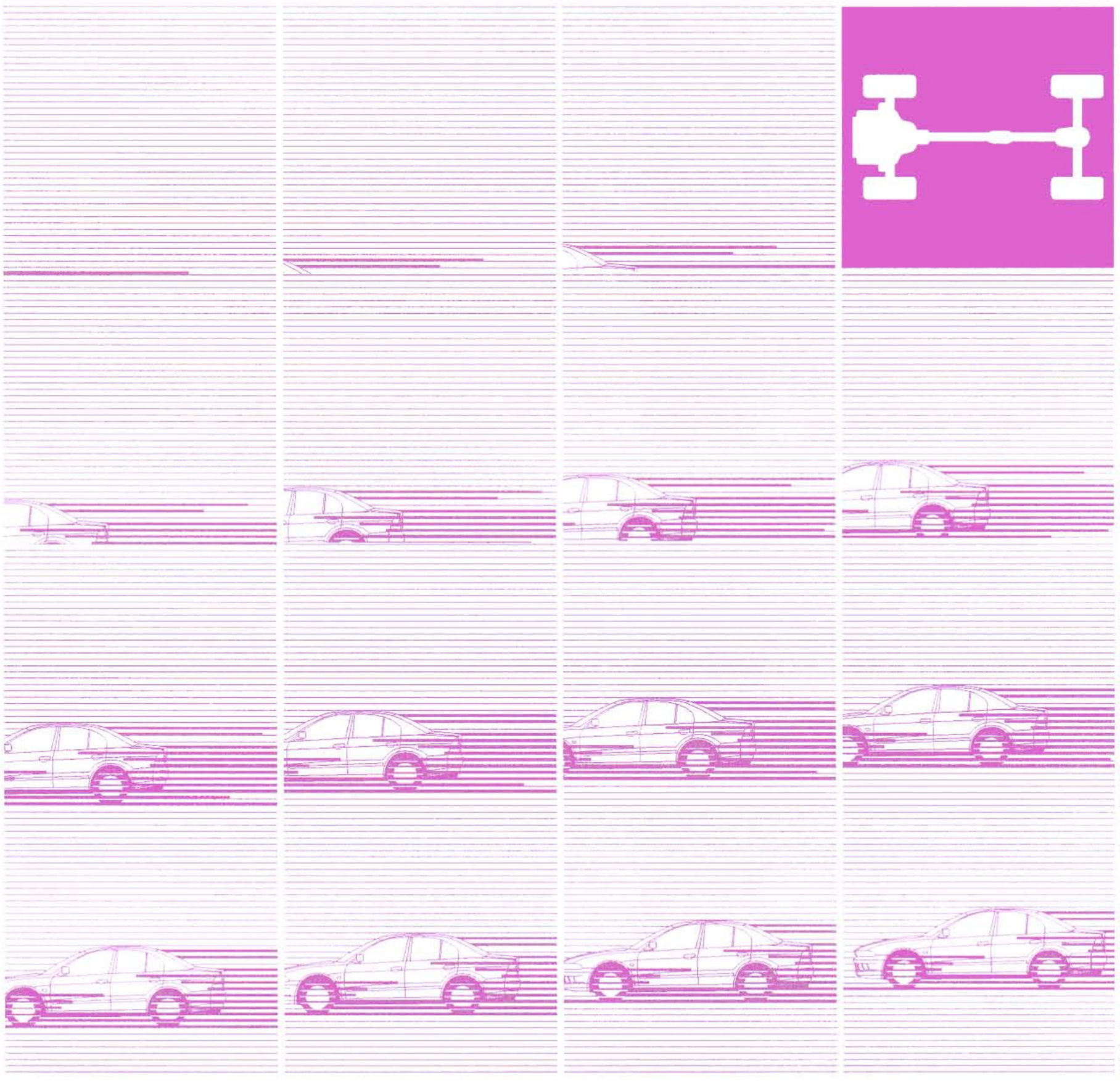
MITSUBISHI MOTORS

Workshop Manual

chassis

GALANT 2001



GALANT

WORKSHOP MANUAL SUPPLEMENT

FOREWORD

This manual outlines changes in servicing procedures related to the chassis including vehicle inspections, adjustments and improvements in the newly equipped models. Use the following manuals in combination with this manual as required.

TECHNICAL INFORMATION MANUAL
PYDE9604
PYDE9604-A (Supplement)
PYDE9604-B (Supplement)

WORKSHOP MANUAL
ENGINE GROUP
PWEE____
(Looseleaf edition)
CHASSIS GROUP
PWDE9611
PWDE9611-A (Supplement)
ELECTRICAL WIRING
PHDE9608
PHDE9608-A (Supplement)
PHDE9608-B (Supplement)
PHDE9608-C (Supplement)
BODY REPAIR MANUAL
PBDE9609

PARTS CATALOGUE
Sedan B608S101□□
Wagon B608T501□□

All information, illustrations and product descriptions contained in this manual are current as of 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

March 2000

NOTES

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HOW TO USE THIS MANUAL

MODEL INDICATIONS

The following abbreviations are used in this manual for identification of model types.
2000: Indicates models equipped with the 2,000 mL <4G63> petrol engine.
2400: Indicates models equipped with the 2,400 mL <4G64> petrol engine.
2500: Indicates models equipped with the 2,500 mL <6A13> petrol engine.
MPI: Indicates the multi-point injection, or engine equipped with the multi-point injection.
GDI: Indicates the gasoline direct injection, or engine equipped with the gasoline direct injection.
SOHC: Indicates an engine with the single overhead camshaft, or models equipped with such an engine.
DOHC: Indicates an engine with the double overhead camshaft, or models equipped with such an engine.
M/T: Indicates the manual transmission, or models equipped with the manual transmission.
A/T: Indicates the automatic transmission, or models equipped with the automatic transmission.
A/C: Indicates the air conditioner.

VEHICLE IDENTIFICATION

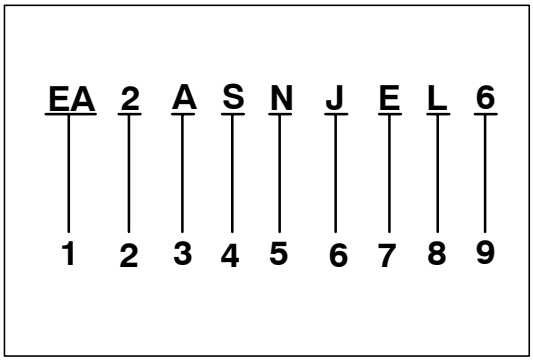
MODELS

<SEDAN>

Model code		Engine model	Transmission model	Fuel supply system
EA2A	SNJESL6/R6	4G63-SOHC (1,997 mL)	F5M42 (5M/T)	MPI (Electronically Controlled Multi-point Fuel Injection)
	SRJESL6/R6		F4A42 (Sports Mode 4A/T)	
EA3A	SNJCSL6/R6	4G64-DOHC-GDI (2,351 mL)	F5M42 (5M/T)	GDI (Gasoline Direct Injection)
	SRJCSL6/R6		F4A42 (Sports Mode 4A/T)	
EA5A	SNGESL6/R6	6A13-SOHC (2,498 mL)	F5M42 (5M/T)	MPI (Electronically Controlled Multi-point Fuel Injection)
	SRGESL6/R6		F4A42 (Sports Mode 4A/T)	

<WAGON>

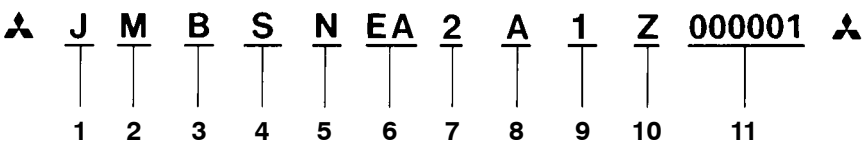
Model code		Engine model	Transmission model	Fuel supply system
EA2W	LNJESL6/R6	4G63-SOHC (1,997 mL)	F5M42 (5M/T)	MPI (Electronically Controlled Multi-point Fuel Injection)
	LRJESL6/R6		F4A42 (Sports Mode 4A/T)	
EA3W	LNJCSL6/R6	4G64-DOHC-GDI (2,351 mL)	F5M42 (5M/T)	GDI (Gasoline Direct Injection)
	LRJCSL6/R6		F4A42 (Sports Mode 4A/T)	
EA5W	LNGESL6/R6	6A13-SOHC (2,498 mL)	F5M42 (5M/T)	MPI (Electronically Controlled Multi-point Fuel Injection)
	LRGESL6/R6		F4A42 (Sports Mode 4A/T)	



MODEL CODE

No.	Items	Contents
1	Development	EA: MITSUBISHI GALANT
2	Engine type	2: 2,000 mL petrol engine 3: 2,400 mL petrol engine 5: 2,500 mL petrol engine
3	Sort	A: Passenger car W: Wagon
4	Body style	A: 4-door sedan L: 4-door station wagon
5	Transmission type	N: 5-speed manual transmission R: 4-speed automatic transmission
6	Trim level	J: 2000 Comfort/Sport/Avance, 2400 Comfort/Sport/Avance G: 2500 Sport/Avance
7	Specification engine feature	C: GDI E: MPI
8	Steering wheel location	L: Left hand R: Right hand
9	Destination	6: For Europe

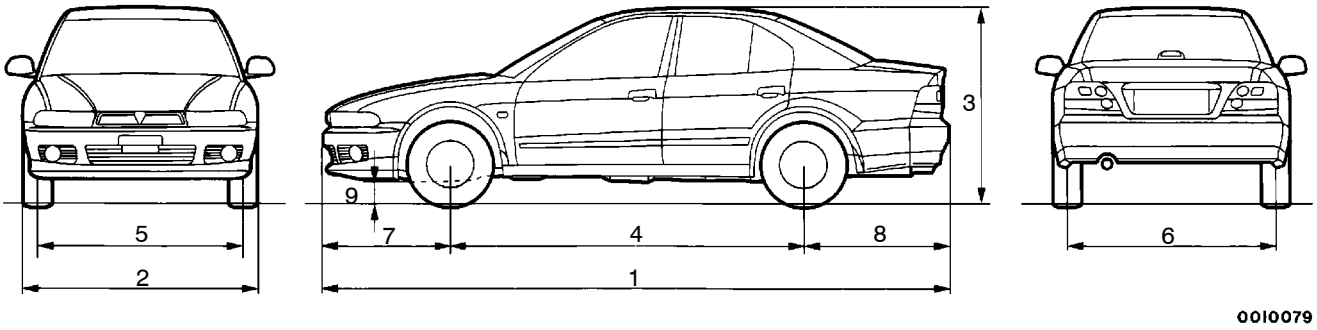
CHASSIS NUMBER



A00I0083

No.	Items		Contents
1	Fixed figure	J	Asia
2	Distribution channel	M	Japan channel
3	Destination	A	For Europe, right hand drive
		B	For Europe, left hand drive
4	Body style	S	4-door sedan
		L	4-door station wagon
5	Transmission type	N	5-speed manual transmission
		R	4-speed automatic transmission
6	Development order	EA	GALANT
7	Engine	2	4G63: 1,997 mL petrol engine
		3	4G64: 2,351 mL petrol engine
		5	6A13: 2,498 mL petrol engine
8	Sort	A	Passenger car
		W	Wagon
9	Model year	1	2001
10	Plant	Z	Okazaki Motor Vehicle Works
11	Serial number	-	-

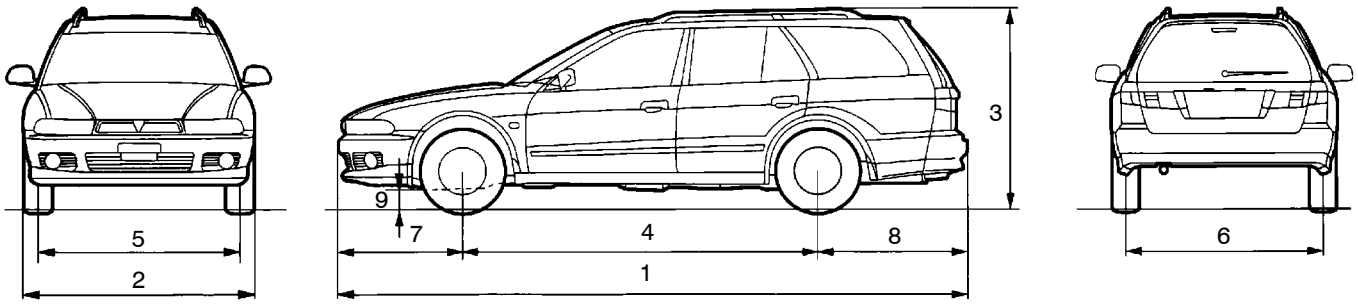
MAJOR SPECIFICATIONS
<Sedan>



Items			EA2A SNJESL6, SNJESR6	EA2A SRJESL6, SRJESR6	EA3A SNJCSL6, SNJCSR6	EA3A SRJCSL6, SRJCSR6
Vehicle dimensions mm	Overall length	1	4,630	4,630	4,630	4,630
	Overall width	2	1,740	1,740	1,740	1,740
	Overall height (unladen)	3	1,415	1,415	1,415	1,415
	Wheelbase	4	2,635	2,635	2,635	2,635
	Track-front	5	1,510	1,510	1,510	1,510
	Track-rear	6	1,505	1,505	1,505	1,505
	Overhang-front	7	930	930	930	930
	Overhang-rear	8	1,065	1,065	1,065	1,065
	Ground clearance (unladen)	9	150	150	150	150
Vehicle weight kg	Kerb weight		1,295	1,315	1,345	1,365
	Max. gross vehicle weight rating		1,880		1,930	
	Max. axle weight rating-front		915		965	
	Max. axle weight rating-rear		965		965	
Seating capacity			5			
Engine	Model No.		4G63		4G64	
	Total displacement mL		1,997		2,351	
Transmission	Model No.		F5M42	F4A42	F5M42	F4A41
	Type		5-speed manual	Sports mode 4-speed automatic	5-speed manual	Sports mode 4-speed automatic
Fuel system	Fuel supply system		Electronically controlled multi-point injection		Gasoline direct injection	

Items			EA5A SNGESL6, SNGESR6	EA5A SRGESL6, SRGESR6
Vehicle dimensions mm	Overall length	1	4,630	4,630
	Overall width	2	1,740	1,740
	Overall height (unladen)	3	1,415	1,415
	Wheelbase	4	2,635	2,635
	Track-front	5	1,510	1,510
	Track-rear	6	1,505	1,505
	Overhang-front	7	930	930
	Overhang-rear	8	1,065	1,065
	Ground clearance (unladen)	9	150	150
Vehicle weight kg	Kerb weight		1,325	1,345
	Max. gross vehicle weight rating		1,910	
	Max. axle weight rating-front		945	
	Max. axle weight rating-rear		965	
Seating capacity			5	
Engine	Model No.		6A13	
	Total displacement mL		2,498	
Transmission	Model No.		F5M42	F4A42
	Type		5-speed manual	Sports mode 4-speed automatic
Fuel system	Fuel supply system		Electronically controlled multi-point injection	

<Wagon>



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Items			EA2W LNJESL6, LNJESR6	EA2W LRJESL6, LRJESR6	EA3W LNJCSL6, LNJCSR6	EA3W LRJCSL6, LRJCSR6
Vehicle dimensions mm	Overall length	1	4,680	4,680	4,680	4,680
	Overall width	2	1,740	1,740	1,740	1,740
	Overall height (unladen)	3	1,445, 1,495*	1,445, 1,495*	1,445, 1,495*	1,445, 1,495*
	Wheelbase	4	2,635	2,635	2,635	2,635
	Track-front	5	1,510	1,510	1,510	1,510
	Track-rear	6	1,505	1,505	1,505	1,505
	Overhang-front	7	930	930	930	930
	Overhang-rear	8	1,115	1,115	1,115	1,115
	Ground clearance (unladen)	9	150	150	150	150
Vehicle weight kg	Kerb weight		1,345	1,365	1,395	1,415
	Max. gross vehicle weight rating		1,935		1,985	
	Max. axle weight rating-front		910		960	
	Max. axle weight rating-rear		1,025		1,025	
Seating capacity			5			
Engine	Model No.		4G63		4G64	
	Total displacement mL		1,997		2,351	
Transmission	Model No.		F5M42	F4A42	F5M42	F4A41
	Type		5-speed manual	Sports mode 4-speed automatic	5-speed manual	Sports mode 4-speed automatic
Fuel system	Fuel supply system		Electronically controlled multi-point injection		Gasoline direct injection	

NOTE
*: With roof rails

Items			EA5W LNGESL6, LNGESR6	EA5W LRGESL6, LRGESR6
Vehicle dimensions mm	Overall length	1	4,680	4,680
	Overall width	2	1,740	1,740
	Overall height (unladen)	3	1,445 1,495*	1,445 1,495*
	Wheelbase	4	2,635	2,635
	Track-front	5	1,510	1,510
	Track-rear	6	1,505	1,505
	Overhang-front	7	930	930
	Overhang-rear	8	1,115	1,115
	Ground clearance (unladen)	9	150	150
Vehicle weight kg	Kerb weight		1,375	1,395
	Max. gross vehicle weight rating		1,965	
	Max. axle weight rating-front		940	
	Max. axle weight rating-rear		1,025	
Seating capacity			5	
Engine	Model No.		6A13	
	Total displacement mL		2,498	
Transmission	Model No.		F5M42	F4A42
	Type		5-speed manual	Sports mode 4-speed automatic
Fuel system	Fuel supply system		Electronically controlled multi-point injection	

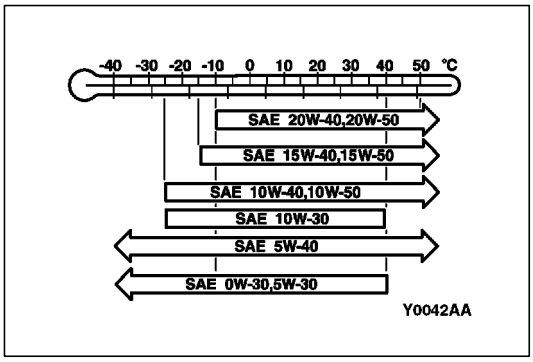
NOTE
*: With roof rails

GROUP 12
ENGINE LUBRICATION

GENERAL

OUTLINE OF CHANGES

A quality of the engine oil has been changed.



ON-VEHICLE SERVICE

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

FUEL

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MULTIPOINT FUEL INJECTION (MPI)

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MULTIPOINT FUEL INJECTION (MPI) <4G6>

GENERAL

OUTLINE OF CHANGES

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

- On-board Diagnostics System has been adopted to expand the diagnostic items and to change diagnosis code numbering system.
- The engine-ECU has been changed. <Vehicles with M/T>
- An engine-A/T-ECU has been adopted. <Vehicles with A/T>
- An ignition failure sensor has been adopted.
- The injector has been changed.
- The oxygen sensor has been changed.

GENERAL INFORMATION

SELF-DIAGNOSIS FUNCTION

Following functions have been added.

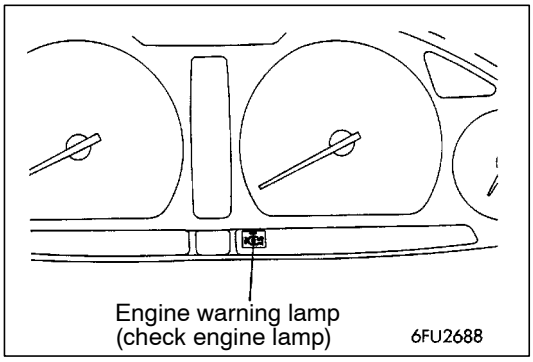
- The engine-ECU records the engine operating condition when the diagnosis code is set. This data is called “freeze frame” data. It can be read by using the MUT-II, and can be used in simulation tests for troubleshooting.

GENERAL SPECIFICATIONS

Items		Specifications
Engine-ECU <M/T>	Identification model No.	E2T67693
Engine-A/T-ECU <A/T>	Identification model No.	E6T30571
Actuators	Injector identification mark	CDH240

SERVICE SPECIFICATIONS

Items		Standard value
Oxygen sensor output voltage V		0.6 - 1.0
Oxygen sensor heater coil resistance (at 20°C) Ω	front	4.5 - 8.0
	rear	11 - 18



TROUBLESHOOTING

DIAGNOSIS FUNCTION

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

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

Engine warning lamp inspection items

Code No.	Diagnosis item
-	Engine-ECU <M/T> or engine-A/T-ECU <A/T>
P0100	Air flow sensor system
P0105	Barometric pressure sensor system
P0110	Intake air temperature sensor system
P0115	Engine coolant temperature sensor system
P0120	Throttle position sensor system
P0125	Feedback system
P0130	Oxygen sensor (front) system <sensor 1>
P0135	Oxygen sensor heater (front) system <sensor 1>
P0136	Oxygen sensor (rear) system <sensor 2>
P0141	Oxygen sensor heater (rear) system <sensor 2>
P0170	Abnormal fuel system
P0201	No. 1 injector system
P0202	No. 2 injector system
P0203	No. 3 injector system
P0204	No. 4 injector system
P0300★	Ignition coil (power transistor) system
P0301	No. 1 cylinder misfire detected
P0302	No. 2 cylinder misfire detected
P0303	No. 3 cylinder misfire detected
P0304	No. 4 cylinder misfire detected
P0335	Crank angle sensor system
P0340	Camshaft position sensor system

Code No.	Diagnosis item
P0403	EGR valve system
P0420	Catalyst malfunction
P0443	Purge control solenoid valve system
P0505	Idle speed control system
P0510	Idle position switch system
P0551	Power steering fluid pressure switch system

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

METHOD OF READING AND ERASING DIAGNOSIS CODES

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

DIAGNOSIS USING DIAGNOSIS 2 MODE

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

   NOTE
   By turning the ignition switch to OFF, the ENGINE-ECU will switch the diagnosis mode from DIAGNOSIS 2 mode to DIAGNOSIS 1 mode.
5. Erase the diagnosis codes.

INSPECTION USING MUT-II DATA LIST AND ACTUATOR TESTING

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

FREEZE FRAME DATA

When the engine-ECU <M/T> or engine-A/T-ECU <A/T> detects a malfunction and stores a diagnosis code, it also stores a current status of the engine. This function is called "Freeze frame data." By analyzing this "freeze frame" data with the MUT-II, an effective troubleshooting can be performed.
The display items of freeze frame data are shown below.

Display item list

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

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

READINESS TEST STATUS

The engine-ECU <M/T> or engine-A/T-ECU <A/T> monitors the following main diagnosis items, judges if these items are in good condition or not, and the stores its history. This history can be read out by using MUT-II. (If the ECU has judged a item before, the MUT-II displays "Complete.")
In addition, if diagnosis codes are erased or the battery cable is disconnected, this history will also be erased (the memory will be reset).

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

FAIL-SAFE FUNCTION REFERENCE TABLE

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

Malfunctioning item	Control contents during malfunction
Air flow sensor	1. Uses the throttle position sensor signal and engine speed signal (crank angle sensor signal) to take reading of the basic injector drive time and basic ignition timing from the pre-set mapping. 2. Fixes the ISC servo in the appointed position so idle control is not performed.
Intake air temperature sensor	Controls as if the intake air temperature is 25°C.
Throttle position sensor (TPS)	No increase in fuel injection amount during acceleration due to the throttle position sensor signal.
Engine coolant temperature sensor	Controls as if the engine coolant temperature is 80°C.
Camshaft position sensor	Injects fuel to all cylinders simultaneously. (However, after the ignition switch is turned to ON, the No. 1 cylinder top dead centre is not detected at all.)
Barometric pressure sensor	Controls as if the barometric pressure is 101 kPa.
Detonation sensor	Switches the ignition timing from ignition timing for super petrol to ignition timing for standard petrol.
Ignition coil, power transistor	Cuts off the fuel supply to cylinders with an abnormal ignition.
Oxygen sensor (front)	Air/fuel ratio feedback control (closed loop control) is not performed.
Oxygen sensor (rear)	Performs the feedback control (closed loop control) of the air/fuel ratio by using only the signal of the oxygen sensor (front) installed on the front of the catalytic converter.
Alternator FR terminal	Does not control the output of the alternator according to an electrical load. (works as a normal alternator)
Misfiring	If the detected misfiring causes damage to the catalyst, the misfiring cylinder will be shut down.

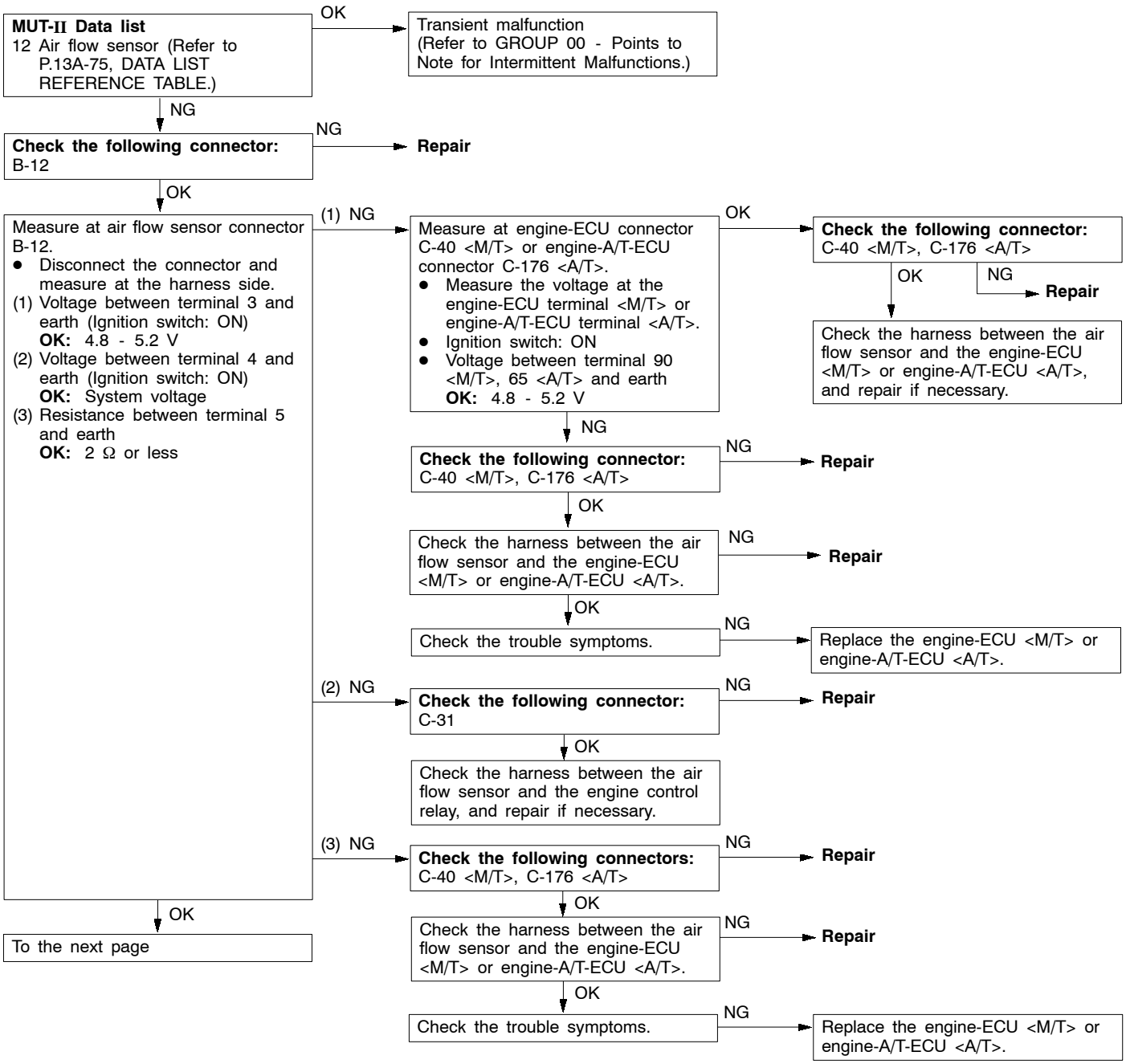
INSPECTION CHART FOR DIAGNOSIS CODES

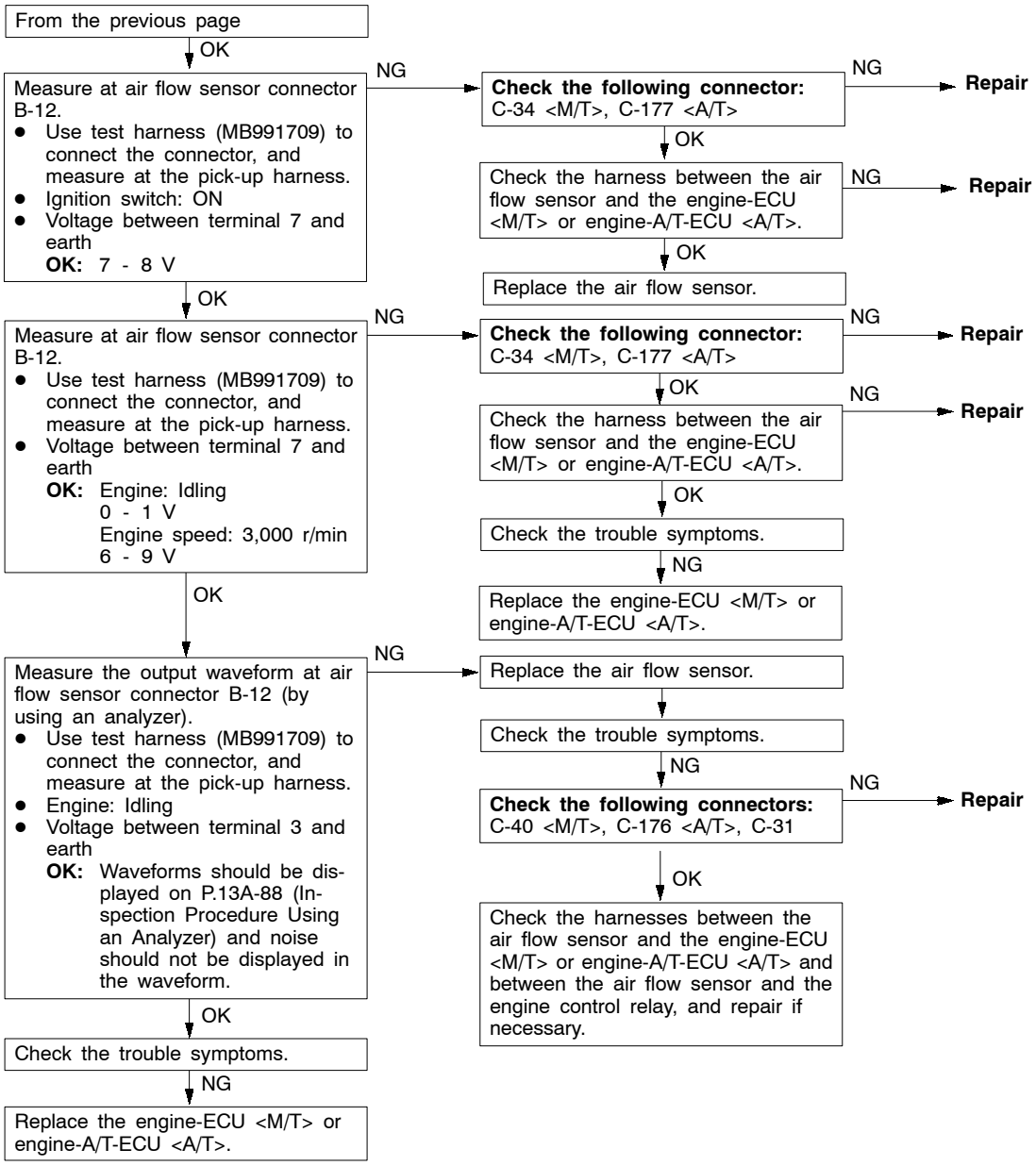
Code No.	Diagnosis item	Reference page
P0100	Air flow sensor system	13A-10
P0105	Barometric pressure sensor system	13A-12
P0110	Intake air temperature sensor system	13A-14
P0115	Engine coolant temperature sensor system	13A-16
P0120	Throttle position sensor system	13A-18
P0125	Feedback system	13A-20
P0130	Oxygen sensor (front) system <sensor 1>	13A-21
P0135	Oxygen sensor heater (front) system <sensor 1>	13A-23
P0136	Oxygen sensor (rear) system <sensor 2>	13A-24
P0141	Oxygen sensor heater (rear) system <sensor 2>	13A-26
P0170	Abnormal fuel system	13A-27
P0201	No. 1 injector system	13A-28
P0202	No. 2 injector system	13A-28
P0203	No. 3 injector system	13A-28
P0204	No. 4 injector system	13A-28
P0300★	Ignition coil (power transistor) system	13A-29
P0301	No. 1 cylinder misfire detected	13A-31
P0302	No. 2 cylinder misfire detected	13A-31
P0303	No. 3 cylinder misfire detected	13A-31
P0304	No. 4 cylinder misfire detected	13A-31
P0325	Detonation sensor system	13A-32
P0335	Crank angle sensor system	13A-32
P0340	Camshaft position sensor system	13A-34
P0403	EGR valve system	13A-36
P0420	Catalyst malfunction	13A-37
P0443	Purge control solenoid valve system	13A-38
P0500	Vehicle speed sensor system	13A-39
P0505	Idle speed control system	13A-39
P0510	Idle position switch system	13A-41
P0551	Power steering fluid pressure switch system	13A-42
P1500	Alternator FR terminal system	13A-43
P1610	Immobilizer system	13A-44

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

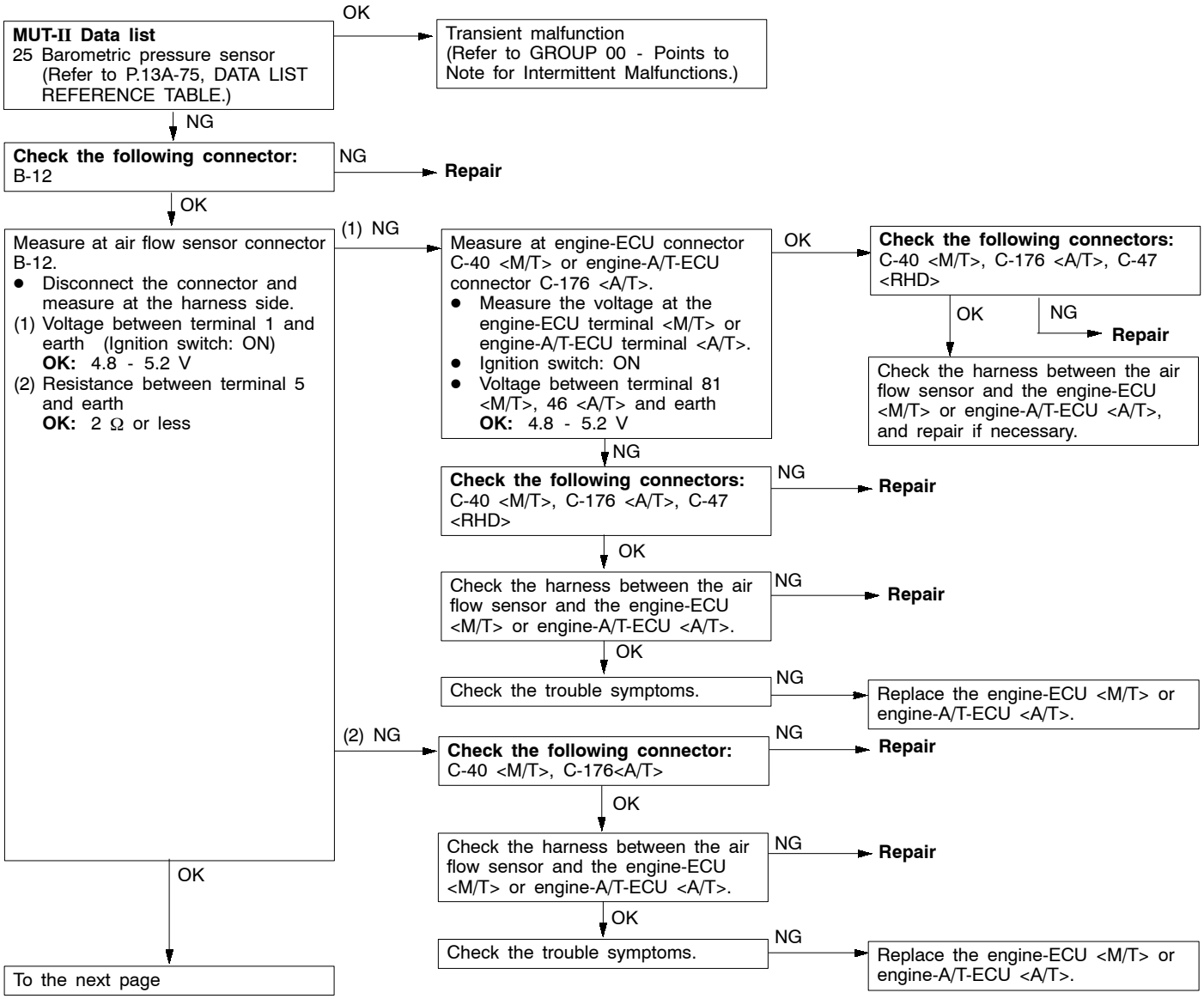
INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

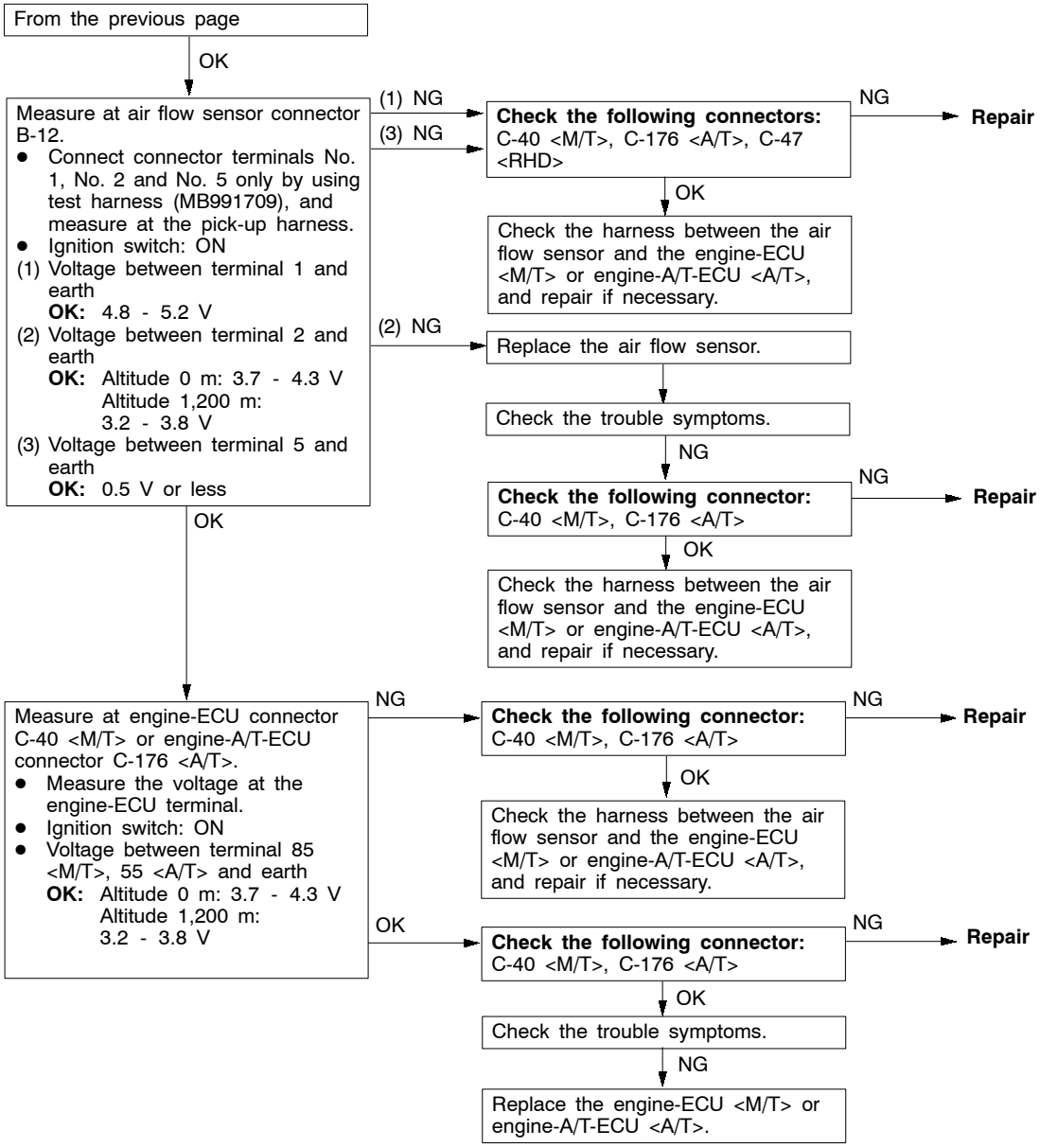
Code No. P0100 Air flow sensor system	Probable cause
Range of Check ● Engine speed: 500 r/min or more Set Conditions ● The sensor output frequency is 3.3 Hz or less for four seconds.	● Malfunction of air flow sensor ● Open or short circuit in air flow sensor circuit or loose connector contact ● Malfunction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



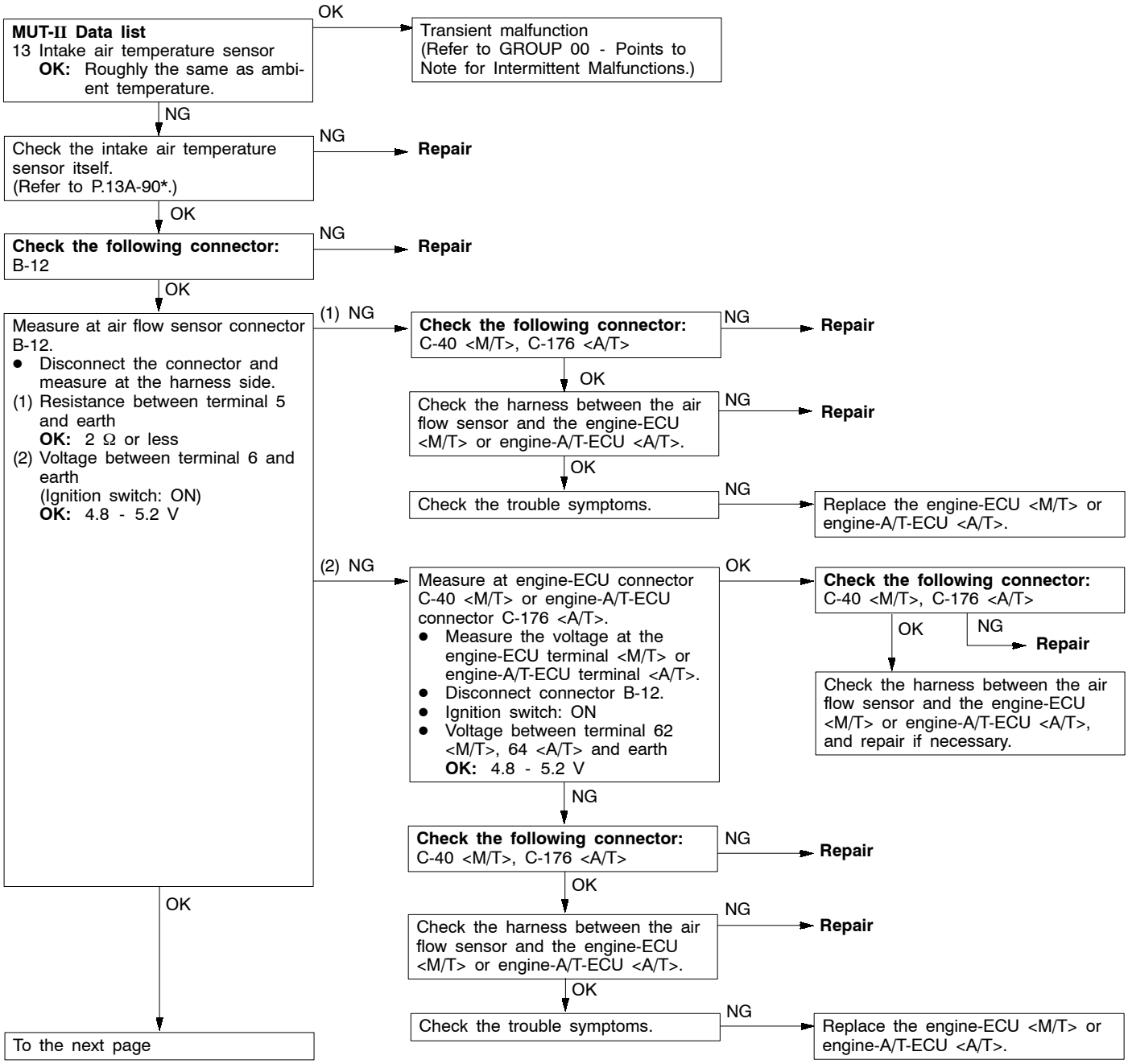

From the previous page
OK
Measure at air flow sensor connector B-12.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Ignition switch: ON
● Voltage between terminal 7 and earth
OK: 7 - 8 V
NG
Check the following connector: C-34 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Replace the air flow sensor.
OK
Measure at air flow sensor connector B-12.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Voltage between terminal 7 and earth
OK: Engine: Idling
0 - 1 V
Engine speed: 3,000 r/min
6 - 9 V
NG
Check the following connector: C-34 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure the output waveform at air flow sensor connector B-12 (by using an analyzer).
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Engine: Idling
● Voltage between terminal 3 and earth
OK: Waveforms should be displayed on P.13A-88 (Inspection Procedure Using an Analyzer) and noise should not be displayed in the waveform.
NG
Replace the air flow sensor.
Check the trouble symptoms.
NG
Check the following connectors: C-40 <M/T>, C-176 <A/T>, C-31
NG
Repair
OK
Check the harnesses between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T> and between the air flow sensor and the engine control relay, and repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

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

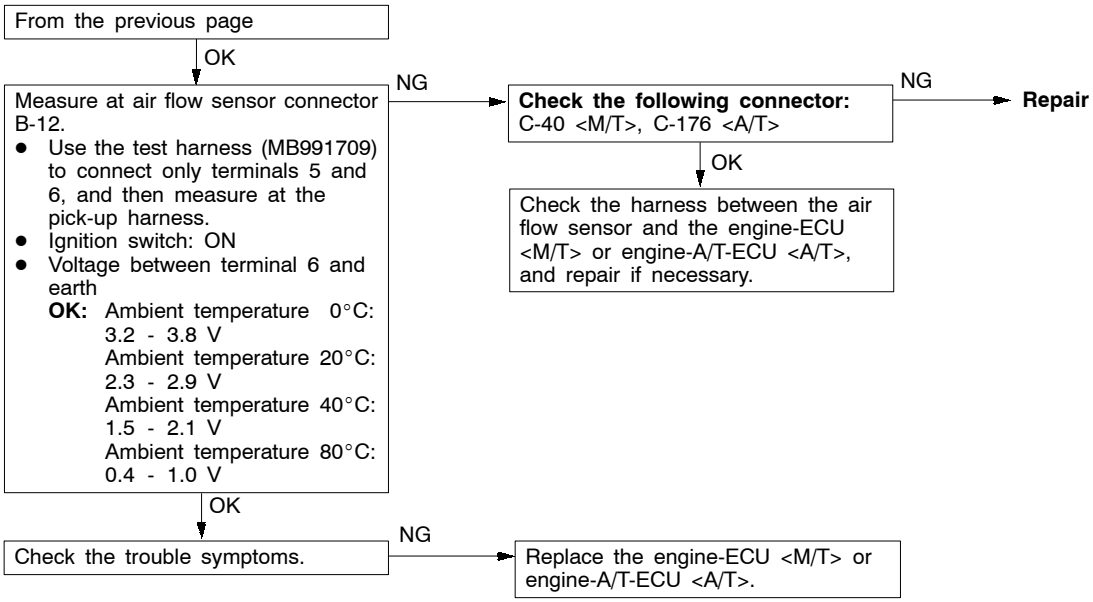



From the previous page
OK
Measure at air flow sensor connector B-12.
● Connect connector terminals No. 1, No. 2 and No. 5 only by using test harness (MB991709), and measure at the pick-up harness.
● Ignition switch: ON
(1) Voltage between terminal 1 and earth
OK: 4.8 - 5.2 V
(2) Voltage between terminal 2 and earth
OK: Altitude 0 m: 3.7 - 4.3 V
Altitude 1,200 m: 3.2 - 3.8 V
(3) Voltage between terminal 5 and earth
OK: 0.5 V or less
(1) NG
(3) NG
Check the following connectors:
C-40 <M/T>, C-176 <A/T>, C-47 <RHD>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Replace the air flow sensor.
Check the trouble symptoms.
NG
Check the following connector:
C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-40 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal.
● Ignition switch: ON
● Voltage between terminal 85 <M/T>, 55 <A/T> and earth
OK: Altitude 0 m: 3.7 - 4.3 V
Altitude 1,200 m: 3.2 - 3.8 V
NG
Check the following connector:
C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connector:
C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

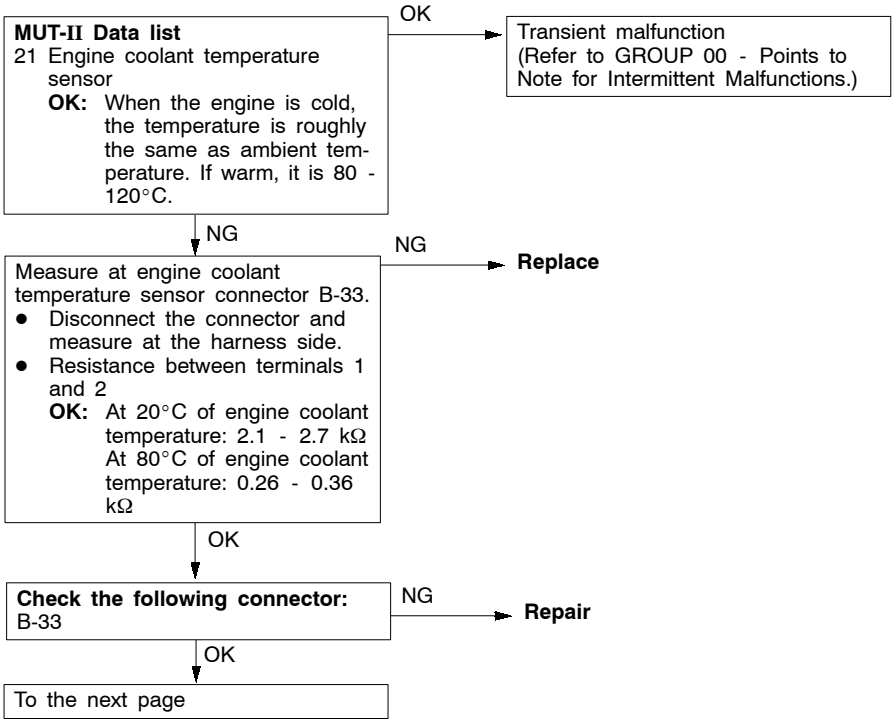
Code No. P0110 Intake air temperature sensor system	Probable cause
Range of Check ● Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. Set Conditions ● The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of intake air temperature) or ● The sensor output voltage is 0.2 V or more for four seconds (equivalent to 125°C of intake air temperature)	● Malfunction of intake air temperature sensor ● Open or short circuit in intake air temperature sensor or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>

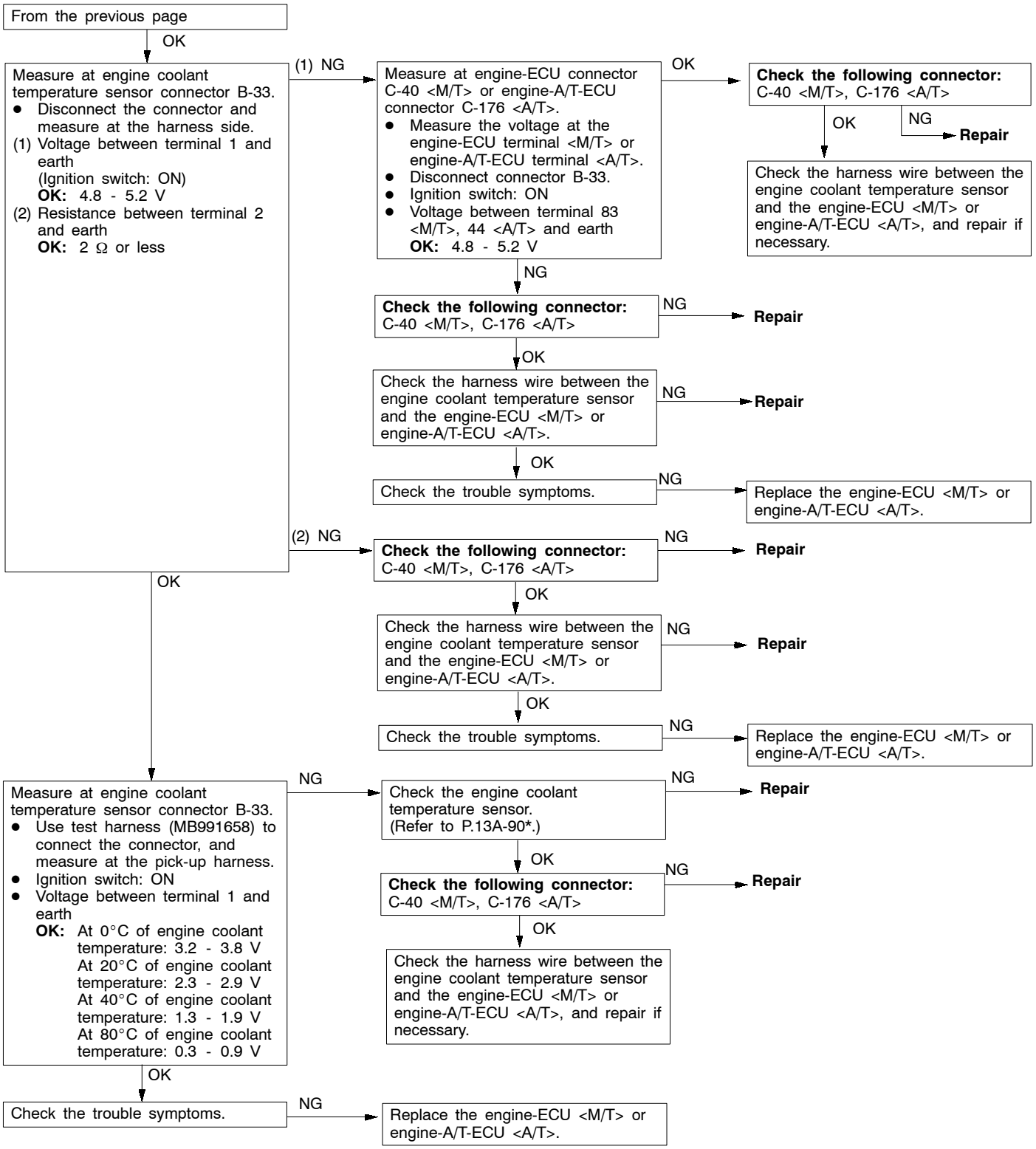


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)


From the previous page
OK
Measure at air flow sensor connector B-12.
● Use the test harness (MB991709) to connect only terminals 5 and 6, and then measure at the pick-up harness.
● Ignition switch: ON
● Voltage between terminal 6 and earth
OK: Ambient temperature 0°C: 3.2 - 3.8 V
Ambient temperature 20°C: 2.3 - 2.9 V
Ambient temperature 40°C: 1.5 - 2.1 V
Ambient temperature 80°C: 0.4 - 1.0 V
NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

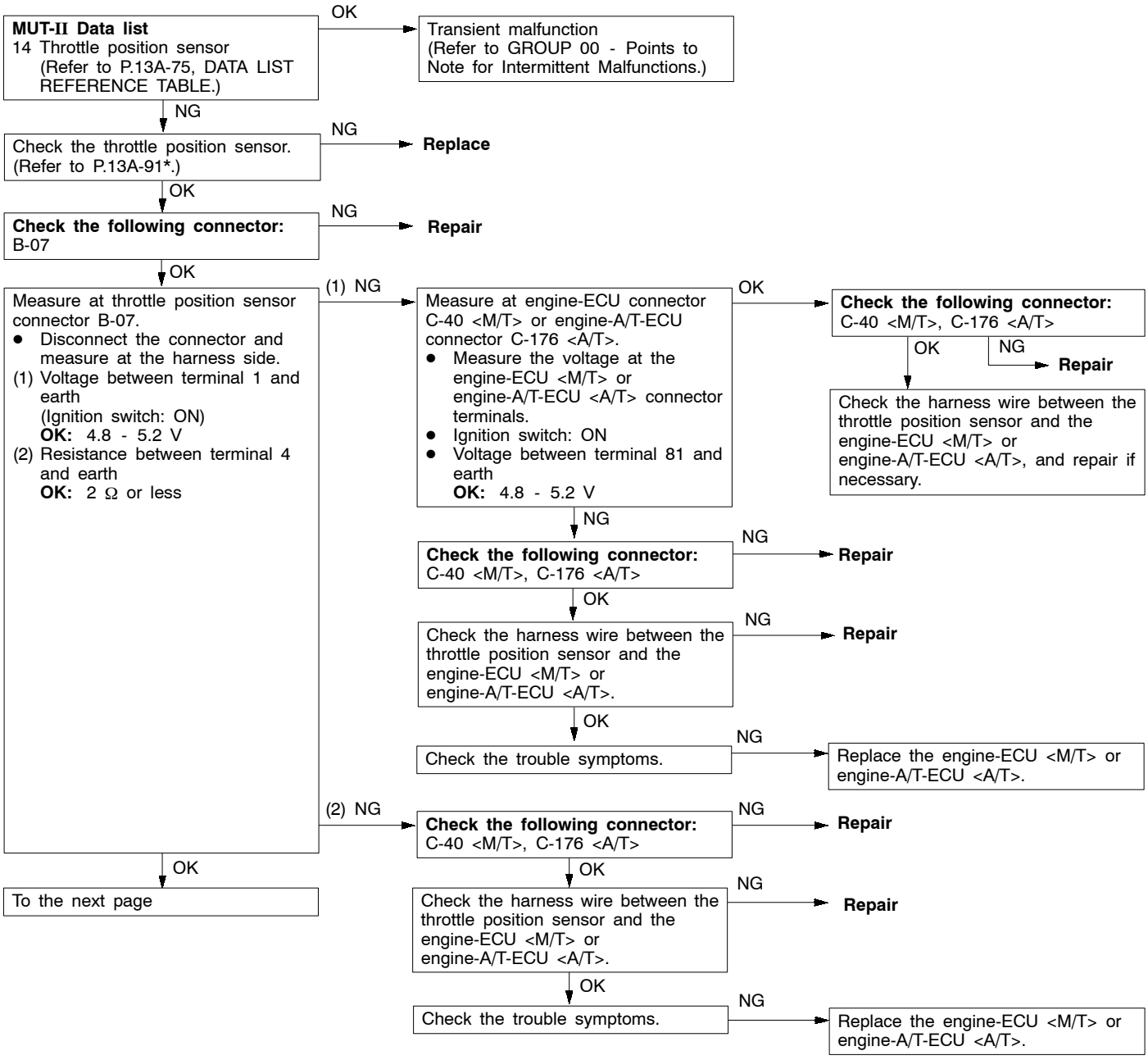
Code No. P0115 Engine coolant temperature sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C or lower of engine coolant temperature) or ● The sensor output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



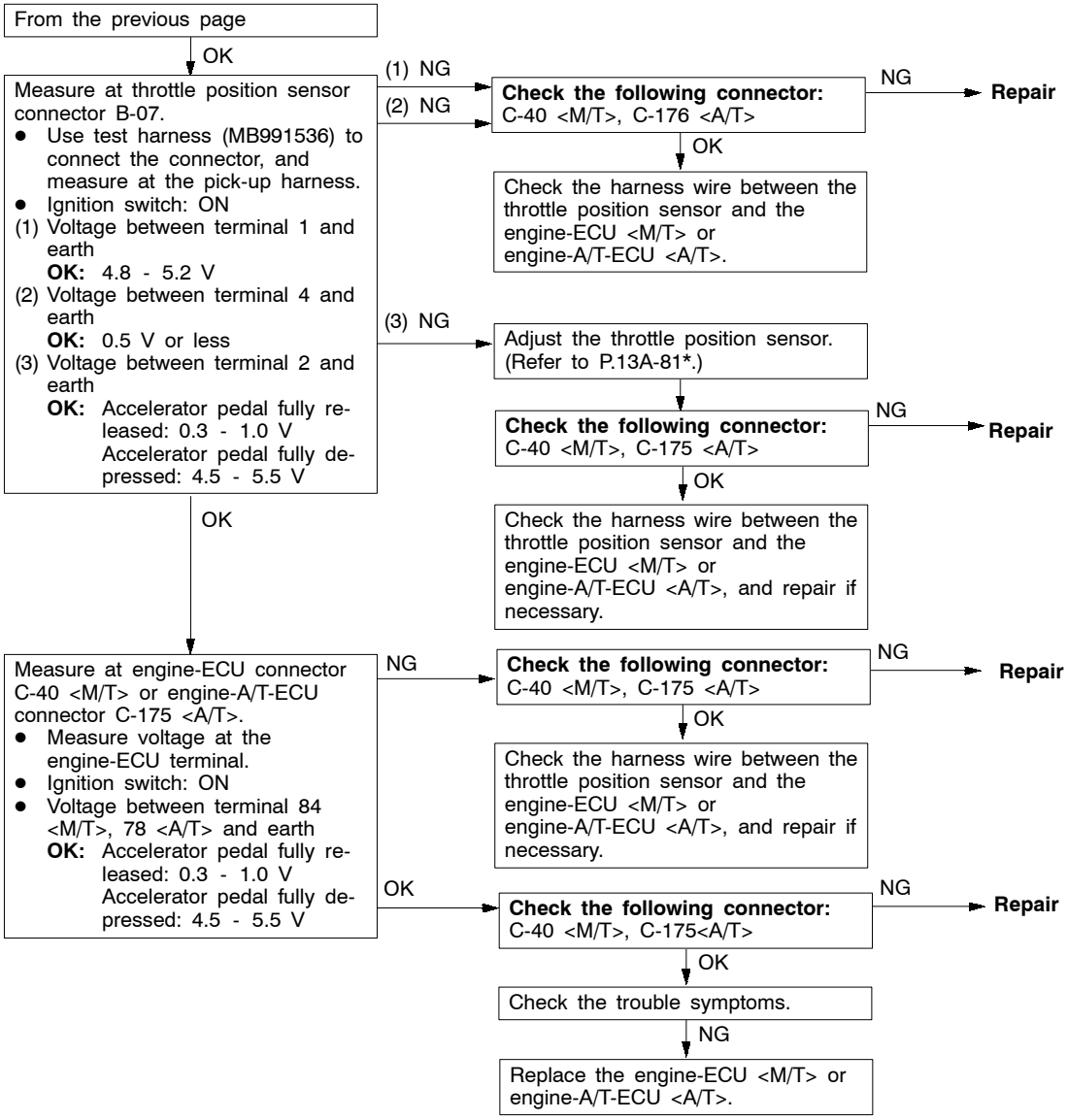


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0120 Throttle position sensor system	Probable cause
Range of Check • Excluding two seconds after the ignition switch is turned ON or immediately after the engine starts. Set Conditions • When the idle position switch is ON, the sensor output voltage is 2 V or more for 4 seconds or • The sensor output voltage is 0.2 V or less for 4 seconds	• Malfunction of throttle position sensor • Improper connector contact, open circuit or short-circuited harness wire • Improper "ON" state of idle position switch • Short circuit of the idle position switch signal line • Malfunction of engine-ECU <M/T> • Malfunction of engine-A/T-ECU <A/T>

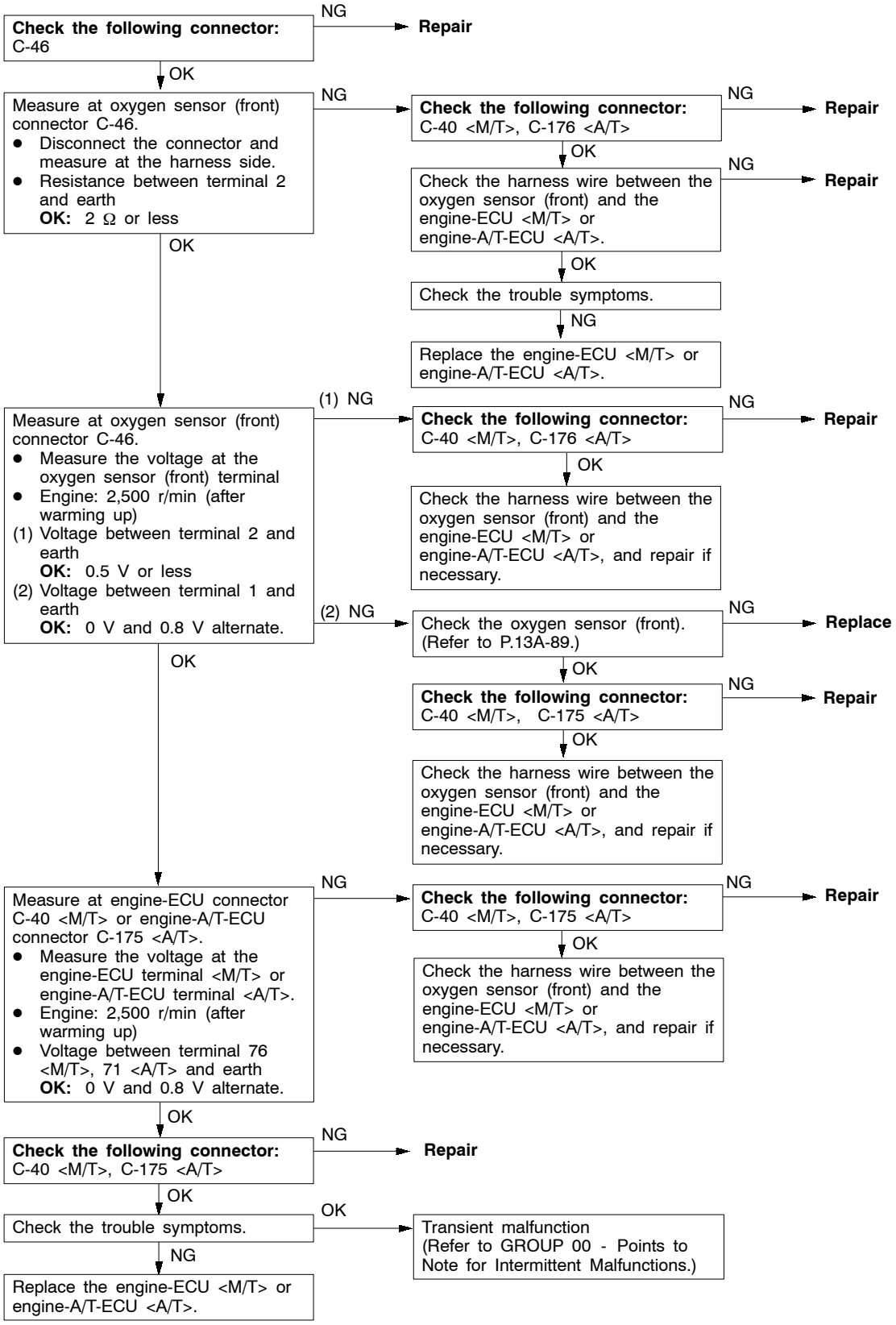


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

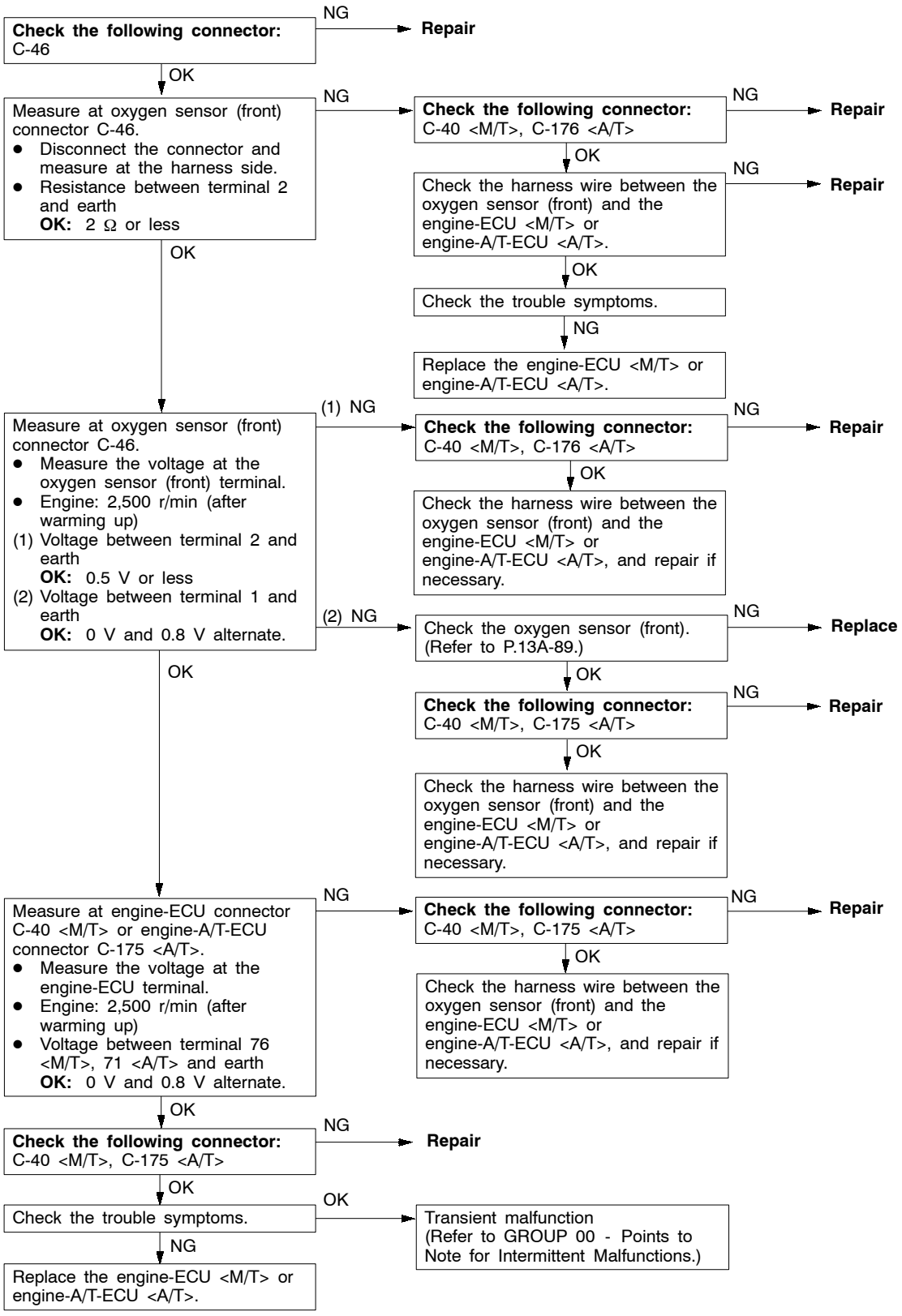


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

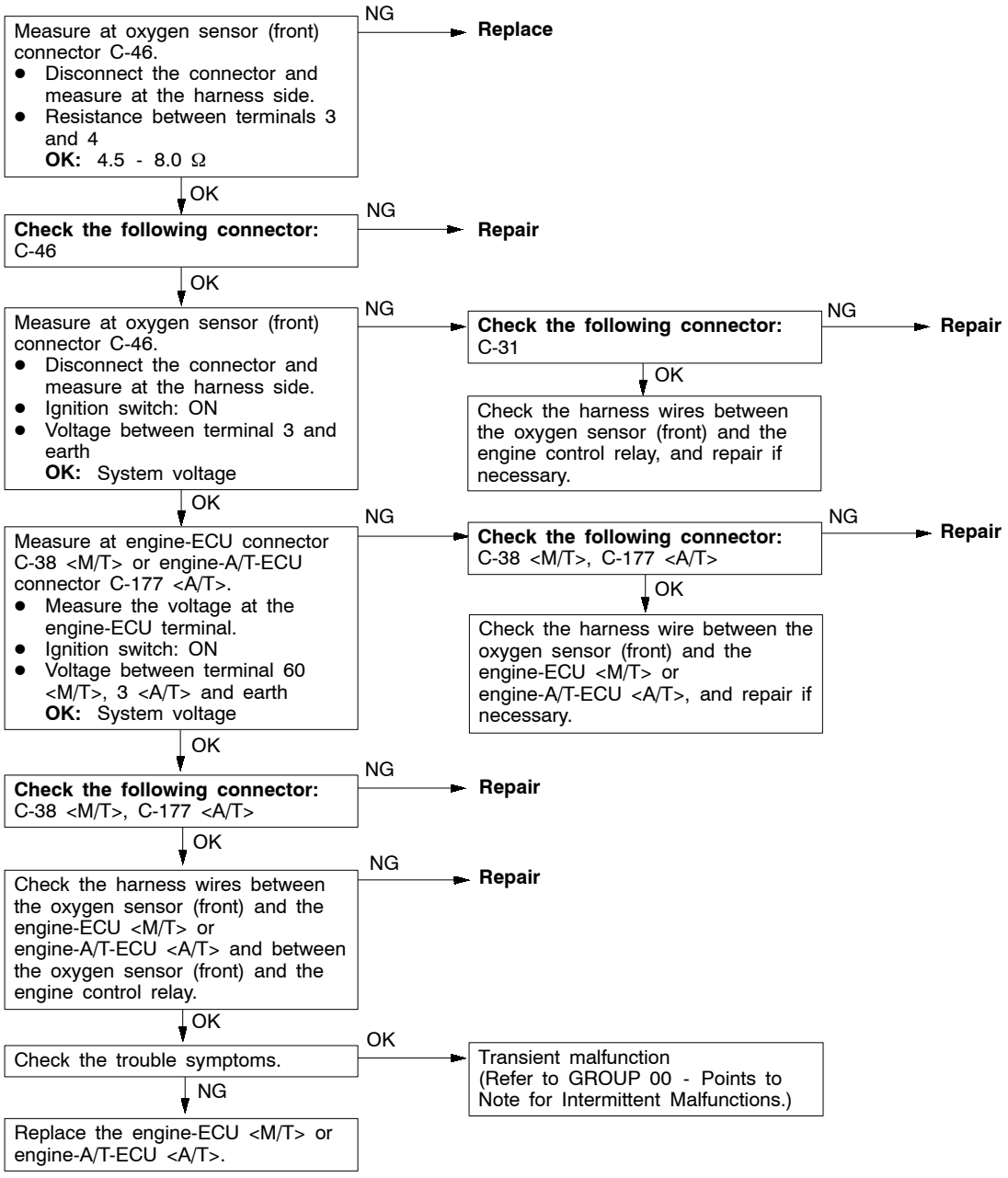
Code No. P0125 Feedback system	Probable cause
Range of Check ● The engine coolant temperature is approx. 80°C or more. ● During stoichiometric feedback control ● The vehicle is not being decelerated. Set Conditions ● Oxygen sensor (front) output voltage has been higher or lower than 0.5 V for at least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



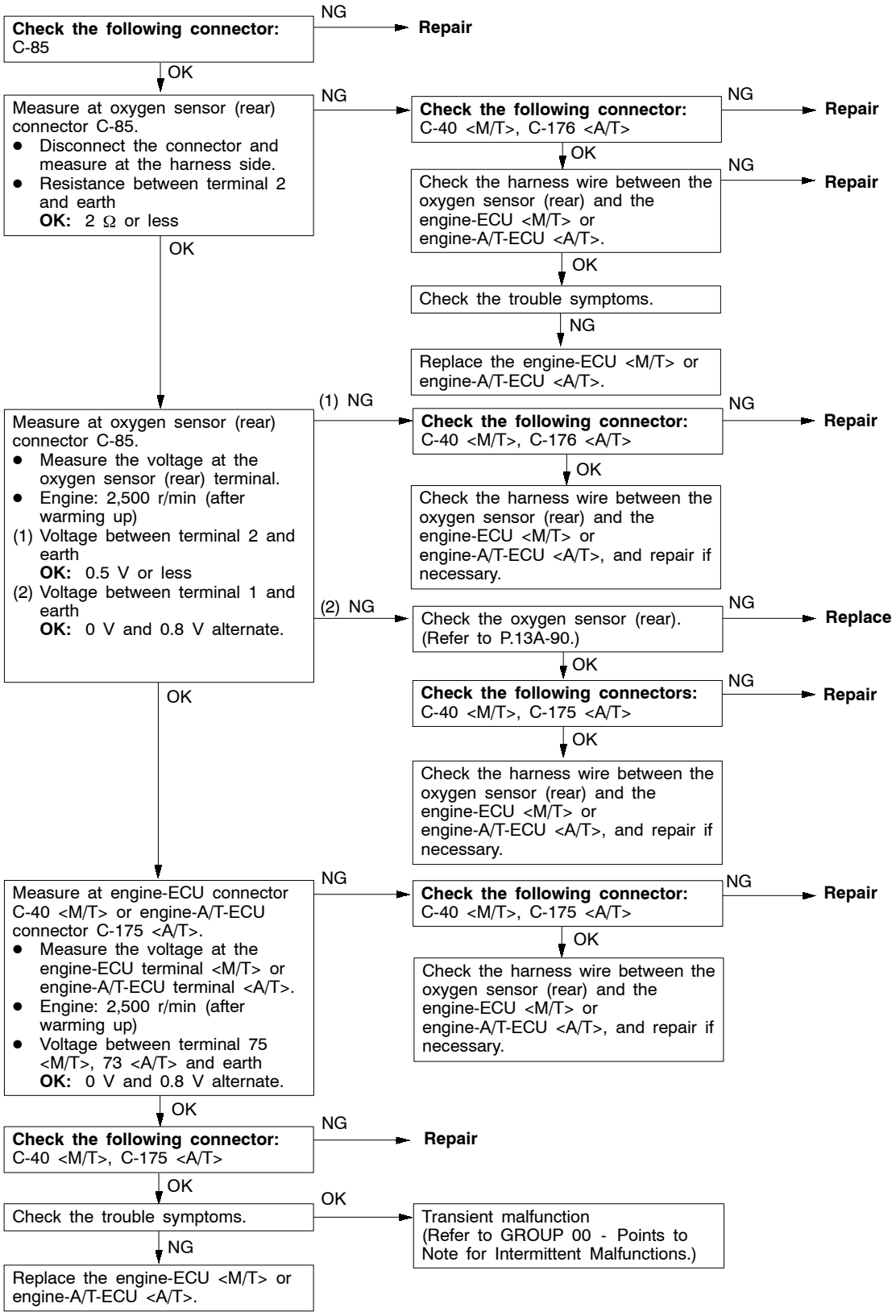
Code No. P0130 Oxygen sensor (front) system <sensor 1>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Engine speed is 1,200 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The oxygen sensor (front) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the oxygen sensor (front) inside the engine-ECU.	● Malfunction of oxygen sensor (front) ● Open or short circuit in the oxygen sensor (front) circuit or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>
Range of Check ● Engine speed is 2,800 r/min or less ● During driving ● During air/fuel ratio feedback control Set Conditions ● The oxygen sensor (front) output frequency is six or less per 10 seconds on average.	


Check the following connector: C-46
NG
Repair
OK
Measure at oxygen sensor (front) connector C-46.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 2 and earth
OK: 2 Ω or less
NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure at oxygen sensor (front) connector C-46.
● Measure the voltage at the oxygen sensor (front) terminal.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 2 and earth
OK: 0.5 V or less
(2) Voltage between terminal 1 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Check the oxygen sensor (front). (Refer to P.13A-89.)
NG
Replace
OK
Check the following connector: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-40 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 76 <M/T>, 71 <A/T> and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connector: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

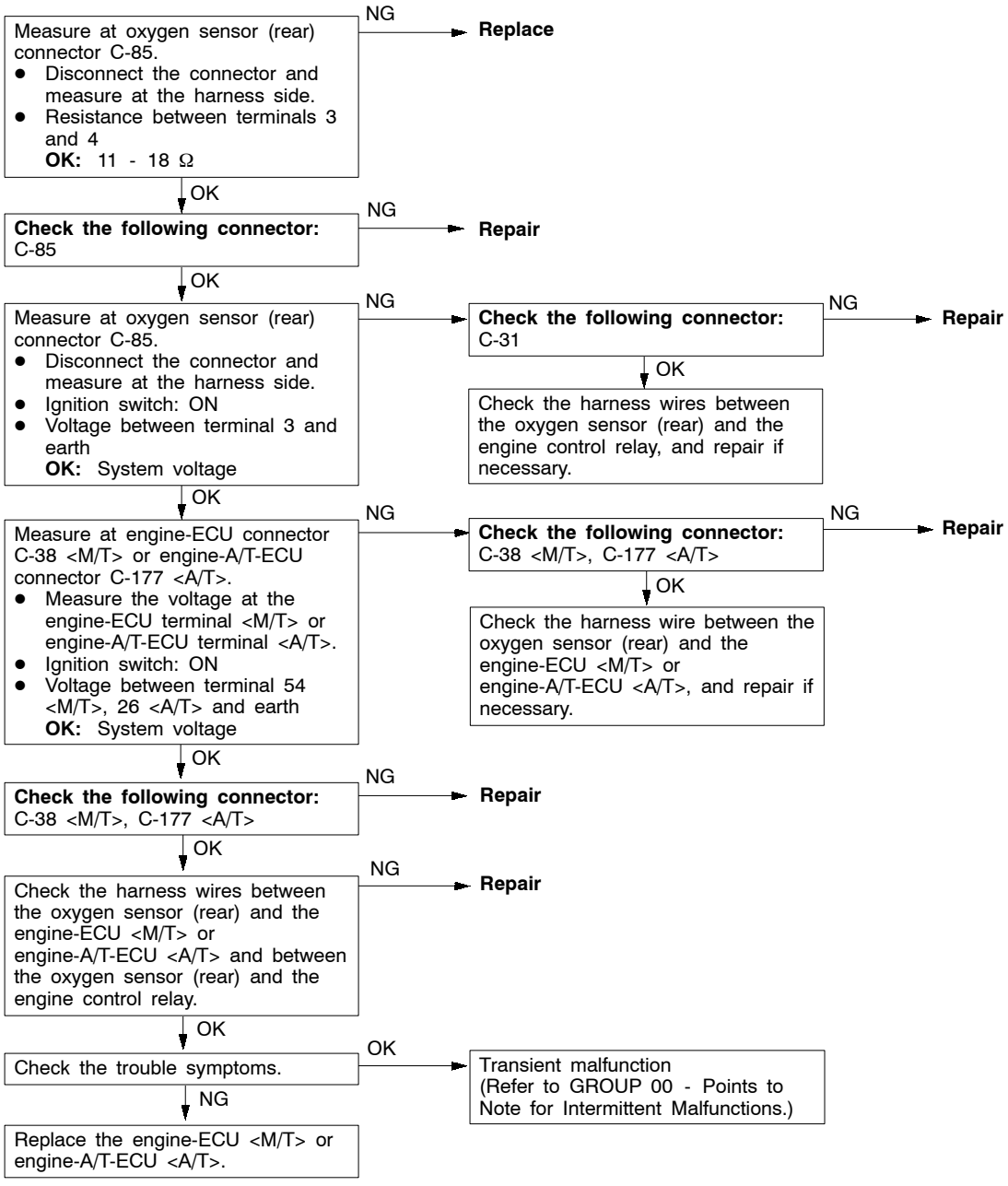
Code No. P0135 Oxygen sensor heater (front) system <sensor 1>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (front) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which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



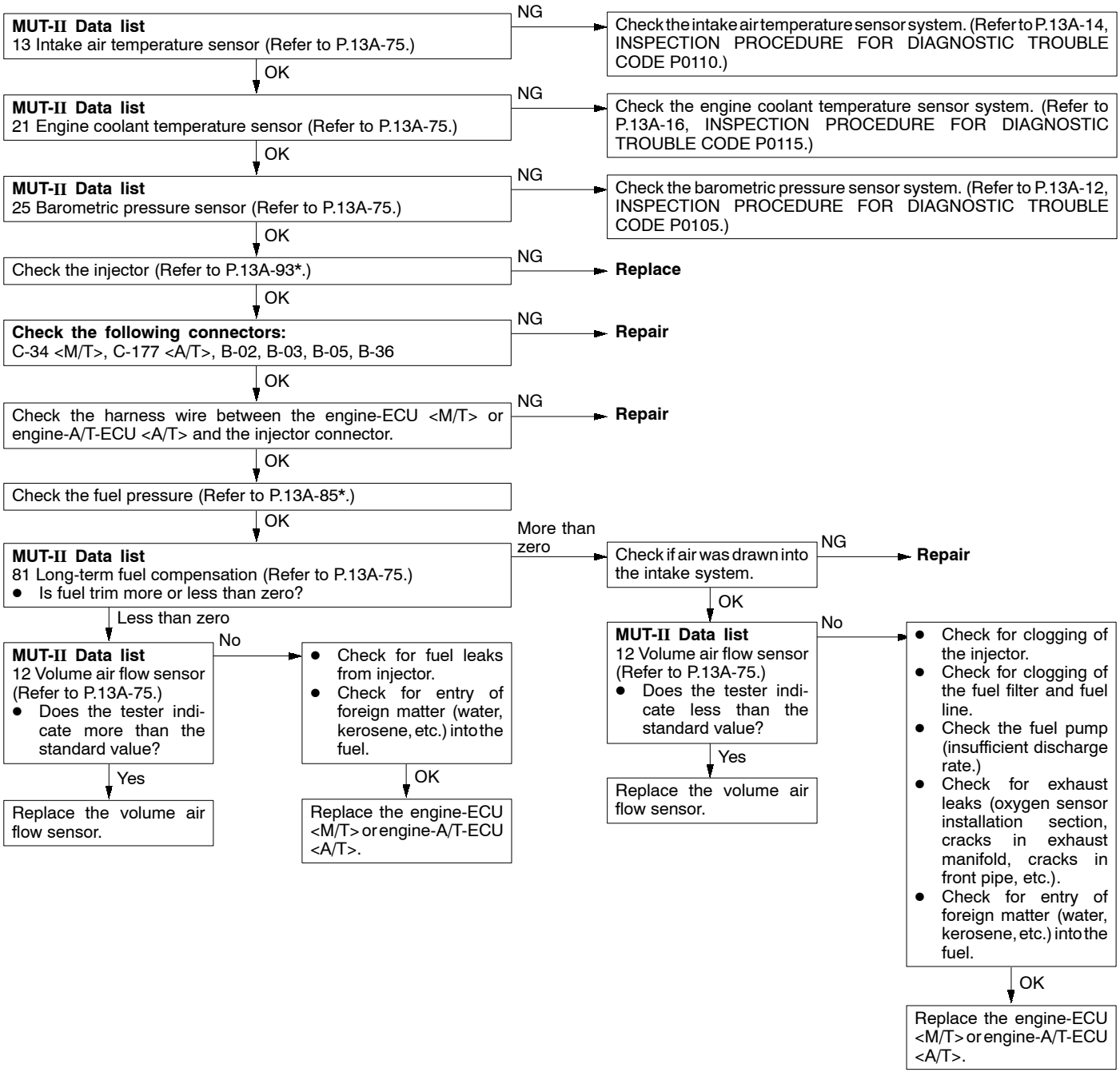
Code No. P0136 Oxygen sensor (rear) system <sensor 2>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Engine speed is 1,200 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The oxygen sensor (rear) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the oxygen sensor (rear) inside the engine-ECU <M/T> or engine-A/T-ECU <A/T>.	● Malfunction of oxygen sensor (rear) ● Open or short circuit in the oxygen sensor (rear) circuit or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>


Check the following connector: C-85
NG
Repair
OK
Measure at oxygen sensor (rear) connector C-85.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 2 and earth
OK: 2 Ω or less
NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure at oxygen sensor (rear) connector C-85.
● Measure the voltage at the oxygen sensor (rear) terminal.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 2 and earth
OK: 0.5 V or less
(2) Voltage between terminal 1 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Check the oxygen sensor (rear). (Refer to P.13A-90.)
NG
Replace
OK
Check the following connectors: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-40 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 75 <M/T>, 73 <A/T> and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connector: C-40 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

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



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



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0201 No. 1 injector system Code No. P0202 No. 2 injector system Code No. P0203 No. 3 injector system Code No. P0204 No. 4 injector system	Probable cause
Range of Check ● Engine speed is approx. 50 - 1,000 r/min ● The throttle position sensor output voltage is 1.15 V or less. ● Actuator test by MUT-II is not carried out. Set Conditions ● Surge voltage of injector coil is not detected for 4 seconds.	● Malfunction of the injector ● Improper connector contact, open circuit or short-circuited harness wire of the injector circuit ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>

MUT-II Actuator Test
01 No. 1 injector
02 No. 2 injector
03 No. 3 injector
04 No. 4 injector
OK: The idling condition should change

OK → Intermittent malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)

NG ↓

Check the following connectors:
B-02, B-03, B-05, B-36

NG → **Repair**

OK ↓

Check the injector. (Refer to P.13A-93*.)

NG → **Replace**

OK ↓

Measure at the injector connector B-02, B-03, B-05, B-36.
- Disconnect the connector, and measure at the harness side.
- Voltage between 1 and earth (Ignition switch: ON)
  OK: System voltage

NG → Check the harness wire between the engine control relay and the injector connector, and repair if necessary.

OK ↓

Check the following connector: C-34 <M/T>, C-177 <A/T>

NG → **Repair**

OK ↓

Measure at the engine-ECU connector C-34 <M/T> or engine-A/T-ECU connector C-177<A/T>.
- Disconnect the connector, and measure at the harness side.
- Voltage between 1, 2, 14, 15 and earth (Ignition switch: ON) <M/T>
- Voltage between 1, 2, 9, 24 and earth (Ignition switch: ON) <A/T>
  OK: System voltage

NG → Check the harness wire between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the injector connector, and repair if necessary.

OK ↓

Check trouble symptoms.

NG ↓

Use an analyzer to measure the signal waveform at injector connector B-02, B-03, B-05, B-36.
- Use a test harness (MB991348) to connect the connector, and measure at the pick-up harness side.
- Engine: Idling
- The voltage between terminal 2 and earth
  OK: A normal waveform should be displayed as described on P.13A-88 (INSPECTION PROCEDURE USING AN ANALYZER).

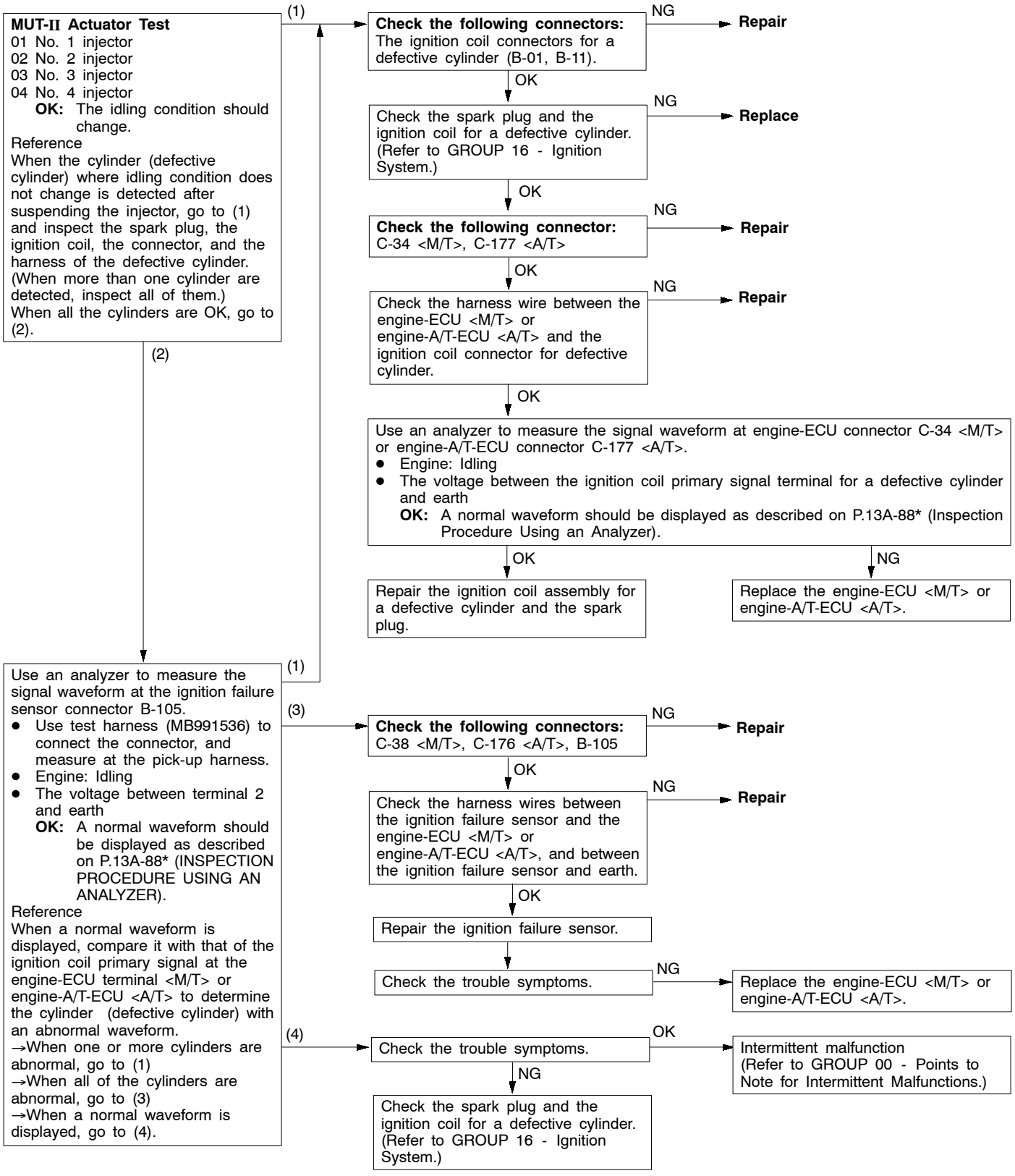
OK → Intermittent malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)

NG ↓

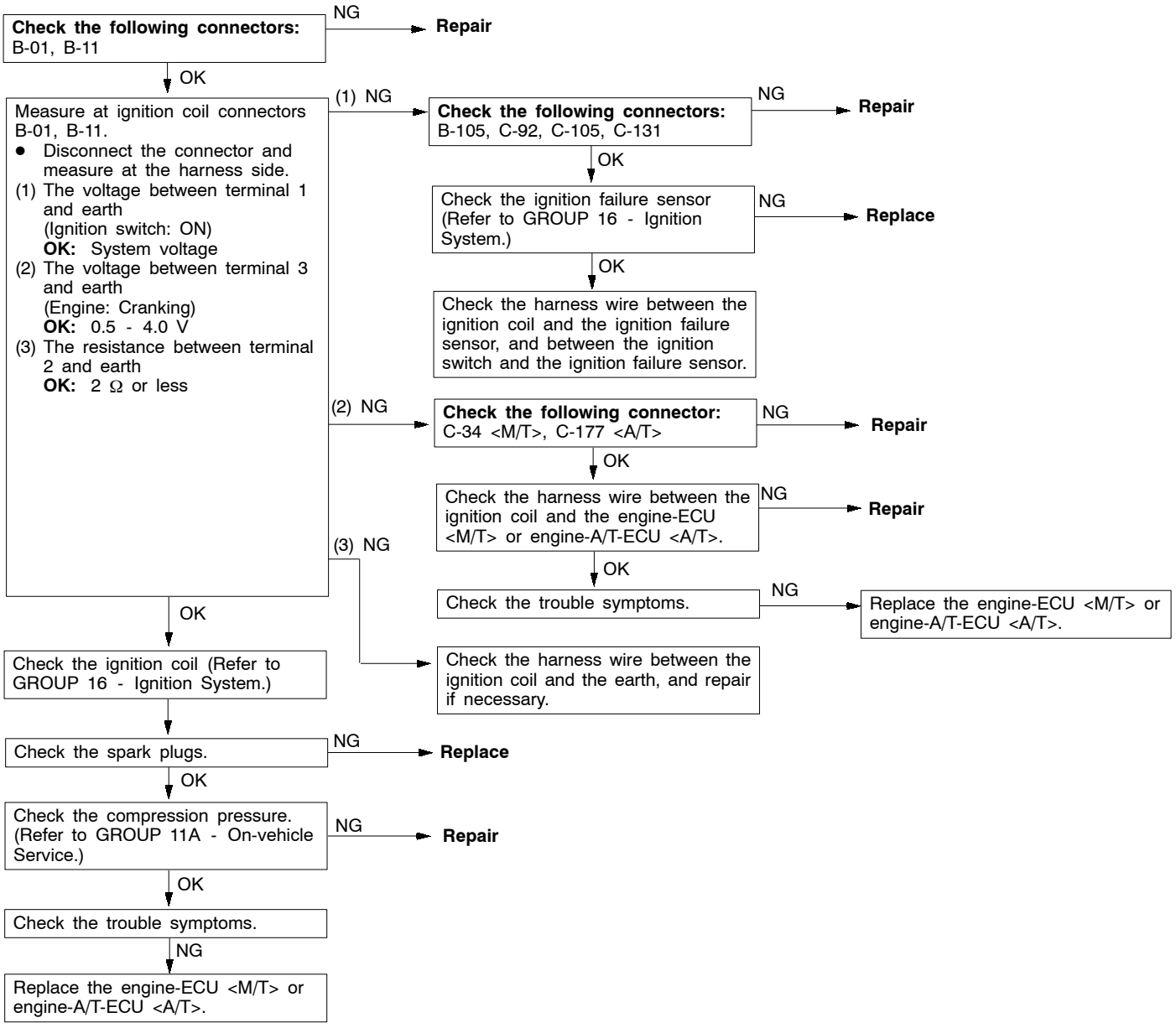
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

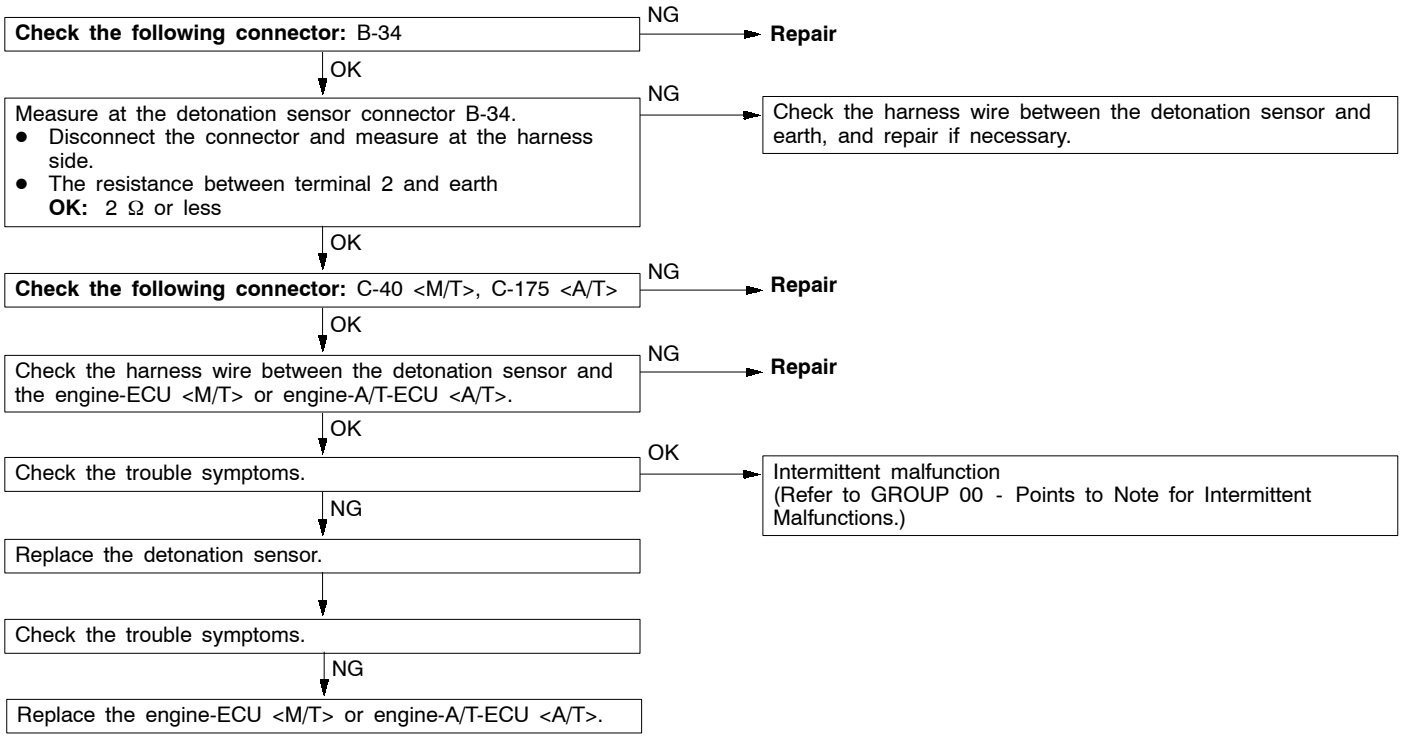
Code No. P0300 Ignition coil (power transistor) system	Probable cause
Range of Check ● Engine speed is approx. 50 - 4,000 r/min. ● Engine is not cranking. Set Conditions ● The ignition failure sensor does not send a signal about a certain cylinder for four seconds.	● Malfunction of the ignition coil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


MUT-II Actuator Test
01 No. 1 injector
02 No. 2 injector
03 No. 3 injector
04 No. 4 injector
OK: The idling condition should change.
Reference
When the cylinder (defective cylinder) where idling condition does not change is detected after suspending the injector, go to (1) and inspect the spark plug, the ignition coil, the connector, and the harness of the defective cylinder. (When more than one cylinder are detected, inspect all of them.)
When all the cylinders are OK, go to (2).
(1)
Check the following connectors:
The ignition coil connectors for a defective cylinder (B-01, B-11).
NG
Repair
OK
Check the spark plug and the ignition coil for a defective cylinder. (Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Check the following connector:
C-34 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness wire between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the ignition coil connector for defective cylinder.
NG
Repair
OK
Use an analyzer to measure the signal waveform at engine-ECU connector C-34 <M/T> or engine-A/T-ECU connector C-177 <A/T>.
Engine: Idling
The voltage between the ignition coil primary signal terminal for a defective cylinder and earth
OK: A normal waveform should be displayed as described on P.13A-88* (Inspection Procedure Using an Analyzer).
OK
NG
Repair the ignition coil assembly for a defective cylinder and the spark plug.
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(2)
Use an analyzer to measure the signal waveform at the ignition failure sensor connector B-105.
Use test harness (MB991536) to connect the connector, and measure at the pick-up harness.
Engine: Idling
The voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13A-88* (INSPECTION PROCEDURE USING AN ANALYZER).
Reference
When a normal waveform is displayed, compare it with that of the ignition coil primary signal at the engine-ECU terminal <M/T> or engine-A/T-ECU <A/T> to determine the cylinder (defective cylinder) with an abnormal waveform.
→When one or more cylinders are abnormal, go to (1)
→When all of the cylinders are abnormal, go to (3)
→When a normal waveform is displayed, go to (4).
(1)
(3)
Check the following connectors:
C-38 <M/T>, C-176 <A/T>, B-105
NG
Repair
OK
Check the harness wires between the ignition failure sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and between the ignition failure sensor and earth.
NG
Repair
OK
Repair the ignition failure sensor.
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(4)
Check the trouble symptoms.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check the spark plug and the ignition coil for a defective cylinder. (Refer to GROUP 16 - Ignition System.)

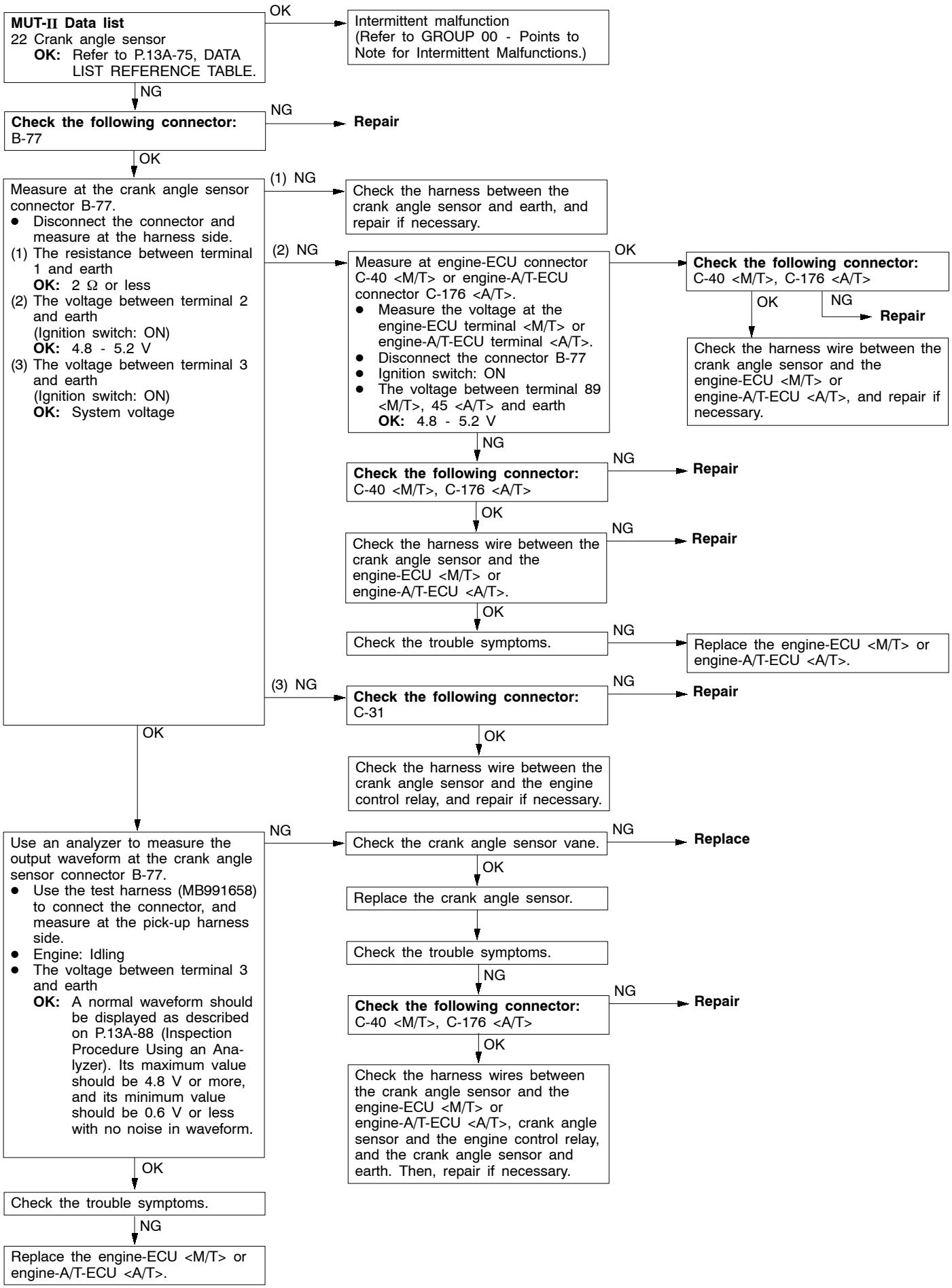
Code No. P0301 No. 1 cylinder misfire detected Code No. P0302 No. 2 cylinder misfire detected Code No. P0303 No. 3 cylinder misfire detected Code No. P0304 No. 4 cylinder misfire detected	Probable cause
Range of Check ● The engine speed is 500 - 4,500 r/min. ● While the engine is running except deceleration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



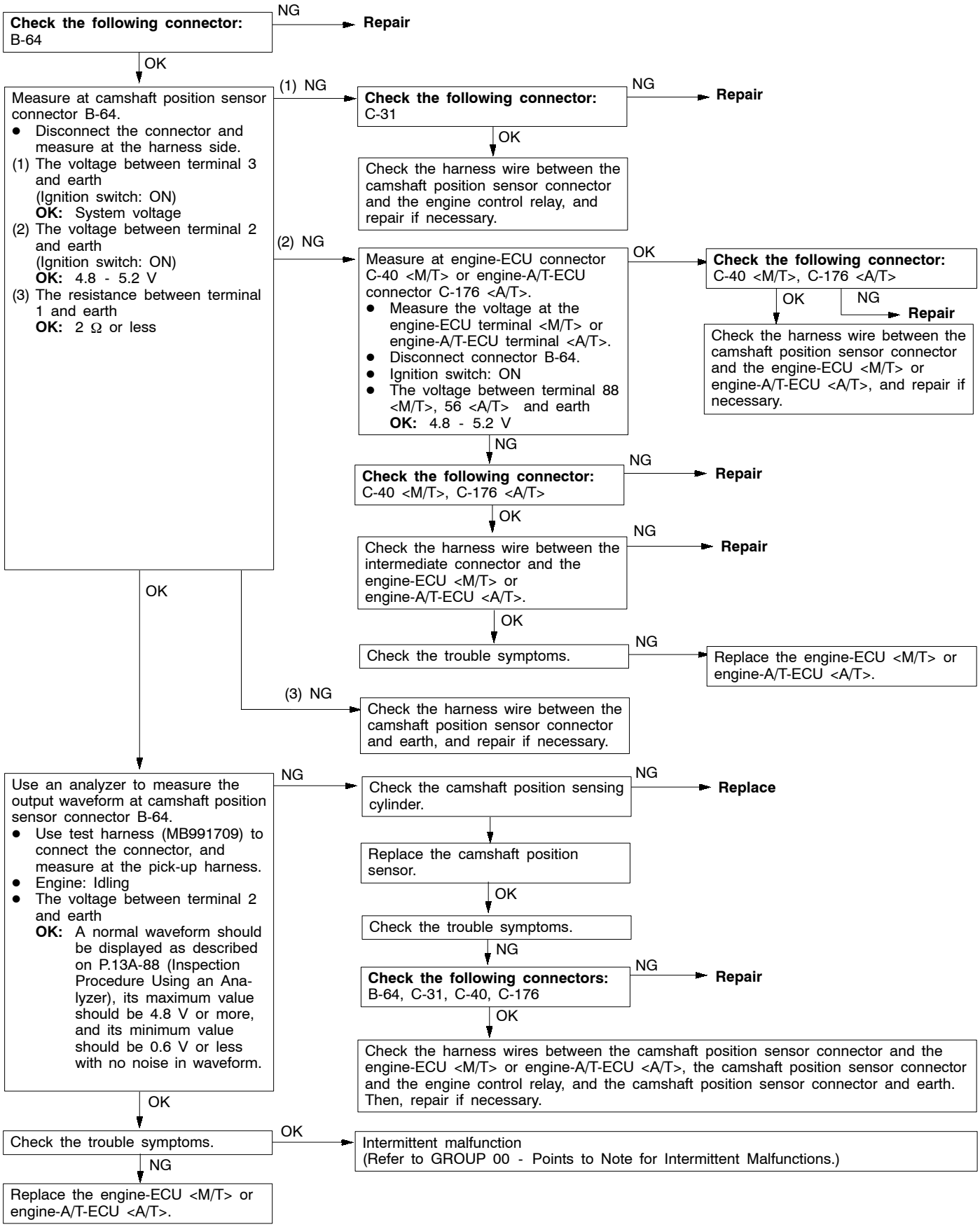
Code No. P0325 Detonation sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● Changes in sensor output voltage (detonation sensor peak voltage per 1/2 crankshaft rotation) in 200 consecutive cycles are 0.06 V or less.	● Malfunction of the detonation sensor ● Open or short circuit in the detonation sensor circuit or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>



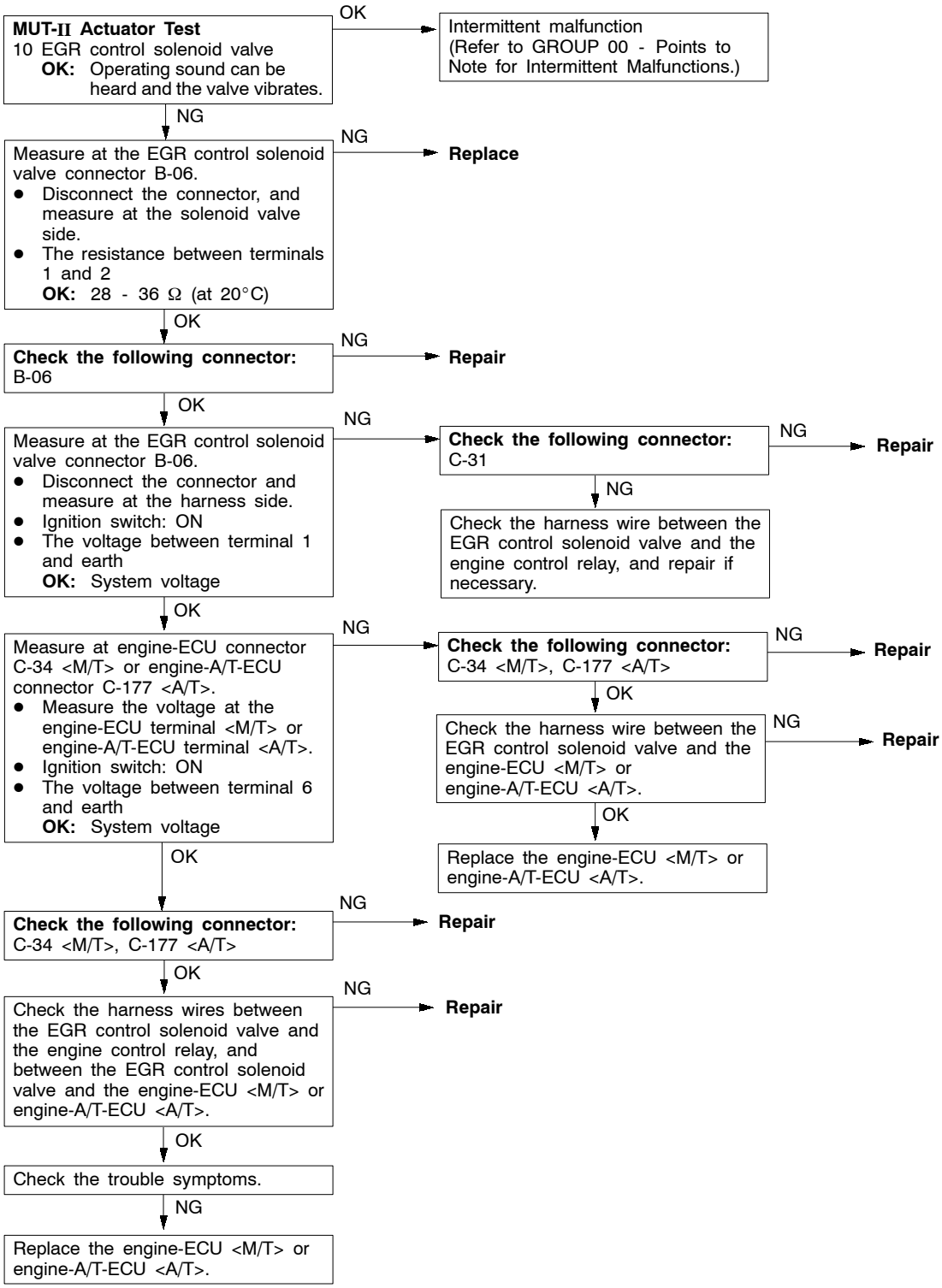
Code No. P0335 Crank angle sensor system	Probable cause
Range of Check ● Engine is cranking Set Conditions ● Sensor output voltage does not change for 4 seconds (no pulse signal input).	● Malfunction of the crank angle sensor. ● Open or short circuit in the crank angle sensor circuit or loose connector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


MUT-II Data list
22 Crank angle sensor
OK: Refer to P.13A-75, DATA LIST REFERENCE TABLE.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check the following connector:
B-77
NG
Repair
OK
Measure at the crank angle sensor connector B-77.
● Disconnect the connector and measure at the harness side.
(1) The resistance between terminal 1 and earth
OK: 2 Ω or less
(2) The voltage between terminal 2 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) The voltage between terminal 3 and earth
(Ignition switch: ON)
OK: System voltage
(1) NG
Check the harness between the crank angle sensor and earth, and repair if necessary.
(2) NG
Measure at engine-ECU connector C-40 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Disconnect the connector B-77
● Ignition switch: ON
● The voltage between terminal 89 <M/T>, 45 <A/T> and earth
OK: 4.8 - 5.2 V
OK
Check the following connector:
C-40 <M/T>, C-176 <A/T>
OK
NG
Repair
Check the harness wire between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connector:
C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(3) NG
Check the following connector:
C-31
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine control relay, and repair if necessary.
OK
Use an analyzer to measure the output waveform at the crank angle sensor connector B-77.
● Use the test harness (MB991658) to connect the connector, and measure at the pick-up harness side.
● Engine: Idling
● The voltage between terminal 3 and earth
OK: A normal waveform should be displayed as described on P.13A-88 (Inspection Procedure Using an Analyzer). Its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.
NG
Check the crank angle sensor vane.
NG
Replace
OK
Replace the crank angle sensor.
Check the trouble symptoms.
NG
Check the following connector:
C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wires between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, crank angle sensor and the engine control relay, and the crank angle sensor and earth. Then, repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

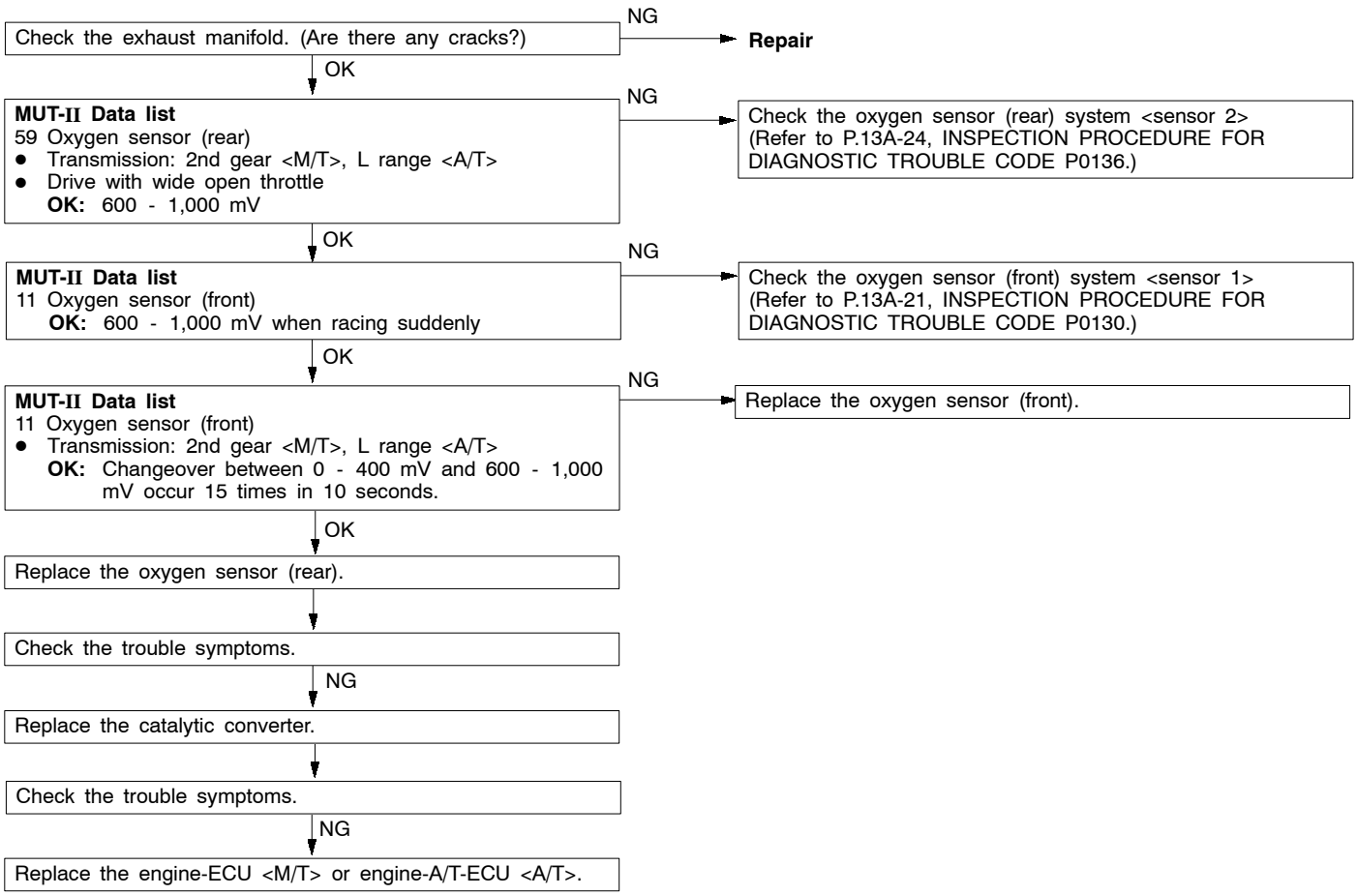
Code No. P0340 Camshaft position sensor system	Probable cause
Range of Check ● Ignition switch: ON ● Engine speed: 50 r/min or more Set Conditions ● The sensor output voltage does not change for 4 seconds (no pulse signal input).	● Malfunction of the camshaft position sensor ● Open or short circuit in the camshaft position sensor circuit or loose connector contact. ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>


Check the following connector: B-64
NG
Repair
OK
Measure at camshaft position sensor connector B-64.
● Disconnect the connector and measure at the harness side.
(1) The voltage between terminal 3 and earth (Ignition switch: ON)
OK: System voltage
(2) The voltage between terminal 2 and earth (Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) The resistance between terminal 1 and earth
OK: 2 Ω or less
(1) NG
Check the following connector: C-31
NG
Repair
OK
Check the harness wire between the camshaft position sensor connector and the engine control relay, and repair if necessary.
(2) NG
Measure at engine-ECU connector C-40 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Disconnect connector B-64.
● Ignition switch: ON
● The voltage between terminal 88 <M/T>, 56 <A/T> and earth
OK: 4.8 - 5.2 V
OK
Check the following connector: C-40 <M/T>, C-176 <A/T>
OK
NG
Repair
Check the harness wire between the camshaft position sensor connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connector: C-40 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the intermediate connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(3) NG
Check the harness wire between the camshaft position sensor connector and earth, and repair if necessary.
OK
Use an analyzer to measure the output waveform at camshaft position sensor connector B-64.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Engine: Idling
● The voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13A-88 (Inspection Procedure Using an Analyzer), its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.
NG
Check the camshaft position sensing cylinder.
NG
Replace
Replace the camshaft position sensor.
OK
Check the trouble symptoms.
NG
Check the following connectors: B-64, C-31, C-40, C-176
NG
Repair
OK
Check the harness wires between the camshaft position sensor connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the camshaft position sensor connector and the engine control relay, and the camshaft position sensor connector and earth. Then, repair if necessary.
OK
Check the trouble symptoms.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

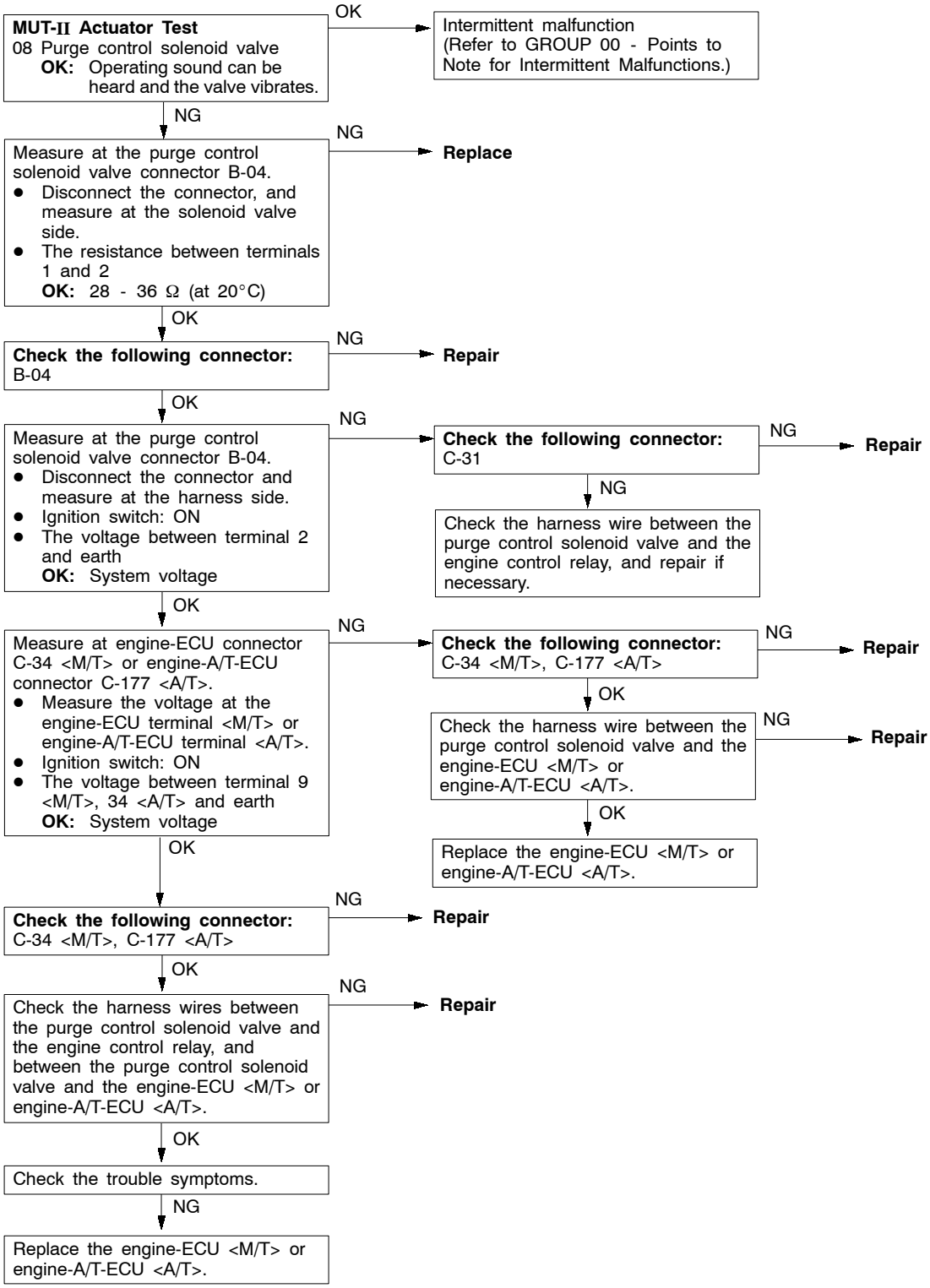
Code No. P0403 EGR control solenoid valve system	Probable cause
Range of Check ● Ignition switch: ON ● Battery voltage is 10 V or more. Set Conditions ● The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	● Malfunction of the EGR control solenoid valve ● Open or short circuit in the EGR control solenoid valve circuit or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>



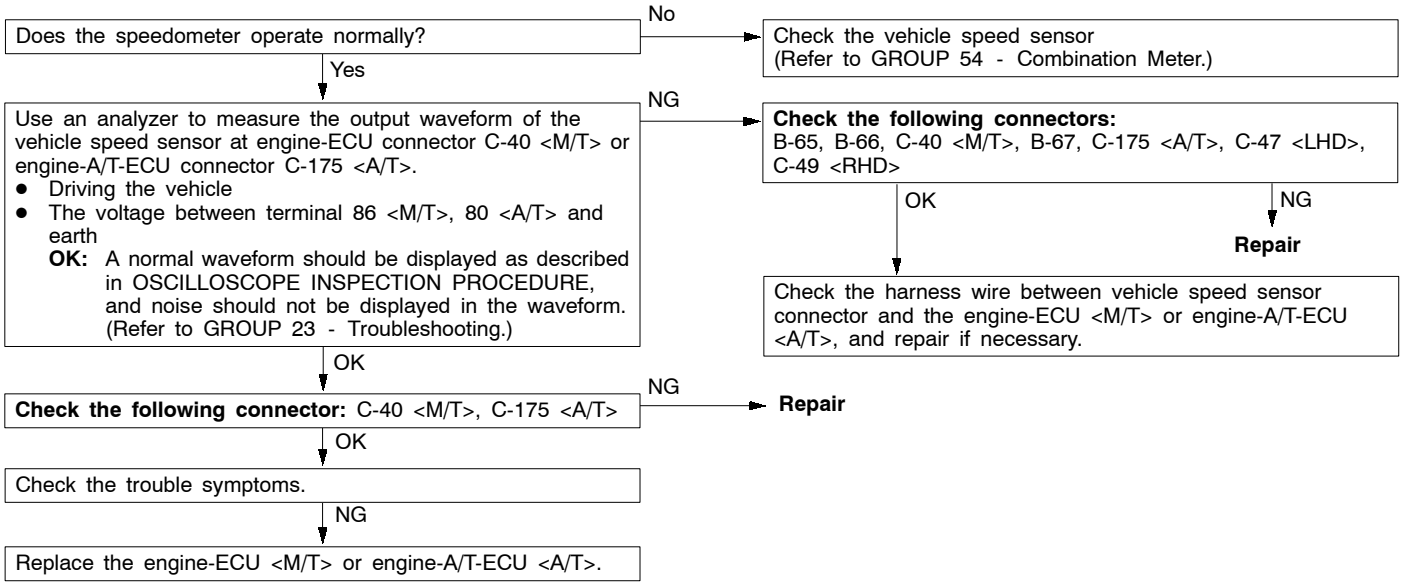
Code No. P0420 Catalyst malfunction	Probable cause
Range of Check ● The engine speed is 3,000 r/min or less. ● During driving ● During air/fuel ratio feedback control Set Conditions ● The ratio between the oxygen sensor (rear) and the oxygen sensor (front) output frequencies reaches 0.8 per 12 seconds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



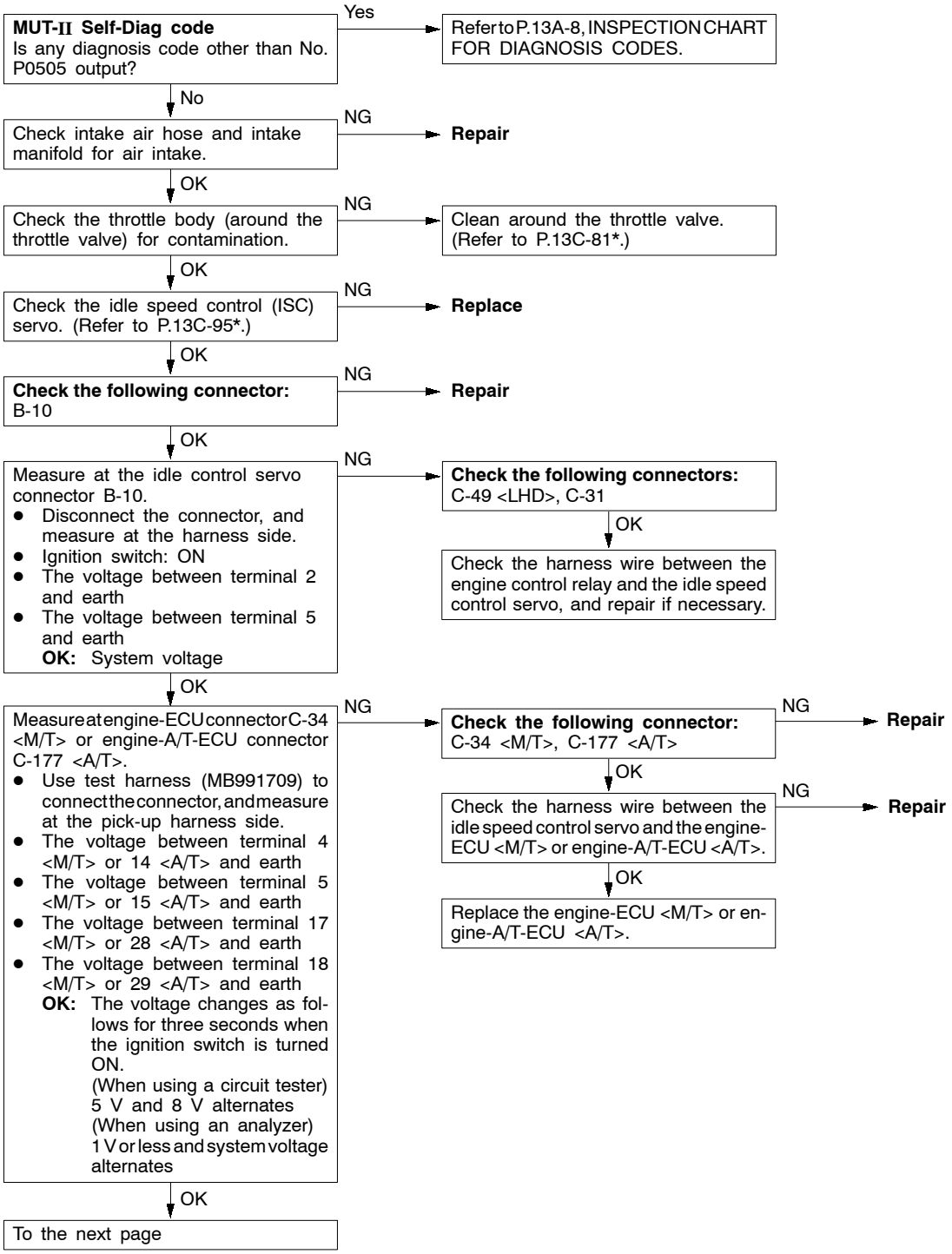
Code No. P0443 Purge control solenoid valve system	Probable cause
Range of Check ● Ignition switch: ON ● Battery voltage is 10 V or more. Set Conditions ● The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	● Malfunction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



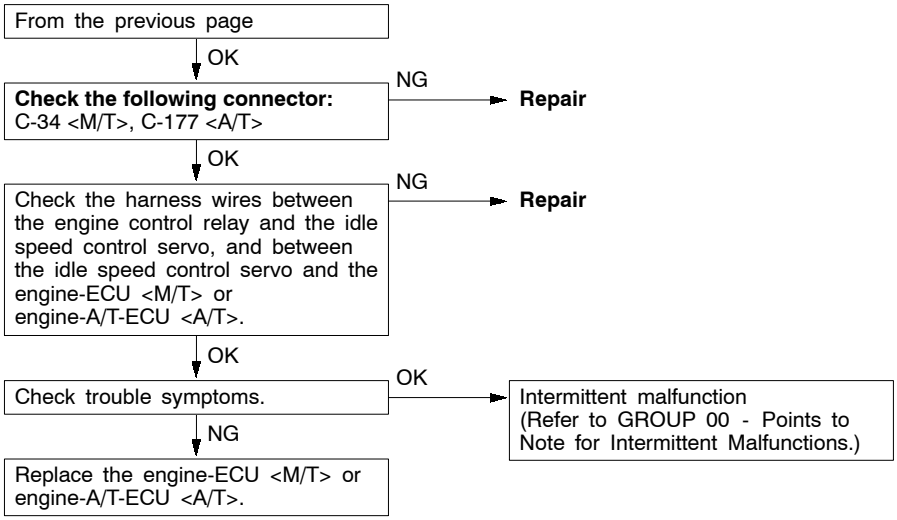
Code No. P0500 Vehicle speed sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine was started ● Idle switch: OFF ● Engine speed: 2,500 r/min or more ● During high engine load Set Conditions ● The sensor output voltage does not change for 2 seconds (no pulse signal input).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



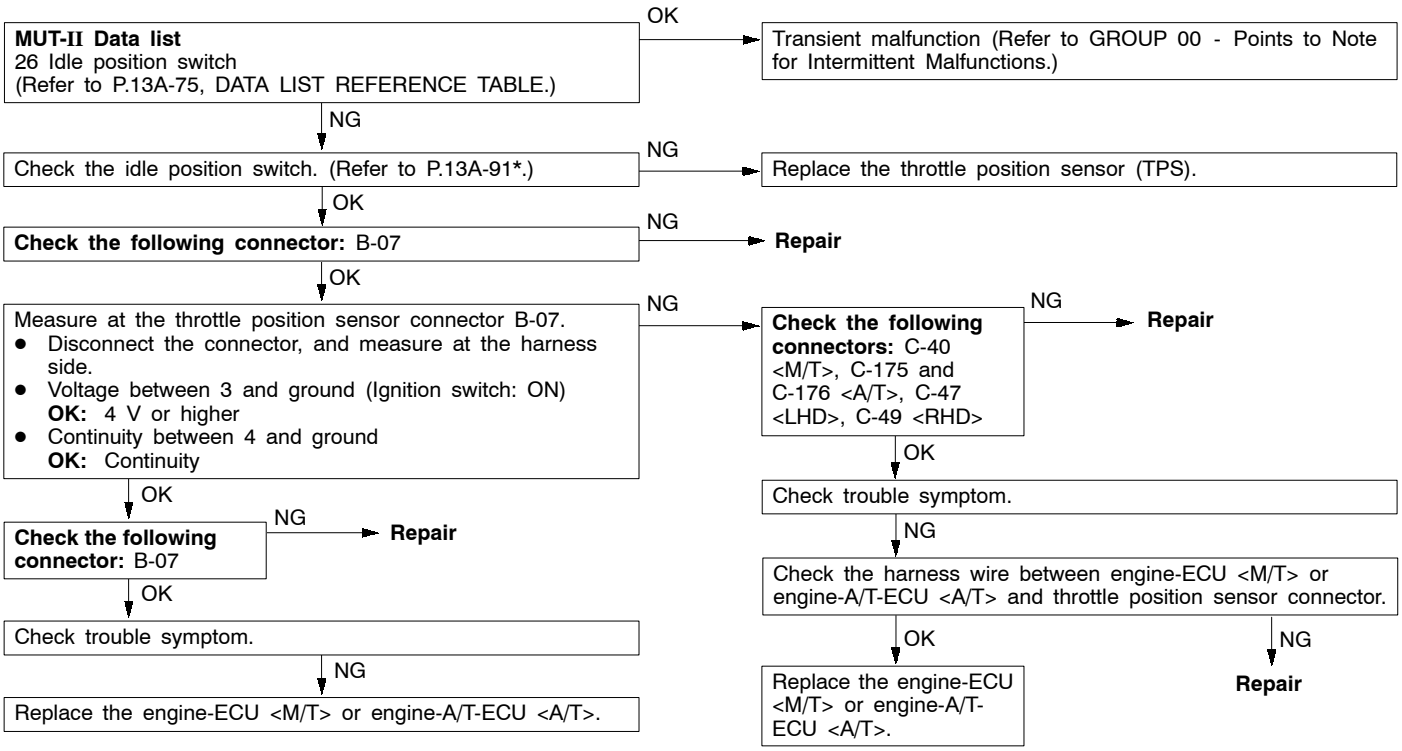
Code No. P0505 Idle speed control (ISC) system	Probable cause
Check Area ● Vehicle speed has reached 1.5 km/h at least once. ● Under the closed loop idle speed control. Judgment Criteria ● Actual idle speed has continued to be higher than the target idle speed by 300 r/min or more for 10 sec. Check Area ● Vehicle speed has reached 1.5 km/h at least once. ● During idle speed closed loop control. ● The highest temperature at the last drive is 45°C or less. ● Engine coolant temperature is approx. 80°C or more. ● Battery voltage is 10 V or more. ● Barometric pressure is 76 kPa or higher. ● Intake air temperature is -10°C or more. Judgment Criteria ● Actual idle speed has been minimum 200 r/min higher than the target idle speed for ten seconds. Check Area ● During idle speed closed loop control. ● Engine coolant temperature is about 80°C or higher. ● Battery voltage is 10 V or higher. ● Power steering switch is off. ● Volumetric efficiency is 40 % or lower. ● Barometric pressure is 76 kPa or higher. ● Intake air temperature is -10°C or more. Judgment Criteria ● Actual idle speed has been minimum 100 r/min higher than the target idle speed for ten seconds.	● Malfunction of idle speed control (ISC) servo ● Improper connector contact, open circuit or short-circuit harness wire ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/C-ECU <A/T>



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

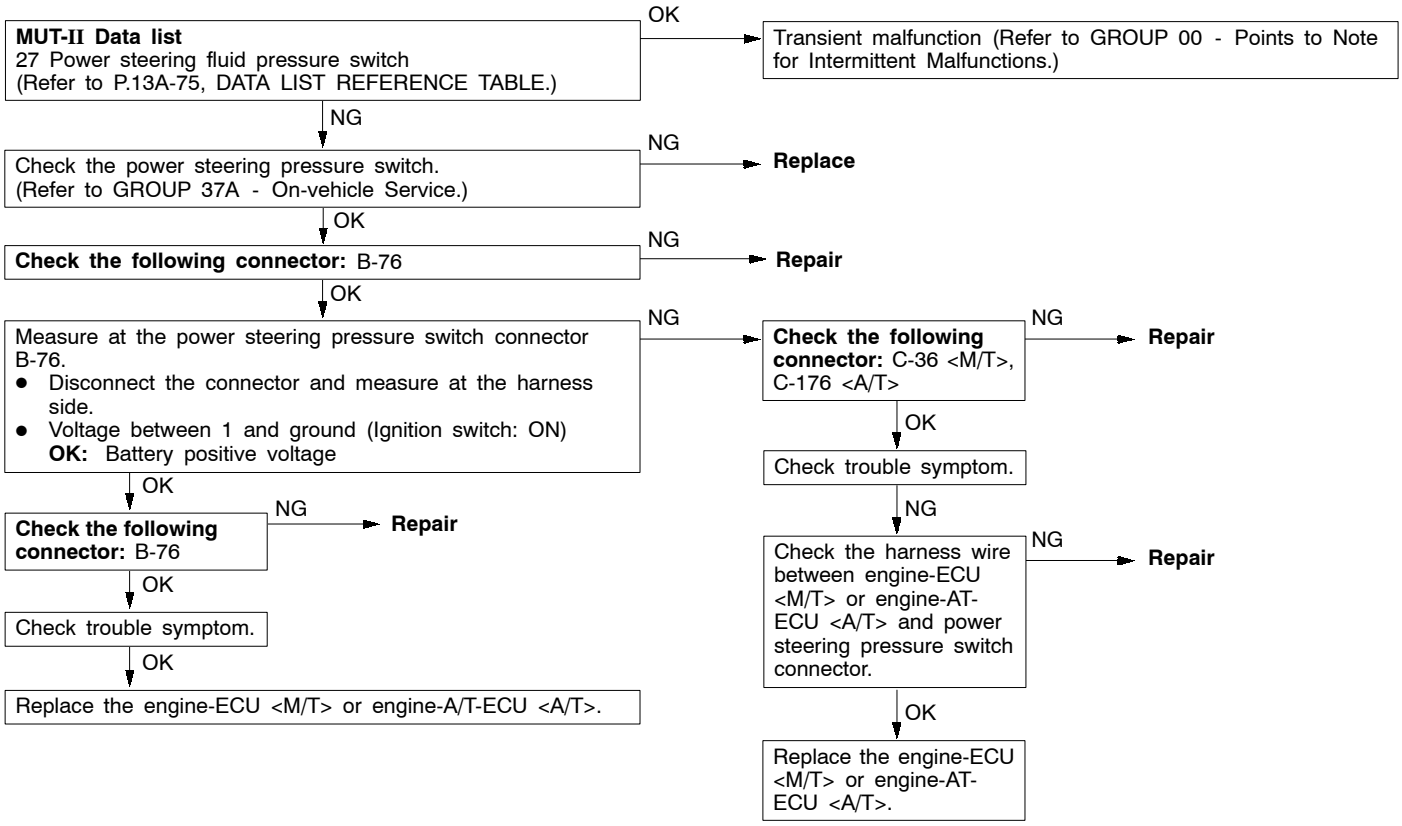


Code No. P0510 Idle Position Switch System	Probable cause
Check Area ● Throttle position sensor output voltage is 2.0 V or more. Judgment Criteria ● Idle position switch has been turned on. Check Area ● Repeat the *1 drive and *2 stop 15 times or more. *1 drive: The vehicle remains under the following conditions for at least two seconds; engine speed is 1,500 rpm or higher, air flow sensor output waveform is 100 Hz or higher, and vehicle speed is more than 30 km/h for two seconds. *2 stop: The vehicle remains under the following conditions for at least two seconds; engine speed is 800 rpm or lower, and vehicle speed is less than 1.5 km/h. Judgment Criteria ● Idle position switch remains off.	● Malfunction of idle position switch ● Open or shorted idle position switch circuit, or loose connector. ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>

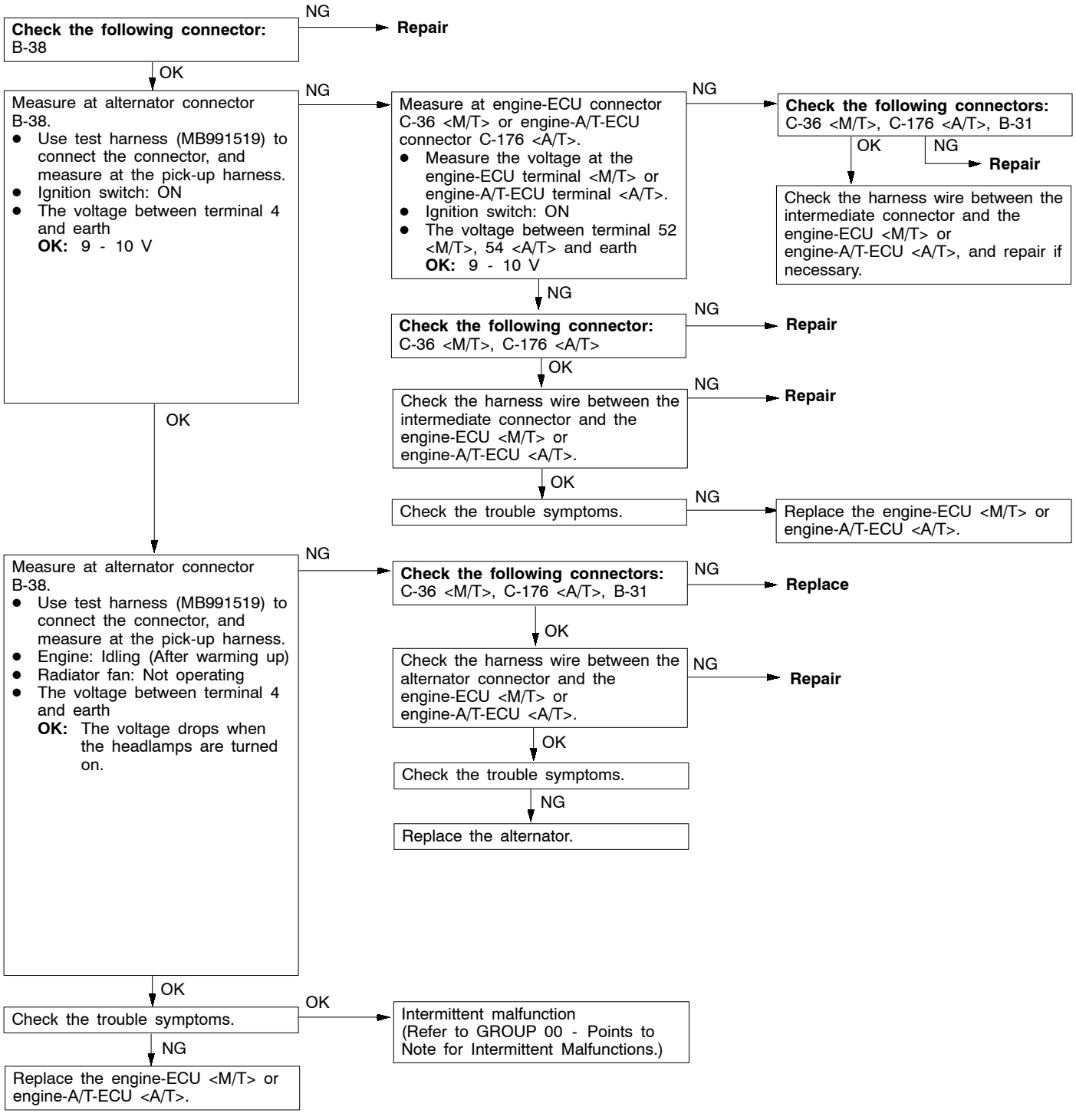


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0551 Power steering fluid pressure switch system	Probable cause
Check Area ● Intake air temperature is -10°C or higher. ● Barometric pressure is 76 kPa or higher. ● Engine coolant temperature is 30°C or more. ● Repeat the *1 drive and *2 stop ten times or more. *1: Engine speed is 2,500 r/min or higher, volumetric efficiency is 55 % or higher and vehicle speed is 5 km/h or higher for 4 seconds or more. *2: Vehicle speed is 1.5 km/h or lower. Judgment Criteria ● Power steering pressure switch remains on.	● Power steering fluid pressure switch failed. ● Open or shorted power steering fluid pressure switch circuit or loose connector ● Malfunction of the engine-ECU <M/T> ● Malfunction of the engine-A/C-ECU <A/T>

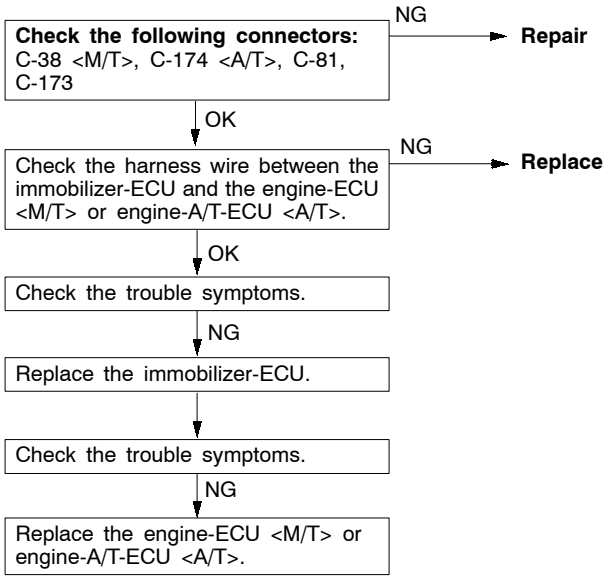


Code No. P1500 Alternator FR terminal system	Probable cause
Range of Check ● Engine speed: 50 r/min or more Set Conditions ● Input voltage from the alternator FR terminal is system voltage for 20 seconds.	● Open circuit in alternator FR terminal circuit ● Malfunction of engine-ECU <M/T> ● Malfunction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



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

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



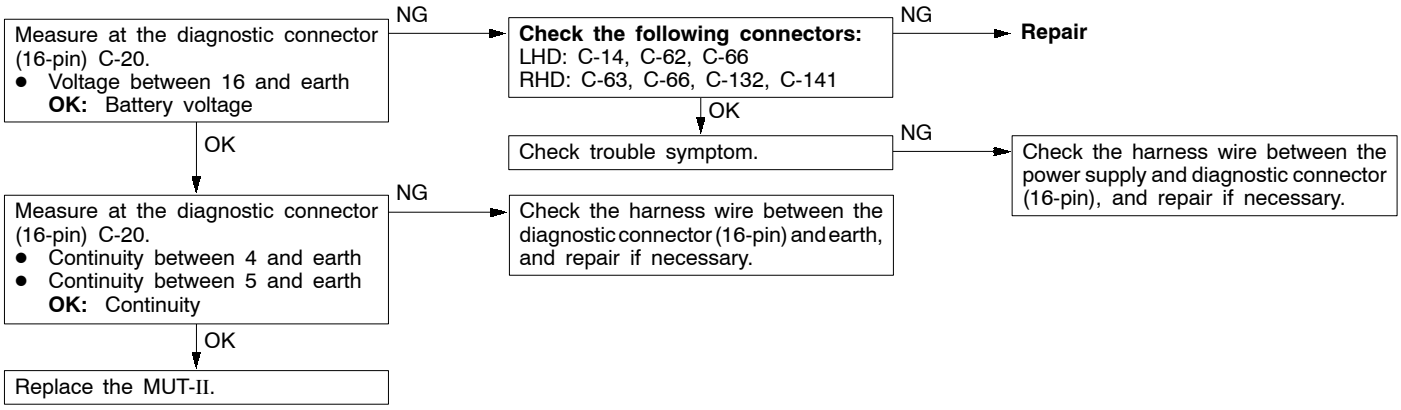
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13A-46
	Communication with engine-ECU <M/T> or engine-A/T-ECU <A/T> only is not possible.	2	13A-46
Engine warning lamp and related parts	The engine warning lamp does not illuminate right after the ignition switch is turned to the ON position.	3	13A-47
	The engine warning lamp remains illuminating and never goes out.	4	13A-47
Starting	No initial combustion (starting impossible)	5	13A-48
	Initial combustion but no complete combustion (starting impossible)	6	13A-49
	Long time to start (improper starting)	7	13A-50
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	8	13A-51
	Idling speed is high. (Improper idling speed)	9	13A-53
	Idling speed is low. (Improper idling speed)	10	13A-54
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	11	13A-55
	When the engine becomes hot, it stalls at idling. (Die out)	12	13A-56
	The engine stalls when starting the car. (Pass out)	13	13A-58
	The engine stalls when decelerating.	14	13A-58
Driving	Hesitation, sag or stumble	15	13A-59
	The feeling of impact or vibration when accelerating	16	13A-60
	The feeling of impact or vibration when decelerating	17	13A-60
	Poor acceleration	18	13A-61
	Surge	19	13A-63
	Knocking	20	13A-64
Dieseling		21	13A-64
Too high CO and HC concentration when idling		22	13A-65
Low alternator output voltage (approx. 12.3 V)		23	13A-66
Idling speed is improper when A/C is operating		24	13A-66
Fans (radiator fan, A/C condenser fan) are inoperative		25	13A-67

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

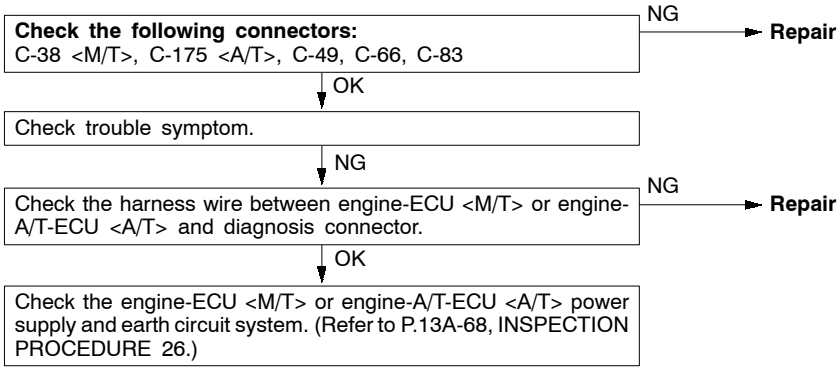
INSPECTION PROCEDURE 1

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



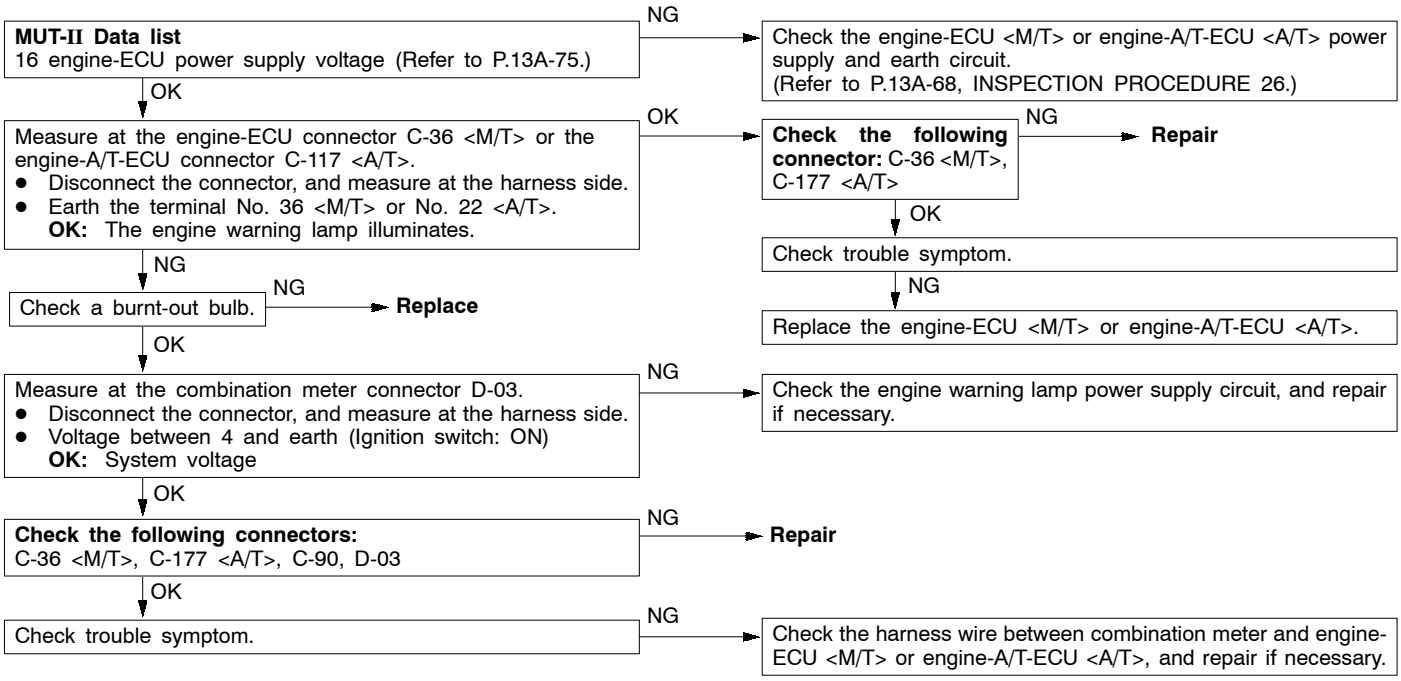
INSPECTION PROCEDURE 2

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



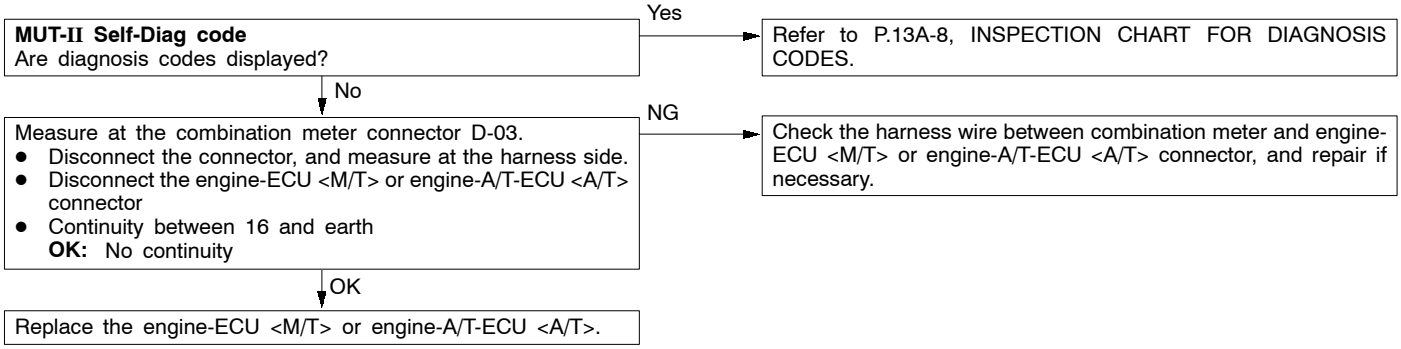
INSPECTION PROCEDURE 3

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



INSPECTION PROCEDURE 4

The engine warning lamp remains illuminating and never goes out.	Probable cause
In cases such as the above, the cause is probably that the engine-ECU <M/T> or engine-A/T-ECU <A/T> is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has occurred.	• Short-circuit between the engine warning lamp and engine-ECU <M/T> or engine-A/T-ECU <A/T> • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



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.	• Malfunction of the ignition system • Malfunction of the fuel pump system • Malfunction of the injectors • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T> • Malfunction of the immobilizer system • Foreign materials in fuel

Check battery voltage when cranking.
OK: 8 V or higher
- NG → Check the battery. (Refer to GROUP 54 - Battery.)
- OK ↓

Is immobilizer-ECU diagnosis code displayed?
- Yes → Check the immobilizer. (Refer to GROUP 54 - Ignition Key and Immobilizer.)
- No ↓

MUT-II Data list
16 Power supply voltage (Refer to P.13A-75.)
- NG → Check the power supply and ignition switch-IG system. (Refer to P.13A-69, INSPECTION PROCEDURE 27.)
- OK ↓

Does the camshaft rotate at the engine cranking? (When oil filler cap is removed.)
- No → Check timing belt for breakage.
- Yes ↓

MUT-II Self-Diag code
Are diagnosis codes displayed?
- Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

MUT-II Data list
22 Crank angle sensor
OK: Cranking speed is displayed
- No → Check the crank angle sensor system. (Refer to P.13A-32, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0335.)
- OK ↓

MUT-II Actuator test
07 Fuel pump (Refer to P.13A-80.)
- NG → Check the fuel pump system. (Refer to P.13A-69, INSPECTION PROCEDURE 28.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-75.)
- NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

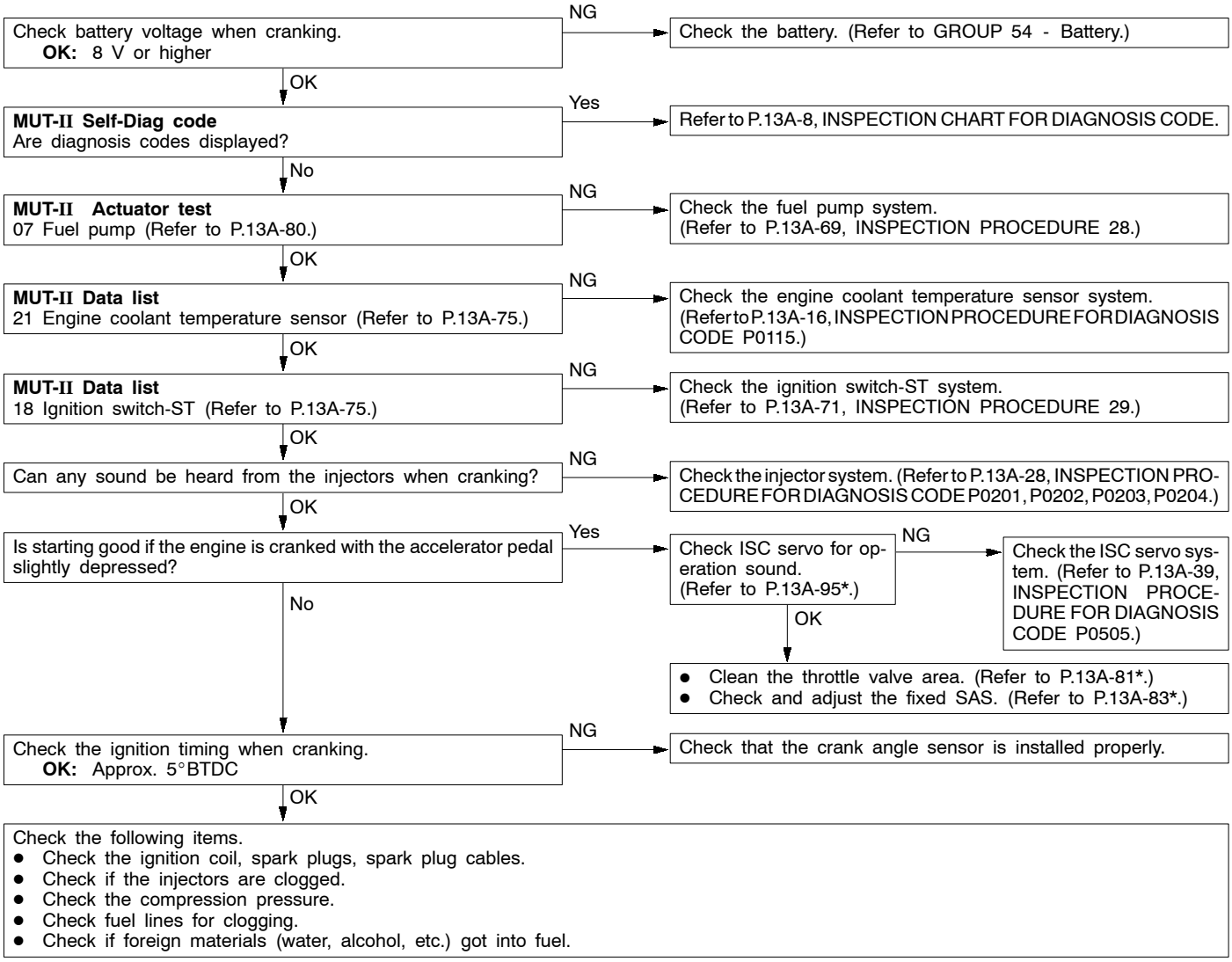
Can any sound be heard from the injectors when cranking?
- No → Check the injector system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
- Yes ↓

Measure at the ignition coil connectors B-01 and B-11
- Connectors connected
- Check by connecting the timing light to terminal 1 of each connector (Engine: Cranking)
  OK: The timing light flashes.
- No → Check the ignition circuit system. (Refer to P.13A-72, INSPECTION PROCEDURE 31.)
- OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check if foreign materials (water, alcohol, etc.) got into fuel.
- Check the compression pressure.
- Check the immobilizer system.

