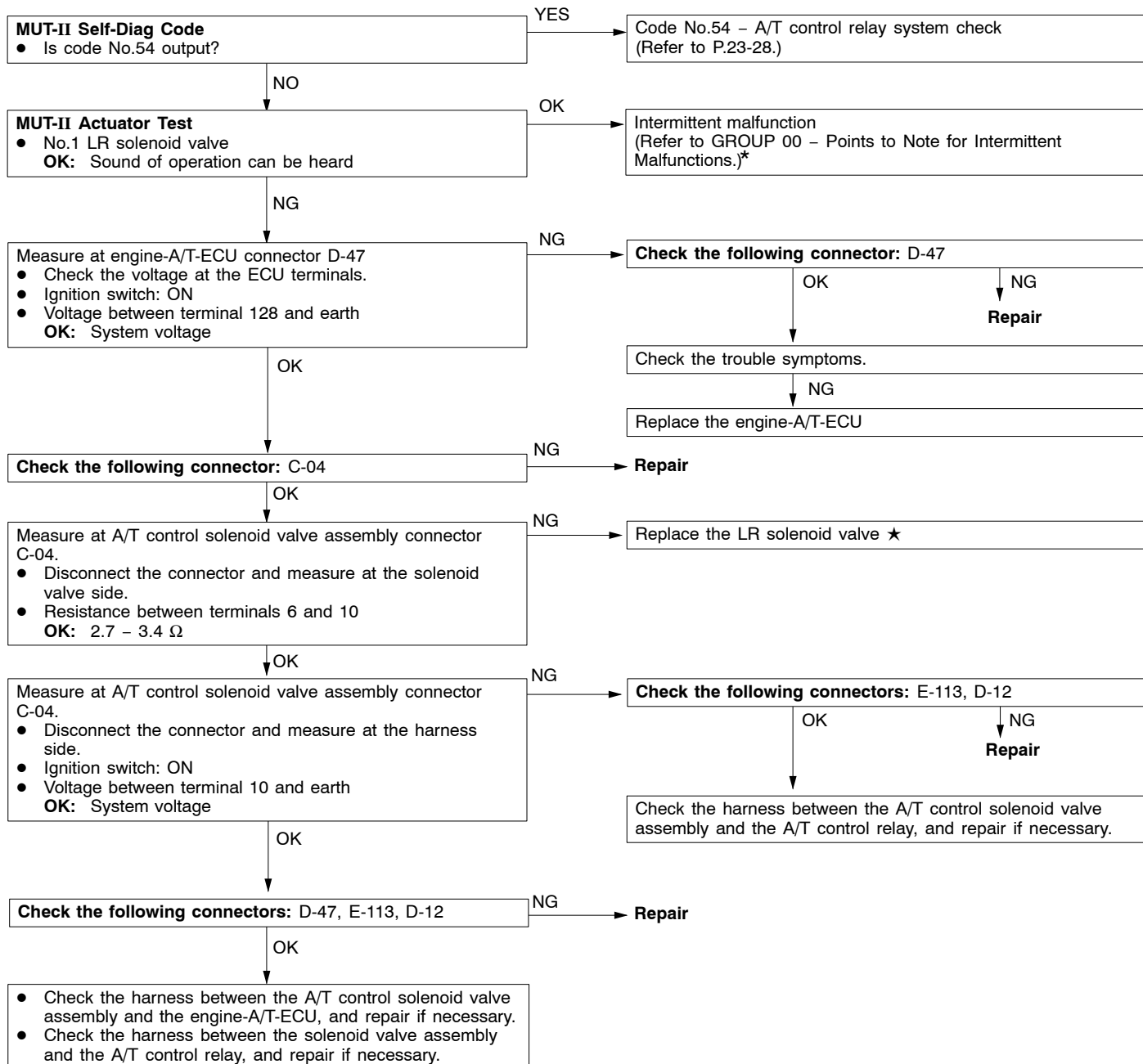


Code No.29 Vehicle speed sensor system	Probable cause
If the engine-A/T-ECU detects no pulse signal from the vehicle speed sensor for continuous period of 30 seconds under following conditions, it is judged as a vehicle sensor system malfunction and code No.29 is output.	<ul style="list-style-type: none"> • Malfunction of brake pedal • Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



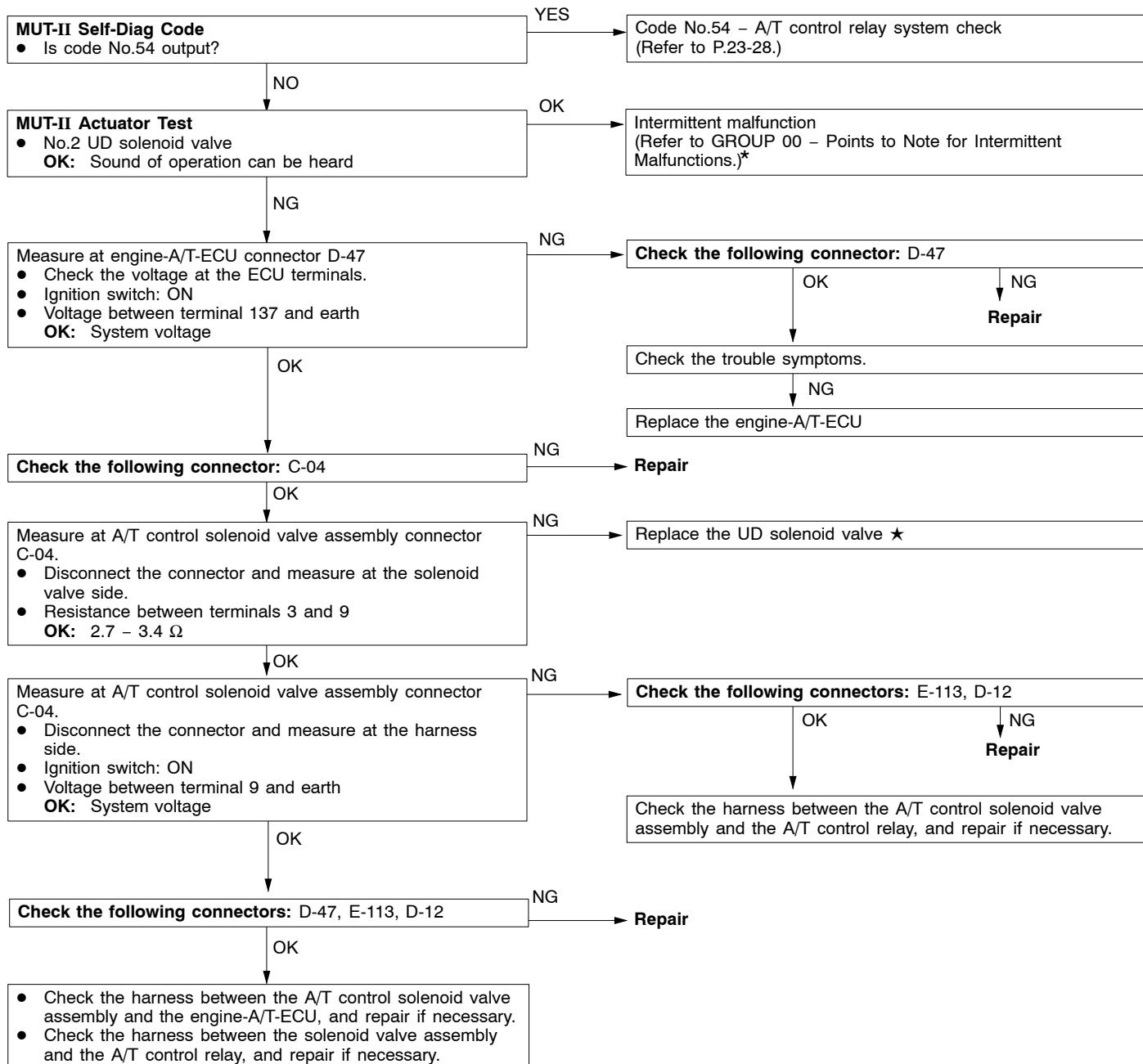
Code No.31 LR solenoid valve system	Probable cause
<p>If the drive terminal voltage of the LR solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the LR solenoid valve, and the corresponding code is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of LR solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual



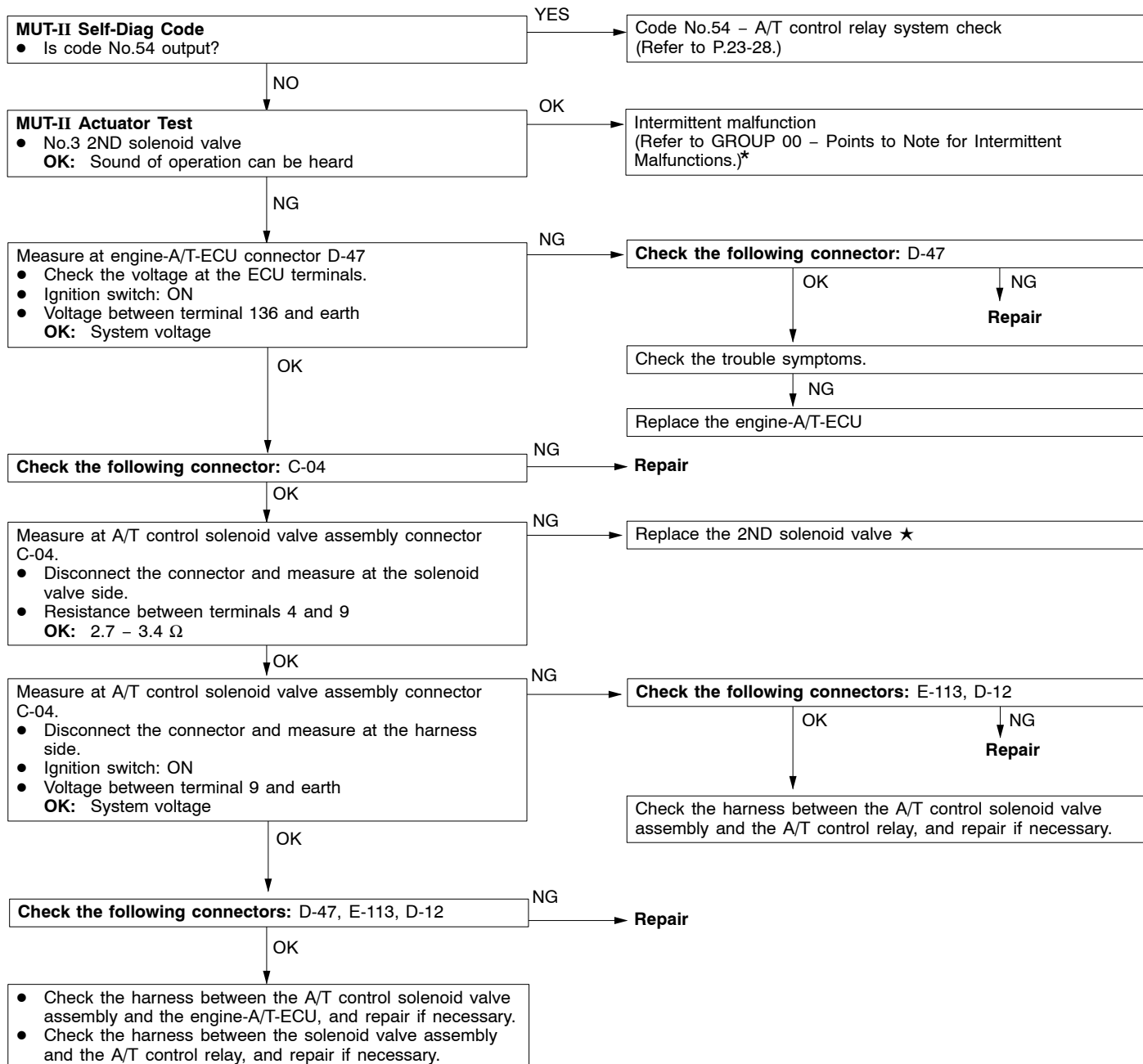
Code No.32 UD solenoid valve system	Probable cause
<p>If the drive terminal voltage of the UD solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the UD solenoid valve, and the corresponding code is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of UD solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual



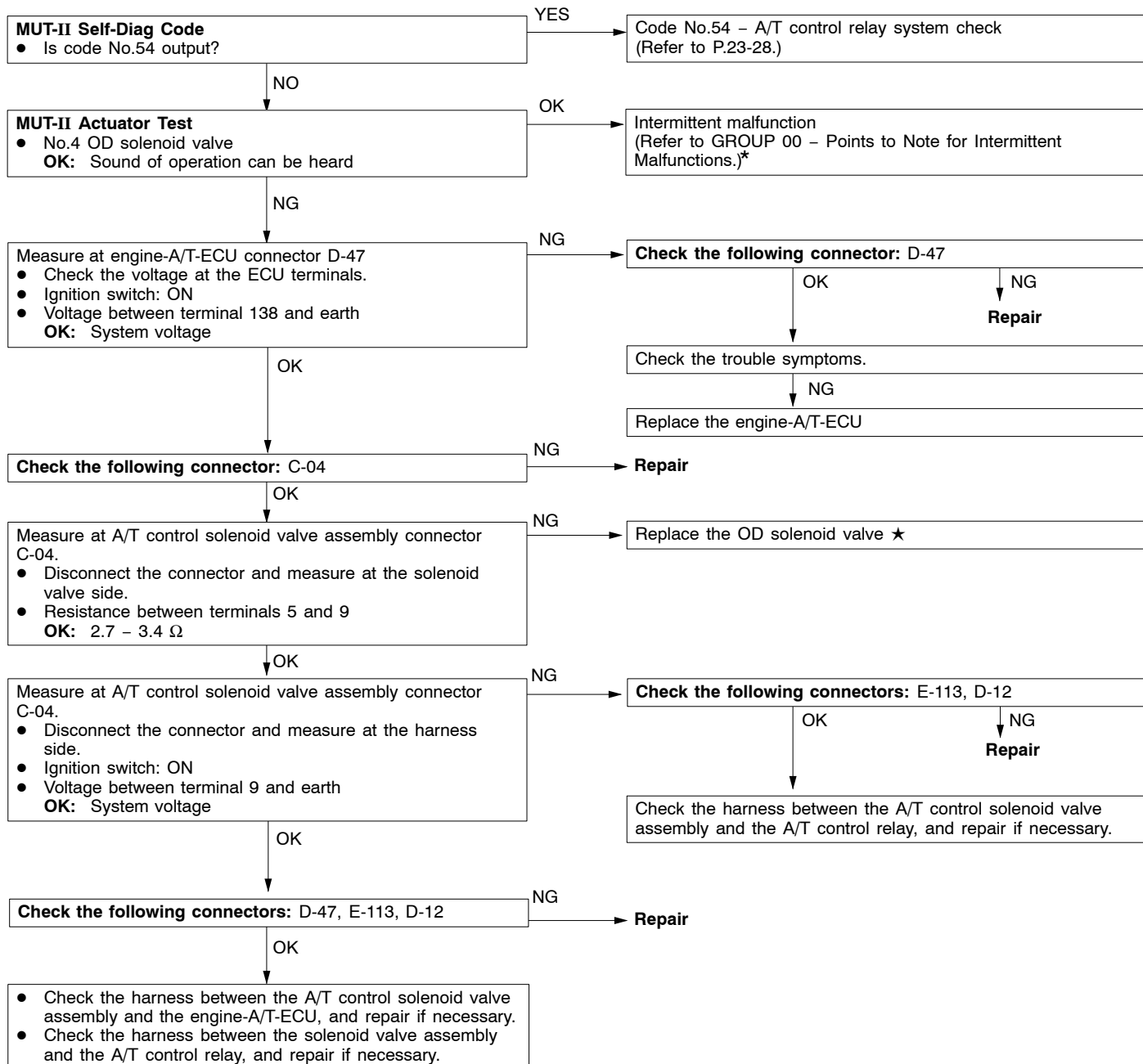
Code No.33 2ND solenoid valve system	Probable cause
<p>If the drive terminal voltage of the 2nd solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the 2nd solenoid valve, and the corresponding code is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of 2ND solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual



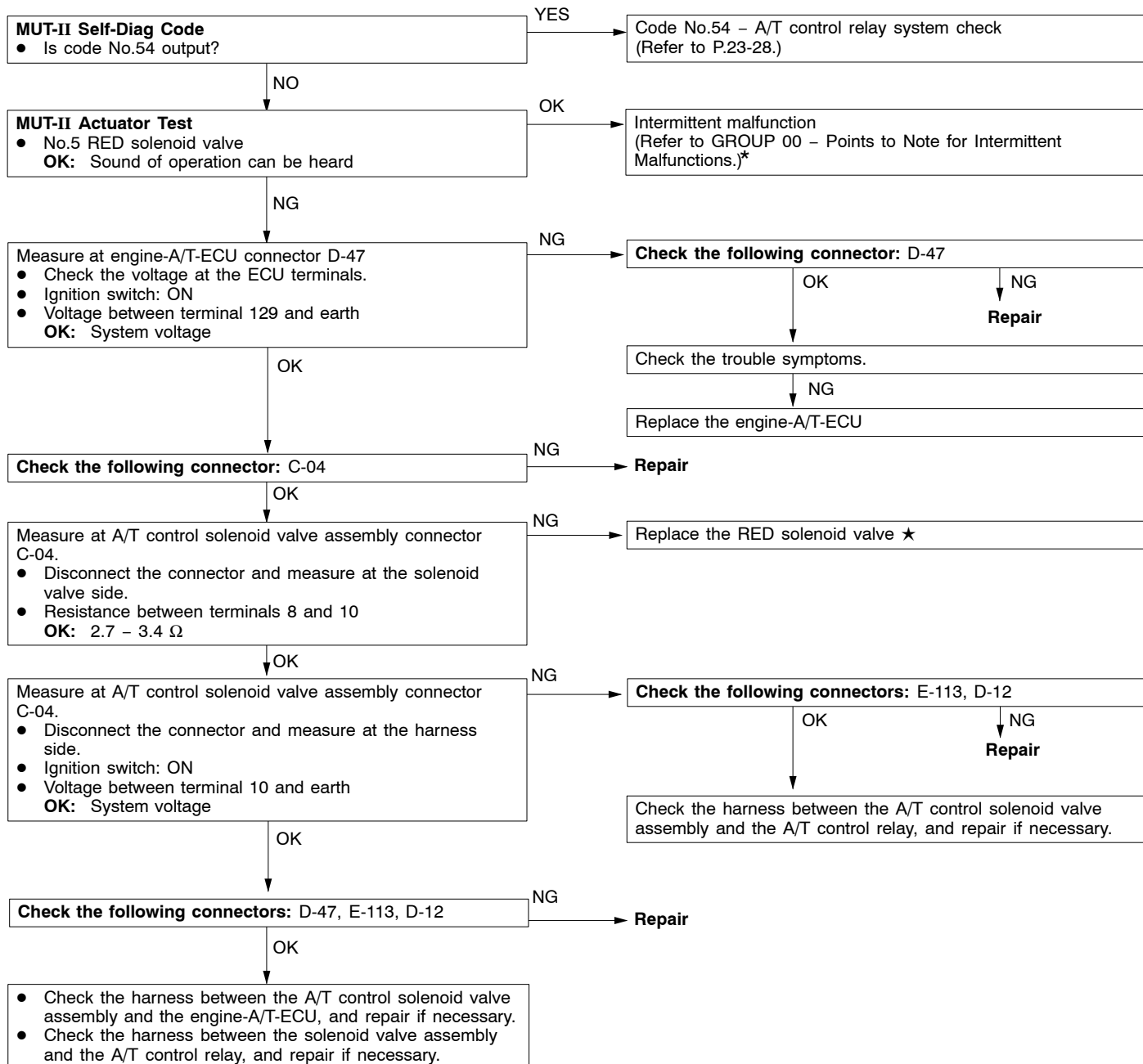
Code No.34 OD solenoid valve system	Probable cause
<p>If the drive terminal voltage of the OD solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the OD solenoid valve, and the corresponding code is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of OD solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual



