CARISMA

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	
	PYGE95E1
	PYGE95E1-A (Supplement)
WORKSHOP MANUAL	
ENGINE GROUP	PWEE□□□□ (Looseleaf edition)
CHASSIS GROUP	PWDE9502
	PWDE9502-A (Supplement)
ELECTRICAL WIRING	PHDE9501
	PHDE9501-A (Supplement)
	PHDE9501-B (Supplement)
BODY REPAIR MANUAL	PBGE95E1
	PBGE95E1-A (Supplement)
PARTS CATALOGUE	N606C006D□

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

MITSUBISHI MOTOR SALES
Europe B.V.

WARNING!

(1) Improper service or maintenance of any component of the SRS and seat belt with pre-tensioner, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag and seat belt with pre-tensioner) or to the driver and passenger (from rendering the SRS inoperative).

(2) SRS components and seat belt with pre-tensioner should not be subjected to heat, so remove the SRS-ECU, air bag module (driver's side and front passenger's side), clock spring, side impact sensor, front seat assembly (side air bag module) and seat belt with pre-tensioner before drying or baking the vehicle after painting.
SRS-ECU, air bag module, clock spring and side impact sensor: 93°C or more
Seat belt with pre-tensioner: 90°C or more

(3) Service or maintenance of any SRS component and seat belt with pre-tensioner or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(4) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS), before beginning any service or maintenance of any component of the SRS and seat belt with pre-tensioner or any SRS-related component.

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

GENERAL

CONTENTS

HOW TO USE THIS MANUAL

MODEL INDICATIONS

The following abbreviations are used in this manual for classification of model types.
1600: Indicates models equipped with the 1,597 mℓ <4G92> petrol engine.
1800: Indicates models equipped with the 1,834 mℓ <4G93> petrol engine.
1900D: Indicates models equipped with the 1,870 mℓ <F8QT> diesel engine.
MPI: Indicates the multipoint injection, or engines equipped with the multipoint injection.
SOHC: Indicates an engine with the single overhead camshaft, or a model equipped with such an engine.
DOHC: Indicates an engine with the double overhead camshaft, or a model 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.
ECU: Indicates the electronic control unit.

VEHICLE IDENTIFICATION

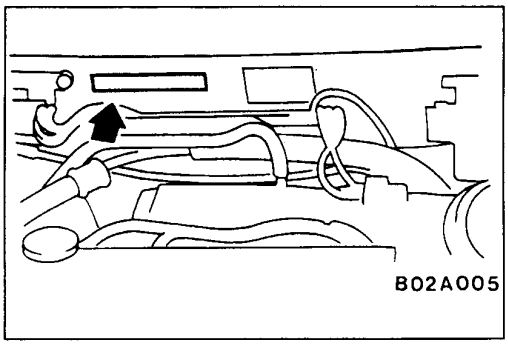
MODELS

<HATCHBACK>

Model code		Engine model	Transmission model	Fuel supply system
DA1A	LNDEL6/R6	4G92-SOHC (1,597 mℓ)	F5MR1 (2WD-5M/T)	MPI
	LRDEL6/R6		F4A41 (2WD-4A/T)	
	LNJEL6/R6		F5MR1 (2WD-5M/T)	
	LRJEL6/R6		F4A41 (2WD-4A/T)	
	LNDVL6/R6		F5MR1 (2WD-5M/T)	
	LRDVL6/R6		F4A41 (2WD-4A/T)	
	LNJVL6/R6		F5MR1 (2WD-5M/T)	
	LRJVL6/R6		F4A41 (2WD-4A/T)	
DA2A	LNJEL6/R6	4G93-SOHC (1,834 mℓ)	F5MR2 (2WD-5M/T)	
	LRJEL6/R6		F4A42 (2WD-4A/T)	
	LNPEL6/R6		F5MR2 (2WD-5M/T)	
	LRPEL6/R6		F4A42 (2WD-4A/T)	
DA4A	LNDFL6/R6	F8QT (1,870 mℓ)	F5MR3 (2WD-5M/T)	Fuel injection pump
	LNJFL6/R6			
	LNPFL6/R6			

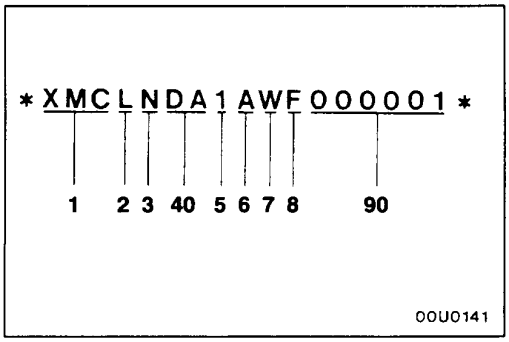
<SEDAN>

Model code		Engine model	Transmission model	Fuel supply system
DA1A	SNDEL6/R6	4G92-SOHC (1,597 mℓ)	F5MR1 (2WD-5M/T)	MPI
	SRDEL6/R6		F4A41 (2WD-4A/T)	
	SNJEL6/R6		F5MR1 (2WD-5M/T)	
	SRJEL6/R6		F4A41 (2WD-4A/T)	
	SNDVL6/R6		F5MR1 (2WD-5M/T)	
	SRDVL6/R6		F4A41 (2WD-4A/T)	
	SNJVL6/R6		F5MR1 (2WD-5M/T)	
	SRJVL6/R6		F4A41 (2WD-4A/T)	
	SNJVL6B		F5MR1 (2WD-5M/T)	
	SRJVL6B		F4A41 (2WD-4A/T)	
DA2A	SNJEL6/R6	4G93-SOHC (1,834 mℓ)	F5MR2 (2WD-5M/T)	
	SRJEL6/R6		F4A42 (2WD-4A/T)	
	SNPEL6/R6		F5MR2 (2WD-5M/T)	
	SRPEL6/R6		F4A42 (2WD-4A/T)	
DA4A	SNDFL6/R6	F8QT (1,870 mℓ)	F5MR3 (2WD-5M/T)	Fuel injection pump
	SNJFL6/R6			
	SNPFL6/R6			



CHASSIS NUMBER

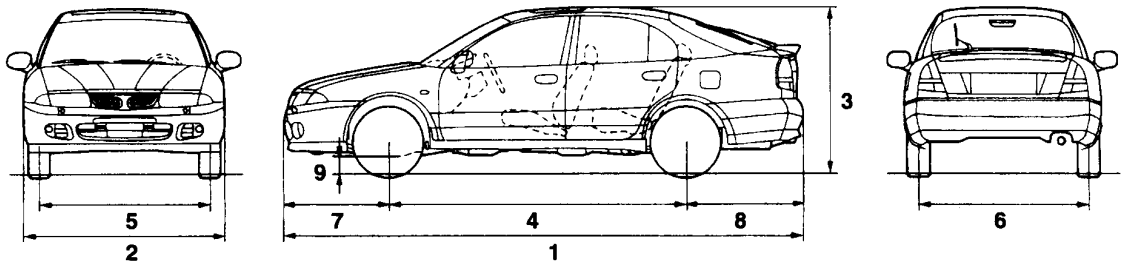
The chassis number is stamped on the toeboard inside the engine compartment.



No.	Items		Contents
1	Steering wheel location	XMC	Left hand drive
		XMD	Right hand drive
2	Body style	S	4-door sedan
		L	5-door hatchback
3	Transmission type	N	5-speed manual transmission
		R	4-speed automatic transmission
4	Vehicle line	DA	CARISMA
5	Development order	1	1,597 mℓ petrol engine
		2	1,834 mℓ petrol engine
		4	1,870 mℓ diesel engine
6	Sort	A	Passenger car
7	Model year	W	1998
8	Factory code	F	Netherlands Car B.V.
9	Serial number	–	–

MAJOR SPECIFICATIONS

HATCHBACK



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<DA1A>

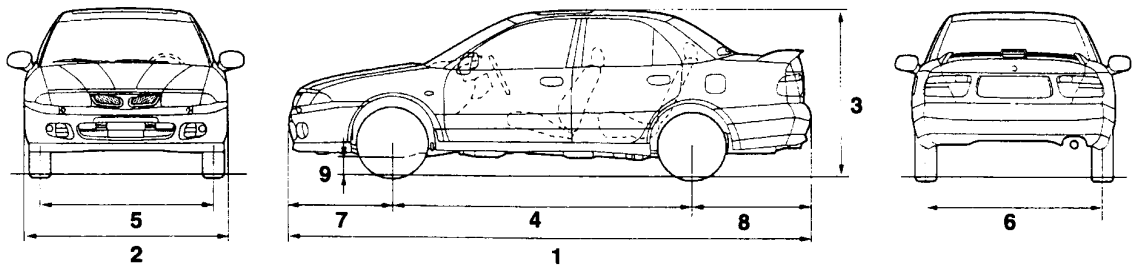
Items			DA1A LNDEL6, LNDER6	DA1A LRDEL6, LRDER6	DA1A LNJEL6, LNJER6	DA1A LRJEL6, LRJER6	DA1A LNDVL6, LNDVR6	DA1A LRDVL6, LRDVR6	DA1A LNJVL6, LNJVR6	DA1A LRJVL6, LRJVR6
Vehicle dimensions mm	Overall length	1	4,435	4,435	4,435	4,435	4,435	4,435	4,435	4,435
	Overall width	2	1,710	1,710	1,710	1,710	1,710	1,710	1,710	1,710
	Overall height (unladen)	3	1,405	1,405	1,405	1,405	1,405	1,405	1,405	1,405
	Wheel-base	4	2,550	2,550	2,550	2,550	2,550	2,550	2,550	2,550
	Track-front	5	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455
	Track-rear	6	1,475	1,475	1,475	1,475	1,475	1,475	1,475	1,475
	Overhang-front	7	880	880	880	880	880	880	880	880
	Overhang-rear	8	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005
	Ground clearance (unladen)	9	155	150	155	150	155	150	155	150
Vehicle weight kg	Kerb weight		1,105	1,135	1,110	1,140	1,105	1,135	1,110	1,140
	Max. gross vehicle weight rating		1,630	1,660	1,630	1,660	1,630	1,660	1,630	1,660
	Max. axle weight rating-front		900	900	900	900	900	900	900	900
	Max. axle weight rating-rear		865	865	865	865	865	865	865	865
Seating capacity			5							

Items		DA1A LNDEL6, LNDER6	DA1A LRDEL6, LRDER6	DA1A LNJEL6, LNJER6	DA1A LRJEL6, LRJER6	DA1A LNDVL6, LNDVR6	DA1A LRDVL6, LRDVR6	DA1A LNJVL6, LNJVR6	DA1A LRJVL6, LRJVR6
Engine	Model No.	4G92							
	Total displacement mℓ	1,597							
Transmission	Model No.	F5MR1	F4A41	F5MR1	F4A41	F5MR1	F4A41	F5MR1	F4A41
	Type	5-speed manual	4-speed automatic	5-speed manual	4-speed automatic	5-speed manual	4-speed automatic	5-speed manual	4-speed automatic
Fuel system	Fuel supply system	Electronic control multipoint fuel injection							

<DA2A, DA4A>

Items			DA2A LNJEL6, LNJER6	DA2A LRJEL6, LRJER6	DA2A LNPEL6, LNPER6	DA2A LRPEL6, LRPER6	DA4A LNDFL6, LNDFR6	DA4A LNJFL6, LNJFR6	DA4A LNPFL6, LNPFR6
Vehicle dimensions mm	Overall length	1	4,435	4,435	4,435	4,435	4,445	4,445	4,445
	Overall width	2	1,710	1,710	1,710	1,710	1,710	1,710	1,710
	Overall height (unladen)	3	1,405	1,405	1,405	1,405	1,405	1,405	1,405
	Wheelbase	4	2,550	2,550	2,550	2,550	2,550	2,550	2,550
	Track-front	5	1,455	1,455	1,455	1,455	1,455	1,455	1,455
	Track-rear	6	1,475	1,475	1,475	1,475	1,475	1,475	1,475
	Overhang-front	7	880	880	880	880	890	890	890
	Overhang-rear	8	1,005	1,005	1,005	1,005	1,005	1,005	1,005
	Ground clearance (unladen)	9	155	150	155	150	155	155	155
Vehicle weight kg	Kerb weight		1,130	1,160	1,135	1,165	1,155	1,165	1,170
	Max. gross vehicle weight rating		1,660	1,690	1,660	1,690	1,695	1,695	1,695
	Max. axle weight rating-front		900	900	900	900	900	900	900
	Max. axle weight rating-rear		875	875	875	875	870	870	870
Seating capacity			5						
Engine	Model No.		4G93				F8QT		
	Total displacement mℓ		1,834				1,870		
Transmission	Model No.		F5MR2	F4A42	F5MR2	F4A42	F5MR3		
	Type		5-speed manual	4-speed automatic	5-speed manual	4-speed automatic	5-speed manual		
Fuel system	Fuel supply system		Electronic control multipoint fuel injection				Fuel injection pump		

SEDAN



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<DA1A>

Items			DA1A SNDEL6, SNDER6	DA1A SRDEL6, SRDER6	DA1A SNJEL6, SNJER6	DA1A SRJEL6, SRJER6
Vehicle dimensions mm	Overall length	1	4,435	4,435	4,435	4,435
	Overall width	2	1,710	1,710	1,710	1,710
	Overall height (unladen)	3	1,405	1,405	1,405	1,405
	Wheelbase	4	2,550	2,550	2,550	2,550
	Track-front	5	1,455	1,455	1,455	1,455
	Trakt-rear	6	1,475	1,475	1,475	1,475
	Overhang-front	7	880	880	880	880
	Overhang-rear	8	1,005	1,005	1,005	1,005
	Ground clearance (unladen)	9	155	150	155	150
Vehicle weight kg	Kerb weight		1,080	1,110	1,090	1,120
	Max. gross vehicle weight rating		1,610	1,640	1,610	1,640
	Max. axle weight rating-front		900	900	900	900
	Max. axle weight rating-rear		840	840	840	840
Seating capacity			5			
Engine	Model No.		4G92			
	Total displacement mℓ		1,597			
Transmission	Model No.		F5MR1	F4A41	F5MR1	F4A41
	Type		5-speed manual	4-speed automatic	5-speed manual	4-speed automatic
Fuel system	Fuel supply system		Electronic control multipoint fuel injection			

Items			DA1A SNDVL6, SNDVR6	DA1A SRDVL6, SRDVR6	DA1A SNJVL6, SNJVR6	DA1A SRJVL6, SRJVR6	DA1A SNJVL6B	DA1A SRJVL6B
Vehicle dimensions mm	Overall length	1	4,435	4,435	4,435	4,435	4,435	4,435
	Overall width	2	1,710	1,710	1,710	1,710	1,710	1,710
	Overall height (unladen)	3	1,405	1,405	1,405	1,405	1,405	1,405
	Wheelbase	4	2,550	2,550	2,550	2,550	2,550	2,550
	Track-front	5	1,455	1,455	1,455	1,455	1,455	1,455
	Track-rear	6	1,475	1,475	1,475	1,475	1,475	1,475
	Overhang-front	7	880	880	880	880	880	880
	Overhang-rear	8	1,005	1,005	1,005	1,005	1,005	1,005
	Ground clearance (unladen)	9	155	150	155	150	155	150
Vehicle weight kg	Kerb weight		1,080	1,110	1,090	1,120	1,130	1,160
	Max. gross vehicle weight rating		1,610	1,640	1,610	1,640	1,610	1,640
	Max. axle weight rating-front		900	900	900	900	900	900
	Max. axle weight rating-rear		840	840	840	840	840	840
Seating capacity			5					
Engine	Model No.		4G92					
	Total displacement mℓ		1,597					
Transmission	Model No.		F5MR1	F4A41	F5MR1	F4A41	F5MR1	F4A41
	Type		5-speed manual	4-speed automatic	5-speed manual	4-speed automatic	5-speed manual	4-speed automatic
Fuel system	Fuel supply system		Electronic control multipoint fuel injection					

<DA2A, DA4A>

Items			DA2A SNJEL6, SNJER6	DA2A SRJEL6, SRJER6	DA2A SNPEL6, SNPER6	DA2A SRPEL6, SRPER6	DA4A SNDFL6, SNDFR6	DA4A SNJFL6, SNJFR6	DA4A SNPFL6, SNPFR6
Vehicle dimensions mm	Overall length	1	4,435	4,435	4,435	4,435	4,445	4,445	4,445
	Overall width	2	1,710	1,710	1,710	1,710	1,710	1,710	1,710
	Overall height (unladen)	3	1,405	1,405	1,405	1,405	1,405	1,405	1,405
	Wheelbase	4	2,550	2,550	2,550	2,550	2,550	2,550	2,550
	Track-front	5	1,455	1,455	1,455	1,455	1,455	1,455	1,455
	Track-rear	6	1,475	1,475	1,475	1,475	1,475	1,475	1,475
	Overhang-front	7	880	880	880	880	890	890	890
	Overhang-rear	8	1,005	1,005	1,005	1,005	1,005	1,005	1,005
	Ground clearance (unladen)	9	155	150	155	150	155	155	155
Vehicle weight kg	Kerb weight		1,110	1,140	1,115	1,145	1,130	1,145	1,150
	Max. gross vehicle weight rating		1,640	1,670	1,640	1,670	1,675	1,675	1,675
	Max. axle weight rating-front		900	900	900	900	900	900	900
	Max. axle weight rating-rear		850	850	850	850	845	845	845
Seating capacity			5						
Engine	Model No.		4G93				F8QT		
	Total displacement mℓ		1,834				1,870		
Transmission	Model No.		F5MR2	F4A42	F5MR2	F4A42	F5MR3		
	Type		5-speed manual	4-speed auto-matic	5-speed manual	4-speed auto-matic	5-speed manual		
Fuel system	Fuel supply system		Electronic control multipoint fuel injection				Fuel injection pump		

PRECAUTIONS BEFORE SERVICE

SUPPLEMENTAL RESTRAINT SYSTEM (SRS), SEAT BELT WITH PRE-TENSIONER

1. Items to follow when servicing SRS
   (1) Be sure to read GROUP 52B – Supplemental Restraint System (SRS).
   For safe operations, please follow the directions and heed all warnings.
   (2) Wait at least 60 seconds after disconnecting the battery cable before doing any further work.
   The SRS system is designed to retain enough voltage to deploy the air bag even after the battery has been disconnected. Serious injury may result from unintended air bag deployment if work is done on the SRS system immediately after the battery cable is disconnected.
   (3) Warning labels must be heeded when servicing or handling SRS components and seat belt with pre-tensioner. Warning labels are located in the following locations.
   - Sun visor
   - Glove box
   - SRS air bag control unit
   - Steering wheel
   - Steering gear and linkage
   - Air bag module (driver's side and front passenger's side)
   - Clock spring
   - Seat belt with pre-tensioner
   - Side air bag module
   - Side impact sensor

   (4) Always use the designated special tools and test equipment.
   (5) Store components removed from the SRS and seat belt with pre-tensioner in a clean and dry place.
   The air bag module and seat belt with pre-tensioner should be stored on a flat surface and placed so that the pad surface is facing upward.
   Do not place anything on top of it.
   (6) Never attempt to disassemble or repair the SRS components (SRS air bag control unit, air bag module, clock spring and side impact sensor) and seat belt with pre-tensioner.
   (7) Whenever you finish servicing the SRS and seat belt with pre-tensioner, check the SRS warning lamp operation to make sure that the system functions properly.
   (8) Be sure to deploy the air bag and seat belt with pre-tensioner before disposing of the air bag module and seat belt with pre-tensioner or disposing of a vehicle equipped with an air bag and seat belt with pre-tensioner. (Refer to GROUP 52B – Air Bag Module and Seat Belt Pre-tensioner Disposal Procedures.)
2. Observe the following when carrying out operations on places where SRS components and seat belt with pre-tensioner are installed, including operations not directly related to the SRS air bag and seat belt with pre-tensioner.
   (1) When removing or installing parts do not allow any impact or shock to the SRS components and seat belt with pre-tensioner.
   (2) SRS components and seat belt with pre-tensioner should not be subjected to heat, so remove the SRS components and seat belt with pre-tensioner before drying or baking the vehicle after painting.
   - SRS components: 93°C or more
   - Seat belt with pre-tensioner 90°C or more

   After re-installing them, check the SRS warning lamp operation to make sure that the system functions properly.

FUEL

CONTENTS

NOTE
THE GROUPS MARKED BY ARE NOT IN THIS MANUAL

MULTIPOINT FUEL INJECTION (MPI)

CONTENTS

GENERAL

OUTLINE OF CHANGES

The following improvements have been made to vehicles with 4G9-SOHC engine. Maintenance service points have been established to correspond to these changes.

- A new type of air flow sensor has been adopted.
- A composite ECU which incorporates both the engine-ECU and the A/T-ECU has been adopted. <A/T>

GENERAL INFORMATION

Items		Specifications
Engine-ECU	Identification model No.	E2T68471 <4G92-SOHC-M/T> E2T68477 <4G92-SOHC-M/T>*1 E2T68474 <4G92-SOHC-M/T>*2 E2T68572 <4G92-SOHC-A/T> E2T68579 <4G92-SOHC-A/T>*1 E2T68575 <4G92-SOHC-A/T>*2 E2T68472 <4G93-SOHC-M/T (Vehicles without TCL)> E2T68573 <4G93-SOHC-A/T (Vehicles without TCL)> E2T68473 <4G93-SOHC-M/T (Vehicles with TCL)> E2T68574 <4G93-SOHC-A/T (Vehicles with TCL)>
Actuators	Purge control solenoid valve	Duty cycle type solenoid valve

NOTE
*1: 74 kW engine output specifications (SNDVL6, SNDVR6, SNJVL6, SNJVR6, SRDVL6, SRDVR6, SRJVL6, SRJVR6, LNDVL6, LNDVR6, LNJVL6, LNJVR6, LRDVL6, LRDVR6, LRJVL6, LRJVR6)
*2: 6B model

SPECIAL TOOL

Tool	Number	Name	Use
	MB991709	Test harness	• Measurement of voltage during troubleshooting • Inspection using an analyzer

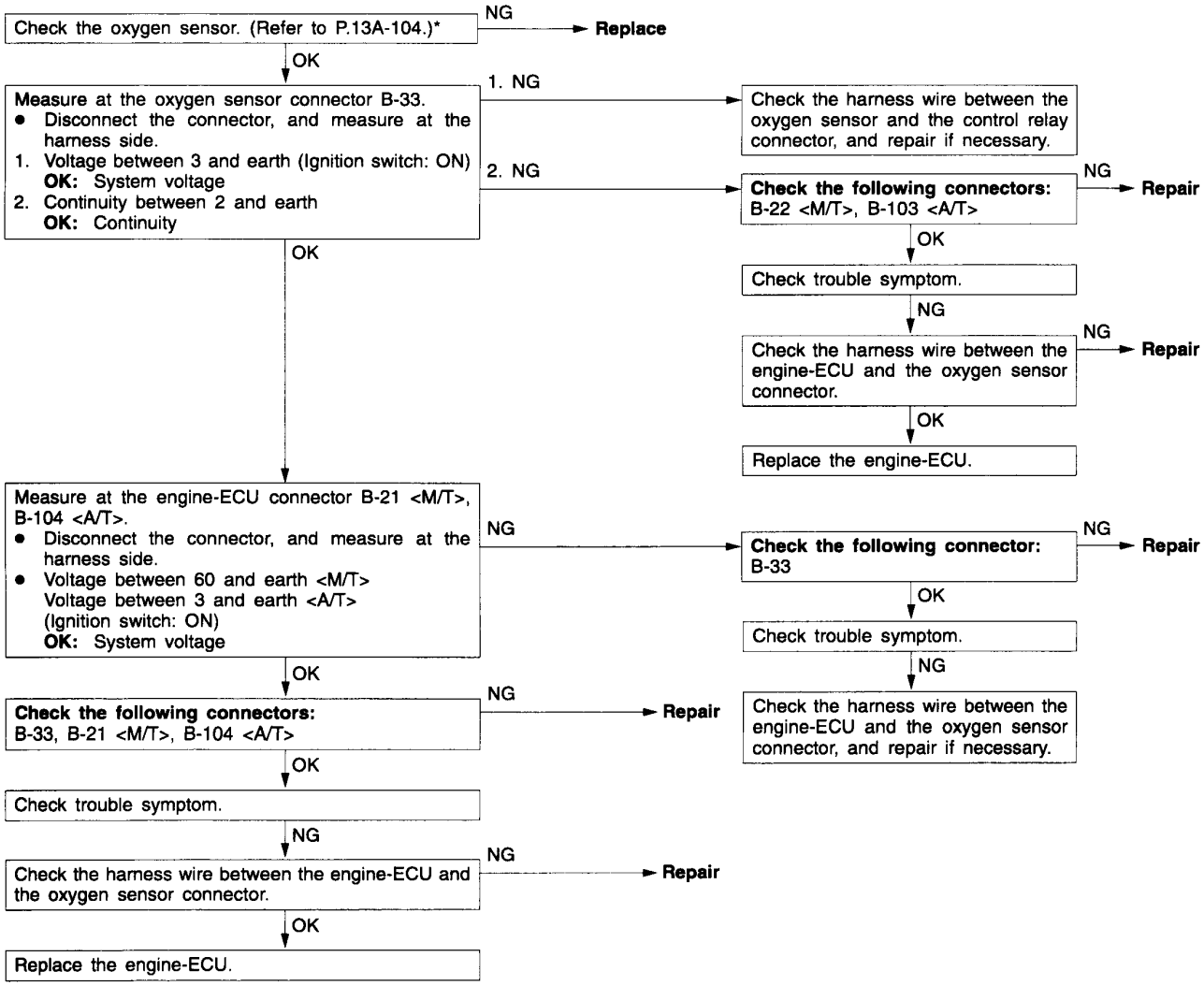
TROUBLESHOOTING

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
11	Oxygen sensor system	13A-5
12	Air flow sensor system	13A-6
13	Intake air temperature sensor system	13A-6
14	Throttle position sensor system	13A-7
21	Engine coolant temerature sensor system	13A-8
22	Crank angle sensor system	13A-9
23	Camshaft position sensor system	13A-10
24	Vehicle speed sensor system	13A-11
25	Barometric pressure sensor system	13A-12
31	Detonation sensor system	13A-13
41	Injector system	13A-13
44	Ignition coil and power trnasistor unit system	13A-14
54	Immobilizer system	13A-15
61	Communication wire with A/T-ECU system <A/T>	13A-16
71	Vacuum control solenoid valve system <Vehciles with TCL>	13A-17
72	Ventilation control solenoid valve system <Vehicles with TCL>	13A-18

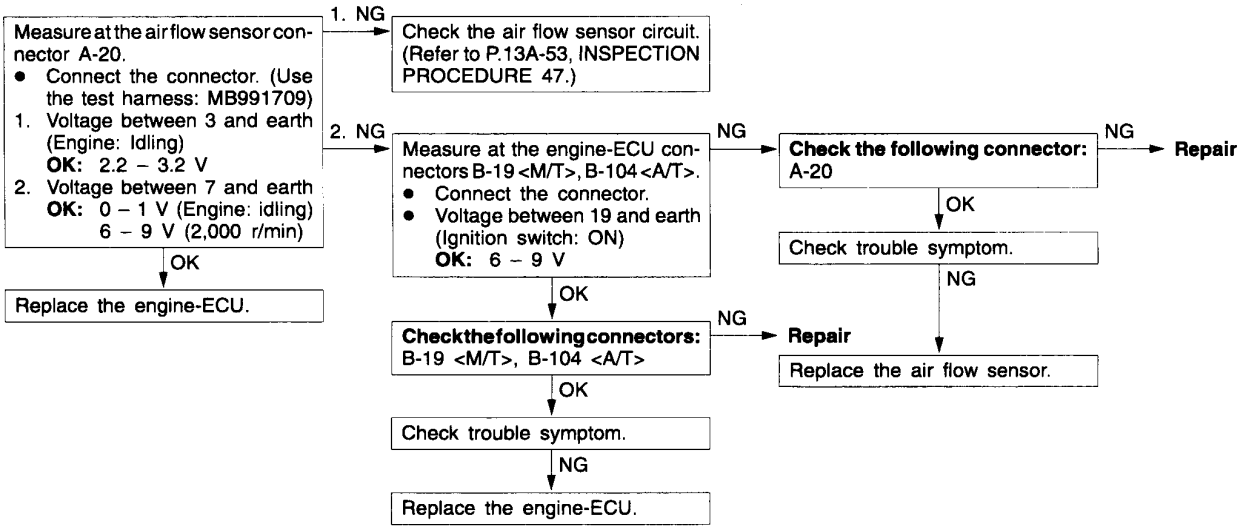
INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code No. 11 Oxygen sensor system	Probable cause
Range of Check • 3 minutes have passed after engine was started. • Engine coolant temperature is approx. 80°C or more. • Intake air temperature is 20 – 50°C. • Engine speed is approx. 2,000 – 3,000 r/min • Vehicle is moving at constant speed on a flat, level road surface Set conditions • The oxygen sensor output voltage is around 0.6 V for 30 seconds (does not cross 0.6 V for 30 seconds). • When the range of check operations given above which accompany starting of the engine are carried out four time in succession, a problem is detected after each operation.	• Malfunction of the oxygen sensor • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU