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.	● Malfunction of the ignition system ● Malfunction of the injector system ● Foreign materials in fuel ● Poor compression ● Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 7

It takes too long time to start. (Incorrect 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.	• Malfunction of the ignition system • Malfunction of the injector system • Inappropriate gasoline use • Poor compression

Check battery voltage when cranking
OK: 8 V or higher
→ NG → Check the battery. (Refer to GROUP 54 - Battery.)
↓ OK

MUT-II Self-Diag code
Are diagnosis codes displayed?
→ Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODE.
↓ No

MUT-II Actuator test
07 Fuel pump (Refer to P.13A-80.)
→ NG → Check the fuel pump system. (Refer to P.13A-69, INSPECTION PROCEDURE 28.)
↓ OK

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-75.)
→ NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
↓ OK

MUT-II Data list
18 Ignition switch-ST (Refer to P.13A-75.)
→ NG → Check the ignition switch-ST system. (Refer to P.13A-71, INSPECTION PROCEDURE 29.)
↓ OK

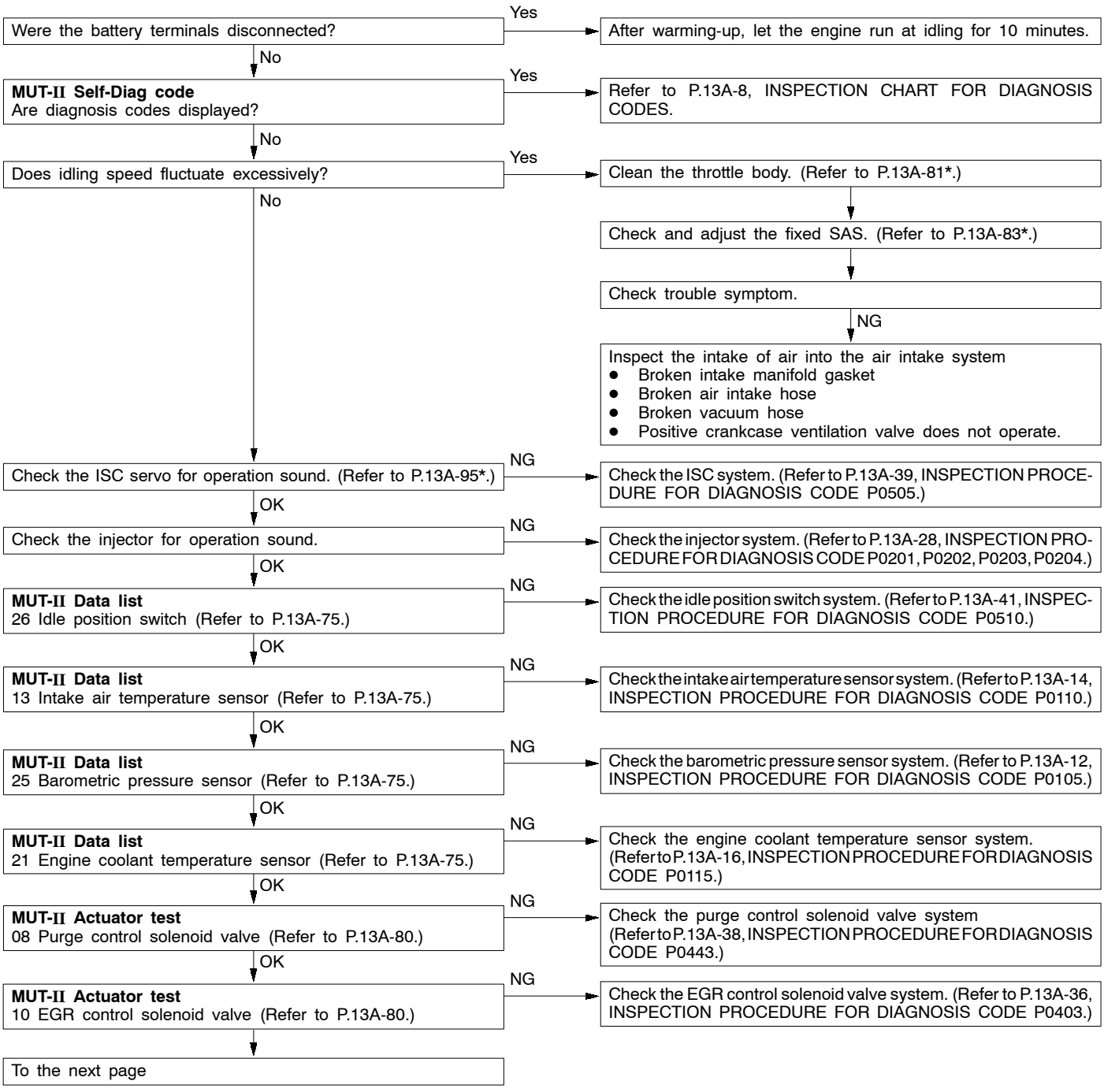
Can any sound be heard from the injectors when cranking?
→ NG → Check the injector system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
↓ OK

Check the ignition timing when cranking.
OK: Approx. 5°BTDC
→ NG → Check that the crank angle sensor is installed properly.
↓ OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check the compression pressure.
- Check if foreign materials (water, alcohol, etc.) got into fuel.

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, idle speed control (ISC) or compression pressure is defective. Because the range of possible causes is broad, inspection is narrowed down to simple items.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the ISC system • Malfunction of the purge control solenoid valve system • Malfunction of the EGR solenoid valve system • Poor compression • Drawing air into exhaust system



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

From the previous page

OK

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV

NG → Check the oxygen sensor (rear) system. (Refer to P.13A-24, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)

OK

MUT-II Data list
11 Oxygen sensor

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor (front) system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)

OK

MUT-II Data list
11 Oxygen sensor

OK: Changes between 0 - 400 mV and 600 - 1,000 mV during idling

NG → Check the fuel pressure. (Refer to P.13A-85*.)

OK → 1. Inspect the intake of air into the air intake system.
- Broken intake manifold gasket
- Broken vacuum hose
- PCV valve does not operate.
- Broken air intake hose

2. Check the injector for clog.

OK

MUT-II Data list
27 Power steering fluid pressure switch (Refer to P.13A-75.)

NG → Check the power steering fluid pressure switch system. (Refer to P.13A-42, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0551.)

OK

MUT-II Data list
28 A/C switch (Refer to P.13A-75.)

NG → Check the A/C switch and A/C relay system. (Refer to P.13A-72, INSPECTION PROCEDURE 30.)

OK

MUT-II Data list
29 Inhibitor switch (Refer to P.13A-75.)

NG → Check the ignition switch-ST. (Refer to P.13A-71, INSPECTION PROCEDURE 29.)

OK

MUT-II Data list
45 ISC Servo position (Refer to P.13A-61.)

NG → Adjust the basic idle speed. (Refer to P.13A-83*.)

OK

Check the ignition timing. (Refer to GROUP 11A - On-vehicle Service.)

NG → Check that the crank angle sensor is installed properly.

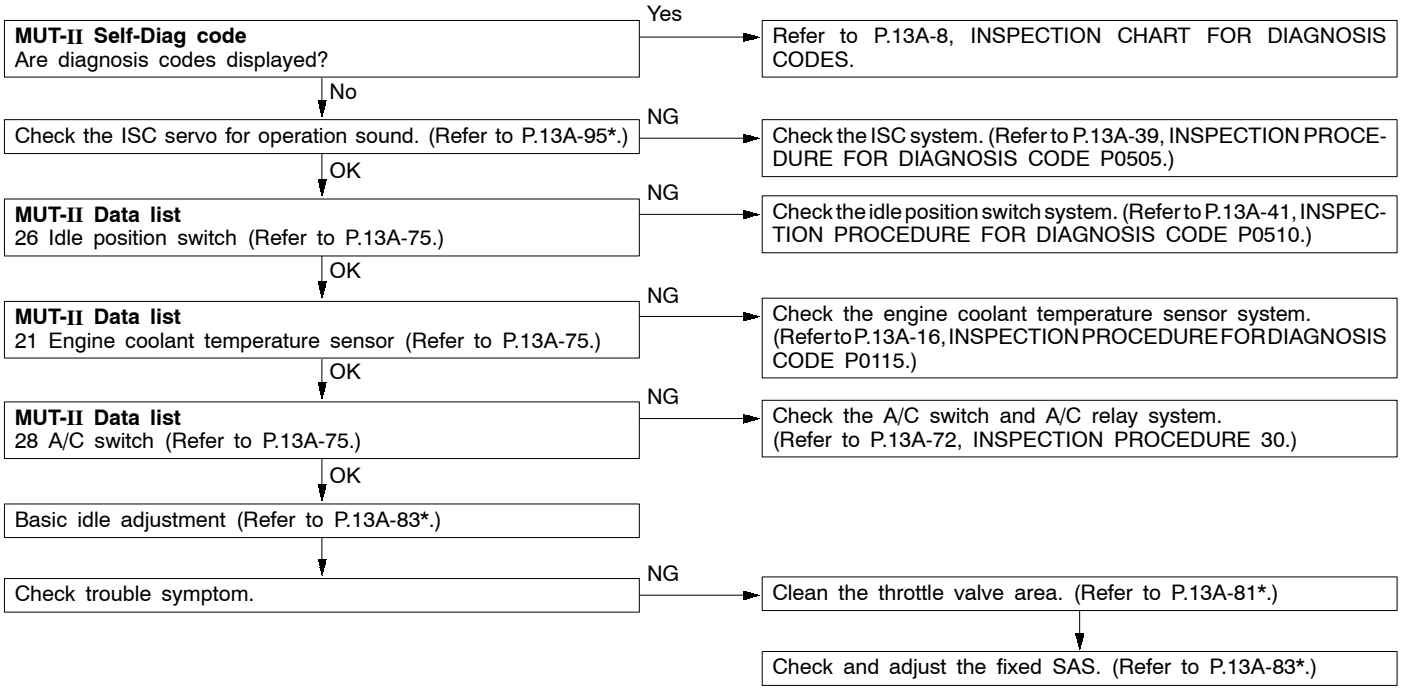
OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the purge control system.
- Check the EGR control system.
- Check the compression pressure.
- Check if foreign materials (water, alcohol, etc.) got into fuel.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 9

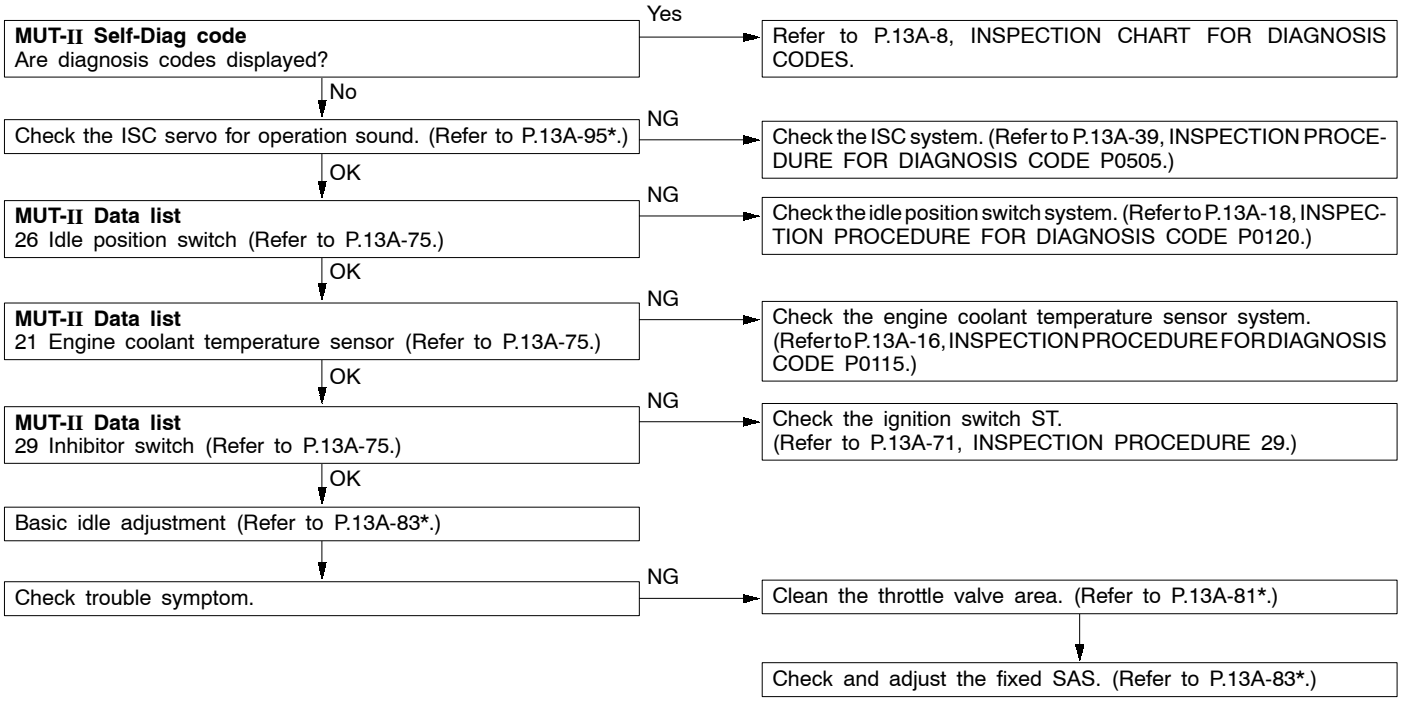
Idling speed is high. (Improper idling speed)	Probable cause
In such cases as the above, the cause is probably that the intake air volume during idling is too great.	• Malfunction of the ISC system • Malfunction of the throttle body



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 10

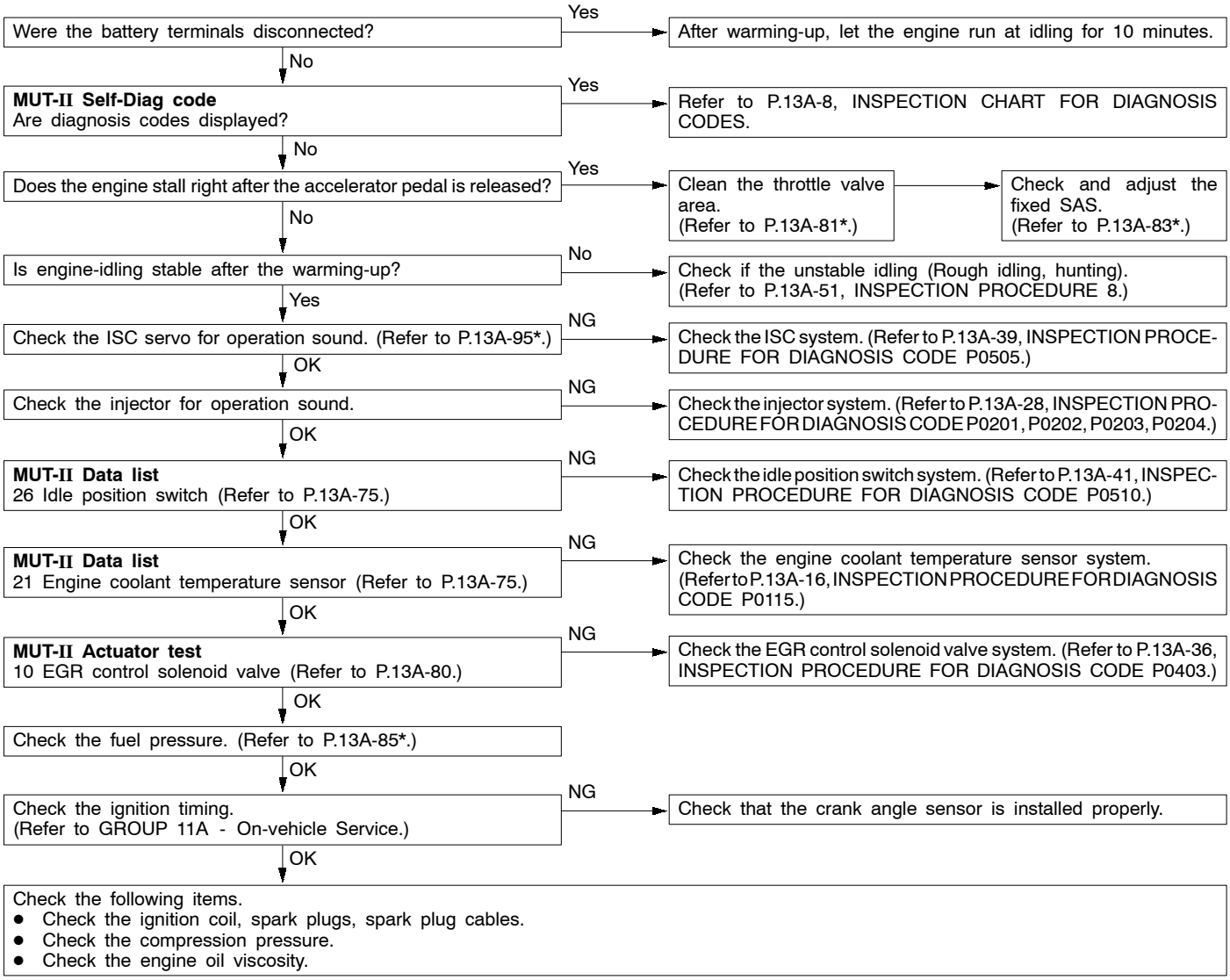
Idling speed is low. (Improper idling speed)	Probable cause
In cases such as the above, the cause is probably that the intake air volume during idling is too small.	• Malfunction of the ISC system • Malfunction of the throttle body



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 11

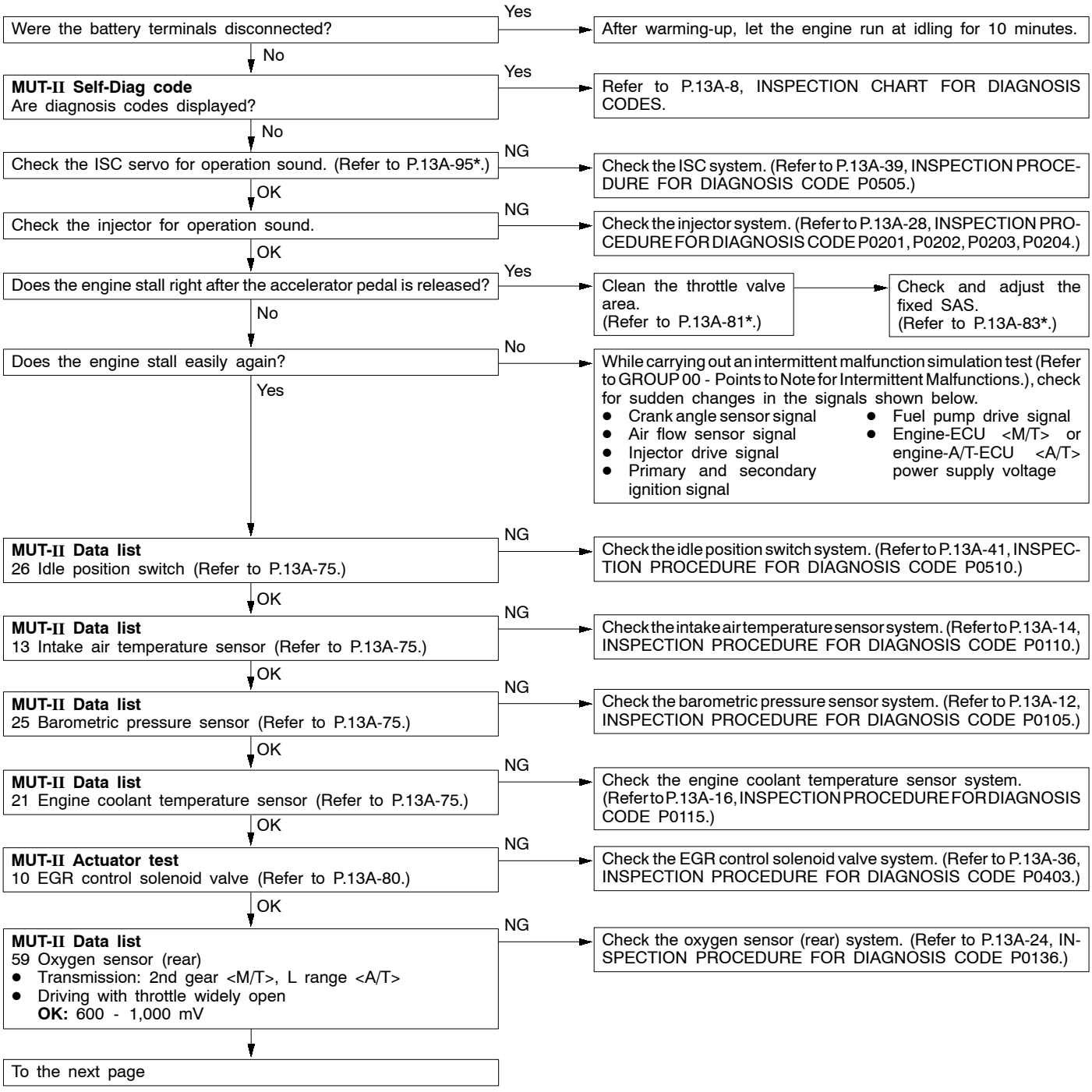
When the engine is cold, it stalls at idling. (Die out)	Probable cause
In such cases as the above, the cause is probably that the air/fuel mixture is inappropriate when the engine is cold, or that the intake air volume is insufficient.	• Malfunction of the ISC system • Malfunction of the throttle body • Malfunction of the injector system • Malfunction of the ignition system



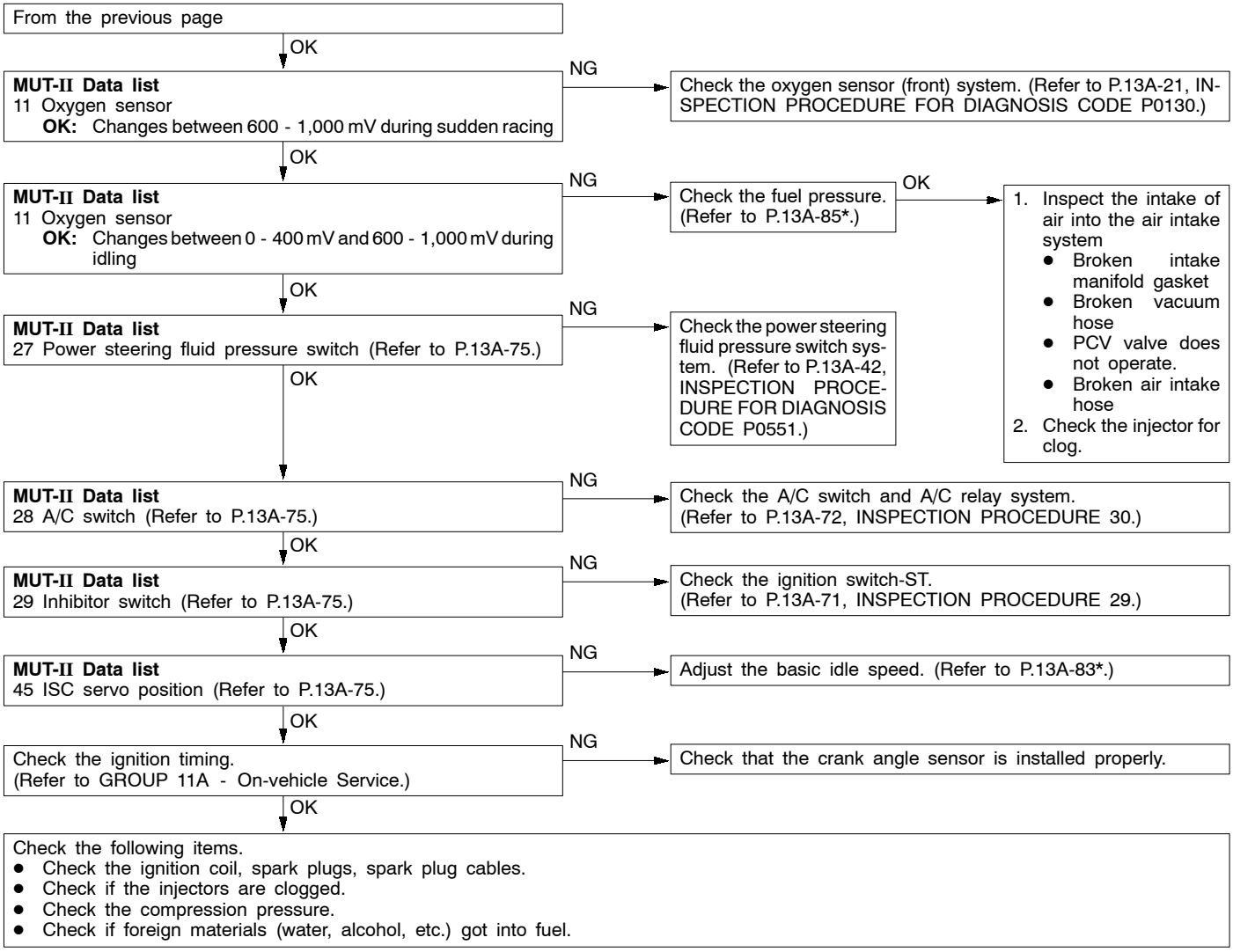
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 12

When the engine is 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, idle speed control (ISC) or compression pressure is defective. In addition, if the engine suddenly stalls, the cause may also be a defective connector contact.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the ISC system • Drawing air into intake system • Improper connector contact



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

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.	• Drawing air into intake system • Malfunction of the ignition system

MUT-II Self-Diag code
Are diagnosis codes displayed?
→ Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
↓ No

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-80.)
→ NG → Check the EGR control solenoid valve system. (Refer to P.13A-36, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
↓ OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if air was drawn into the intake system.
  - Broken intake manifold gasket
  - Broken or disconnected vacuum hose
  - Improper operation of the PCV valve
  - Broken air intake hose

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 idle speed control (ISC) system.	• Malfunction of the ISC system

Were the battery terminals disconnected?
→ Yes → After warming-up, let the engine run at idling for 10 minutes.
↓ No

MUT-II Self-Diag code
Are diagnosis codes displayed?
→ Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
↓ No

MUT-II Data list
26 Idle position switch (Refer to P.13A-75.)
→ NG → Check the idle position switch system. (Refer to P.13A-41, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
↓ OK

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-75.)
→ NG → Check the throttle position sensor system. (Refer to P.13A-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
↓ OK

MUT-II Data list
45 ISC servo position
- Is the idle speed control (ISC) servo position drops to 0 - 2 steps when decelerating (engine r/min less than 1,000)?

→ Yes → Check the vehicle speed sensor system. (Refer to P.13A-39, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0500.)
↓ No

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-80.)
→ NG → Check the EGR control solenoid valve system. (Refer to P.13A-36, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
↓ OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Clean the throttle valve area.
- Check and adjust the fixed SAS.

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.	• 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 • Poor compression

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-75.)
NG → Check the idle position switch system. (Refer to P.13A-41, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-75.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-14, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-75.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-12, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-75.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-75.)
NG → Check the throttle position sensor system. (Refer to P.13A-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-80.)
NG → Check the EGR control solenoid valve system. (Refer to P.13A-36, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
NG → Check the oxygen sensor (rear) system. (Refer to P.13A-24, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
OK ↓

MUT-II Data list
11 Oxygen sensor
OK: Changes between 600 - 1,000 mV during sudden racing
NG → Check the oxygen sensor (front) system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)

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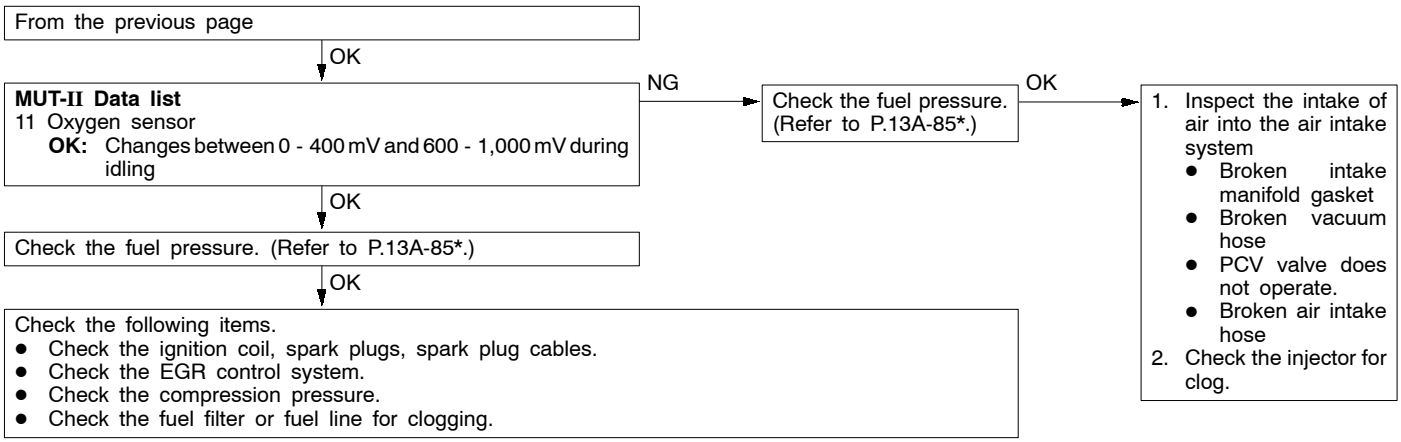
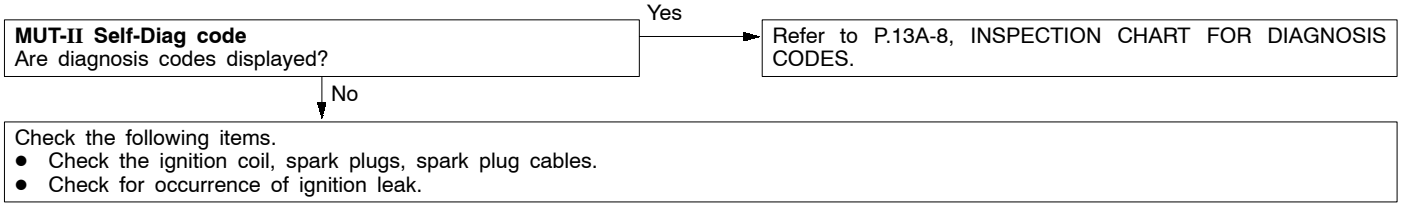


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

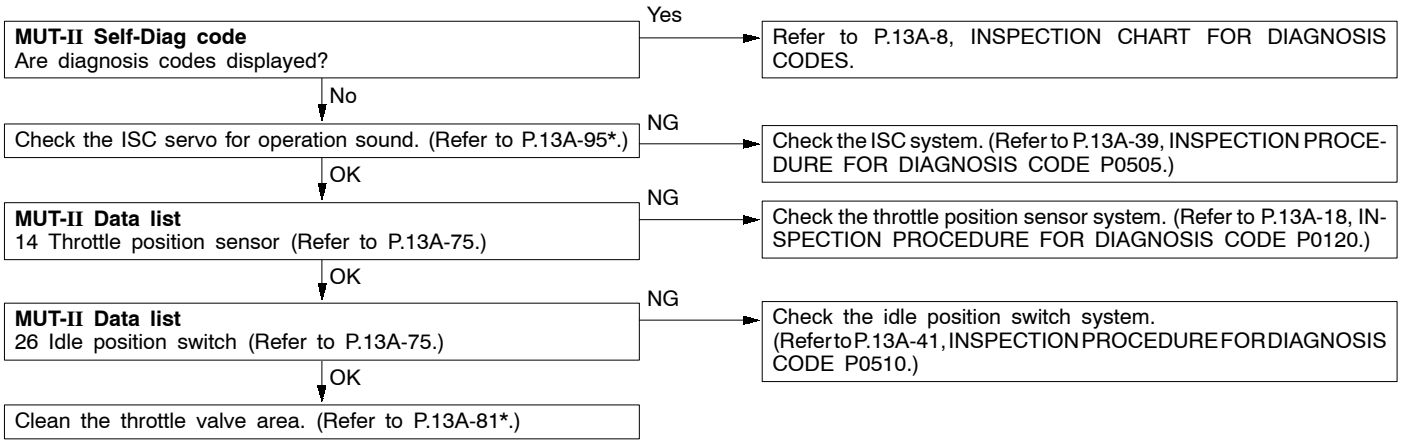
INSPECTION PROCEDURE 16

The feeling of impact or vibration when accelerating	Probable cause
In cases such as the above, the cause is probably that there is an ignition leak accompanying the increase in the spark plug demand voltage during acceleration.	● Malfunction of the ignition system



INSPECTION PROCEDURE 17

The feeling of impact or vibration when decelerating.	Probable cause
Malfunction of the ISC system is suspected.	● Malfunction of the ISC system



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 18

Poor acceleration	Probable cause
Defective ignition system, abnormal air/fuel ratio, poor compression pressure, etc. are suspected.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the fuel supply system • Poor compression pressure • Clogged exhaust system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-75.)
NG → Check the idle position switch system. (Refer to P.13A-41, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-75.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-14, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-75.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-12, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-75.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-75.)
NG → Check the throttle position sensor system. (Refer to P.13A-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-80.)
NG → Check the EGR control solenoid valve system. (Refer to P.13A-36, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
NG → Check the oxygen sensor (rear) system. (Refer to P.13A-24, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
OK ↓

MUT-II Data list
11 Oxygen sensor
OK: Changes between 600 - 1,000 mV during sudden racing
NG → Check the oxygen sensor (front) system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)

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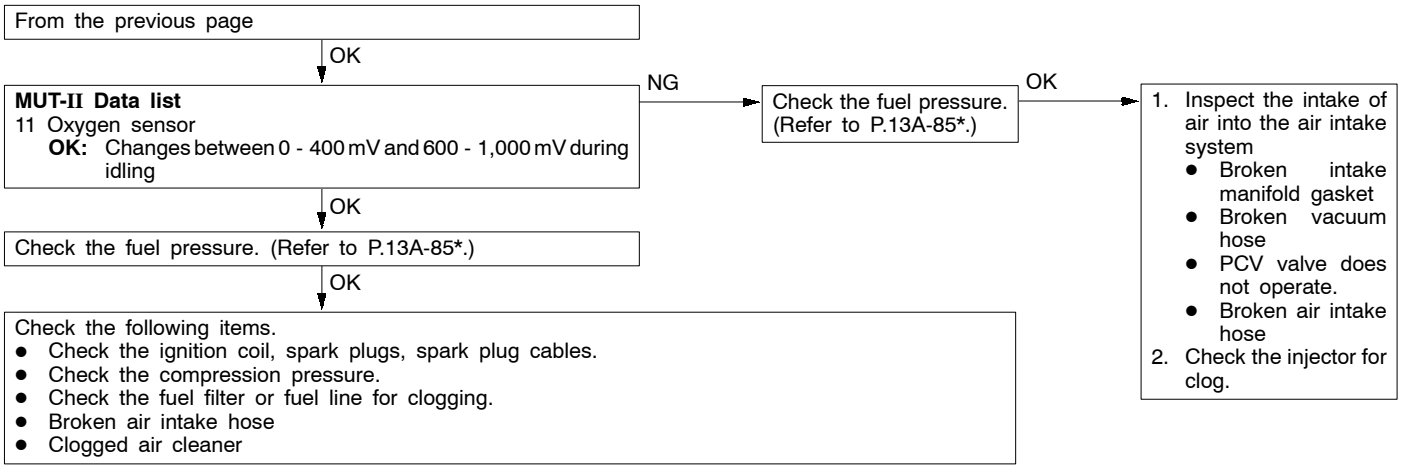


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 19

Surge	Probable cause
Defective ignition system, abnormal air/fuel ratio, etc. are suspected.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the EGR control solenoid valve system

MUT-II Self-Diag code
Are diagnosis codes displayed?
- Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

Check the injectors for operation sound.
- NG → Check the injector system. (Refer to P.13A-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
- OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
- NG → Check that the crank angle sensor is installed properly.
- OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-75.)
- NG → Check the idle position switch system. (Refer to P.13A-41, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
- OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-75.)
- NG → Check the intake air temperature sensor system. (Refer to P.13A-14, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
- OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-75.)
- NG → Check the barometric pressure sensor system. (Refer to P.13A-12, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-75.)
- NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-75.)
- NG → Check the throttle position sensor system. (Refer to P.13A-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
- OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-80.)
- NG → Check the EGR control solenoid valve system. (Refer to P.13A-36, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
- OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
- NG → Check the oxygen sensor (rear) system. (Refer to P.13A-24, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
- OK ↓

MUT-II Data list
11 Oxygen sensor
OK: Changes between 600 - 1,000 mV during sudden racing
- NG → Check the oxygen sensor (front) system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
- OK ↓

MUT-II Data list
11 Oxygen sensor
OK: Changes between 0 - 400 mV and 600 - 1,000 mV during idling
- NG → Check the fuel pressure. (Refer to P.13A-85*.)
  - OK → 1. Inspect the intake of air into the air intake system
    - Broken intake manifold gasket
    - Broken vacuum hose
    - PCV valve does not operate.
    - Broken air intake hose
    2. Check the injector for clog.
- OK ↓

Check the fuel pressure. (Refer to P.13A-85*.)
- OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the EGR control system.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 20

Knocking	Probable cause
In cases as the above, the cause is probably that the detonation control is defective or the heat value of the spark plug is inappropriate.	• Defective detonation sensor • Inappropriate heat value of the spark plug

MUT-II Self-Diag code
Are diagnosis codes displayed?
→ Yes: Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
↓ No

Does knocking occur when driving with the sensor disconnected? At this time, use the MUT-II to check if the timing is retarded compared to when the detonation sensor connector is connected.
→ No: Check the detonation sensor system. (Refer to P.13A-32, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0325.)
↓ Yes

Check the following items.
- Spark plugs
- Check if foreign materials (water, alcohol, etc.) got into fuel.

INSPECTION PROCEDURE 21

Dieseling	Probable cause
Fuel leakage from injectors is suspected.	• 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.	• Malfunction of the air/fuel ratio control system • Deteriorated catalyst

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-8, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor. (Refer to P.13A-75.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-16, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-75.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-14, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-75.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-12, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
NG → Check the oxygen sensor (rear) system. (Refer to P.13A-24, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
OK ↓

MUT-II Data list
11 Oxygen sensor
OK: 600 - 1,000 mV when racing suddenly.
NG → Check the oxygen sensor (front) system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
OK ↓

MUT-II Data list
11 Oxygen sensor
OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling.
OK → Replace the oxygen sensor. → Check trouble symptom.
NG ↓

Check the fuel pressure. (Refer to P.13A-85*.)
OK ↓

Check the following items.
- Check the injectors for operation sound.
- Check the injectors for fuel leakage.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the compression pressure.
- Check the positive crankcase ventilation system.
- Check the purge control system.
- Check the EGR control system.

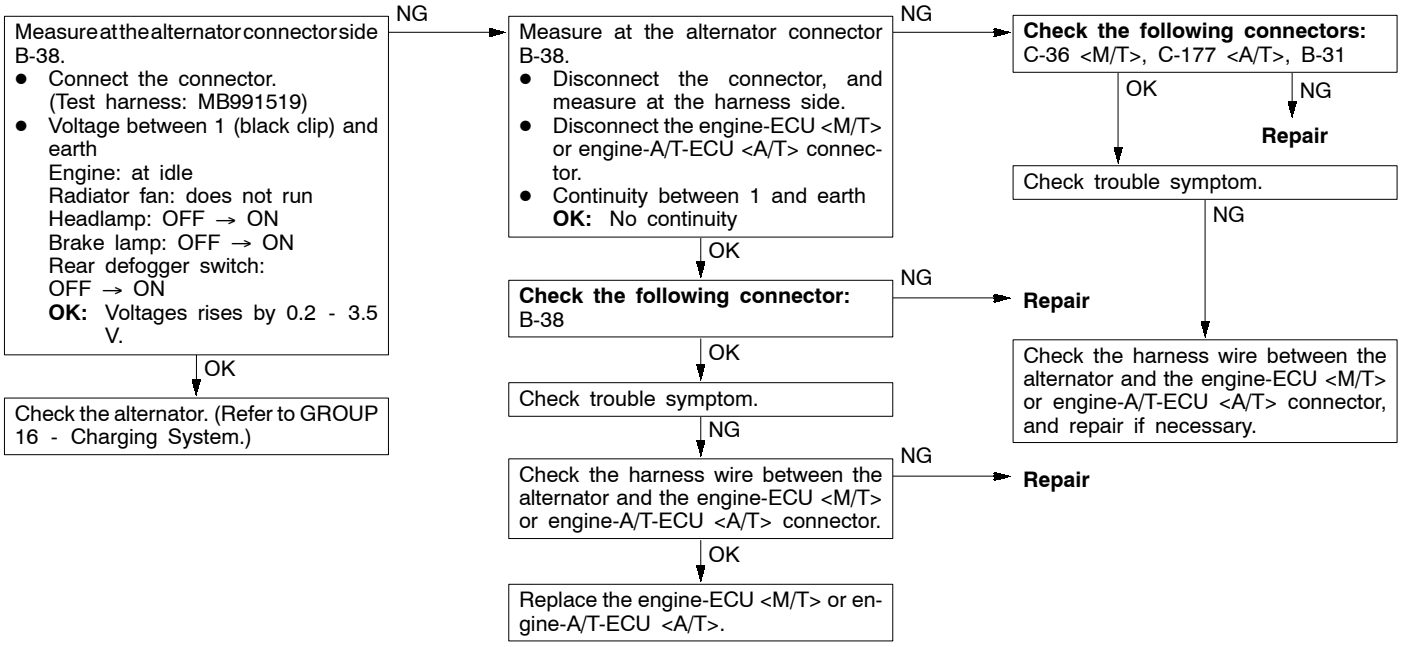
Check the trouble symptom.
NG ↓

Replace the catalytic converter.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

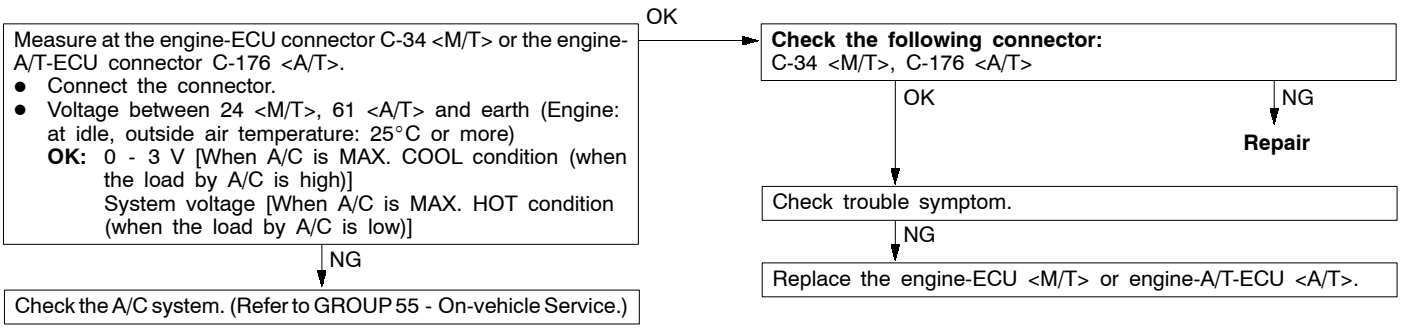
INSPECTION PROCEDURE 23

Low alternator output voltage (approx. 12.3 V)	Probable cause
The alternator may be defective, or malfunctions, which are listed in the right column, may be suspected.	• Malfunction of charging system • Short circuit in harness between alternator G terminal and engine-ECU <M/T> or engine-A/T-ECU <A/T> • Malfunction of engine-ECU <M/T> or engine-A/T-ECU <A/T>



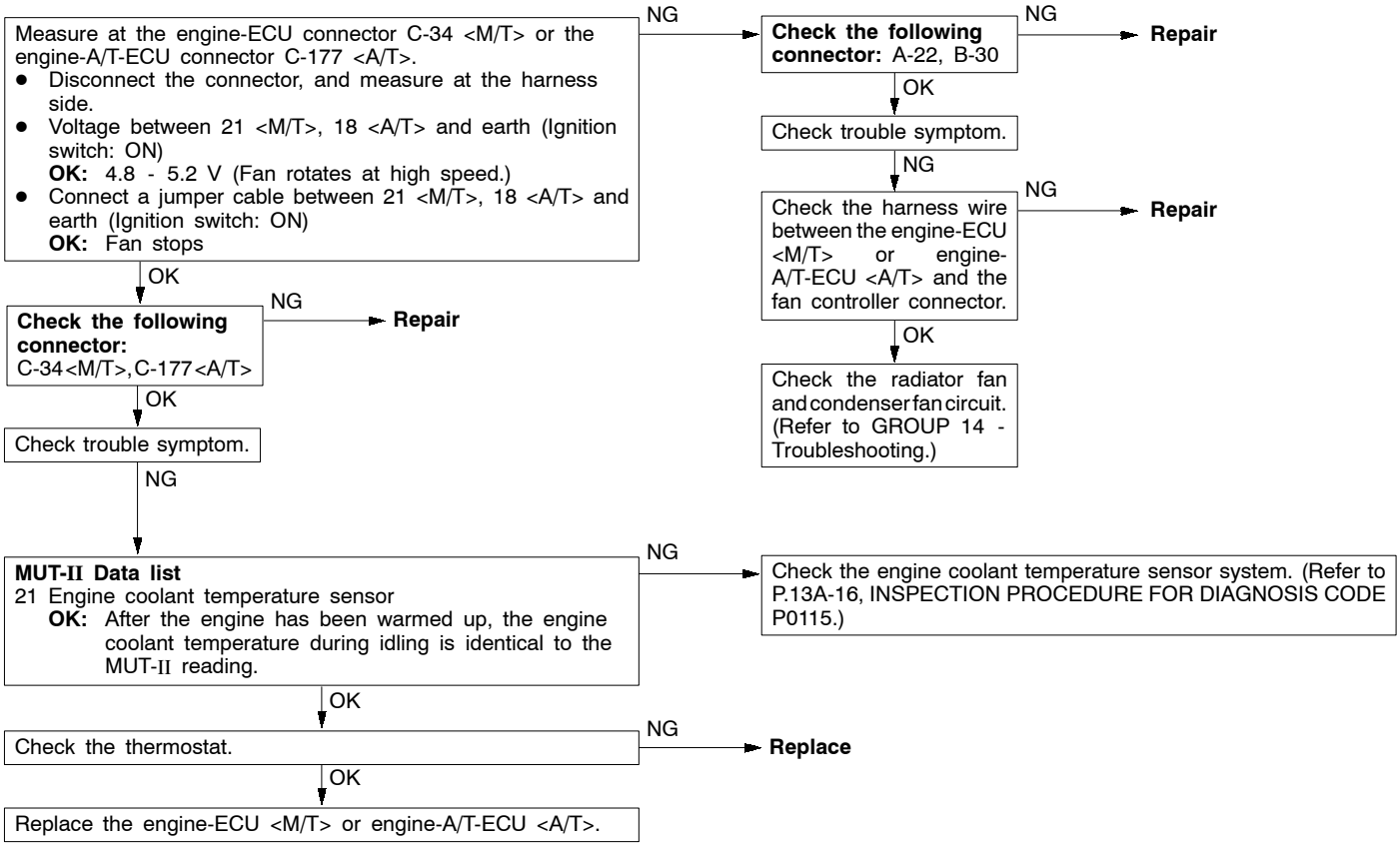
INSPECTION PROCEDURE 24

Idling speed is improper when A/C is operating	Probable cause
If the engine-ECU <M/T> or engine-A/T-ECU <A/T> detects that the air conditioner is on, it activates the idle speed control (ISC) servo to control idle-up operation. The A/C-ECU judges if the load caused by air conditioner operation is high or low, and converts it to voltage signal (high or low voltage) and inputs the signal to the engine-ECU <M/T> or engine-A/T-ECU <A/T>. Based on this voltage signal, the engine-ECU <M/T> or engine-A/T-ECU <A/T> controls the idle-up speed (for high or low load).	• Malfunction of the A/C control system • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



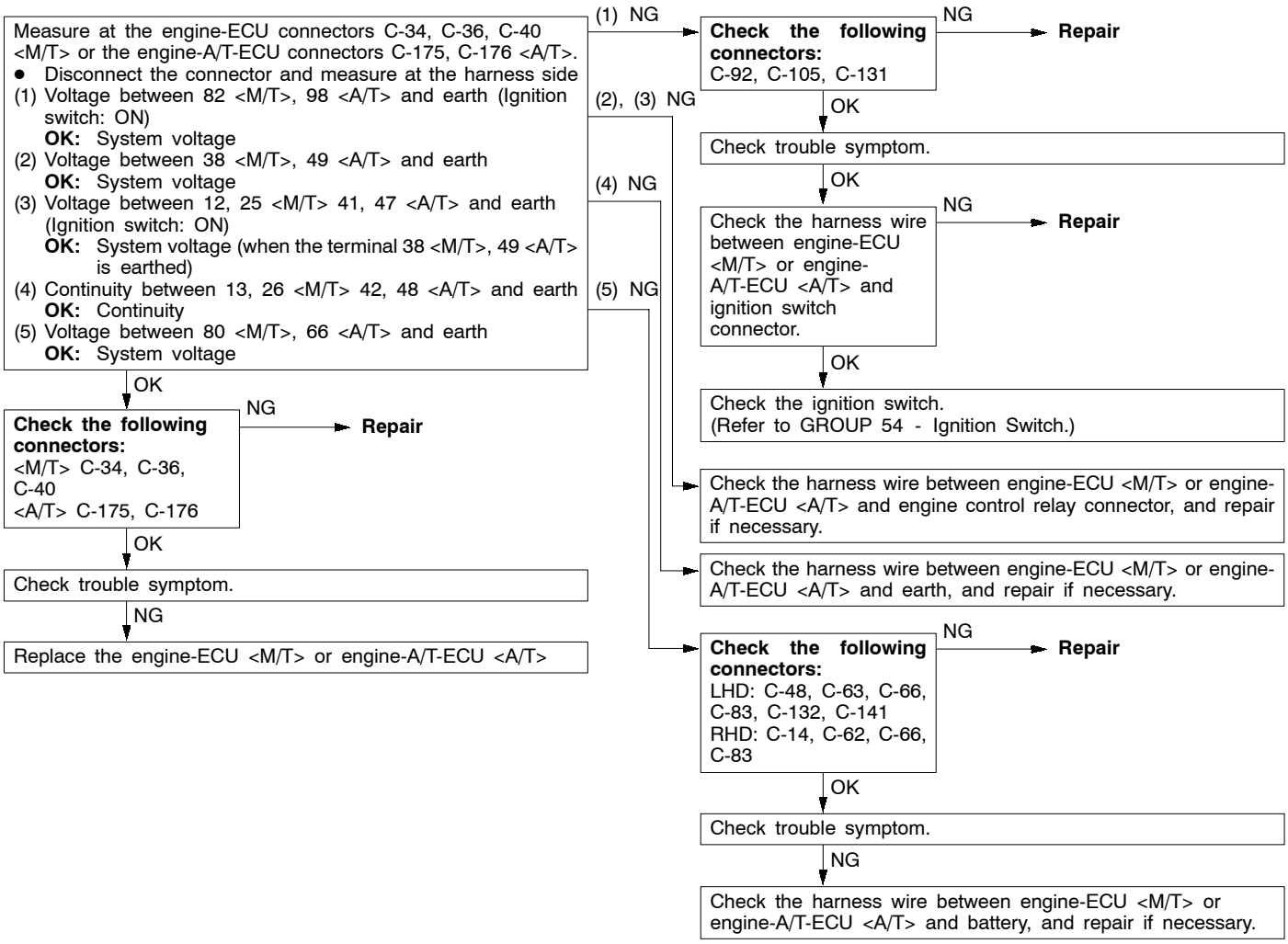
INSPECTION PROCEDURE 25

Fans (radiator fan, A/C condenser fan) are inoperative	Probable cause
The engine-ECU <M/T> or engine-A/T-ECU <A/T> outputs a duty signal to the fan controller depending on the engine coolant temperature, vehicle speed, and air conditioner switch condition. Based on this signal, the fan controller controls the radiator fan and condenser fan speeds (The more the average voltage at the terminal approaches 5 V, the higher the fan speed become.)	• Malfunction of the fan motor relay • Malfunction of the fan motor • Malfunction of the fan controller • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



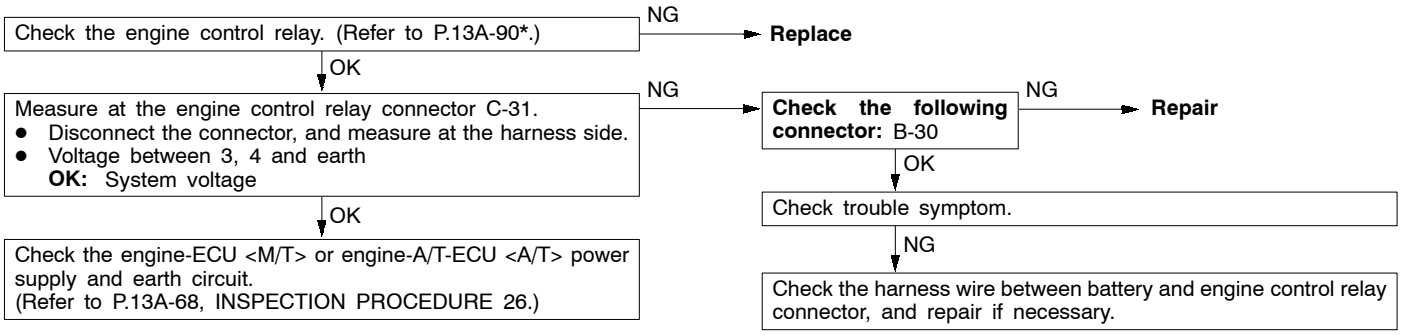
INSPECTION PROCEDURE 26

Engine-ECU <M/T> or engine-A/T-ECU <A/T> power supply and earth circuit system	Probable cause
The engine-ECU <M/T> or engine-A/T-ECU <A/T> may be defective, or that one of the malfunctions listed at right has occurred.	• Improper connector contact, open circuit or short-circuited harness wire in the engine-ECU <M/T> or engine-A/T-ECU <A/T> power supply circuit. • Open circuit or short-circuited harness wire in the engine-ECU <M/T> or engine-A/T-ECU <A/T> earth circuit • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



INSPECTION PROCEDURE 27

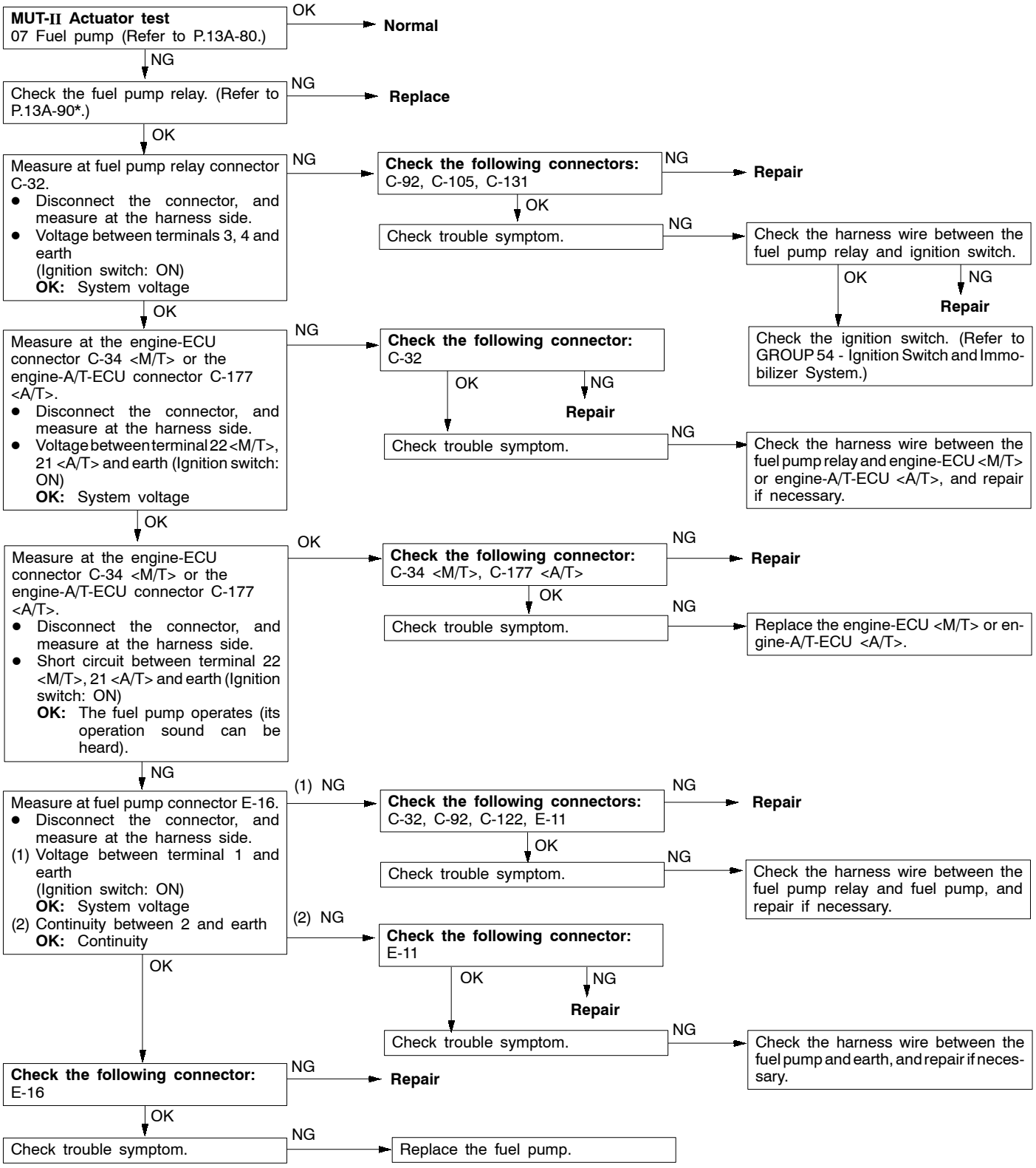
Power supply system and ignition switch-IG system	Probable cause
When an ignition switch ON signal is input to the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the engine-ECU <M/T> or engine-A/T-ECU <A/T> turns the engine control relay ON. This causes battery voltage to be supplied to the engine-ECU <M/T> or engine-A/T-ECU <A/T>, injectors and air flow sensor.	• Malfunction of the ignition switch • Malfunction of the engine control relay • Improper connector contact, open circuit or short-circuited harness wire • Disconnected engine-ECU <M/T> or engine-A/T-ECU <A/T> earth wire • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 28

Fuel pump system	Probable cause
The engine-ECU <M/T> or engine-A/T-ECU <A/T> turns the control relay ON when the engine is cranking or running, and this supplies power to drive the fuel pump.	• 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-ECU <M/T> or engine-A/T-ECU <A/T>

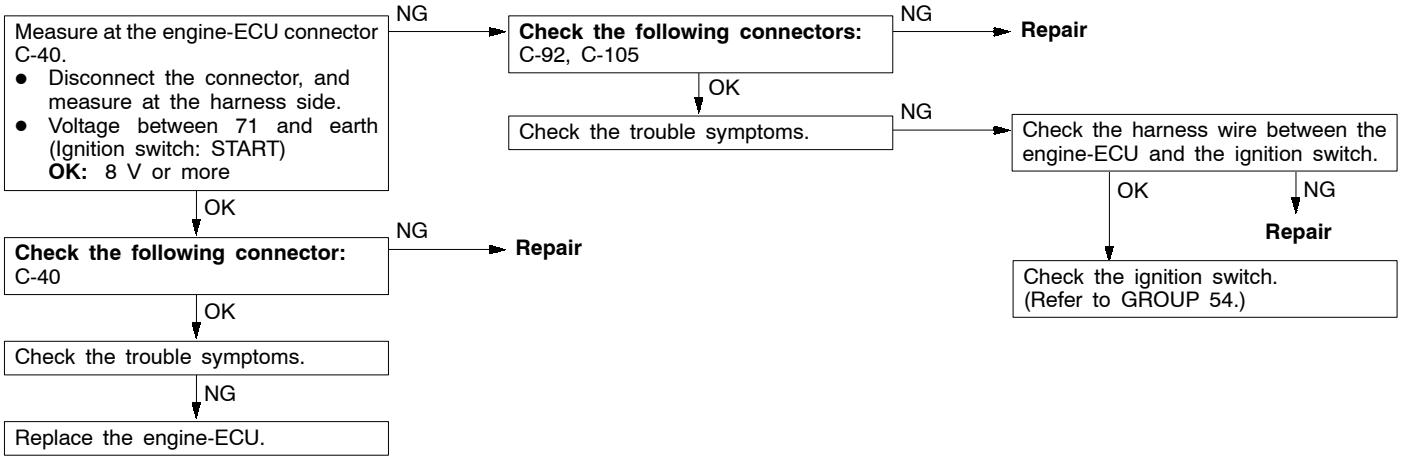


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

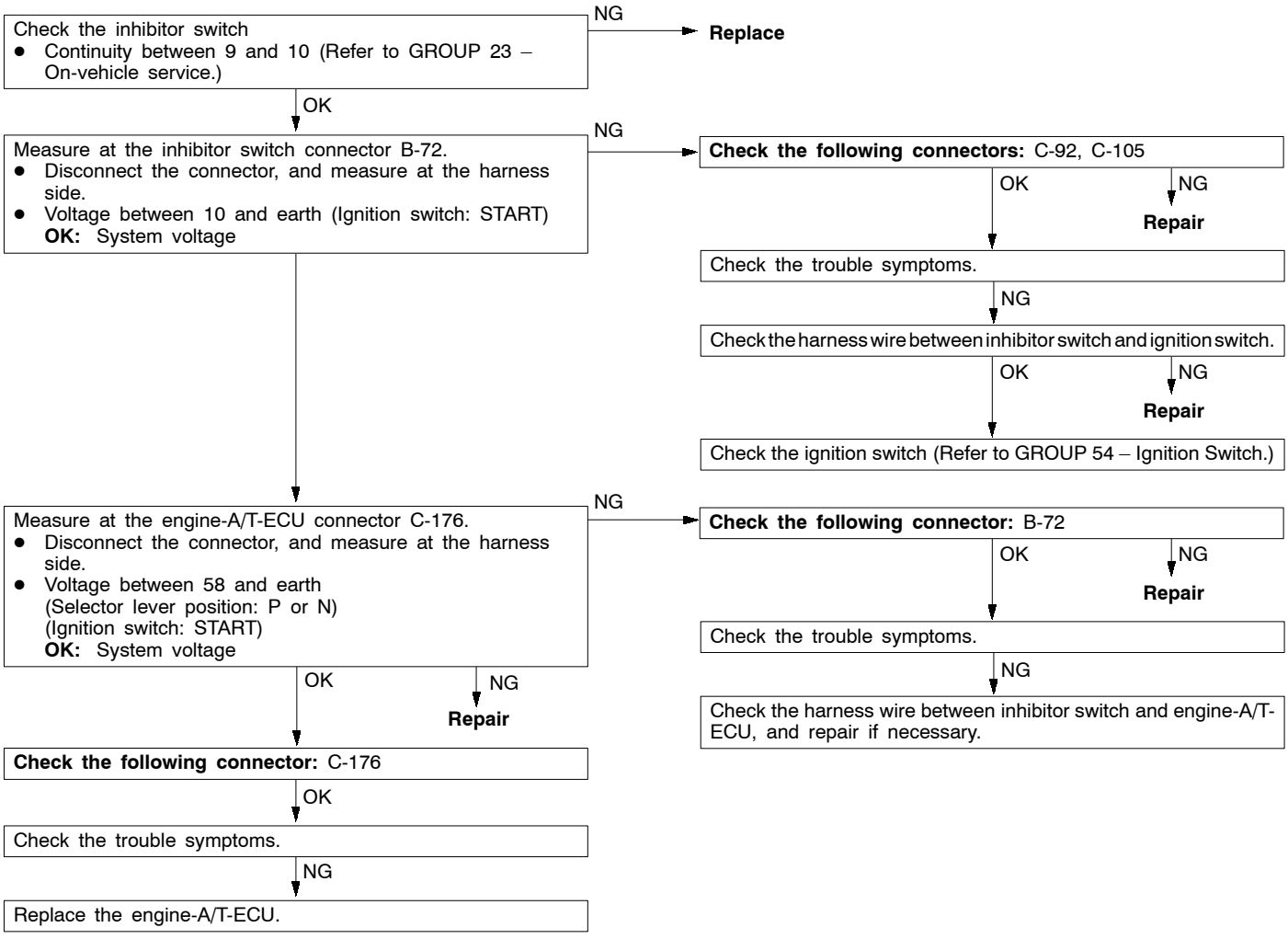
Inspection procedure 29

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

<M/T>

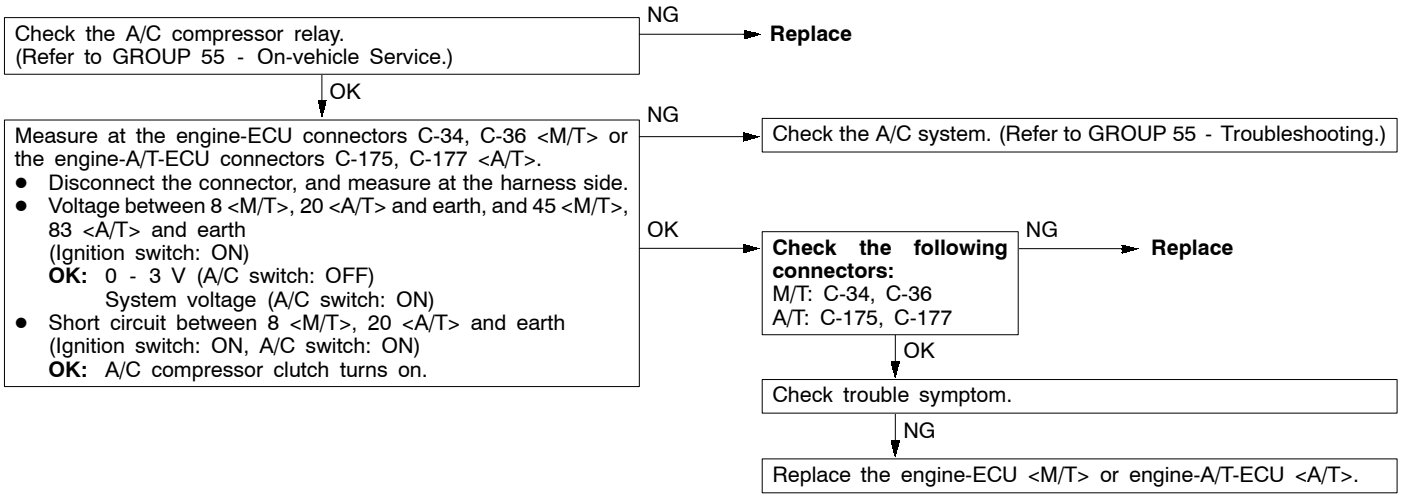


<A/T>



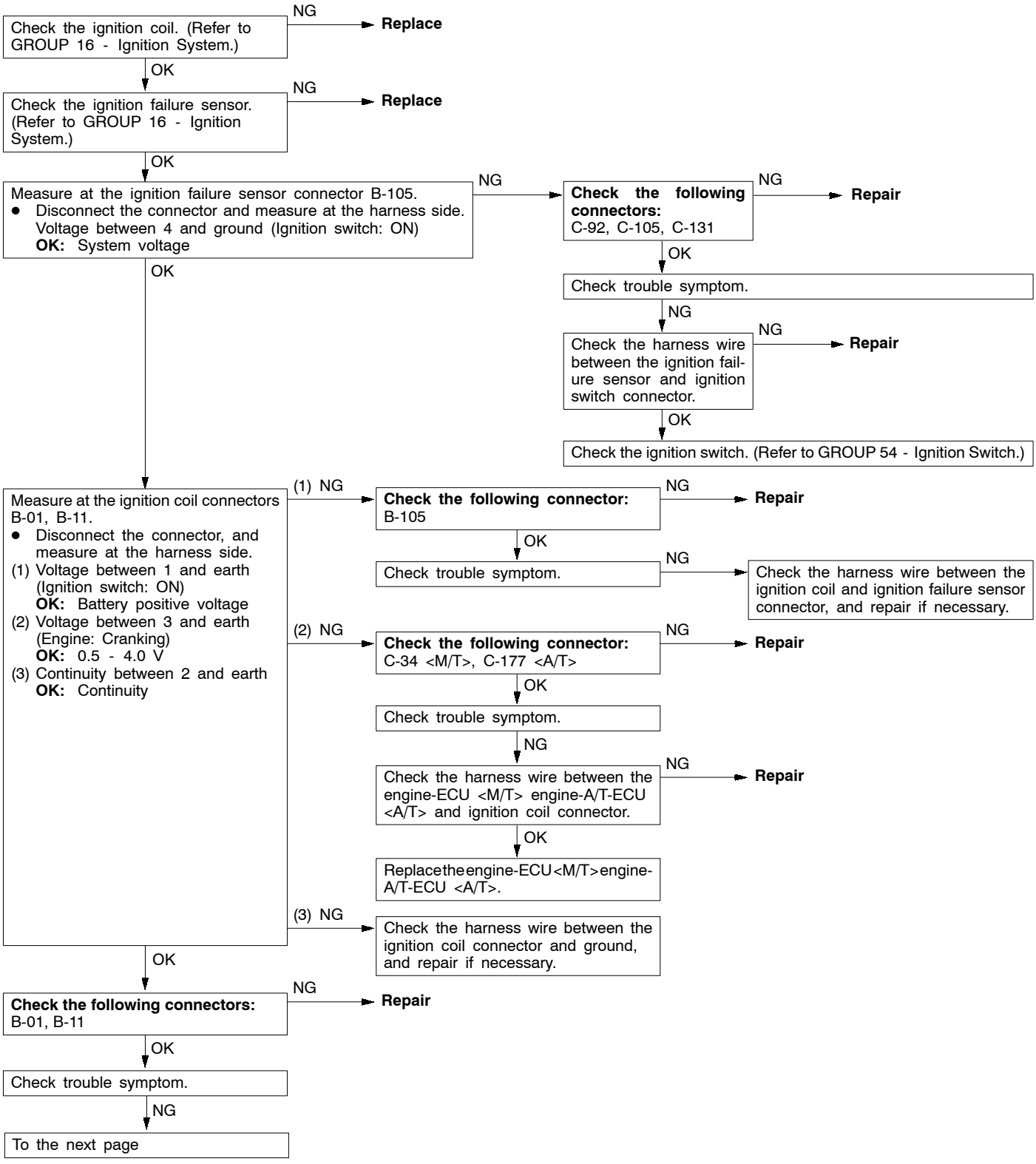
INSPECTION PROCEDURE 30

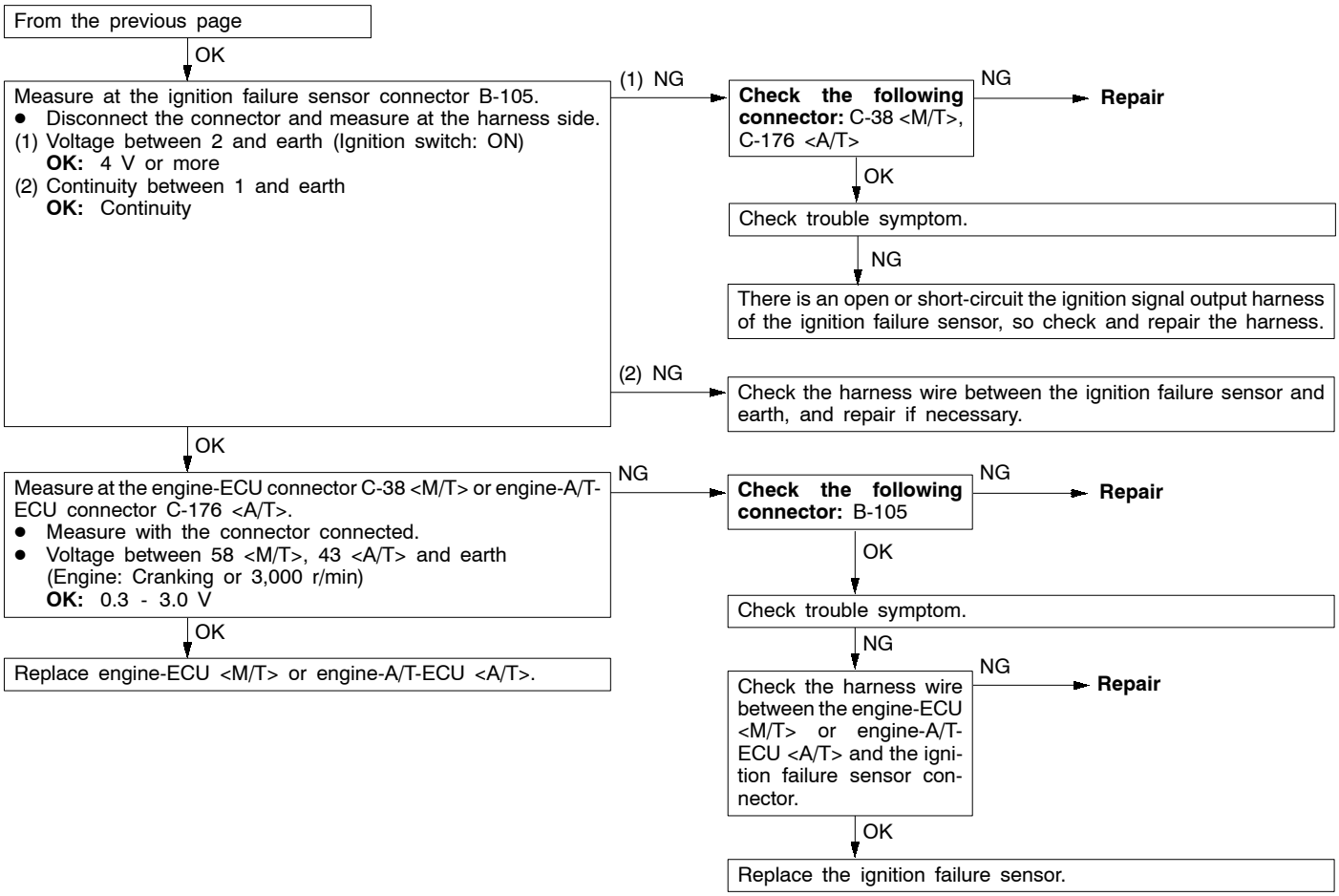
A/C switch and A/C relay system	Probable cause
When an A/C ON signal is input to the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the engine-ECU <M/T> or engine-A/T-ECU <A/T> carries out control of the idle speed control (ISC) servo, and also operates the A/C compressor magnetic clutch.	• Malfunction of A/C control system • Malfunction of A/C switch • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>



INSPECTION PROCEDURE 31

Ignition circuit system	Probable cause
The engine-ECU <M/T> or engine-A/T-ECU <A/T> interrupts the ignition coil primary current by turning the power transistor inside the engine-ECU <M/T> or engine-A/T-ECU <A/T> ON and OFF.	• Malfunction of ignition coil. • Malfunction of ignition failure sensor. • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU <M/T> or engine-A/T-ECU <A/T>


Check the ignition coil. (Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Check the ignition failure sensor. (Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Measure at the ignition failure sensor connector B-105.
● Disconnect the connector and measure at the harness side.
Voltage between 4 and ground (Ignition switch: ON)
OK: System voltage
NG
Check the following connectors:
C-92, C-105, C-131
NG
Repair
OK
Check trouble symptom.
NG
Check the harness wire between the ignition failure sensor and ignition switch connector.
NG
Repair
OK
Check the ignition switch. (Refer to GROUP 54 - Ignition Switch.)
OK
Measure at the ignition coil connectors B-01, B-11.
● Disconnect the connector, and measure at the harness side.
(1) Voltage between 1 and earth (Ignition switch: ON)
OK: Battery positive voltage
(2) Voltage between 3 and earth (Engine: Cranking)
OK: 0.5 - 4.0 V
(3) Continuity between 2 and earth
OK: Continuity
(1) NG
Check the following connector:
B-105
NG
Repair
OK
Check trouble symptom.
NG
Check the harness wire between the ignition coil and ignition failure sensor connector, and repair if necessary.
(2) NG
Check the following connector:
C-34 <M/T>, C-177 <A/T>
NG
Repair
OK
Check trouble symptom.
NG
Check the harness wire between the engine-ECU <M/T> engine-A/T-ECU <A/T> and ignition coil connector.
NG
Repair
OK
Replace the engine-ECU <M/T> engine-A/T-ECU <A/T>.
(3) NG
Check the harness wire between the ignition coil connector and ground, and repair if necessary.
OK
Check the following connectors:
B-01, B-11
NG
Repair
OK
Check trouble symptom.
NG
To the next page


From the previous page
OK
Measure at the ignition failure sensor connector B-105.
● Disconnect the connector and measure at the harness side.
(1) Voltage between 2 and earth (Ignition switch: ON)
OK: 4 V or more
(2) Continuity between 1 and earth
OK: Continuity
(1) NG
Check the following connector: C-38 <M/T>, C-176 <A/T>
NG
Repair
OK
Check trouble symptom.
NG
There is an open or short-circuit the ignition signal output harness of the ignition failure sensor, so check and repair the harness.
(2) NG
Check the harness wire between the ignition failure sensor and earth, and repair if necessary.
OK
Measure at the engine-ECU connector C-38 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure with the connector connected.
● Voltage between 58 <M/T>, 43 <A/T> and earth (Engine: Cranking or 3,000 r/min)
OK: 0.3 - 3.0 V
NG
Check the following connector: B-105
NG
Repair
OK
Check trouble symptom.
NG
Check the harness wire between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the ignition failure sensor connector.
NG
Repair
OK
Replace the ignition failure sensor.
OK
Replace engine-ECU <M/T> or engine-A/T-ECU <A/T>.

DATA LIST REFERENCE TABLE

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

NOTE
*1. 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 idle position switch normally turns off when the voltage of the throttle position sensor is 50 - 100 mV higher than the voltage at the idle position. If the throttle position switch turns back on after the throttle position sensor voltage has risen by 100 mV and the throttle valve has opened, the idle position switch and the throttle position sensor need to be adjusted.
*3. 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.
*4. In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10 % longer than the standard time.
*5. In a new vehicle [driven approximately 500 km or less], the step of the stepper motor is sometimes 30 steps greater than the standard value.

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
11	Oxygen sensor (front)	Engine: After having warmed up Air/fuel mixture is made leaner when decelerating, and is made richer when racing.	When at 4,000 r/min, engine is suddenly decelerated	200 mV or less	Code No. P0130	13A-21
			When engine is suddenly raced	600 - 1,000 mV		
		Engine: After having warmed up The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the ECU.	Engine is idling	400 mV or less (Changes) 600 - 1,000 mV		
			2,500 r/min			
12	Air flow sensor*1	● Engine coolant temperature: 80 - 95°C ● Lamps, electric cooling fan and all accessories: OFF ● Transmission: Neutral (A/T: P range)	Engine is idling	17 - 43 Hz (1.0 – 4.0 g/s)	-	-
			2,500 r/min	70 - 110 Hz (5.0 – 10.0 g/s)		
			Engine is raced	Frequency increases in response to racing		

Item No.	Inspection item	Inspection contents		Normal condition	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	13A-14
			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	Ignition switch: ON	Set to idle position	300 - 1,000 mV	Code No. P0120	13A-18
			Gradually open	Increases in proportion to throttle opening angle		
			Open fully	4,500 - 5,500 mV		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 26	13A-68
18	Cranking signal (ignition switch-ST)	Ignition switch: ON	Engine: Stopped	OFF	Procedure No. 29	13A-71
			Engine: Cranking	ON		
21	Engine coolant temperature sensor	Ignition switch: ON or with engine running	When engine coolant temperature is -20°C	-20°C	Code No. P0115	13A-16
			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		

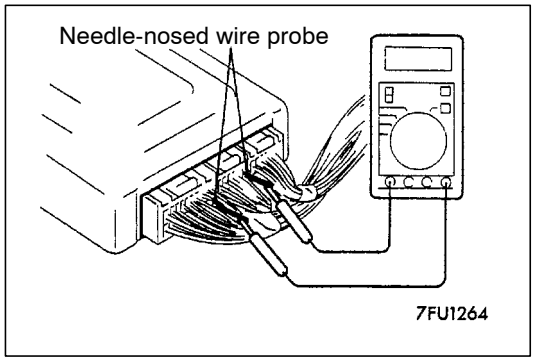
Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
22	Crank angle sensor	● Engine: Cranking ● Tachometer: Connected	Compare the engine speed readings on the tachometer and the MUT-II.	Accord	Code No. P0335	13A-32
		● Engine: Idling ● Idle position switch: ON	When engine coolant temperature is -20°C	1,275 - 1,475 rpm		
			When engine coolant temperature is 0°C	1,225 - 1,425 rpm		
			When engine coolant temperature is 20°C	1,100 - 1,300 rpm		
			When engine coolant temperature is 40°C	950 - 1,150 rpm		
			When engine coolant temperature is 80°C	650 - 850 rpm		
24	Vehicle speed sensor	Drive at 40 km/h		Approximately 40 km/h	Code No. P0500	13A-39
25	Barometric pressure sensor	Ignition switch: ON	At altitude of 0 m	101 kPa	Code No. P0105	13A-12
			At altitude of 600 m	95 kPa		
			At altitude of 1,200 m	88 kPa		
			At altitude of 1,800 m	81 kPa		
26	Idle position switch	Ignition switch: ON Check by operating accelerator pedal repeatedly	Throttle valve: Set to idle position	ON	Code No. P0510	13A-41
			Throttle valve: Slightly open	OFF*2		
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Code No. P0551	13A-42
			Steering wheel turning	ON		
28	A/C switch	Engine: Idling (when A/C switch is ON, A/C compressor should be operating.)	A/C switch: OFF	OFF	Procedure No. 30	13A-72
			A/C switch: ON	ON		
29	Inhibitor switch <A/T>	Ignition switch: ON	P or N	P or N	Procedure No. 29	13A-71
			D, 2, L or R	D, 2, L or R		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
41	Injectors*3	Engine: Cranking	When engine coolant temperature is 0°C (injection is carried out for all cylinders simultaneously)	12 - 19 ms	-	-
			When engine coolant temperature is 20°C	26 - 40 ms		
			When engine coolant temperature is 80°C	6.0 - 9.1 ms		
	Injectors*4	● Engine coolant temperature: 80 – 95°C ● Lamps, electric cooling fan and all accessories: OFF ● Transmission: Neutral (A/T: P range)	Engine is idling	1.6 - 2.8 ms		
			2,500 r/min	1.4 - 2.6 ms		
			When engine is suddenly raced	Increases		
44	Ignition coils and power transistors	● Engine: After having warmed up ● Timing lamp is set. (The timing lamp is set in order to check actual ignition timing.)	Engine is idling	2 - 18°BTDC	Code No. P0300	13A-29
			2,500 r/min	18 - 38°BTDC		
45	ISC (stepper) motor position*5	● Engine coolant temperature: 80 - 95°C ● Lamps, electric cooling fan and all accessories: OFF ● Transmission: Neutral (A/T: P range) ● Idle position switch: ON ● Engine: Idling ● When A/C switch is ON, A/C compressor should be operating	A/C switch: OFF	2 - 25 STEP	-	-
			A/C switch: OFF → ON	Increases by 10 - 70 steps		
			● A/C switch: OFF ● Select lever: N range → D range	Increases by 5 - 50 steps		
49	A/C relay	Engine: After having warmed up/Engine is idling	A/C switch: OFF	OFF (Compressor clutch is not operating)	Procedure No. 30	13A-72
			A/C switch: ON	ON (Compressor clutch is operating)		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
59	Oxygen sensor (rear)	● Transmission: 2nd gear <M/T>, L range <A/T> ● Drive with throttle widely open	3,500 r/min	600 - 1,000 mV	Code No. P0136	13A-24
81	Long-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		-12.5 - 12.5 %	Code No. P0170	13A-27
82	Short-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		-30 - 25 %	Code No. P0170	13A-27
87	Calculation load value	Engine: Warm	Engine: Idling	15 - 35 %	-	-
			2,500 r/min	15 - 35 %		
88	Fuel control condition	Engine: Warm	2,500 r/min	Closed loop	Code No. P0125	13A-20
			when engine is suddenly raced	Open loop - drive condition		
A1	Oxygen sensor (sensor 1)	Engine: After having warmed up	Idling	0 V	Code No. P0130	13A-21
			Sudden racing	0.6 - 1.0 V		
			2,500 r/min	0.4 V or less and 0.6 - 1.0 V alternates		
A2	Oxygen sensor (sensor 2)	● Transmission: 2nd gear <M/T>, L range <A/T> ● Drive with throttle widely open	3,500 r/min	0.6 - 1.0 V	Code No. P0136	13A-24
8A	Throttle position sensor (Throttle valve opening angle)	● Engine coolant temperature: 80 - 95°C ● Ignition switch: ON (Engine: Stopped)	Release the accelerator pedal.	6 - 20 %	Code No. P0120	13A-18
			Depress the accelerator pedal gradually	Increase in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	80 - 100 %		

ACTUATOR TEST REFERENCE TABLE

Item No.	Inspection item	Drive contents	Inspection contents		Normal condition	Inspection procedure No.	Reference page
01	Injectors	Cut fuel to No. 1 injector	Engine: After having warmed up/Engine is idling (Cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)		Idling condition becomes different (becomes unstable).	Code No. P0201	13A-28
02		Cut fuel to No. 2 injector				Code No. P0202	13A-28
03		Cut fuel to No. 3 injector				Code No. P0203	13A-28
04		Cut fuel to No. 4 injector				Code No. P0204	13A-28
07	Fuel pump	Fuel pump operates and fuel is recirculated.	• Engine: Cranking • Fuel pump: Forced driving Inspect according to both the above conditions.	Pinch the return hose with fingers to feel the pulse of the fuel being recirculated.	Pulse is felt.	Procedure No. 28	13A-69
				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		Sound of operation can be heard when solenoid valve is driven.	Code No. P0443	13A-38
10	EGR control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Sound of operation can be heard when solenoid valve is driven.	Code No. P0403	13A-36
17	Basic ignition timing	Set to ignition timing adjustment mode	Engine: Idling Timing light is set		5°BTDC	-	-
21	Fan controller	Drive the fan motor	Ignition switch: ON		Radiator fan and condenser fan operate at high speed	Procedure No. 25	13A-67



CHECK AT THE ENGINE-ECU TERMINALS

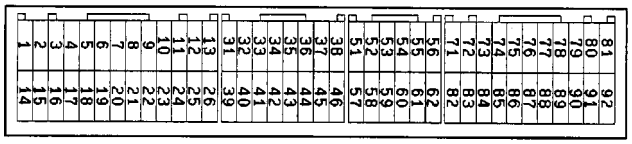
TERMINAL VOLTAGE CHECK CHART

1. Connect a needle-nosed wire probe (test harness: MB991223 or paper clip) to a voltmeter probe.
2. Insert the needle-nosed wire probe into each of the engine-ECU <M/T> or engine-A/T-ECU <A/T> connector terminals from the wire side, and measure the voltage while referring to the check chart.

   NOTE
   (1) Make the voltage measurement with the engine-ECU <M/T> or engine-A/T-ECU <A/T> connectors connected.
   (2) You may find it convenient to pull out the engine-ECU <M/T> or engine-A/T-ECU <A/T> to make it easier to reach the connector terminals.
   (3) The checks can be carried out off the order given in the chart.

   Caution
   Short-circuiting the positive (+) probe between a connector terminal and earth could damage the vehicle wiring, the sensor, engine-ECU <M/T> or engine-A/T-ECU <A/T> or all of them. Be careful to prevent this!
3. If voltmeter shows any division from standard value, check the corresponding sensor, actuator and related electrical wiring, then repair or replace.
4. After repair or replacement, recheck with the voltmeter to confirm that the repair has corrected the problem.

Engine-ECU <M/T> Connector Terminal Arrangement



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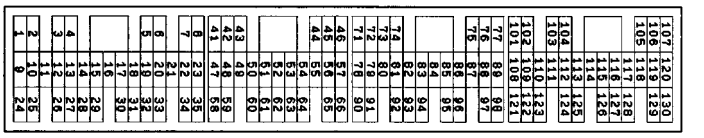
Engine-A/T-ECU <A/T> Connector Terminal Arrangement



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Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)	Normal condition
1	1	No. 1 injector	While engine is idling after having warmed up, suddenly depress the accelerator pedal.	From 11 - 14 V, momentarily drops slightly
14	9	No. 2 injector		
2	24	No. 3 injector		
15	2	No. 4 injector		
4	14	Stepper motor coil <A1>	Engine: Soon after the warmed up engine is started	System voltage ↔ 0 V (Changes repeatedly)
17	28	Stepper motor coil <A2>		
5	15	Stepper motor coil <B1>		
18	29	Stepper motor coil <B2>		
6	6	EGR control solenoid valve	Ignition switch: ON	System Voltage
			While engine is idling, suddenly depress the accelerator pedal.	From system voltage, momentarily drops
8	20	A/C relay	• Engine: Idle speed • A/C switch: OFF → ON (A/C compressor is operating)	System voltage or momentarily 6 V or more → 0 - 3 V
9	34	Purge control solenoid valve	Ignition switch: ON	System voltage
			Running at 3,000 r/min while engine is warming up after having been started.	0 - 3 V
10	11	Ignition coil - No. 1, No. 4 (power transistor)	Engine r/min: 3,000 r/min	0.3 - 3.0 V
23	12	Ignition coil - No. 2, No. 3 (power transistor)		
12	41	Power supply	Ignition switch: ON	System voltage
25	47			

Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
19	19	Air flow sensor reset signal	Engine: Idle speed		0 - 1 V
			Engine r/min: 3,000 r/min		6 - 9 V
21	18	Fan controller	Radiator fan and condenser fan are not operating		0 - 0.3 V
			Radiator fan and condenser fan are operating		0.7 V or more
22	21	Fuel pump relay	Ignition switch: ON		System voltage
			Engine: Idle speed		0 - 3 V
24	61	A/C switch 2	● 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
33	8	Alternator G terminal	● Engine: Warm, idle (radiator fan: OFF) ● Headlamp: OFF to ON ● Rear defogger switch: OFF to ON ● Brake lamp: ON		Voltage rises by 0.2 - 3.5 V.
41	54	Alternator FR terminal	● Engine: Warm, idle (radiator fan: OFF) ● Headlamp: OFF to ON ● Rear defogger switch: OFF to ON ● Brake lamp: ON		Voltage drops by 0.2 - 3.5 V.
36	22	Engine warning lamp	Ignition switch: “LOCK” (OFF) position → ON		0 - 3 V → 9 - 13 V (After several seconds have elapsed)
37	52	Power steering fluid pressure switch	Engine: Idling after warming up	When steering wheel is stationary	System voltage
				When steering wheel is turned	0 - 3 V
38	49	Control relay (Power supply)	Ignition switch: “LOCK” (OFF) position		System voltage
			Ignition switch: ON		0 - 3 V
45	83	A/C switch 1	Engine: Idle speed	Turn the A/C switch OFF	0 - 3 V
				Turn the A/C switch ON (A/C compressor is operating)	System voltage
58	43	Tachometer signal	Engine r/min: 3,000 r/min		0.3 - 3.0 V

Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
60	3	Oxygen sensor (front) heater	Engine: Idling after warming up		0 - 3 V
			Engine r/min: 5,000 r/min.		System voltage
54	26	Oxygen sensor (rear) heater	Engine: Idling after having warmed up		0 - 3 V
			Engine r/min: 5,000 r/min		System voltage
71	58	Ignition switch-ST	Engine: Cranking		8 V or more
72	64	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
75	73	Oxygen sensor (rear)	• Transmission: 2nd gear <M/T>, L range <A/T> • Engine r/min: 3,500 r/min or more • Driving with the throttle valve widely open		0.6 - 1.0 V
76	71	Oxygen sensor (front)	Engine: Running at 2,500 r/min after warmed up (Check using a digital type voltmeter)		0 ↔ 0.8 V (Changes repeatedly)
80	66	Backup power supply	Ignition switch: “LOCK” (OFF) position		System voltage
81	46	Sensor impressed voltage	Ignition switch: ON		4.5 - 5.5 V
82	98	Ignition switch-IG	Ignition switch: ON		System voltage
83	44	Engine coolant temperature sensor	Ignition switch: ON	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 80°C	0.3 - 0.9 V

Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
84	78	Throttle position sensor	Ignition switch: ON	Set throttle valve to idle position	0.3 - 1.0 V
				Fully open throttle valve	4.5 - 5.5 V
85	55	Barometric pressure sensor	Ignition switch: ON	When altitude is 0 m	3.7 - 4.3 V
				When altitude is 1,200 m	3.2 - 3.8 V
86	80	Vehicle speed sensor	● Ignition switch: ON ● Move the vehicle slowly forward		0 ↔ 5 V (Changes repeatedly)
87	79	Idle position switch	Ignition switch: ON	Set throttle valve to idle position	0 - 1 V
				Slightly open throttle valve	4 V or more
88	56	Camshaft position sensor	Engine: Cranking		0.4 - 3.0 V
			Engine: Idle speed		0.5 - 2.0 V
89	45	Crank angle sensor	Engine: Cranking		0.4 - 4.0 V
			Engine: Idle speed		1.5 - 2.5 V
90	65	Air flow sensor	Engine: Idle speed		2.2 - 3.2 V
			Engine r/min: 2,500 r/min		

CHECK CHART FOR RESISTANCE AND CONTINUITY BETWEEN TERMINALS

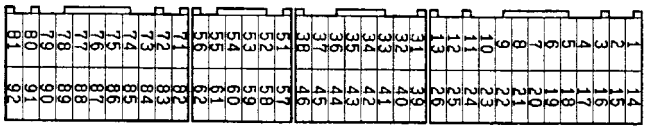
1. Turn the ignition switch to “LOCK” (OFF) position.
2. Disconnect the engine-ECU <M/T> or engine-A/T-ECU <A/T> connector.
3. Measure the resistance and check for continuity between the terminals of the engine-ECU <M/T> or engine-A/T-ECU <A/T> harness-side connector while referring to the check chart.

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

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

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

Engine-ECU <M/T> Harness Side Connector Terminal Arrangement



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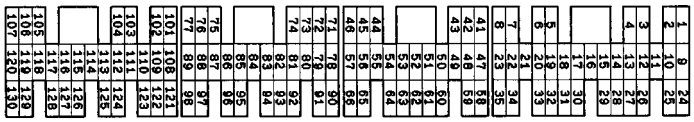
Engine-A/T-ECU <A/T> Harness Side Connector Terminal Arrangement



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Terminal No.<M/T>	Terminal No. <A/T>	Inspection item	Normal condition (Check condition)
1 - 12	1 - 41	No. 1 injector	13 - 16 Ω (At 20°C)
14 - 12	9 - 41	No. 2 injector	
2 - 12	24 - 41	No. 3 injector	
15 - 12	2 - 41	No. 4 injector	
4 - 12	14 - 41	Stepper motor coil (A1)	28 - 33 Ω (At 20°C)
17 - 12	28 - 41	Stepper motor coil (A2)	
5 - 12	15 - 41	Stepper motor coil (B1)	
18 - 12	29 - 41	Stepper motor coil (B2)	
6 - 12	6 - 41	EGR control solenoid valve	29 - 35 Ω (At 20°C)
9 - 12	34 - 41	Purge control solenoid valve	29 - 35 Ω (At 20°C)
13 - Body earth	42 - Body earth	Engine-ECU earth <M/T> Engine-A/T-ECU earth <A/T>	Continuity (0 Ω)
26 - Body earth	48 - Body earth	Engine-ECU earth <M/T> Engine-A/T-ECU earth <A/T>	
60 - 12	3 - 41	Oxygen sensor (front) heater	4.5 - 8.0 Ω (At 20°C)
54 - 12	26 - 41	Oxygen sensor (rear) heater	11 - 18 Ω (At 20°C)

Terminal No.<M/T>	Terminal No. <A/T>	Inspection item	Normal condition (Check condition)
72 - 92	64 - 57	Intake air temperature sensor	5.3 - 6.7 kΩ (When intake air temperature is 0°C)
			2.3 - 3.0 kΩ (When intake air temperature is 20°C)
			1.0 - 1.5 kΩ (When intake air temperature is 40°C)
			0.30 - 0.42 kΩ (When intake air temperature is 80°C)
83 - 92	44 - 57	Engine coolant temperature sensor	5.1 - 6.5 kΩ (When coolant temperature is 0°C)
			2.1 - 2.7 kΩ (When coolant temperature is 20°C)
			0.9 - 1.3 kΩ (When coolant temperature is 40°C)
			0.26 - 0.36 kΩ (When coolant temperature is 80°C)
87 - 92	79 - 57	Idle position switch	Continuity (When throttle valve is at idle position)
			No continuity (When throttle valve is slightly open)

INSPECTION PROCEDURE USING AN ANALYZER

On vehicles with A/T, the ECU controls the engine and the transmission comprehensively (This is called engine-A/T-ECU). Due to this, the following describe only the inspection procedures at the engine-A/T-ECU terminals. On vehicles with M/T, the ECU (engine-ECU) has not been changed, so the inspection procedures at the ECU terminals are the same as before.

AIR FLOW SENSOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 65.

CAMSHAFT POSITION SENSOR AND CRANK ANGLE SENSOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 56. (When checking the camshaft position sensor signal wave pattern.)
2. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 45. (When checking the crank angle sensor signal wave pattern.)

INJECTOR

Alternate 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 9. (When checking the No. 2 cylinder.)
3. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 24. (When checking the No. 3 cylinder.)
4. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 2. (When checking the No. 4 cylinder.)

IDLE SPEED CONTROL SERVO (STEPPER MOTOR)

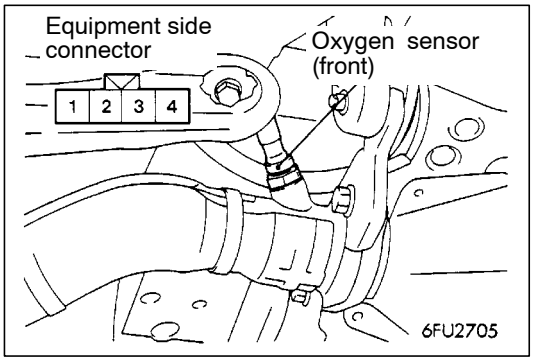
Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 14, connection terminal 28, connection terminal 15, and connection terminal 29 respectively.

IGNITION COIL AND POWER TRANSISTOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 11 (No. 1 - No. 4), terminal 12 (No. 2 - No. 3) respectively

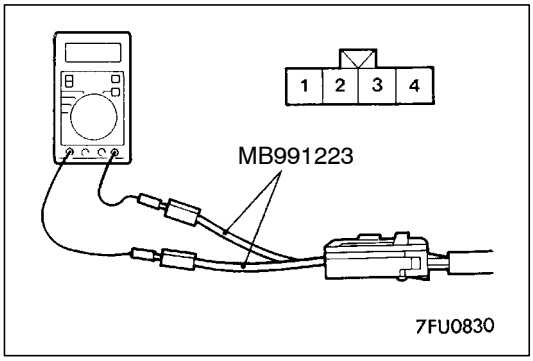


ON-VEHICLE SERVICE

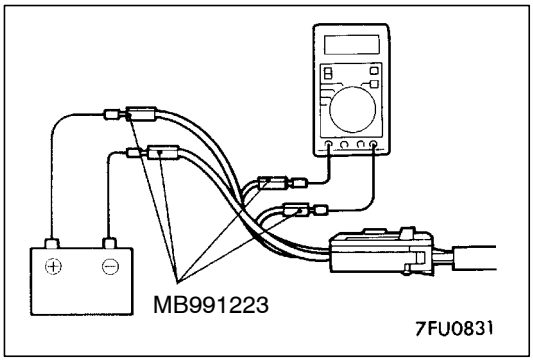
OXYGEN SENSOR CHECK

<Oxygen sensor (front)>

1. Disconnect the oxygen sensor connector and connect the special tool (test harness) to the connector on the oxygen sensor side.
2. Make sure that there is continuity (4.5 - 8.0 Ω at 20°C) between terminal 3 and terminal 4 on the oxygen sensor connector.



3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until engine coolant is 80°C or higher.



5. Use the jumper wire to connect terminal 3 of the oxygen sensor connector to the battery (+) terminal and terminal 4 to the battery (-) terminal.

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

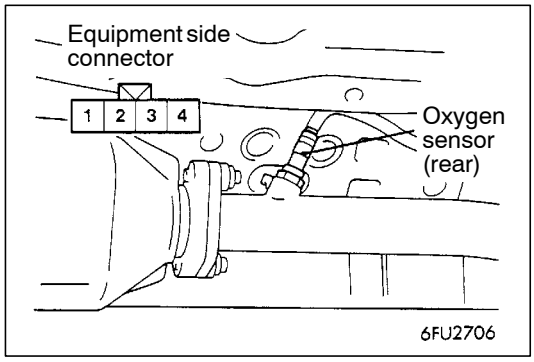
6. Connect a digital voltage meter between terminal 1 and terminal 2.
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

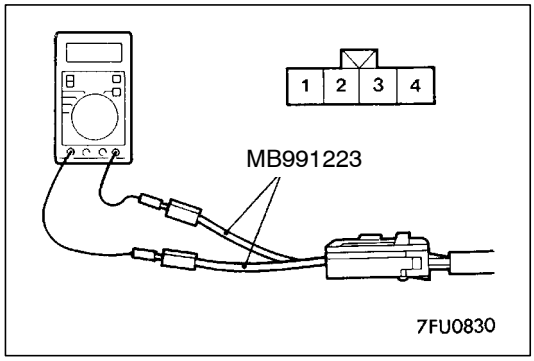
   Standard value:

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

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

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





<Oxygen sensor (rear)>

1. Disconnect the oxygen sensor connector and connect the special tool (test harness set) to the connector on the oxygen sensor side.
2. Make sure that there is continuity (11 - 18 Ω at 20°C) between terminal 3 and terminal 4 on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.

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

MULTIPOINT FUEL INJECTION (MPI) <6A1>

GENERAL

OUTLINE OF CHANGES

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

- On-board Diagnostics System has been adopted to expand the diagnostic items and to change diagnosis code numbering system.
- The engine-ECU has been changed. (from 76-pin connector to 93-pin connector)
- The oxygen sensor has been changed.

GENERAL INFORMATION

SELF-DIAGNOSIS FUNCTION

Following functions have been added.

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

GENERAL SPECIFICATIONS

Items		Specifications
Engine-ECU	Identification model No.	E6T30473 <Vehicles without TCL> E6T30474 <Vehicles with TCL>

MULTIPOINT FUEL INJECTION SYSTEM DIAGRAM

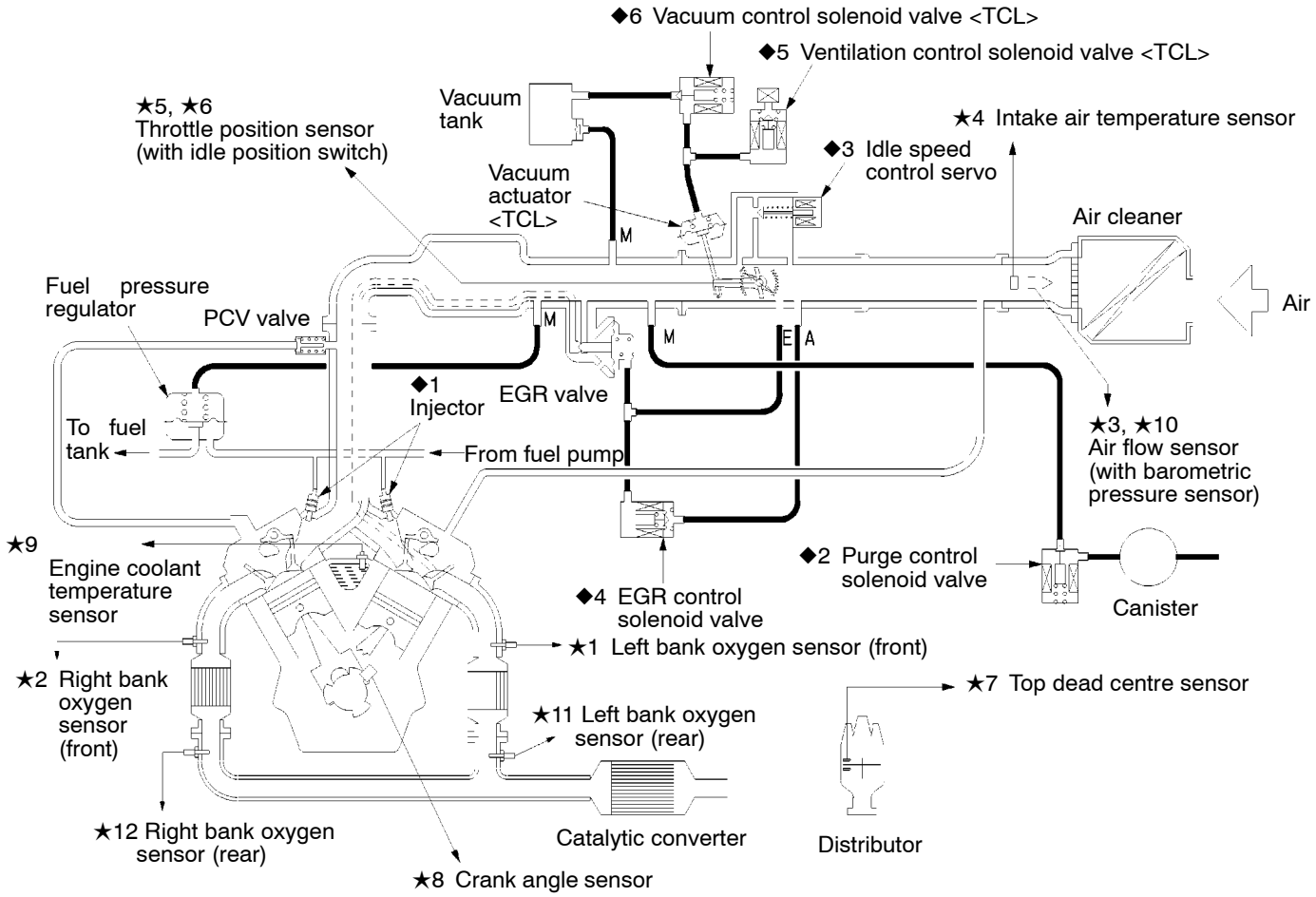
- ★1 Left bank oxygen sensor (front)
- ★2 Right bank oxygen sensor (front)
- ★3 Air flow sensor
- ★4 Intake air temperature sensor
- ★5 Throttle position sensor
- ★6 Idle position switch
- ★7 Top dead centre sensor
- ★8 Crank angle sensor
- ★9 Engine coolant temperature sensor
- ★10 Barometric pressure sensor
- ★11 Left bank oxygen sensor (rear)
- ★12 Right bank oxygen sensor (rear)

- Power supply voltage
- Vehicle speed sensor
- A/C switch 1, 2
- Inhibitor switch
- Power steering fluid pressure switch
- Ignition switch-ST
- Ignition switch-IG
- Alternator FR terminal
- A/T-ECU
- TCL-ECU <TCL>

⇨ Engine-ECU ⇨

- ◆1 Injector
- ◆2 Purge control solenoid valve
- ◆3 Idle speed control servo
- ◆4 EGR control solenoid valve
- ◆5 Ventilation control solenoid valve <TCL>
- ◆6 Vacuum control solenoid valve <TCL>

- Fuel pump relay
- Engine control relay
- A/C power relay
- Engine warning lamp
- Diagnosis signal
- Ignition coil, power transistor
- Fan controller
- Alternator G terminal
- A/T-ECU
- TCL-ECU <TCL>



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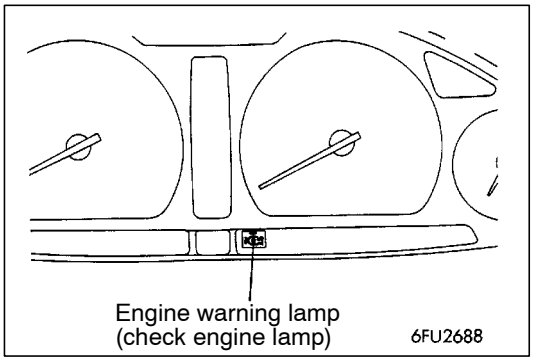
SERVICE SPECIFICATIONS

Items	Standard value
Oxygen sensor output voltage V	0.6 - 1.0
Oxygen sensor heater coil resistance front (at 20°C) Ω	4.5 - 8.0
Oxygen sensor heater coil resistance rear (at 20°C) Ω	11 - 18



TROUBLESHOOTING

DIAGNOSIS FUNCTION

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

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

Engine warning lamp inspection items

Code No.	Diagnosis item
-	Engine-ECU
P0100	Air flow sensor system
P0105	Barometric pressure sensor system
P0110	Intake air temperature sensor system
P0115	Engine coolant temperature sensor system
P0120★	Throttle position sensor (1st channel) system
P0125	Feedback system
P0130	Oxygen sensor (front) system <Bank 1 sensor 1>
P0135	Oxygen sensor heater (front) system <Bank 1 sensor 1>
P0136	Oxygen sensor (rear) system <Bank 1 sensor 2>
P0141	Oxygen sensor heater (rear) system <Bank 1 sensor 2>
P0150	Oxygen sensor (front) <Bank 2 sensor 1>
P0155	Oxygen sensor heater (front) <Bank 2 sensor 1>
P0156	Oxygen sensor (rear) <Bank 2 sensor 2>
P0161	Oxygen sensor heater (rear) <Bank 2 sensor 2>
P0170	Abnormal fuel system (Bank 1)
P0173	Abnormal fuel system (Bank 2)
P0201	No. 1 injector system
P0202	No. 2 injector system
P0203	No. 3 injector system
P0204	No. 4 injector system
P0205	No. 5 injector system
P0206	No. 6 injector system

Code No.	Diagnosis item
P0300★	Ignition coil (power transistor) system
P0301	No. 1 cylinder misfire detected
P0302	No. 2 cylinder misfire detected
P0303	No. 3 cylinder misfire detected
P0304	No. 4 cylinder misfire detected
P0305	No. 5 cylinder misfire detected
P0306	No. 6 cylinder misfire detected
P0335	Crank angle sensor system
P0340	Top dead centre sensor system
P0403	EGR valve system
P0421	Catalyst malfunction (Bank 1)
P0431	Catalyst malfunction (Bank 2)
P0443	Purge control solenoid valve system
P0505	Idle speed control system
P0510	Idle position switch system
P0551	Power steering fluid pressure switch system
P1101	Vacuum control solenoid valve system
P1102	Ventilation control solenoid valve system

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

METHOD OF READING AND ERASING DIAGNOSIS CODES

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

DIAGNOSIS USING DIAGNOSIS 2 MODE

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

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

5. Erase the diagnosis codes.

INSPECTION USING MUT-II DATA LIST AND ACTUATOR TESTING

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

FREEZE FRAME DATA

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

Display item list

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

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

READINESS TEST STATUS

The engine-ECU monitors the following main diagnosis items, judges if these items are in good condition or not, and the stores its history. This history can be read out by using MUT-II. (If the ECU has judged a item before, the MUT-II displays "Complete.")
In addition, if diagnosis codes are erased or the battery cable is disconnected, this history will also be erased (the memory will be reset).

- Catalyst: P0421, P0431
- Oxygen sensor: P0130, P0150
- Oxygen sensor heater: P0135, P0141, P0155, P0161

FAIL-SAFE FUNCTION REFERENCE TABLE

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

Malfunctioning item	Control contents during malfunction
Air flow sensor	1. Uses the throttle position sensor signal and engine speed signal (crank angle sensor signal) to take reading of the basic injector drive time and basic ignition timing from the pre-set mapping. 2. Fixes the ISC servo in the appointed position so idle control is not performed.
Intake air temperature sensor	Controls as if the intake air temperature is 25°C.
Throttle position sensor (TPS)	No increase in fuel injection amount during acceleration due to the throttle position sensor signal.
Engine coolant temperature sensor	Controls as if the engine coolant temperature is 80°C.
Top dead centre sensor	Injects fuel to all cylinders simultaneously. (However, after the ignition switch is turned to ON, the No. 1 cylinder top dead centre is not detected at all.)
Barometric pressure sensor	Controls as if the barometric pressure is 101 kPa.
Detonation sensor	Switches the ignition timing from ignition timing for super petrol to ignition timing for standard petrol.
Right bank oxygen sensor (front) and left bank oxygen sensor (front)	Air/fuel ratio feedback control (closed loop control) is not performed.
Right bank oxygen sensor (rear) and left bank oxygen sensor (rear)	Performs the feedback control (closed loop control) of the air/fuel ratio by using only the signal of the oxygen sensor (front) installed on the front of the catalytic converter.
Communication wire with transmission control unit <A/T>	Ignition timing is not retarded during transmission gear shifting (overall engine and transmission control).
Alternator FR terminal	Does not control the output of the alternator according to an electrical load. (works as a normal alternator)
Misfiring	If the detected misfiring causes damage to the catalyst, the misfiring cylinder will be shut down.

NOTE
When a problem is detected in the vacuum control solenoid valve, ventilation control solenoid valve, crank angle sensor or any of the above items, traction control is not performed <Vehicles with TCL>.

INSPECTION CHART FOR DIAGNOSIS CODES

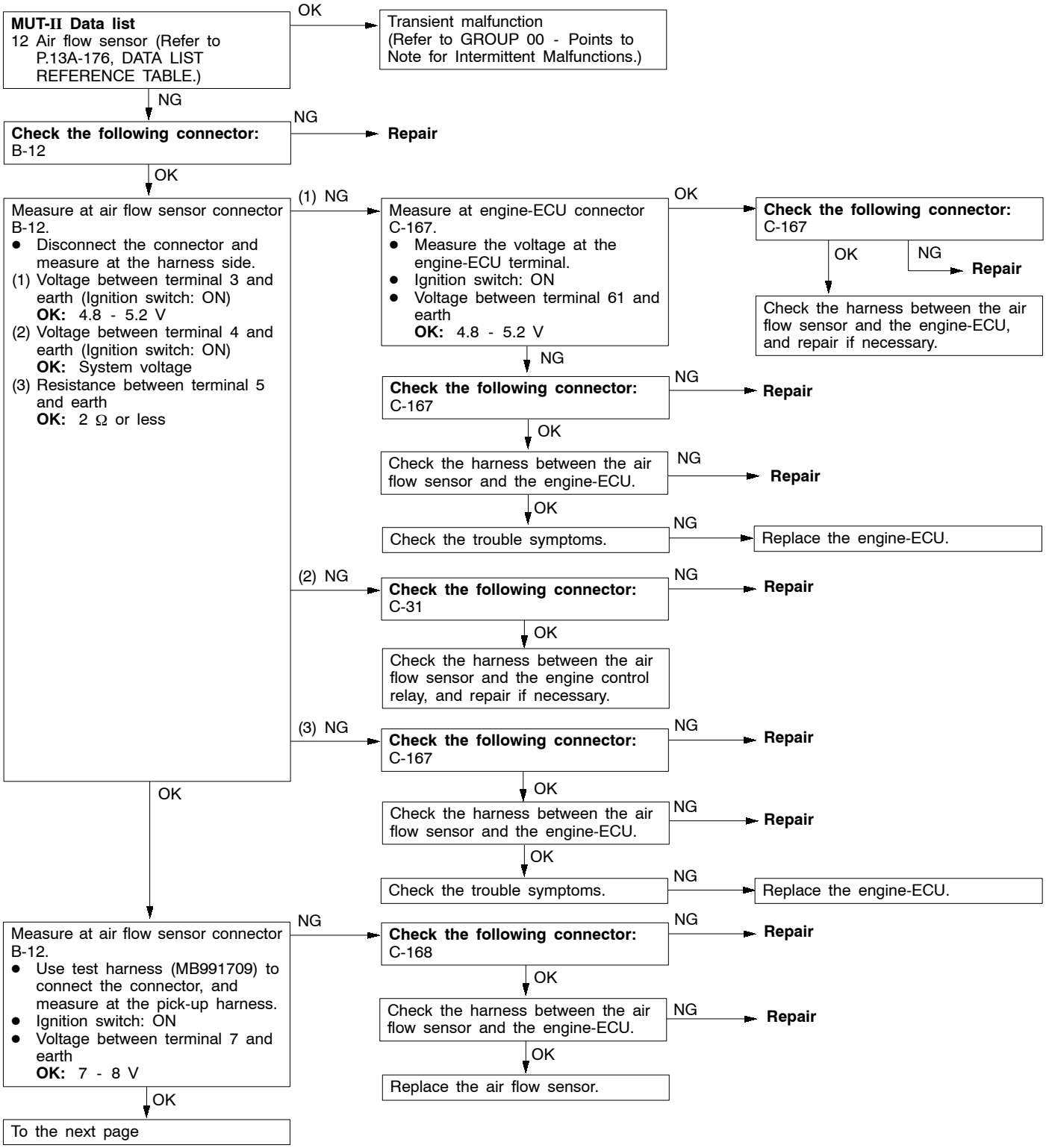
Code No.	Diagnosis item	Reference page
P0100	Air flow sensor system	13A-101
P0105	Barometric pressure sensor system	13A-103
P0110	Intake air temperature sensor system	13A-105
P0115	Engine coolant temperature sensor system	13A-106
P0120★	Throttle position sensor 1 system	13A-109
P0125	Feedback system	13A-110
P0130	Oxygen sensor (front) system <Bank 1 sensor 1>	13A-113
P0135	Oxygen sensor heater (front) system <Bank 1 sensor 1>	13A-115
P0136	Oxygen sensor (rear) system <Bank 1 sensor 2>	13A-116
P0141	Oxygen sensor heater (rear) system <Bank 1 sensor 2>	13A-118
P0150	Oxygen sensor (front) <Bank 2 sensor 1>	13A-119
P0155	Oxygen sensor heater (front) <Bank 2 sensor 1>	13A-121
P0156	Oxygen sensor (rear) <Bank 2 sensor 2>	13A-122
P0161	Oxygen sensor heater (rear) <Bank 2 sensor 2>	13A-124
P0170	Abnormal fuel system (Bank 1)	13A-125
P0173	Abnormal fuel system (Bank 2)	13A-126
P0201	No. 1 injector system	13A-127
P0202	No. 2 injector system	13A-127
P0203	No. 3 injector system	13A-127
P0204	No. 4 injector system	13A-127
P0205	No. 5 injector system	13A-127
P0206	No. 6 injector system	13A-127
P0300★	Ignition coil (power transistor) system	13A-128
P0301	No. 1 cylinder misfire detected	13A-129
P0302	No. 2 cylinder misfire detected	13A-129
P0303	No. 3 cylinder misfire detected	13A-129
P0304	No. 4 cylinder misfire detected	13A-129
P0305	No. 5 cylinder misfire detected	13A-129
P0306	No. 6 cylinder misfire detected	13A-129
P0325	Detonation sensor system	13A-130
P0335	Crank angle sensor system	13A-130
P0340	Top dead centre sensor system	13A-132

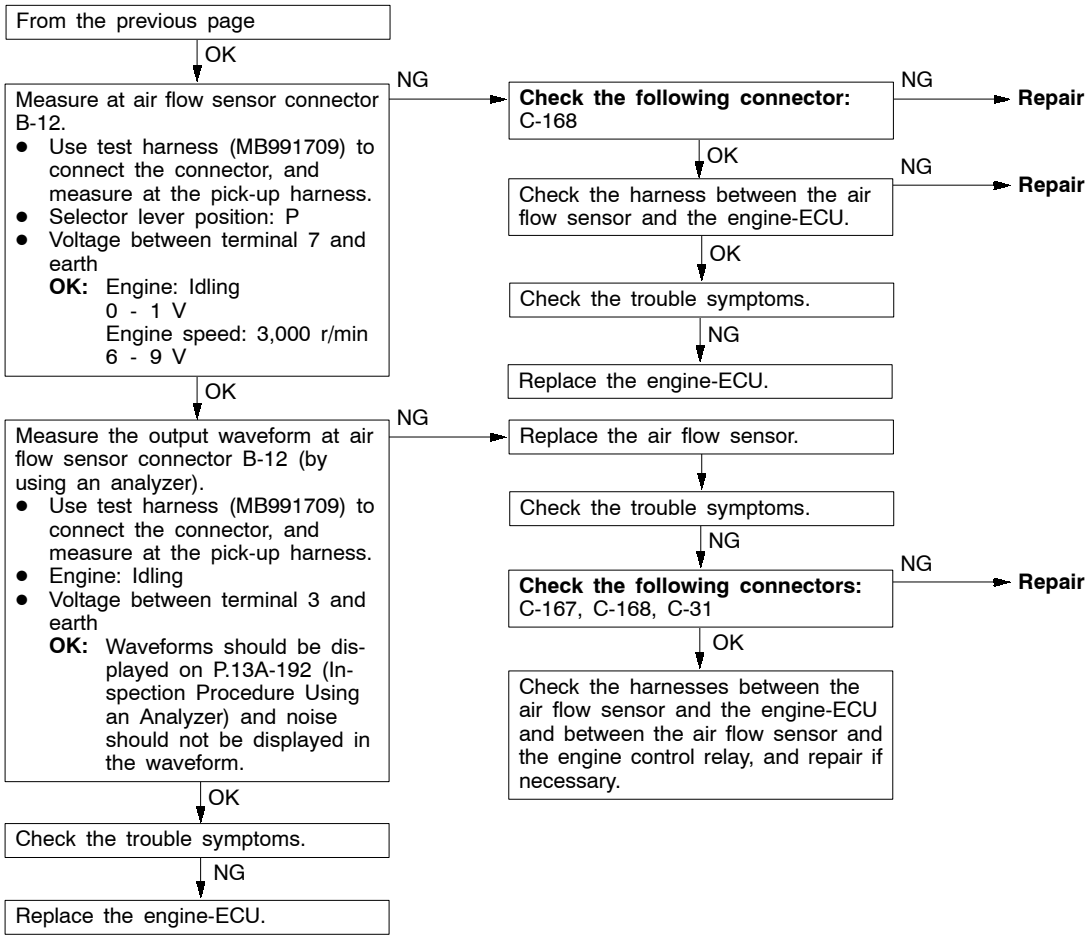
Code No.	Diagnosis item	Reference page
P0403	EGR valve system	13A-133
P0421	Catalyst malfunction (Bank 1)	13A-134
P0431	Catalyst malfunction (Bank 2)	13A-135
P0443	Purge control solenoid valve system	13A-136
P0500	Vehicle speed sensor system	13A-137
P0505	Idle speed control system	13A-137
P0510	Idle position switch system	13A-139
P0551	Power steering fluid pressure switch system	13A-140
P1101	Vacuum control solenoid valve system	13A-141
P1102	Ventilation control solenoid valve system	13A-142
P1500	Alternator FR terminal system	13A-143
P1600	Communication wire with A/T-ECU system <A/T>	13A-144
P1610	Immobilizer system	13A-144

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

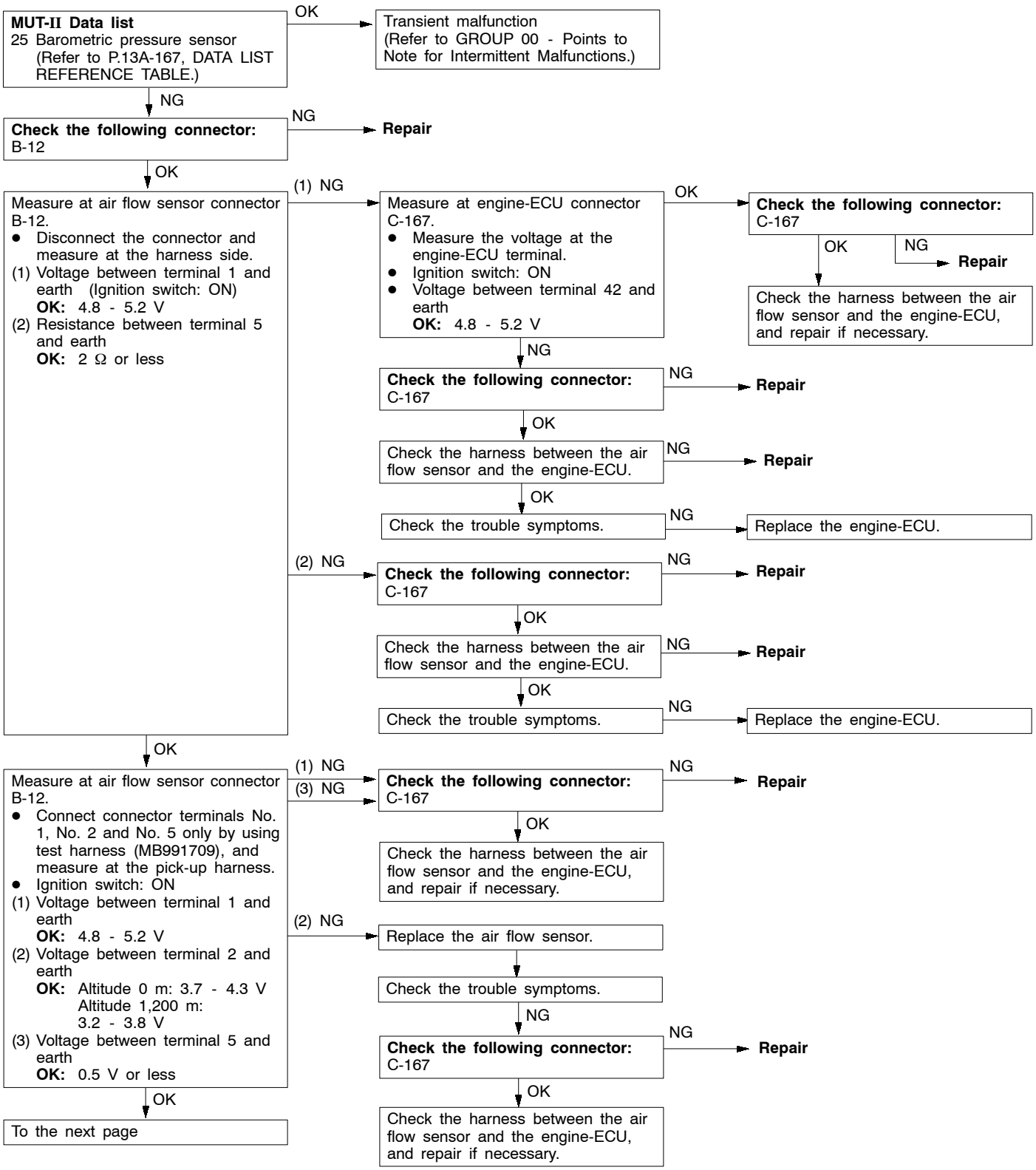
INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

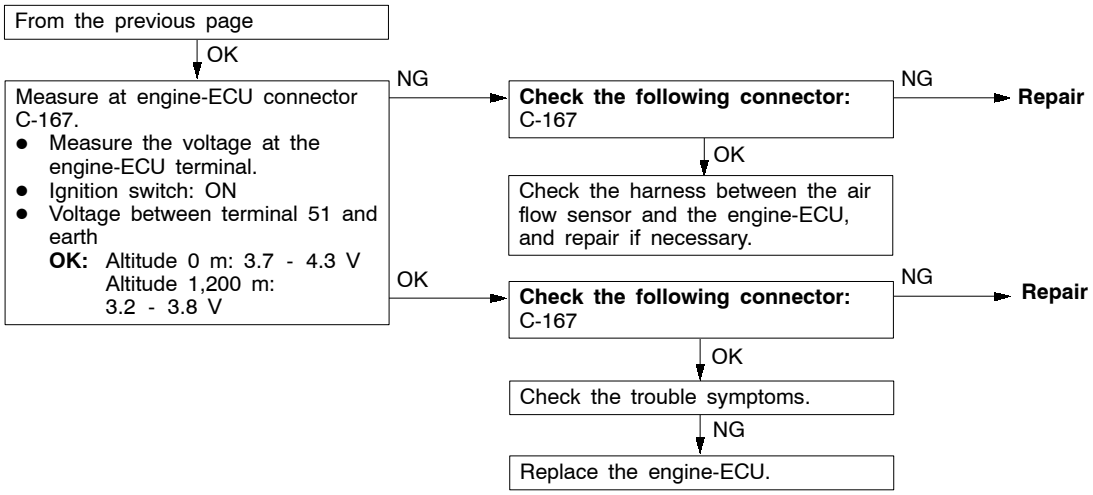
Code No. P0100 Air flow sensor system	Probable cause
Range of Check ● Engine speed: 500 r/min or more Set Conditions ● The sensor output frequency is 3.3 Hz or less for four seconds.	● Malfunction of air flow sensor ● Open or short circuit in air flow sensor circuit or loose connector contact ● Malfunction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



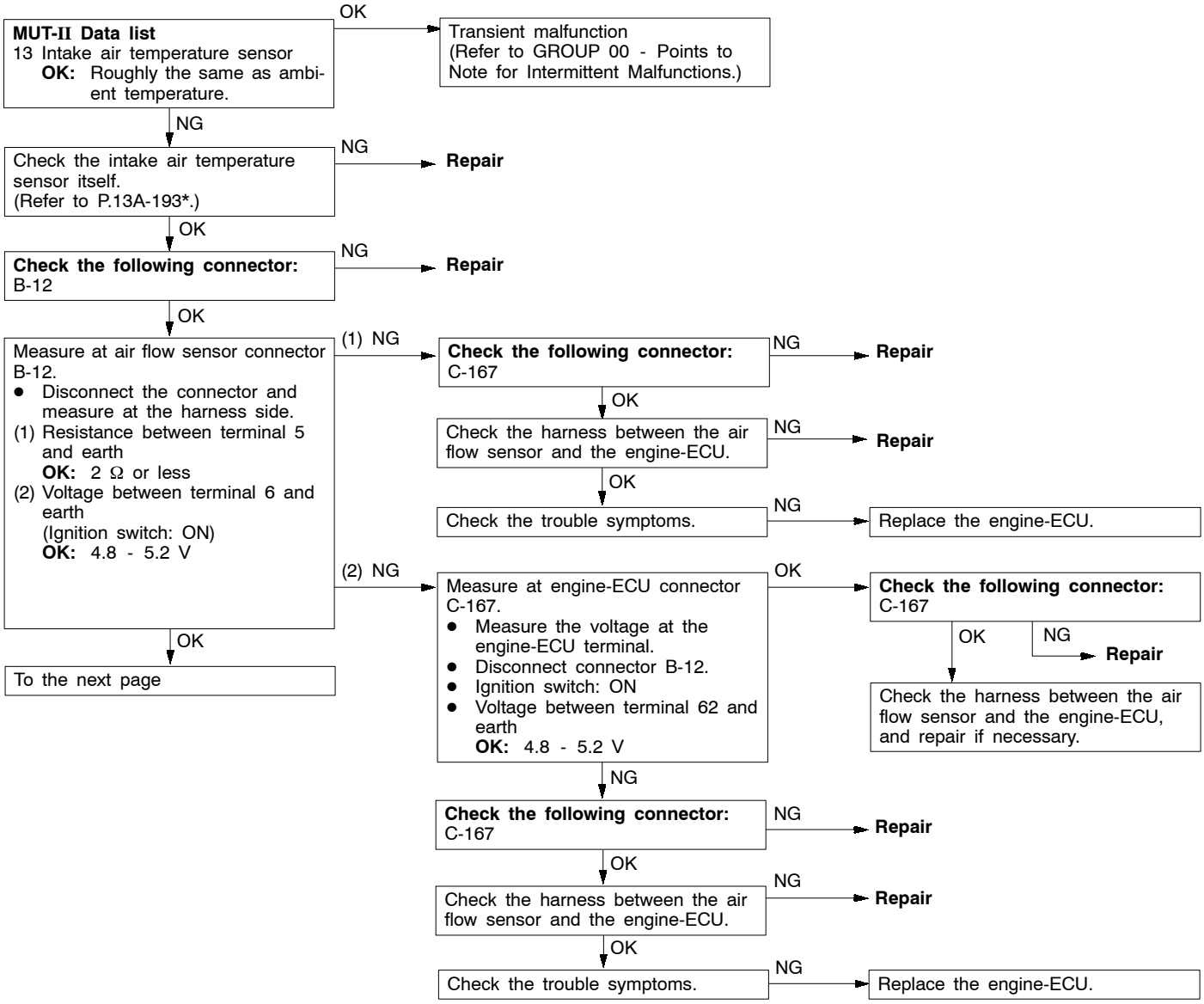

From the previous page
OK
Measure at air flow sensor connector B-12.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Selector lever position: P
● Voltage between terminal 7 and earth
OK: Engine: Idling
0 - 1 V
Engine speed: 3,000 r/min
6 - 9 V
NG
Check the following connector: C-168
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure the output waveform at air flow sensor connector B-12 (by using an analyzer).
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Engine: Idling
● Voltage between terminal 3 and earth
OK: Waveforms should be displayed on P.13A-192 (Inspection Procedure Using an Analyzer) and noise should not be displayed in the waveform.
NG
Replace the air flow sensor.
Check the trouble symptoms.
NG
Check the following connectors: C-167, C-168, C-31
NG
Repair
OK
Check the harnesses between the air flow sensor and the engine-ECU and between the air flow sensor and the engine control relay, and repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.

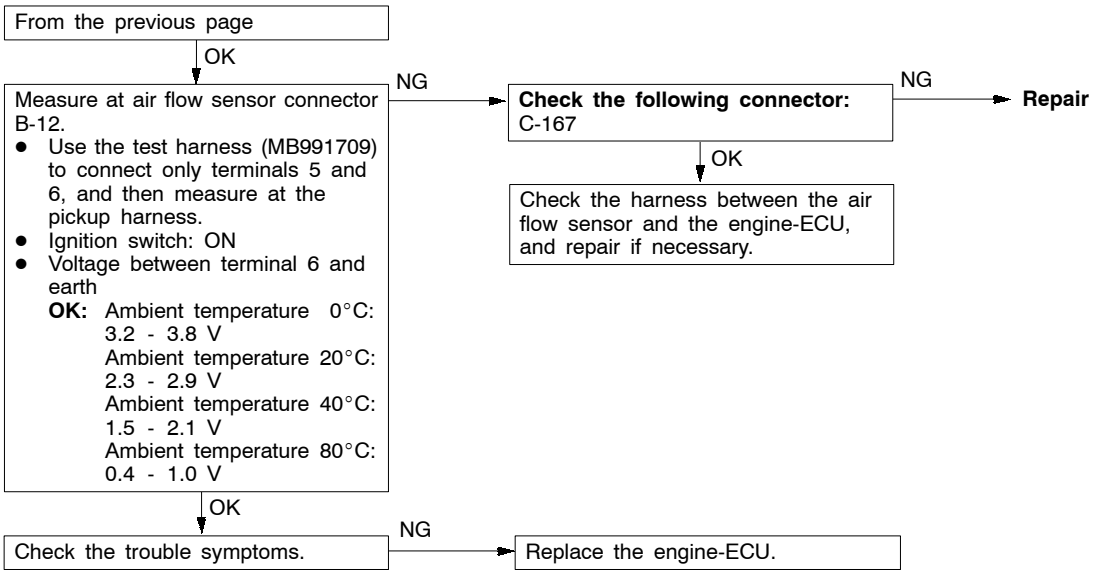
Code No. P0105 Barometric pressure sensor system	Probable cause
Range of Check ● Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. ● Battery voltage: 8 V or more Set Conditions ● The sensor output voltage is 4.5 V or more for four seconds (equivalent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




From the previous page
OK
Measure at engine-ECU connector C-167.
● Measure the voltage at the engine-ECU terminal.
● Ignition switch: ON
● Voltage between terminal 51 and earth
OK: Altitude 0 m: 3.7 - 4.3 V
Altitude 1,200 m: 3.2 - 3.8 V
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU, and repair if necessary.
OK
Check the following connector: C-167
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.

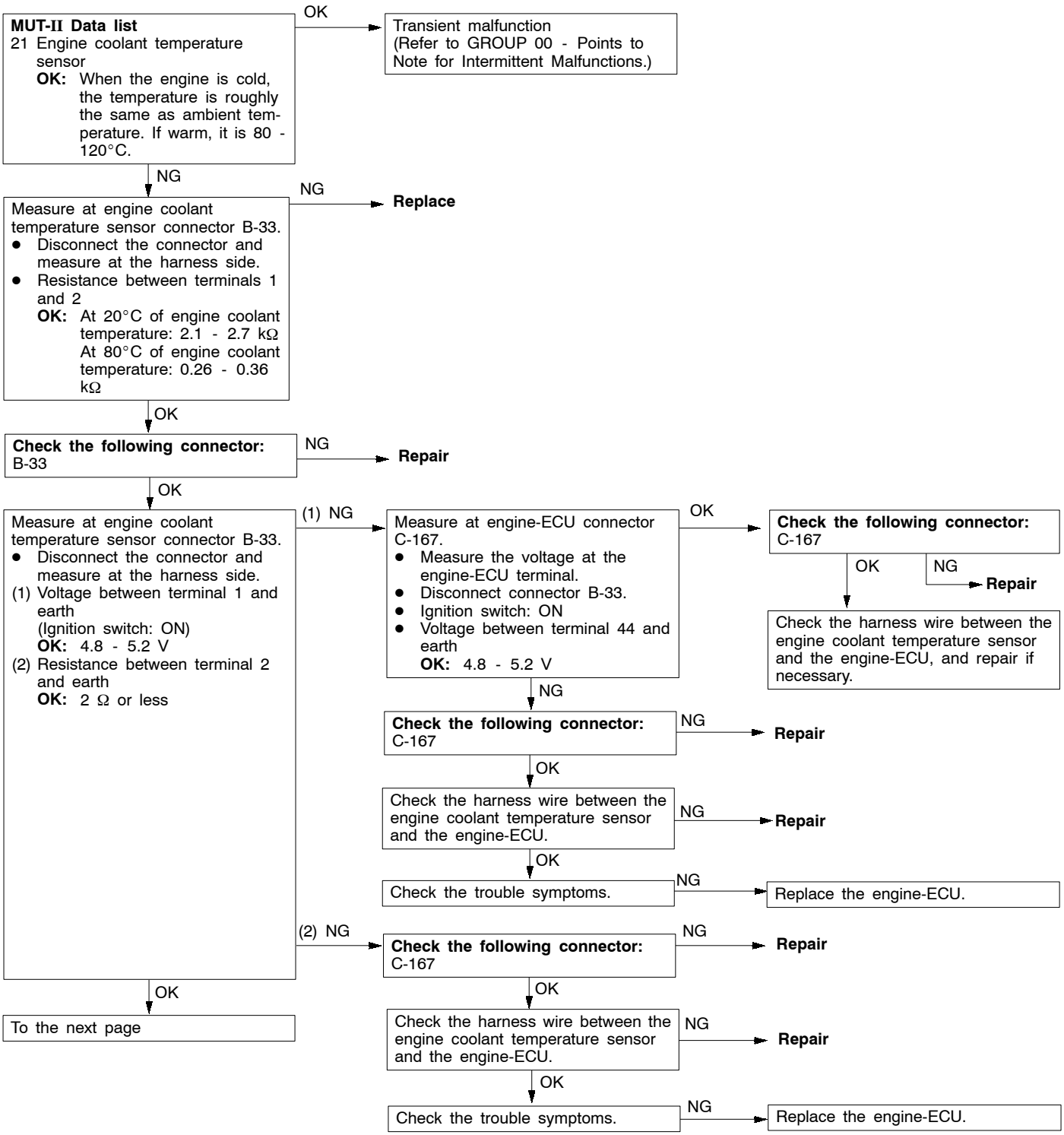
Code No. P0110 Intake air temperature sensor system	Probable cause
Range of Check • Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. Set Conditions • The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of intake air temperature) or • The sensor output voltage is 0.2 V or more for four seconds (equivalent to 125°C of intake air temperature)	• Malfunction of intake air temperature sensor • Open or short circuit in intake air temperature sensor or loose connector contact • Malfunction of engine-ECU

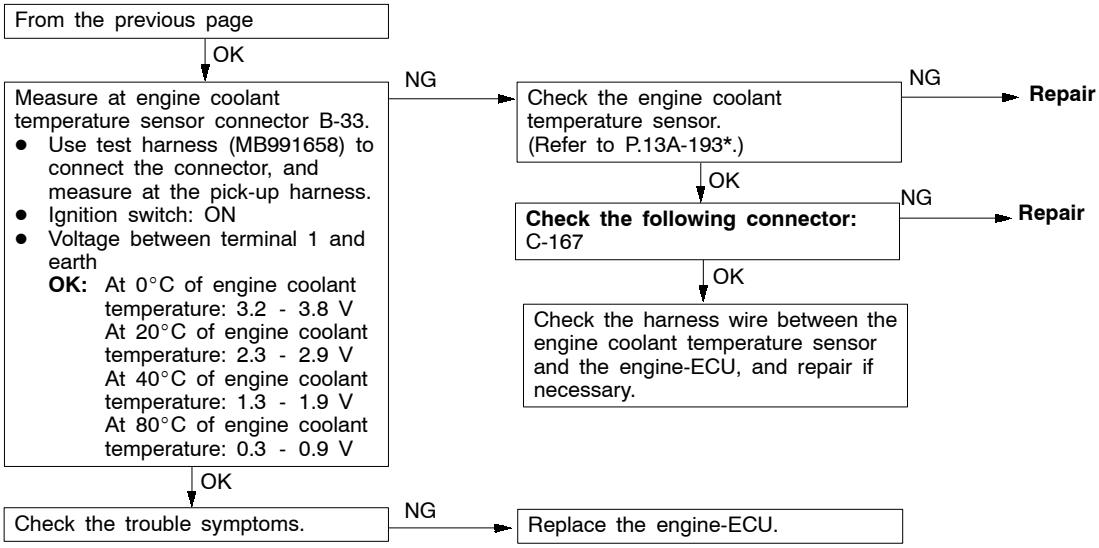




NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611).

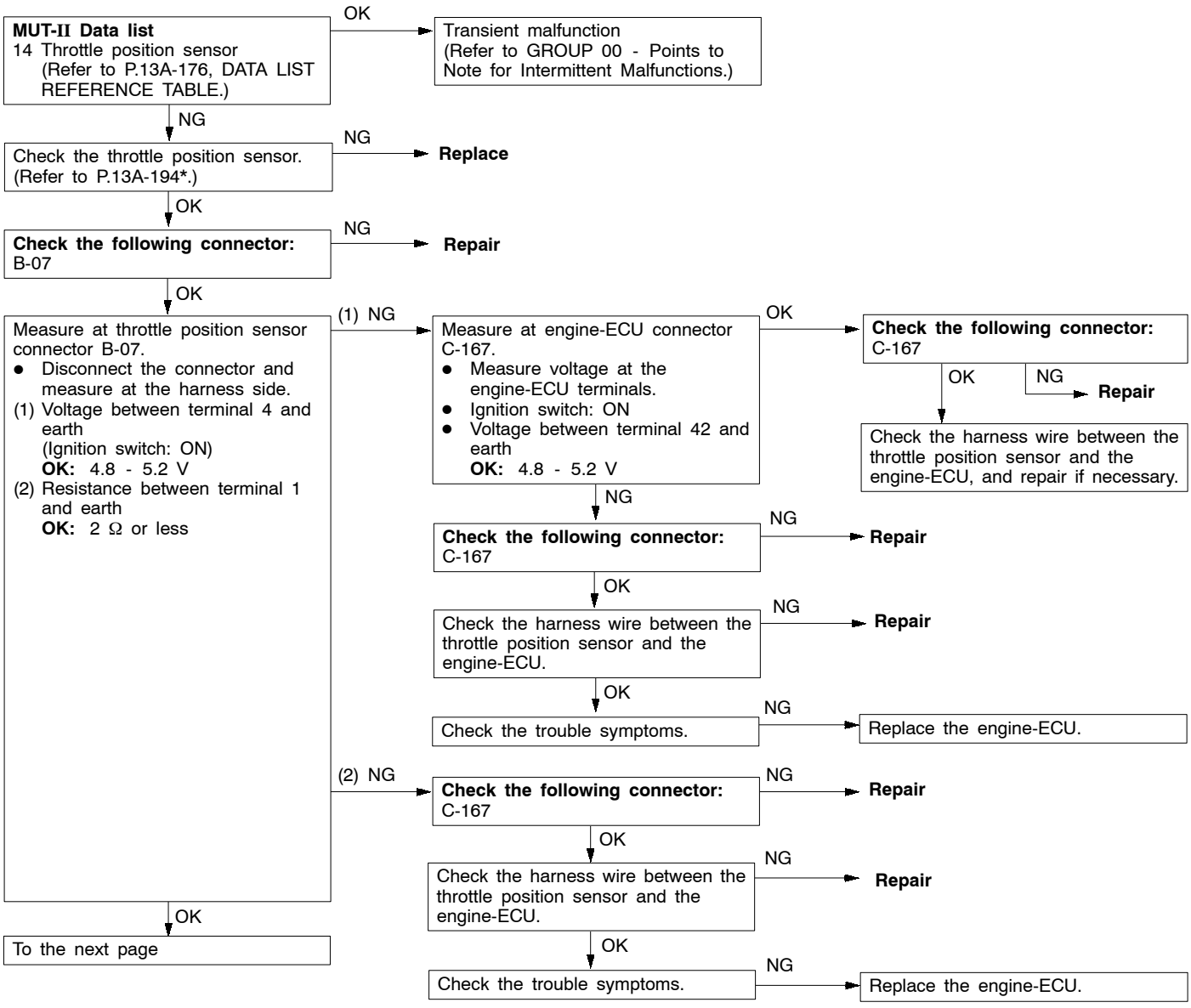
Code No. P0115 Engine coolant temperature sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of engine coolant temperature) or ● The sensor output voltage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

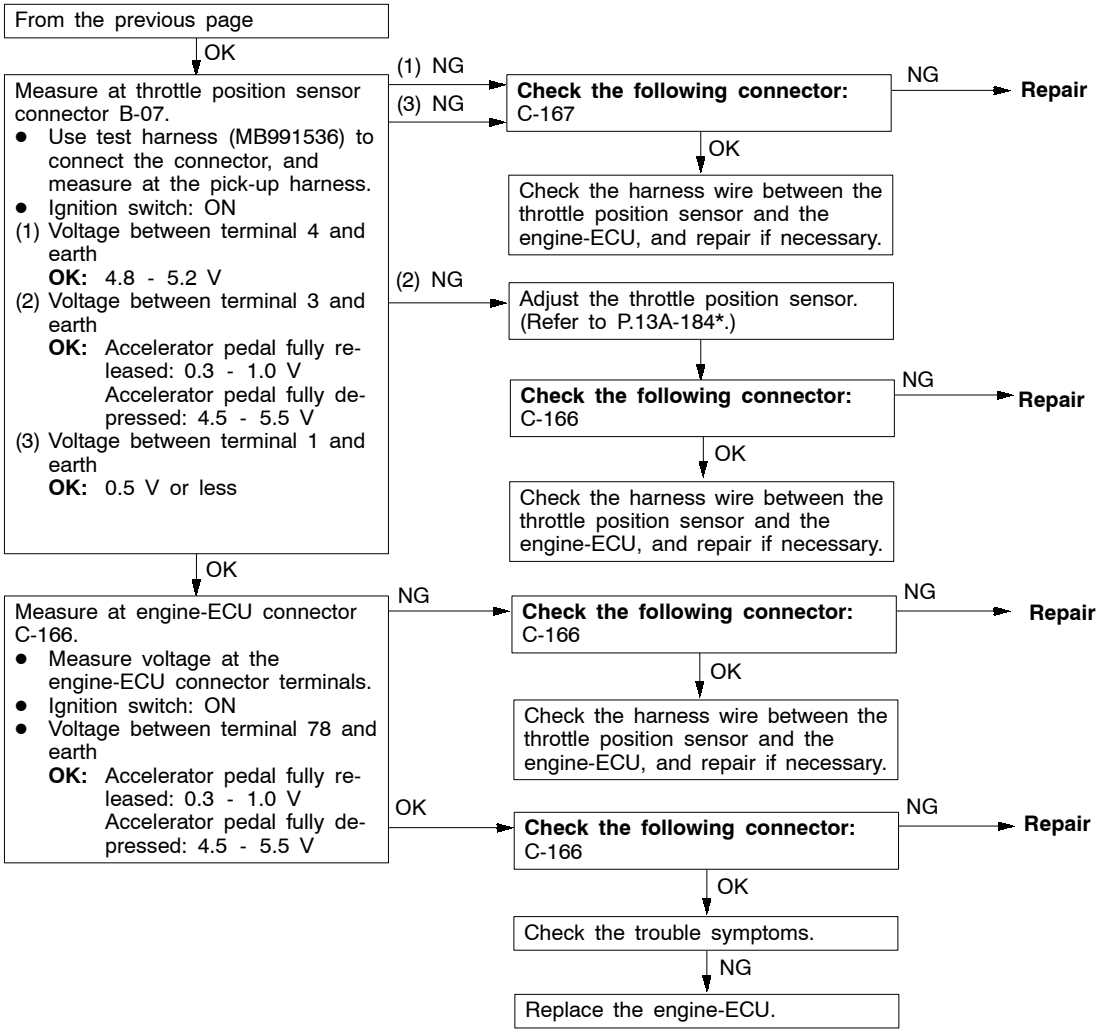

MUT-II Data list
21 Engine coolant temperature sensor
OK: When the engine is cold, the temperature is roughly the same as ambient temperature. If warm, it is 80 - 120°C.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Measure at engine coolant temperature sensor connector B-33.
Disconnect the connector and measure at the harness side.
Resistance between terminals 1 and 2
OK: At 20°C of engine coolant temperature: 2.1 - 2.7 kΩ
At 80°C of engine coolant temperature: 0.26 - 0.36 kΩ
NG
Replace
OK
Check the following connector: B-33
NG
Repair
OK
Measure at engine coolant temperature sensor connector B-33.
Disconnect the connector and measure at the harness side.
(1) Voltage between terminal 1 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(2) Resistance between terminal 2 and earth
OK: 2 Ω or less
(1) NG
Measure at engine-ECU connector C-167.
Measure the voltage at the engine-ECU terminal.
Disconnect connector B-33.
Ignition switch: ON
Voltage between terminal 44 and earth
OK: 4.8 - 5.2 V
OK
Check the following connector: C-167
OK
NG
Repair
Check the harness wire between the engine coolant temperature sensor and the engine-ECU, and repair if necessary.
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the engine coolant temperature sensor and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
(2) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the engine coolant temperature sensor and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
To the next page



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611).

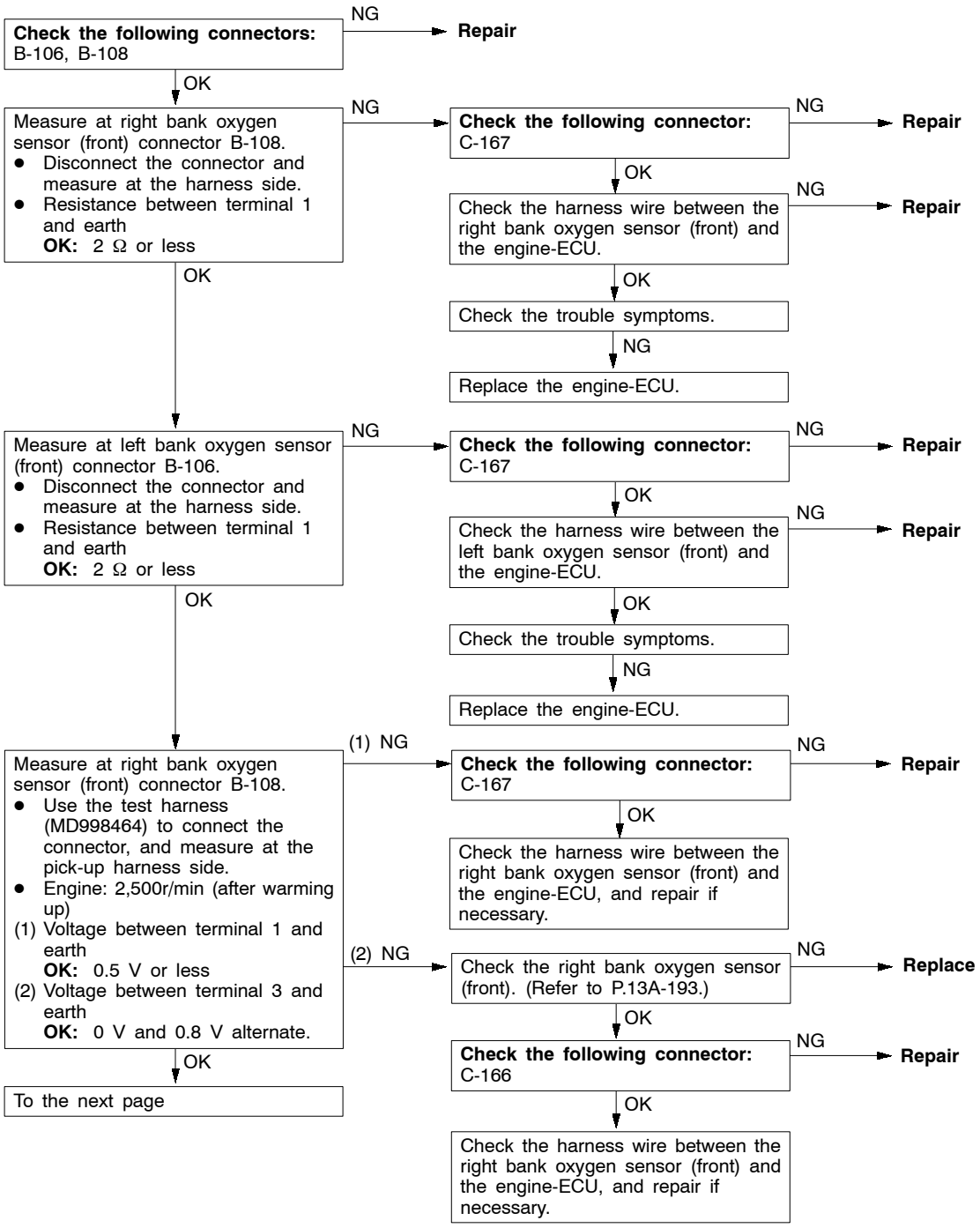
Code No. P0120 Throttle position sensor system	Probable cause
Range of Check ● Ignition switch: ON ● Excluding 60 seconds after the ignition switch is turned ON or immediately after the engine starts. Set Conditions ● When the idle position switch is ON, the sensor output voltage is 2 V or more for 4 seconds or ● The sensor output voltage is 0.2 V or less for 4 seconds	● Malfunction of throttle position sensor ● Improper connector contact, open circuit or short-circuited harness wire ● Improper "ON" state of idle position switch ● Short circuit of the idle position switch signal line ● Malfunction of engine-ECU <M/T>

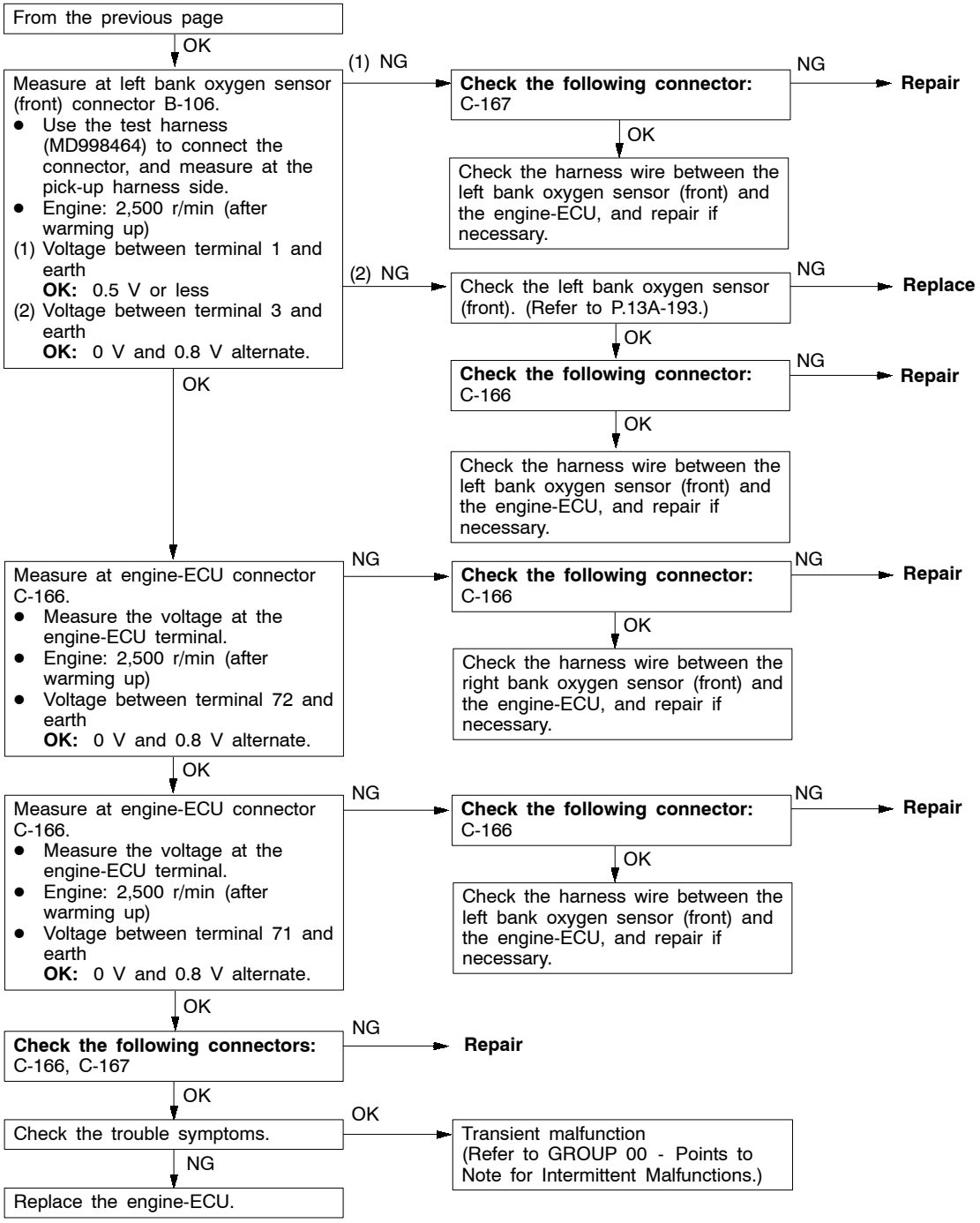




NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611).