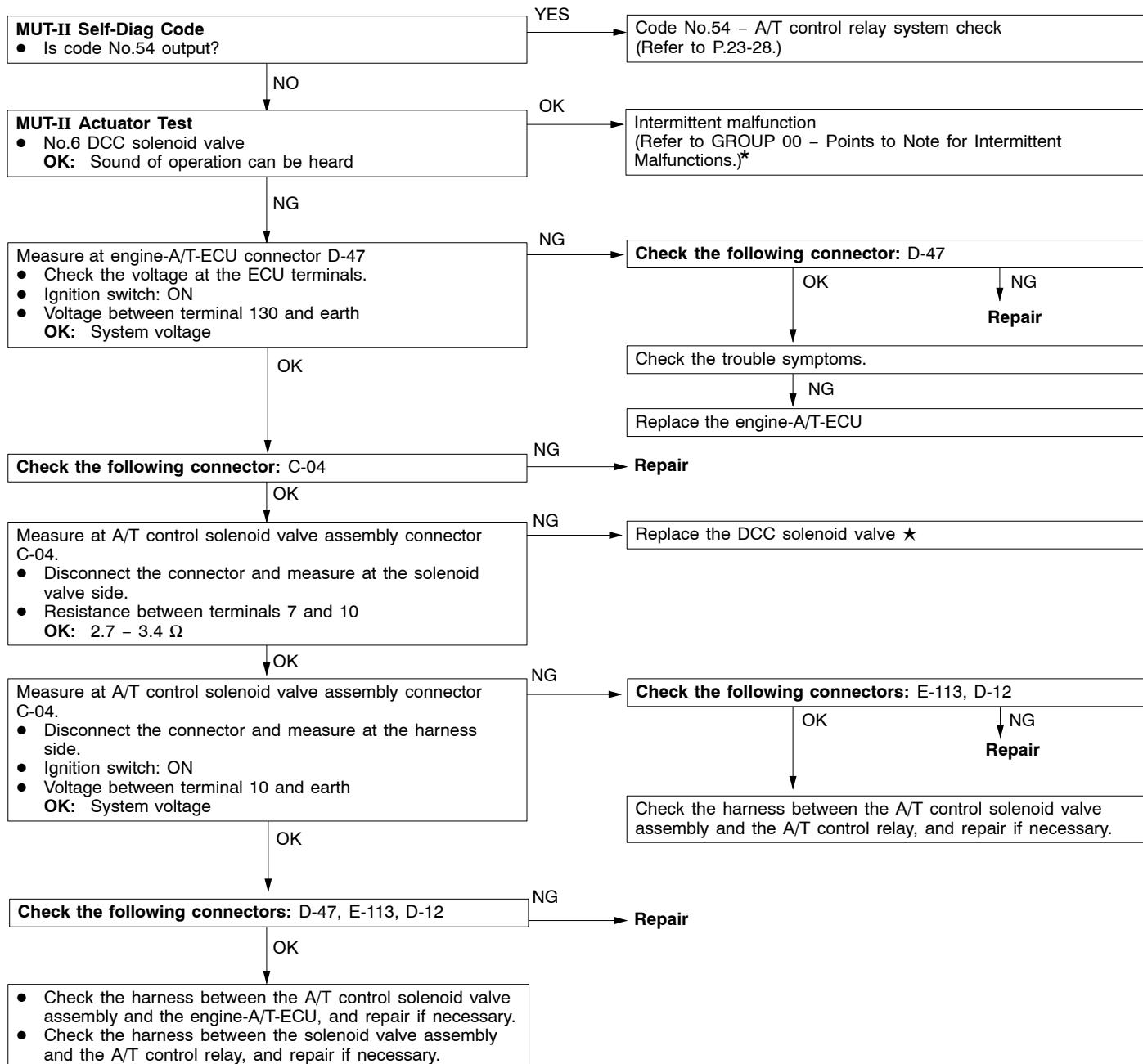
Code No.35 RED solenoid valve system	Probable cause
<p>If the drive terminal voltage of the RED solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the RED solenoid valve, and the corresponding code is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of RED solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

★ Refer to the Transmission Workshop Manual



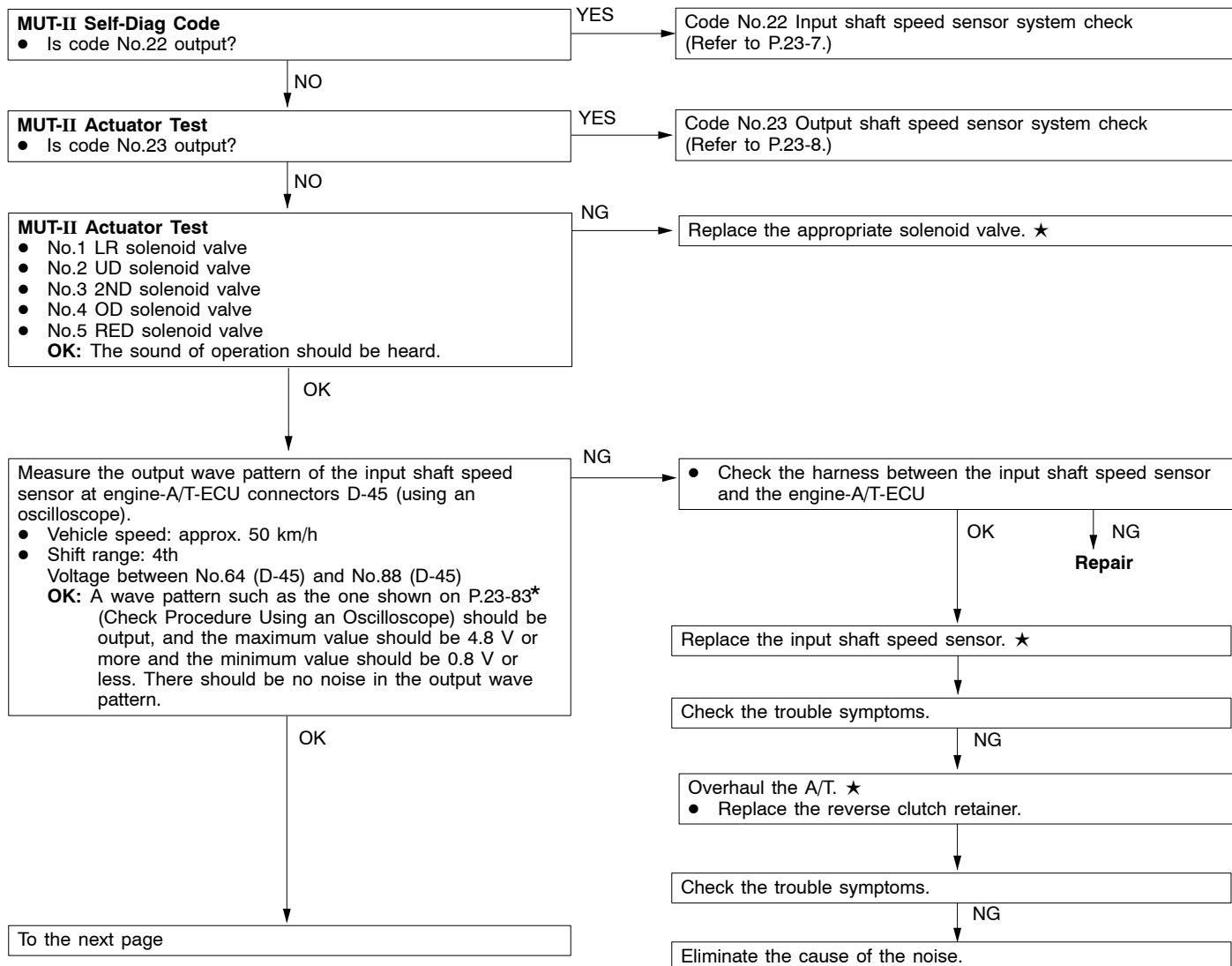
Code No.36 DCC solenoid valve system	Probable cause
<p>If the drive terminal voltage of the DCC solenoid valve is 3.0 V or less, it is judged that there is a short-circuit or open circuit in the DCC solenoid valve, and code No.36 is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of DCC solenoid valve • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

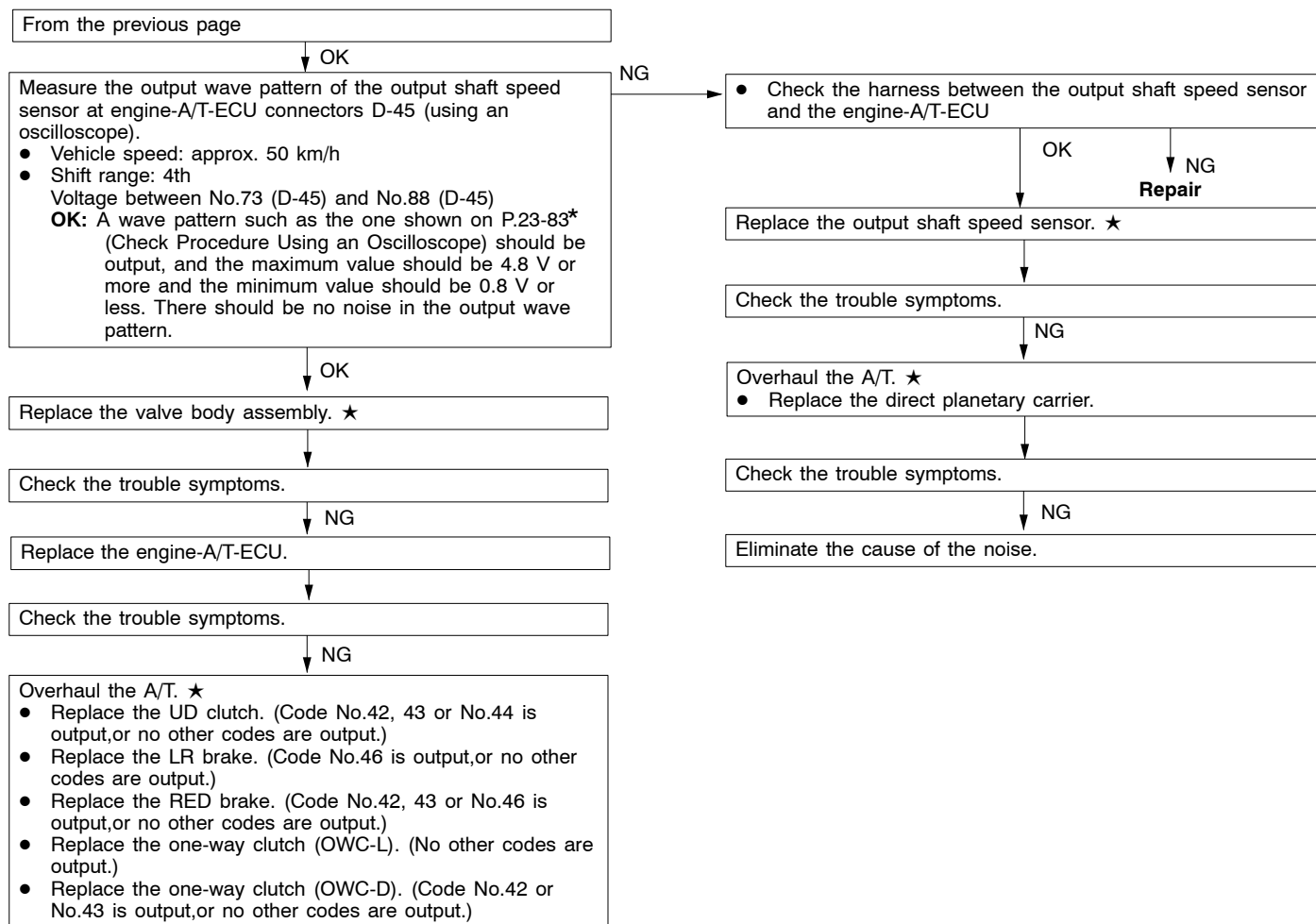
★ Refer to the Transmission Workshop Manual



Code No.41 1st without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the 1st gear ratio is not identical to the input shaft speed sensor output after shifting to 1st, code No.41 is output.</p> <p>If code No.41 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of output shaft speed sensor • Malfunction of harness or connector • Malfunction of solenoid valve • Malfunction of reverse clutch retainer • Malfunction of direct planetary carrier • Malfunction of LR brake system • Malfunction of UD clutch system • Malfunction of RED brake system • Malfunction of one-way clutch system • Malfunction of engine-A/T-ECU • Noise is generated.

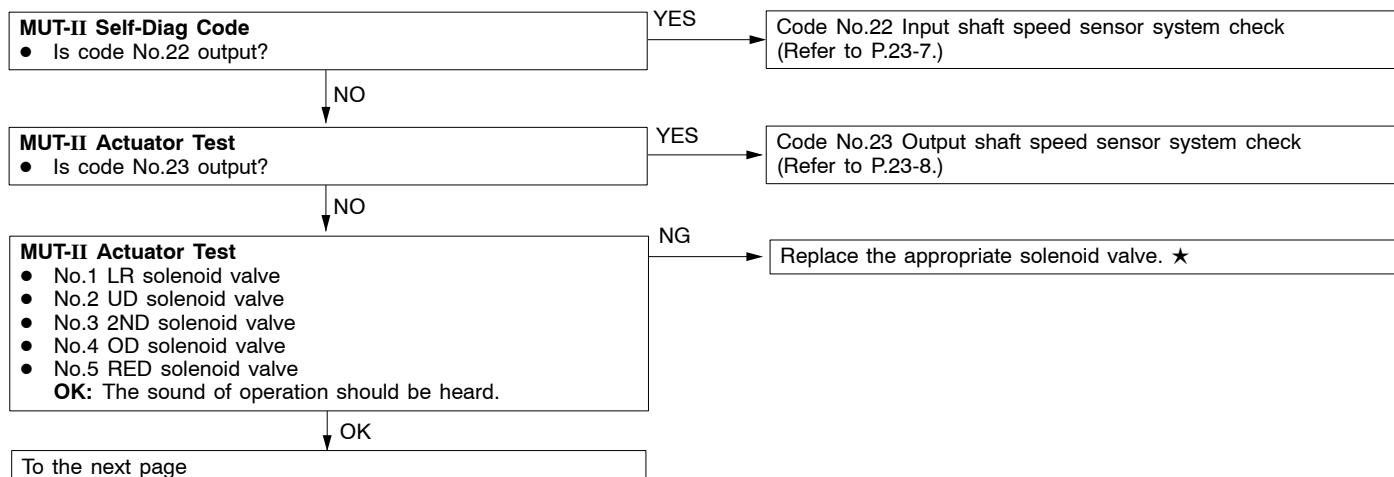
★ Refer to the Transmission Workshop Manual

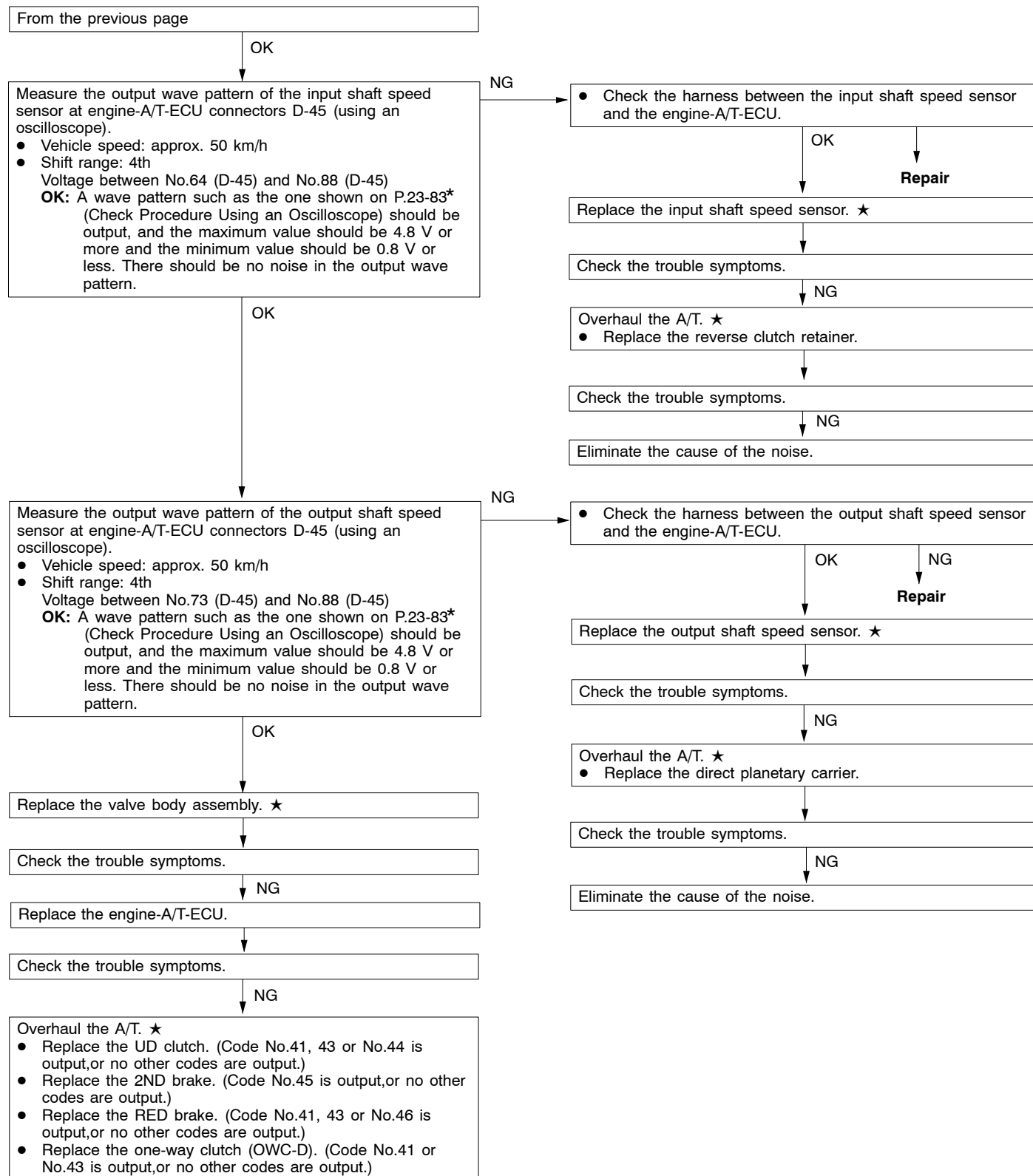




Code No.42 2nd without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the 2nd gear ratio is not identical to the input shaft speed sensor output after shifting to 2nd, code No.42 is output.</p> <p>If code No.42 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of output shaft speed sensor • Malfunction of harness or connector • Malfunction of solenoid valve • Malfunction of reverse clutch retainer • Malfunction of direct planetary carrier • Malfunction of 2ND brake system • Malfunction of UD clutch system • Malfunction of RED brake system • Malfunction of one-way clutch system • Malfunction of engine-A/T-ECU • Noise is generated.