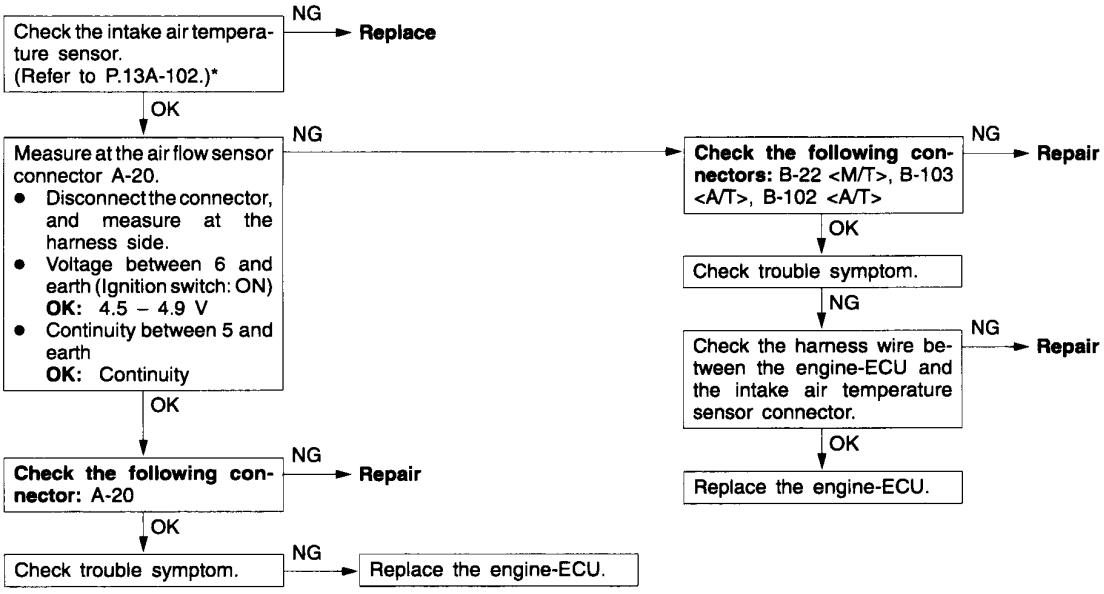


*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

Code No. 12 Air flow sensor system	Probable cause
Range of Check • Engine speed is 500 r/min or more. Set conditions • Sensor output frequency is 3 Hz or less for 4 seconds.	• Malfunction of the air flow sensor • Improper connector contact, open circuit or short-circuited harness wire of the air flow sensor • Malfunction of the engine-ECU

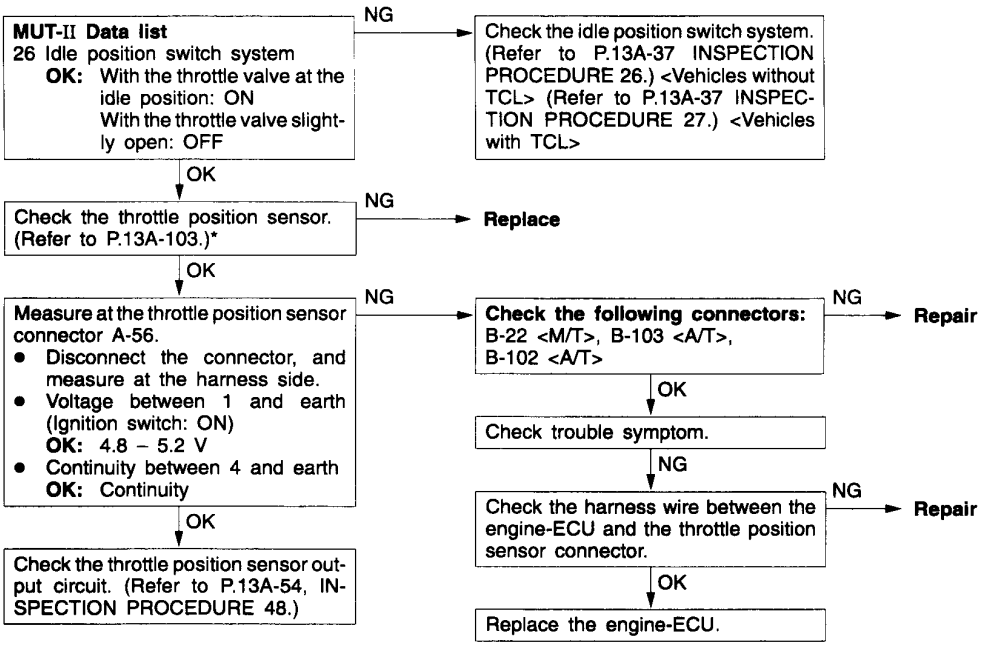


Code No. 13 Intake air temperature sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. Set conditions • Sensor output voltage is 4.6 V or more (corresponding to an intake air temperature of –45°C or less) for 4 seconds. or • Sensor output voltage is 0.2V or less (corresponding to an intake air temperature of 125°C or more) for 4 seconds.	• Malfunction of the intake air temperature sensor • Improper connector contact, open circuit or short-circuited harness wire of the intake air temperature sensor circuit • Malfunction of the engine-ECU



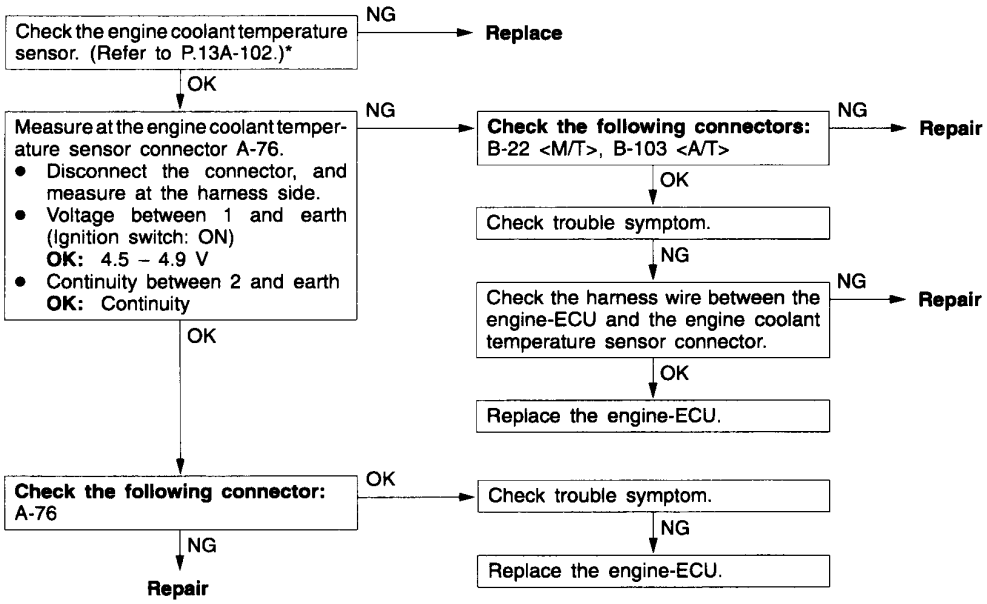
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

Code No. 14 Throttle position sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to 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 the throttle position sensor or maladjustment • Improper connector contact, open circuit or short-circuited harness wire of the throttle position sensor circuit • Improper "ON" state of idle position switch • Short circuit of the idle position switch signal line • Malfunction of the engine-ECU



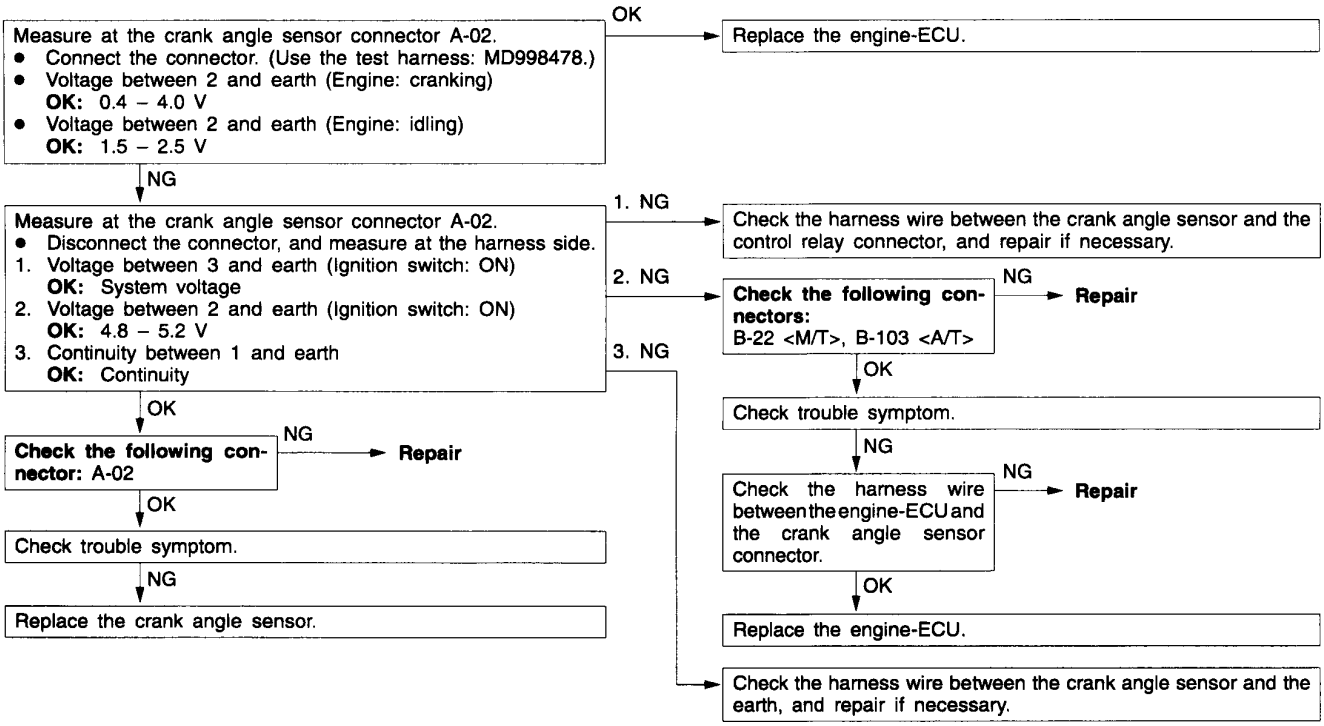
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

Code No. 21 Engine coolant temperature sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. Set conditions • Sensor output voltage is 4.6 V or more (corresponding to an engine coolant temperature of –45°C or less) for 4 seconds. or • Sensor output voltage is 0.1 V or less (corresponding to an engine coolant temperature of 140°C or more) for 4 seconds.	• Malfunction of the engine coolant temperature sensor • Improper connector contact, open circuit or short-circuited harness wire of the engine coolant temperature sensor circuit • Malfunction of the engine-ECU
Range of Check • Ignition switch: ON • Engine speed is approx. 50 r/min or more Set conditions • The sensor output voltage increases from 1.6 V or less (corresponding to an engine coolant temperature of 40°C or more) to 1.6 V or more (corresponding to an engine coolant temperature of 40°C or less). • After this, the sensor output voltage is 1.6 V or more for 5 minutes.	

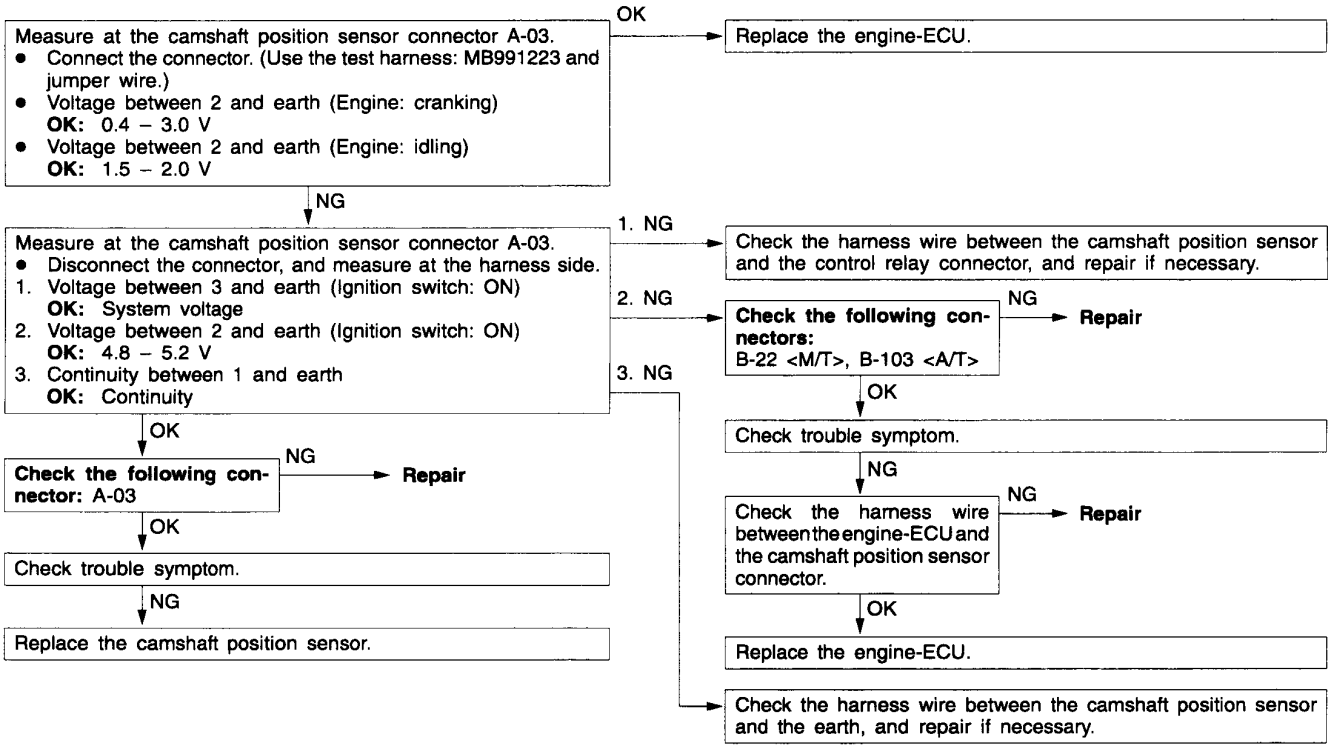


*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

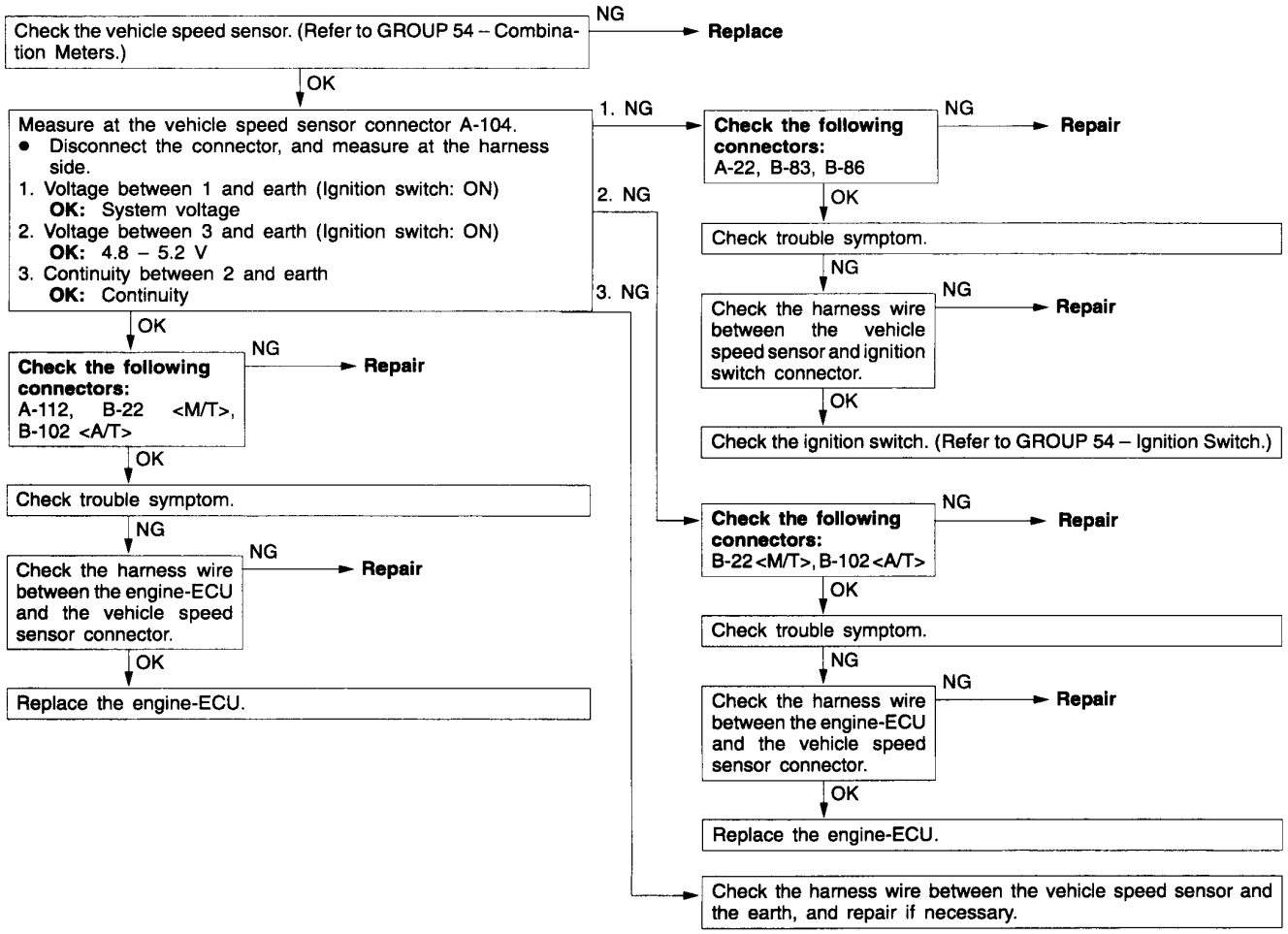
Code No. 22 Crank angle sensor system	Probable cause
Range of Check • Engine is cranking. Set conditions • Sensor output voltage does not change for 4 seconds (no pulse signal input.)	• Malfunction of the crank angle sensor • Improper connector contact, open circuit or short-circuited harness wire of the crank angle sensor • Malfunction of the engine-ECU



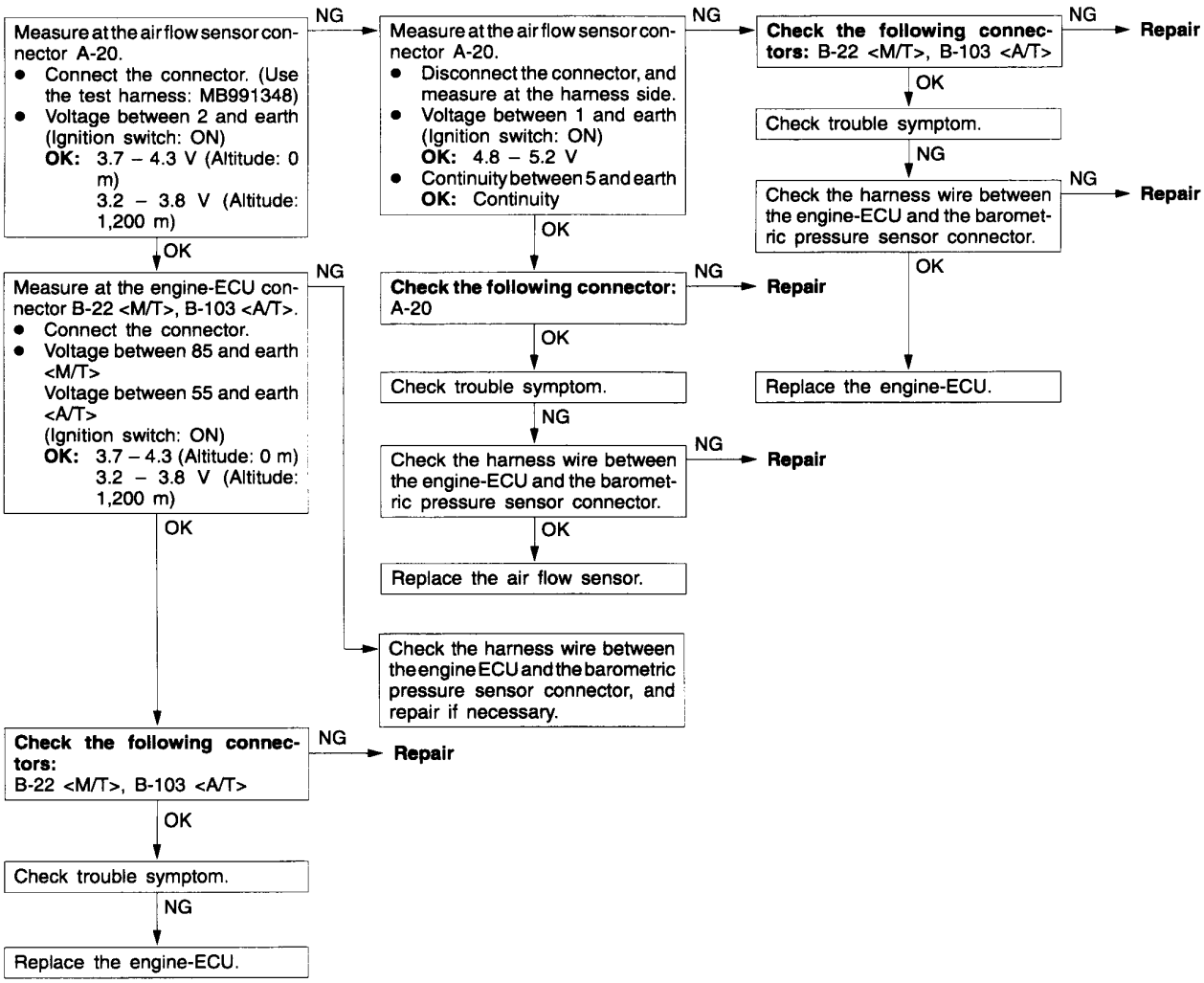
Code No. 23 Camshaft position sensor system	Probable cause
Range of Check • Ignition switch: ON • Engine speed is approx. 50 r/min or more. Set conditions • Sensor output voltage does not change for 4 seconds (no pulse signal input.)	• Malfunction of the camshaft position sensor • Improper connector contact, open circuit or short-circuited harness wire of the camshaft position sensor circuit • Malfunction of the engine-ECU



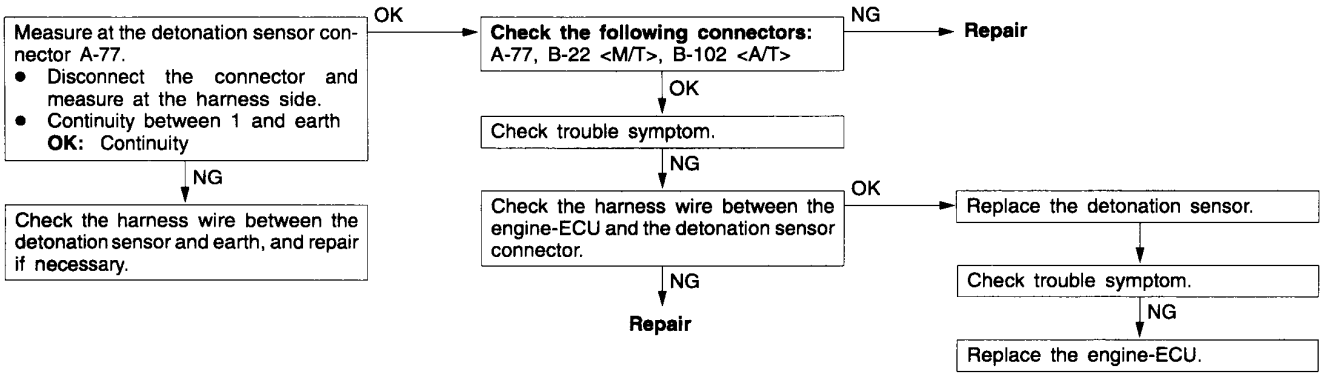
Code No. 24 Vehicles speed sensor system	Probable cause
Range of check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. • Idle position switch: OFF • Engine speed is 3,000 r/min or more. • Driving under high engine load conditions. Set conditions • Sensor output voltage does not change for 4 seconds (no pulse signal input).	• Malfunction of the vehicle speed sensor • Improper connector contact, open circuit or short-circuited harness wire of the vehicle speed sensor circuit • Malfunction of the engine-ECU



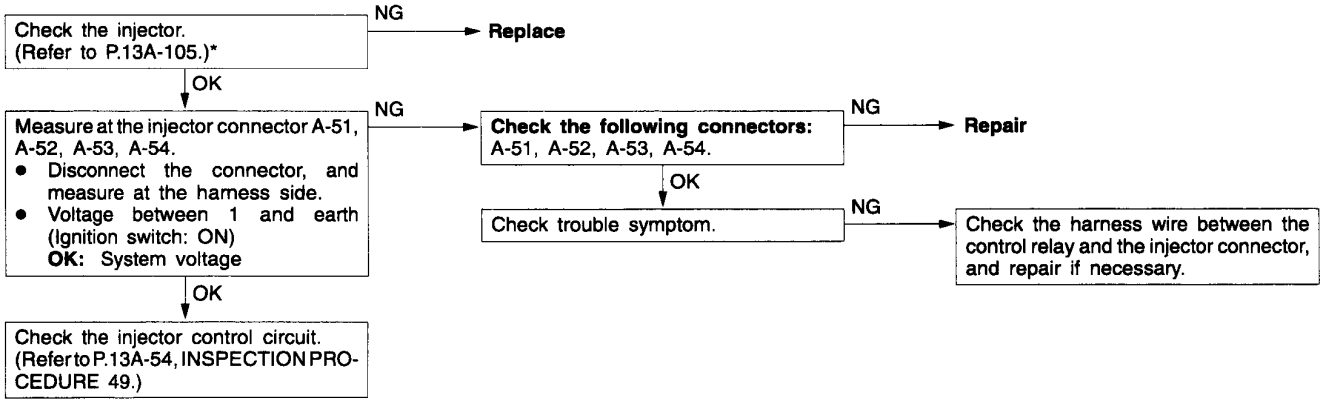
Code No. 25 Barometric pressure sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. • Battery voltage is 8 V or more. Set conditions • Sensor output voltage is 4.5 V or more (corresponding to a barometric pressure of 114 kPa or more) for 4 seconds. or • Sensor output voltage is 0.2 V or less (corresponding to a barometric pressure of 5.33 kPa or less) for 4 seconds.	• Malfunction of the barometric pressure sensor • Improper connector contact, open circuit or short-circuited harness wire of the barometric pressure sensor circuit • Malfunction of the engine-ECU



Code No. 31 Detonation sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. • Engine speed is approx. 5,000 r/min or more Set conditions The change in the detonation sensor output voltage (detonation sensor peak voltage at each 1/2 revolution of the crankshaft) is less than 0.06 V for 200 times in succession.	• Malfunction of the detonation sensor • Improper connector contact, open circuit or short-circuited harness wire of the detonation sensor circuit • Malfunction of the engine-ECU

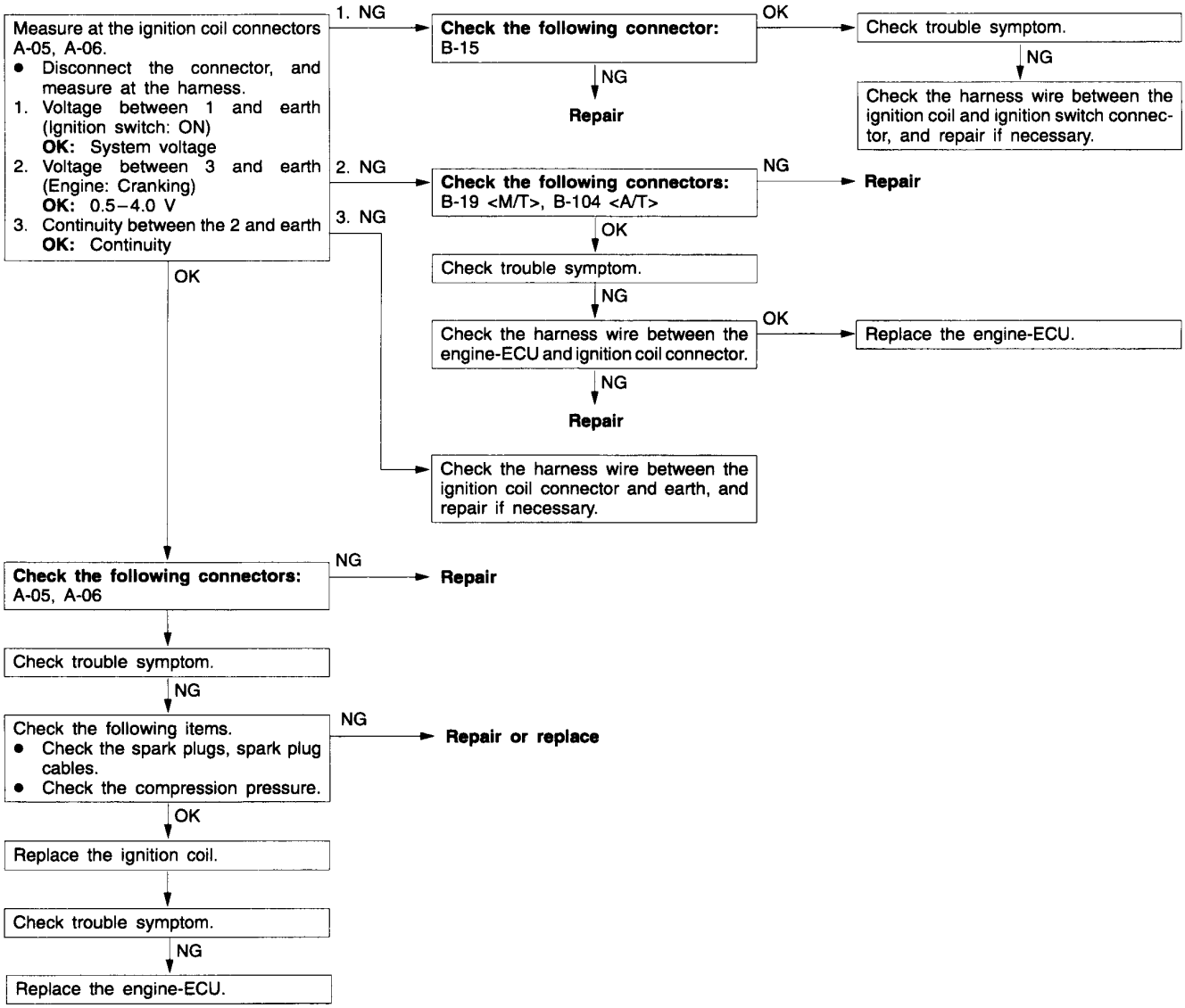


Code No. 41 Injector system	Probable cause
Range of Check • Engine speed is approx. 50 – 1,000 r/min • The throttle position sensor output voltage is 1.15 V or less. • Actuator test by MUT-II is not carried out. Set conditions • Surge voltage of injector coil is not detected for 4 seconds.	• Malfunction of the injector • Improper connector contact, open circuit or short-circuited harness wire of the injector circuit • Malfunction of the engine-ECU