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


Check the following connectors: B-106, B-108
NG
Repair
OK
Measure at right bank oxygen sensor (front) connector B-108.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at left bank oxygen sensor (front) connector B-106.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at right bank oxygen sensor (front) connector B-108.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
(2) NG
Check the right bank oxygen sensor (front). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
To the next page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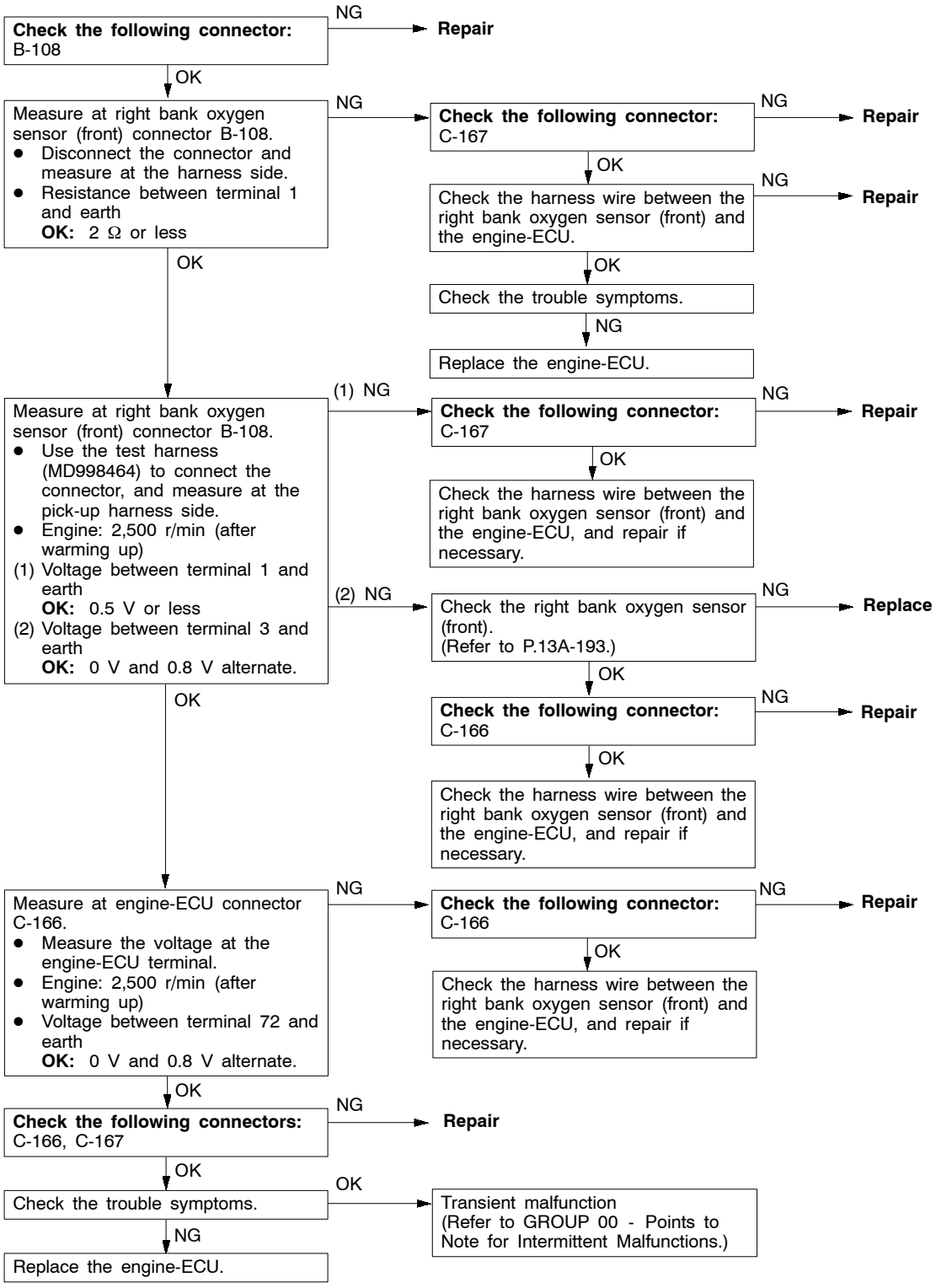
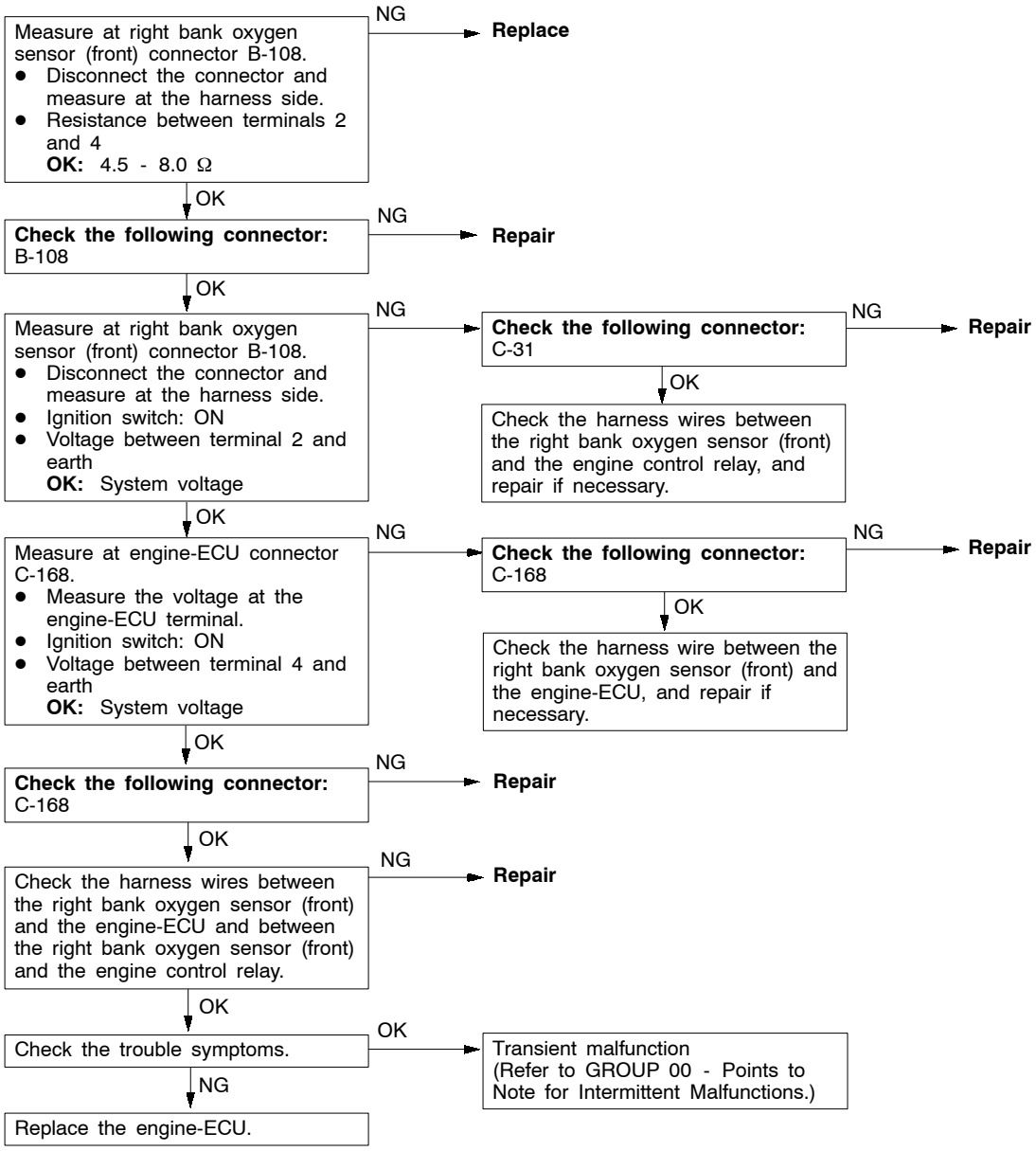
OK
Measure at left bank oxygen sensor (front) connector B-106.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
(2) NG
Check the left bank oxygen sensor (front). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 72 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 71 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Check the following connectors: C-166, C-167
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU.

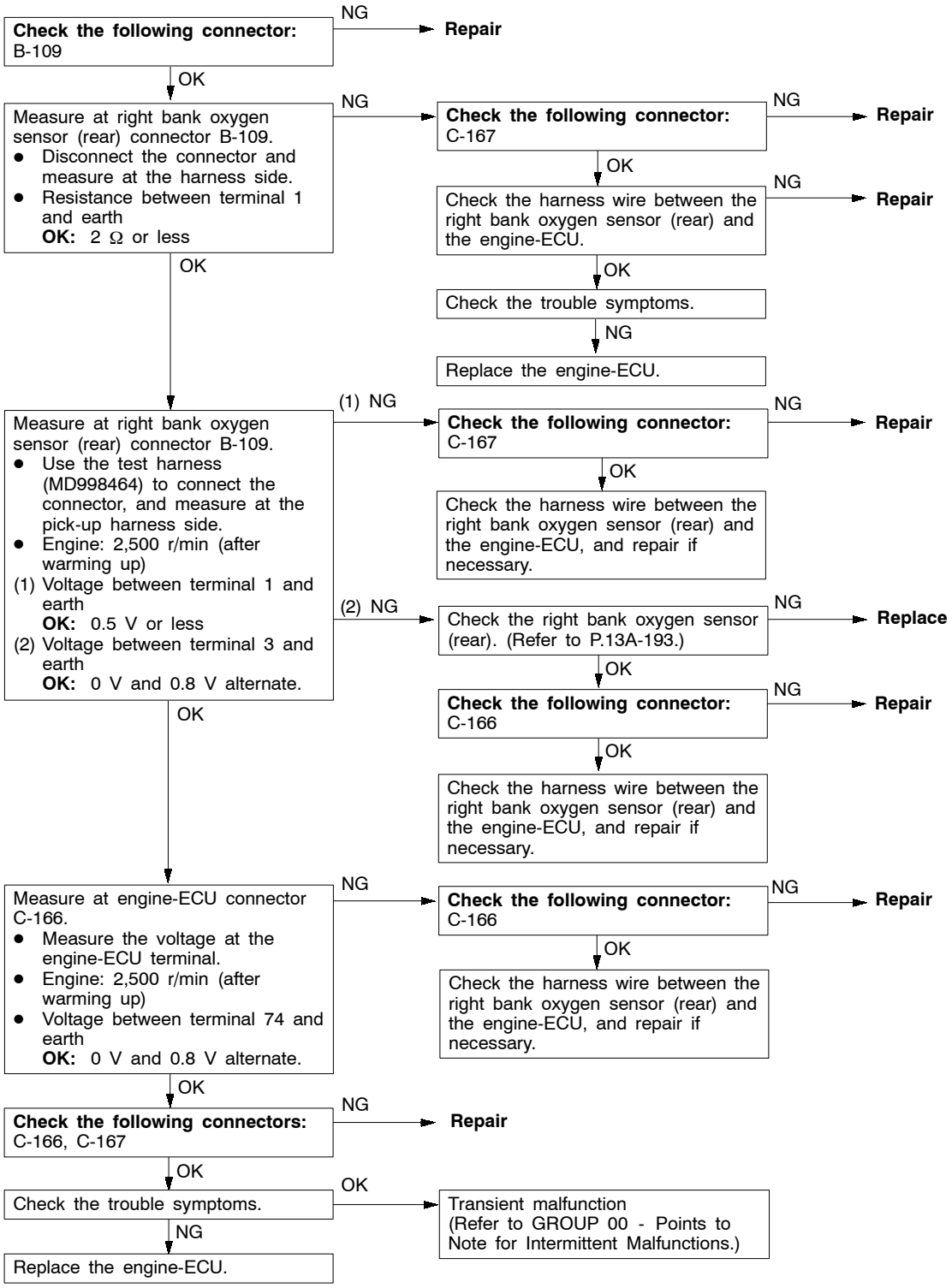
Code No. P0130 Oxygen sensor (front) system <Bank 1 sensor 1>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Intake air temperature is 20 - 50°C ● Engine speed is 2,000 – 3,000 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The right bank oxygen sensor (front) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the right bank oxygen sensor (front) inside the engine-ECU.	● Malfunction of right bank oxygen sensor (front) ● Open or short circuit in the right bank oxygen sensor (front) circuit or loose connector contact ● Malfunction of engine-ECU
Range of Check ● Engine speed is 3,000 r/min or less ● During driving ● During air/fuel ratio feedback control Set Conditions ● The right bank oxygen sensor (front) output frequency is five or less per 12 seconds on average.	


Check the following connector: B-108
NG
Repair
OK
Measure at right bank oxygen sensor (front) connector B-108.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at right bank oxygen sensor (front) connector B-108.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
(2) NG
Check the right bank oxygen sensor (front). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 72 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Check the following connectors: C-166, C-167
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU.

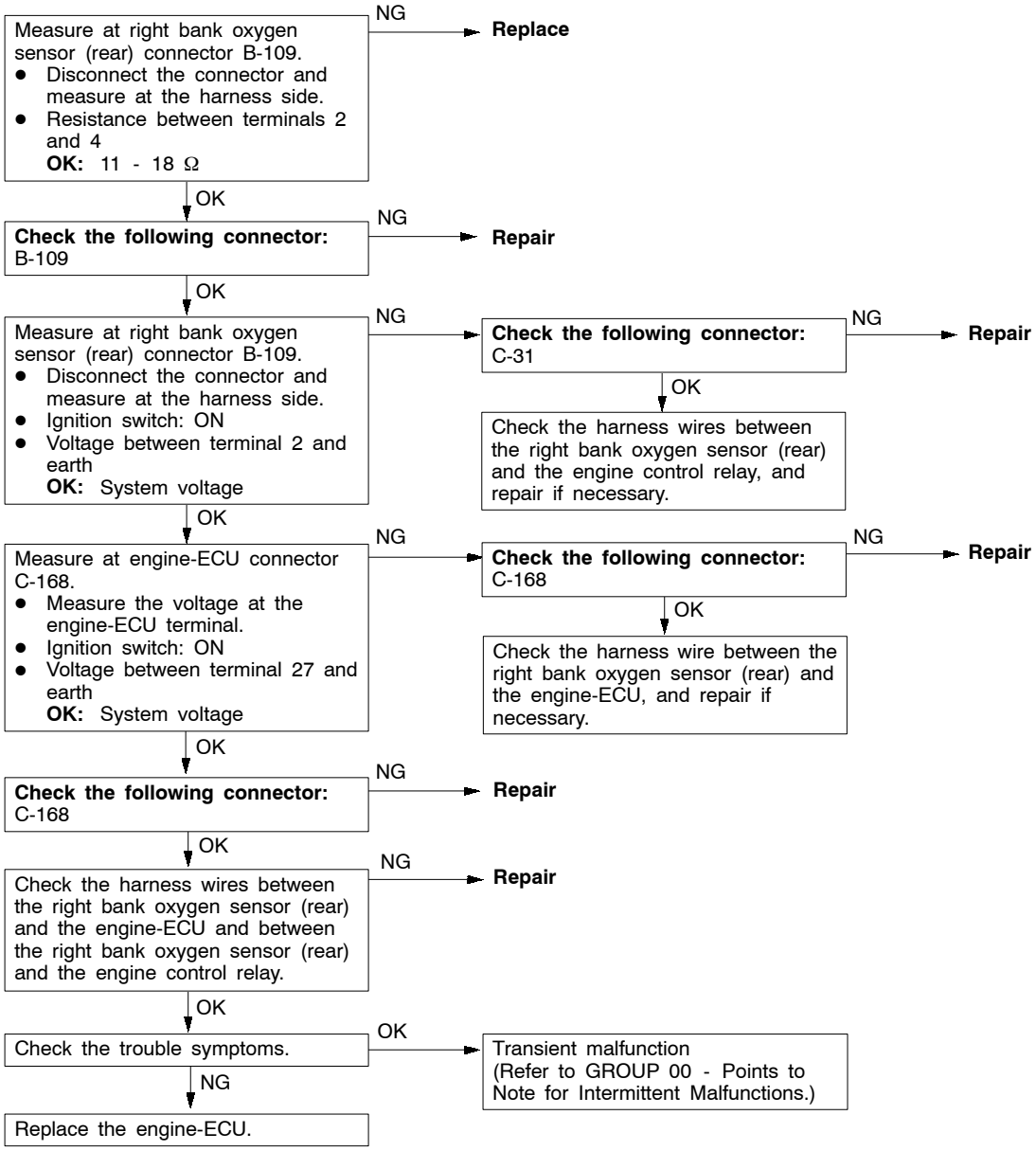
Code No. P0135 Oxygen sensor heater (front) system <Bank 1 sensor 1>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (front) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current,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



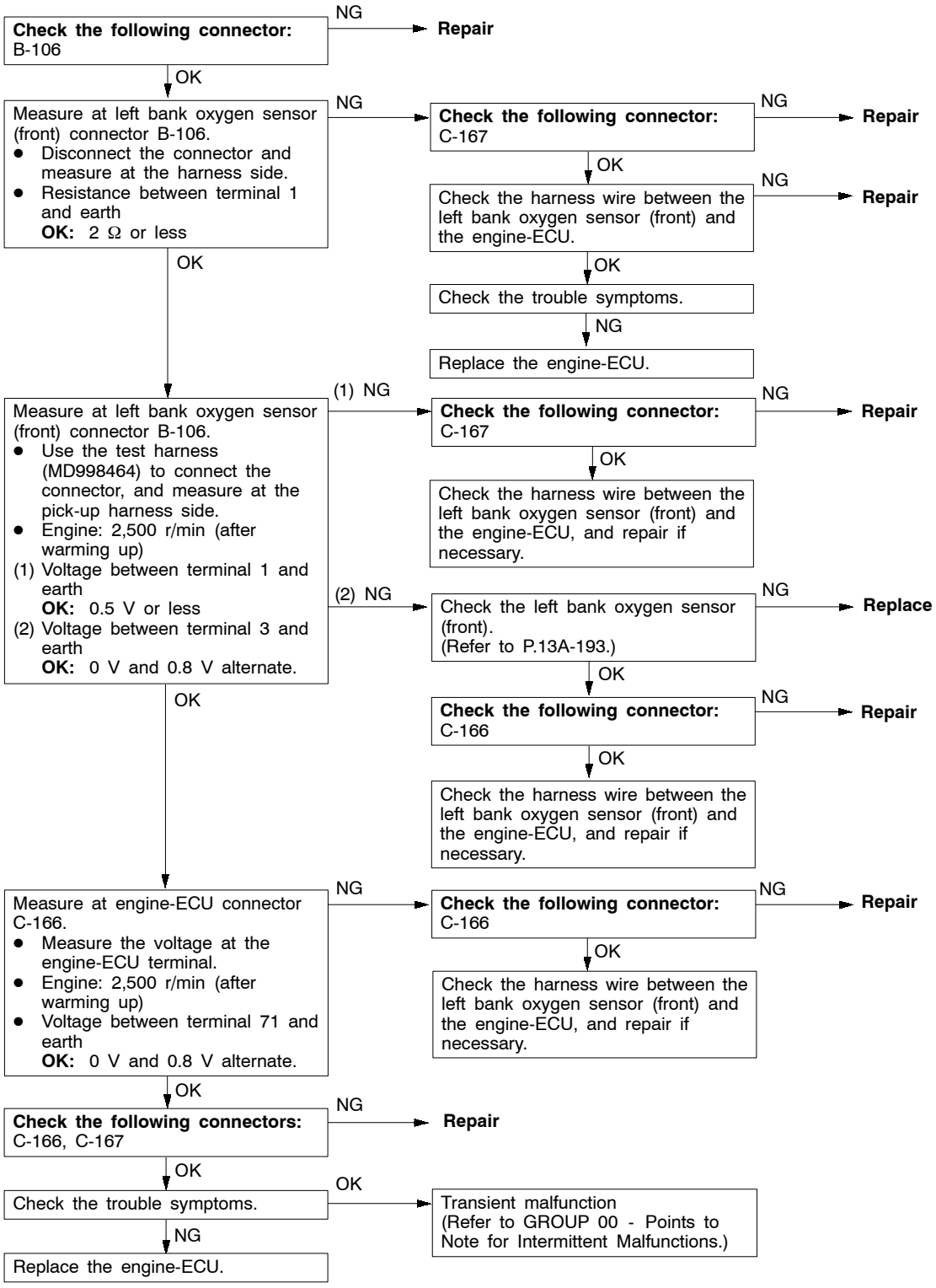
Code No. P0136 Oxygen sensor (rear) system <Bank 1 sensor 2>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Engine speed is 1,200 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The right bank oxygen sensor (rear) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the right bank oxygen sensor (rear) inside the engine-ECU.	● Malfunction of right bank oxygen sensor (rear) ● Open or short circuit in the right bank oxygen sensor (rear) circuit or loose connector contact ● Malfunction of engine-ECU


Check the following connector: B-109
NG
Repair
OK
Measure at right bank oxygen sensor (rear) connector B-109.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (rear) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at right bank oxygen sensor (rear) connector B-109.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
(2) NG
Check the right bank oxygen sensor (rear). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 74 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the right bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
OK
Check the following connectors: C-166, C-167
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU.

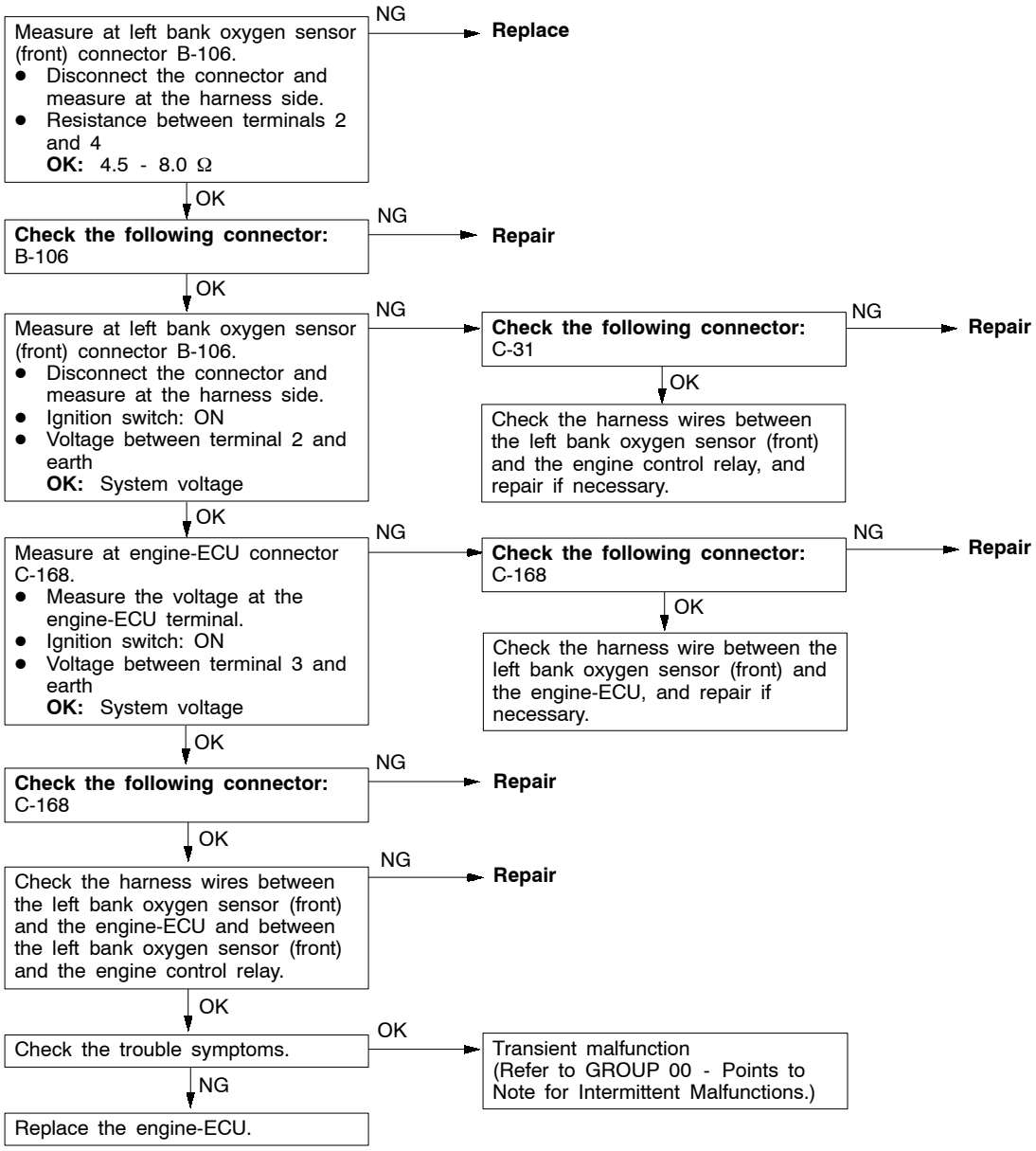
Code No. P0141 Oxygen sensor heater (rear) system <Bank 1 sensor 2>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (rear) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which flows through the oxygen sensor heater (rear), is 0.2 A or less or 3.5 A or more for six seconds.	● Malfunction of right bank oxygen sensor heater (rear) ● Open or short circuit in the oxygen sensor heater (rear) circuit or loose connector contact ● Malfunction of engine-ECU



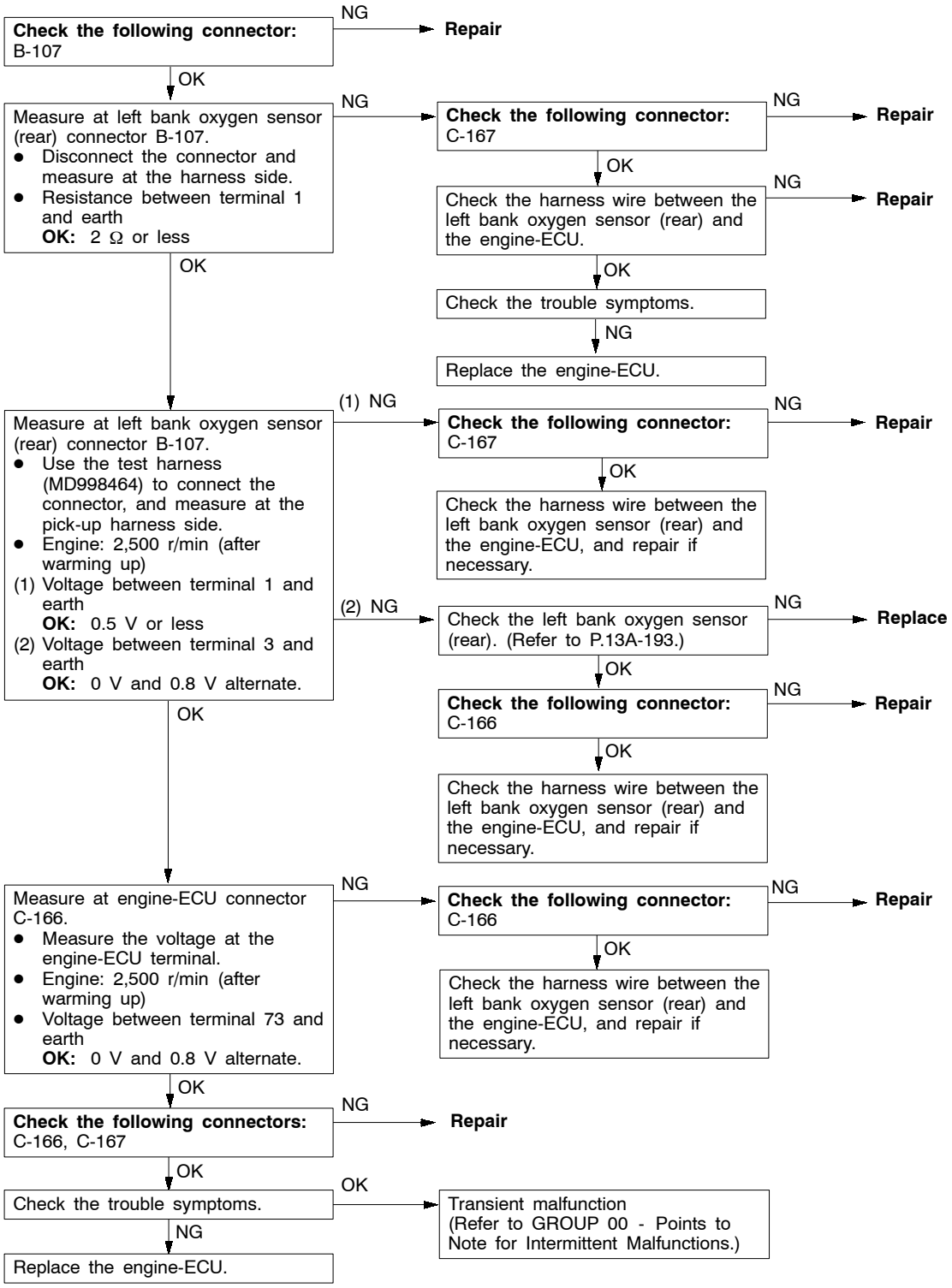
Code No. P0150 Oxygen sensor (front) system <Bank 2 sensor 1>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Intake air temperature is 20 - 50°C ● Engine speed is 2,000 – 3,000 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The left bank oxygen sensor (front) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the left bank oxygen sensor (front) inside the engine-ECU.	● Malfunction of left bank oxygen sensor (front) ● Open or short circuit in the left bank oxygen sensor (front) circuit or loose connector contact ● Malfunction of engine-ECU
Range of Check ● Engine speed is 3,000 r/min or less ● During driving ● During air/fuel ratio feedback control Set Conditions ● The left bank oxygen sensor (front) output frequency is five or less per 12 seconds on average.	


Check the following connector: B-106
NG
Repair
OK
Measure at left bank oxygen sensor (front) connector B-106.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at left bank oxygen sensor (front) connector B-106.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
(2) NG
Check the left bank oxygen sensor (front). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 71 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (front) and the engine-ECU, and repair if necessary.
OK
Check the following connectors: C-166, C-167
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU.

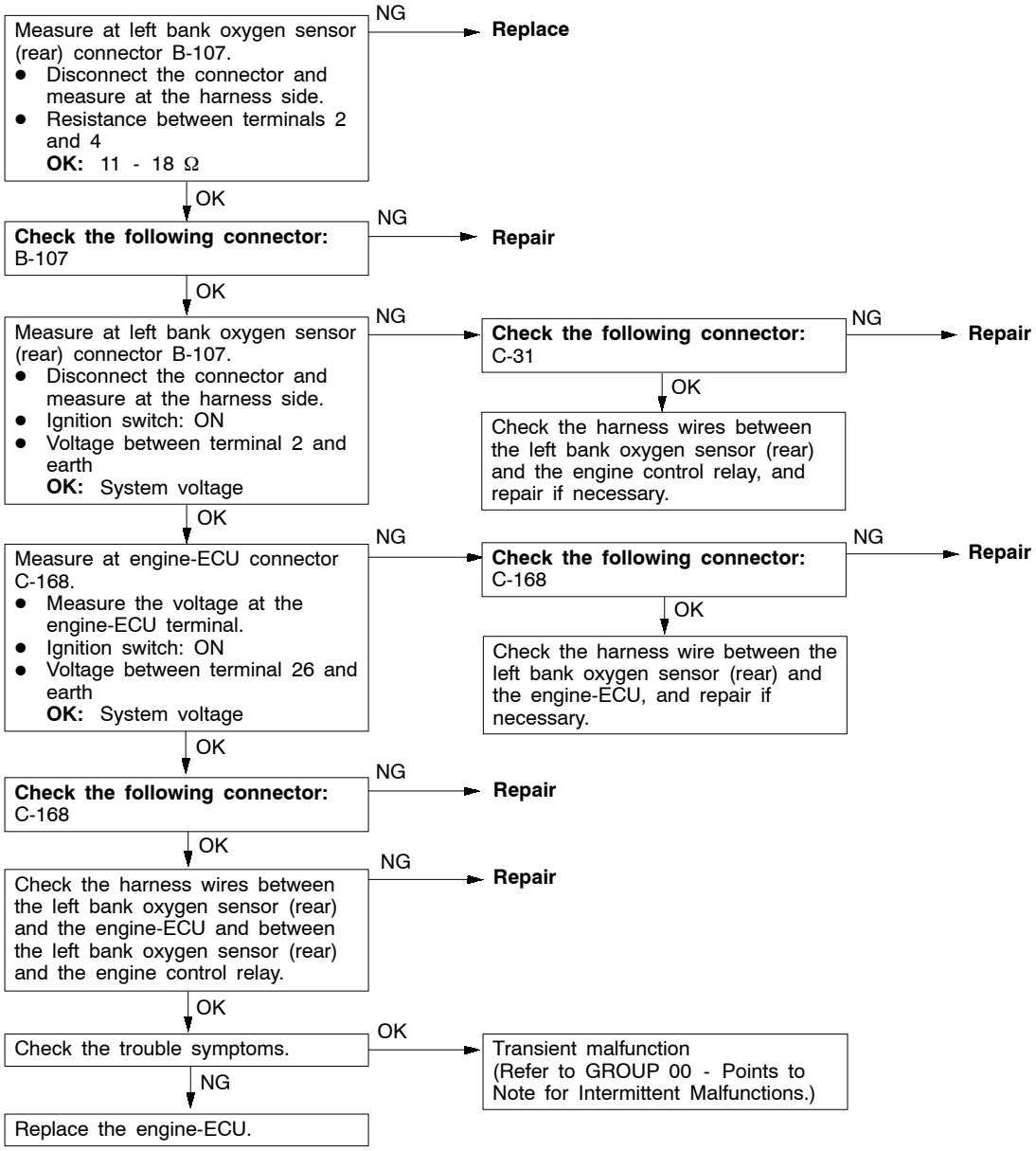
Code No. P0155 Oxygen sensor heater (front) system <Bank 2 sensor 1>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (front) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which flows through the oxygen sensor heater (front), is 0.2 A or less or 3.5 A or more for six seconds.	● Malfunction of left bank oxygen sensor heater (front) ● Open or short circuit in the left bank oxygen sensor heater (front) circuit or loose connector contact ● Malfunction of engine-ECU



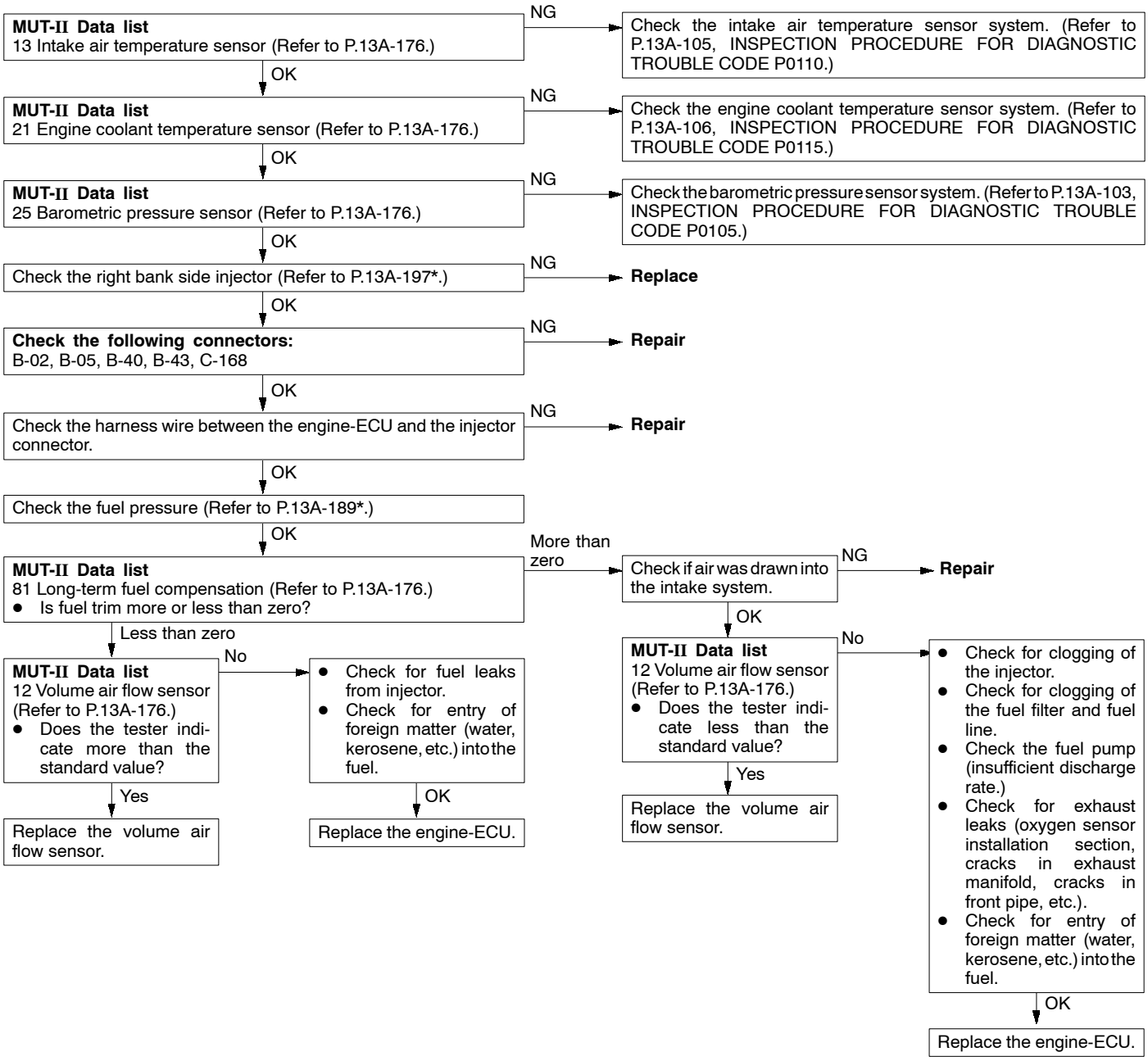
Code No. P0156 Oxygen sensor (rear) system <Bank 2 sensor 2>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Engine speed is 1,200 r/min or more ● Driving on a level surface at constant speed. Set Conditions ● The left bank oxygen sensor (rear) output voltage is 4.5 V or more when the sensor output voltage is 0.2 V or less and a voltage of 5 V is applied to the left bank oxygen sensor (rear) inside the engine-ECU.	● Malfunction of left bank oxygen sensor (rear) ● Open or short circuit in the left bank oxygen sensor (rear) circuit or loose connector contact ● Malfunction of engine-ECU


Check the following connector: B-107
NG
Repair
OK
Measure at left bank oxygen sensor (rear) connector B-107.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 1 and earth
OK: 2 Ω or less
NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (rear) and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
OK
Measure at left bank oxygen sensor (rear) connector B-107.
● Use the test harness (MD998464) to connect the connector, and measure at the pick-up harness side.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 1 and earth
OK: 0.5 V or less
(2) Voltage between terminal 3 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connector: C-167
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
(2) NG
Check the left bank oxygen sensor (rear). (Refer to P.13A-193.)
NG
Replace
OK
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
OK
Measure at engine-ECU connector C-166.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 73 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connector: C-166
NG
Repair
OK
Check the harness wire between the left bank oxygen sensor (rear) and the engine-ECU, and repair if necessary.
OK
Check the following connectors: C-166, C-167
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU.

Code No. P0161 Oxygen sensor heater (rear) system <Bank 2 sensor 2>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (rear) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which flows through the oxygen sensor heater (rear), is 0.2 A or less or 3.5 A or more for six seconds.	● Malfunction of left bank oxygen sensor heater (rear) ● Open or short circuit in the left bank oxygen sensor heater (rear) circuit or loose connector contact ● Malfunction of engine-ECU

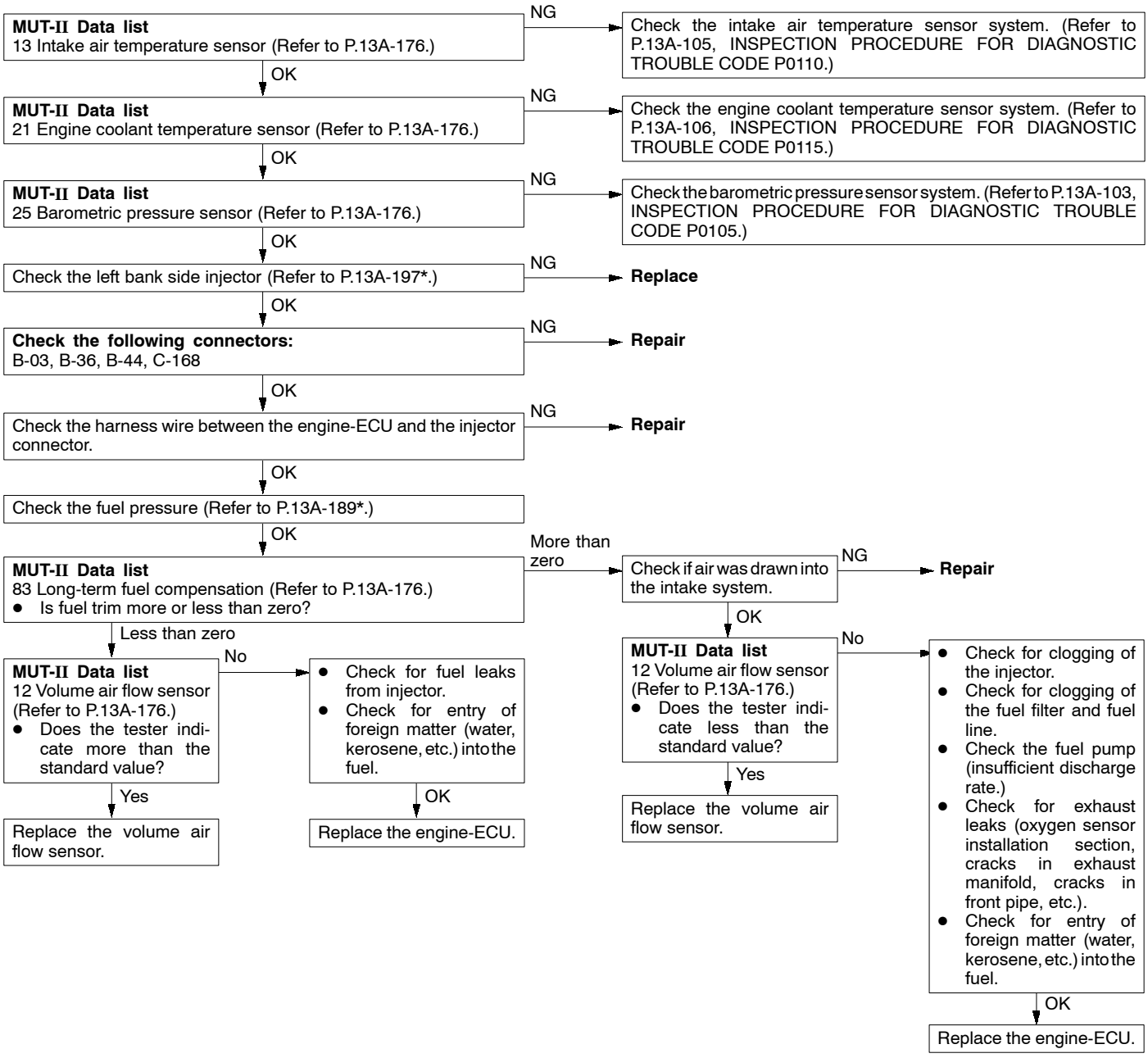


Code No. P0170 Abnormal fuel system (Bank 1)	Probable cause
Range of Check ● Engine: Being learning the air-fuel ratio Set Conditions ● Ten seconds or more have been passed while the fuel injection amount compensation value is too low. or ● Ten seconds or more have been passed while the fuel injection amount compensation value is too high.	● Incorrect fuel pressure ● Malfunction of fuel supply system ● Malfunction of right bank oxygen sensor (front) ● Malfunction of intake air temperature sensor ● Malfunction of barometric pressure sensor ● Malfunction of air flow sensor ● Malfunction of engine-ECU



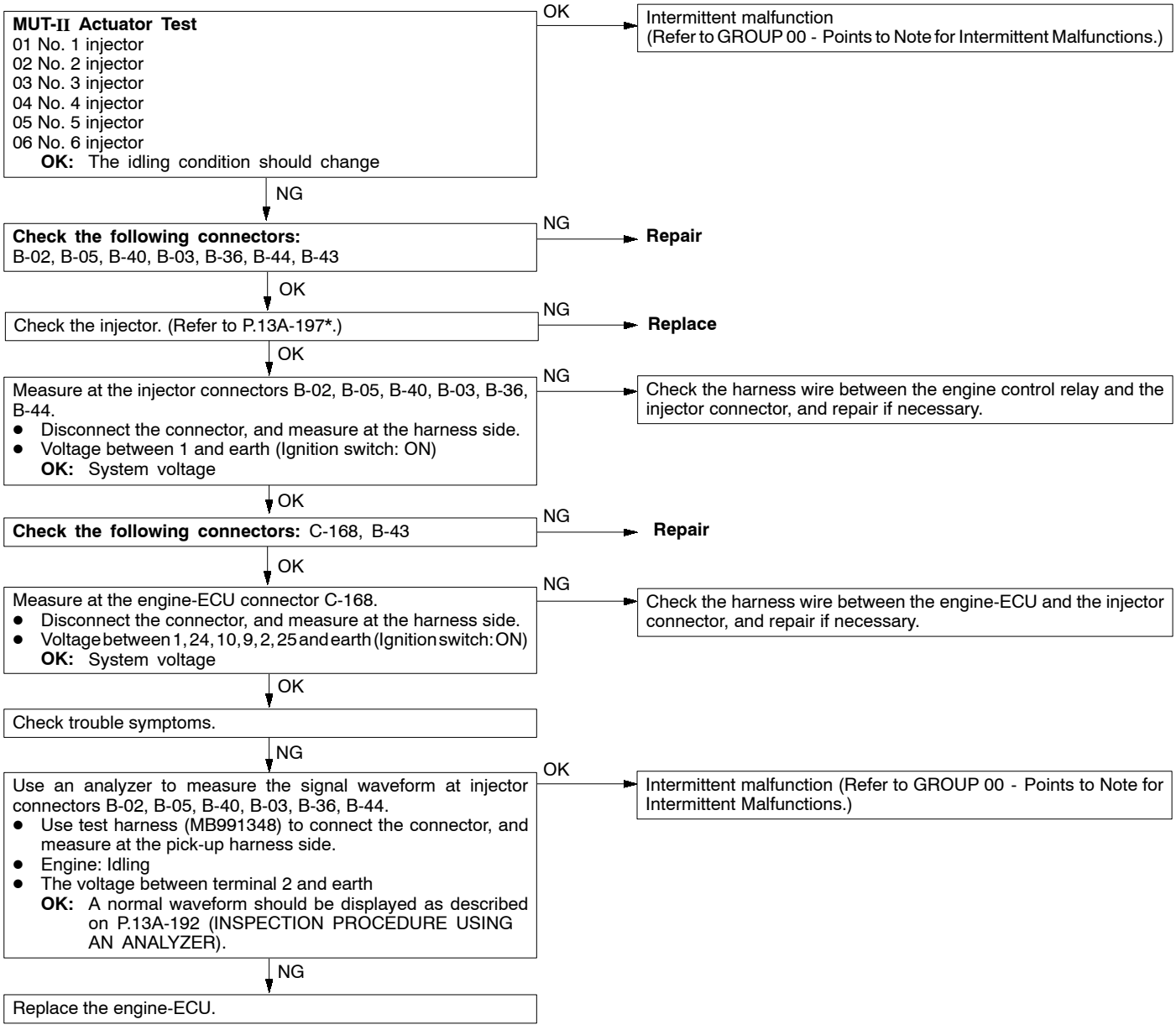
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0173 Abnormal fuel system (Bank 2)	Probable cause
Range of Check ● Engine: Being learning the air/fuel ratio Set Conditions ● Ten seconds or more have been passed while the fuel injection amount compensation value is too low. or ● Ten seconds or more have been passed while the fuel injection amount compensation value is too high.	● Incorrect fuel pressure ● Malfunction of fuel supply system ● Malfunction of left bank oxygen sensor (front) ● Malfunction of intake air temperature sensor ● Malfunction of barometric pressure sensor ● Malfunction of air flow sensor ● Malfunction of engine-ECU



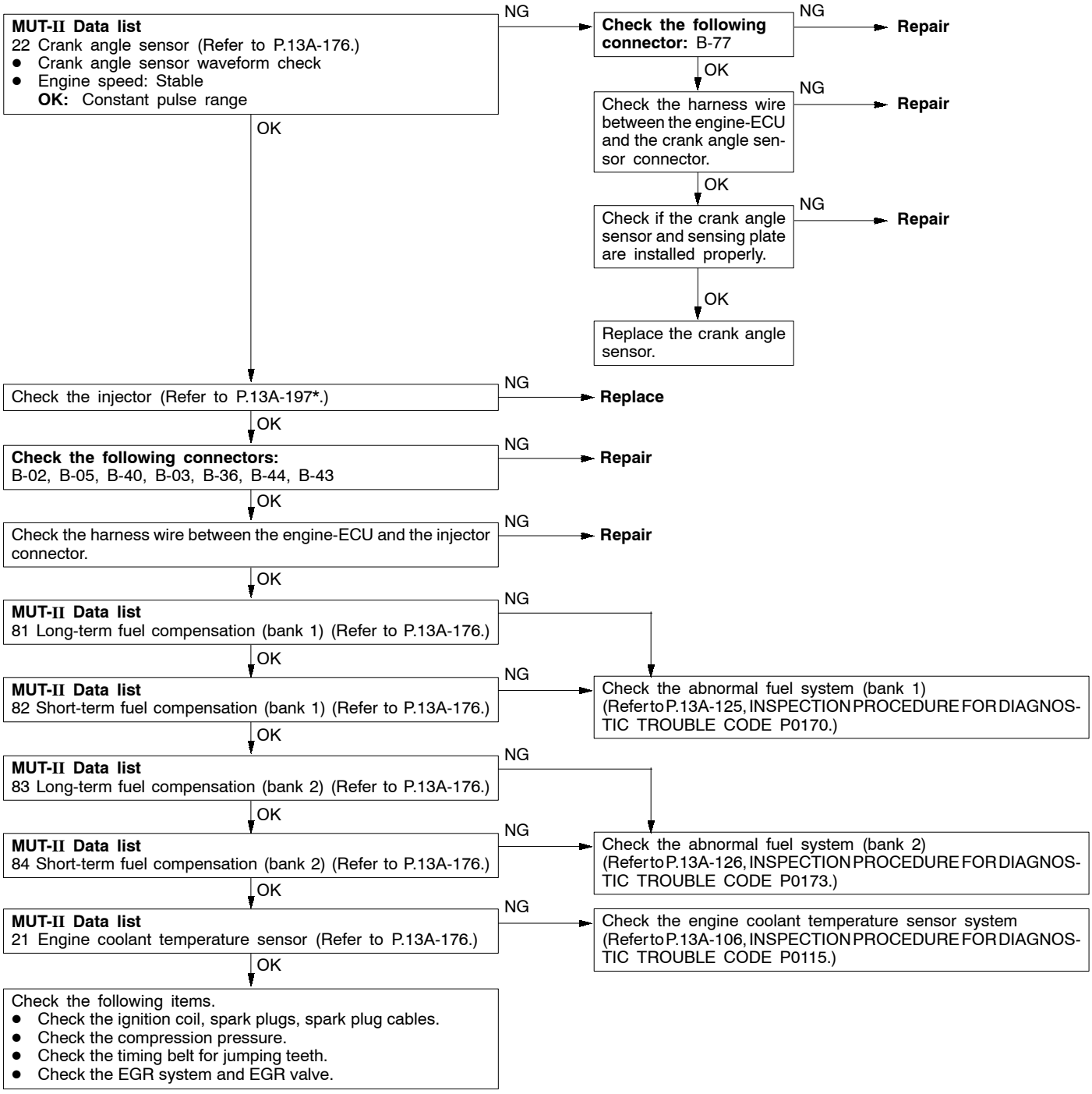
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0201 No. 1 injector system Code No. P0202 No. 2 injector system Code No. P0203 No. 3 injector system Code No. P0204 No. 4 injector system Code No. P0205 No. 5 injector system Code No. P0206 No. 6 injector system	Probable cause
Range of Check ● Engine speed is approx. 50 - 1,000 r/min ● The throttle position sensor output voltage is 1.15 V or less. ● Actuator test by MUT-II is not carried out. Set Conditions ● Surge voltage of injector coil is not detected for 4 seconds.	● Malfunction of the injector ● Improper connector contact, open circuit or short-circuited harness wire of the injector circuit ● Malfunction of engine-ECU



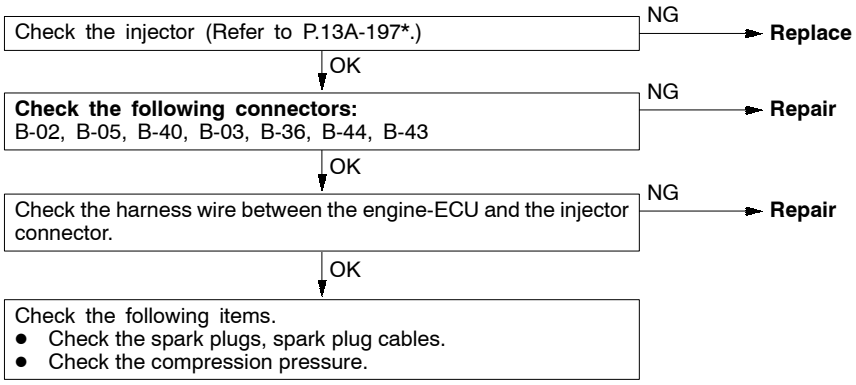
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0300 Ignition coil (power transistor) system	Probable cause
Range of Check ● Engine speed is 500 - 3,500 r/min. ● While the engine is running except deceleration and sudden acceleration. Set Conditions ● The number of misfires exceeds a predetermined number per 200 engine revolutions (Misfire has occurred in two cylinders or more). or ● The number of misfires exceeds a predetermined number per 100 engine revolutions (Misfire has occurred in two cylinders or more).	● Malfunction of the ignition system ● Poor crank angle sensor signal ● Incorrect air/fuel ratio ● Abnormal compression ● Engine coolant temperature sensor failed ● Timing belt teeth jumped ● Malfunction of the injector ● Malfunction of engine-ECU



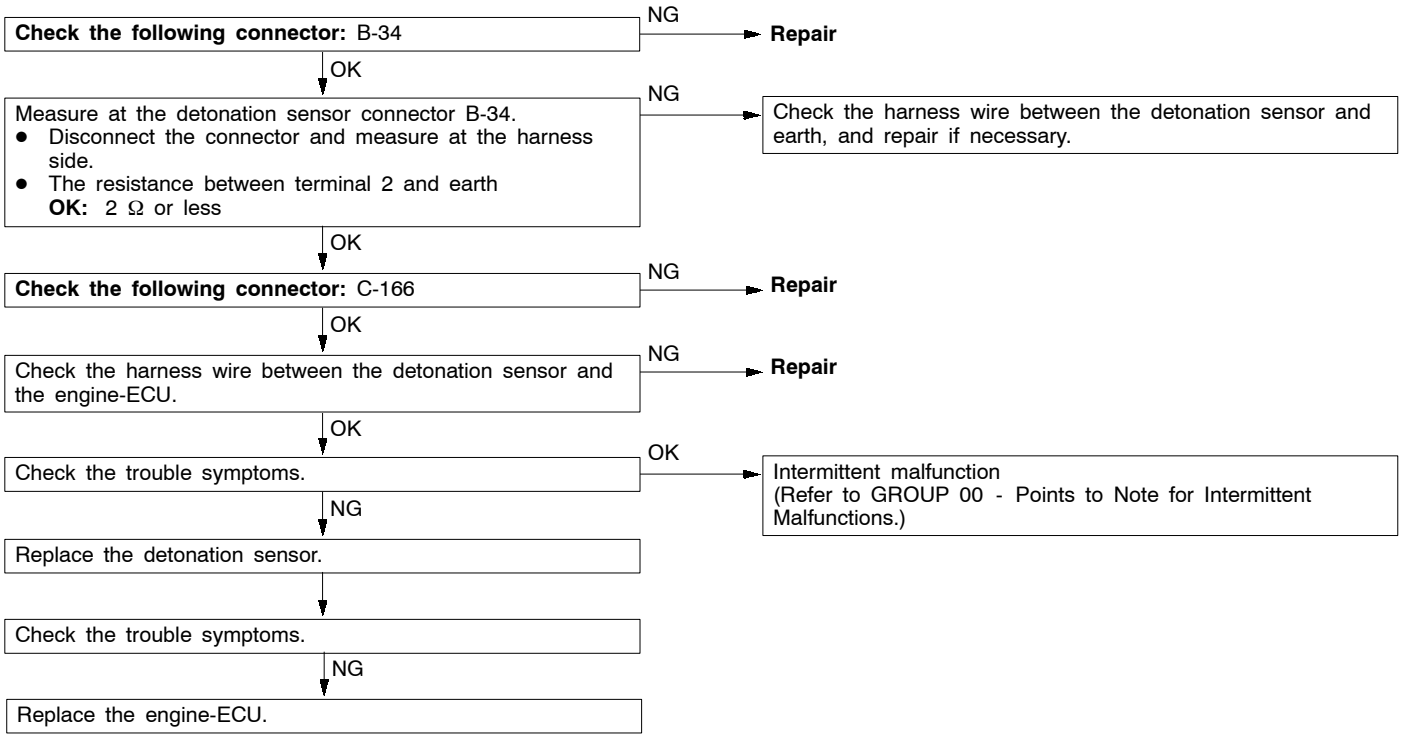
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0301 No. 1 cylinder misfire detected Code No. P0302 No. 2 cylinder misfire detected Code No. P0303 No. 3 cylinder misfire detected Code No. P0304 No. 4 cylinder misfire detected Code No. P0305 No. 5 cylinder misfire detected Code No. P0306 No. 6 cylinder misfire detected	Probable cause
Range of Check ● The engine speed is 500 - 3,500 r/min. ● While the engine is running except deceleration and sudden acceleration. Set Conditions ● The number of misfires exceeds a predetermined number per 200 engine revolutions (Misfire has occurred in only one cylinder). or ● The number of misfires exceeds a predetermined number per 100 engine revolutions (Misfire has occurred in only one cylinder).	● Malfunction of the ignition system ● Abnormal compression ● Malfunction of injector ● Malfunction of engine-ECU

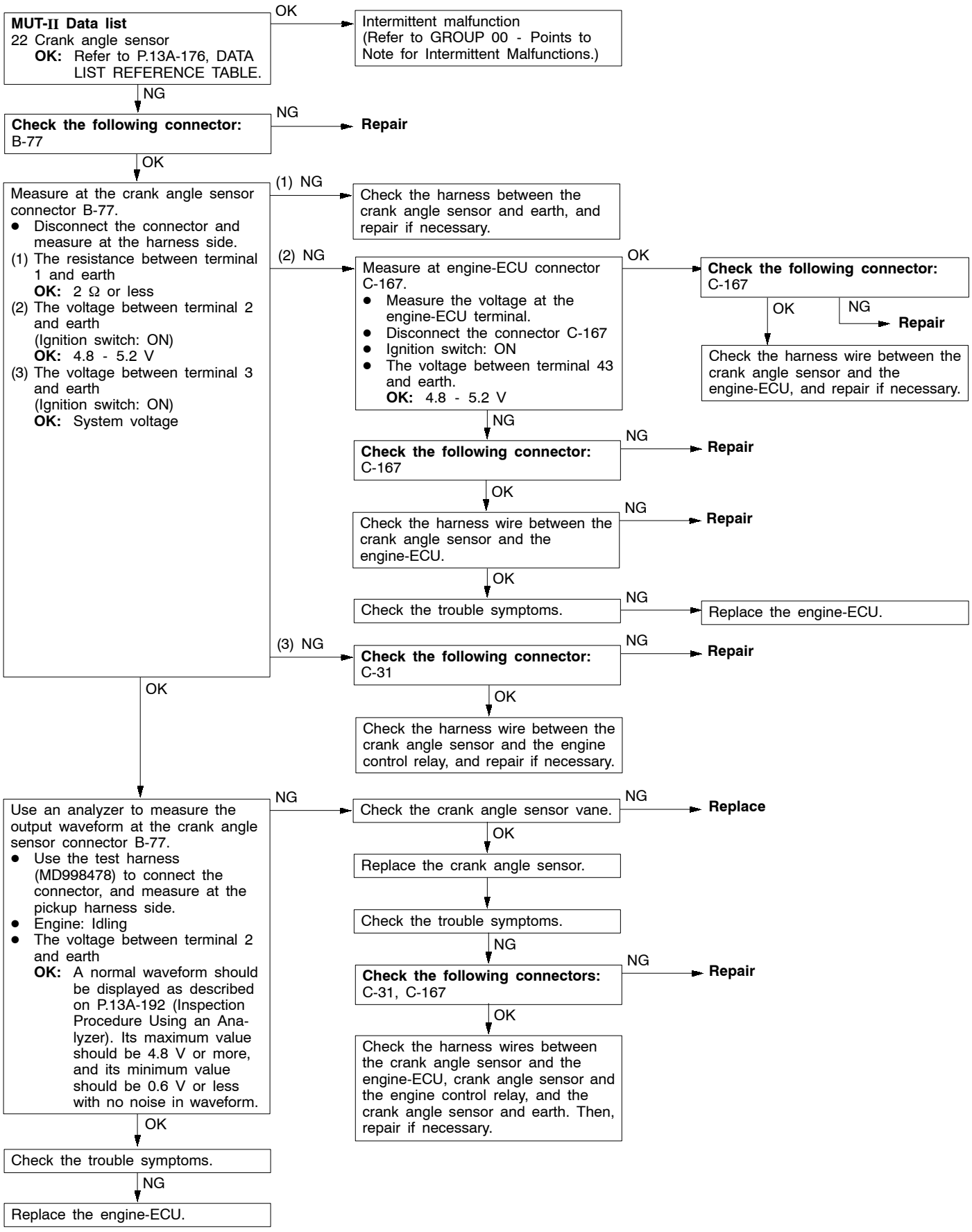


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

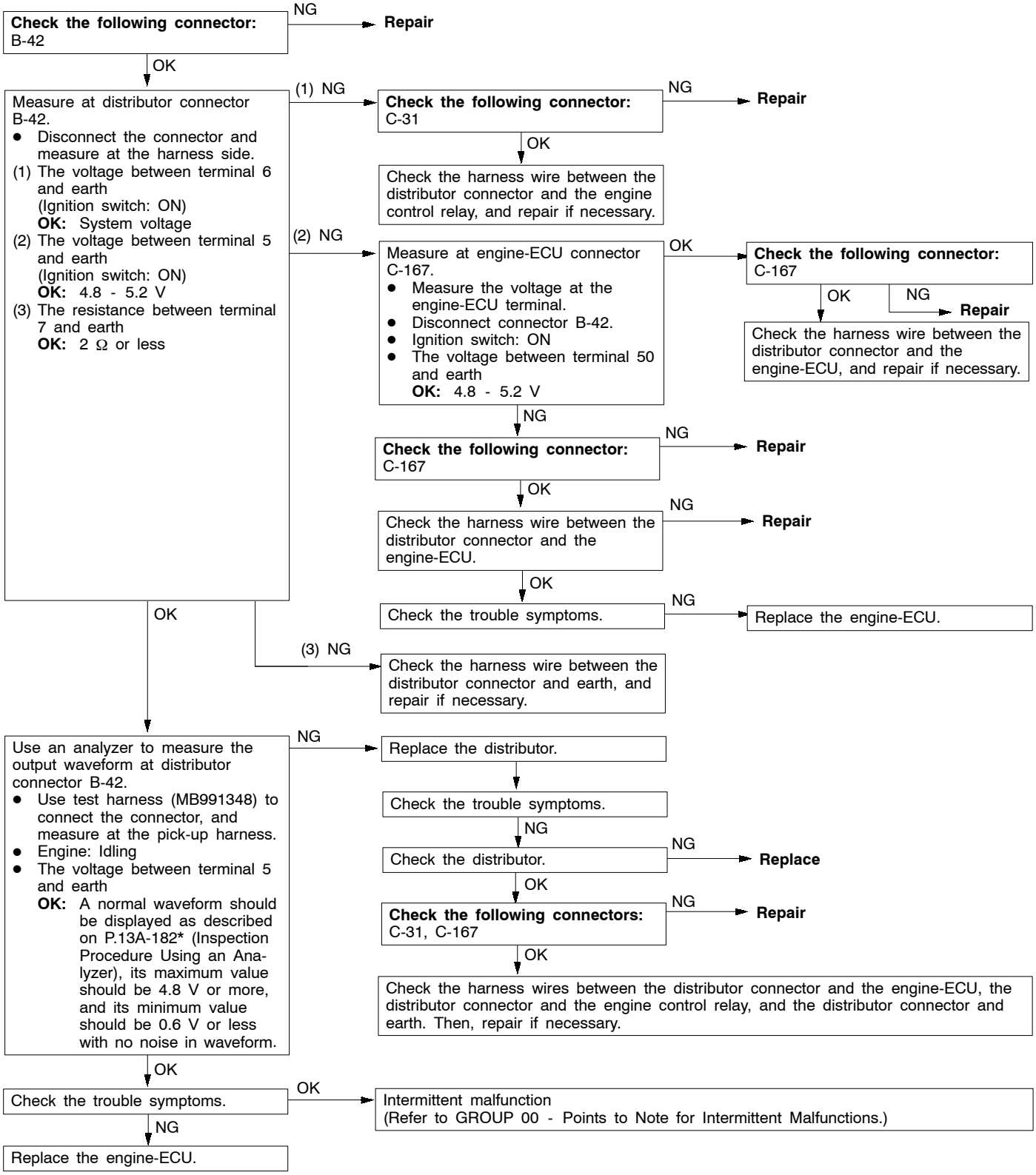
Code No. P0325 Detonation sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● Changes in sensor output voltage (detonation sensor peak voltage per 1/3 crankshaft rotation) in 200 consecutive cycles are 0.08 V or less.	● Malfunction of the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



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

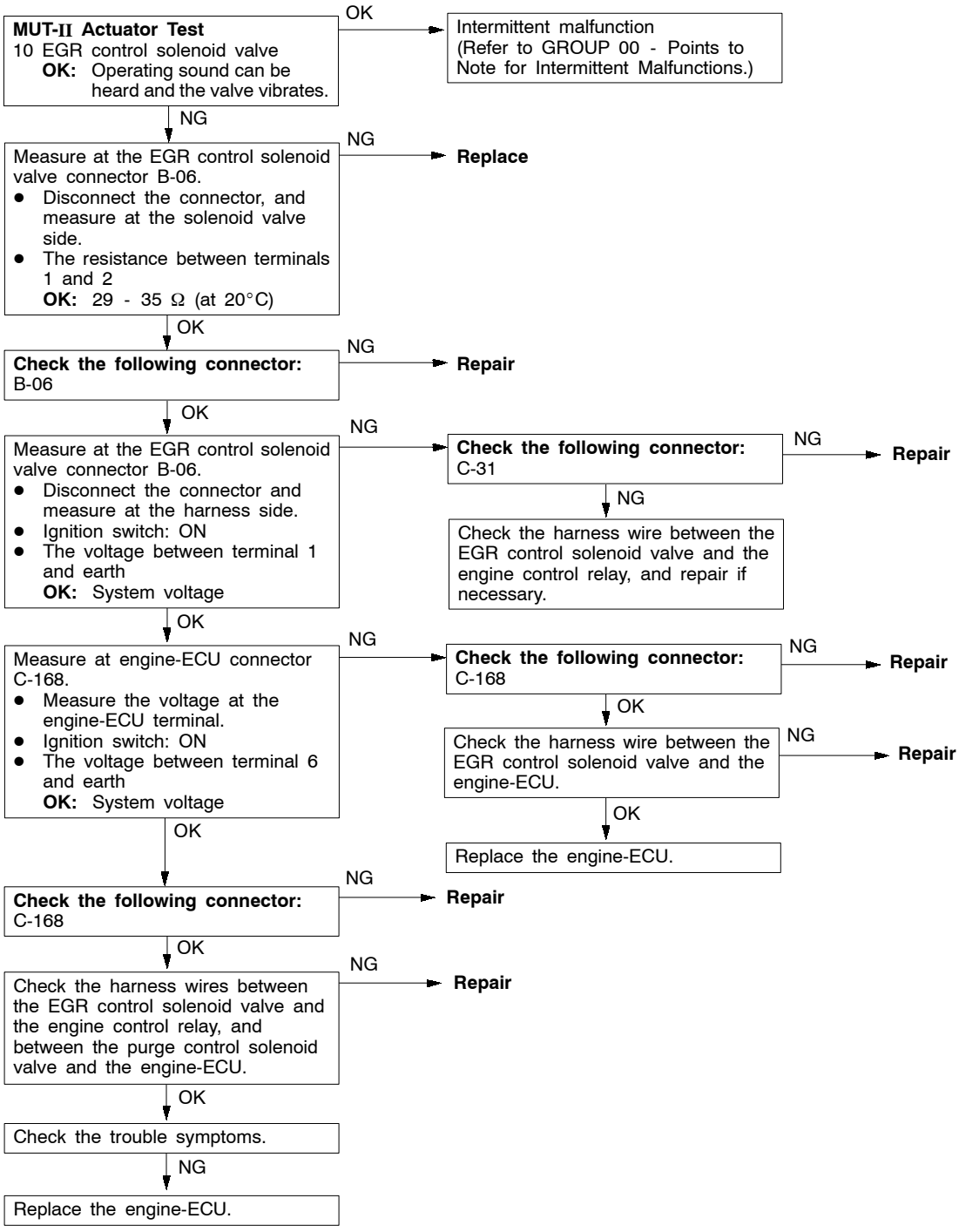

MUT-II Data list
22 Crank angle sensor
OK: Refer to P.13A-176, DATA LIST REFERENCE TABLE.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check the following connector:
B-77
NG
Repair
OK
Measure at the crank angle sensor connector B-77.
● Disconnect the connector and measure at the harness side.
(1) The resistance between terminal 1 and earth
OK: 2 Ω or less
(2) The voltage between terminal 2 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) The voltage between terminal 3 and earth
(Ignition switch: ON)
OK: System voltage
(1) NG
Check the harness between the crank angle sensor and earth, and repair if necessary.
(2) NG
Measure at engine-ECU connector C-167.
● Measure the voltage at the engine-ECU terminal.
● Disconnect the connector C-167
● Ignition switch: ON
● The voltage between terminal 43 and earth.
OK: 4.8 - 5.2 V
OK
Check the following connector:
C-167
OK
NG
Repair
Check the harness wire between the crank angle sensor and the engine-ECU, and repair if necessary.
NG
Check the following connector:
C-167
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine-ECU.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.
(3) NG
Check the following connector:
C-31
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine control relay, and repair if necessary.
OK
Use an analyzer to measure the output waveform at the crank angle sensor connector B-77.
● Use the test harness (MD998478) to connect the connector, and measure at the pickup harness side.
● Engine: Idling
● The voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13A-192 (Inspection Procedure Using an Analyzer). Its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.
NG
Check the crank angle sensor vane.
NG
Replace
OK
Replace the crank angle sensor.
Check the trouble symptoms.
NG
Check the following connectors:
C-31, C-167
NG
Repair
OK
Check the harness wires between the crank angle sensor and the engine-ECU, crank angle sensor and the engine control relay, and the crank angle sensor and earth. Then, repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU.

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

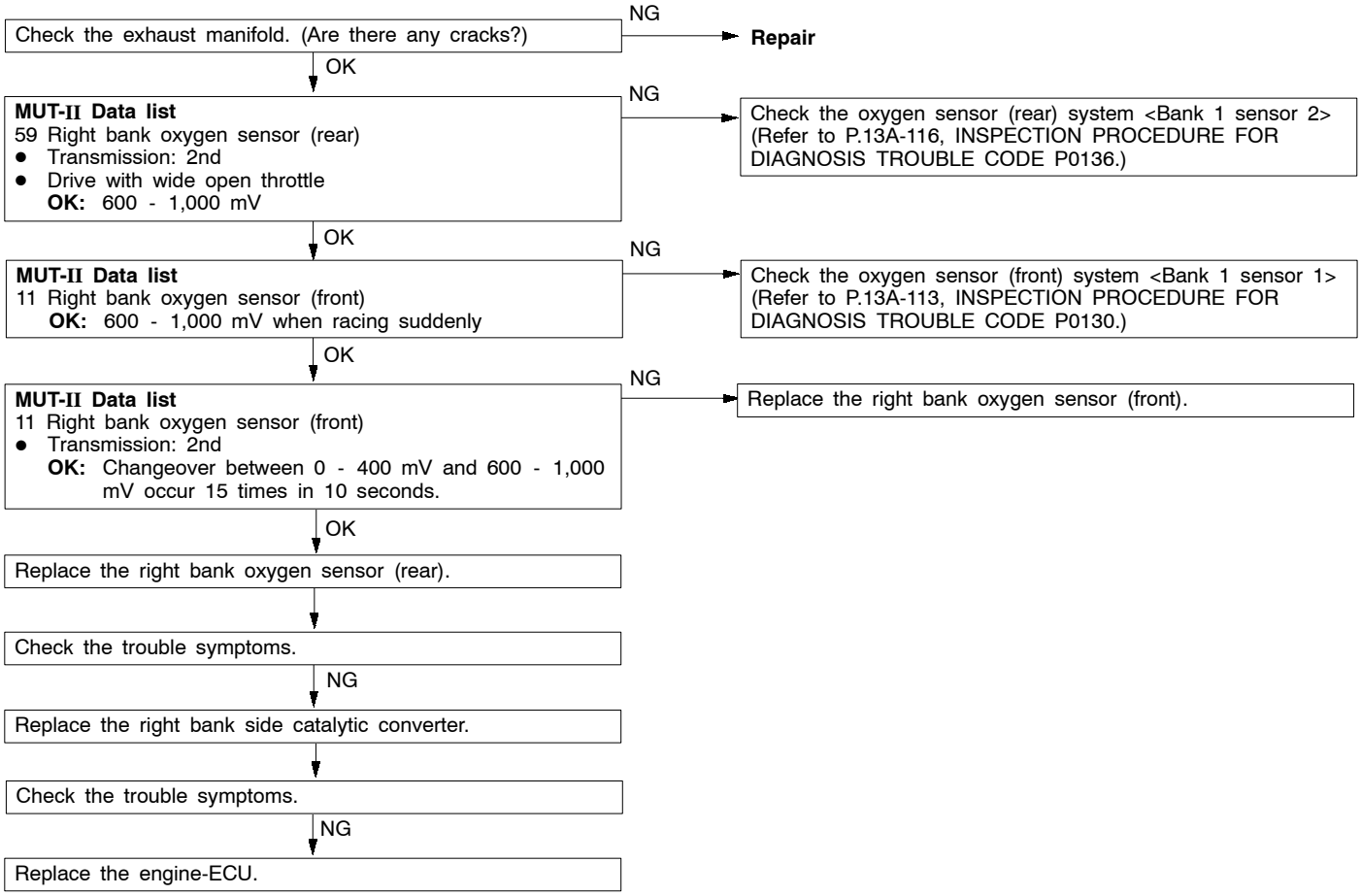


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

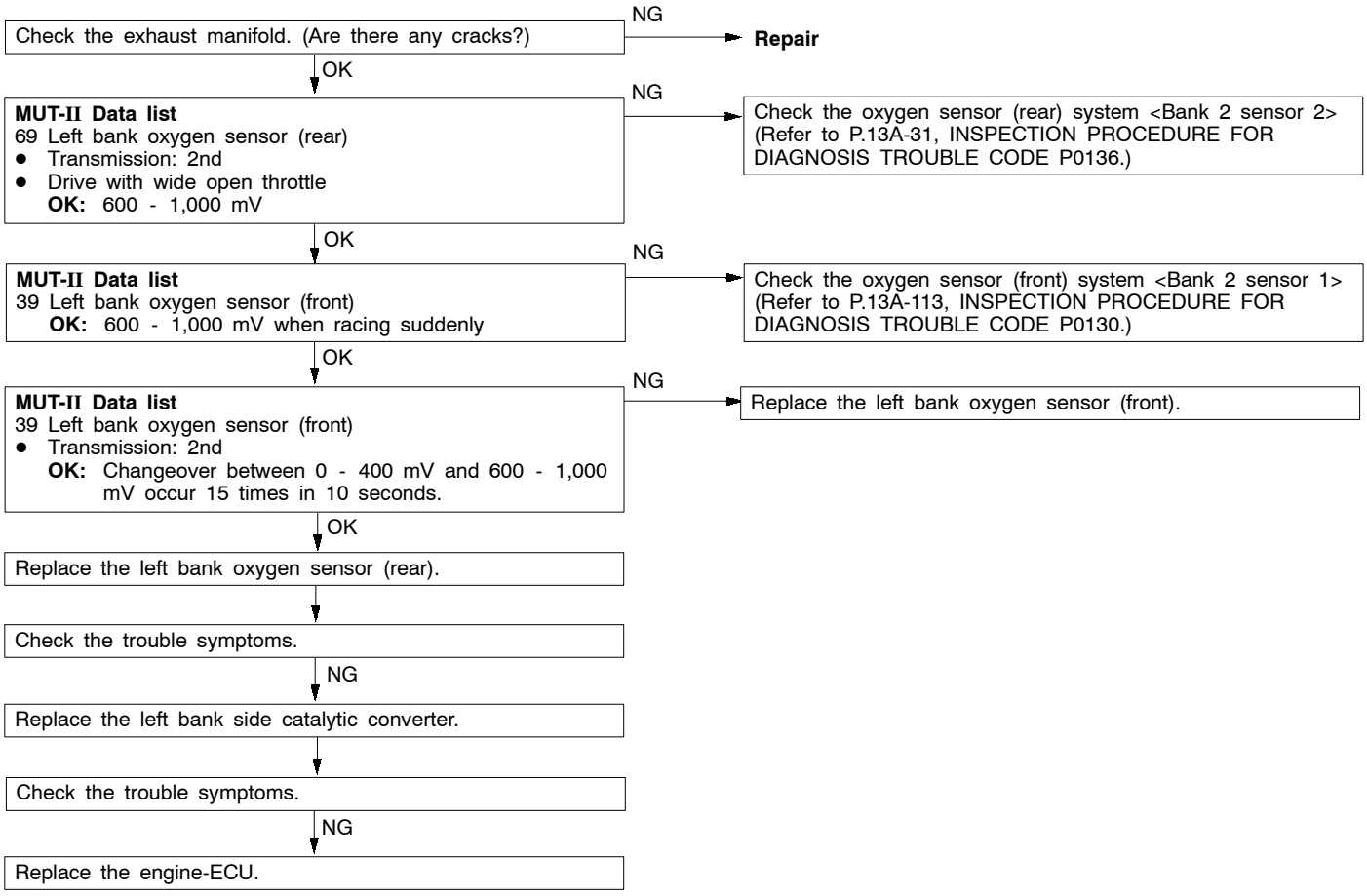
Code No. P0403 EGR control solenoid valve system	Probable cause
Range of Check ● Ignition switch: ON ● Battery voltage is 10 V or more. Set Conditions ● The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	● Malfunction of the EGR control solenoid valve ● Open or short circuit in the EGR control solenoid valve circuit or loose connector contact ● Malfunction of engine-ECU



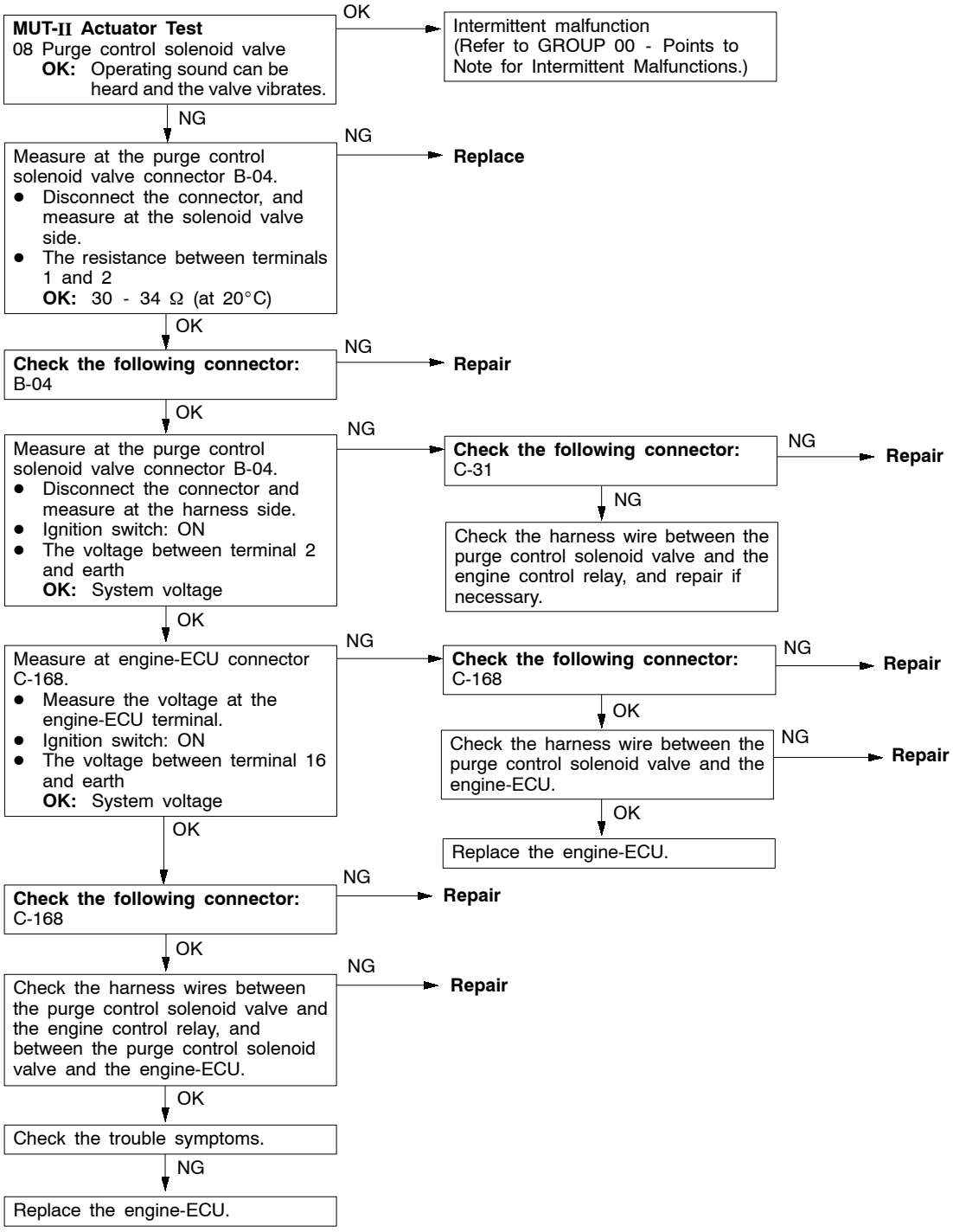
Code No. P0421 Catalyst malfunction (Bank 1)	Probable cause
Range of Check ● The engine speed is 3,000 r/min or less. ● During driving ● During air/fuel ratio feedback control Set Conditions ● The ratio between the right bank oxygen sensor (rear) and the right bank oxygen sensor (front) output frequencies reaches 0.8 per 12 seconds on average.	● Malfunction of right bank side catalyst ● Malfunction of the right bank oxygen sensor (front) ● Malfunction of the right bank oxygen sensor (rear) ● Malfunction of engine-ECU



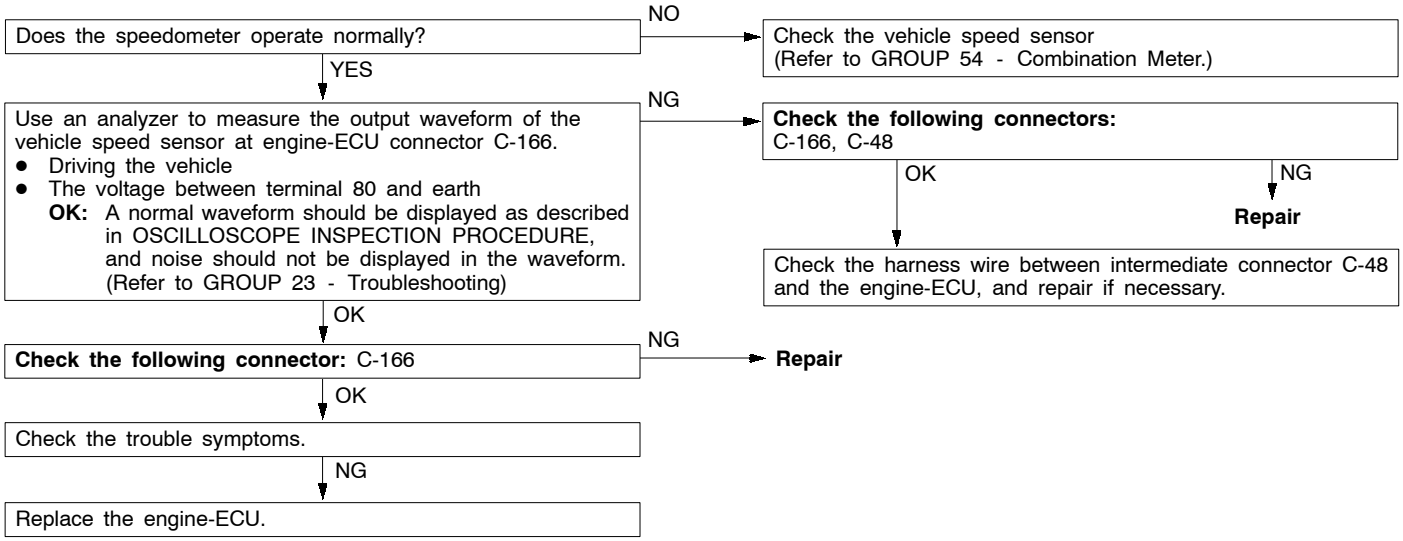
Code No. P0431 Catalyst malfunction	Probable cause
Range of Check ● The engine speed is 3,000 r/min or less. ● During driving ● During air/fuel ratio feedback control Set Conditions ● The ratio between the left bank oxygen sensor (rear) and the left bank oxygen sensor (front) output frequencies reaches 0.8 per 12 seconds on average.	● Malfunction of left bank side catalyst ● Malfunction of the left bank oxygen sensor (front) ● Malfunction of the left bank oxygen sensor (rear) ● Malfunction of engine-ECU



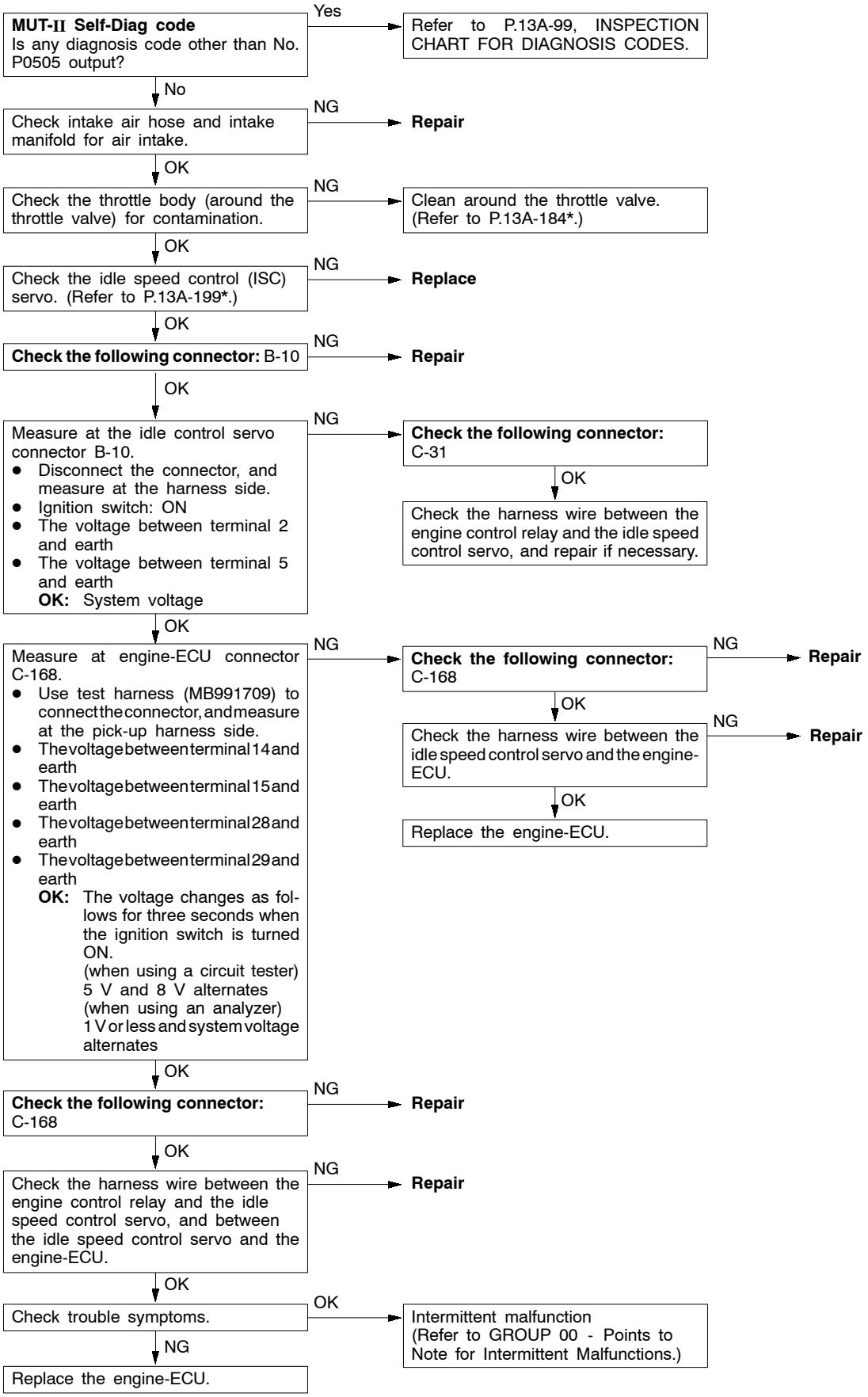
Code No. P0443 Purge control solenoid valve system	Probable cause
Range of Check ● Ignition switch: ON ● Battery voltage is 10 V or more. Set Conditions ● The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	● Malfunction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



Code No. P0500 Vehicle speed sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine was started ● Idle switch: OFF ● Engine speed: 3,000 r/min or more ● During high engine load Set Conditions ● The sensor output voltage does not change for 4 seconds (no pulse signal input).	● Malfunction of the vehicle speed sensor ● Open or short circuit in the vehicle speed sensor circuit or loose connector contact ● Malfunction of engine-ECU

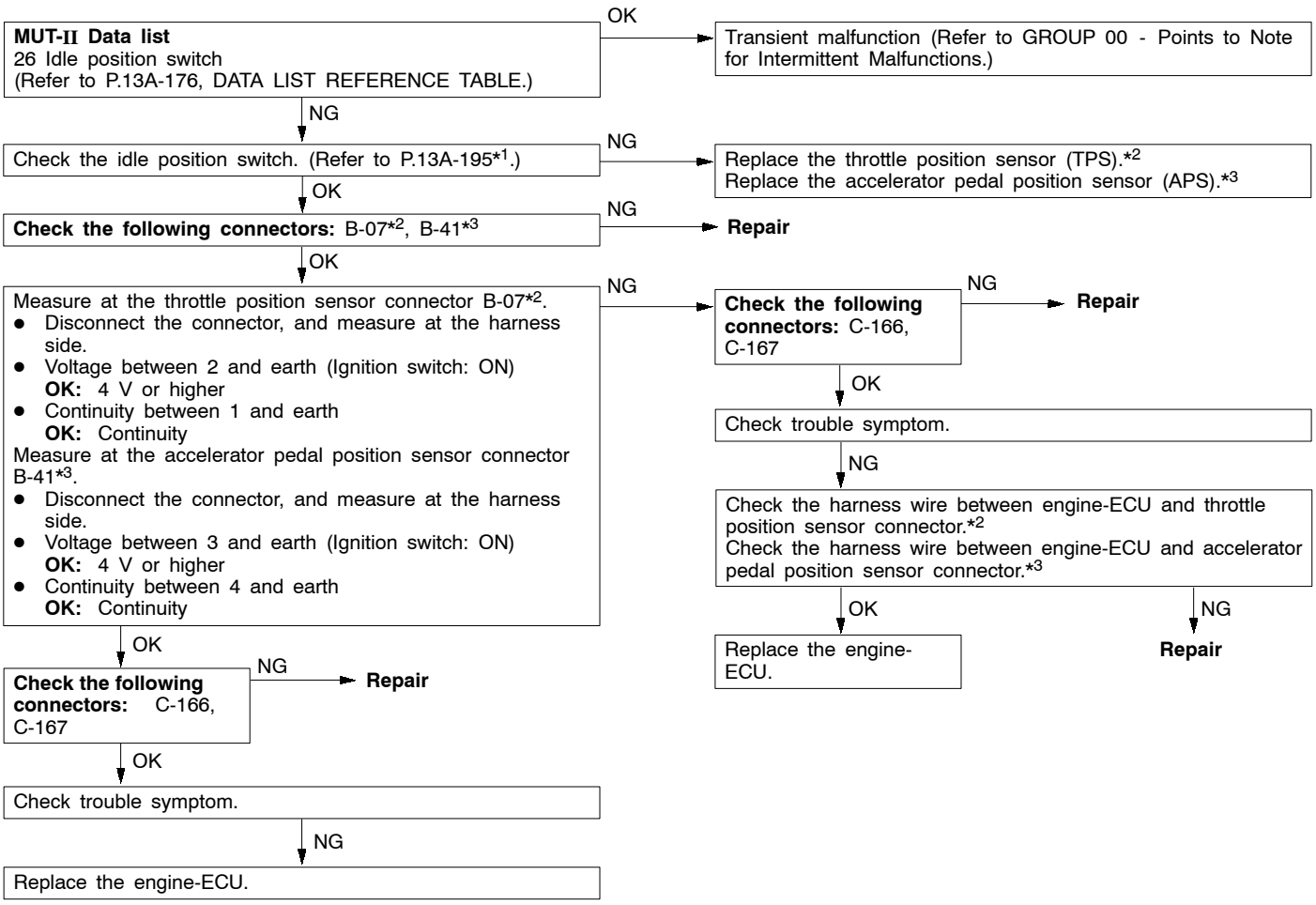


Code No. P0505 Idle speed control (ISC) system	Probable cause
Check Area ● Vehicle speed has reached 1.5 km/h at least once. ● Under the closed loop idle speed control. Judgment Criteria ● Actual idle speed has continued to be higher than the target idle speed by 300 r/min or more for 10 sec. Check Area ● Vehicle speed has reached 1.5 km/h at least once. ● During idle speed closed loop control. ● The highest temperature at the last drive is 45°C or less. ● Engine coolant temperature is approx. 80°C or more. ● Battery voltage is 10 V or more. ● Barometric pressure is 76 kPa or higher. ● Intake air temperature is -10°C (14°F) or more. Judgment Criteria ● Actual idle speed has been minimum 200 r/min higher than the target idle speed for ten seconds. Check Area ● During idle speed closed loop control. ● Engine coolant temperature is about 80°C or higher. ● Battery voltage is 10 V or higher. ● Power steering switch is off. ● Volumetric efficiency is 40 % or lower. ● Barometric pressure is 76 kPa or higher. ● Intake air temperature is -10°C or more. Judgment Criteria ● Actual idle speed has been minimum 100 r/min higher than the target idle speed for ten seconds.	● Malfunction of idle speed control (ISC) servo ● Improper connector contact, open circuit or short-circuit harness wire ● Malfunction of engine-ECU



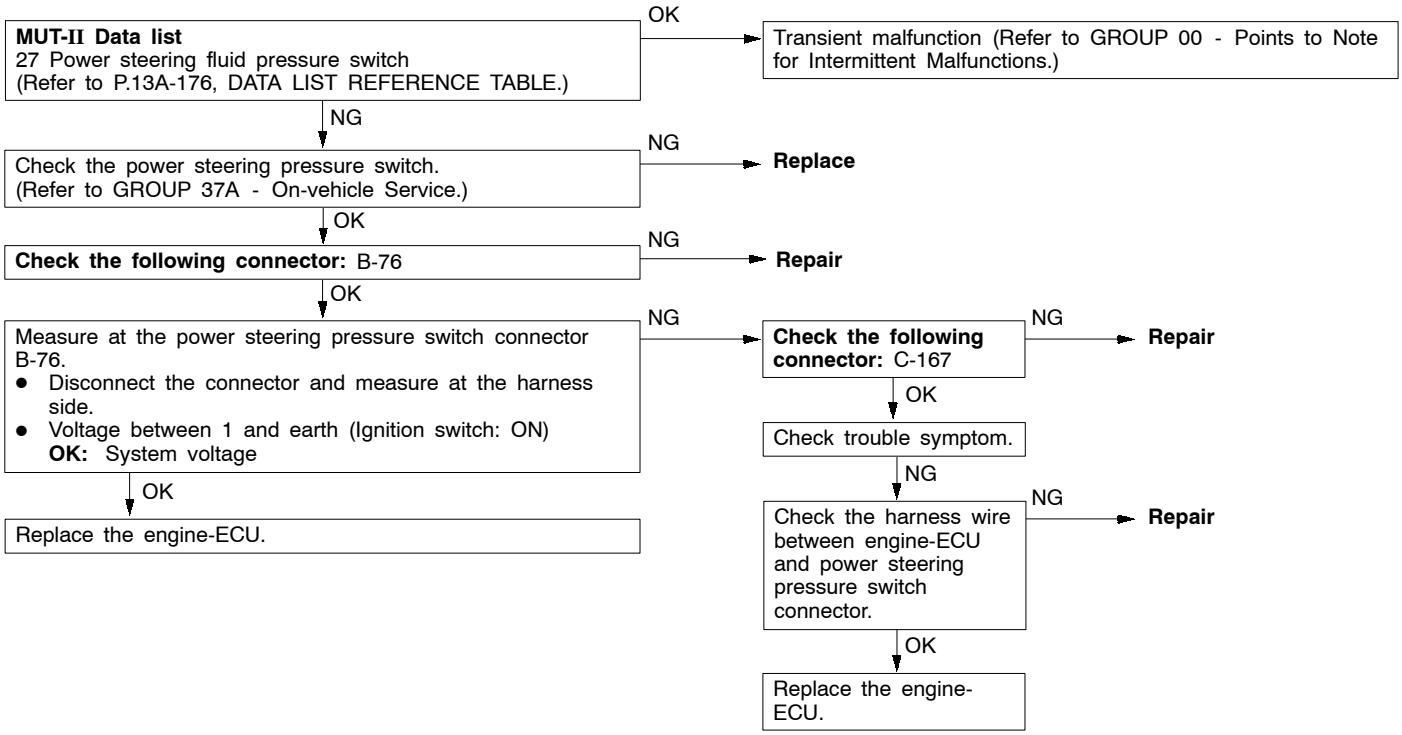
NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

Code No. P0510 Idle position switch system	Probable cause
Check Area ● Throttle position sensor output voltage is 2.0 V or more. Judgment Criteria ● Idle position switch has been turned on. Check Area ● Repeat the *1 drive and *2 stop 15 times or more. *1 drive: The vehicle remains under the following conditions for at least two seconds; engine speed is 1,500 rpm or higher, air flow sensor output waveform is 100 Hz or higher, and vehicle speed is more than 30 km/h for two seconds. *2 stop: The vehicle remains under the following conditions for at least two seconds; engine speed is 800 rpm or lower, and vehicle speed is less than 1.5 km/h. Judgment Criteria ● Idle position switch remains off.	● Malfunction of idle position switch ● Open or shorted idle position switch circuit, or loose connector. ● Malfunction of engine-ECU

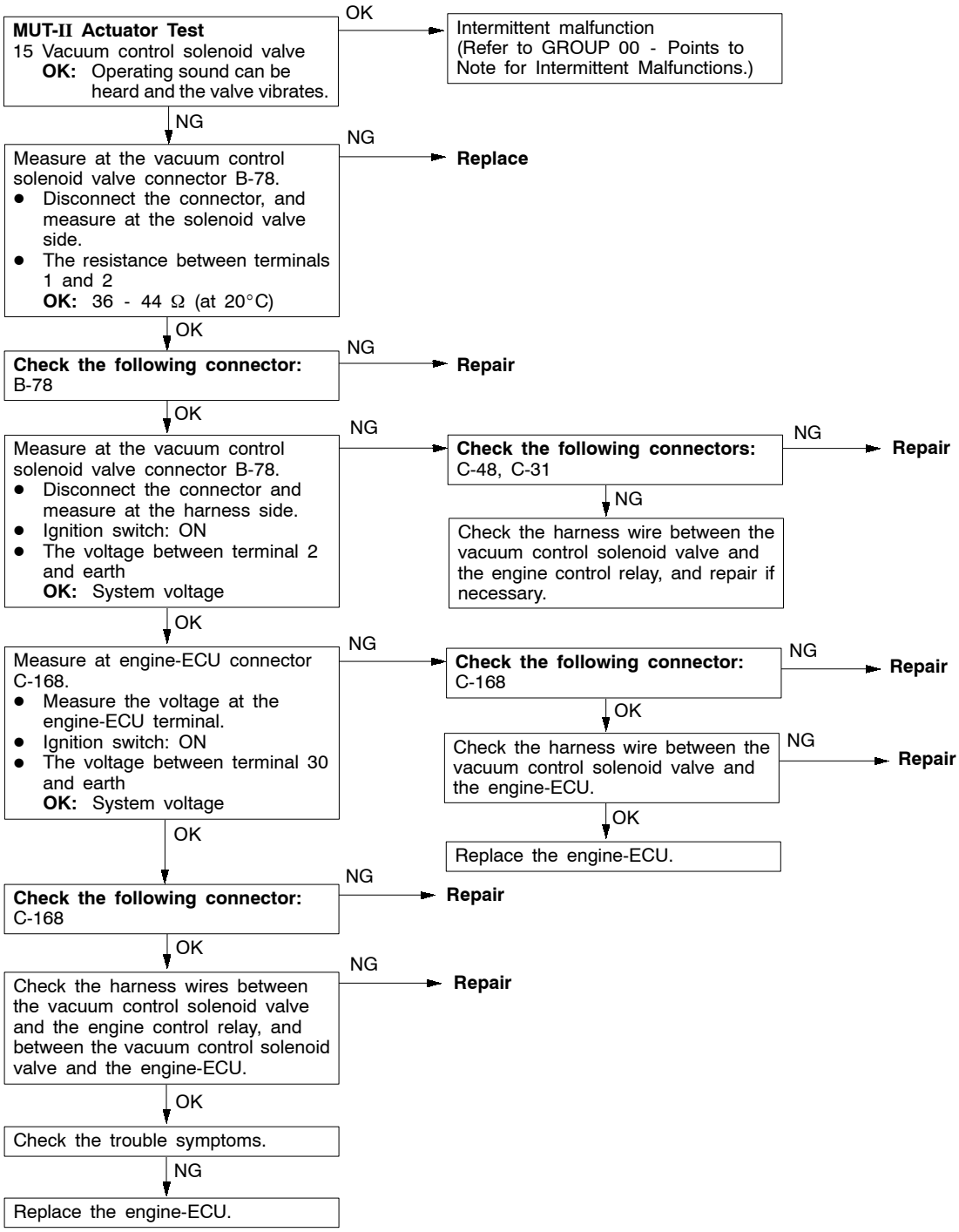


NOTE:
*1: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)
*2: Vehicles without TCL and vehicles without ASC.
*3: Vehicles with TCL and vehicles with ASC.

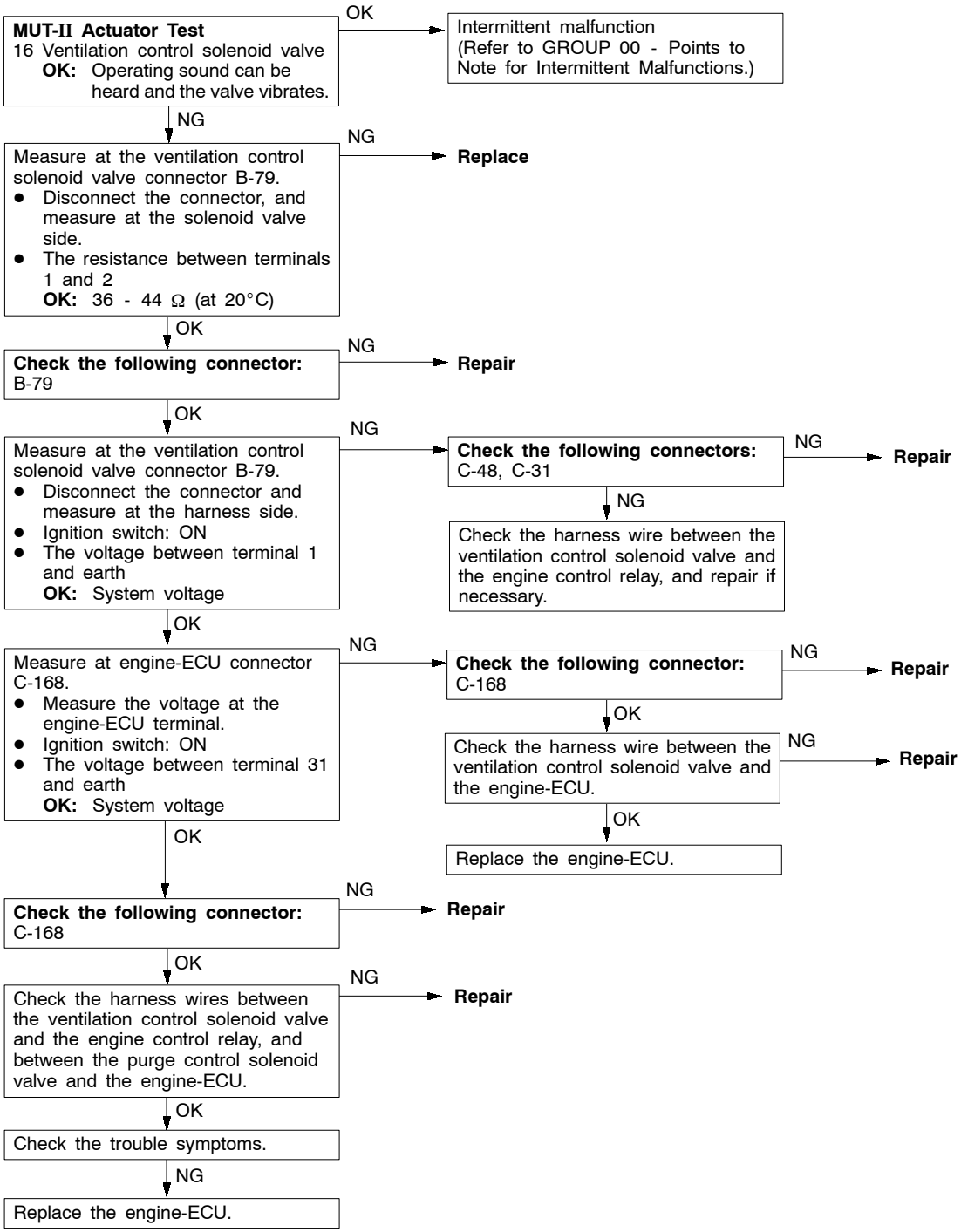
Code No. P0551 Power steering fluid pressure switch system	Probable cause
Check Area ● Intake air temperature is -10°C or higher. ● Barometric pressure is 76 kPa or higher. ● Engine coolant temperature is 30°C or more. ● Repeat *1 drive and *2 stop ten times or more. *1: Engine speed is 2,500 r/min or higher, volumetric efficiency is 55 % or higher and vehicle speed is 5 km/h or higher for 4 seconds or more. *2: Vehicle speed is 1.5 km/h or lower. Judgment Criteria ● Power steering pressure switch remains on.	● Power steering fluid pressure switch failed. ● Open or shorted power steering fluid pressure switch circuit, or loose connector. ● Engine-ECU failed.



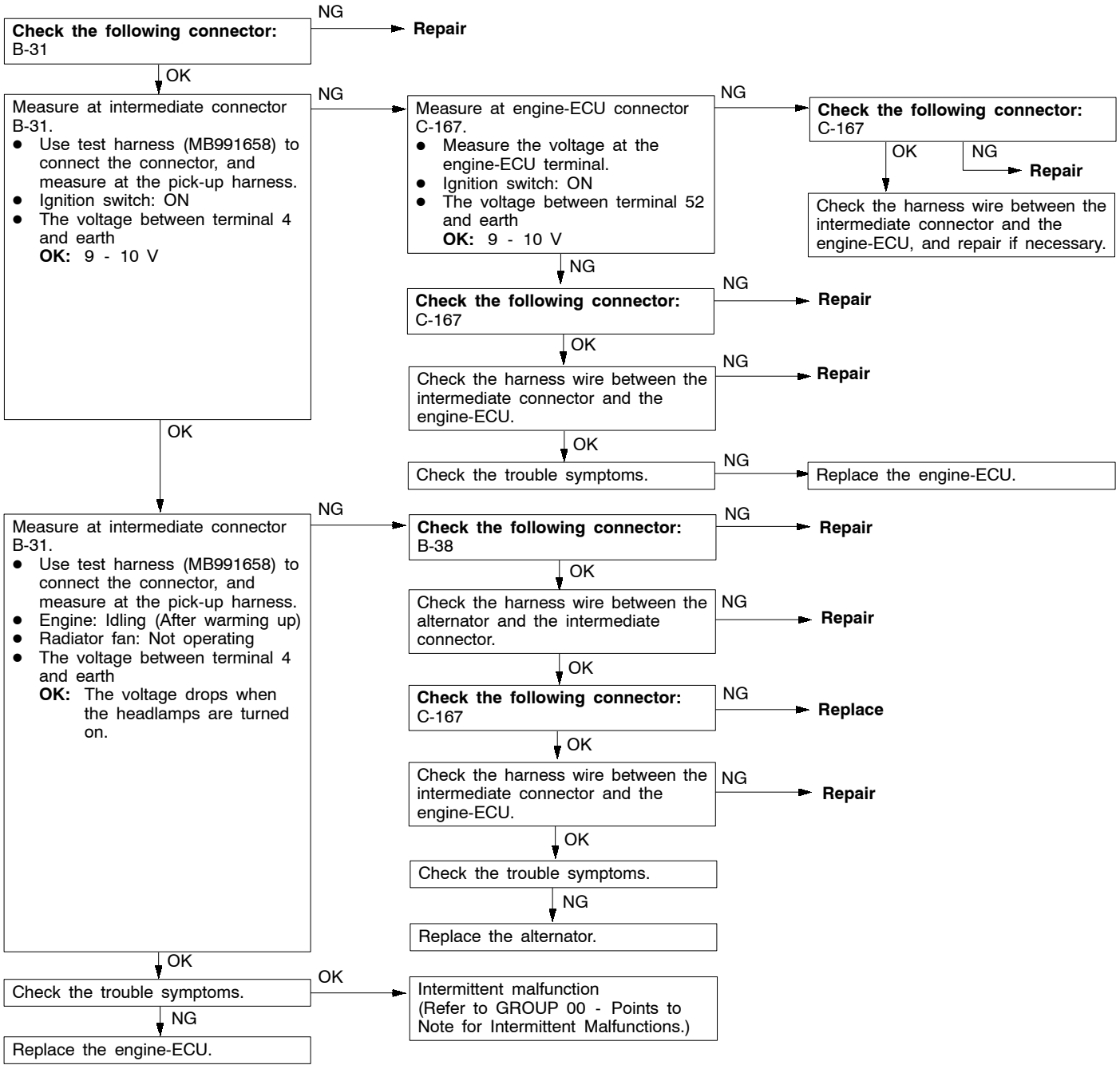
Code No. P1101 Vacuum control solenoid valve system <Vehicles with TCL and vehicles with ASC>	Probable cause
Range of Check ● Ignition switch: ON ● Excluding 60 seconds immediately after the engine starts. ● Battery voltage is 10 V or more. ● Forced actuation by means of MUT-II is not being carried out. Set condition Solenoid valve drive or non-drive instruction and energized condition of solenoid coil are different.	● Malfunction of the vacuum control solenoid valve ● Improper connector contact, open circuit or short-circuited harness wire of the vacuum control solenoid valve ● Malfunction of the engine-ECU



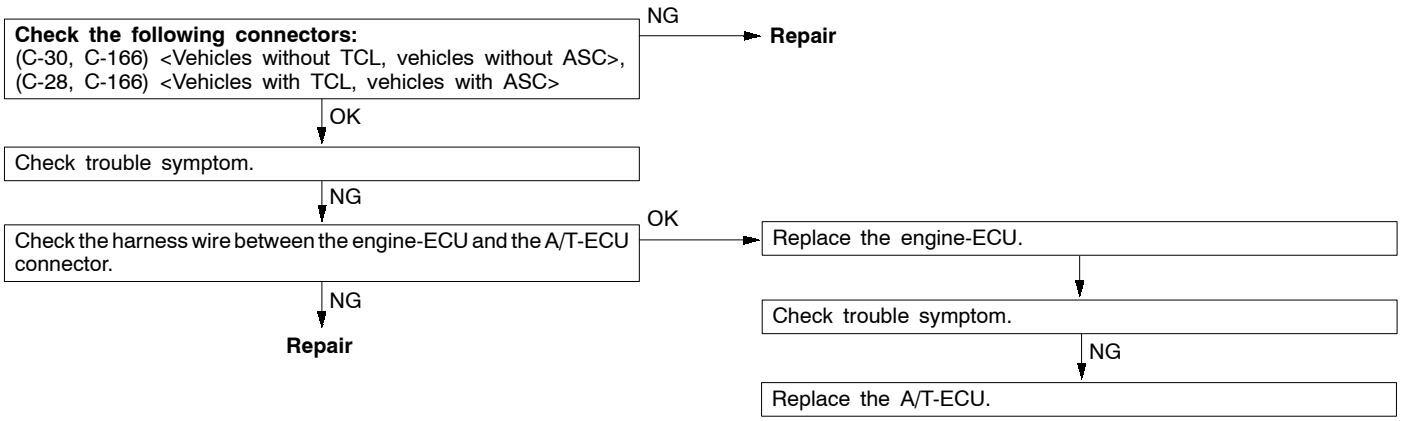
Code No. P1102 Ventilation control solenoid valve system <Vehicles with TCL and vehicles with ASC>	Probable cause
Range of Check ● Ignition switch: ON ● Excluding 60 seconds immediately after the engine starts. ● Battery voltage is 10 V or more. ● Forced actuation by means of MUT-II is not being carried out. Set condition Solenoid valve drive or non-drive instruction and energized condition of solenoid coil are different.	● Malfunction of the ventilation control solenoid valve ● Improper connector contact, open circuit or short-circuited harness wire of the ventilation control solenoid valve ● Malfunction of the engine-ECU



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

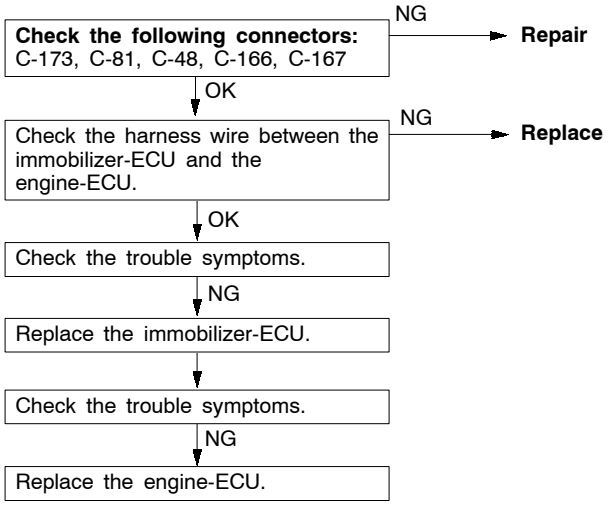


Code No. 1600 Communication wire with A/T-ECU system <A/T>	Probable cause
Range of Check ● 60 seconds or more have passed immediately after engine was started. ● Engine speed is approx. 50 r/min or more Set conditions The voltage of the torque reduction request signal from the A/T-ECU is LOW for 1.5 seconds or more.	● Malfunction of the harness wire and the connector ● Malfunction of the engine-ECU ● Malfunction of the A/T-ECU



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

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



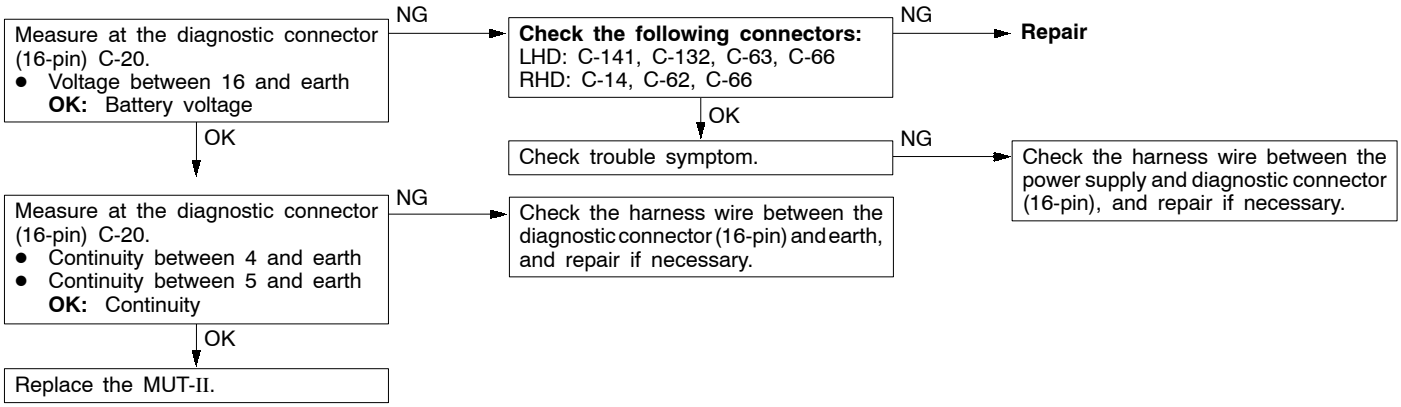
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13A-146
	Communication with engine-ECU only is not possible.	2	13A-146
Engine warning lamp and related parts	The engine warning lamp does not illuminate right after the ignition switch is turned to the ON position.	3	13A-147
	The engine warning lamp remains illuminating and never goes out.	4	13A-147
Starting	No initial combustion (starting impossible)	5	13A-148
	Initial combustion but no complete combustion (starting impossible)	6	13A-149
	Long time to start (improper starting)	7	13A-150
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	8	13A-151
	Idling speed is high. (Improper idling speed)	9	13A-153
	Idling speed is low. (Improper idling speed)	10	13A-154
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	11	13A-155
	When the engine becomes hot, it stalls at idling. (Die out)	12	13A-156
	The engine stalls when starting the car. (Pass out)	13	13A-158
	The engine stalls when decelerating.	14	13A-158
Driving	Hesitation, sag or stumble	15	13A-159
	The feeling of impact or vibration when accelerating	16	13A-161
	The feeling of impact or vibration when decelerating	17	13A-161
	Poor acceleration	18	13A-162
	Surge	19	13A-164
	Knocking	20	13A-166
Dieseling		21	13A-166
Too high CO and HC concentration when idling		22	13A-166
Low alternator output voltage (approx. 12.3 V)		23	13A-168
Idling speed is improper when A/C is operating		24	13A-168
Fans (radiator fan, A/C condenser fan) are inoperative		25	13A-169

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

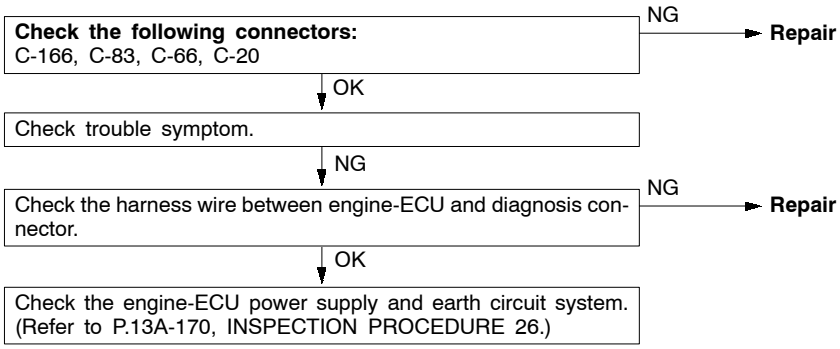
INSPECTION PROCEDURE 1

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



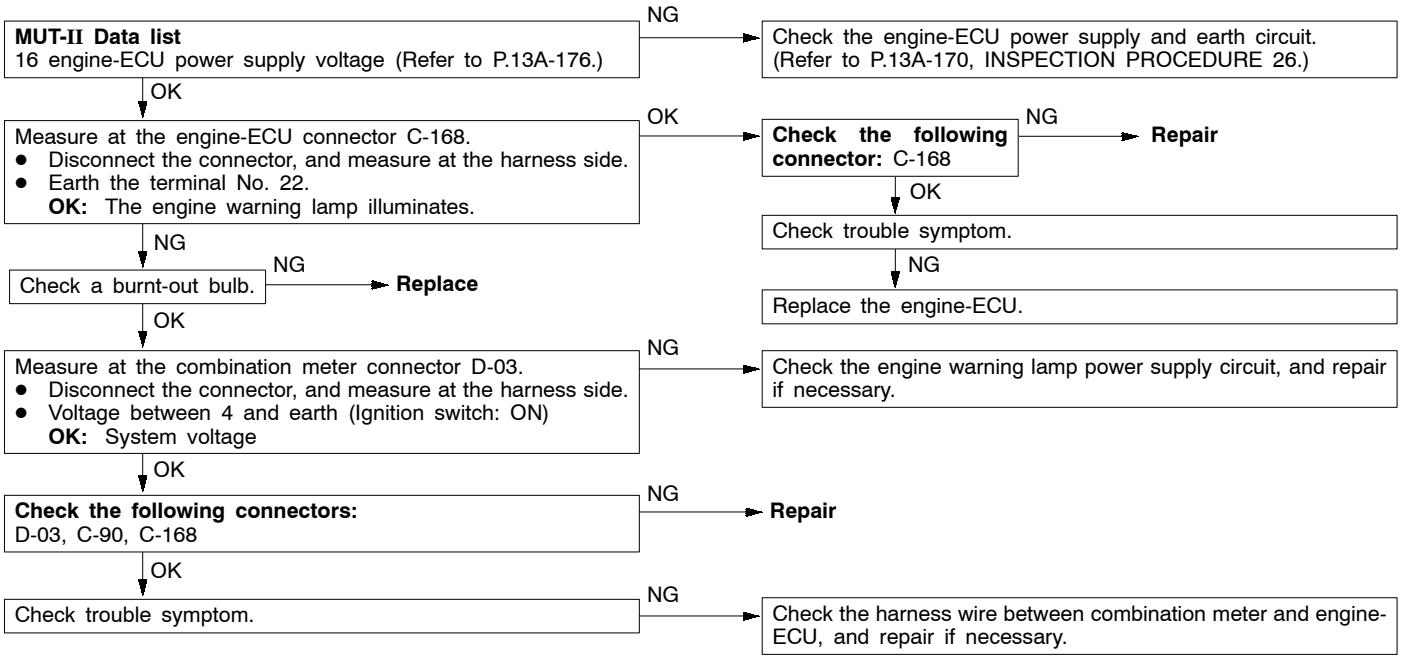
INSPECTION PROCEDURE 2

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



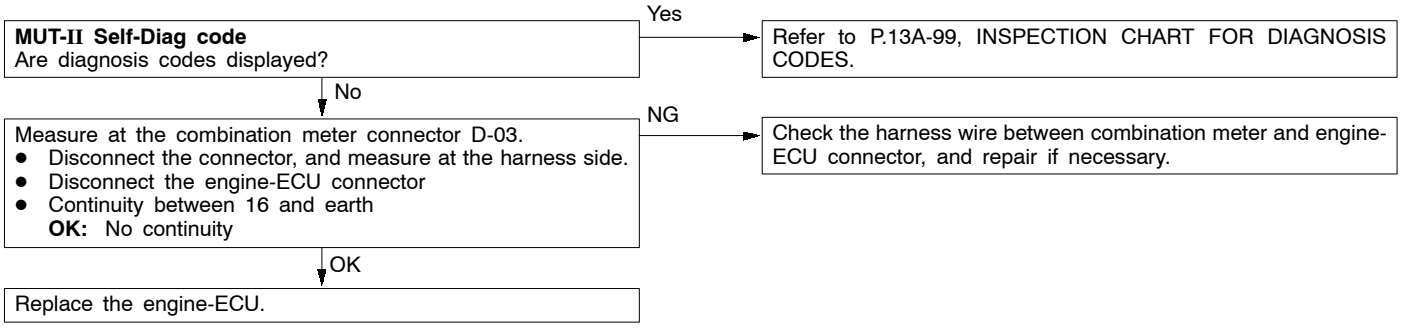
INSPECTION PROCEDURE 3

The engine warning lamp does not illuminate right after the ignition switch is turned to the ON position.	Probable cause
Because there is a burnt-out bulb, the engine-ECU causes the engine warning lamp to illuminate for five seconds immediately after the ignition switch is turned to ON. If the engine warning lamp does not illuminate immediately after the ignition switch is turned to ON, one of the malfunctions listed at right has probably occurred.	• Burnt-out bulb • Defective warning lamp circuit • Malfunction of the engine-ECU



INSPECTION PROCEDURE 4

The engine warning lamp remains illuminating and never goes out.	Probable cause
In cases such as the above, the cause is probably that the engine-ECU is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has occurred.	• Short-circuit between the engine warning lamp and engine-ECU • Malfunction of the engine-ECU



INSPECTION PROCEDURE 5

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.	• Malfunction of the ignition system • Malfunction of the fuel pump system • Malfunction of the injectors • Malfunction of the engine-ECU • Malfunction of the immobilizer system • Foreign materials in fuel

Check battery voltage when cranking.
OK: 8 V or higher
- NG → Check the battery. (Refer to GROUP 54 - Battery.)
- OK ↓

Is immobilizer-ECU diagnosis code displayed?
- Yes → Check the immobilizer. (Refer to GROUP 54 - Ignition Key and Immobilizer.)
- No ↓

MUT-II Data list
16 Power supply voltage (Refer to P.13A-176.)
- NG → Check the power supply and ignition switch-IG system. (Refer to P.13A-171, INSPECTION PROCEDURE 27.)
- OK ↓

Does the camshaft rotate at the engine cranking? (When oil filler cap is removed.)
- No → Check timing belt for breakage.
- Yes ↓

MUT-II Self-Diag code
Are diagnosis codes displayed?
- Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

MUT-II Data list
22 Crank angle sensor
OK: Cranking speed is displayed
- No → Check the crank angle sensor system. (Refer to P.13A-130, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0335.)
- OK ↓

MUT-II Actuator test
07 Fuel pump (Refer to P.13A-183.)
- NG → Check the fuel pump system. (Refer to P.13A-172, INSPECTION PROCEDURE 28.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
- NG → Check the engine coolant temperature sensor system. (Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

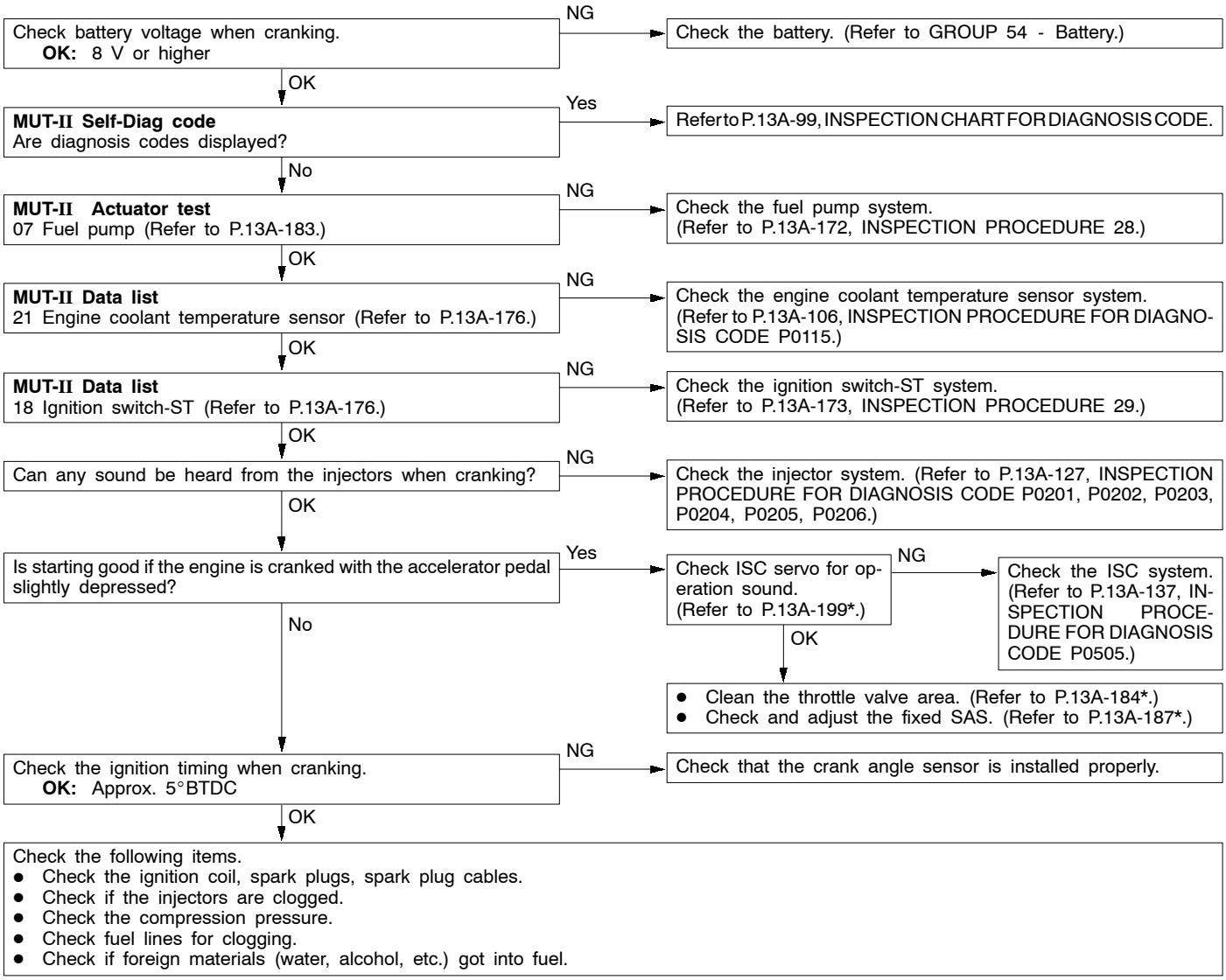
Can any sound be heard from the injectors when cranking?
- No → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204, P0205, P0206.)
- Yes ↓

Measure at the ignition coil connector B-09
- Connect an engine tachometer, which detects primary voltage, to terminal 3 while the engine is cranking.
  OK: The engine tachometer indicates cranking speed.
- No → Check the ignition circuit system (Refer to P.13A-174, INSPECTION PROCEDURE 31.)
- OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check if foreign materials (water, alcohol, etc.) got into fuel.
- Check the compression pressure.
- Check the immobilizer system.

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.	● Malfunction of the ignition system ● Malfunction of the injector system ● Foreign materials in fuel ● Poor compression ● Malfunction of the engine-ECU



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 7

It takes too long time to start. (Incorrect 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.	• Malfunction of the ignition system • Malfunction of the injector system • Inappropriate gasoline use • Poor compression

Check battery voltage when cranking.
OK: 8 V or higher
NG → Check the battery. (Refer to GROUP 54 - Battery.)
OK ↓

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODE.
No ↓

MUT-II Actuator test
07 Fuel pump (Refer to P.13A-183.)
NG → Check the fuel pump system. (Refer to P.13A-172, INSPECTION PROCEDURE 28.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
18 Ignition switch-ST (Refer to P.13A-176.)
NG → Check the ignition switch-ST system. (Refer to P.13A-173, INSPECTION PROCEDURE 29.)
OK ↓

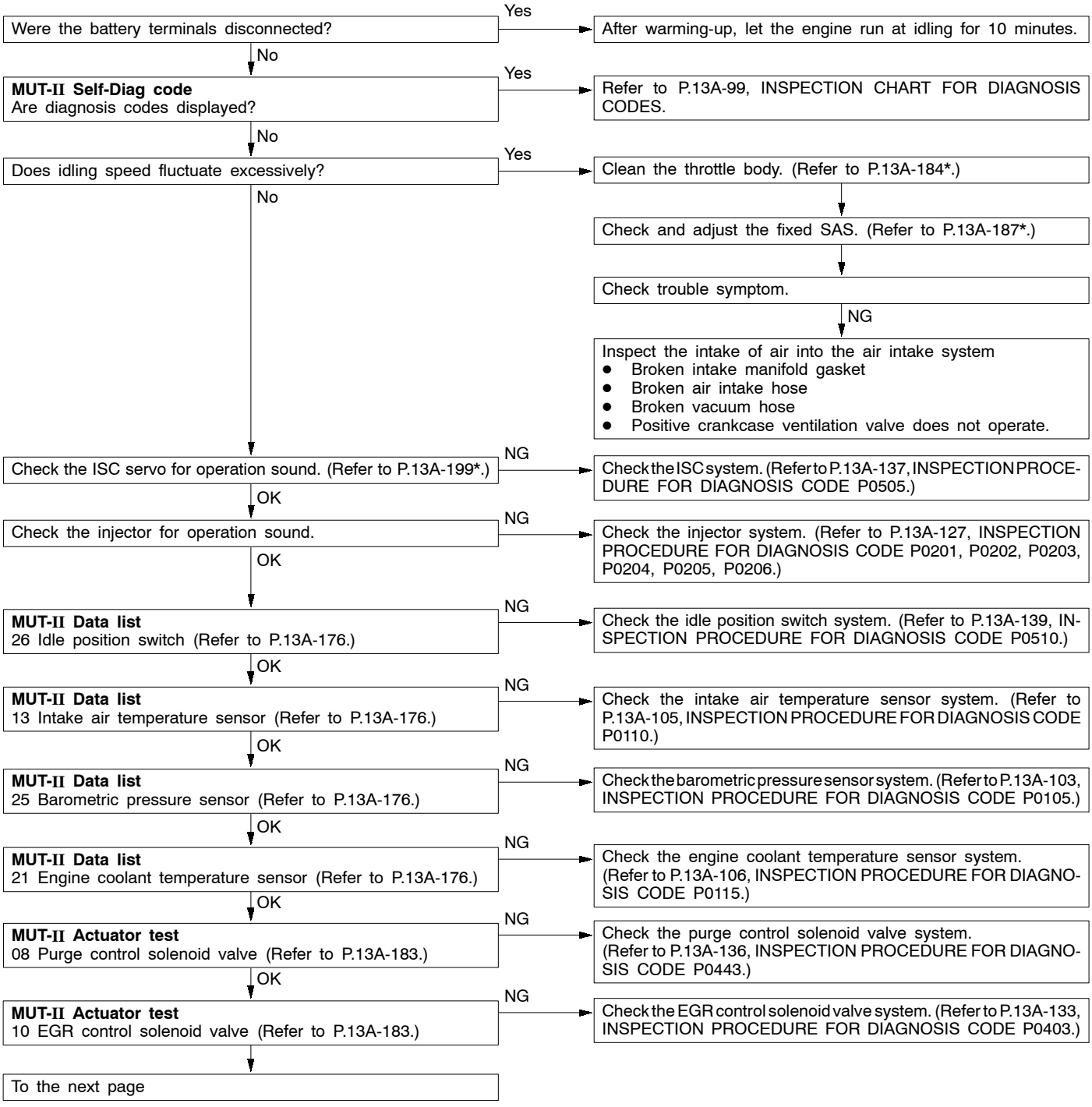
Can any sound be heard from the injectors when cranking?
NG → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204, P0205, P0206.)
OK ↓

Check the ignition timing when cranking.
OK: Approx. 5°BTDC
NG → Check that the crank angle sensor is installed properly.
OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check the compression pressure.
- Check if foreign materials (water, alcohol, etc.) got into fuel.

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, idle speed control (ISC) or compression pressure is defective. Because the range of possible causes is broad, inspection is narrowed down to simple items.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the ISC system • Malfunction of the purge control solenoid valve system • Malfunction of the EGR solenoid valve system • Poor compression • Drawing air into exhaust system



From the previous page

OK

MUT-II Data list
59 Right bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (rear). (Refer to P.13A-116, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0136.) (Bank 1 sensor 2)

OK

MUT-II Data list
69 Left bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 2). (Refer to P.13A-122, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0156.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (front). (Refer to P.13A-113, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0130.) (Bank 1 sensor 1)

OK

MUT-II Data list
39 Left bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 1). (Refer to P.13A-119, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0150.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)
39 Left bank oxygen sensor (front)

OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling and 2,500 r/min

NG → Check the fuel pressure. (Refer to P.13A-189*.)

OK → 1. Inspect the intake of air into the air intake system.
- Broken intake manifold gasket
- Broken vacuum hose
- PCV valve does not operate.

2. Check the injector for blockage.

OK

MUT-II Data list
27 Power steering fluid pressure switch (Refer to P.13A-176.)

NG → Check the power steering fluid pressure switch system. (Refer to P.13A-140, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0551.)

OK

MUT-II Data list
28 A/C switch (Refer to P.13A-176.)

NG → Check the A/C switch and A/C relay system. (Refer to P.13A-174. INSPECTION PROCEDURE 30.)

OK

MUT-II Data list
29 Inhibitor switch (Refer to P.13A-176.)

NG → Check the ignition switch-ST. (Refer to P.13A-173, INSPECTION PROCEDURE 29.)

OK

MUT-II Data list
45 ISC Servo position (Refer to P.13A-176.)

NG → Adjust the basic idle speed. (Refer to P.13A-188*.)

OK

Check the ignition timing. (Refer to GROUP 11A - On-vehicle Service.)

NG → Check that the crank angle sensor is installed properly.

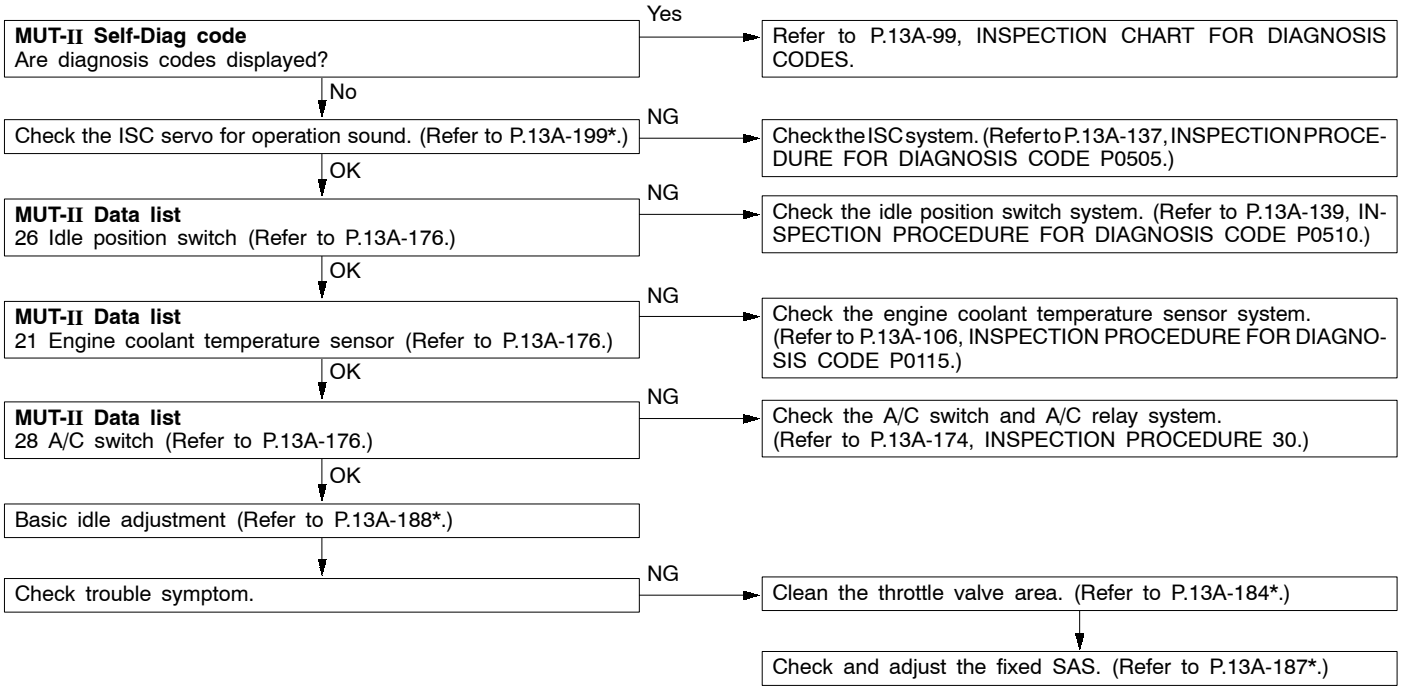
OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the purge control system.
- Check the EGR control system.
- Check the compression pressure.
- Check if foreign materials (water, alcohol, etc.) got into fuel.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 9

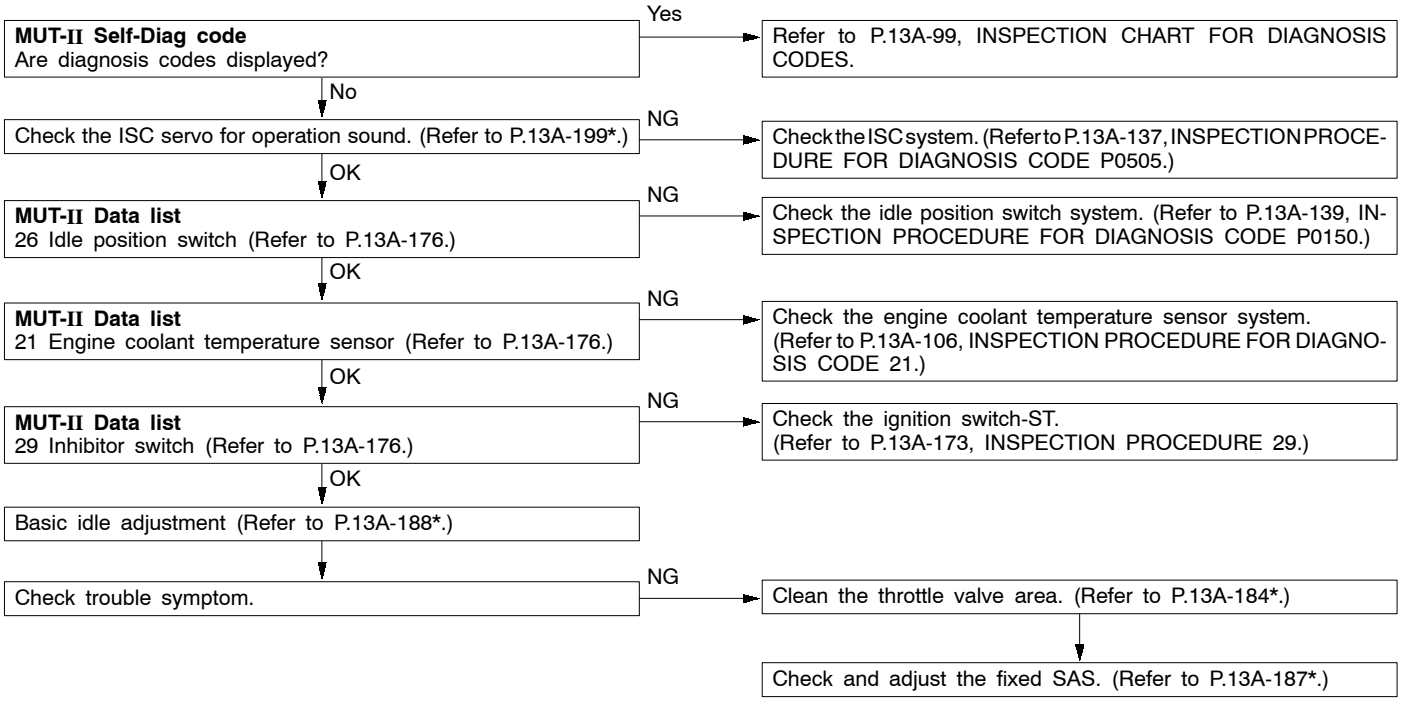
Idling speed is high. (Improper idling speed)	Probable cause
In such cases as the above, the cause is probably that the intake air volume during idling is too great.	• Malfunction of the ISC system • Malfunction of the throttle body



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 10

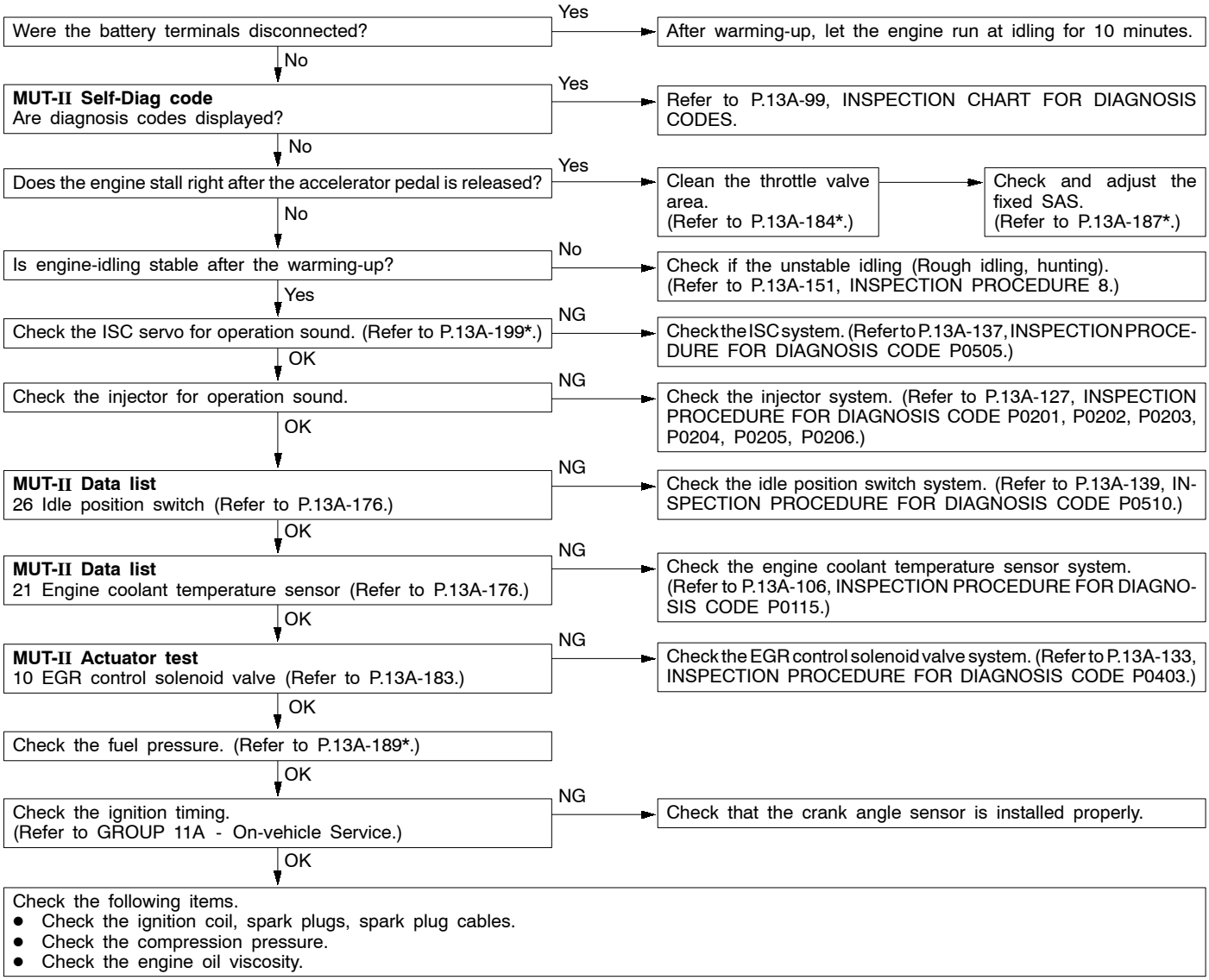
Idling speed is low. (Improper idling speed)	Probable cause
In cases such as the above, the cause is probably that the intake air volume during idling is too small.	• Malfunction of the ISC system • Malfunction of the throttle body



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

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, or that the intake air volume is insufficient.	• Malfunction of the ISC system • Malfunction of the throttle body • Malfunction of the injector system • Malfunction of the ignition system



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 12

When the engine is 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, idle speed control (ISC) or compression pressure is defective. In addition, if the engine suddenly stalls, the cause may also be a defective connector contact.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the ISC system • Drawing air into intake system • Improper connector contact

Were the battery terminals disconnected?
- Yes → After warming-up, let the engine run at idling for 10 minutes.
- No ↓

MUT-II Self-Diag code
Are diagnosis codes displayed?
- Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

Check the ISC servo for operation sound. (Refer to P.13A-199*.)
- NG → Check the ISC system. (Refer to P.13A-137, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0505.)
- OK ↓

Check the injector for operation sound.
- NG → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204.)
- OK ↓

Does the engine stall right after the accelerator pedal is released?
- Yes → Clean the throttle valve area. (Refer to P.13A-184*.) → Check and adjust the fixed SAS. (Refer to P.13A-187*.)
- No ↓

Does the engine stall easily again?
- No → While carrying out an intermittent malfunction simulation test (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.), check for sudden changes in the signals shown below.
  - Crank angle sensor signal
  - Air flow sensor signal
  - Injector drive signal
  - Primary and secondary ignition signal
  - Fuel pump drive signal
  - Engine-ECU power supply voltage
- Yes ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
- NG → Check the idle position switch system. (Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
- OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-176.)
- NG → Check the intake air temperature sensor system. (Refer to P.13A-105, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
- OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-176.)
- NG → Check the barometric pressure sensor system. (Refer to P.13A-103, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
- NG → Check the engine coolant temperature sensor system. (Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
- NG → Check the EGR control solenoid valve system. (Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)

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OK

MUT-II Data list
59 Right bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (rear). (Refer to P.13A-116, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0136.) (Bank 1 sensor 2)

OK

MUT-II Data list
69 Left bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 2). (Refer to P.13A-122, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0156.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (front). (Refer to P.13A-113, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0130.) (Bank 1 sensor 1)

OK

MUT-II Data list
39 Left bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 1). (Refer to P.13A-119, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0150.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)
39 Left bank oxygen sensor (front)

OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling and 2,500 r/min

NG → Check the fuel pressure. (Refer to P.13A-189*.)

OK →
1. Inspect the intake of air into the air intake system.
   - Broken intake manifold gasket
   - Broken vacuum hose
   - PCV valve does not operate.
2. Check the injector for blockage.

OK

MUT-II Data list
27 Power steering fluid pressure switch (Refer to P.13A-176.)

NG → Check the power steering fluid pressure switch system. (Refer to P.13A-140, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0551.)

OK

MUT-II Data list
28 A/C switch (Refer to P.13A-176.)

NG → Check the A/C switch and A/C relay system. (Refer to P.13A-174, INSPECTION PROCEDURE 30.)

OK

MUT-II Data list
29 Inhibitor switch (Refer to P.13A-176.)

NG → Check the ignition switch-ST. (Refer to P.13A-173, INSPECTION PROCEDURE 29.)

OK

MUT-II Data list
45 ISC servo position (Refer to P.13A-176.)

NG → Adjust the basic idle speed. (Refer to P.13A-188*.)

OK

Check the ignition timing. (Refer to GROUP 11A - On-vehicle Service.)

NG → Check that the crank angle sensor is installed properly.

OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if the injectors are clogged.
- Check the compression pressure.
- Check if foreign materials (water, alcohol, etc.) got into fuel.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

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.	• Drawing air into intake system • Malfunction of the ignition system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
NG → Check the EGR control solenoid valve system. (Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check if air was drawn into the intake system.
  - Broken intake manifold gasket
  - Broken or disconnected vacuum hose
  - Improper operation of the PCV valve
  - Broken air intake hose

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 idle speed control (ISC) system.	• Malfunction of the ISC system

Were the battery terminals disconnected?
Yes → After warming-up, let the engine run at idling for 10 minutes.
No ↓

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
NG → Check the idle position switch system. (Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-176.)
NG → Check the throttle position sensor system. (Refer to P.13A-109, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Data list
45 ISC servo position
- Is the idle speed control (ISC) servo position drops to 0 - 2 steps when decelerating (engine r/min less than 1,000)?

Yes → Check the vehicle speed sensor system. (Refer to P.13A-137, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0500.)
No ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
NG → Check the EGR control solenoid valve system. (Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Clean the throttle valve area.
- Check and adjust the fixed SAS.

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.	• 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 • Poor compression

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204, P0205, P0206.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
NG → Check the idle position switch system.
(Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-176.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-105, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-176.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-103, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
NG → Check the engine coolant temperature sensor system.
(Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-176.)
NG → Check the throttle position sensor system. (Refer to P.13A-109, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
NG → Check the EGR control solenoid valve system.
(Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

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OK

MUT-II Data list
59 Right bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (rear). (Refer to P.13A-116, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0136.) (Bank 1 sensor 2)

OK

MUT-II Data list
69 Left bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 2). (Refer to P.13A-122, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0156.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (front). (Refer to P.13A-113, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0130.) (Bank 1 sensor1)

OK

MUT-II Data list
39 Left bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 1). (Refer to P.13A-119, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0150.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)
39 Left bank oxygen sensor (front)

OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling and 2,500 r/min

NG → Check the fuel pressure. (Refer to P.13A-189*.)

OK →
1. Inspect the intake of air into the air intake system
   - Broken intake manifold gasket
   - Broken vacuum hose
   - PCV valve does not operate.
2. Check the injector for blockage.

OK

MUT-II Actuator test
15 Vacuum control solenoid valve <Vehicles with TCL> (Refer to P.13A-183.)

NG → Check the vacuum control solenoid valve system. (Refer to P.13A-141, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1101.)

OK

MUT-II Actuator test
16 Ventilation control solenoid valve <Vehicles with TCL> (Refer to P.13A-183.)

NG → Check the ventilation control solenoid valve system. (Refer to P.13A-142, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1102.)

OK

Check the fuel pressure. (Refer to P.13A-189*.)

OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the injector operating sound at the rear bank.
- Check the operation vacuum of the traction control (TCL).
- Check the operation of the throttle valve.
- Check the vacuum tank and vacuum actuator.
- Check the EGR control system.
- Check the compression pressure.
- Check the fuel filter or fuel line for clogging.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 16

The feeling of impact or vibration when accelerating	Probable cause
In cases such as the above, the cause is probably that there is an ignition leak accompanying the increase in the spark plug demand voltage during acceleration.	• Malfunction of the ignition system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check for occurrence of ignition leak.

INSPECTION PROCEDURE 17

The feeling of impact or vibration when decelerating.	Probable cause
Malfunction of the ISC system is suspected.	• Malfunction of the ISC system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the ISC servo for operation sound. (Refer to P.13A-199*.)
NG → Check the ISC system. (Refer to P.13A-137, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0505.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-176.)
NG → Check the throttle position sensor system. (Refer to P.13A-109, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
NG → Check the idle position switch system. (Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

Clean the throttle valve area. (Refer to P.13A-184*.)

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 18

Poor acceleration	Probable cause
Defective ignition system, abnormal air-fuel ratio, poor compression pressure, etc. are suspected.	• Malfunction of the ignition system • Malfunction of air/fuel ratio control system • Malfunction of the fuel supply system • Poor compression pressure • Clogged exhaust system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204, P0205, P0206.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
NG → Check the idle position switch system.
(Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-176.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-105, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-176.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-103, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
NG → Check the engine coolant temperature sensor system.
(Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-176.)
NG → Check the throttle position sensor system. (Refer to P.13A-109, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
NG → Check the EGR control solenoid valve system.
(Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

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OK

MUT-II Data list
59 Right bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (rear). (Refer to P.13A-116, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0136.) (Bank 1 sensor 2)

OK

MUT-II Data list
69 Left bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 2). (Refer to P.13A-122, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0156.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (front). (Refer to P.13A-113, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0130.) (Bank 1 sensor1)

OK

MUT-II Data list
39 Left bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 1). (Refer to P.13A-119, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0150.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)
39 Left bank oxygen sensor (front)

OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling and 2,500 r/min

NG → Check the fuel pressure. (Refer to P.13A-189*.)

OK →
1. Inspect the intake of air into the air intake system
   - Broken intake manifold gasket
   - Broken vacuum hose
   - PCV valve does not operate.
2. Check the injector for blockage.

OK

MUT-II Actuator test
15 Vacuum control solenoid valve <Vehicles with TCL> (Refer to P.13A-183.)

NG → Check the vacuum control solenoid valve system. (Refer to P.13A-141, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1101.)

OK

MUT-II Actuator test
16 Ventilation control solenoid valve <Vehicles with TCL> (Refer to P.13A-183.)

NG → Check the ventilation control solenoid valve system. (Refer to P.13A-142, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1102.)

OK

Check the fuel pressure. (Refer to P.13A-189*.)

OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the injector operating sound at the rear bank.
- Check the operation vacuum of the traction control (TCL).
- Check the operation of the throttle valve.
- Check the vacuum tank and vacuum actuator.
- Check the compression pressure.
- Check the fuel filter or fuel line for clogging.
- Broken air intake hose
- Clogged air cleaner

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 19

Surge	Probable cause
Defective ignition system, abnormal air-fuel ratio, etc. are suspected.	• Malfunction of the ignition system • Malfunction of air-fuel ratio control system • Malfunction of the EGR control solenoid valve system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-127, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0201, P0202, P0203, P0204, P0205, P0206.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-176.)
NG → Check the idle position switch system. (Refer to P.13A-139, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0510.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-176.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-105, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-176.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-103, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-176.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-176.)
NG → Check the throttle position sensor system. (Refer to P.13A-109, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

MUT-II Actuator test
10 EGR control solenoid valve (Refer to P.13A-183.)
NG → Check the EGR control solenoid valve system. (Refer to P.13A-133, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

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OK

MUT-II Data list
59 Right bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (rear). (Refer to P.13A-116, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0136.) (Bank 1 sensor 2)

OK

MUT-II Data list
69 Left bank oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Drive with wide open throttle

OK: 600 - 1,000 mV

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 2). (Refer to P.13A-122, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0156.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (front). (Refer to P.13A-113, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0130.) (Bank 1 sensor 1)

OK

MUT-II Data list
39 Left bank oxygen sensor (front)

OK: 600 - 1,000 mV during sudden racing

NG → Check the oxygen sensor circuit malfunction (Bank 2 sensor 1). (Refer to P.13A-119, INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODE P0150.)

OK

MUT-II Data list
11 Right bank oxygen sensor (front)
39 Left bank oxygen sensor (front)

OK: Repeat 0 - 400 mV and 600 - 1,000 mV alternately when idling and 2,500 r/min

NG → Check the fuel pressure. (Refer to P.13A-189*.) OK →
1. Inspect the intake of air into the air intake system
   - Broken intake manifold gasket
   - Broken vacuum hose
   - PCV valve does not operate.
2. Check the injector for blockage.

OK

Check the fuel pressure. (Refer to P.13A-189*.)

OK

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the injector operation sound at the rear bank.
- Check the EGR control system.

NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 20

Knocking	Probable cause
In cases as the above, the cause is probably that the detonation control is defective or the heat value of the spark plug is inappropriate.	• Defective detonation sensor • Inappropriate heat value of the spark plug

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Does knocking occur when driving with the sensor disconnected? At this time, use the MUT-II to check if the timing is retarded compared to when the detonation sensor connector is connected.
No → Check the detonation sensor system. (Refer to P.13A-130, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0325.)
Yes ↓

Check the following items.
- Spark plugs
- Check if foreign materials (water, alcohol, etc.) got into fuel.