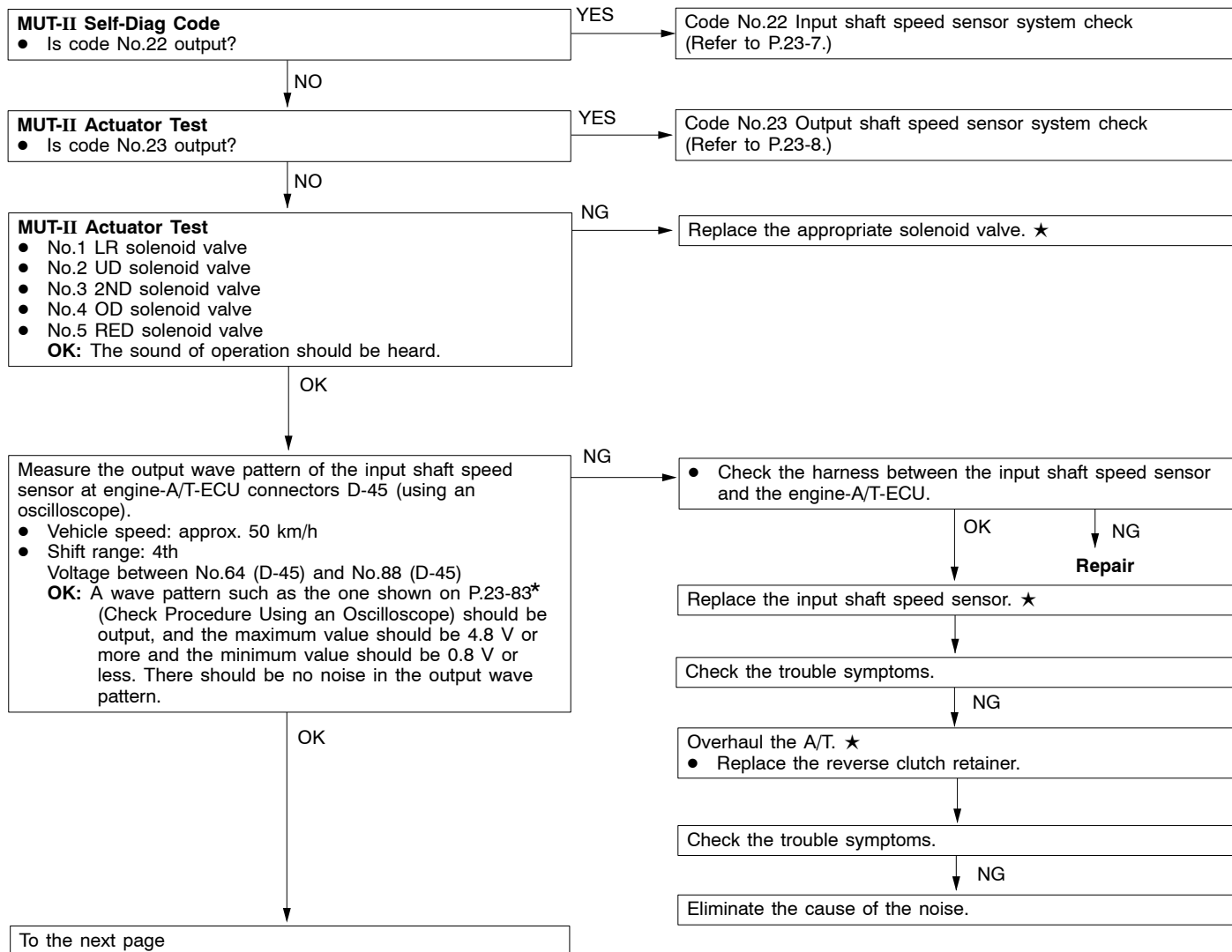
★ Refer to the Transmission Workshop Manual

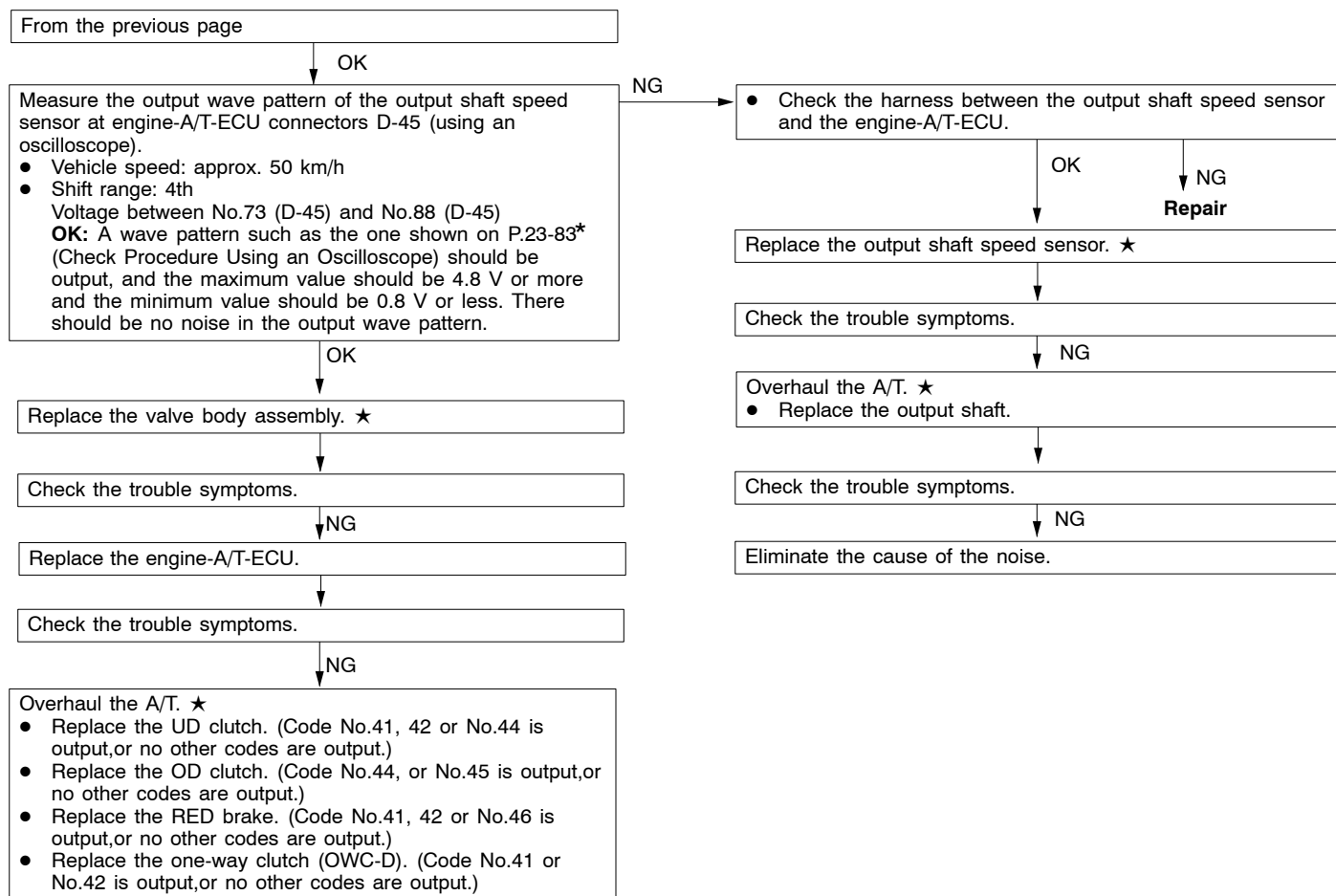




Code No.43 3rd without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the 3rd gear ratio is not identical to the input shaft speed sensor output after shifting to 3rd, code No.43 is output.</p> <p>If code No.43 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of output shaft speed sensor • Malfunction of harness or connector • Malfunction of solenoid valve • Malfunction of reverse clutch retainer • Direct planetary carrier • Malfunction of UD clutch system • Malfunction of OD clutch system • Malfunction of RED brake system • Malfunction of one-way clutch system • Malfunction of engine-A/T-ECU • Noise is generated.

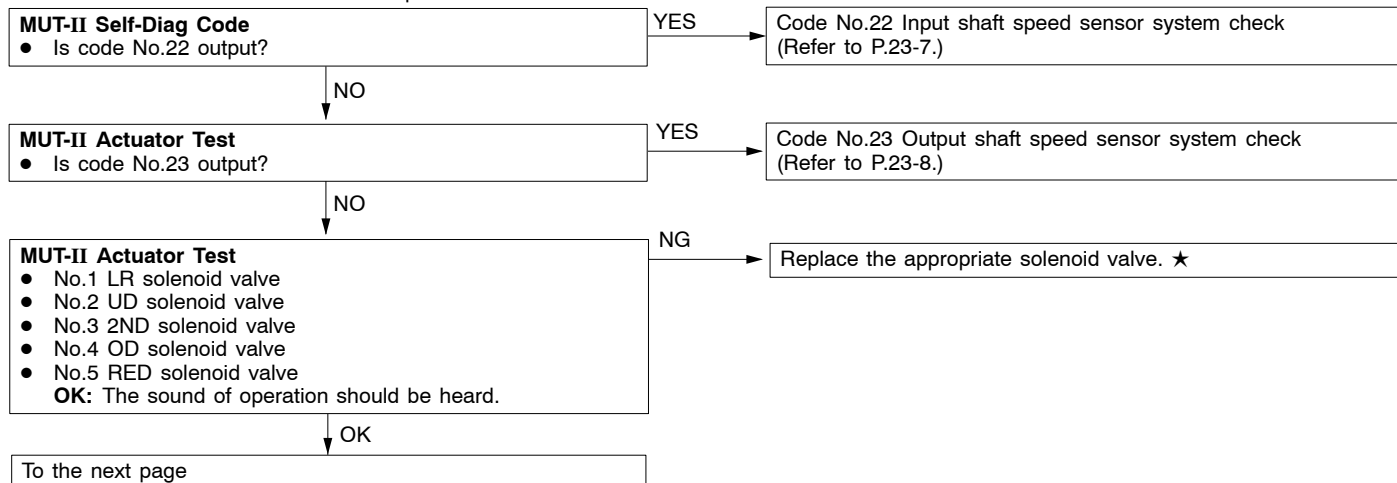
★ Refer to the Transmission Workshop Manual

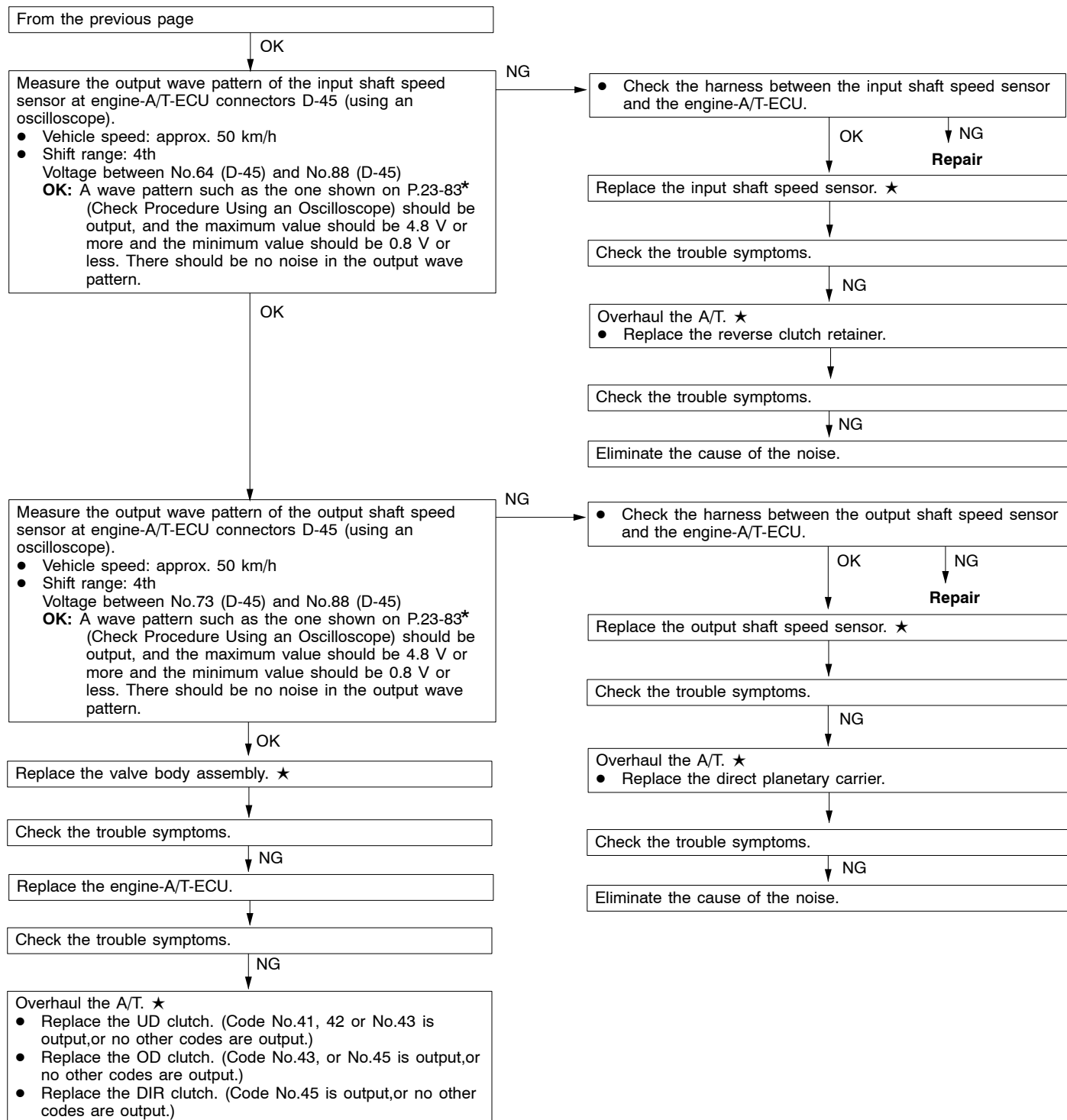




Code No.44 4th without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the 4th gear ratio is not identical to the input shaft speed sensor output after shifting to 4th, code No.44 is output.</p> <p>If code No.44 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> Malfunction of input shaft speed sensor Malfunction of output shaft speed sensor Malfunction of harness or connector Malfunction of solenoid valve Malfunction of reverse clutch retainer Malfunction of direct planetary carrier Malfunction of UD clutch system Malfunction of 2ND brake system Malfunction of OD clutch system Malfunction of DIR clutch system Malfunction of engine-A/T-ECU Noise is generated.