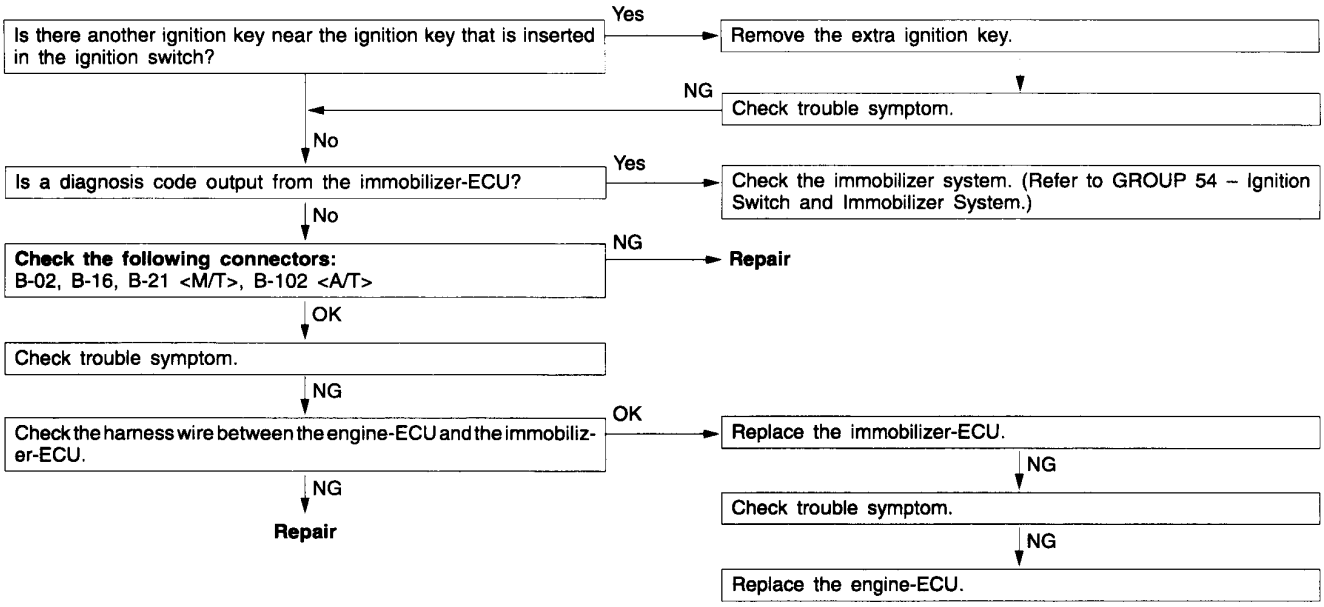
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

Code No.44 Ignition coil and power transistor unit system	Probable cause
Range of Check • Engine speed is approx. 50–4,000 r/min • Excluding deceleration driving and sudden acceleration or deceleration driving Set conditions • Misfire occurs in No.1 and No.4 cylinders or No.2 and No.3 cylinders more than predeterminated times per 1,000 r/min.	• Malfunction of the ignition coil • Improper connector contact, open circuit or short-circuited harness wire of the ignition primary circuit • Malfunction of the spark plug and spark plug cable • Improper compression pressure • Malfunction of the engine-ECU



Code No.54 Immobilizer system	Probable cause
Range of Check • Ignition switch: ON Set Conditions • Improper communication between the engine-ECU and immobilizer-ECU	• Radio interference of ID codes • Incorrect ID code • Malfunction of harness or connector • Malfunction of immobilizer-ECU • Malfunction of engine-ECU

NOTE
(1) If the ignition switches 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.

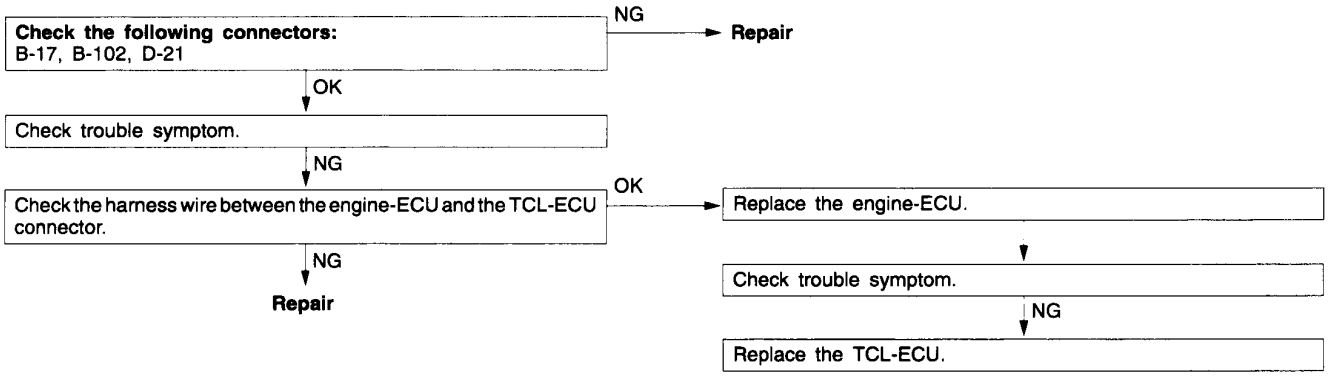


Code No. 61 Communication wire with A/T-ECU system <A/T>	Probable cause
Range of Check • 60 seconds or more have passed immediately after engine was started. • Engine speed is approx. 50 r/min or more Set conditions The voltage of the torque reduction request signal from the A/T-ECU is LOW for 1.5 seconds or more.	• Malfunction of the harness wire and the connector • Malfunction of the engine ECU • Malfunction of the A/T-ECU • Malfunction of the TCL-ECU <Vehicles with TCL>

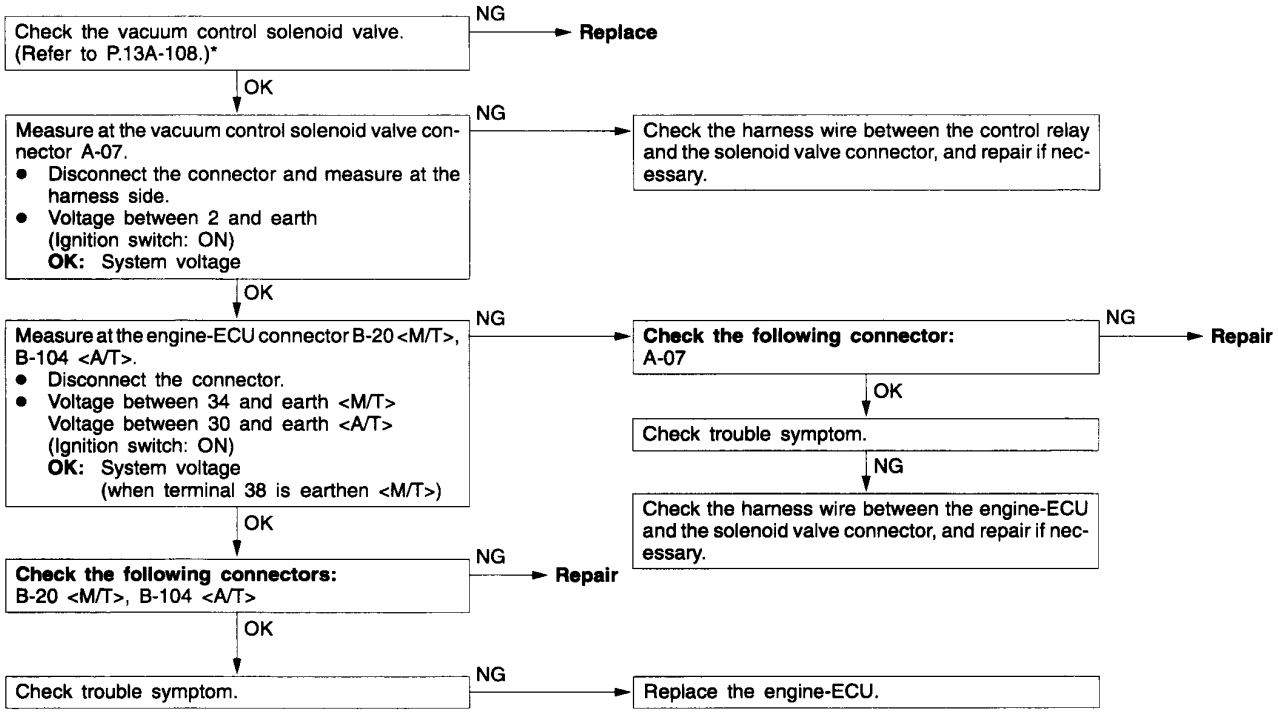
<Vehicles without TCL>

Replace the engine-ECU.

<Vehicles with TCL>

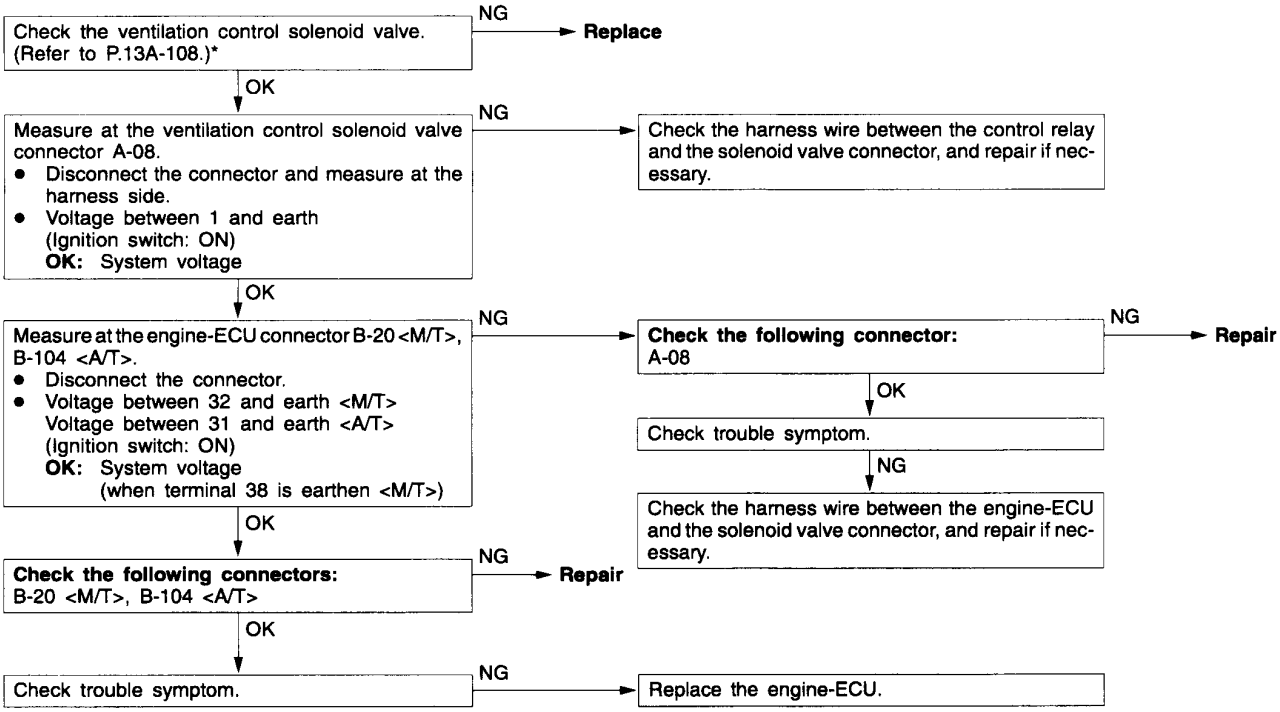


Code No. 71 Vacuum control solenoid valve system <Vehicles with TCL>	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds immediately after the engine starts. • Battery voltage is 10 V or more. • Forced actuation by means of MUT-II is not being carried out. Set condition Solenoid 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



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

Code No. 72 Ventilation control solenoid valve system <Vehicles with TCL>	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



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

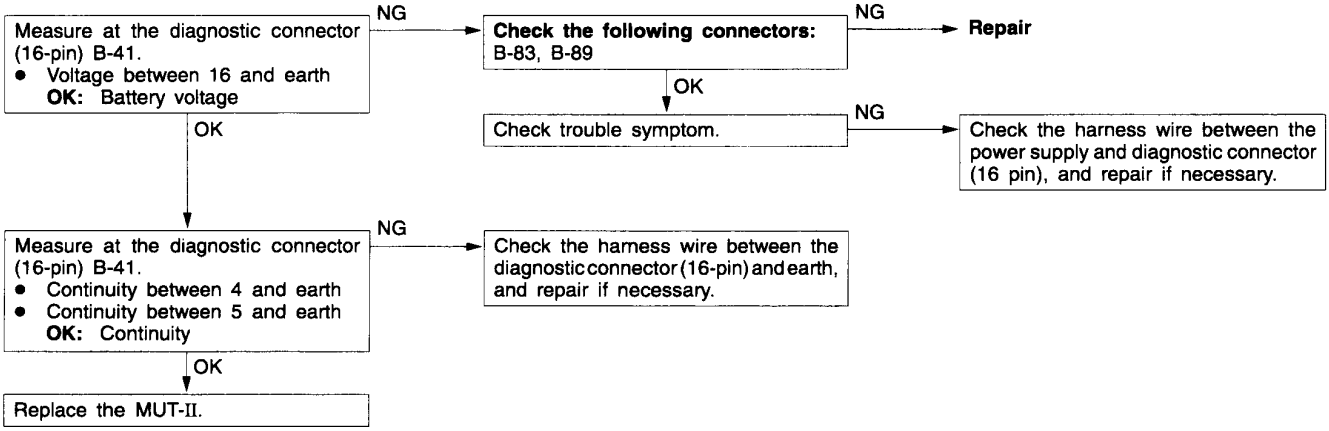
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is impossible.	Communication with all systems is not possible.	1	13A-20
	Communication with engine ECU only is not possible.	2	13A-20
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-21
	The engine warning lamp remains illuminating and never goes out.	4	13A-21
Starting	No initial combustion (starting impossible)	5	13A-22
	Initial combustion but no complete combustion (starting impossible)	6	13A-23
	Long time to start (improper starting)	7	13A-24
Idling stability (Improper idling)	Unstable idling (Rough idling, hunting)	8	13A-25
	Idling speed is high. (Improper idling speed)	9	13A-26
	Idling speed is low. (Improper idling speed)	10	13A-27
Idling stability (Engine stalls)	When the engine is cold, it stalls at idling. (Die out)	11	13A-28
	When the engine becomes hot, it stalls at idling. (Die out)	12	13A-29
	The engine stalls when starting the car. (Pass out)	13	13A-30
	The engine stalls when decelerating.	14	13A-30
Driving	Hesitation, sag or stumble	15	13A-31
	The feeling of impact or vibration when accelerating	16	13A-31
	The feeling of impact or vibration when decelerating	17	13A-32
	Poor acceleration	18	13A-32
	Surge	19	13A-33
	Knocking	20	13A-33
Dieseling		21	13A-33
Too high CO and HC concentration when idling		22	13A-34
Fan (radiator fan, A/C condenser fan) are inoperative.		23	13A-35

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

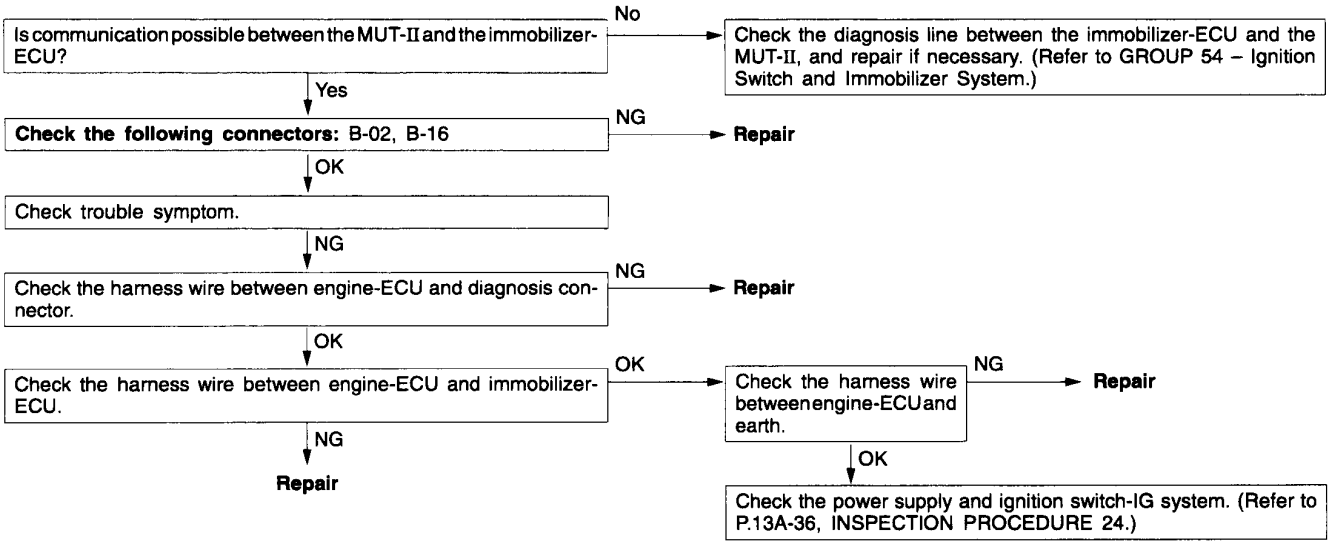
INSPECTION PROCEDURE 1

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



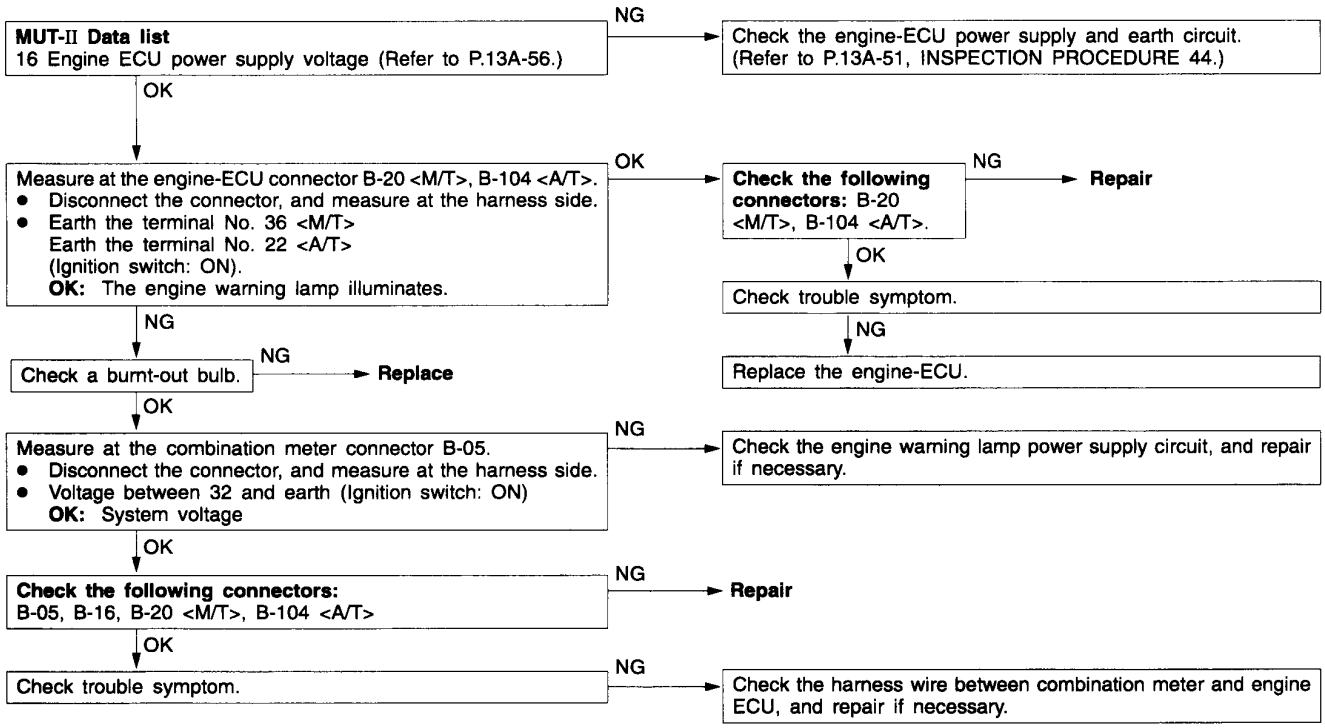
INSPECTION PROCEDURE 2

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 • Malfunction of immobilizer-ECU • Open circuit between immobilizer-ECU and diagnosis connector • Open circuit between engine-ECU and immobilizer-ECU



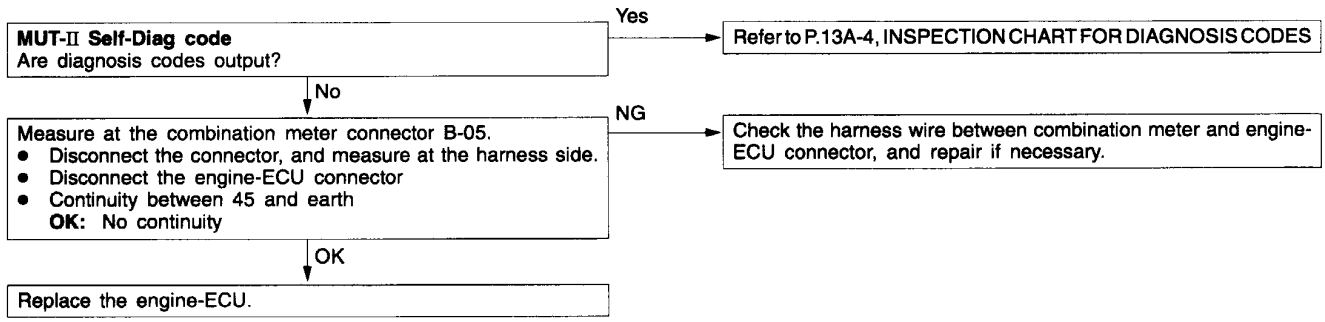
INSPECTION PROCEDURE 3

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



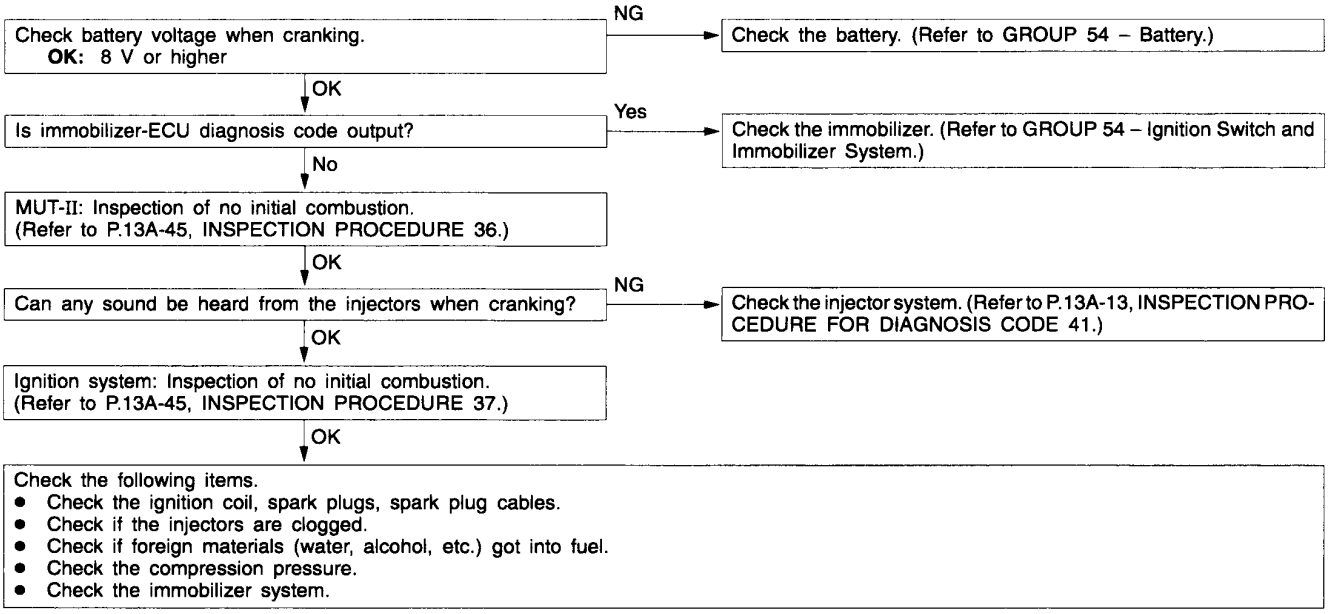
INSPECTION PROCEDURE 4

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



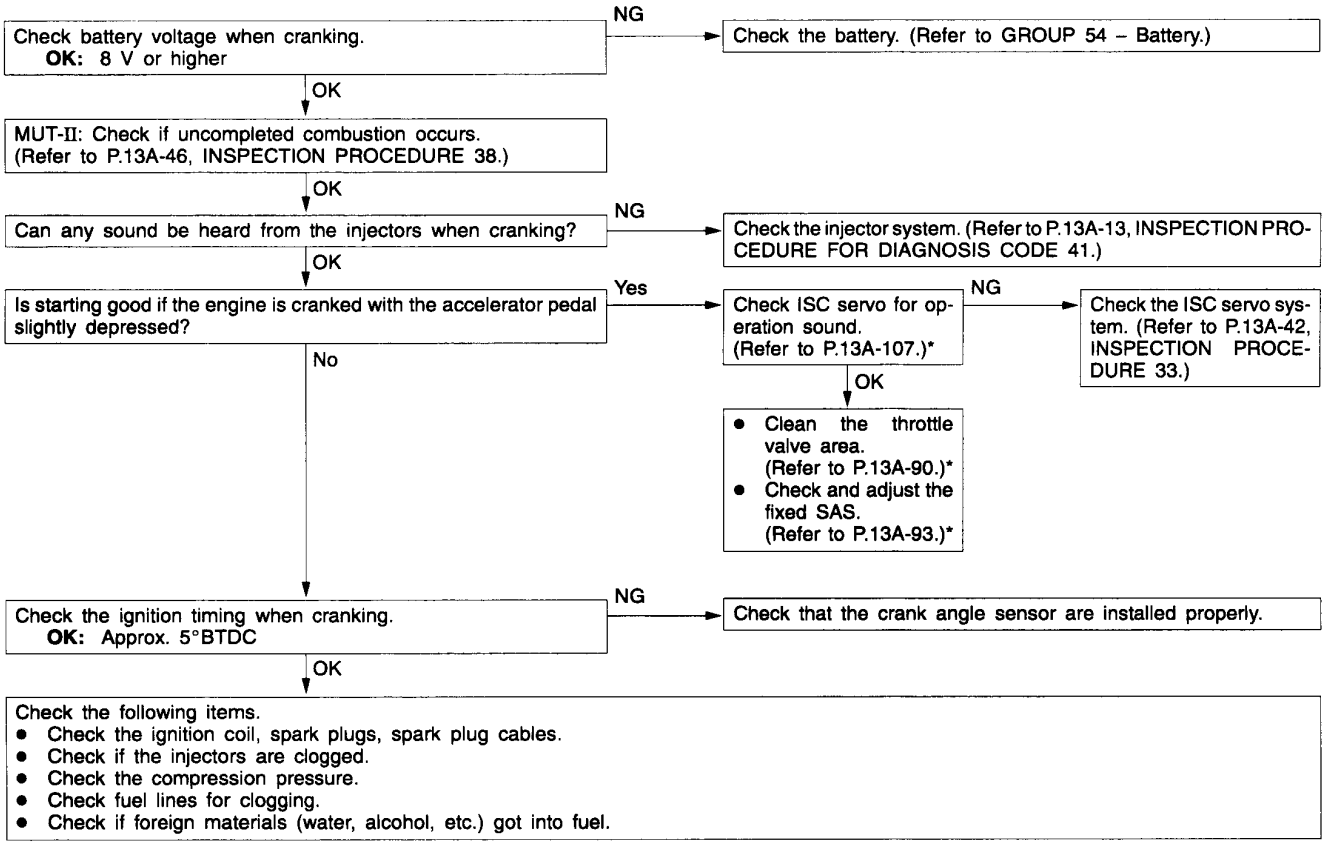
INSPECTION PROCEDURE 5

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



INSPECTION PROCEDURE 6

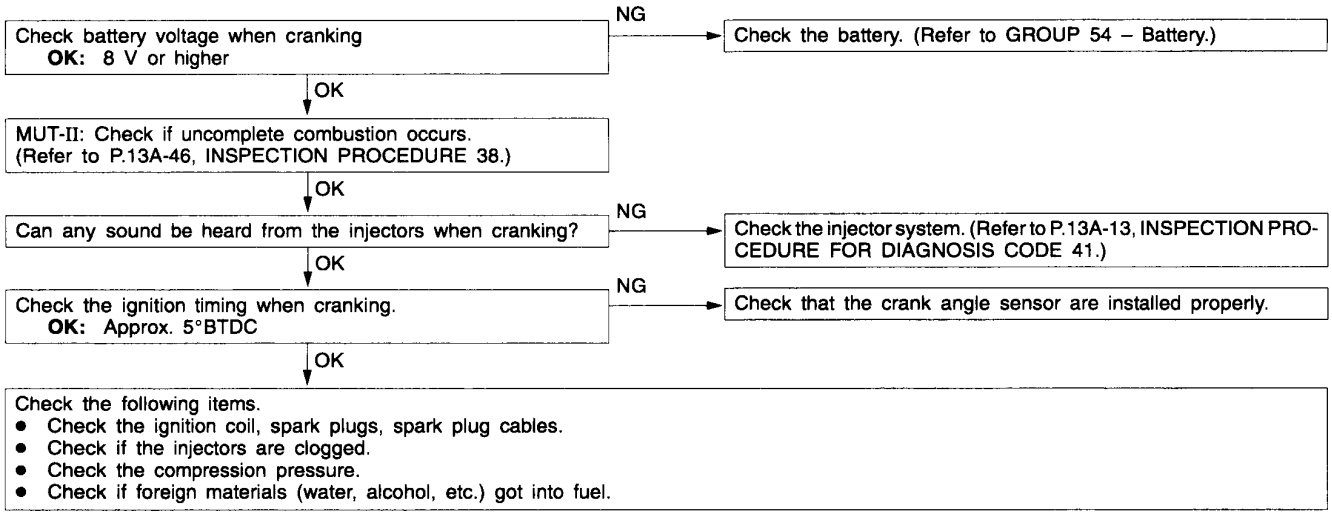
Initial combustion but no complete combustion (starting impossible)	Probable cause
In such cases as the above, the cause is probably that the spark plugs are generating sparks but the sparks are weak, or the initial mixture for starting is not appropriate.	• Malfunction of the ignition system • Malfunction of the injector system • Foreign materials in fuel • Poor compression • Malfunction of the engine-ECU