INSPECTION PROCEDURE 21

Dieseling	Probable cause
Fuel leakage from injectors is suspected.	• 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.	• Malfunction of the air/fuel ratio control system • Deteriorated catalyst

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-99, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

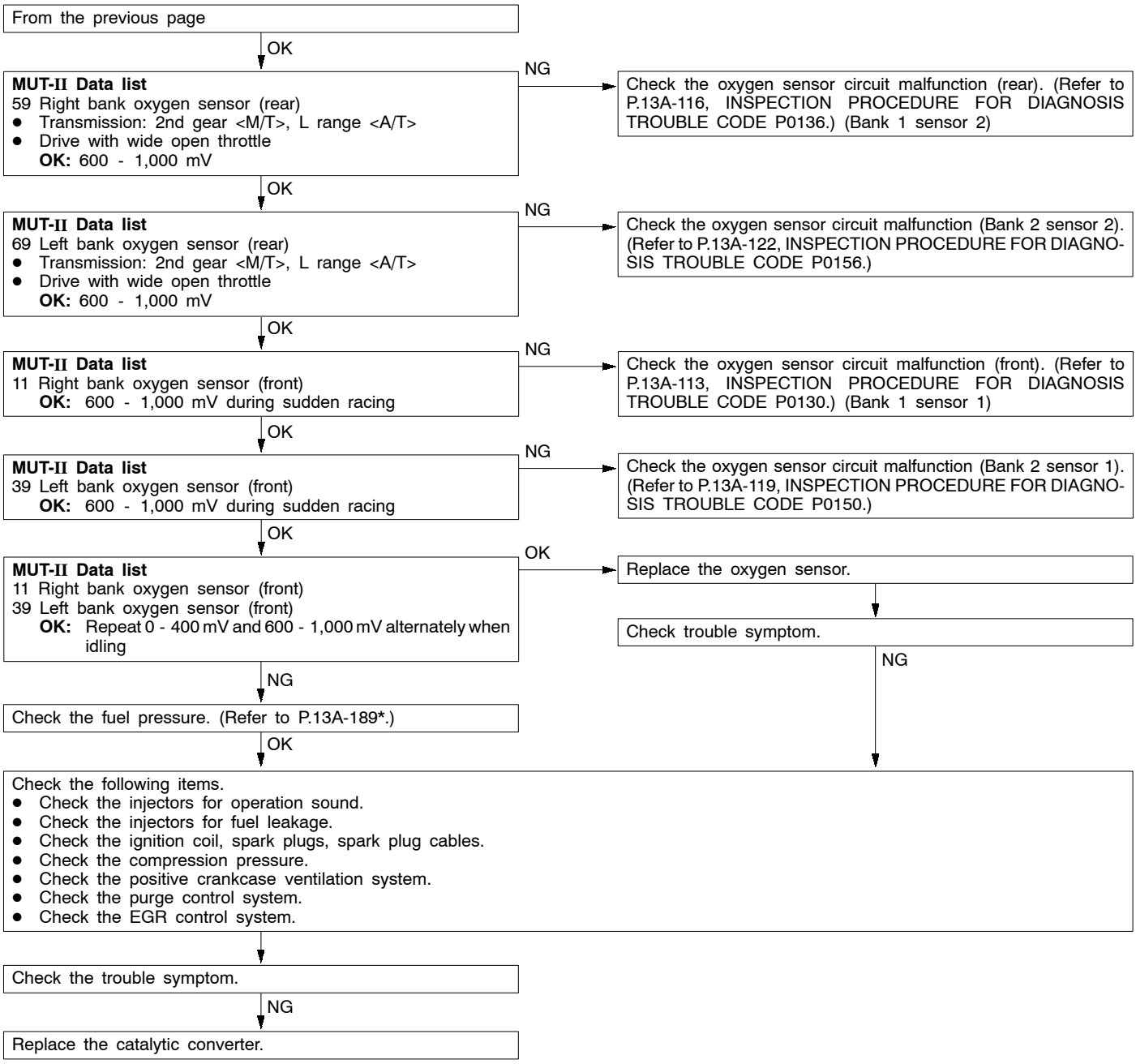
Check the ignition timing.
(Refer to GROUP 11A - On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor. (Refer to P.13A-176.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-106, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13A-176.)
NG → Check the intake air temperature sensor system. (Refer to P.13A-105, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13A-176.)
NG → Check the barometric pressure sensor system. (Refer to P.13A-103, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

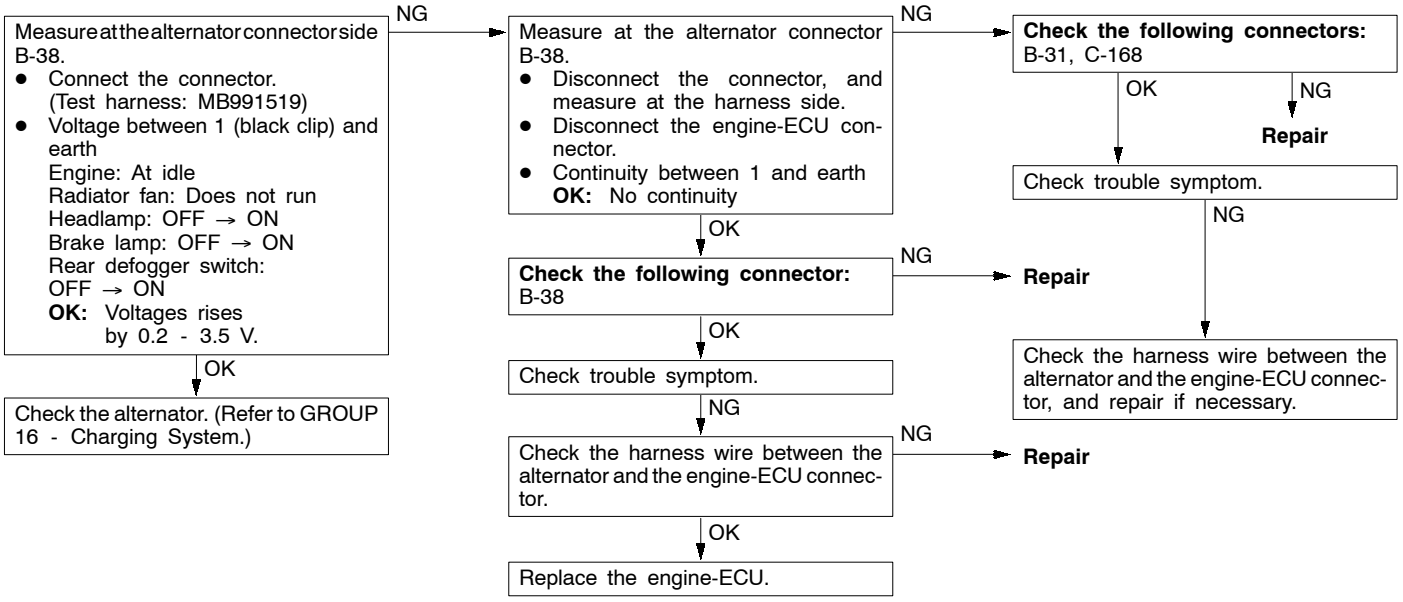
To the next page



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

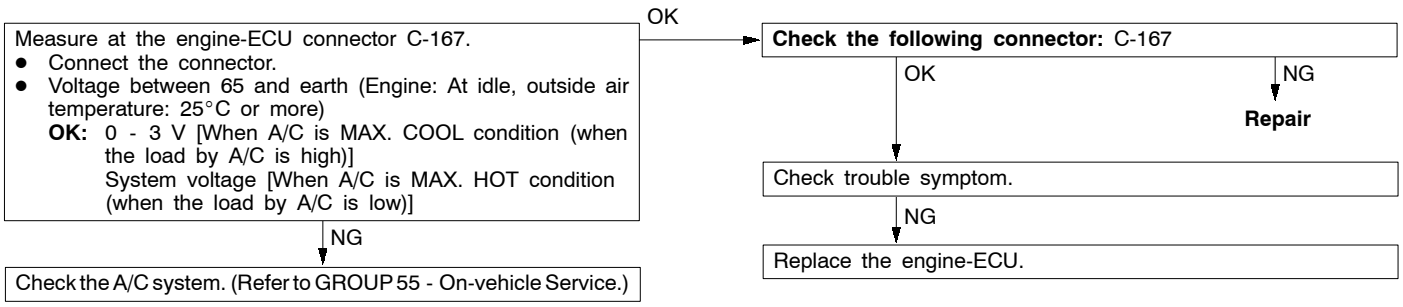
INSPECTION PROCEDURE 23

Low alternator output voltage (approx. 12.3 V)	Probable cause
The alternator may be defective, or malfunctions, which are listed in the right column, may be suspected.	• Malfunction of charging system • Short circuit in harness between alternator G terminal and engine-ECU • Malfunction of engine-ECU



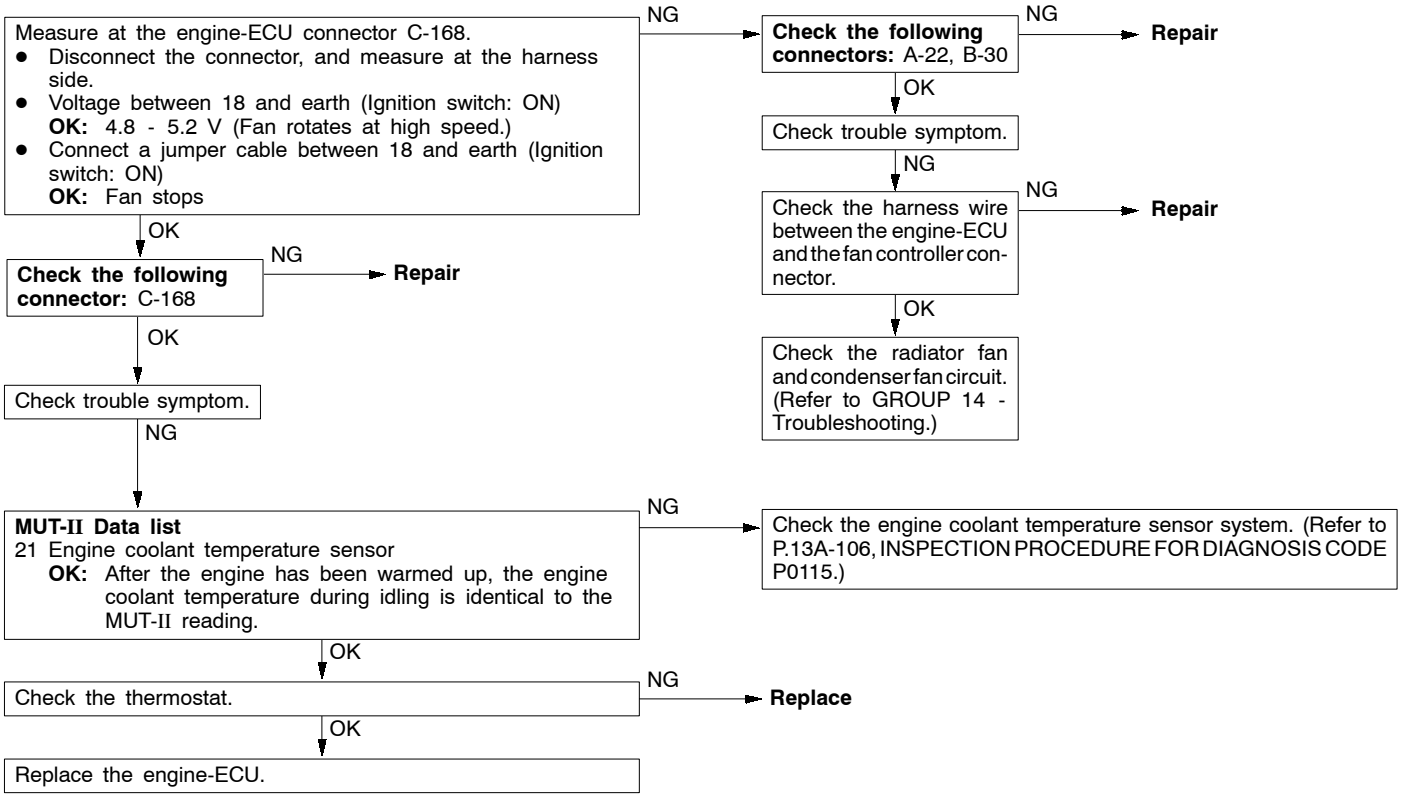
INSPECTION PROCEDURE 24

Idling speed is improper when A/C is operating	Probable cause
If the engine-ECU detects that the air conditioner is on, it activates the idle speed control (ISC) servo to control idle-up operation. The A/C-ECU judges if the load caused by air conditioner operation is high or low, and converts it to voltage signal (high or low voltage) and inputs the signal to the engine-ECU. Based on this voltage signal, the engine-ECU controls the idle-up speed (for high or low load).	• Malfunction of the A/C control system • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



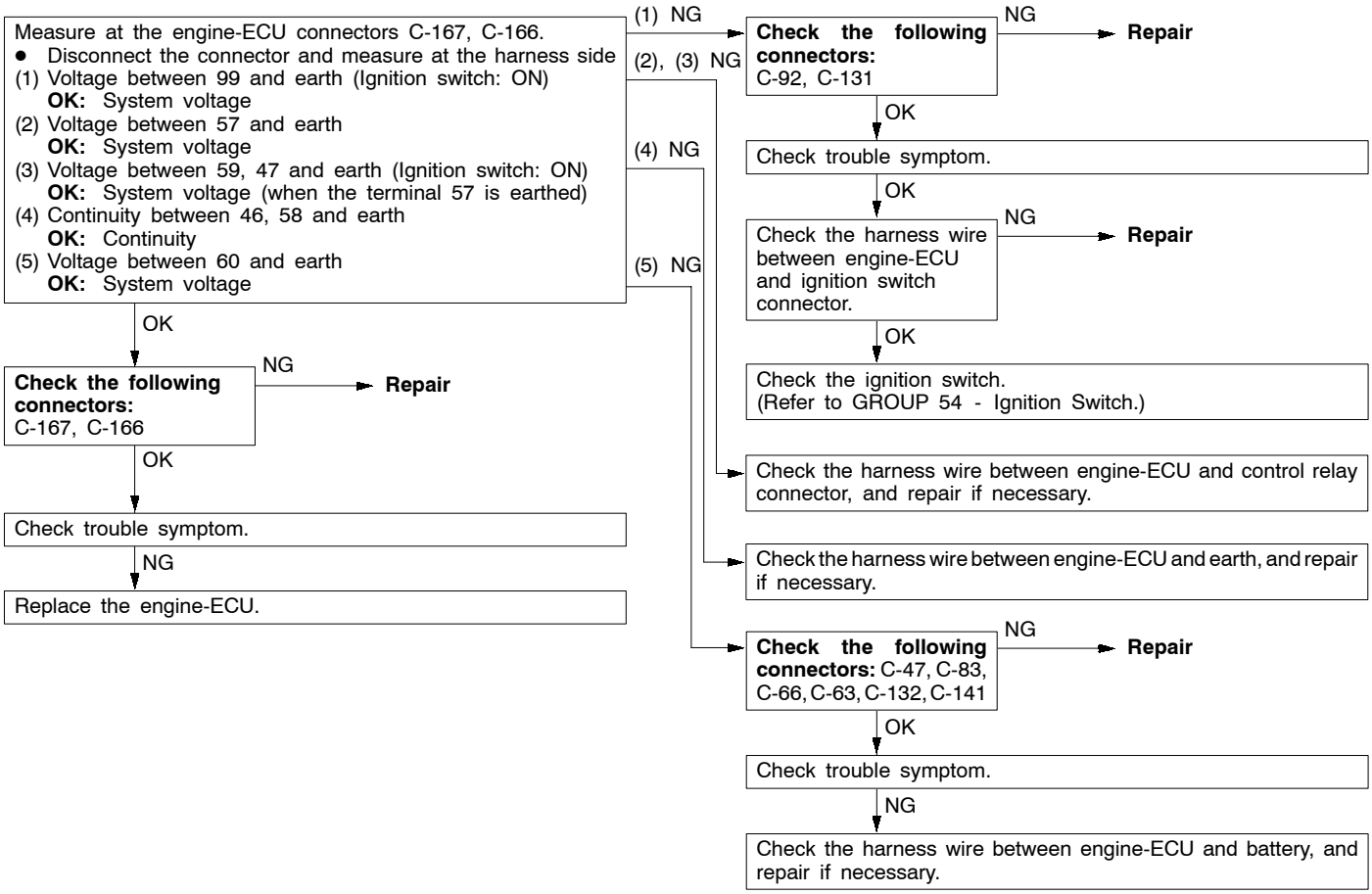
INSPECTION PROCEDURE 25

Fans (radiator fan, A/C condenser fan) are inoperative	Probable cause
The engine-ECU outputs a duty signal to the fan controller depending on the engine coolant temperature, vehicle speed, and air conditioner switch condition. Based on this signal, the fan controller controls the radiator fan and condenser fan speeds (The more the average voltage at the terminal approaches 5 V, the higher the fan speed become.)	• Malfunction of the fan motor relay • Malfunction of the fan motor • Malfunction of the fan controller • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



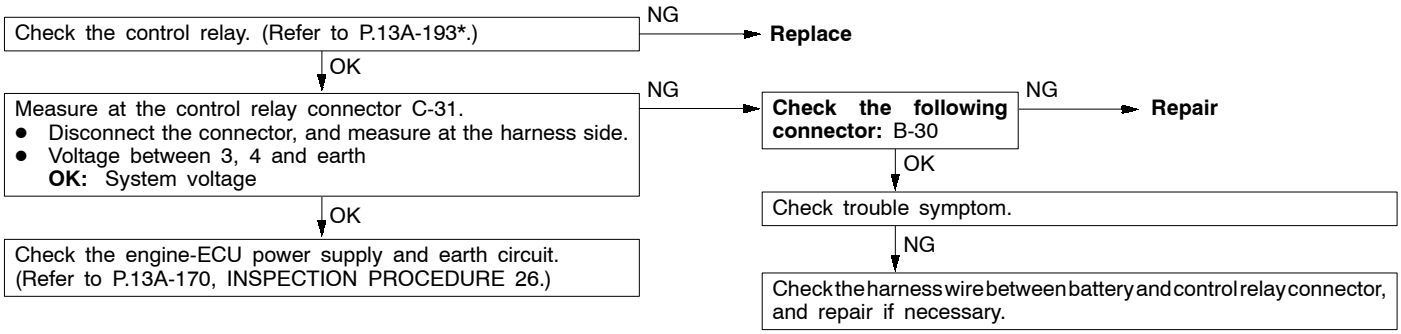
INSPECTION PROCEDURE 26

Engine-ECU power supply and earth circuit system	Probable cause
The engine-ECU may be defective, or that one of the malfunctions listed at right has occurred.	• Improper connector contact, open circuit or short-circuited harness wire in the engine-ECU power supply circuit. • Open circuit or short-circuited harness wire in the engine-ECU earth circuit • Malfunction of the engine-ECU



INSPECTION PROCEDURE 27

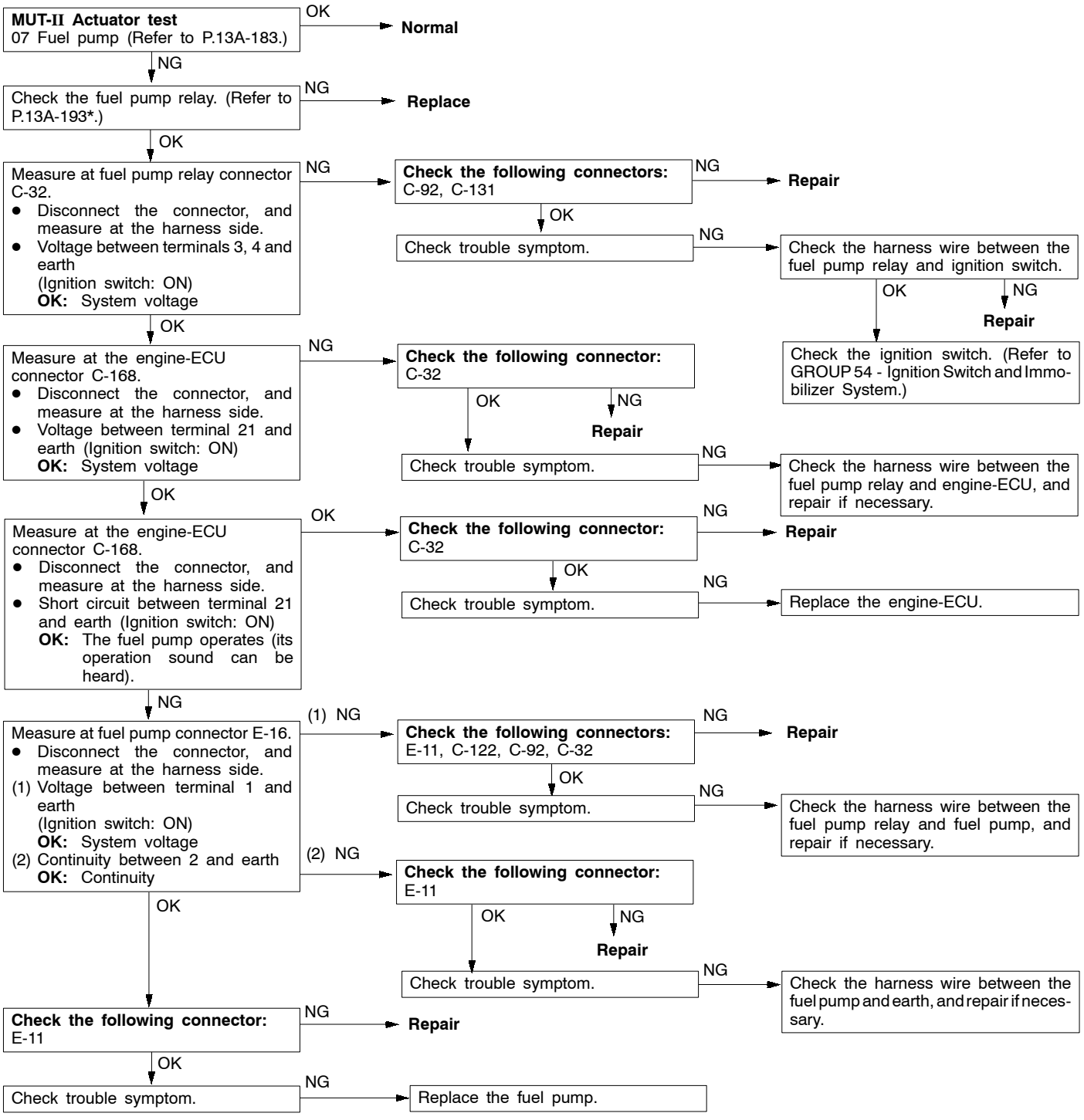
Power supply system and ignition switch-IG system	Probable cause
When an ignition switch ON signal is input to the engine-ECU, the engine-ECU turns the control relay ON. This causes battery voltage to be supplied to the engine-ECU, injectors and air flow sensor.	• Malfunction of the ignition switch • Malfunction of the control relay • Improper connector contact, open circuit or short-circuited harness wire • Disconnected engine-ECU earth wire • Malfunction of the engine-ECU



NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

INSPECTION PROCEDURE 28

Fuel pump system	Probable cause
The engine-ECU turns the control relay ON when the engine is cranking or running, and this supplies power to drive the fuel pump.	• 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-ECU

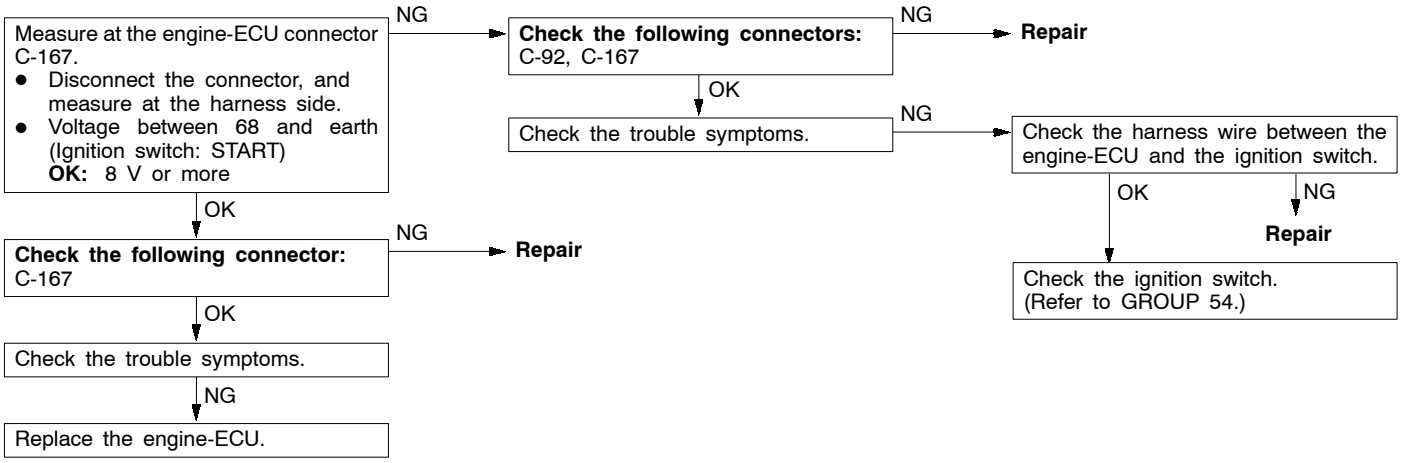


NOTE:
*: Refer to the '97 GALANT Workshop Manual (Pub. No. PWDE9611)

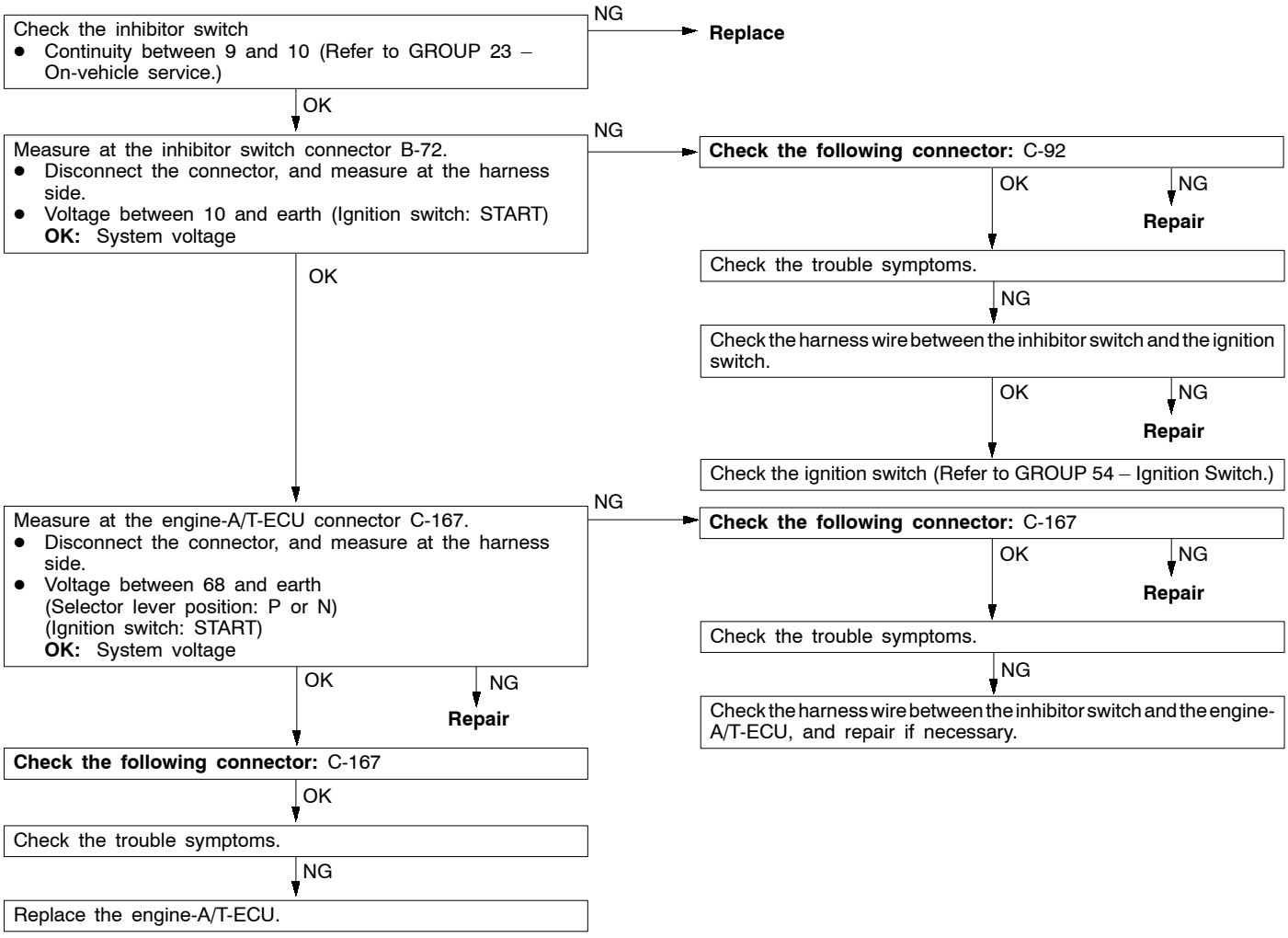
INSPECTION PROCEDURE 29

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

<M/T>

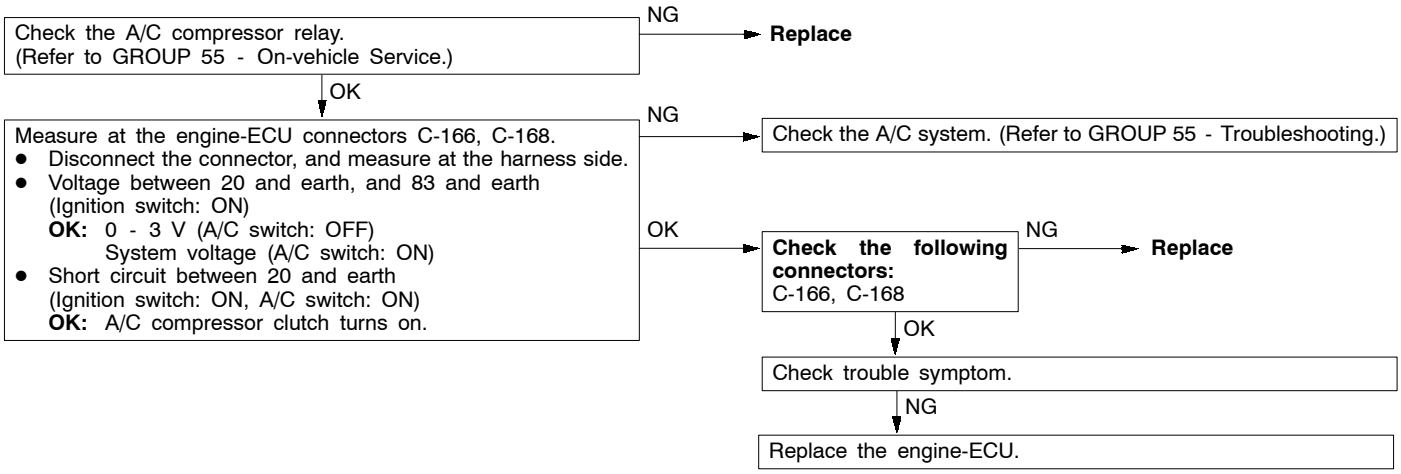


<A/T>



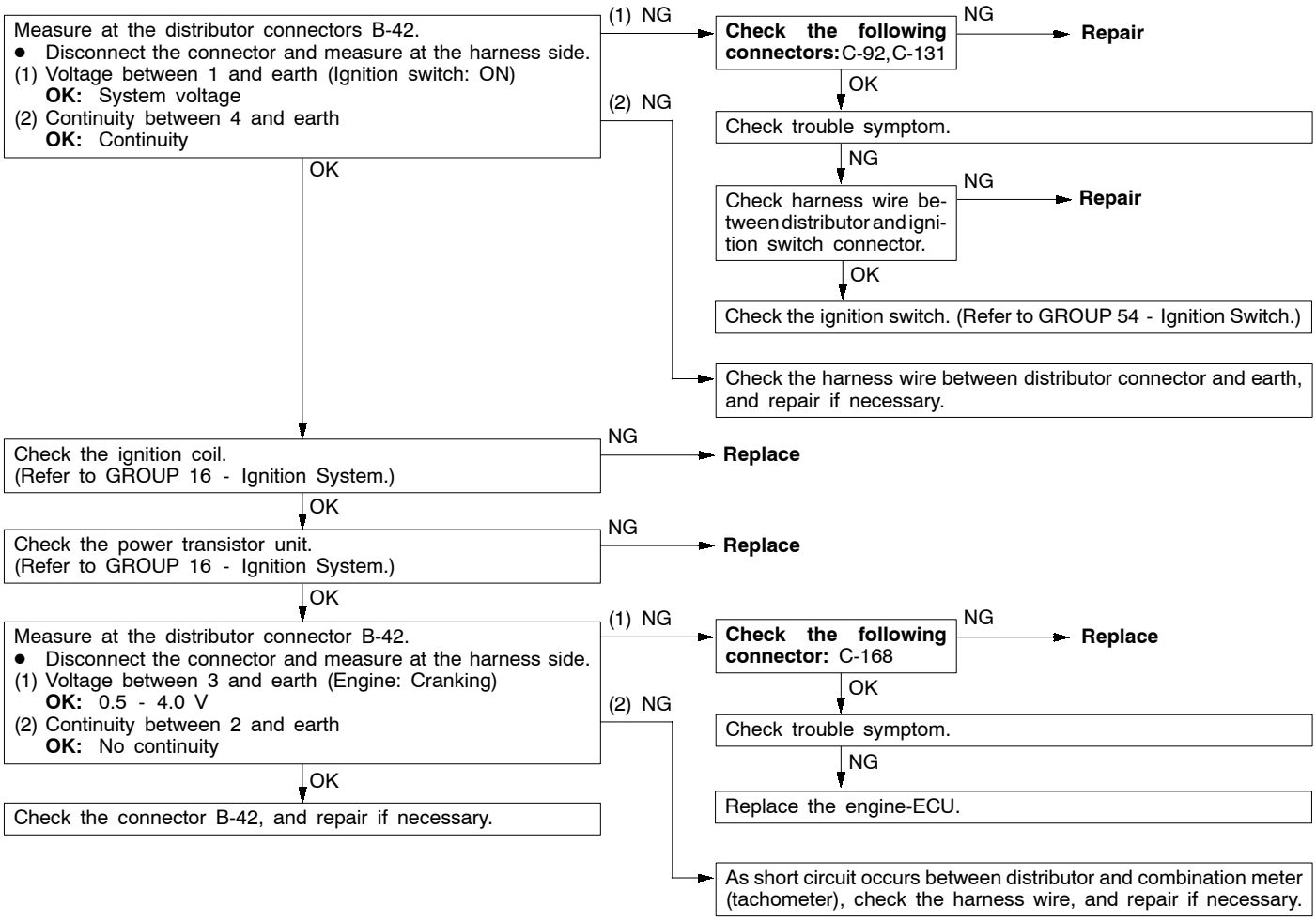
INSPECTION PROCEDURE 30

A/C switch and A/C relay system	Probable cause
When an A/C ON signal is input to the engine-ECU, the engine-ECU carries out control of the idle speed control (ISC) servo, and also operates the A/C compressor magnetic clutch.	• 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-ECU



INSPECTION PROCEDURE 31

Ignition circuit system	Probable cause
The engine-ECU interrupts the ignition coil primary current by turning the ignition power transistor inside the engine-ECU ON and OFF.	• Malfunction of ignition coil • Malfunction of power transistor unit • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU


Measure at the distributor connectors B-42.
● Disconnect the connector and measure at the harness side.
(1) Voltage between 1 and earth (Ignition switch: ON)
OK: System voltage
(2) Continuity between 4 and earth
OK: Continuity
(1) NG
Check the following connectors: C-92, C-131
NG
Repair
OK
Check trouble symptom.
NG
Check harness wire between distributor and ignition switch connector.
NG
Repair
OK
Check the ignition switch. (Refer to GROUP 54 - Ignition Switch.)
(2) NG
Check the harness wire between distributor connector and earth, and repair if necessary.
OK
Check the ignition coil.
(Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Check the power transistor unit.
(Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Measure at the distributor connector B-42.
● Disconnect the connector and measure at the harness side.
(1) Voltage between 3 and earth (Engine: Cranking)
OK: 0.5 - 4.0 V
(2) Continuity between 2 and earth
OK: No continuity
(1) NG
Check the following connector: C-168
NG
Replace
OK
Check trouble symptom.
NG
Replace the engine-ECU.
(2) NG
As short circuit occurs between distributor and combination meter (tachometer), check the harness wire, and repair if necessary.
OK
Check the connector B-42, and repair if necessary.

DATA LIST REFERENCE TABLE

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

NOTE
*1. 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 idle position switch normally turns off when the voltage of the throttle position sensor is 50 - 100 mV higher than the voltage at the idle position. If the throttle position switch turns back on after the throttle position sensor voltage has risen by 100 mV and the throttle valve has opened, the idle position switch and the throttle position sensor need to be adjusted.
*3. 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.
*4. In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10 % longer than the standard time.
*5. In a new vehicle [driven approximately 500 km or less], the step of the stepper motor is sometimes 30 steps greater than the standard value.

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
11	Right bank oxygen sensor (front)	Engine: After having warmed up Air/fuel mixture is made leaner when decelerating, and is made richer when racing.	When at 4,000 r/min, engine is suddenly decelerated	200 mV or less	Code No. P0130	13A-113
			When engine is suddenly raced	600 - 1,000 mV		
		Engine: After having warmed up The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the ECU.	Engine is idling	400 mV or less (Changes) 600 - 1,000 mV		
			2,500 r/min			
12	Air flow sensor*1	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	14 - 40 Hz (1.8 - 4.9 g/s)	–	–
			2,500 r/min	42 - 82 Hz (6.8 - 13.8 g/s)		
			Engine is raced	Frequency increases in response to racing		

Item No.	Inspection item	Inspection contents		Normal condition	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	13A-105
			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	Ignition switch: ON	Set to idle position	300 - 1,000 mV	Code No. P0120	13A-109
			Gradually open	Increases in proportion to throttle opening angle		
			Open fully	4,500 - 5,500 mV		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 26	13A-170
18	Cranking signal (ignition switch-ST)	Ignition switch: ON	Engine: Stopped	OFF	Procedure No. 29	13A-173
			Engine: Cranking	ON		
21	Engine coolant temperature sensor	Ignition switch: ON or with engine running	When engine coolant temperature is -20°C	-20°C	Code No. P0115	13A-106
			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 contents		Normal condition	Inspection procedure No.	Reference page
22	Crank angle sensor	• Engine: Cranking • Tachometer: Connected	Compare the engine speed readings on the tachometer and the MUT-II.	Accord	Code No. P0335	13A-130
		• Engine: Idling • Idle position switch: ON	When engine coolant temperature is -20°C	1,300 - 1,500 rpm		
			When engine coolant temperature is 0°C	1,300 - 1,500 rpm		
			When engine coolant temperature is 20°C	1,300 - 1,500 rpm		
			When engine coolant temperature is 40°C	1,100 - 1,300 rpm		
			When engine coolant temperature is 80°C	550 - 750 rpm		
24	Vehicle speed sensor	Drive at 40 km/h		Approximately 40 km/h	Code No. P0500	13A-137
25	Barometric pressure sensor	Ignition switch: ON	At altitude of 0 m	101 kPa	Code No. P0105	13A-103
			At altitude of 600 m	95 kPa		
			At altitude of 1,200 m	88 kPa		
			At altitude of 1,800 m	81 kPa		
26	Idle position switch	Ignition switch: ON Check by operating accelerator pedal repeatedly	Throttle valve: Set to idle position	ON	Code No. P0510	13A-139
			Throttle valve: Slightly open	OFF*2		
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Code No. P0551	13A-140
			Steering wheel turning	ON		
28	A/C switch	Engine: Idling (when A/C switch is ON, A/C compressor should be operating.)	A/C switch: OFF	OFF	Procedure No. 30	13A-174
			A/C switch: ON	ON		
29	Inhibitor switch <A/T>	Ignition switch: ON	P or N	P or N	Procedure No. 29	13A-173
			D, 2, L or R	D, 2, L or R		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
34	Air flow sensor reset signal	Engine: After having warmed up	Engine is idling	ON	Code No. P0100	13A-101
			2,000 r/min	OFF		
37	Volumetric efficiency	• Engine coolant temperature: 80 - 95°C • Lights, power cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	15 - 35 %	-	-
			2,000 r/min	15 - 35 %		
			Engine is suddenly raced	Volumetric efficiency increases in response to racing		
38	Crank angle sensor	• Engine: Cranking [reading is possible at 2,000 r/min or less] • Tachometer: Connected		Engine speeds displayed on the MUT-II and tachometer are identical.	Code No. P0335	13A-130
39	Left bank oxygen sensor (front)	• Engine: After having warmed up • Air/fuel mixture is made leaner when decelerating, and is made richer when racing.	When at 4,000 r/min, engine is suddenly decelerated	200 mV or less	Code No. P0150	13A-119
			When engine is suddenly raced	600 - 1,000 mV		
		• Engine: After having warmed up • The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition is also checked by the ECU.	Engine is idling	400 mV or less (Changes) 600 - 1,000 mV		
			2,500 r/min			

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
41	Injectors*3	Engine: Cranking	When engine coolant temperature is 0°C (injection is carried out for all cylinders simultaneously)	23 - 80 ms	-	-
			When engine coolant temperature is 20°C	12 - 40 ms		
			When engine coolant temperature is 80°C	2.0 - 8.0 ms		
	Injectors*4	• Engine coolant temperature: 80 – 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	2.6 - 3.8 ms		
			2,500 r/min	1.8 - 3.0 ms		
			When engine is suddenly raced	Increases		
44	Ignition coils and power transistors	• Engine: After having warmed up • Timing lamp is set. (The timing lamp is set in order to check actual ignition timing.)	Engine is idling	1 - 15°BTDC	-	-
			2,500 r/min	23 - 43°BTDC		
45	ISC (stepper) motor position*5	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range) • Idle position switch: ON • Engine: Idling • When A/C switch is ON, A/C compressor should be operating	A/C switch: OFF	2 - 25 STEP	-	-
			A/C switch: OFF → ON	Increases by 10 - 70 steps		
			• A/C switch: OFF • Select lever: N range → D range	Increases by 5 - 50 steps		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
49	A/C relay	Engine: After having warmed up/Engine is idling	A/C switch: OFF	OFF (Compressor clutch is not operating)	Procedure No. 30	13A-174
			A/C switch: ON	ON (Compressor clutch is operating)		
59	Right bank oxygen sensor (rear)	• Transmission: 2nd gear <M/T>, L range <A/T> • Drive with throttle widely open	3,500 r/min	600 - 1,000 mV	Code No. P0136	13A-116
69	Left bank oxygen sensor (rear)	• Transmission: 2nd gear <M/T>, L range <A/T> • Drive with throttle widely open	3,500 r/min	600 - 1,000 mV	Code No. P0156	13A-122
81	Long-term fuel compensation (bank 1)	Engine: Warm, 2,500 r/min without any load (during closed loop)		-12.5 - 12.5 %	Code No. P0170	13A-125
82	Short-term fuel compensation (bank 1)	Engine: Warm, 2,500 r/min without any load (during closed loop)		-16.8 - 16.8 %	Code No. P0170	13A-125
83	Long-term fuel compensation (bank 2)	Engine: Warm, 2,500 r/min without any load (during closed loop)		-12.5 - 12.5 %	Code No. P0173	13A-126
84	Short-term fuel compensation (bank 2)	Engine: Warm, 2,500 r/min without any load (during closed loop)		-16.8 - 16.8 %	Code No. P0173	13A-126
87	Calculation load value	Engine: Warm	Engine: Idling	10 - 30 %	-	-
			2,500 r/min	10 - 30 %		
88	Fuel control condition (bank 1)	Engine: Warm	2,500 r/min	Closed loop	Code No. P0125	13A-110
			When engine is suddenly raced	Open loop - drive condition		
89	Fuel control condition (bank 2)	Engine: Warm	2,500 r/min	Closed loop	Code No. P0125	13A-110
			When engine is suddenly raced	Open loop - drive condition		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
A1	Oxygen sensor (Bank 1, sensor 1)	Engine: After warm-up	Idling	0 V	Code No. P0130	13A-113
			Sudden racing	0.6 - 1.0 V		
			2,500 r/min	0.4 V or less and 0.6 - 1.0 V alternates		
A2	Oxygen sensor (Bank 1, sensor 2)	● Transmission: 2nd gear <M/T>, L range <A/T> ● Drive with throttle widely open	3,500 r/min	0.6 - 1.0 V	Code No. P0136	13A-116
A3	Oxygen sensor (Bank 2, sensor 1)	Engine: After having warmed up	Idling	0 V	Code No. P0150	13A-119
			Sudden racing	0.6 - 1.0 V		
			2,500 r/min	0.4 V or less and 0.6 - 1.0 V alternates		
A4	Oxygen sensor (Bank 2, sensor 2)	● Transmission: 2nd gear <M/T>, L range <A/T> ● Drive with throttle widely open	3,500 r/min	0.6 - 1.0 V	Code No. P0156	13A-122
8A	Throttle position sensor (throttle valve opening angle)	● Engine coolant temperature: 80 - 95°C ● Ignition switch: ON (Engine: Stopped)	Release the accelerator pedal	6 - 20 %	Code No. P0120	13A-109
			Depress the accelerator pedal gradually	Increase in response to pedal depression stroke		
			Depress the accelerator pedal fully	80 - 100 %		

ACTUATOR TEST REFERENCE TABLE

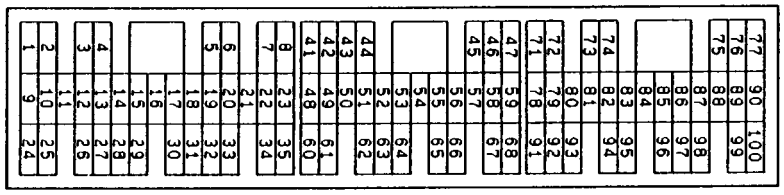
Item No.	Inspection item	Drive contents	Inspection contents		Normal condition	Inspection procedure No.	Reference page
01	Injectors	Cut fuel to No. 1 injector	Engine: After having warmed up/ Engine is idling (Cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)		Idling condition becomes different (becomes unstable).	Code No. P0201, P0202, P0203, P0204, P0205, P0206	13A-127
02		Cut fuel to No. 2 injector					
03		Cut fuel to No. 3 injector					
04		Cut fuel to No. 4 injector					
05		Cut fuel to No. 5 injector					
06		Cut fuel to No. 6 injector					
07	Fuel pump	Fuel pump operates and fuel is recirculated.	• Engine: Cranking • Fuel pump: Forced driving Inspect according to both the above conditions.	Pinch the return hose with fingers to feel the pulse of the fuel being recirculated.	Pulse is felt.	Procedure No. 28	13A-172
				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		Sound of operation can be heard when solenoid valve is driven.	Code No. P0443	13A-136
10	EGR control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Sound of operation can be heard when solenoid valve is driven.	Code No. P0403	13A-133
15	Vacuum control solenoid valve <Vehicles with TCL>	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Sound of operation can be heard when solenoid valve is driven.	Code No. P1101	13A-141
16	Ventilation control solenoid valve <Vehicles with TCL>	Solenoid valve turns from OFF to ON.	Ignition switch: ON		Sound of operation can be heard when solenoid valve is driven.	Code No. P1102	13A-142

Item No.	Inspection item	Drive contents	Inspection contents	Normal condition	Inspection procedure No.	Reference page
17	Basic ignition timing	Set to ignition timing adjustment mode	Engine: Idling Timing light is set	5°BTDC	-	-
21	Fan controller	Drive the fan motor	• Ignition switch: ON	Radiator fan and condenser fan rotate at high speed	Procedure No. 25	13A-169

CHECK AT THE ENGINE-ECU TERMINALS

TERMINAL VOLTAGE CHECK CHART

Engine-ECU Connector Terminal Arrangement



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
9	No. 2 injector		
24	No. 3 injector		
2	No. 4 injector		
10	No. 5 injector		
25	No. 6 injector		
14	Stepper motor coil <A1>	Engine: Soon after the warmed up engine is started	10 - 15 V ⇔ 0 - 6 V (Changes repeatedly)
28	Stepper motor coil <A2>		
15	Stepper motor coil <B1>		
29	Stepper motor coil <B2>		
6	EGR control solenoid valve	Ignition switch: ON	System Voltage
		While engine is idling, suddenly depress the accelerator pedal.	From system voltage, momentarily drops
8	Alternator G terminal	● Engine: Warm up, and then idling ● Radiator fan: Not operating ● Headlamp: OFF → ON ● Stop lamp: OFF → ON ● Rear defogger switch: OFF → ON	Voltage increases by 0.2 - 3.5 V
52	Alternator FR terminal	● Engine: Warm up, and then idling ● Radiator fan: Not operating ● Headlamp: OFF → ON ● Stop lamp: OFF → ON ● Rear defogger switch: OFF → ON	Voltage decrease
11	Power transistor unit	Engine r/min: 3,000 r/min	0.3 - 3.0 V
47	Power supply	Ignition switch: ON	System voltage
59			

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
19	Air flow sensor reset signal	Engine: Idle speed		0 - 1 V
		Engine r/min: 3,000 r/min		6 - 9 V
18	Fan controller	When the radiator fan and condenser fan are not operating		0 - 0.3 V
		When the radiator fan and condenser fan are operating		0.7 V or more
20	A/C relay	● Engine: Idle speed ● A/C switch: OFF → ON (A/C compressor is operating)		System voltage or momentarily 6 V or more → 0 - 3 V
21	Fuel pump relay	Ignition switch: ON		System voltage
		Engine: Idle speed		0 - 3 V
16	Purge control solenoid valve	Ignition switch: ON		System voltage
		Running at 3,000 r/min while engine is warming up after having been started.		0 - 3 V
22	Engine warning lamp	Ignition switch: OFF → ON		0 - 3 V → 9 - 13 V (After several seconds have elapsed)
30	Vacuum control solenoid valve <Vehicles with TCL>	Ignition switch: ON		System voltage
31	Ventilation control solenoid valve <Vehicles with TCL>	Ignition switch: ON		System voltage
54	Power steering fluid pressure switch	Engine: Idling after warming up	When steering wheel is stationary	System voltage
			When steering wheel is turned	0 - 3 V
57	Control relay (Power supply)	Ignition switch: OFF		System voltage
		Ignition switch: ON		0 - 3 V
83	A/C switch 1	Engine: Idle speed	Turn the A/C switch OFF	0 - 3 V
			Turn the A/C switch ON (A/C compressor is operating)	System voltage

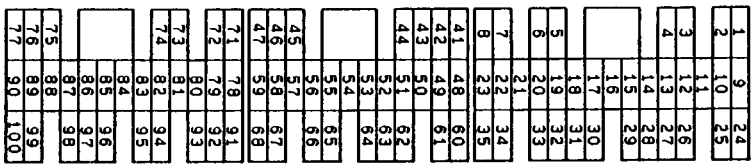
Terminal No.	Check item	Check condition (Engine condition)		Normal condition
65	A/C switch 2	• Engine: Idling • Outside air temperature: 25°C or more	When A/C is MAX. COOL condition (when the load by A/C is high)	0 - 3 V
			When A/C is MAX. HOT condition (When the load by A/C is low)	System voltage
68	Ignition switch - ST	Engine: Cranking		8 V or more
62	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
71	Left bank oxygen sensor (front)	Engine: Running at 2,500 r/min after having warmed up (Check using a digital type voltmeter)		0 ⇔ 0.8 V (Changes repeatedly)
73	Left bank oxygen sensor (rear)	• Transmission: 2nd gear <M/T>, L range <A/T> • Engine speed: 3,500 r/min or more • Driving with the throttle valve widely open		0.6 - 1.0 V
72	Right bank oxygen sensor (front)	Engine: Running at 2,500 r/min after having warmed up (Check using a digital type voltmeter)		0 ⇔ 0.8 V (Changes repeatedly)
74	Right bank oxygen sensor (rear)	• Transmission: 2nd gear <M/T>, L range <A/T> • Engine speed: 3,500 r/min or more • Driving with the throttle valve widely open		0.6 - 1.0 V
3	Left bank oxygen sensor heater (front)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
26	Left bank oxygen sensor heater (rear)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
4	Right bank oxygen sensor heater (front)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
27	Right bank oxygen sensor heater (rear)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
60	Backup power supply	Ignition switch: OFF		System voltage
42	Sensor impressed voltage	Ignition switch: ON		4.5 - 5.5 V
99	Ignition switch-IG	Ignition switch: ON		System voltage
44	Engine coolant temperature sensor	Ignition switch: ON	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 80°C	0.3 - 0.9 V
78	Throttle position sensor	Ignition switch: ON	Set throttle valve to idle position	0.3 - 1.0 V
			Fully open throttle valve	4.5 - 5.5 V
51	Barometric pressure sensor	Ignition switch: ON	When altitude is 0 m	3.7 - 4.3 V
			When altitude is 1,200 m	3.2 - 3.8 V
80	Vehicle speed sensor	• Ignition switch: ON • Move the vehicle slowly forward		0 ⇔ 5 V (Changes repeatedly)
79	Idle position switch	Ignition switch: ON	Set throttle valve to idle position	0 - 1 V
			Slightly open throttle valve	4 V or more
50	Top dead centre sensor	Engine: Cranking		0.4 - 3.0 V
		Engine: Idle speed		0.5 - 2.0 V
43	Crank angle sensor	Engine: Cranking		0.4 - 4.0 V
		Engine: Idle speed		1.5 - 2.5 V

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
61	Air flow sensor	Engine: Idle speed		2.2 - 3.2 V
		Engine r/min: 2,500 r/min		
67	Inhibitor switch <A/T>	Ignition switch: ON	Set selector lever to P or N	0 - 3 V
			Set selector lever to Other than P or N	8 - 14 V

CHECK CHART FOR RESISTANCE AND CONTINUITY BETWEEN TERMINALS

Engine-ECU Harness Side Connector Terminal Arrangement



Terminal No.	Inspection item	Normal condition (Check condition)
1 - 47	No. 1 injector	13 - 16 Ω (At 20°C)
9 - 47	No. 2 injector	
24 - 47	No. 3 injector	
2 - 47	No. 4 injector	
10 - 47	No. 5 injector	
25 - 47	No. 6 injector	
14 - 47	Stepper motor coil (A1)	28 - 33 Ω (At 20°C)
28 - 47	Stepper motor coil (A2)	
15 - 47	Stepper motor coil (B1)	
29 - 47	Stepper motor coil (B2)	
6 - 47	EGR control solenoid valve	29 - 35 Ω (At 20°C)
16 - 47	Purge control solenoid valve	30 - 34 Ω (At 20°C)
30 - 47	Vacuum control solenoid valve system <Vehicles with TCL>	36 - 44 Ω (At 20°C)
31 - 47	Ventilation control solenoid valve system <Vehicles with TCL>	36 - 44 Ω (At 20°C)
46 - Body earth	Engine-ECU earth	Continuity (0 Ω)
58 - Body earth	Engine-ECU earth	
3 - 47	Left bank oxygen sensor heater control (front)	4.5 - 8.0 Ω (At 20°C)
26 - 47	Left bank oxygen sensor heater control (rear)	11 - 18 Ω (At 20°C)
4 - 47	Right bank oxygen sensor heater (front)	4.5 - 8.0 Ω (At 20°C)
27 - 47	Right bank oxygen sensor heater (rear)	11 - 18 Ω (At 20°C)

Terminal No.	Inspection item	Normal condition (Check condition)
62 - 49	Intake air temperature sensor	5.3 - 6.7 kΩ (When intake air temperature is 0°C)
		2.3 - 3.0 kΩ (When intake air temperature is 20°C)
		1.0 - 1.5 kΩ (When intake air temperature is 40°C)
		0.30 - 0.42 kΩ (When intake air temperature is 80°C)
44 - 49	Engine coolant temperature sensor	5.1 - 6.5 kΩ (When coolant temperature is 0°C)
		2.1 - 2.7 kΩ (When coolant temperature is 20°C)
		0.9 - 1.3 kΩ (When coolant temperature is 40°C)
		0.26 - 0.36 kΩ (When coolant temperature is 80°C)
79 - 49	Idle position switch	Continuity (when throttle valve is at idle position)
		No continuity (when throttle valve is slightly open)
67 - Body earth	Inhibitor switch <A/T>	Continuity (when select lever is at P or N)
		No continuity (when select lever is at D, 2, L or R)

INSPECTION PROCEDURE USING AN ANALYZER

Due to the change on the engine-ECU, the following describes only the inspection procedures at the engine-ECU terminals.

AIR FLOW SENSOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-ECU terminal 61.

TOP DEAD CENTRE SENSOR AND CRANK ANGLE SENSOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-ECU terminal 50. (When checking the top dead centre sensor signal wave pattern.)
2. Connect the analyzer special patterns pickup to engine-ECU terminal 43. (When checking the crank angle sensor signal wave pattern.)

INJECTOR

Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-ECU terminal 1. (When checking the No. 1 cylinder.)
2. Connect the analyzer special patterns pickup to engine-ECU terminal 9. (When checking the No. 2 cylinder.)
3. Connect the analyzer special patterns pickup to engine-ECU terminal 24. (When checking the No. 3 cylinder.)
4. Connect the analyzer special patterns pickup to engine-ECU terminal 2. (When checking the No. 4 cylinder.)
5. Connect the analyzer special patterns pickup to engine-ECU terminal 10. (When checking the No. 5 cylinder.)
6. Connect the analyzer special patterns pickup to engine-ECU terminal 25. (When checking the No. 6 cylinder.)

IDLE SPEED CONTROL SERVO (STEPPER MOTOR)

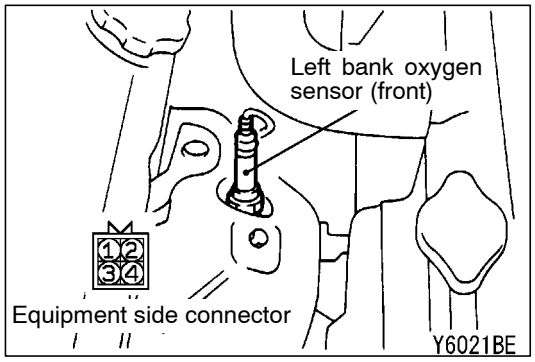
Alternate method (Test harness not available)

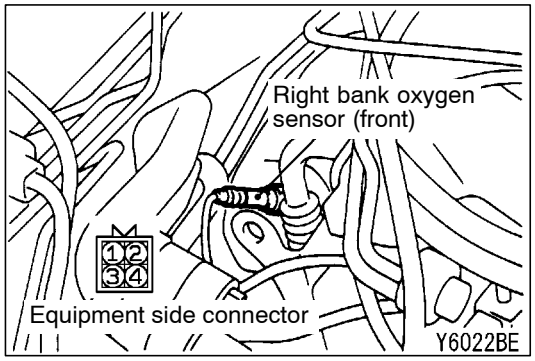
1. Connect the analyzer special patterns pickup to engine-ECU terminal 14, connection terminal 28, connection terminal 15, and connection terminal 29 respectively.

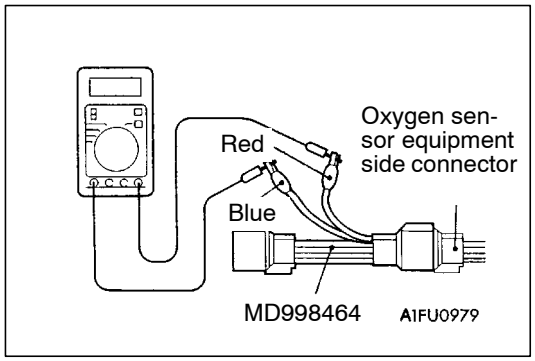
IGNITION COIL AND POWER TRANSISTOR

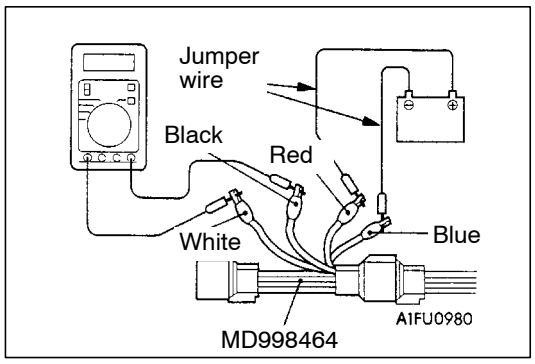
Alternate method (Test harness not available)

1. Connect the analyzer special patterns pickup to engine-ECU terminal 11.









ON-VEHICLE SERVICE

OXYGEN SENSOR CHECK

<Left bank oxygen sensor (front) and right bank oxygen sensor (front)>

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

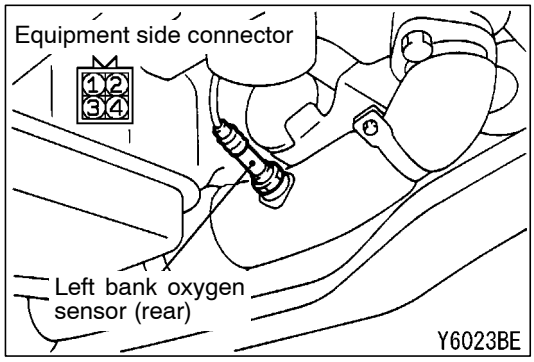
   Caution
   Be very careful when connecting the jumper wire; incorrect connection can damage the oxygen sensor.
6. Connect a digital voltage meter between terminal 2 (black clip) and terminal 4 (white clip).
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

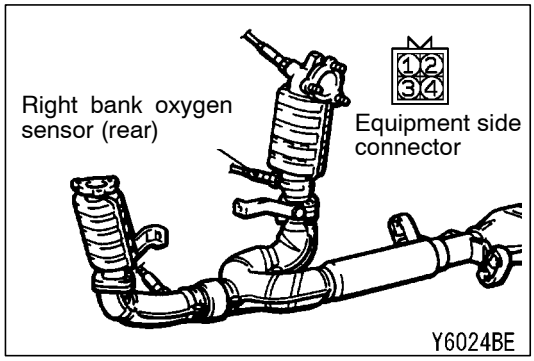
   Standard value:

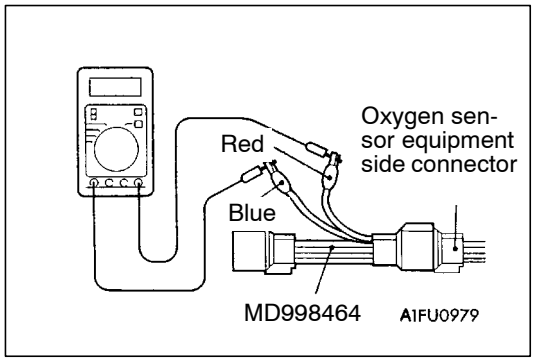
Engine	Oxygen sensor output voltage	Remarks
When racing the engine	0.6 - 1.0 V	If you make the air/fuel ratio rich by racing the engine repeatedly, a normal oxygen sensor will output a voltage of 0.6 - 1.0 V.

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

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







<Left bank oxygen sensor (rear) and Right bank oxygen sensor (rear)>

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

NOTE

(1) If the MUT-II does not display the standard value although no abnormality is found by the above mentioned continuity test and harness check, replace the oxygen sensor (rear).

(2) For removal and installation of the oxygen sensor, refer to GROUP 15 - Exhaust Pipe and Main Muffler.

GASOLINE DIRECT INJECTION (GDI)

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GENERAL

OUTLINE OF CHANGES

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

- On-board Diagnostics System has been adopted to expand the diagnostic items and to change diagnosis code numbering system.
- Fuel pressure regulator (high-pressure) incorporate fuel pump (high-pressure) has been adopted.
- An ignition failure sensor has been adopted.
- An engine-A/T-ECU has been adopted. <Vehicles with A/T>

GENERAL INFORMATION

SELF-DIAGNOSIS FUNCTION

Following functions have been added.

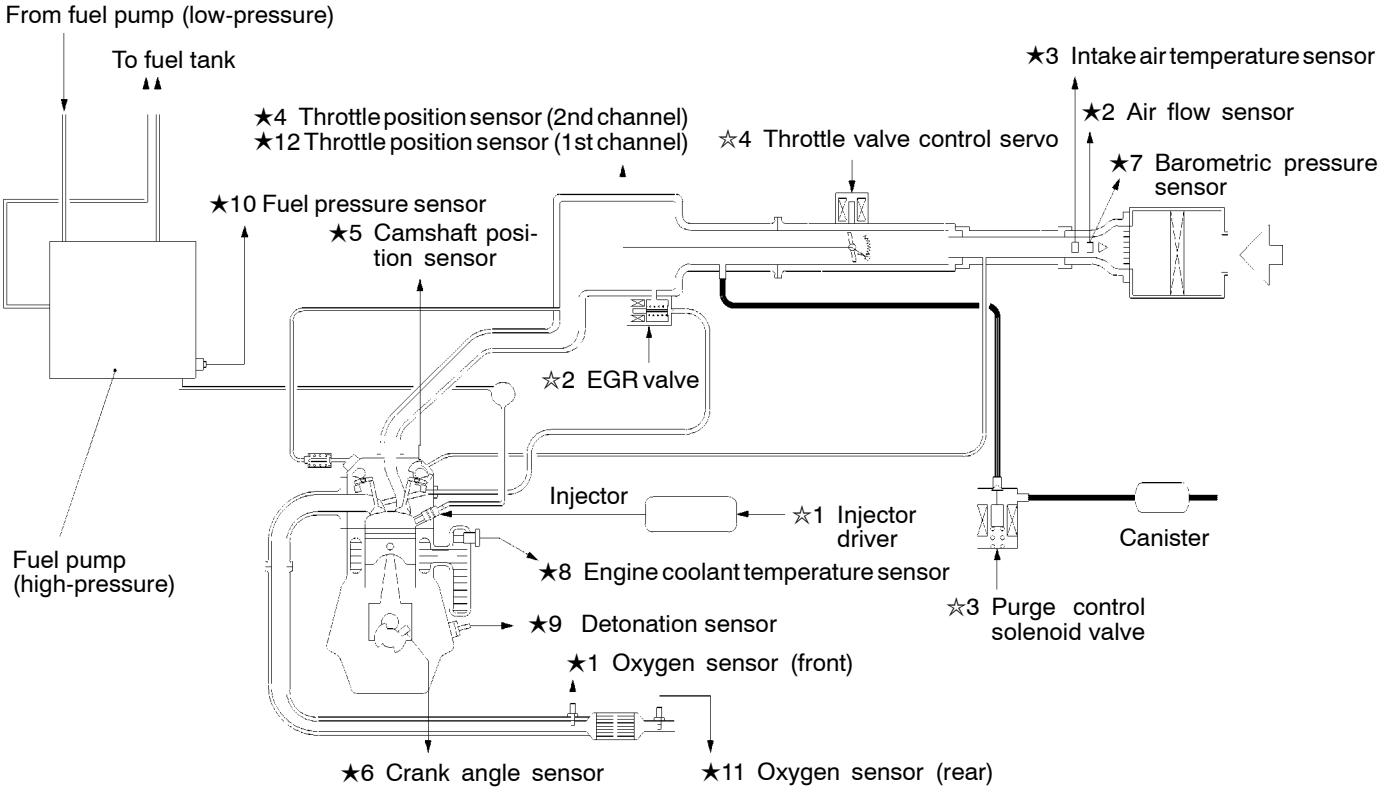
- The engine-ECU records the engine operating condition when the diagnosis code is set.
  This data is called “freeze frame” data.
  This data can be read by using the MUT-II, are can then be used in simulation tests for troubleshooting.

GENERAL SPECIFICATIONS

Items		Specifications
Engine-ECU <M/T>	Identification No.	E2T72886
Engine-A/T-ECU <A/T>	Identification No.	E2T79574

GASOLINE DIRECT INJECTION SYSTEM DIAGRAM

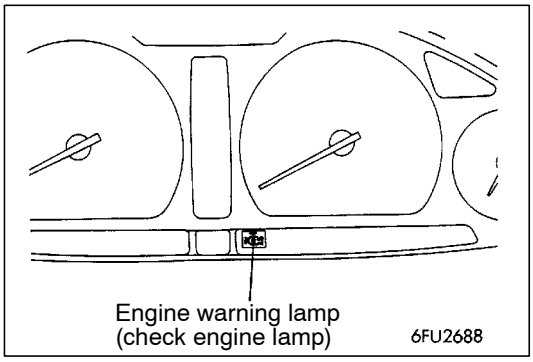
★1 Oxygen sensor (front) ★2 Air flow sensor ★3 Intake air temperature sensor ★4 Throttle position sensor (2nd channel) ★5 Camshaft position sensor ★6 Crank angle sensor ★7 Barometric pressure sensor ★8 Engine coolant temperature sensor ★9 Detonation sensor ★10 Fuel pressure sensor ★11 Oxygen sensor (rear)	• Power supply • Ignition switch-IG • Ignition switch-ST • Accelerator pedal position sensor (1st channel) • Accelerator pedal position switch • Vehicle speed sensor • A/C switch 1 • A/C switch 2 • M/T oil temperature sensor • Inhibitor switch • Power steering fluid pressure switch • Alternator FR terminal • Clutch switch • Small lamp switch • Stop lamp switch • Brake vacuum sensor • Injector wire open circuit check signal • Throttle valve controller	⇨	Engine-ECU <M/T> or engine-A/T-ECU <A/T>	☆1 Injector driver (Injector) ☆2 EGR valve (Stepper motor) ☆3 Purge control solenoid valve	• Engine control relay • Fuel pump relay • Injector driver relay • Throttle valve control servo relay • A/C relay • Ignition coil • Fan controller • Engine warning lamp • GDI ECO indication lamp • Diagnosis output • Alternator G terminal • Auto-cruise control lamp • Throttle valve controller • Tachometer • Oxygen sensor heater (front)
★12 Throttle position sensor (1st channel)	• Power supply • Ignition switch-IG • Accelerator pedal position sensor (2nd channel) • Brake switch • Main switch • Control switch • Brake lamp switch • Engine-ECU <M/T> • Engine-A/T-ECU <A/T>	⇨	Throttle valve controller	☆4 Throttle valve control servo	• Engine-ECU <M/T> • Engine-A/T-ECU <A/T>



Y6012BE

SERVICE SPECIFICATIONS

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



TROUBLESHOOTING

DIAGNOSIS FUNCTION

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

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

Engine warning lamp inspection items

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

Code No.	Diagnosis item
P0304	No. 4 cylinder misfire detected
P0335	Crank angle sensor system
P0340	Camshaft position sensor system
P0403	EGR valve system
P0420	Catalyst malfunction
P0443	Purge control solenoid valve system
P1200	Injector driver system
P1220★	Electronic-controlled throttle valve system
P1221★	Throttle valve position feedback system
P1223★	Communication line with throttle valve controller
P1224★	Throttle valve control servo motor (motor 1st phase malfunction) system
P1225★	Accelerator pedal position sensor (2nd channel) system
P1228★	Throttle valve control servo motor (motor 2nd phase malfunction) system
P1515	Brake vacuum sensor system

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

METHOD OF READING AND ERASING DIAGNOSIS CODES

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

DIAGNOSIS USING DIAGNOSIS 2 MODE

1. Switch the diagnosis mode of the engine-ECU <M/T> or engine A/T-ECU <A/T> to DIAGNOSIS 2 mode using the MUT-II.
2. Carry out a road test.
3. Take a reading of the diagnosis code and repair the problem location.
4. Turn the ignition switch to OFF and then back to ON again.

   NOTE
   By turning the ignition switch to OFF, the engine-ECU <M/T> or engine-A/T-ECU <A/T> will switch the diagnosis mode from DIAGNOSIS 2 mode to DIAGNOSIS 1 mode.

5. Erase the diagnosis codes.

INSPECTION USING MUT-II DATA LIST AND ACTUATOR TESTING

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

FREEZE FRAME DATA

When the engine-ECU <M/T> or engine-A/T-ECU <A/T> detects a malfunction and stores a diagnosis code, it also stores a current status of the engine. This function is called "Freeze frame data." By analyzing this "freeze frame" data with the MUT-II, an effective troubleshooting can be performed.
The display items of freeze frame data are shown below.

Display item list

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

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

READINESS TEST STATUS

The engine-ECU <M/T> or engine-A/T-ECU <A/T> monitors the following main diagnosis items, judges if these items are in good condition or not, and the stores its history. This history can be read out by using MUT-II. (If the ECU has judged a item before, the MUT-II displays "Complete.")
In addition, if diagnosis codes are erased or the battery cable is disconnected, this history will also be erased (the memory will be reset).

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

FAIL-SAFE FUNCTION REFERENCE TABLE

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

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

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

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

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
P0100	Air flow sensor system	13I-13
P0105	Barometric pressure sensor system	13I-15
P0110	Intake air temperature sensor system	13I-17
P0115	Engine coolant temperature sensor system	13I-18
P0120★	Throttle position sensor (1st channel) system	13I-21
P0125	Feedback system	13I-23
P0130	Oxygen sensor (front) system <sensor 1>	13I-25
P0135	Oxygen sensor heater (front) system <sensor 1>	13I-27
P0136	Oxygen sensor (rear) system <sensor 2>	13I-28
P0141	Oxygen sensor heater (rear) system <sensor 2>	13I-30
P0170	Abnormal fuel system	13I-31
P0190★	Abnormal fuel pressure	13I-33
P0201	No. 1 injector system	13I-34
P0202	No. 2 injector system	13I-36
P0203	No. 3 injector system	13I-37
P0204	No. 4 injector system	13I-38
P0220★	Accelerator pedal position sensor (1st channel) system	13I-40
P0225★	Throttle position sensor (2nd channel) system	13I-43
P0300★	Ignition coil (power transistor) system	13I-44
P0301	No. 1 cylinder misfire detected	13I-46
P0302	No. 2 cylinder misfire detected	13I-46
P0303	No. 3 cylinder misfire detected	13I-46
P0304	No. 4 cylinder misfire detected	13I-46
P0325	Detonation sensor system	13I-47
P0335	Crank angle sensor system	13I-47
P0340	Camshaft position sensor system	13I-49
P0403	EGR valve system	13I-51
P0420	Catalyst malfunction	13I-53
P0443	Purge control solenoid valve system	13I-54
P0500	Vehicle speed sensor system	13I-55
P1200	Injector driver system	13I-55
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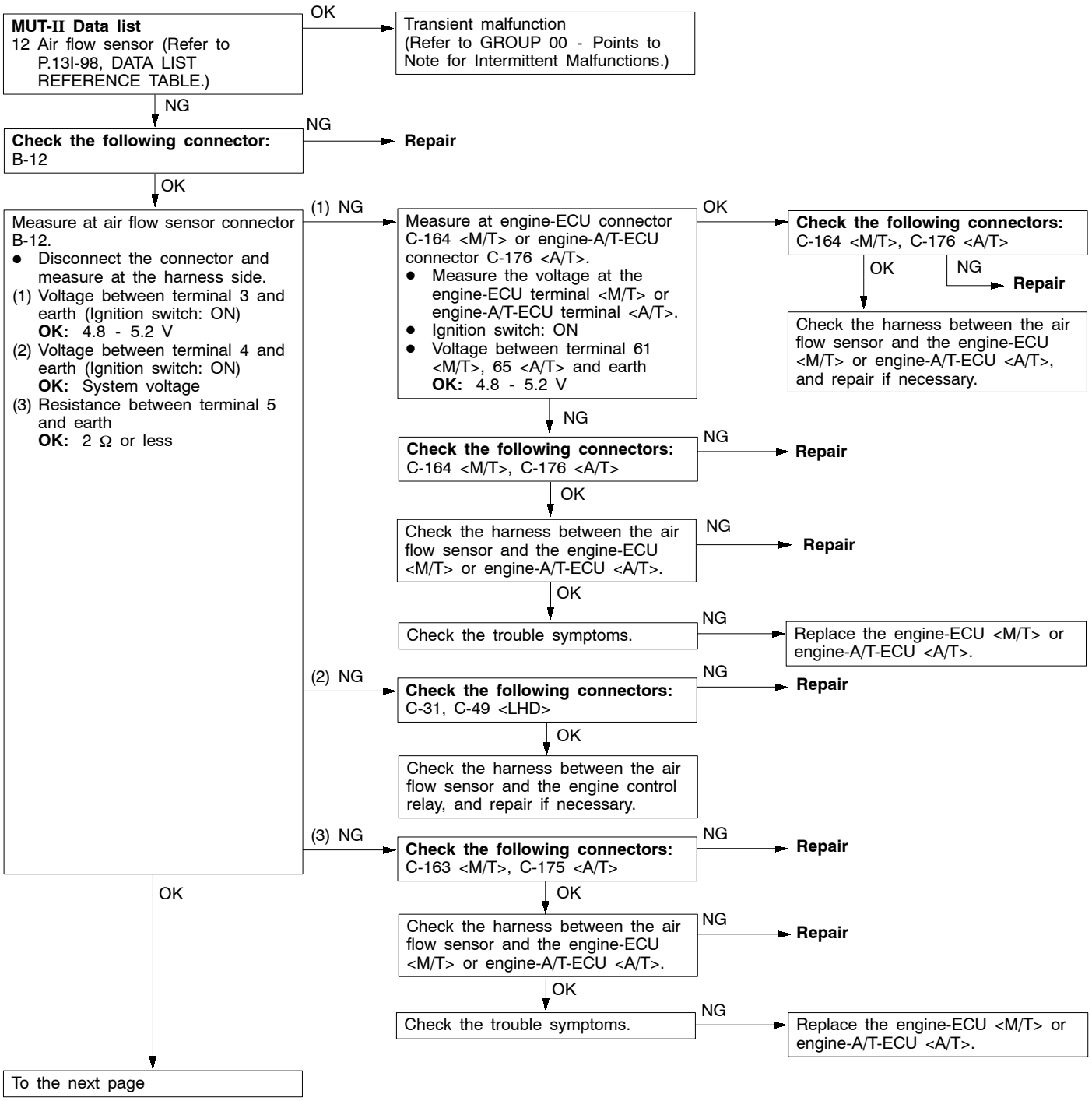
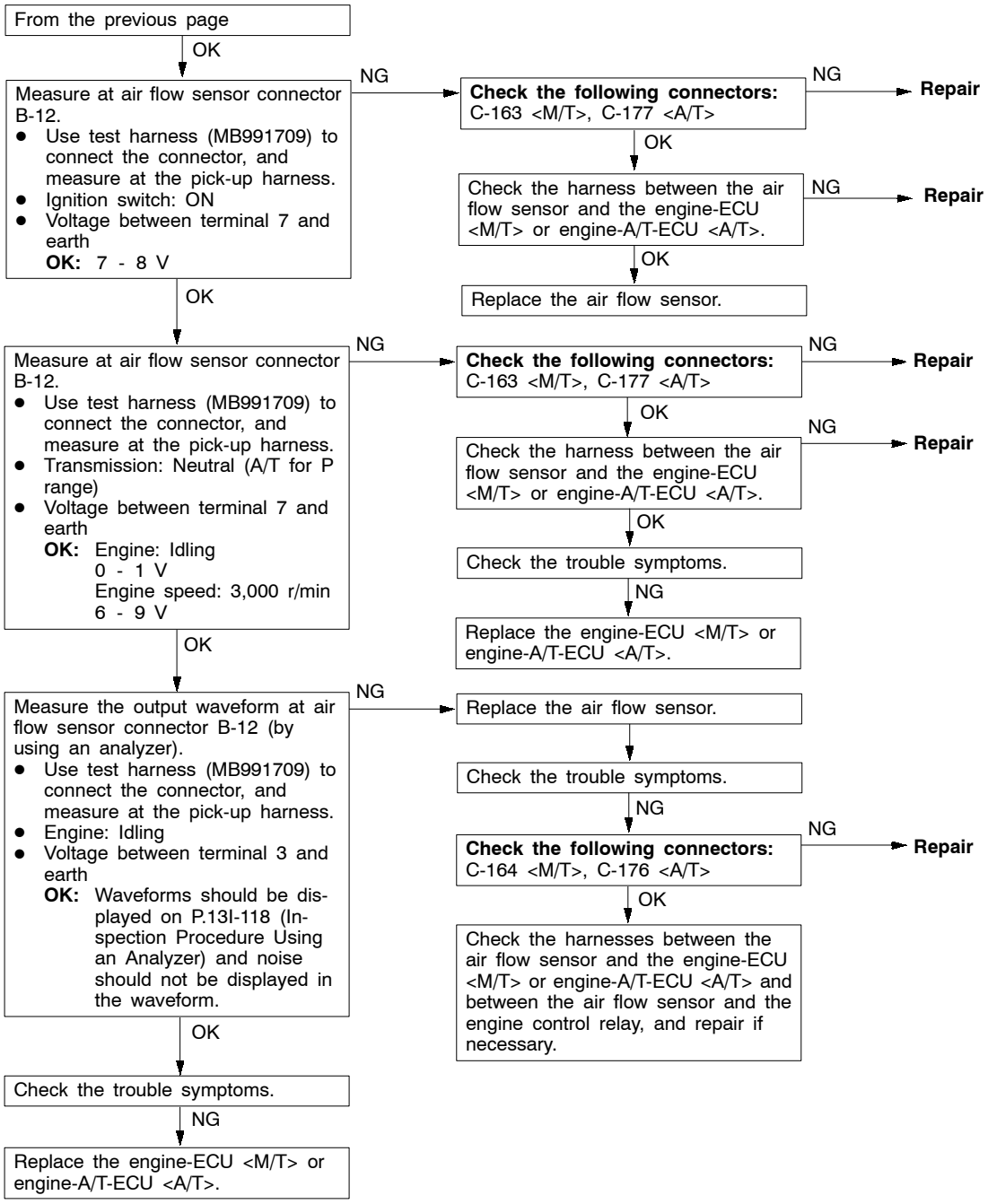
Code No.	Diagnosis item	Reference page
P1221★	Throttle valve position feedback system	13I-57
P1223★	Communication line with the throttle valve controller	13I-58
P1224★	Throttle valve control servo motor (motor 1st phase malfunction) system	13I-59
P1225★	Accelerator pedal position sensor (2nd channel) system	13I-60
P1228★	Throttle valve control servo motor (motor 2nd phase malfunction) system	13I-62
P1500	Alternator FR terminal system	13I-63
P1515	Brake vacuum sensor system	13I-64
P1610	Immobilizer system	13I-66

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

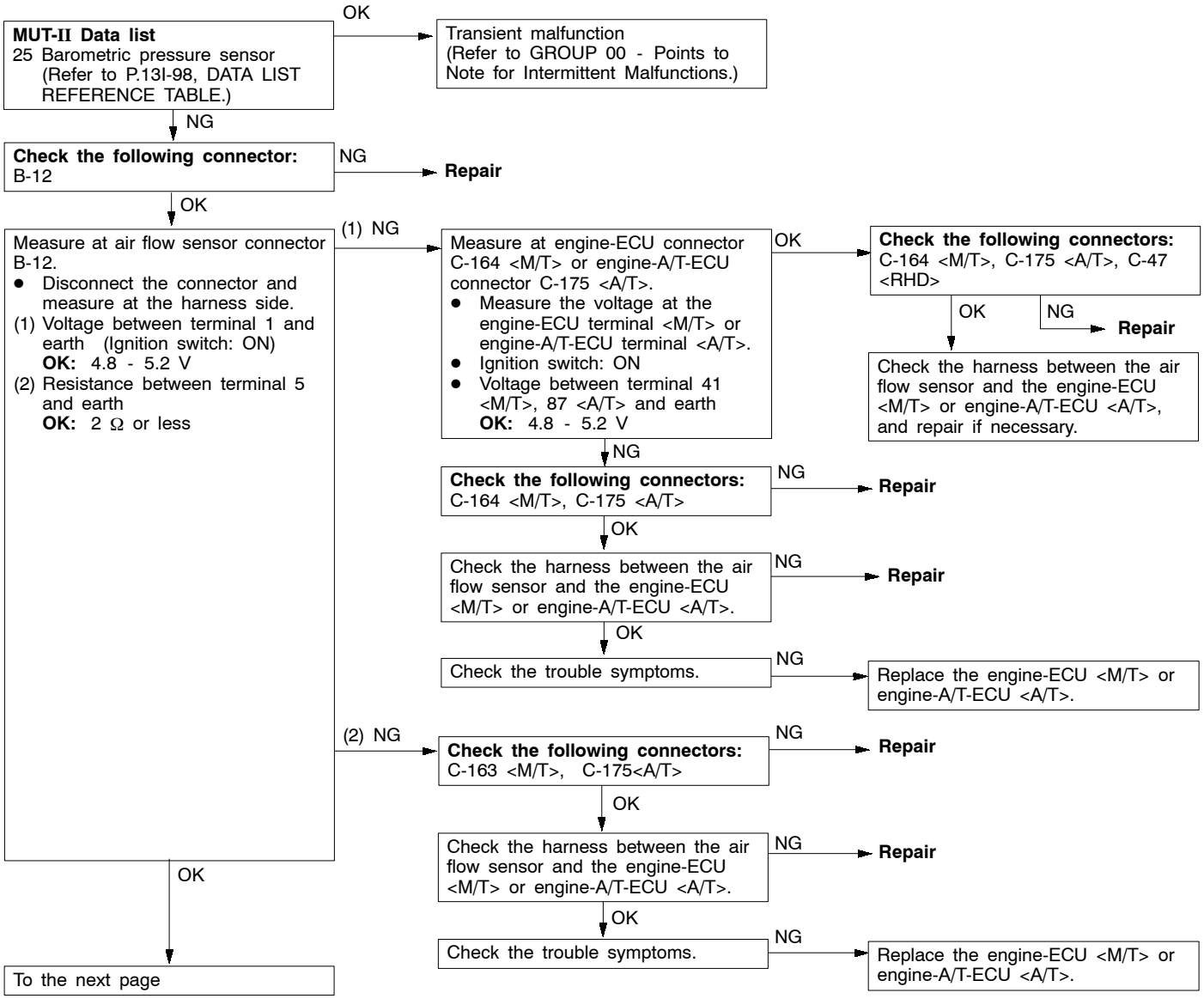
INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

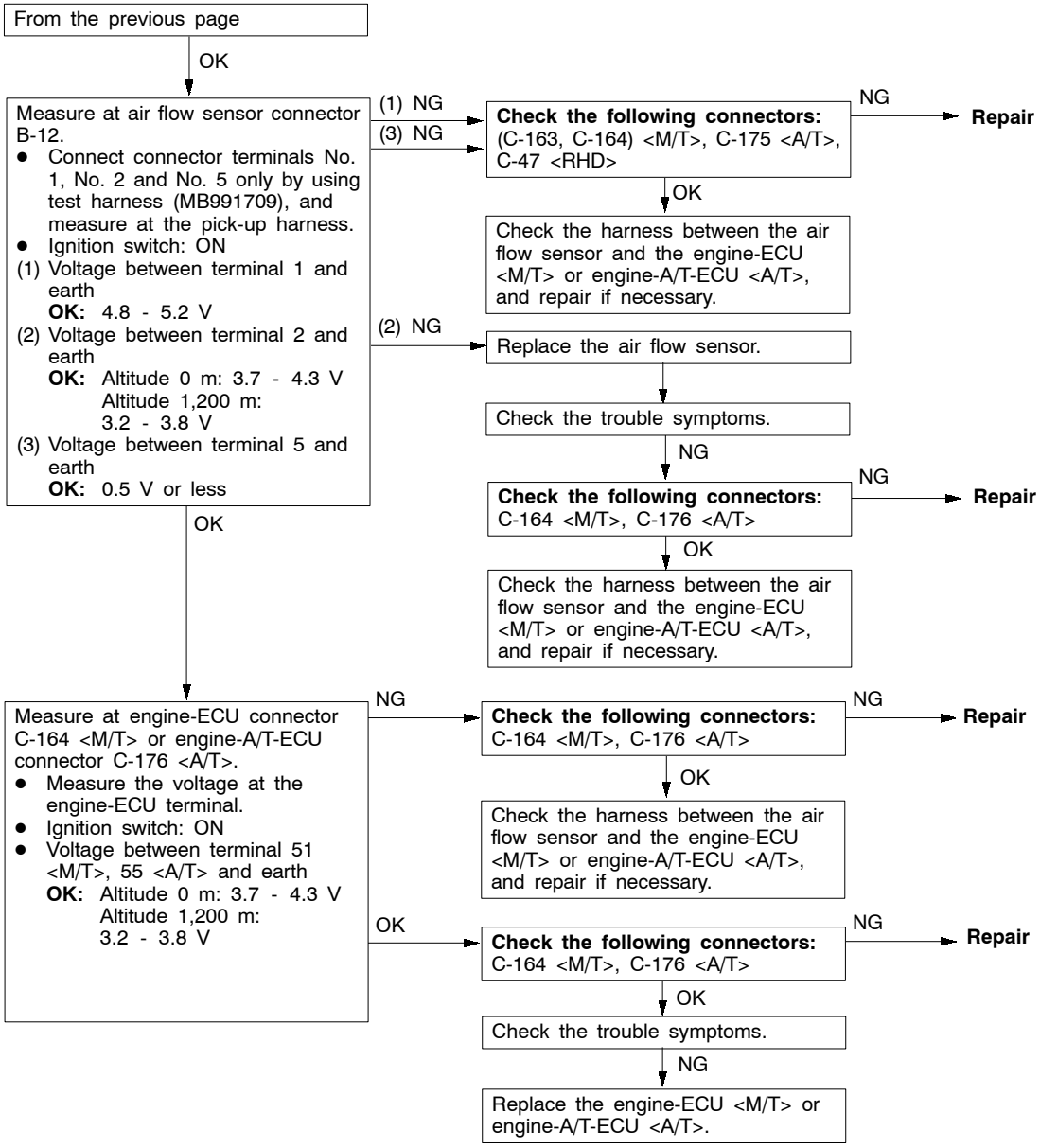
Code No. P0100 Air flow sensor system	Probable cause
Range of Check ● Engine speed: 500 r/min or more Set Conditions ● The sensor output frequency is 3.3 Hz or less for four seconds.	● Malfunction of air flow sensor ● Open or short circuit in air flow sensor circuit or loose connector contact ● Malfunction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



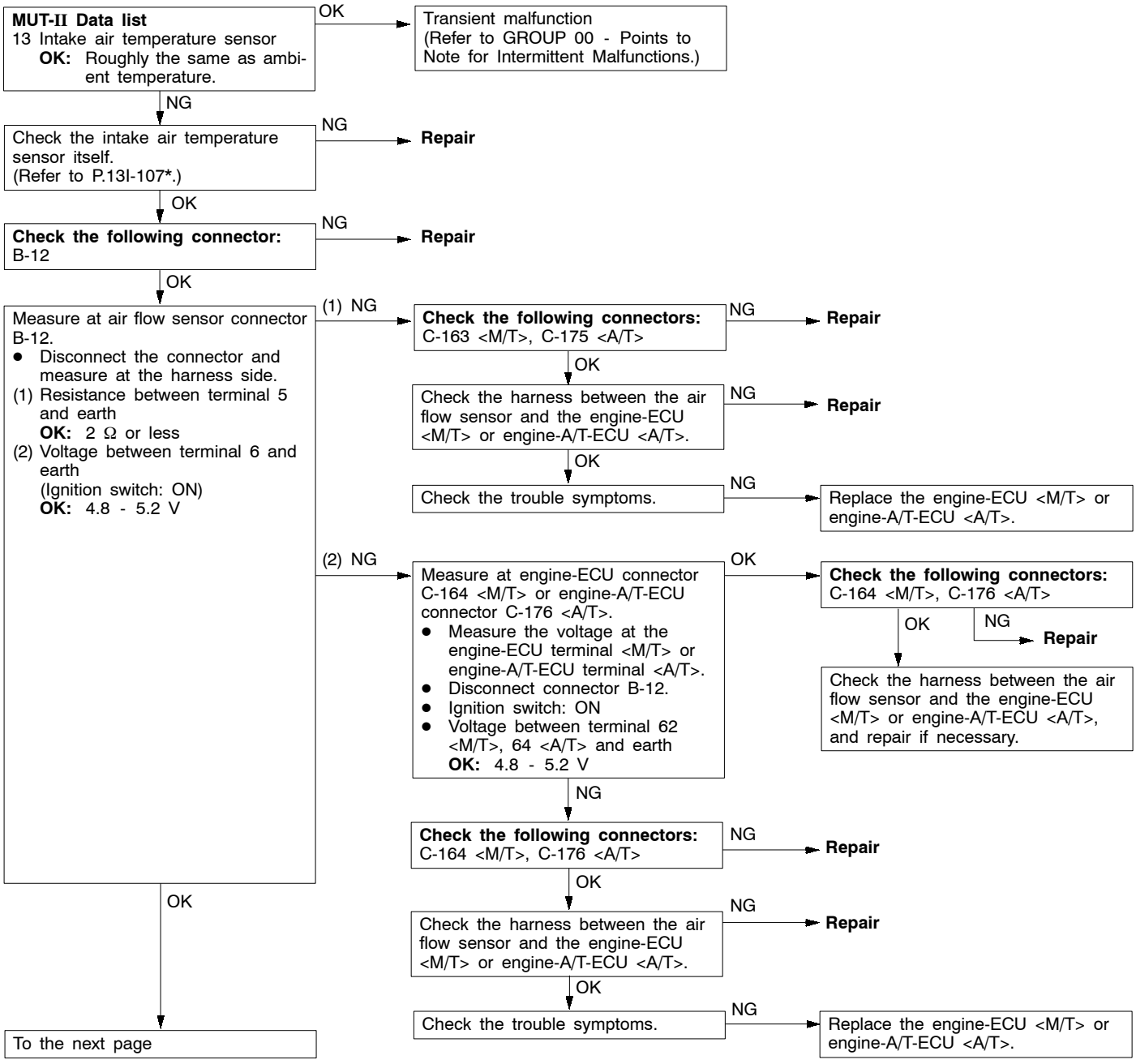

From the previous page
OK
Measure at air flow sensor connector B-12.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Ignition switch: ON
● Voltage between terminal 7 and earth
OK: 7 - 8 V
NG
Check the following connectors: C-163 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Replace the air flow sensor.
OK
Measure at air flow sensor connector B-12.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Transmission: Neutral (A/T for P range)
● Voltage between terminal 7 and earth
OK: Engine: Idling
0 - 1 V
Engine speed: 3,000 r/min
6 - 9 V
NG
Check the following connectors: C-163 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure the output waveform at air flow sensor connector B-12 (by using an analyzer).
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Engine: Idling
● Voltage between terminal 3 and earth
OK: Waveforms should be displayed on P.13I-118 (Inspection Procedure Using an Analyzer) and noise should not be displayed in the waveform.
NG
Replace the air flow sensor.
Check the trouble symptoms.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harnesses between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T> and between the air flow sensor and the engine control relay, and repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

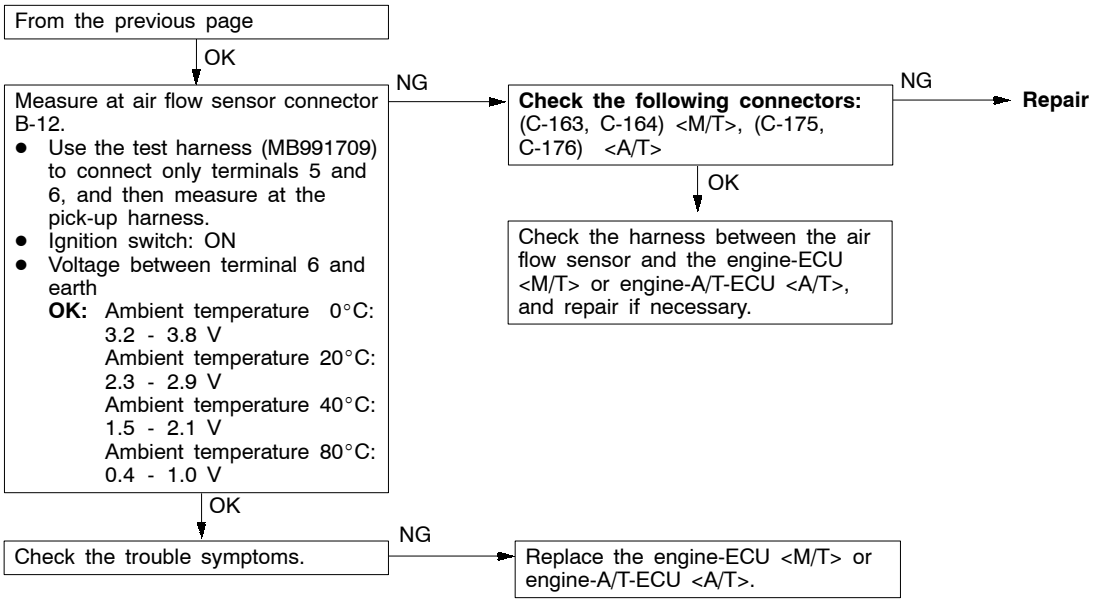
Code No. P0105 Barometric pressure sensor system	Probable cause
Range of Check ● Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. ● Battery voltage: 8 V or more Set Conditions ● The sensor output voltage is 4.5 V or more for four seconds (equivalent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




From the previous page
OK
Measure at air flow sensor connector B-12.
● Connect connector terminals No. 1, No. 2 and No. 5 only by using test harness (MB991709), and measure at the pick-up harness.
● Ignition switch: ON
(1) Voltage between terminal 1 and earth
OK: 4.8 - 5.2 V
(2) Voltage between terminal 2 and earth
OK: Altitude 0 m: 3.7 - 4.3 V
Altitude 1,200 m: 3.2 - 3.8 V
(3) Voltage between terminal 5 and earth
OK: 0.5 V or less
(1) NG
(3) NG
Check the following connectors: (C-163, C-164) <M/T>, C-175 <A/T>, C-47 <RHD>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Replace the air flow sensor.
Check the trouble symptoms.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal.
● Ignition switch: ON
● Voltage between terminal 51 <M/T>, 55 <A/T> and earth
OK: Altitude 0 m: 3.7 - 4.3 V
Altitude 1,200 m: 3.2 - 3.8 V
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness between the air flow sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

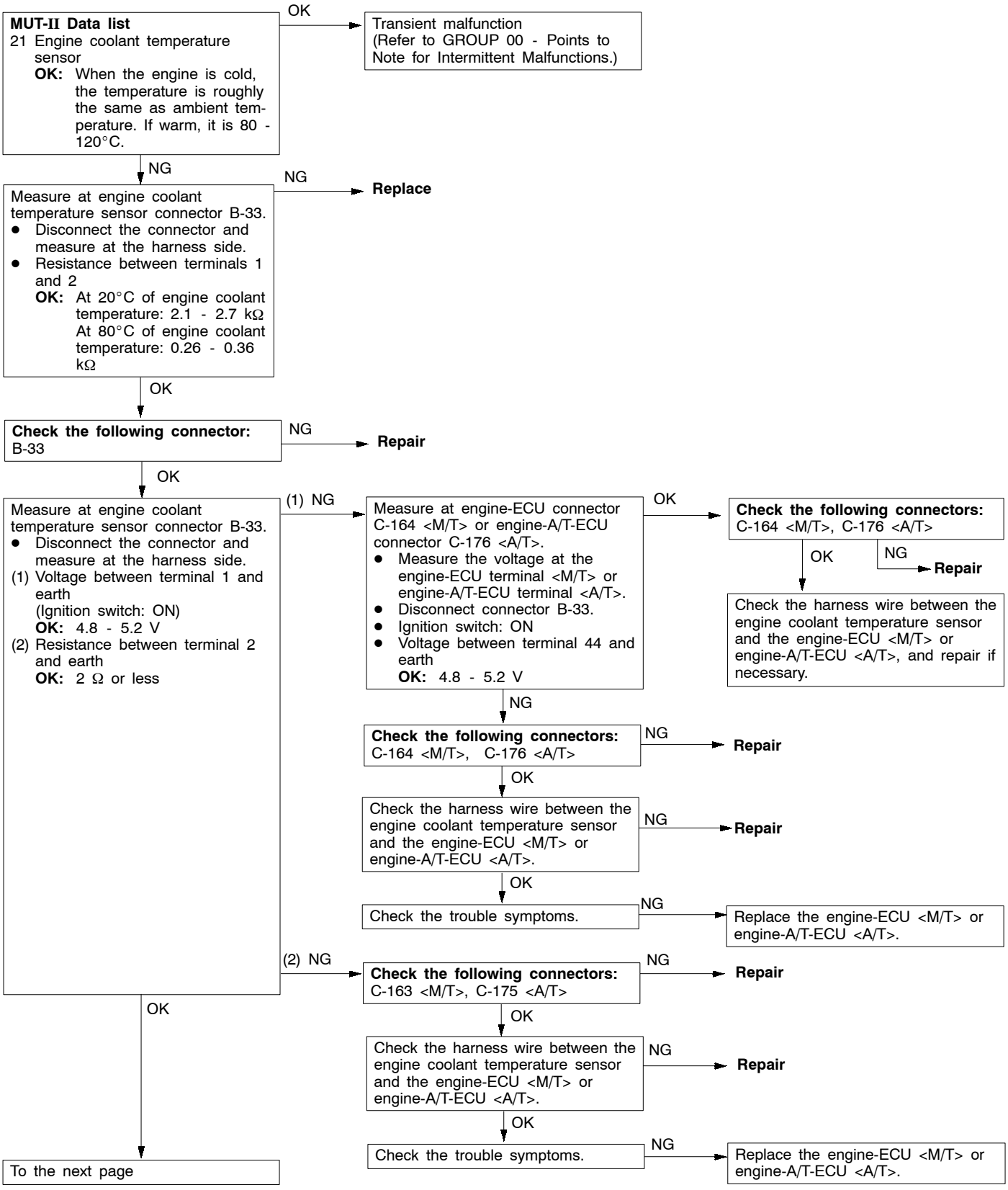
Code No. P0110 Intake air temperature sensor system	Probable cause
Range of Check • Two seconds have passed since the ignition switch is turned ON or the engine starting process is completed. Set Conditions • The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of intake air temperature) or • The sensor output voltage is 0.2 V or more for four seconds (equivalent to 125°C of intake air temperature)	• Malfunction of intake air temperature sensor • Open or short circuit in intake air temperature sensor or loose connector contact • Malfunction of engine-ECU <M/T> • Malfunction of engine-A/T-ECU <A/T>

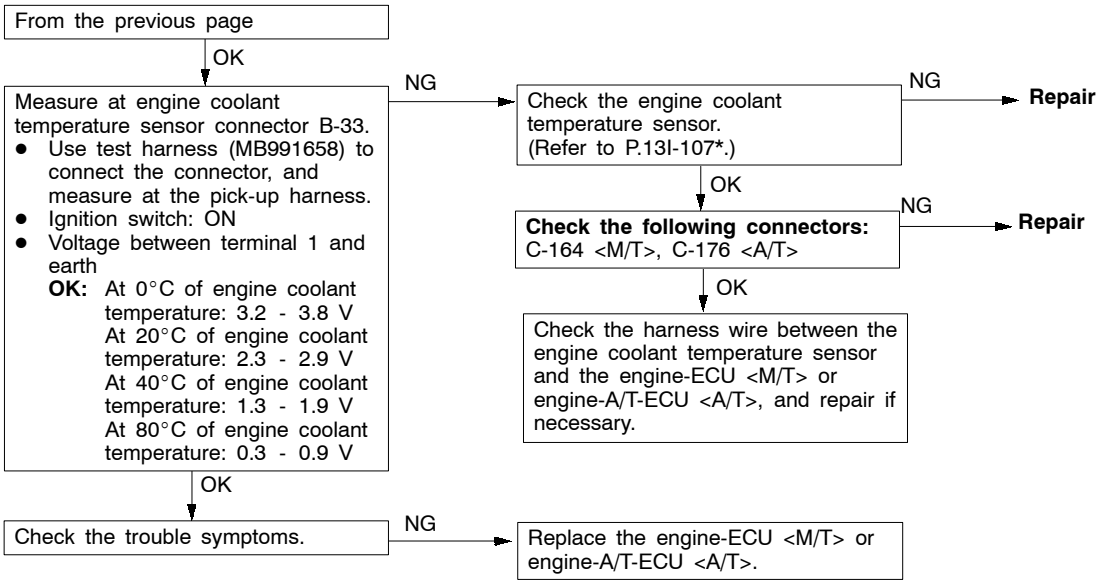




NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

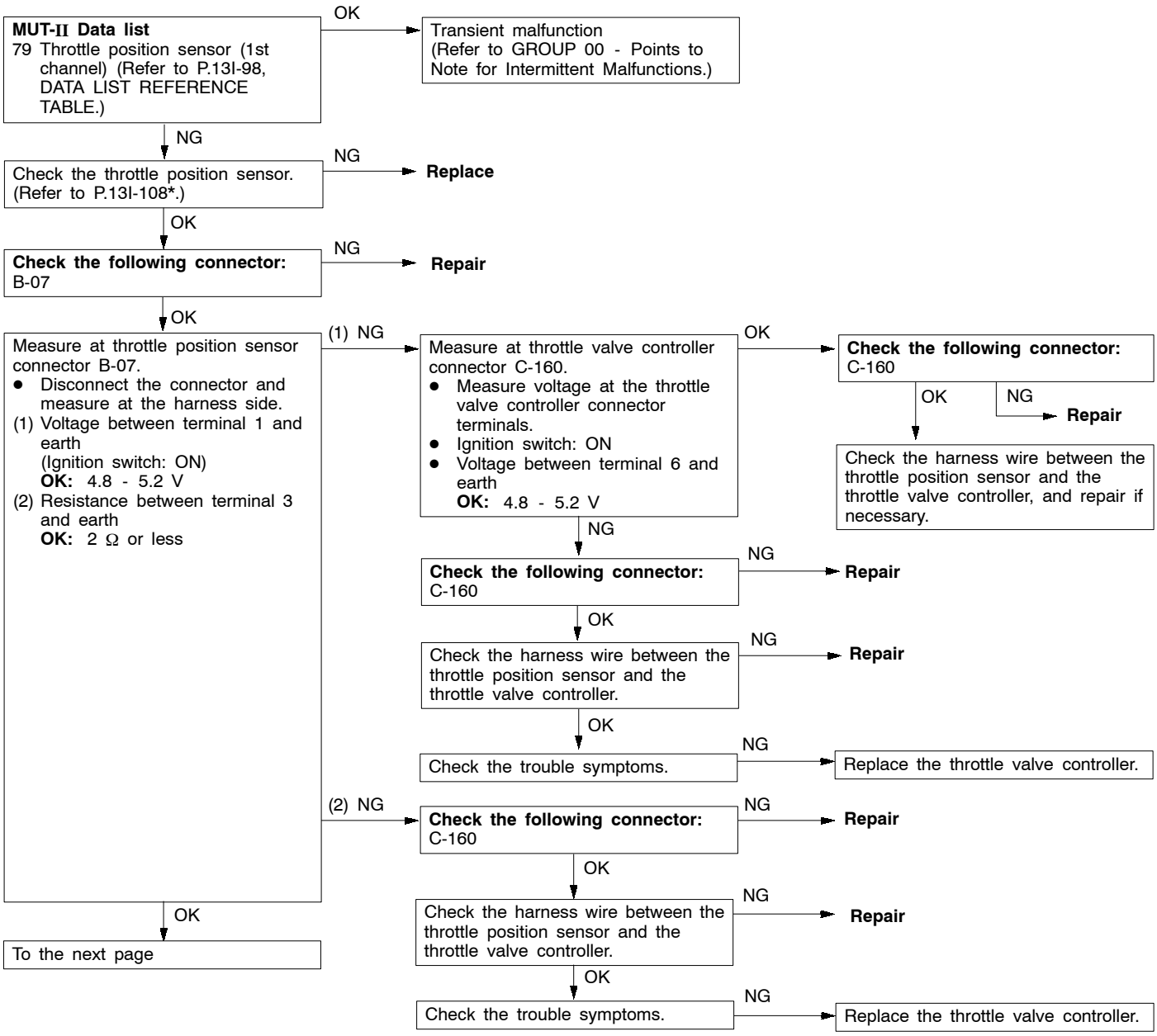
Code No. P0115 Engine coolant temperature sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● The sensor output voltage is 4.6 V or more for four seconds (equivalent to -45°C of engine coolant temperature) or ● The sensor output voltage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

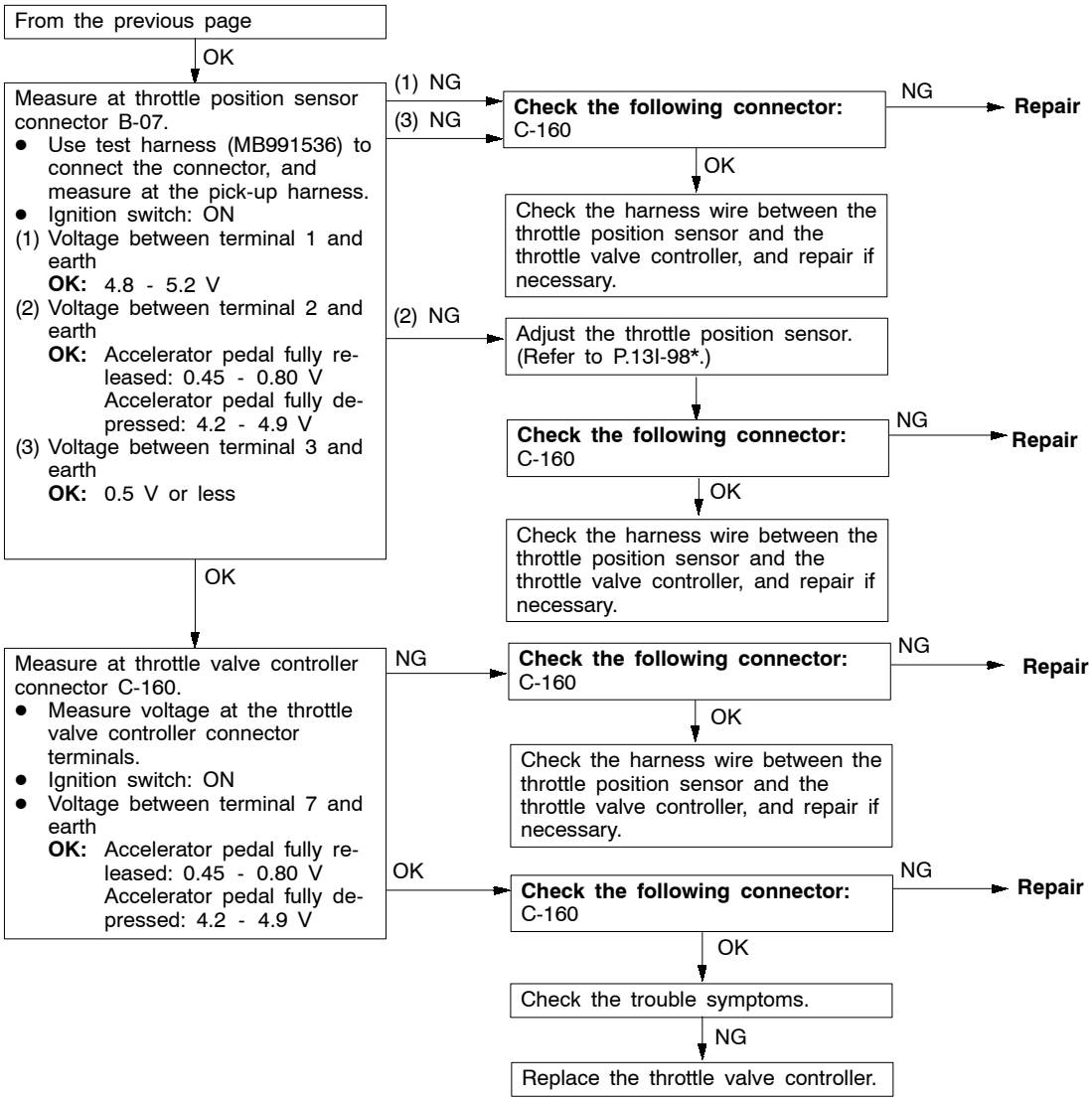

MUT-II Data list
21 Engine coolant temperature sensor
OK: When the engine is cold, the temperature is roughly the same as ambient temperature. If warm, it is 80 - 120°C.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Measure at engine coolant temperature sensor connector B-33.
Disconnect the connector and measure at the harness side.
Resistance between terminals 1 and 2
OK: At 20°C of engine coolant temperature: 2.1 - 2.7 kΩ
At 80°C of engine coolant temperature: 0.26 - 0.36 kΩ
NG
Replace
OK
Check the following connector: B-33
NG
Repair
OK
Measure at engine coolant temperature sensor connector B-33.
Disconnect the connector and measure at the harness side.
(1) Voltage between terminal 1 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(2) Resistance between terminal 2 and earth
OK: 2 Ω or less
(1) NG
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
Disconnect connector B-33.
Ignition switch: ON
Voltage between terminal 44 and earth
OK: 4.8 - 5.2 V
OK
Check the following connectors: C-164 <M/T>, C-176 <A/T>
OK
NG
Repair
Check the harness wire between the engine coolant temperature sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the engine coolant temperature sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(2) NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the engine coolant temperature sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
To the next page



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

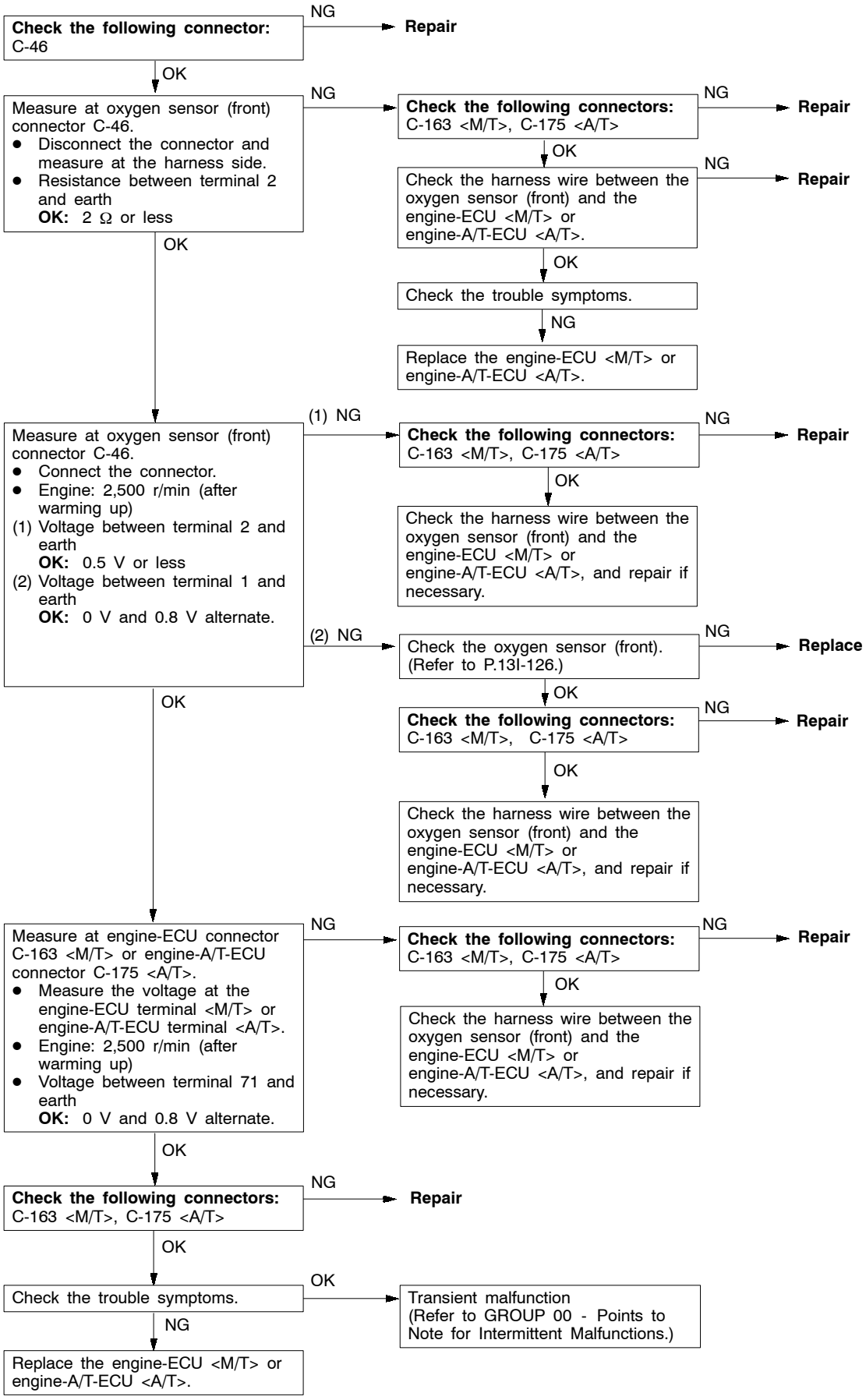
Code No. P0120 Throttle position sensor (1st channel) system	Probable cause
The throttle valve controller judges a malfunction, and then transmit the result to the engine-ECU <M/T> or engine-A/T-ECU <A/T>. Range of Check ● Ignition switch: ON Set Conditions ● The sensor output voltage is 0.2 V or less. or ● The sensor output voltage is 4.85 V or more and the throttle position sensor (2nd channel) output voltage is 2.5 V or more. or ● The throttle position sensor (1st channel) and throttle position sensor (2nd channel) combination output voltage is outside 4 - 6 V. or ● The opening angle of throttle position sensor (1st channel) is different from its target by 1 V or more. or ● The throttle position sensor (1st channel) output changes within 25 mV when the throttle control servo moves one step.	● Malfunction of throttle position sensor ● Open or short circuit in the throttle position sensor (1st channel) circuit or loose connector contact ● Malfunction of throttle valve controller ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>



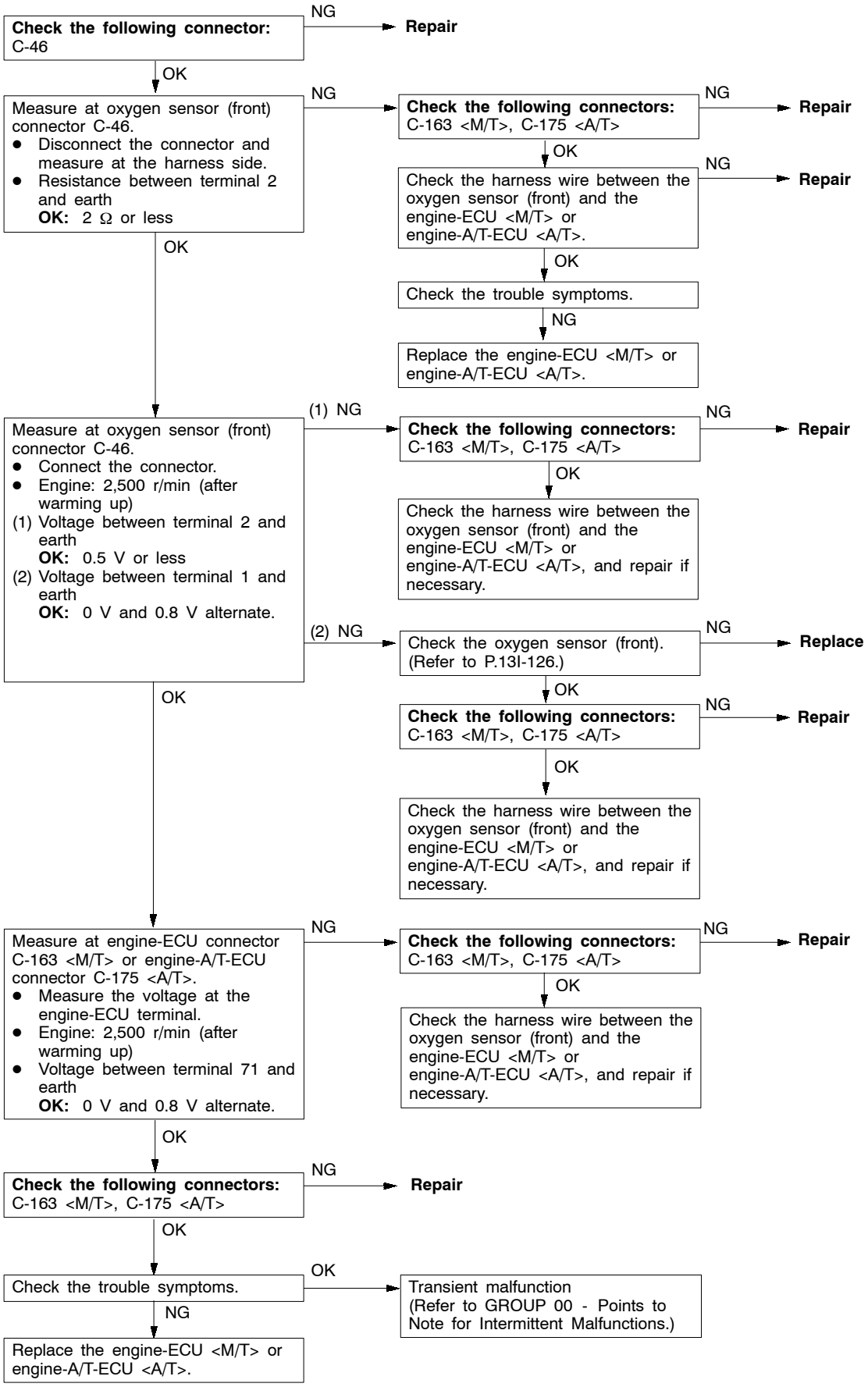


NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

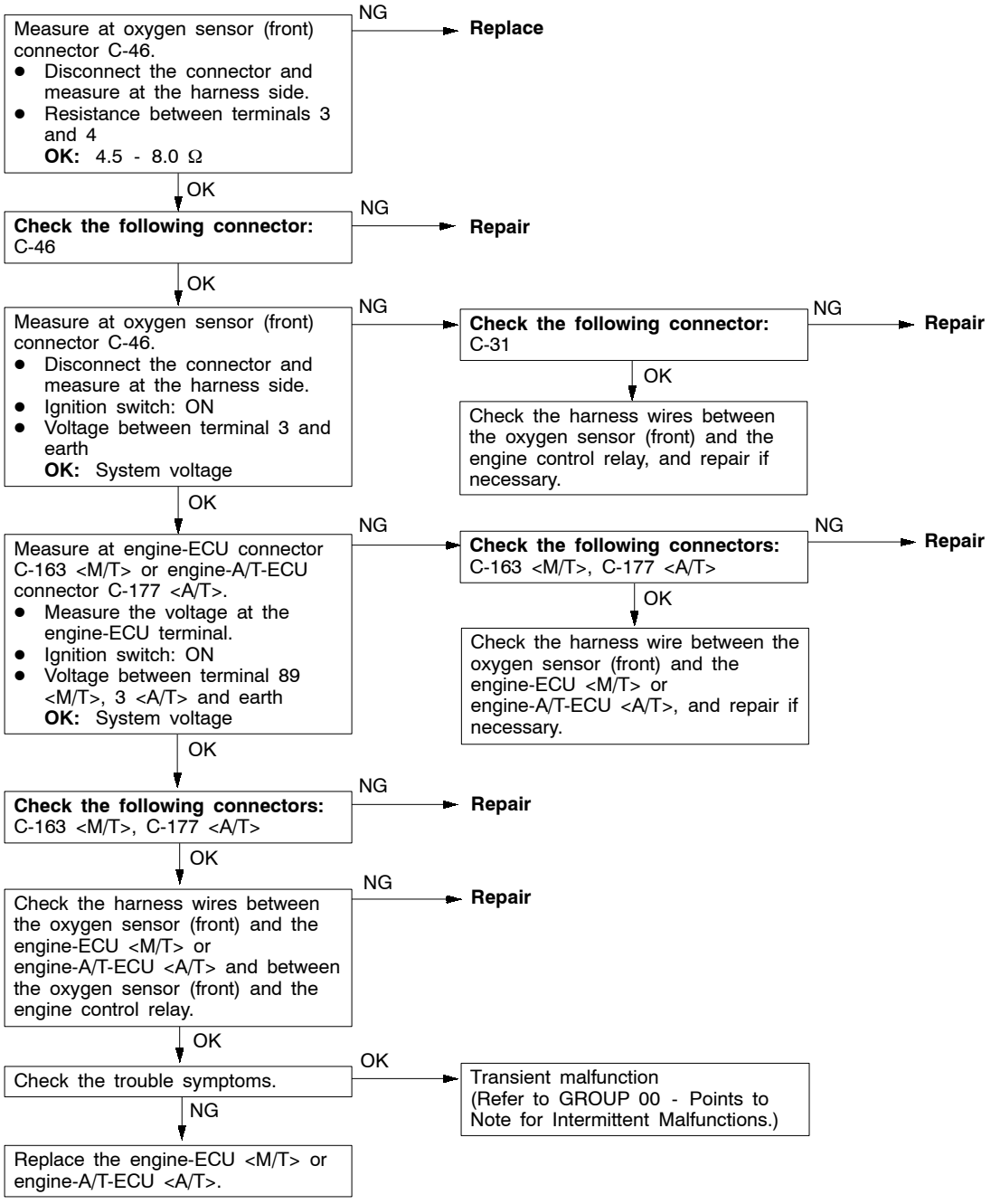
Code No. P0125 Feedback system	Probable cause
Range of Check ● The engine coolant temperature is approx. 80°C or more. ● During stoichiometric feedback control ● The vehicle is not being decelerated. Set Conditions ● Oxygen sensor (front) output voltage has been higher or lower than 0.5 V for at least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


Check the following connector: C-46
NG
Repair
OK
Measure at oxygen sensor (front) connector C-46.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 2 and earth
OK: 2 Ω or less
NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure at oxygen sensor (front) connector C-46.
● Connect the connector.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 2 and earth
OK: 0.5 V or less
(2) Voltage between terminal 1 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Check the oxygen sensor (front). (Refer to P.13I-126.)
NG
Replace
OK
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-163 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 71 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

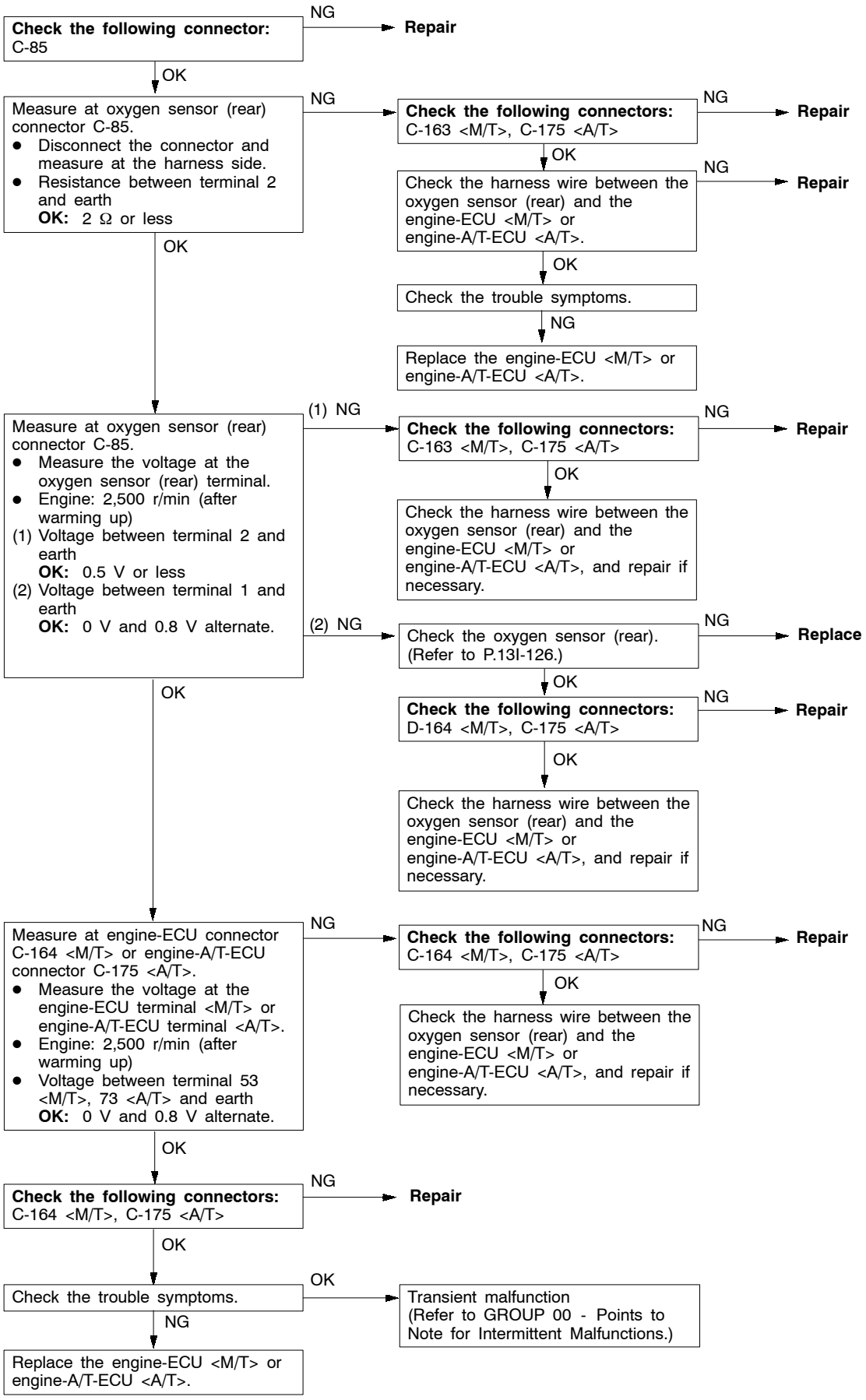
Code No. P0130 Oxygen sensor (front) system <sensor 1>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Intake air temperature is 20 - 50°C ● Engine speed is 1,200 r/min or more ● Driving on a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


Check the following connector: C-46
NG
Repair
OK
Measure at oxygen sensor (front) connector C-46.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 2 and earth
OK: 2 Ω or less
NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure at oxygen sensor (front) connector C-46.
● Connect the connector.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 2 and earth
OK: 0.5 V or less
(2) Voltage between terminal 1 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Check the oxygen sensor (front). (Refer to P.13I-126.)
NG
Replace
OK
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-163 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-ECU terminal.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 71 and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (front) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

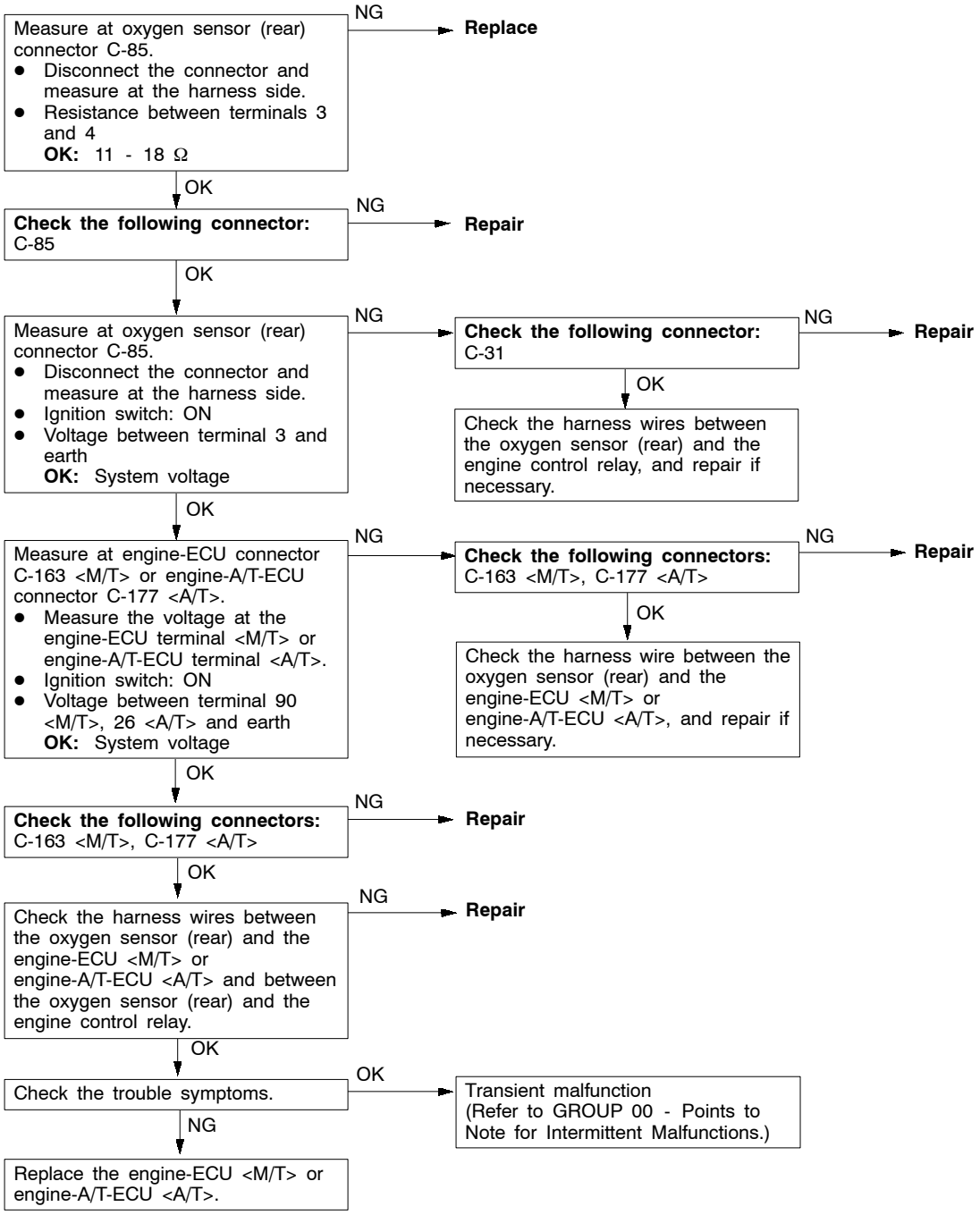
Code No. P0135 Oxygen sensor heater (front) system <sensor 1>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (front) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which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



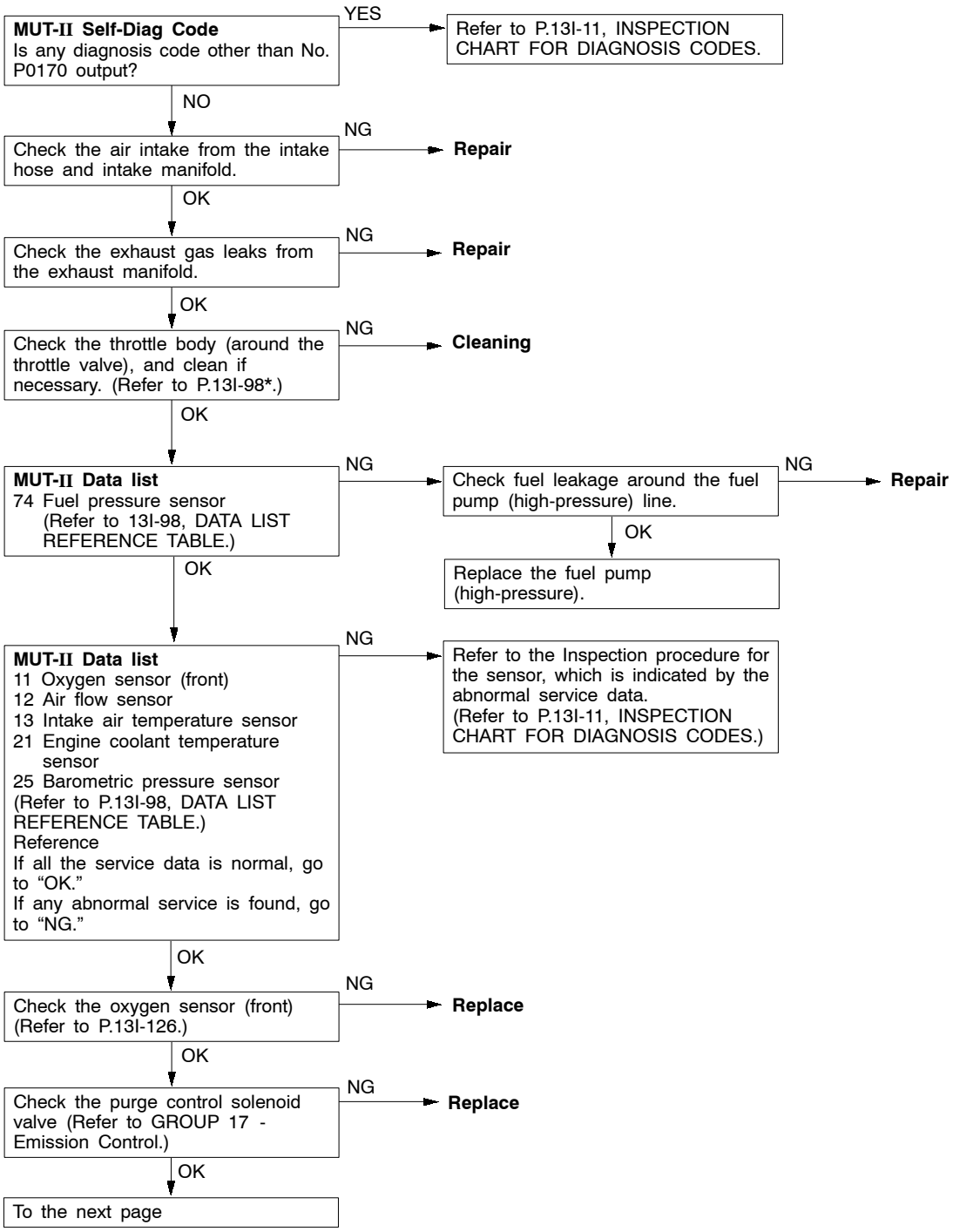
Code No. P0136 Oxygen sensor (rear) system <sensor 2>	Probable cause
Range of Check ● Three minutes have been passed since the engine has been started. ● The engine coolant temperature is approx. 80°C or more. ● Intake air temperature is 20 - 50°C ● Engine speed is 1,200 r/min or more ● Driving on a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


Check the following connector: C-85
NG
Repair
OK
Measure at oxygen sensor (rear) connector C-85.
● Disconnect the connector and measure at the harness side.
● Resistance between terminal 2 and earth
OK: 2 Ω or less
NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Measure at oxygen sensor (rear) connector C-85.
● Measure the voltage at the oxygen sensor (rear) terminal.
● Engine: 2,500 r/min (after warming up)
(1) Voltage between terminal 2 and earth
OK: 0.5 V or less
(2) Voltage between terminal 1 and earth
OK: 0 V and 0.8 V alternate.
(1) NG
Check the following connectors: C-163 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Check the oxygen sensor (rear). (Refer to P.13I-126.)
NG
Replace
OK
Check the following connectors: D-164 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Engine: 2,500 r/min (after warming up)
● Voltage between terminal 53 <M/T>, 73 <A/T> and earth
OK: 0 V and 0.8 V alternate.
NG
Check the following connectors: C-164 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the oxygen sensor (rear) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connectors: C-164 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

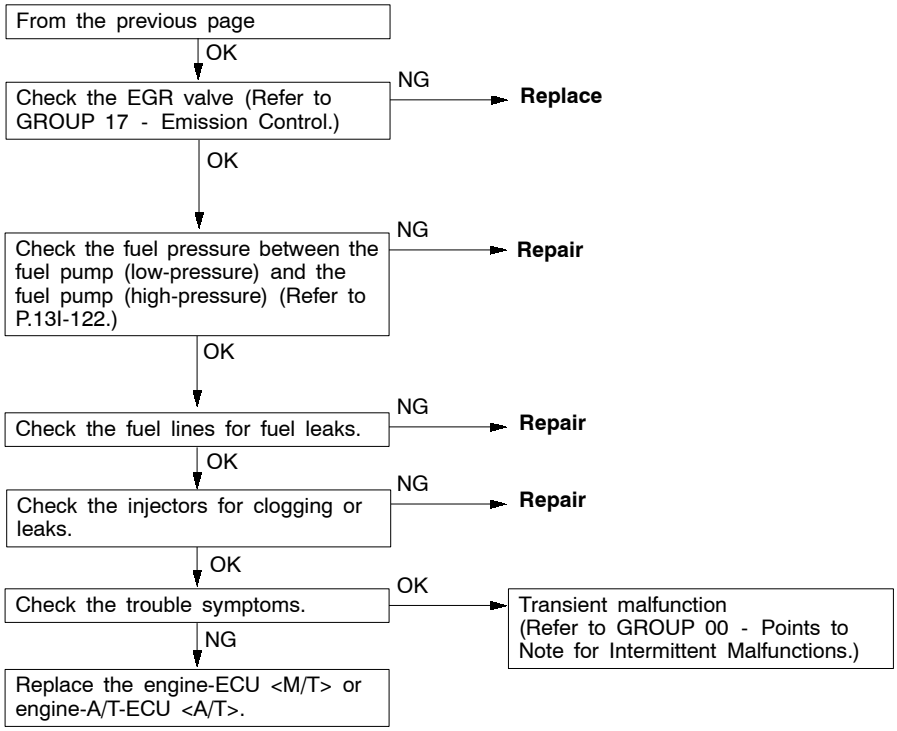
Code No. P0141 Oxygen sensor heater (rear) system <sensor 2>	Probable cause
Range of Check ● The engine coolant temperature is approx. 20°C or more. ● The oxygen sensor heater (rear) remains on. ● The engine speed is 50 r/min or more. ● Battery voltage is 11 - 16 V. Set Conditions ● The current, which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



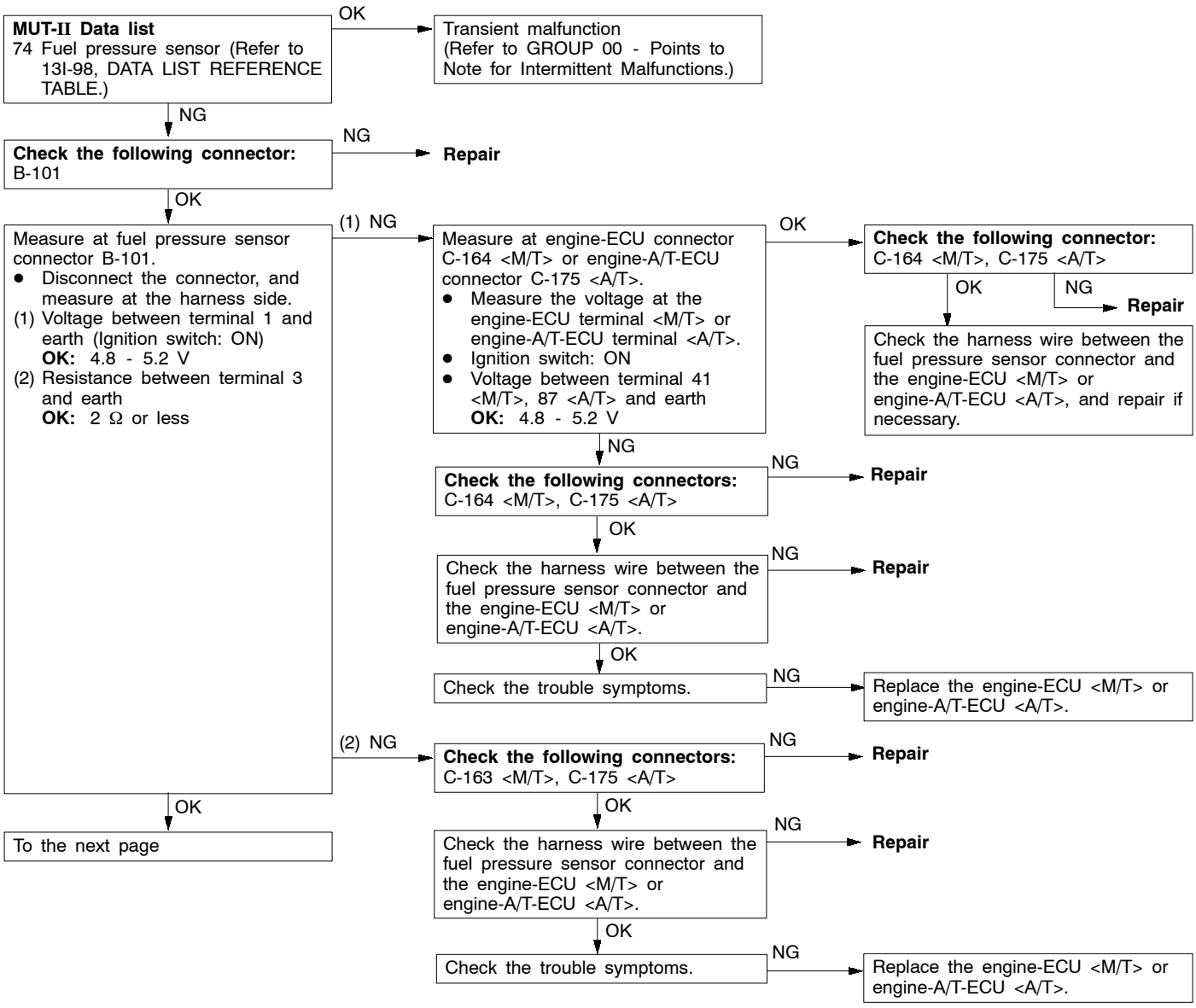
Code No. P0170 Abnormal fuel system	Probable cause
Range of Check ● Engine: Being learning the air-fuel ratio Set Conditions ● Ten seconds or more have been passed while the fuel injection amount compensation value is too low. or ● Ten seconds or more have been passed while the fuel injection amount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

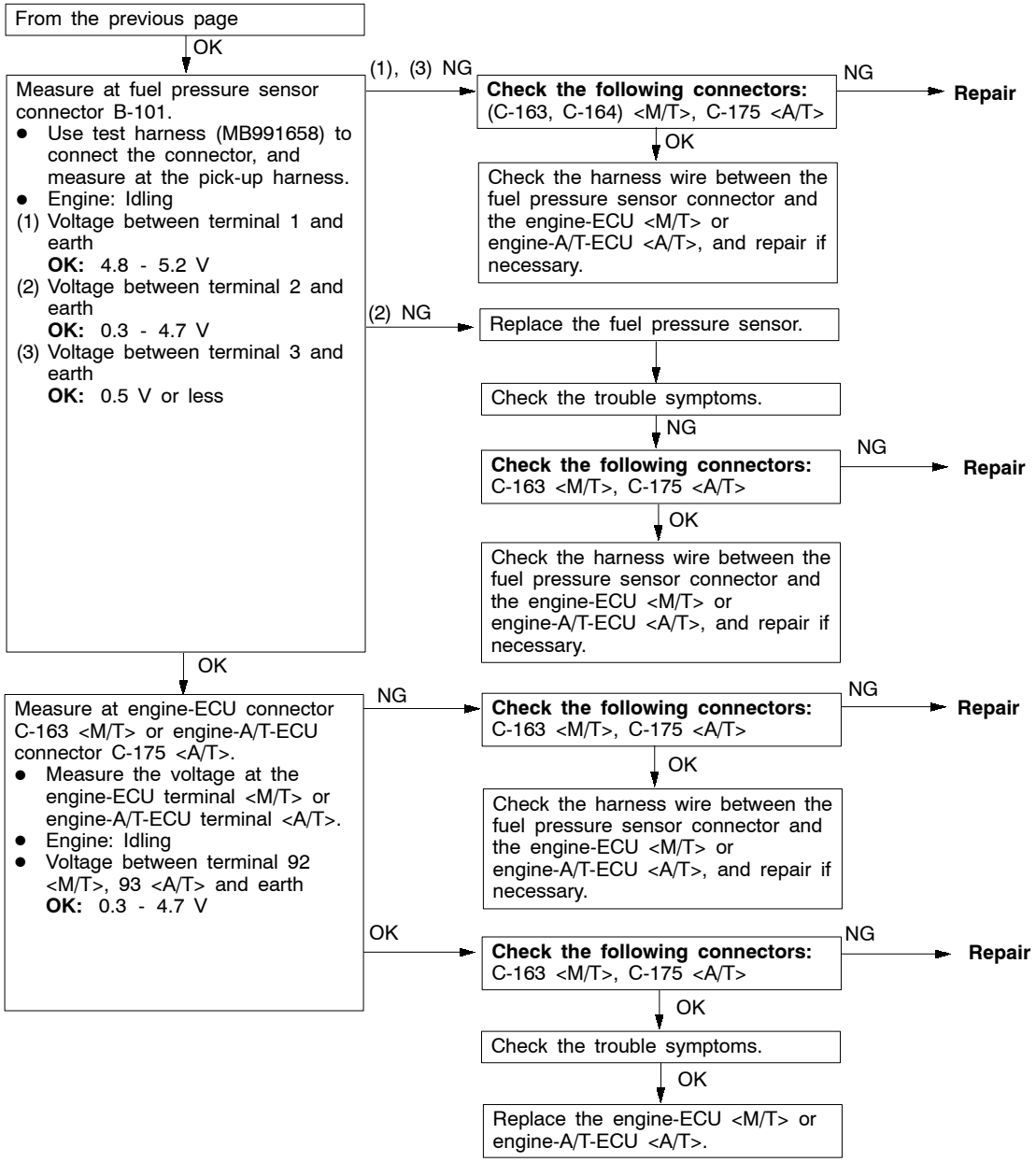


NOTE:
*: Refer to the ’99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

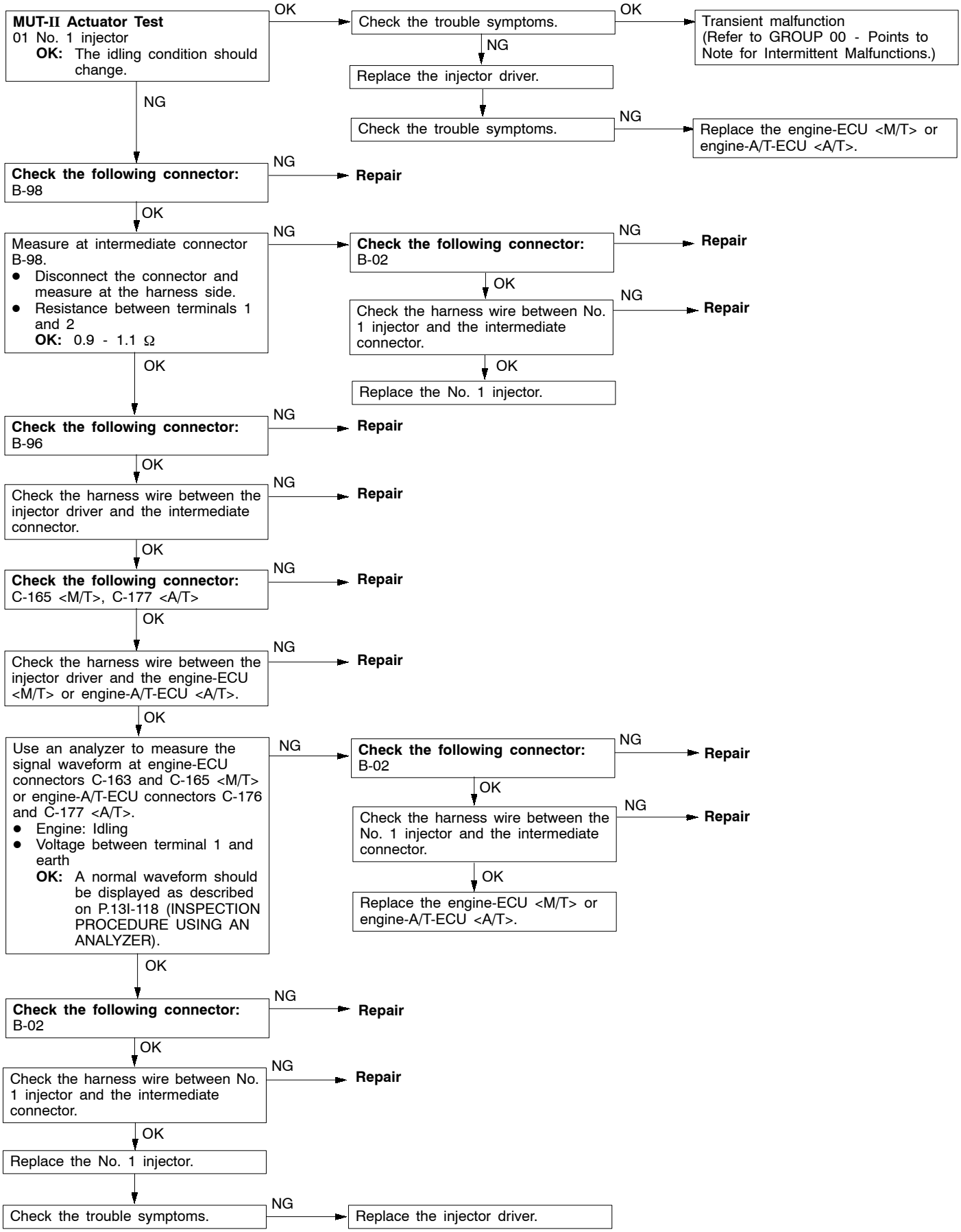

From the previous page
OK
Check the EGR valve (Refer to GROUP 17 - Emission Control.)
NG
Replace
OK
Check the fuel pressure between the fuel pump (low-pressure) and the fuel pump (high-pressure) (Refer to P.13I-122.)
NG
Repair
OK
Check the fuel lines for fuel leaks.
NG
Repair
OK
Check the injectors for clogging or leaks.
NG
Repair
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

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

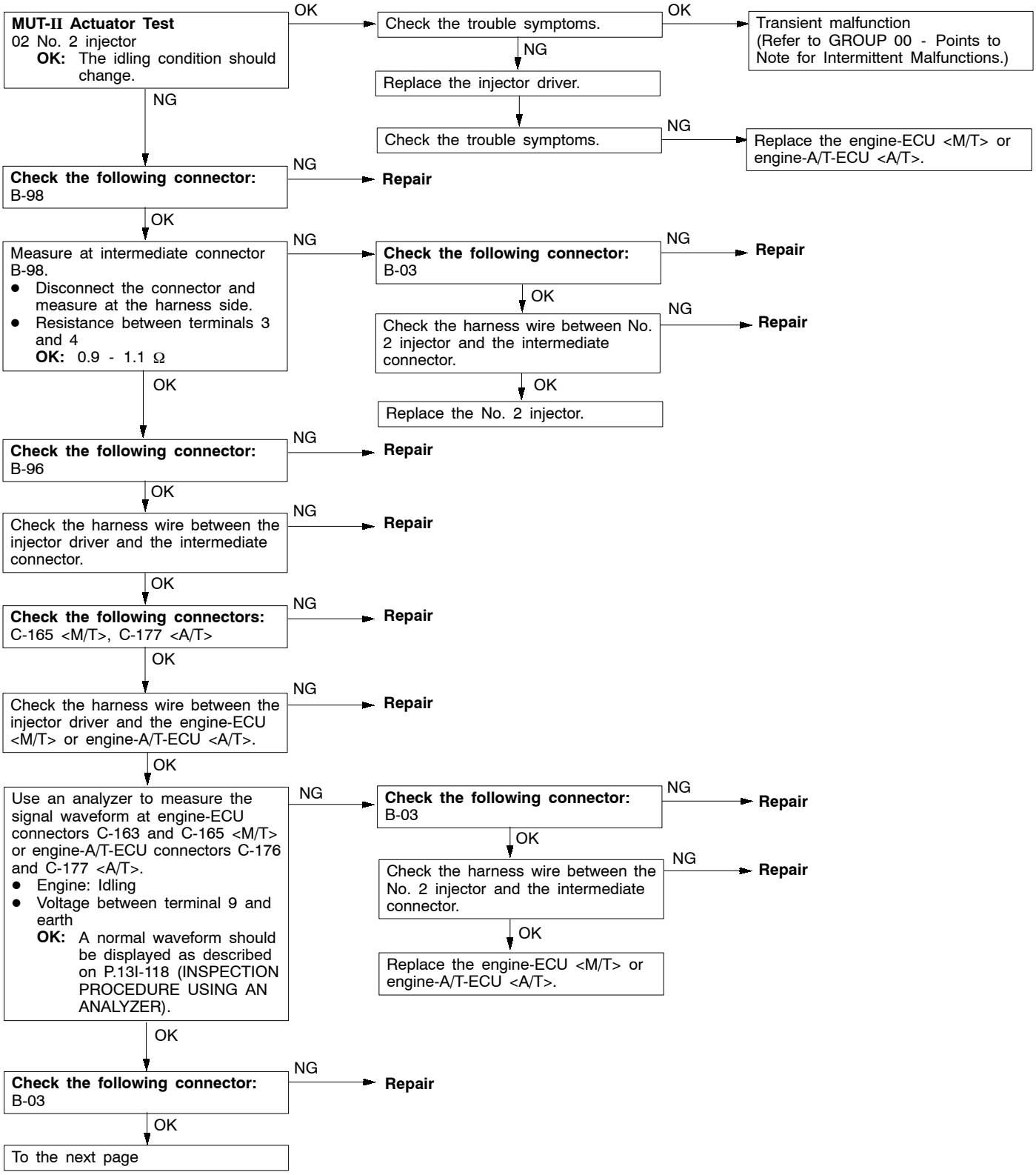


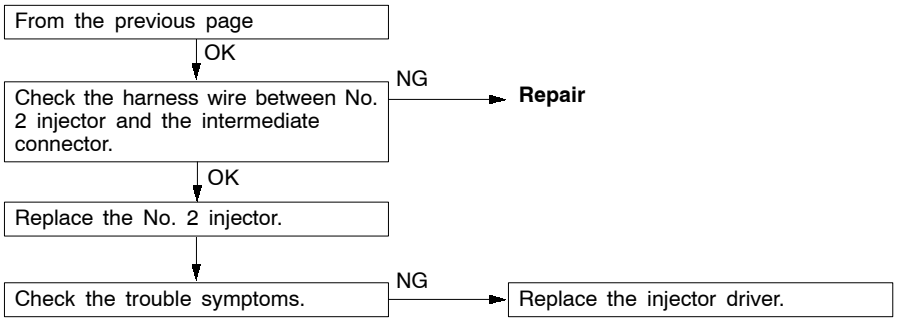


Code No. P0201 No. 1 injector system	Probable cause
Range of Check ● The engine speed is 4,000 r/min or less. ● The battery voltage is 10 V or more. ● The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions ● The injector driver is not transmitting a injector open circuit check signal for four seconds.	● Malfunction of No. 1 injector ● Open or short circuit in the No. 1 injector circuit or loose connector contact ● Malfunction of engine-ECU <M/T> ● Malfunction of engine-A/T-ECU <A/T>

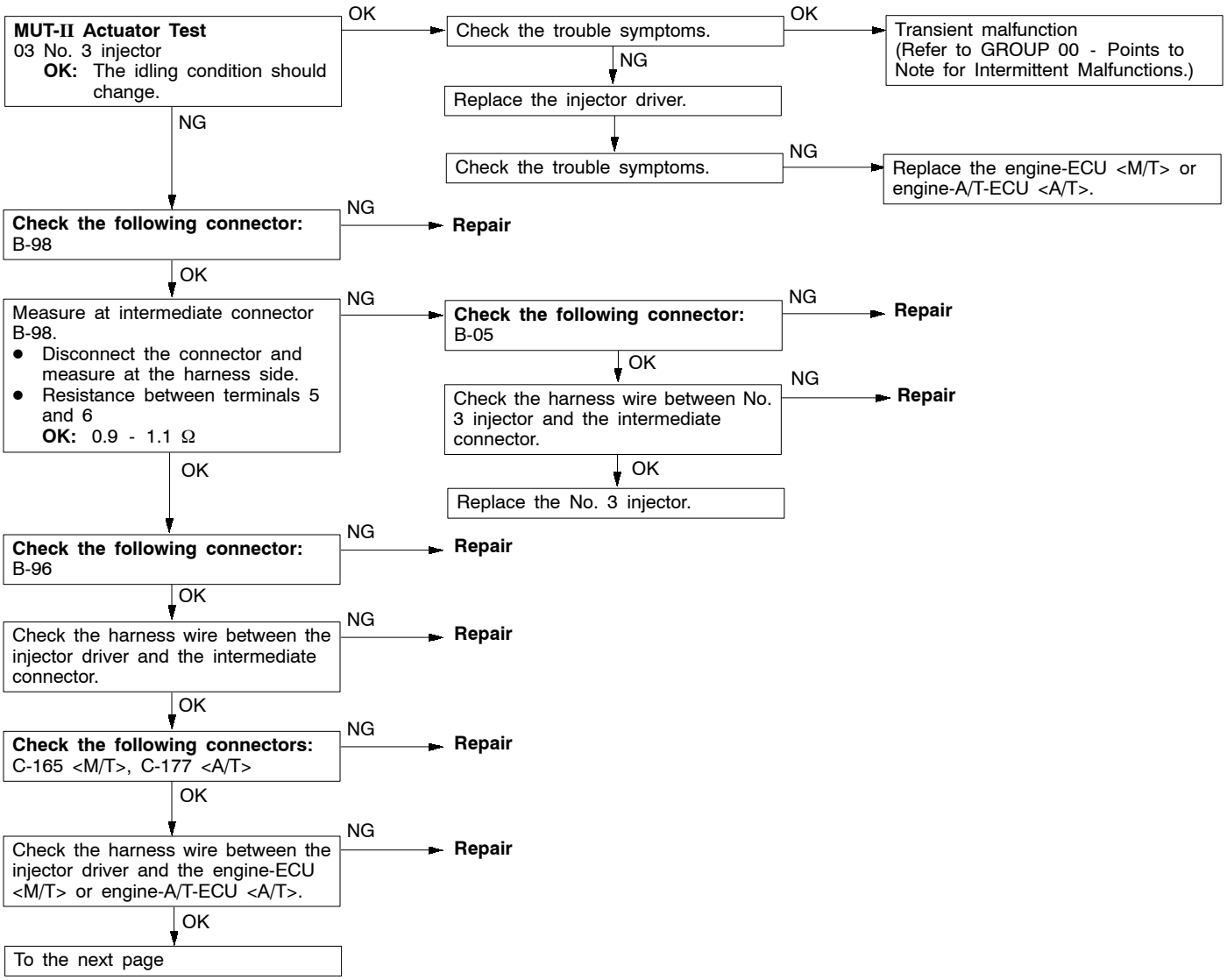

MUT-II Actuator Test
01 No. 1 injector
OK: The idling condition should change.
OK
Check the trouble symptoms.
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the injector driver.
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Check the following connector: B-98
NG
Repair
OK
Measure at intermediate connector B-98.
Disconnect the connector and measure at the harness side.
Resistance between terminals 1 and 2
OK: 0.9 - 1.1 Ω
NG
Check the following connector: B-02
NG
Repair
OK
Check the harness wire between No. 1 injector and the intermediate connector.
NG
Repair
OK
Replace the No. 1 injector.
OK
Check the following connector: B-96
NG
Repair
OK
Check the harness wire between the injector driver and the intermediate connector.
NG
Repair
OK
Check the following connector: C-165 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness wire between the injector driver and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Use an analyzer to measure the signal waveform at engine-ECU connectors C-163 and C-165 <M/T> or engine-A/T-ECU connectors C-176 and C-177 <A/T>.
Engine: Idling
Voltage between terminal 1 and earth
OK: A normal waveform should be displayed as described on P.13I-118 (INSPECTION PROCEDURE USING AN ANALYZER).
NG
Check the following connector: B-02
NG
Repair
OK
Check the harness wire between the No. 1 injector and the intermediate connector.
NG
Repair
OK
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Check the following connector: B-02
NG
Repair
OK
Check the harness wire between No. 1 injector and the intermediate connector.
NG
Repair
OK
Replace the No. 1 injector.
Check the trouble symptoms.
NG
Replace the injector driver.