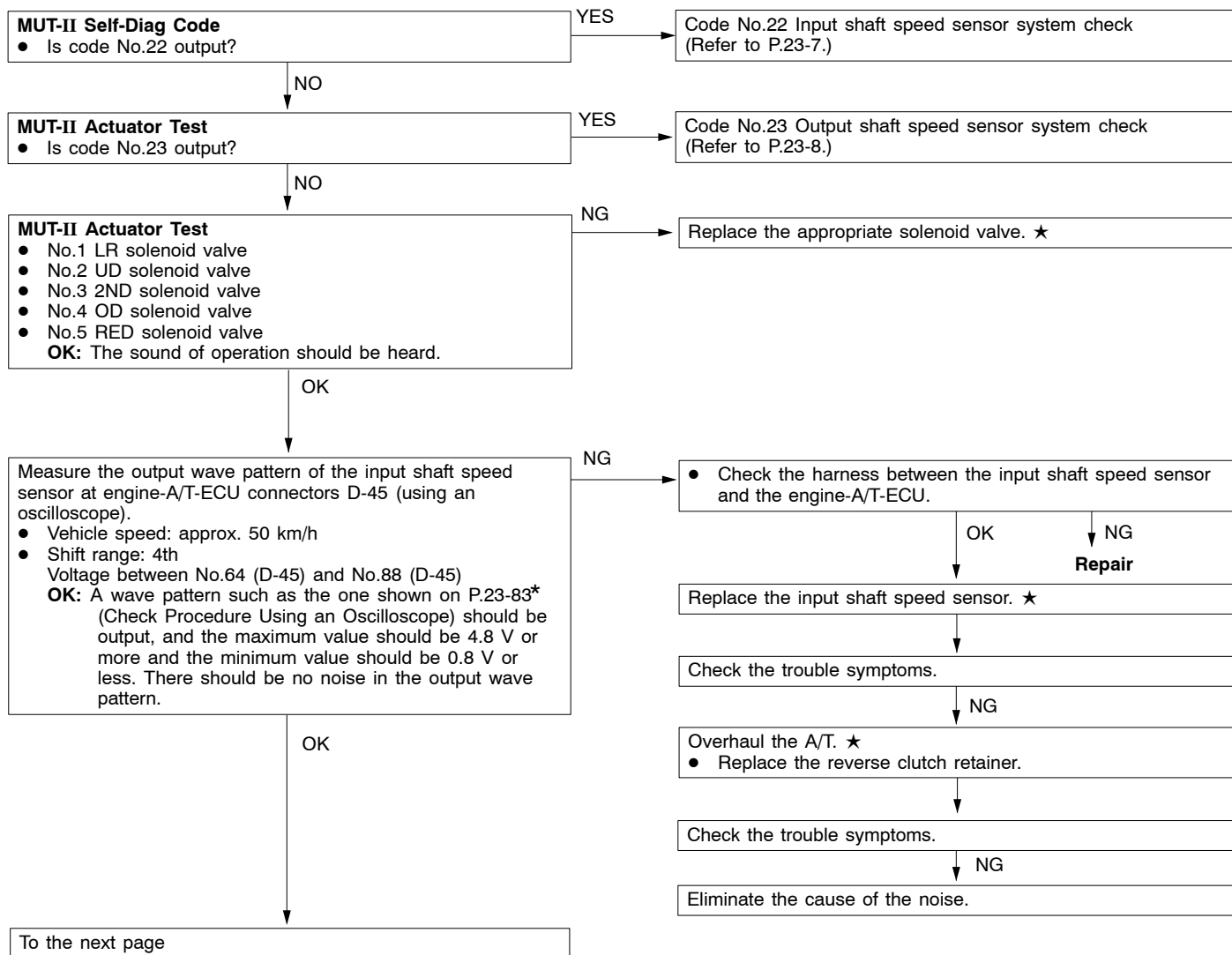
★ Refer to the Transmission Workshop Manual

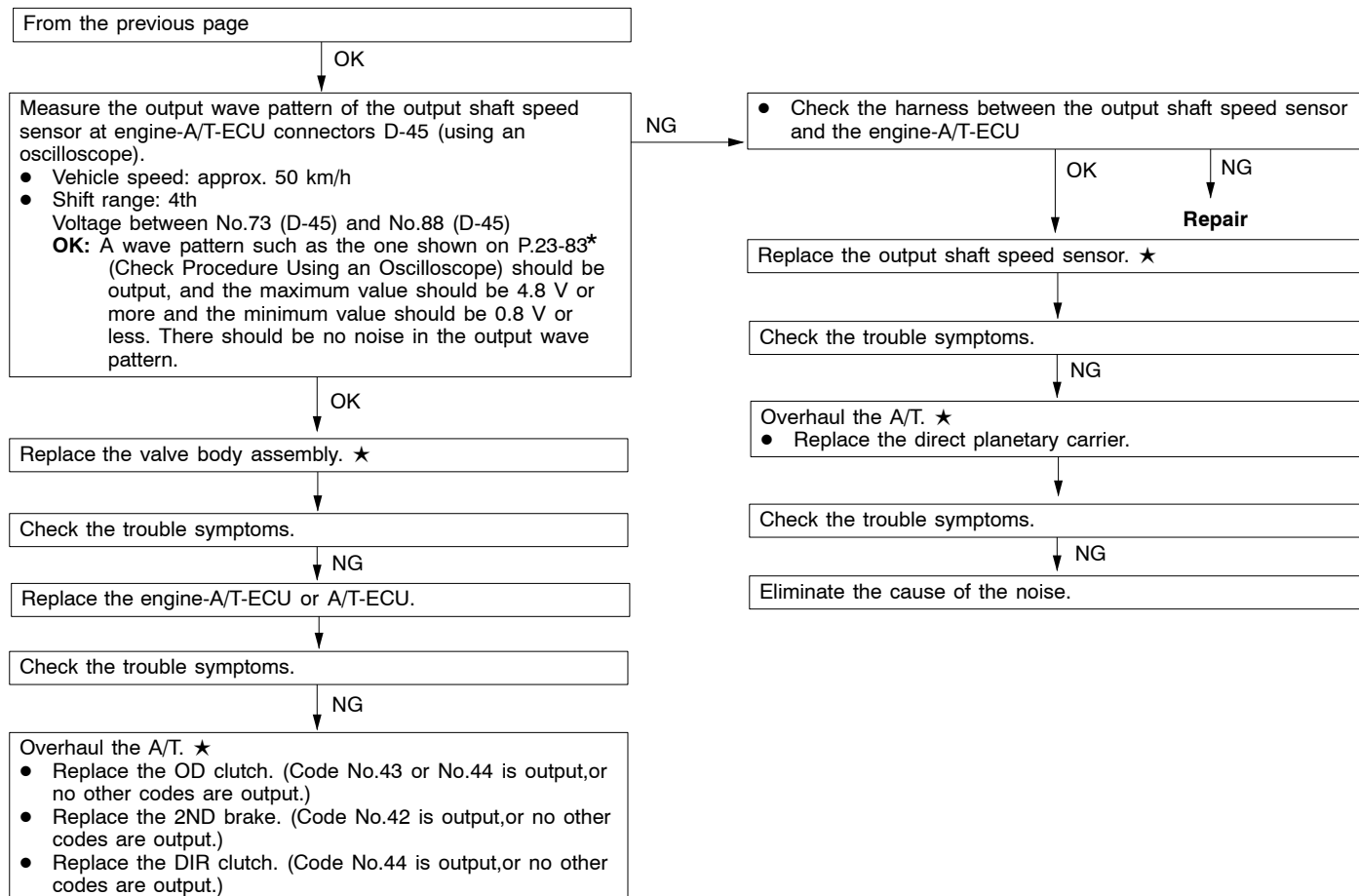




Code No.45 5th without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the 5th gear ratio is not identical to the input shaft speed sensor output after shifting to 5th, code No.45 is output.</p> <p>If code No.45 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of output shaft speed sensor • Malfunction of harness or connector • Malfunction of solenoid valve • Malfunction of reverse clutch retainer • Malfunction of direct planetary carrier • Malfunction of 2ND brake system • Malfunction of OD clutch system • Malfunction of DIR clutch system • Malfunction of engine-A/T-ECU • Noise is generated.

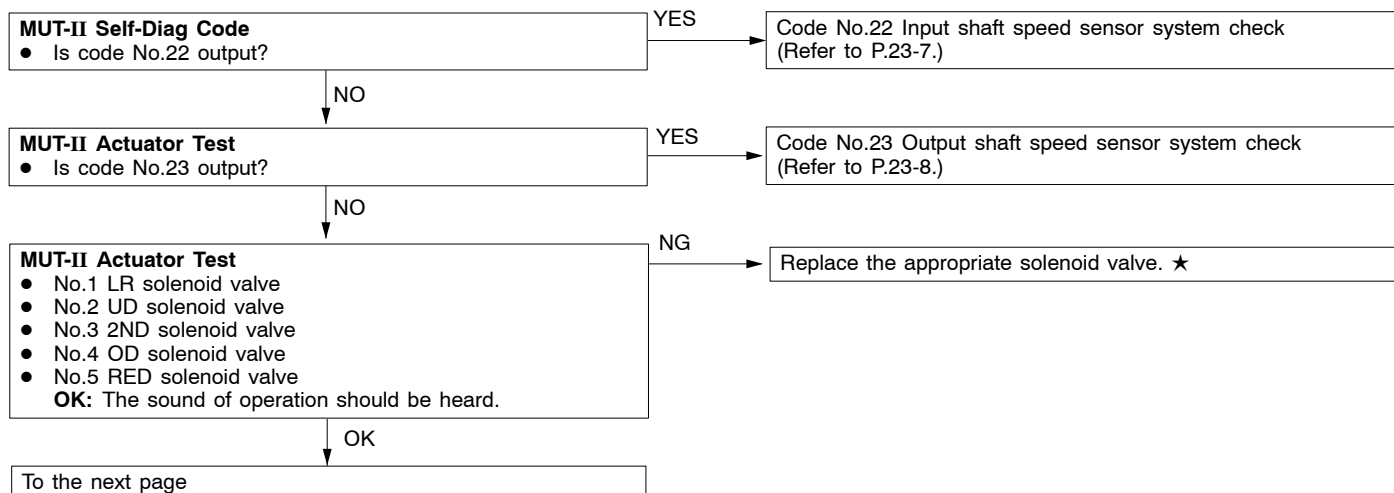
★ Refer to the Transmission Workshop Manual

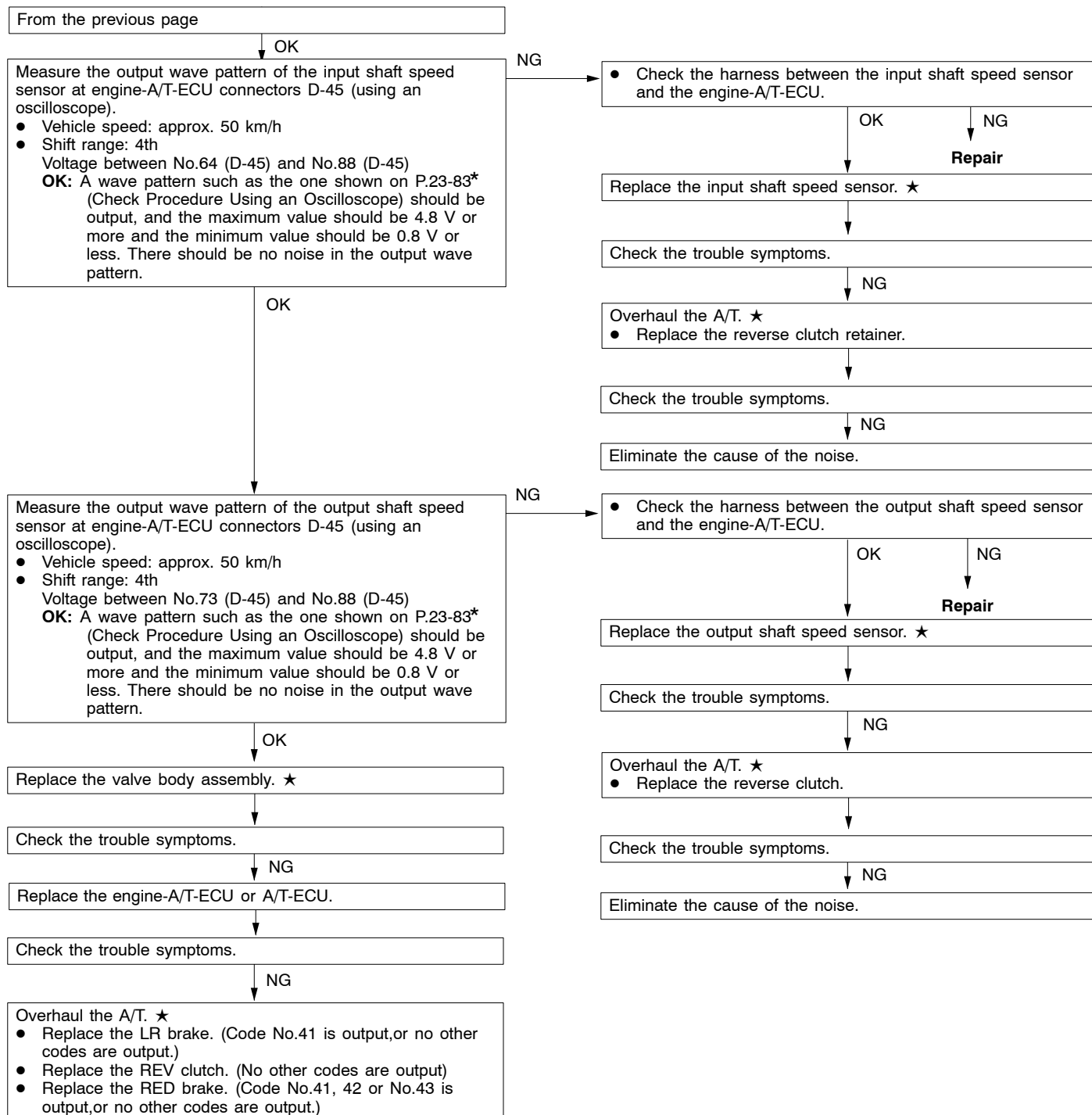




Code No.46 Reverse without completion of shifting	Probable cause
<p>If the output shaft speed sensor output multiplied by the reverse gear ratio is not identical to the input shaft speed sensor output after shifting to reverse, code No.46 is output.</p> <p>If code No.46 is output 4 times, the transmission is fixed in 3rd and the N range lamp flashes at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of output shaft speed sensor • Malfunction of harness or connector • Malfunction of solenoid valve • Malfunction of reverse clutch retainer • Malfunction of direct planetary carrier • Malfunction of LR brake system • Malfunction of REV clutch system • Malfunction of RED clutch system • Malfunction of engine-A/T-ECU • Noise is generated.

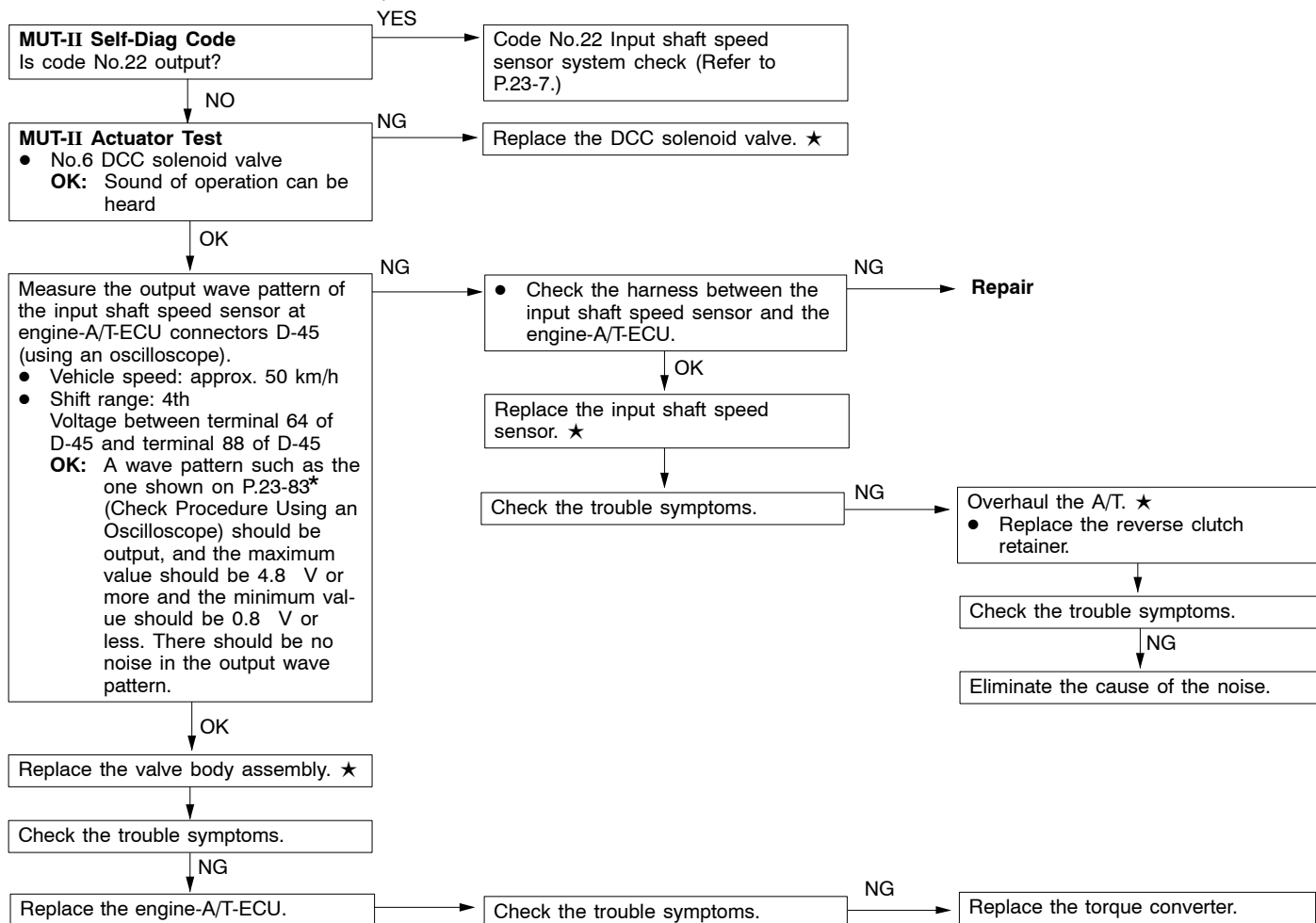
★ Refer to the Transmission Workshop Manual



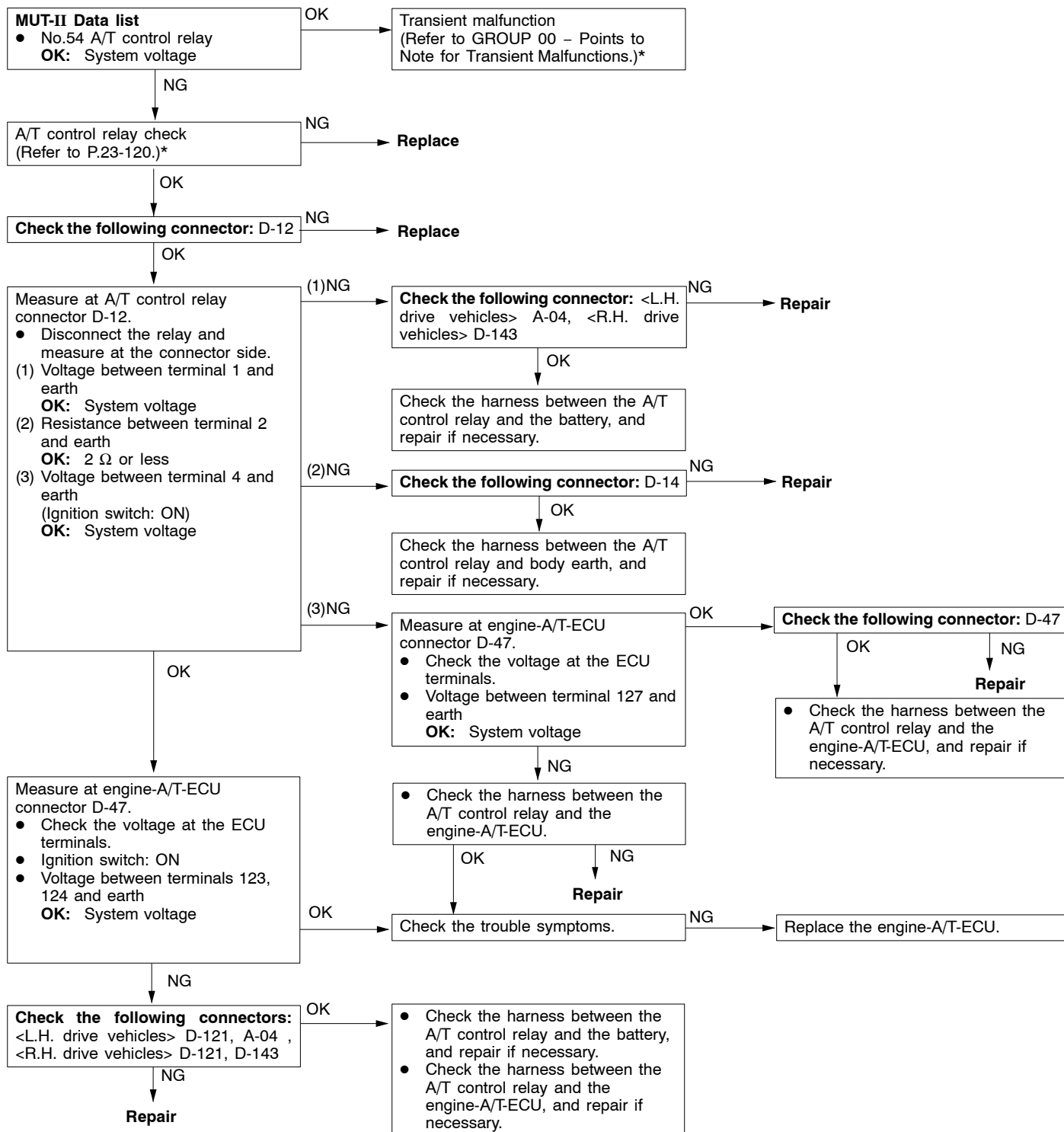


Code No.52 Damper clutch control system	Probable cause
If the DCC solenoid valve drive duty ratio is 100% for a continuous period of 4 seconds or more when the damper clutch starts operating, it is judged that there is a problem with the damper clutch control system, and code No.52 is output.	<ul style="list-style-type: none"> • Malfunction of input shaft speed sensor • Malfunction of DCC solenoid valve • Malfunction of harness or connector • Malfunction of reverse clutch retainer • Malfunction of engine-A/T-ECU • Malfunction of torque converter