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

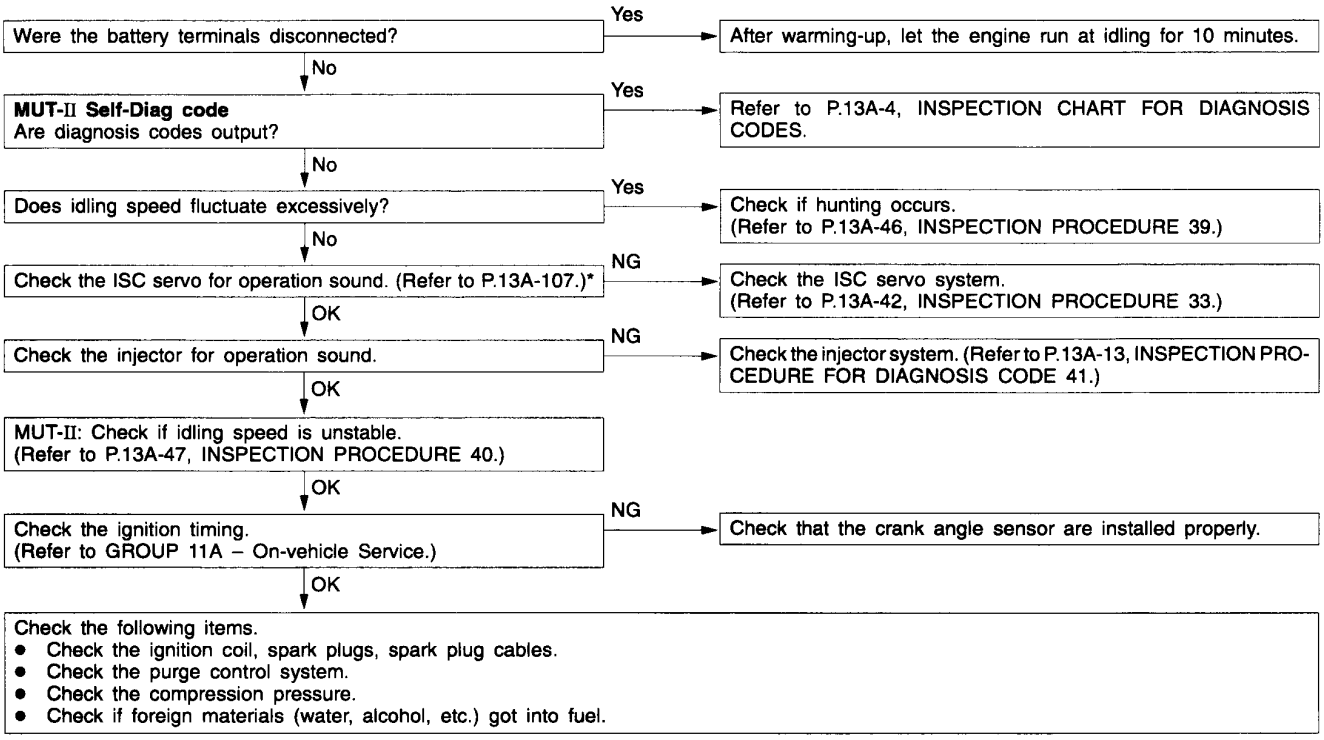
INSPECTION PROCEDURE 7

In 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



INSPECTION PROCEDURE 8

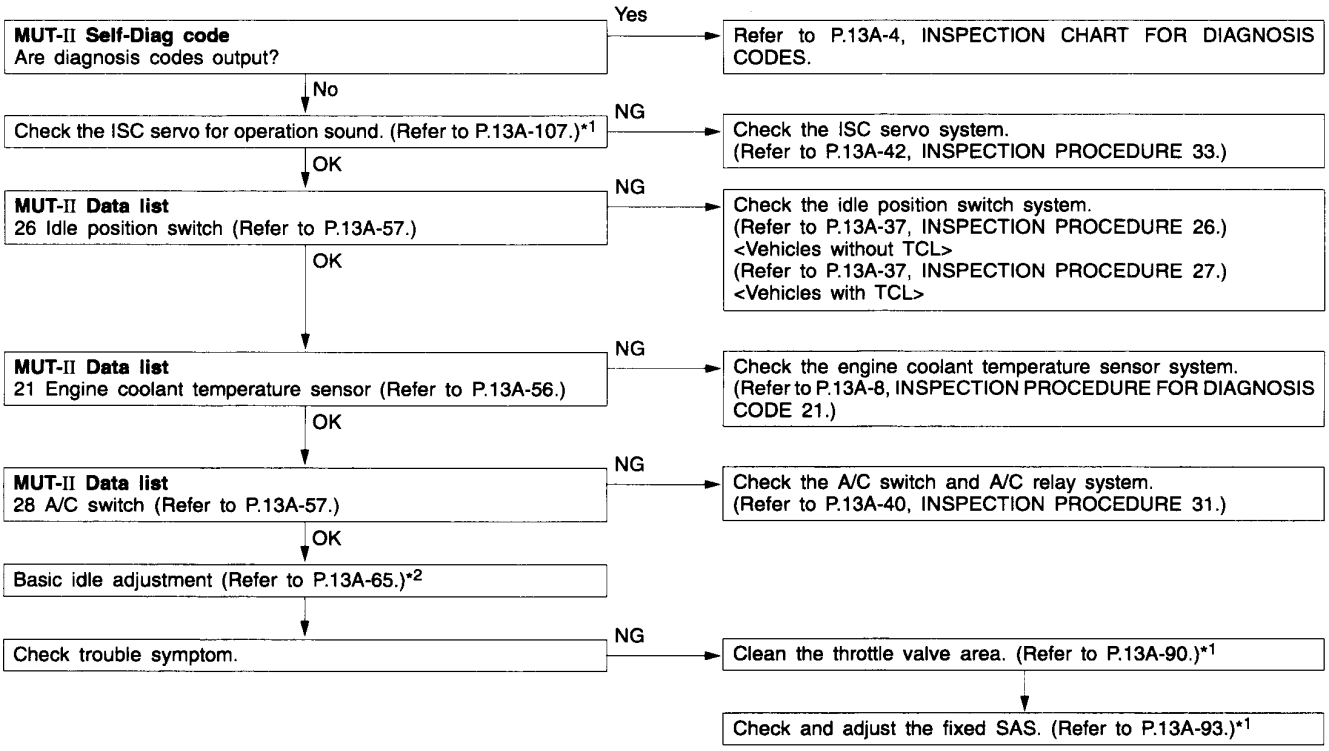
Unstable idling (Rough idling, hunting)	Probable cause
In cases as the above, the cause is probably that the ignition system, air/fuel mixture, idle speed control (ISC) or compression pressure is defective. Because the range of possible causes is broad, inspection is narrowed down to simple items.	• 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 • Poor compression • Drawing air into exhaust system



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

INSPECTION PROCEDURE 9

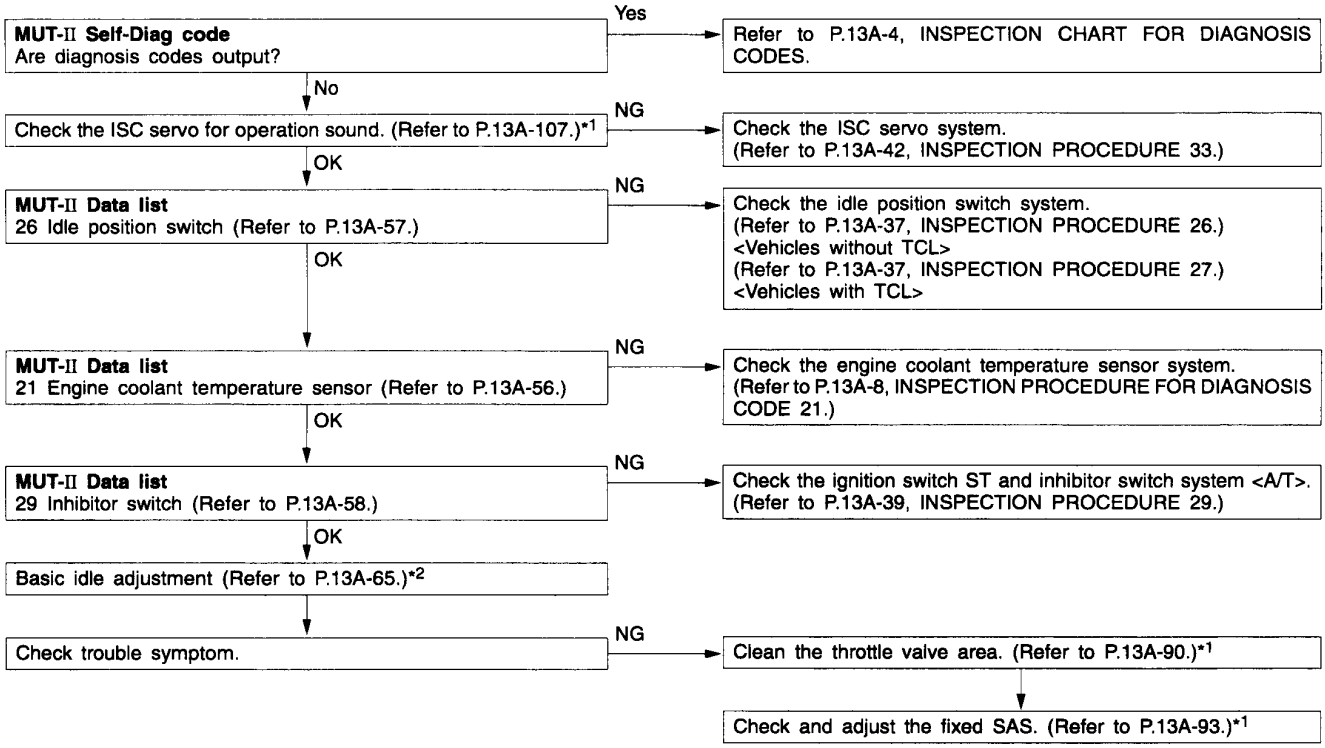
Idling speed is high. (Improper idling speed)	Probable cause
In such cases as the above, the cause is probably that the intake air volume during idling is too great.	• Malfunction of the ISC servo system • Malfunction of the throttle body



*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

INSPECTION PROCEDURE 10

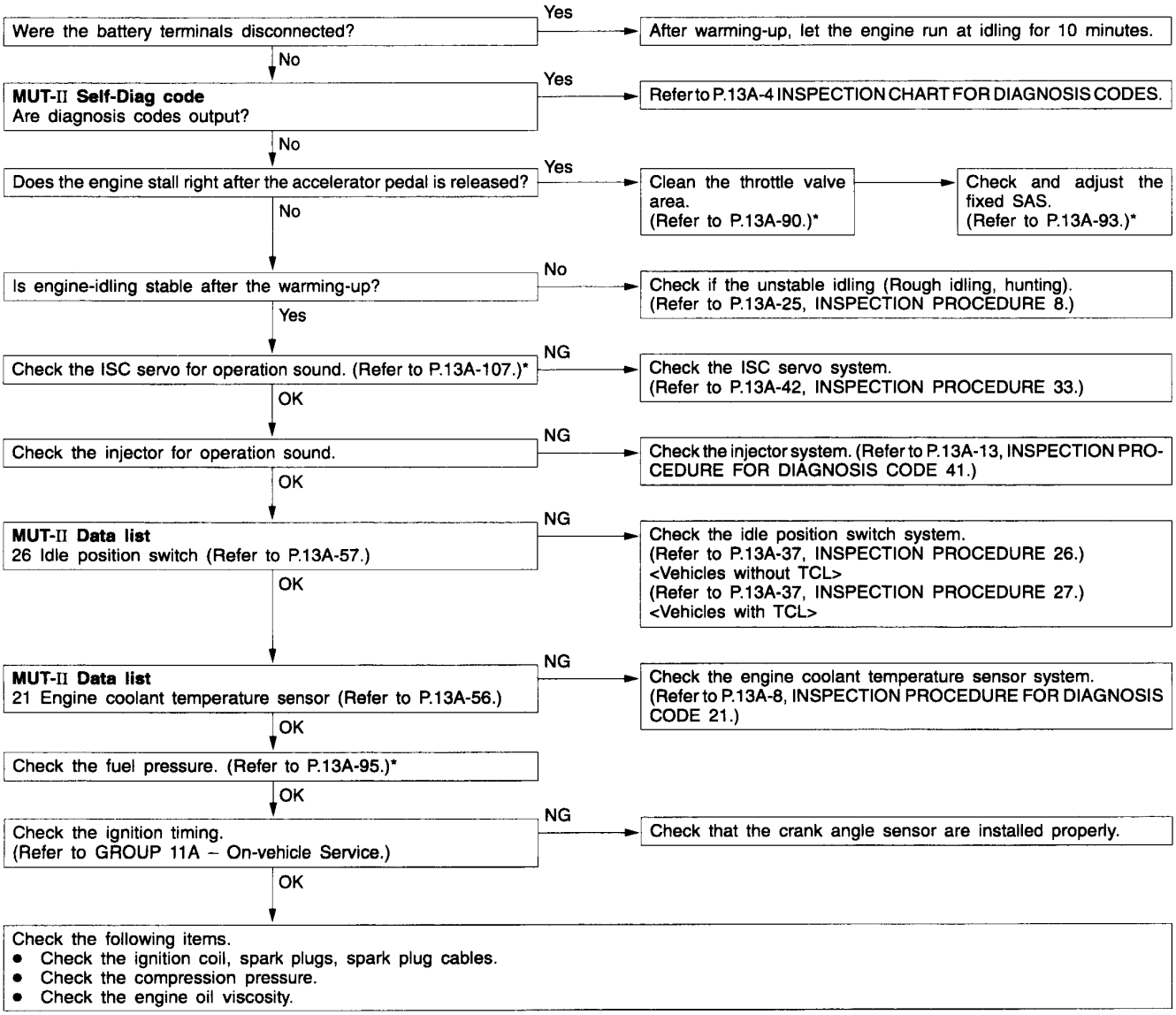
Idling speed is low. (Improper idling speed)	Probable cause
In cases such as the above, the cause is probably that the intake air volume during idling is too small.	• Malfunction of the ISC servo system • Malfunction of the throttle body



*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

INSPECTION PROCEDURE 11

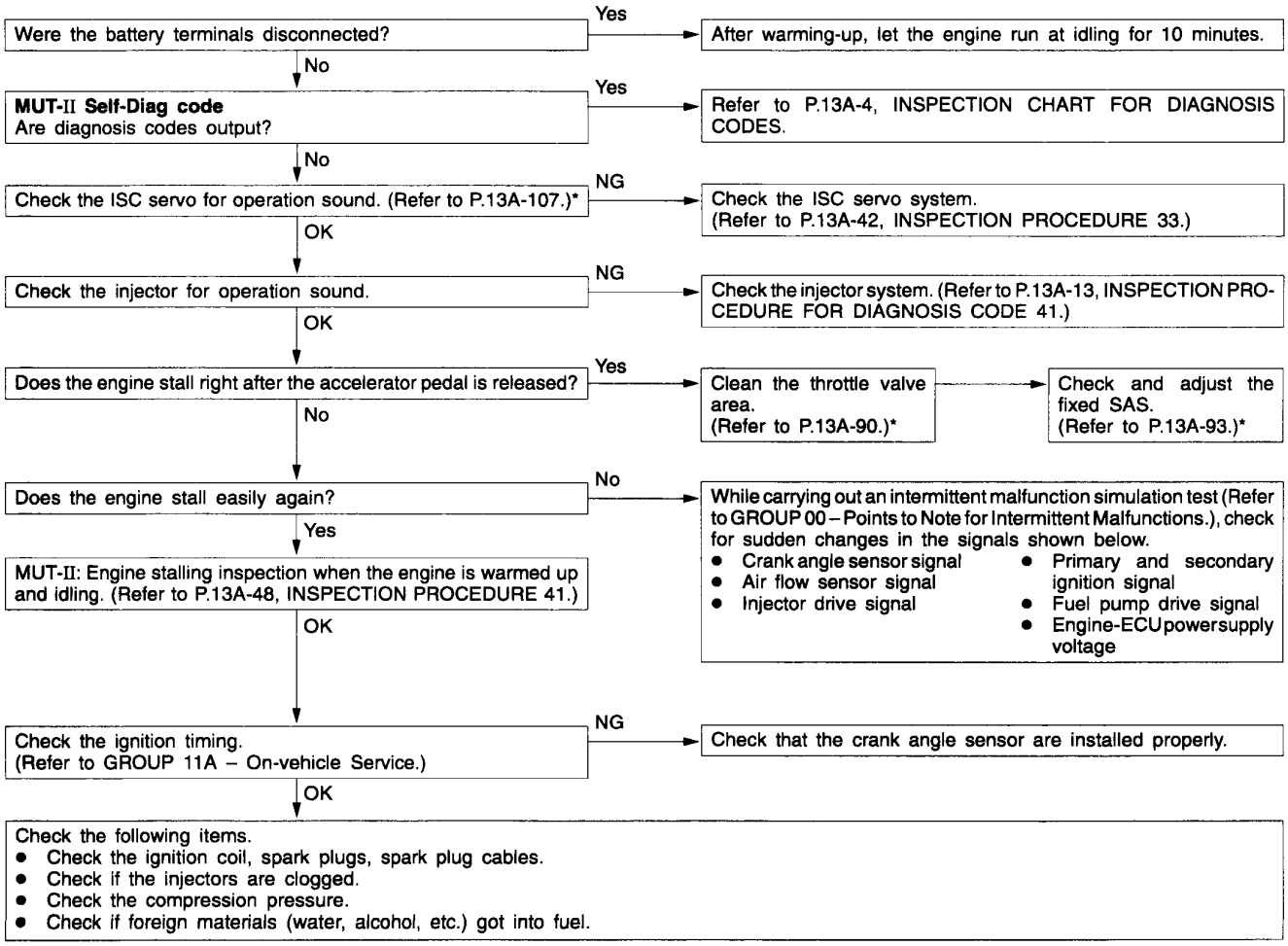
When the engine is cold, it stalls at idling. (Die out)	Probable cause
In such cases as the above, the cause is probably that the air/fuel mixture is inappropriate when the engine is cold, or that the intake air volume is insufficient.	• Malfunction of the ISC servo system • Malfunction of the throttle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



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

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



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

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 output?
→ Yes: Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODES.
↓ No:

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) servo 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 output?
→ Yes: Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODES.
↓ No

MUT-II Data list
26 Idle position switch (Refer to P.13A-57.)
→ NG: Check the idle position switch system.
(Refer to P.13A-37, INSPECTION PROCEDURE 26.)
<Vehicles without TCL>
(Refer to P.13A-37, INSPECTION PROCEDURE 27.)
<Vehicles with TCL>
↓ OK

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-56.)
→ NG: Check the throttle position sensor system. (Refer to P.13A-7, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 14.)
↓ 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)?

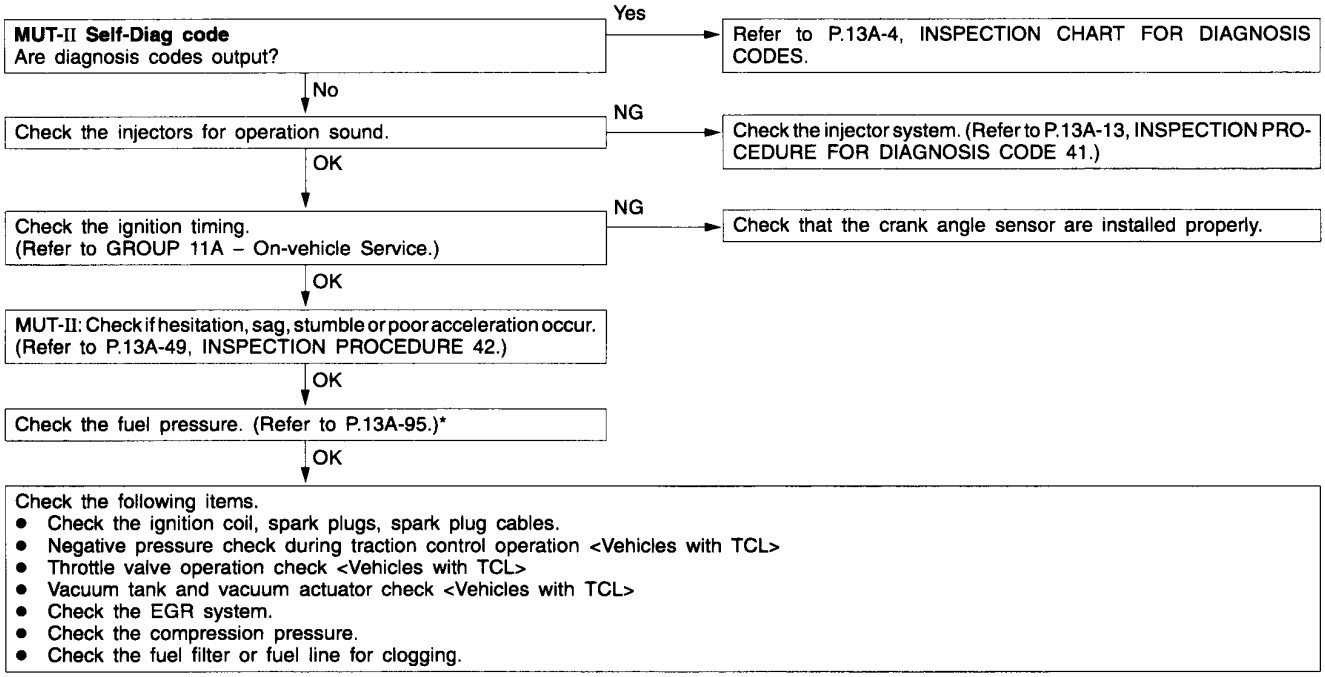
→ Yes: Check the vehicle speed sensor system. (Refer to P.13A-11, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 24.)
↓ No

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

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

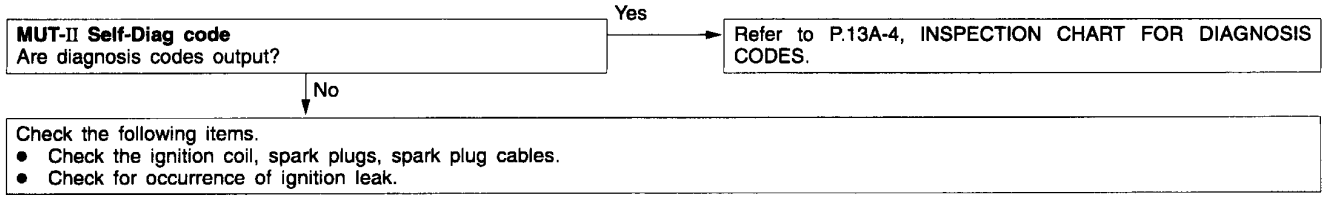
INSPECTION PROCEDURE 15

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



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



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

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 output?
- Yes → Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

Check the ISC servo for operation sound. (Refer to P.13A-107.)*
- NG → Check the ISC servo system. (Refer to P.13A-42, INSPECTION PROCEDURE 33.)
- OK ↓

MUT-II Data list
14 Throttle position sensor (Refer to P.13A-56.)
- NG → Check the throttle position sensor system. (Refer to P.13A-7, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 14.)
- OK ↓

MUT-II Data list
26 Idle position switch (Refer to P.13A-57.)
- NG → Check the idle position switch system. (Refer to P.13A-37, INSPECTION PROCEDURE 26.) <Vehicles without TCL> (Refer to P.13A-37, INSPECTION PROCEDURE 27.) <Vehicles with TCL>
- OK ↓

Clean the throttle valve area. (Refer to P.13A-90.)*

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 output?
- Yes → Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODES.
- No ↓

Check the injectors for operation sound.
- NG → Check the injector system. (Refer to P.13A-13, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 41.)
- OK ↓

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

MUT-II: Check if hesitation, sag, stumble or poor acceleration occur. (Refer to P.13A-49, INSPECTION PROCEDURE 42.)
- OK ↓

Check the fuel pressure. (Refer to P.13A-95.)*
- OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Negative pressure check during traction control operation <Vehicles with TCL>
- Throttle valve operation check <Vehicles with TCL>
- Vacuum tank and vacuum actuator check <Vehicles with TCL>
- Check the compression pressure.
- Check the fuel filter or fuel line for clogging.
- Broken air intake hose
- Clogged air cleaner

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

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 output?
Yes → Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P. 13A-13, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 41.)
OK ↓

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

MUT-II: Check if surge occurs.
(Refer to P.13-50, INSPECTION PROCEDURE 43.)
OK ↓

Check the fuel pressure. (Refer to P.13A-95.)*
OK ↓

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

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 output?
Yes → Refer to P.13A-4, 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-13, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 31.)
Yes ↓

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

INSPECTION PROCEDURE 21

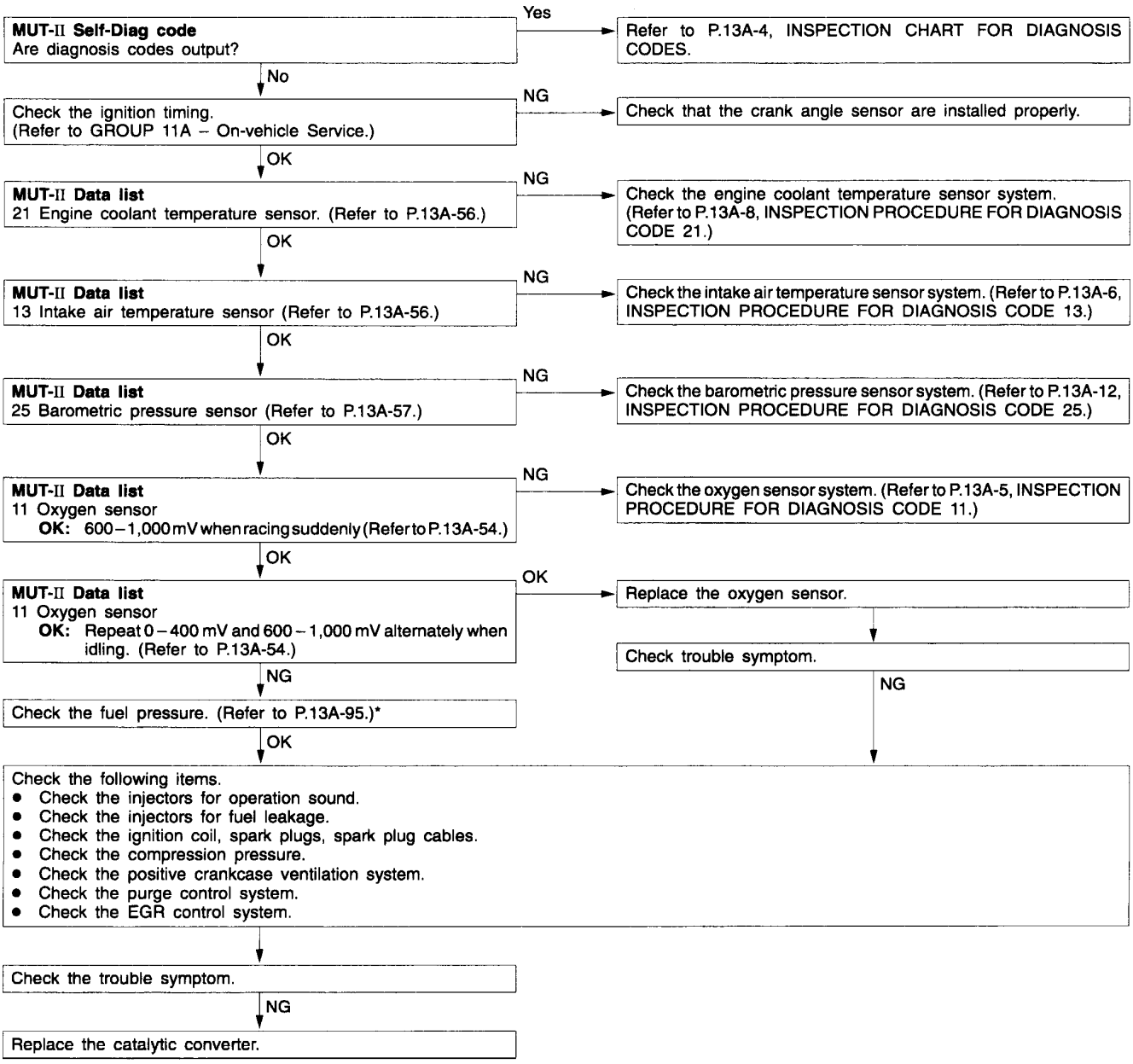
Dieseling	Probable cause
Fuel leakage from injectors is suspected.	• Fuel leakage from injectors

Check the injectors for fuel leakage.