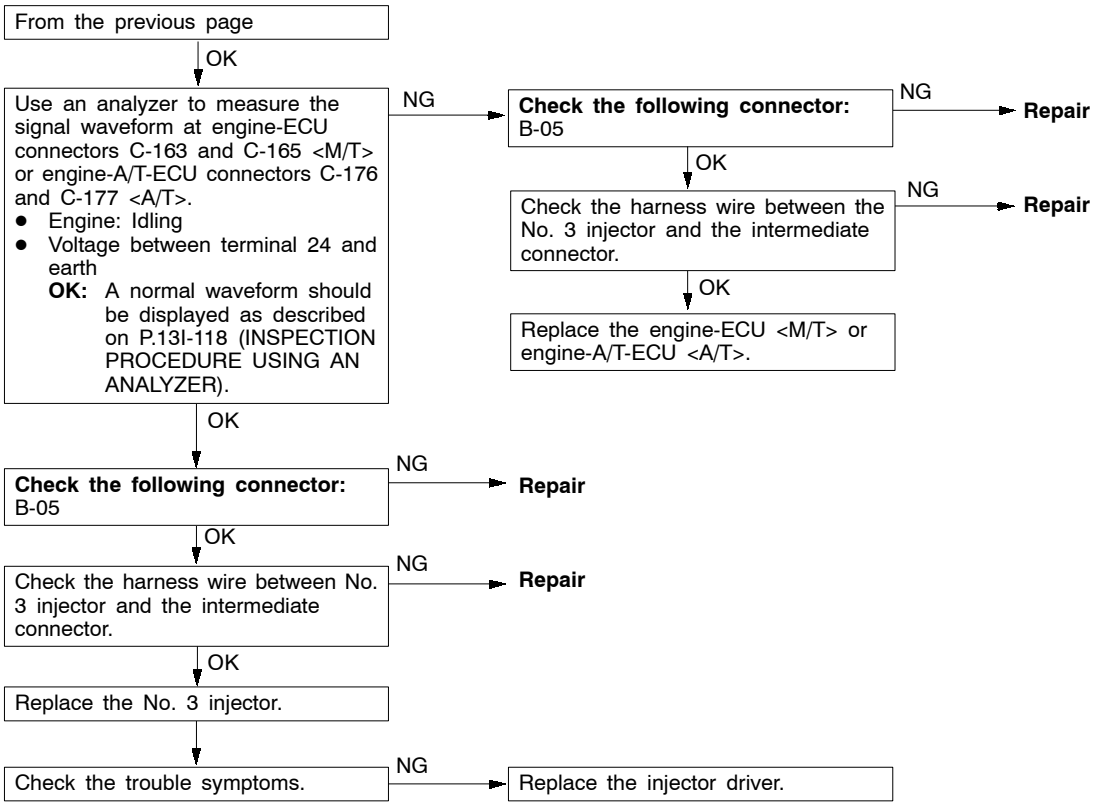
Code No. P0202 No. 2 injector system	Probable cause
Range of Check ● The engine speed is 4,000 r/min or less. ● The battery voltage is 10 V or more. ● The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions ● The injector driver is not transmitting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



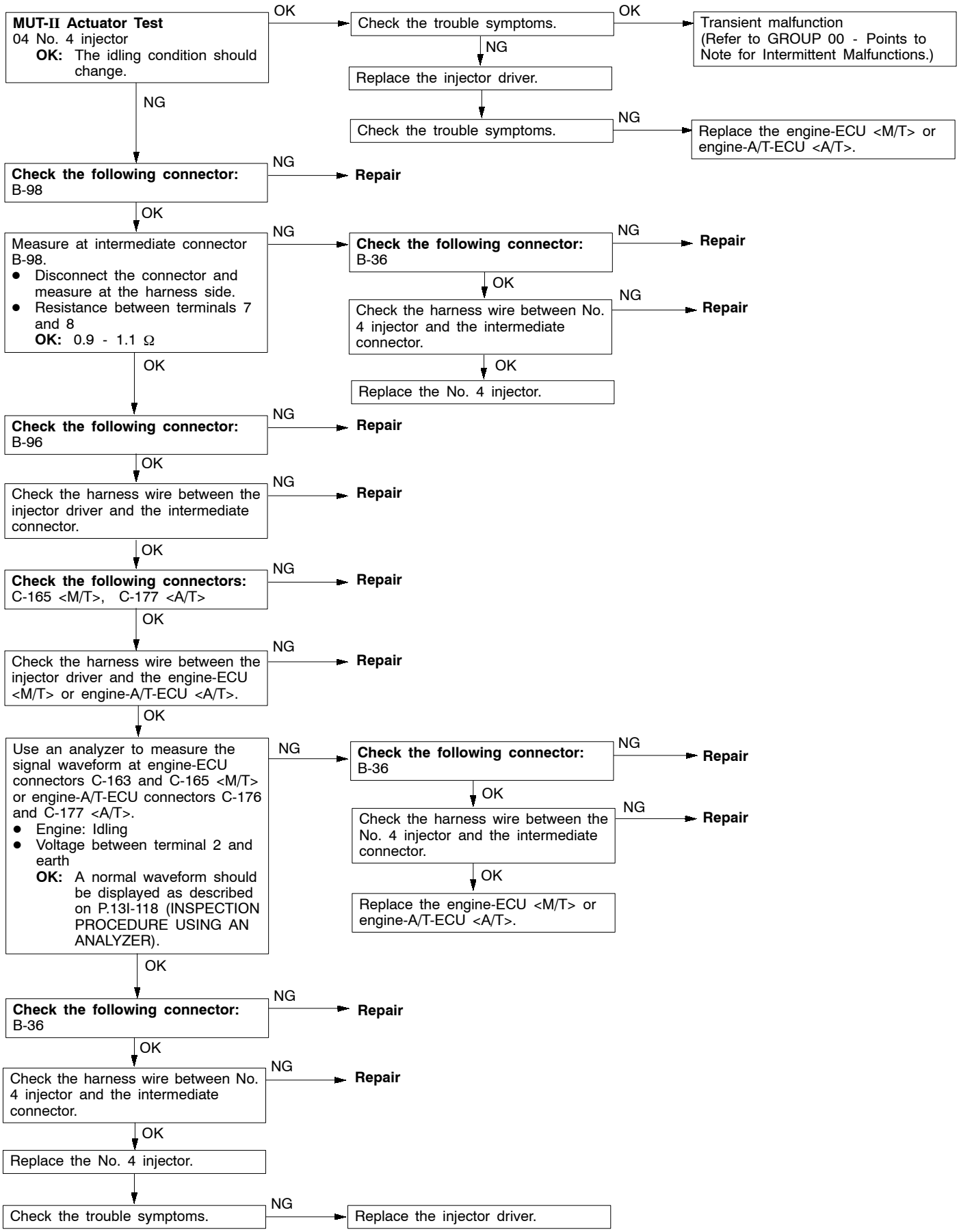


Code No. P0203 No. 3 injector system	Probable cause
Range of Check • The engine speed is 4,000 r/min or less. • The battery voltage is 10 V or more. • The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions • The injector driver is not transmitting a injector open circuit check signal for four seconds.	• Malfunction of No. 3 injector • Open or short circuit in the No. 3 injector circuit or loose connector contact • Malfunction of engine-ECU <M/T> • Malfunction of engine-A/T-ECU <A/T>

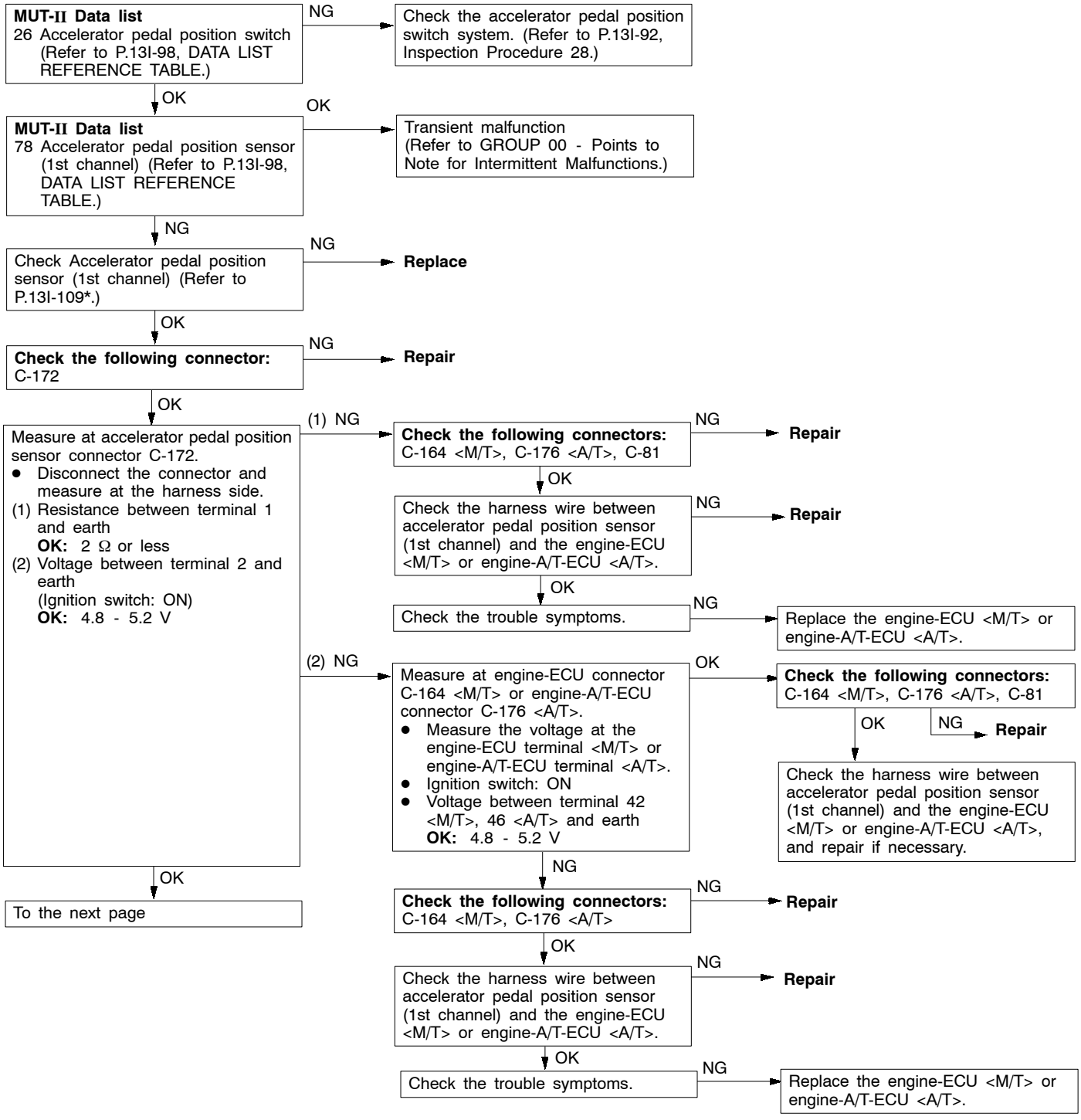


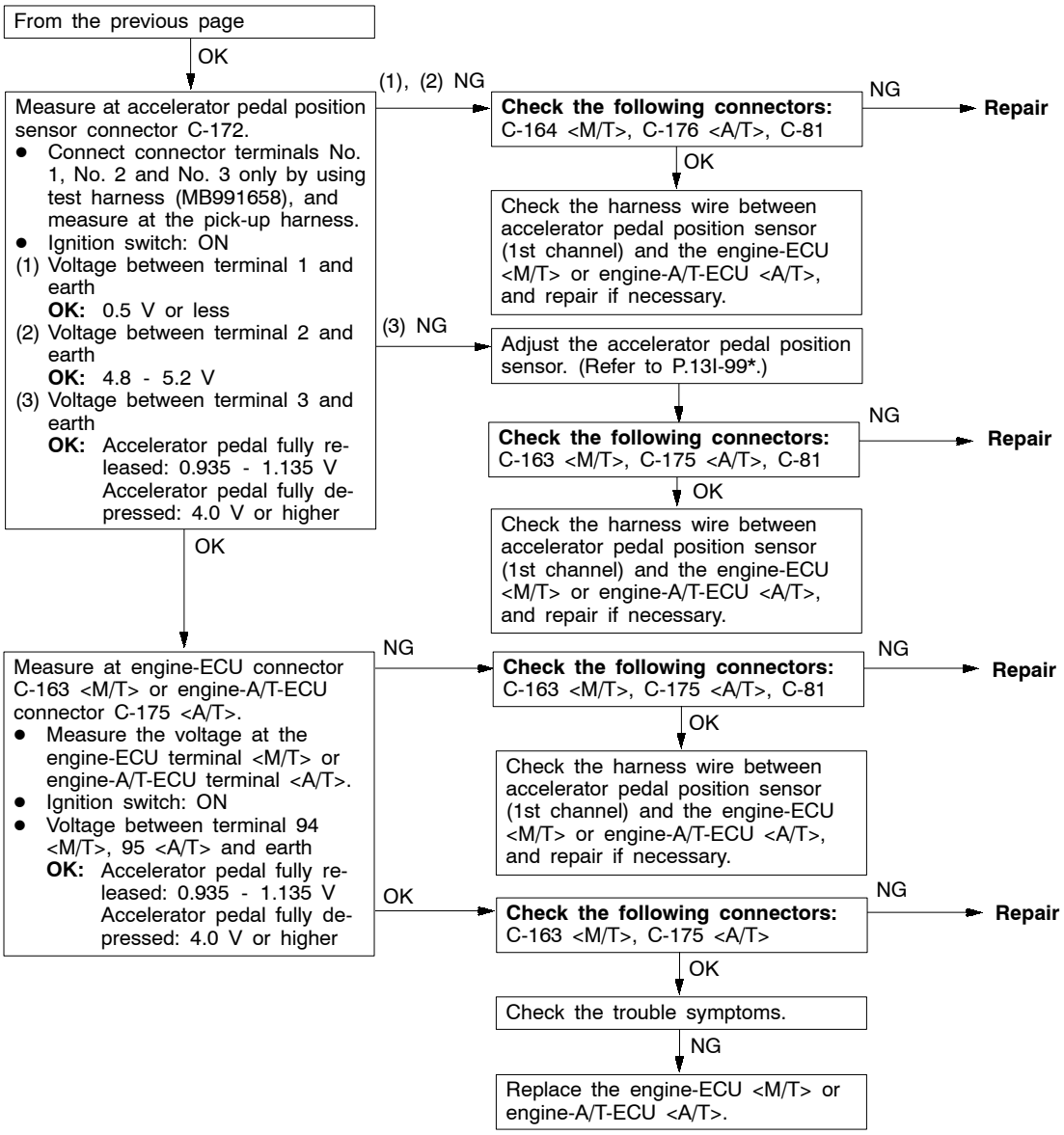


Code No. P0204 No. 4 injector system	Probable cause
Range of Check ● The engine speed is 4,000 r/min or less. ● The battery voltage is 10 V or more. ● The fuel cut operation or the injector operation (by carrying out the Actuator Test) is not in progress. Set Conditions ● The injector driver is not transmitting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


MUT-II Actuator Test
04 No. 4 injector
OK: The idling condition should change.
OK
Check the trouble symptoms.
OK
Transient malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the injector driver.
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Check the following connector:
B-98
NG
Repair
OK
Measure at intermediate connector B-98.
Disconnect the connector and measure at the harness side.
Resistance between terminals 7 and 8
OK: 0.9 - 1.1 Ω
NG
Check the following connector:
B-36
NG
Repair
OK
Check the harness wire between No. 4 injector and the intermediate connector.
NG
Repair
OK
Replace the No. 4 injector.
OK
Check the following connector:
B-96
NG
Repair
OK
Check the harness wire between the injector driver and the intermediate connector.
NG
Repair
OK
Check the following connectors:
C-165 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness wire between the injector driver and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Use an analyzer to measure the signal waveform at engine-ECU connectors C-163 and C-165 <M/T> or engine-A/T-ECU connectors C-176 and C-177 <A/T>.
Engine: Idling
Voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13I-118 (INSPECTION PROCEDURE USING AN ANALYZER).
NG
Check the following connector:
B-36
NG
Repair
OK
Check the harness wire between the No. 4 injector and the intermediate connector.
NG
Repair
OK
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Check the following connector:
B-36
NG
Repair
OK
Check the harness wire between No. 4 injector and the intermediate connector.
NG
Repair
OK
Replace the No. 4 injector.
Check the trouble symptoms.
NG
Replace the injector driver.

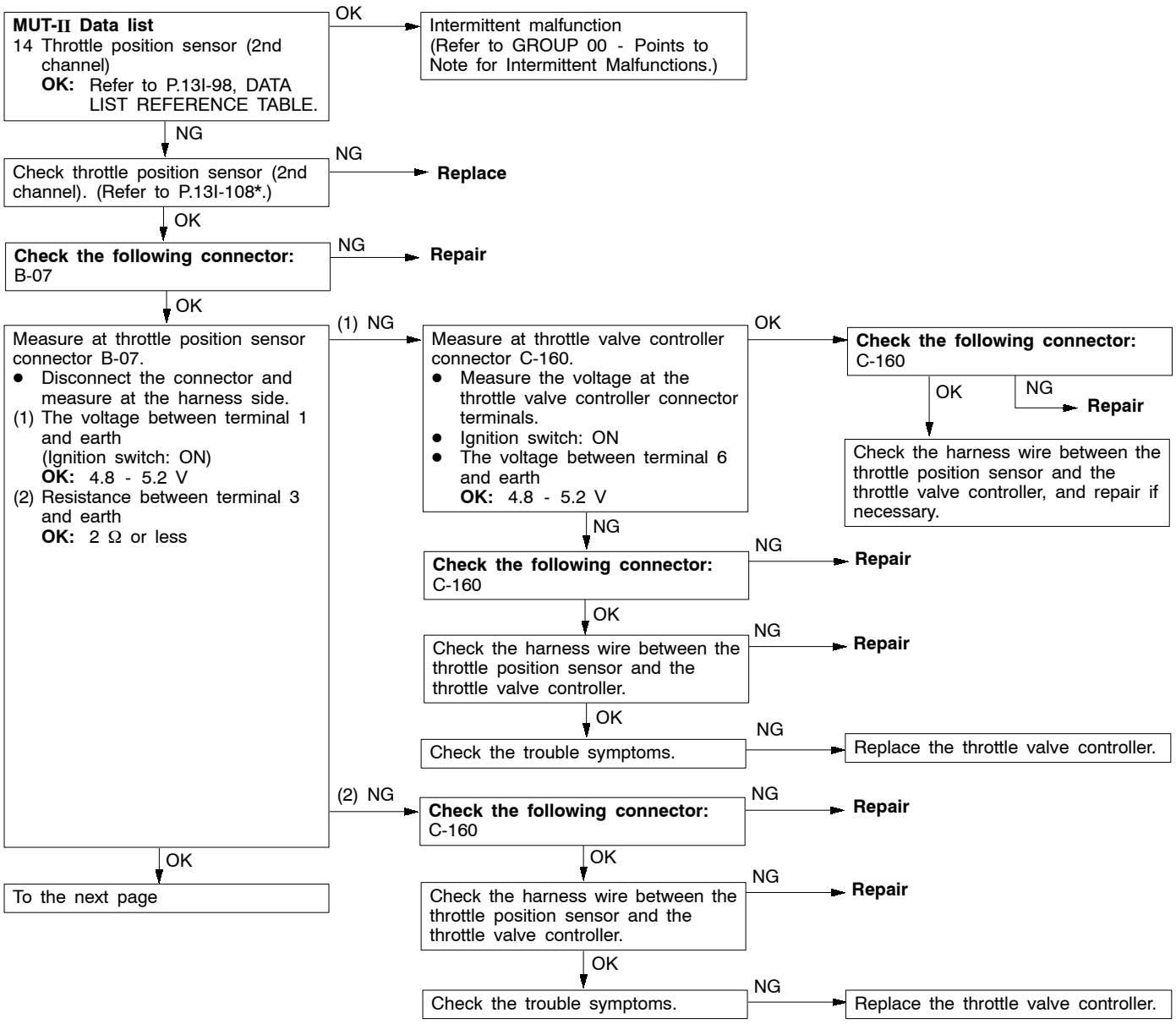
Code No. P0220 Accelerator pedal position sensor (1st channel) system	Probable cause
Range of Check ● Accelerator pedal position sensor (2nd channel) is normal. ● Communication between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the throttle valve controller is normal. Set Conditions ● The output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

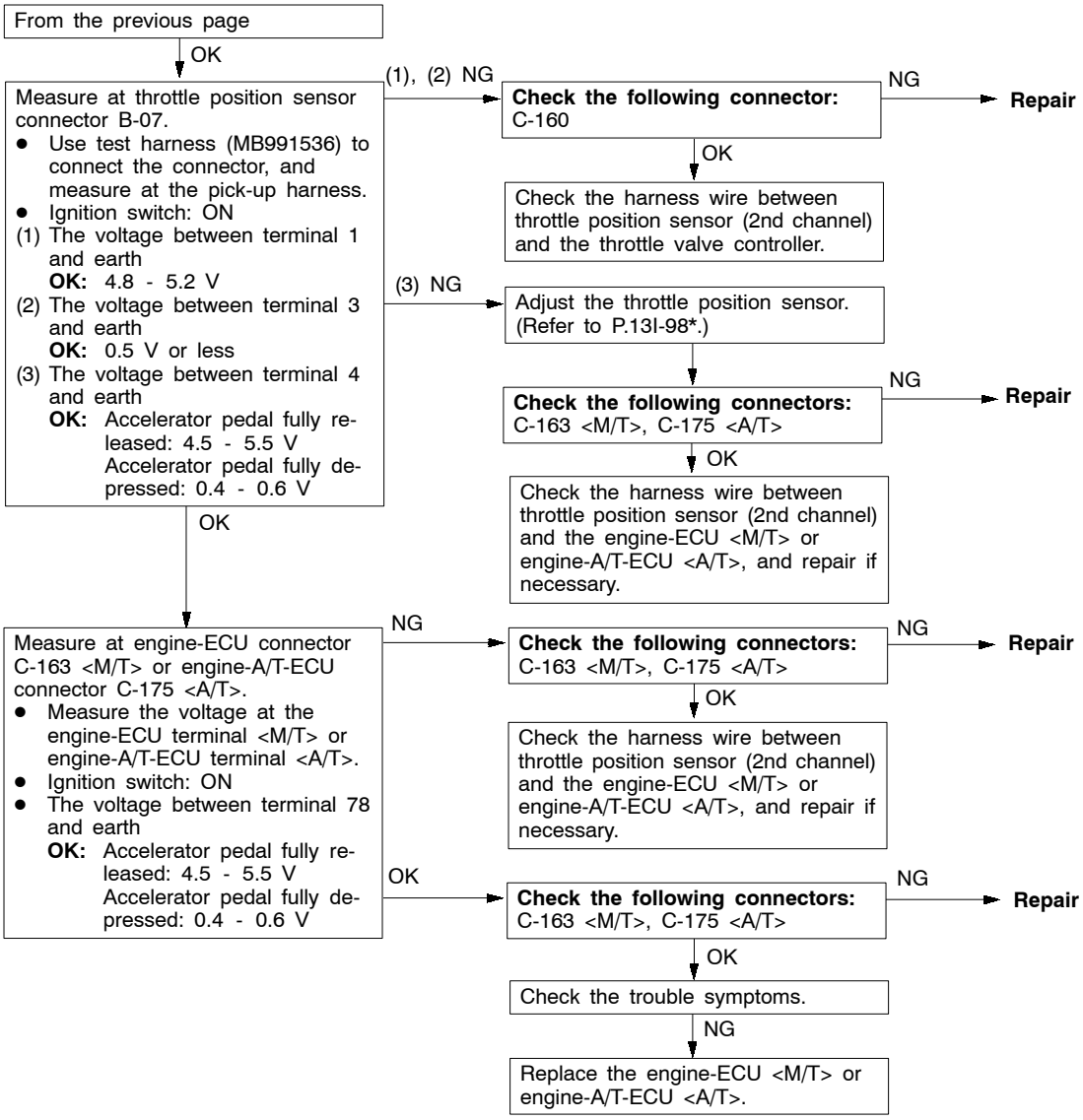

MUT-II Data list
26 Accelerator pedal position switch (Refer to P.13I-98, DATA LIST REFERENCE TABLE.)
NG
Check the accelerator pedal position switch system. (Refer to P.13I-92, Inspection Procedure 28.)
OK
MUT-II Data list
78 Accelerator pedal position sensor (1st channel) (Refer to P.13I-98, DATA LIST REFERENCE TABLE.)
OK
Transient malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check Accelerator pedal position sensor (1st channel) (Refer to P.13I-109*.)
NG
Replace
OK
Check the following connector: C-172
NG
Repair
OK
Measure at accelerator pedal position sensor connector C-172.
● Disconnect the connector and measure at the harness side.
(1) Resistance between terminal 1 and earth
OK: 2 Ω or less
(2) Voltage between terminal 2 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(1) NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>, C-81
NG
Repair
OK
Check the harness wire between accelerator pedal position sensor (1st channel) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(2) NG
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Ignition switch: ON
● Voltage between terminal 42 <M/T>, 46 <A/T> and earth
OK: 4.8 - 5.2 V
OK
Check the following connectors: C-164 <M/T>, C-176 <A/T>, C-81
OK
NG
Repair
Check the harness wire between accelerator pedal position sensor (1st channel) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between accelerator pedal position sensor (1st channel) and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
To the next page



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

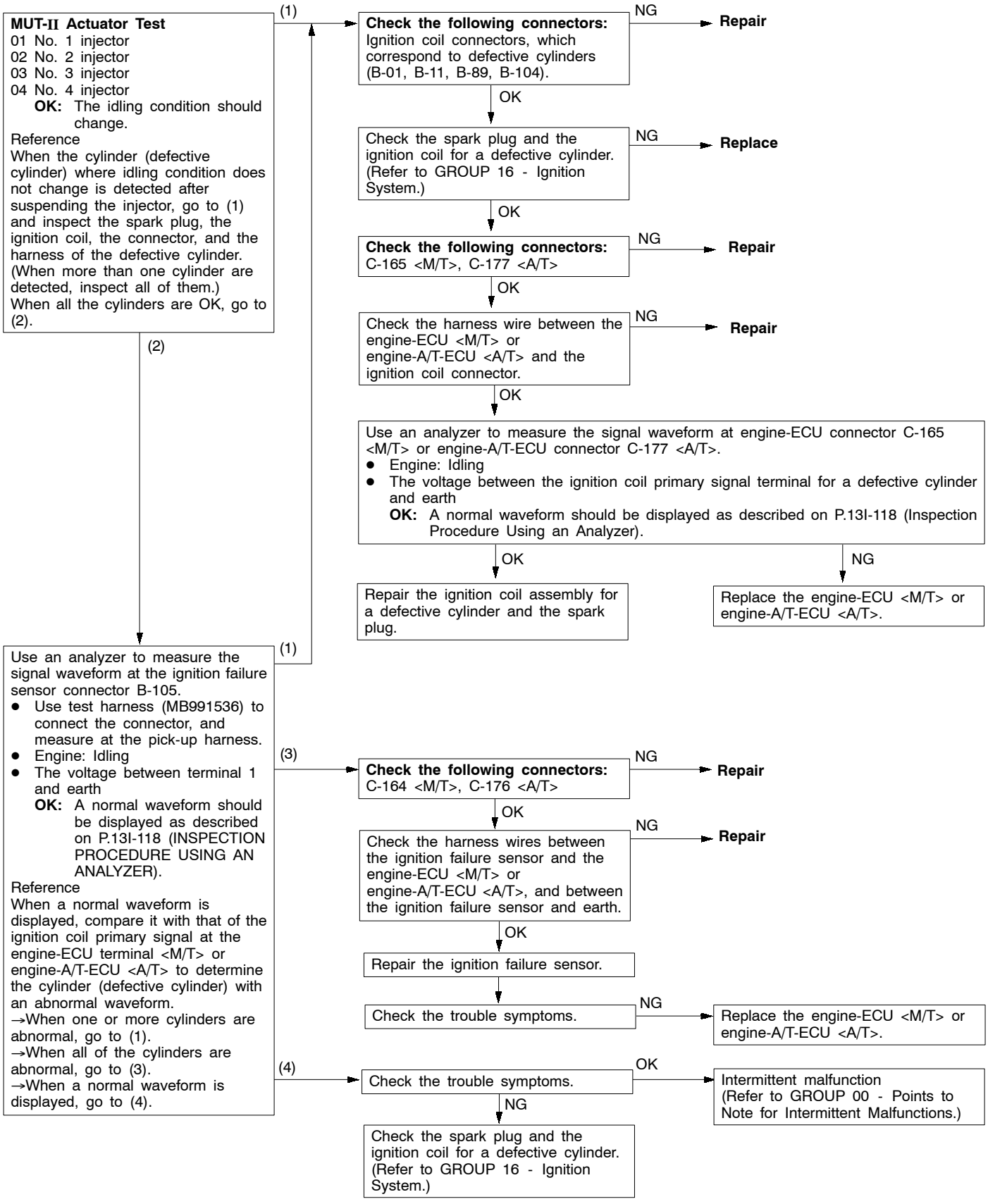
Code No. 0225 Throttle position sensor (2nd channel) system	Probable cause
The throttle valve controller judges a malfunction, and then transmit the result to the engine-ECU <M/T> or engine-A/T-ECU <A/T>. Range of Check ● Ignition switch: ON ● The throttle position sensor (1st channel) is normal. Set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



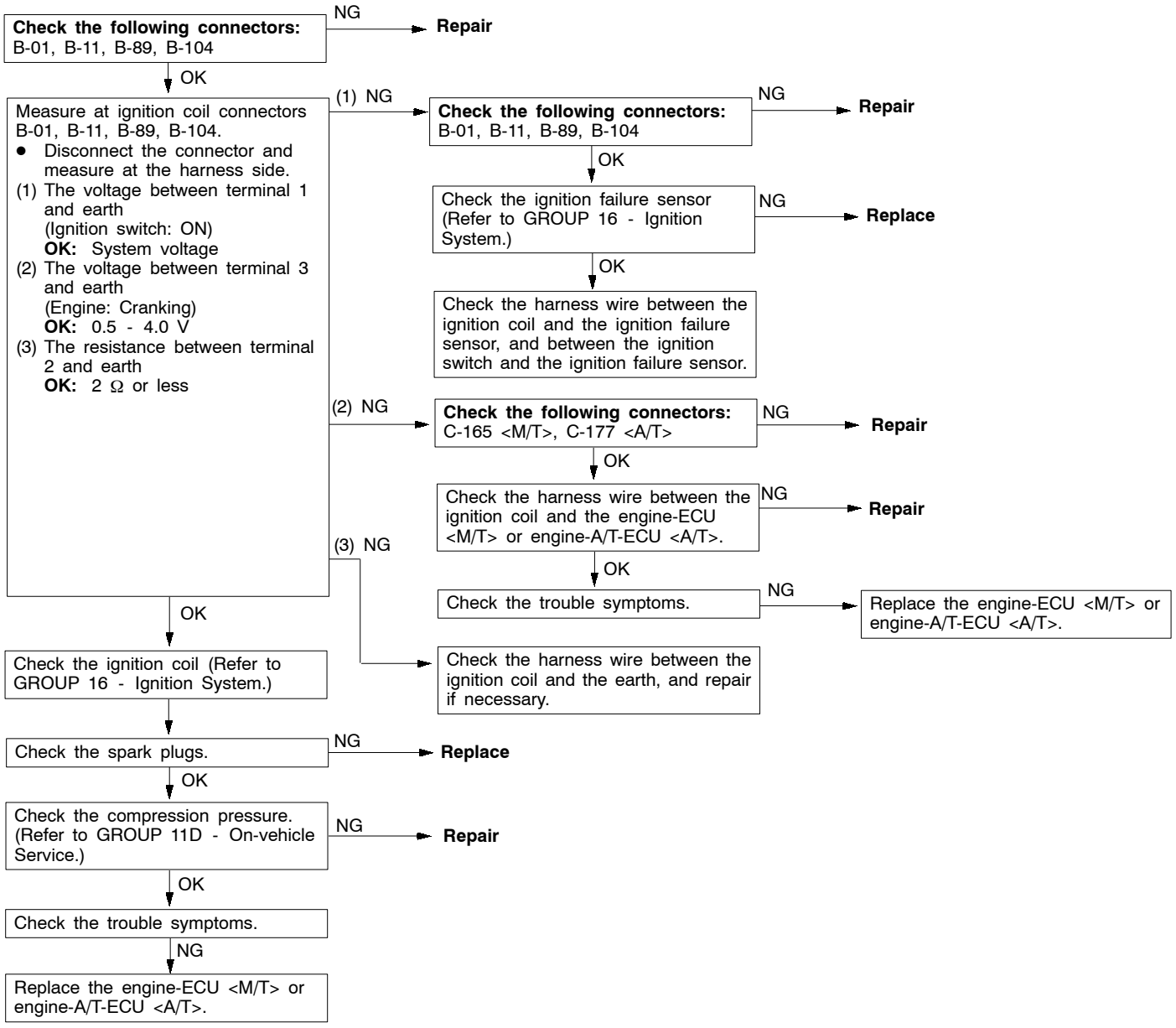


NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

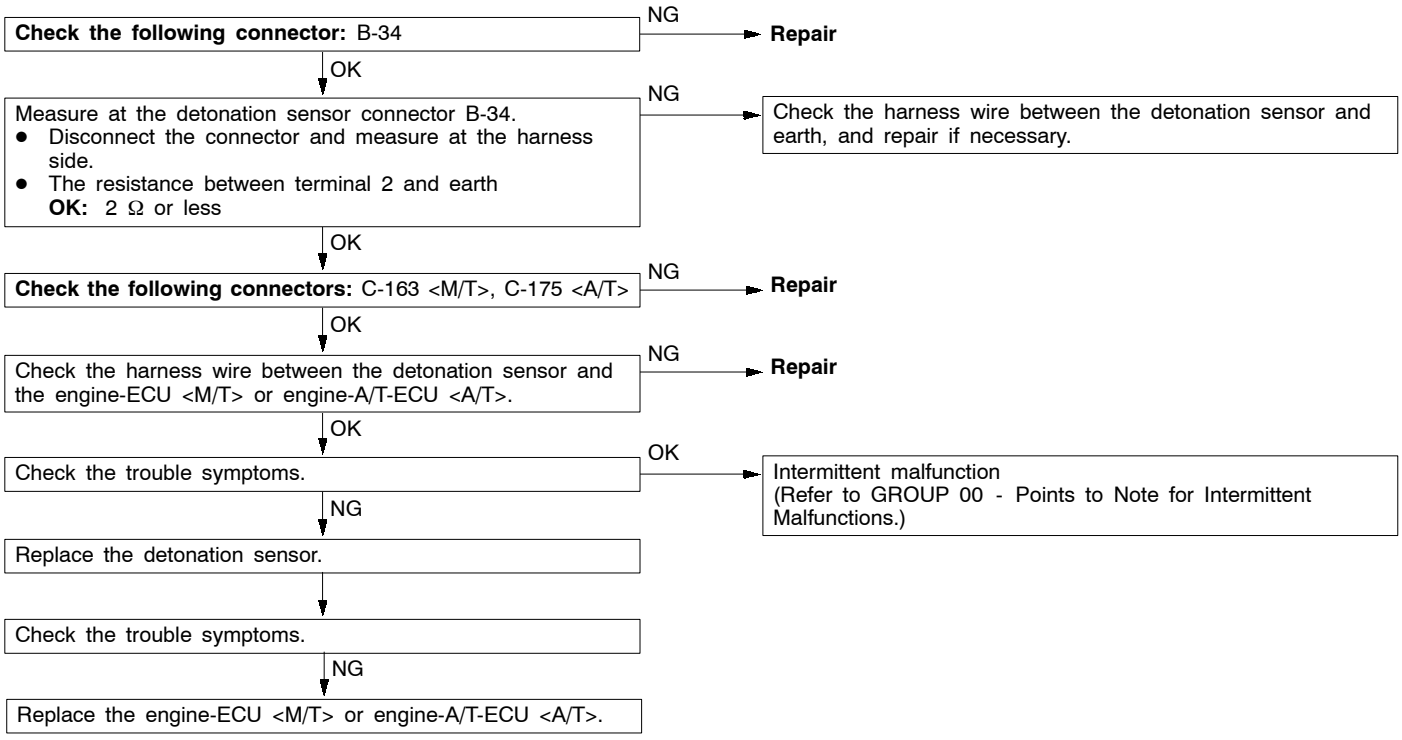
Code No. P0300 Ignition coil (power transistor) system	Probable cause
Range of Check ● Engine speed is approx. 50 - 4,000 r/min. ● Engine is not cranking. Set Conditions ● The ignition failure sensor does not send a signal about a certain cylinder for four seconds.	● Malfunction of the ignition coil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


MUT-II Actuator Test
01 No. 1 injector
02 No. 2 injector
03 No. 3 injector
04 No. 4 injector
OK: The idling condition should change.
Reference
When the cylinder (defective cylinder) where idling condition does not change is detected after suspending the injector, go to (1) and inspect the spark plug, the ignition coil, the connector, and the harness of the defective cylinder. (When more than one cylinder are detected, inspect all of them.)
When all the cylinders are OK, go to (2).
(1)
Check the following connectors: Ignition coil connectors, which correspond to defective cylinders (B-01, B-11, B-89, B-104).
NG
Repair
OK
Check the spark plug and the ignition coil for a defective cylinder. (Refer to GROUP 16 - Ignition System.)
NG
Replace
OK
Check the following connectors: C-165 <M/T>, C-177 <A/T>
NG
Repair
OK
Check the harness wire between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the ignition coil connector.
NG
Repair
OK
Use an analyzer to measure the signal waveform at engine-ECU connector C-165 <M/T> or engine-A/T-ECU connector C-177 <A/T>.
Engine: Idling
The voltage between the ignition coil primary signal terminal for a defective cylinder and earth
OK: A normal waveform should be displayed as described on P.13I-118 (Inspection Procedure Using an Analyzer).
OK
NG
Repair the ignition coil assembly for a defective cylinder and the spark plug.
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(2)
Use an analyzer to measure the signal waveform at the ignition failure sensor connector B-105.
Use test harness (MB991536) to connect the connector, and measure at the pick-up harness.
Engine: Idling
The voltage between terminal 1 and earth
OK: A normal waveform should be displayed as described on P.13I-118 (INSPECTION PROCEDURE USING AN ANALYZER).
Reference
When a normal waveform is displayed, compare it with that of the ignition coil primary signal at the engine-ECU terminal <M/T> or engine-A/T-ECU <A/T> to determine the cylinder (defective cylinder) with an abnormal waveform.
→When one or more cylinders are abnormal, go to (1).
→When all of the cylinders are abnormal, go to (3).
→When a normal waveform is displayed, go to (4).
(1)
(3)
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wires between the ignition failure sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and between the ignition failure sensor and earth.
NG
Repair
OK
Repair the ignition failure sensor.
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(4)
Check the trouble symptoms.
OK
Intermittent malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check the spark plug and the ignition coil for a defective cylinder. (Refer to GROUP 16 - Ignition System.)

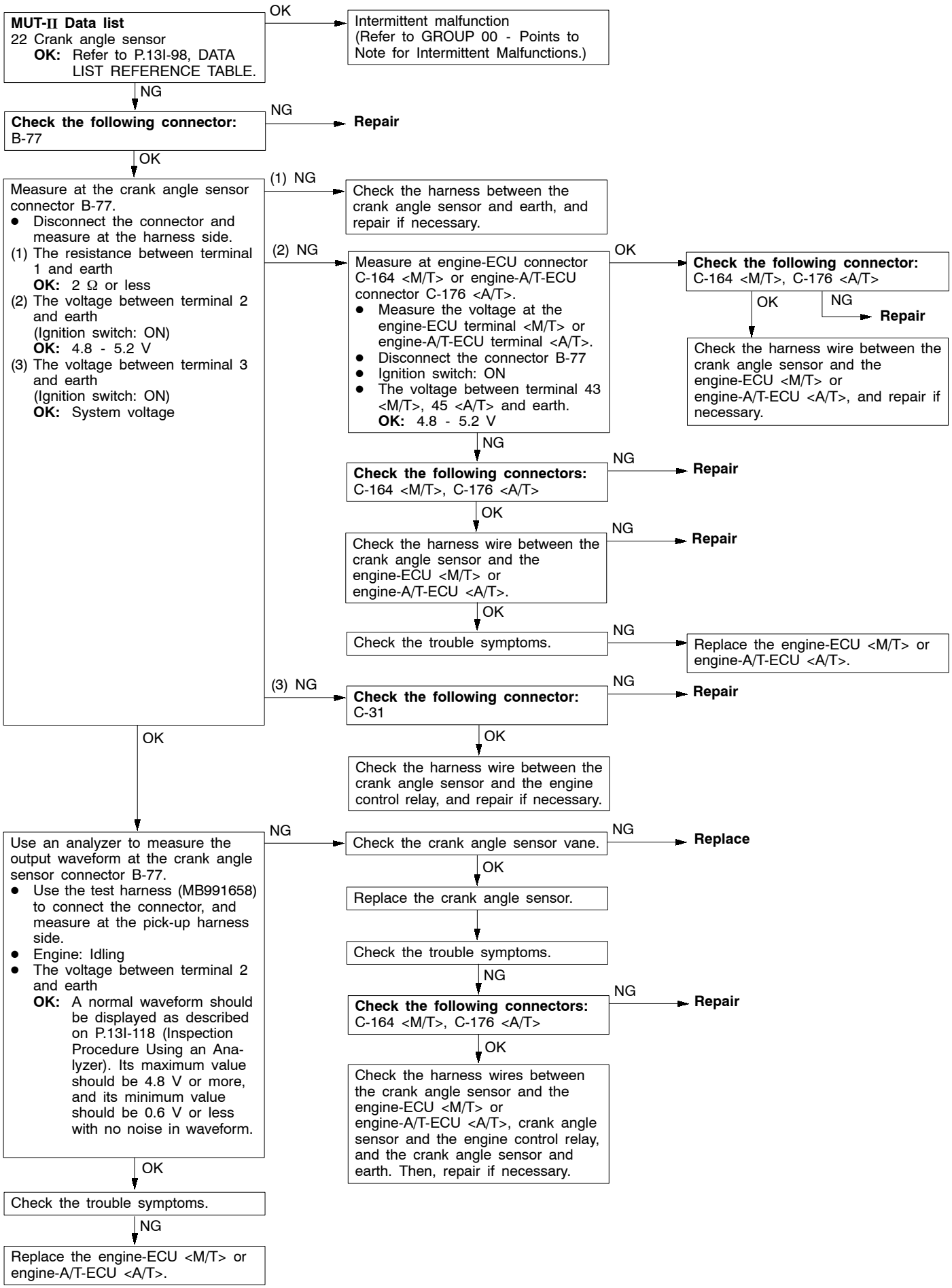
Code No. P0301 No. 1 cylinder misfire detected **Code No. P0302 No. 2 cylinder misfire detected** **Code No. P0303 No. 3 cylinder misfire detected** **Code No. P0304 No. 4 cylinder misfire detected**	**Probable cause**
Range of Check ● The engine speed is 500 - 4,500 r/min. ● While the engine is running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



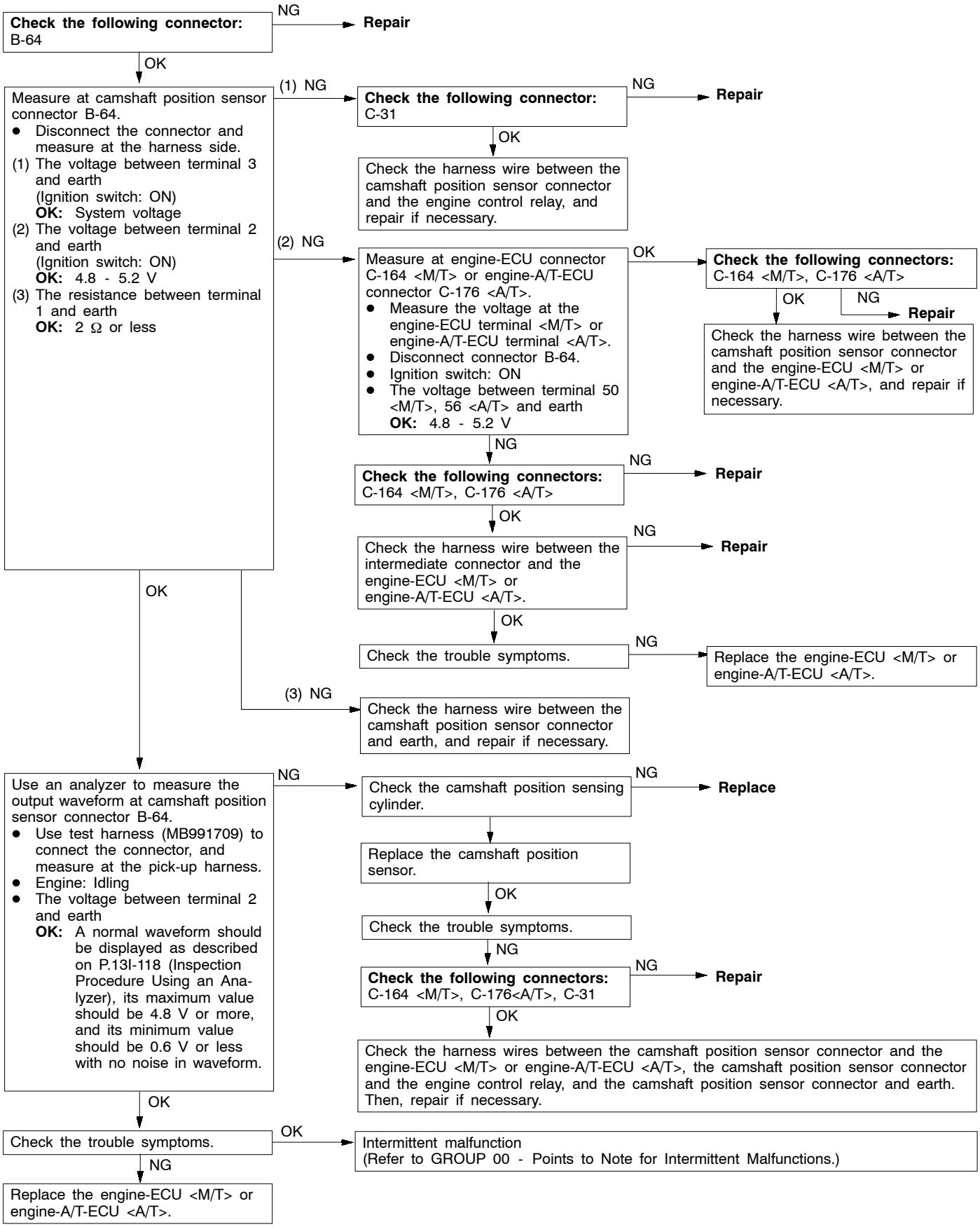
Code No. P0325 Detonation sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine has been started Set Conditions ● Changes in sensor output voltage (detonation sensor peak voltage per 1/3 crankshaft rotation) in 200 consecutive cycles are 0.08 V or less.	● Malfunction of the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



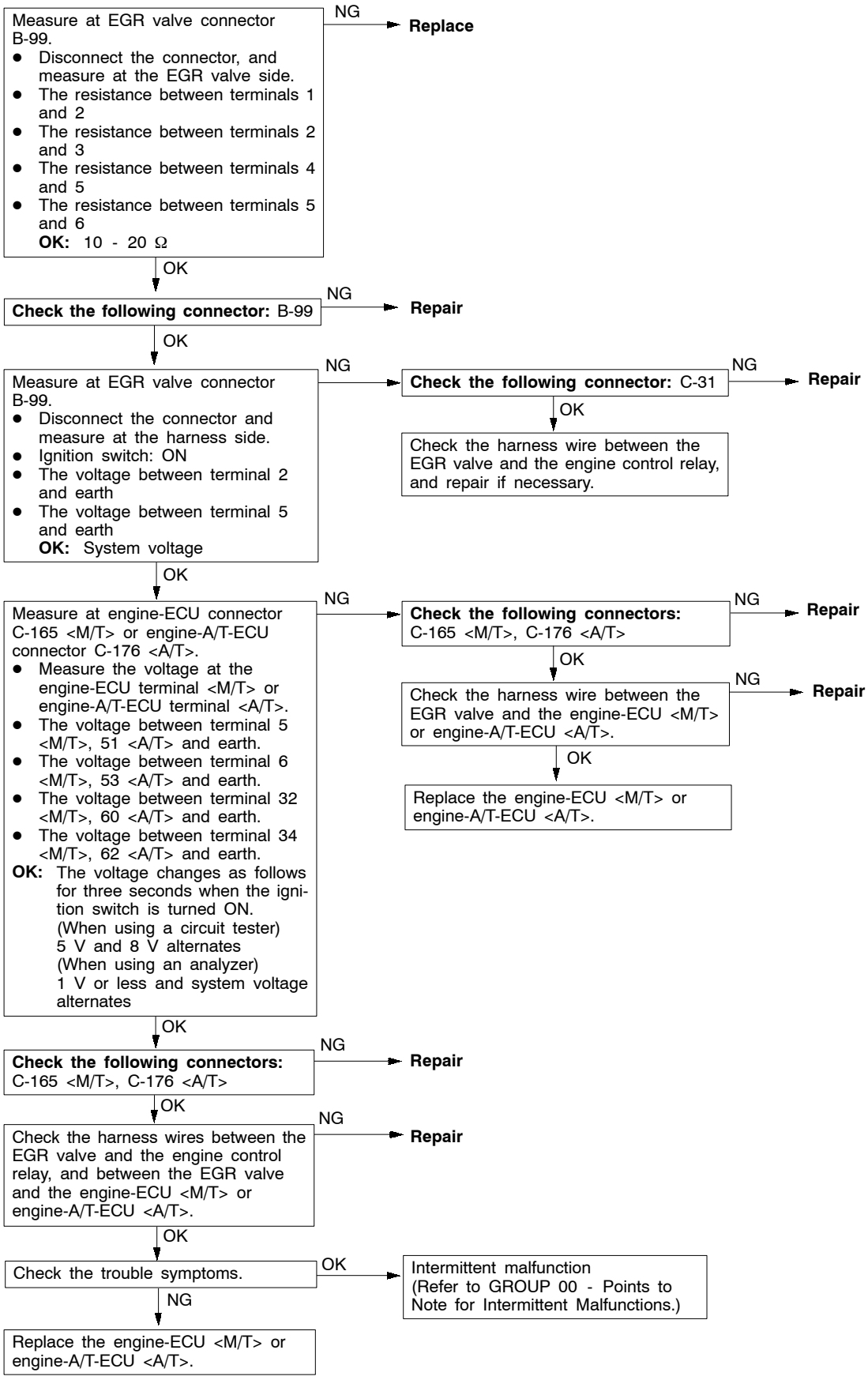
Code No. P0335 Crank angle sensor system	Probable cause
Range of Check ● Engine is cranking Set Conditions ● Sensor output voltage does not change for 4 seconds (no pulse signal input).	● Malfunction of the crank angle sensor. ● Open or short circuit in the crank angle sensor circuit or loose connector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


MUT-II Data list
22 Crank angle sensor
OK: Refer to P.13I-98, DATA LIST REFERENCE TABLE.
OK
Intermittent malfunction (Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Check the following connector: B-77
NG
Repair
OK
Measure at the crank angle sensor connector B-77.
Disconnect the connector and measure at the harness side.
(1) The resistance between terminal 1 and earth
OK: 2 Ω or less
(2) The voltage between terminal 2 and earth
(Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) The voltage between terminal 3 and earth
(Ignition switch: ON)
OK: System voltage
(1) NG
Check the harness between the crank angle sensor and earth, and repair if necessary.
(2) NG
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
Disconnect the connector B-77
Ignition switch: ON
The voltage between terminal 43 <M/T>, 45 <A/T> and earth.
OK: 4.8 - 5.2 V
OK
Check the following connector: C-164 <M/T>, C-176 <A/T>
OK
NG
Repair
Check the harness wire between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(3) NG
Check the following connector: C-31
NG
Repair
OK
Check the harness wire between the crank angle sensor and the engine control relay, and repair if necessary.
OK
Use an analyzer to measure the output waveform at the crank angle sensor connector B-77.
Use the test harness (MB991658) to connect the connector, and measure at the pick-up harness side.
Engine: Idling
The voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13I-118 (Inspection Procedure Using an Analyzer). Its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.
NG
Check the crank angle sensor vane.
NG
Replace
OK
Replace the crank angle sensor.
Check the trouble symptoms.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wires between the crank angle sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, crank angle sensor and the engine control relay, and the crank angle sensor and earth. Then, repair if necessary.
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

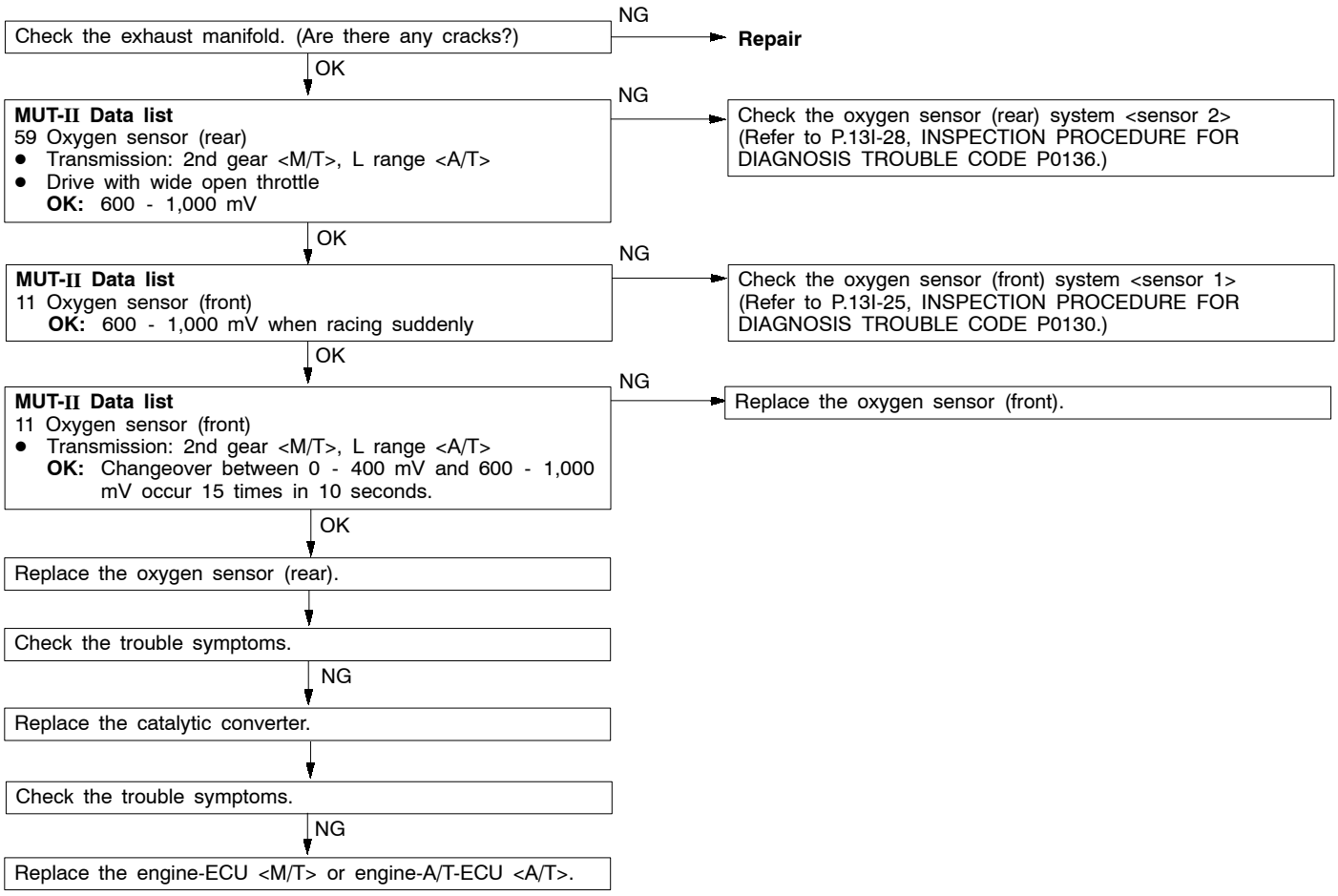
Code No. P0340 Camshaft position sensor system	Probable cause
Range of Check ● After the engine was started Set Conditions ● The sensor output voltage does not change for 4 seconds (no pulse signal input).	● Malfunction of the camshaft position sensor ● Open or short circuit in the camshaft position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


Check the following connector: B-64
NG
Repair
OK
Measure at camshaft position sensor connector B-64.
● Disconnect the connector and measure at the harness side.
(1) The voltage between terminal 3 and earth (Ignition switch: ON)
OK: System voltage
(2) The voltage between terminal 2 and earth (Ignition switch: ON)
OK: 4.8 - 5.2 V
(3) The resistance between terminal 1 and earth
OK: 2 Ω or less
(1) NG
Check the following connector: C-31
NG
Repair
OK
Check the harness wire between the camshaft position sensor connector and the engine control relay, and repair if necessary.
(2) NG
Measure at engine-ECU connector C-164 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● Disconnect connector B-64.
● Ignition switch: ON
● The voltage between terminal 50 <M/T>, 56 <A/T> and earth
OK: 4.8 - 5.2 V
OK
Check the following connectors: C-164 <M/T>, C-176 <A/T>
OK
NG
Repair
Check the harness wire between the camshaft position sensor connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
NG
Check the following connectors: C-164 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the intermediate connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
(3) NG
Check the harness wire between the camshaft position sensor connector and earth, and repair if necessary.
OK
Use an analyzer to measure the output waveform at camshaft position sensor connector B-64.
● Use test harness (MB991709) to connect the connector, and measure at the pick-up harness.
● Engine: Idling
● The voltage between terminal 2 and earth
OK: A normal waveform should be displayed as described on P.13I-118 (Inspection Procedure Using an Analyzer), its maximum value should be 4.8 V or more, and its minimum value should be 0.6 V or less with no noise in waveform.
NG
Check the camshaft position sensing cylinder.
NG
Replace
Replace the camshaft position sensor.
OK
Check the trouble symptoms.
NG
Check the following connectors: C-164 <M/T>, C-176<A/T>, C-31
NG
Repair
OK
Check the harness wires between the camshaft position sensor connector and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the camshaft position sensor connector and the engine control relay, and the camshaft position sensor connector and earth. Then, repair if necessary.
OK
Check the trouble symptoms.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

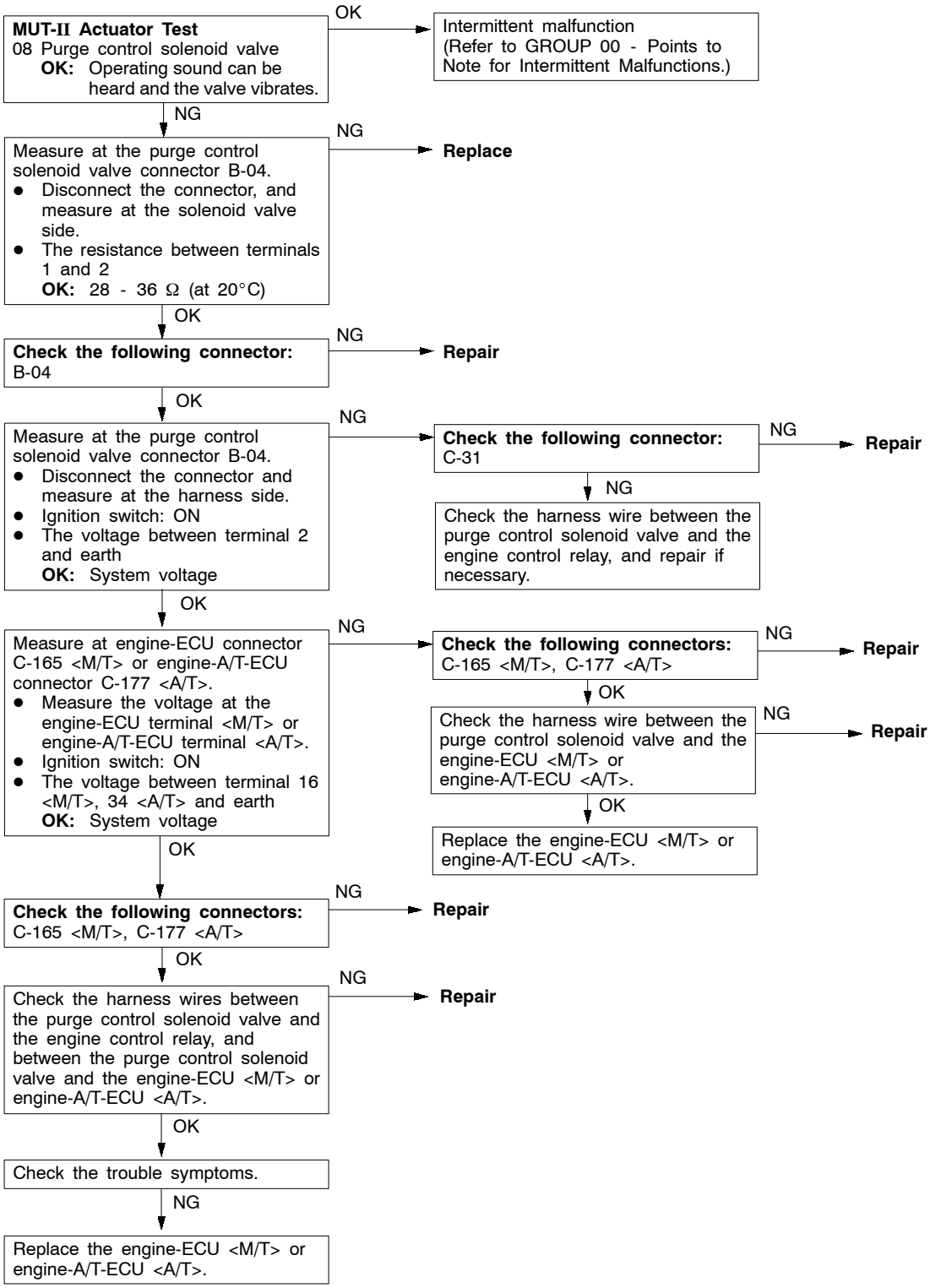
Code No. P0403 EGR valve system	Probable cause
Range of Check ● Ignition switch: OFF to ON ● EGR valve is in operation after the engine starting process is complete. Set Conditions ● Off-surge voltage is not generated from the motor coil while the EGR valve control motor is running.	● Malfunction of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


Measure at EGR valve connector B-99.
● Disconnect the connector, and measure at the EGR valve side.
● The resistance between terminals 1 and 2
● The resistance between terminals 2 and 3
● The resistance between terminals 4 and 5
● The resistance between terminals 5 and 6
OK: 10 - 20 Ω
NG
Replace
OK
Check the following connector: B-99
NG
Repair
OK
Measure at EGR valve connector B-99.
● Disconnect the connector and measure at the harness side.
● Ignition switch: ON
● The voltage between terminal 2 and earth
● The voltage between terminal 5 and earth
OK: System voltage
NG
Check the following connector: C-31
NG
Repair
OK
Check the harness wire between the EGR valve and the engine control relay, and repair if necessary.
OK
Measure at engine-ECU connector C-165 <M/T> or engine-A/T-ECU connector C-176 <A/T>.
● Measure the voltage at the engine-ECU terminal <M/T> or engine-A/T-ECU terminal <A/T>.
● The voltage between terminal 5 <M/T>, 51 <A/T> and earth.
● The voltage between terminal 6 <M/T>, 53 <A/T> and earth.
● The voltage between terminal 32 <M/T>, 60 <A/T> and earth.
● The voltage between terminal 34 <M/T>, 62 <A/T> and earth.
OK: The voltage changes as follows for three seconds when the ignition switch is turned ON.
(When using a circuit tester)
5 V and 8 V alternates
(When using an analyzer)
1 V or less and system voltage alternates
NG
Check the following connectors: C-165 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wire between the EGR valve and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
OK
Check the following connectors: C-165 <M/T>, C-176 <A/T>
NG
Repair
OK
Check the harness wires between the EGR valve and the engine control relay, and between the EGR valve and the engine-ECU <M/T> or engine-A/T-ECU <A/T>.
NG
Repair
OK
Check the trouble symptoms.
OK
Intermittent malfunction
(Refer to GROUP 00 - Points to Note for Intermittent Malfunctions.)
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

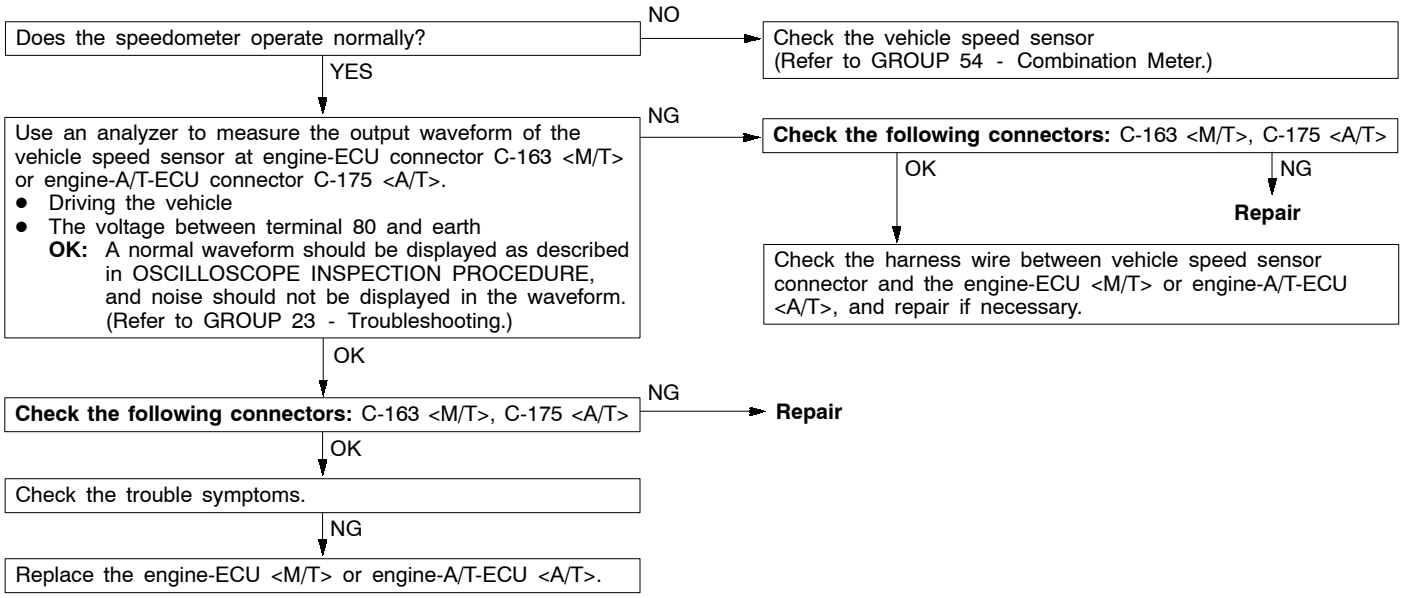
Code No. P0420 Catalyst malfunction	Probable cause
Range of Check ● The engine speed is 3,000 r/min or less. ● During driving ● During air/fuel ratio feedback control Set Conditions ● The ratio between the oxygen sensor (rear) and the oxygen sensor (front) output frequencies reaches 0.8 per 12 seconds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



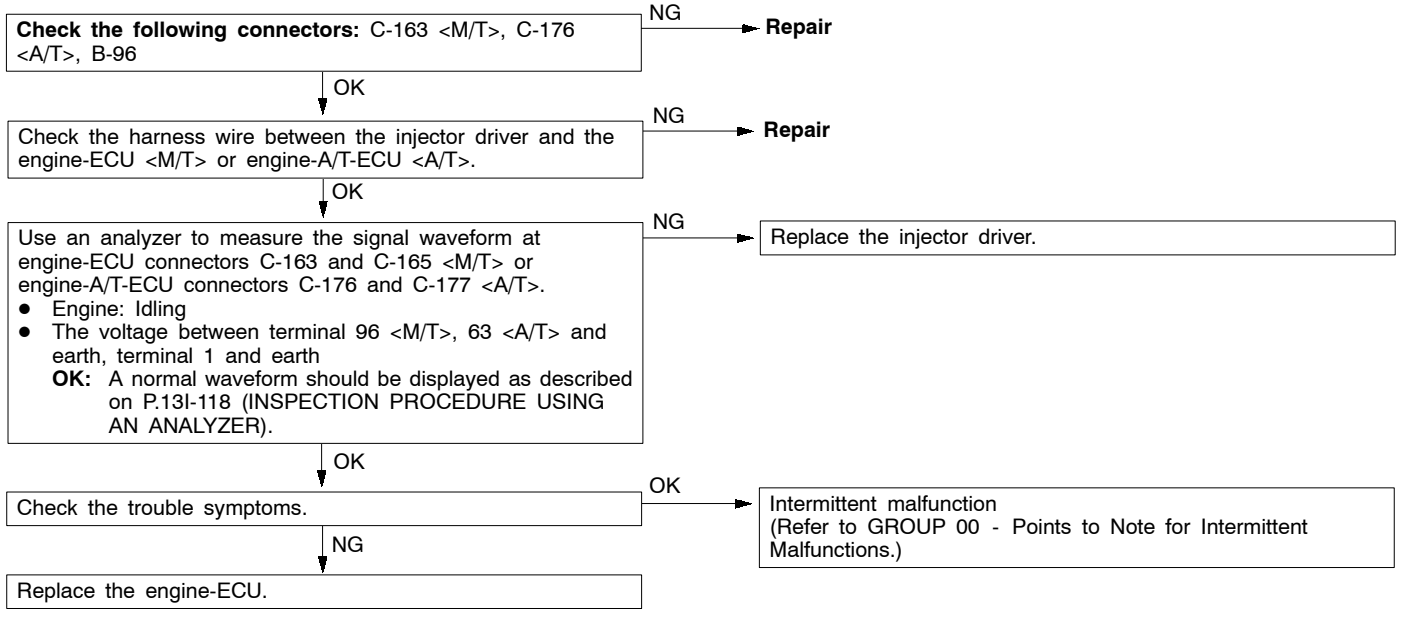
Code No. P0443 Purge control solenoid valve system	Probable cause
Range of Check ● Ignition switch: ON ● Battery voltage is 10 V or more. Set Conditions ● The solenoid coil surge voltage (battery voltage + 2 V) is not detected when the purge control solenoid valve is turned from on to off.	● Malfunction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



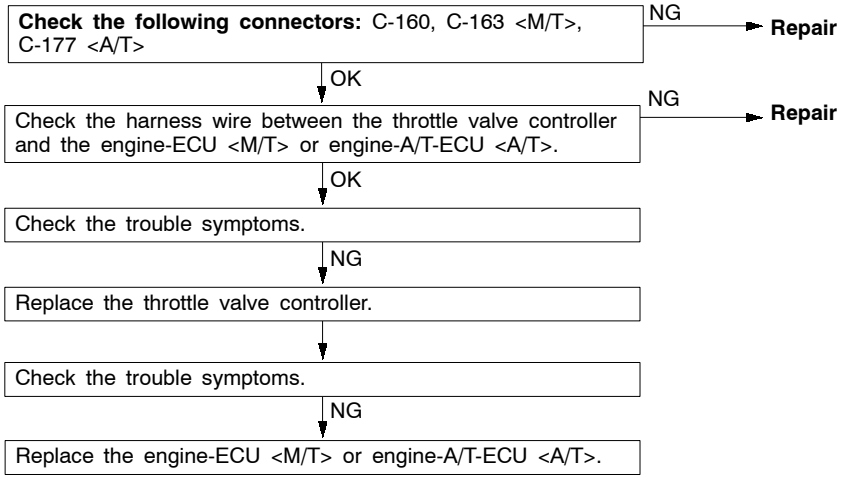
Code No. P0500 Vehicle speed sensor system	Probable cause
Range of Check ● Engine: Two seconds after the engine was started ● Idle switch: OFF ● Engine speed: 2,500 r/min or more ● During high engine load Set Conditions ● The sensor output voltage does not change for 4 seconds (no pulse signal input).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



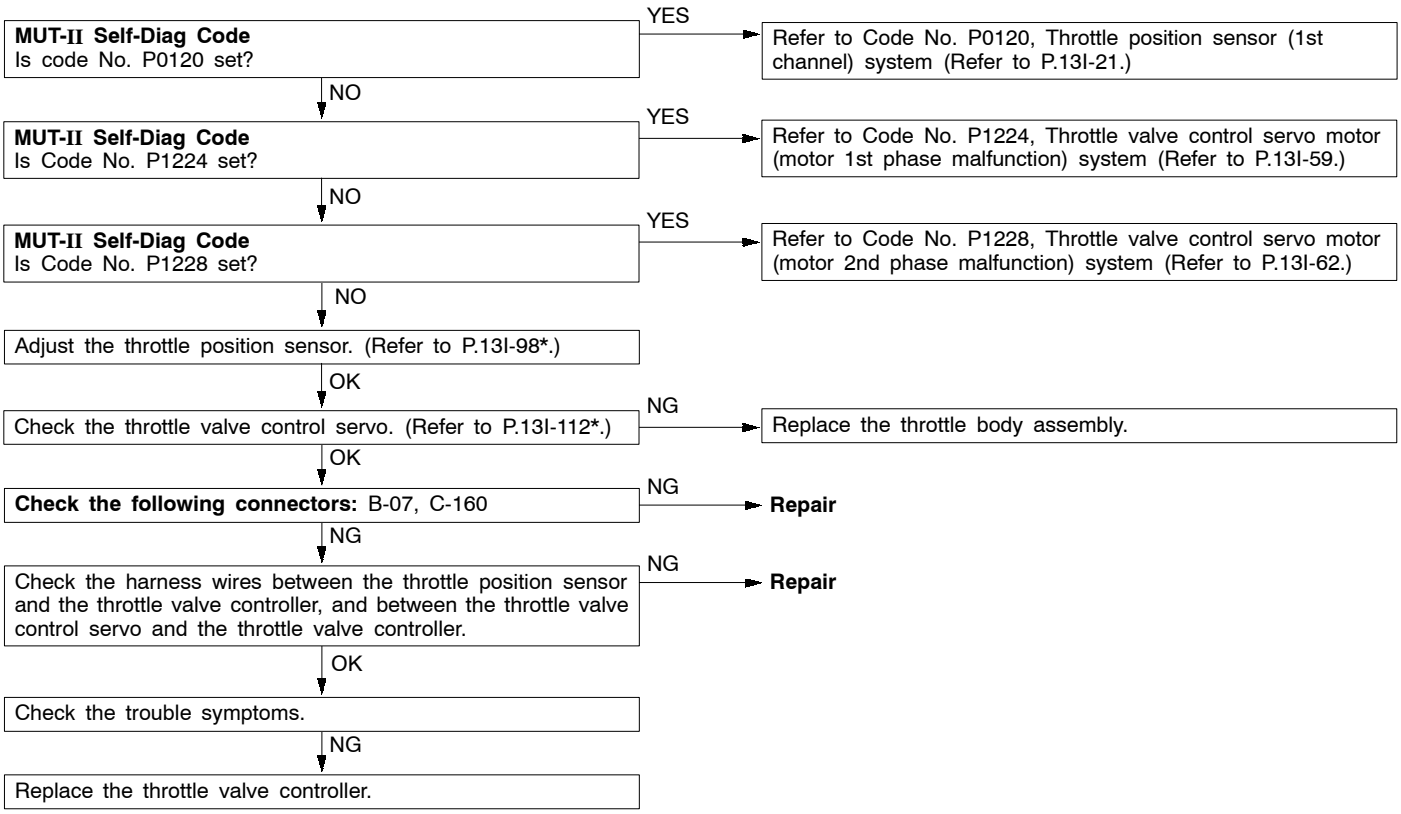
Code No. P1200 Injector driver system	Probable cause
Range of Check ● Engine speed: 4,000 r/m or less ● Battery voltage: 10 V or more ● The fuel cut operation and the injector operation (by carrying out the Actuator test) are not in progress. ● During high engine load Set Conditions ● Injector open circuit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



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

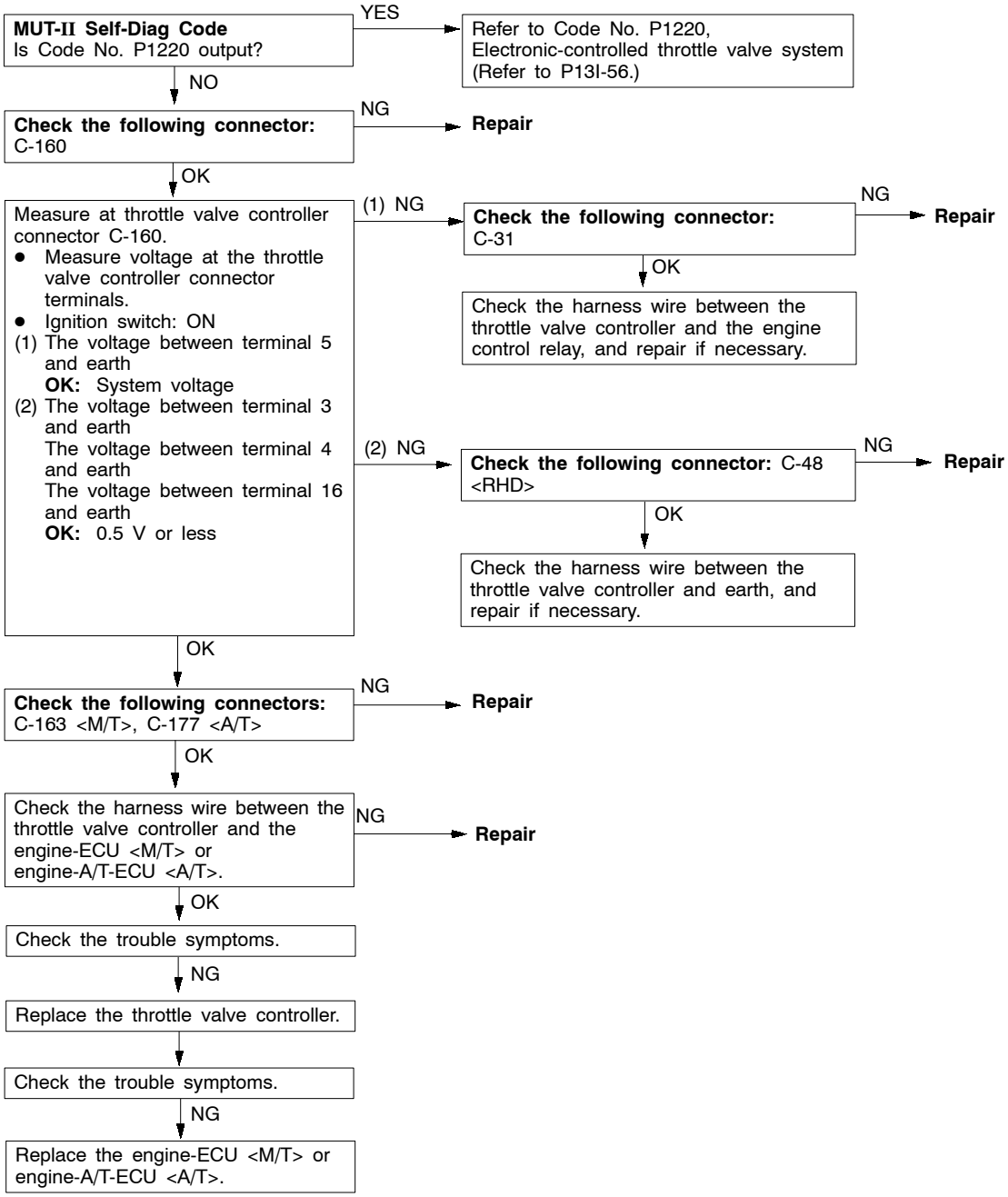


Code No. P1221 Throttle valve position feedback system	Probable cause
The throttle valve controller judges a malfunction, and then transmit the result to the engine-ECU <M/T> or engine-A/T-ECU <A/T>. Range of Check ● Ignition switch: ON ● Battery voltage: 10 V or more Set Conditions ● Failure in the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

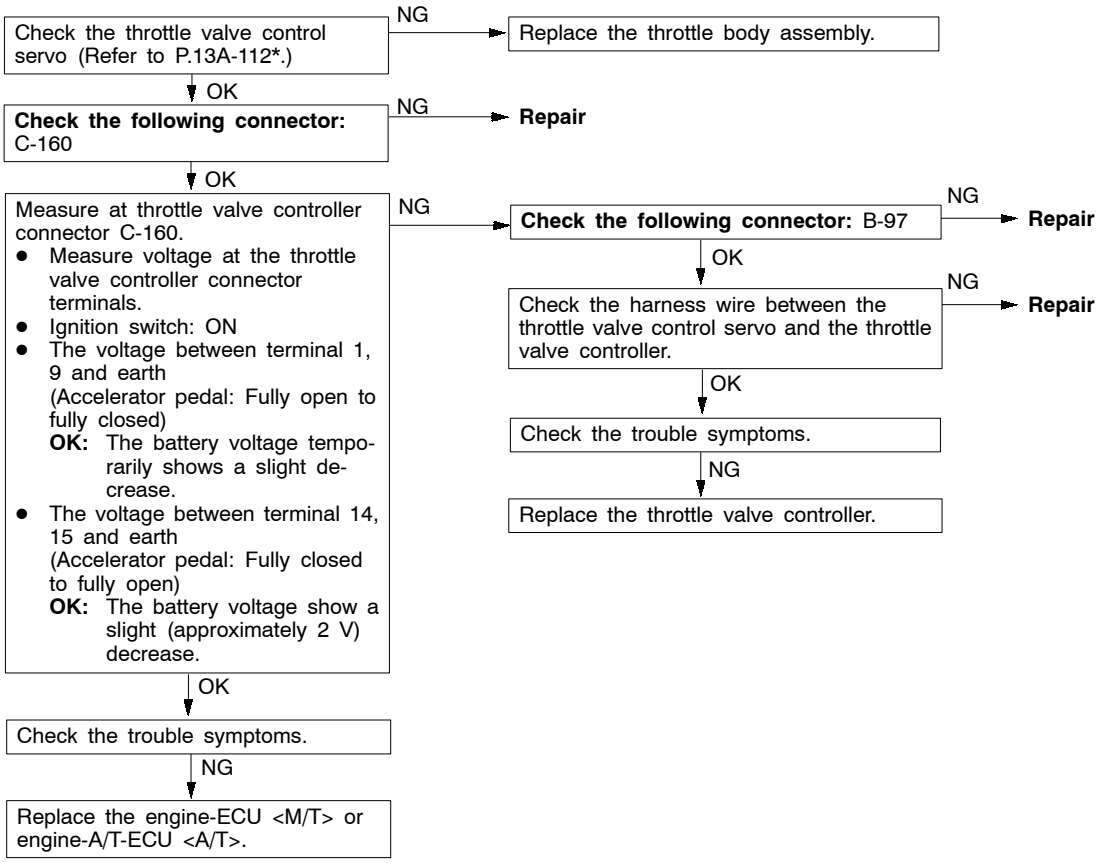


NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

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

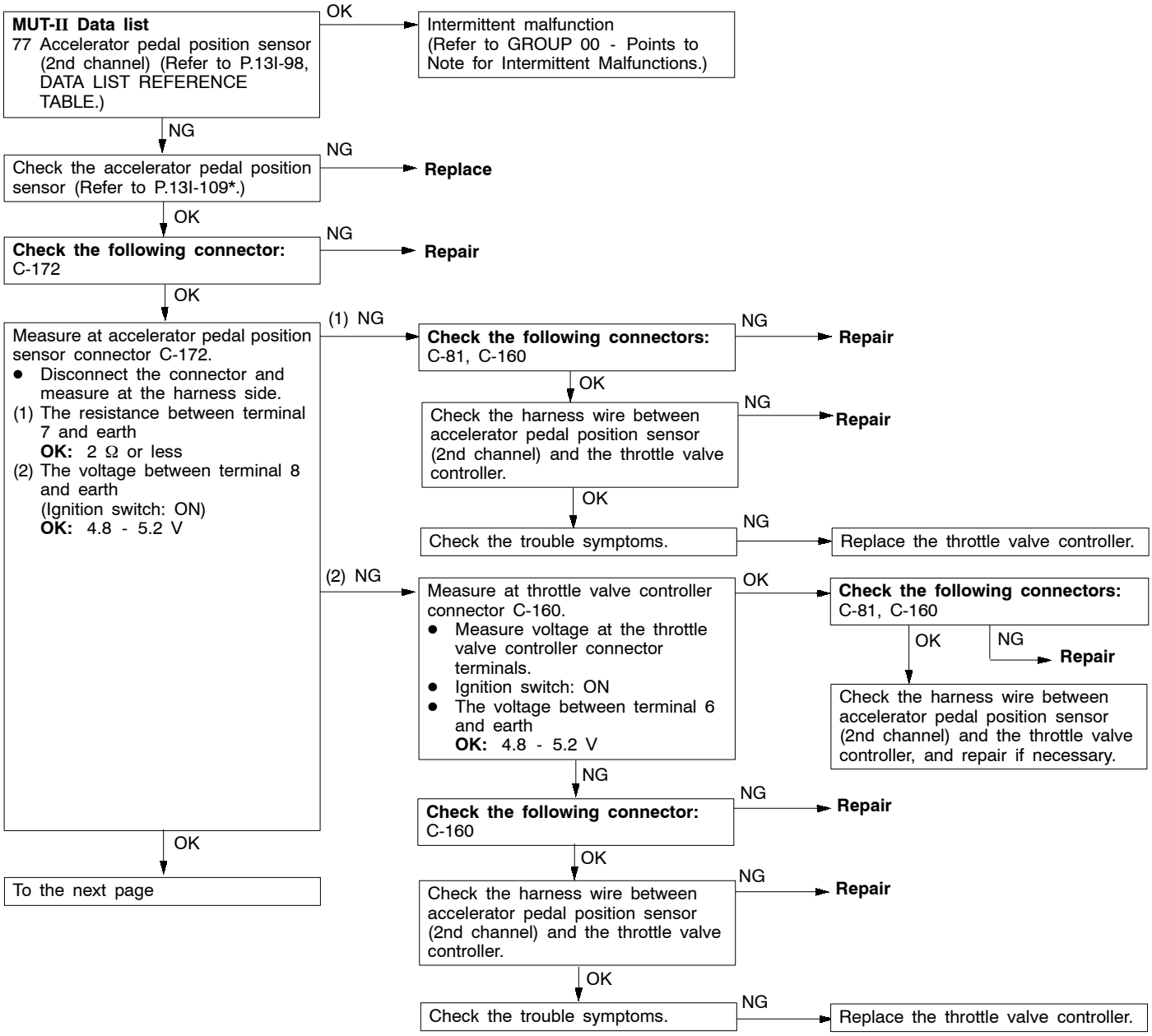


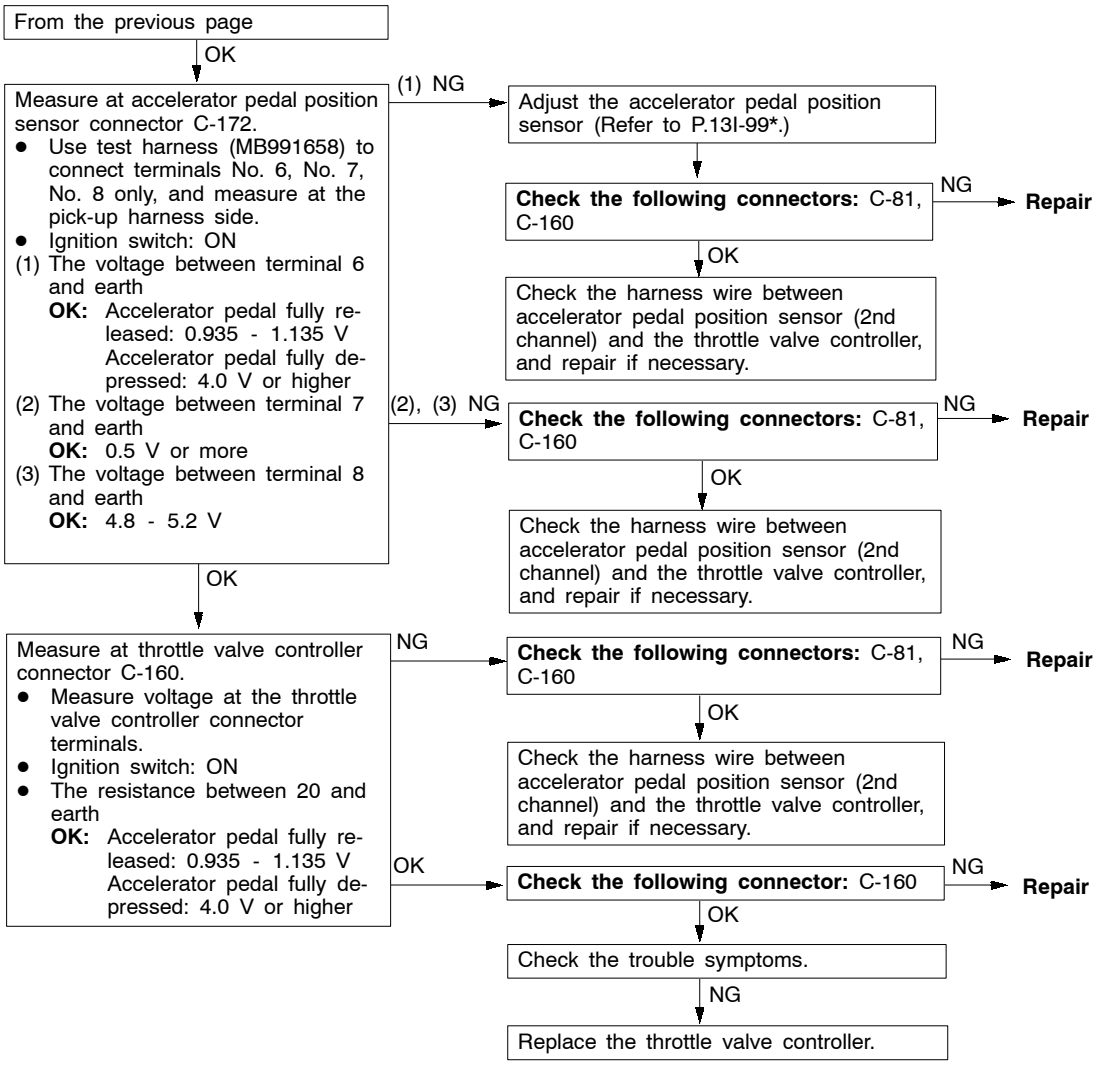
Code No. P1224 Throttle valve control servo motor (Motor 1st phase malfunction) system	Probable cause
Range of Check ● Throttle valve control servo relay: ON ● System voltage: 8 V or more. Set Conditions ● Throttle valve control servo drive circuit is shorted to earth. ● Other power source interferences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



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

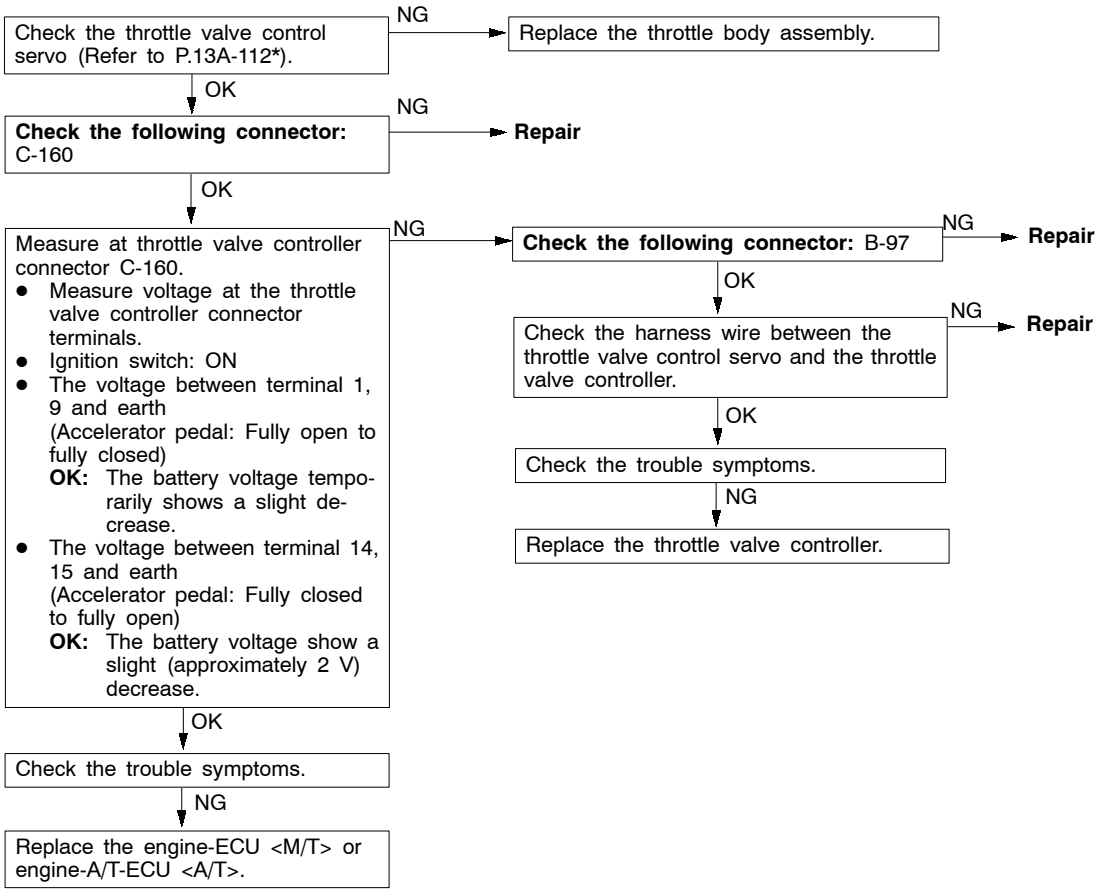
Code No. P1225 Accelerator pedal position sensor (2nd channel) system	Probable cause
Range of Check ● Accelerator pedal position sensor (1st channel) is normal. ● Communication between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and the throttle valve controller is normal. Set Conditions ● Output voltage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





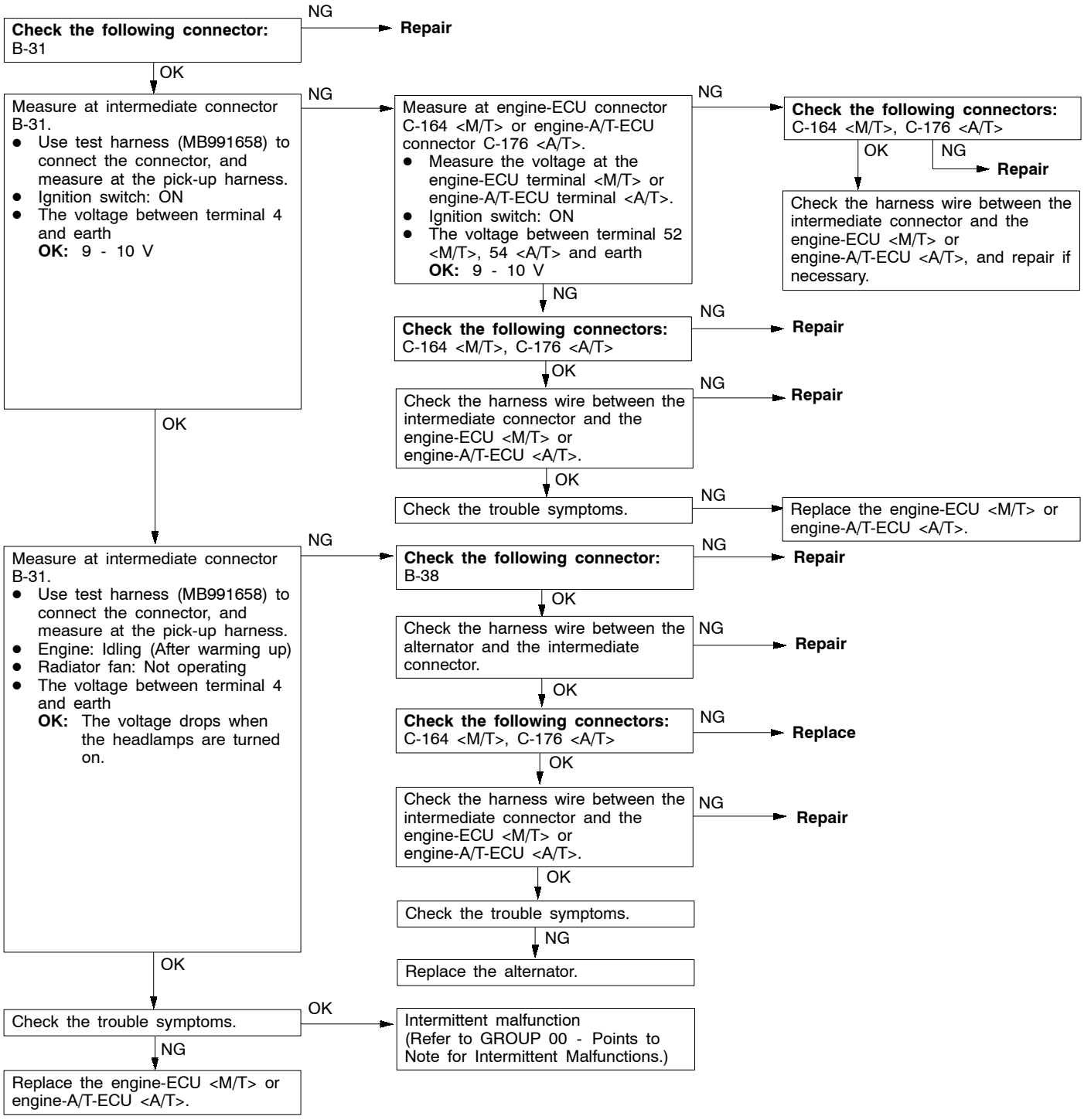
NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

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

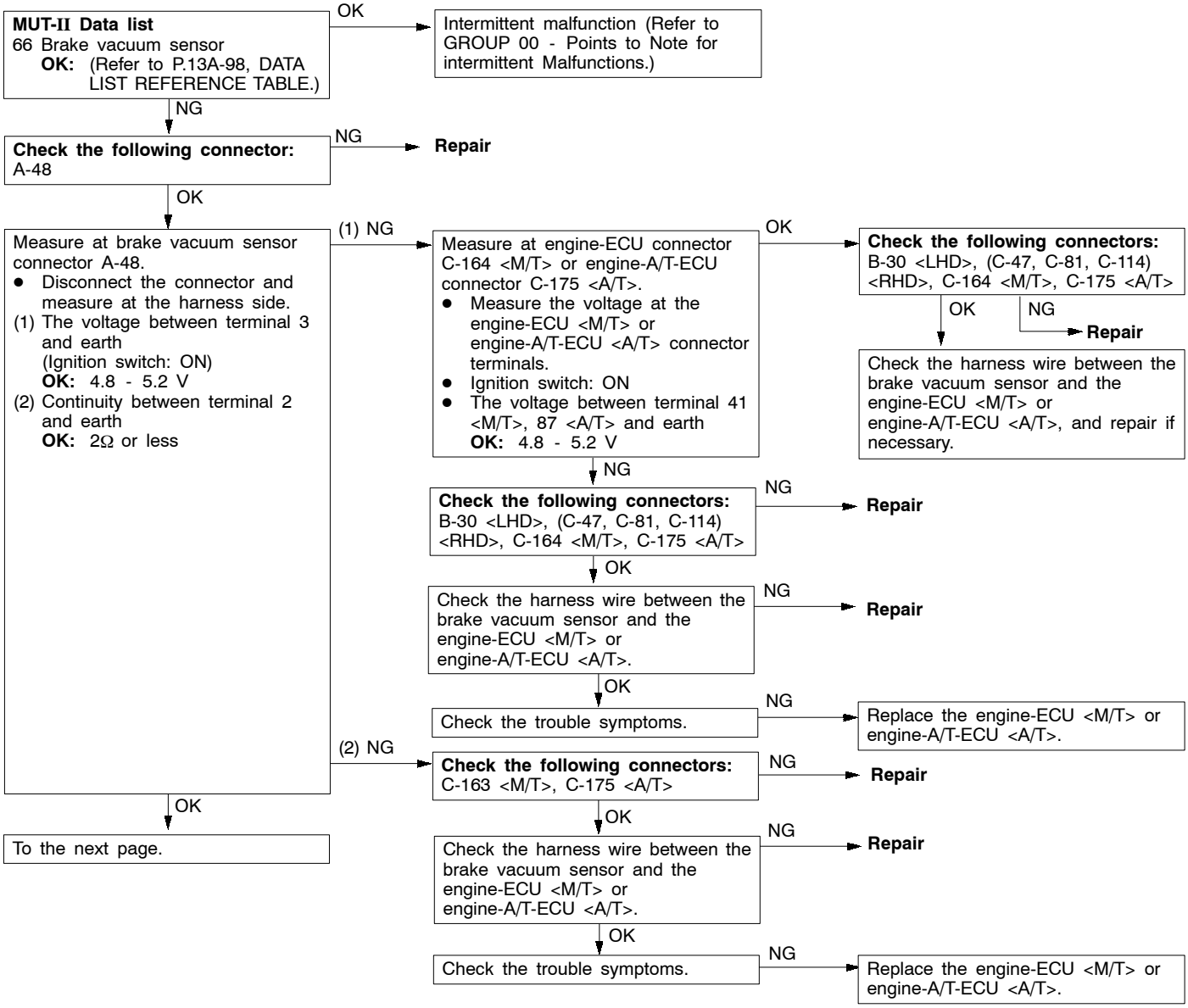


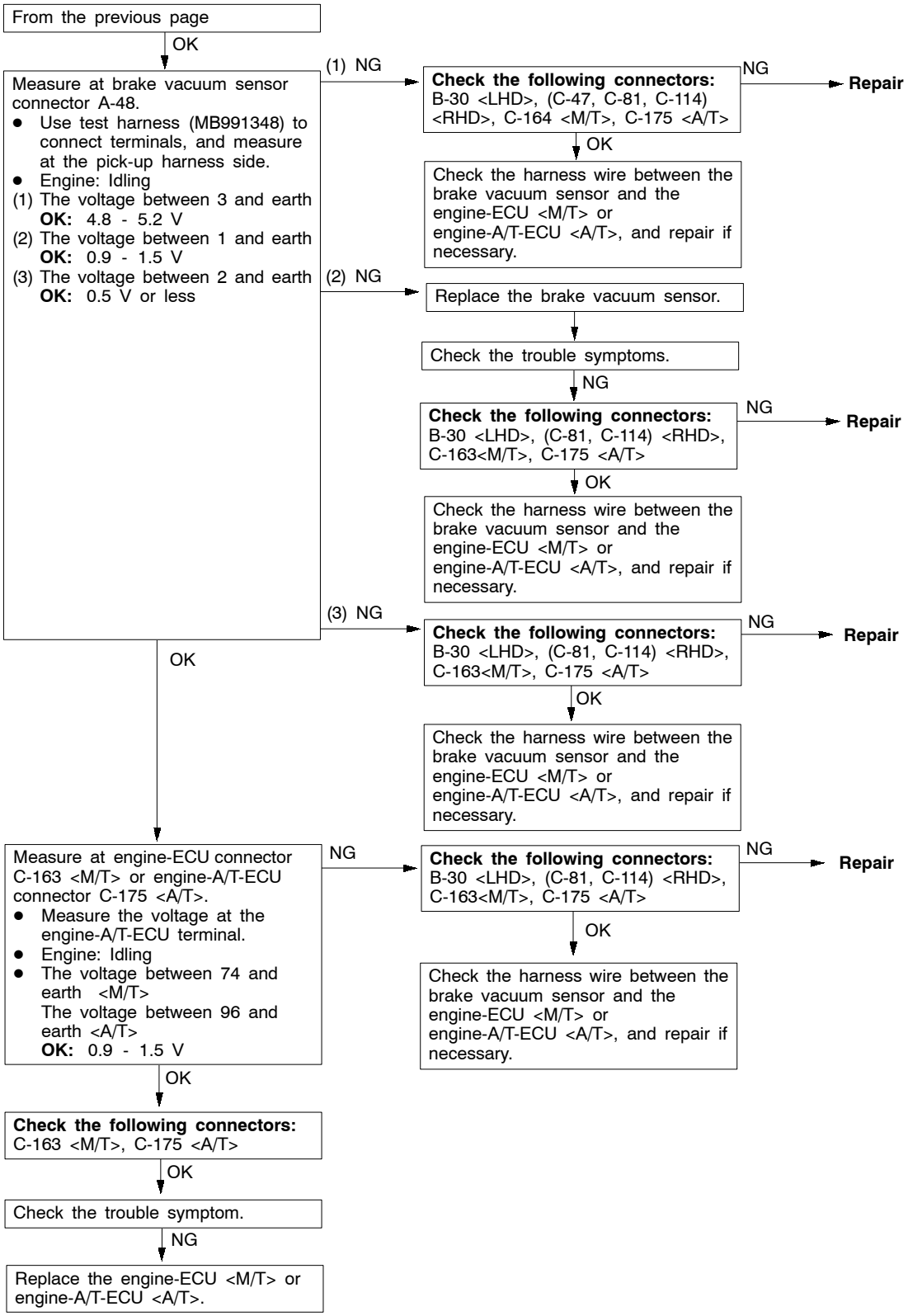
NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

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



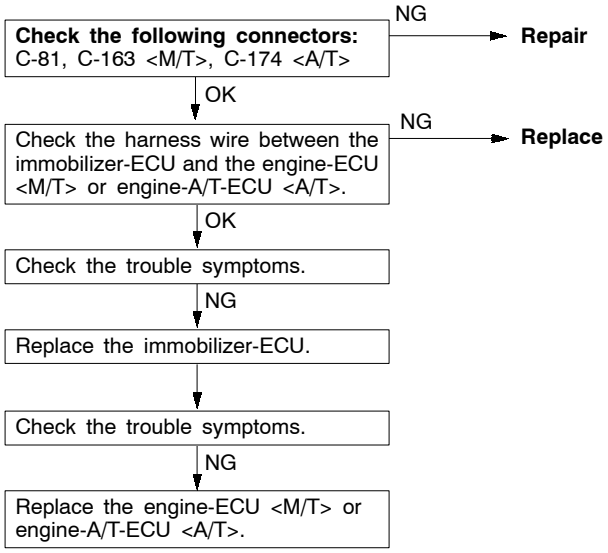
Code No. P1515 Brake vacuum sensor system	Probable cause
Range of Check ● Ignition switch: ON Set Conditions ● Sensor output voltage is 4.8 V or more. or ● Sensor output voltage is 0.2 V or less.	● Malfunction of the brake vacuum sensor ● Improper connector contact, open circuit or short-circuited harness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




From the previous page
OK
Measure at brake vacuum sensor connector A-48.
● Use test harness (MB991348) to connect terminals, and measure at the pick-up harness side.
● Engine: Idling
(1) The voltage between 3 and earth
OK: 4.8 - 5.2 V
(2) The voltage between 1 and earth
OK: 0.9 - 1.5 V
(3) The voltage between 2 and earth
OK: 0.5 V or less
(1) NG
Check the following connectors:
B-30 <LHD>, (C-47, C-81, C-114) <RHD>, C-164 <M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the brake vacuum sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(2) NG
Replace the brake vacuum sensor.
Check the trouble symptoms.
NG
Check the following connectors:
B-30 <LHD>, (C-81, C-114) <RHD>, C-163<M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the brake vacuum sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
(3) NG
Check the following connectors:
B-30 <LHD>, (C-81, C-114) <RHD>, C-163<M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the brake vacuum sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Measure at engine-ECU connector C-163 <M/T> or engine-A/T-ECU connector C-175 <A/T>.
● Measure the voltage at the engine-A/T-ECU terminal.
● Engine: Idling
● The voltage between 74 and earth <M/T>
The voltage between 96 and earth <A/T>
OK: 0.9 - 1.5 V
NG
Check the following connectors:
B-30 <LHD>, (C-81, C-114) <RHD>, C-163<M/T>, C-175 <A/T>
NG
Repair
OK
Check the harness wire between the brake vacuum sensor and the engine-ECU <M/T> or engine-A/T-ECU <A/T>, and repair if necessary.
OK
Check the following connectors:
C-163 <M/T>, C-175 <A/T>
OK
Check the trouble symptom.
NG
Replace the engine-ECU <M/T> or engine-A/T-ECU <A/T>.

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

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



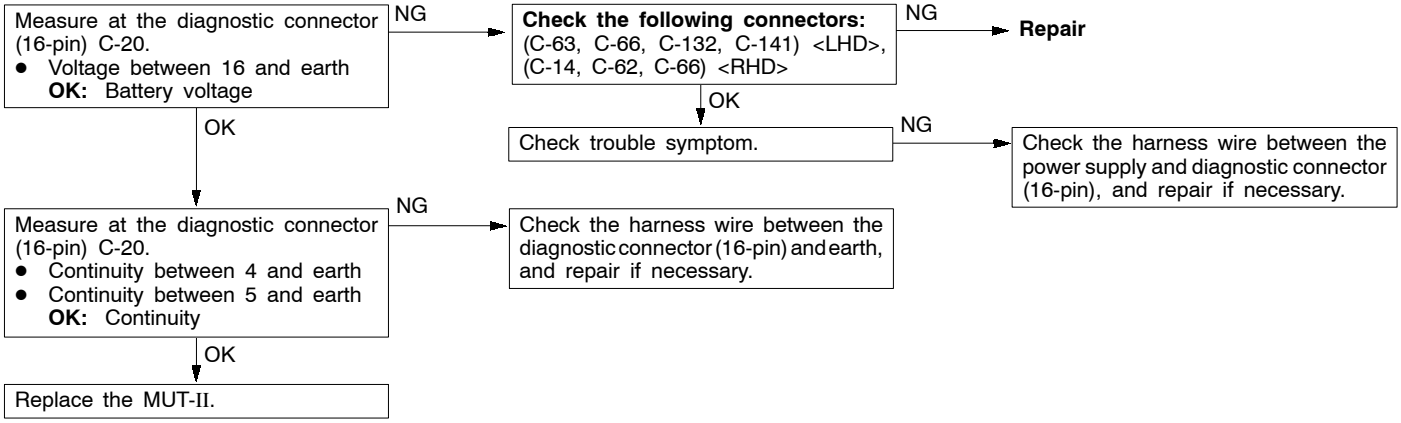
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13I-68
	Communication with engine-ECU only is not possible.	2	13I-68
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	13I-69
	The engine warning lamp remains illuminating and never goes out.	4	13I-69
Starting	No initial combustion (starting impossible)	5	13I-70
	Initial combustion but no complete combustion (starting impossible)	6	13I-72
	Long time to start (improper starting)		
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	7	13I-73
	Idling speed is high. (Improper idling speed)	8	13I-75
	Idling speed is low. (Improper idling speed)		
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	9	13I-76
	When the engine is hot, it stalls at idling. (Die out)	10	13I-77
	The engine stalls when starting the car. (Pass out)	11	13I-79
	The engine stalls when decelerating.	12	13I-80
Driving	Hesitation, sag or stumble	13	13I-81
	Poor acceleration		
	Surge		
	The feeling of impact or vibration when accelerating	14	13I-82
	The feeling of impact or vibration when decelerating	15	13I-83
	Knocking	16	13I-83
Dieseling		17	13I-83
Too high CO and HC concentration when idling		18	13I-84
Low alternator output voltage (approx. 12.3 V)		19	13I-85
Idling speed is improper when A/C is operating.		20	13I-86
Fans (radiator fan, A/C condenser fan) are inoperative		21	13I-86
Clutch switch system malfunction <M/T>		22	13I-87
GDI ECO indicator lamp system	GDI ECO indicator lamp does not illuminate.	23	13I-87
	GDI ECO indicator lamp remains illuminated and does not go off.	24	13I-88

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

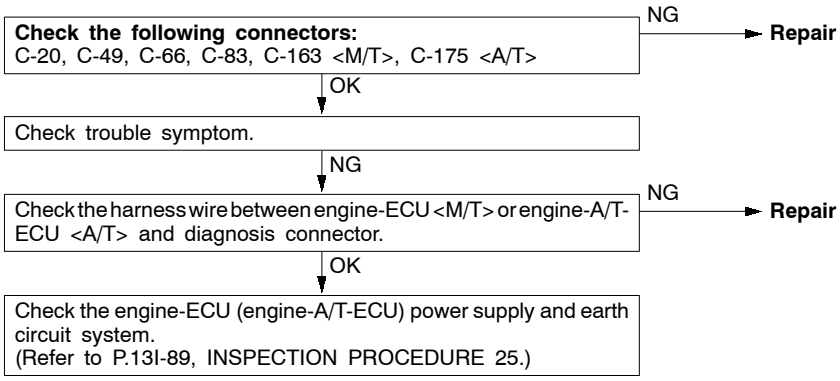
INSPECTION PROCEDURE 1

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



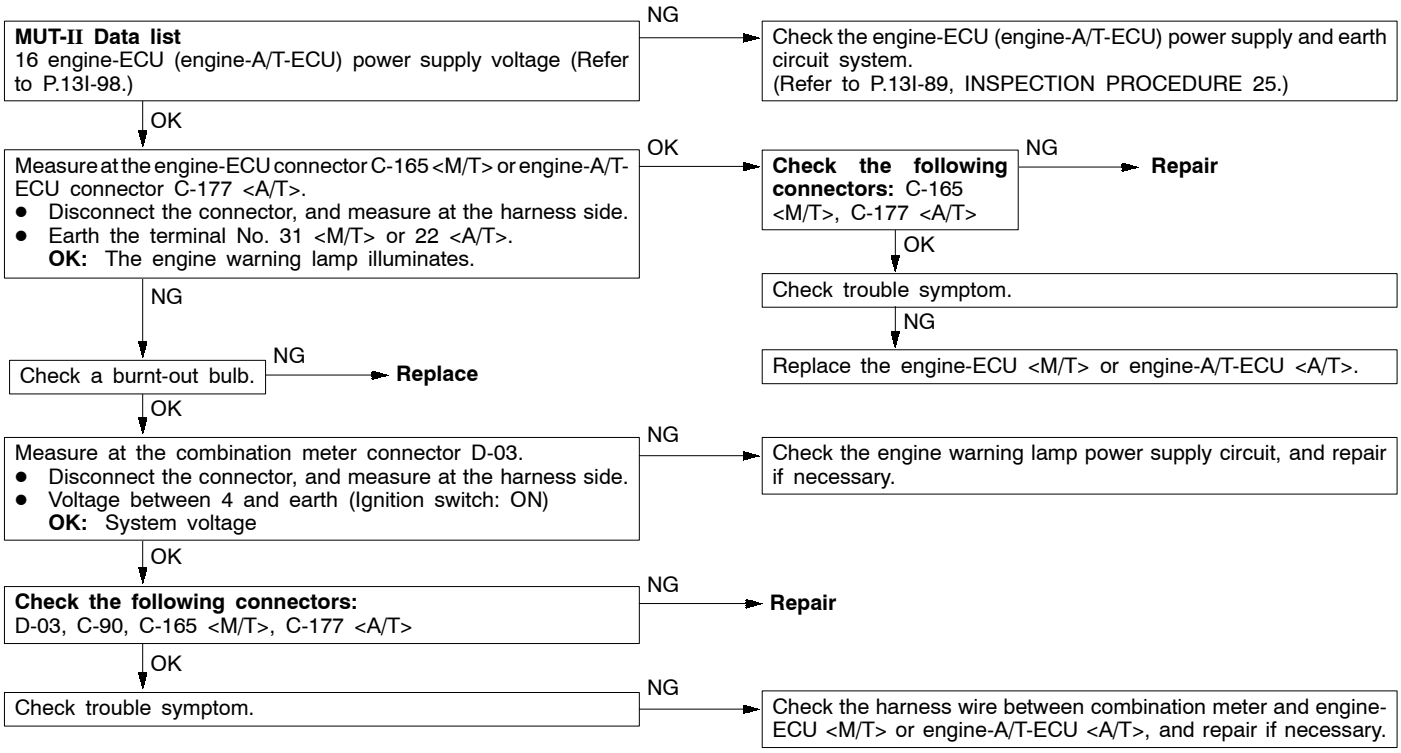
INSPECTION PROCEDURE 2

MUT-II communication with engine-ECU (engine-A/T-ECU) is not possible.	Probable cause
One of the following causes may be suspected. • No power supply to engine-ECU <M/T> or engine-A/T-ECU <A/T>. • Defective earth circuit of engine-ECU <M/T> or engine-A/T-ECU <A/T>. • Defective engine-ECU <M/T> or engine-A/T-ECU <A/T>. • Improper communication line between engine-ECU <M/T> or engine-A/T-ECU <A/T> and MUT-II	• Malfunction of engine-ECU <M/T> or engine-A/T-ECU <A/T> power supply circuit • Malfunction of engine-ECU <M/T> or engine-A/T-ECU <A/T> • Open circuit between the engine-ECU <M/T> or engine-A/T-ECU <A/T> and diagnosis connector



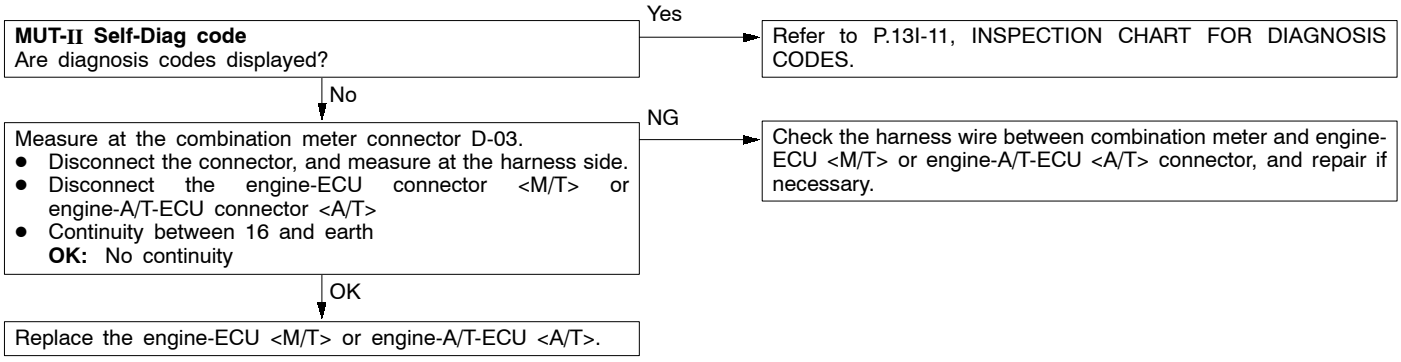
INSPECTION PROCEDURE 3

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



INSPECTION PROCEDURE 4

The engine warning lamp remains illuminating and never goes out.	Probable cause
In cases such as the above, the cause is probably that the engine-ECU <M/T> or engine-A/T-ECU <A/T> is detecting a problem in a sensor or actuator, or that one of the malfunctions listed at right has occurred.	• Short-circuit between the engine warning lamp and engine-ECU • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>



INSPECTION PROCEDURE 5

No initial combustion (starting impossible)	Probable cause
This is caused by incorrect fuel supply into the combustion chamber, and improper ignition circuit. Besides that, foreign material may be contaminated in fuel.	• Malfunction of the fuel supply system • Malfunction of the ignition system • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>

Check system voltage while the engine is cranking.
OK: 8 V or more
NG → Check the battery. (Refer to GROUP 55 - Battery.)
OK ↓

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

MUT-II Data list
16 System voltage (Refer to P.13I-98.)
NG → Check the engine control relay and ignition switch-IG system. (Refer to P.13I-90, INSPECTION PROCEDURE 26.)
OK ↓

Does the camshaft rotate when the engine is cranking?
No → Check if the timing belt is broken or damaged.
Yes ↓

MUT-II Actuator test
07 Fuel pump (low pressure) (Refer to P.13I-104.)
NG → Check the fuel pump (low pressure) system. (Refer to P.13I-94, INSPECTION PROCEDURE 30.)
OK ↓

MUT-II Data list
22 Crank angle sensor (Refer to P.13I-98.)
NG → Check the crank angle sensor system. (Refer to P.13I-47, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0335.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
NG → Check the throttle position sensor (1st channel) system. (Refer to P.13I-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0120.)
OK ↓

Inspect engine start ability by cranking the engine while the accelerator pedal is slightly depressed.
OK → Clean around the throttle valve. (Refer to P.13I-98*.)
NG ↓

Measure at injector driver connector B-96.
- Disconnect the connector, and measure at the connector side.
- Voltage between each of terminals 12, 21 and earth (Ignition switch: ON)
  OK: System voltage

NG → Check the injector driver relay system. (Refer to P.13I-91, INSPECTION PROCEDURE 27.)
OK ↓

Check fuel leakage. (Refer to P.13I-125.)
NG → **Repair**
OK ↓

Measure low fuel pressure between the fuel pump (low pressure) and fuel pump (high pressure). (Refer to P.13I-122.)
NG → **Repair**
OK ↓

Measure at ignition coil connectors B-01, B-11, B-89, B-104
- Connect the connector.
- Connect a timing light to the No. 1 terminal of each connector in turn.
  (Engine cranking)
  OK: The timing light flashes.

NG → Check the ignition coil (incorporating power transitor) system. (Refer to P.13I-44, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0300.)
OK ↓

Check ignition timing while the engine is cranking.
OK: Approx. 5° BTDC
NG → Check that the crank angle sensor and timing belt cover are properly installed.
OK ↓

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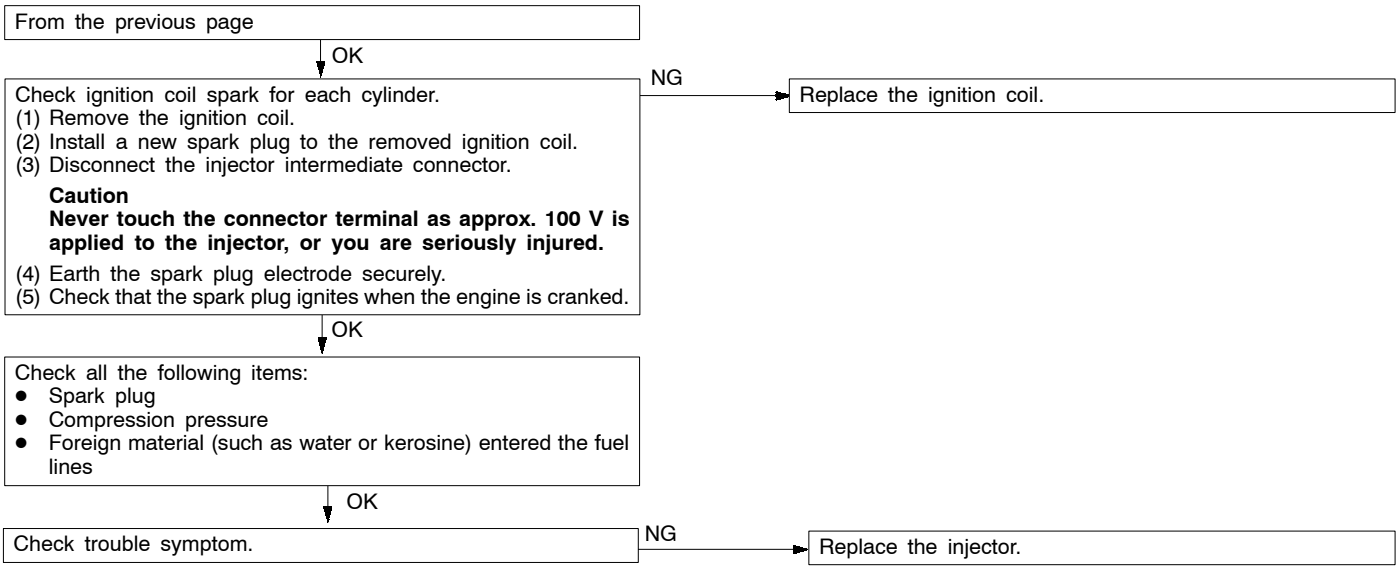

NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 6

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

Check system voltage while the engine is cranking.
OK: 8 V or more
NG → Check the battery. (Refer to GROUP 55 - Battery.)
OK ↓

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

MUT-II Actuator test
07 Fuel pump (low pressure) (Refer to P.13I-104.)
NG → Check the fuel pump (low pressure) system. (Refer to P.13I-94, INSPECTION PROCEDURE 30.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
NG → Check the engine coolant temperature system. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
18 Cranking signal (Refer to P.13I-98.)
NG → Check the ignition switch-ST system. (Refer to P.13I-92, INSPECTION PROCEDURE 28.)
OK ↓

MUT-II Data list
74 Fuel pressure sensor (Refer to P.13I-98.)
NG → Check an abnormal fuel pressure system. (Refer to P.13I-33, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0190.)
OK ↓

Check fuel leakage. (Refer to P.13I-125.)
NG → **Repair**
OK ↓

Is the engine started normally when it is cranked with the accelerator pedal depressed slightly?
Yes → Clean around the throttle valve. (Refer to P.13I-98*.)
No ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
OK ↓

Check ignition timing when the engine is cranked.
OK: approx. 5° BTDC
NG → Check that the crank angle sensor and timing belt cover are properly installed.
OK ↓

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.
NG → Replace the ignition coil.
OK ↓

Check all the following items:
- Spark plug
- Compression pressure
- Foreign material (such as water or kerosine) entered the fuel lines

OK ↓

Check trouble symptom.
NG → Replace the injector.

NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 7

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

Has the battery been disconnected recently?
- Yes → Warm up the engine, and then let it run at idle for approx. ten minutes.
- No ↓

MUT-II Self-Diag code
Is a diagnosis code displayed?
- Yes → Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

Does the engine idle speed fluctuates excessively (excessive hunting)?
- Yes → Clean around the throttle valve. (Refer to P.13I-98*.)
- No ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
- NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
- OK ↓

MUT-II Data list
26 Accelerator pedal position switch (Refer to P.13I-98.)
- NG → Check the accelerator pedal position switch system. (Refer to P.13I-93, INSPECTION PROCEDURE 29.)
- OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13I-98.)
- NG → Check the intake air temperature sensor system. (Refer to P.13I-17, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
- OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13I-98.)
- NG → Check the barometric pressure sensor system. (Refer to P.13I-15, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
- NG → Check the engine coolant temperature sensor. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

MUT-II Actuator test
08 Purge control solenoid valve (Refer to P.13I-104.)
- NG → Check the purge control solenoid valve system. (Refer to P.13I-54, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0443.)
- OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
- NG → Check the oxygen sensor (rear) system. (Refer to P.13I-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
- OK ↓

MUT-II Data list
11 Oxygen sensor (front)
OK: 600 - 1,000 mV when the engine is suddenly raced
- NG → Check the oxygen sensor (front) system. (Refer to P.13I-25, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
- OK ↓

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OK

MUT-II Data list
11 Oxygen sensor (front)
OK: 0 - 400 mV and 600 - 1,000 mV alternates when the engine is idling (wait for four minutes after the engine started).

NG → Measure fuel high-pressure between the fuel pump (high pressure) and injector. (Refer to P.13I-122.)

OK → Check that air is sucked in the air intake system.
- Broken intake manifold gasket
- Damaged vacuum hose
- Damaged air intake hose

NG → **Repair**

OK

MUT-II Data list
27 Power steering fluid pressure switch (Refer to P.13I-98.)

NG → Check the power steering fluid pressure switch system. (Refer to P.13I-95, INSPECTION PROCEDURE 31.)

OK

MUT-II Data list
28 A/C switch (Refer to P.13I-98.)

NG → Check the A/C switch and A/C relay system. (Refer to P.13I-95, INSPECTION PROCEDURE 32.)

OK

MUT-II Data list
48 M/T oil temperature sensor (Refer to P.13I-98.)

NG → Check the M/T oil temperature sensor system. (Refer to P.13I-96, INSPECTION PROCEDURE 33.)

OK

MUT-II Data list
67 Stop lamp switch (Refer to P.13I-98.)

NG → Check the stop lamp switch. (Refer to P.13I-97, INSPECTION PROCEDURE 34.)

OK

MUT-II Data list
31 Small lamp switch (Refer to P.13I-98.)

NG → Check the small lamp switch system. (Refer to P.13I-97, INSPECTION PROCEDURE 35.)

OK

MUT-II Data list
68 EGR valve (Refer to P.13I-98.)

NG → Check the EGR valve. (Refer to P.13I-51, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)

OK

Check ignition timing. (Refer to GROUP 11D - Engine Adjustment.)

NG → Check that the crank angle sensor and timing belt cover are properly installed.

OK

Clean around the throttle valve. (Refer to P.13I-98*.)

Check trouble symptom.

NG

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

NG → Replace the ignition coil.

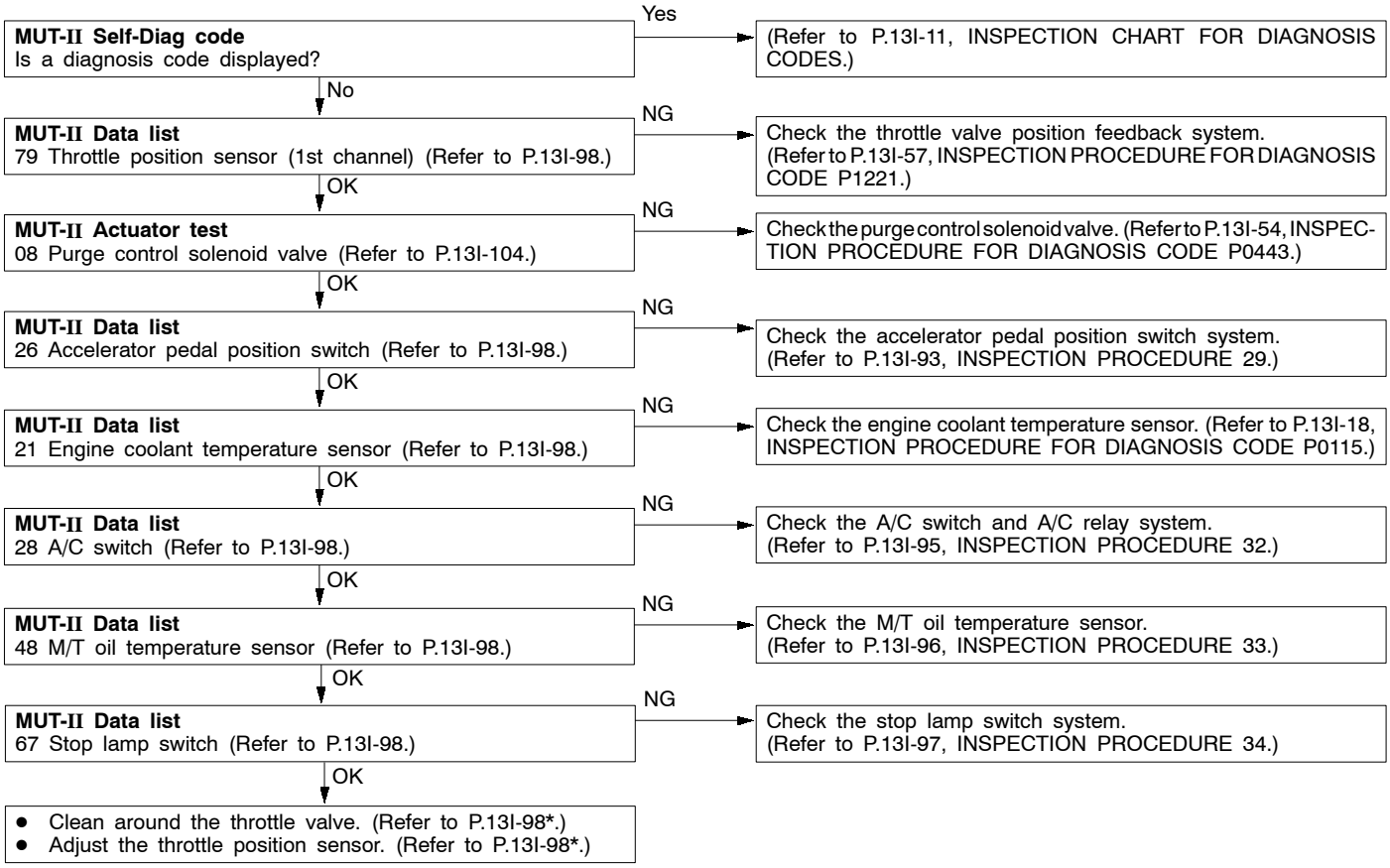
OK

Check all the following items in that order.
(1) Spark plugs
(2) Exhaust gas emission control system
(3) EGR system
(4) Compression pressure
(5) Foreign material (such as water or kerosine) entered the fuel line.
(6) Air is sucked in the air intake system, or EGR gas leaks.
- Damaged intake manifold gasket
- Damaged air intake hose
- Damaged vacuum hose
- Faulty EGR valve seat

NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 8

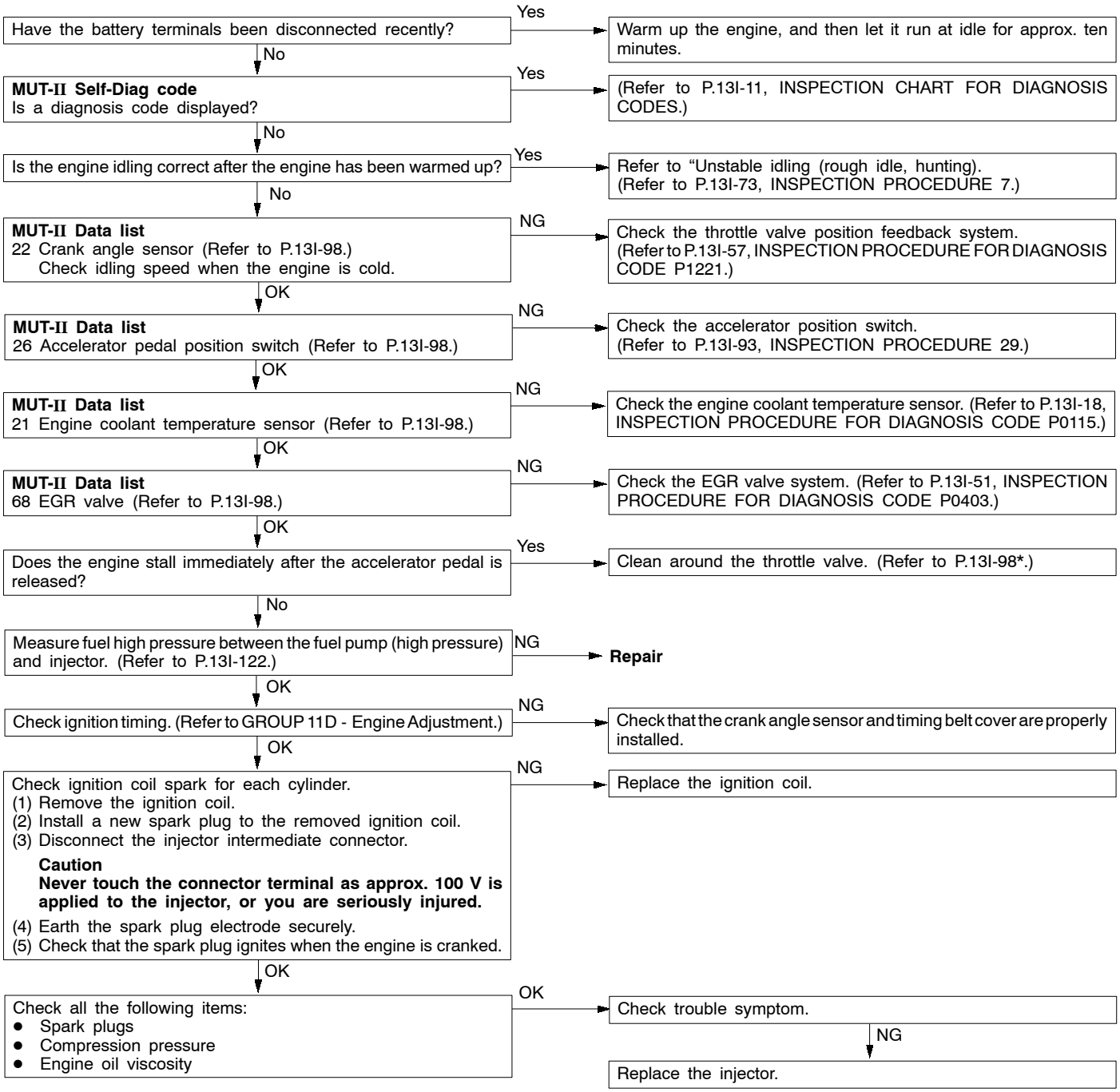
Idle speed is high or low (Improper idling)	Probable cause
The cause is probably that the intake air amount during idling is too great or too small.	• Malfunction of the electronic-controlled throttle valve system • Malfunction of the throttle body



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 9

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



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 10

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

Have the battery terminals been disconnected recently?
- Yes → Warm up the engine, and then let it run at idle for approx. ten minutes.
- No ↓

MUT-II Self-Diag code
Is a diagnosis code displayed?
- Yes → Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
- NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
- OK ↓

Is it easy to reproduce the engine stall?
- No → While carrying out an intermittent malfunction simulation test. (Refer to GROUP 00 - Points to Note for Intermittent Malfunction.), check for sudden changes in the following signals.
  - Crank angle sensor signal
  - Injector drive signal
  - Fuel pump (low pressure) drive signal
  - Air flow sensor
  - Primary ignition signal
  - Power supply to the engine-ECU <M/T> or engine-A/T-ECU <A/T>
- Yes ↓

MUT-II Data list
26 Accelerator pedal position switch (Refer to P.13I-98.)
- NG → Check the accelerator pedal position switch. (Refer to P.13I-93, INSPECTION PROCEDURE 29.)
- OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13I-98.)
- NG → Check the intake air temperature sensor. (Refer to P.13I-17, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
- OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13I-98.)
- NG → Check the barometric pressure sensor. (Refer to P.13I-15, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
- NG → Check the engine coolant temperature sensor. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
- NG → Check the oxygen sensor (rear) system. (Refer to P.13I-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
- OK ↓

MUT-II Data list
11 Oxygen sensor (front)

OK: 600 - 1,000 mV when the engine is suddenly raced
- NG → Check the oxygen sensor (front) system. (Refer to P.13I-25, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
- OK ↓

MUT-II Data list
11 Oxygen sensor (front)

OK: 0 - 400 mV and 600 - 1,000 mV alternates when the engine is idling (wait for four minutes after the engine started).
- NG → Measure fuel high-pressure between the fuel pump (high pressure) and injector. (Refer to P.13I-122.)
  - OK → Check that air is sucked in the air intake system.
    - Broken intake manifold gasket
    - Damaged vacuum hose
    - Damaged air intake hose
  - NG → **Repair**
- OK ↓

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OK

MUT-II Data list
27 Power steering fluid pressure switch (Refer to P.13I-98.)

NG → Check the power steering fluid pressure switch system. (Refer to P.13I-95, INSPECTION PROCEDURE 31.)

OK

MUT-II Data list
28 A/C switch (Refer to P.13I-98.)

NG → Check the A/C switch and A/C relay system. (Refer to P.13I-95, INSPECTION PROCEDURE 32.)

OK

MUT-II Data list
31 Small lamp switch (Refer to P.13I-98.)

NG → Check the small lamp switch system. (Refer to P.13I-97, INSPECTION PROCEDURE 35.)

OK

MUT-II Data list
34 Air flow sensor reset signal (Refer to P.13I-98.)

NG → Check the air flow sensor system. (Refer to P.13I-13, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0100.)

OK

MUT-II Data list
68 EGR valve (Refer to P.13I-98.)

NG → Check the EGR valve. (Refer to P.13I-51, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)

OK

Does the engine stall immediately after the accelerator pedal is released?

Yes → Clean around the throttle valve. (Refer to P.13I-98*.)

No

Check ignition timing. (Refer to GROUP 11D - Engine Adjustment.)

NG → Check that the crank angle sensor and timing belt cover are properly installed.

OK

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

NG → Replace the ignition coil.

OK

Check all the following items:
- Spark plugs
- Compression pressure
- Foreign material (such as water or kerosine) entered the fuel lines

NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 11

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

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)
No ↓

MUT-II Data list
68 EGR valve (Refer to P.13I-98.)
NG → Check the EGR valve. (Refer to P.13I-51, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
OK ↓

MUT-II Actuator test
08 Purge control solenoid valve (Refer to P.13I-104.)
NG → Check the purge control solenoid valve system. (Refer to P.13I-54, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0443.)
OK ↓

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

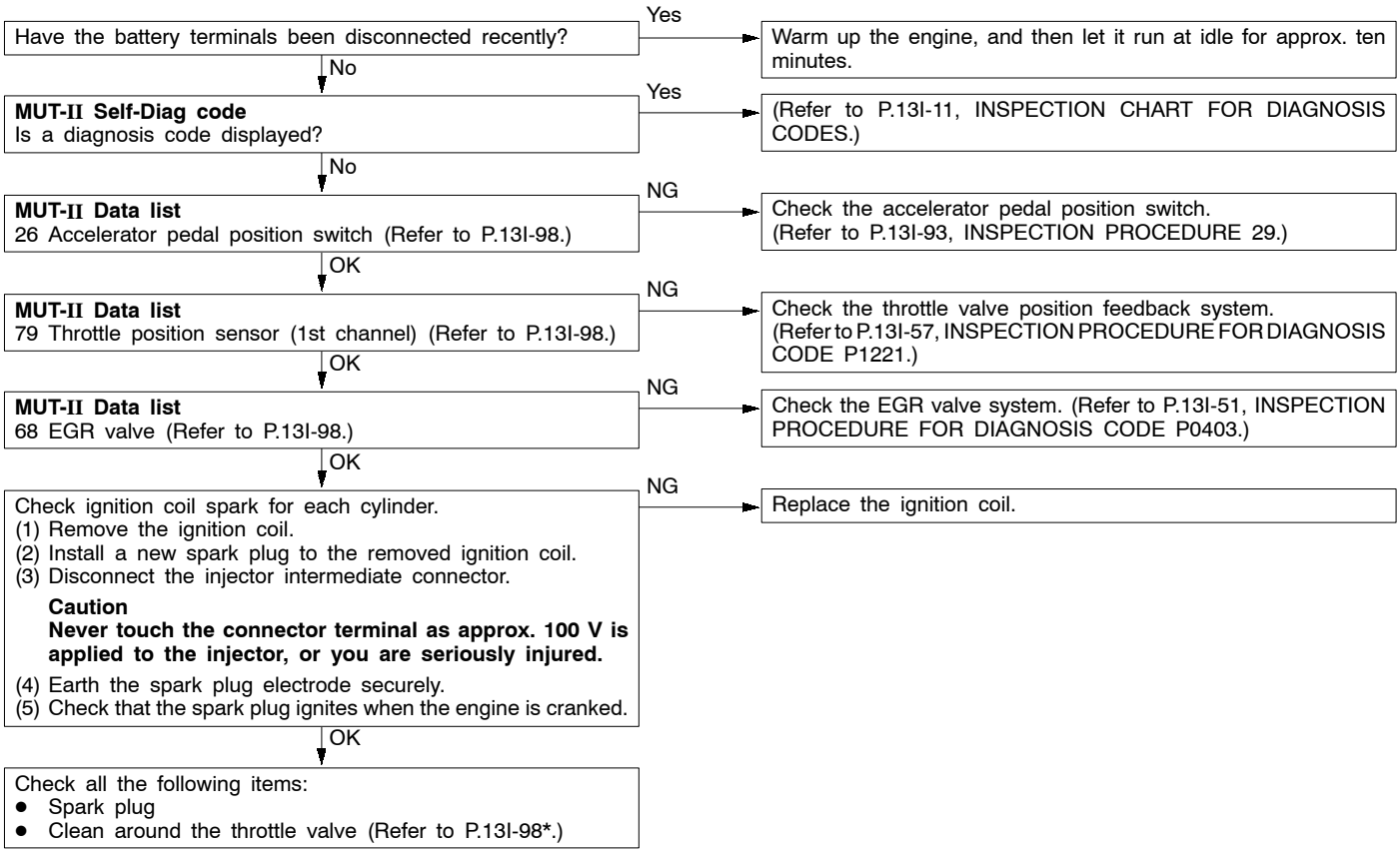
(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

NG → Replace the ignition coil.
OK ↓

Check all the following items:
(1) Spark plug
(2) Check if air is stuck in the air intake system.
- Damage intake manifold gasket
- Damaged or disconnected vacuum hose
- Damaged air intake hose

INSPECTION PROCEDURE 12

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



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 13

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

MUT-II Self-Diag code
Is a diagnosis code displayed?
- Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)
- No ↓

Check ignition timing. (Refer to GROUP 11D - Engine Adjustment.)
- NG → Check that the crank angle sensor and timing belt cover are properly installed.
- OK ↓

MUT-II Data list
26 Accelerator pedal position switch (Refer to P.13I-98.)
- NG → Check the accelerator pedal position switch. (Refer to P.13I-93, INSPECTION PROCEDURE 29.)
- OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13I-98.)
- NG → Check the intake air temperature sensor. (Refer to P.13I-17, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
- OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13I-98.)
- NG → Check the barometric pressure sensor. (Refer to P.13I-15, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
- OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
- NG → Check the engine coolant temperature sensor. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
- OK ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
- NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
- OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
- NG → Check the oxygen sensor (rear) system. (Refer to P.13I-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
- OK ↓

MUT-II Data list
11 Oxygen sensor (front)
OK: 600 - 1,000 mV when the engine is suddenly raced
- NG → Check the oxygen sensor (front) system. (Refer to P.13I-25, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
- OK ↓

MUT-II Data list
11 Oxygen sensor (front)
OK: 0 - 400 mV and 600 - 1,000 mV alternates when the engine is idling (wait for four minutes after the engine started).
- NG → Measure fuel high-pressure between the fuel pump (high pressure) and injector. (Refer to P.13I-122.)
  - OK ↓

Check that air is sucked in the air intake system.
- Broken intake manifold gasket
- Damaged vacuum hose
- Damaged air intake hose

- OK ↓

MUT-II Data list
68 EGR valve (Refer to P.13I-98.)
- NG → Check the EGR valve. (Refer to P.13I-51, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0403.)
- OK ↓

MUT-II Actuator test
08 Purge control solenoid valve (Refer to P.13I-104.)
- NG → Check the purge control solenoid valve. (Refer to P.13I-54, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0443.)
- OK ↓

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↓ OK

Measure high fuel pressure between the fuel pump (high pressure) and injector. (Refer to P.13I-122.)

NG → **Repair**

↓ OK

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

NG → Replace the ignition coil.

↓ OK

Check all the following items:
- Spark plug
- EGR system
- Compression pressure
- Clogged fuel filter, fuel line

OK → Check trouble symptom.

NG → Replace the injector.

INSPECTION PROCEDURE 14

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

MUT-II Self-Diag code
Is a diagnosis code displayed?

Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)

↓ No

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)

NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)

↓ OK

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

OK → Check all the following items:
- Spark plug
- Ignition current leak

NG → Replace the ignition coil.

INSPECTION PROCEDURE 15

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

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)
No ↓

MUT-II Data list
79 Throttle position sensor (1st channel) (Refer to P.13I-98.)
NG → Check the throttle valve position feedback system. (Refer to P.13I-57, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P1221.)
OK ↓

MUT-II Data list
26 Accelerator pedal position switch (Refer to P.13I-98.)
NG → Check the accelerator pedal position switch system. (Refer to P.13I-93, INSPECTION PROCEDURE 29.)
OK ↓

Clean around the throttle valve. (Refer to P.13I-98*.)

NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 16

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

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)
No ↓

Does knocking occur when the vehicle is driven with the detonation sensor disconnected?
(At this time, use the MUT-II to check whether the ignition timing is retarded from when the detonation sensor connector is connected.)
No → Check the detonation sensor system. (Refer to P.13I-47, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0325.)
Yes ↓

Check all the following items:
- Spark plug
- Foreign material (such as water or kerosine) entered the fuel lines

INSPECTION PROCEDURE 17

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

Replace the injector.

INSPECTION PROCEDURE 18

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

MUT-II Self-Diag code
Is a diagnosis code displayed?
Yes → (Refer to P.13I-11, INSPECTION CHART FOR DIAGNOSIS CODES.)
No ↓

Check ignition timing. (Refer to GROUP 11D - Engine Adjustment.)
NG → Check that the crank angle sensor and timing belt cover are properly installed.
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13I-98.)
NG → Check the engine coolant temperature sensor. (Refer to P.13I-18, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0115.)
OK ↓

MUT-II Data list
13 Intake air temperature sensor (Refer to P.13I-98.)
NG → Check the intake air temperature sensor. (Refer to P.13I-17, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0110.)
OK ↓

MUT-II Data list
25 Barometric pressure sensor (Refer to P.13I-98.)
NG → Check the barometric pressure sensor. (Refer to P.13I-15, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0105.)
OK ↓

MUT-II Data list
59 Oxygen sensor (rear)
- Transmission: 2nd gear <M/T>, L range <A/T>
- Driving with throttle widely open

OK: 600 - 1,000 mV
NG → Check the oxygen sensor (rear) system. (Refer to P.13I-28, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0136.)
OK ↓

MUT-II Data list
11 Oxygen sensor (front)
OK: 600 - 1,000 mV when the engine is suddenly raced
NG → Check the oxygen sensor (front) system. (Refer to P.13I-25, INSPECTION PROCEDURE FOR DIAGNOSIS CODE P0130.)
OK ↓

MUT-II Data list
11 Oxygen sensor (front)
OK: 0 - 400 mV and 600 - 1,000 mV alternates when the engine is idling (wait for four minutes after the engine started).
OK → Replace the oxygen sensor (front).
Check trouble symptom.
NG ↓

Measure fuel high-pressure between the fuel pump (high pressure) and injector. (Refer to P.13I-122.)
NG → **Repair**
OK ↓

Check ignition coil spark for each cylinder.
(1) Remove the ignition coil.
(2) Install a new spark plug to the removed ignition coil.
(3) Disconnect the injector intermediate connector.

Caution
Never touch the connector terminal as approx. 100 V is applied to the injector, or you are seriously injured.

(4) Earth the spark plug electrode securely.
(5) Check that the spark plug ignites when the engine is cranked.

OK ↓
NG → Replace the ignition coil.