★ Refer to the Transmission Workshop Manual



Code No.54 A/T control relay system	Probable cause
<p>If the A/T control relay voltage is less than 7 V after the ignition switch is turned to the ON position, it is judged that there is a short-circuit to earth or open circuit in the A/T control relay, and code No.54 is output.</p> <p>The transmission will be fixed in 3rd as a fail-safe measure, and the N range indicator will flash at a rate of 1 Hz.</p>	<ul style="list-style-type: none"> • Malfunction of A/T control relay • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



Code No.56 N range lamp system	Probable cause
If the N range signal is OFF after the N range lamp illuminates (ON), it is judged that there is a short-circuit to earth in the N range lamp, and code No.56 is output.	<ul style="list-style-type: none"> • Malfunction of Combination meter • Malfunction of harness or connector • Malfunction of engine-A/T-ECU

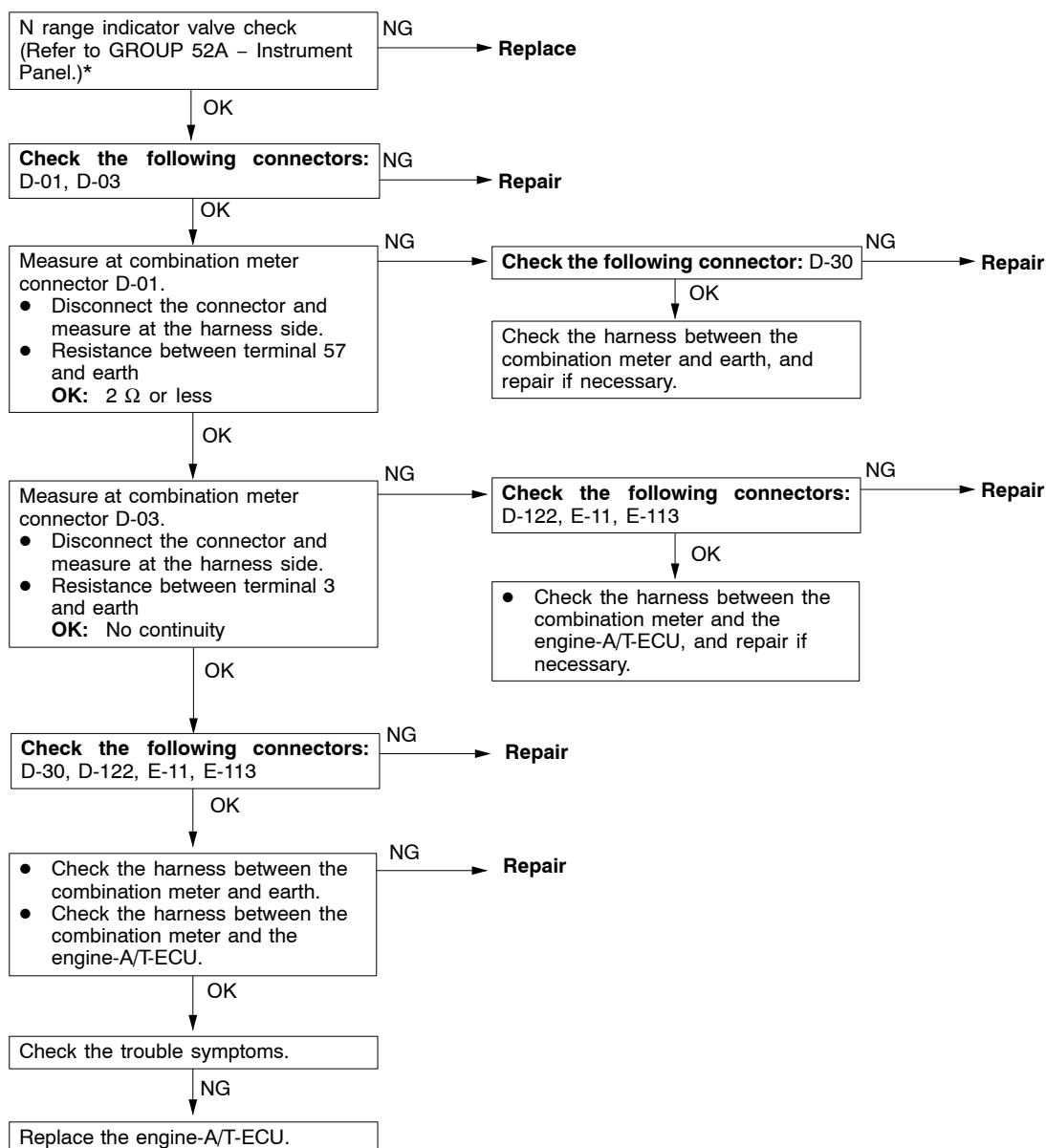


CHART CLASSIFIED BY TROUBLE SYMPTOMS

*: Refer to 2001 PAJERO Workshop Manual chassis Volume 1 (Pub. No. PWJE0005 1/2).

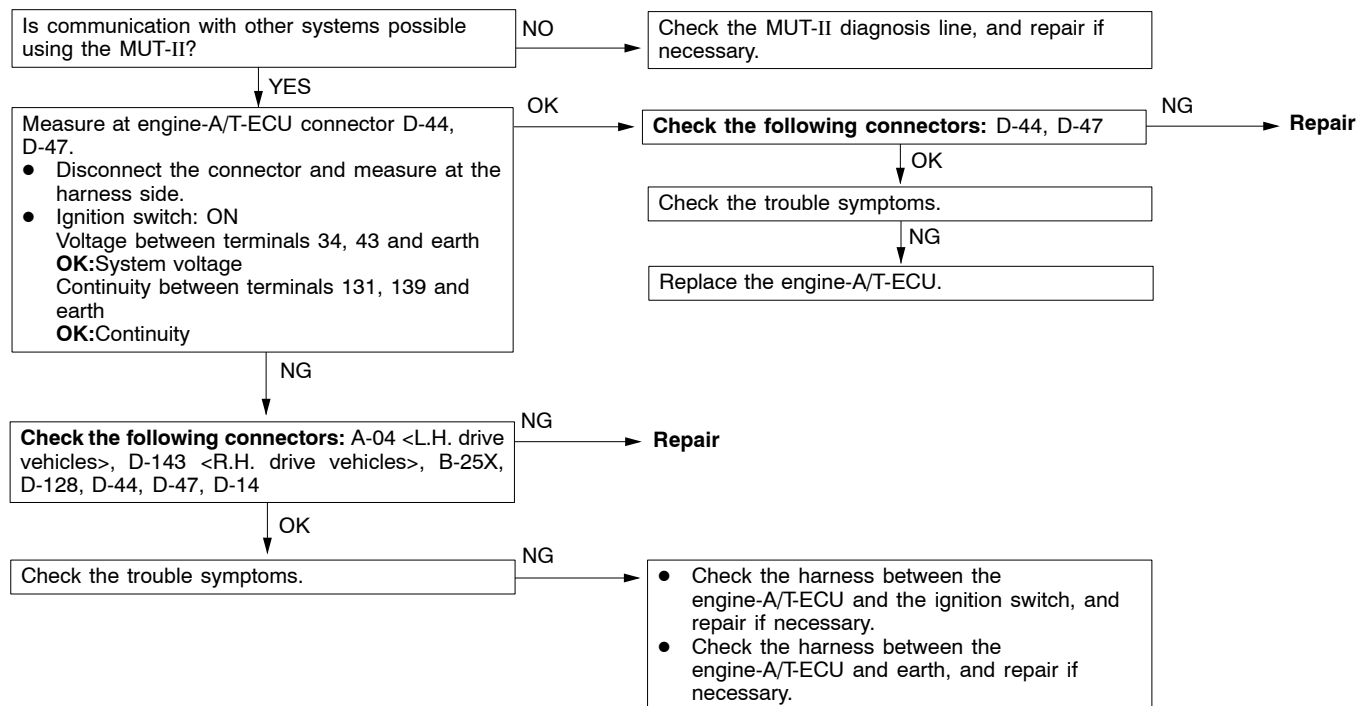
Trouble Symptom		Inspection pro- cedure No.	Reference page
Communication with the MUT-II is not possible.		1	23-31
Driving not possible	Starting not possible	2	23-61*
	Does not move forward	3	23-61*
	Does not reverse	4	23-62*
	Does not move (forward or reverse)	5	23-63*
Malfunction when starting off	Engine stalls during shifting	6	23-63*
	N-to-D shocks, large time lag	7	23-64*
	N-to-R shocks, large time lag	8	23-65*
	N-to-D, N-to-R shocks, large time lag	9	23-66*
Problem during shifting	Shocks, engine racing	10	23-66*
Incorrect shift points	All points	11	23-67*
	Some points	12	23-68*
No shifting	No diagnosis codes	13	23-68*
Problem during driving	Poor acceleration	14	23-69*
	Vibration	15	23-69*
Inhibitor switch system		16	23-32
Shift switch assembly system		17	23-32
Dual pressure switch system		18	23-33
4LLc switch system		19	23-33

INSPECTION PROCEDURES FOR EACH TROUBLE SYMPTOM

*: Refer to 2001 PAJERO Workshop Manual chassis Volume 1 (Pub. No. PWJE0005 1/2).

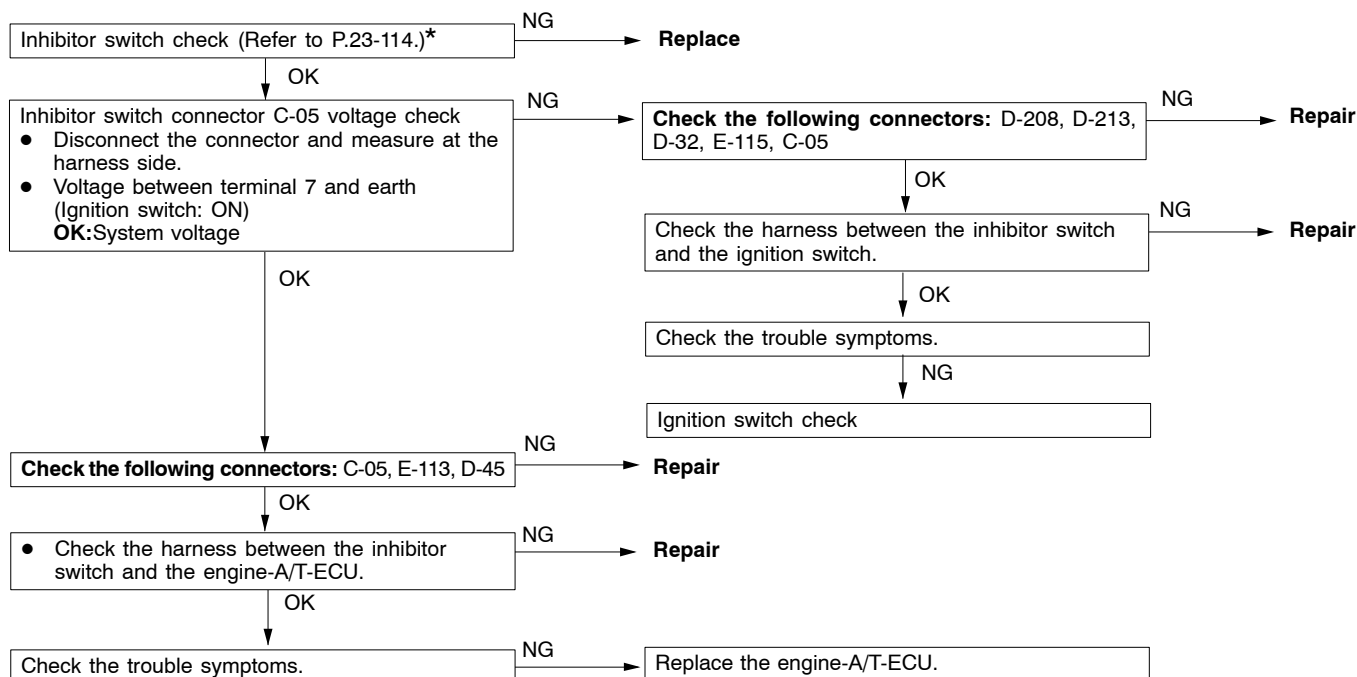
Inspection procedure 1

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 of the diagnosis line or the engine-A/T-ECU is not functioning.	<ul style="list-style-type: none"> • Malfunction of diagnosis line • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



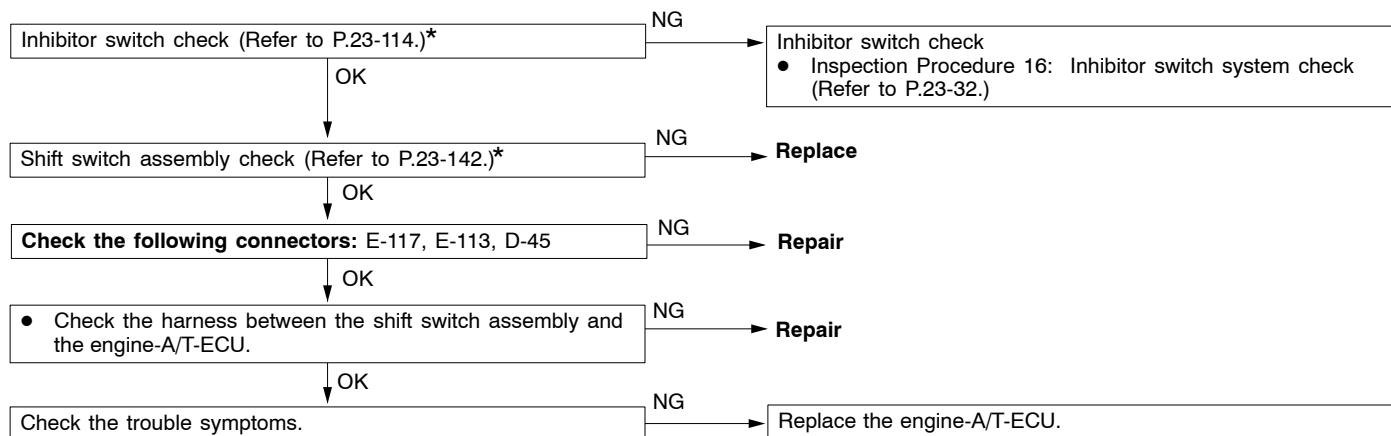
Inspection procedure 16

Inhibitor switch system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit or the ignition switch circuit.	<ul style="list-style-type: none"> • Malfunction of Inhibitor switch • Malfunction of ignition switch • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



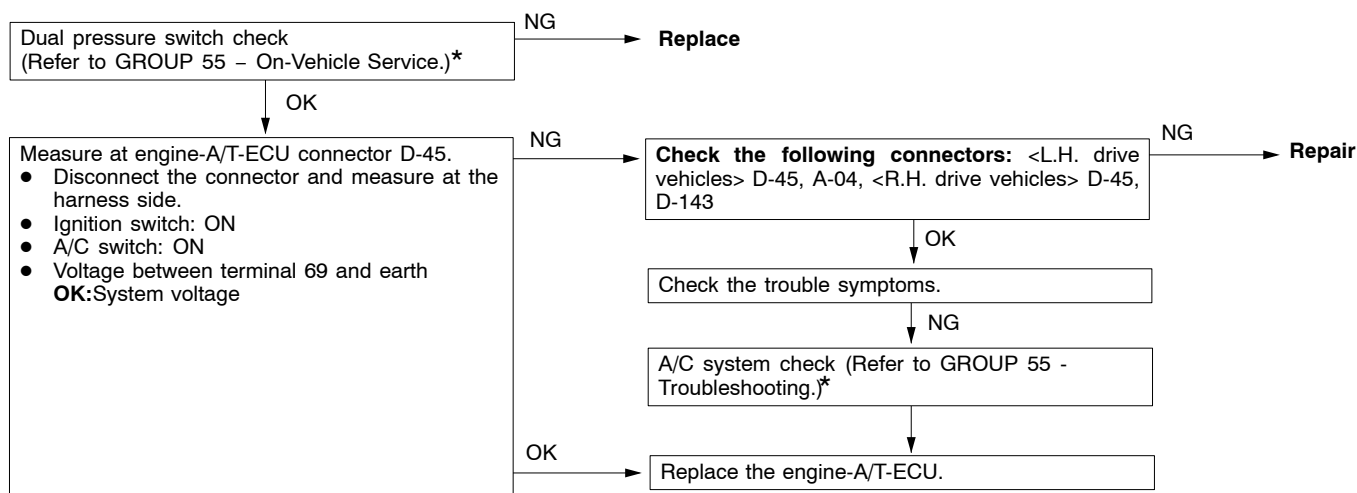
Inspection procedure 17

Shift switch assembly system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, shift switch assembly circuit, or of the engine-A/T-ECU.	<ul style="list-style-type: none"> • Malfunction of Inhibitor switch • Malfunction of shift switch assembly • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