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

INSPECTION PROCEDURE 22

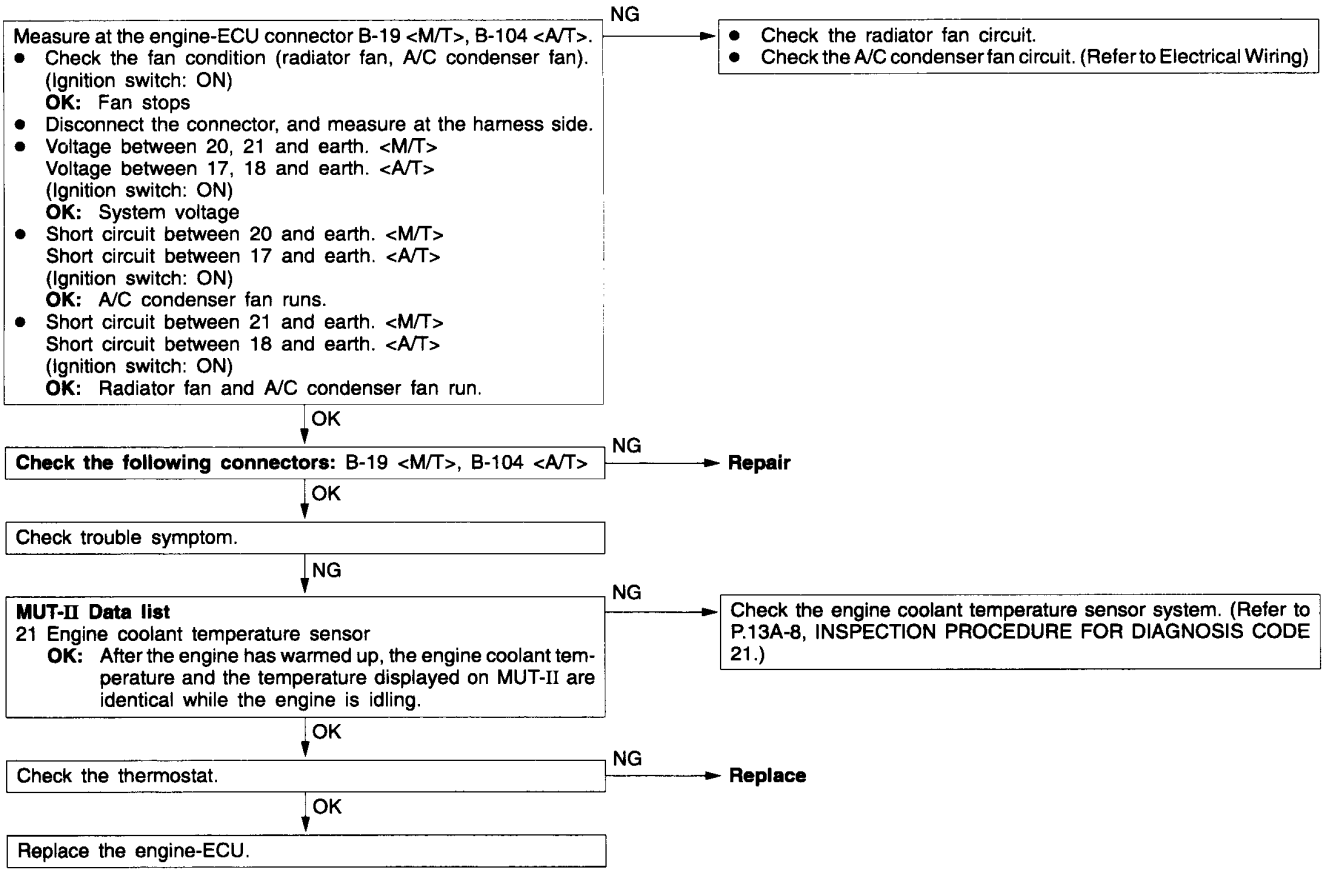
Too high CO and HC concentration when idling	Probable cause
Abnormal air-fuel ratio is suspected.	• Malfunction of the air-fuel ratio control system • Deteriorated catalyst



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

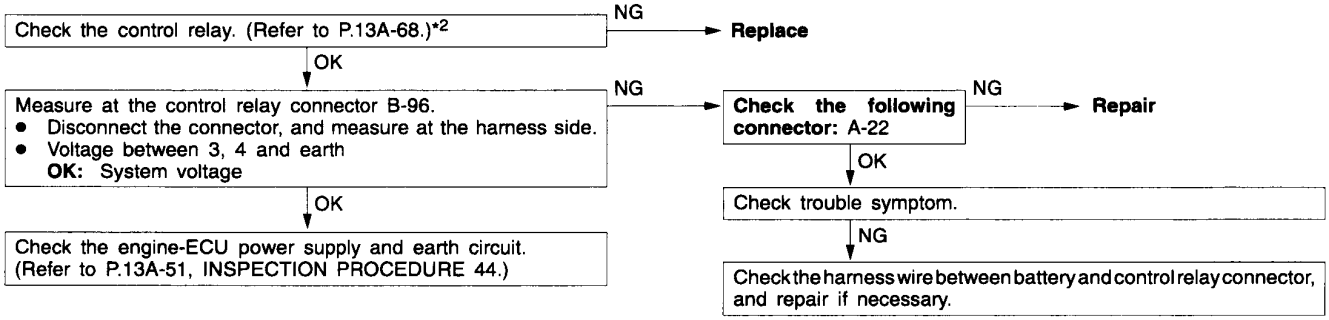
INSPECTION PROCEDURE 23

Fan (radiator fan, A/C condenser fan) are inoperative	Probable cause
The power transistor inside the engine-ECU turns the fan motor relay ON and OFF.	• Malfunction of the fan motor relay • Malfunction of the fan motor • Malfunction of the thermostat • Improper connector contact, open or short-circuited harness wire • Malfunction of the engine-ECU



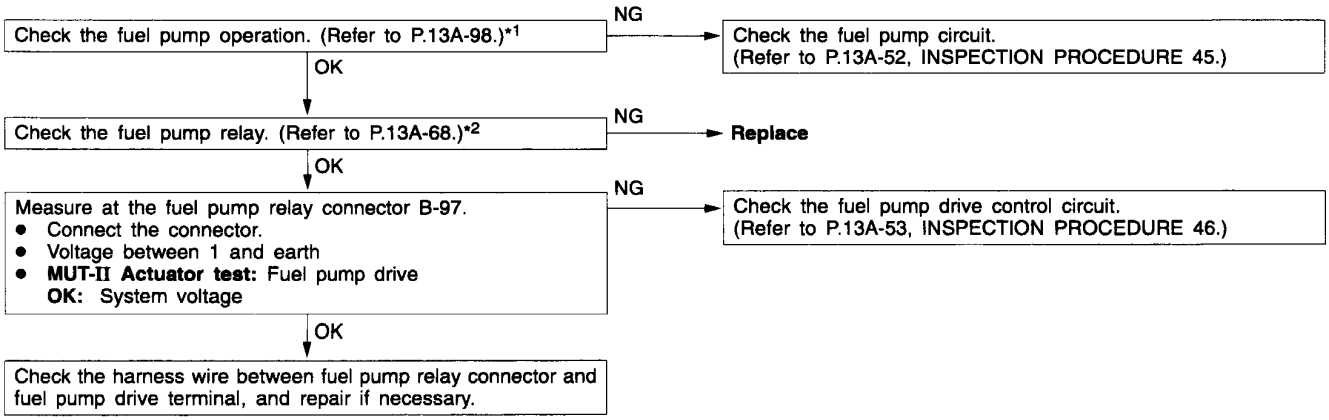
INSPECTION PROCEDURE 24

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



INSPECTION PROCEDURE 25

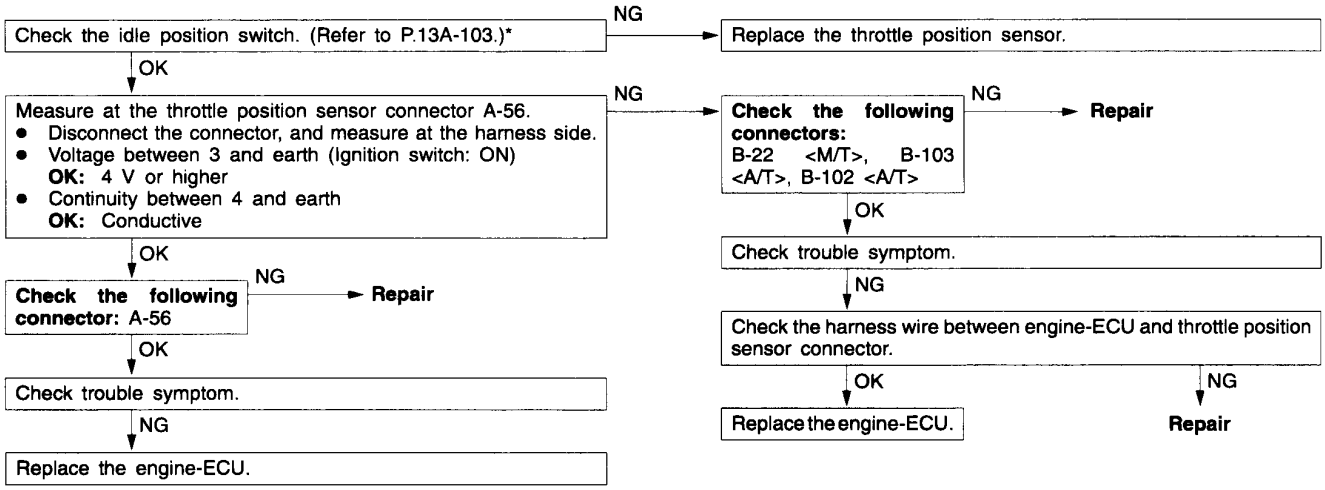
Fuel pump system	Probable cause
The engine-ECU turns the control relay ON when the engine is cranking or running, and this supplies power to drive the fuel pump.	• Malfunction of the fuel pump relay • Malfunction of the fuel pump • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

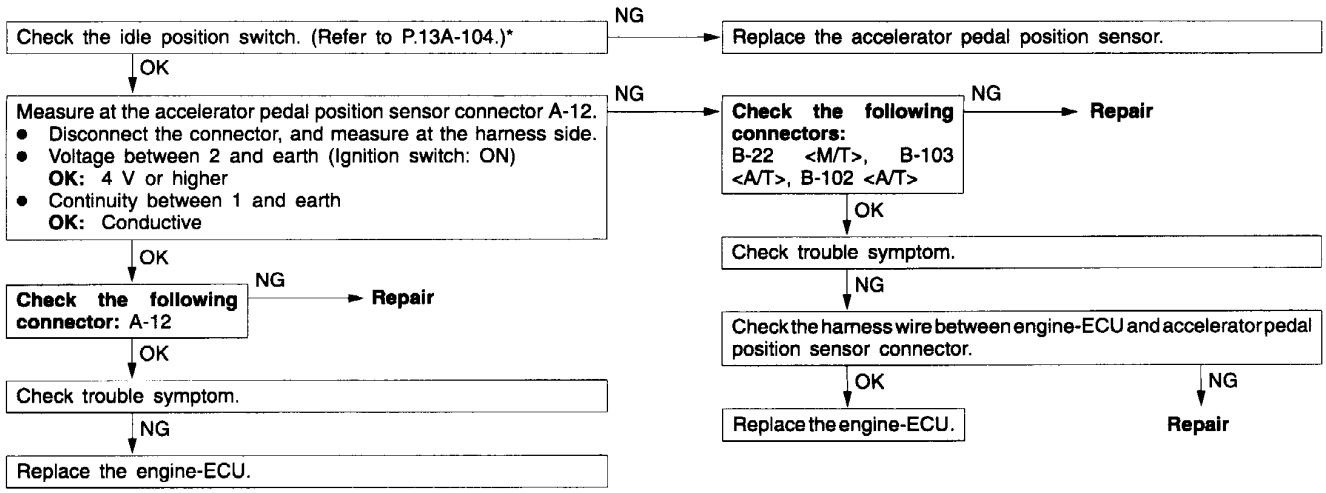
INSPECTION PROCEDURE 26

Idle position switch system <Vehicles without TCL>	Probable cause
The idle position switch inputs the condition of the accelerator pedal, i.e. whether it is depressed or released (HIGH/LOW), to the engine-ECU. The engine-ECU controls the idle speed control servo based on this input.	• Maladjustment of the accelerator pedal • Maladjustment of the fixed SAS • Maladjustment of the idle position switch and throttle position sensor • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



INSPECTION PROCEDURE 27

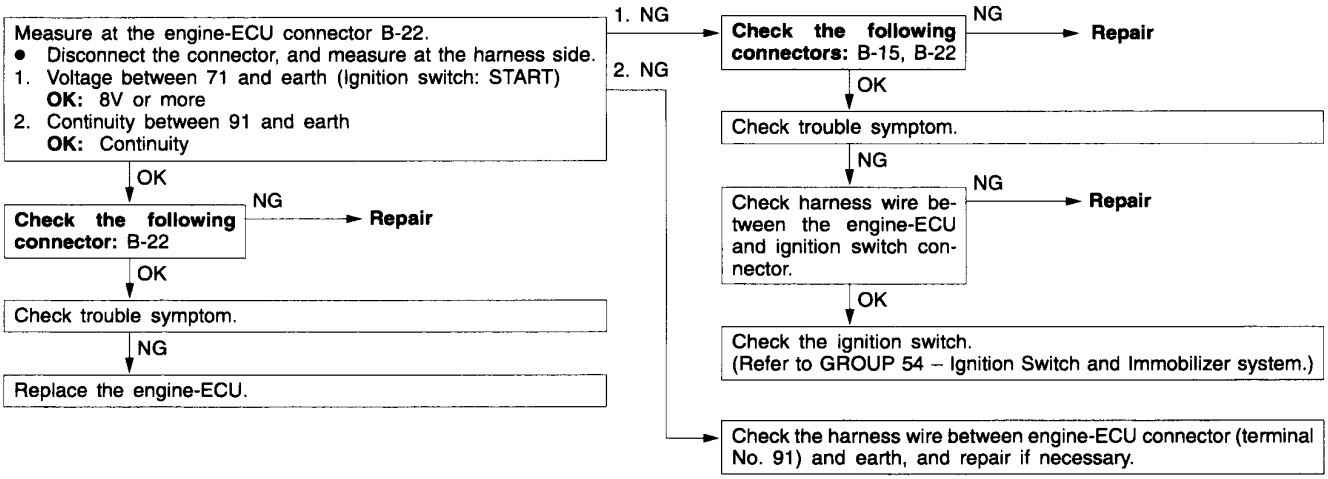
Idle position switch system <Vehicles with TCL>	Probable cause
The idle position switch inputs the condition of the accelerator pedal, i.e. whether it is depressed or released (HIGH/LOW), to the engine-ECU. The engine-ECU controls the idle speed control servo based on this input.	• Maladjustment of the accelerator pedal • Maladjustment of the fixed SAS • Maladjustment of the idle position switch and accelerator pedal position sensor • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

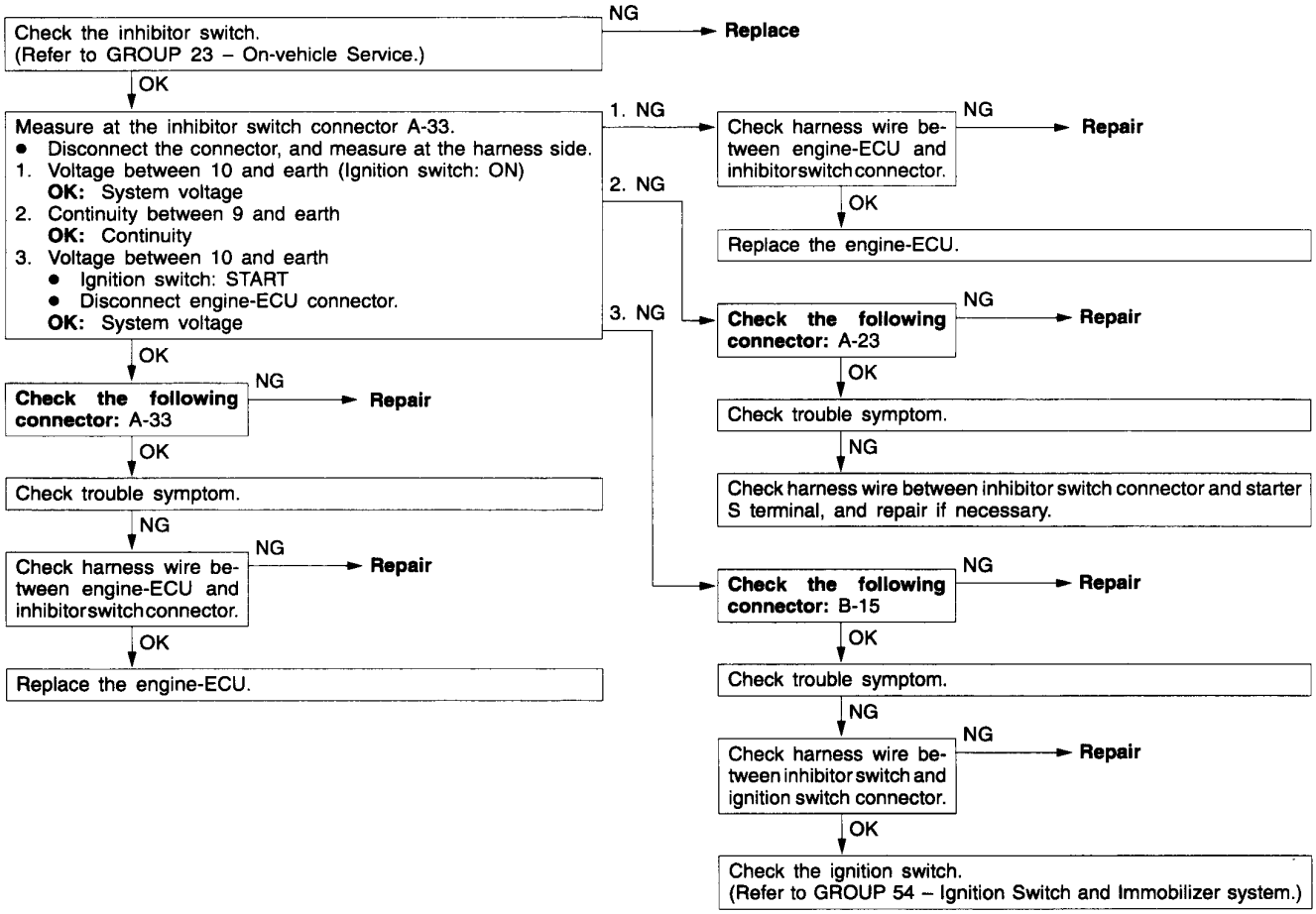
INSPECTION PROCEDURE 28

Ignition switch-ST system <M/T>	Probable cause
The ignition switch-ST inputs a HIGH signal to the engine-ECU while the engine is cranking. The engine-ECU controls fuel injection, etc. during starting based on this input.	• Malfunction of ignition switch • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



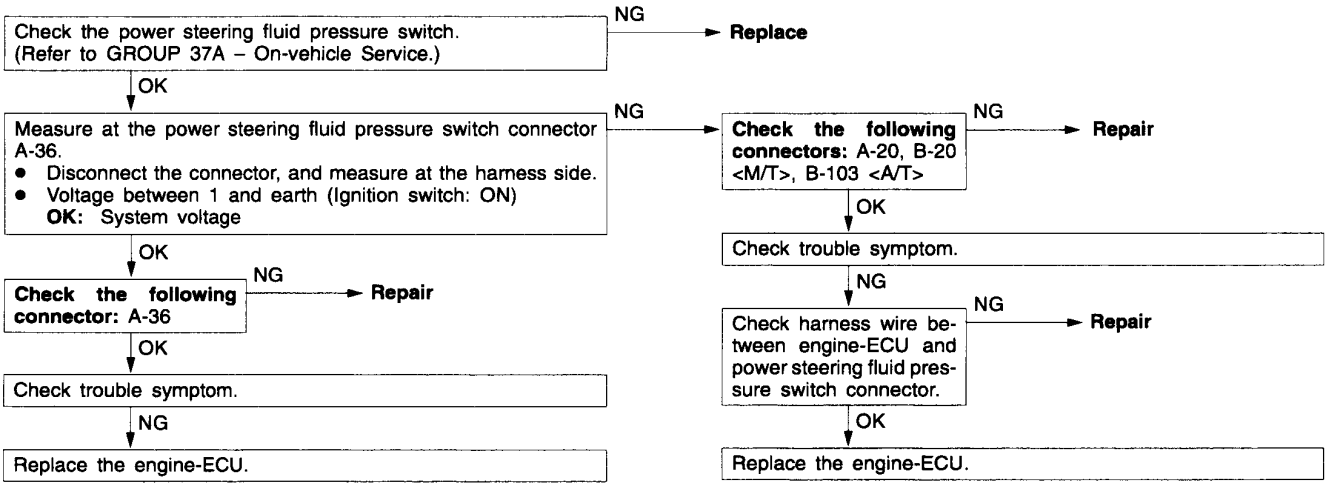
INSPECTION PROCEDURE 29

Ignition switch-ST and inhibitor switch system <A/T>	Probable cause
• The ignition switch-ST inputs a HIGH signal to the engine-ECU while the engine is cranking. The engine-ECU controls fuel injection, etc. during starting based on this input. • The inhibitor switch inputs the condition of the select lever, i.e. whether it is in P or N range or in some other range, to the engine-ECU. The engine-ECU controls the idle speed control (ISC) servo based on this input.	• Malfunction of ignition switch • Malfunction of inhibitor switch • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU.



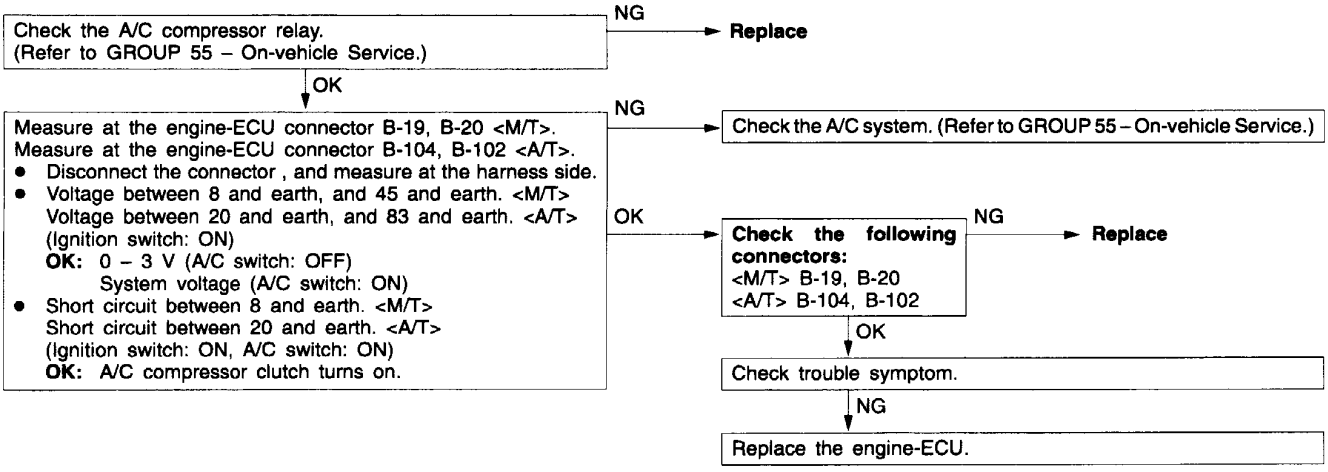
INSPECTION PROCEDURE 30

Power steering fluid pressure switch system	Probable cause
The presence or absence of power steering load is input to the engine-ECU. The engine-ECU controls the idle speed control (ISC) servo based on this input.	• Malfunction of power steering fluid pressure switch • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