Check all the following items:
- Spark plug
- EGR system
- Compression pressure
- Clogged fuel filter or line

OK ↓

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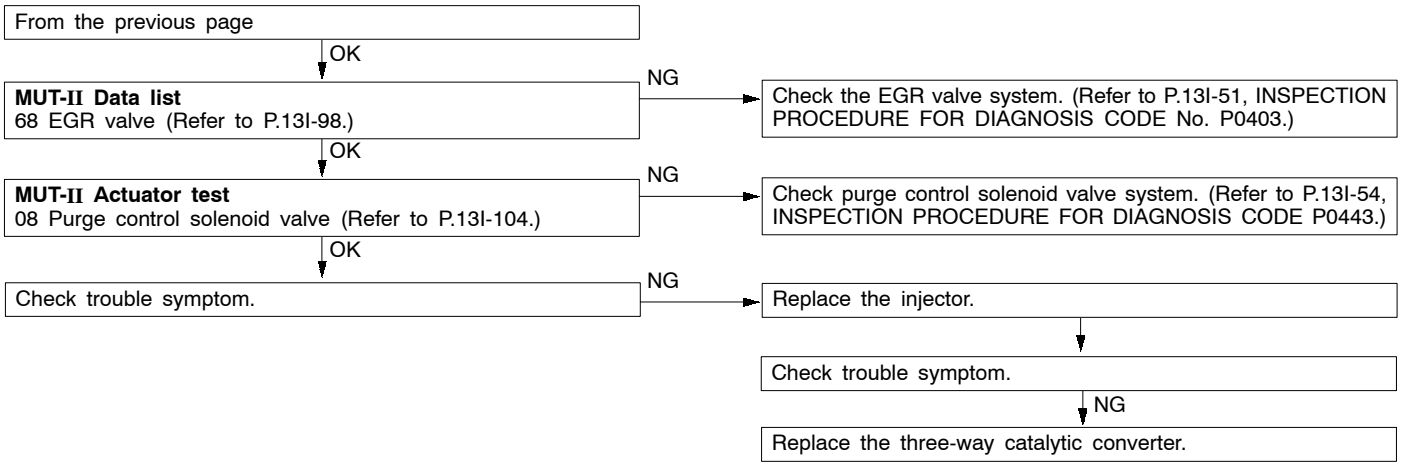
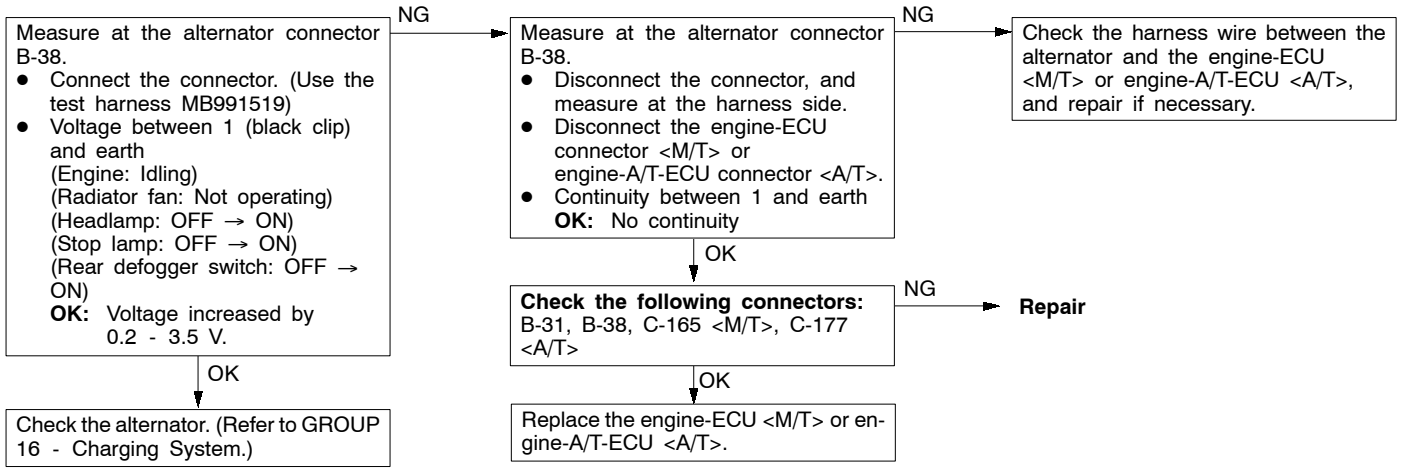


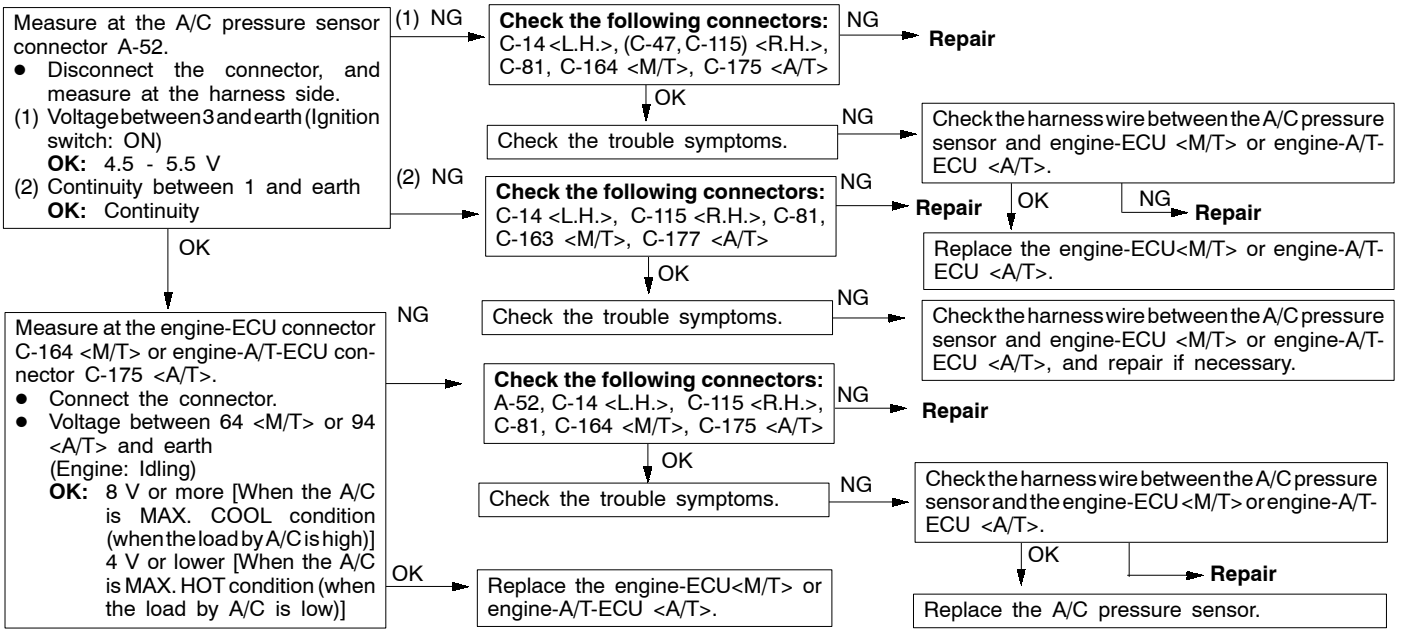
INSPECTION PROCEDURE 19

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



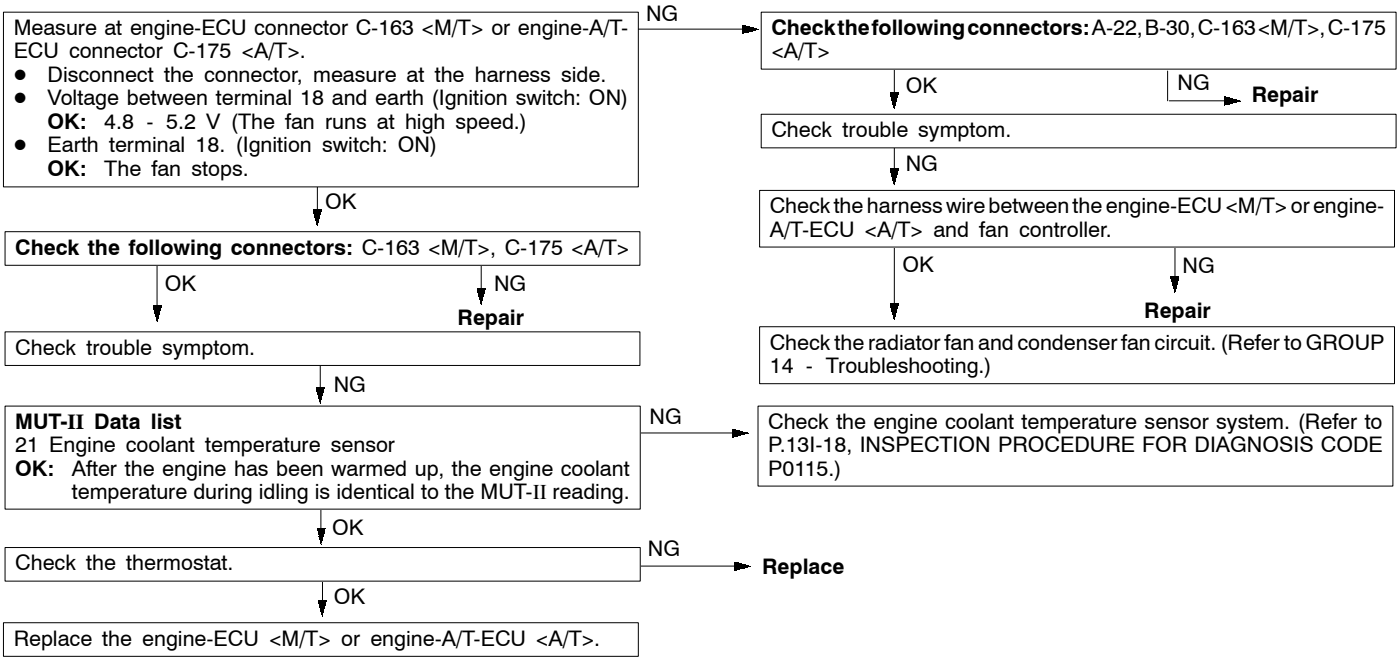
INSPECTION PROCEDURE 20

Idling speed is improper when A/C is operating	Probable cause
If the engine-ECU <M/T> or engine-A/T-ECU <A/T> detects that the air conditioner is on, it activates the idle speed control (ISC) servo to control idle-up operation. The A/C pressure sensor monitors the A/C compressor, and sends a signal to the engine-ECU<M/T> or engine-A/T-ECU<A/T>. The ECU controls fast idling speed according to this signal.	• Malfunction of the A/C control system • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the A/C pressure sensor • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>



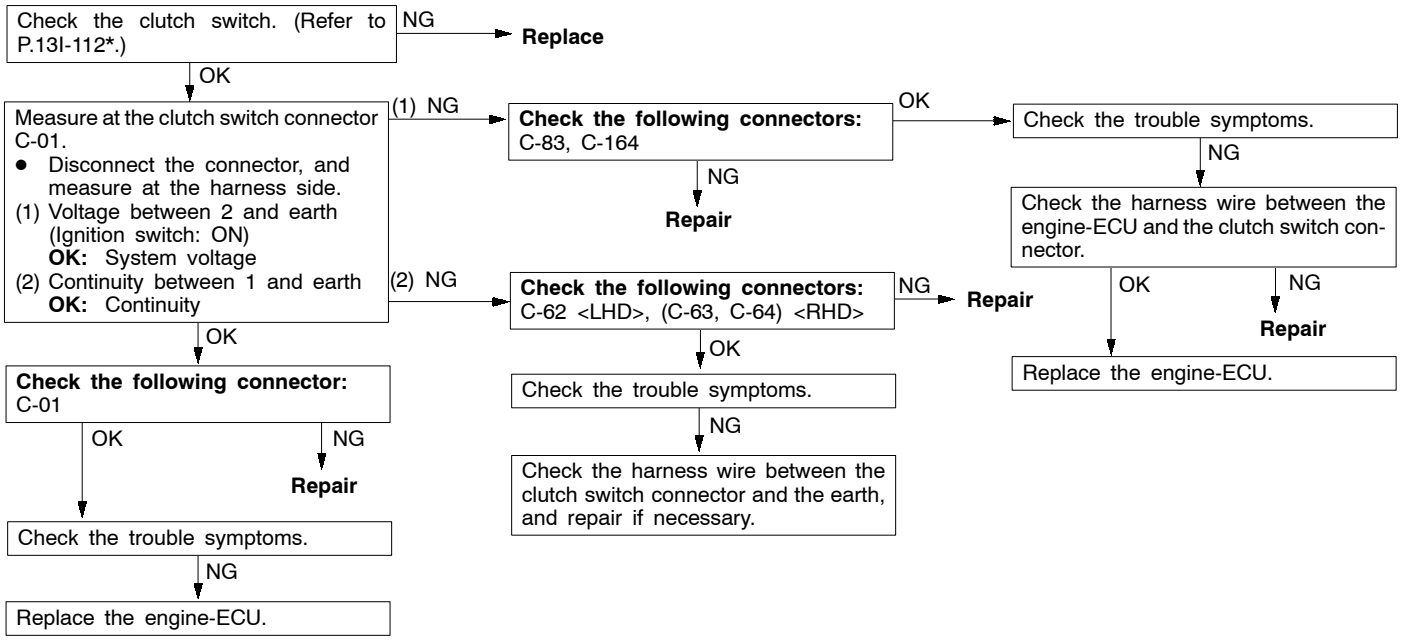
INSPECTION PROCEDURE 21

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



INSPECTION PROCEDURE 22

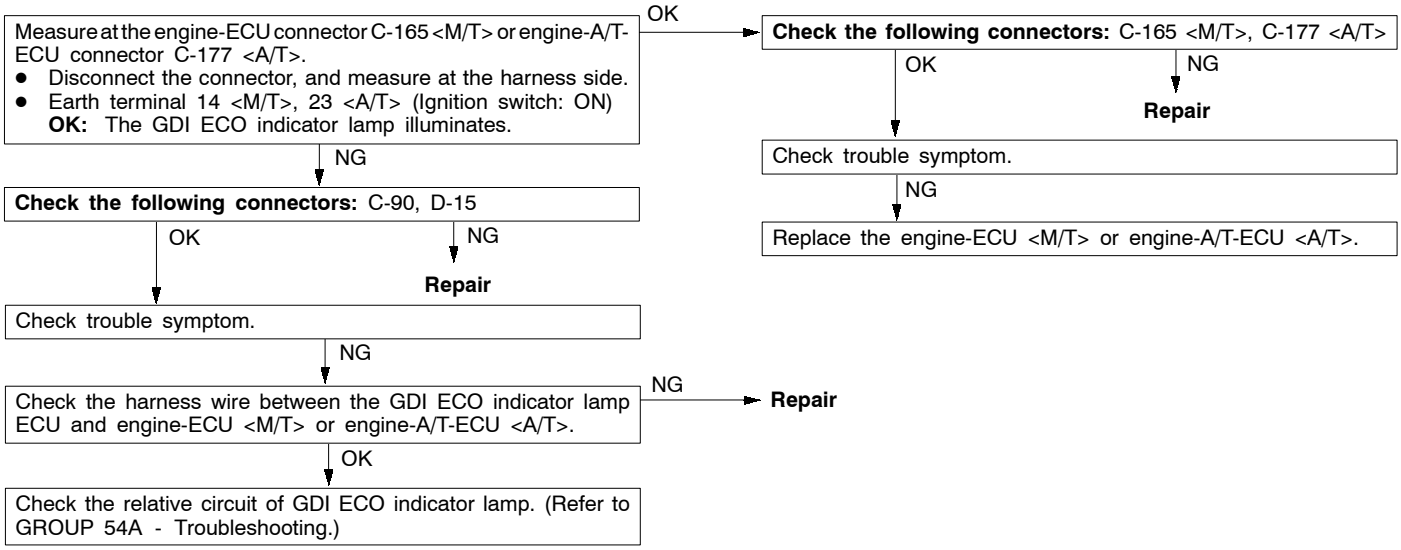
Clutch switch system malfunction <M/T>	Probable cause
The clutch pedal switch sends a signal indicating clutch pedal depression to the engine-ECU. The engine-ECU controls the fuel injection properly according to this signal, thus prevents the fluctuation of the engine speed during shift change.	• Malfunction of the clutch switch • Open circuit or short-circuited harness wire in the clutch switch circuit • Malfunction of the engine-ECU



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

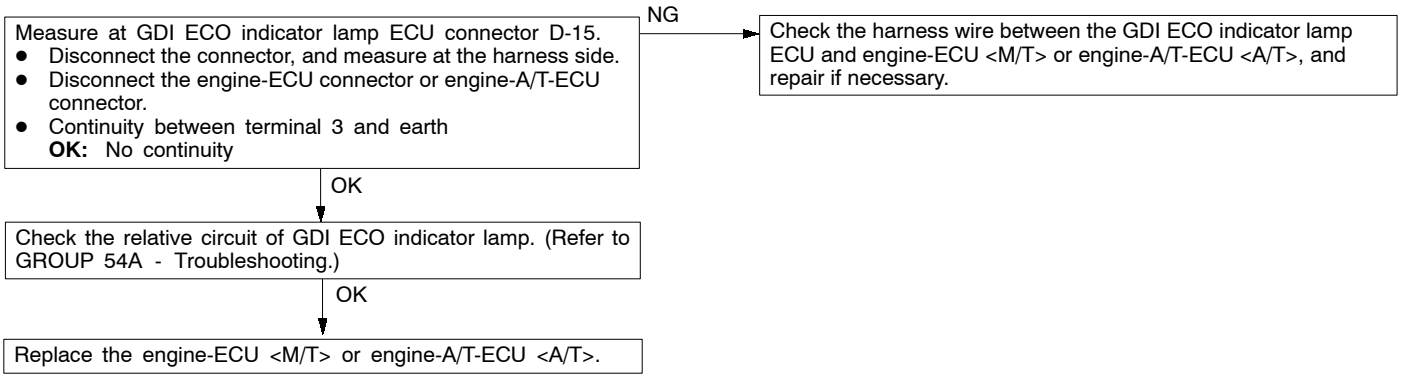
INSPECTION PROCEDURE 23

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



INSPECTION PROCEDURE 24

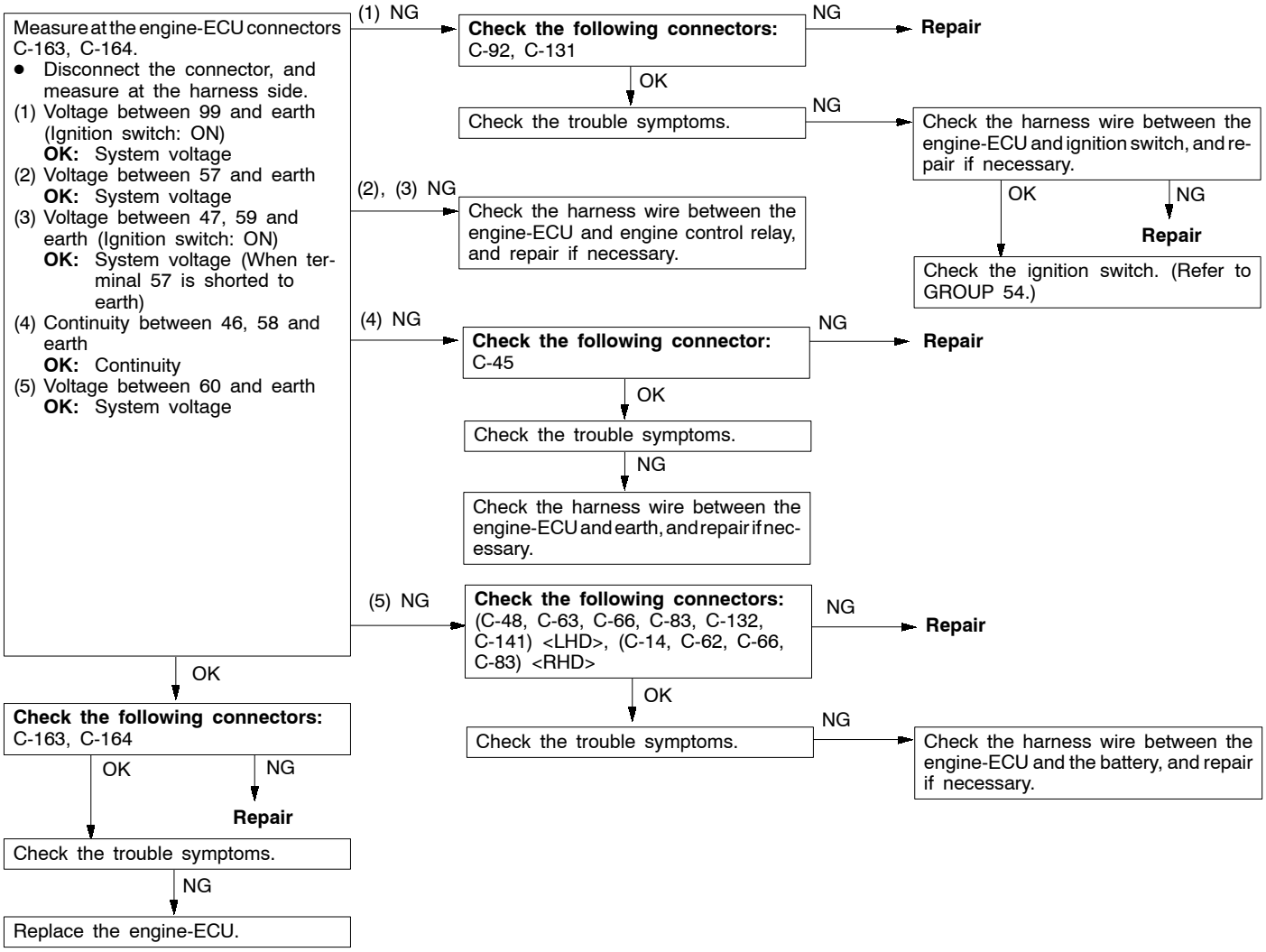
GDI ECO indicator lamp remains illuminated and does not go off.	Probable cause
If the GDI ECO indicator lamp does not go off during high load operation, the causes listed in the right column are suspected.	• Short circuit between the GDI ECO indicator lamp and engine-ECU • Malfunction of the engine-ECU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



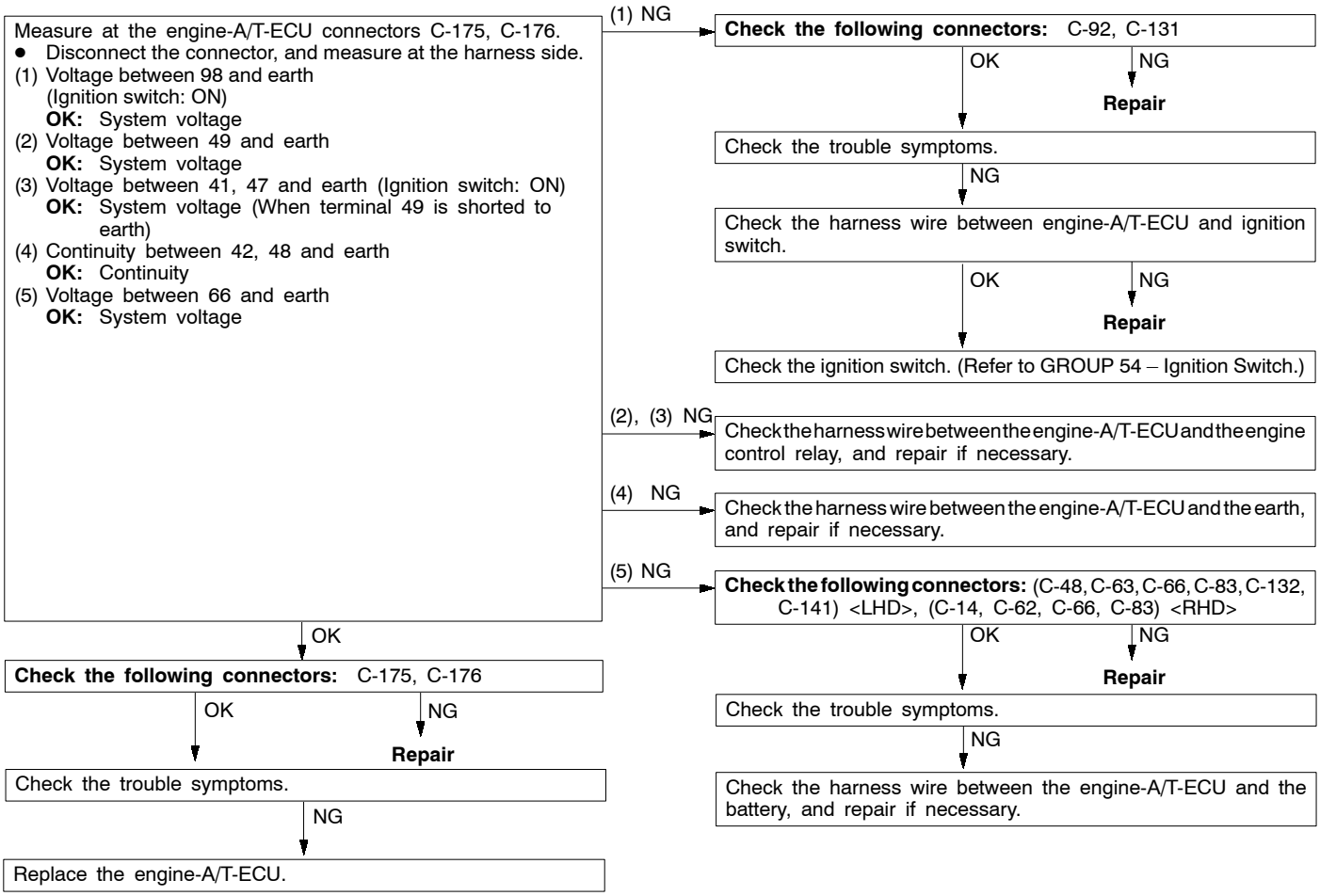
INSPECTION PROCEDURE 25

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

<M/T>

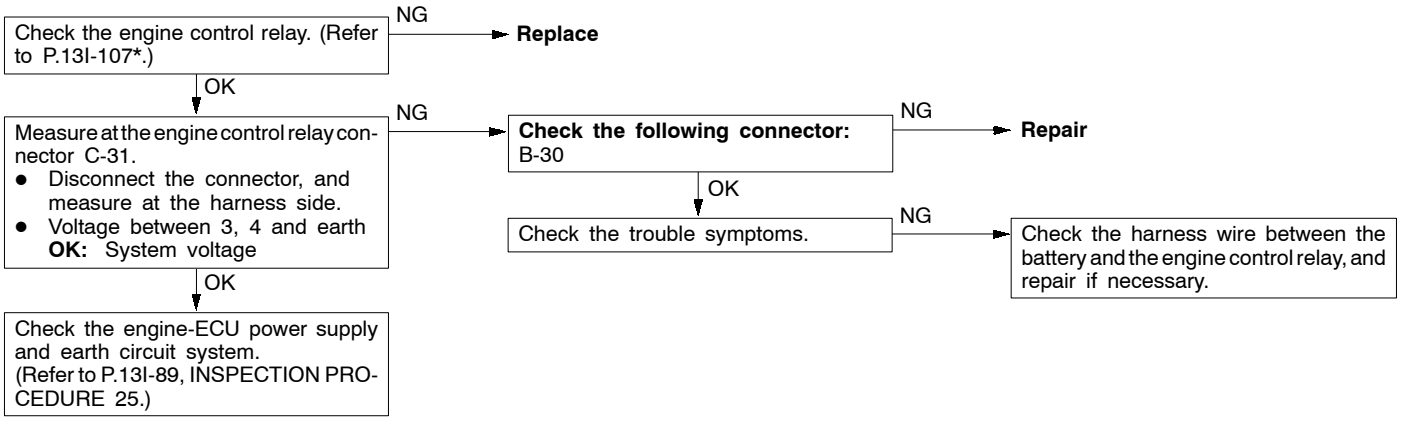


<A/T>



INSPECTION PROCEDURE 26

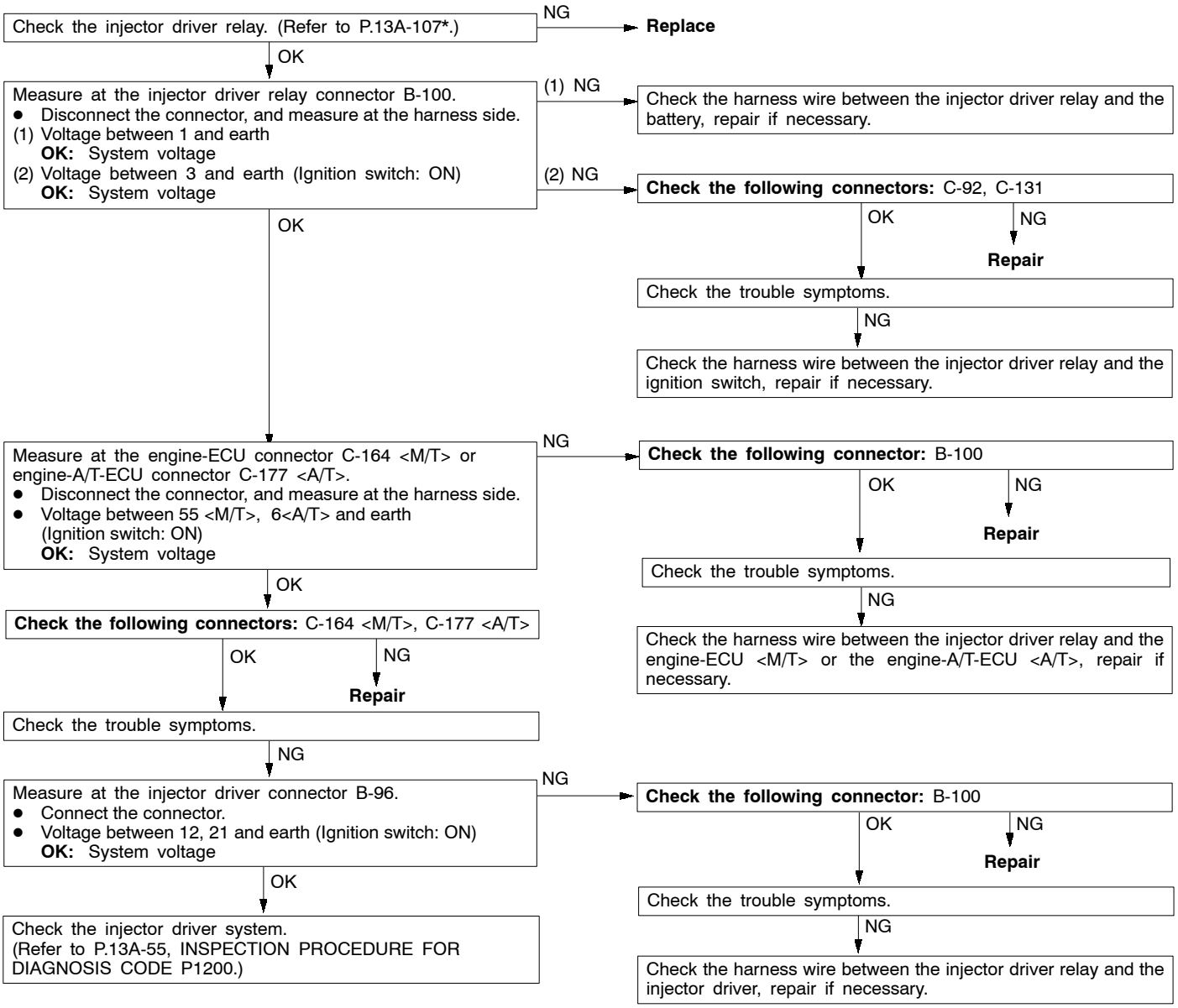
Engine control relay and ignition switch-IG system	Probable cause
When the ignition switch ON signal is input to the engine-ECU <M/T> or engine-A/T-ECU <A/T>, the engine-ECU <M/T> or engine-A/T-ECU <A/T> turns on the engine control relay. This causes system voltage to be supplied to the engine-ECU <M/T>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



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 27

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

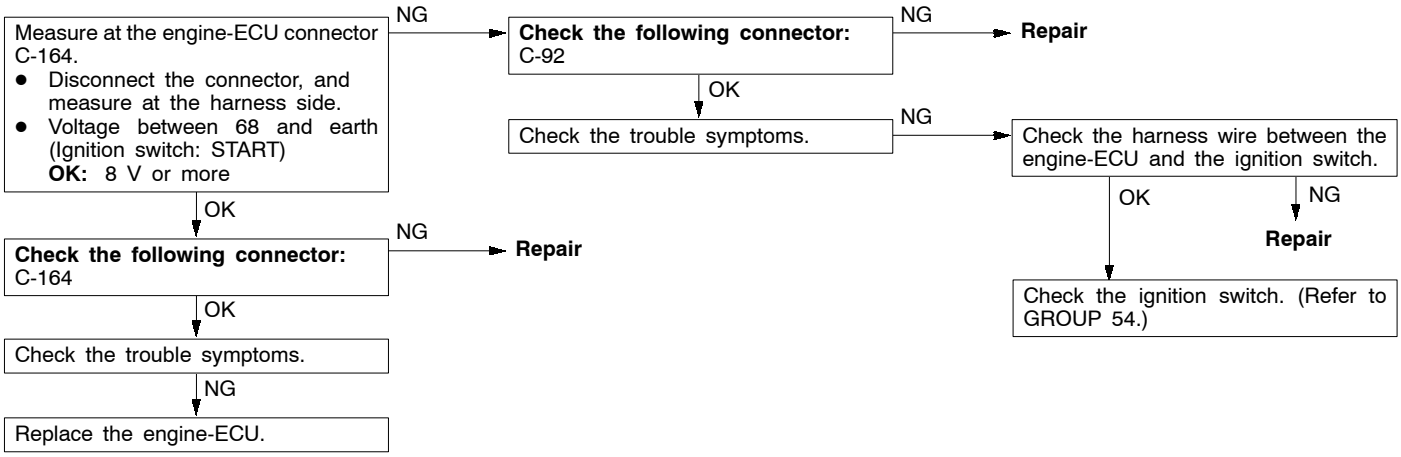


NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

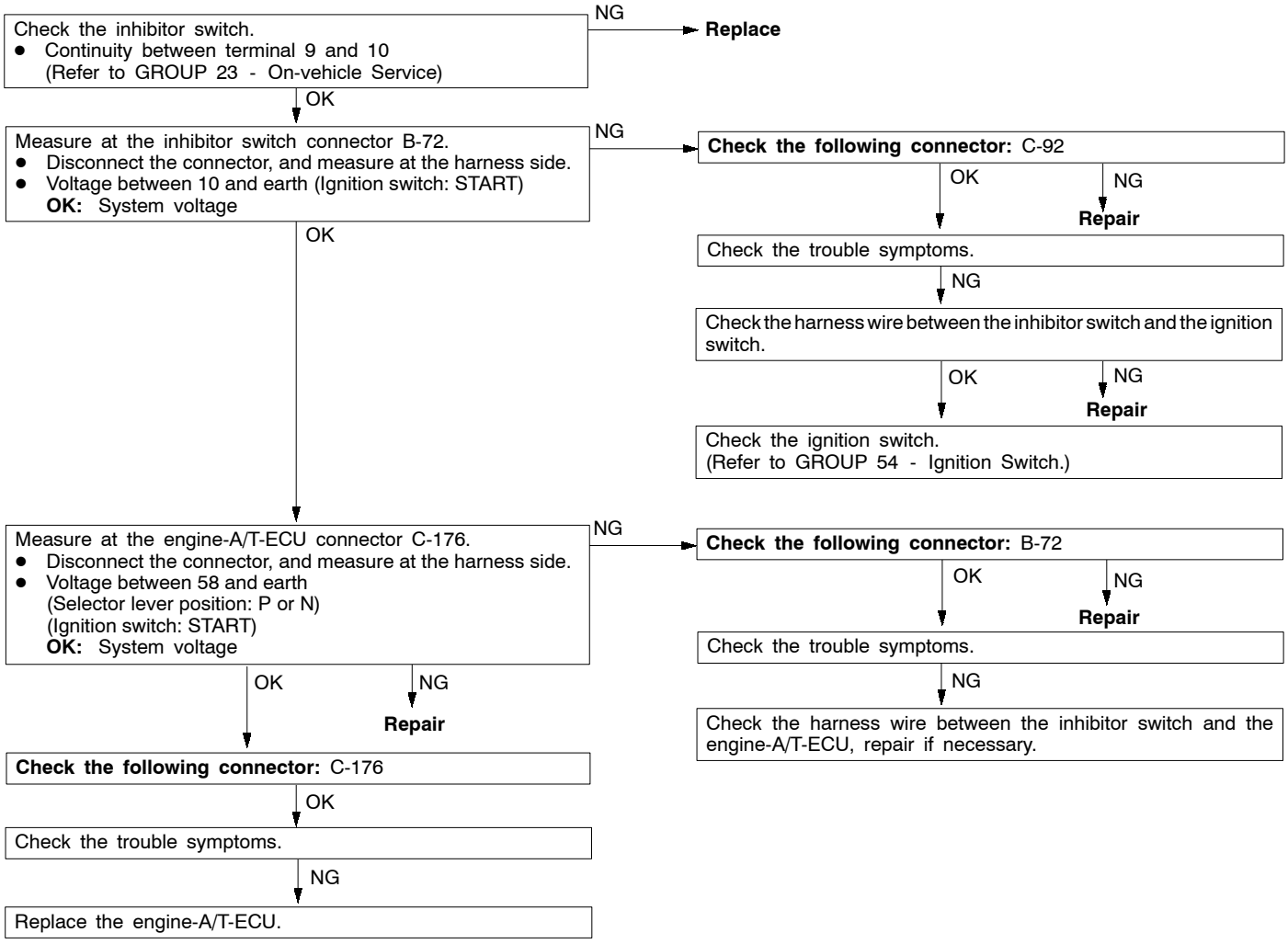
INSPECTION PROCEDURE 28

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

<M/T>

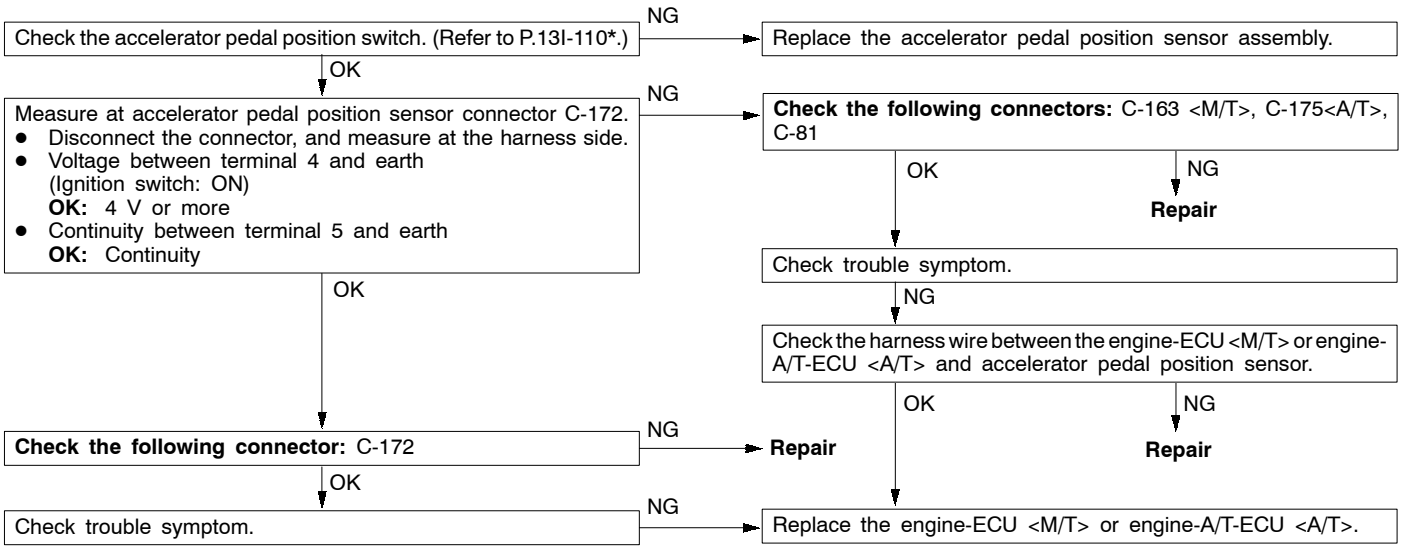


<A/T>



INSPECTION PROCEDURE 29

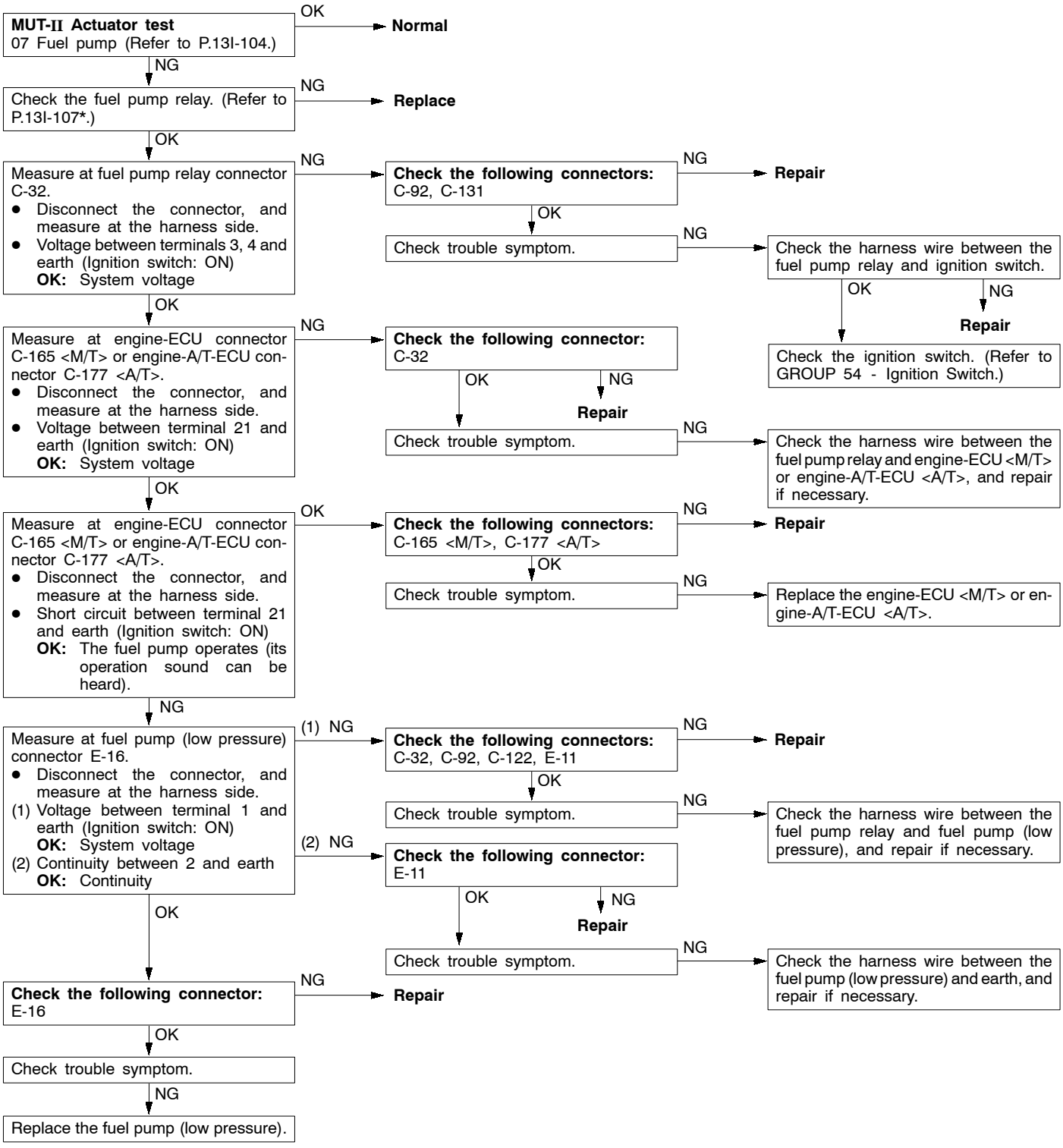
Accelerator pedal position switch system	Probable cause
The accelerator pedal position switch detects that the accelerator pedal is fully closed, and sends a signal to the engine-ECU <M/T> or engine-A/T-ECU <A/T>. The engine-ECU <M/T> or engine-A/T-ECU <A/T> controls idle speed, based on this signal.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



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

INSPECTION PROCEDURE 30

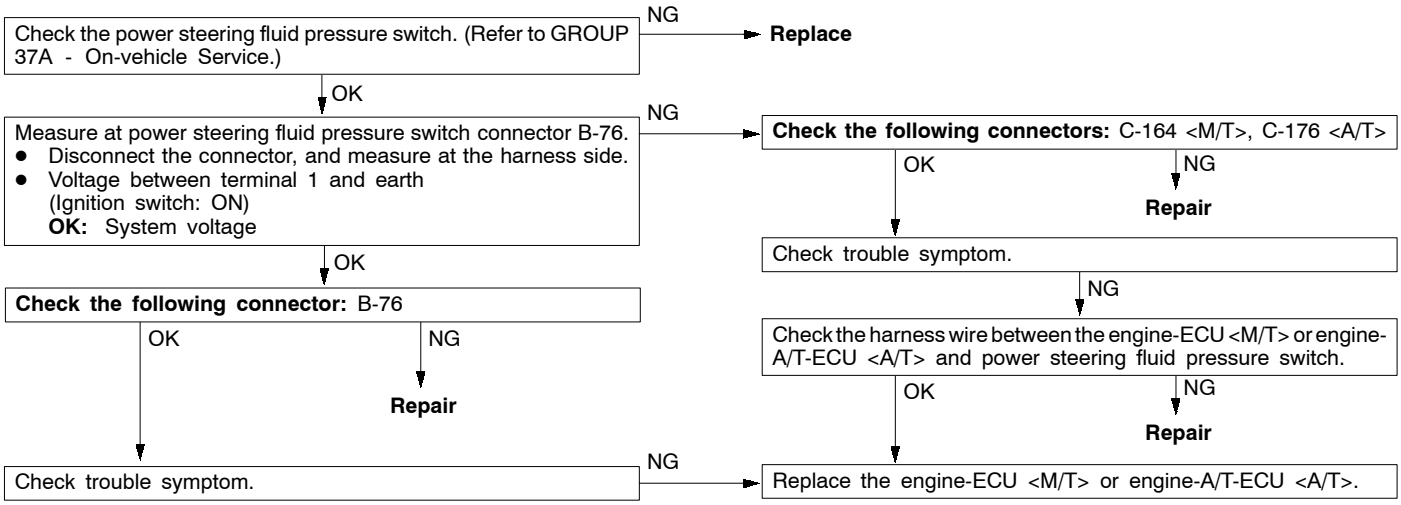
Fuel pump (low pressure) system	Probable cause
The engine-ECU <M/T> or engine-A/T-ECU <A/T> turns on the fuel pump relay while the engine is cranking or running, and supplies power source to the fuel pump (low pressure).	• Malfunction of the fuel pump relay • Malfunction of the fuel pump (low pressure) • Open circuit or short-circuited harness wire in the fuel pump (low pressure) circuit, or poor connector contact • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>



NOTE:
*: Refer to the '99 GALANT Workshop Manual (Pub. No. PWDE9611-A)

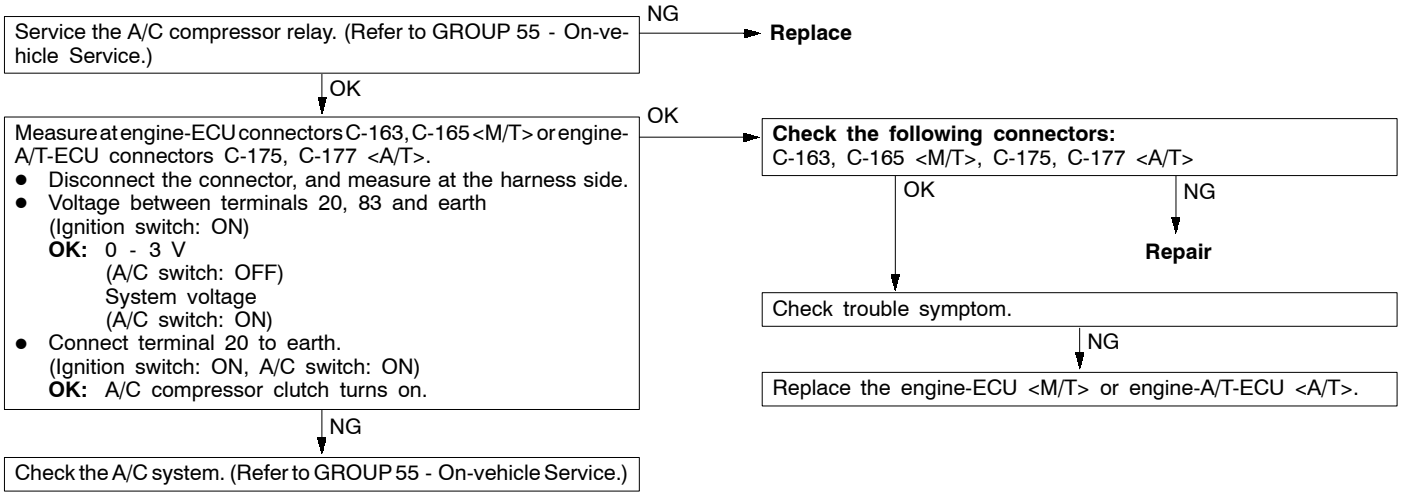
INSPECTION PROCEDURE 31

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



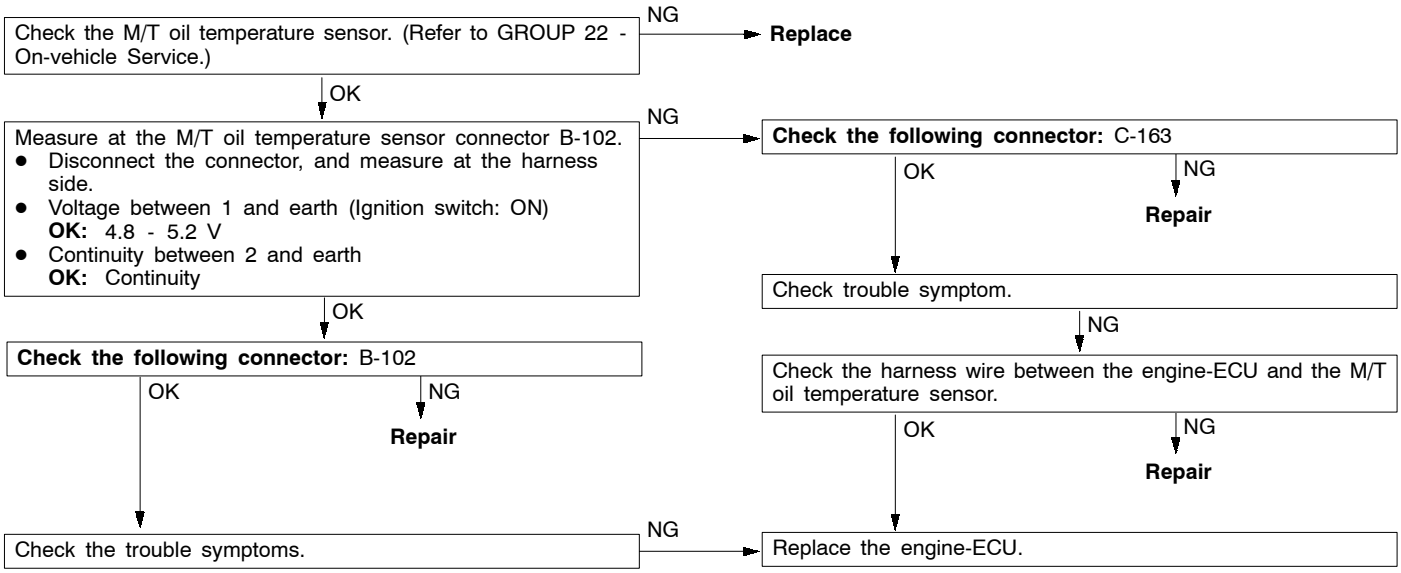
INSPECTION PROCEDURE 32

A/C switch and A/C relay system	Probable cause
If the engine-ECU receives a 'A/C on' signal, it operates the throttle control servo and A/C compressor magnetic clutch so that idle speed increases.	• Malfunction of the A/C control system • Malfunction of the A/C switch • Open circuit or short-circuited harness wire in the A/C switch circuit, or poor connector contact • Malfunction of the engine-ECU <M/T> • Malfunction of the engine-A/T-ECU <A/T>



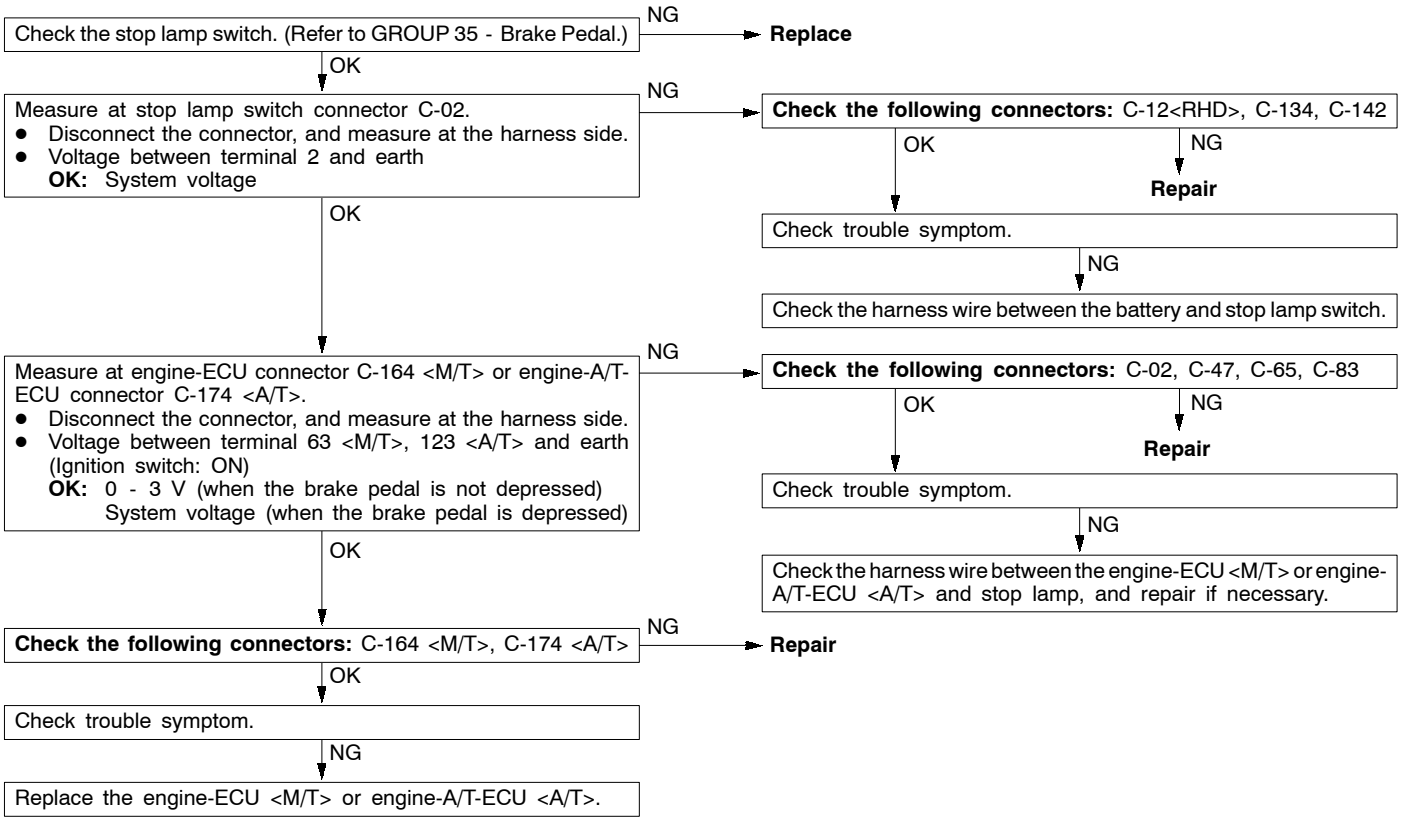
INSPECTION PROCEDURE 33

M/T oil temperature sensor system	Probable cause
This sensor inputs the manual transmission oil temperature to the engine-ECU. The engine-ECU uses this input to control the idle speed control servo so that the idle speed is increased when the manual transmission oil temperature becomes low.	• Malfunction of the M/T oil temperature sensor • Open circuit or short-circuited harness wire in the M/T oil temperature sensor circuit • Malfunction of the engine-ECU



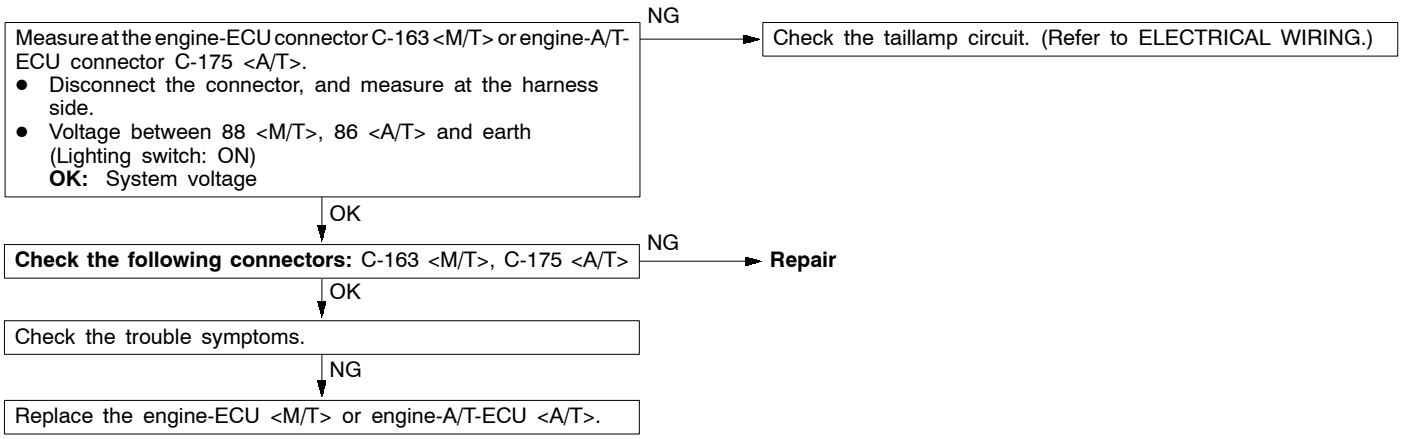
INSPECTION PROCEDURE 34

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



INSPECTION PROCEDURE 35

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



DATA LIST REFERENCE TABLE

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

NOTE
*1: Within four minutes after starting the engine
*2: In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10 % longer than the standard time.
*3: The accelerator pedal position switch normally turns off when the voltage of the accelerator pedal position sensor (1st channel) is 300 - 500 mV higher than the voltage at the idle position. If the accelerator pedal position switch turns back on after the accelerator pedal position sensor voltage has risen by 100 mV and the throttle valve has opened, the accelerator pedal position switch and the accelerator pedal position sensor (1st channel) need to be adjusted.
*4: Transmission oil temperature is 50°C or more.

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
11	Oxygen sensor (front)	Engine: After warm-up	Idling	200 mV or less*1	Code No. P0130	13I-25
			Sudden racing	600 - 1,000 mV		
			2,500 r/min	400 mV or less and 600 - 1,000 mV alternates.		
12	Air flow sensor	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Idling	20 - 55 Hz (2.0 - 5.0 g/s)	Code No. P0100	13I-13
			2,500 r/min	70 - 90 Hz (6.0 - 12.0 g/s)		
			Racing	Frequency increases in response to racing.		
13	Intake air temperature sensor	Ignition switch: ON	Intake air temperature: -20°C	-20°C	Code No. P0110	13I-17
			Intake air temperature: 0°C	0°C		
			Intake air temperature: 20°C	20°C		
			Intake air temperature: 40°C	40°C		
			Intake air temperature: 80°C	80°C		

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
14	Throttle position sensor (2nd channel)	• Engine coolant temperature: 80 - 95°C • Ignition switch: ON (Engine stopped)	Release the accelerator pedal.	4,500 - 5,500 mV	Code No. P0225	13I-43
			Depress the accelerator pedal gradually.	Voltage decreases in response to the pedal depression.		
			Depress the accelerator pedal fully.	400 - 600 mV		
16	Power supply voltage	Ignition switch: ON		System voltage	Procedure No. 25	13I-89
18	Cranking signal (Ignition switch-ST)	Transmission: Neutral (A/T: P range)	Engine: Stopped	OFF	Procedure No. 28	13I-92
			Engine: Cranking	ON		
21	Engine coolant temperature sensor	Ignition switch: ON	Engine coolant temperature: -20°C	-20°C	Code No. P0115	13I-18
			Engine coolant temperature: 0°C	0°C		
			Engine coolant temperature: 20°C	20°C		
			Engine coolant temperature: 40°C	40°C		
			Engine coolant temperature: 80°C	80°C		
22	Crank angle sensor	• Engine: Cranking • Tachometer: Connected	Compare the engine speed readings on the tachometer and the MUT-II.	Accord	Code No. P0335	13I-47
		• Engine: Idling • Accelerator pedal position switch: ON	Engine coolant temperature: -20°C	1,300 - 1,500 r/min		
			Engine coolant temperature: 0°C	1,200 - 1,400 r/min		
			Engine coolant temperature: 20°C	1,050 - 1,250 r/min		
			Engine coolant temperature: 40°C	850 - 1,050 r/min		
			Engine coolant temperature: 80°C	500 - 700 r/min <M/T>*1, *4 550 - 750 r/min <A/T>*1		
24	Vehicle speed sensor	Drive at 40 km/h		Approximately 40 km/h	Code No. P0500	13I-55

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
25	Barometric pressure sensor	Ignition switch: ON	Altitude: 0 m	101 kPa	Code No. P0105	13I-15
			Altitude: 600 m	95 kPa		
			Altitude: 1,200 m	88 kPa		
			Altitude: 1,800 m	81 kPa		
26	Accelerator pedal position switch	Ignition switch: ON (Depress and release the accelerator pedal several times)	Release the accelerator pedal.	ON	Procedure No. 29	13I-93
			Depress the accelerator pedal slightly.	OFF		
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Procedure No. 31	13I-95
			Steering wheel turning	ON		
28	A/C switch	Engine: Idling (The A/C compressor is running when the A/C switch is on.)	A/C switch: OFF	OFF	Procedure No. 32	13I-95
			A/C switch: ON	ON		
31	Small lamp switch	Engine: Idling	Lighting switch: OFF	OFF	Procedure No. 35	13I-97
			Lighting switch: ON	ON		
34	Air flow sensor reset signal	Engine: After having warmed up	Engine is idling	ON	Code No. P0100	13I-13
			3,000 r/min	OFF		
37	Volumetric efficiency	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	15 - 35 %	-	-
			2,500 r/min	15 - 35 %		
			Engine is suddenly raced	Volumetric efficiency increases in response to racing		
38	Crank angle sensor	• Engine: Cranking [reading is possible at 2,000 r/min or less] • Tachometer: Connected		Engine speeds displayed on the MUT-II and tachometer are identical.	-	-

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
41	Injector drive time*2	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Idling	0.4 - 0.6 ms*1	-	-
			2,500 r/min	0.4 - 0.8 ms		
			Sudden racing	Increases		
44	Ignition advance	• Engine: After warm-up • Set a timing light.	Idling	15 - 25°BTDC*1	Code No. P0300	13I-44
			2,500 r/min	25 - 35°BTDC		
48	M/T oil temperature sensor	Drive after the engine has warmed up.	Drive for 15 minutes or more	Gradually increases to 50 - 90°C	Procedure No. 33	13I-96
49	A/C relay	Engine: After warm-up, idling	A/C switch: OFF	OFF (compressor clutch is not operating)	Procedure No. 32	13I-95
			A/C switch: ON	ON (compressor clutch is operating)		
59	Oxygen sensor (rear)	• Transmission: 2nd gear (A/T: L range) • Drive with throttle widely open	3,500 r/min	600 - 1,000 mV	Code No. P0136	13I-28
66	Brake vacuum sensor	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Stop the engine from idling speed, and then depress the brake pedal several times with the ignition switch on.	Displayed pressure increases.	Code No. P1515	13I-64
67	Stop lamp switch	Ignition switch: ON	Brake pedal: Depressed	OFF	Procedure No. 34	13I-97
			Brake pedal: Released	ON		
68	EGR valve	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Idling	0 - 15 STEP	Code No. P0403	13I-51
			2,500 r/min	0 - 10 STEP		

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
74	Fuel pressure sensor	• Engine coolant temperature: 80 - 95°C • Lamps, electric cooling fan and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine: Idling	4 - 6.9 MPa	Code No. P0190	13I-33
77	Accelerator pedal position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	935 - 1,135 mV	Code No. P1225	13I-60
			Depress the accelerator pedal gradually.	Increases in response to the pedal depression stroke.		
			Depress the accelerator pedal fully.	4,000 mV or more		
78	Accelerator pedal position sensor (1st channel)*3	Ignition switch: ON	Release the accelerator pedal.	935 - 1,135 mV	Code No. P0220	13I-40
			Depress the accelerator pedal gradually.	Increases in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	4,200 mV or more		
79	Throttle position sensor (1st channel)	• Engine coolant temperature: 80 - 95°C • Ignition switch: ON (Engine stopped)	Release the accelerator pedal.	450 - 800 mV	Code No. P0120	13I-21
			Depress the accelerator pedal gradually.	Increases in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	4,200 - 4,900 mV		
		Engine: After warm-up, idling	No load	450 - 1,000 mV		
			A/C switch: OFF → ON	Increases by 100 - 600 mV.		
			Selector lever: N → D range	Increases by 0 - 200 mV.		
81	Long-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		-5 - 10 %	Code No. P0170	13I-31
82	Short-term fuel compensation	Engine: Warm, 2,500 r/min without any load (during closed loop)		-25 - 25 %	Code No. P0170	13I-31

Item No.	Check items	Requirements		Normal condition	Inspection procedure No.	Reference page
85	Fuel pressure sensor	● Engine coolant temperature: 80 - 95°C ● Lamps, electric cooling fan and all accessories: OFF ● Transmission: Neutral (A/T: P range)	Engine: Idling	4,000 - 6,900 kPa	-	-
87	Calculation load value	Engine: Warm	Engine: Idling	30 - 50 %	-	-
			2,500 r/min	30 - 50 %		
88	Fuel control condition	Engine: Warm	2,500 r/min	Closed loop	Code No. P0125	13I-23
			When engine is suddenly raced	Open loop - drive condition		
99	Fuel injection mode	Engine: After warm up	Idling (after four minutes or more have passed since engine start)	Lean compression	-	-
			2,500 r/min	Stoichiometric metric feedback		
			Sudden racing after idle position	Open loop		
A1	Oxygen sensor (front)	Engine: After warm-up	Idling	0 V	Code No. P0130	13I-25
			Sudden racing	0.6 - 1.0 V		
			2,500 r/min	0.4 V or less and 0.6 - 1.0 V alternates		
A2	Oxygen sensor (rear)	● Transmission: 2nd gear <M/T>, L range <A/T> ● Drive with throttle widely open	3,500 r/min	0.6 - 1.0 V	Code No. P0136	13I-28
8A	Throttle position sensor (1st channel) (Throttle valve opening angle)	● Engine coolant temperature: 80 - 95°C ● Ignition switch: ON (Engine: stopped)	Release the accelerator pedal.	8 - 16 %	Code No. P0120	13I-21
			Depress the accelerator pedal gradually.	Increase in response to pedal depression stroke.		
			Depress the accelerator pedal fully.	80 - 100 %		
		Engine: After warm-up, idling	No load	8 - 18 %		
			A/C switch: OFF → ON	Rises by 2 - 10 %		

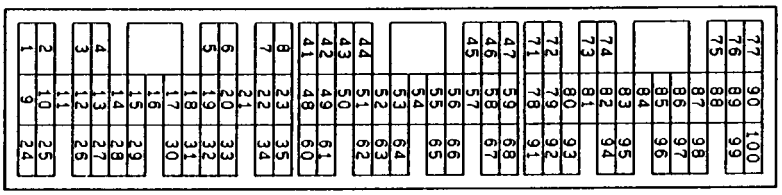
ACTUATOR TEST REFERENCE TABLE

Item No.	Inspection item	Drive contents	Inspection contents	Normal condition	Inspection procedure No.	Reference page
01	Injectors	Cut fuel to No. 1 injector	Engine: After having warmed up/Engine is idling (Cut the fuel supply to each injector in turn and check cylinders which don't affect idling.)	Idling condition becomes different (becomes unstable).	Code No. P0201	13I-34
02		Cut fuel to No. 2 injector			Code No. P0202	13I-36
03		Cut fuel to No. 3 injector			Code No. P0203	13I-37
04		Cut fuel to No. 4 injector			Code No. P0204	13I-38
07	Fuel pump (low pressure)	Fuel pump operates and fuel is recirculated.	Ignition switch: ON	Sound of operation is heard.	Procedure No. 30	13I-94
08	Purge control solenoid valve	Solenoid valve turns from OFF to ON.	Ignition switch: ON	Sound of operation can be heard when solenoid valve is driven.	Code No. P0443	13I-54
17	Basic ignition timing	Set the engine-ECU <M/T> or engine-A/T-ECU <A/T> to ignition timing adjustment mode	Idling after engine warm up	5°BTDC	-	-
21	Fan controller	Drive the fan motor	Ignition switch: ON	The fan motor operates	Procedure No. 21	13I-86
34	Electronic-controlled throttle valve system	Stop the throttle control servo.	Ignition switch: ON	Throttle valve is opened slightly.	Code No. P1220	13I-56

CHECK AT THE ENGINE-ECU TERMINALS <M/T>

TERMINAL VOLTAGE CHECK CHART

Engine-ECU Connector Terminal Arrangement



Terminal No.	Check item	Check requirements (engine condition)		Normal condition
1	No. 1 injector	Engine: Warm up, and then depress the accelerator pedal suddenly from the idle speed.		Decreases slightly for short time from 9 - 13 V
9	No. 2 injector			
24	No. 3 injector			
2	No. 4 injector			
3	No. 1 ignition coil	Engine: 3,000 r/min		0.3 - 3.0 V
13	No. 2 ignition coil			
12	No. 3 ignition coil			
4	No. 4 ignition coil			
5	EGR valve (D)	Ignition switch: Immediately after turning ON		5 - 8 V (fluctuates for approx. three seconds)
6	EGR valve (C)			
32	EGR valve (B)			
34	EGR valve (A)			
8	Alternator G terminal	• Engine: Warm up, and then idling • Radiator fan: Not operating • Headlamp: OFF → ON • Stop lamp: OFF → ON • Rear defogger switch: OFF → ON		Voltage increases by 0.2 - 3.5 V
14	GDI ECO indication lamp	Ignition switch: OFF → ON		0 - 3 V (System voltage after five seconds)
		Engine: When the accelerator pedal is suddenly depressed while the engine is idling		System voltage
16	Purge control solenoid valve	• Engine coolant temperature: 80 - 95°C • Ignition switch: ON	Engine: Stopped	System voltage
			Engine: Start the engine, and then increase engine speed up to 3,500 r/min.	Voltage decreases

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
18	Fan controller	Radiator and condenser fans are not operating.		0 - 0.3 V
		Radiator and condenser fans are operating.		0.7 V or more
20	A/C relay	● Engine: Idling ● A/C switch: OFF → ON (Compressor is operating)		System voltage, or changes from momentarily 6 V or more to 0 → 3 V
21	Fuel pump relay	Ignition switch: ON	Engine: Stopped	System voltage
			Engine: Idling	0 - 3 V
31	Engine warning lamp	Ignition switch: OFF → ON		0 - 3 V → System voltage (after several seconds)
41	Sensor power supply	Ignition switch: ON		4.5 - 5.5 V
42	Power supply to accelerator pedal position sensor (1st channel)	Ignition switch: ON		4.5 - 5.5 V
43	Crank angle sensor	Engine: Cranking		0.4 - 4.0 V
		Engine: Idling		1.5 - 2.5 V
44	Engine coolant temperature sensor	Ignition switch: ON	Engine coolant temperature: 0°C	3.2 - 3.8 V
			Engine coolant temperature: 20°C	2.3 - 2.9 V
			Engine coolant temperature: 40°C	1.3 - 1.9 V
			Engine coolant temperature: 80°C	0.3 - 0.9 V
45	Engine ignition signal	Engine: 3,000 r/min		0.3 - 3.0 V
47	Power supply	Ignition switch: ON		System voltage
59				
50	Camshaft position sensor	Engine: Cranking		0.3 - 3.0 V
		Engine: Idling		0.5 - 3.5 V
51	Barometric pressure sensor	Ignition switch: ON	Altitude: 0 m	3.7 - 4.3 V
			Altitude: 1,200 m	3.2 - 3.8 V
52	Alternator FR terminal	● Engine: Warm up, and then idling ● Radiator fan: Not operating ● Headlamp: OFF → ON ● Stop lamp: OFF → ON ● Rear defogger: OFF → ON		Voltage decreases

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
53	Oxygen sensor (rear)	● Transmission: 2nd gear ● Engine speed: 3,500 r/min or more ● Driving with the throttle valve widely open		0.6 - 1.0 V
54	Power steering fluid pressure switch	Engine: Warm up, and then idling	Steering wheel stationary	System voltage
			Steering wheel turning	0 - 3 V
55	Injector driver relay	Ignition switch: OFF		0 - 0.1 V
		Ignition switch: ON		0.5 - 1.0 V
56	Throttle valve control servo relay	Ignition switch: OFF		0 - 0.3 V
		Ignition switch: ON		0.5 - 1.0 V
57	Engine control relay	Ignition switch: OFF		0 - 3 V
		Ignition switch: ON		System voltage
60	Back-up power source	Ignition switch: OFF		System voltage
61	Air flow sensor	Engine: Idling		2.2 - 3.2 V
		Engine: 2,500 r/min		
62	Intake air temperature sensor	Ignition switch: ON	Intake air temperature: 0°C	3.2 - 3.8 V
			Intake air temperature: 20°C	2.3 - 2.9 V
			Intake air temperature: 40°C	1.5 - 2.1 V
			Intake air temperature: 80°C	0.4 - 1.0 V
63	Stop lamp switch	Depress the brake pedal.		System voltage
		Release the brake pedal.		0 - 3 V
64	A/C pressure sensor	Engine: Idling	Set the A/C switch to Max. COOL (under high load)	8 V or more
			Set the A/C switch to MAX. HOT (under low load)	4 V or less
66	Clutch switch	Depress the clutch pedal.		0 - 3 V
		Release the clutch pedal.		System voltage
68	Ignition switch-ST	Engine: Cranking		8 V or more
71	Oxygen sensor (front)	Engine: Warm up, and then hold the engine speed at 2,500 r/min (Use a digital voltmeter).		0 ↔ 0.8 V alternates.

Terminal No.	Check item	Check requirements (engine condition)		Normal condition
73	M/T oil temperature sensor	M/T oil temperature: 25°C		2.4 - 2.7 V
		M/T oil temperature: 80°C		0.5 - 0.8 V
74	Brake vacuum sensor	Engine: Stop the engine from idle speed, turn the ignition switch ON, and then depress the brake pedal several times.		Voltage increases
76	Air flow sensor reset signal	Engine: Idling		0 - 1 V
		Engine: 3,000 r/min		6 - 9 V
78	Throttle position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	4.5 - 5.5 V
			Depress the accelerator pedal fully.	0.4 - 0.6 V
79	Accelerator pedal position switch	Ignition switch: ON	Release the accelerator pedal.	0 - 1 V
			Depress the accelerator pedal fully.	4 V or more
80	Vehicle speed sensor	• Ignition switch: ON • Move the vehicle forward.		0 ↔ system voltage alternates.
83	A/C switch	Engine: Idling	A/C switch: OFF	0 - 3 V
			A/C switch: ON (Compressor is operating)	System voltage
88	Small lamp switch	Lighting switch: OFF		0 - 3 V
		Lighting switch: ON (Taillamp: ON)		System voltage
89	Oxygen sensor heater (front)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
90	Oxygen sensor heater (rear)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
92	Fuel pressure sensor	Engine: Idling		0.3 - 4.7 V
94	Accelerator pedal position sensor (1st channel)	Ignition switch: ON	Release the accelerator pedal.	0.9 - 1.2 V
			Depress the accelerator pedal fully.	4 V or more
96	Injector open circuit check signal	Engine: Increase engine speed from idle speed to 4,000 r/min.		Decreases slightly (approx. 0.7 V) from 4.5 V - 5.0 V.
99	Ignition switch-IG	Ignition switch: ON		System voltage

CHECK CHART FOR RESISTANCE AND CONTINUITY BETWEEN TERMINALS

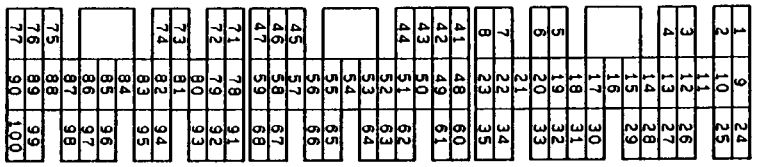
1. Turn the ignition switch to OFF.
2. Disconnect the engine-ECU connector.
3. Measure the resistance and check for continuity between the terminals of the engine-ECU harness-side connector while referring to the check chart.

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

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

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

Engine-ECU Harness Side Connector Terminal Arrangement

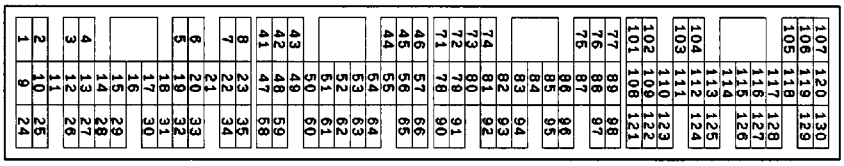


Terminal No.	Check item	Standard value, normal condition (check requirements)
5 - 47	EGR valve (D)	10 - 20 Ω (at 20°C)
6 - 47	EGR valve (C)	
32 - 47	EGR valve (B)	
34 - 47	EGR valve (A)	
16 - 47	Purge control solenoid valve	28 - 36 Ω (at 20°C)
44 - 72	Engine coolant temperature sensor	5.1 - 6.5 kΩ (when engine coolant temperature is 0°C)
		2.1 - 2.7 kΩ (when engine coolant temperature is 20°C)
		0.9 - 1.3 kΩ (when engine coolant temperature is 40°C)
		0.26 - 0.36 kΩ (when engine coolant temperature is 80°C)
46 - Body earth	Earth	Continuity (0 Ω)
58 - Body earth		
62 - 72	Intake air temperature sensor	5.3 - 6.7 kΩ (when intake air temperature is 0°C)
		2.3 - 3.0 kΩ (when intake air temperature is 20°C)
		1.0 - 1.5 kΩ (when intake air temperature is 40°C)
		0.30 - 0.42 kΩ (when intake air temperature is 80°C)
79 - 49	Accelerator pedal position switch	Continuity (when the accelerator pedal is released)
		No continuity (when the accelerator pedal is slightly depressed)
89 - 47	Oxygen sensor heater control (front)	4.5 - 8.0 Ω (at 20°C)
90 - 47	Oxygen sensor heater (rear)	11 - 18 Ω (at 20°C)

CHECK AT THE ENGINE-A/T-ECU TERMINALS <A/T>

TERMINAL VOLTAGE CHECK CHART

Engine-A/T-ECU Connector Terminal Arrangement



7FU1763

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 9 - 13 V, momentarily drops slightly
9	No. 2 injector		
24	No. 3 injector		
2	No. 4 injector		
3	Oxygen sensor heater (front)	Engine: Idling	0 - 3 V
		Engine: 3,500 r/min	System voltage
6	Injector driver relay	Ignition switch: OFF	0 - 0.1 V
		Ignition switch: ON	0.5 - 1.0 V
8	Alternator G terminal	• Engine: Idling after warming-up • Radiator fan: Not operating • Headlamp: OFF to ON • Stop lamp: OFF to ON • Defogger switch: OFF to ON	The voltage increases by 0.2 - 3.5 V
54	Alternator FR terminal	• Engine: Idling after warming-up • Radiator fan: Not operating • Headlamp: OFF to ON • Stop lamp: OFF to ON • Defogger switch: OFF to ON	The voltage drops
11	No. 1 ignition coil	Engine speed: 3,000 r/min	0.3 - 3.0 V
12	No. 2 ignition coil		
31	No. 3 ignition coil		
30	No. 4 ignition coil		
14	Throttle control servo relay	Ignition switch: OFF	0 - 0.1 V
		Ignition switch: ON	0.5 - 1.0 V
18	Fan controller	Condenser fan not operating	System voltage
		Condenser fan operating	0 - 3 V or more
19	Air flow sensor reset signal	Engine: Idling	0 - 1 V
		Engine speed: 3,000 r/min	6 - 9 V

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
20	A/C relay	• Engine: Idling • A/C switch: OFF to ON (Compressor operating)		System voltage or changes momentarily 6 V or more to 0 - 3 V
21	Fuel pump relay	Ignition switch: ON		System voltage
		Engine: Idling		0 - 3 V
22	Engine warning lamp	Ignition switch: OFF to ON		System voltage
23	GDI ECO indication lamp	Ignition switch: OFF → ON		0 - 3 V (System voltage after five seconds)
		Rev the engine suddenly.		System voltage
26	Oxygen sensor heater (rear)	Engine: Idling		0 - 3 V
		Engine: 3,500 r/min		System voltage
34	Purge control solenoid valve	• Engine coolant temperature: 80 - 95°C • Ignition switch: ON	Engine: Stopped	System voltage
			Engine: After starting, increase the engine speed up to 3,500 r/min	The voltage drops
41	Power supply	Ignition switch: ON		System voltage
47				
43	Engine ignition signal	Engine speed: 3,000 r/min		0.3 - 3.0 V
44	Engine coolant temperature sensor	Ignition switch: ON	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 80°C	0.3 - 0.9 V
45	Crank angle sensor	Engine: Cranking		0.4 - 4.0 V
		Engine: Idling		1.5 - 2.5 V
46	Power supply voltage applied to accelerator pedal position sensor (1st channel)	Ignition switch: ON		4.5 - 5.5 V
49	Engine control relay	Ignition switch: OFF		0 - 3 V
		Ignition switch: ON		System voltage
51	EGR valve (A)	Ignition switch: OFF to ON		5 - 8 V (Repeatedly changes for approx. 3 seconds)
53	EGR valve (C)			
60	EGR valve (B)			
62	EGR valve (C)			

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
52	Power steering fluid pressure switch	Engine: Idling after warming-up	When steering wheel is stationary	System voltage
			When steering wheel is turned	0 - 3 V
55	Barometric pressure sensor	Ignition switch: ON	At an altitude of 0 m	3.7 - 4.3 V
			At an altitude of 1,200 m	3.2 - 3.8 V
56	Camshaft position sensor	Engine: Cranking		0.3 - 3.0 V
		Engine: Idling		0.5 - 3.5 V
58	Ignition switch-ST	Engine: Cranking		8 V or more
63	Injector open circuit check signal	Engine: Increases from idling up to 4,000 r/min		The voltage decreases slightly (approx. 0.7 V) from 4.5 - 5.0 V.
64	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
65	Air flow sensor	Engine: Idling		2.2 - 3.2 V
		Engine speed: 2,500 r/min		
66	Backup power supply	Ignition switch: OFF		System voltage
71	Oxygen sensor (front)	Engine: Running at 2,500 r/min after warming-up (Check by using a digital voltmeter.)		Voltages of 0 V and 0.8 V alternate
73	Oxygen sensor (rear)	• Transmission: L range • Engine speed: 3,500 r/min or more • Driving with the throttle valve widely open		0.6 - 1.0 V
78	Throttle position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	4.5 - 5.5 V
			Depress the accelerator pedal fully.	0.4 - 0.6 V
79	Accelerator pedal position switch	Ignition switch: ON	Release the accelerator pedal.	0 - 1 V
			Depress the accelerator pedal slightly.	4 V or more
80	Vehicle speed sensor	• Ignition switch: ON • Move the vehicle slowly forward		Voltages of 0 and 8 - 12 V alternate (changes repeatedly)

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
83	A/C switch	Engine: Idling	A/C switch: OFF	0 - 3 V
			A/C switch: ON (Compressor is operating)	System voltage
86	Small lamp switch	Lighting switch: OFF		0 - 3 V
		Lighting switch: Tail light position		System voltage
87	Sensor applied voltage	Ignition switch: ON		4.5 - 5.5 V
93	Fuel pressure sensor	Engine: Idling		0.3 - 4.7 V
94	A/C pressure sensor	Engine: Idling	Set the A/C switch to MAX. COOL (under high load)	8 V or more
			Set the A/C switch to MAX. HOT (under low load)	4 V or less
95	Accelerator pedal position sensor (1st channel)	Ignition switch: ON	Release the accelerator pedal.	0.9 - 1.2 V
			Depress the accelerator pedal fully.	4.0 V or higher
96	Brake vacuum sensor	Engine: Stop the engine from idle speed, turn the ignition switch ON, and then depress the brake pedal several times.		Voltage increases
98	Ignition switch-IG	Ignition switch: ON		System voltage
123	Stop lamp switch	Depress the brake pedal.		System voltage
		Release the brake pedal.		0 - 3 V

CHECK CHART FOR RESISTANCE AND CONTINUITY BETWEEN TERMINALS

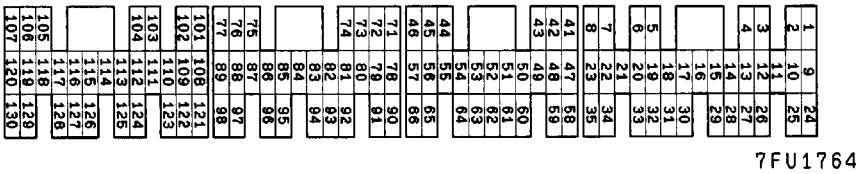
1. Turn the ignition switch to OFF.
2. Disconnect the engine-A/T-ECU connector.
3. Measure the resistance and check for continuity between the terminals of the engine-A/T-ECU harness-side connector while referring to the check chart.

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

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

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

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

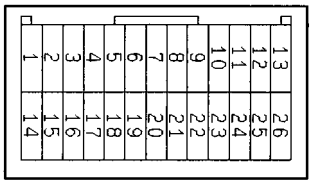


Terminal No.	Check item	Standard value, normal condition (check conditions)
3 - 41	Oxygen sensor heater (front)	4.5 - 8.0 Ω (at 20°C)
26 - 41	Oxygen sensor heater (rear)	11 - 18 Ω (at 20°C)
34 - 41	Purge control solenoid valve	28 - 36 Ω (at 20°C)
Between terminal 42 and body earth	Earth	Continuity (0 Ω)
Between terminal 48 and body earth		
51 - 41	EGR valve (A)	10 - 20 Ω (at 20°C)
53 - 41	EGR valve (C)	
60 - 41	EGR valve (B)	
62 - 41	EGR valve (D)	
44 - 81	Engine coolant temperature sensor	5.1 - 6.5 kΩ (When coolant temperature is 0°C)
		2.1 - 2.7 kΩ (When coolant temperature is 20°C)
		0.9 - 1.3 kΩ (When coolant temperature is 40°C)
		0.26 - 0.36 kΩ (When coolant temperature is 80°C)
64 - 81	Intake air temperature sensor	5.3 - 6.7 kΩ (When intake air temperature is 0°C)
		2.3 - 3.0 kΩ (When intake air temperature is 20°C)
		1.0 - 1.5 kΩ (When intake air temperature is 40°C)
		0.30 - 0.42 kΩ (When intake air temperature is 80°C)
79 - 81	Accelerator pedal position switch	Continuity (when the accelerator pedal is released)
		No continuity (when the accelerator pedal is depressed slightly)

CHECK AT THE THROTTLE VALVE CONTROLLER TERMINALS

TERMINAL VOLTAGE CHECK CHART

Throttle Valve Controller Terminal Arrangement



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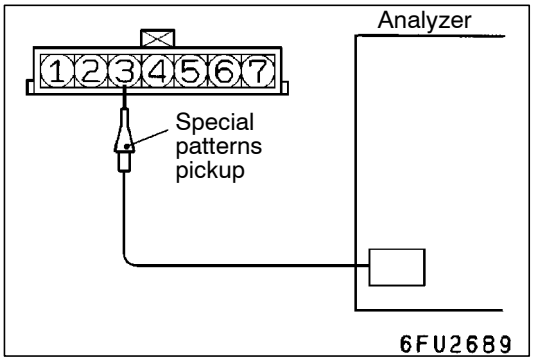
Terminal No.	Check items	Requirements		Normal value
1	Throttle valve control servo (A+)	● Ignition switch: ON ● Accelerator pedal: Fully opened → fully closed		Decreases slightly from system voltage.
9	Throttle valve control servo (B+)			
14	Throttle valve control servo (A-)	● Ignition switch: ON ● Accelerator pedal: Fully closed → fully opened		Decreases slightly (approx. 2 V) from system voltage.
15	Throttle valve control servo (B-)			
2	Power supply to throttle valve control servo	Ignition switch: ON		System voltage
19				
5	Power supply	Ignition switch: ON		System voltage
6	Sensor voltage	Ignition switch: ON		4.5 - 5.5 V
7	Throttle position sensor (1st channel)	Ignition switch: ON	Release the accelerator pedal.	0.4 - 0.8 V
			Depress the accelerator pedal fully.	4.2 - 4.9 V
20	Accelerator pedal position sensor (2nd channel)	Ignition switch: ON	Release the accelerator pedal.	0.9 - 1.2 V
			Depress the accelerator pedal fully.	4 V or more
22	Ignition switch-IG	Ignition switch: ON		System voltage



INSPECTION PROCEDURE USING AN ANALYZER

AIR FLOW SENSOR (AFS)

The followings have been changed from the previous description.

Alternate Method (Test harness not available)

<Vehicles with M/T>

1. Connect the analyzer special patterns pickup to engine-ECU terminal 61.

<Vehicles with A/T>

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 65.

CAMSHAFT POSITION SENSOR AND CRANK ANGLE SENSOR

The measurement method has been changed from the previous description.

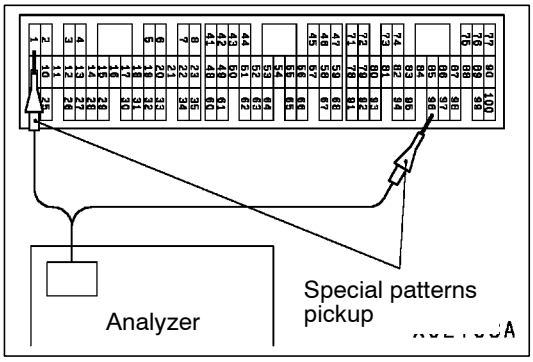
Alternate Method (Test harness not available)

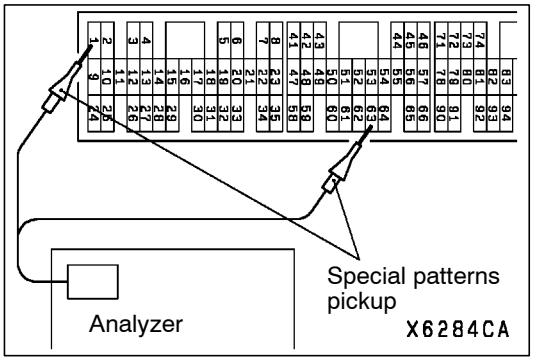
<Vehicles with M/T>

1. Connect the analyzer special patterns pickup to engine-ECU terminal 50. (When checking the camshaft position sensor signal wave pattern.)
2. Connect the analyzer special patterns pickup to engine-ECU terminal 43. (When checking the crank angle sensor signal wave pattern.)

<Vehicles with A/T>

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 56. (When checking the camshaft position sensor signal wave pattern.)
2. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 45. (When checking the crank angle sensor signal wave pattern.)





INJECTORS AND INJECTOR OPEN CIRCUIT CHECK SIGNAL

Measurement Method

<Vehicles with M/T>

1. Connect the analyzer special patterns pickup to terminal 1 (No. 1 injector) of the engine-ECU connector.
2. Connect the analyzer special patterns pickup to terminal 96 (injector open circuit check signal) of the engine-ECU connector.
3. After checking terminal 1, check terminal 9 (No. 2 injector), terminal 24 (No. 3 injector) and terminal 2 (No. 4 injector).

<Vehicles with A/T>

1. Connect the analyzer special patterns pickup to terminal 1 (No. 1 injector) of the engine-A/T-ECU connector.
2. Connect the analyzer special patterns pickup to terminal 63 (injector open circuit check signal) of the engine-A/T-ECU connector.
3. After checking terminal 1, check terminal 9 (No. 2 injector), terminal 24 (No. 3 injector) and terminal 2 (No. 4 injector).

IGNITION COIL AND POWER TRANSISTOR (Power transistor control signal)

The followings have been changed from the previous description.

Alternate Method (Test harness not available)

<Vehicles with M/T>

1. Connect the analyzer special patterns pickup to engine-ECU terminal 3 (No. 1 ignition coil), terminal 13 (No. 2 ignition coil), terminal 12 (No. 3 ignition coil) and terminal 4 (No. 4 ignition coil) respectively.

<Vehicles with A/T>

1. Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 11 (No. 1 ignition coil), terminal 12 (No. 2 ignition coil), terminal 31 (No. 3 ignition coil) and terminal 30 (No. 4 ignition coil) respectively.

EGR VALVE (STEPPER MOTOR)

The followings have been changed from the previous description.

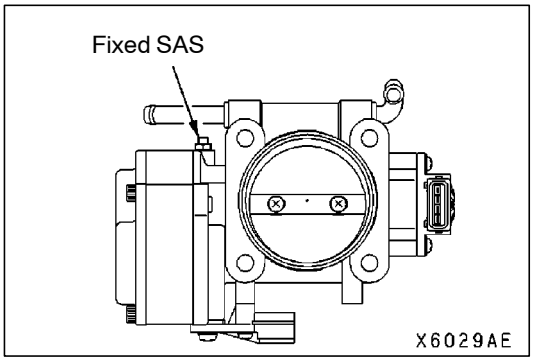
Alternate Method (Test harness not available)

<Vehicles with M/T>

Connect the analyzer special patterns pickup to engine-ECU terminal 34, connection terminal 32, connection terminal 6, and connection terminal 5 respectively.

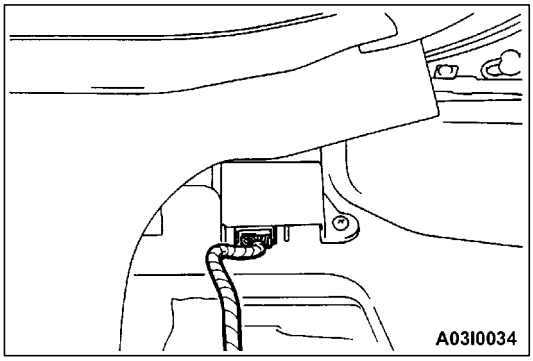
<Vehicles with A/T>

Connect the analyzer special patterns pickup to engine-A/T-ECU terminal 51, connection terminal 60, connection terminal 53, and connection terminal 62 respectively.



ON-VEHICLE SERVICE

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



FUEL PUMP CONNECTOR DISCONNECTION (HOW TO REDUCE FUEL PRESSURE)

When removing the fuel pipe, hose, etc., since fuel pressure in the fuel pipe line is high, do the following operation so as to release fuel pressure in the line and prevent fuel from running out.

1. Remove the fuel filler cap to release pressure in the fuel tank.
2. Remove the fuel pump relay.
3. Connect the MUT-II to the diagnosis connector.

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

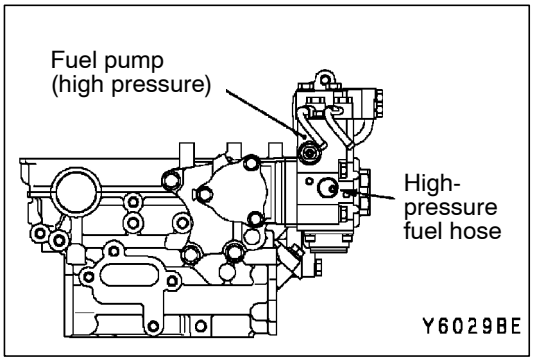
4. Turn off the ignition switch.
5. Select “Item No. 74” from the MUT-II Data list.
6. Crank the engine for at least two seconds.
7. If the engine is not be started, use the MUT-II to make sure that the fuel pressure is 0.5 MPa or less. Then turn off the ignition switch.
8. If the engine is started, release fuel pressure by the following procedure:
   (1) Turn off the ignition switch, and then stop the engine.
   (2) Disconnect one of the ignition coil connectors.
   (3) Crank the engine for at least two seconds.
   (4) If the engine is not be started, use the MUT-II to make sure that the fuel pressure is 0.5 MPa or less. Then turn off the ignition switch.
   (5) If the engine is started, stop it by racing and use the MUT-II to make sure that the fuel pressure is 0.5 MPa or less. Then turn off the ignition switch.
   (6) Reconnect the ignition coil connector.

   Caution
   Clean the spark plug which corresponds to the disconnected ignition coil connector.

9. Remove the MUT-II.
10. Install the fuel pump relay.

FUEL PUMP OPERATION CHECK

This procedure is the same as for the 4G6-MPI engine.

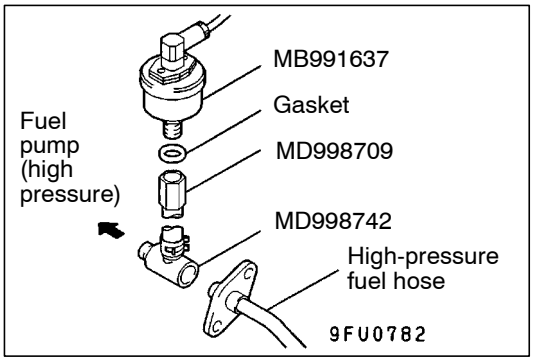


FUEL PRESSURE TEST

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

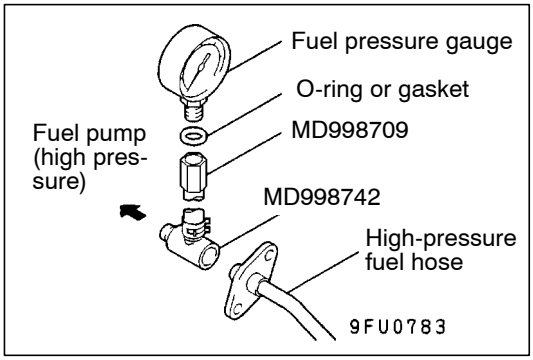
1. Release residual pressure from the fuel pipe line to prevent fuel gush out. (Refer to P. 13I-121)
2. Disconnect the high-pressure fuel hose at the fuel pump (high pressure) side.

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



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

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



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

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

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

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

    Standard value: approximately 324 kPa

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

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

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

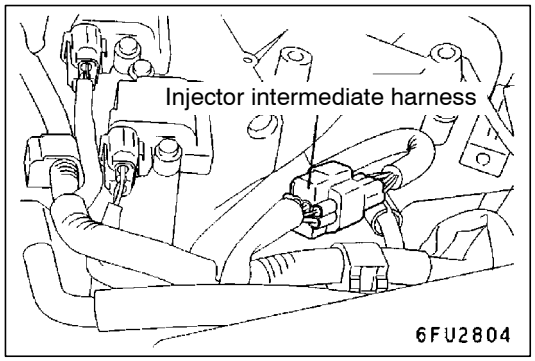
Symptom	Probable cause	Remedy
Fuel pressure drops gradually after engine is stopped	Leaky fuel pressure regulator (low pressure) valve seat	Replace fuel pressure regulator (low pressure)
Fuel pressure drops sharply immediately after engine is stopped	Check valve in fuel pump (low pressure) is held open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

14. Release residual pressure from the fuel pipe line. (Refer to P.13I-121.)

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

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

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



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

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

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

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

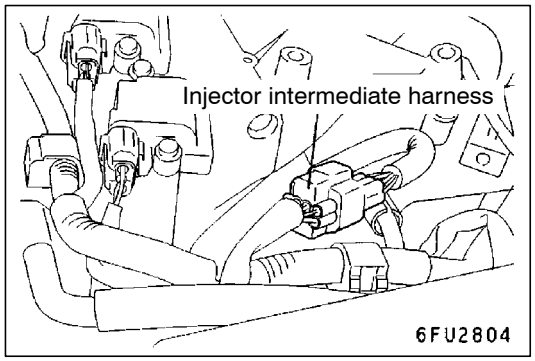
6. Check if the fuel pressure is more than 1 MPa immediately after 20 seconds have passed since cranking was finished.
7. If the fuel pressure is lower than 1 MPa, it means that there is likely to be a leak in the high-pressure fuel system, so this system should be checked.
8. Turn the ignition switch to OFF.
9. Connect the injector intermediate harness connector.
10. Start the engine and run at idle.
11. Measure fuel pressure while the engine is running at idle.

    Standard value: 4 - 6.9 MPa

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

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

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



FUEL LEAK CHECK

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

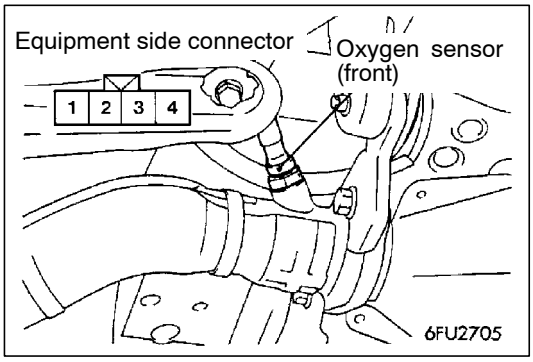
   Caution
   If any fuel leaks appear, stop cranking immediately and repair the source of the leak.

6. Crank the engine, and then measure fuel pressure immediately after 20 seconds.

   Limit: Minimum 1 MPa

   Caution
   If the fuel pressure is less than 1 MPa, there may be a partial fuel leak in the high-pressure fuel system.

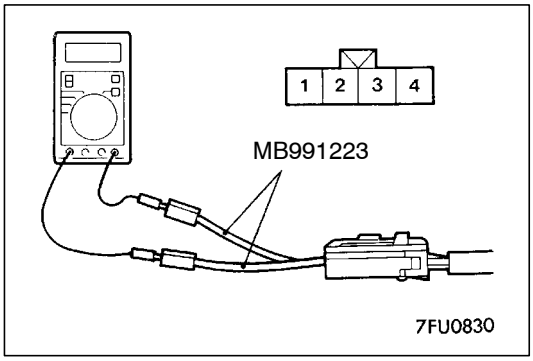
7. Turn off the ignition switch.
8. Reconnect the injector intermediate connector.
9. Remove the MUT-II.



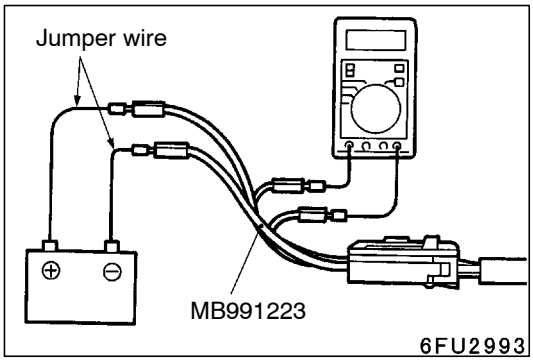
OXYGEN SENSOR CHECK

<Oxygen sensor (front)>

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



2. Make sure that there is continuity (4.5 - 8.0 Ω at 20°C) between terminal 3 and terminal 4 on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.
4. Warm up the engine until engine coolant is 80°C or higher.



5. Use a jumper wire to connect terminal 3 of the oxygen sensor connector to the battery (+) terminal and terminal 4 to the battery (-) terminal.

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

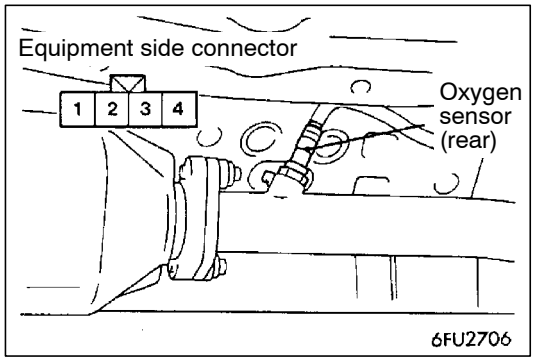
6. Connect a digital voltage meter between terminal 1 and terminal 2.
7. While repeatedly racing the engine, measure the oxygen sensor output voltage.

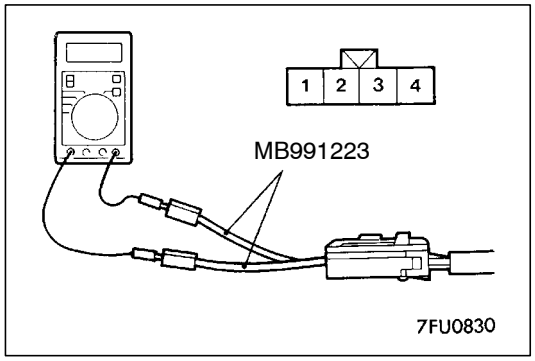
   Standard value:

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

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

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





<Oxygen sensor (rear)>

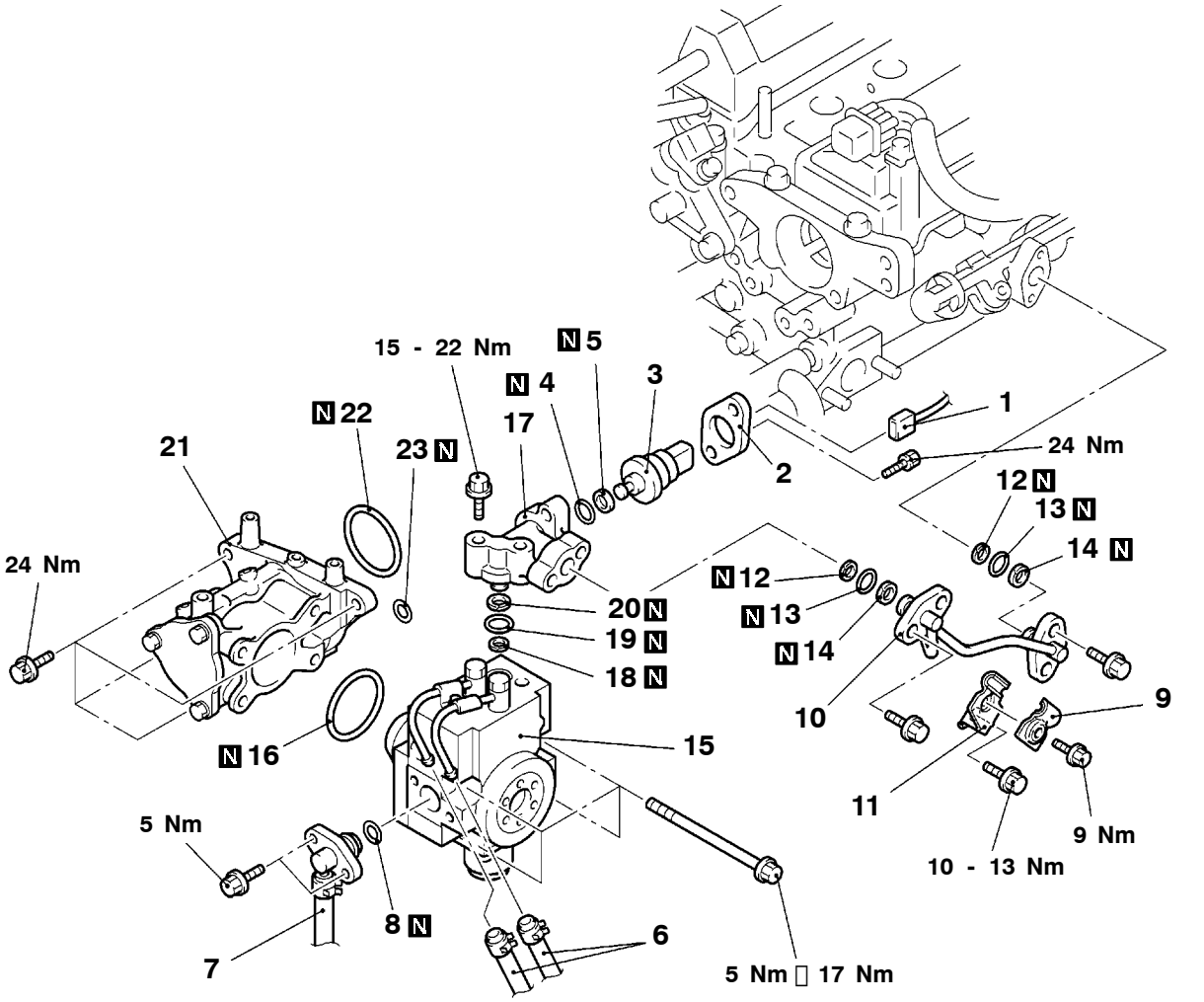
1. Disconnect the oxygen sensor connector and connect the special tool (test harness set) to the connector on the oxygen sensor side.
2. Make sure that there is continuity (11 - 18 Ω at 20°C) between terminal 3 and terminal 4 on the oxygen sensor connector.
3. If there is no continuity, replace the oxygen sensor.

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

FUEL PUMP (HIGH PRESSURE)

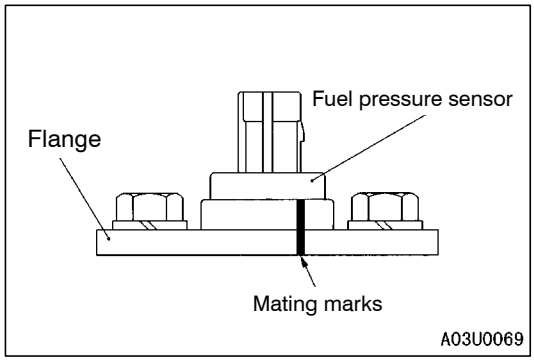
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Prevention of fuel discharge <before removal only> (Refer to P.13I-121.)
- Engine Cover Removal and Installation
- Air Cleaner Assembly Removal and Installation
- Fuel Leak Check <after installation only> (Refer to P.13I-125)



Removal steps

▶H◀ ● Air-bleed the high-pressure fuel line
1. Fuel pressure sensor harness connector
◀A▶ ▶G◀ 2. Flange
▶G◀ 3. Fuel pressure sensor
▶F◀ 4. O-ring
▶F◀ 5. Back-up ring
6. Fuel return hose connection
▶E◀ 7. Fuel pressure hose connection
8. O-ring
9. Clamp
▶D◀ 10. Fuel pipe
11. Fuel pipe bracket
▶D◀ 12. Back-up ring A
▶D◀ 13. O-ring
▶D◀ 14. Back-up ring B
▶C◀ 15. Fuel pump (high pressure) assembly
16. O-ring
▶B◀ 17. Fuel fitting
▶B◀ 18. Back-up ring A
▶B◀ 19. O-ring
▶B◀ 20. Back-up ring B
▶A◀ 21. Pump camshaft case assembly
22. O-ring
23. O-ring

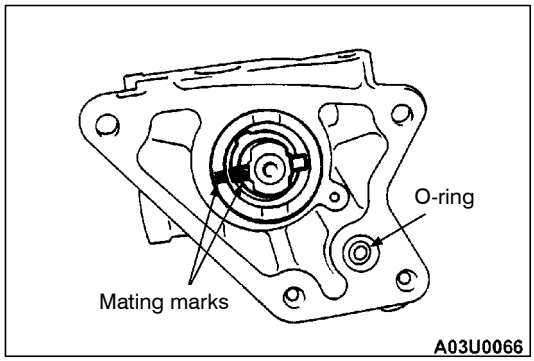


REMOVAL SERVICE POINT

◀A▶ FLANGE REMOVAL

If the fuel pressure sensor is used again, write the mating mark on the the sensor and the mating mark on the flange before removing the flange.

NOTE
The shape of the flange is deformed by torsioning during installation to secure the sufficient sealing performance and the rigidity of the fuel pressure sensor. Therefore, write mating marks so that the phase and the side of a flange can be matched with the original condition. Furthermore, if the fuel pressure sensor needs to be replaced with a new one, a flange should be replaced as well.

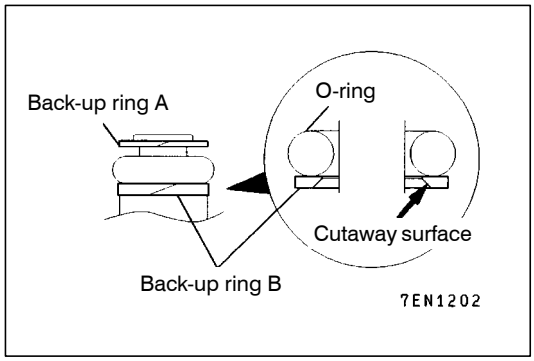


INSTALLATION SERVICE POINT

▶A◀ PUMP CAMSHAFT CASE ASSEMBLY INSTALLATION

1. Set the No.1 cylinder to the compression top dead centre position.
2. Align the mating mark on the housing of the pump camshaft case assembly with the mating mark on the coupling, and then install the pump camshaft case assembly to the engine.

Caution
Take care not to drop the O-ring.



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

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

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

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

2. Apply new engine oil a little to the O-ring.

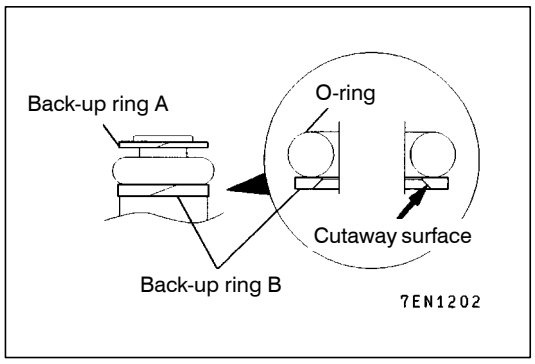
Caution
Take care not let any of the engine oil get inside the fuel pump (high pressure).

3. Insert the fuel fitting straight into the mounting hole of fuel pump (high pressure). Ensure that the fuel fitting should be securely inserted without being torsioned and tighten the mounting bolt to the specified torque.

Tightening torque: 10 - 13 Nm

▶C◀ FUEL PUMP (HIGH PRESSURE) ASSEMBLY INSTALLATION

1. Apply new engine oil a little to the O-ring and the roller of the fuel pump (high pressure).
2. Insert the fuel pump (high pressure) straight into the mounting hole of the pump camshaft case to tighten the mounting bolt lightly (a little tighter than by doing with fingers). Installation to the specified torque should be done with ▶D◀.



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

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

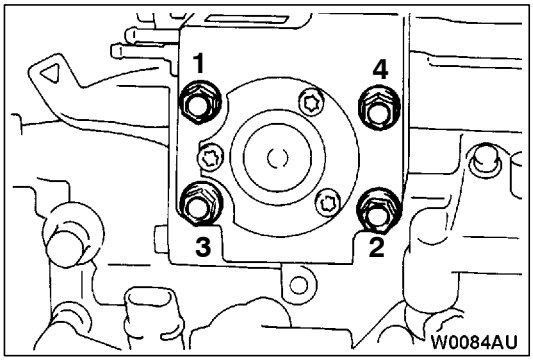
Caution
(1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.
(2) Take care not to install the back-up ring for the fuel pressure sensor by mistake.
(Outer diameter of the back-up ring A: 14.8 mm)

2. Apply new engine oil a little to the O-ring.

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

3. Insert the fuel pipe straight into the mounting hole of the fuel pump (high pressure) and the delivery pipe. Make sure that the fuel pipe should be securely inserted to the bottom without being tortioned and tighten the mounting bolt to the specified torque.

   Tightening torque: 10 - 13 Nm



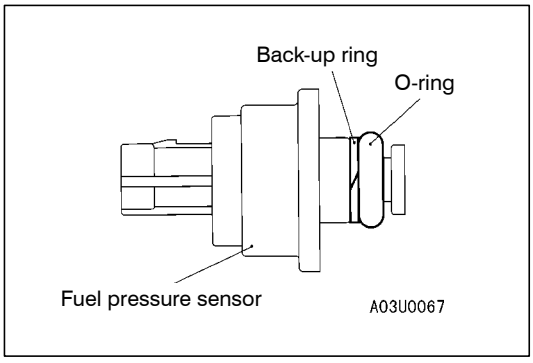
4. Tighten the temporarily tightened fuel pump (high pressure) mounting bolt to 5 Nm in the order of the illustrated numbers.
5. Tighten the bolt to 17 Nm in the order of the illustrated numbers again. The deviation of tightening torque should be 2 Nm or less.

▶E◀ FUEL PRESSURE HOSE INSTALLATION

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

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

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



▶F◀BACK-UP RING/O-RING INSTALLATION

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

Caution
Take care not to install the back-up ring A for the injector, fuel feed pipe or fuel return pipe by mistake. (Outer diameter of the back-up ring for the fuel pressure sensor: 15.1 mm)

▶G◀ FUEL PRESSURE SENSOR/FLANGE INSTALLATION

1. Apply new engine oil a little to the O-ring.

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

2. Align the mating marks on the removal and install to the fuel fitting.

   Caution
   If the fuel pressure sensor is replaced with a new one, a flange should be replaced as well.

▶H◀ AIR-BLEED THE HIGH PRESSURE FUEL LINE

1. After installing the fuel pump (high-pressure), run the engine at 2000 r/min for 15 seconds or more to air-bleed the high-pressure fuel line.

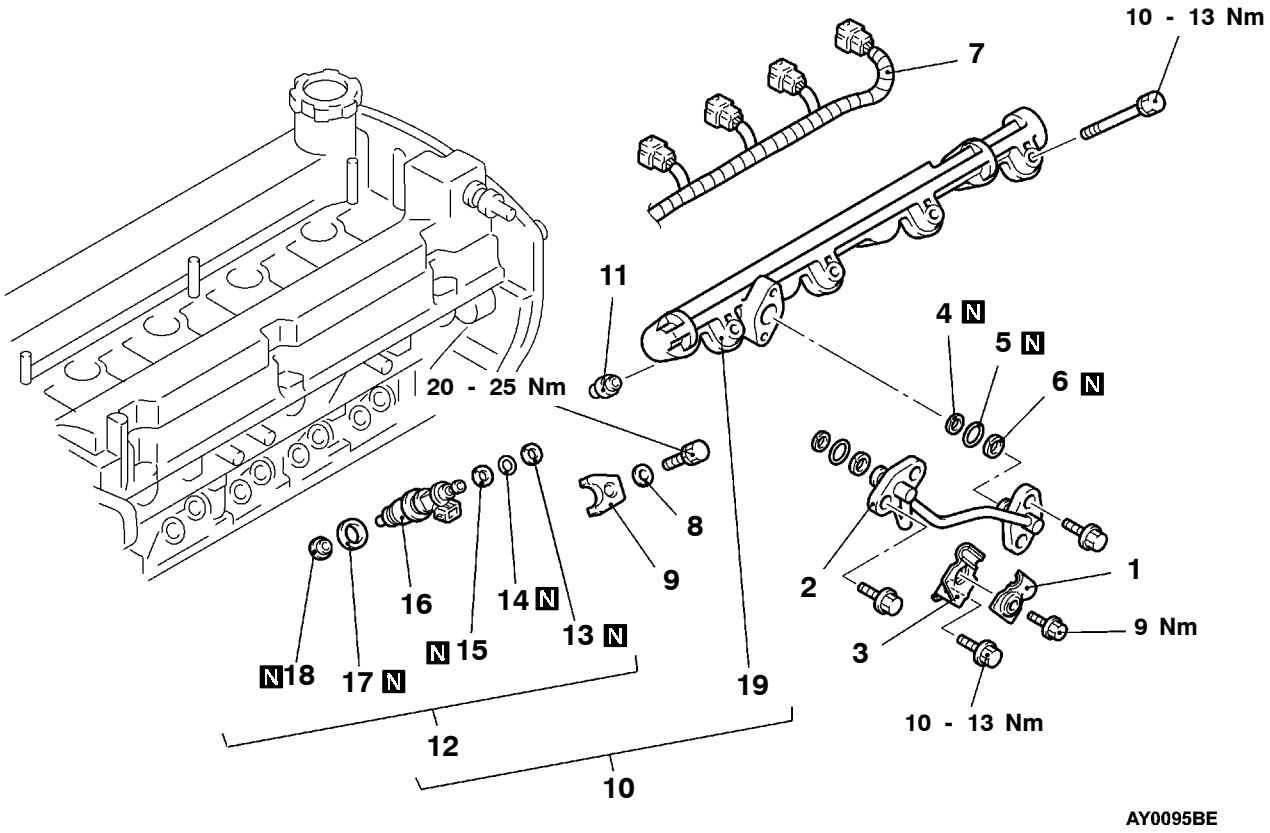
   NOTE
   If the removal of the fuel pipe causes the air to be trapped inside the high-pressure fuel line, diagnosis code No.P0190 is output for abnormal fuel pressure.

2. If the trouble code No. P0190 of the fuel pressure sensor system is output after checking the diagnosis code using the MUT-II, erase the trouble code.

INJECTOR

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Prevention of Fuel Discharge <before removal only> (Refer to P.13I-121.)
- Engine Cover Removal and Installation
- Air Cleaner Assembly Removal and Installation
- Intake Manifold Removal and Installation (Refer to GROUP 15.)
- Fuel Leak Check <after installation only> (Refer to P.13I-125)



Removal steps

- ▶E◀ ● Air-bleed the high-pressure fuel line
- 1. Clamp
- ▶D◀ 2. Fuel pipe
- 3. Fuel pipe bracket
- ▶D◀ 4. Back-up ring A
- ▶D◀ 5. O-ring
- ▶D◀ 6. Back-up ring B
- ◀A▶ 7. Injector harness connector
- ▶C◀ 8. Injector harness washer
- ▶C◀ 9. Injector holder
- ◀B▶ ▶C◀ 10. Delivery pipe and Fuel injector assembly
- ▶C◀ 11. Insulator
- ▶B◀ 12. Fuel injector assembly
- ▶A◀ 13. Back-up ring A
- ▶A◀ 14. O-ring
- ▶A◀ 15. Back-up ring B
- 16. Fuel injector
- ▶C◀ 17. Injector gasket
- ▶A◀ 18. Corrugated washer
- 19. Delivery pipe

REMOVAL SERVICE POINTS

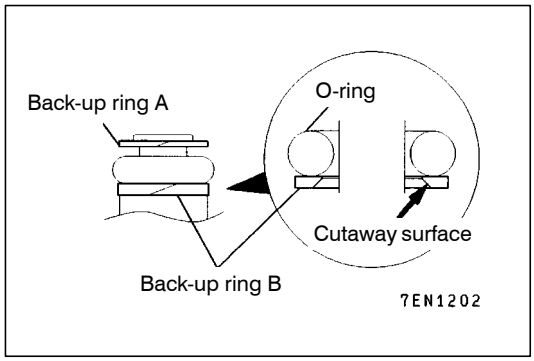
◀A▶ INJECTOR HARNESS CONNECTOR DISCONNECTION

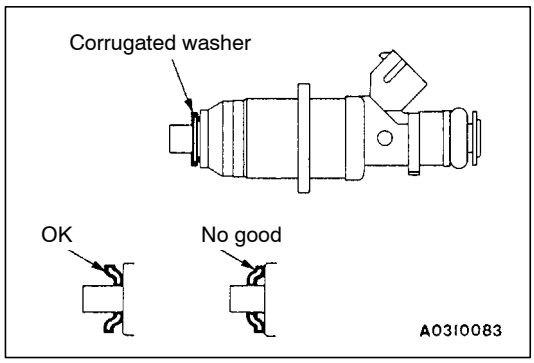
Caution
Disconnect the battery (-) cable from its terminal before carrying out this operation.

◀B▶ DELIVERY PIPE AND FUEL INJECTOR ASSEMBLY REMOVAL

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

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





INSTALLATION SERVICE POINTS

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

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

   Caution
   (1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.
   (2) Take care not to install the back-up ring for the fuel pressure sensor by mistake.
   (Outer diameter of the back-up ring A:14.8 mm)
2. Apply white vaseline to prevent the corrugated washer from falling and install it to the in the illustrated direction.

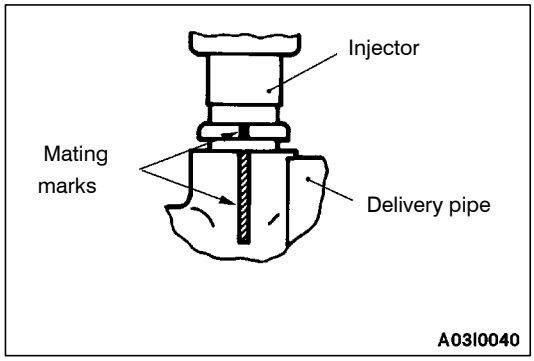
   Caution
   If the corrugated washer which was once tightened is used again, it can cause fuel leak or gas leak. Therefore, always use a new one.

▶B◀ FUEL INJECTOR ASSEMBLY INSTALLATION

1. Apply new engine oil a little to the O-ring of the injector.

   Caution
   Take care not to let any of the engine oil get inside the delivery pipe.
2. Insert the injector straight into the mounting hole of the delivery pipe. Check that the injector smoothly turns after insertion.

3. If the injector does not turn smoothly, the engagement of the O-ring may be the cause. After removing the injector to check the O-ring for damage, insert the injector again into the delivery pipe.



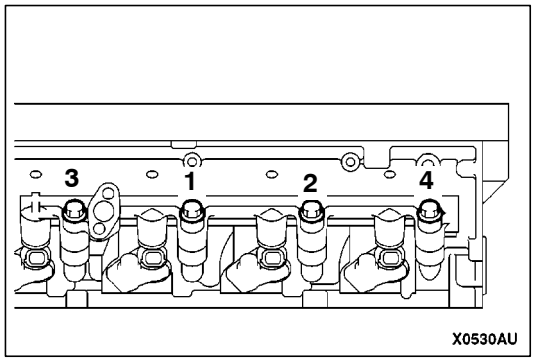
▶C◀ INJECTOR GASKET/INSULATOR/DELIVERY PIPE AND FUEL INJECTOR ASSEMBLY/INJECTOR HOLDER/INJECTOR HARNESS WASHER INSTALLATION

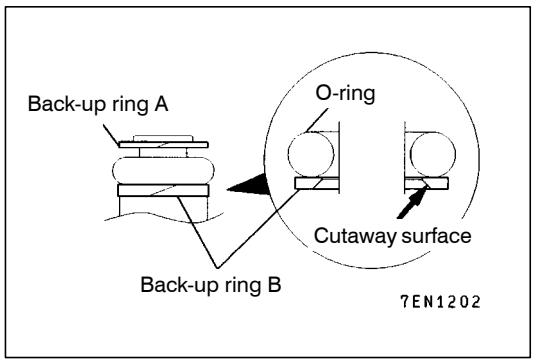
1. Make the mating mark on the injector with the mating mark on the delivery pipe.
2. Install the injector gasket and the insulator to the cylinder head.
3. Install the delivery pipe and the fuel injector assembly to the cylinder head and temporarily tighten the mounting bolt.
4. Install the injector holder and the injector washer and tighten the mounting bolt to the specified torque.

   Tightening torque: 20 - 25 Nm

5. Tighten the temporarily tightened delivery and injector assembly mounting bolts to the specified torque in the order of the illustrated numbers.

   Tightening torque: 10 - 13 Nm





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

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

   Caution
   (1) Install the back-up ring B facing its cutaway surface toward the opposite side of the O-ring as shown in the illustration.
   (2) Take care not to install the back-up ring A for the back-up ring for the fuel pressure sensor by mistake.
   (Outer diameter of back-up ring A: 14.8 mm)

2. Apply new engine oil a little to the O-ring.

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

3. Insert the fuel pipe fitting straight into the mounting bolt of the fuel pump (high-pressure) and the delivery pipe. Make sure that the fuel fitting is inserted the mounting holes of the fuel pump (high-pressure) and the delivery pipe, and then tighten the bolts to the specified torque.

   Tightening torque: 10 - 13 Nm

▶E◀ AIR-BLEED THE HIGH-PRESSURE FUEL LINE

1. After installing the injector, run the engine at 2000 r/min for 15 seconds or more to air-bleed the high-pressure fuel line.

   NOTE
   If the removal of the fuel pipe causes the air to be trapped inside the high-pressure fuel line, diagnosis code No.P0190 is output for abnormal fuel pressure.

2. If the trouble code No. 0190 of the fuel pressure sensor system is output after checking the diagnosis with the MUT-II, erase the trouble code.

INTAKE AND EXHAUST

CONTENTS

GENERAL INFORMATION 2
INTAKE MANIFOLD<4G64> 2
EXHAUST MANIFOLD 3
EXHAUST PIPE AND MAIN MUFFLER 5

GENERAL

OUTLINE OF CHANGES

The following service procedures have been established to correspond to the following changes. Other items are the same as before.

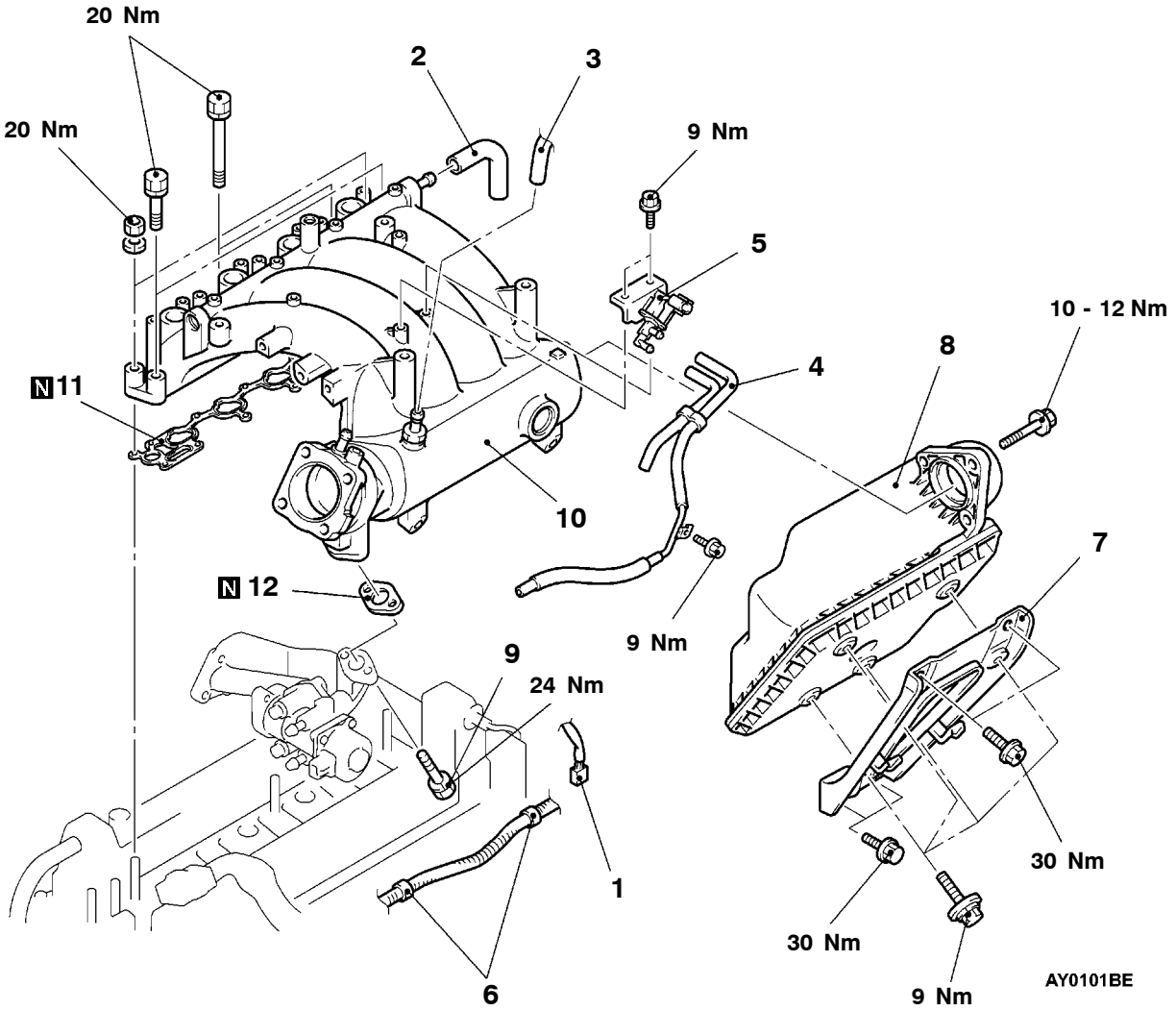
- The solenoid valve assembly in vehicles with 4G64 engine have been changed.
- The exhaust manifold, exhaust pipe and main muffler have been changed.

INTAKE MANIFOLD <4G64>

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying
- Engine Cover Removal and Installation
- Air Cleaner Assembly Removal and Installation
- Ignition Coil Removal and Installation
- Throttle Body Removal and Installation



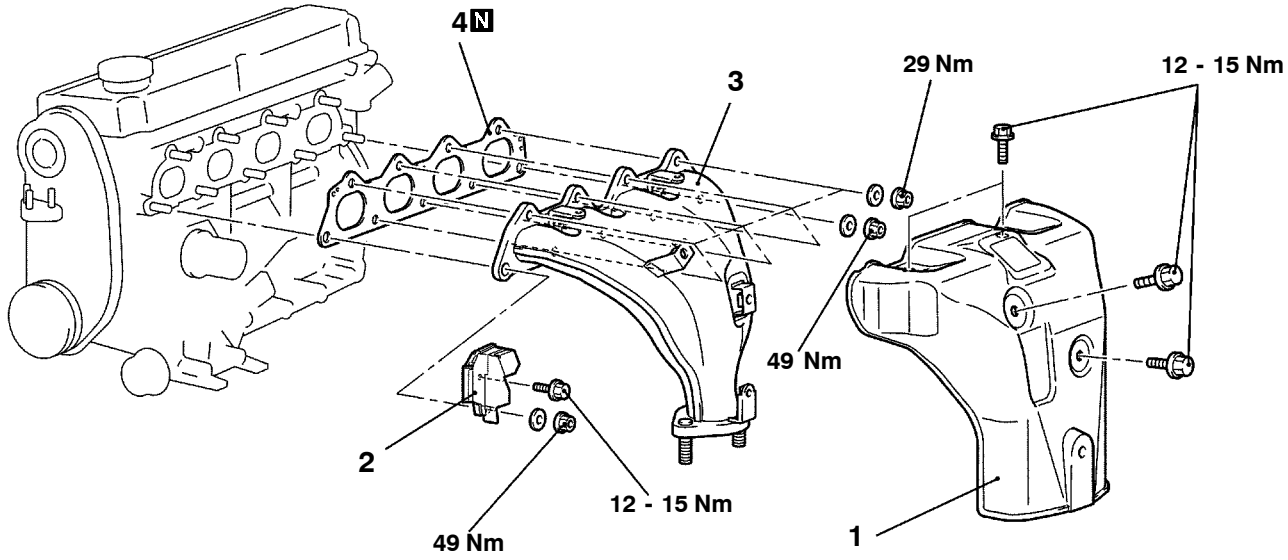
1. Engine harness connector and clamp
2. PCV hose
3. Brake booster vacuum hose connection
4. Vacuum pipe and hose assembly
5. Solenoid valve assembly
6. Alternator harness clamp
7. Intake manifold stay
8. Air intake plenum resonator
9. Intake manifold and EGR valve support connecting bolt
10. Intake manifold
11. Intake manifold gasket
12. Gasket

EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Front Exhaust Pipe Removal and Installation
(Refer to P.15-5.)

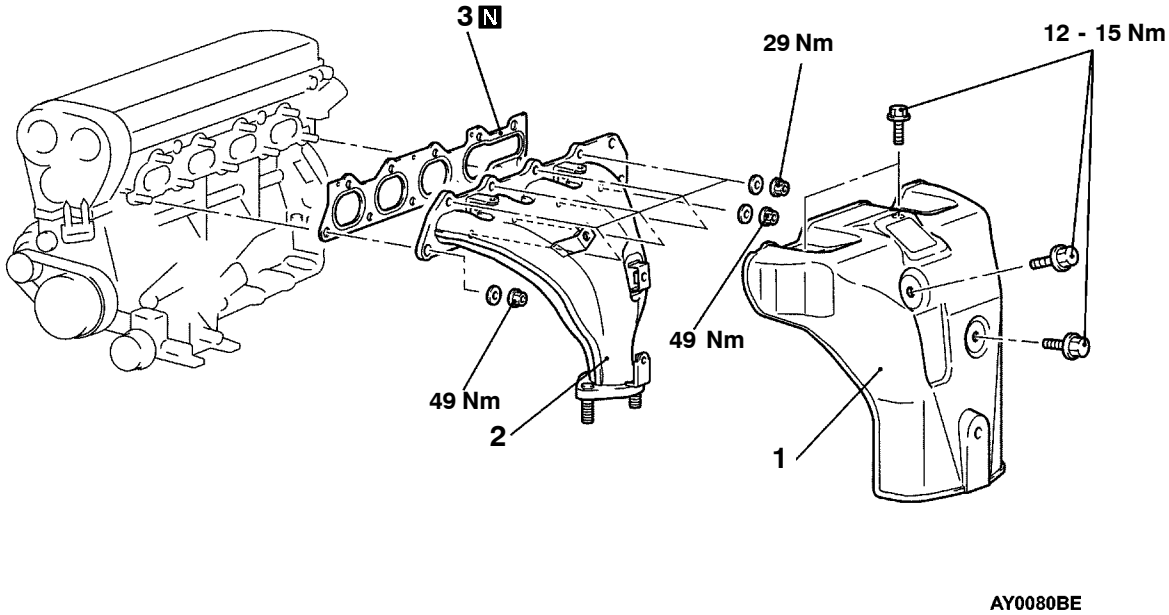
<4G63>



Removal steps

1. Exhaust manifold cover
2. Heat protector
3. Exhaust manifold
4. Exhaust manifold gasket

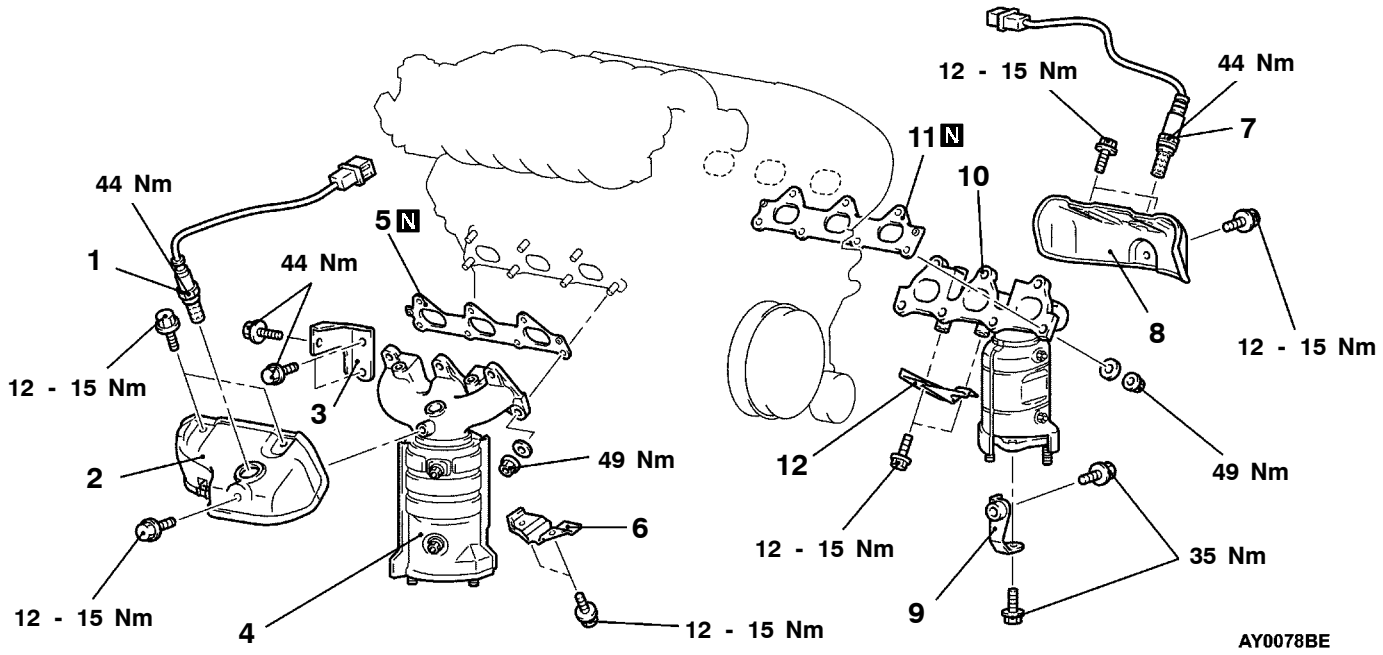
<4G64>



Removal steps

1. Exhaust manifold cover
2. Exhaust manifold
3. Exhaust manifold gasket

<6A1>

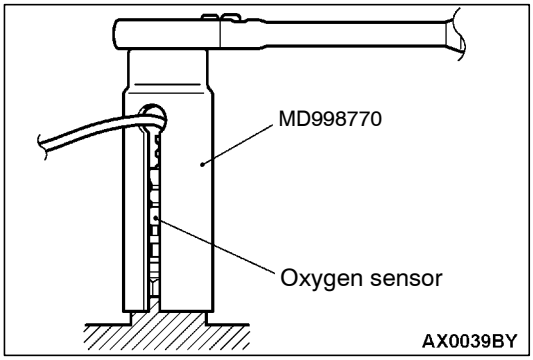


Exhaust manifold right removal steps

◀A▶ 1. Oxygen sensor
2. Heat protector
3. Exhaust manifold stay
4. Exhaust manifold
5. Exhaust manifold gasket
6. Lower heat protector

Exhaust manifold left removal steps

◀A▶ 7. Oxygen sensor
8. Heat protector
9. Exhaust manifold stay
10. Exhaust manifold
11. Exhaust manifold gasket
12. Lower heat protector



REMOVAL SERVICE POINT

◀A▶ OXYGEN SENSOR REMOVAL

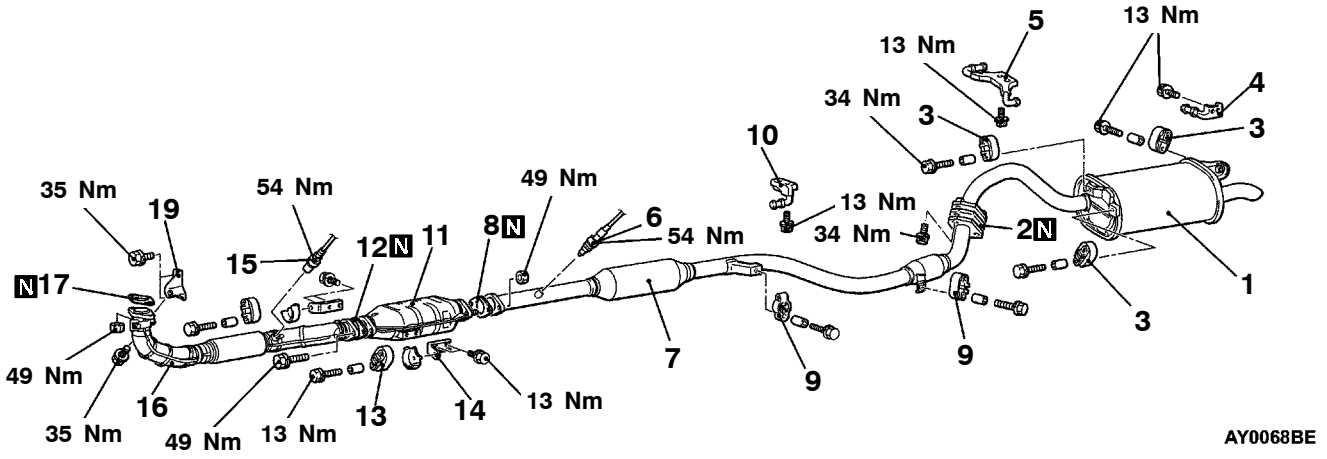
Disconnect an oxygen sensor connector and clamp, and use the special tool to remove the oxygen sensor.

EXHAUST PIPE AND MAIN MUFFLER

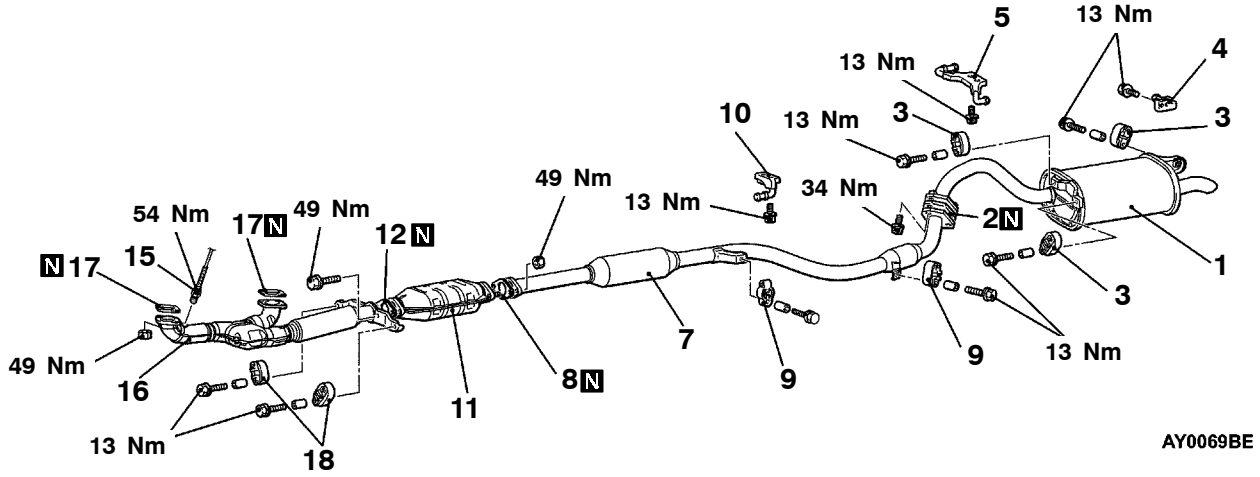
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Under Cover Removal and Installation

<4G6>



<6A1>



Main muffler removal steps

1. Main muffler assembly
2. Gasket
3. Hanger
4. Tail hanger
5. Rear hanger

Center exhaust pipe removal steps

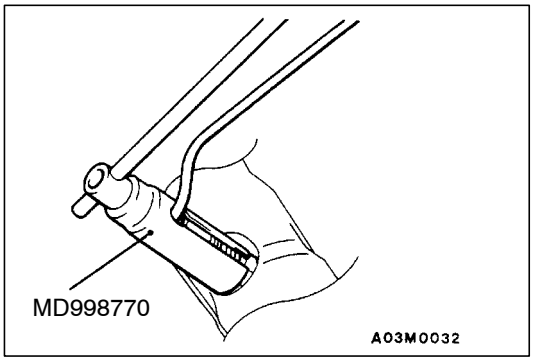
◀A▶ ▶A◀ 6. Oxygen sensor
7. Center exhaust pipe
8. Gasket
9. Hanger
10. Center hanger

Catalytic converter removal steps

11. Catalytic converter
12. Gasket
13. Hanger
14. Hanger bracket

Front exhaust pipe removal steps

◀A▶ ▶A◀ 15. Oxygen sensor
16. Front exhaust pipe
17. Gasket
18. Hanger
19. Front exhaust pipe bracket



REMOVAL SERVICE POINT

◀A▶ OXYGEN SENSOR REMOVAL

INSTALLATION SERVICE POINT

▶A◀ OXYGEN SENSOR INSTALLATION

ENGINE ELECTRICAL

CONTENTS

CHARGING SYSTEM 2

GENERAL 2
Outline of Change 2

ALTERNATOR 2

IGNITION SYSTEM 3

GENERAL 3
Outline of Change 3

SERVICE SPEECIFICATIONS 3

ON-VEHICLE SERVICE 3

IGNITION FAILURE SENSOR 4

CHARGING SYSTEM

GENERAL

OUTLINE OF CHANGE

The following service procedures have been established to correspond to the change of the exhaust manifold.

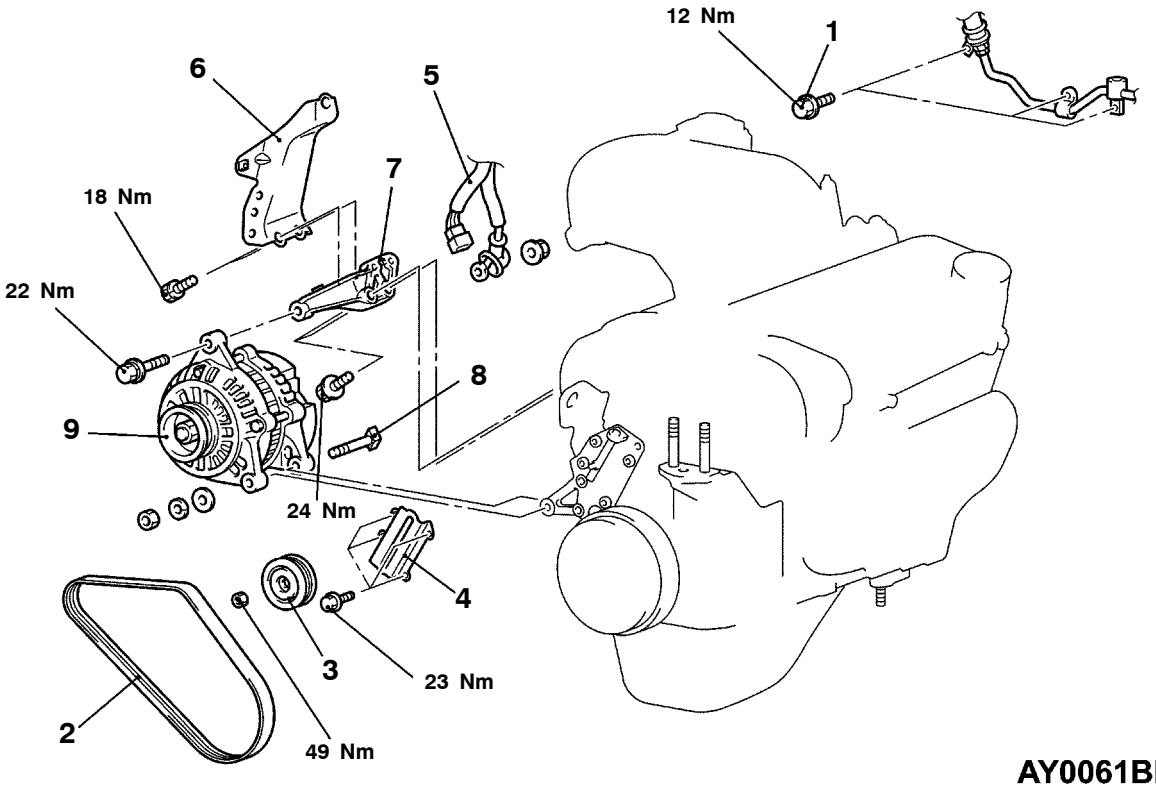
ALTERNATOR

REMOVAL AND INSTALLATION

<6A1>

Pre-removal Operation
Solenoid Valve Assembly Removal
(Refer to GROUP 15 - Air Intake Plenum.)

Post-installation Operation
- Solenoid Valve Assembly Installation
  (Refer to GROUP 15 - Air Intake Plenum.)
- Drive Belt Tension Adjustment
  (Refer to GROUP 11B - On-vehicle Service.)



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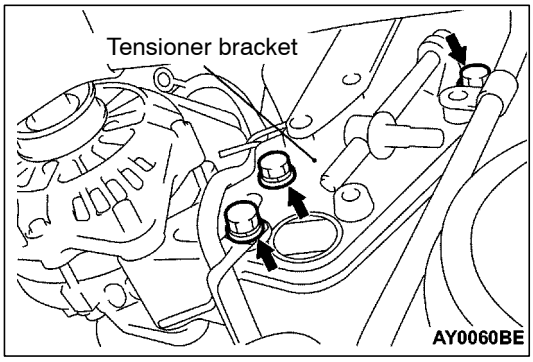
Removal steps

1. Oil pressure hose and tube assembly clamp bolt
2. Drive belt (Alternator)
3. Tensioner pully
4. Tensioner bracket
5. Alternator connector
6. Air intake plenum stay
7. Alternator brace
8. Alternator mounting bolt
9. Alternator

◀A▶



REMOVAL SERVICE POINT

◀A▶ ALTERNATOR MOUNTING BOLTS REMOVAL

While three bolts arrowed in the illustration are unscrewed, remove the alternator mounting bolts.

IGNITION SYSTEM

GENERAL

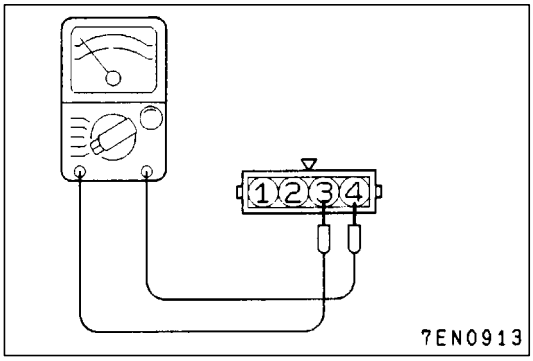
OUTLINE OF CHANGES

The following service procedures have been established to correspond to the addition of a ignition failure sensor <4G63, 4G64-GDI>. Other items are the same as before.

SERVICE SPECIFICATIONS

IGNITION FAILURE SENSOR

Items	4G63, 4G64-GDI
Resistance Ω	0.1 or less



ON-VEHICLE SERVICE

IGNITION FAILURE SENSOR CHECK <4G63, 4G64-GDI>

NOTE

An analog-type circuit tester should be used.

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

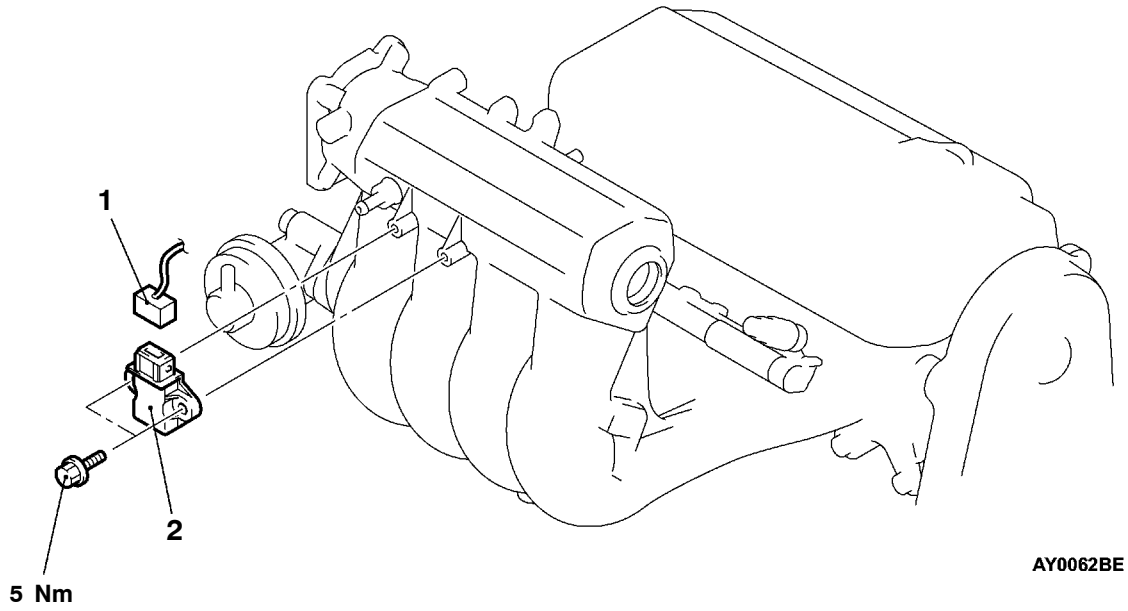
Standard value: 0.1Ω or less

IGNITION FAILURE SENSOR

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Engine Cover Removal and Installation <4G64-GDI>

<4G63>



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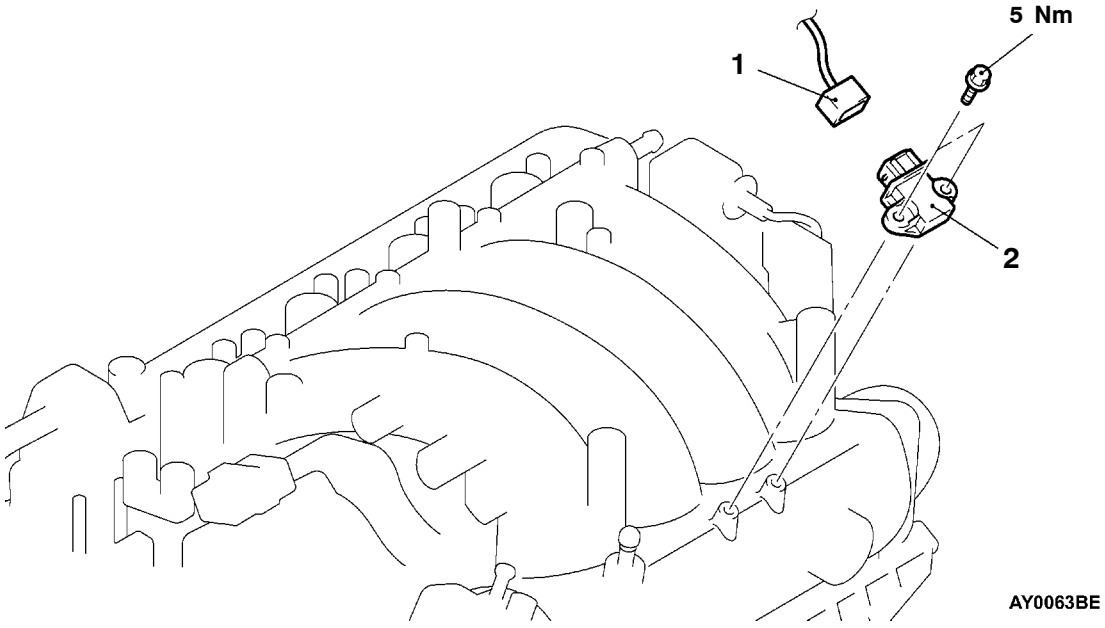

Removal steps

1. Ignition failure sensor connector
2. Ignition failure sensor

ENGINE AND EMISSION CONTROL

CONTENTS

EMISSION CONTROL SYSTEM <MPI> 2

GENERAL 2
Outline of Change 2

SERVICE SPECIFICATIONS 2

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Vacuum Hose Piping Diagram 3
Vacuum Circuit Diagram 5

EVAPORATIVE EMISSION CONTROL SYSTEM 7
System Diagram 7
Purge Control System Check 8
Purge Port Vacuum Check 8
Purge Control Solenoid Valve Check 9

EXHAUST GAS RECIRCULATION (EGR) SYSTEM 10
EGR Control Solenoid Valve Check <4G6> 10
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CANISTER 11

EMISSION CONTROL SYSTEM <GDI> 12

GENERAL 12
Outline of Change 12

CANISTER 12

EMISSION CONTROL SYSTEM <MPI>

GENERAL

OUTLINE OF CHANGE

The following service procedures have been established to correspond to the following changes.

- Evaporative emission control system
- EGR control solenoid valve
- Canister

Items	Name	Specification
Evaporative emission control system	Canister Purge control solenoid valve	Equipped Duty cycle type solenoid valve (Purpose: HC reduction)

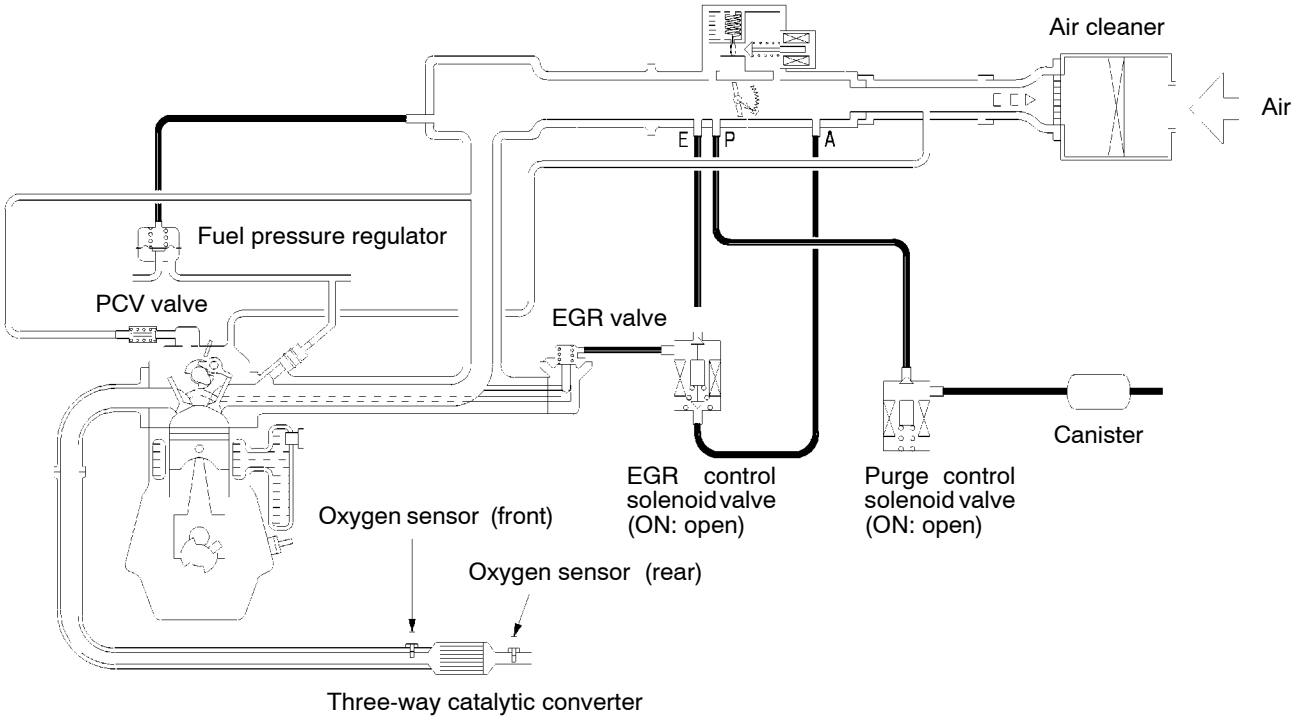
SERVICE SPECIFICATIONS

Items		Standard value
EGR control solenoid valve coil resistance (at 20°C) Ω		29 - 35
Purge control solenoid valve coil resistance (at 20°C) Ω	4G6	29 - 35
	6A1	30 - 34

VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM

<4G6>



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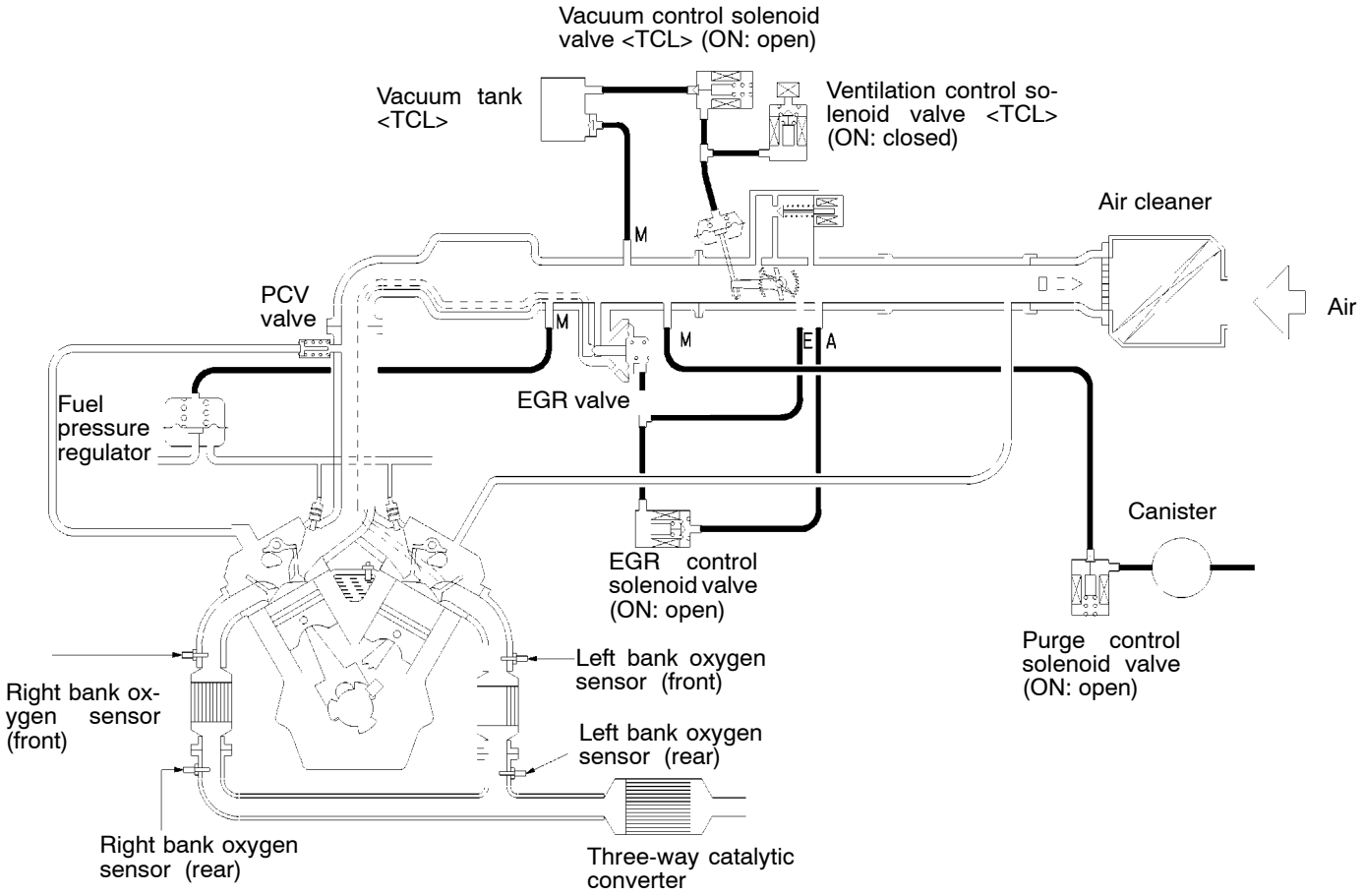
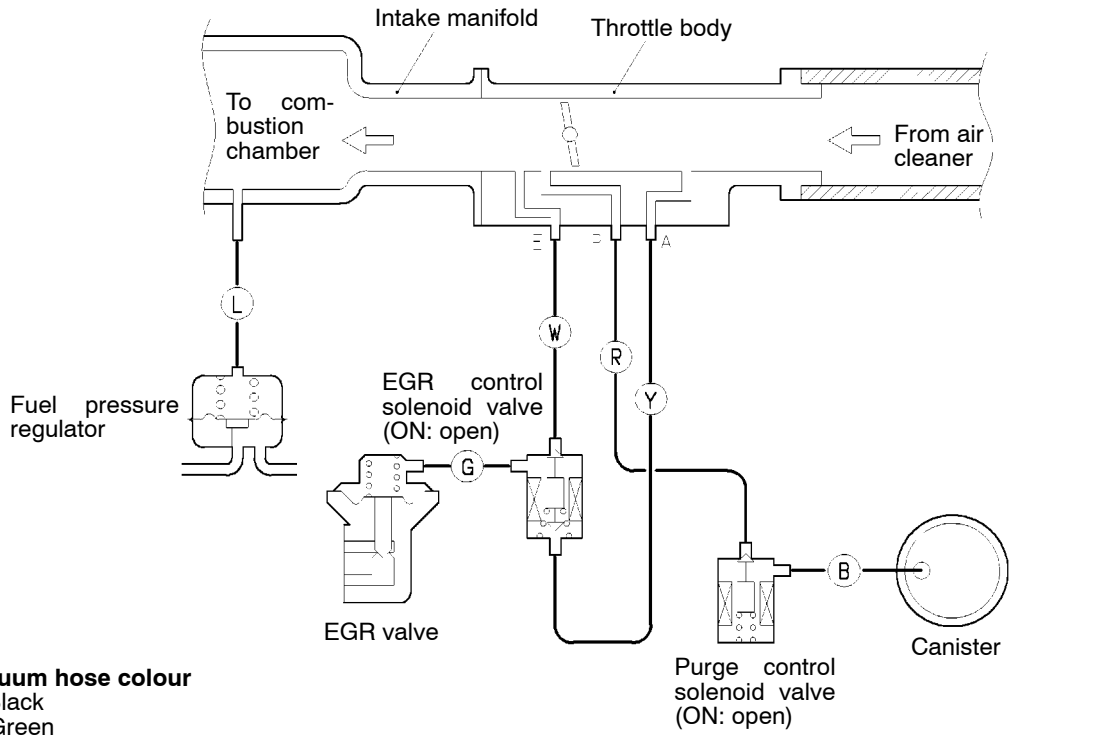
<6A1>


Vacuum control solenoid valve <TCL> (ON: open)
Vacuum tank <TCL>
Ventilation control solenoid valve <TCL> (ON: closed)
Air cleaner
M
PCV valve
M
M
E
A
Air
Fuel pressure regulator
EGR valve
Canister
EGR control solenoid valve (ON: open)
Purge control solenoid valve (ON: open)
Left bank oxygen sensor (front)
Right bank oxygen sensor (front)
Left bank oxygen sensor (rear)
Right bank oxygen sensor (rear)
Three-way catalytic converter

Y6002BE

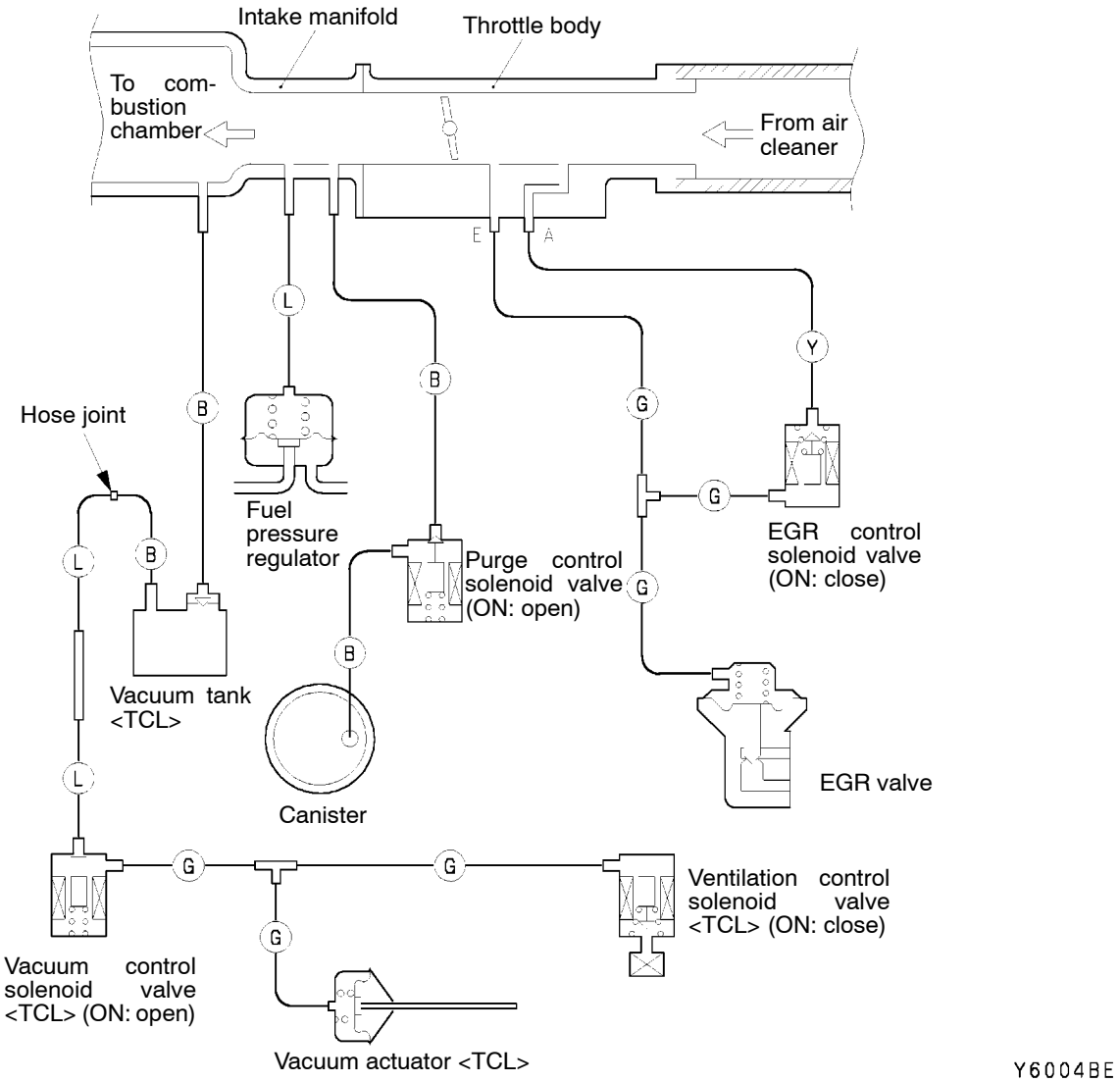
VACUUM CIRCUIT DIAGRAM

<4G6>



Vacuum hose colour
B: Black
G: Green
L: Light blue
R: Red
W: White
Y: Yellow

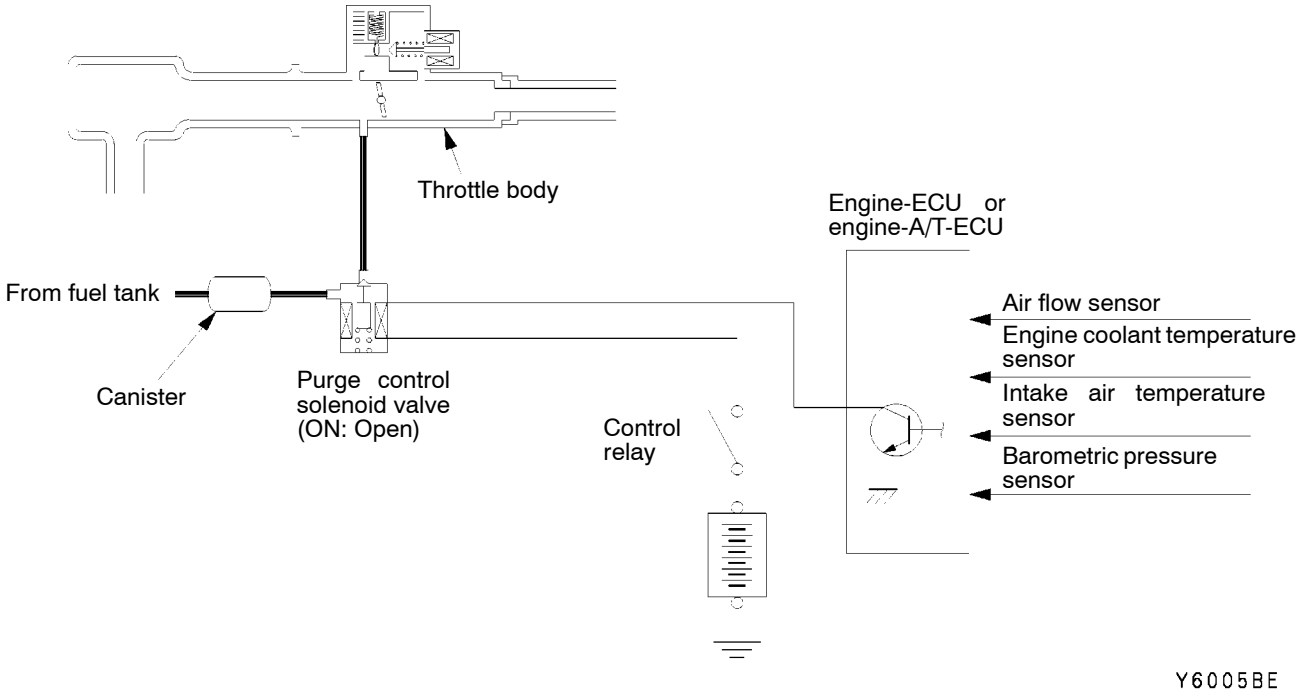
<6A1>

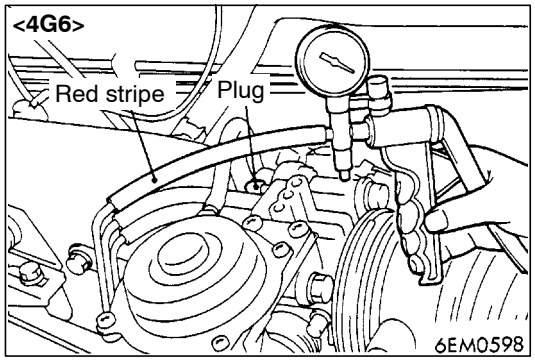


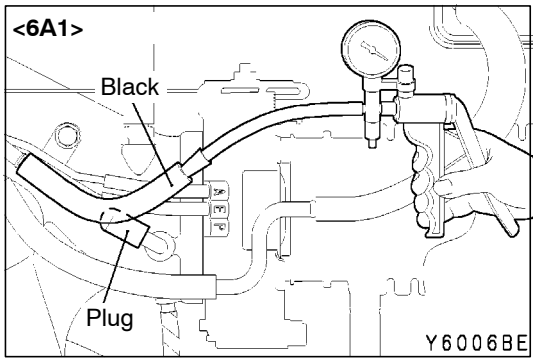
Vacuum hose colour
B: Black
G: Green
L: Light blue
R: Red
Y: Yellow

EVAPORATIVE EMISSION CONTROL SYSTEM

SYSTEM DIAGRAM







PURGE CONTROL SYSTEM CHECK

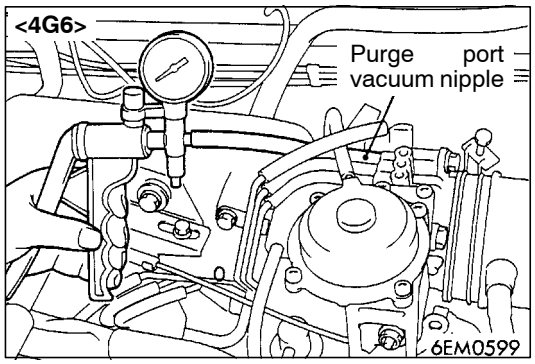
1. Disconnect the vacuum hose (red stripe) from the throttle body and connect it to a hand vacuum pump. <4G6> Disconnect the vacuum hose (black) from the surge tank and connect it to a hand vacuum pump. <6A1>
2. Plug the nipple from which the vacuum hose was removed.
3. When the engine is cold or hot, apply a vacuum of 53 kPa, and check the condition of the vacuum.

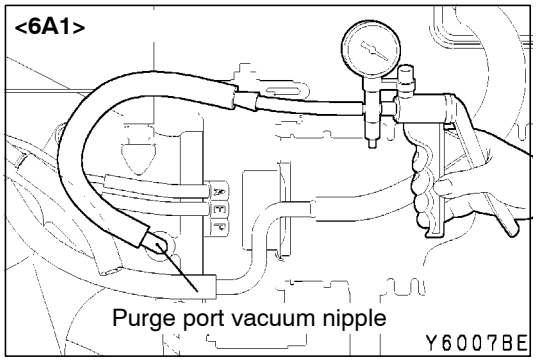
When engine is cold
(Engine coolant temperature: 40°C or less)

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

When engine is hot
(Engine coolant temperature: 80°C or higher)

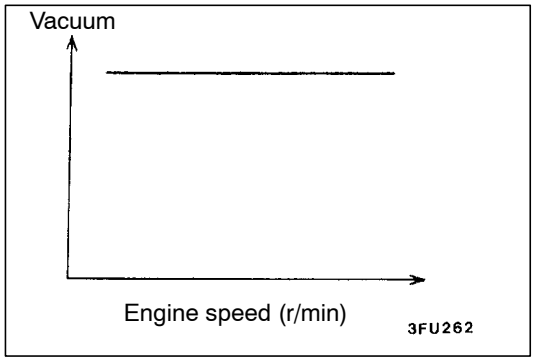
Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min (for approximately 3 minutes after the engine is started.)	Vacuum will leak





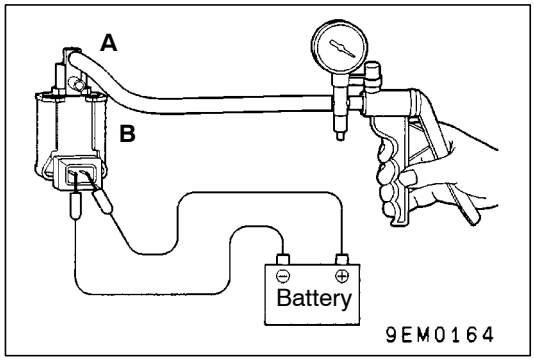
PURGE PORT VACUUM CHECK

1. Disconnect the vacuum hose (red stripe) from the throttle body and connect it to a hand vacuum pump. <4G6> Disconnect the vacuum hose (black) from the surge tank and connect it to a hand vacuum pump. <6A1>



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

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

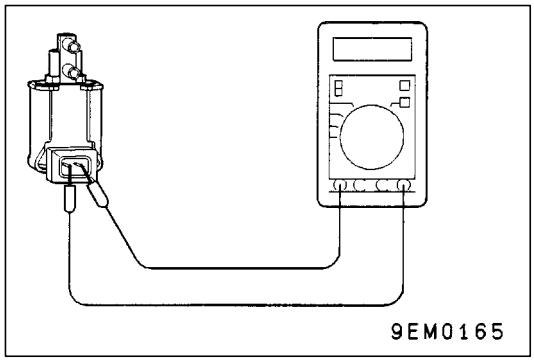


PURGE CONTROL SOLENOID VALVE CHECK

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

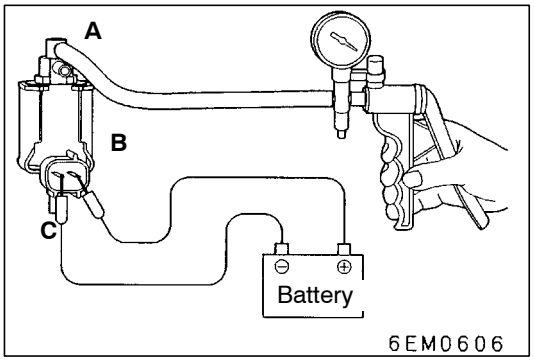
1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the solenoid valve (refer to the illustration at left).
4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the purge control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

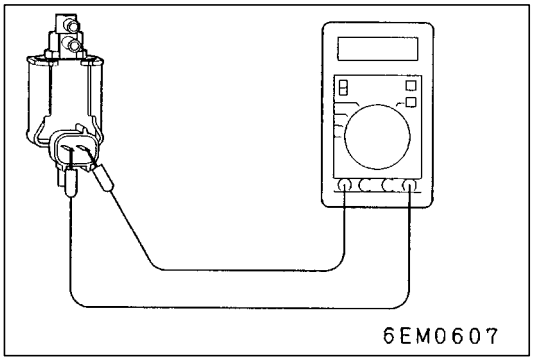
Battery voltage	Normal condition
Applied	Vacuum leaks
Not applied	Vacuum maintained



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

   Standard value:
   29 - 35 Ω (at 20°C) <4G6>
   30 - 34 Ω (at 20°C) <6A1>





EXHAUST GAS RECIRCULATION (EGR) SYSTEM

EGR CONTROL SOLENOID VALVE CHECK <4G6>

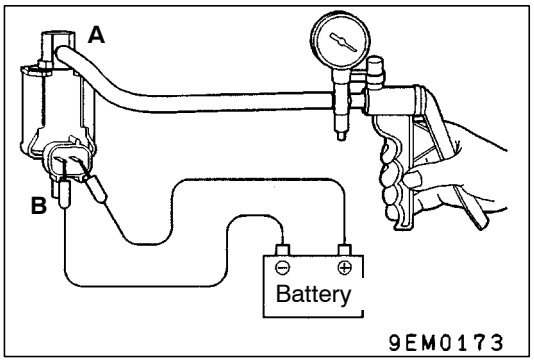
NOTE
When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

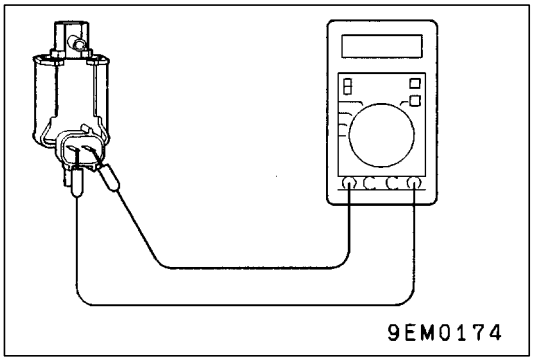
1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the solenoid valve (refer to the illustration at left).
4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the EGR control 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 - 35 Ω (at 20°C)





EGR CONTROL SOLENOID VALVE CHECK <6A1>

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 nipple (A) of the solenoid valve (refer to the illustration at left).
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.