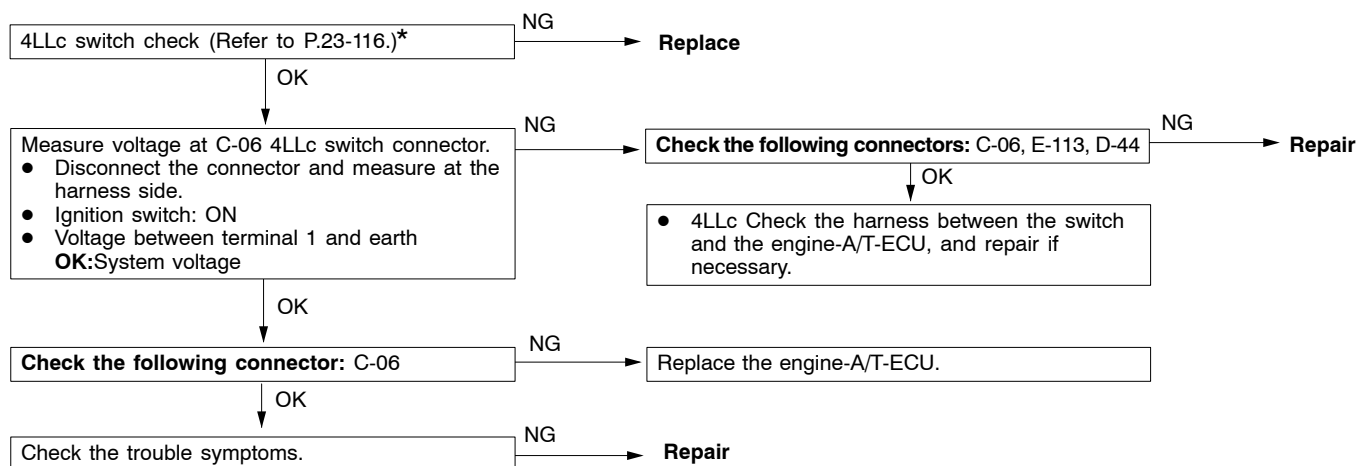
Inspection procedure 18

Dual pressure switch system	Probable cause
The cause is probably a malfunction of the dual pressure switch circuit, or of the engine-A/T-ECU.	<ul style="list-style-type: none"> • Malfunction of dual pressure switch • Malfunction of harness or connector • Malfunction of A/C system • Malfunction of engine-A/T-ECU



Inspection procedure 19

4LLc Switch system	Probable cause
The cause is probably a malfunction of the 4LLc switch circuit, or of the engine-A/T-ECU.	<ul style="list-style-type: none"> • Malfunction of 4LLc switch • Malfunction of harness or connector • Malfunction of engine-A/T-ECU



ENGINE-A/T-ECU TERMINAL VOLTAGE TABLE

[illegible]

AC201888

*: Refer to 2001 PAJERO Workshop Manual chassis Volume 1 (Pub. No. PWJE0005 1/2).

Terminal No.	Check item	Inspection conditions		Standard value
39	Stop lamp switch	Ignition switch: ON	Brake pedal: Depressed	System voltage
			Brake pedal: Released	1 V or less
55	4LLc switch	Ignition switch: ON	Transfer lever position: 4LLc	System voltage
			Transfer lever position: Other than above	1 V or less
64	Input shaft speed sensor	Measure between terminals 64 and 88 using an oscilloscope. Engine: 2,000 r/min Shift range: 4th		Check procedure using oscilloscope (Refer to P.23-83.)*
66	Inhibitor switch P	Ignition switch: ON	Selector lever position: P	System voltage
			Selector lever position: Other than above	1 V or less
67	Inhibitor switch R	Ignition switch: ON	Selector lever position: R	System voltage
			Selector lever position: Other than above	1 V or less
68	Shift switch (Down)	Ignition switch: ON	Selector lever position: Downshifted in Sport mode	System voltage
			Selector lever position: Other than above	1 V or less
70	Crank angle sensor	Engine: Idling		1.5 V – 2.5 V
73	Output shaft speed sensor	Measure between terminals 73 and 88 using an oscilloscope. Engine: 2,000 r/min Shift range: 4th		Check procedure using oscilloscope (Refer to P.23-83.)*
75	Inhibitor switch N	Ignition switch: ON	Selector lever position: N	System voltage
			Ignition switch: ON	1 V or less
76	Inhibitor switch D	Ignition switch: ON	Selector lever position: D	System voltage
			Ignition switch: ON	1 V or less
77	Shift switch (Up)	Ignition switch: ON	Selector lever position: Upshifted in Sport mode	System voltage
			Selector lever position: Other than above	1 V or less
79	Vehicle speed sensor	Measure between terminals 79 and 88 using an oscilloscope. Engine: 2,000 r/min Shift range: 4th		Check procedure using oscilloscope (Refer to P.23-83.)*
85	Select switch	Ignition switch: ON	Selector lever position: Sport mode	System voltage
			Selector lever position; Other than above	1 V or less

Ter- minal No.	Check item	Inspection conditions	Standard value
88	Earth	At all times	1 V or less
119	A/T fluid temperature sensor	A/T fluid temperature: 20°C	3.8 – 4.0 V
		A/T fluid temperature: 40°C	3.2 – 3.4 V
		A/T fluid temperature: 80°C	1.7 – 1.9 V
121	1st shift indicator lamp	Shift range: 1st	System voltage
		Shift range: Other than above	1 V or less
122	5th shift indicator lamp	Shift range: 5th	System voltage
		Shift range: Other than above	1 V or less
123	Solenoid valve power supply	Ignition switch: OFF	1 V or less
		Ignition switch: ON	System voltage
124	Solenoid valve power supply	Ignition switch: OFF	1 V or less
		Ignition switch: ON	System voltage
125	2nd shift indicator lamp	Shift range: 2nd	System voltage
		Shift range: Other than above	1 V or less
127	A/T control relay	Ignition switch: OFF	1 V or less
		Ignition switch: ON	1 V or less
128	LR/DIR solenoid valve	Shift range: Parking	System voltage
		Shift range: 2nd	6 – 9 V
129	RED solenoid valve	Shift range: 5th	System voltage
		Shift range: Parking	6 – 9 V
130	DCC solenoid valve	Shift range: Parking	System voltage
131	Earth	At all times	1 V or less
134	3rd shift indicator lamp	Shift range: 3rd	System voltage
		Shift range: Other than above	1 V or less
135	A/T fluid warning lamp	Ignition switch: OFF	1 V or less
		Ignition switch: ON	1 V or less → System voltage
136	2ND solenoid valve	Shift range: 2nd	System voltage
		Shift range: Parking	6 – 9 V
137	UD solenoid valve	Shift range: 1st	System voltage
		Shift range: Parking	6 – 9 V
138	OD solenoid valve	Shift range: 3rd	System voltage
		Shift range: Parking	6 – 9 V
139	Earth	At all times	1 V or less
142	4th shift indicator lamp	Shift range: 4th	System voltage
		Shift range: Other than above	1 V or less

33A FRONT SUSPENSION

CONTENTS

[GENERAL](#) 2

[GENERAL INFORMATION](#) 2

GENERAL

OUTLINE OF CHANGES

- The specifications of the coil spring has been changed as long wheelbase-3800 mL engine model has been newly added.
- The specifications of the coil spring has been changed. <3000-GLS for China>

GENERAL INFORMATION

COIL SPRING

<Long wheelbase-3800>

Item	3800	3500 (for reference)
Wire diameter × average diameter × free length mm	16 × (89 – 109) × 322	17 × (90 – 110) × 317

<3000-GLS for China>

Item	New	Old
Wire diameter × average diameter × free length mm	17 × (90 – 110) × 317	17 × (90 – 110) × 321

35B ANTI-SKID BRAKING SYSTEM (ABS) <4WD>

CONTENTS

[GENERAL](#) 2

[WHEEL SPEED SENSOR <3800>](#) 2

GENERAL

OUTLINE OF CHANGE

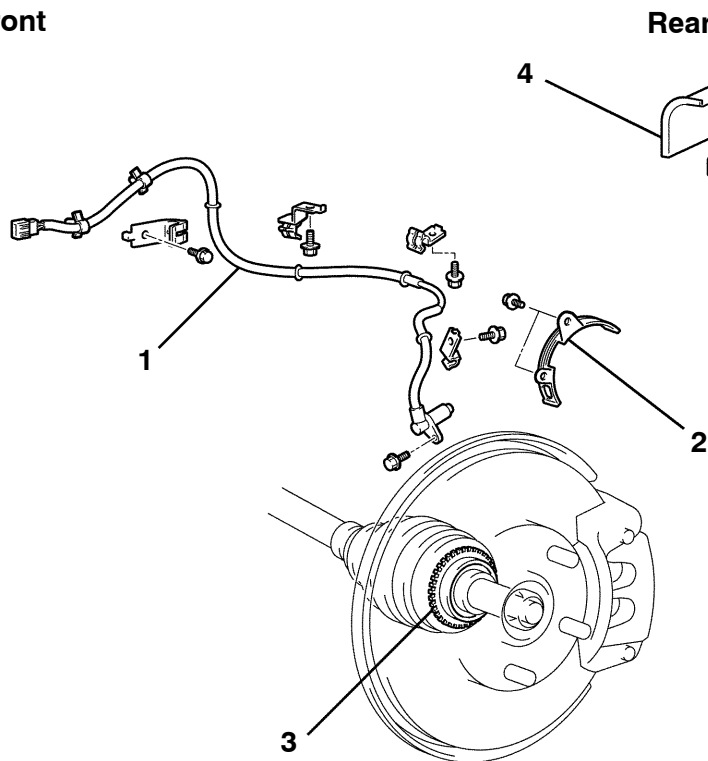
Since the heat protector has been adopted to the rear ABS sensor connector, the following service procedures have been added. <3800>

WHEEL SPEED SENSOR <3800>

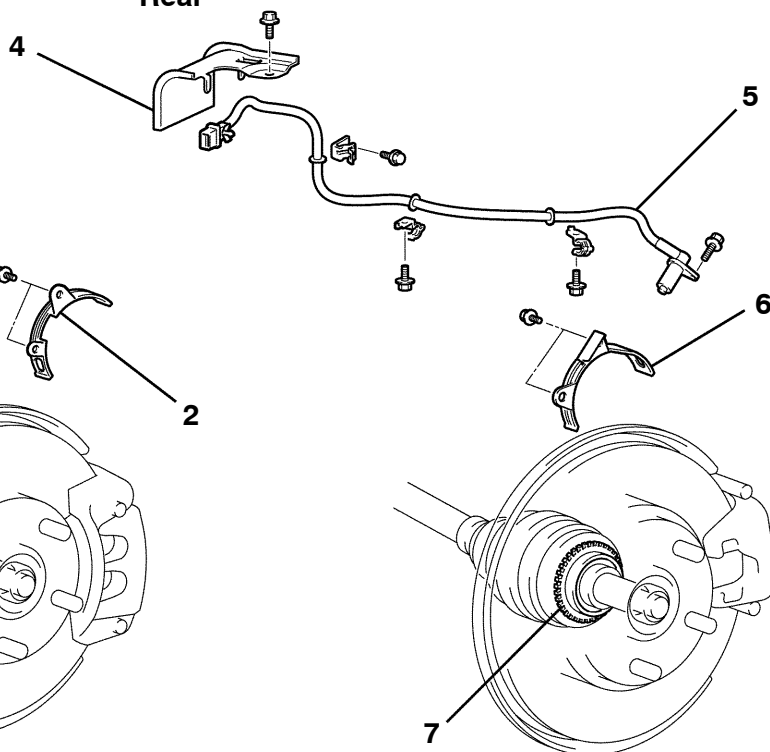
REMOVAL AND INSTALLATION

Post-installation Operations

Wheel speed sensor output voltage measurement

Front**Front wheel speed sensor removal steps**

1. Front wheel speed sensor
2. Front ABS rotor protector
3. Front ABS rotor

Rear**Rear wheel speed sensor removal steps**

4. Heat protector
5. Rear wheel speed sensor
6. Rear ABS rotor protector
7. Rear ABS rotor

AC204256AB

**NOTE**

- The front and rear ABS rotors are integrated with the drive shaft and cannot be disassembled.
- The removal service points are the same as before.

51 EXTERIOR

CONTENTS

GENERAL	2
Outline of Changes	2
MARK	2

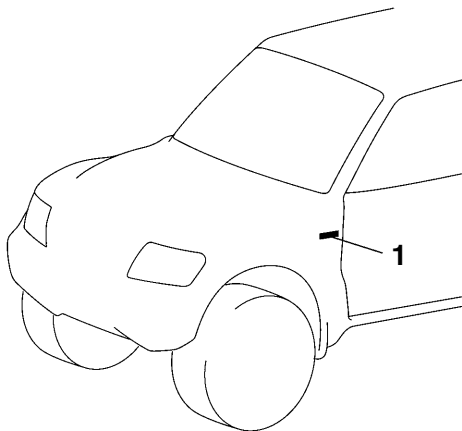
GENERAL

OUTLINE OF CHANGE

Due to the addition of 3.8 V6 mark, the following service procedure has been established. <3800>

MARK

REMOVAL AND INSTALLATION



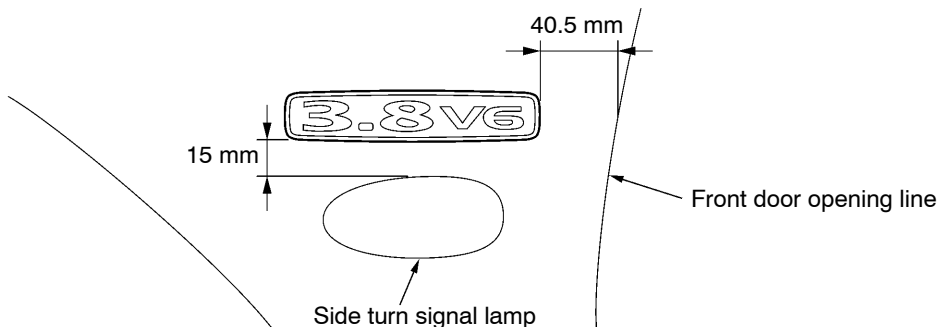
AC305328

►A◄ 1. 3.8 V6 mark

INSTALLATION SERVICE POINTS

►A◄ 3.8 V6 MARK INSTALLATION

1. Installation position



AC305375

2. Installation steps

- (1) Remove grease on the marked surface of the body with unleaded gasoline.
- (2) Peel off the protection sheet on the back of the mark to paste it on the installation position.

Caution

- 1) Carry out this work in a location which has an ambient temperature of 20° – 38°C and which is free from dust.
- 2) If ambient temperature is lower than 20°C, heat the mark and the vehicle body (application location) to 20° – 30°C.
- 3) Be sure to pressure the mark immediately after the pasting is done.

52 INTERIOR & SUPPLEMENTAL RESTRAINT SYSTEM

CONTENTS

INTERIOR	52A
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)	52B

52A INTERIOR

CONTENTS

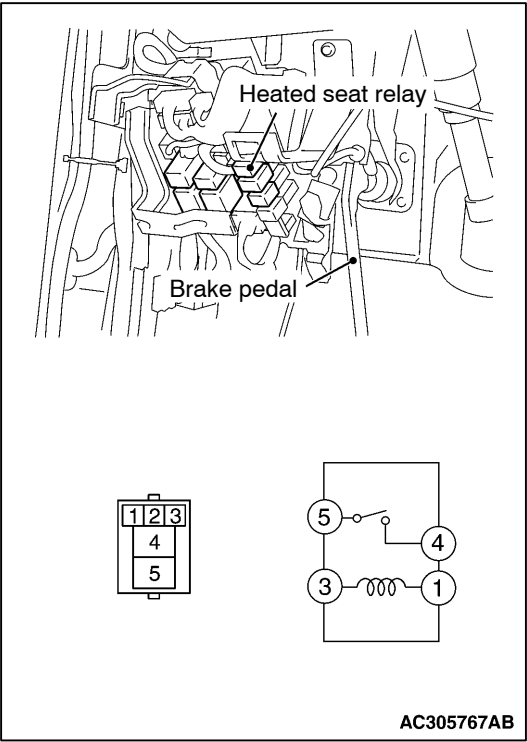
GENERAL 2

SEAT 2

GENERAL

OUTLINE OF CHANGE

Due to the addition of the heated seat relay, the following service procedure has been established.



SEAT

INSPECTION

HEATED SEAT RELAY CONTINUITY CHECK

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

52B

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

GENERAL	2	WARNING/CAUTION LABEL	9
SRS SERVICE PRECAUTIONS	3	SEAT BELT WITH PRE-TENSIONER	10
SPECIAL TOOLS	4	SEAT BELT PRE-TENSIONER DISPOSAL PROCEDURES	12
TROUBLESHOOTING	5	Undeployed Seat Belt Pre-tensioner Disposal ...	12
POST-COLLISION DIAGNOSIS	8	Operated Seat Belt Pre-tensioner Disposal Procedures	15
INDIVIDUAL COMPONENT SERVICE	9		

CAUTION

- Carefully read and observe the information in the SRS SERVICE PRECAUTIONS prior to any service.
- For information concerning troubleshooting or maintenance, always observe the procedures in the Troubleshooting 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 for the components involved.
- If you have any questions about the SRS, please contact your local distributor.

GENERAL

OUTLINE OF CHANGE

A service procedure has been established as seat belts with pre-tensioner have been added <Vehicles for Australia>.