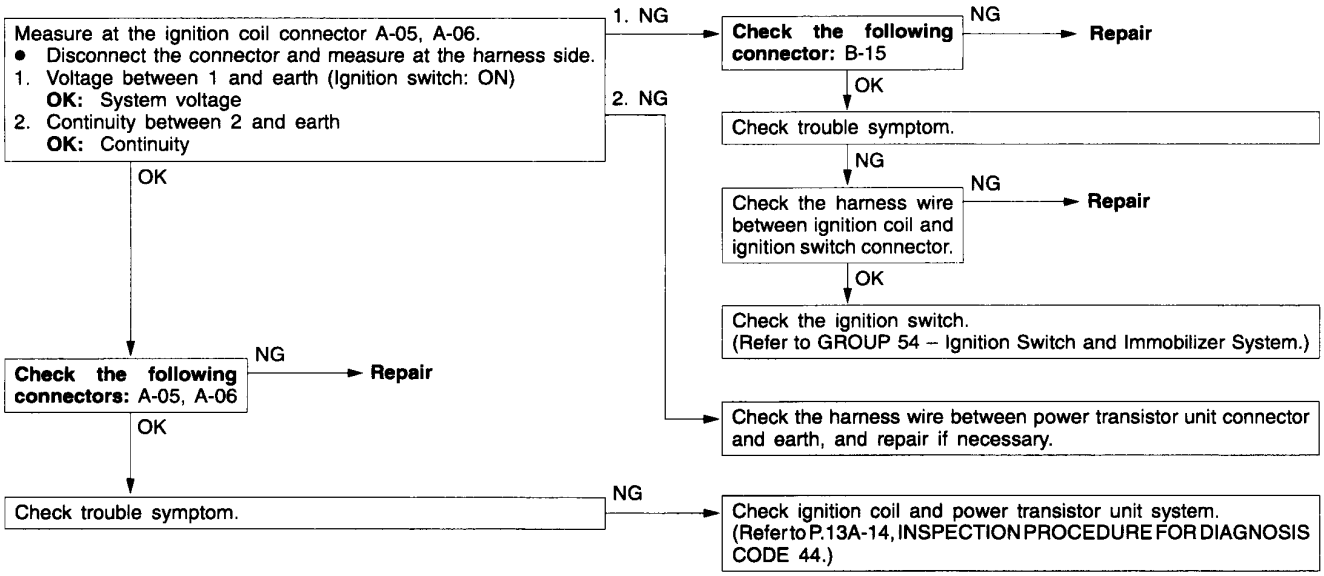
INSPECTION PROCEDURE 31

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



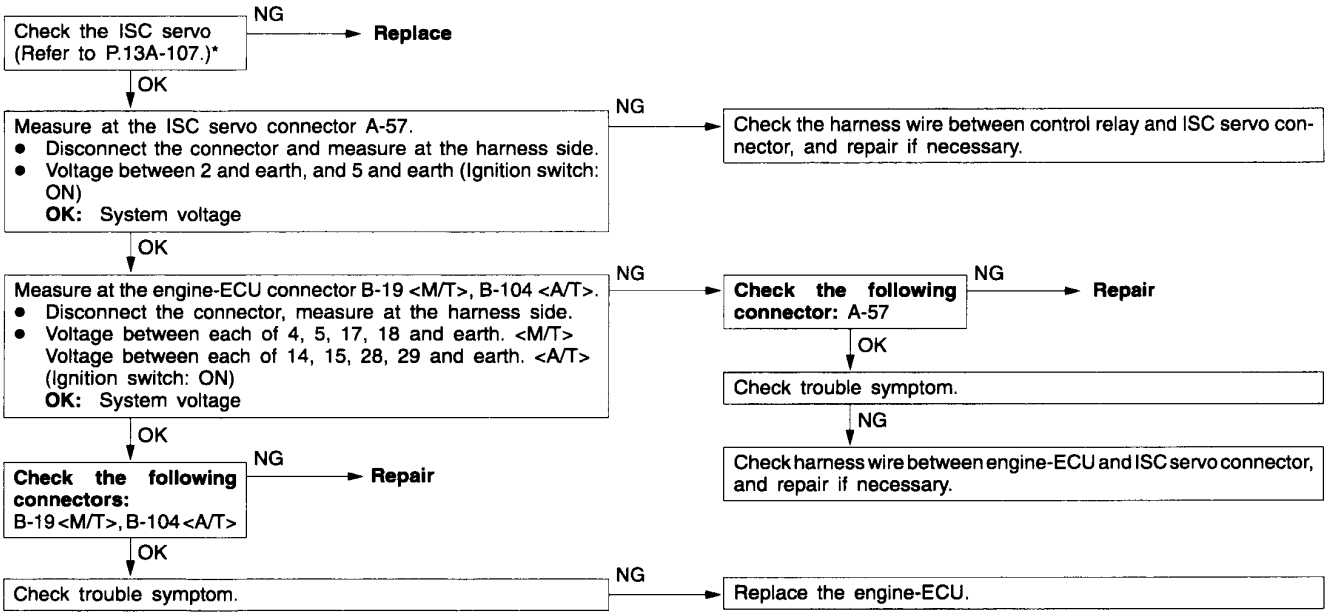
INSPECTION PROCEDURE 32

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



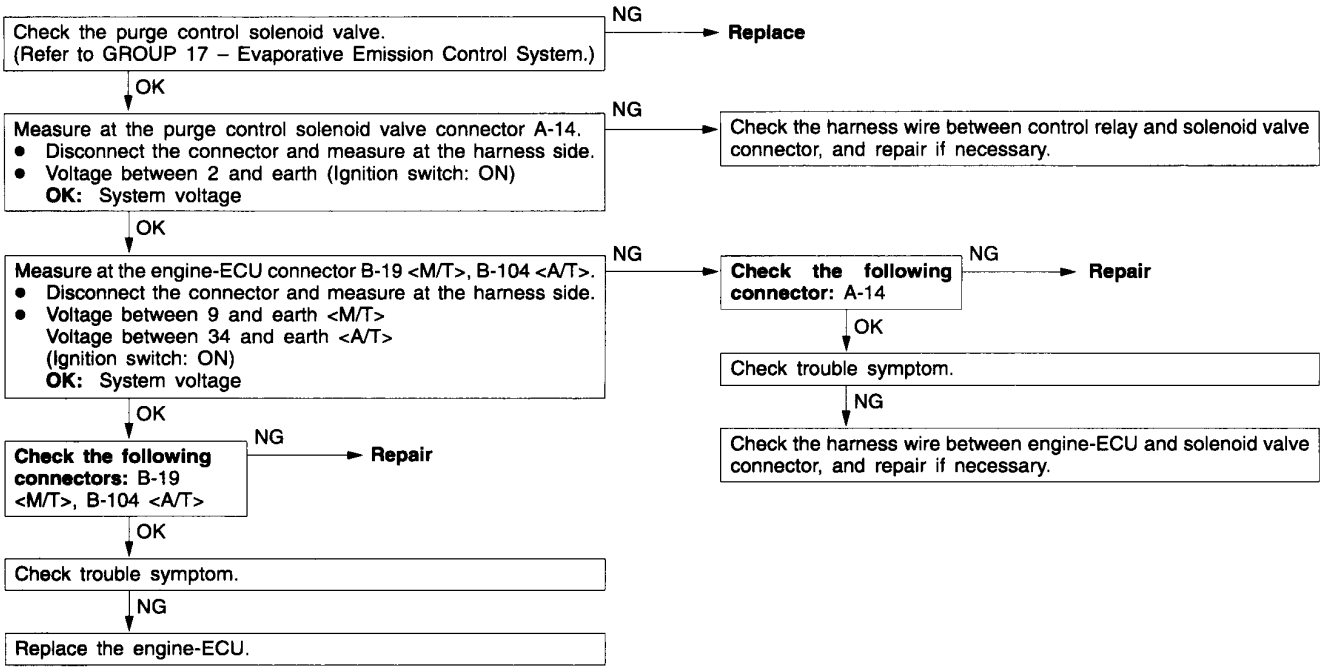
INSPECTION PROCEDURE 33

Idle speed control (ISC) servo (Stepper motor) system	Probable cause
The engine ECU controls the intake air volume during idling by opening and closing the servo valve located in the bypass air passage.	• Malfunction of ISC servo • Improper connector contact, open circuit or short-circuited harness wire • Malfunction of the engine-ECU



INSPECTION PROCEDURE 34

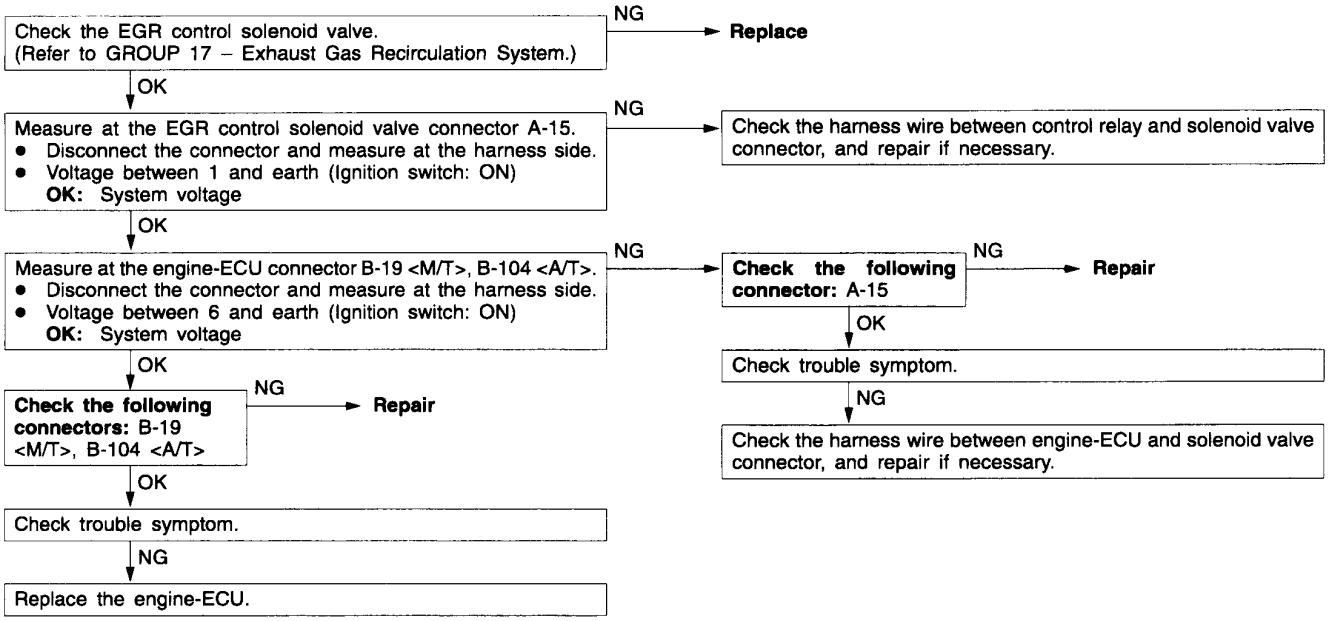
Purge control solenoid valve system	Probable cause
The purge control solenoid valve controls the purging of air from the canister located inside the intake manifold.	• Malfunction of solenoid valve • Improper connector contact, open circuit or short-circuited harness wire. • Malfunction of the engine-ECU



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

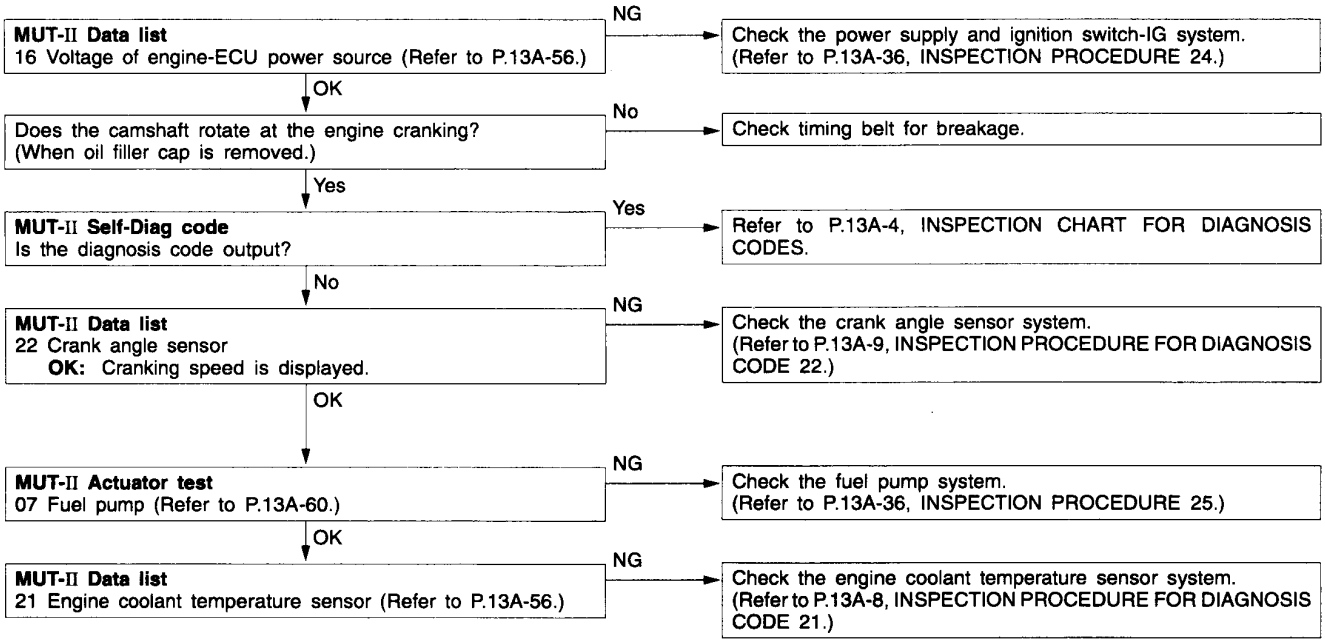
INSPECTION PROCEDURE 35

EGR control solenoid valve system	Probable cause
The EGR control solenoid valve is controlled by the negative pressure resulting from EGR operation leaking to port "A" of the throttle body.	• Malfunction of solenoid valve • Improper connector contact, open circuit or short-circuited harness wire. • Malfunction of the engine-ECU



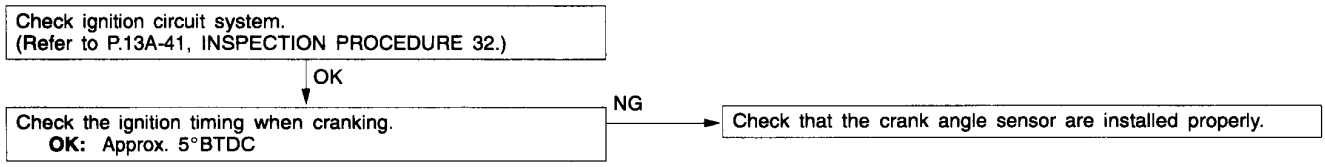
INSPECTION PROCEDURE 36

MUT-II: Inspection of no initial combustion



INSPECTION PROCEDURE 37

Ignition system: Inspection of no initial combustion.



INSPECTION PROCEDURE 38

MUT-II: Check if uncomplete combustion occurs.

MUT-II Self-Diag code
Is the diagnosis code output?
Yes → Refer to P.13A-4, INSPECTION CHART FOR DIAGNOSIS CODE
No ↓

MUT-II Actuator test
07 Fuel pump (Refer to P.13A-60.)
NG → Check the fuel pump system. (Refer to P.13A-36, INSPECTION PROCEDURE 25.)
OK ↓

MUT-II Data list
21 Engine coolant temperature sensor (Refer to P.13A-56.)
NG → Check the engine coolant temperature sensor system. (Refer to P.13A-8, INSPECTION PROCEDURES FOR DIAGNOSIS CODE 21.)
OK ↓

MUT-II Data list
18 Ignition switch-ST (Refer to P.13A-56.)
NG → Check the ignition switch-ST system <M/T>. (Refer to P.13A-38, INSPECTION PROCEDURE 28.) Check the ignition switch-ST and inhibitor switch system <A/T>. (Refer to P.13A-39, INSPECTION PROCEDURE 29.)

INSPECTION PROCEDURE 39

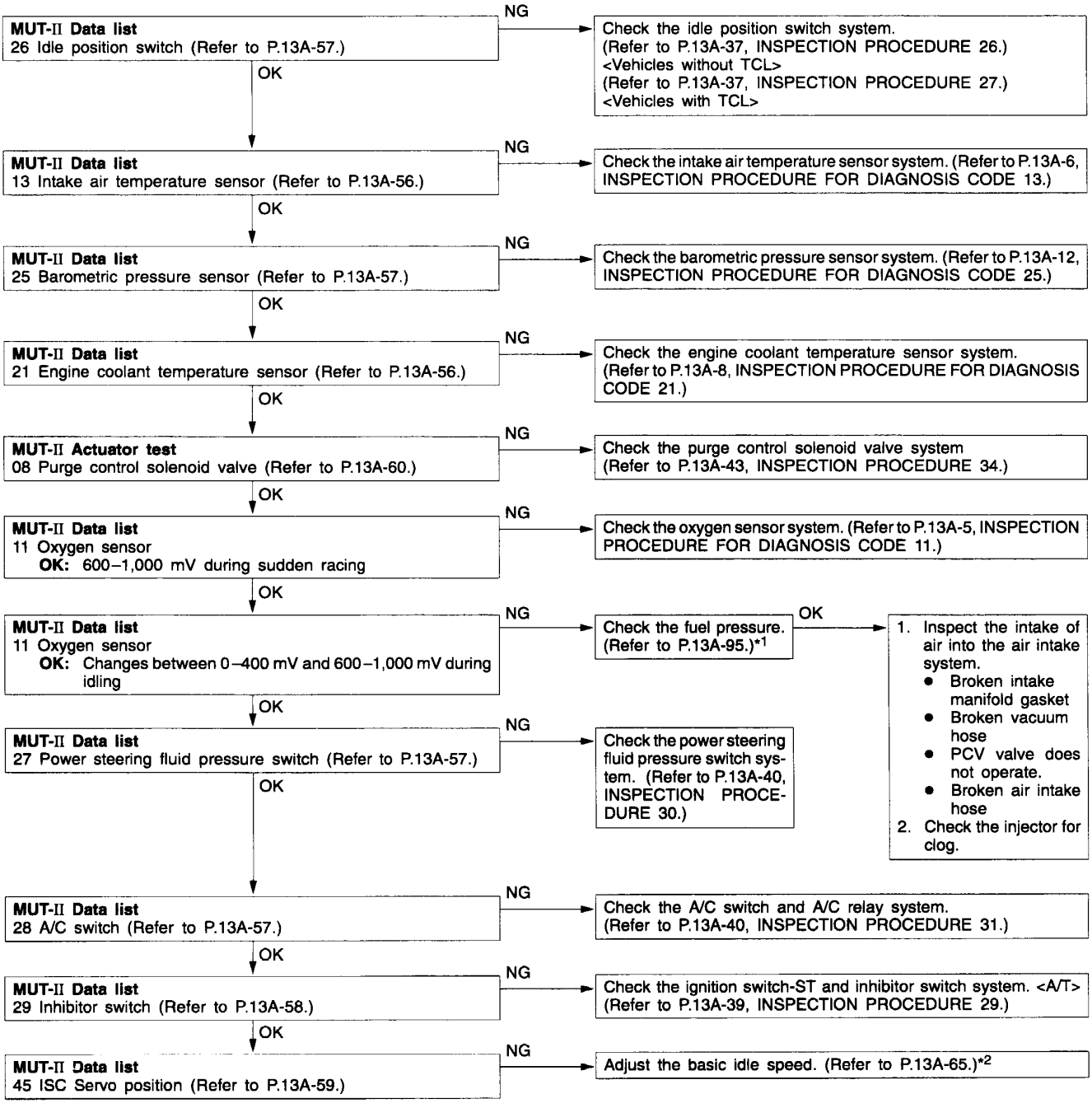
Check if hunting occurs.

Clean the throttle body. (Refer to P.13A-90.)*
↓
Check and adjust the fixed SAS. (Refer to P.13A-93.)*
↓
Check trouble symptom.
NG ↓
Inspect the intake of air into the air intake system
- Broken intake manifold gasket
- Broken air intake hose
- Broken vacuum hose
- Positive crankcase ventilation valve does not operate.

*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

INSPECTION PROCEDURE 40

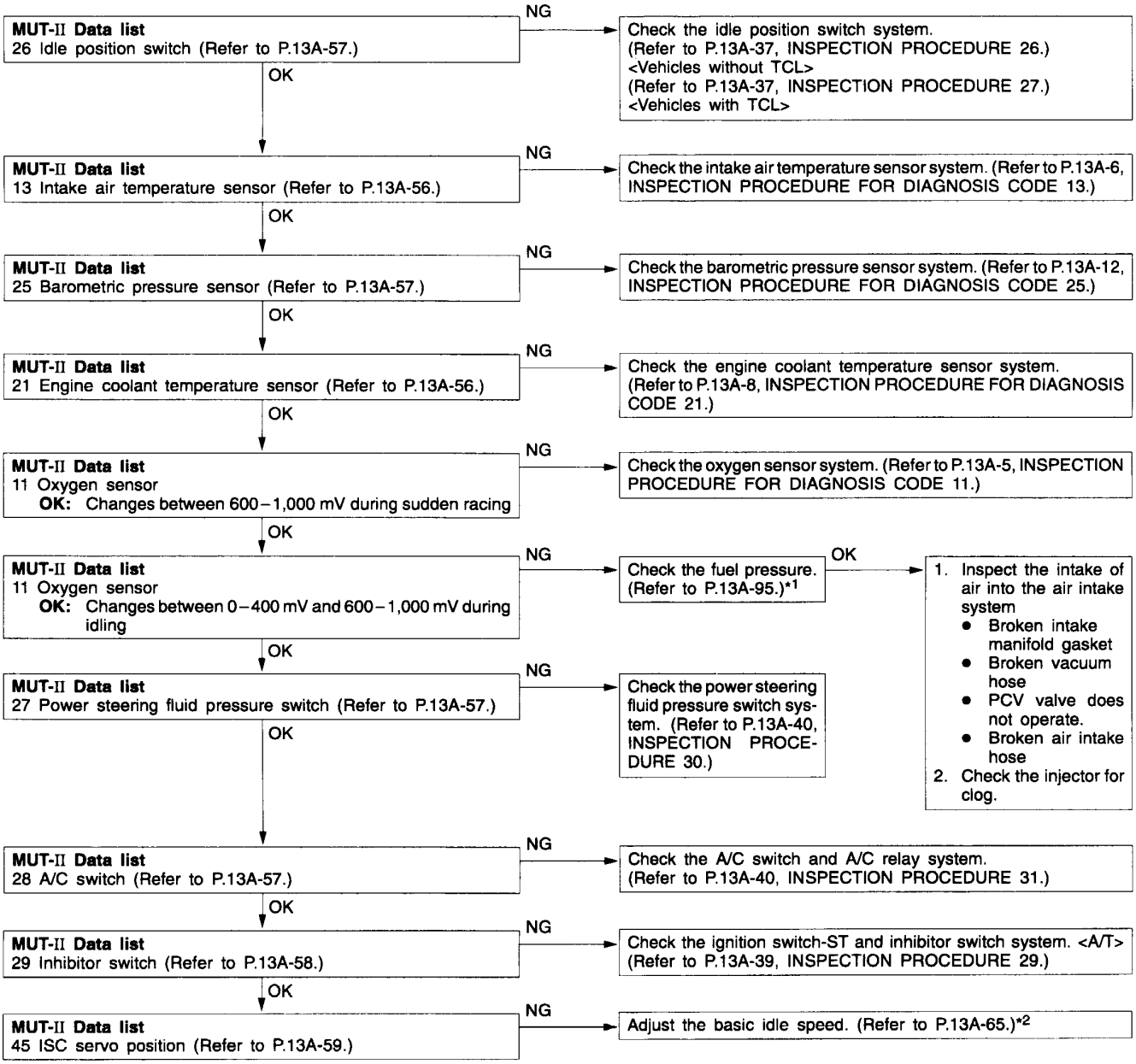
MUT-II: Check if idling speed is unstable.



*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

INSPECTION PROCEDURE 41

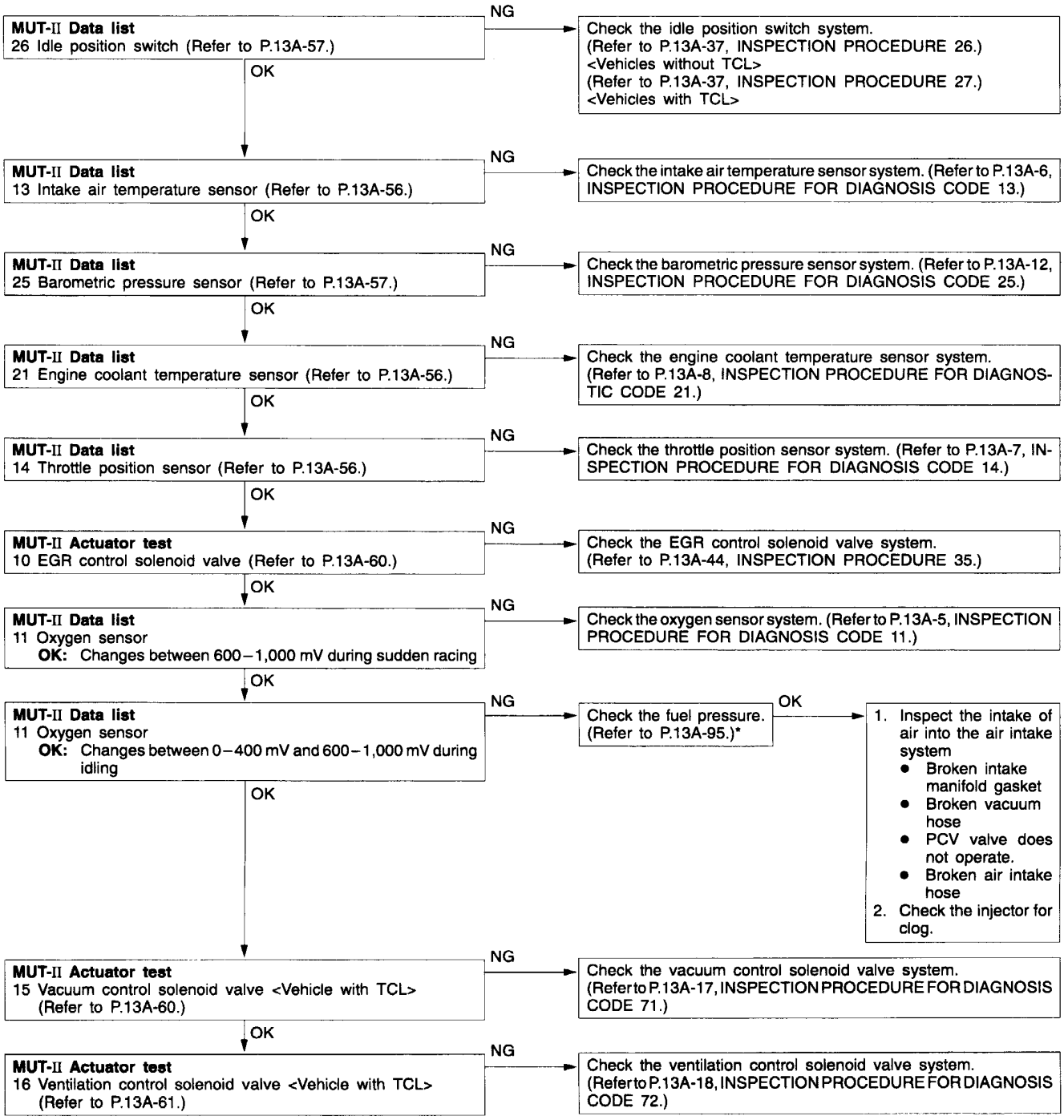
MUT-II: Engine stalling inspection when the engine is warmed up and idling.



*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

INSPECTION PROCEDURE 42

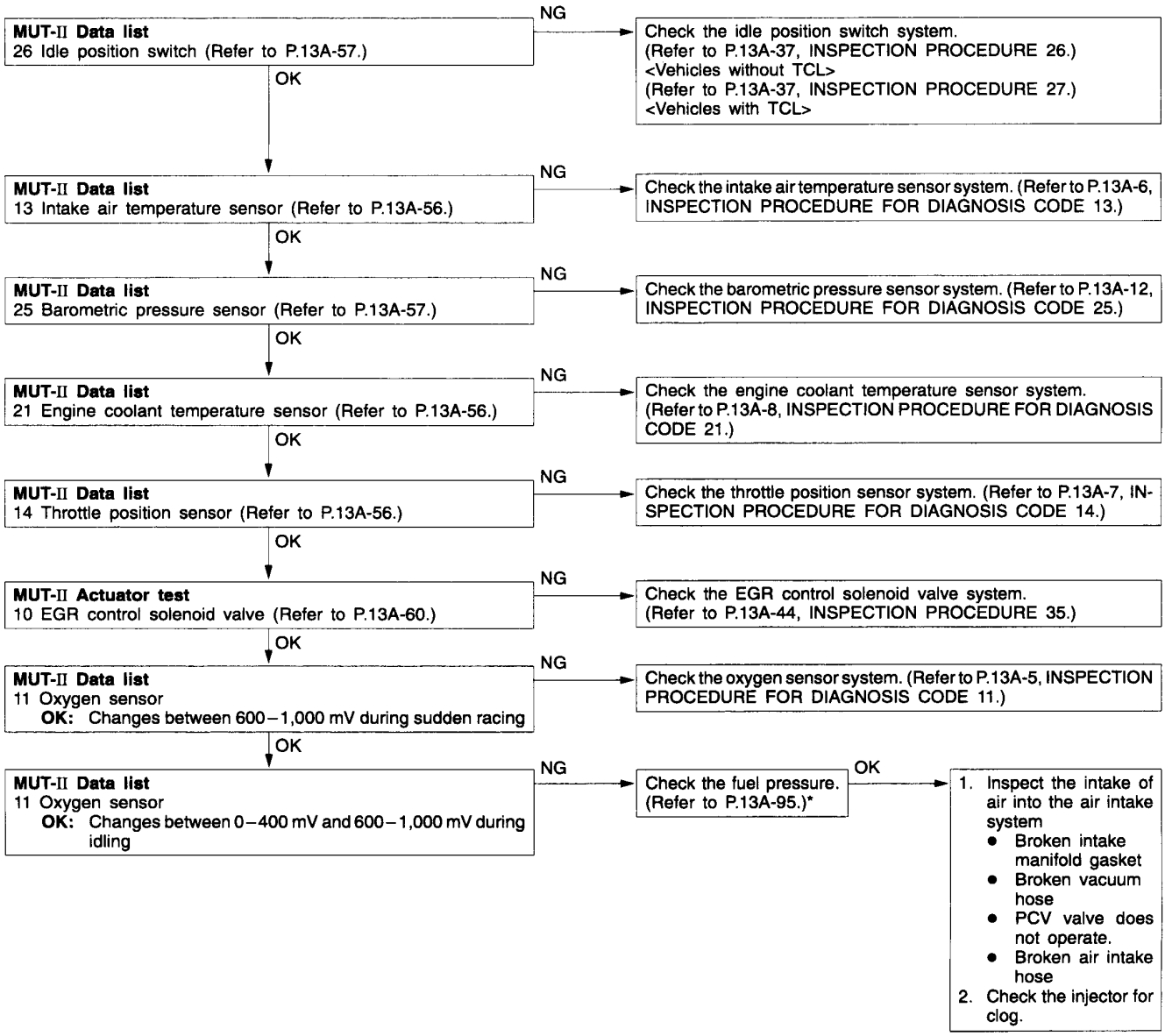
MUT-II: Check if hesitation, sug, stumble or poor acceleration occurs.



*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

INSPECTION PROCEDURE 43

MUT-II Check if surge occurs.