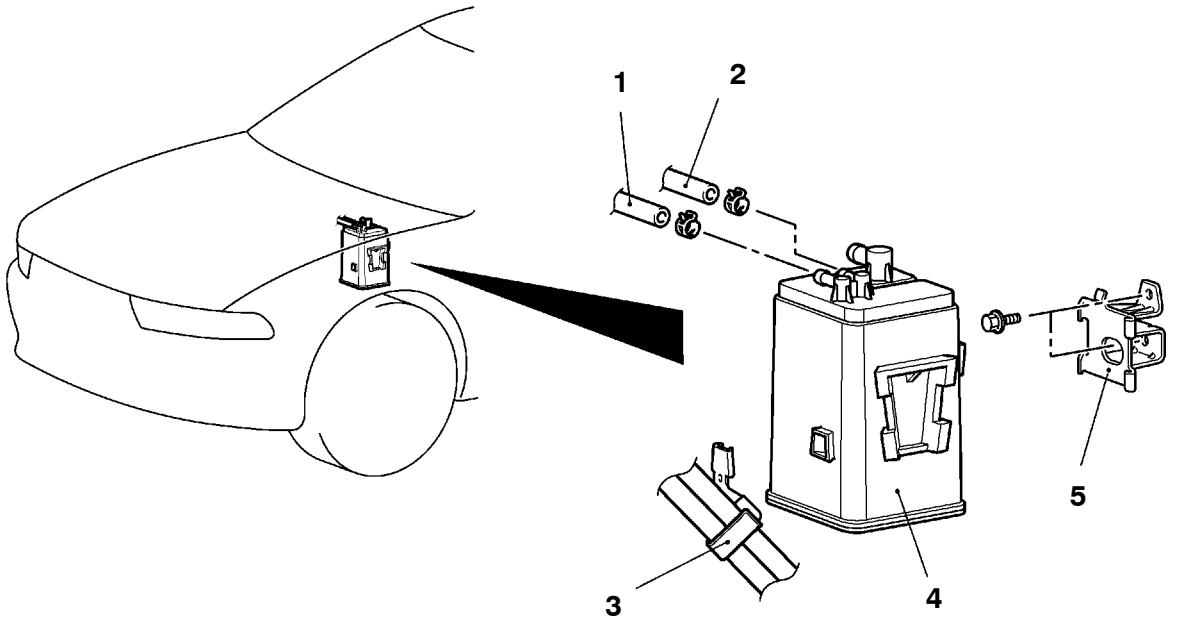
Battery voltage	Normal condition
Not applied	Vacuum leaks
Applied	Vacuum maintained

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

Standard value: 29 - 35 Ω (at 20°C)

CANISTER

REMOVAL AND INSTALLATION



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Removal steps

1. Vacuum hose connection
2. Vapor hose connection
3. Hose clamp
4. Canister
5. Canister bracket

EMISSON CONTROL SYSTEM <GDI>

GENERAL

OUTLINE OF CHANGE

The following service procedures have been established correspond to the change of the canister.

CANISTER

Refer to P.17-11.

AUTOMATIC TRANSMISSION

CONTENTS

GENERAL **2**
Outline of Changes 2
TROUBLESHOOTING **2**

GENERAL

OUTLINE OF CHANGES

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

- The 6A13 engine vehicle with ASC has been added.
- The downshift pattern of 4G63, 4G64 engine vehicles has been changed.
- The ECU of 4G63, 4G64 engine vehicles has been changed from the A/T-ECU to the engine-A/T-ECU.

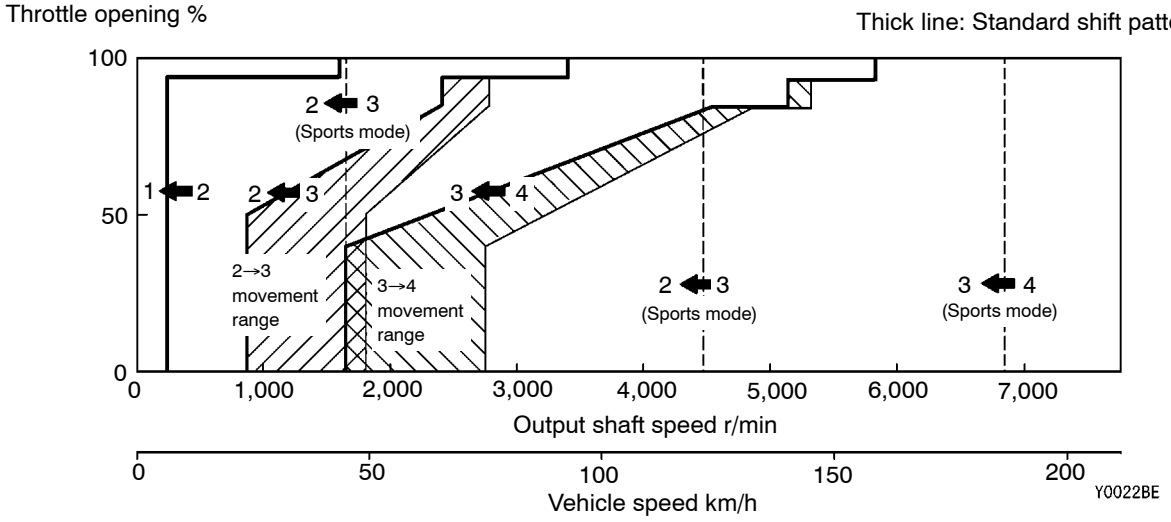
TROUBLESHOOTING

SHIFT PATTERN

The downshift pattern of 4G63, 4G64 engine vehicles has been changed.

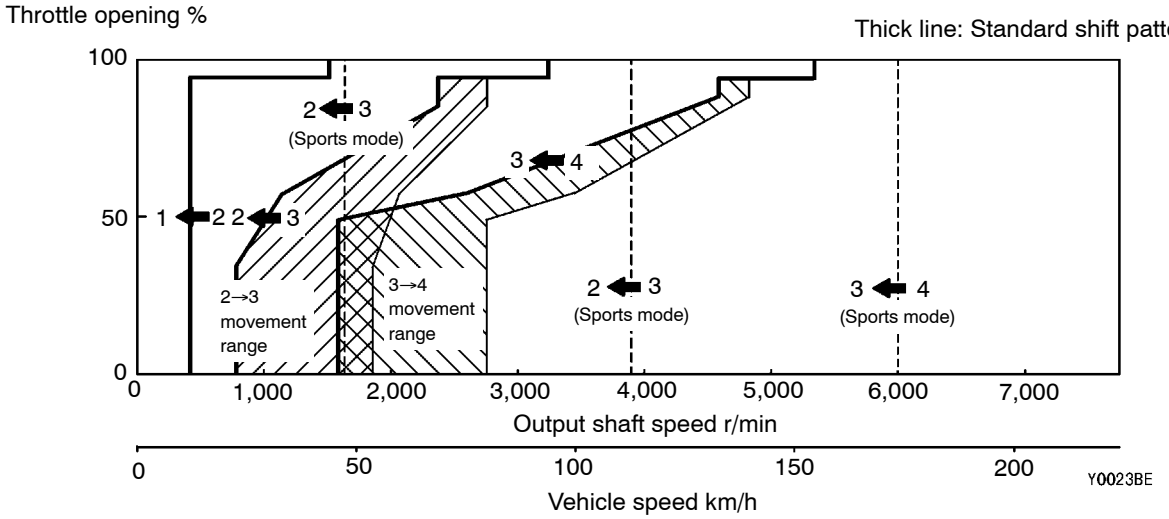
<4G63>

DOWNSHIFT PATTERN



<4G64>

DOWNSHIFT PATTERN



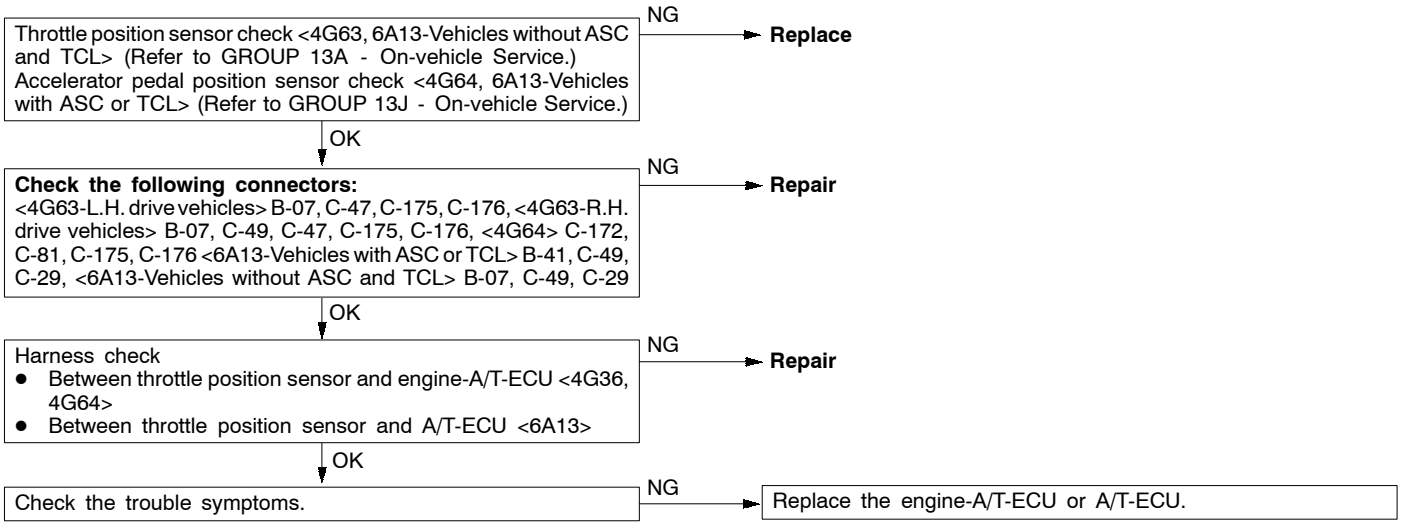
INSPECTION CHART FOR DIAGNOSIS CODE

Code	Diagnosis item		Reference page
11	Throttle position sensor system (TPS) <4G63, 6A13-Vehicles without ASC and TCL> Accelerator pedal position sensor system (APS) <4G64, 6A13-Vehicles with ASC or TCL>	Short circuit	23-4
12		Open circuit	23-4
14		Sensor maladjustment	23-4
15	A/T fluid temperature sensor system	Open circuit	23-4
21	Crank angle sensor system	Open circuit	23-5
22	Input shaft speed sensor system	Short circuit/open circuit	23-5
23	Output shaft speed sensor system	Short circuit/open circuit	23-6
25	Wide open throttle switch system	Short circuit	23-6
26	Stop lamp switch system	Short circuit/open circuit	23-7
31	Low and reverse solenoid valve system	Short circuit/open circuit	23-7
32	Underdrive solenoid valve system	Short circuit/open circuit	23-7
33	Second solenoid valve system	Short circuit/open circuit	23-7
34	Overdrive solenoid valve system	Short circuit/open circuit	23-7
36	Damper control clutch solenoid valve system	Short circuit/open circuit	23-8
41	1st gear ratio does not meet the specification		23-9
42	2st gear ratio does not meet the specification		23-9
43	3rd gear ratio does not meet the specification		23-9
44	4th gear ratio does not meet the specification		23-9
46	Reverse gear ratio does not meet the specification		23-9
51	Abnormal communication with engine-A/T-ECU <4G63, 4G64> Abnormal communication with engine-ECU <6A13-Vehicles without ASC and TCL> Abnormal communication with TCL-ECU and engine-ECU <6A13-Vehicles with TCL> Abnormal communication with ASC-ECU and engine-ECU <6A13-Vehicles with ASC>		23-10
52	Damper clutch control solenoid valve system	Defective system	23-8
54	A/T Control relay system	Short circuit to earth/ open circuit	23-10
56	N range lamp system	Short circuit to earth	23-11

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

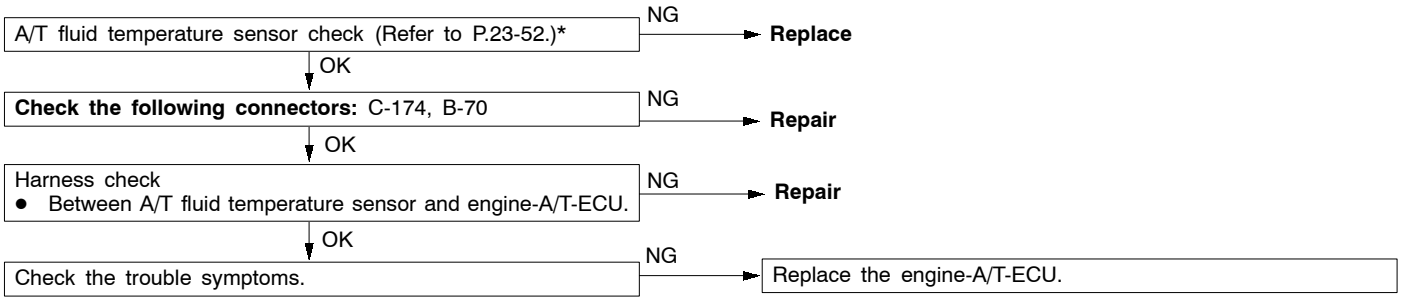
Since the ECU of 4G63, 4G64 engine vehicles has been changed from the A/T-ECU to the engine A/T-ECU, INSPECTION PROCEDURES FOR DIAGNOSIS CODES have been changed. Due to the addition of the 6A13 engine vehicle with ASC, only code Nos.11, 12, 14, 51 have been changed.

Code No. 11, 12, 14 Throttle position sensor system (TPS) <4G63, 6A13-Vehicles without ASC and TCL>, Accelerator pedal position sensor (APS) <4G64, 6A13-Vehicles with ASC or TCL>	**Probable cause**
If the TPS or APS output voltage is 4.8 V or higher when the engine is idling, the output is judged to be too high and diagnosis code No. 11 is output. If the TPS or APS output voltage is 0.2 V or lower at times other than when the engine is idling, the output is judged to be too low and diagnosis code No. 12 is output. If the TPS or APS output voltage is 0.2 V or lower or if it is 1.2 V or higher when the engine is idling, the TPS or APS adjustment is judged to be incorrect and diagnosis code No. 14 is output.	• Malfunction of the throttle position sensor <4G63, 6A13-Vehicles without ASC and TCL > • Malfunction of the accelerator pedal position sensor <4G64, 6A13-Vehicles with ASC or TCL> • Malfunction of connector • Malfunction of the engine-A/T-ECU <4G63, 4G64> • Malfunction of the A/T-ECU <6A13>



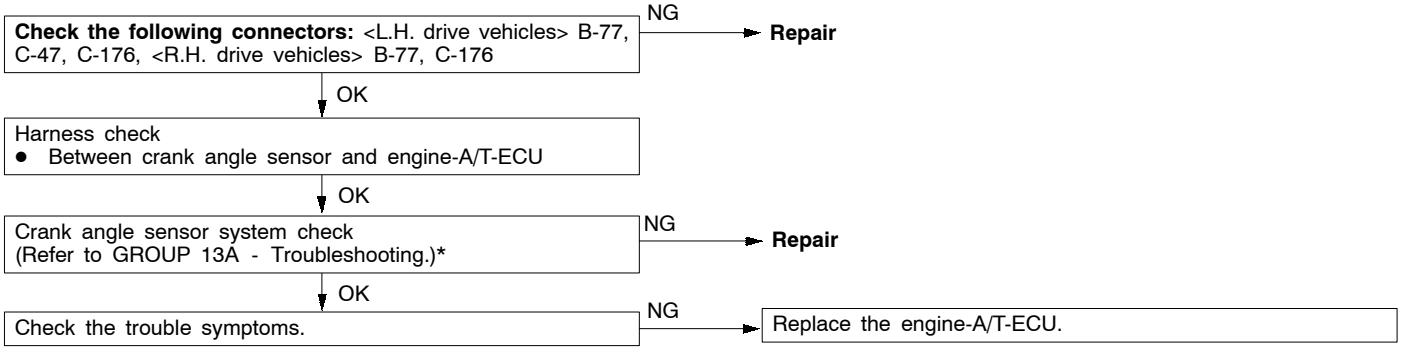
Code No. 15 A/T fluid temperature sensor system	**Probable cause**
If the A/T fluid temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (if the A/T fluid temperature does not increase), it is judged that there is an open circuit in the A/T fluid temperature sensor and diagnosis code No. 15 is output.	• Malfunction of the A/T fluid temperature sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



Code No. 21 Crank angle sensor system	Probable cause
If no output pulse is detected from the crank angle sensor for 5 seconds or more while driving at 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor and diagnosis code No. 21 is output.	• Malfunction of the crank angle sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

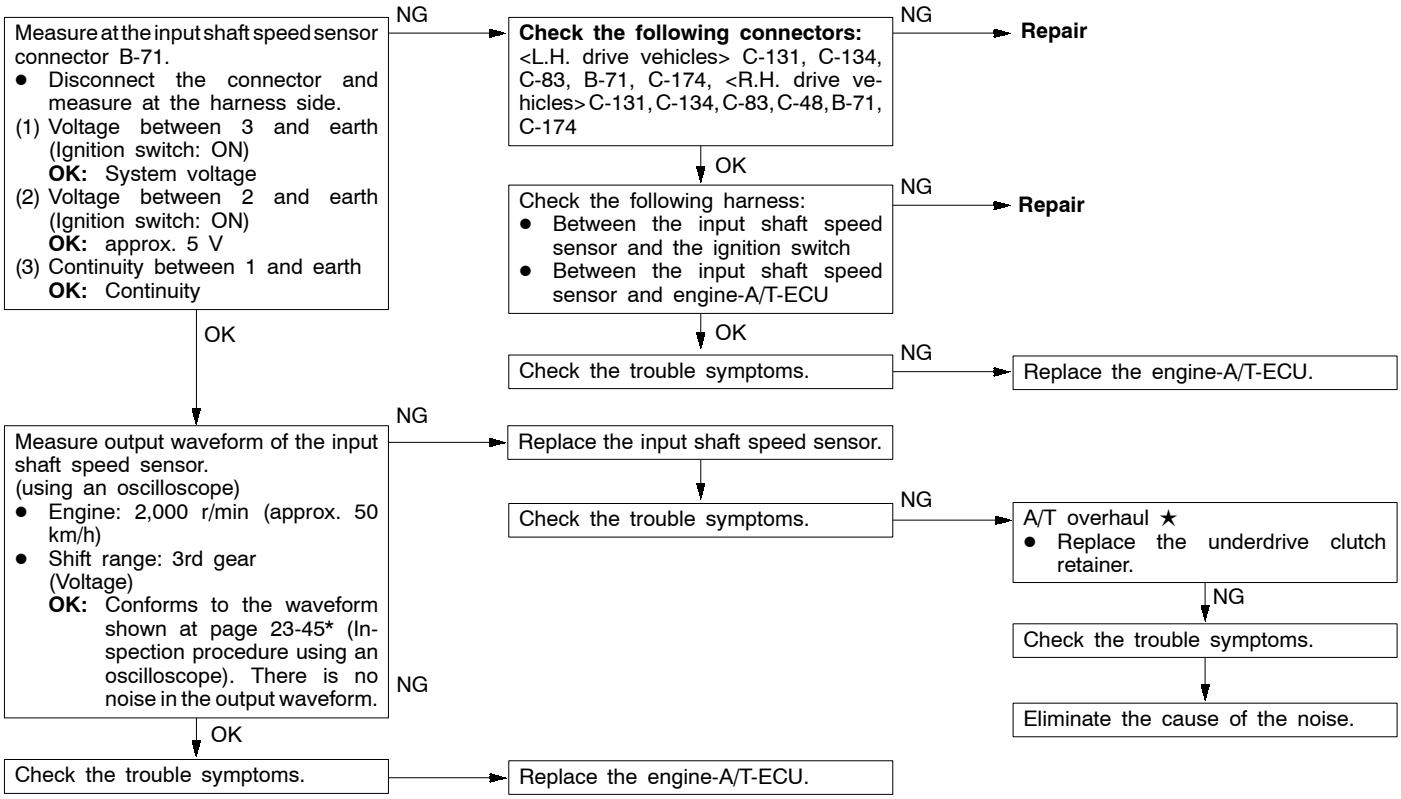
*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



Code No. 22 Input shaft speed sensor system	Probable cause
If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the input shaft speed sensor and diagnosis code No. 22 is output. If diagnosis code No. 22 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear (downshifting at Sport mode) as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the input shaft speed sensor • Malfunction of the underdrive clutch retainer • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

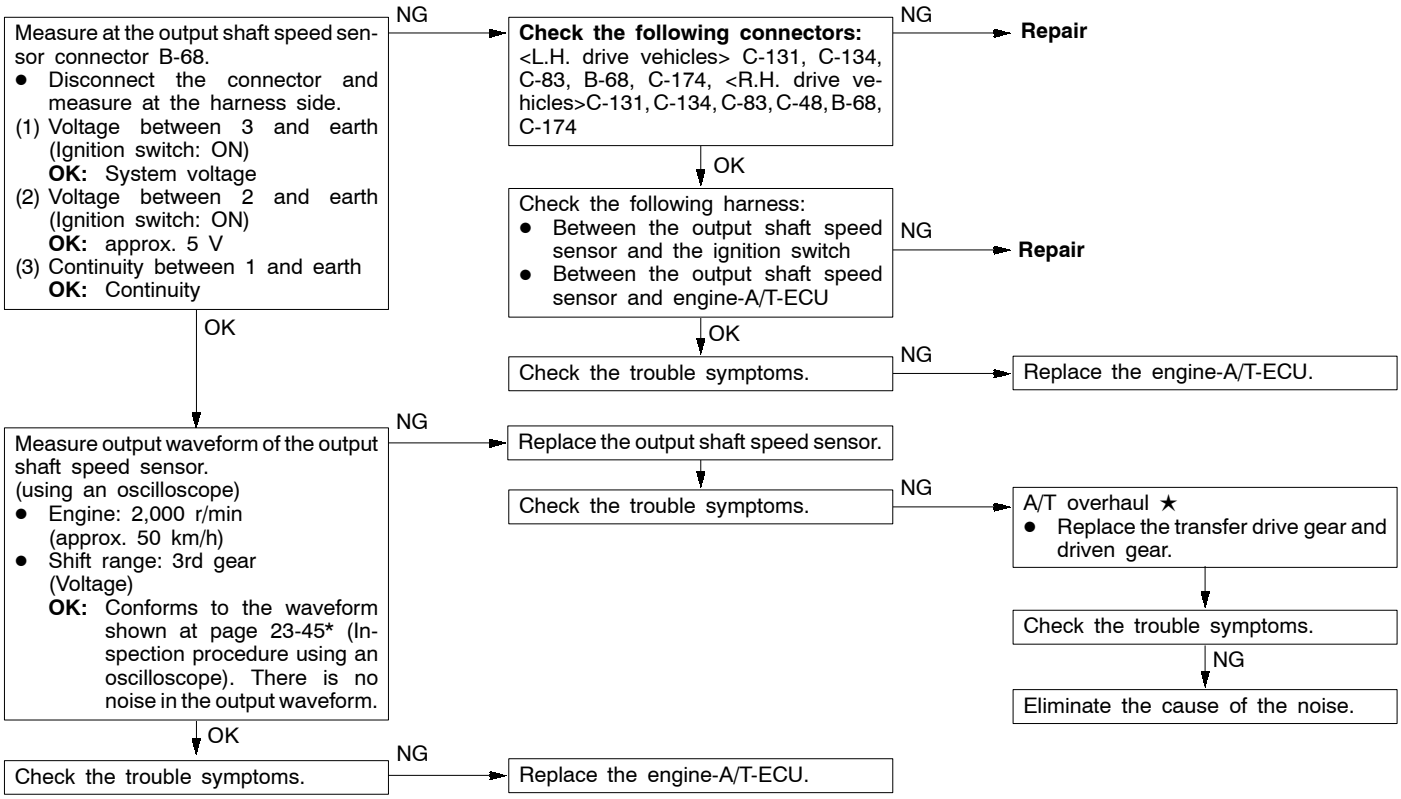
★: Refer to the Transmission Workshop Manual.



Code No. 23 Output shaft speed sensor system	Probable cause
If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the output shaft speed sensor and diagnosis code No. 23 is output. If diagnosis code No. 23 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear (downshifting at Sport mode) as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the output shaft speed sensor • Malfunction of the transfer drive gear or driven gear • Malfunction of connector • Malfunction of the engine-A/T-ECU

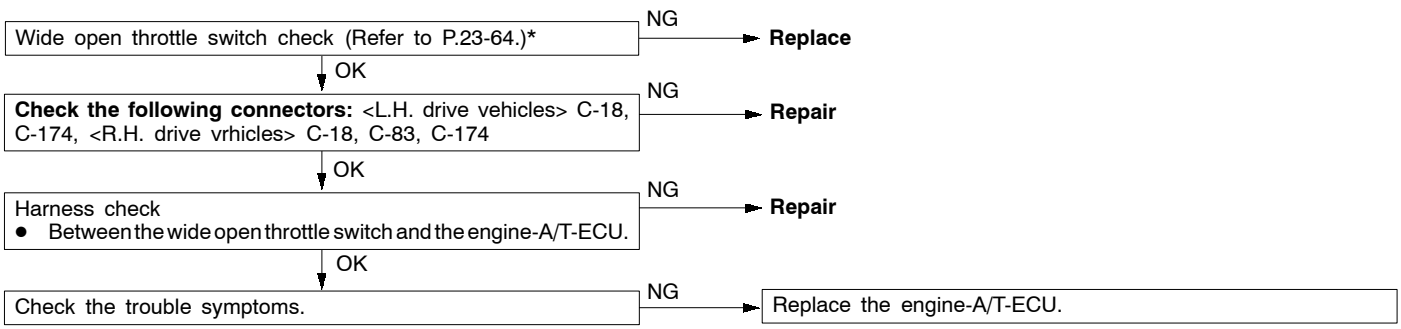
*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

★: Refer to the Transmission Workshop Manual.



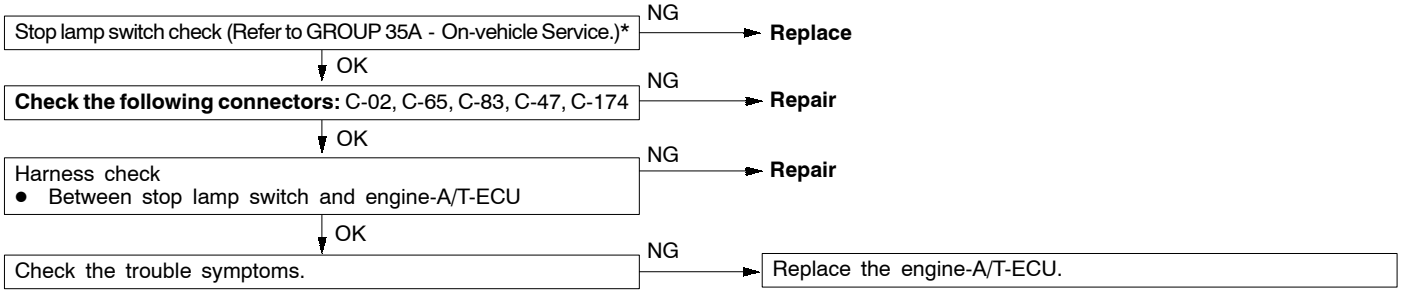
Code No. 25 Wide open throttle switch system	Probable cause
If the wide open throttle switch is on for 1 second or more with the throttle valve opening angle at 70% or less, it is judged that there is a short circuit in the wide open throttle switch and diagnosis code No. 25 is output.	• Malfunction of the wide open throttle switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



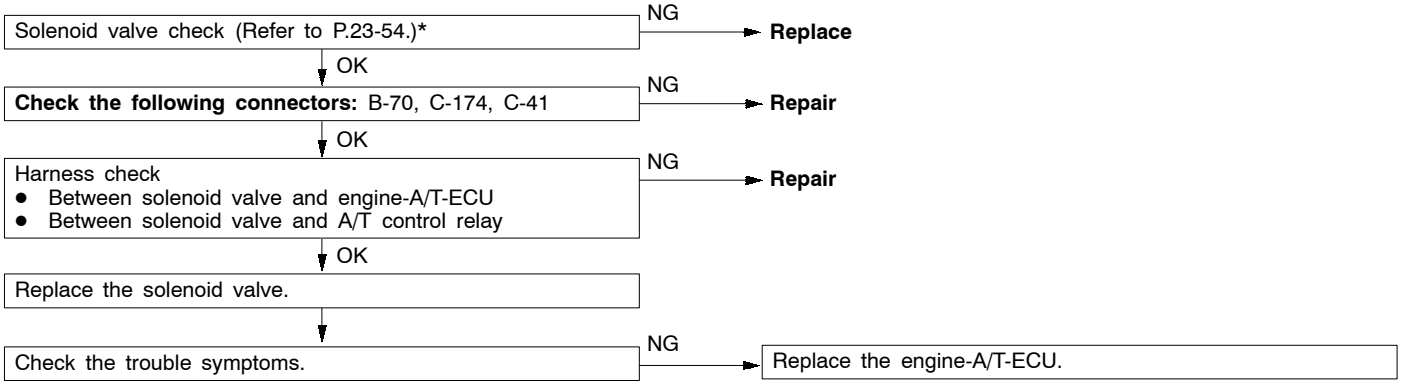
Code No. 26 Stop lamp switch system	Probable cause
If the stop lamp switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop lamp switch and diagnosis code No. 26 is output.	• Malfunction of the stop lamp switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



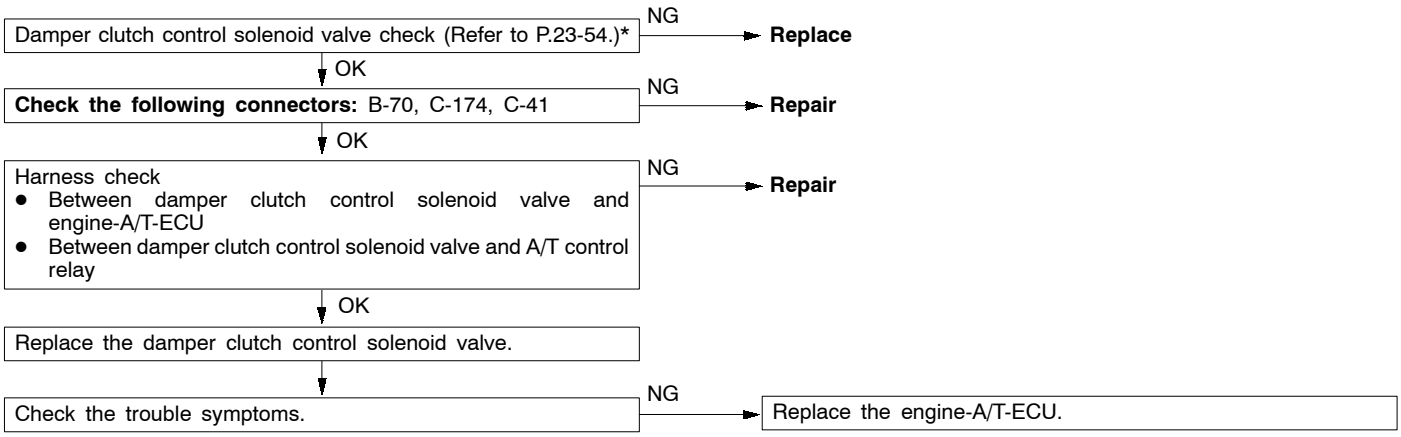
Code No. 31 Low and reverse solenoid valve system Code No. 32 Underdrive solenoid valve system Code No. 33 Second solenoid valve system Code No. 34 Overdrive solenoid valve system	Probable cause
If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the solenoid valve and the respective diagnosis code is output. The transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of solenoid valve • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



Code No. 36, 52 Damper clutch control solenoid valve system	Probable cause
If the resistance value for the damper clutch control solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the damper clutch control solenoid valve and diagnosis code No. 36 is output. If the drive duty rate for the damper clutch control solenoid valve is 100 % for a continuous period of 4 seconds or more, it is judged that there is an abnormality in the damper clutch control system and diagnosis code No. 52 is output. When diagnosis code No. 36 is output, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the damper clutch control solenoid valve • Malfunction of connector • Malfunction of the engine-A/T-ECU

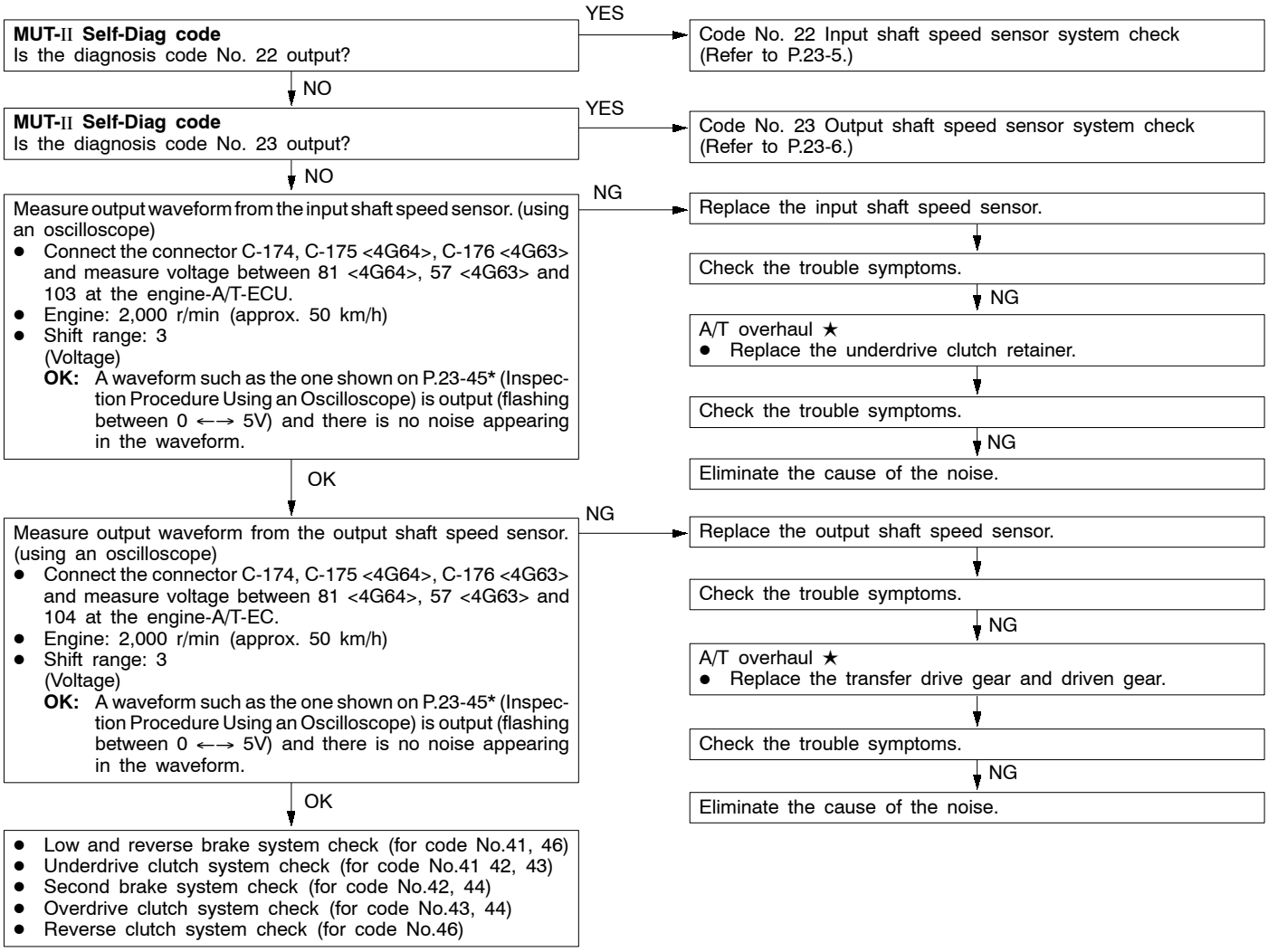
*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



Code No. 41 1st gear ratio does not meet the specification **Code No. 42 2nd gear ratio does not meet the specification** **Code No. 43 3rd gear ratio does not meet the specification** **Code No. 44 4th gear ratio does not meet the specification** **Code No. 46 Reverse gear ratio does not meet the specification**	**Probable cause**
If the output from the output shaft speed sensor multiplied by each gear ratio is not the same as the output from the input shaft speed sensor after shifting to each gear has been completed, each diagnosis code is output. If each diagnosis code is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the input shaft speed sensor • Malfunction of the output shaft speed sensor • Malfunction of the underdrive clutch retainer • Malfunction of the transfer drive gear or driven gear • Malfunction of the low and reverse brake system (for code No.41, 46) • Malfunction of the underdrive clutch system (for code No.41 42, 43) • Malfunction of the second brake system (for code No.42, 44) • Malfunction of the overdrive clutch system (for code No.43, 44) • Malfunction of the reverse clutch system (for code No.46) • Noise generated

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

★: Refer to the Transmission Workshop Manual.



Code No. 51 Abnormal communication with engine-A/T-ECU <4G63, 4G64>, Abnormal communication with engine-ECU <6A13-Vehicles without ASC and TCL>, Abnormal communication with TCL-ECU and engine-ECU <6A13-Vehicles with TCL>, Abnormal communication with ASC-ECU and engine-ECU<6A13-Vehicles with ASC>	Probable cause
If normal communication is not possible for a continuous period of 1 second or more when the ignition switch is at the ON position, the battery voltage is 10 V or more and the engine speed is 450 r/min or more, diagnosis code No. 51 is output. Diagnosis code No. 51 is also output if the data being received is abnormal for a continuous period of 4 seconds under the same conditions.	• Malfunction of connector • Malfunction of the engine-A/T-ECU <4G63, 4G64> • Malfunction of the A/T-ECU <6A13> • Malfunction of the engine-ECU <6A13> • Malfunction of the TCL-ECU <6A13-Vehicles with TCL> • Malfunction of the ASC-ECU <6A13-Vehicles with ASC>

<4G63, 4G64>

Replace the engine-A/T-ECU

<6A13>

Check the following connectors: <Vehicles without ASC and TCL> C-30, C-166, <Vehicles with TCL> C-30, C-51, C-10, C-28, C-166, <Vehicles with ASC> C-30, C-51, C-181,C-28, C-166
NG → **Repair**
OK ↓

Harness check
- Between engine-ECU and A/T-ECU <Vehicles without ASC and TCL>
- Between A/T-ECU and TCL-ECU, engine-ECU <Vehicles with TCL>
- Between A/T-ECU and ASC-ECU, engine-ECU <Vehicles with ASC>

NG → **Repair**
OK ↓

Check the trouble symptoms.
OK ↓

Replace the engine-ECU. <Vehicles without ASC and TCL>
Replace the TCL-ECU. <Vehicles with TCL>
Replace the ASC-ECU. <Vehicles with ASC>
→ Check the trouble symptoms.
OK ↓
Replace the A/T-ECU

Code No. 54 A/T control relay system	Probable cause
If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay earth and diagnosis code No. 54 is output. Then the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.	• Malfunction of the A/T control relay • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

Check the A/T control relay. (Refer to P.23-53.)*
NG → **Replace**
OK ↓

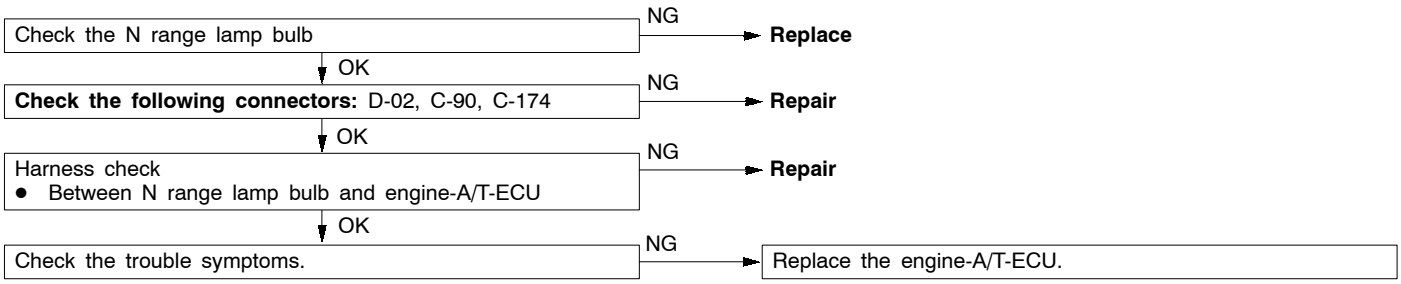
Check the following connectors: B-30, C-41, C-175, C-176, C-45
NG → **Repair**
OK ↓

Harness check
- Between control relay and body earth
- Between control relay and battery
- Between control relay and engine-A/T-ECU

NG → **Repair**
OK ↓

Check the trouble symptoms.
NG → Replace the engine-A/T-ECU.

Code No. 56 N range lamp system	Probable cause
If the N range signal is off after an N range lamp illumination instruction (ON instruction) has been given, it is judged that there is a short-circuit in the N range lamp earth and diagnosis code No. 56 is output.	• Malfunction of the N range lamp bulb • Malfunction of connector • Malfunction of the engine-A/T-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

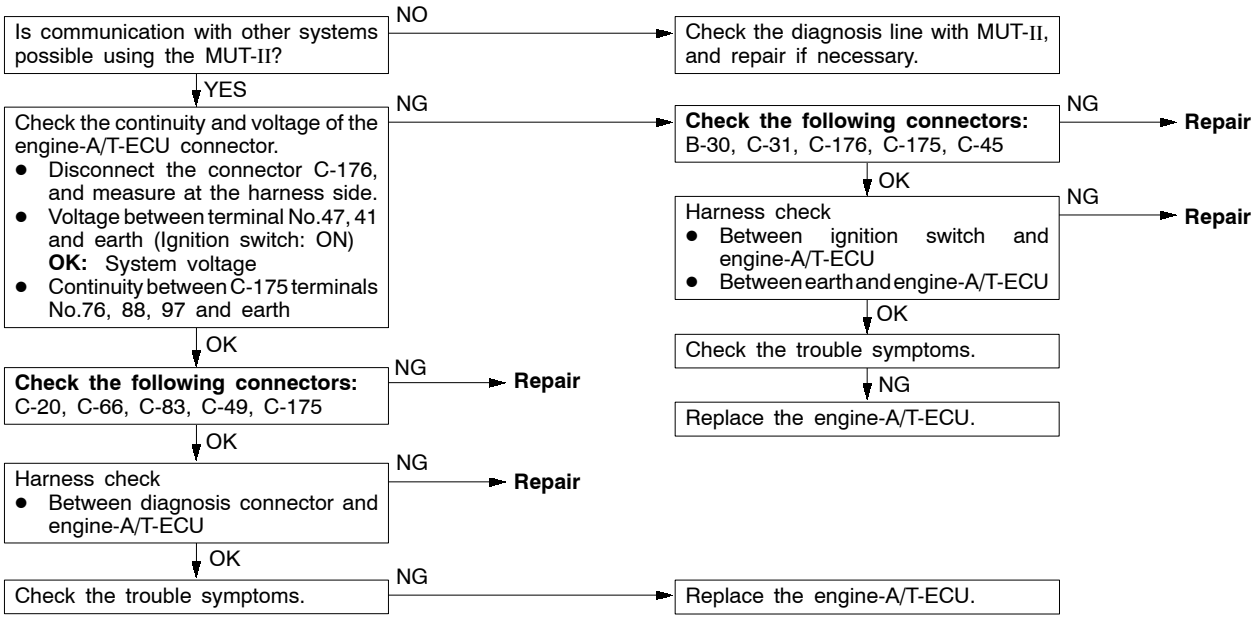
Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible		1	23-12
Driving impossible	Starting impossible	2	23-27*
	Does not move forward	3	23-27*
	Does not reverse	4	23-28*
	Does not move (forward or reverse)	5	23-28*
Malfunction when starting	Engine stalling when shifting	6	23-29*
	Shocks when changing from N to D and large time lag	7	23-29*
	Shocks when changing from N to R and large time lag	8	23-30*
	Shocks when changing from N to D, N to R and large time lag	9	23-31*
Malfunction when shifting	Shocks and running up	10	23-31*
Displaced shifting points	All points	11	23-32*
	Some points	12	23-33*
Does not shift	No diagnosis codes	13	23-33*
Malfunction while driving	Poor acceleration	14	23-34*
	Vibration	15	23-35*
Inhibitor switch system		16	23-13
Shift switch assembly system		17	23-14
A/C system		18	23-14
Vehicle speed sensor system		19	23-15
Auto-cruse-ECU system <4G64>		20	23-15

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

Since the ECU of 4G63, 4G64 engine vehicles has been changed from the A/T-ECU to the engine A/T-ECU, INSPECTION PROCEDURES FOR DIAGNOSIS CODES have been changed. INSPECTION PROCEDURES FOR DIAGNOSIS CODES of the 6A13 engine vehicle are the same as before.

INSPECTION PROCEDURE 1

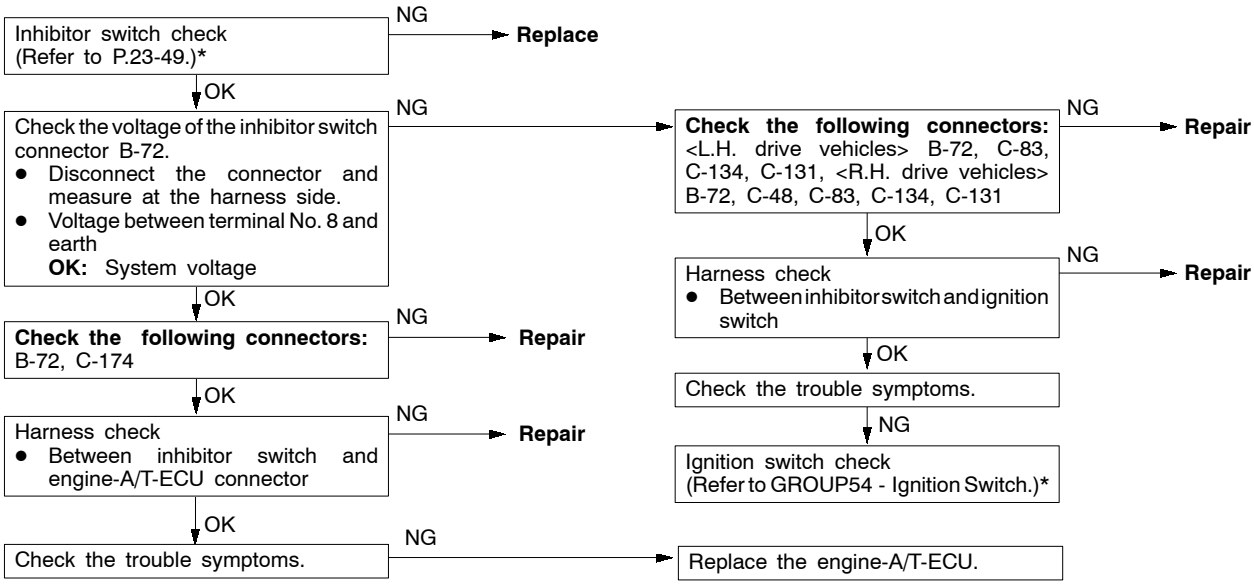
Communication with MUT-II is not possible	Probable cause
If communication with the MUT-II is not possible, the cause is probably a defective diagnosis line or the engine-A/T-ECU is not functioning.	• Malfunction of diagnosis line • Malfunction of connector • Malfunction of the engine-A/T-ECU



INSPECTION PROCEDURE 16

Inhibitor switch system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, ignition switch circuit or a defective engine-A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the ignition switch • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

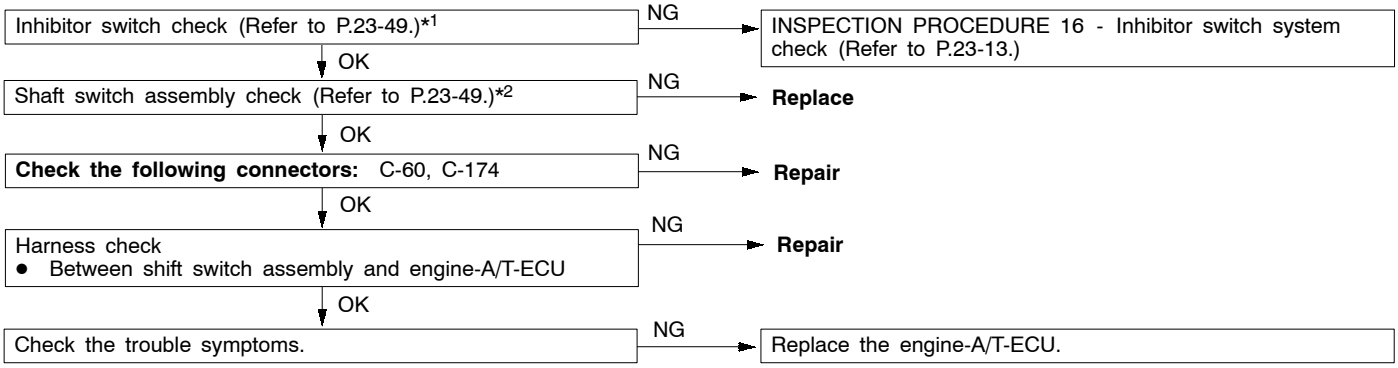


INSPECTION PROCEDURE 17

Shift switch assembly system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, shift switch assembly circuit or a engine-A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the shift switch assembly • Malfunction of connector • Malfunction of the engine-A/T-ECU

*1: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).

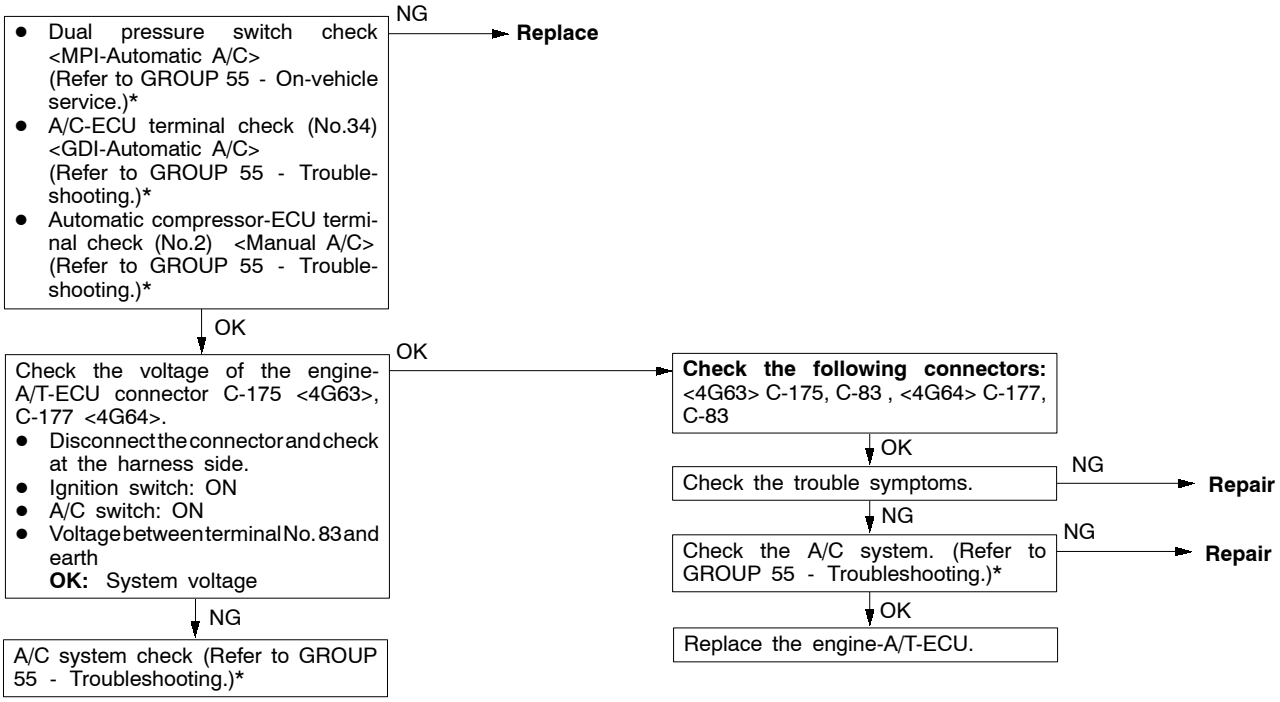
*2: Refer to '99 GALANT Workshop Manual (Pub. No. PWDE9611-A).



INSPECTION PROCEDURE 18

A/C system	Probable cause
The cause is probably a defective A/C system circuit or a defective engine-A/T-ECU.	• Malfunction of the dual pressure switch <MPI-Automatic A/C> • Malfunction of A/C-ECU <GDI-Automatic A/C> • Malfunction of Automatic compressor-ECU <Manual A/C> • Malfunction of connector • Malfunction of A/C system • Malfunction of the engine-A/T-ECU

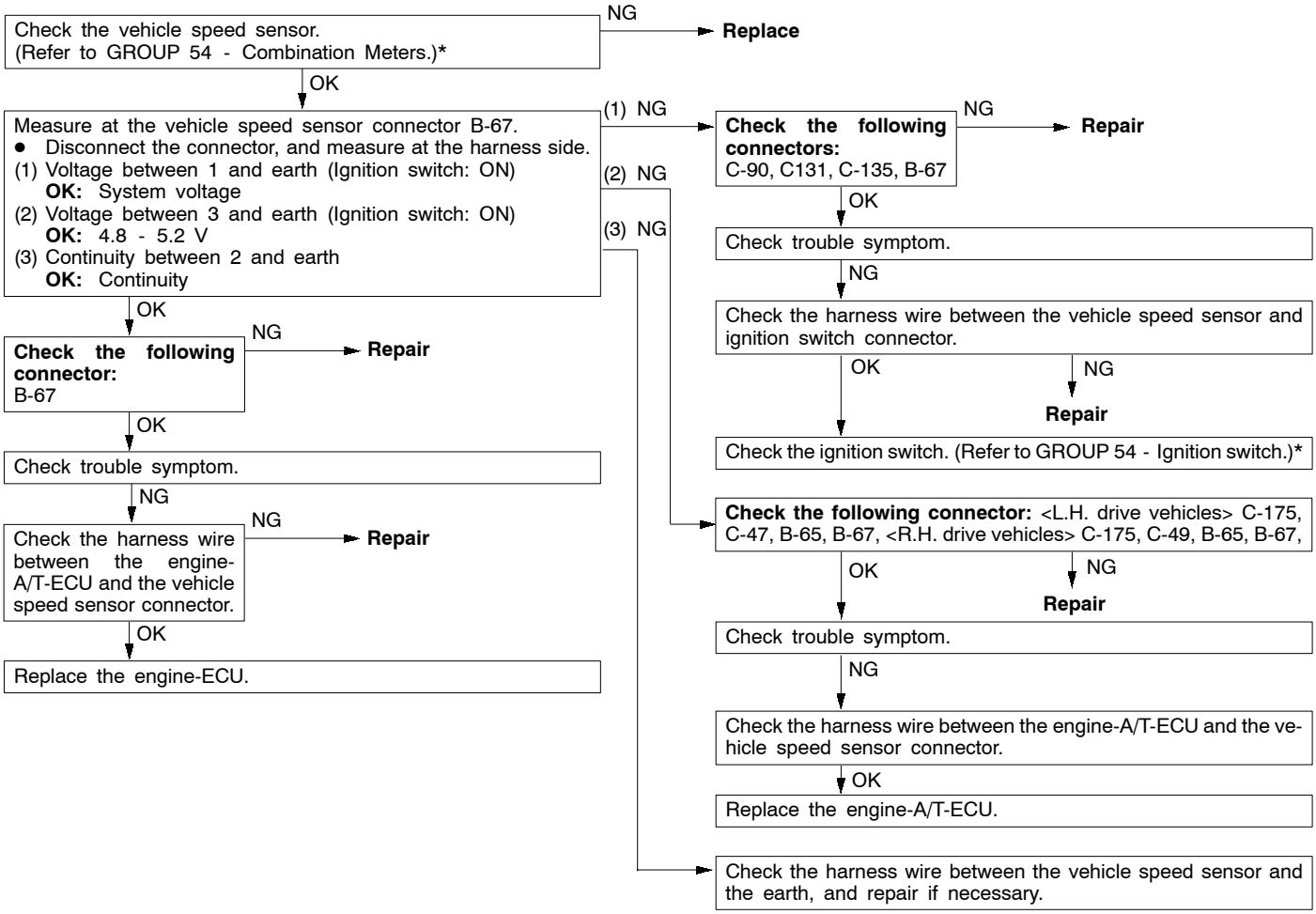
*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



INSPECTION PROCEDURE 19

Vehicle speed sensor system	Probable cause
The cause is probably a defective vehicle speed sensor circuit or a defective engine-A/T-ECU.	• Malfunction of the vehicle speed sensor • Malfunction of connector • Malfunction of the engine-A/T-ECU

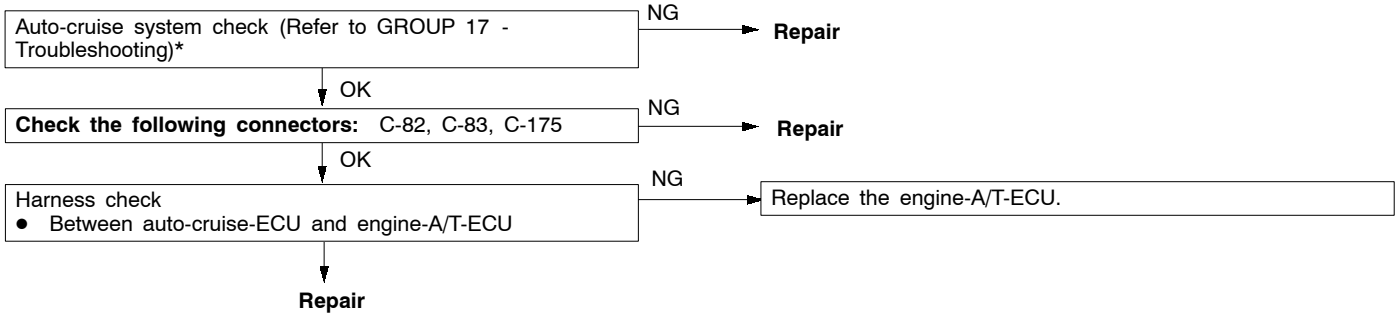
*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).



INSPECTION PROCEDURE 20

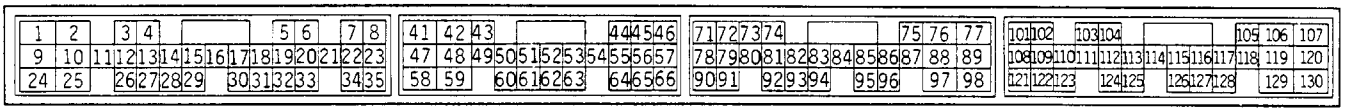
Auto-cruise-ECU signal system <4G64>	Probable cause
The cause is probably a defective auto-cruise signal line circuit or a defective engine-A/T-ECU.	• Malfunction of the auto-cruise-ECU • Malfunction of connector • Malfunction of the engine-A/T-ECU

*: Refer to '99 GALANT Workshop Manual (Pub. No. PWDE9611-A).



CHECK AT ENGINE-A/T-ECU TERMINALS

*: Refer to '97 GALANT Workshop Manual (Pub. No. PWDE9611).
<4G63, 4G64>



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Terminal No.	Check item	Check requirement	Standard value
45	Crank angle sensor	Engine: Idling	2.0 - 2.4 V
50	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
57	Sensor earth	Always	0 V
66	Backup power supply	Ignition switch: OFF	System voltage
76	Earth	Always	0 V
77	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
78	Throttle position sensor (TPS) <4G63>	Accelerator pedal: Released (Engine stopped)	0.5 - 1.0 V
		Accelerator pedal: Depressed (Engine stopped)	4.5 - 5.0 V
80	Vehicle speed sensor	When stopped	0 V
		Move forward slowly	0 → 5 V flashing
83	A/C compressor load signal	A/C switch: OFF	0 V
		A/C switch: ON	0 V
84	Diagnosis control	-	-
85	Diagnosis output	Normal (No diagnosis code output)	0 → 5 V flashing
88	Earth	Always	0 V
89	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	System voltage
95	Accelerator pedal position sensor (APS) <4G64>	Accelerator pedal: Released (Engine stopped)	0.5 - 1.0 V
		Accelerator pedal: Depressed (Engine stopped)	4.5 - 5.0 V
97	Earth	Always	0 V
101	Inhibitor switch P	Selector lever position: P	System voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
102	Inhibitor switch D	Selector lever position: D	System voltage
		Selector lever position: Other than above	0 V
103	Input shaft speed sensor	Measure between terminal No. 31 and No.43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: Sports mode (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
104	Output shaft speed sensor	Measure between terminal No. 32 and No.43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: Sports mode (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
105	1st gear shift indicator lamp	Gear: 1st gear	System voltage
		Gear: Other than above	0 V
106	Second solenoid valve	Selector lever position: Sports mode (2nd gear)	System voltage
		Selector lever position: P	Approx. 7 - 9 V
107	Damper clutch control solenoid valve	Selector lever position: Sports mode (1st gear)	System voltage
		Selector lever position: Sports mode (50 km/h in 3rd gear)	Other than battery voltage
108	Inhibitor switch R	Selector lever position: R	System voltage
		Selector lever position: Other than above	0 V
109	Select switch	Selector lever position: Sports mode	System voltage
		Selector lever position: Other than above	0 V
110	Down shift switch	Selector lever position: Downshift and lever held	System voltage
		Selector lever position: Other than above	0 V
115	Wide-open throttle switch	Accelerator pedal: Released	4.5 - 5.5 V
		Accelerator pedal: Depressed	Less than 0.4 V
117	3rd gear shift indicator lamp	Gear: 3rd gear	System voltage
		Gear: Other than above	0 V
118	2nd gear shift indicator lamp	Gear: 2nd gear	System voltage
		Gear: Other than above	0 V
120	Underdrive solenoid valve	Selector lever position: Sports mode (1st gear)	System voltage
		Selector lever position: P	Approx. 7 - 9 V
121	Inhibitor switch N	Selector lever position: N	System voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
122	Upshift switch	Selector lever position: Upshift and lever held	System voltage
		Selector lever position: Other than above	0 V
123	Stop lamp switch	Brake pedal: Depressed	System voltage
		Brake pedal: Released	0 V
124	A/T fluid temperature sensor	A/T fluid temperature: 20°C (68°F)	3.8 - 4.0 V
		A/T fluid temperature: 40°C (104°F)	3.2 - 3.4 V
		A/T fluid temperature: 80°C (176°F)	1.7 - 1.9 V
126	Mode control switch	Select HOLD mode	System voltage
		Select AUTO mode	0 V
128	4th gear shift indicator lamp	Gear: 4th gear	System voltage
		Gear: Other than above	0 V
129	Low-reverse solenoid valve	Selector lever position: D (1st gear)	System voltage
		Selector lever position: D (2nd gear)	Approx. 7 - 9 V
130	Overdrive solenoid valve	Selector lever position: Sports mode (3rd gear)	System voltage
		Selector lever position: P	Approx. 7 - 9 V

GROUP 31
WHEEL AND TYRE

GENERAL

OUTLINE OF CHANGE

Specifications for wheels and tyres have been changed.

GENERAL SPECIFICATIONS

Items			New	Old		
			All models	2000	2400	2500
Wheel	Type		Steel type Aluminium type*	Steel type Aluminium type*	Steel type Aluminium type*	Aluminium type Steel type*
	Size		15 × 6JJ	14 × 5 1/2JJ 15 × 6JJ*	15 × 6JJ	15 × 6JJ
Tyre	Size		195/60R15 88V 205/60R15 91V*	195/65R14 89V	195/60R15 88V	195/60R15 88V 205/60R15 91V*
Spare wheel	Type		Steel type Aluminium type*	Steel type Aluminium type*	Steel type Aluminium type*	Steel type or Aluminium type
	Size	Standard equipment	16 × 4.0T<LHD> 15 × 6JJ<RHD>	15 × 4.0T or 14 × 5 1/2JJ	15 × 6JJ or 16 × 4.0T	15 × 6JJ or 16 × 4.0T
		Optional equipment	15 × 6JJ<LHD>	14 × 5 1/2JJ, 16 × 4.0T, or 15 × 6JJ	15 × 6JJ	15 × 6JJ
Spare tyre	Size	Standard equipment	T125/70D16 (High pressure) <LHD> 195/60R15 88V <RHD>	T125/70D15 (High pressure) or 195/65R14 89 V	T125/70D16 (High pressure) or 195/60R15 88V	T125/70D16 (High pressure), 195/60R15 88V, or 205/60R15 91V
		Optional equipment	195/60R15 88V <LHD>	T125/70D16 (High pressure), 195/65R14 89 V or 195/60R15 88V	195/60R15 88V	195/60R15 88V, or 205/60R15 91V

NOTE
*: Optional items

GROUP 32
POWER PLANT MOUNT

GENERAL

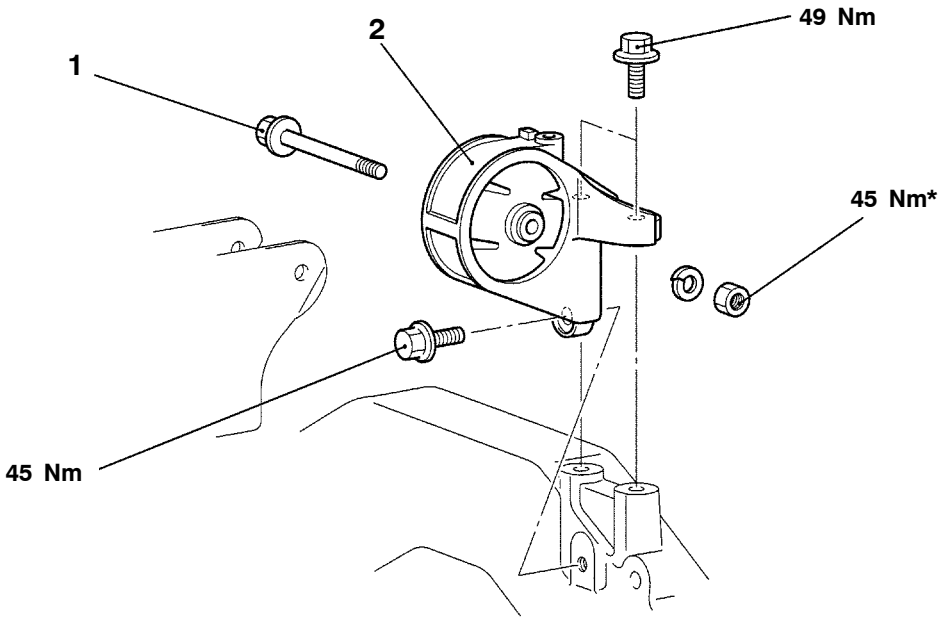
OUTLINE OF CHANGE

The following service procedures have been established to correspond to the change of the rear roll stopper in vehicles with 6A1 engine. Other items are the same as before.

ENGINE REAR ROLL STOPPER

REMOVAL AND INSTALLATION

Caution
Mounting locations marked by * should be provisionally tightened, and then fully tightened when the body is supporting the full weight of the engine.



Removal steps

1. Transmission and rear roll stopper connecting bolt
2. Rear roll stopper

GROUP 33A
FRONT SUSPENSION

GENERAL

OUTLINE OF CHANGES

The service procedures have been revised as the following parts due to the change in the crossmember. <2500>

- Lateral lower arm assembly
- Stabilizer bar

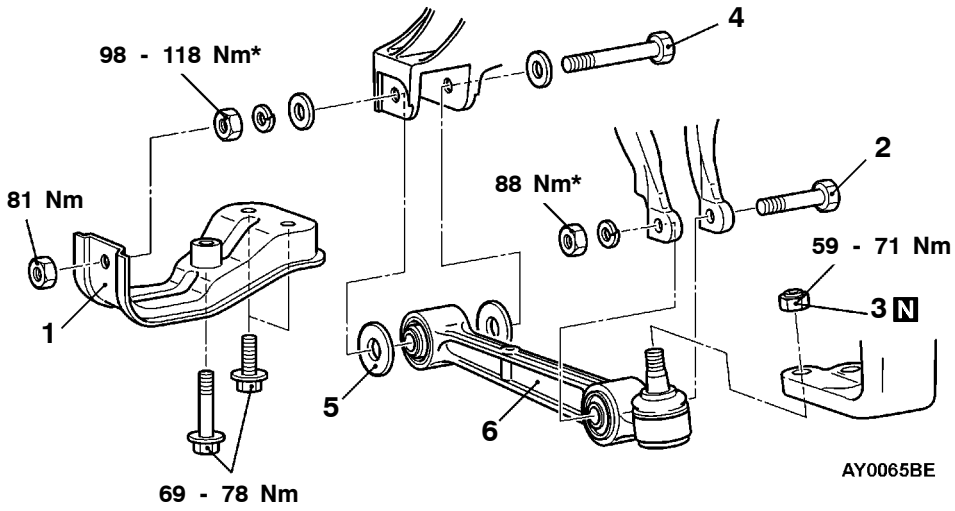
LATERAL LOWER ARM ASSEMBLY <2500>

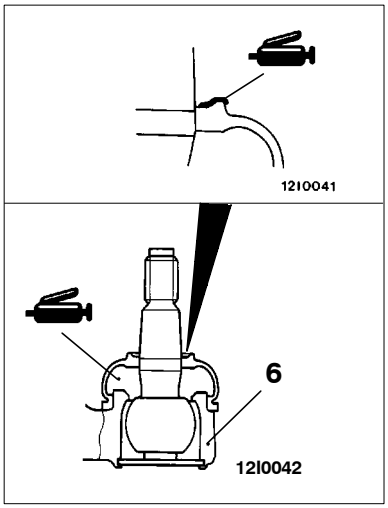
REMOVAL AND INSTALLATION

Caution

***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**

Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Wheel Alignment Check and Adjustment





Removal steps

1. No.2 stay
2. Lateral lower arm and damper fork connection
◀A▶ 3. Lateral lower arm and knuckle connection
4. Lateral lower arm mounting bolt
5. Stopper
6. Lateral lower arm assembly

NOTE

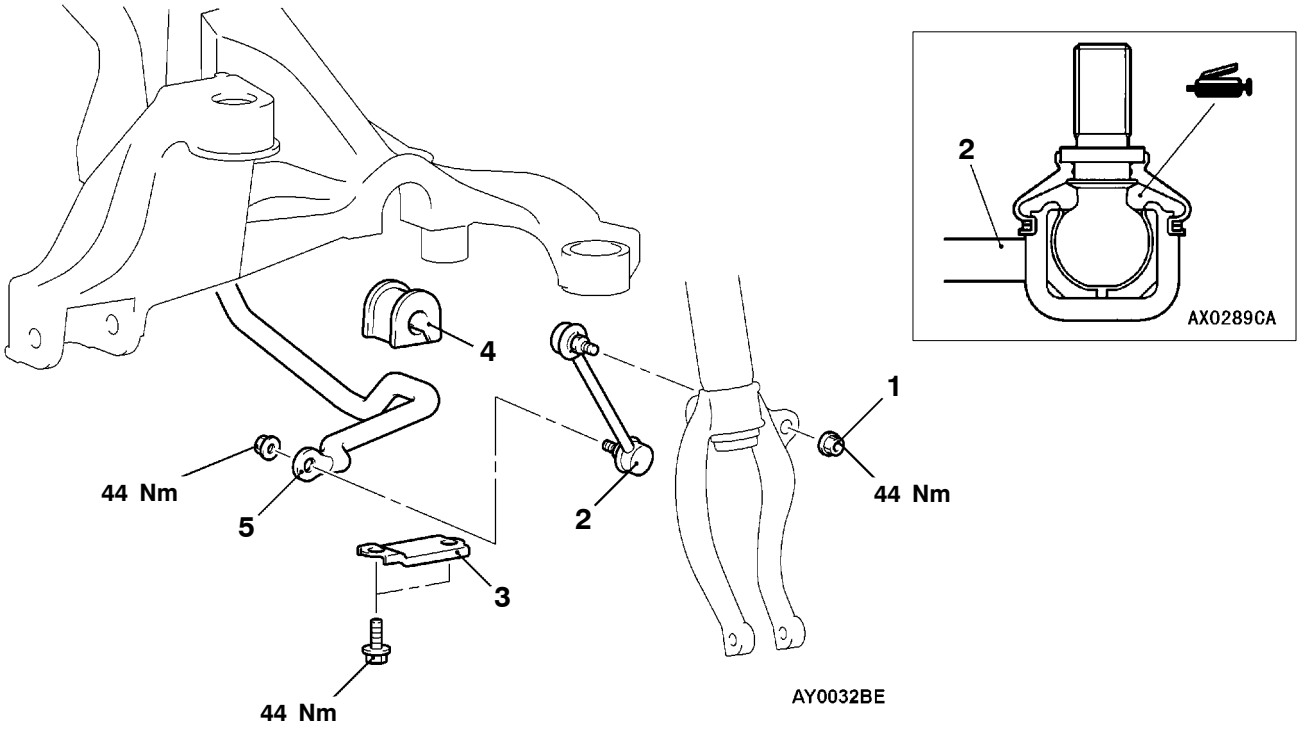
For service point, inspection, and lower arm ball joint dust cover replacement, refer to the Basic Manual.

STABILIZER BAR <2500>

REMOVAL AND INSTALLATION

Pre-removal Operation
- Left Side of No.1 and No.2 Stays Disconnection <L.H. drive vehicles>
- Right Side of No.1 and No.2 Stays Disconnection <R.H. drive vehicles>

Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Left Side of No.1 and No.2 Stays Connection <L.H. drive vehicles>
- Right Side of No.1 and No.2 Stays Connection <R.H. drive vehicles>



Removal steps

1. Stabilizer link mounting nut
2. Stabilizer link
▶A◀ 3. Stabilizer bar bracket
▶A◀ 4. Bushing
▶A◀ 5. Stabilizer bar

NOTE
For service point, inspection, and stabilizer link ball joint dust cover replacement, refer to the Basic Manual.

SERVICE BRAKES

CONTENTS

BASIC BRAKE SYSTEM 35A

ANTI-SKID BRAKING SYSTEM (ABS) <2WD> 35B

ACTIVE STABILITY CONTOROL (ASC) SYSTEM 35C

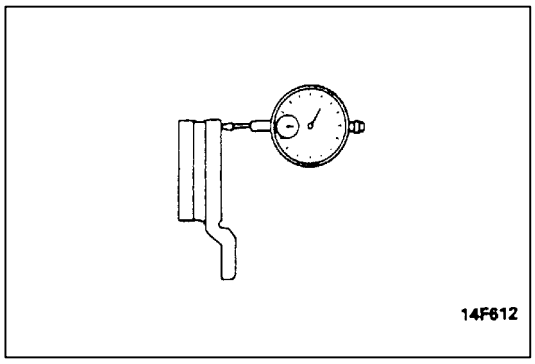
GROUP 35A
BASIC BRAKE SYSTEM

GENERAL

OUTLINE OF CHANGES

The proportioning valve has been discontinued due to the introduction of the Electronic Brake-force Distribution (EBD) function. In addition, the service specification and procedure have been revised.

- FRONT BRAKE DISC RUN-OUT
- FRONT DISC BRAKE DISASSEMBLY AND REASSEMBLY



ON-VEHICLE SERVICE

BRAKE DISC ROTOR CHECK

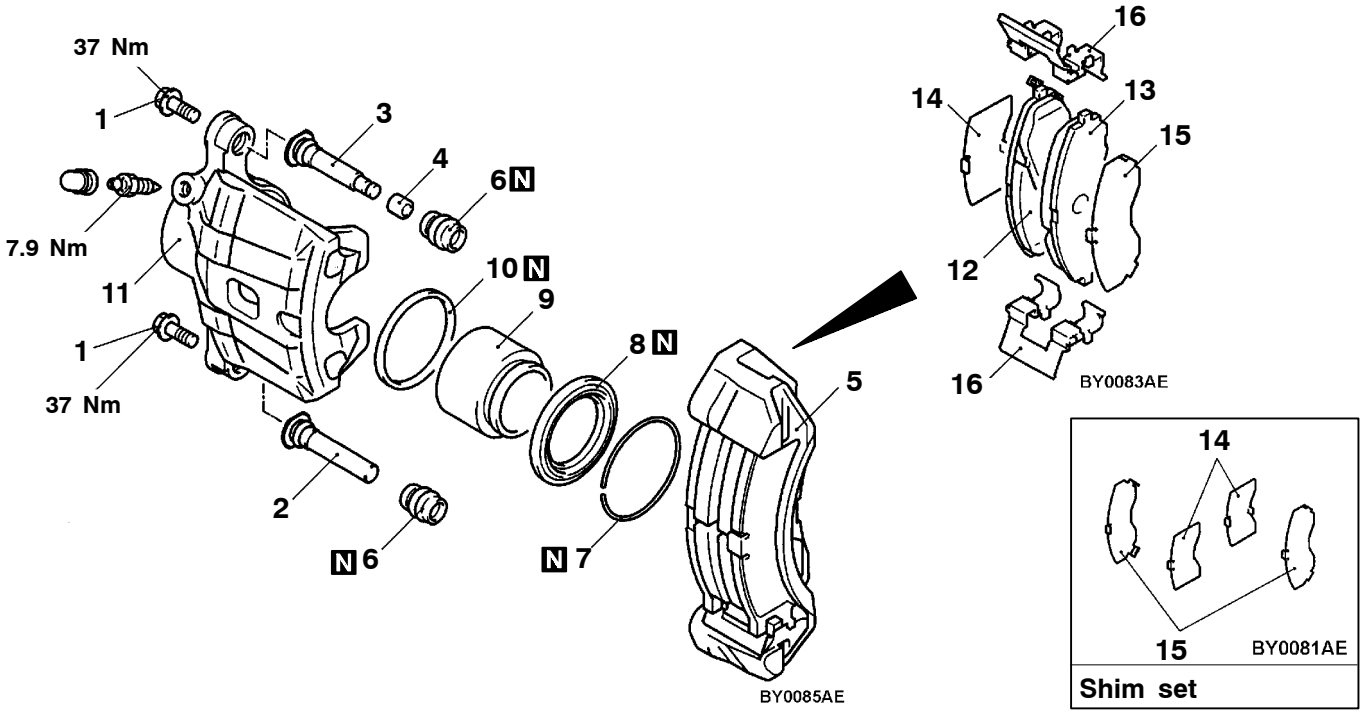
For the checking procedure, refer to the Basic Manual.

Front Brake Disc Run-out

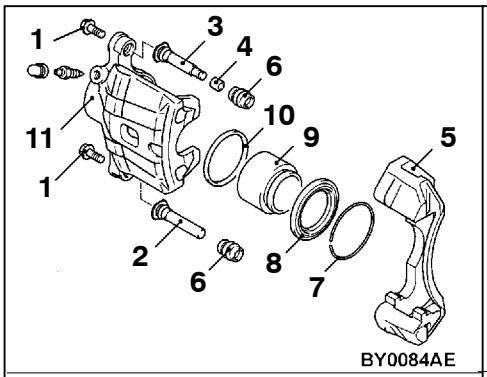
Limit: 0.03 mm or less

FRONT DISC BRAKE

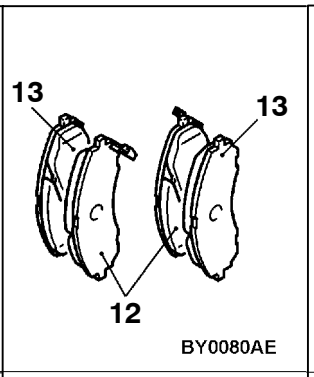
DISASSEMBLY AND REASSEMBLY



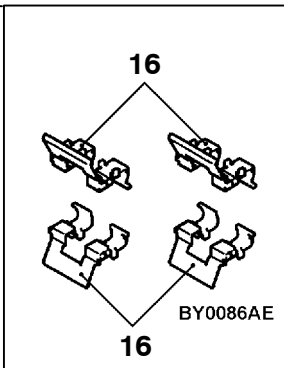
Shim set



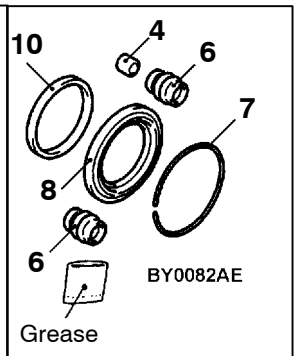
Brake caliper kit



Pad set



Clip set

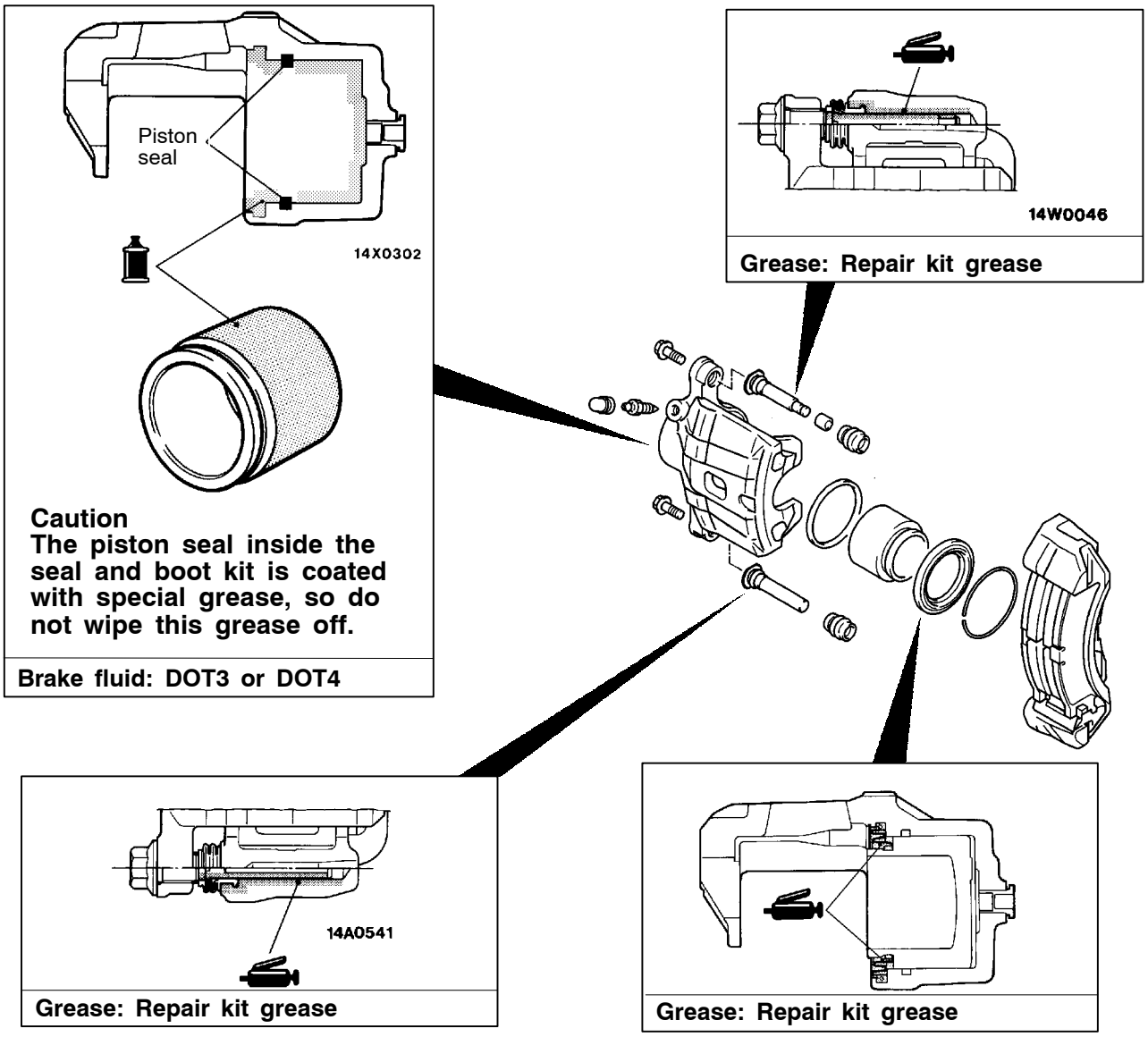


Seal and boots kit

Disassembly steps

1. Pin bolt
2. ▶A◀ Guide pin
3. ▶A◀ Lock pin
4. ▶A◀ Bushing
5. Caliper support
6. Pin boot
7. Boot ring
8. ◀A▶ Piston boot
9. ◀A▶ Piston
10. ◀B▶ Piston seal
11. Caliper body
12. Pad and wear indicator assembly
13. Pad assembly
14. Inner shim
15. Outer shim
16. Pad clip

LUBRICATION POINTS



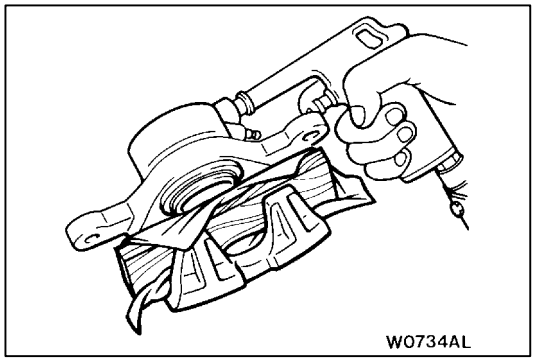
Caution
The piston seal inside the seal and boot kit is coated with special grease, so do not wipe this grease off.

Brake fluid: DOT3 or DOT4

Grease: Repair kit grease

Grease: Repair kit grease

Grease: Repair kit grease

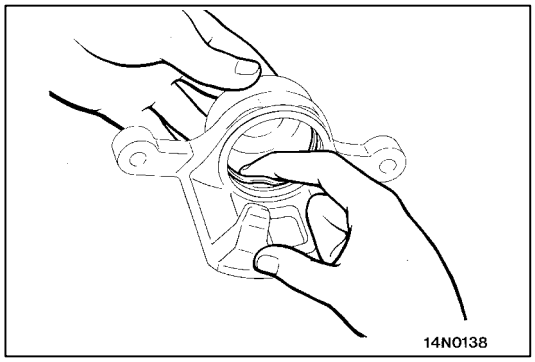


DISASSEMBLY SERVICE POINTS

◀A▶ PISTON BOOT/PISTON REMOVAL

Use a piece of wood to protect the caliper body outer side, and then apply compressed air through the brake hose connection hole to withdraw the piston and piston boot.

Caution
If air is blown into the caliper body suddenly, the piston will pop out, causing damage to the caliper body. Be sure to apply compressed air gradually.



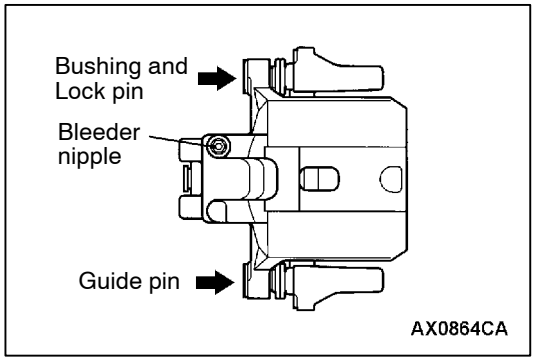
◀B▶ PISTON SEAL REMOVAL

1. Remove the piston seal with finger tip.

   Caution
   Do not use a flat-tipped screwdriver or other tool to prevent damage to inner cylinder.

2. Clean piston surface and inner bore with trichloroethylene, alcohol or the specified brake fluid.

   Specified brake fluid: DOT3 or DOT4



REASSEMBLY SERVICE POINT

▶A◀ BUSHING/LOCK PIN/GUIDE PIN INSTALLATION

Install the bushing and lock pin to the bleeder nipple side at the caliper body, the guide pin to its opposite side, respectively.

INSPECTION

Refer to the Basic Manual.

GROUP 35B
ANTI-SKID BRAKING SYSTEM (ABS) <2WD>

GENERAL

OUTLINE OF CHANGES

The Electronic Brake-force Distribution (EBD) has been adopted. The EBD makes it possible to maintain the maximum amount of braking force for the rear wheels even when the vehicle's load is unevenly distributed.

EBD CONTROL

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

- Because the system provides the optimum rear wheel braking force regardless of the vehicle laden condition and the condition of the road surface, the system reduces the required pedal depression force, particularly when the vehicle is heavily laden or driving on road surfaces with high frictional coefficients.
- Because the duty placed on the front brakes has been reduced, the increases in pad temperature can be controlled during front brakes applying to improve the wear resistance characteristics of the pad.
- Control valves such as the proportioning valve are no longer required.

NOTE
Only the description below has been changed due to the introduciton of the EBD. The other service procedures are the same as before. (Refer to the Basic Manual.)

ON-VEHICLE SERVICE

REMEDY FOR A FLAT BATTERY

When booster cables are used to start the engine when the battery is completely flat and then the vehicle is immediately driven without waiting for the battery to recharge itself to some extent, the engine may misfire, and driving might not be possible.
This happens because ABS consumes a great amount of current for its self-check function; the remedy is to allow the battery to recharge sufficiently.

Caution
Do not drive the vehicle while the ABS is disabled (e.g. the ABS-ECU connector is disconnected), otherwise vehicle behaviour will become unstable when braking.

ACTIVE STABILITY CONTROL (ASC) SYSTEM

CONTENTS

GENERAL 2
- Outline of Change 2
- Active Stability Control (ASC) System 2

SERVICE SPECIFICATIONS 4

SPECIAL TOOLS 4

TROUBLESHOOTING 5

ON-VEHICLE SERVICE 46
- Master Cylinder Pressure Sensor Check 46
- Solenoid Valve Checks 47
- Motor Operation Check 47
- Valve Relay Continuity Check 48

MASTER CYLINDER AND BRAKE BOOSTER 49
- Master Cylinder 50

MOTOR RELAY 51

HYDRAULIC UNIT 51

SENSORS 52

ASC SWITCH 54

ASC-ECU 55

GENERAL

OUTLINE OF CHANGE

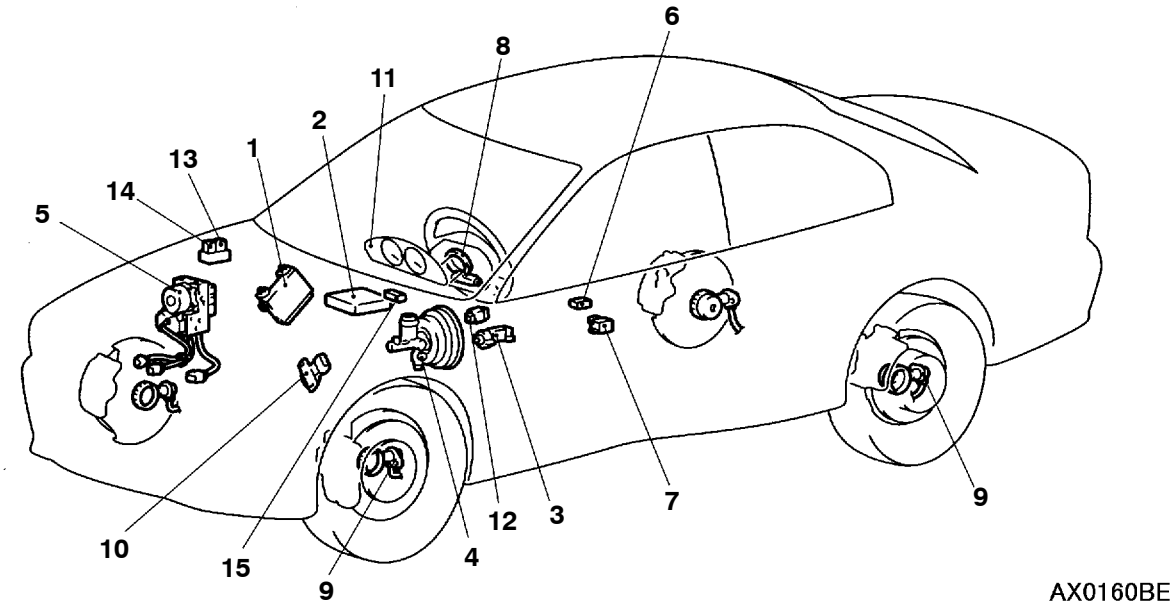
The following service procedures have been established to correspond to the addition of an Active Stability Control (ASC) system as an option. <2500>

ACTIVE STABILITY CONTROL (ASC) SYSTEM

This system is a safety and accident-prevention system which augments the ABS and TCL functions by controlling the braking force independently for all four wheels; this controls the longitudinal and lateral forces applied to the vehicle in order to restrict any dangerous vehicle behaviour when driving under marginal conditions.

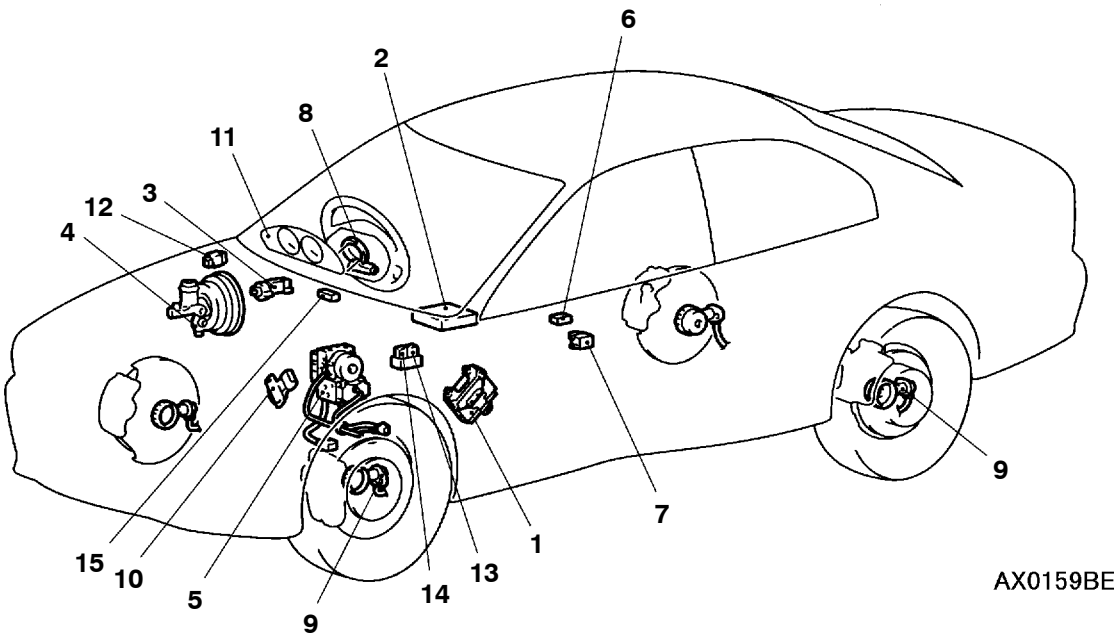
CONSTRUCTION DIAGRAM

<L.H. drive vehicles>



AX0160BE

<R.H. drive vehicles>



AX0159BE

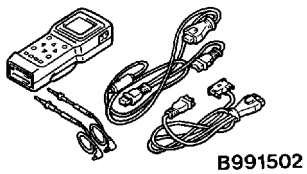
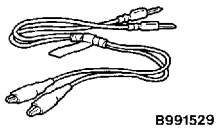
No.	Name of each component part	Outline of function
1	ASC control unit (ASC-ECU)	Processes the information from the various sensors to calculate factors such as the demand yaw moment based on the control model, and uses these calculations to control the brake hydraulic pressure for the four wheels and the engine output.
		Controls the diagnosis functions and fail-safe functions.
2	Engine control unit (Engine-ECU)	Sends the signals which are required by the ASC for engine control to the ASC-ECU.
		Carries out corrections in response to the engine condition (such as whether the engine is cold or warm) based on engine torque reduction requests and ignition timing retard requests, and also controls the ignition timing.
3	Stop lamp	Sends a signal to the ASC-ECU indicating whether the brake pedal is depressed or not.
4	Master cylinder pressure sensor	Detects the master cylinder output pressure and inputs this to the ASC-ECU.
5	Accumulator pressure sensor	Detects the accumulator hydraulic pressure and inputs this to the ASC-ECU.
6	Lateral G sensor	Detects the acceleration in the lateral vehicle direction and inputs this to the ASC-ECU.
7	Yaw rate sensor	Detects the angular velocity of the vehicle and inputs this to the ASC-ECU.
8	Steering sensor	Detects the steering wheel angle signal and inputs this to the ASC-ECU.
9	Wheel speed sensors	Detect the DC signals at frequencies which are proportional to the rotation speeds of the wheels, and input these to the ASC-ECU.
10	Accelerator pedal position sensor (APS)	Detects the accelerator pedal depression amount and inputs this to the ASC-ECU.
11	ASC/TCL operation lamp	Switched off when neither the ASC and TCL function is operating, and illuminates when either function is operating.
	ASC-OFF indication lamp	Illuminates when the ASC and TCL systems are cancelled. (the ASC switch is at OFF). In addition, the indicator lamp illuminates when the ASC-ECU fail-safe function cancels the system.
12	ASC switch	Sends a signal for switching the ASC/TCL control modes (ASC/TCL-ON, ASC/TCL-OFF) to the ASC-ECU. The ASC-ECU turns the entire system on and via the switch operation.
13	Motor relay	Turns ON to supply power to the motor inside the hydraulic unit when a signal is received from the ASC-ECU.
14	Valve relay	Turns ON to supply power to the solenoid valve inside the hydraulic unit when a signal is received from the ASC-ECU.
15	Diagnosis connector	Outputs diagnosis codes.

NOTE
In the case of component parts which from a part of other systems also, only the functions of that part which relate to the ASC system are mentioned.

SERVICE SPECIFICATIONS

Item			Standard value
Master cylinder pressure sensor output voltage V	Hydraulic pressure 0 MPa		0.4 - 0.6
	Hydraulic pressure 9.8 MPa		2.4 - 2.6
Resistance between ABS solenoid valve terminals Ω	Front-right side Front-left side Rear-right side Rear-left side	IN	6.3 - 6.9
		OUT	3.1 - 3.4
Resistance between ASC solenoid valve terminals Ω	Diagonal accumulator valves	FR-RL	3.1 - 3.4
		FL-RR	3.1 - 3.4
	Diagonal cut valves	FR-RL	6.3 - 6.9
		FL-RR	6.3 - 6.9
G sensor output voltage V	When horizontal		2.4 - 2.6
	When label surface is facing sideways		3.3 - 3.7
Yaw rate sensor output voltage V	When stationary		2.4 - 2.6

SPECIAL TOOLS

Tool	Number	Name	Use
	MB991502	MUT-II sub assembly	ASC inspection (diagnosis display using MUT-II)
	MB991529	Diagnosis code check harness	ASC inspection (diagnosis display using ASC/TCL operation lamp and ASC-OFF indication lamp)
	MB991348	Test harness set	Sensor inspection

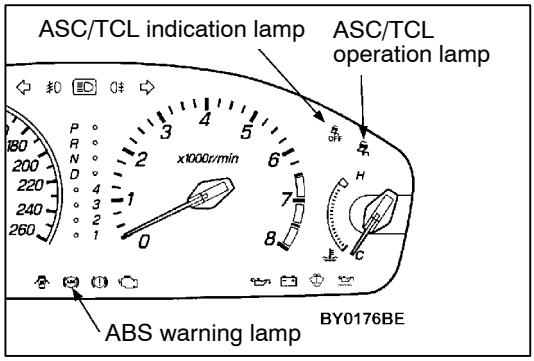
TROUBLESHOOTING

BASIC FLOW FOR TROUBLE DIAGNOSIS

'97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.

NOTE
Check that the followings are normal before judging that there is a problem.

- Is the proper steering wheel installed in the correct position to the centre of the steering column shaft?
- Are the sizes, specifications, air pressures, balance and wear for the tires and wheels normal?
- Is the wheel alignment normal?
- Have any modifications been made to areas such as the engine or suspension which might have an effect on the ASC system?



DIAGNOSIS FUNCTION

READING DIAGNOSIS CODES

Use the MUT-II or the following lamp to take a reading of the diagnosis codes.
('97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

ABS and ASC diagnosis code: ASC/TCL operation lamp
TCL diagnosis code: ASC-OFF indication lamp

NOTE
(1) Connect the MUT-II to the 16-pin diagnosis connector.
(2) ABS diagnosis codes can be read out by means of the ABS warning lamp if the valve relay has been removed.

ERASING DIAGNOSIS CODES

'97 GALANT Workshop Manual - Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.

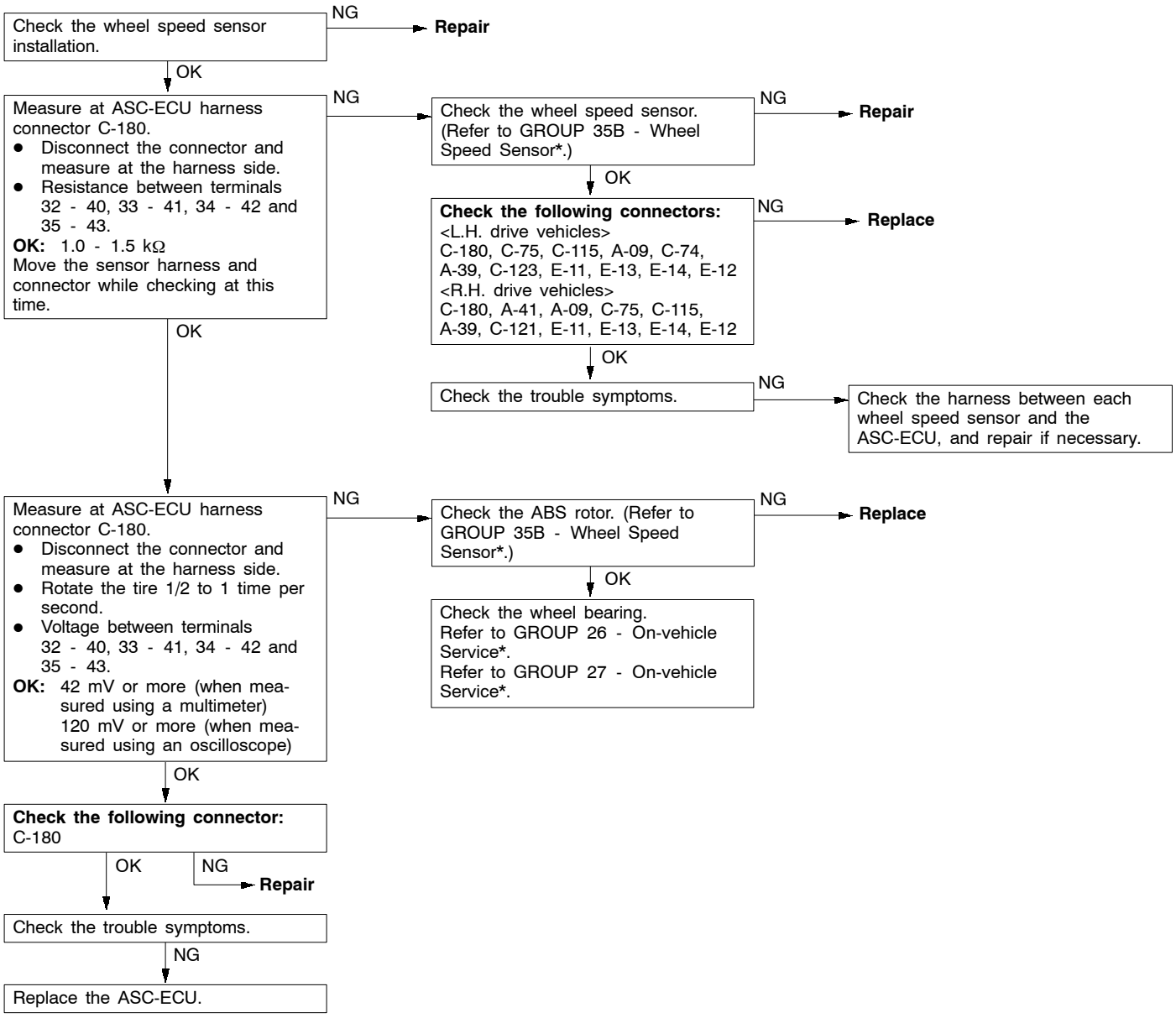
INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
11	FR wheel speed sensor (open or short-circuit)	35C-8
12	FL wheel speed sensor (open or short-circuit)	
13	RR wheel speed sensor (open or short-circuit)	
14	RL wheel speed sensor (open or short-circuit)	
15	Wheel speed sensor system (output signal abnormality)	35C-9
16	ECU power supply voltage abnormality	35C-10
17	ASC switch system	35C-11
21	FR wheel speed sensor system	35C-8
22	FL wheel speed sensor system	
23	RR wheel speed sensor system	
24	RL wheel speed sensor system	
25	Rear wheel speed sensor system (open circuit in both left and right sensors)	35C-12
26	Rear wheel speed sensor system (malfunction in both left and right sensors)	
27	Front and rear wheel speed sensor system (open circuit in both front and rear sensors)	
31	Ignition switch (IG2) system	35C-12
33	Stop lamp switch system (open circuit or ON problem)	35C-13
35	Steering sensor system (ST-1, 2, N)	35C-14
36	Steering sensor system (ST-N)	35C-15
37	Steering sensor system (ST-1, 2)	35C-15
41	FR solenoid valve system	35C-16
42	FL solenoid valve system	
43	RR solenoid valve system	
44	RL solenoid valve system	
45	FR diagonal cut valve system	
46	FL diagonal cut valve system	
47	FR diagonal booster valve system	
48	FL diagonal booster valve system	
51	Valve relay system (ON malfunction)	35C-16
52	Valve relay system (OFF malfunction)	35C-17
53	Motor relay system (OFF malfunction)	35C-17
54	Motor relay system (ON malfunction)	35C-19

Code No.	Diagnosis item	Reference page
61	Communication system with A/T-ECU	35C-20
63	ECU failure	35C-20
65	APS or TPS system	35C-21
66	TPS or APS system	35C-22
67	APS system	35C-23
71	Lateral G sensor circuit system	35C-24
72	Yaw rate sensor circuit system (open or short-circuit)	35C-24
73	Master cylinder pressure sensor system	35C-25
74	Yaw rate or lateral G sensor system	35C-25
75	Engine-ECU system	35C-26
76	Communication system with engine-ECU	35C-26
77	TCL vacuum or ventilation solenoid valve system	35C-26
78	Accumulator stroke switch system	35C-27

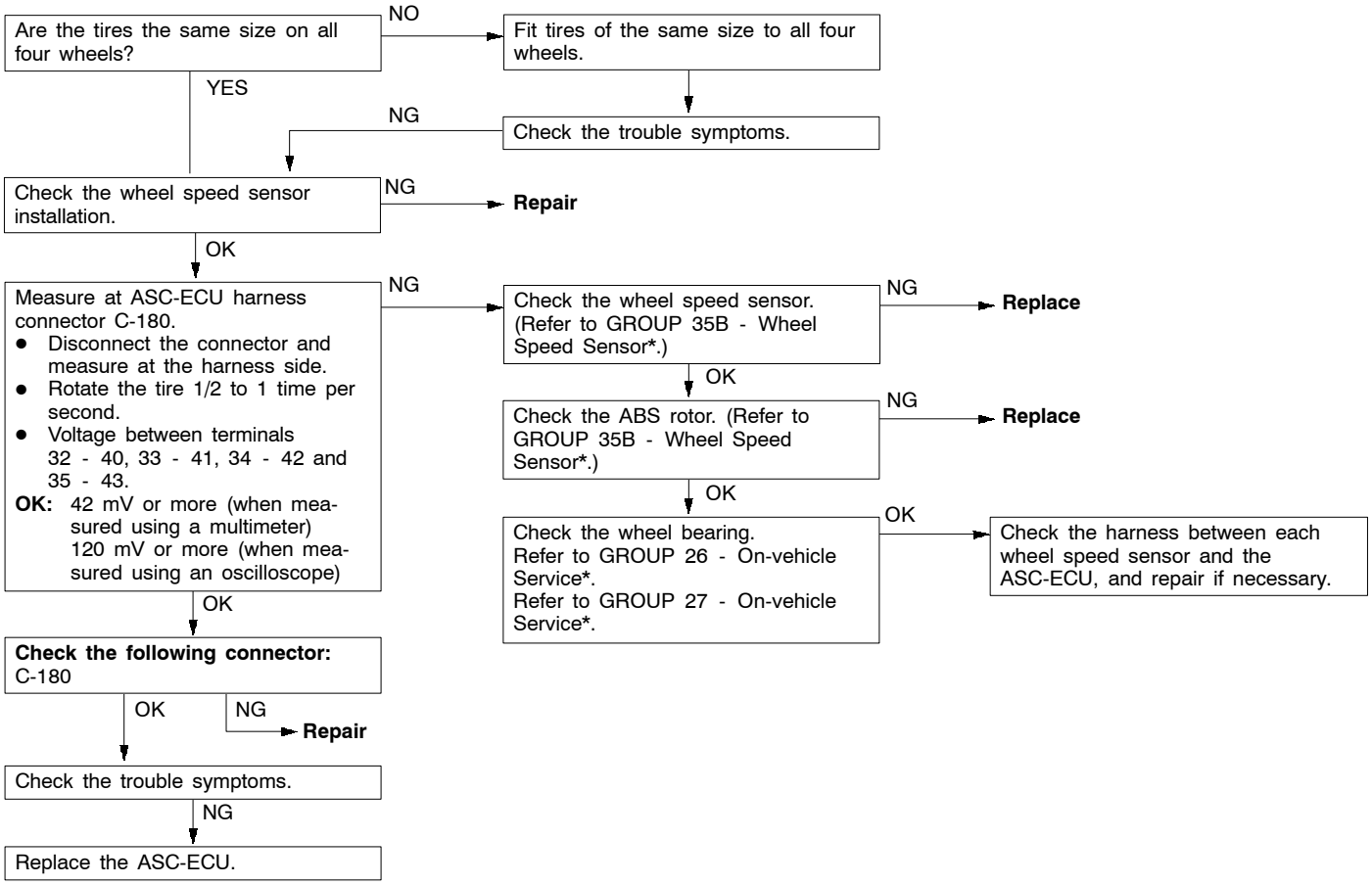
INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

Code Nos. 11, 12, 13, 14 Wheel speed sensor system (open or short-circuit) Code Nos. 21, 22, 23, 24 Wheel speed sensor system	Probable cause
Code Nos. 11, 12, 13 and 14 are output if an open circuit or short-circuit is detected in the (+) or (-) line of one or more of the four wheel speed sensors because of an open circuit or short-circuit detected by the ASC-ECU hardware circuit.	• Malfunction of wheel speed sensor • Malfunction of harness or connector • Malfunction of ASC-ECU
Code Nos. 21, 22, 23 and 24 are output at the following times. • If an open circuit cannot be confirmed, but there is no signal input received from one of the four wheel speed sensors when the vehicle speed is 8 km/h or higher. • If a chipped or blocked ABS rotor is detected, or if anti-lock brake control is continuously engaged because the sensor output drops due to of a sensor malfunction or a deformed ABS rotor.	• Malfunction of wheel speed sensor • Malfunction of harness or connector • Malfunction of ABS rotor • Excessive clearance between sensor and ABS rotor • Malfunction of ASC-ECU • Malfunction of wheel bearing



NOTE
*: Refer to '97 GALANT Workshop Manual.

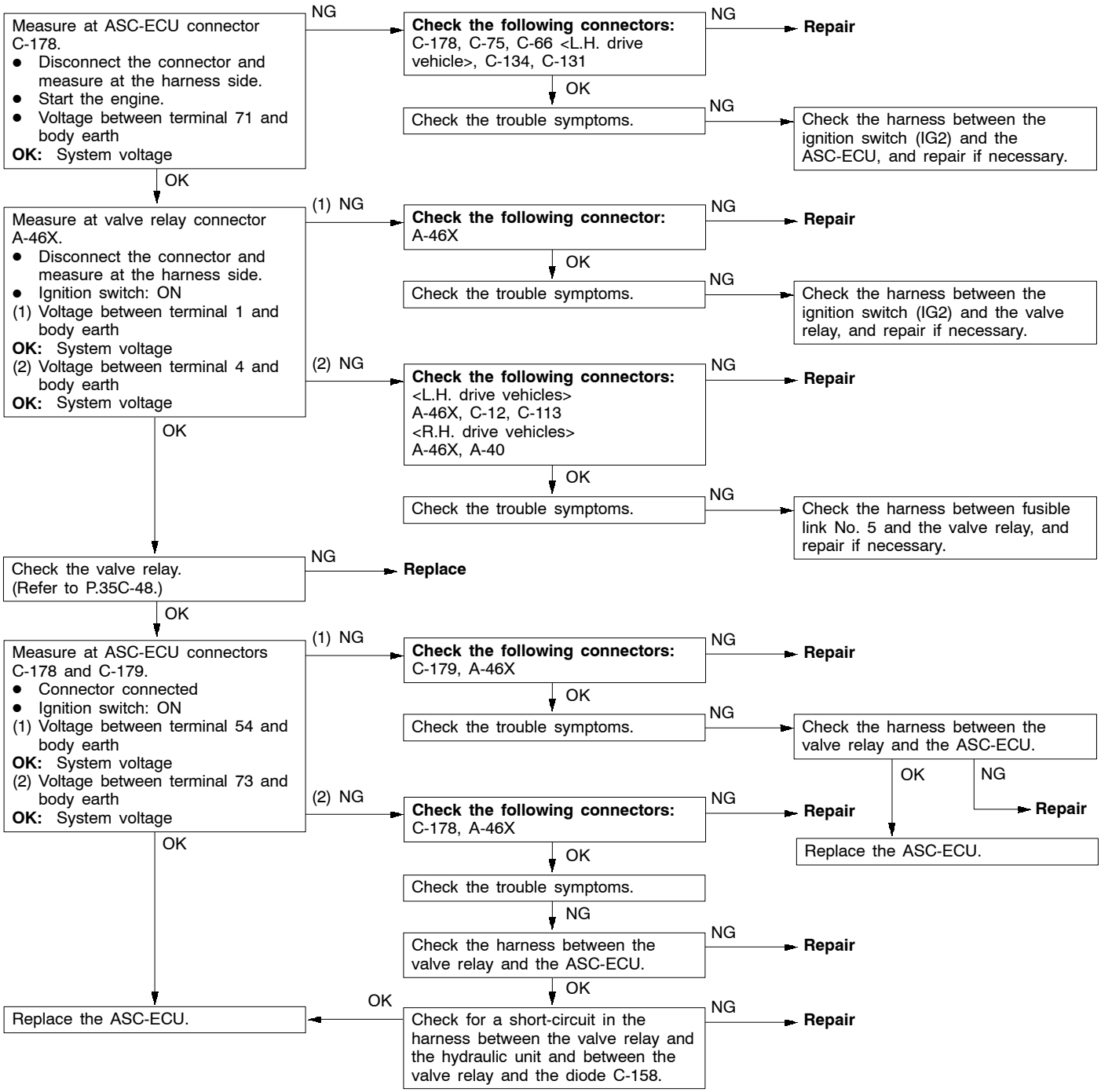
Code No. 15 Wheel speed sensor system (output signal abnormality)	Probable cause
This code is output if there is an abnormality (other than an open circuit or short-circuit) in any of the wheel speed sensor output signals.	• Incorrect tire sizes for 4 wheels • Incorrect wheel speed sensor installation • Malfunction of wheel speed sensor • Malfunction of ABS rotor • Malfunction of wheel bearing • Malfunction of ASC-ECU



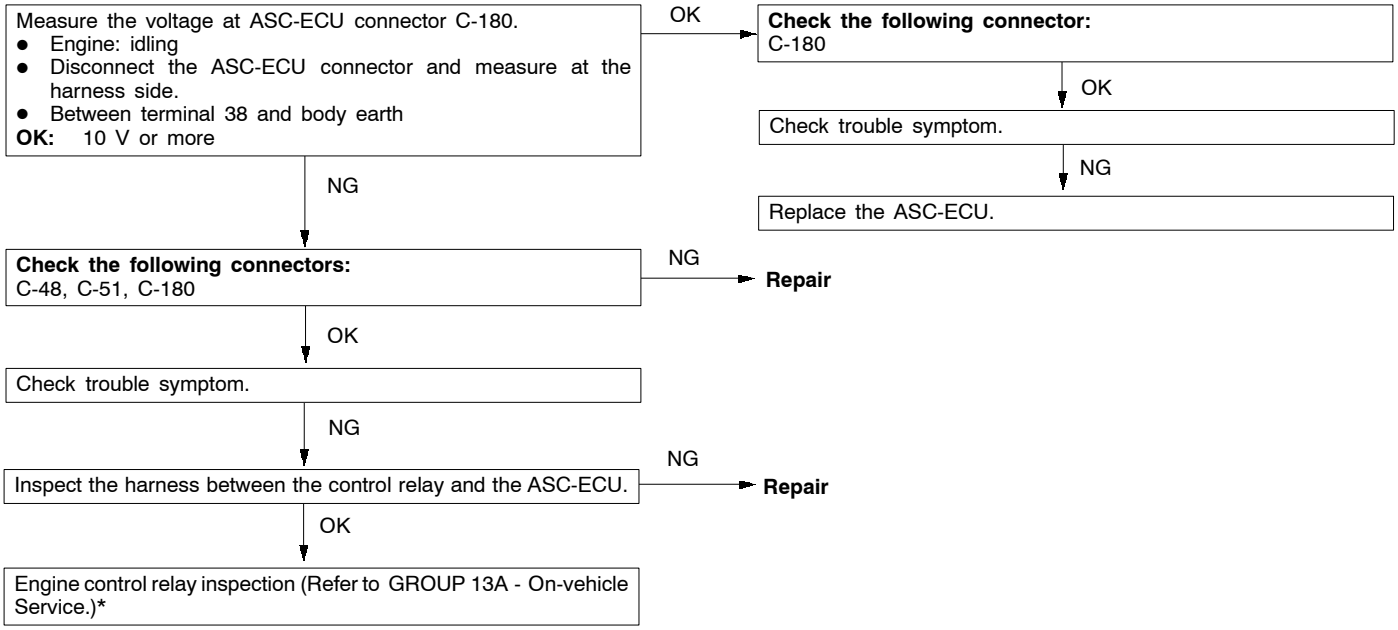
NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 16 ECU power supply voltage abnormality (when the ABS warning lamp is on)	Probable cause
This code is output if the ASC-ECU power supply voltage or valve relay power supply voltage drops below or rises above the standard level. Furthermore, the valve relay power supply voltage is detected from the voltage at the valve relay monitoring line.	• Malfunction of battery • Malfunction of harness or connector • Malfunction of valve relay • Malfunction of ASC-ECU

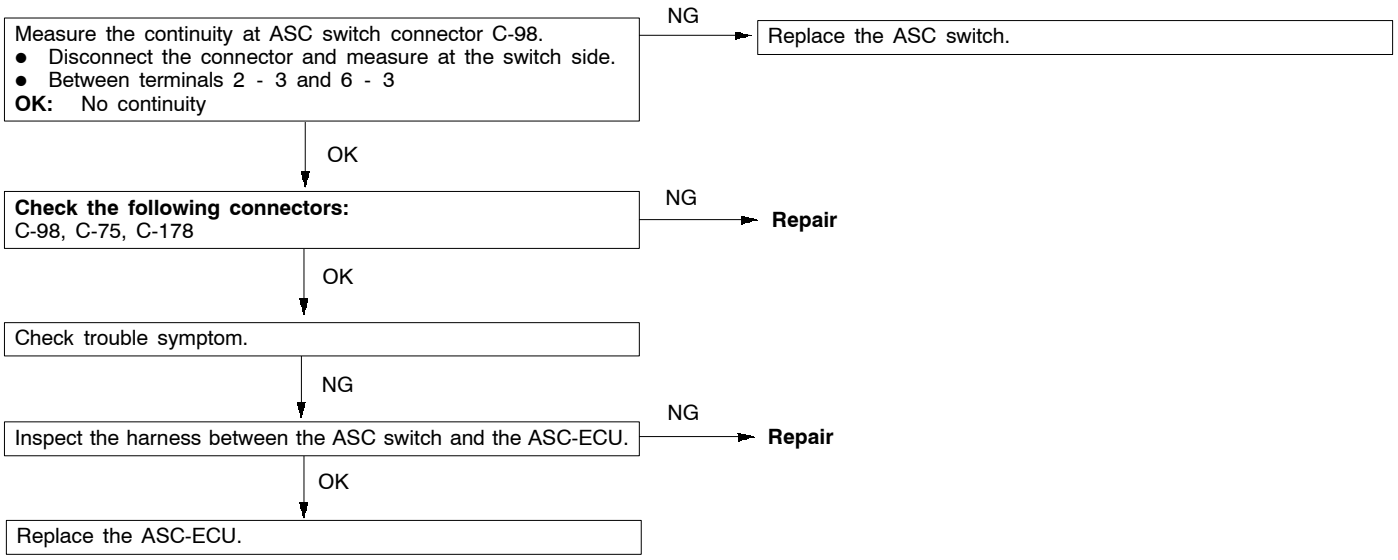
Caution
If the battery voltage drops or rises during inspection, this code may be output as a current problem and correct problem diagnosis may not be possible.



Code No. 16 ECU power supply voltage abnormality (when the ABS warming lamp is off)	Probable cause
This diagnosis code is output if the ASC-ECU power supply voltage (engine control relay supply voltage) is lower than the specified value. If the voltage returns to the specified value or greater, the diagnosis code is erased.	• Malfunction of control relay • Malfunction of harness or connector • Malfunction of ASC-ECU



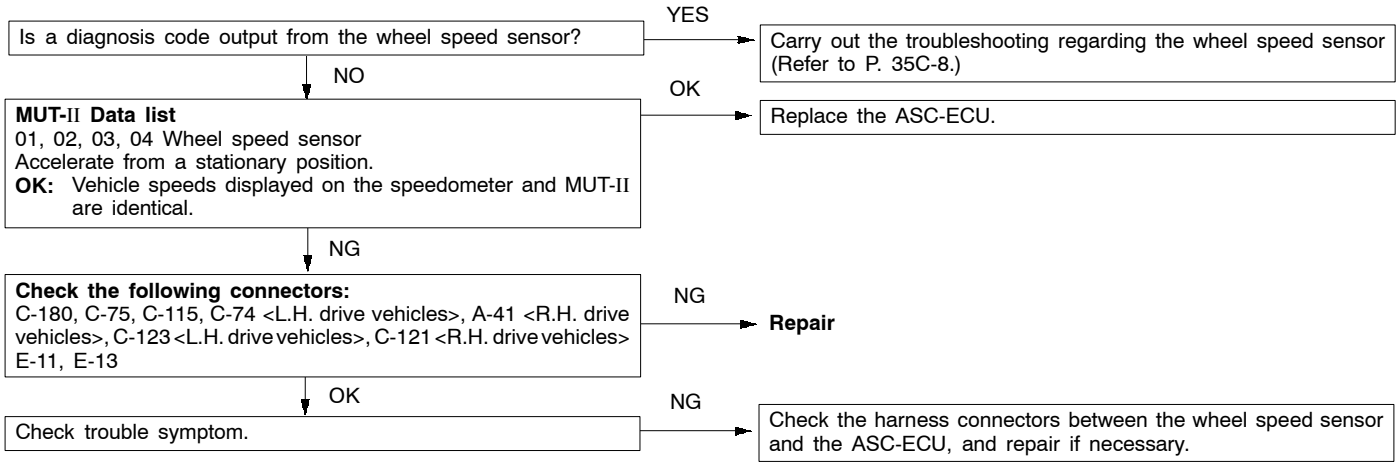
Code No. 17 ASC switch circuit system	Probable cause
This diagnosis code is output if signals are input simultaneously from both the ASC-OFF and ASC-ON positions because of a short circuit in the ASC switch circuit.	• Malfunction of the ASC switch • Malfunction of harness or connector • Malfunction of ASC-ECU



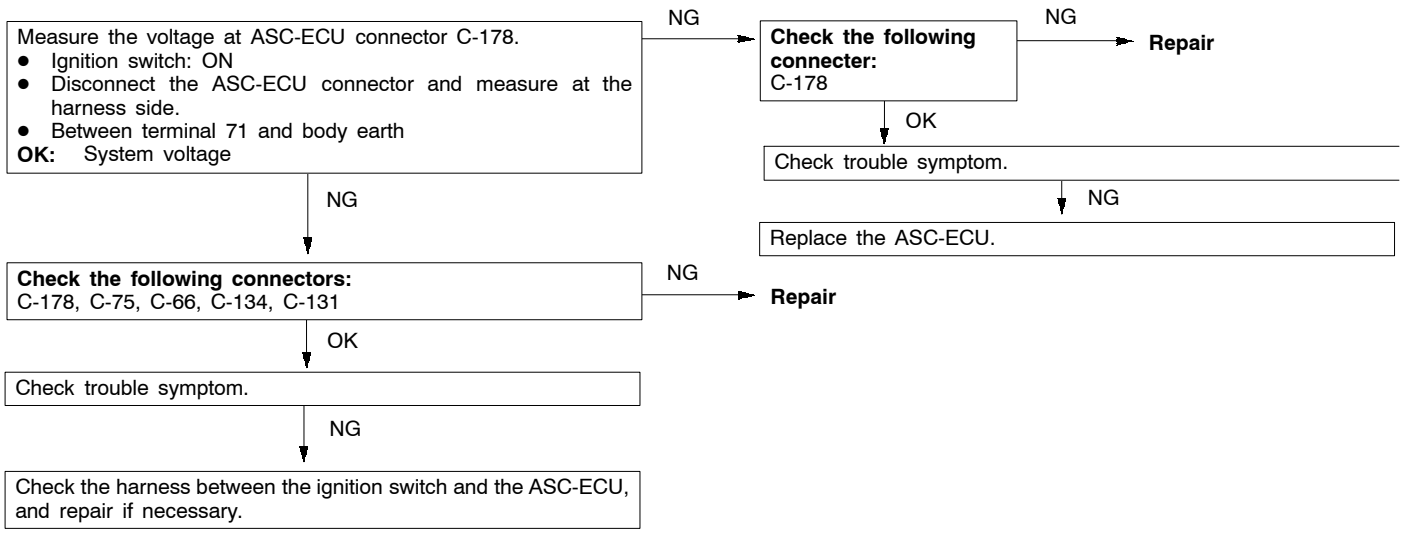
NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 25 Rear wheel speed sensor circuit system (open circuit in both left and right rear wheel speed sensors) **Code No. 26 Rear wheel speed sensor circuit system (malfunction in both rear wheel speed sensors)** **Code No. 27 Front and rear wheel speed sensor system (malfunction in both front and rear wheel speed sensors)**	**Probable cause**
Diagnosis code No. 25 is output if the pulse signal from a rear wheel sensor is momentarily interrupted (0.02 sec.) because of a transient open circuit in a rear wheel speed sensor. Diagnosis code No. 26 is output if a rear wheel speed sensor abnormality is judged when the turning speed of both rear wheels is 0 km/h for 20 seconds or more while TCL is operating. Code No. 27 is displayed if a condition occurs continually where the difference in the average wheel speed between the front and rear wheels is 20 km/h or more for 10 seconds.	• Malfunction of wheel speed sensor • Malfunction of harness or connector • Malfunction of ASC-ECU

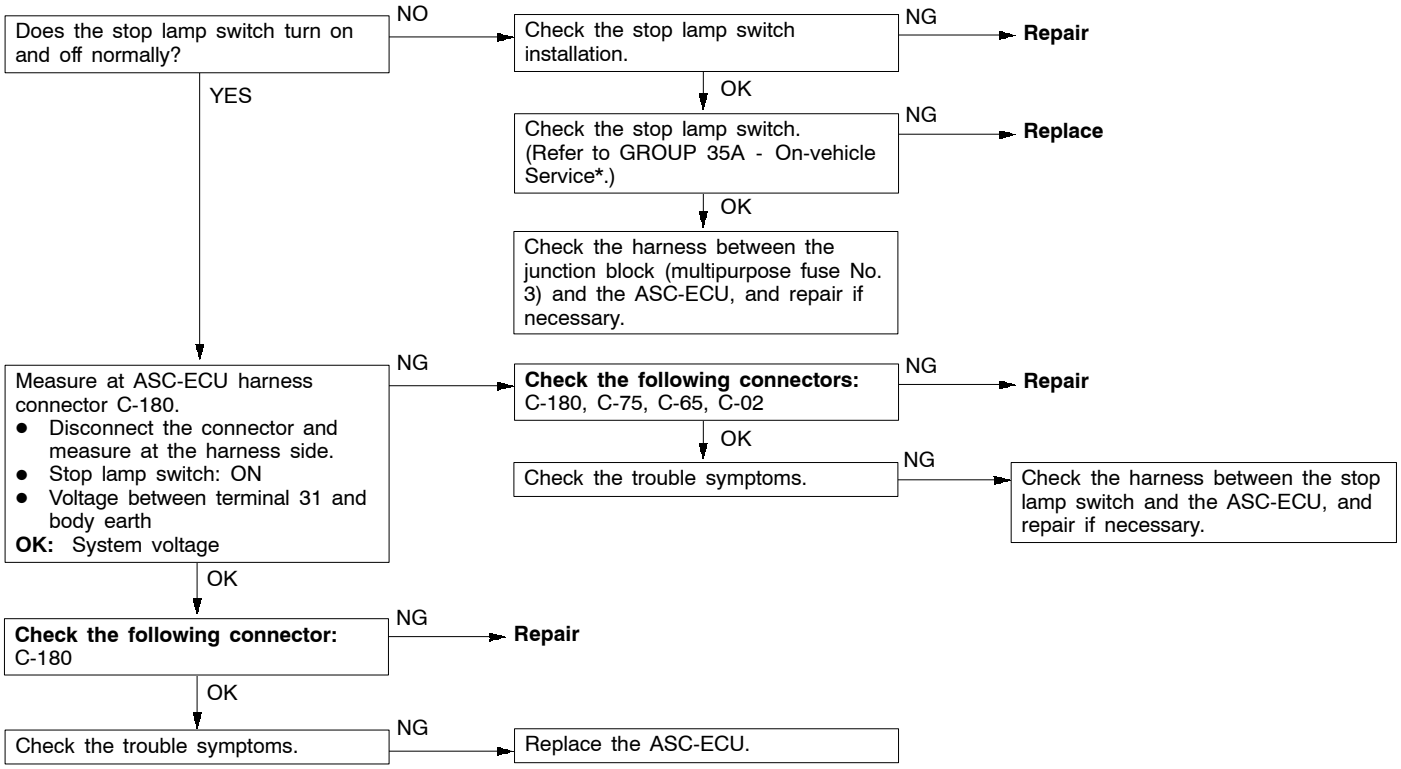
NOTE
(1) If the front wheels only are turning while the rear wheels are stationary (wheel slip), the ASC-OFF indicator will start flashing after 20 seconds, and the system will be isolated.
(2) When these diagnosis codes are output, erase the diagnosis code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis codes are not output again.



Code No. 31 Ignition switch (IG2) circuit system	**Probable cause**
This diagnosis code is output if the IG2 power supply is not distributed, even though the engine speed is 450 r/min or more.	• Malfunction of harness or connector • Malfunction of ASC-ECU

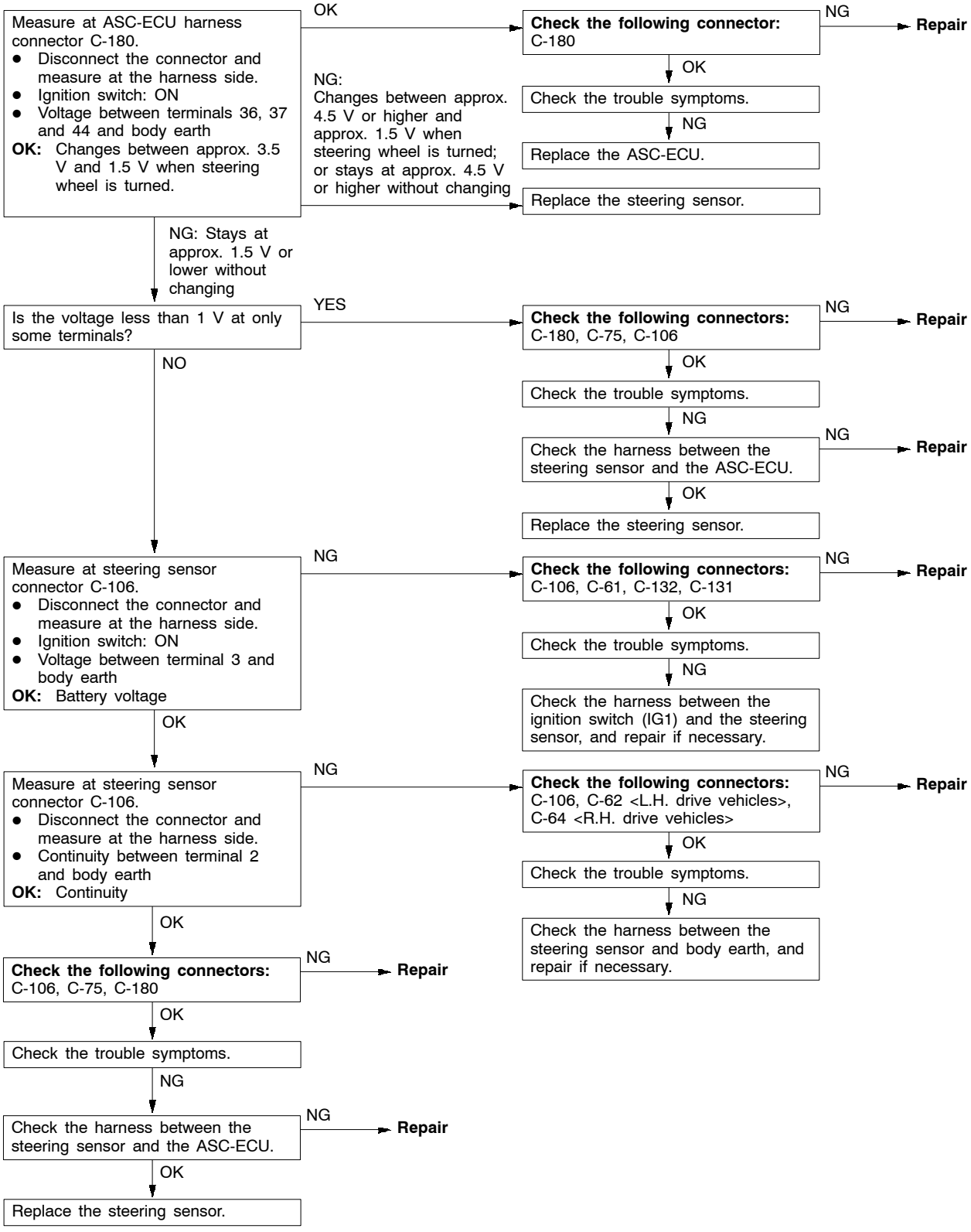


Code No. 33 Stop lamp switch system (open circuit or ON problem)	Probable cause
This code is output if there is a stop lamp switch ON malfunction (the stop lamp switch remains ON continuously for 15 minutes or more).	• Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of ASC-ECU



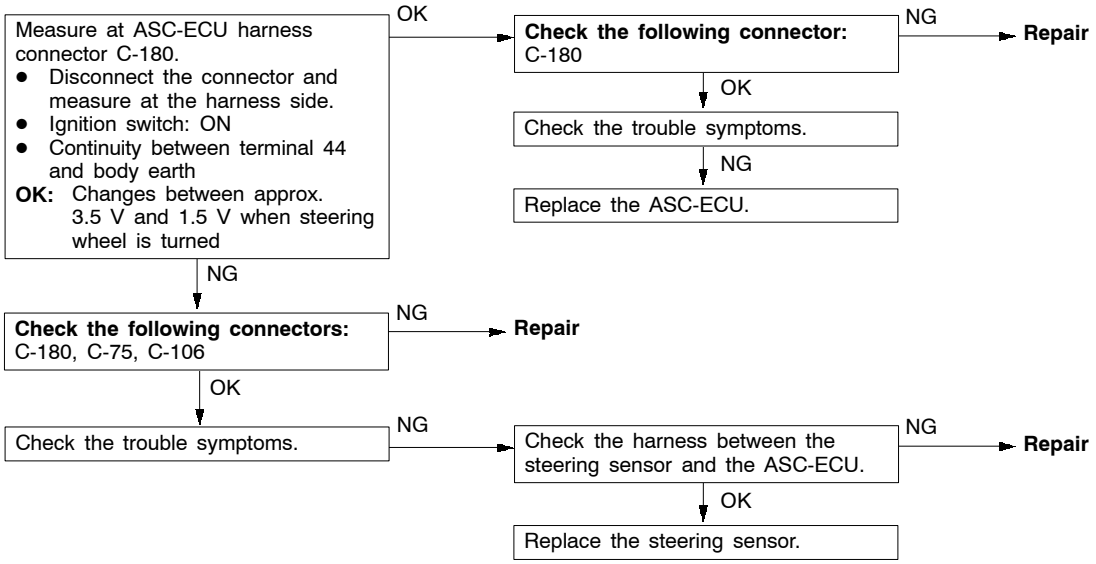
NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 35 Steering sensor system (ST-1, 2, N)	Probable cause
This code is output if it is detected that there is an open circuit or short-circuit in any one of the steering sensor ST-1, ST-2 or ST-N output circuits, or if there is an open circuit in the steering sensor earth circuit, or if the output from any one of the ST-1, ST-2 or ST-N terminals is lower than approximately 1 V or higher than approximately 4.5 V.	• Malfunction of harness or connector • Malfunction of steering sensor • Malfunction of ASC-ECU

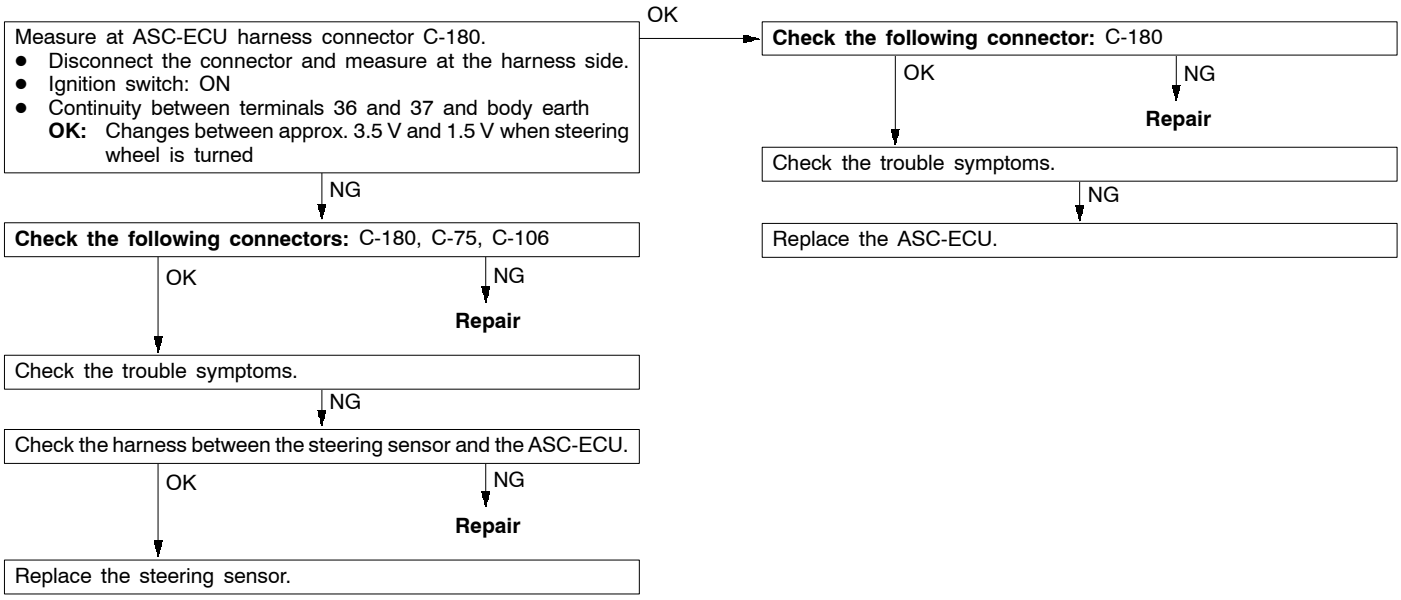


ASC - Troubleshooting

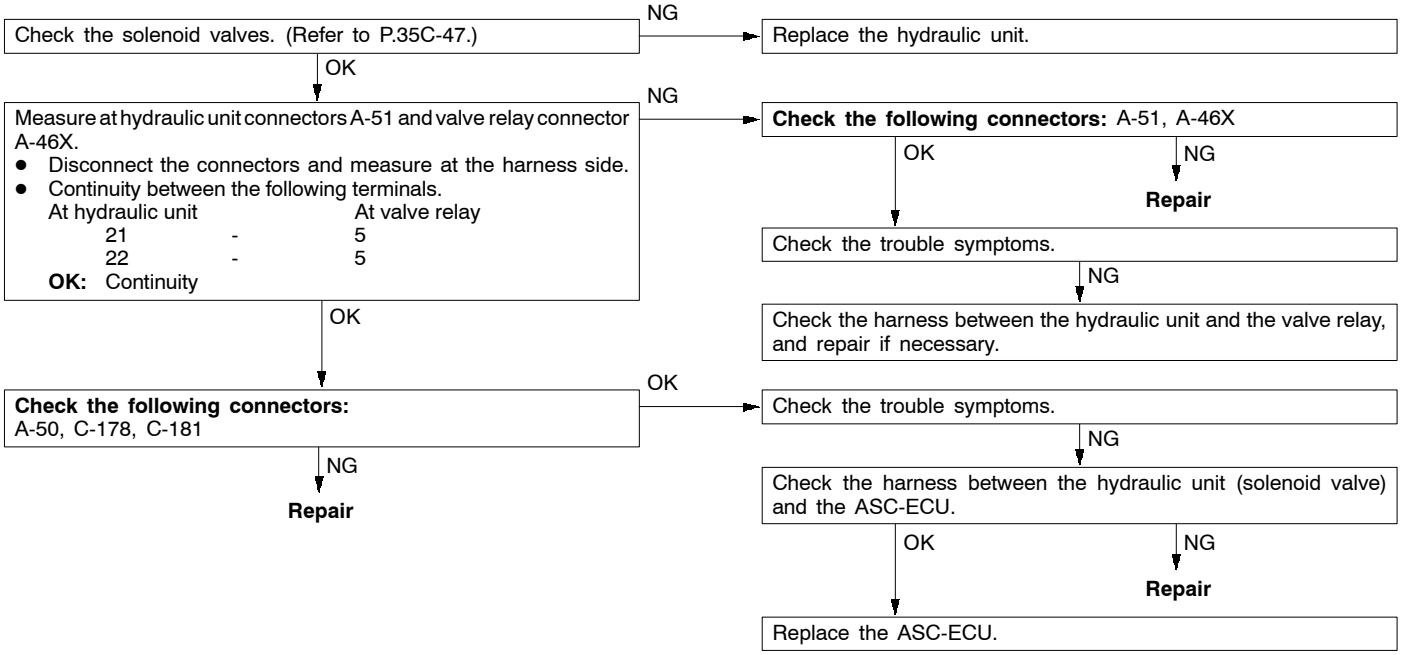
Code No. 36 Steering sensor system (ST-N)	Probable cause
This code is output if the neutral position is still detected when the steering wheel is turned 20° or more in either direction due to a cause such as a short-circuit in the steering sensor (ST-N).	• Malfunction of steering sensor • Malfunction of harness or connector • Malfunction of ASC-ECU



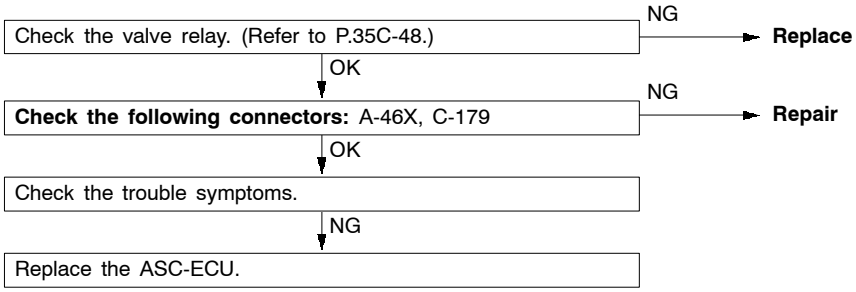
Code No. 37 Steering sensor system (ST-1, ST-2)	Probable cause
This code is output if there is a short-circuit in the steering sensor (ST-1) or the steering sensor (ST-2) and no steering angle signal is input when the average speed detected by the left and right rear wheel speed sensors is 15 km/h or more.	• Malfunction of steering sensor • Malfunction of harness or connector • Malfunction of ASC-ECU



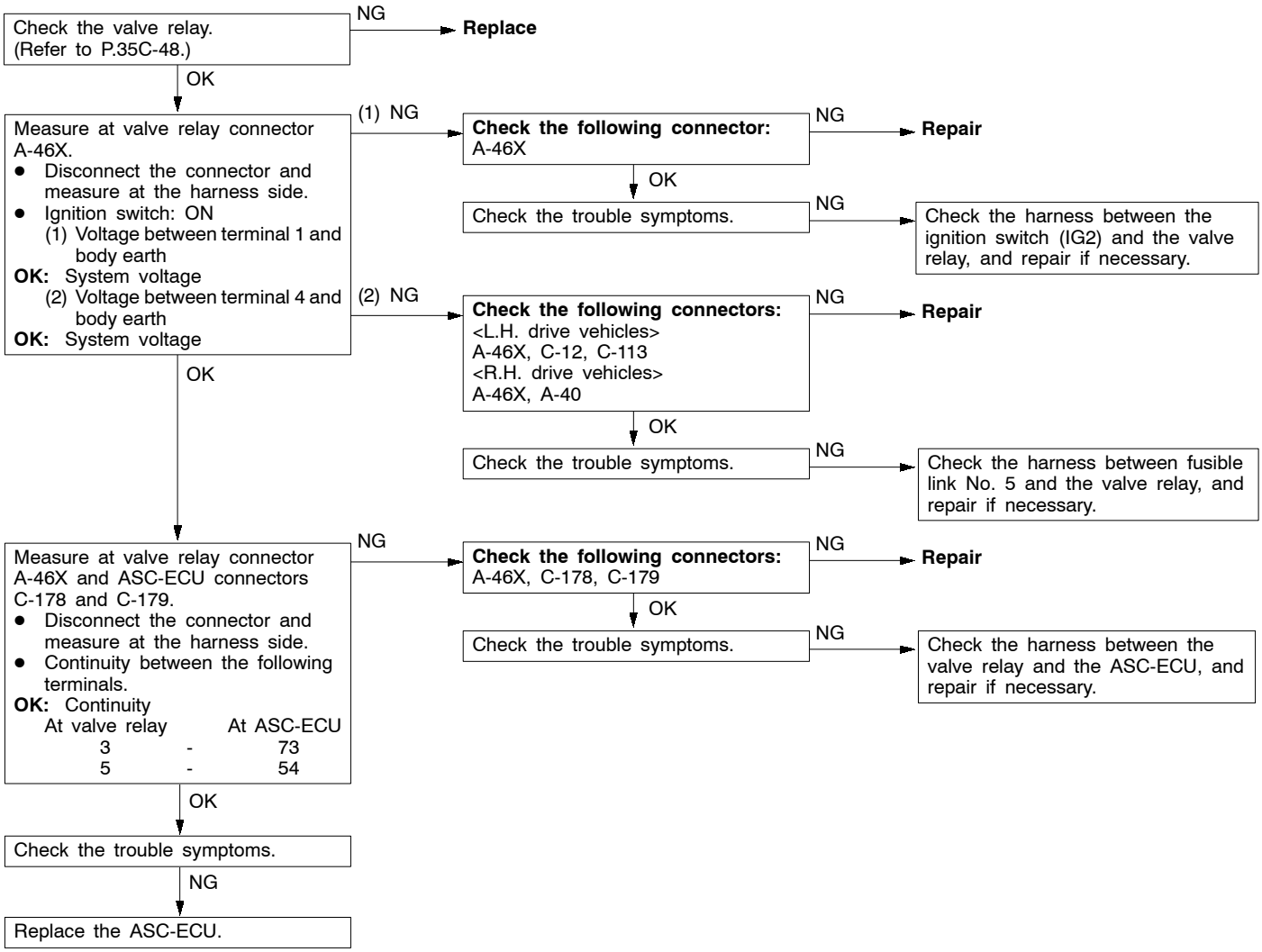
Code Nos. 41, 42, 43, 44, 45, 46, 47, 48 Solenoid valve system	Probable cause
The ASC-ECU continually monitors the solenoid valve drive circuits. These codes are output if the ASC-ECU judges that there is an open circuit or short-circuit in a solenoid coil or an open circuit or short-circuit in a harness because current is not flowing even though the solenoid valve is ON, or current is flowing even though the solenoid valve is OFF.	• Malfunction of hydraulic unit • Malfunction of harness or connector • Malfunction of ASC-ECU



Code No. 51 Valve relay system (ON malfunction)	Probable cause
This code is output if the ASC-ECU judges that a relay contact is fused or that there is a short-circuit in the valve relay drive circuit because the valve relay is OFF but power is being supplied to the solenoid valves during the initial check when the ignition switch is turned to ON.	• Malfunction of ABS valve relay • Malfunction of harness or connector • Malfunction of ASC-ECU

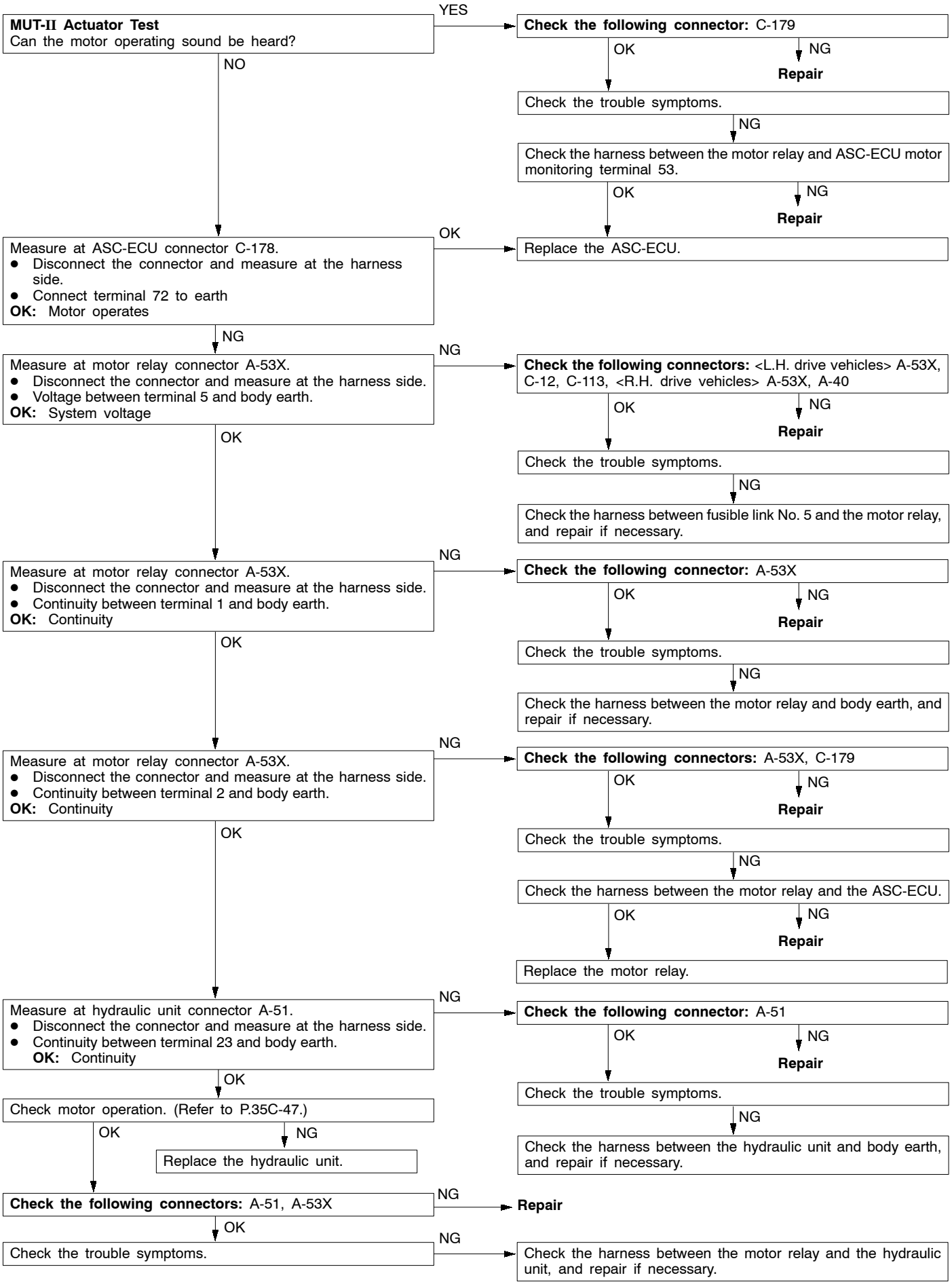


Code No. 52 Valve relay system (OFF malfunction)	Probable cause
This code is output it the ASC-ECU judges that there is a valve relay OFF malfunction because no voltage is being supplied to the solenoid valves when the ignition switch is at ON and the valve relay is on.	• Malfunction of ABS valve relay • Malfunction of harness or connector • Malfunction of ASC-ECU



Code No. 53 Motor relay system (OFF malfunction)	Probable cause
This code is output if motor monitoring is off (for example, when the motor is not operating) when the ASC-ECU gives a pump motor ON command.	• Malfunction of harness or connector • Malfunction of motor relay • Malfunction of ASC-ECU

Caution
Because driving the motor during actuator testing will drain the battery, start the engine and let it run for a while after testing is finished.

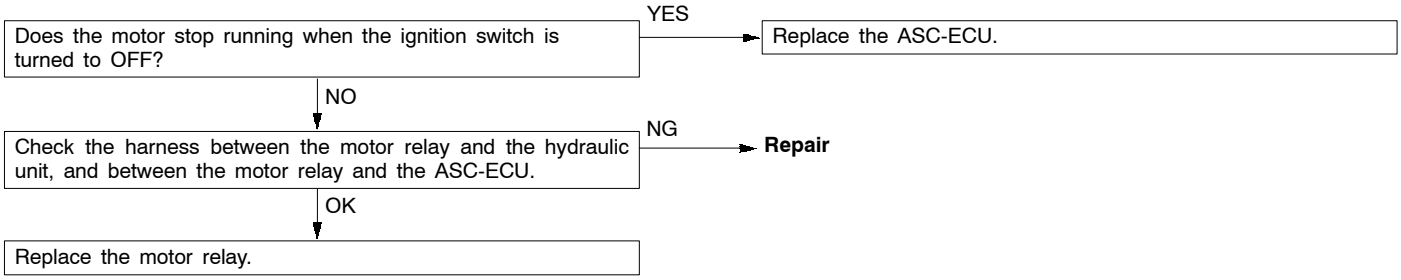

MUT-II Actuator Test
Can the motor operating sound be heard?
YES
Check the following connector: C-179
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the motor relay and ASC-ECU motor monitoring terminal 53.
OK
NG
Repair
NO
Measure at ASC-ECU connector C-178.
● Disconnect the connector and measure at the harness side.
● Connect terminal 72 to earth
OK: Motor operates
OK
Replace the ASC-ECU.
NG
Measure at motor relay connector A-53X.
● Disconnect the connector and measure at the harness side.
● Voltage between terminal 5 and body earth.
OK: System voltage
NG
Check the following connectors: <L.H. drive vehicles> A-53X, C-12, C-113, <R.H. drive vehicles> A-53X, A-40
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between fusible link No. 5 and the motor relay, and repair if necessary.
OK
Measure at motor relay connector A-53X.
● Disconnect the connector and measure at the harness side.
● Continuity between terminal 1 and body earth.
OK: Continuity
NG
Check the following connector: A-53X
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the motor relay and body earth, and repair if necessary.
OK
Measure at motor relay connector A-53X.
● Disconnect the connector and measure at the harness side.
● Continuity between terminal 2 and body earth.
OK: Continuity
NG
Check the following connectors: A-53X, C-179
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the motor relay and the ASC-ECU.
OK
NG
Repair
Replace the motor relay.
OK
Measure at hydraulic unit connector A-51.
● Disconnect the connector and measure at the harness side.
● Continuity between terminal 23 and body earth.
OK: Continuity
NG
Check the following connector: A-51
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the hydraulic unit and body earth, and repair if necessary.
OK
Check motor operation. (Refer to P.35C-47.)
OK
NG
Replace the hydraulic unit.
Check the following connectors: A-51, A-53X
NG
Repair
OK
Check the trouble symptoms.
NG
Check the harness between the motor relay and the hydraulic unit, and repair if necessary.

Code No. 54 Motor relay system (ON malfunction)	Probable cause
This code is output if the ASC-ECU judges that there is a motor relay ON malfunction when motor monitoring is on when the ASC-ECU gives a pump motor OFF command.	• Malfunction of harness or connector • Malfunction of motor relay • Malfunction of ASC-ECU

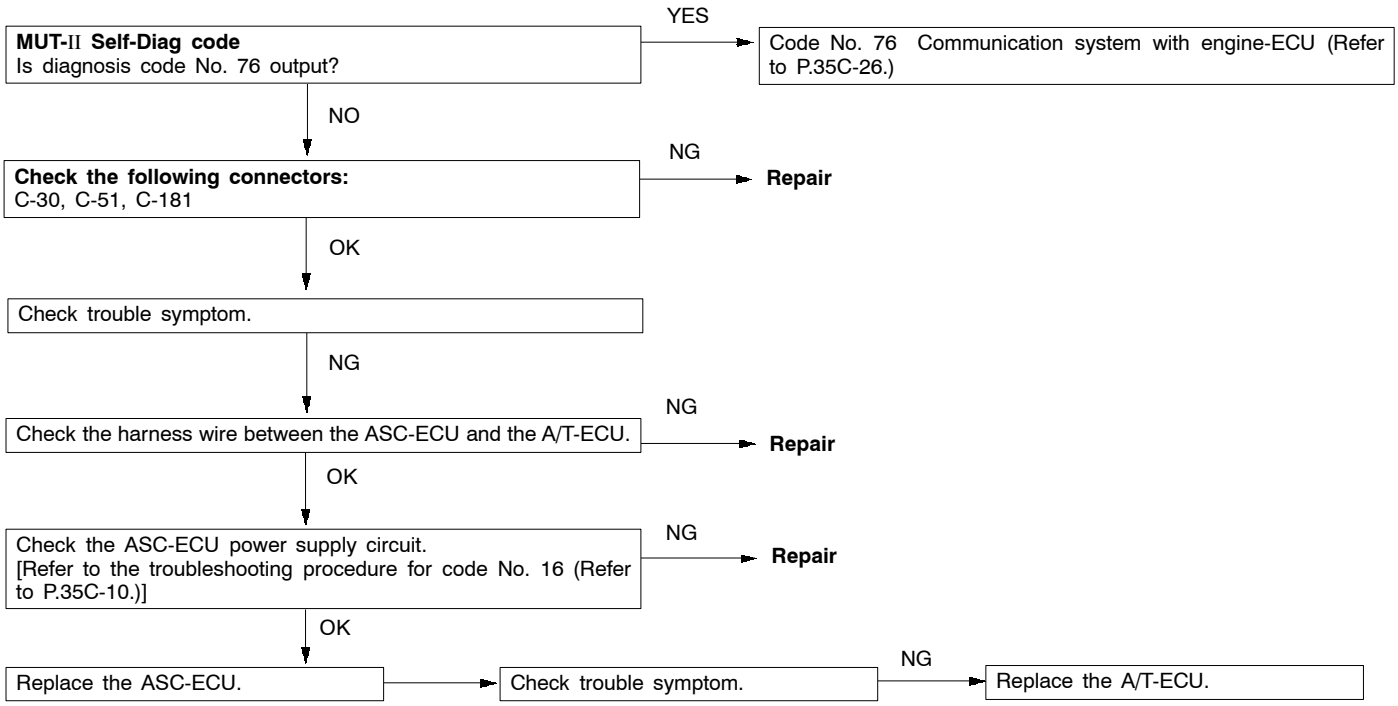
Caution

(1) If a motor relay ON malfunction occurs, the motor will continue operating even when the ignition switch is turned to OFF. If this happens, fusible link No. 5 (60 A) should be removed or hydraulic unit connector A-51 should be disconnected immediately. Excessive running of the motor will drain the battery.

(2) The motor relay may become hot while the motor is running or immediately after it has been running, so take care when handling the motor relay.