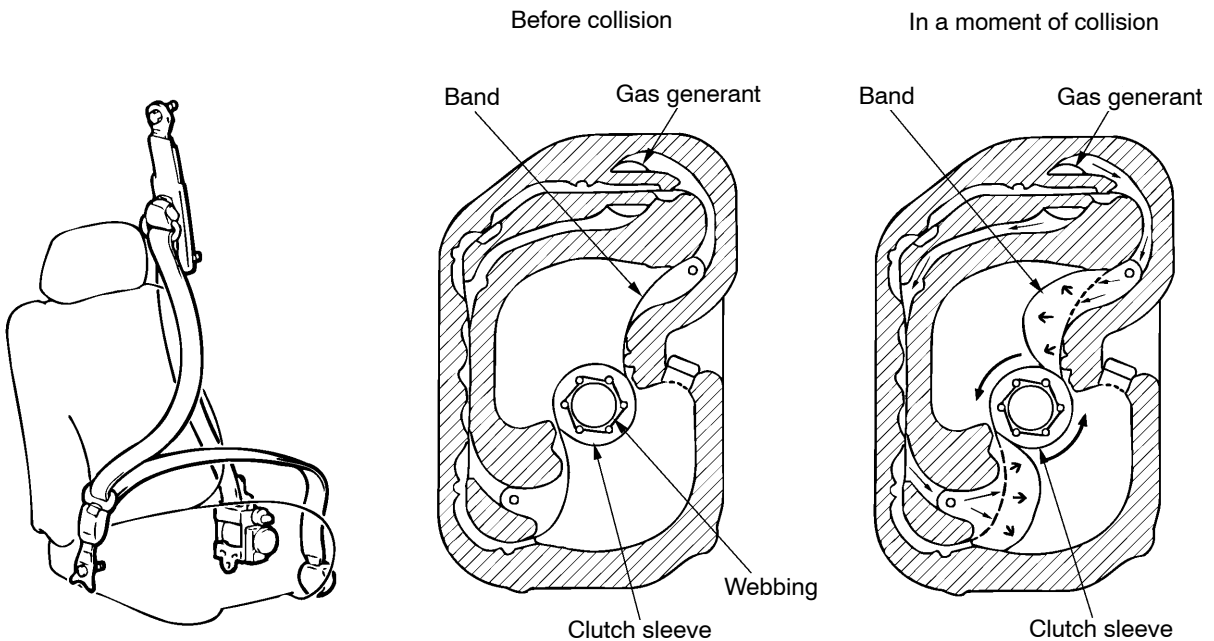
SEAT BELT WITH PRE-TENSIONER

Caution

Never disassemble the seat belt with pre-tensioner.

The driver's and passenger's seat belt pre-tensioners take up seat belt slack immediately when a collision takes place, thus restraining the pre-tensioners on the seats simultaneously with the SRS air bags. this improves the passive safety. when the G sensor in the SRS-ECU detects impact above a certain level during a collision, the pre-tensioner operates as follows:

1. The igniting heater heats up according to the signal from the SRS-ECU.
2. this ignites the gas generant and explosive gas will be generated.
3. The strip is pushed outwards by the gas pressure. As the strip wound around the clutch sleeve is pulled out, the clutch sleeve rotates at high speed.
4. The clutch sleeve rotates to wind the webbing.



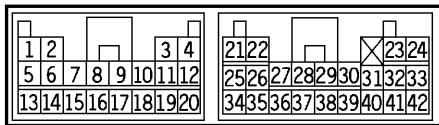
SRS SERVICE PRECAUTIONS

1. In order to avoid injury to yourself or others from accidental deployment of the air bag and accidental operation of the seat belt with pre-tensioner during servicing, read and carefully follow all the precautions and procedures described in this manual.
2. Do not use any electrical test equipment on or near SRS components, except those specified on P.52B-4.
3. **Never Attempt to Repair the Following Components:**
 - SRS air bag control unit (SRS-ECU)
 - Front impact sensors
 - Seat belt with Pre-tensioner

NOTE

If any of these components are diagnosed as faulty, they should only be replaced, in accordance with the INDIVIDUAL COMPONENTS SERVICE procedures in this manual, starting at page P.52B-9.

SRS-ECU connector



W0582AU

4. **Do not attempt to repair the wiring harness connectors of the SRS. If a defective wiring harness is found, repair or replace it by referring to the table follows.**

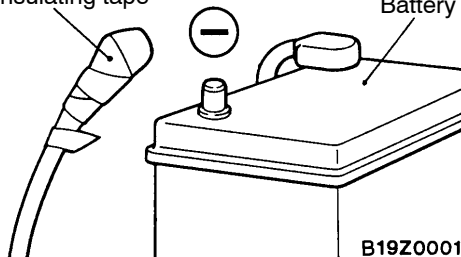
NOTE

The table below shows the pre-tensioner related terminals only. The other terminals are the same as before.

SRS-ECU Terminal No.	Destination of harness	Corrective action
27, 28	Floor wiring harness → Seat belt with pre-tensioner (Front passenger's side)	Correct or replace each wiring harness.
29, 30	Floor wiring harness → Seat belt with pre-tensioner (Driver's side)	

Insulating tape

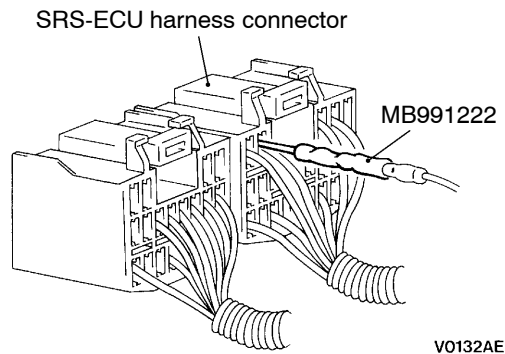
Battery



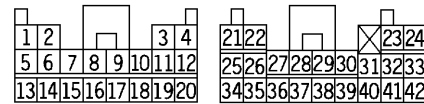
5. **After disconnecting the negative (–) battery cable, wait 60 seconds at least before any service and insulate the disconnected cable with tape. The SRS retain enough voltage to deploy the air bags for a short time even after the disconnection of the battery. So, serious injury may result by accidental air bag deployment if a work is done on the SRS just after the disconnection of the battery.**

6. Seat belt with pre-tensioner should not be subjected to heat, so remove the SRS-ECU, front impact sensor, and seat belt with pre-tensioner before drying or baking the vehicle after painting.
 - SRS-ECU, front impact sensor: 93°C or more
 - Seat belt with pre-tensioner: 90°C or more
7. Whenever you finish servicing the SRS, check warning lamp operation to make sure that the system functions properly.
8. If checks are carried out by using the SRS-ECU harness connector, observe the following procedures:

Insert the special tool (probe in the harness set) into connector from harness side (rear side), and connect the tester to this probe. If any tool than special tool is used, damage to the harness and other components will result. Never insert the probe directly to the terminals from the front of the connector. The terminals are plated to increase their conductivity, so that if they are touched directly by the probe, the plating may break, which will cause drops in reliability.



SRS-ECU harness connector (rear side)



W0584AU

SPECIAL TOOLS

The items other than below are the same as before.

Tools	No.	Name	Application
<p>B991865</p>	MB991865	Dummy resistor	SRS air bag circuit check
<p>B991866</p>	MB991866	Resistor harness	

TROUBLESHOOTING

The following items have been changed. The other items are the same as before.

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
26*, 27*, 66, 67	Driver's side pre-tensioner (squib) system	52B-5
28*, 29*, 68, 69	Front passenger's side pre-tensioner (squib) system	52B-7
56, 57	Driver's side pre-tensioner (squib ignition drive circuit) system	52B-8
58, 59	Front passenger's side pre-tensioner (squib ignition drive circuit) system	52B-8

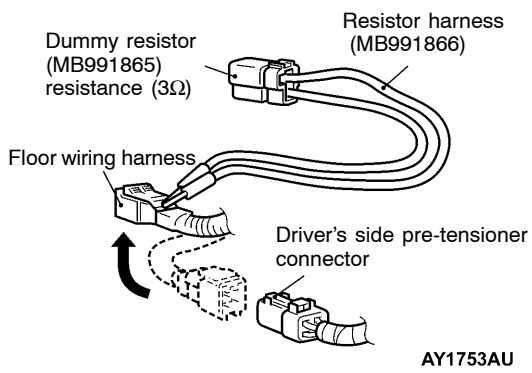
NOTE

*: If the system returns to normal, the SRS warning lamp will go out, but the relevant diagnosis code will be retained in memory.

INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

Code No.26, 27, 66 or 67 Driver's side pre-tensioner (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the driver's side pre-tensioner (squib). The trouble causes for each diagnosis code No. are as follows.	<ul style="list-style-type: none"> • Malfunction of wiring harnesses or connectors • Malfunction of driver's side pre-tensioner (squib) • Malfunction of SRS-ECU

Code No.	Trouble causes
26	<ul style="list-style-type: none"> • Short in driver's side pre-tensioner (squib) or harness short
27	<ul style="list-style-type: none"> • Open circuit in driver's side pre-tensioner (squib) or open harness • Malfunction of connector contact
66	<ul style="list-style-type: none"> • Short in driver's side pre-tensioner (squib) harness leading to the power supply
67	<ul style="list-style-type: none"> • Short in driver's side pre-tensioner (squib) harness leading to the earth

**MUT-II Self-diag code**

- Connect the dummy resistor (MB991865) to the resistor harness (MB991866).
- Disconnect driver's side pre-tensioner connector F-37, and insert probe of resistor harness MB991866 to the connector by backprobing.

Caution

Never insert the probe directly to the terminals from the front of the connector.

- Connect the negative (–) battery terminal.
 - Erase diagnosis code memory.
- Is code No.26, 27, 66 or 67 displayed?

YES

Check the following connectors: E-110, E-20, F-37

OK

Check trouble symptoms.

NG

Check wiring harness between the driver's side pre-tensioner and SRS-ECU.

OK

Replace SRS-ECU.

NG

Repair

NG

Repair

NO

Replace the driver's side seat belt with pre-tensioner.

Code No.28, 29, 68 or 69 Front passenger's side pre-tensioner (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the front passenger's side pre-tensioner (squib). The trouble causes for each diagnosis code No. are as follows.	<ul style="list-style-type: none"> • Malfunction of wiring harnesses or connectors • Malfunction of front passenger's side pre-tensioner (squib) • Malfunction of SRS-ECU

Code No.	Trouble causes
28	<ul style="list-style-type: none"> • Short in front passenger's side pre-tensioner (squib) or harness short
29	<ul style="list-style-type: none"> • Open circuit in front passenger's side pre-tensioner (squib) or open harness • Malfunction of connector contact
68	<ul style="list-style-type: none"> • Short in front passenger's side pre-tensioner (squib) harness leading to the power supply
69	<ul style="list-style-type: none"> • Short in front passenger's side pre-tensioner (squib) harness leading to the earth

Dummy resistor (MB991865) resistance (3Ω)

Resistor harness (MB991866)

Floor wiring harness

Front passenger's side pre-tensioner connector

AY1753AU

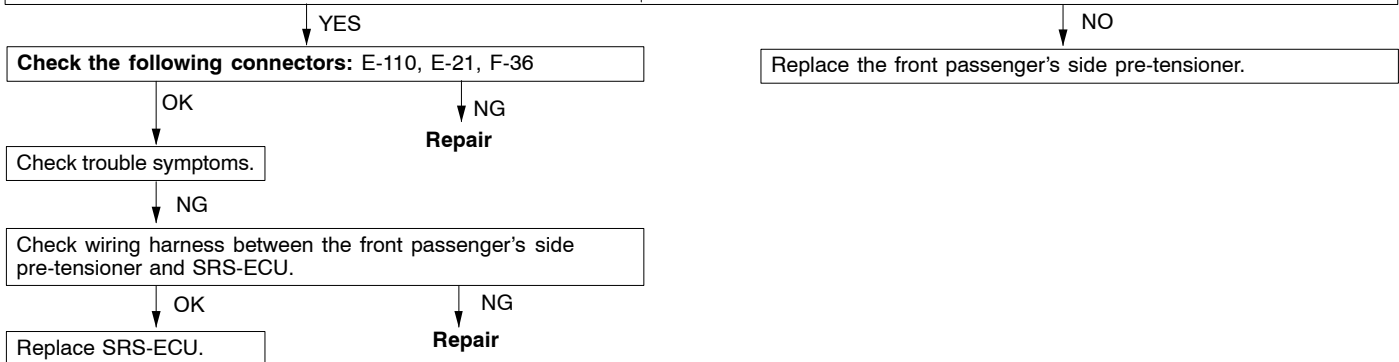
MUT-II Self-diag code

- Connect the dummy resistor (MB991865) to the resistor harness (MB991866).
- Disconnect front passenger's side pre-tensioner connector F-36 and insert probe of resistor harness MB991866 to the connector by backprobing.

Caution
Never insert the probe directly to the terminals from the front of the connector.

- Connect the negative (-) battery terminal.
- Erase diagnosis code memory.

Is code No.28, 29, 68 or 69 displayed?



Code No.56, 57, 58, 59 System inside SRS-ECU	Probable cause
These diagnostic trouble codes are output when a fault is detected in the SRS-ECU. The defective parts and trouble causes for each diagnosis code No. are as follows.	<ul style="list-style-type: none"> • Malfunction of SRS-ECU

Code No.	Defective parts	Trouble causes
56	Driver's side pre-tensioner (squib ignition drive circuit)	<ul style="list-style-type: none"> • Short circuit in the squib ignition drive circuit
57		<ul style="list-style-type: none"> • Open circuit in the squib ignition drive circuit
58	Front passenger's side pre-tensioner (squib ignition drive circuit)	<ul style="list-style-type: none"> • Short circuit in the squib ignition drive circuit
59		<ul style="list-style-type: none"> • Open circuit in the squib ignition drive circuit

If the diagnosis code(s) above is set, replace the SRS-ECU.

POST-COLLISION DIAGNOSIS

Check and service the vehicle after collision as follows regardless of the operation of the pre-tensioner:

SRS-ECU MEMORY CHECK

The check procedure is the same as before.

REPAIR PROCEDURE

WHEN PRE-TENSIONER OPERATES IN A COLLISION.

1. Replace the following parts with new ones.
 - SRS-ECU
 - Front impact sensor
 - Seat belt with pre-tensioner (Refer to P.52B-10.)
2. Check harness for binding, connectors for damage, poor connections, and terminals for deformation.

UNDEPLOYED AIR BAGS IN LOW-SPEED COLLISION

Check the SRS-ECU and Front impact sensor and Seat belt with pre-tensioner. If visible damage such as dents, cracks, or deformation are found on the the SRS-ECU and Front impact sensor and Seat belt with pre-tensioner, replace them with new ones. Concerning parts removed for inspection, replacement with new parts and cautions in working, refer to INDIVIDUAL COMPONENT SERVICE.

SRS-ECU

The check procedure is the same as before.

Front impact sensor

The check procedure is the same as before.

Seat belt with pre-tensioner

1. Check the seat belt for damage or deformation.
2. Check the pre-tensioner for cracks or deformation.
3. Check that the unit is installed correctly to the vehicle body.

INDIVIDUAL COMPONENT SERVICE

If the seat belt with pre-tensioner are to be removed or replaced as a result of maintenance, troubleshooting, etc., follow each procedure (P.52B-9 – P.52B-11.)

Caution

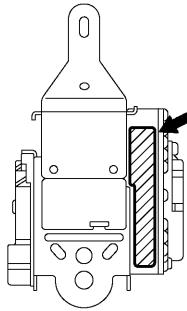
1. The seat belt with pre-tensioner should not be subjected to temperature 90°C, so remove the seat belts with pre-tensioner before drying or baking the vehicle after painting.
2. If the seat belt with pre-tensioner are removed for the purpose of check, sheet metal repair, painting, etc., they should be stored in a clean, dry place until they are reinstalled.

WARNING/CAUTION LABEL

Caution label on the seat belt with pre-tensioner are attached in the vehicle as shown. Follow instructions in the label when servicing the seat

belt with pre-tensioner. If the labels are dirty or damaged, replace with new ones.

Seat belt with pre-tensioner



A10050CA

SEAT BELT WITH PRE-TENSIONER

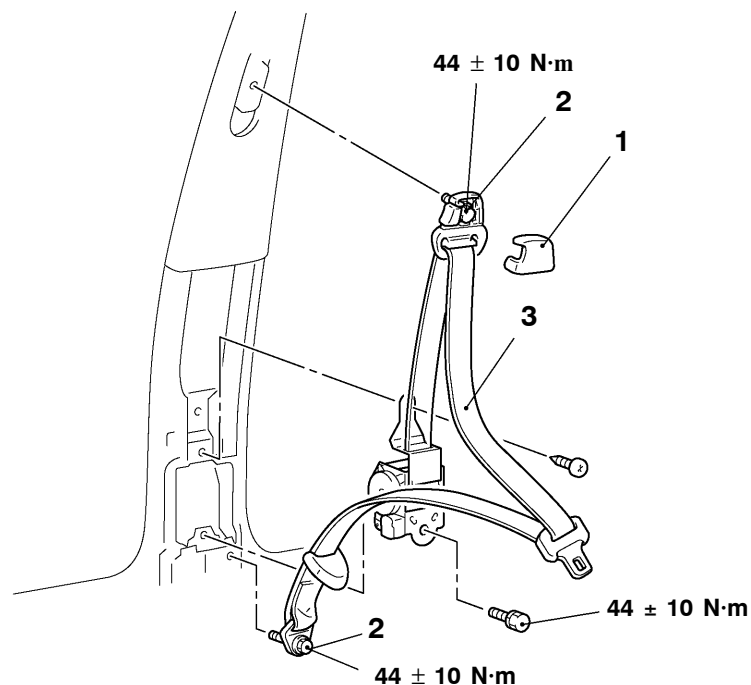
Caution

1. Never attempt to disassemble or repair the 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 pre-tensioner.
4. Do not expose the seat belt with pre-tensioner to temperatures over 90°C.
5. After operating the 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 operated, its pre-tensioner should be operated first before disposal. (Refer to P.52B-12.)

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

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



A10021CA

Removal steps

1. Sash guide cover
2. Outer seat belt connection
 - Center pillar trim, lower
3. Seat belt with pre-tensioner

Installation steps

- **A** • Post-installation inspection
3. Seat belt with pre-tensioner
 - Center pillar trim, lower
 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 (RH)

INSTALLATION SERVICE POINTS**►A◀ PRE-INSTALLATION INSPECTION**

1. Even new seat belt with pre-tensioner require inspection before installation.

Caution

When discarding the seat belt with pre-tensioner, operate the pre-tensioner as specified in the service procedure. (Refer to P.52B-12.)

2. Connect the negative (-) battery terminal.
3. Connect the MUT-II to the diagnosis connector (16 pin).

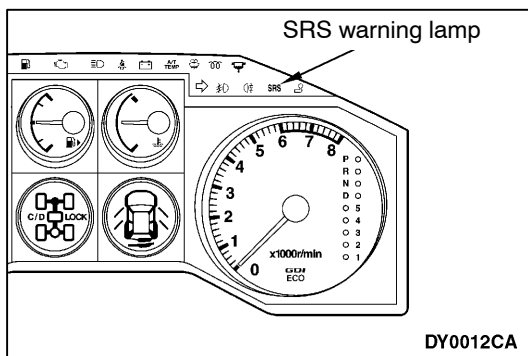
Caution

Turn the ignition switch to the LOCK (OFF) position when connecting and disconnecting the MUT-II.

4. Turn the ignition key to the ON position.
5. Read a diagnosis code to refer to that the SRS is operating properly except an open in the pre-tensioner circuit.
6. Turn the ignition switch to LOCK (OFF) position.
7. Disconnect the negative (-) battery cable and insulate with tape.