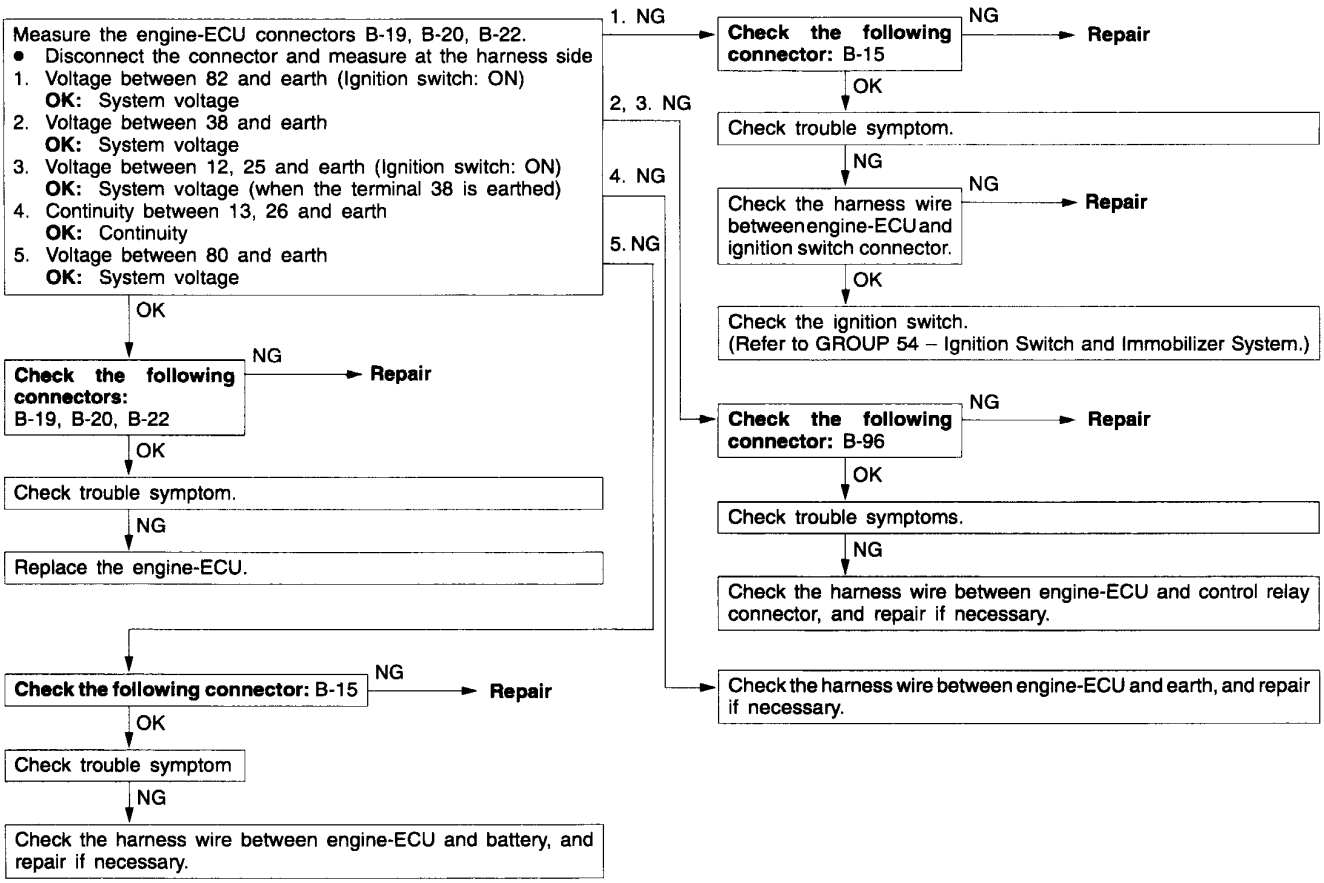


*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

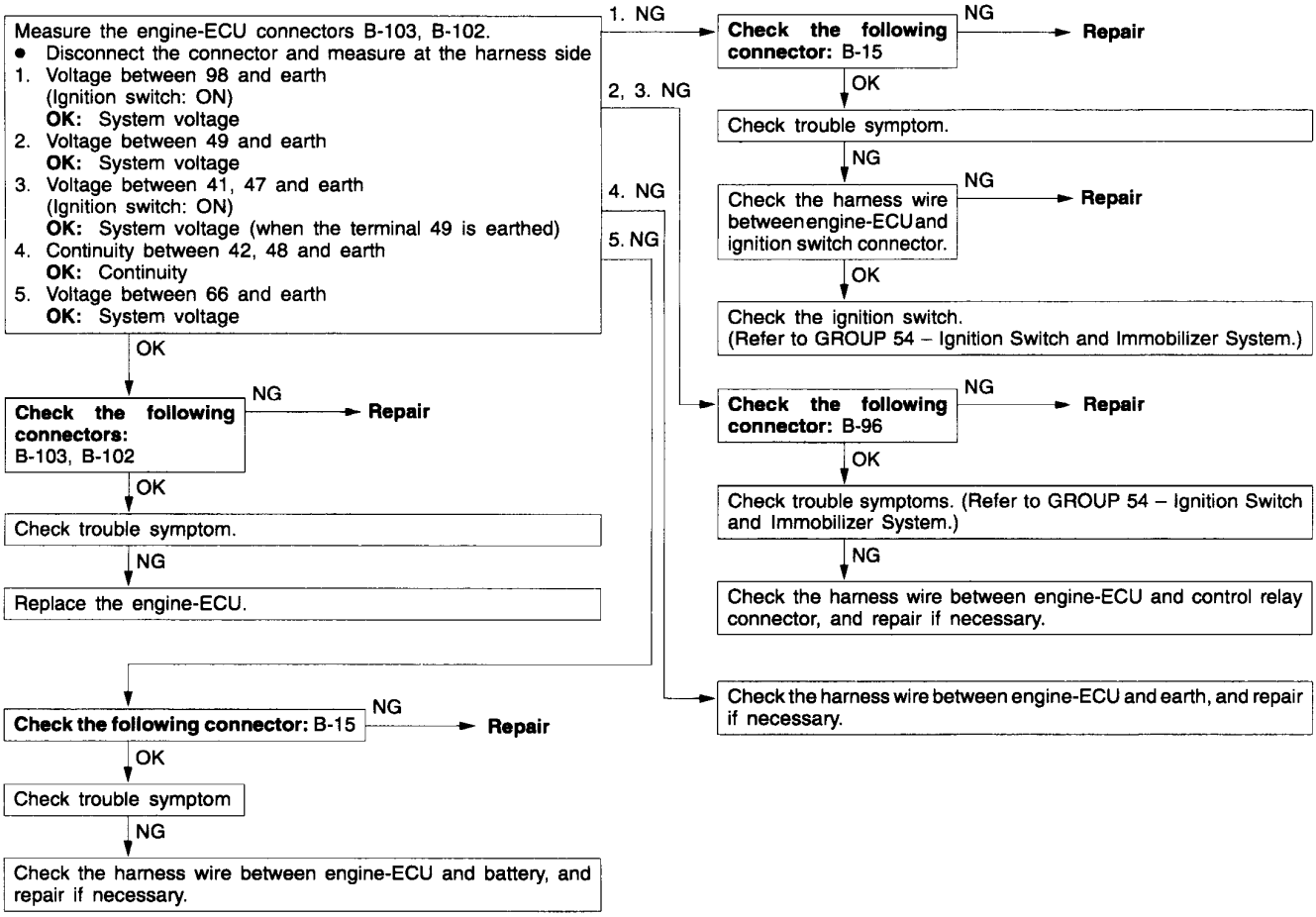
INSPECTION PROCEDURE 44

Check the engine-ECU power supply and earth circuit.

<M/T>

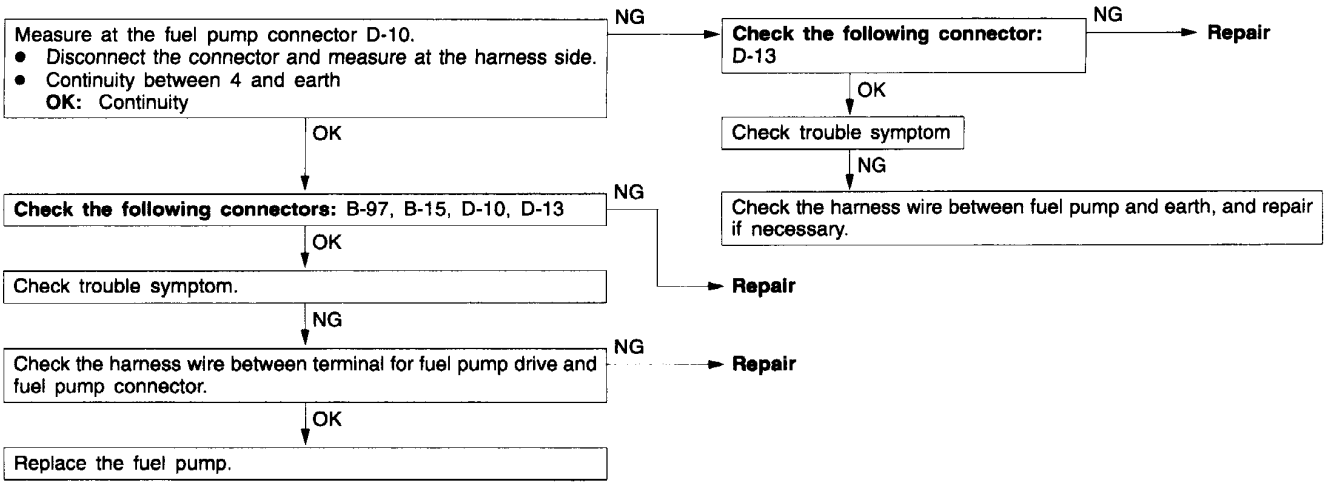


<A/T>



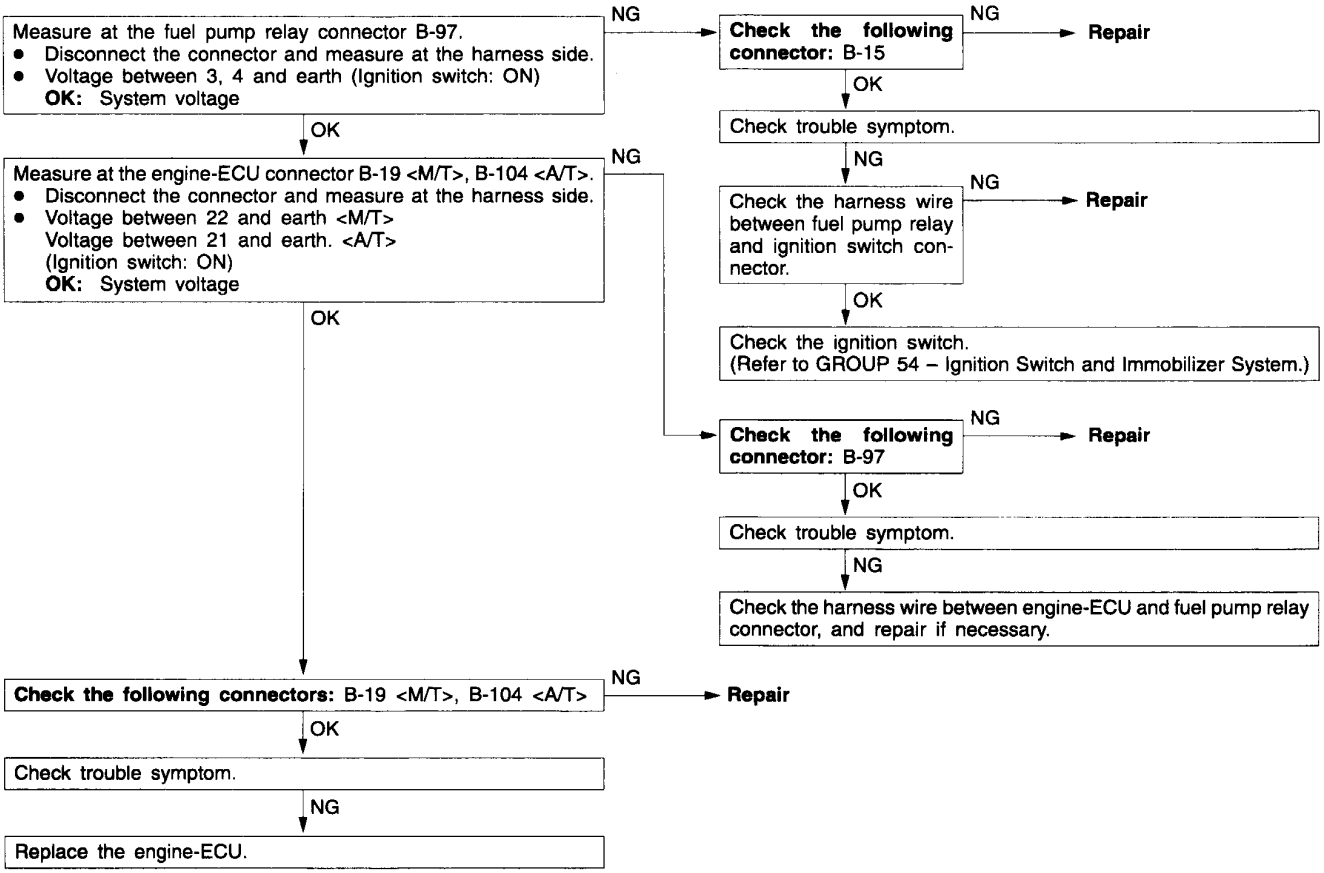
INSPECTION PROCEDURE 45

Check fuel pump circuit.



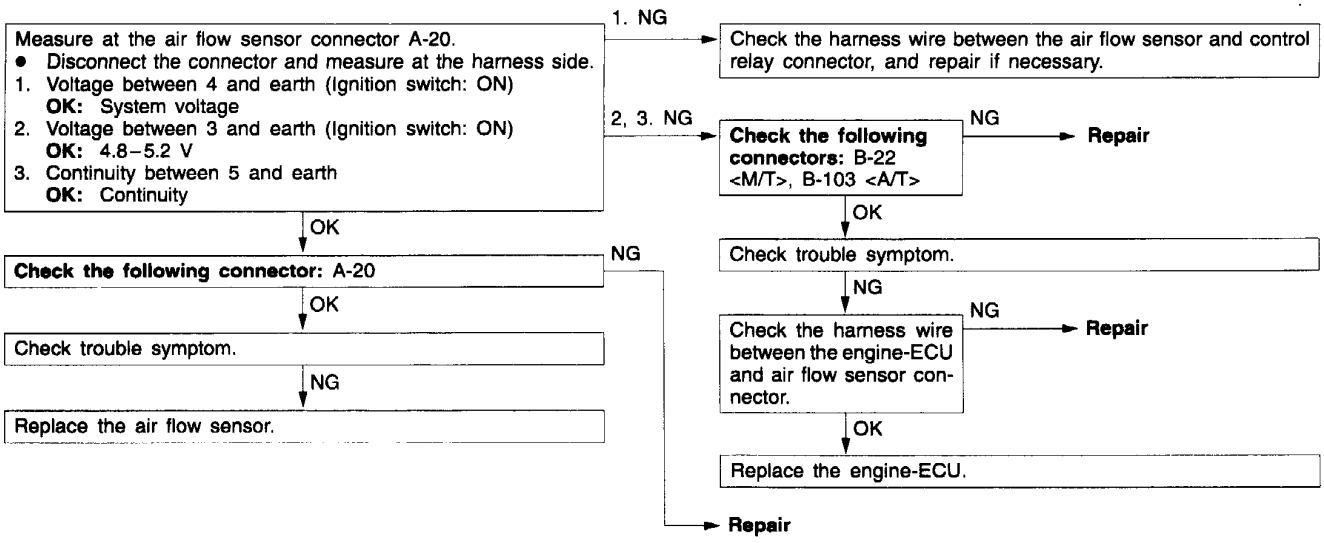
INSPECTION PROCEDURE 46

Check the fuel pump drive control circuit.



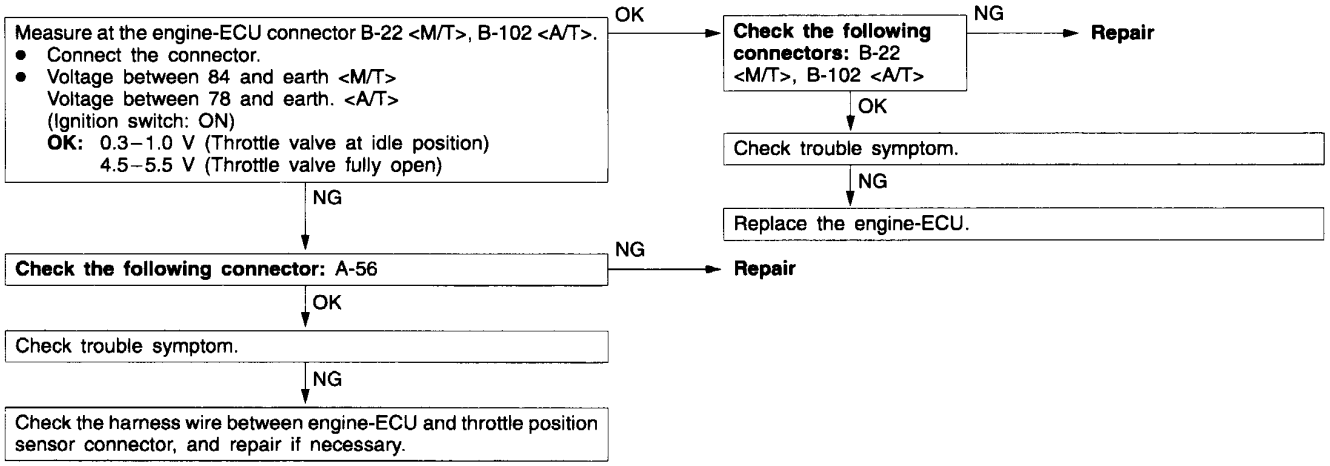
INSPECTION PROCEDURE 47

Check air flow sensor (AFS) control circuit.



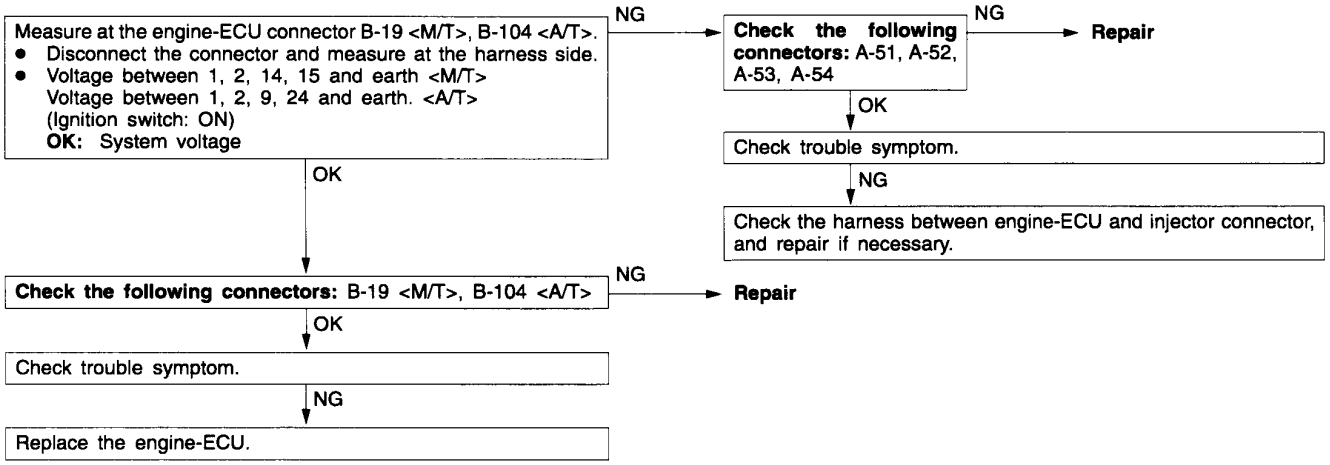
INSPECTION PROCEDURE 48

Check throttle position sensor (TPS) output circuit.



INSPECTION PROCEDURE 49

Check injector control circuit



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. When idling to warm-up from an engine coolant temperature of approx. –20°C, if the idling speed is lower than the standard value even when the stepper motor is fully opened, the air volume limiter built in the throttle body could be defective.
*3. 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.
*4. 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.
*5. In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10% longer than the standard time.
*6. 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	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. 11	13A-5
			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)		
			2,500 r/min	600 – 1,000 mV		
12	Air flow sensor*1	• Engine coolant temperature: 80 – 95°C • Lamps and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	25 – 51 Hz <Except 4G92 (6B model)> 18 – 44 Hz <4G92 (6B model)>	–	–
			2,500 r/min	80 – 120 Hz <4G92> 55 – 95 Hz <4G92 (6B model), 4G93>		
			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. 13	13A-6
			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. 14	13A-7
			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. 24	13A-36
18	Cranking signal (ignition switch-ST)	Ignition switch: ON	Engine: Stopped	OFF	Procedure No. 28 <M/T> Procedure No. 29 <A/T>	13A-38 <M/T> 13A-39 <A/T>
			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. 21	13A-8
			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*2	• Engine: Cranking • Tachometer: Connected	Compare the engine speed readings on the tachometer and the MUT-II.	Accord	Code No. 22	13A-9
		• Engine: Idling • Idle position switch: ON	When engine coolant temperature is –20°C	1,400 – 1,600 r/min		
			When engine coolant temperature is 0°C	1,350 – 1,550 r/min		
			When engine coolant temperature is 20°C	1,300 – 1,500 r/min <4G92> 1,250 – 1,200 r/min <4G93>		
			When engine coolant temperature is 40°C	1,100 – 1,300 r/min <4G92> 1,000 – 1,200 r/min <4G93>		
			When engine coolant temperature is 80°C	650 – 850 r/min <4G92> 700 – 900 r/min <4G93>		
25	Barometric pressure sensor	Ignition switch: ON	At altitude of 0 m	101 kPa	Code No. 25	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	Procedure No. 26 <Vehicles without TCL> Procedure No. 27 <Vehicles with TCL>	13A-37 <Vehicles without TCL> 13A-37 <Vehicles with TCL>
			Throttle valve: Slightly open	OFF*3		
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary	OFF	Procedure No. 30	13A-40
			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. 31	13A-40
			A/C switch: ON	ON		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
29	Inhibitor switch <A/T>	Ignition switch: ON	P or N	P or N	Procedure No. 29	13A-39
			D, 2, L or R	D, 2, L or R		
41	Injectors*4	Engine: Cranking	When engine coolant temperature is 0°C (injection is carried out for all cylinders simultaneously)	13 – 19 ms <4G92> 15 – 22 ms <4G93>	–	–
			When engine coolant temperature is 20°C	27 – 40 ms <4G92> 31 – 46 ms <4G93>		
			When engine coolant temperature is 80°C	5.9 – 8.9 ms <Except 4G92 (6B model)> 6.4 – 9.6 ms <4G92 (6B model)> 7.2 – 10.8 ms <4G93>		
	Injectors*5	• Engine coolant temperature: 80 – 95°C • Lamps and all accessories: OFF • Transmission: Neutral (A/T : P range)	Engine is idling	1.7 – 2.9 ms <Except 4G92 (6B model)> 1.4 – 2.6 ms <4G92 (6B model)> 2.2 – 3.4 ms <4G93>		
			2,500 r/min	1.4 – 2.6 ms <Except 4G92 (6B model)> 1.2 – 2.4 ms <4G92 (6B model)> 2.0 – 3.2 ms <4G93>		
			When engine is suddenly raced	Increases		

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
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 <Except 4G92 (6B model)> 0 – 16 °BTDC <4G92 (6B model)>	–	–
			2,500 r/min	30 – 50 °BTDC <4G92> 22 – 42 °BTDC <4G93>		
45	ISC (stepper) motor position *6	• Engine coolant temperature: 80 – 95°C • Lamps 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. 31	13A-40
			A/C switch: ON	ON (Compressor clutch is operating)		

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. 41	13A-13
02		Cut fuel to No. 2 injector					
03		Cut fuel to No. 3 injector					
04		Cut fuel to No. 4 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. 25	13A-36
				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.	Procedure No. 34	13A-43
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.	Procedure No. 35	13A-44
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. 71	13A-17

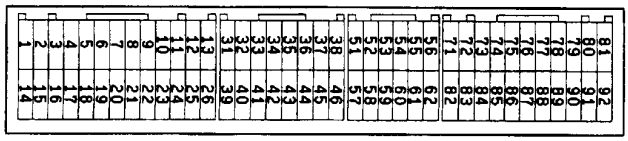
Item No.	Inspection item	Drive contents	Inspection contents	Normal condition	Inspection procedure No.	Reference page
16	Ventilation control solenoid valve <Vehicles with TCL>	Solenoid valve turns from OFF to ON.	Ignition switch: ON	Sound of operation can be heard when solenoid valve is driven.	Code No. 72	13A-18
17	Basic ignition timing	Set to ignition timing adjustment mode	Engine: Idling Timing light is set	5° BTDC	–	–
20	Condenser fan	Drive the fan motors (condenser)	• Ignition switch: ON • A/C switch: ON	Fan motor operates	Procedure No. 23	13A-35
21	Radiator fan and Condenser fan	Drive the fan motors (radiator and condenser).	Ignition switch: ON A/C switch: ON	Fan motor operates	Procedure No. 23	13A-35

CHECK AT THE ENGINE-ECU TERMINALS

TERMINAL VOLTAGE CHECK CHART

Engine ECU Connector Terminal Arrangement

<M/T>



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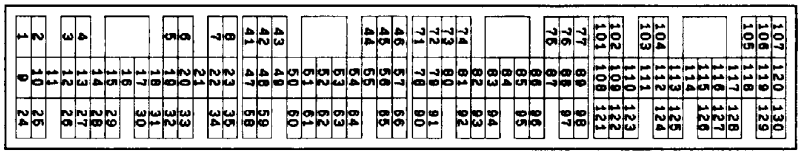

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Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)	Normal condition
1	1	No. 1 injector	While engine is idling after having warmed up, suddenly depress the accelerator pedal.	From 11 – 14 V, momentarily drops slightly
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	24	Purge control solenoid valve	Ignition switch: ON	System voltage
			Running at 3,000r/min while engine is warming up after having been started.	0 – 3 V

Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
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				
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 motor relay	Engine: Idle speed	Radiator fan is not operating	System voltage
				Radiator fan is operating	0 – 3 V
22	21	Fuel pump relay	Ignition switch: ON		System voltage
			Engine: Idle speed		0 – 3 V
32	31	Ventilation control solenoid valve <Vehicles with TCL>	Ignition switch: ON		System voltage
34	30	Vacuum control solenoid valve <Vehicles with TCL>	Ignition switch: ON		System voltage
36	22	Engine warning lamp	Ignition switch: OFF → 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	Ignition switch: OFF		System voltage
			Ignition switch: ON		0 – 3 V
45	83	A/C switch	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	Engine ignition signal	Engine r/min: 3,000 r/min		0.3 – 3.0 V

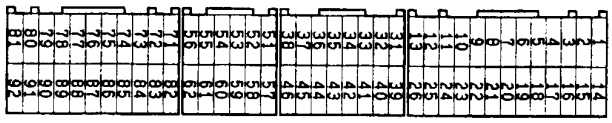
Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
60	3	Oxygen sensor heater	Engine: Idling after warming up		0 – 3 V
			Engine r/min: 5,000r/min		System voltage
71	58	Ignition switch – ST	Engine: Cranking		8 V or more
72	64	Intake air temperature sensor	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
76	71	Oxygen sensor	Engine: Running at 2,000 r/min after warmed up (Check using a digital type voltmeter)		0 ↔ 0.8 V (Changes repeatedly)
80	66	Backup power supply	Ignition switch: OFF		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
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

Terminal No. <M/T>	Terminal No. <A/T>	Check item	Check condition (Engine condition)		Normal condition
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: 2,000r/min		
–	59	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

<M/T>



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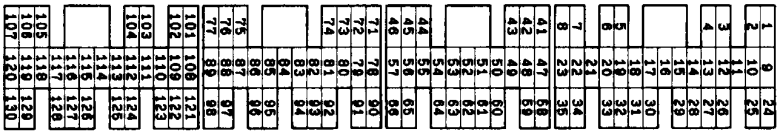

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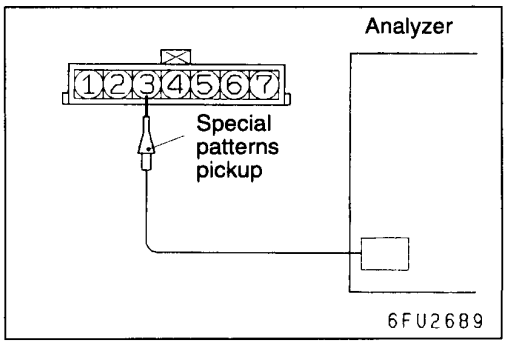
Terminal No. <M/T>	Terminal No. <A/T>	Inspection item	Normal condition (Check condition)
1 – 12	1 – 41	No. 1 injector	13 – 16 Ω (At 20°C)
14 – 12	9 – 41	No. 2 injector	
2 – 12	24 – 41	No. 3 injector	
15 – 12	2 – 41	No. 4 injector	
32 – 12	31 – 41	Ventilation control solenoid valve <Vehicles with TCL>	36 – 44 Ω (At 20°C)
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	36 – 44 Ω (At 20°C)
9 – 12	34 – 41	Purge control solenoid valve	36 – 44 Ω (At 20°C)
34 – 12	30 – 41	Vacuum control solenoid valve <Vehicles with TCL>	36 – 44 Ω (At 20°C)
13 – Body earth	42 – Body earth	ENGINE-ECU earth	Continuity (0Ω)
26 – Body earth	48 – Body earth		

Terminal No. <M/T>	Terminal No. <A/T>	Inspection item	Normal condition (Check condition)
60 – 12	3 – 41	Oxygen sensor heater	Approx. 3.5 Ω (At 20°C)
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)
–	59 – Body earth	Inhibitor switch	Continuity (when select lever is at P or N)
			No continuity (when select lever is at D, 3, 2, L or R)



INSPECTION PROCEDURE USING AN ANALYZER

AIR FLOW SENSOR (AFS)

Measurement Method

Measurement method has been changed to correspond to change of the air flow sensor. Other inspection procedure are the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

1. Disconnect the air flow sensor connector, and connect the special tool (test harness: MB991709) in between. (All terminals should be connected.)
2. Connect the analyzer special patterns pickup to air flow sensor connector terminal 3.