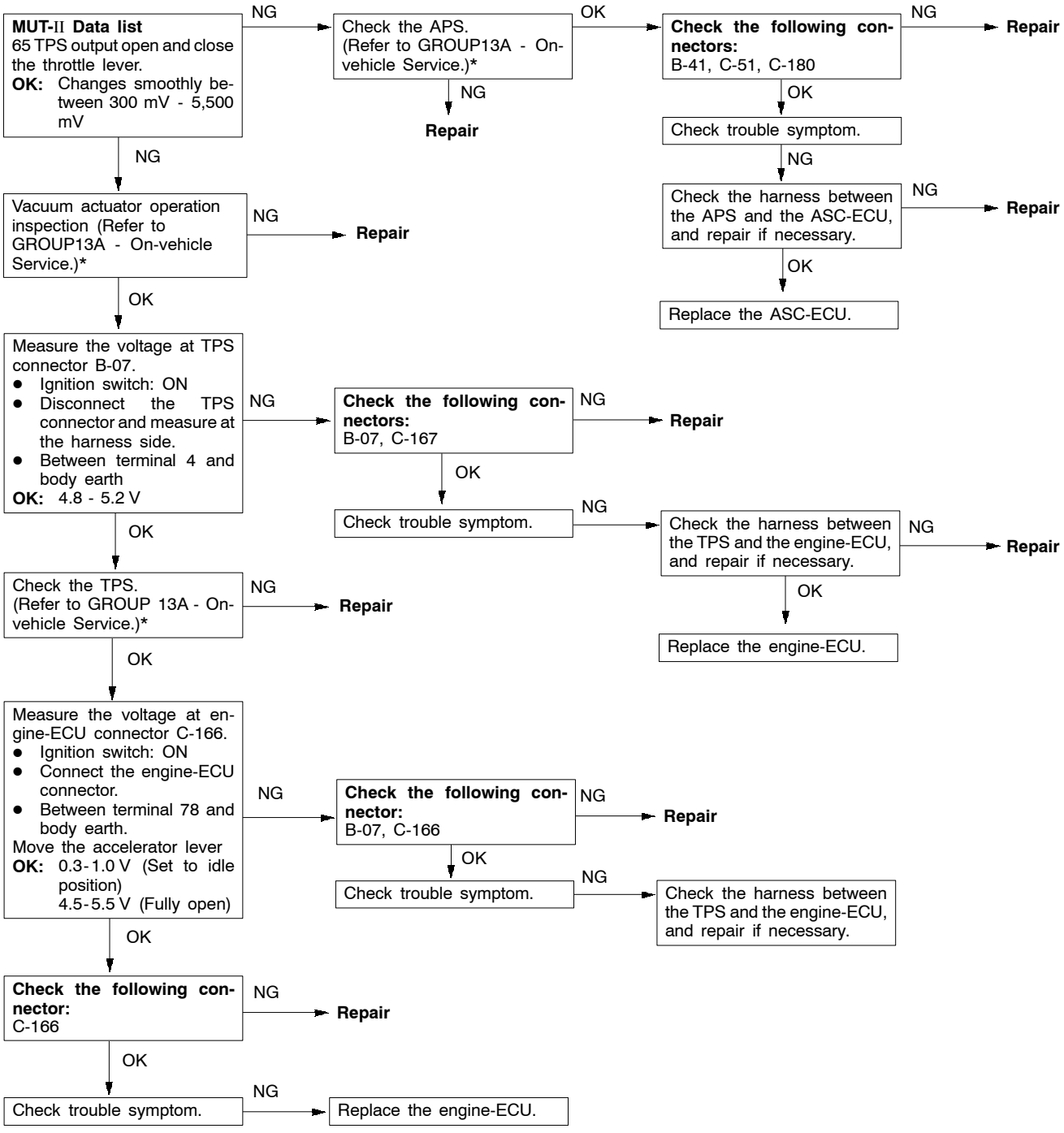
Code No. 61 Communication system between the A/T-ECU and the ASC-ECU	Probable cause
This diagnosis code is output if an error is detected in the communication because of an open or short circuit in the serial communication circuit between the ASC-ECU and the A/T-ECU, a internal malfunction of the ECU or a improper shield wire. This code is also output when diagnosis code No.76 is output. Diagnosis code No.76 indicates that the communication with the A/T-ECU is suspended due to an error in the communication line between the ASC-ECU and the engine-ECU.	• Malfunction of harness or connector • Malfunction of ASC-ECU • Malfunction of A/T-ECU • Malfunction of engine-ECU



Code No. 63 ECU failure	Probable cause
This code is output if a malfunction occurs in the CPU inside the ASC-ECU.	• Malfunction of ASC-ECU

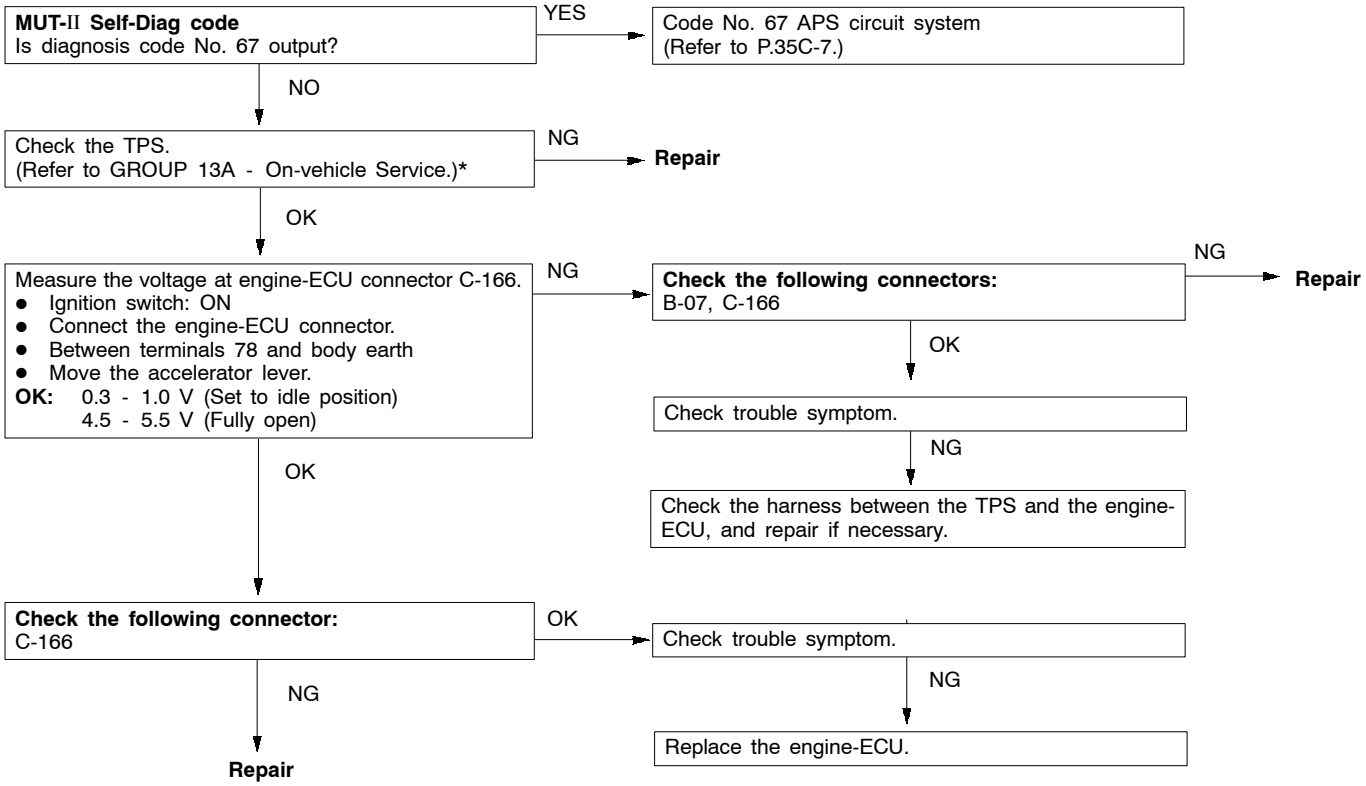
Replace the ASC-ECU.

Code No. 65 APS or TPS circuit system	Probable cause
This diagnosis code is output if the APS opening angle is 20° or greater than the TPS opening angle because of a short in the APS, an open circuit in the TPS or sticking of the vacuum actuator. As this detection condition can be applicable during throttle control, trouble diagnosis is invalid at this time.	• Malfunction of APS • Malfunction of TPS • Malfunction of ASC-ECU • Malfunction of engine-ECU • Malfunction of harness or connector • Malfunction of vacuum actuator



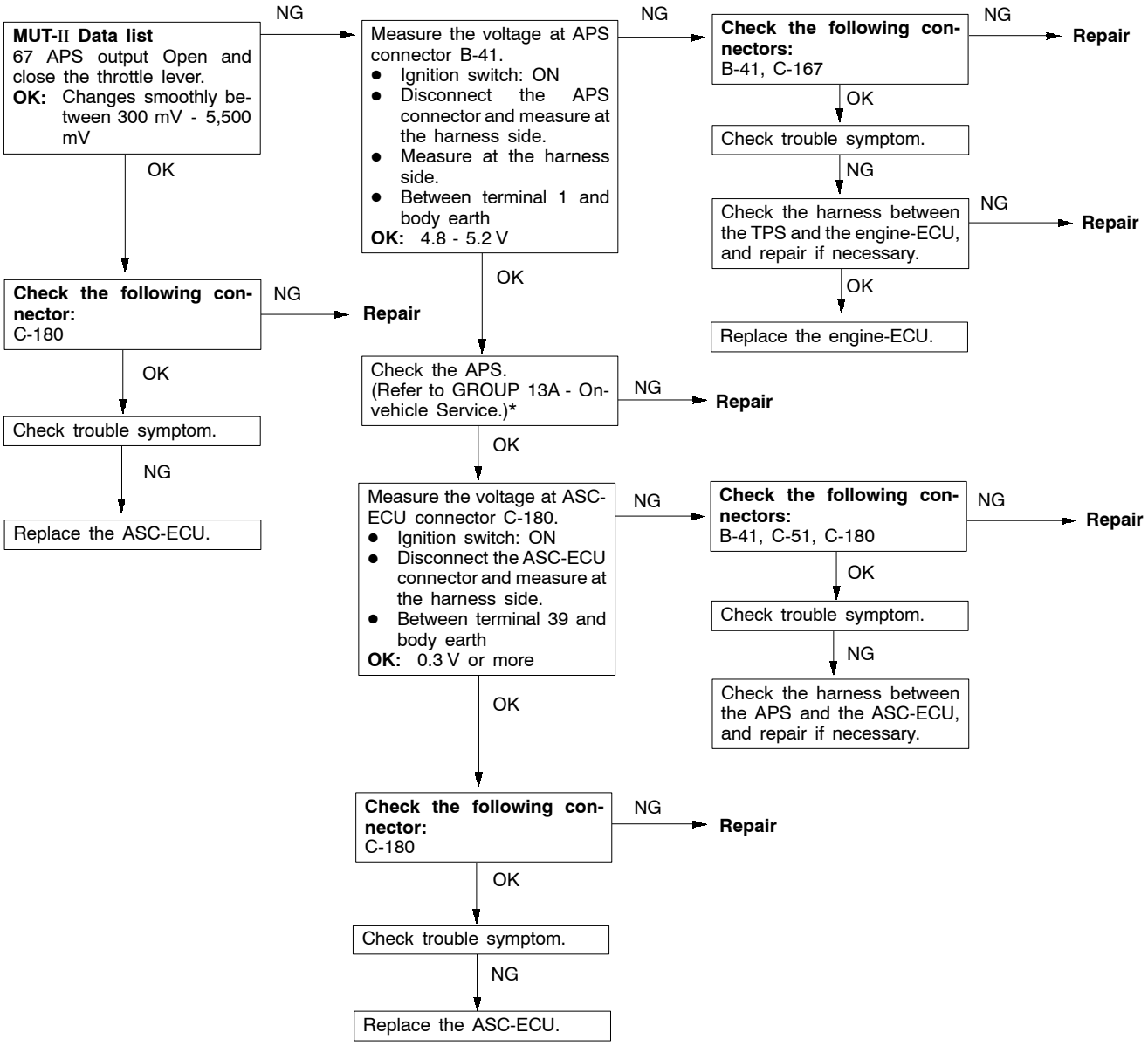
NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 66 TPS or APS circuit system	Probable cause
This diagnosis code is output if the TPS opening angle is 20° or greater than the APS opening angle because of a short in the TPS or an open circuit in the APS. If there is an open circuit in the APS, diagnosis code No. 67 is output at the same time. Accordingly, if only diagnosis code No. 67 is output, the cause is probably an abnormality in the TPS circuit system.	• Malfunction of APS • Malfunction of TPS • Malfunction of harness or connector • Malfunction of engine-ECU

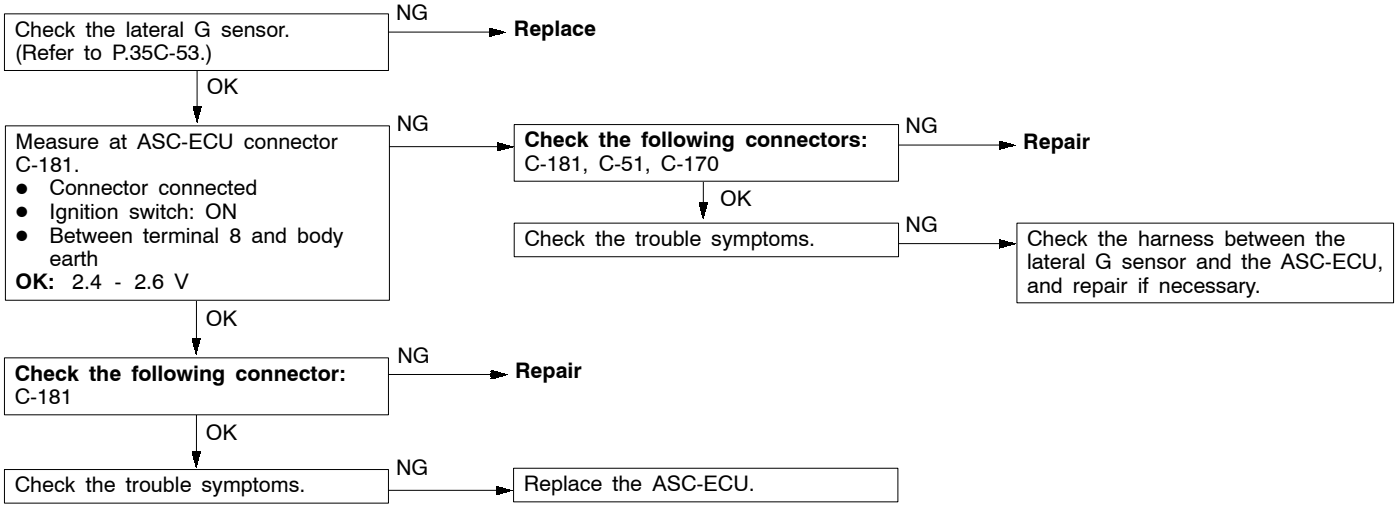


NOTE
*: Refer to '97 GALANT Workshop Manual.

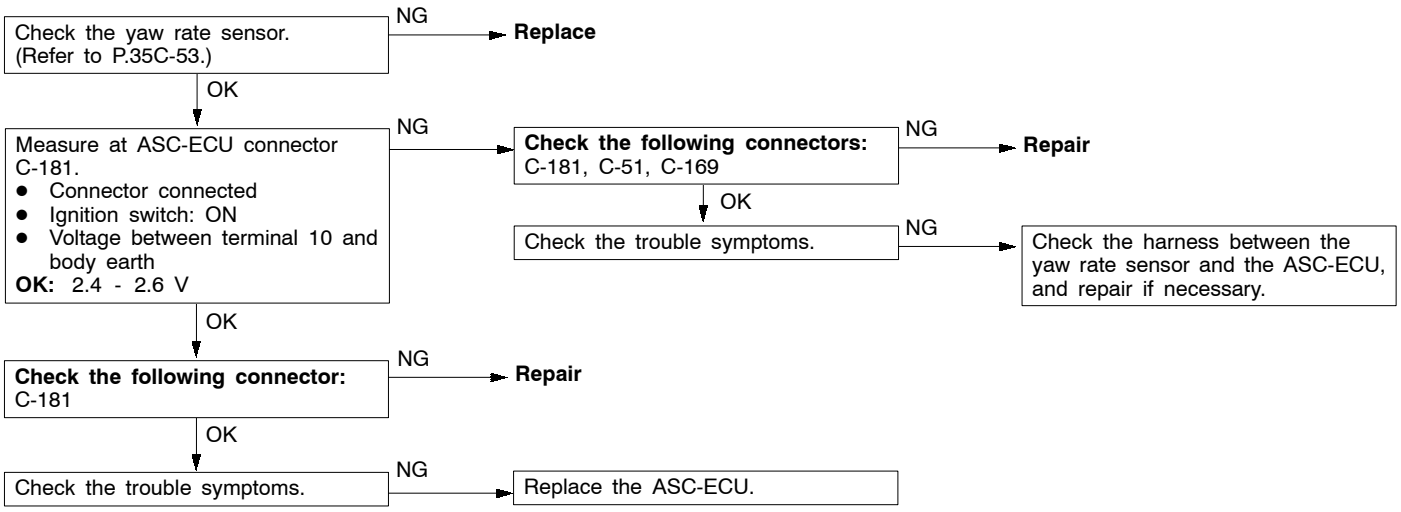
Code No. 67 APS circuit system	Probable cause
This diagnosis code is output if the APS output voltage is less than 0.2 V due to an open circuit or other malfunction in the APS circuit. The APS power supply and earth are supplied from the engine-ECU, and the output signal is used by the A/T-ECU and auto-cruise control-ECU as well as by the ASC-ECU.	• Malfunction of APS • Malfunction of ASC-ECU • Malfunction of engine-ECU • Malfunction of harness or connector



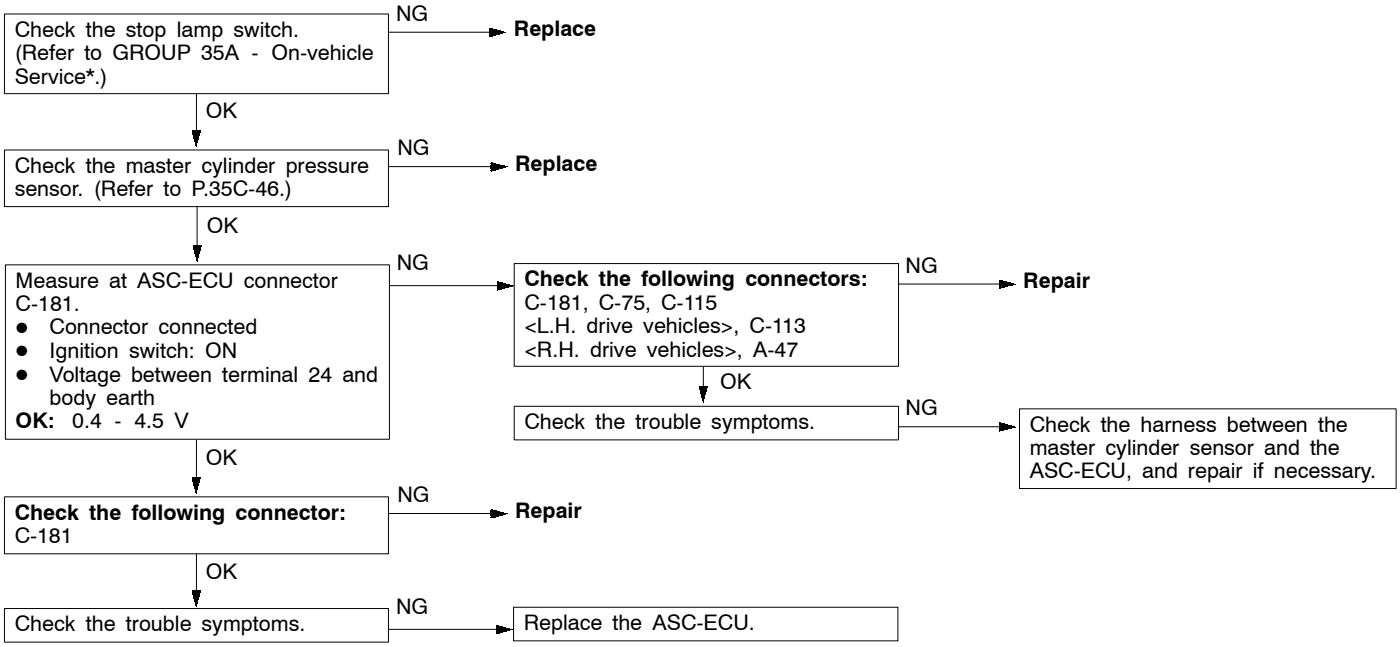
Code No. 71 Lateral G sensor circuit system	Probable cause
This code is output at the following times. ● If the G sensor output is less than 0.5 V or more than 4.5 V. ● If there is an open circuit or short-circuit in a G sensor system harness.	● Malfunction of G sensor ● Malfunction of harness or connector ● Malfunction of ASC-ECU



Code No. 72 Yaw rate sensor circuit system (open or short-circuit)	Probable cause
This code is output at the following times. ● If the yaw rate sensor output is less than 0.3 V or more than 4.7 V. ● If there is an open circuit or short-circuit in a yaw rate sensor system harness.	● Malfunction of yaw rate sensor ● Malfunction of harness or connector ● Malfunction of ASC-ECU

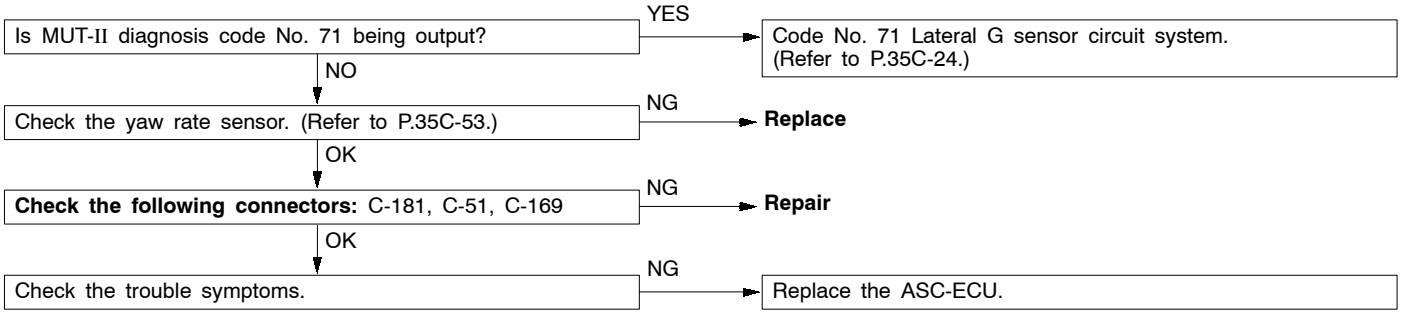


Code No. 73 Master cylinder pressure sensor system	Probable cause
This code is output at the following times. ● If there is an open circuit or short-circuit in a master cylinder pressure sensor system harness and the sensor output is less than 0.3 V or more than 4.7 V. ● If the master cylinder pressure sensor and the stop lamp switch conditions are not identical.	● Malfunction of master cylinder pressure sensor ● Malfunction of harness or connector ● Malfunction of ASC-ECU



NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 74 Yaw rate sensor or lateral G sensor system	Probable cause
This code is output if an open circuit cannot be confirmed, but the difference between the actual yaw rate value and the target yaw rate (the value calculated from the lateral G sensor value and the vehicle speed) is 5° or more when the vehicle speed is 40 km/h or higher.	● Malfunction of yaw rate sensor ● Malfunction of lateral G sensor ● Malfunction of ASC-ECU

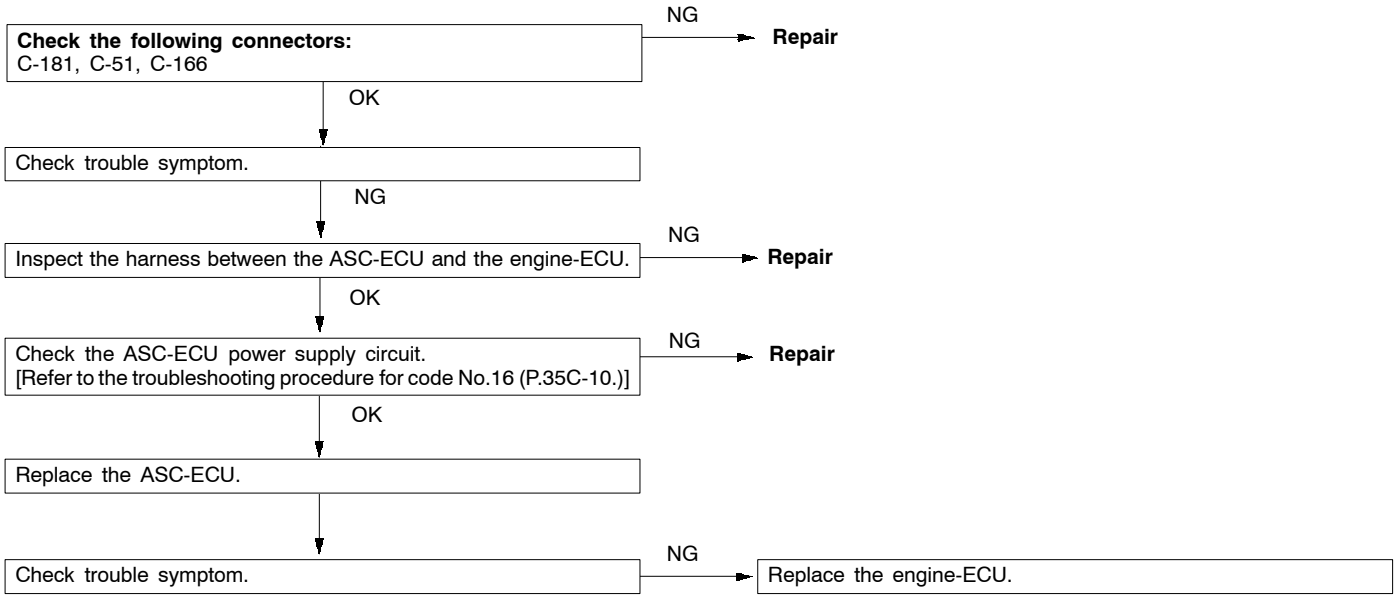


Code No. 75 Engine-ECU system Code No. 77 TCL vacuum or ventilation solenoid valve system	Probable cause
These codes are output when the engine-ECU detects a system abnormality. (MPI system abnormalities are transmitted from the engine-ECU to the ASC-ECU by serial communication.)	• Malfunction of MPI system

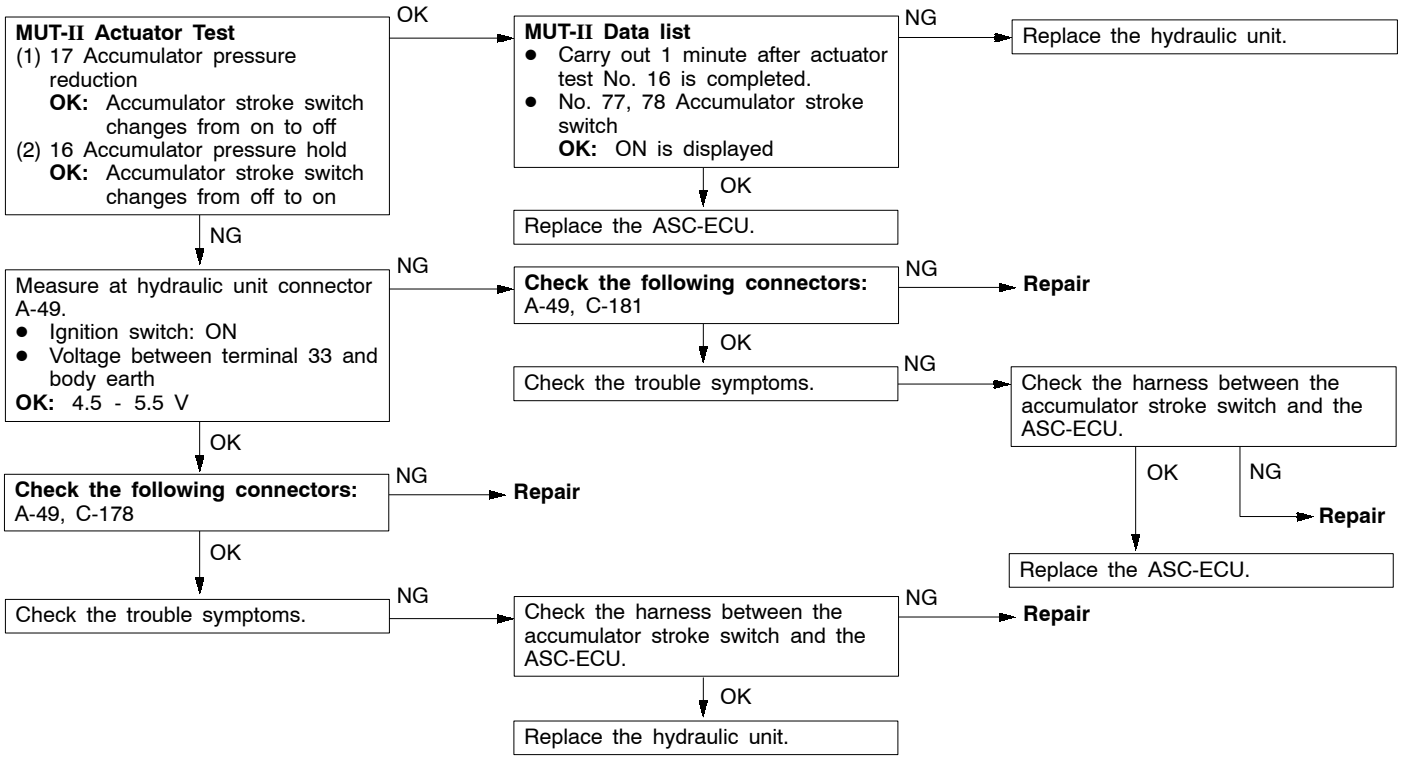
Carry out MPI system troubleshooting. (Refer to GROUP 13A - Troubleshooting.)*

NOTE
*: Refer to '97 GALANT Workshop Manual.

Code No. 76 Communication system with engine-ECU	Probable cause
This diagnosis code is output if an error is detected in the communication contents because of an open or short circuit in the serial communication circuit between the ASC-ECU and the engine-ECU, a malfunction of ECU and a defective shielding of the shied wire.	• Malfunction of harness or connector • Malfunction of ASC-ECU • Malfunction of engine-ECU



Code No. 78 Accumulator stroke switch system	Probable cause
This code is output at the following times. ● If the accumulator signal being is output continuously (open circuit or short-circuit in accumulator stroke switch circuit or incorrect accumulator pressure) ● If the accumulator stroke switch does not turn from on to off during the initial check even though the diagonal accumulator valve is on (incorrect pressure reduction) ● If the accumulator stroke switch turns from on to off within 1 minute after pressure accumulation is complete (fluid leak)	● Malfunction of accumulator stroke switch ● Malfunction of harness or connector ● Malfunction of hydraulic unit ● Malfunction of ASC-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication is not possible between the MUT-II and all other systems.		1	35C-29
Communication is not possible between the MUT-II and the ASC-ECU.		2	35C-30
The ASC/TCL operation lamp display does not operate correctly.	The ASC/TCL operation lamp does not turn on when the ignition switch is turned to ON.	3	35C-31
	The ASC/TCL operation lamp stays on after the engine has been started.	4	35C-31
The ASC-OFF indication lamp display does not operate correctly.	The ASC-OFF indication lamp does not turn on when the ignition switch is turned to ON.	5	35C-32
	The ASC-OFF indication lamp stays on after the engine has been started.	6	35C-32
	The ASC-OFF indication lamp does not turn on even if the ASC switch is continuously pressed to the OFF side while the engine is idling.	7	35C-33
The ABS warning lamp display does not operate correctly.	The ABS warning lamp does not turn on when the ignition switch is turned to ON.	8	35C-34
	The ABS warning lamp stays on after the engine has been started.	9	35C-35
	The ABS warning lamp does not turn on when the ignition switch is turned to START.	10	35C-35
The brakes do not operate correctly.		11	35C-36
Malfunction of TCL operation	ASC/TCL operation lamp illuminates in the TCL operation range, but torque is not reduced.	12	35C-36
Poor starting Poor acceleration	Engine output is reduced in the TCL non-operation range (ASC/TCL operation lamp does not illuminate) and starting and acceleration performance is poor.		

Caution

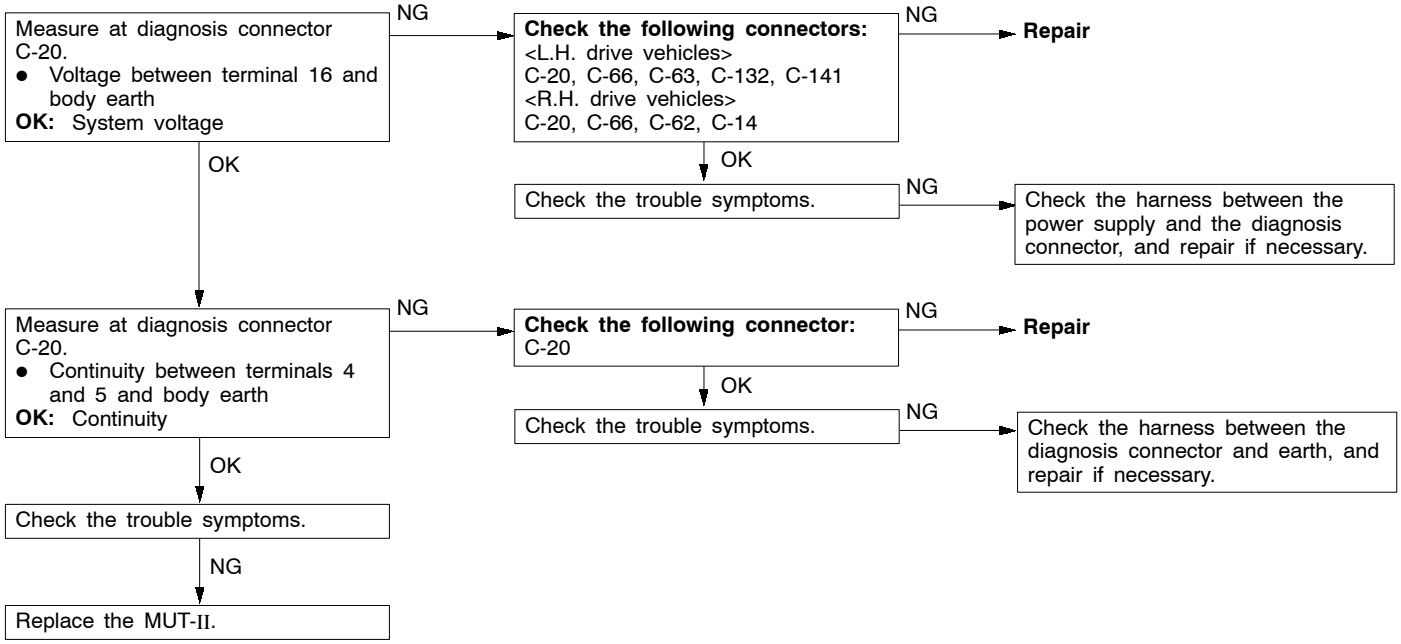
(1) The brake operation feeling changes (kickback conditions) during ASC operation in the same way as it changes during ABS operation. This happens because hydraulic pressure for certain wheels is being forced to increase or decrease, causing intermittent changes in the brake line pressure, and is not a sign of a problem.

(2) The ASC system does not operate while the brake warning lights are on (such as if the brake fluid level is low or the parking brake has been applied).

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

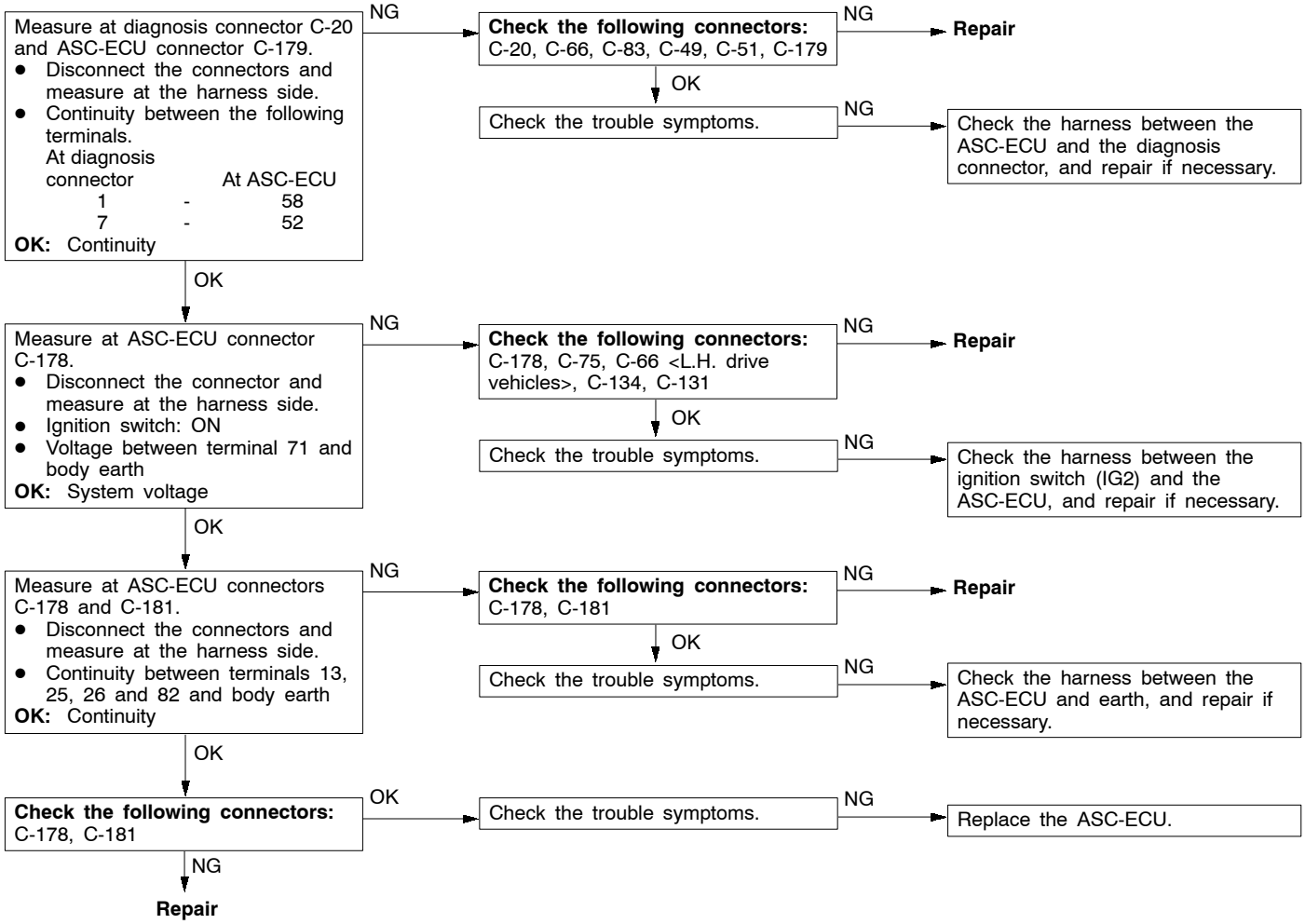
Inspection procedure 1

Communication is not possible between the MUT-II and all other systems.	Probable cause
The cause is probably a malfunction of the power supply circuit or earth circuit for the diagnosis connector.	• Malfunction of diagnosis connector • Malfunction of harness or connector



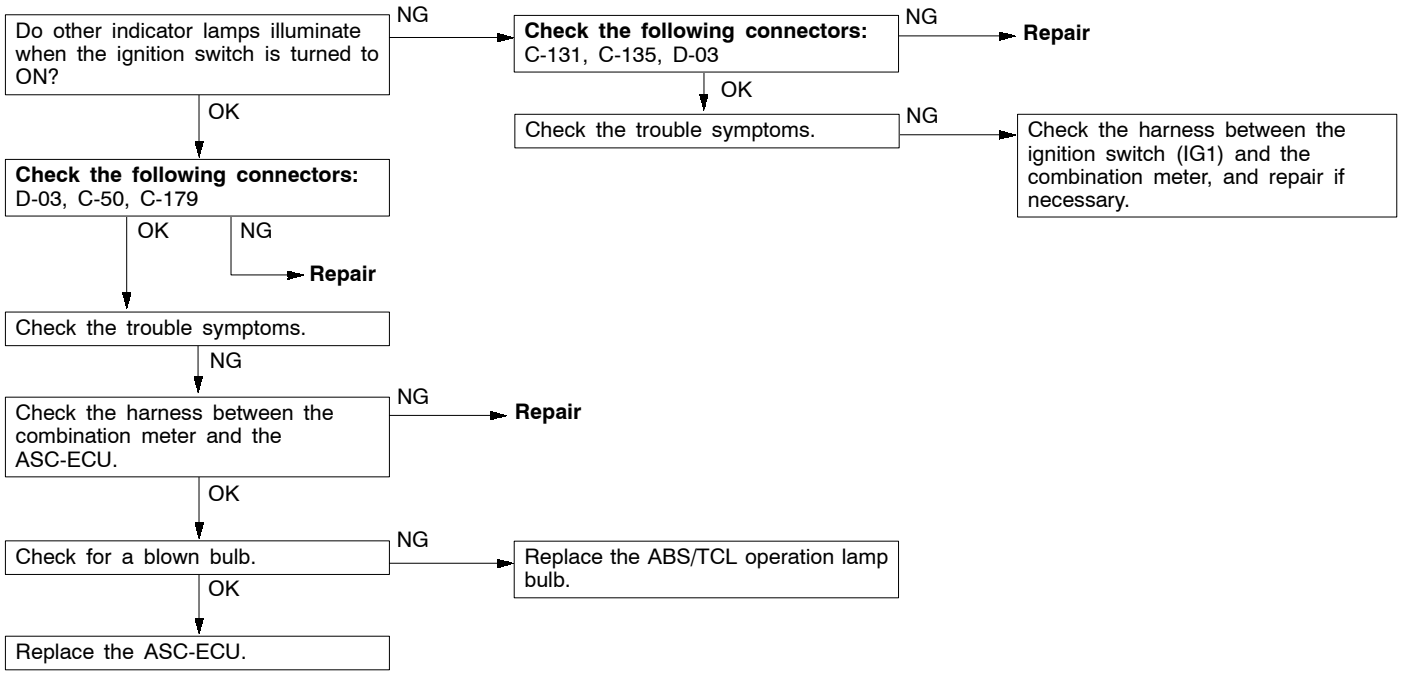
Inspection procedure 2

Communication is not possible between the MUT-II and the ASC-ECU.	Probable cause
The cause is probably an open circuit in the ASC-ECU power supply circuit or an open circuit in the diagnosis output circuit.	• Blown fuse • Malfunction of harness or connector • Malfunction of ABS-ECU



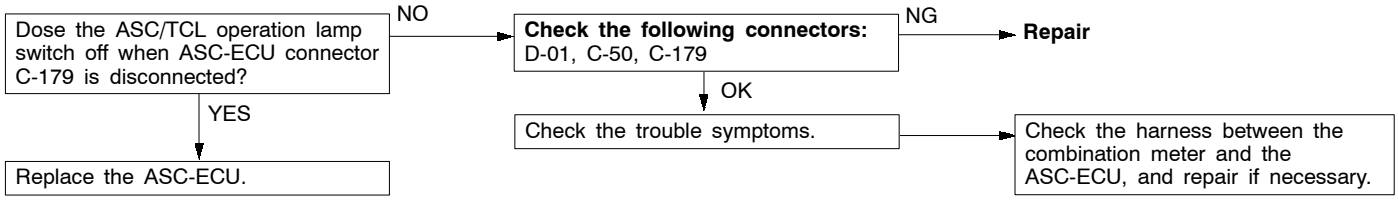
Inspection procedure 3

The ASC/TCL operation lamp does not turn on when the ignition switch is turned to ON.	Probable cause
The cause is usually an open circuit in the indicator circuit because of something such as a blown bulb.	• Malfunction of harness or connector • Malfunction of ASC-ECU • Malfunction of indicator bulb



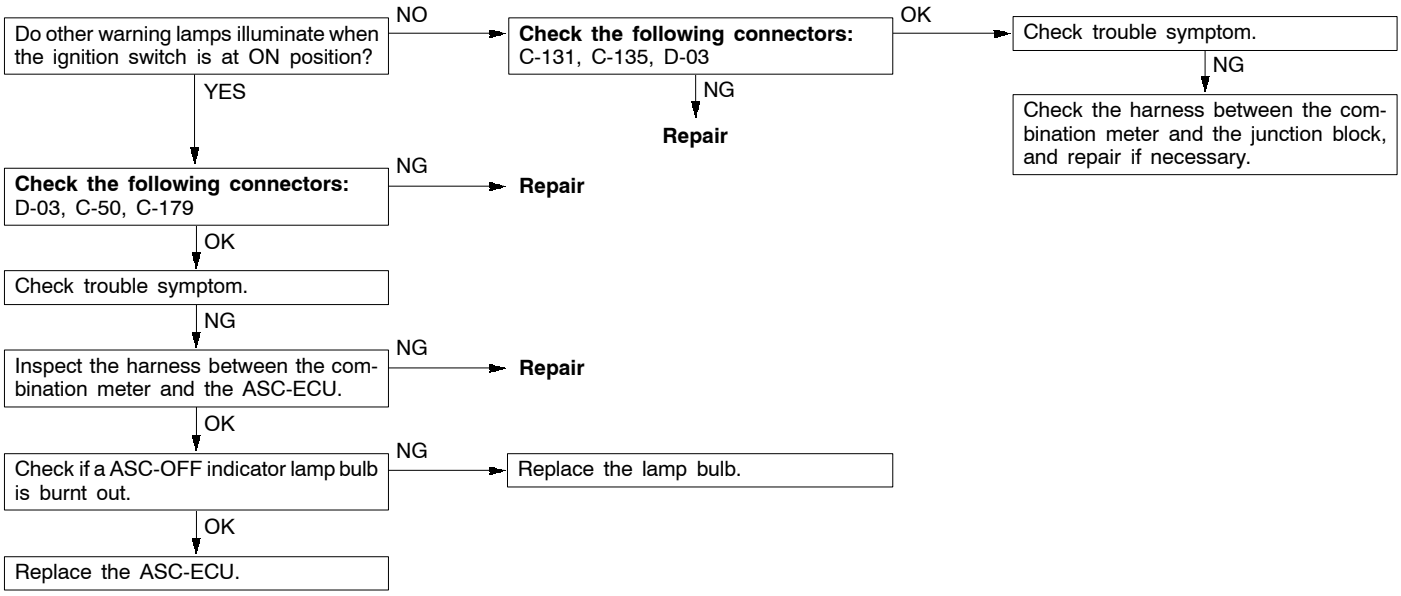
Inspection procedure 4

The ASC/TCL operation lamp stays on after the engine has been started.	Probable cause
The cause is probably a short-circuit in the ASC/TCL operation lamp illumination circuit.	• Malfunction of harness or connector • Malfunction of ASC-ECU



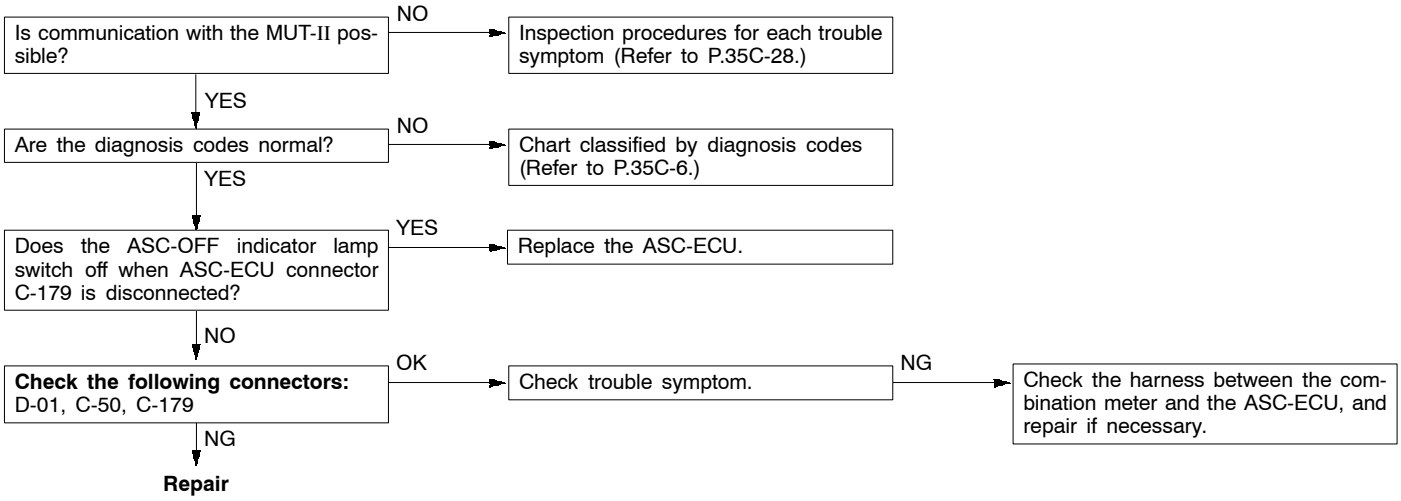
Inspection Procedure 5

The ASC-OFF indication lamp does not turn on when the ignition switch is turned to ON.	Probable cause
The main cause is an open circuit in the indicator circuit because of a burnt-out indicator lamp bulb.	• Malfunction of harness or connector • Malfunction of ASC-ECU • Malfunction of indicator lamp bulb



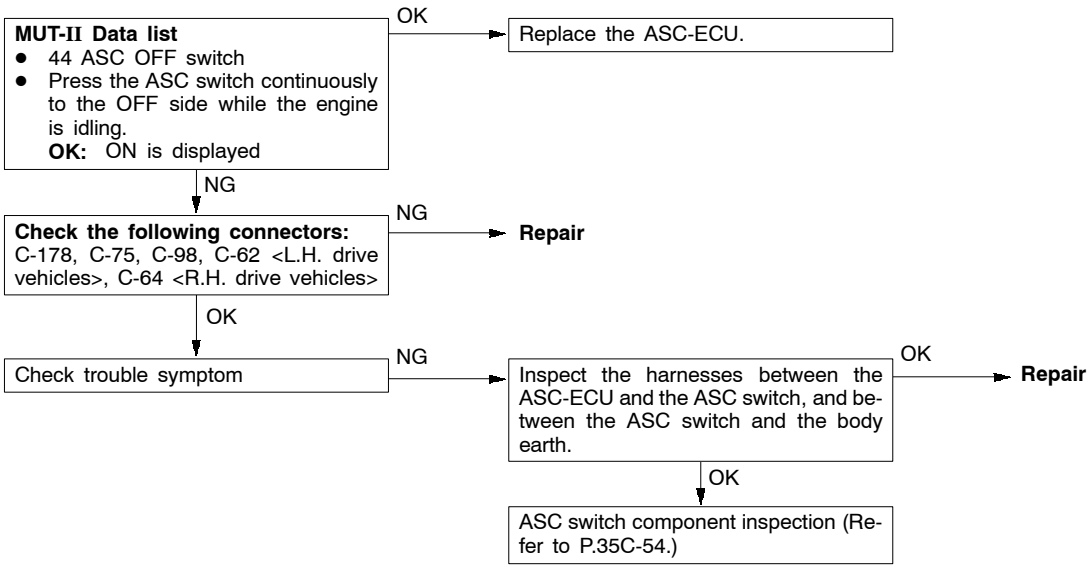
Inspection Procedure 6

ASC-OFF indicator lamp stays on after the engine has been started.	Probable cause
The ASC-OFF indication lamp also serve as a system warning lamp. This indication lamp illuminates when threre is a problem with the system.	• Other system related to the ASC • Malfunction of harness or connector



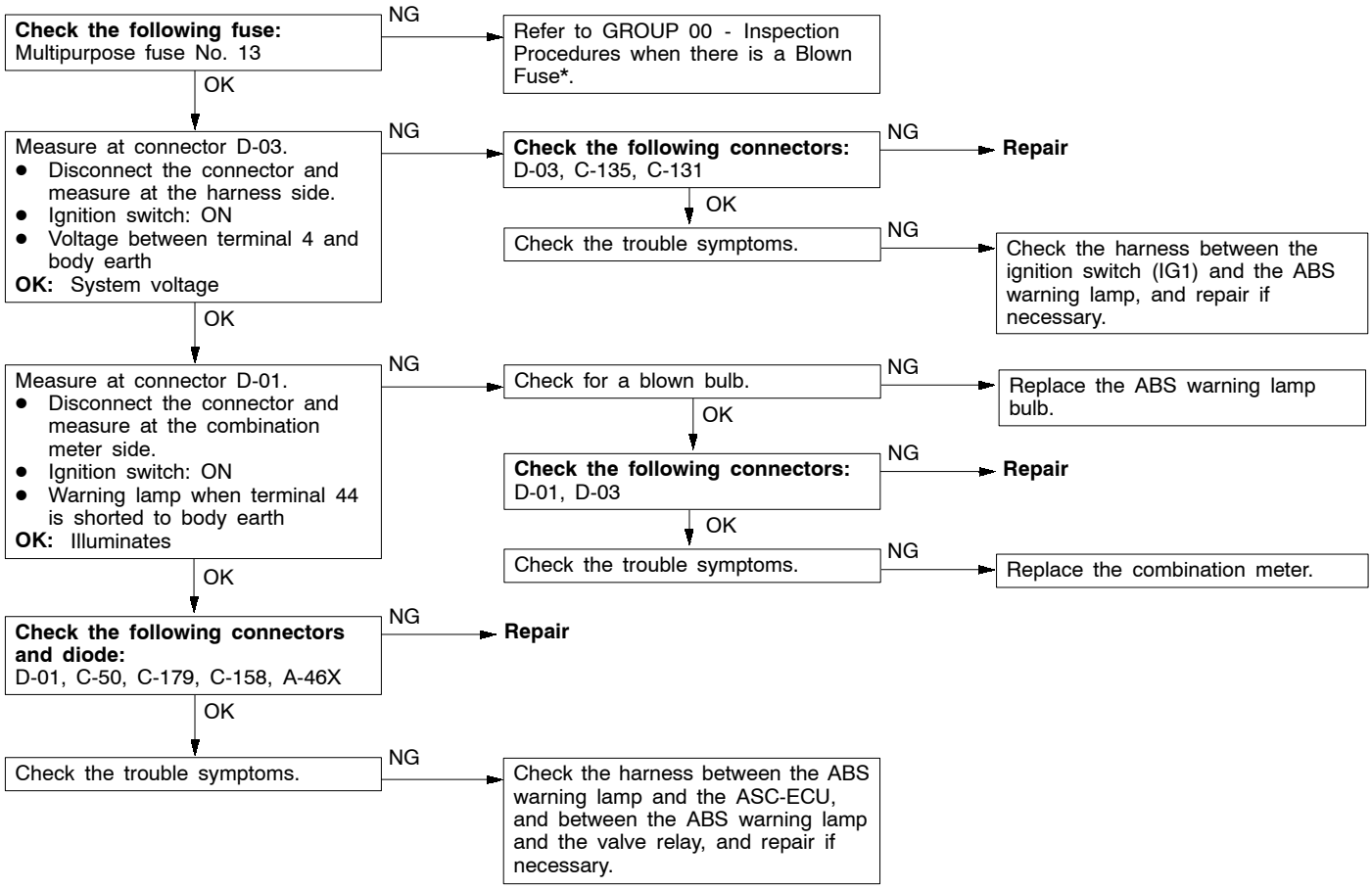
Inspection Procedure 7

The ASC-OFF indication lamp does not turn on even if the ASC switch is continuously pressed to the OFF side while the engine is idling.	Probable cause
If the indicator lamp does not illuminate when the switch is operated, there is a malfunction in the switch, switch circuit or in the ASC-ECU.	• Malfunction of harness or connector • Malfunction of ASC switch • Malfunction of ASC-ECU



Inspection procedure 8

The ABS warning lamp does not turn on when the ignition switch is turned to ON (engine stopped).	Probable cause
When power is being supplied to the ASC power supply, the valve relay changes from OFF to ON, OFF and ON again as part of the initial check. Because of this, the ABS warning lamp illuminates twice when the valve relay is off, even if there is a problem in the circuit between the ABS warning lamp and the ASC-ECU. Accordingly, if the lamp does not illuminate, the cause may be an open circuit in the lamp power supply circuit, a blown lamp bulb, or an open circuit in the circuits between the ABS warning lamp and the ASC-ECU or between the ABS warning lamp and the valve relay.	• Blown fuse • Blown ABS warning lamp bulb • Malfunction of harness or connector

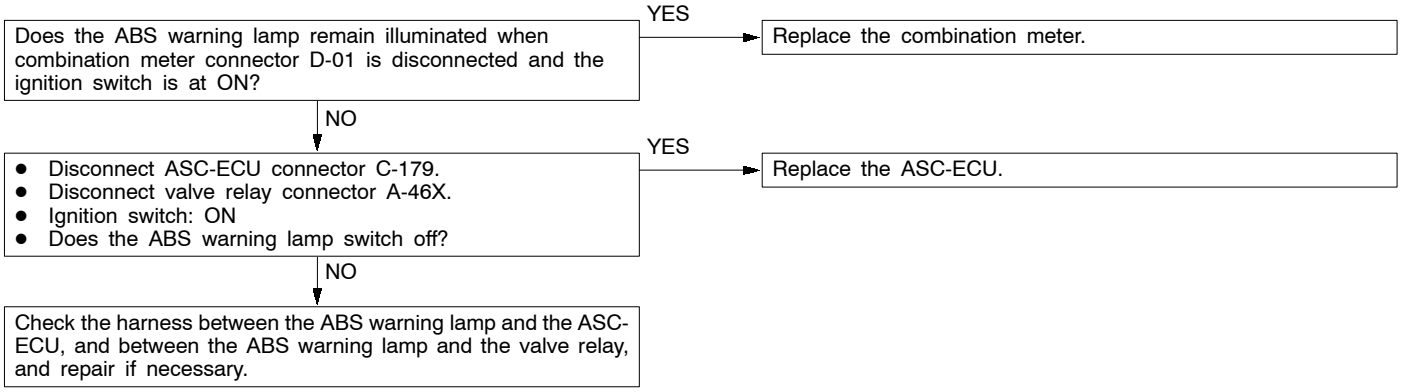


NOTE
*: Refer to '97 GALANT Workshop Manual.

Inspection procedure 9

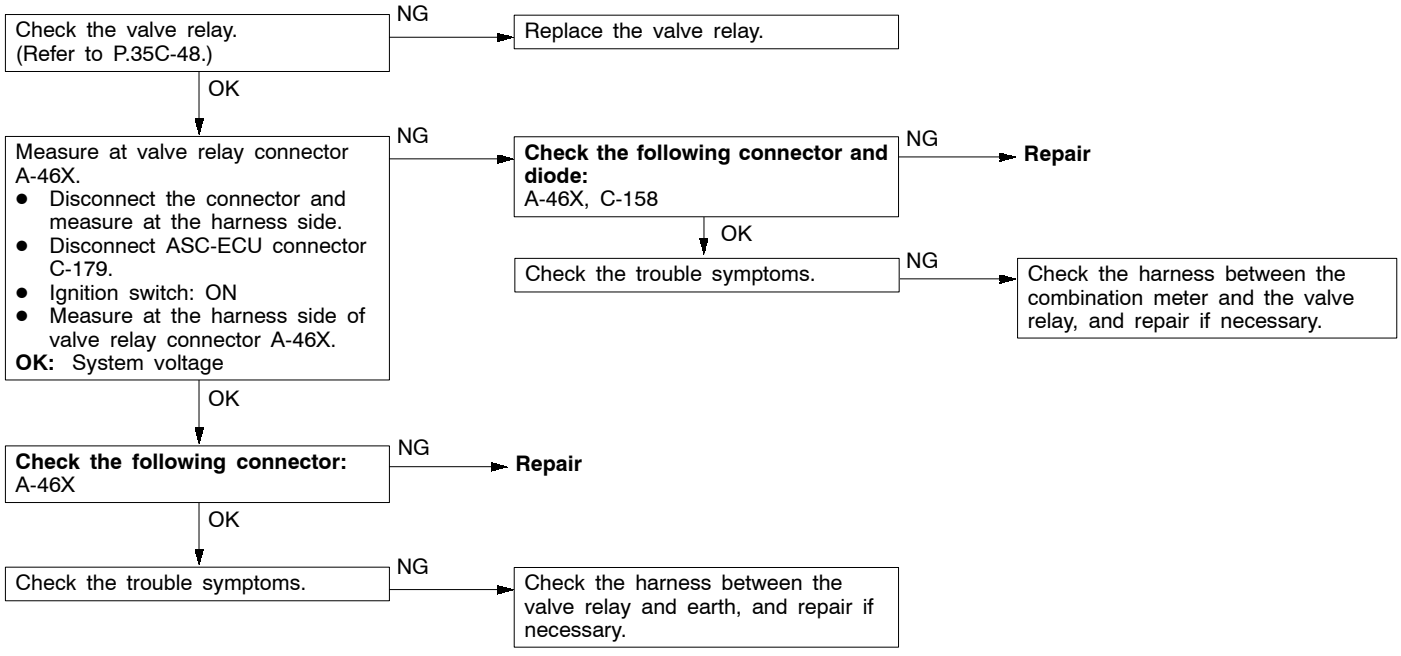
The ABS warning lamp stays on after the engine has been started.	Probable cause
The cause is probably a short-circuit in the ABS warning lamp illumination circuit.	• Malfunction of combination meter • Malfunction of ASC-ECU • Malfunction of harness (short-circuit)

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



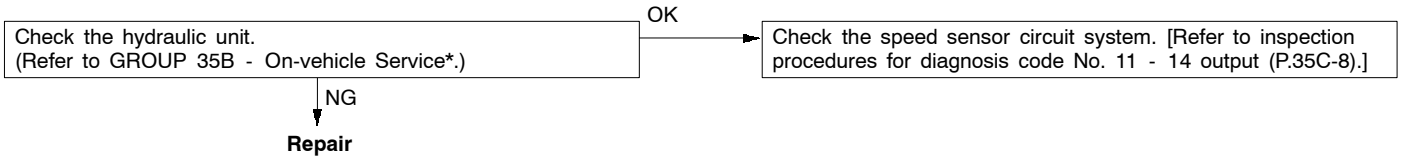
Inspection procedure 10

The ABS warning lamp does not turn on when the ignition switch is turned to START.	Probable cause
The ASC-ECU uses the IG2 power supply which is turned off when the ignition switch is at the START position. The ABS warning lamp uses the IG1 power supply which is not turned off when the ignition switch is at the START position. Thus the problem is with the lamp illumination circuit at the valve relay side.	• Malfunction of valve relay • Malfunction of harness or connector



Inspection procedure 11

The brakes do not operate correctly.	Probable cause
The brake operating feel can change according to the driving conditions and road surface conditions, so it is difficult to judge that there is a problem, but if there is no diagnosis code output, carry out the following inspection.	• Incorrect speed sensor installation • Malfunction of harness or connector • Malfunction of ABS rotor • Foreign material sticking to speed sensor • Malfunction of wheel bearing • Malfunction of hydraulic unit • Malfunction of ASC-ECU



NOTE
*: Refer to '97 GALANT Workshop Manual.

Inspection Procedure 12

ASC/TCL operation lamp illuminates in the TCL operation range, but torque is not reduced. Engine output is reduced in the TCL non-operation range (ASC/TCL operation lamp does not illuminate) and starting and acceleration performance is poor.	Probable cause
In cases such as the above, the electrical system is normal, and the cause is probably an abnormality in the mechanical system (vacuum actuator).	• Malfunction of vacuum solenoid valve • Malfunction of ventilation solenoid valve • Malfunction of vacuum actuator • Incorrect vacuum hose connector • Malfunction of throttle link • Malfunction of vacuum tank • Blocked air cleaner element

As the cause is probably a malfunction of the vacuum actuator system, carry out inspection of the following items in order.

- Vacuum solenoid valve operation inspection (Refer to GROUP 13A - On-vehicle Service.)*
- Ventilation solenoid valve operation inspection (Refer to GROUP 13A - On-vehicle Service.)*
- Disconnected or mis-connected vacuum hose inspection (Refer to GROUP 13A - On-vehicle Service.)*
- Throttle link operation inspection (Refer to GROUP 13A - On-vehicle Service.)*
- Vacuum tank inspection (Refer to GROUP 13A - On-vehicle Service.)*
- Air cleaner element blockage inspection

NOTE
*: Refer to '97 GALANT Workshop Manual.

DATA LIST REFERENCE TABLE

The following ECU input data can be read by the MUT-II.

No.	Inspection item	Inspection contents		Normal condition
11	FR wheel speed	Actual driving		Speedometer display and MUT-II display are the same
12	FL wheel speed			
13	RR wheel speed			
14	RL wheel speed			
17	Engine speed	Engine: Idling		Tachometer display and MUT-II display are the same
18	ASC-ECU power supply and voltage	Ignition switch: ON		9 - 16 V
20	Lateral G sensor	Vehicle stopped		2.4 - 2.6 V
		Actual driving		Display value increases and decreases around 2.5 V
21	Yaw rate sensor	Vehicle stopped		2.4 - 2.6 V
		Actual driving	Turning to the right	2.4 - 4.7 V
			Turning to the left	0.3 - 2.6 V
22	Steering angle	Steering wheel position	Turned 90° to the right	+90°
			Turned 90° to the left	-90°
24	Master cylinder pressure sensor	Brake pedal position	Fully closed	Approx. 0.5 V
			Depressed	Increases to max. 4.5 V from the above value
28	Engine type	Ignition switch: ON		6A13
29	Engine specification 3	Ignition switch: ON		Normal
30	Engine specification 2	Ignition switch: ON		N/A
31	Engine specification 1	Ignition switch: ON		SOHC
32	Destination	Ignition switch: ON		EC
36	Stop lamp switch	Brake pedal position	Depressed	ON
			Released	OFF
41	Steering sensor (ST-N)	Steering wheel position Engine started	Neutral position	ON
			Turned 90° from neutral position	OFF
42	Steering sensor (ST-1)	Steering wheel position: Turned slowly to the left		Display alternates between OFF and ON
43	Steering sensor (ST-2)	Steering wheel position: Turned slowly to the right		Display alternates between OFF and ON

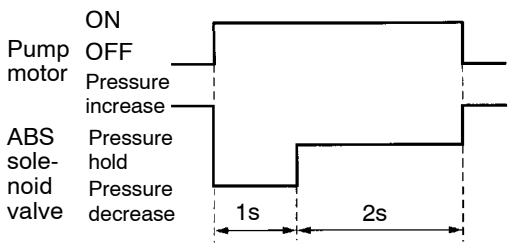
No.	Inspection item	Inspection contents		Normal condition
44	ASC-OFF switch	ASC-OFF switch operation	Pressed	ON
			Released	OFF
45	ASC-ON switch	ASC-ON switch operation	Pressed	ON
			Released	OFF
46	Slip control	ASC switch: ON Driving on low i road	ASC/TCL operation lamp ON	ON
			ASC/TCL operation lamp OFF	OFF
65	TPS system	Accelerator pedal position Ignition switch: ON Selector lever position: P	Fully closed	300 - 1000 mV
			Depressed	Gradually increases from above value
			Fully open	4500 - 5500 mV
67	APS system	Accelerator pedal position Ignition switch: ON Selector lever position: P	Fully closed	300 - 1000 mV
			Depressed	Gradually increases from above value
			Fully open	4500 - 5500 mV
74	Trace control	ASC switch: ON Driving on low i road	ASC/TCL operation lamp ON	ON
			ASC/TCL operation lamp OFF	OFF
75	Idle switch	Accelerator pedal position	Fully closed	ON
			Fully open	OFF
76	Ignition switch	Ignition switch position	ON	ON
			OFF	OFF
77	Accumulator stroke switch (FR - RL)	Accumulator pressure (FR - RL) Held		ON
		Accumulator pressure (FR - RL) Released		OFF
78	Accumulator stroke switch (FL - RR)	Accumulator pressure (FL - RR) Held		ON
		Accumulator pressure (FL - RR) Released		OFF

NOTE
The pressure inside the accumulators can be held and released by carrying out actuator tests. (Refer to P.35C-39.)

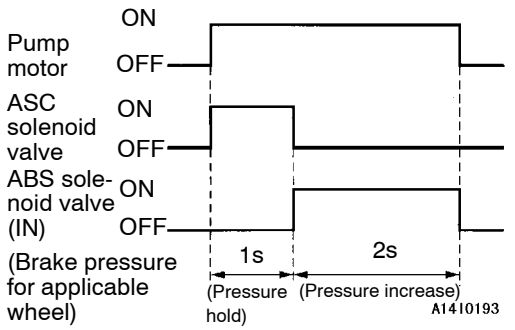
ACTUATOR TEST REFERENCE TABLE

The MUT-II can be used to force-drive components in order to carry out the following actuator tests.

Item Nos. 01 - 04 (ABS solenoid valves) Drive pattern



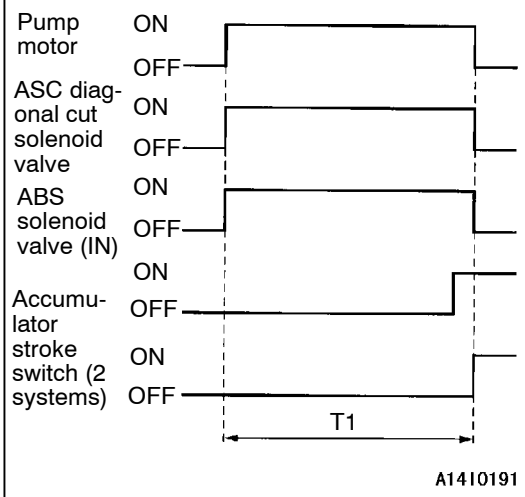
Item Nos. 05 - 08 (ASC solenoid valves) Drive pattern



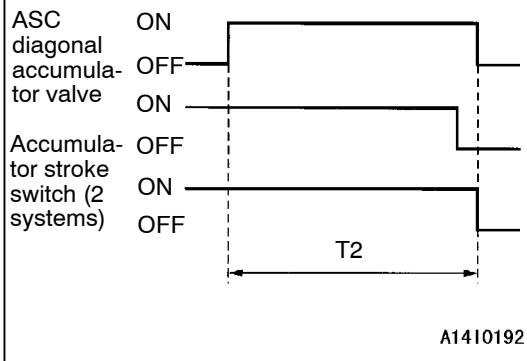
Actuator test specifications

Item No.	Inspection item		Details
01	ABS solenoid valve (front-right) control	*1	Drives the ABS solenoid valves and pump motor for each channel in the hydraulic unit.
02	ABS solenoid valve (front-left) control		
03	ABS solenoid valve (rear-right) control		
04	ABS solenoid valve (rear-left) control		
05	ASC solenoid valve (front-right) control *4	*2	Drives the ASC solenoid valves, ABS solenoid valves and the pump motor. The wheel which is diagonally opposite the wheel being driven (example: the rear-left wheel when the front-right wheel is being driven) is set to holding mode.
06	ASC solenoid valve (front-left) control *4		
07	ASC solenoid valve (rear-right) control *4		
08	ASC solenoid valve (rear-left) control *4		
09	TCL throttle	*3	A torque request 0 signal and a fully-close instruction are sent to the engine-ECU for 3 seconds. Furthermore, service data item No. 65 APS and No. 67 TPS are displayed at the same time.

Item No. 16 (Accumulator pressure holding) Drive pattern



Item No. 17 (Accumulator pressure reduction) Drive pattern



Item No.	Inspection Item		Details
12	Pump motor	*1	The pump motor is driven for approximately 2 seconds.
16	Accumulator pressure holding	*2	The ASC solenoid valves (diagonal cut valves) and the pump motor are driven to that pressure builds up in the accumulator. Furthermore, service data Nos. 77 and 78 (accumulator stroke switches) are displayed at the same time.
17	Accumulator pressure reduction		The ASC solenoid valves (diagonal booster valves) and the pump motor are driven to that pressure is reduced in the accumulator. Furthermore, service data Nos. 77 and 78 (accumulator stroke switches) are displayed at the same time.

NOTE

*1: Actuator testing cannot be carried out if the ABS is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ABS warning lamp will flash and all control operations will be stopped during actuator testing.

*2: Actuator testing cannot be carried out if the ASC is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ASC/TCL operation lamp will flash and all control operations will be stopped during actuator testing.

*3: Actuator testing cannot be carried out if the TCL is in fail-safe mode, or if the speed of the fast of the four wheels is 10 km/h or more. In addition, the ASC/TCL operation lamp will flash and all control operations will be stopped during actuator testing.

*4: The ASC solenoid valves indicate the diagonal cut valves and diagonal accumulator valves. Only the valves for the applicable wheel are driven during actuator testing.

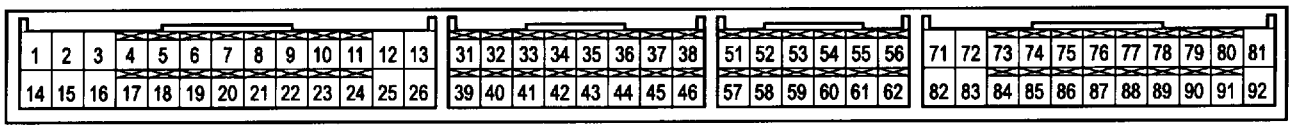
T1: Driven until the two accumulator stroke switch systems both turn on. (Driven for a maximum of 10 seconds if the systems do not turn on.)

T2: Driven until the two accumulator stroke switch systems both turn off. (Driven for a maximum of 10 seconds if the systems do no turn off.)

CHECK AT ASC-ECU

TERMINAL VOLTAGE CHECK CHART

(1) Voltage measurements are taken between each terminal and earth.
(2) The terminal layout is shown in the diagram below.



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Terminal No.	Check item	Check condition	Normal condition
1	ABS solenoid valve OUT (FL)	Ignition switch: ON (when initial check is complete)	System voltage
2	ABS solenoid valve OUT (RR)	Ignition switch: ON (when initial check is complete)	System voltage
3	Diagonal booster valve (FL - RR)	Ignition switch: ON (when initial check is complete)	System voltage
5	A/T-ECU data transmission	Engine: Idling	Other than 0 V
6	Engine-ECU data transmission	Engine: Idling	Other than 0 V
8	Lateral G sensor input	Ignition switch: ON	2.4 - 2.6 V (when horizontal)
10	Yaw rate sensor	Ignition switch: ON	2.4 - 2.6 V (when stopped)
11	Yaw rate sensor earth	At all times	0.5 V or less
12	Master cylinder pressure sensor and accumulator stroke switch power supply	Ignition switch: ON	4.8 - 5.2 V
13	ECU earth	At all times	1 V or less
14	ABS solenoid valve IN (FR)	Ignition switch: ON (when initial check is complete)	System voltage
15	ABS solenoid valve IN (RL)	Ignition switch: ON (when initial check is complete)	System voltage
16	Diagonal booster valve (FL - RR)	Ignition switch: ON (when initial check is complete)	System voltage
18	A/T-ECU data transmission	Engine: Idling	Other than 0 V
19	Engine-ECU data transmission	Engine: Idling	Other than 0 V
21	Lateral G sensor earth	At all times	0.5 V or less
23	Master cylinder pressure sensor earth	At all times	0.5 V or less

Terminal No.	Check item	Check condition		Normal condition
24	Master cylinder pressure sensor input	Ignition switch: ON Brake pedal depressed		0.4 - 4.5 V
25	ECU earth	At all times		1 V or less
26	ECU earth	At all times		1 V or less
31	Stop lamp switch	Ignition switch: ON	Stop lamp switch: ON	System voltage
			Stop lamp switch: OFF	1 V or less
36	Steering sensor (ST-1)	Engine: Idling Steering wheel turned slowly		Flashing between approx. 1.5 V and approx. 3.5 V
37	Steering sensor (ST-2)	Engine: Idling Steering wheel turned slowly		Flashing between approx. 1.5 V and approx. 3.5 V
38	ASC-ECU power supply	Ignition switch: ON		System voltage
39	APS	Ignition switch: ON	Accelerator pedal: Fully closed	0.3 - 1.0 V
			Accelerator pedal: Fully open	4.5 - 5.5 V
44	Steering sensor (ST-N)	Engine: Idling	Steering wheel: Neutral position	1.3 - 2.0 V
			Steering wheel: Turned 90° from neutral position	3.0 - 4.1 V
51	ECU backup power supply	At all times		System voltage
52	Diagnosis data input/output	When MUT-II is connected		Serial communication with MUT-II
		When MUT-II is not connected		1 V or less
53	Motor monitoring input	Ignition switch: ON	When motor is on	System voltage
			When motor is on	1 V or less
54	Valve relay monitoring input	Ignition switch: ON		System voltage
55	ABS warning lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
56	ASC-OFF indicator	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
58	Diagnosis selection input	When MUT-II is connected		1 V or less
		When MUT-II is not connected		System voltage

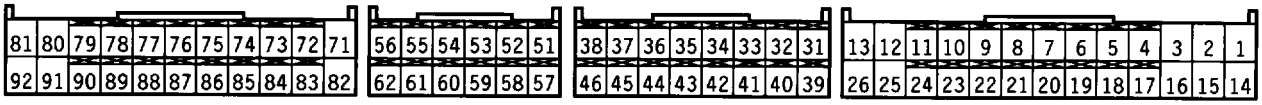
Terminal No.	Check item	Check condition		Normal condition
62	ASC/TCL operation lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
71	ASC-ECU power supply	Ignition switch: ON		System voltage
		Ignition switch: START		0 V
72	Motor relay output	Ignition switch: ON	When motor is on	1 V or less
			When motor is off	System voltage
73	Valve relay output	Ignition switch: ON	When relay turns on approx. 1 second after engine starts	1 V or less
			When system problem detection relay is OFF	System voltage
74	Backup lamp switch input <M/T>	Ignition switch: ON	Shift lever: Reverse	System voltage
			Shift lever: Other than above	1 V or less
78	Diagonal cut valve (FR - RL)	Ignition switch: ON (when initial check is complete)		System voltage
79	Diagonal cut valve (FL - RR)	Ignition switch: ON (when initial check is complete)		System voltage
80	ABS solenoid valve OUT (RL)	Ignition switch: ON (when initial check is complete)		System voltage
81	ABS solenoid valve OUT (FR)	Ignition switch: ON (when initial check is complete)		System voltage
82	ECU earth	At all times		1 V or less
83	ASC-OFF switch	Ignition switch: ON	ASC switch: Pressed to ON	1 V or less
			ASC switch: Released	System voltage
85	M/T identification input	At all times		1 V or less
86	ASC-ON switch	Ignition switch: ON	ASC switch: Pressed to ON	1 V or less
			ASC switch: Released	System voltage
88	Brake warning lamp	Ignition switch: ON	When lamp is off	System voltage
			When lamp is on	1 V or less
89	Accumulator stroke switch (FR - RL)	Ignition switch: ON	Accumulator pressure*: Held	4.5 - 5.5 V
			Accumulator pressure*: Released	0 V

Terminal No.	Check item	Check condition		Normal condition
90	Accumulator stroke switch (FI - RR)	Ignition switch: ON	Accumulator pressure*: Held	4.5 - 5.5 V
			Accumulator pressure*: Released	0 V
91	ABS solenoid valve IN (RL)	Ignition switch: ON (when initial check is complete)		System voltage
92	ABS solenoid valve IN (FR)	Ignition switch: ON (when initial check is complete)		System voltage

NOTE
*: The pressure inside the accumulators can be held and released by carrying out actuator tests. (Refer to P.35C-39.)

RESISTANCE AND CONTINUITY BETWEEN HARNESS-SIDE CONNECTOR TERMINALS CHART

(1) Resistance measurements and continuity checks should be carried out with the ignition switch at OFF and the ASC-ECU connector disconnected.
(2) Resistance measurements and continuity checks should be made between the terminals indicated below.
(3) The square terminal layout is shown in the diagram below.



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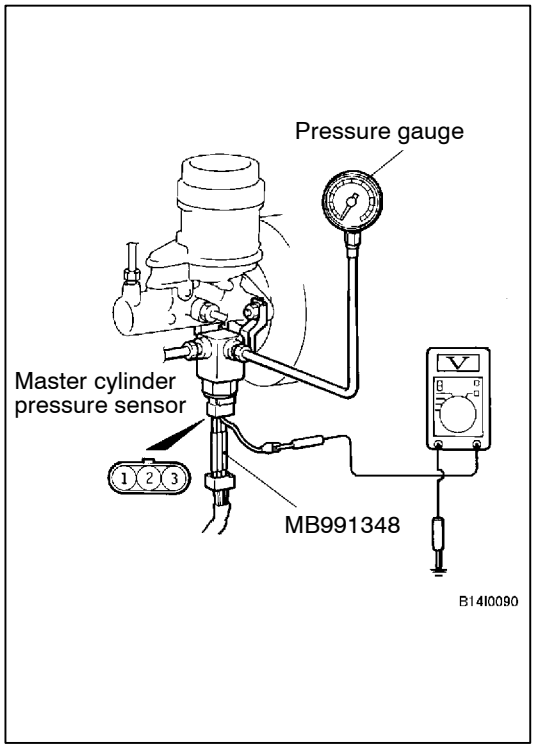
Terminal No.	Signal name	Normal condition
1 - Body earth	ABS OUT solenoid valve (FL)	3.1 - 3.4 Ω
2 - Body earth	ABS OUT solenoid valve (RR)	3.1 - 3.4 Ω
3 - Body earth	Diagonal booster valve (FR - RL)	6.3 - 6.9 Ω
13 - Body earth	ECU earth	Continuity
14 - Body earth	ABS IN solenoid valve (FL)	6.3 - 6.9 Ω
15 - Body earth	ABS IN solenoid valve (RR)	6.3 - 6.9 Ω
16 - Body earth	Diagonal booster valve (FL - RR)	6.3 - 6.9 Ω
25 - Body earth	ECU earth	Continuity
26 - Body earth		
32 - 40	Wheel speed sensor (RL)	1.0 - 1.5 kΩ
33 - 41	Wheel speed sensor (FR)	1.0 - 1.5 kΩ
34 - 42	Wheel speed sensor (RR)	1.0 - 1.5 kΩ
35 - 43	Wheel speed sensor (FL)	1.0 - 1.5 kΩ
53 - Body earth	Motor monitoring	Continuity
54 - Body earth	Valve relay monitoring	Continuity
78 - Body earth	Diagonal cut valve (FR - RL)	6.3 - 6.9 Ω
79 - Body earth	Diagonal cut valve (FL - RR)	6.3 - 6.9 Ω
80 - Body earth	ABS OUT solenoid valve (RL)	3.1 - 3.4 Ω
81 - Body earth	ABS OUT solenoid valve (FR)	3.1 - 3.4 Ω
85 - Body earth	M/T identification input	Continuity
82 - Body earth	ECU earth	Continuity
91 - Body earth	ABS IN solenoid valve (RL)	6.3 - 6.9 Ω
92 - Body earth	ABS IN solenoid valve (FR)	6.3 - 6.9 Ω



ON-VEHICLE SERVICE

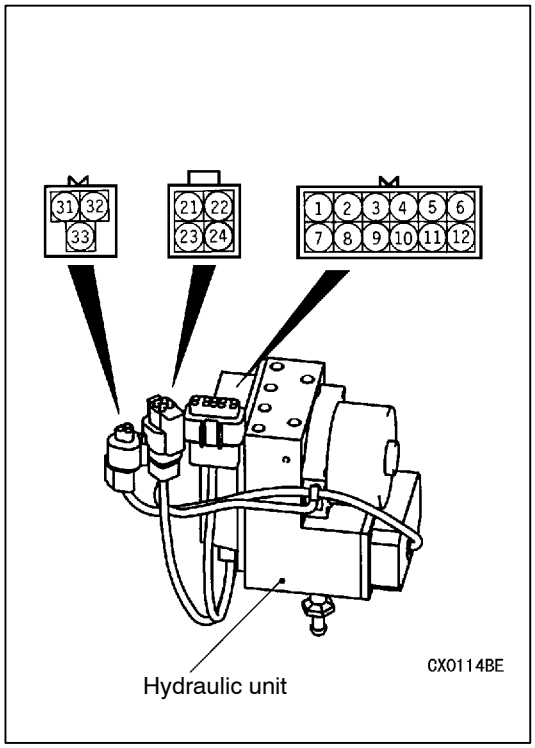
MASTER CYLINDER PRESSURE SENSOR CHECK

1. Connect a pressure gauge to the output side of the pressure sensor's fluid line.
2. Bleed the air from the pressure sensor and the brake line.
3. Disconnect the pressure sensor connector and connect the special tool in between the connectors.
4. Start the engine and check that the output voltage between terminal (2) and earth is within the standard value range for the following hydraulic pressures when the brake pedal is depressed.

Standard values:

Hydraulic pressure MPa	Output voltage
0	0.4 - 0.6
9.8	2.4 - 2.6

5. If the output voltages are outside the standard value ranges, check that there are no problems in the power supply line and earth, and then replace the sensor.



SOLENOID VALVE CHECKS

ABS SOLENOID VALVES

1. Measure the resistances between the terminals and check that they are within the standard value ranges.

Standard values:

Item		Check terminals	Resistance between terminals
Front-right side	IN	11 - 22	6.3 - 6.9 Ω
	OUT	5 - 22	3.1 - 3.4 Ω
Front-left side	IN	12 - 21	6.3 - 6.9 Ω
	OUT	6 - 21	3.1 - 3.4 Ω
Rear-right side	IN	9 - 21	6.3 - 6.9 Ω
	OUT	3 - 21	3.1 - 3.4 Ω
Rear-left side	IN	10 - 22	6.3 - 6.9 Ω
	OUT	4 - 22	3.1 - 3.4 Ω

2. If the resistances between the terminals are higher than the standard values, replace the hydraulic unit.

ASC solenoid valves

1. Measure the resistance between the terminals and check that they are within the standard value ranges.

Standard values:

Item		Check terminals	Resistance between terminals
Diagonal accumulator valve	FR - RL	2 - 21	3.1 - 3.4 Ω
	FL - RR	8 - 22	3.1 - 3.4 Ω
Diagonal cut valves	FR - RL	1 - 21	6.3 - 6.9 Ω
	FL - RR	7 - 22	6.3 - 6.9 Ω

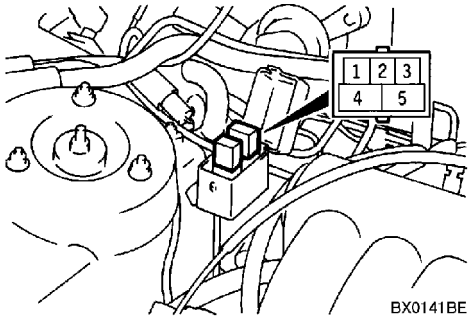
2. If the resistances between the terminals are higher than the standard values, replace the hydraulic unit.

MOTOR OPERATION CHECK

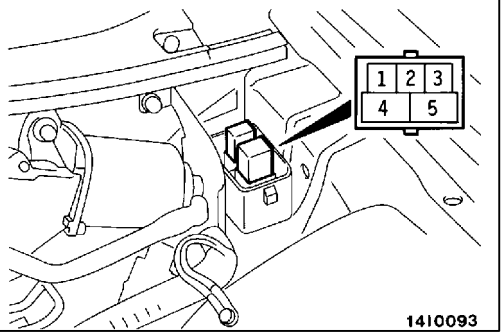
Connect the battery (+) terminal to terminal (24) and the (-) terminal to terminal (23), and then check that the sound of the hydraulic unit motor operating can be heard.

Caution
The battery power should not be applied for any more than 1 second.

<L.H. drive vehicles>



<R.H. drive vehicles>



VALVE RELAY CONTINUITY CHECK

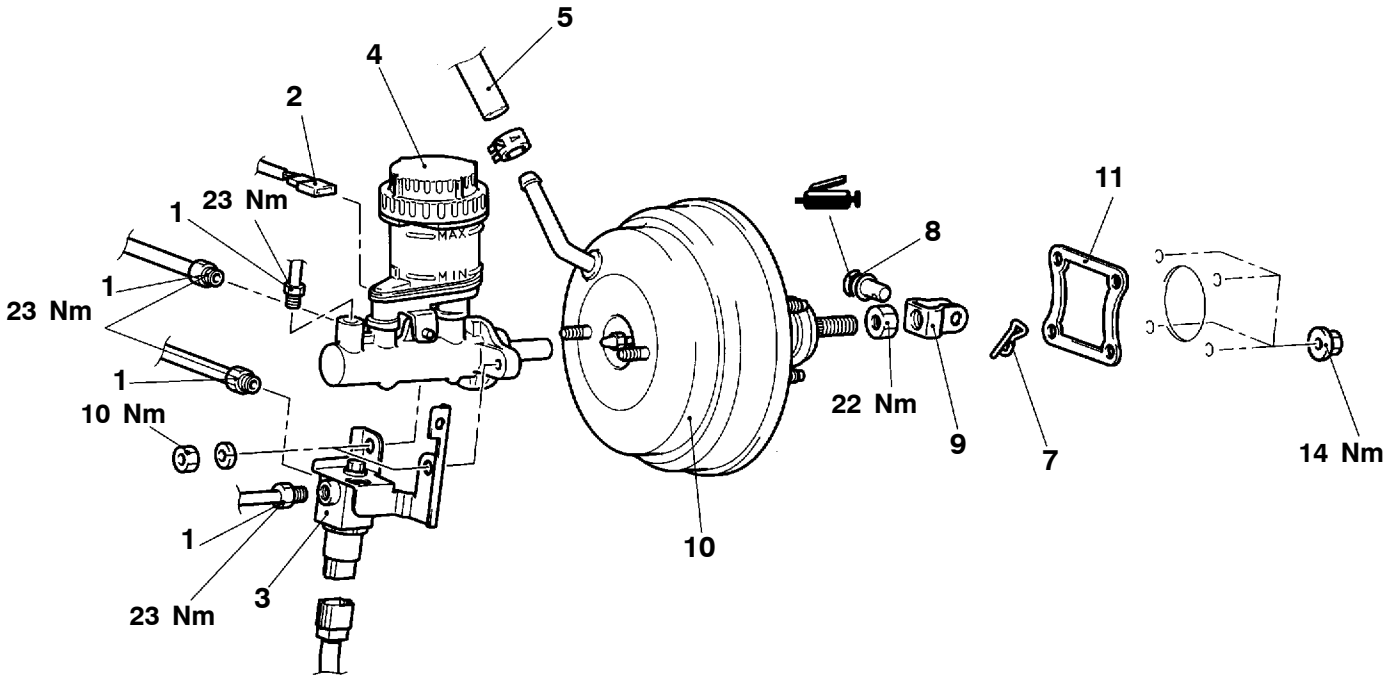
Item	Terminal No.				
	1	2	3	4	5
When power is not supplied	○		○		
		○			○
When power is supplied	⊕		⊖		
				○	○

MASTER CYLINDER AND BRAKE BOOSTER

REMOVAL AND INSTALLATION

Pre-removal Operation
Brake Fluid Draining

Post-installation Operation
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment



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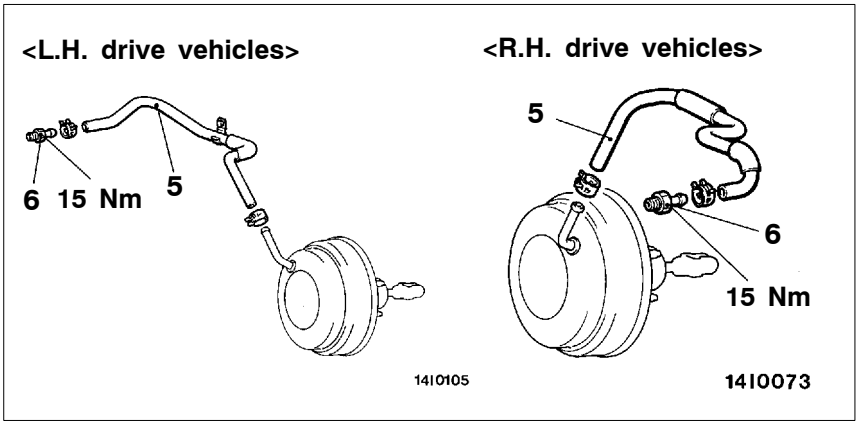
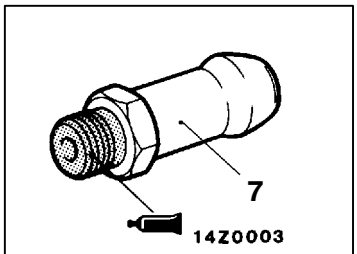




Sealant: 3M ATD Part No. 8661 or equivalent

Removal steps

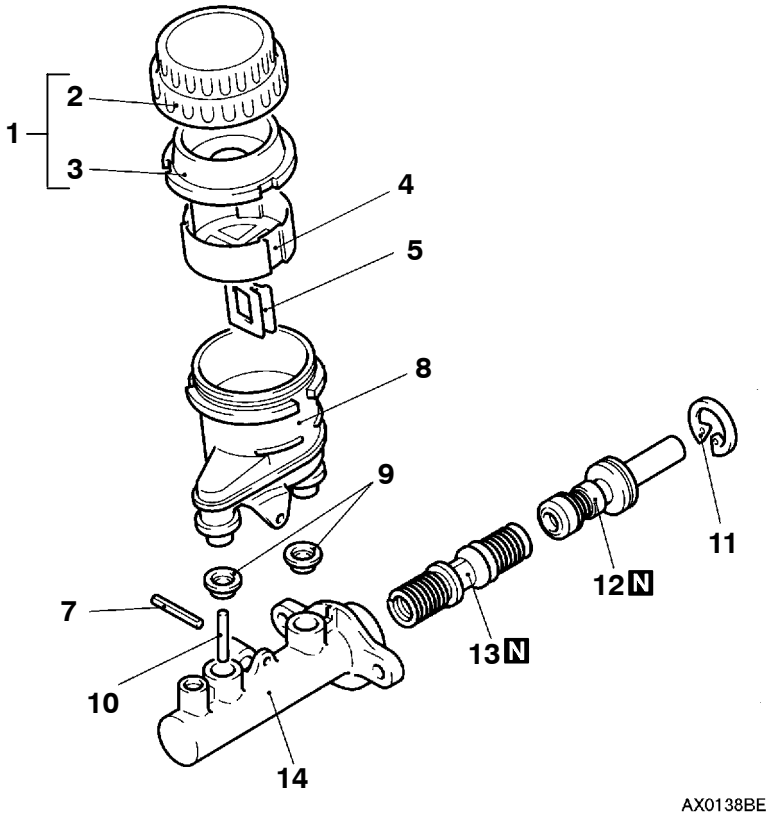
1. Brake pipe connection
2. Brake fluid level sensor connector
3. Master cylinder pressure sensor
4. Master cylinder assembly

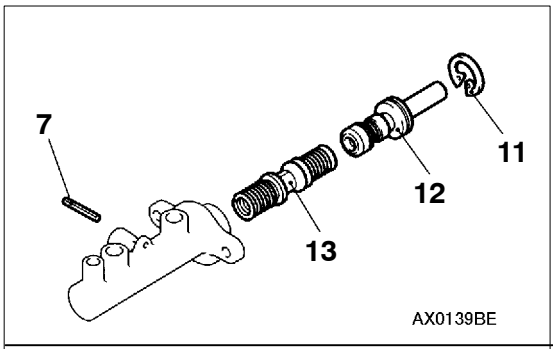
▶B◀ ● Push rod protruding length check and adjustment

▶A◀ 5. Vacuum hose (with built-in check valve)
6. Fitting
7. Snap pin
8. Pin assembly
9. Clevis
10. Brake booster
11. Sealer

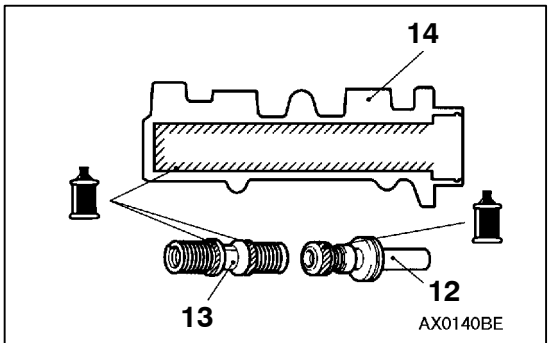
NOTE
Refer to GROUP 35A of the '97 GALANT Workshop Manual for installation service points.

MASTER CYLINDER
DISASSEMBLY AND REASSEMBLY





Master cylinder kit



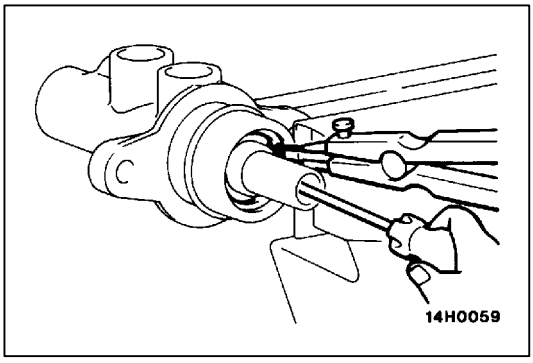
Brake fluid: DOT3 or DOT4

Disassembly steps

1. Reservoir cap assembly
2. Reservoir cap
3. Diaphragm
4. Filter
5. Brake fluid level indicator assembly
6. Float
7. Spring pin

◀A▶

8. Reservoir tank
9. Reservoir seal
10. Pin
11. Piston stopper ring
12. Primary piston assembly
13. Secondary piston assembly
14. Master cylinder body



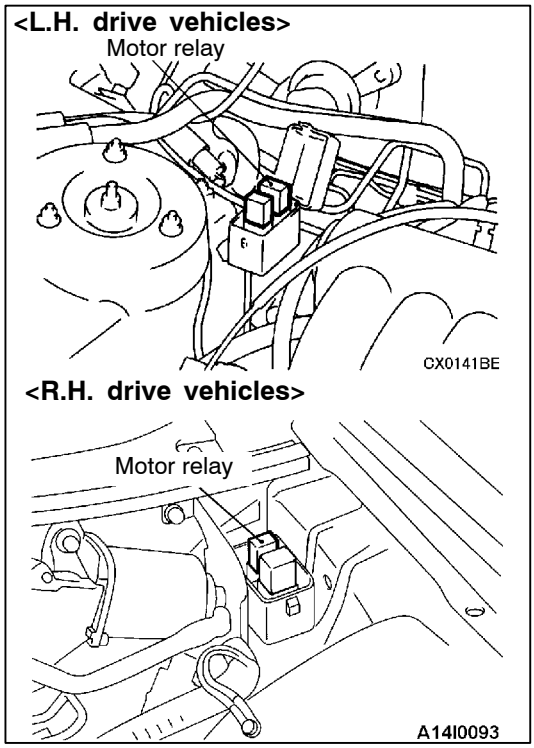
DISASSEMBLY SERVICE POINT

◀A▶ PISTON STOPPER RING REMOVAL

Remove the piston stopper ring while depressing the piston.

INSPECTION

- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear, damage or wear.
- Check the diaphragm for cracks and wear.



MOTOR RELAY

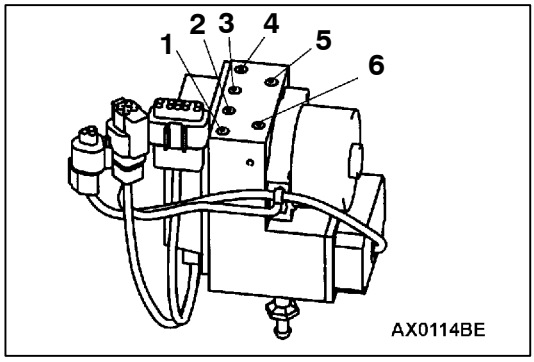
REMOVAL SERVICE POINT

Caution
The motor relay may become hot immediately after driving, so take care when handling the motor relay.

HYDRAULIC UNIT

REMOVAL AND INSTALLATION

Refer to GROUP 35B of '97 GALANT Workshop Manual.



INSTALLATION SERVICE POINT

BRAKE PIPE INSTALLATION

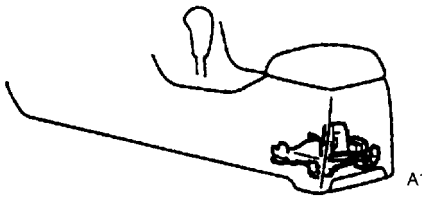
Install the brake pipes to the hydraulic unit as shown in the illustration.

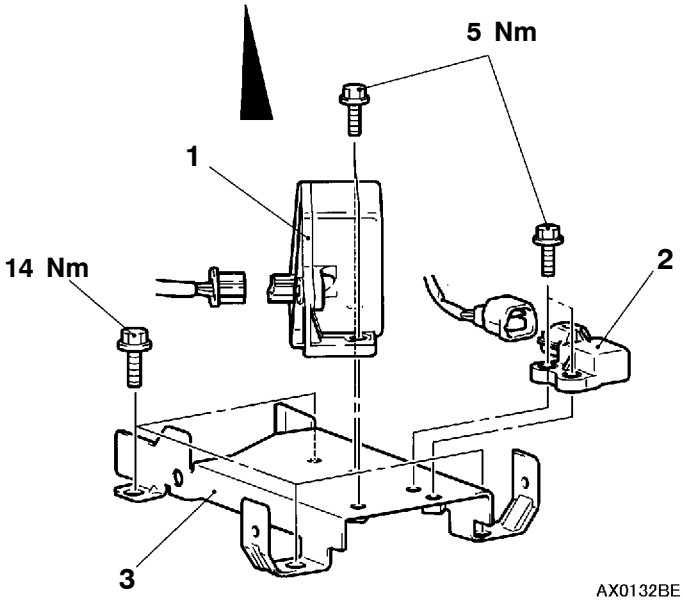
1. From master cylinder (primary)
2. To front brake (L.H.)
3. To proportioning valve (rear R.H. brake)
4. To proportioning valve (rear L.H. brake)
5. To front brake (R.H.)
6. From master cylinder (secondary)

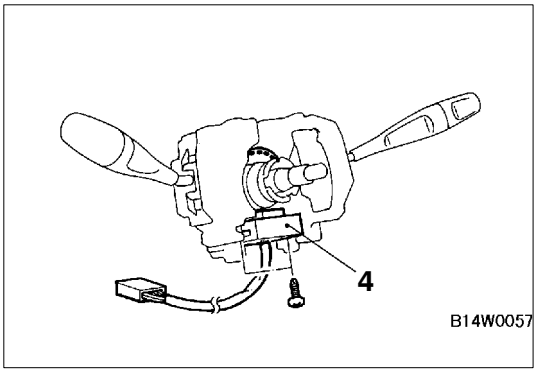
SENSORS

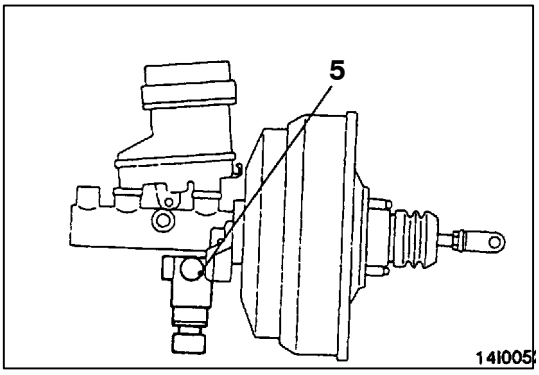
REMOVAL AND INSTALLATION

Caution
(1) SRS: Before removal of air bag module and clock spring, refer to '97 GALANT Workshop Manual GROUP 52B - Service Precautions and Air Bag Module and Clock Spring.
(2) Do not drop the sensors or subject them to shocks.









G sensor and yaw rate sensor removal steps
- Floor console

1. Yaw rate sensor
2. Lateral G sensor
3. G sensor bracket

◀A▶

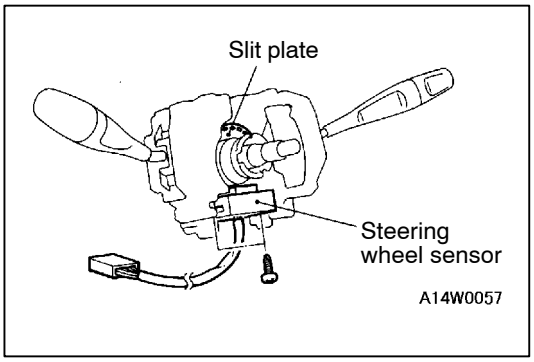
Steering wheel sensor removal steps
- Steering wheel and column cover (Refer to '97 GALANT Workshop Manual - GROUP 37A - Steering Wheel and Shaft.)

4. Steering wheel sensor

Pressure sensor removal steps

5. Master cylinder pressure sensor (Refer to P. 35C-49.)

NOTE
Refer to GROUP 35B of the '97 GALANT Workshop Manual for the wheel speed sensors.

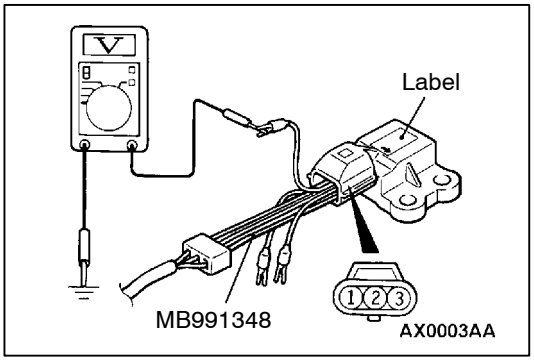


REMOVAL SERVICE POINT

◀A▶ STEERING WHEEL SENSOR REMOVAL

Caution

1. **Do not adhere any dust or grease, etc. to the steering wheel sensor, which has a photo coupler in it.**
2. **Do not bend the slit plate of the column switch nor adhere any grease etc. to it.**

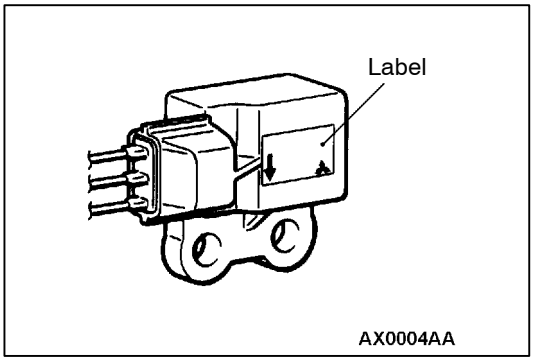


CHECKS

LATERAL G SENSOR CHECK

1. Disconnect the G sensor connector and connect the special tool in between the connectors.
2. Turn the ignition switch to ON and take a reading of the output voltage between terminal No. 2 and body earth.

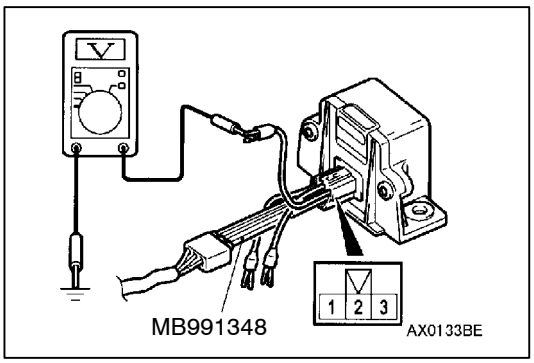
   Standard value: 2.4 - 2.6 V



3. With the special tool connected, hold the sensor so that the label is facing sideways as shown in the illustration, and take a reading of the output voltage between terminal No. 2 and body earth.

   Standard value: 3.3 - 3.7 V

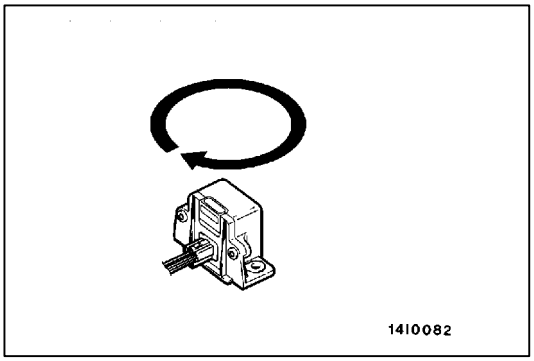
4. If the voltage is outside the standard value, check that there are no problems in the power supply line and earth, and then replace the sensor.



YAW RATE SENSOR CHECK

1. Disconnect the yaw rate sensor connector and connect the special tool in between the connectors.
2. Turn the ignition switch to ON and take a reading of the output voltage between terminal No. 3 and body earth.

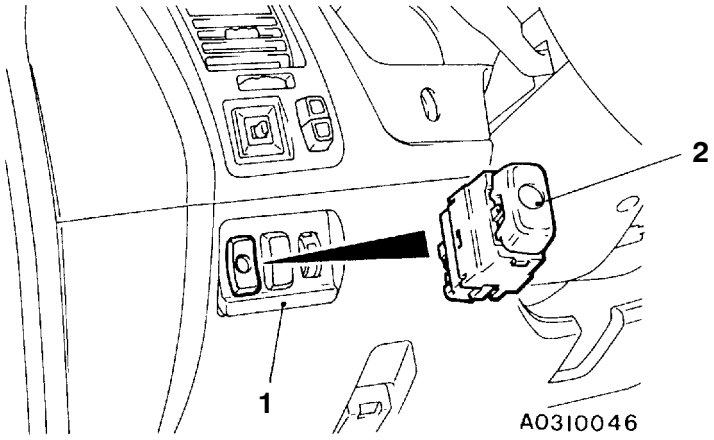
   Standard value: 2.4 - 2.6 V



3. With the special tool connected, remove the yaw rate sensor from the G sensor bracket and take a reading of the output voltage between terminal No. 3 and body earth while turning the sensor to the left and right.
   <Turned to the left> Voltage drops
   <Turned to the right> Voltage rises
4. If the voltage does not drop when the sensor is turned to the left and rise when it is turned to the right, check that there are no problems in the power supply line and earth, and then replace the sensor.

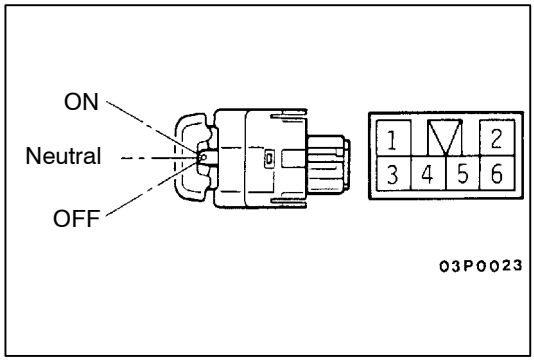
ASC SWITCH

REMOVAL AND INSTALLATION



Removal steps

1. Switch bezel
2. ASC switch



INSPECTION

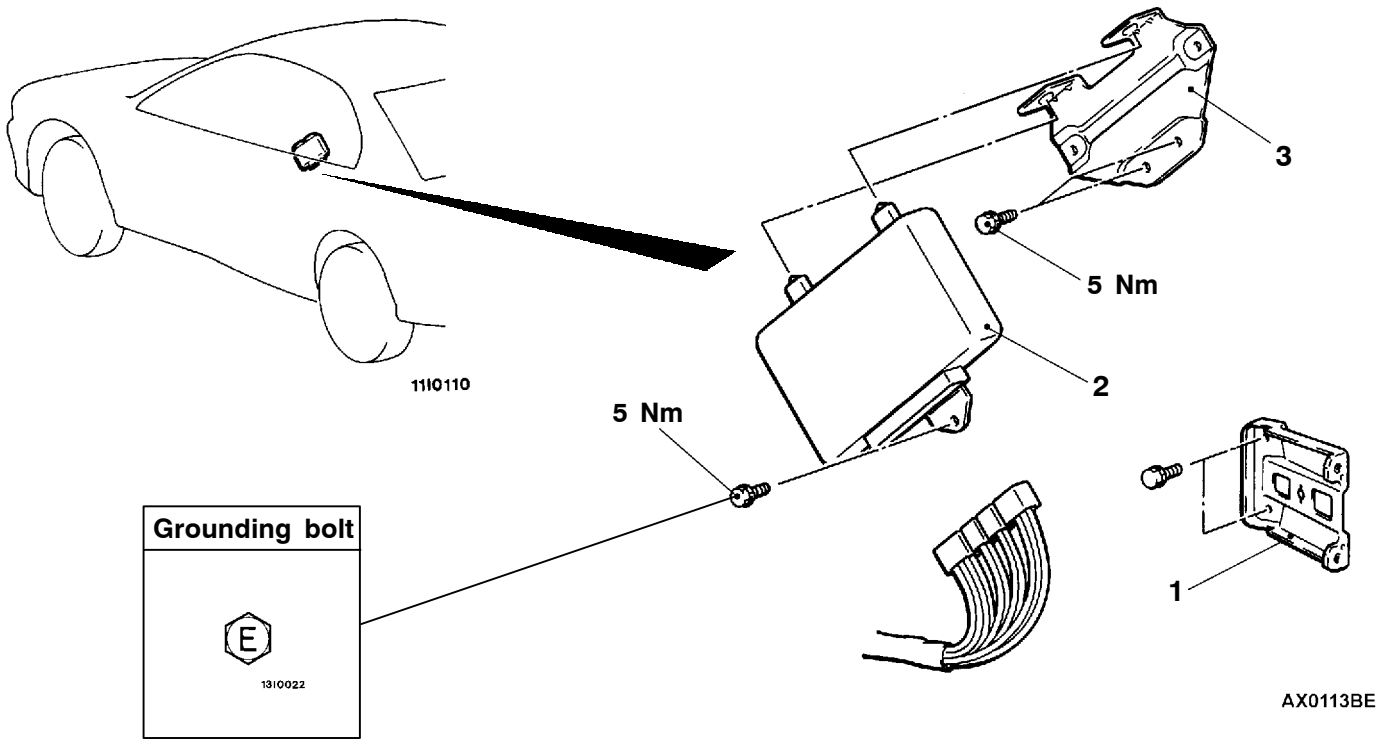
ASC SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1	2	3	6	4	-	5
ON			○	○			
Neutral					○	○	○
OFF		○	○				

ASC-ECU

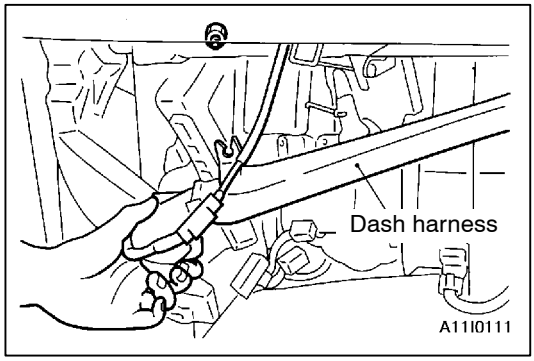
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations
Glove box, glove box frame, side cover and corner panel removal and installation



Removal steps

1. Instrument panel lower passenger-side bracket
◀A▶ 2. ASC-ECU
3. Lower bracket



REMOVAL SERVICE POINT

◀A▶ ASC-ECU REMOVAL

Loosen the dash harness mounting nut, lower the dash harness until the ASC-ECU can be removed, and then remove the ASC-ECU.

CHECKS

Refer to P.35C-41.

GROUP 37A
STEERING

GENERAL

OUTLINE OF CHANGES

The following service procedures have been revised due to the change in the crossmember. <2500>
- POWER STEERING GEAR BOX REMOVAL AND INSTALLATION
- POWER STEERING HOSES REMOVAL AND INSTALLATION

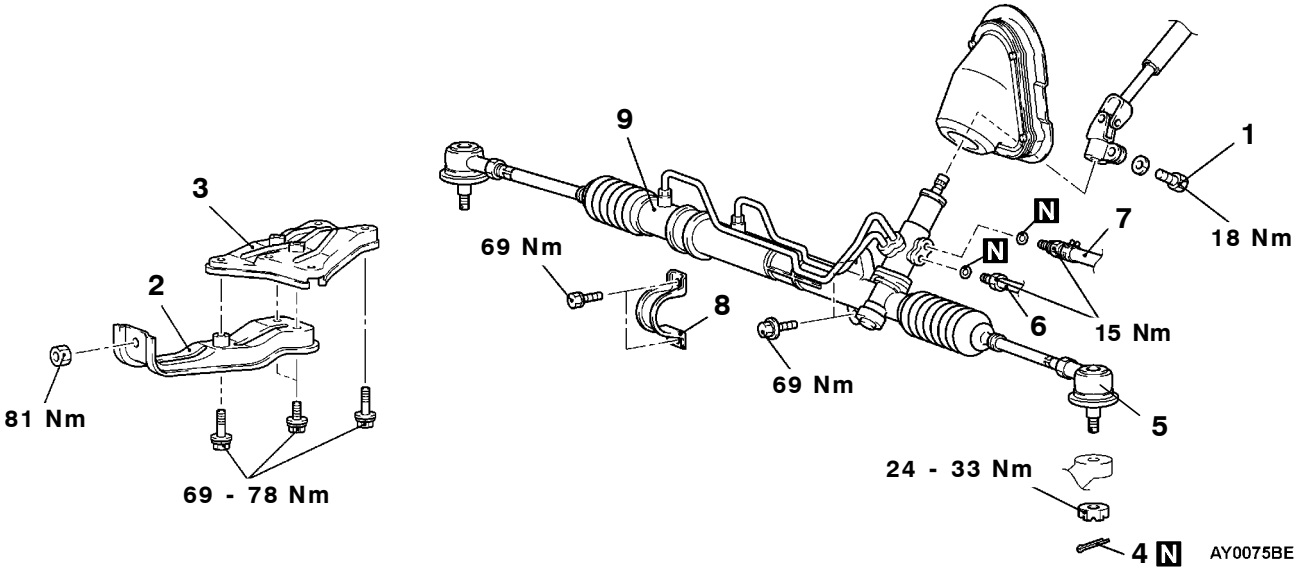
POWER STEERING GEAR BOX <2500>

REMOVAL AND INSTALLATION

CAUTION: SRS
For vehicles with SRS, before removal of steering gear box, centre front wheels and remove ignition key. Failure to do so may damage SRS clock spring and render SRS system inoperative, risking serious driver injury.

Pre-removal Operation
- Power Steering Fluid Draining
- Center Member Removal
- Front Exhaust Pipe Removal
- Stabilizer Bar Removal (Refer to GROUP 33A.)

Post-installation Operation
- Check the Dust Cover for Cracks or Damage by Pushing it with Finger.
- Stabilizer Bar Installation (Refer to GROUP 33A.)
- Front Exhaust Pipe Installation
- Center Member Installation
- Power Steering Fluid Supplying
- Power Steering Fluid Line Bleeding
- Check Steering Wheel Position with Wheels Straight Ahead.
- Front Wheel Alignment Adjustment



Removal steps

1. Steering shaft assembly and gear box connecting bolt
2. No.2 stay
3. No.1 stay
4. Split pin

◀A▶ 5. Tie rod end and knuckle connection

6. Pressure tube connection
7. Return tube connection
8. Cylinder clamp

◀B▶ 9. Gear box assembly

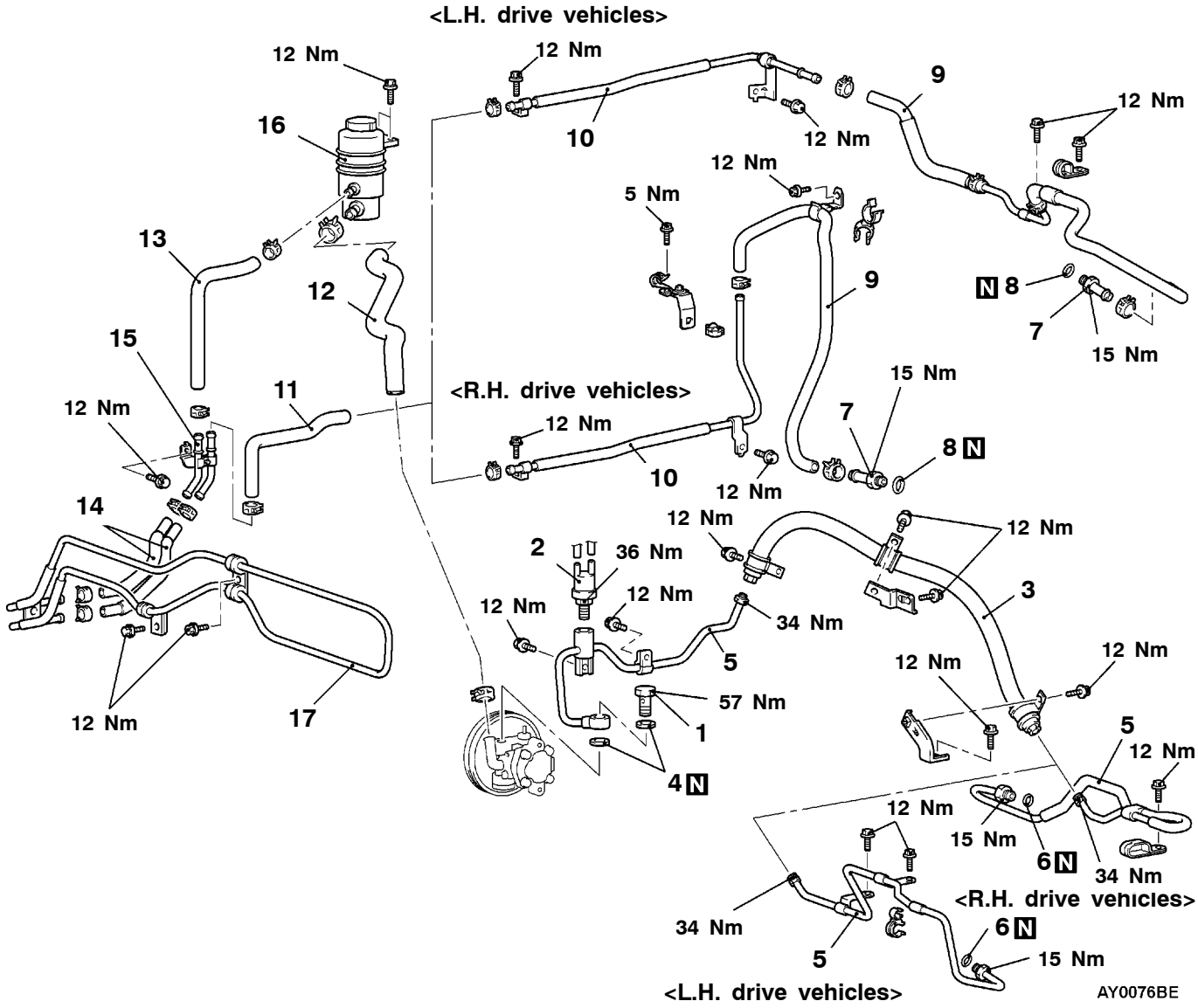
NOTE
For service points, inspection, and disassembly and reassembly, refer to the Basic Manual.

POWER STEERING HOSES <2500>

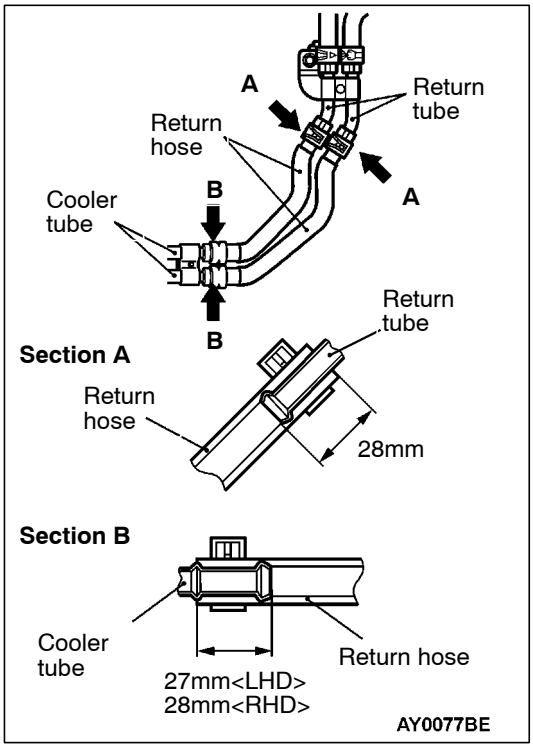
REMOVAL AND INSTALLATION

Pre-removal Operation
- Power Steering Fluid Draining
- Front Bumper Removal

Post-installation Operation
- Front Bumper Installation
- Power Steering Fluid Supplying
- Power Steering Fluid Line Bleeding



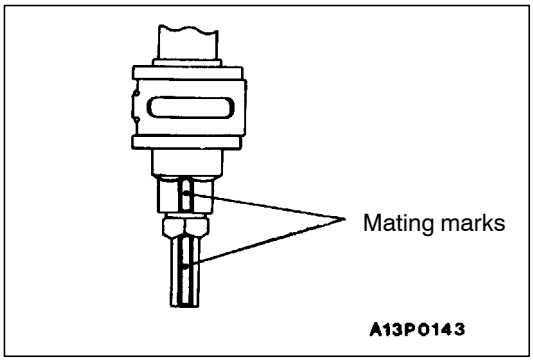
1. Eye bolt
2. Air control valve
▶B◀ 3. Pressure hose
4. Gasket
5. Pressure tube
6. O-ring
7. Return tube
8. O-ring
9. Return hose
10. Return tube
11. Return hose
12. Suction hose
13. Return hose
▶A◀ 14. Return hose
▶A◀ 15. Return tube
16. Oil reservoir
▶A◀ 17. Cooler tube



INSTALLATION SERVICE POINTS

▶A◀ COOLER TUBE/RETURN TUBE/RETURN HOSE INSTALLATION

Install the cooler tube, return tube, and return hoses as shown in the illustration.



▶B◀ PRESSURE HOSE INSTALLATION

Align the marks on the pressure hose and pressure pipe, and install the pressure hose.

GROUP 42
BODY

GENERAL

OUTLINE OF CHANGE

The following service specifications of the trunk lid hinge spring have been added to correspond to the addition of a rear spoiler <sedan>.

TRUNK LID <Sedan>

SERVICE SPECIFICATIONS

Equipment	Length of trunk lid hinge spring
Vehicles without rear spoiler	180 mm
Vehicles with rear spoiler	228 mm

EXTERIOR

CONTENTS

GENERAL 2
Outline of Changes 2
ADHESIVES 2
SPECIAL TOOL 2
FRONT BUMPER 3
AERO PARTS 5
MARKS 7
DOOR MIRRORS 9

GENERAL

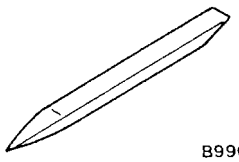
OUTLINE OF CHANGES

- The following service procedures have been added to correspond to the addition of an aero-type front bumper.
- Due to the installation of rear spoiler <Sedan> and tailgate deflector <Wagon>, the service procedures have been added.
- Due to the installation of the large side sill cover, the service procedures have been added.
- Due to the installation of the side decal and grade mark, the service procedures have been added.
- Due to the installation of the door mirrors with electric folding function and heated printing, the inspection procedures have been added.

ADHESIVES

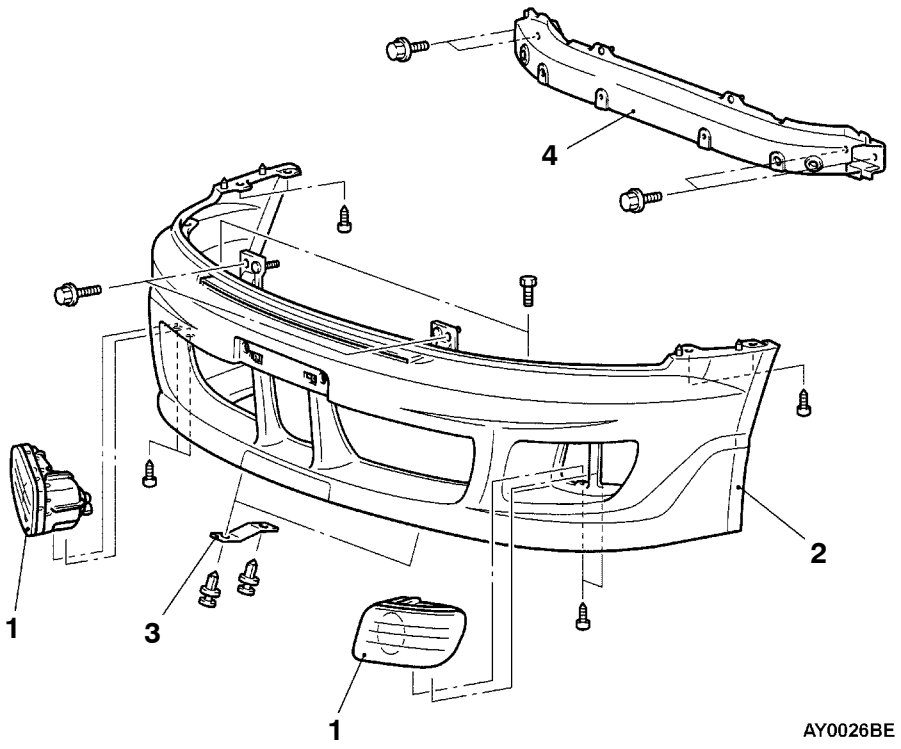
Items	Specified adhesive
Tailgate deflector	Adhesive tape: Double-sided tape (8 mm width and 0.8 mm thickness)
Side sill cover	Adhesive tape: Double-sided tape (4 mm width and 0.8 mm thickness)

SPECIAL TOOL

Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Front bumper, rear spoiler <Sedan>, tailgate deflector <Wagon> and side sill cover removal

FRONT BUMPER

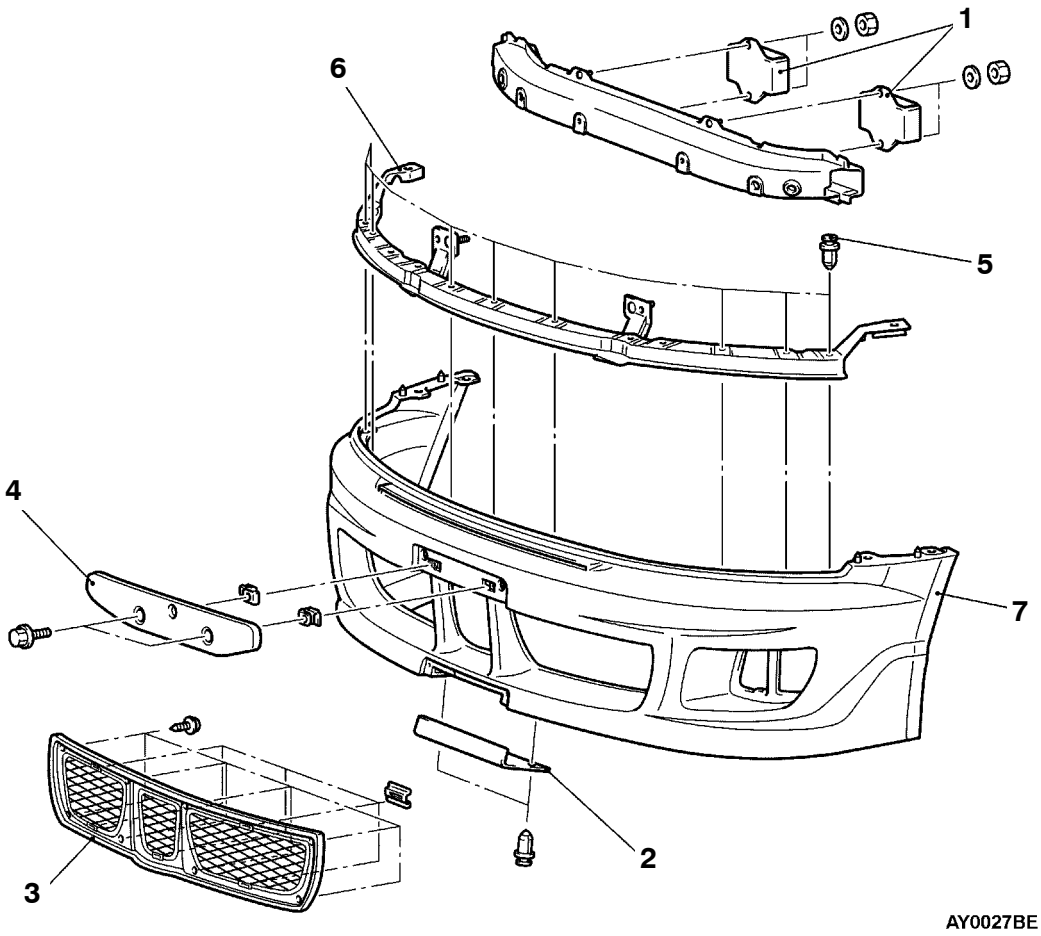
REMOVAL AND INSTALLATION



Removal Steps

1. Fog lamp assembly
2. Front bumper assembly
3. Front bumper lower bracket
4. Front bumper reinforcement assembly

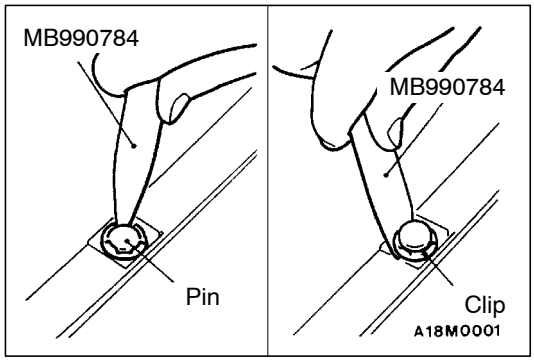
DISASSEMBLY AND REASSEMBLY



Disassembly Steps

1. Dynamic damper assembly <Vehicles with 4G64-GDI engine>
2. Front bumper lower cover
3. Under grille
4. Licence plate bracket
5. Clip
6. Front bumper upper reinforcement
7. Front bumper face

◀A▶



DISASSEMBLY SERVICE POINT

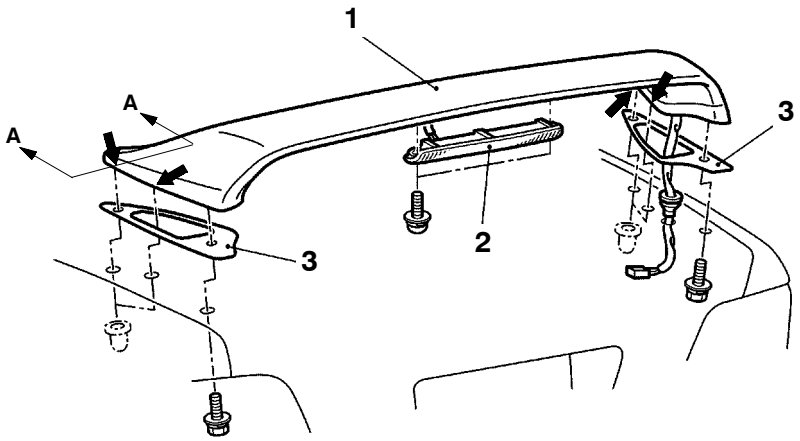
◀A▶ REMOVAL OF CLIP

1. Use the special tool to pull up the center pin in the clop.
2. Remove the clip.

AERO PARTS

REMOVAL AND INSTALLATION

<Sedan>



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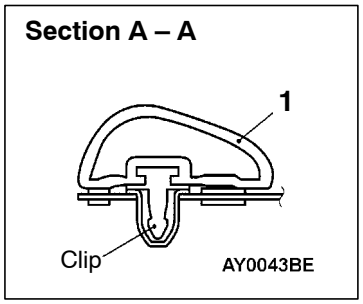
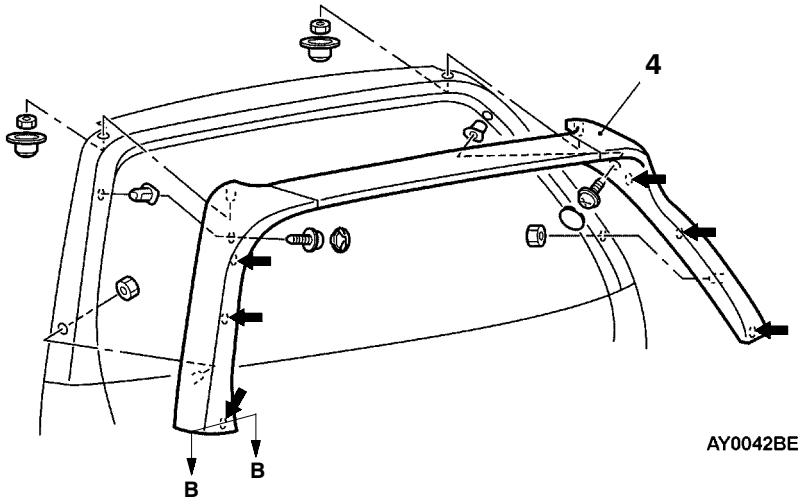


<Wagon>



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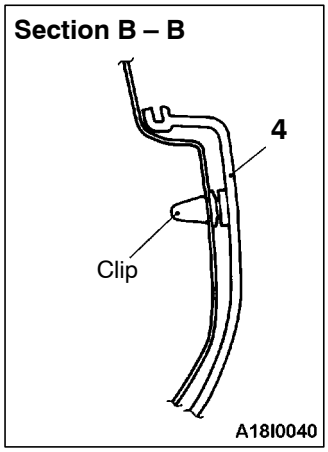
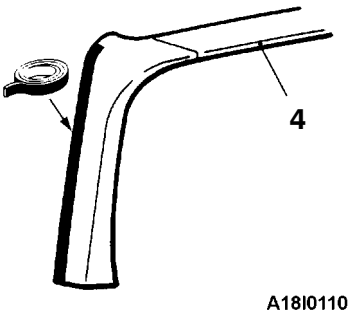


NOTE
⬅ : Clips positions



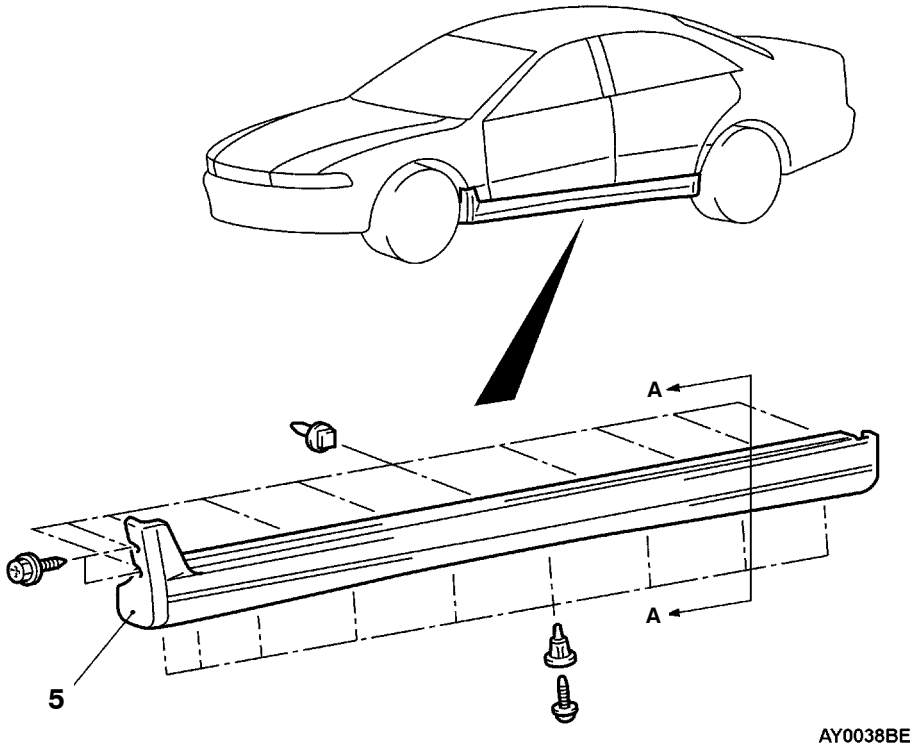
Adhesive tape: double-sided tape (8 mm width and 0.8 mm thickness)

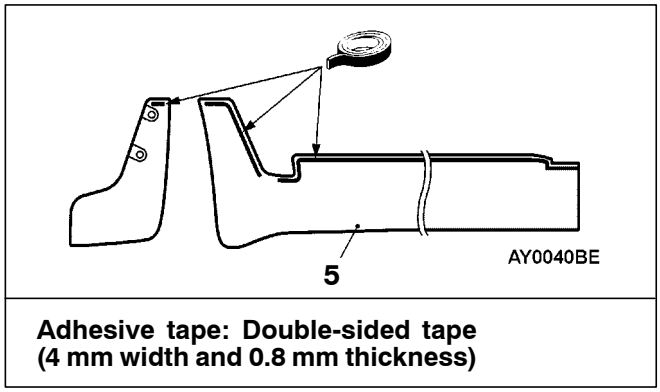
Removal Steps

1. Rear spoiler assembly
2. High mounted stop lamp assembly (Refer to GROUP 54A.)

◀A▶ ▶A◀

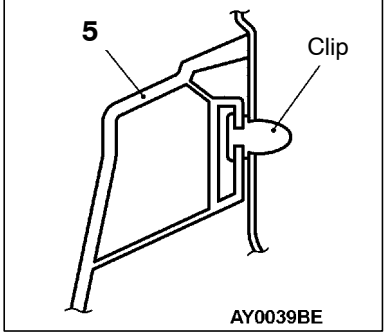
3. Packing
   - Side tailgate trim <Wagon>
4. Tailgate deflector assembly





Adhesive tape: Double-sided tape (4 mm width and 0.8 mm thickness)

Section A – A



Removal Step

◀A▶ ▶A◀ 5. Side sill cover

REMOVAL SERVICE POINT

◀A▶ REMOVAL OF TAILGATE DEFLECTOR ASSEMBLY AND SIDE SILL COVER

The same procedures as that of removal of side protect moulding are applied. [Refer to '97 GALANT Workshop Manual GROUP 51 – Mouldings.]

INSTALLATION SERVICE POINT

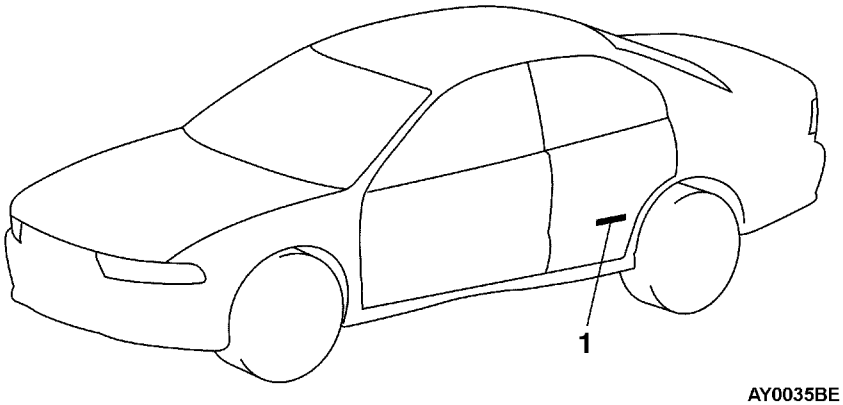
▶A◀ INSTALLATION OF TAILGATE DEFLECTOR ASSEMBLY AND SIDE SILL COVER

The same procedures as the installation of side protect moulding are applied. [Refer to '97 GALANT Workshop Manual GROUP 51 – Mouldings.]

MARKS

REMOVAL AND INSTALLATION

<Sedan>



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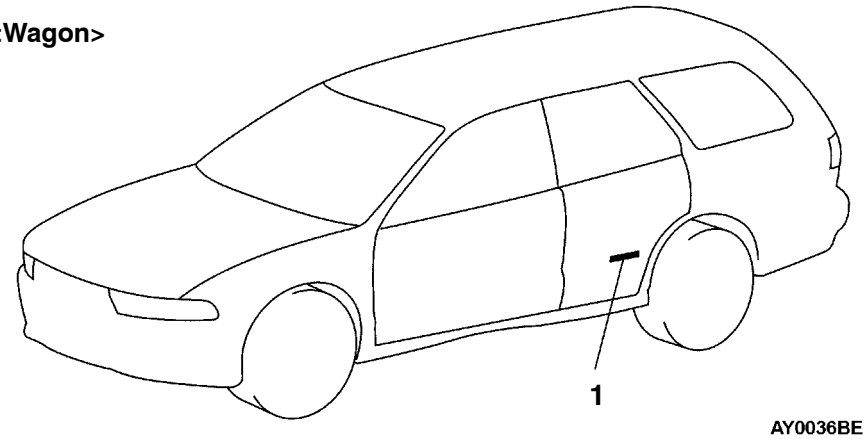
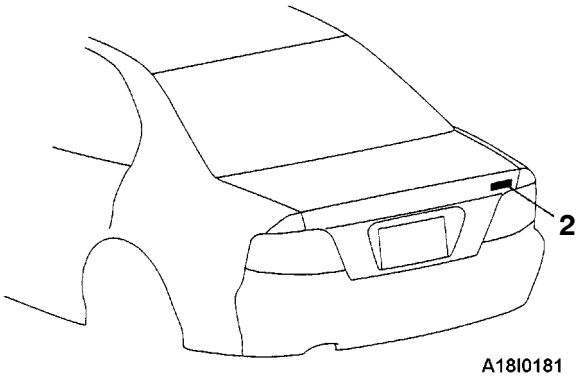
<Wagon>



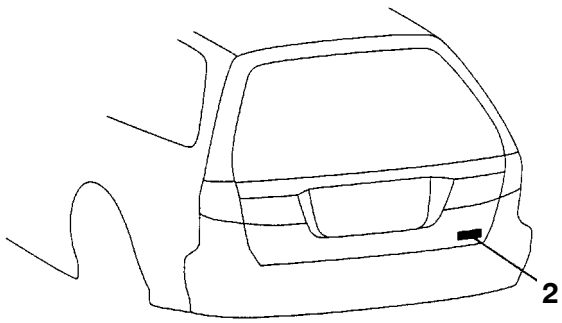
AY0036BE

<Sedan>



A18I0181

<Wagon>



B18I0182

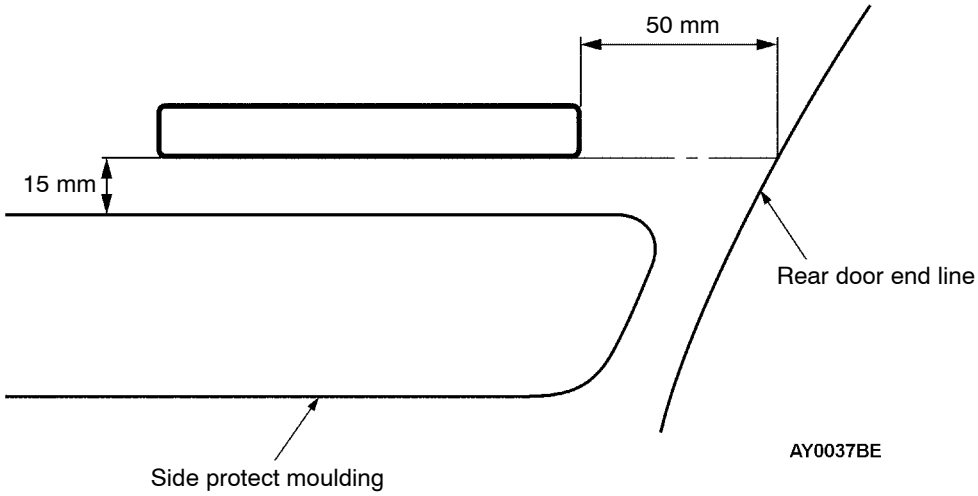
▶A◀ 1. Side decal
▶A◀ 2. Grade mark

INSTALLATION SERVICE POINT

▶A◀ INSTALLATION OF MARKS

1. APPLICATION POSITION

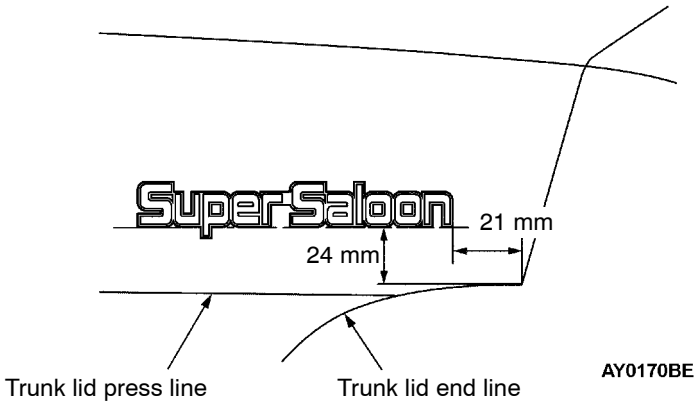
(1) Side decal



NOTE
The illustration shown above indicates the left side.
The right side is symmetrical.

(2) Grade mark

<Sedan>



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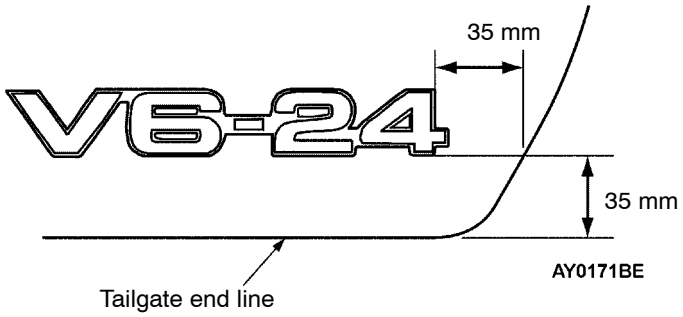
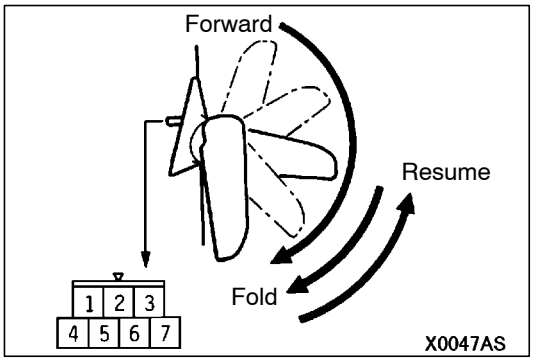


2. INSTALLATION PROCEDURE

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

Caution
When attaching the marks, the surrounding temperature should be 20 - 38°C and the air should be completely free from dust.
If the surrounding temperature is lower than 20°C, the marks and the places on the body where the marks are to be attached should be heated to 20 - 38°C. Make sure not to let air bubbles into the tape when pasting marks.

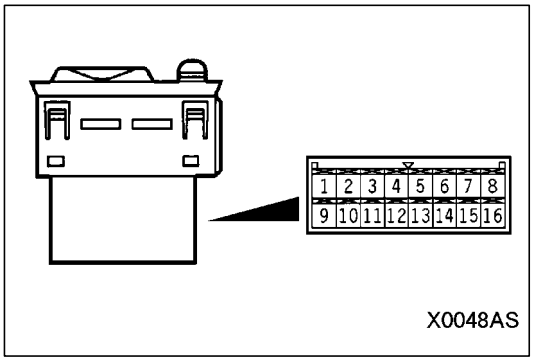


DOOR MIRRORS

INSPECTION

MOTOR-DRIVEN REMOTE CONTROLLED MIRROR OPERATION CHECK

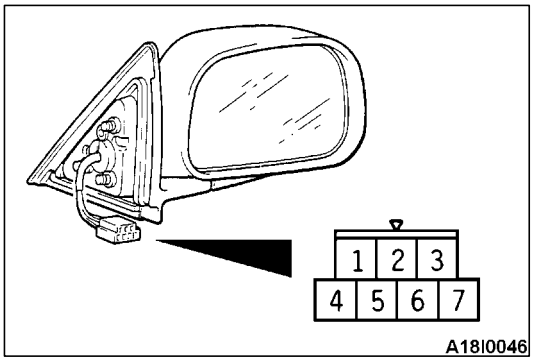
Battery connection terminal					Direction of operation
2	3	5	6	7	
		⊖		⊕	UP
		⊕		⊖	DOWN
		⊕	⊖		LEFT
		⊖	⊕		RIGHT
⊕	⊖				Resume or Forward → Fold position
⊖	⊕				Fold → Resume position



MOTOR-DRIVEN REMOTE CONTROLLED MIRROR SWITCH CONTINUITY CHEK

Switch	Switch position	Terminal No.																
		Left side					Right side					1	2	8	11	7		10
		1	4	5	8	16	1	3	5	6	8							
Mirror adjustment switch	Up	○		○	○	○	○		○	○	○							
	Down	○		○	○	○	○			○	○							
	Left	○	○		○		○	○			○							
	Right		○	○	○			○	○		○							
Mirror folding switch	Resume											○	○	○	○			
	Fold											○	○					
Illumination																○	ILL	○

NOTE
Since a mirror folding switch adopts a holding type switch with3positions(Resume, Neutral, Fold),the position will not automatically return to the Neutral position after pressing the resume switch or fold switch.



THERMAL PRINTED WIRE FUNCTION CHECK

Check that there is continuity between terminals No.1 and No.4.

GROUP 54A
CHASSIS ELECTRICAL

GENERAL

OUTLINE OF CHANGES

- As the front bumper was changed, the front fog lamp service procedures have been revised.
- As rear spoiler <sedan> was added, the high mounted stop lamp service procedures have been added.

FOG LAMPS

SERVICE SPECIFICATIONS

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

ON-VEHICLE SERVICE

FOG LAMP AIMING SERVICE ADJUSTMENT PROCEDURES <VEHICLE WITH LARGE BUMPER>

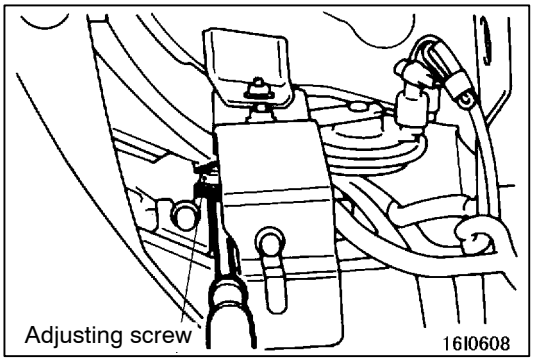
NOTE

The service adjustment procedures for the vehicle with the standard bumper are the same as the existing one.
After setting the vehicle to the following condition, adjust the fog lamp aiming.

- Check that the tyre inflation pressure is at the value indicated on the tyre pressure labels.
- Set the vehicle to the unladen condition and park it on a level surface.
- Have a single person (approximately 55 kg) sit in the driver's seat.
- Run the engine at a speed of 2,000 r/min to fully charge the battery.

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

Standard value: Illuminates to within 40 metres



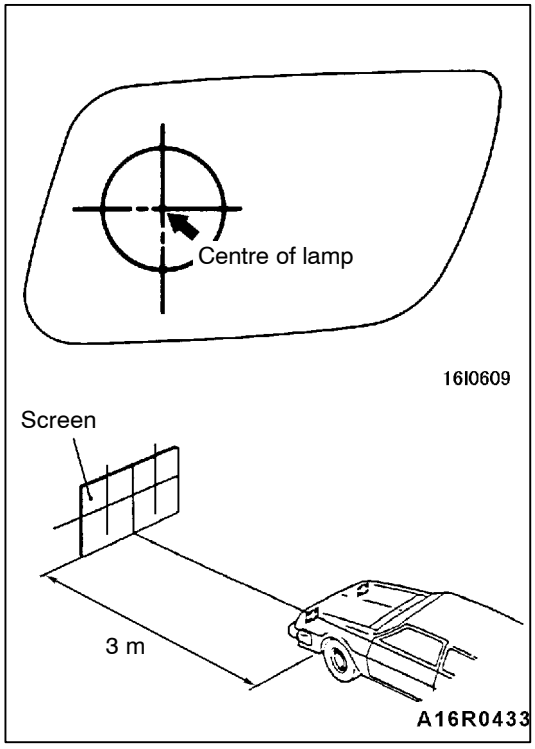
If the value is outside the standard value range, adjust using the adjusting screw.

NOTE

Horizontal adjustment is not possible.

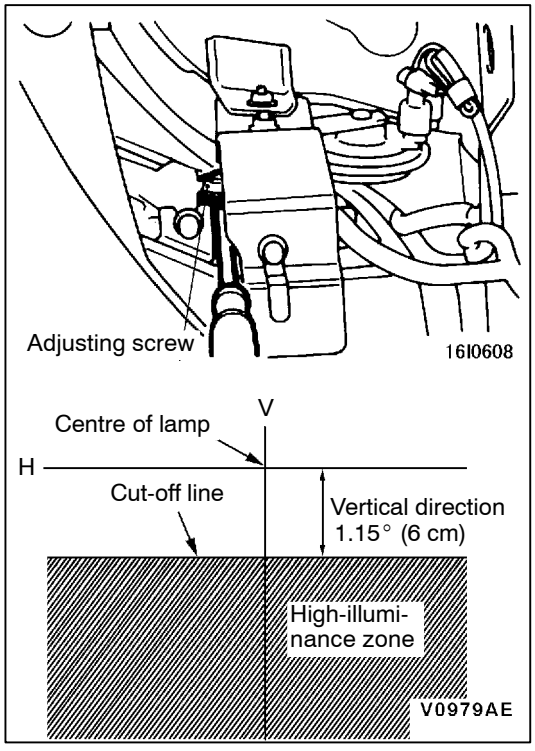
Caution

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



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

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



3. Turn the adjusting screw to adjust so that the position of the cut-off line (light/dark border line) is the standard value.

   NOTE

   Horizontal adjustment is not possible.

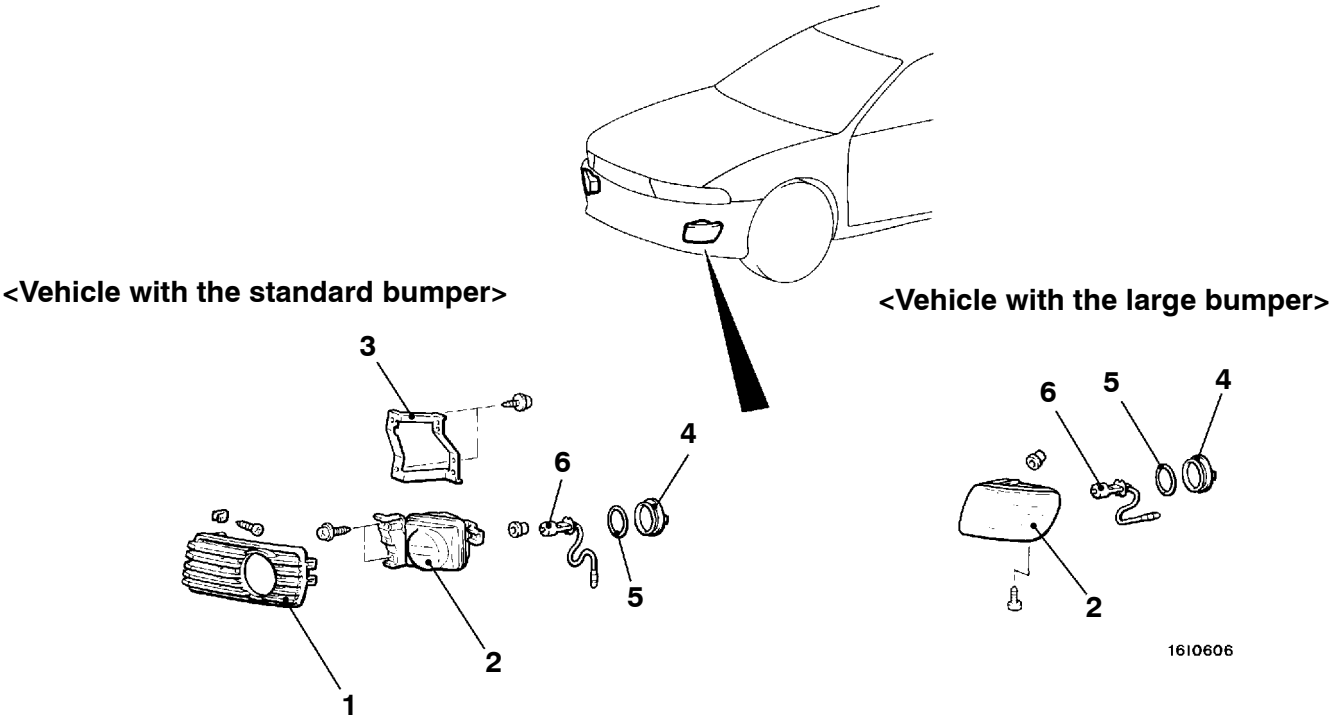
   Caution

   (1) For the fog lamp which is not being measured, disconnect that fog lamp's connector if possible so that it does not illuminate while carrying out the adjustment. Furthermore, make sure that the light axis does not get shifted when re-connecting the connector.

   (2) The adjustment should always be completed by turning the adjusting screws in the tightening direction.

FOG LAMPS

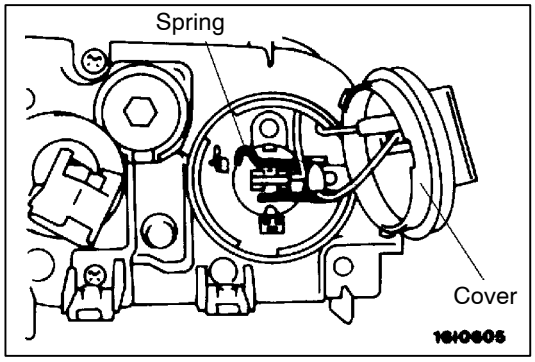
REMOVAL AND INSTALLATION



Removal steps

1. Fog lamp bezel
2. Fog lamp
3. Fog lamp bracket
4. Cover
5. Packing
6. Bulb

◀A▶



REMOVAL SERVICE POINTS

◀A▶BULB REMOVAL

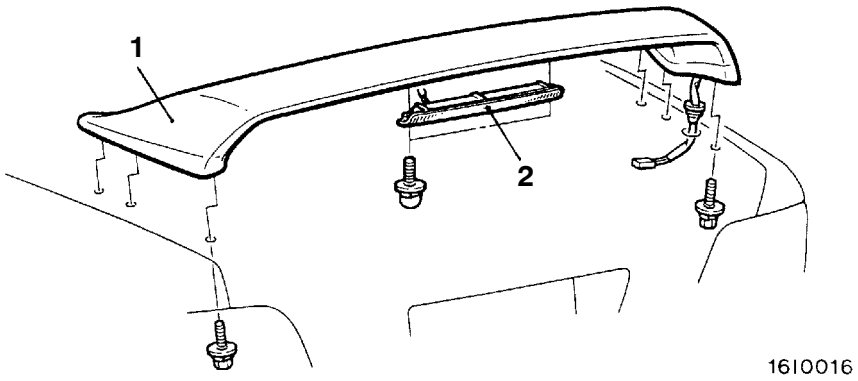
Remove the bulb retainer spring, and then take out the bulb.

Caution

1. **Only the specified genuine bulbs should be used.**
2. **Do not touch the surface of the bulb with bare hands or with dirty gloves. If the surface (glass section) should become dirty, clean it immediately with alcohol or thinner, and let it dry thoroughly before installing it.**
3. **Make sure to fit the cover securely to avoid improper installation, which could cause cloudiness on the lens or water intrusion into the lamp unit.**

HIGH-MOUNTED STOP LAMP <VEHICLE WITH REAR SPOILER>

REMOVAL AND INSTALLATION



Removal steps

1. Rear spoiler
2. High-mounted stop lamp