Caution

**Wait at least 60 seconds after the disconnection of the battery cable before any further job.
(Refer to P.52B-3, item 5 of the SRS Service Precautions)**

**►B◀ POST-INSTALLATION INSPECTION**

1. Reconnect the negative (-) battery terminal.
2. Turn the ignition key to the ON position.
3. Does the SRS warning lamp illuminate for about 7 seconds after turning OFF?
4. If no, refer to troubleshooting.
(Refer to P.52B-5)

INSPECTION**SEAT BELT WITH PRE-TENSIONER CHECK**

If any part is found to be faulty during the inspection, it must be replaced with a new one.

Dispose of the old one according to the specified procedure.
(Refer to P.52B-12.)

- Check pre-tensioner for dents, cracks or deformation.

SEAT BELT PRE-TENSIONER DISPOSAL PROCEDURES

Before disposing of a vehicle which is equipped with seat belts with pre-tensioner, or when disposing of the seat belts with pre-tensioner themselves,

the following procedures must be used to deploy the pre-tensioners before disposal.

UNDEPLOYED SEAT BELT PRE-TENSIONER DISPOSAL

Caution

1. If the vehicle is to be scrapped or otherwise disposed of, operate the pre-tensioners inside the vehicle. If the vehicle is still to be used and only the seat belt pre-tensioner are to be disposed of, operate the pre-tensioners outside the vehicle.
2. Since a little amount of smoke is produced when the pre-tensioner is operated, avoid residential areas whenever possible.
3. Since there is a loud noise when the pre-tensioners are operated, avoid residential areas whenever possible. If anyone is nearby, give warning of the impending noise.
4. Suitable ear protection should be worn by personnel performing these procedures or by people in the immediate area.

DEPLOYMENT INSIDE THE VEHICLE

1. Move the vehicle to an isolated spot.
2. Disconnect the negative (–) and positive (+) battery cables from the battery terminals, and then remove the battery from the vehicle.

Caution

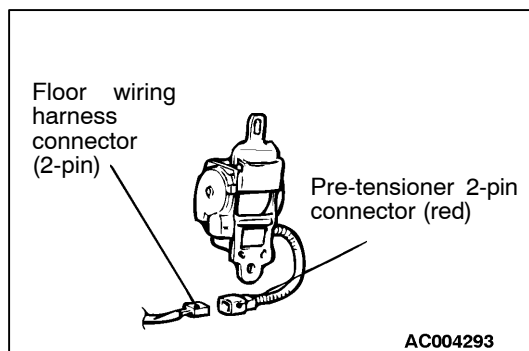
Wait at least 60 seconds after disconnecting the battery cables before doing any further work. (Refer to P.52B-3.)

3. Operate the pre-tensioner as specified in the service procedures that follows.
 - (1) Remove the center pillar trim, lower.

- (2) Remove the connection between the pre-tensioner 2-pin connector (red) and the floor wiring harness connector (2-pin).

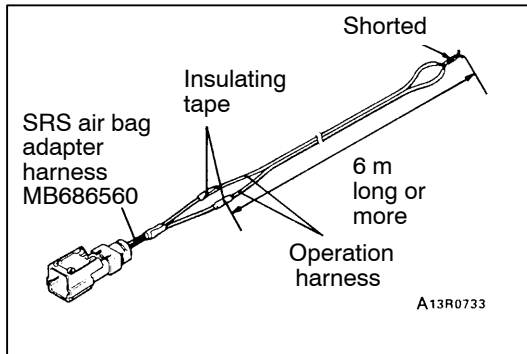
Caution

The pre-tensioner both in the driver's and passenger's sides should be operated.

[Main Index](#)[Group Index](#)[Group TOC](#)

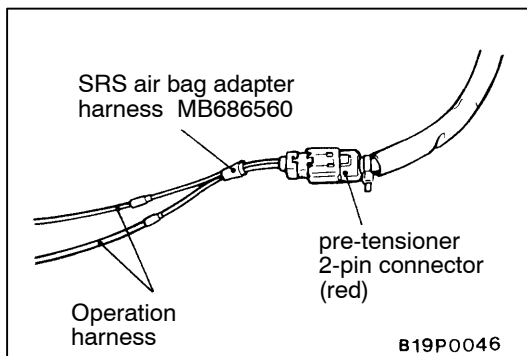
NOTE

Once disconnected from the floor wiring harness, both electrode of the pre-tensioner connector short automatically. This prevents the pre-tensioner from accidental operation caused by static etc.

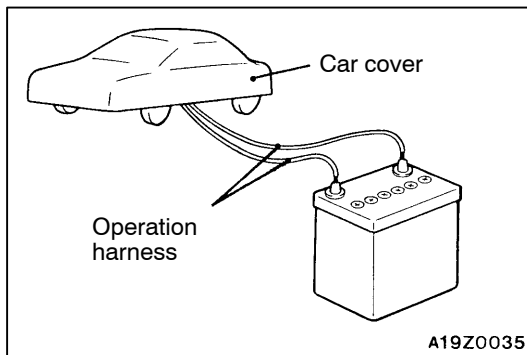


- (2) Connect operation harness longer than 6 m to each SRS air bag adapter harness and insulate the connections with plastic tape.

Also, connect the operation harness in the other ends to short, thereby preventing the pre-tensioner from accidental operation caused by static etc.



- (3) Connect the SRS air bag adapter harness to the pre-tensioner 2-pin connector (red) and route the operation harness out of the vehicle.



- (4) Close all the doors with the windows fully closed and put a cover over the vehicle to minimize sound.

Caution

The cover is required as the glass, if already damaged, may break.

- (5) Separate the operation harness as far from the vehicle as possible and connect to the terminals of the battery removed from the vehicle. Then operate the pre-tensioner.

Caution

- 1) **Before operating the pre-tensioner, see that no one is in and near the vehicle.**
- 2) **The operation of the pre-tensioner makes the inflator very hot. Before handling the inflator, wait more than 30 minutes for cooling.**
- 3) **If the pre-tensioner fails to operate when the procedures above are followed, do not go near the pre-tensioner. Contact your local distributor.**
- (6) After operation of the pre-tensioner, discard as specified in the procedure. (Refer to P.52B-15.)

DEPLOYMENT OUTSIDE THE VEHICLE

Caution

- 1) This should be carried out in a wide, flat area at least 6 m away from obstacles and other people.
- 2) Do not operate outside if wind is high. Even in a soft wind, ignite to windward of the pre-tensioner.

1. Disconnect the negative (–) and positive (+) battery cables from the battery terminals, and then remove the battery from the vehicle.

Caution

Wait at least 60 seconds after disconnecting the battery cables before doing any further work. (Refer to P.52B-3.)

2. Operate pre-tensioner as specified in the service procedures that follows.
 - (1) Remove the seat belt pre-tensioner from the vehicle. (Refer to P.52B-10.)

Caution

The pre-tensioner should be stored on a flat surface and placed so that the pre-tensioner operation surfaces are facing upward. Do not place anything on top of them.

- (2) Connect operation harness longer than 6 m to each SRS air bag adapter harness and insulate the connections with plastic tape. Also, connect the operation harness in the other ends to short, thereby preventing the pre-tensioner from accidental operation caused by static electricity.
- (3) Feed a thick wire through the bracket of the seat belt with pre-tensioner, and connect it to an old tyre with a wheel.
- (4) Connect the operation harness to the pre-tensioner.
- (5) Pull out the seat belt outside the tyre.

- (6) Place an old tyre on the tyre, which the seat belt with pre-tensioner is secured on.

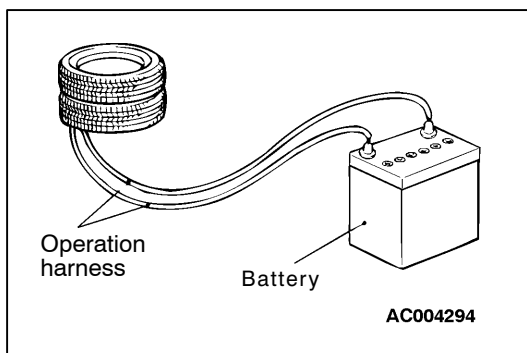
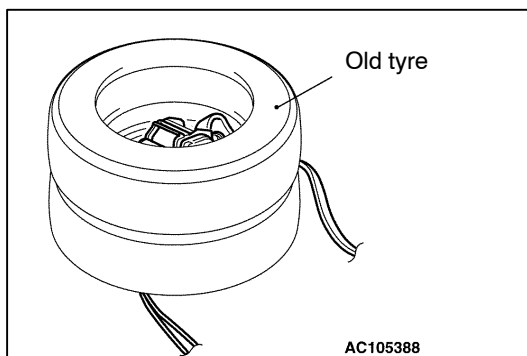
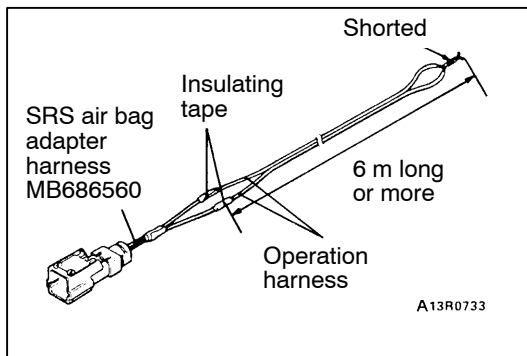
Caution

Be careful not to trap the SRS air bag adapter harness connector between tyres.

- (7) Untie the operation harness ends at the place as far as possible from the seat belt with pre-tensioner, and connect the harness wires to the vehicle battery to activate the pre-tensioner.

Caution

- 1) Before the operation, be sure that no one is near the pre-tensioner.
- 2) The operation of the pre-tensioner makes itself very hot. Before handling the pre-tensioner, wait more than 30 minutes for cooling.



- 3) If the pre-tensioner fails to operate when the procedures above are followed, do not go near the pre-tensioner. Contact your local distributor.
- (8) After operation of the pre-tensioner, discard as specified in the procedure.

OPERATED PRE-TENSIONER DISPOSAL PROCEDURES

After operation, the pre-tensioner should be disposed of in the same manner as any other scrap parts, adhering to local laws and/or legislation that may be in force except that the following points should be carefully noted during disposal.

1. The inflator is quite hot immediately after the operation, so wait at least 30 minutes to allow it cool before attempting to handle it.
2. Do not put water or oil on the pre-tensioner after operation.
3. There may be, adhered to the operated pre-tensioner, material that could irritate the eye and/or skin, so wear gloves and safety glasses when handling a operated pre-tensioner.

Caution

If any materials get into any material does get into the eyes or on the skin, immediately rinse the affected area with a large amount of clean water.

If any irritation develops, seek medical attention.

4. Tightly seal the pre-tensioner in a strong vinyl bag for disposal.
5. Be sure to always wash your hands after completing this operation.

54A CHASSIS ELECTRICAL

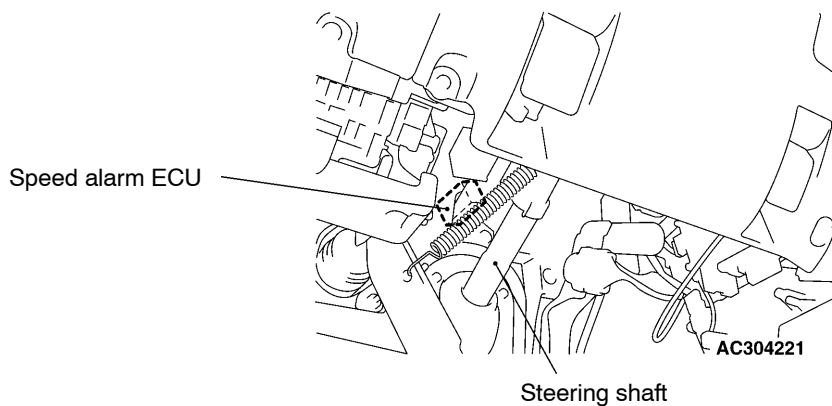
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GENERAL

OUTLINE OF CHANGE <Vehicles for GCC>

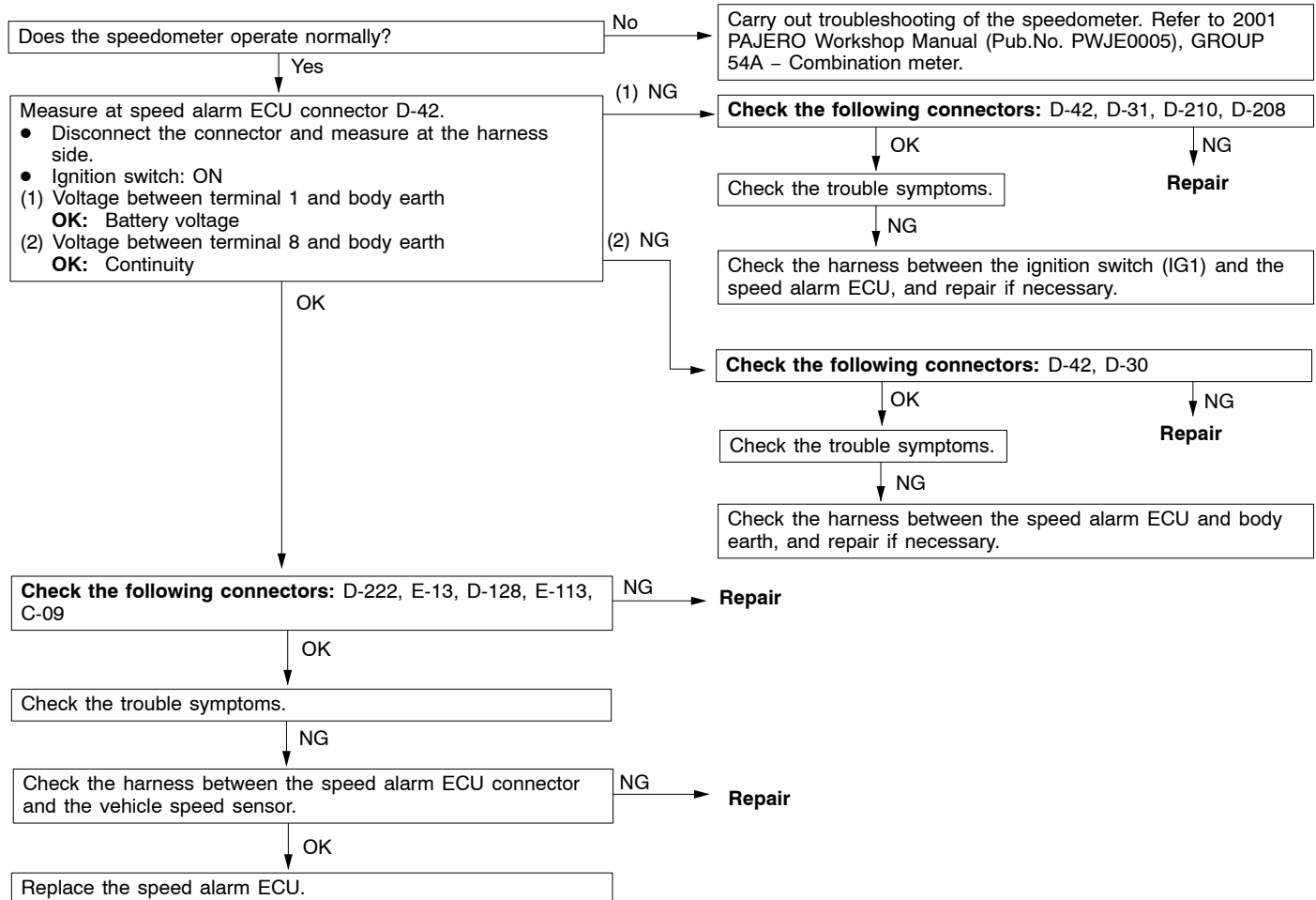
The vehicle speed when the speed alarm sounds has been changed to 120 ± 5 km/h. Due to this, the speed alarm is now controlled by the speed alarm ECU in place of the ETACS-ECU.



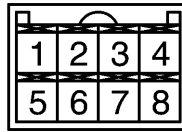
TROUBLESHOOTING

INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

The buzzer does not sound when the speedometer indicates 125km/h or more.	Probable cause
The cause is probably a problem with speed alarm ECU.	<ul style="list-style-type: none"> Malfunction of harness or connector Malfunction of speed alarm ECU



ECU TERMINAL VOLTAGE CHART

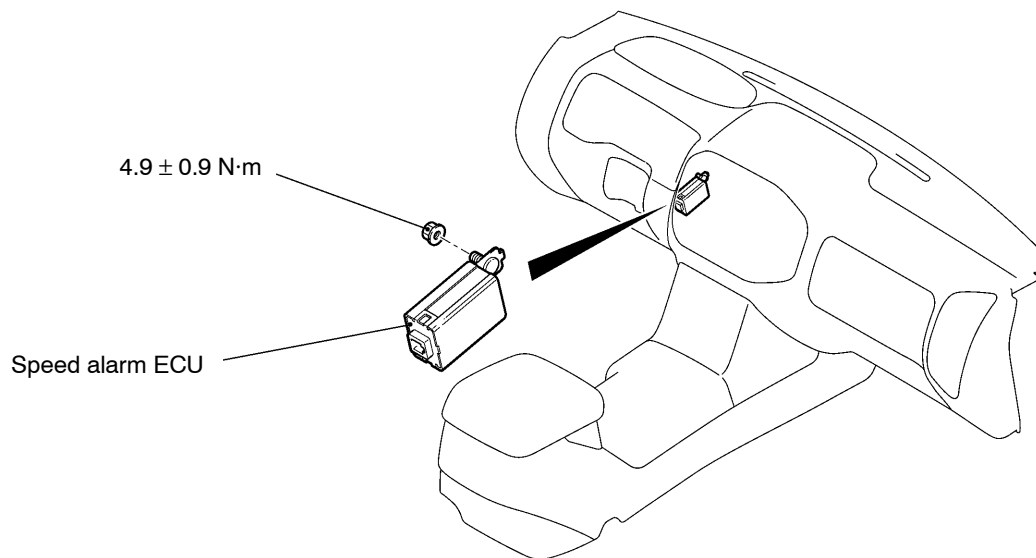


AC305509

Terminal No.	Check item	Check condition	Standard value
1	Ignition switch (IG1) power supply	Ignition switch: LOCK (OFF)	0 V
		Ignition switch: ON	Battery voltage
4	Speed sensor signal input	When the vehicle is being driven	0 – 12 V (pulse signal)
8	Earth	At all times	0 V

SPEED ALARM ECU

REMOVAL AND INSTALLATION



AC305479