Alternate Method (Test harness not available)

1. Connect the analyzer special patterns pickup to the engine-ECU terminal 90 <M/T> or terminal 65 <A/T>.

CAMSHAFT POSITION SENSOR AND CRANK ANGLE SENSOR

Alternate method (test harness not available) has been established. <A/T> Other inspection procedures are the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

Alternate Method (Test harness not available)

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

INJECTOR

Alternate method (test harness not available) has been changed. <A/T> Other inspection procedures are the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

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.)

STEPPER MOTOR

Alternate method (test harness not available) has been established. <A/T> Other inspection procedures are the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

Alternate Method (Test harness not available)

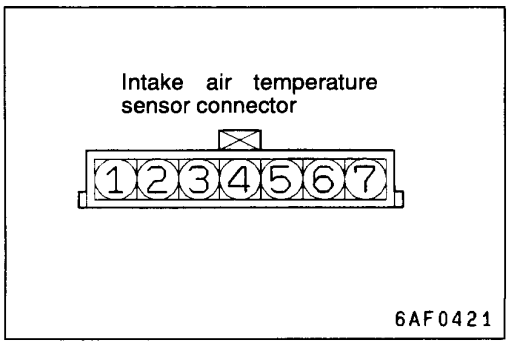
1. Connect the analyzer special patterns pickup to engine-ECU terminal 14, connection terminal 15, connection terminal 28, and connection terminal 29 respectively.

IGNITION COIL AND POWER TRANSISTOR

Alternate method (test harness not available) has been established. <A/T> Other inspection procedures are the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

Alternate Method (Test harness not available)

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



ON-VEHICLE SERVICE

INTAKE AIR TEMPERATURE SENSOR CHECK

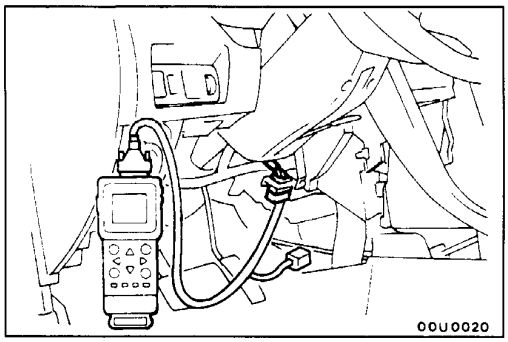
Connector form has been changed. Inspection procedure is the same as before. (Refer to '96 CARISMA Workshop Manual [Pub. No. PWDE9502])

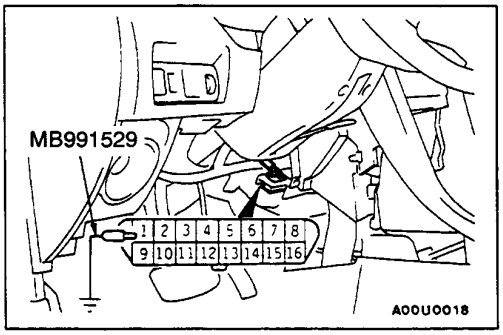
GROUP 13H
TRACTION CONTROL SYSTEM (TCL)

GENERAL

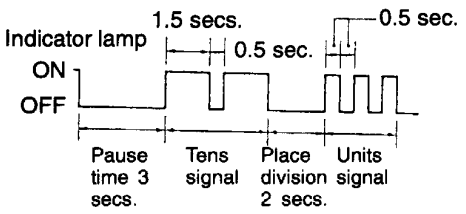
OUTLINE OF CHANGE

- The troubleshooting has been changed to correspond to the integration of the engine-ECU and A/T-ECU and the change of the TCL-ECU.





When diagnosis code No. 23 is output



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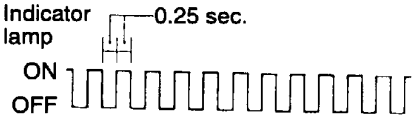


14U0017

TROUBLESHOOTING

DIAGNOSIS FUNCTION

DIAGNOSIS CODES CHECK

With the MUT-II

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

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

Without the MUT-II

1. Use the special tool to earth diagnosis connector terminal No. 1.
2. Turn the ignition switch to ON and then take a reading of the diagnosis codes from the flashing of the TCL-OFF indicator lamp.

ERASING DIAGNOSIS CODES

When using the MUT-II

- Connect the MUT-II to the diagnosis connector and erase the diagnosis code.

Caution

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

When not using the MUT-II

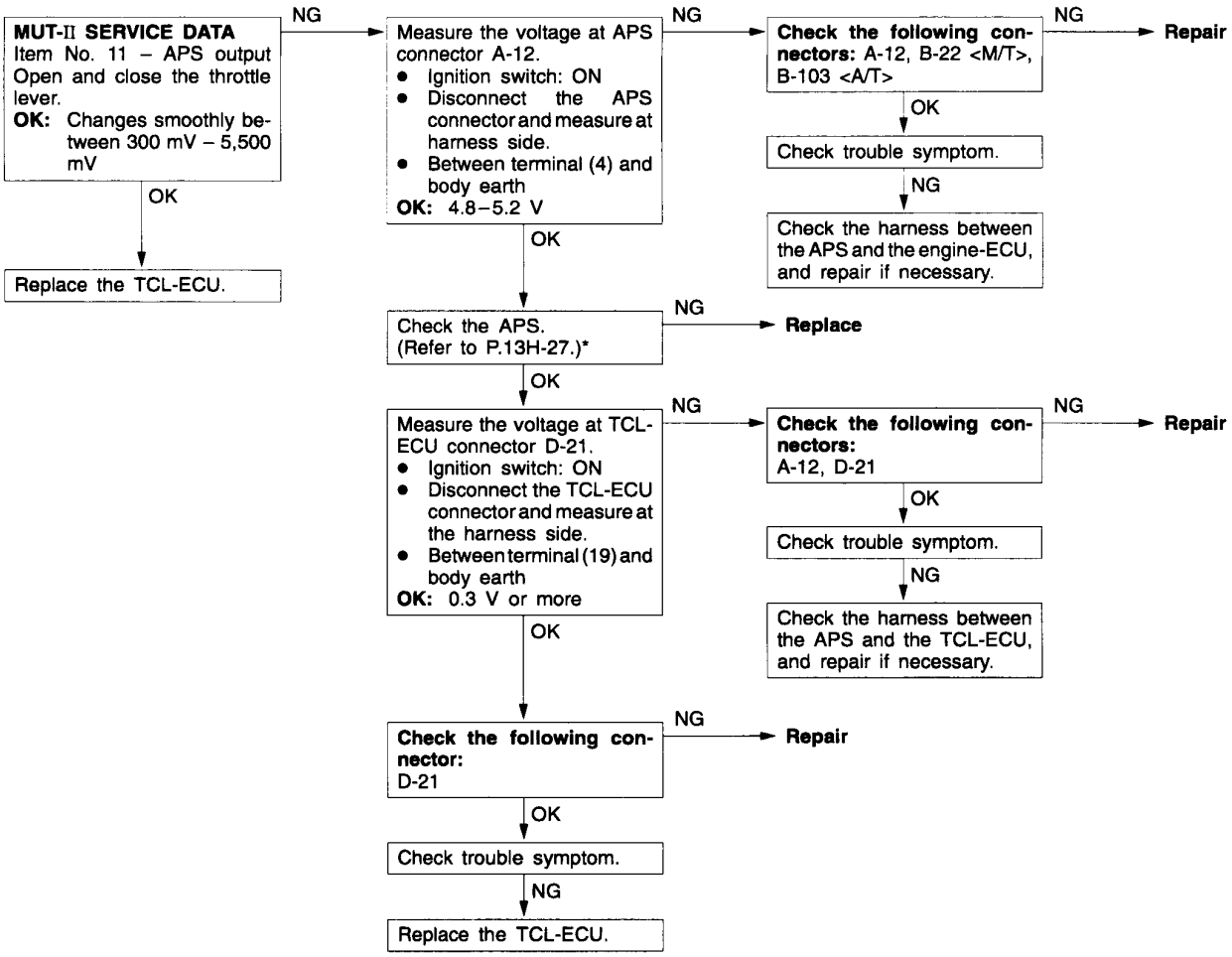
(1) Turn the ignition switch to OFF.
(2) After disconnecting the battery cable from the battery (–) terminal for 10 seconds or more, reconnect the cable.
(3) After the engine has warmed up, run it at idle for about 15 minutes.

INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
11	APS circuit system	13H-3
12	APS or TPS circuit system	13H-4
13	TPS or APS circuit system	13H-5
23	Stop lamp switch circuit system	13H-5
24	TCL switch circuit system	13H-6
26	Ignition switch (IG2) circuit system	13H-6
27	TCL-ECU power supply voltage circuit (engine control relay circuit) system	13H-7
31	Front right wheel speed sensor circuit system	13H-8
32	Front left wheel speed sensor circuit system	13H-8
33	Rear right wheel speed sensor circuit system	13H-8
34	Rear left wheel speed sensor circuit system	13H-8
35	Rear wheel speed sensor circuit system (1)	13H-9
36	Rear wheel speed sensor circuit system (2)	13H-9
41	Steering wheel sensor (ST-1) circuit system (open circuit)	13H-10
42	Steering wheel sensor (ST-2) circuit system (open circuit)	13H-10
43	Steering wheel sensor (ST-N) circuit system (open circuit)	13H-10
44	Steering wheel sensor circuit system (short circuit)	13H-11
45	Steering wheel sensor (ST-N) circuit system (short circuit)	13H-11
71	Engine-ECU communication circuit system	13H-12
72	Engine-ECU circuit system	GROUP 13A – Troubleshooting
73		
74	A/T-ECU communication circuit system	13H-12
76	ABS circuit system	13H-13

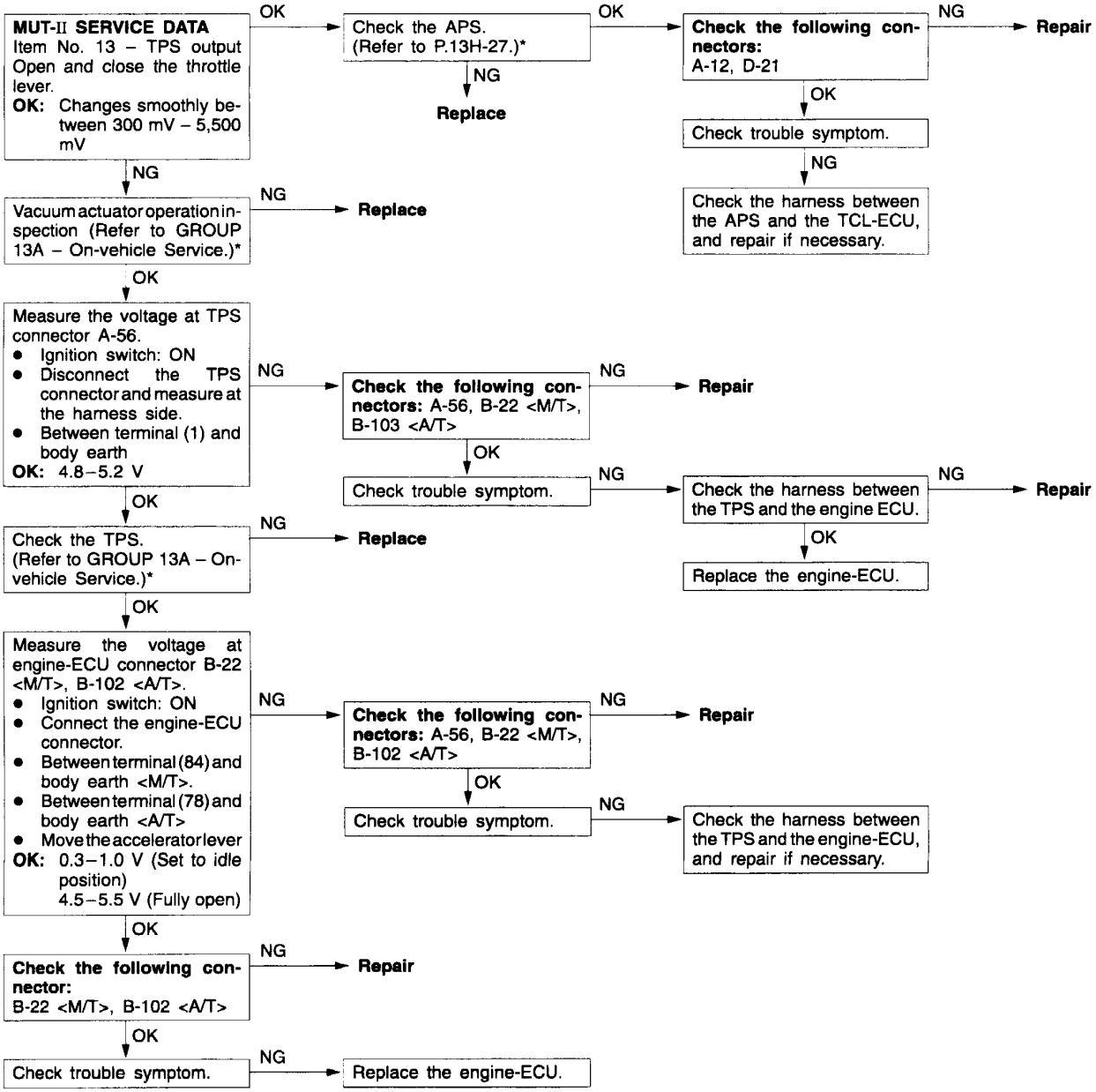
INSPECTION PROCEDURES FOR DIAGNOSIS CODES

Code No. 11 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 TCL-ECU.	• Malfunction of APS • Malfunction of TCL-ECU • Malfunction of engine-ECU • Malfunction of harness or connector



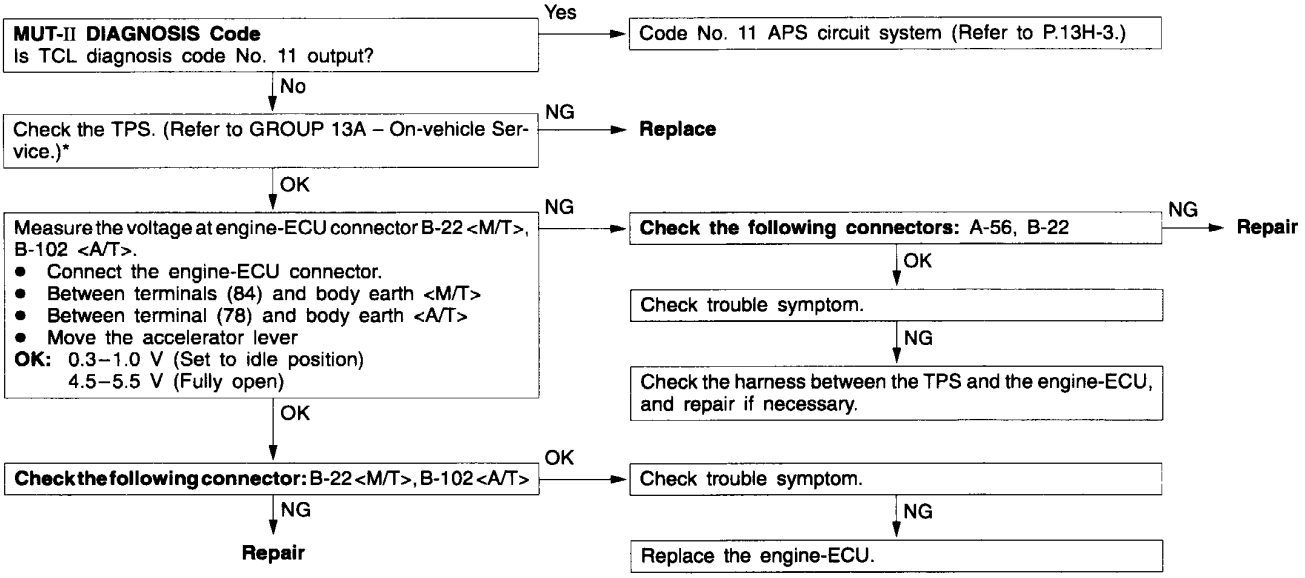
NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

Code No. 12 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.	• Malfunciton of APS • Malfunction of TPS • Malfunction of TCL-ECU • Malfunction of harness or connector • Malfunction of vacuum actuator



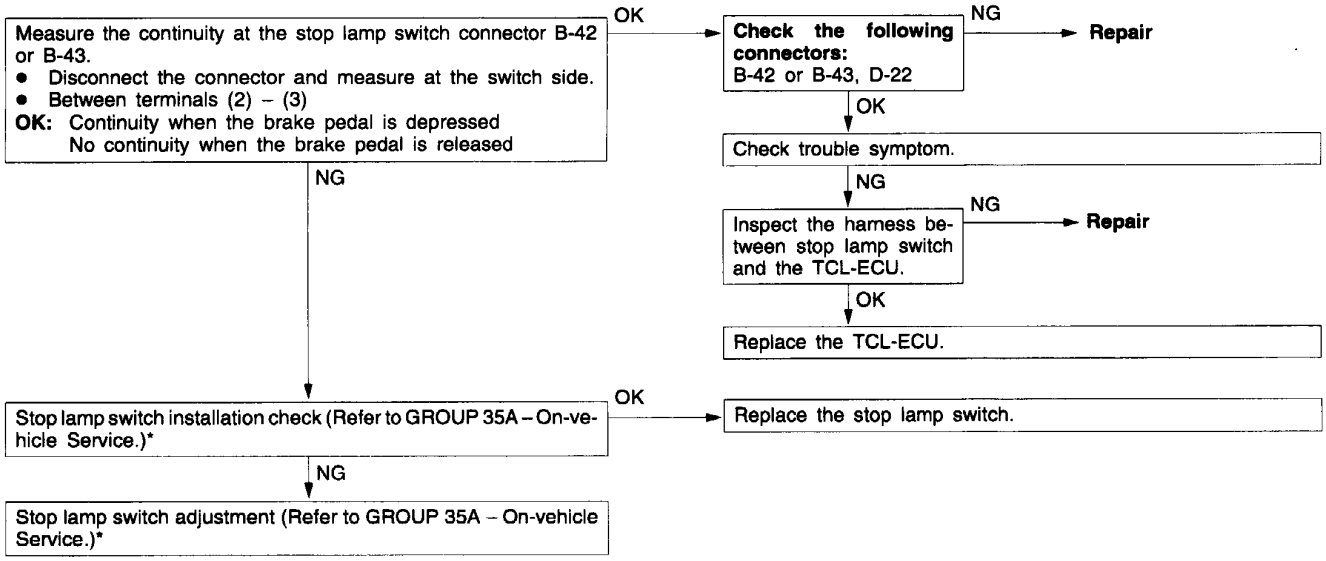
NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

Code No. 13 TPS 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. 11 is output at the same time. Accordingly, if only diagnosis code No. 11 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



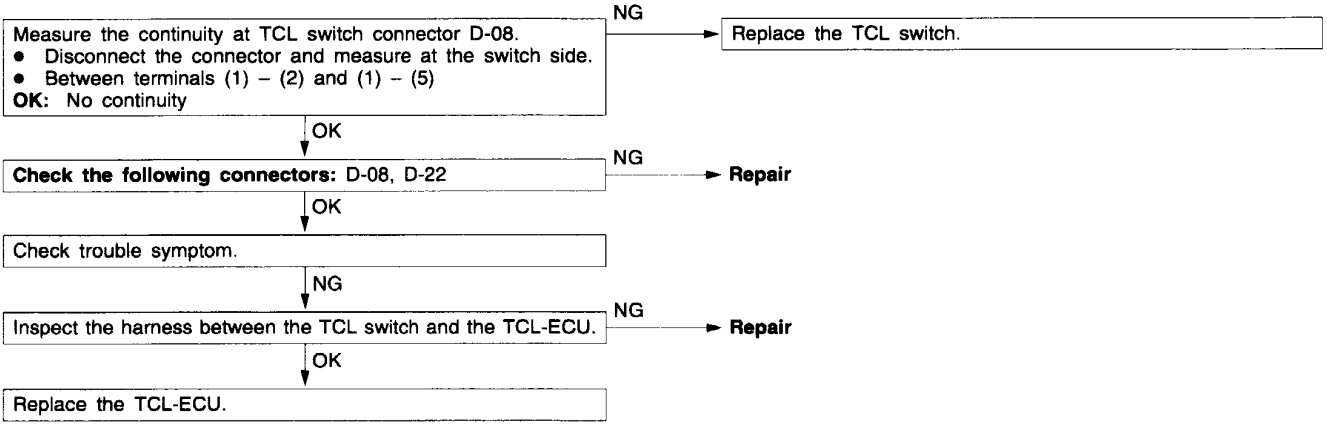
NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

Code No. 23 Stop lamp switch circuit system	Probable cause
This diagnosis code is output if the stop lamp switch remains ON for a continuous period of 15 minutes or more, or for a continuous period of 1 minute or more when driving at a speed of 10 km/h or more, because of a short circuit or defective adjustment of the stop lamp switch. This diagnosis code No. may also occur while driving in traffic jams or if the foot is resting on the brake pedal with driving.	• Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of TCL-ECU

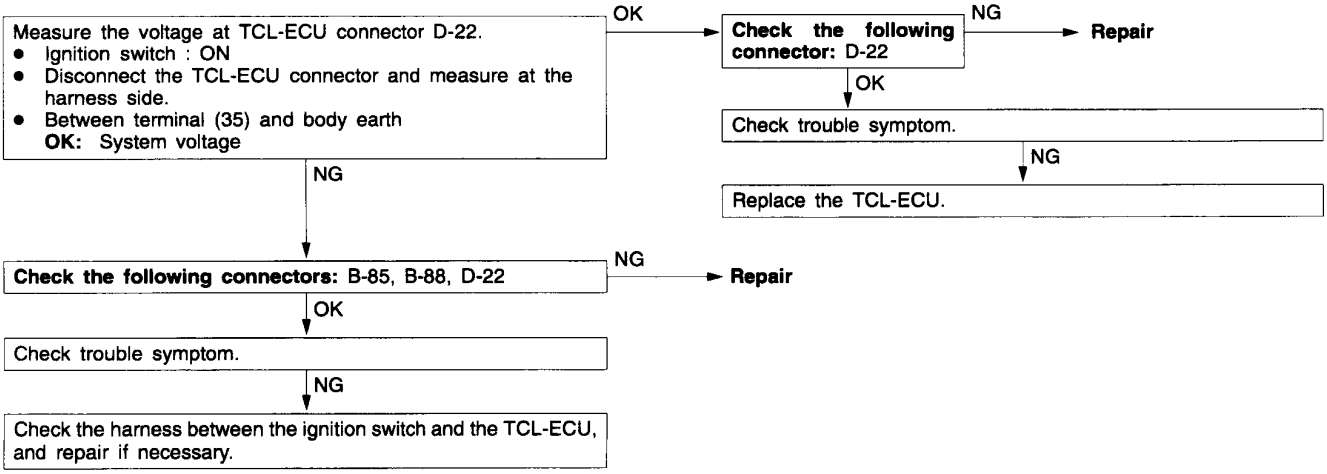


NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

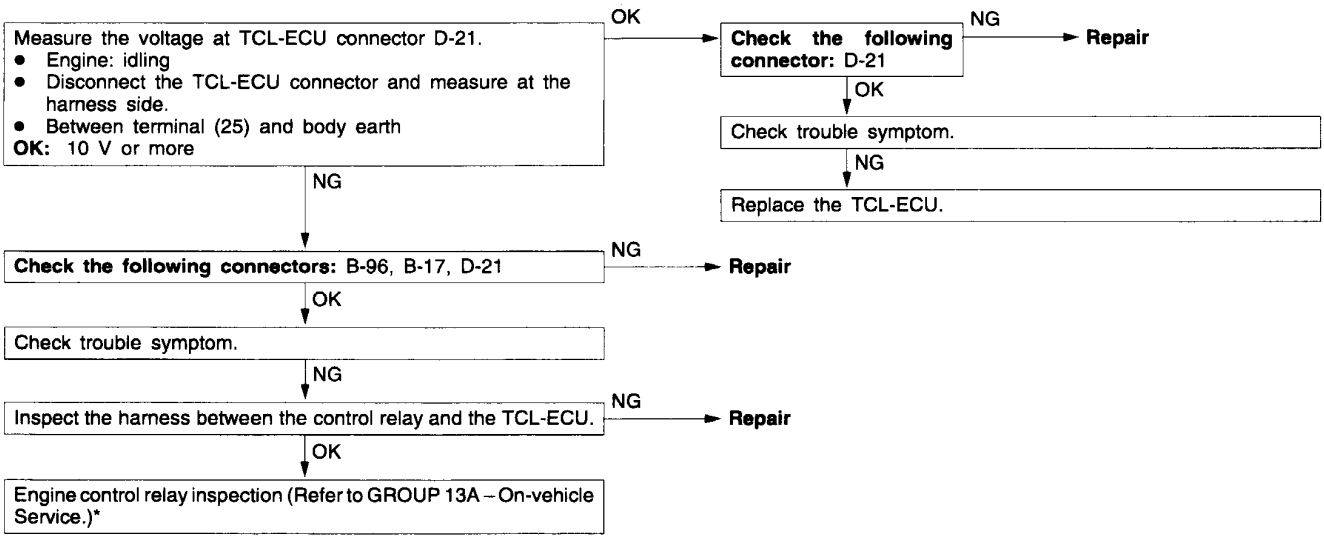
Code No. 24 TCL switch circuit system	Probable cause
This diagnosis code is output if signals are input simultaneously from both the TCL-OFF and TCL-ON positions because of a short circuit in the TCL switch circuit.	• Malfunction of the TCL switch • Malfunction of harness or connector • Malfunction of TCL-ECU



Code No. 26 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 TCL-ECU



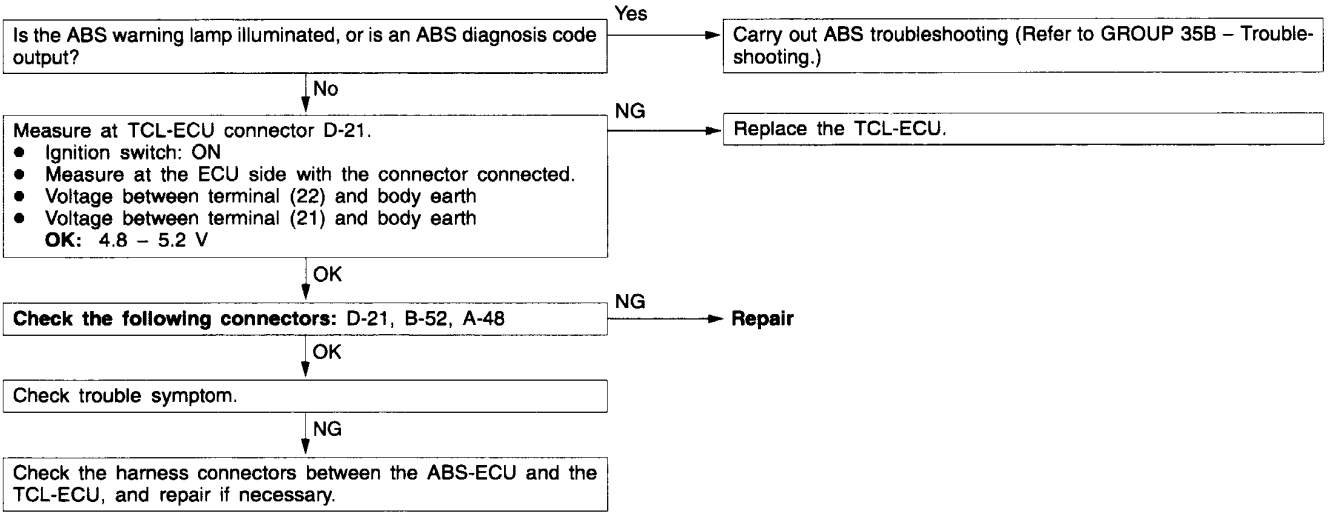
Code No. 27 TCL-ECU power supply voltage circuit (engine control relay circuit) system	Probable cause
This diagnosis code is output if the TCL-ECU power supply voltage (engine control relay supply voltage) is lower than the specified value. If the voltage returns to the specified value or greater, the diagnosis code is erased.	• Malfunction of control relay • Malfunction of harness or connector • Malfunction of TCL-ECU



NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

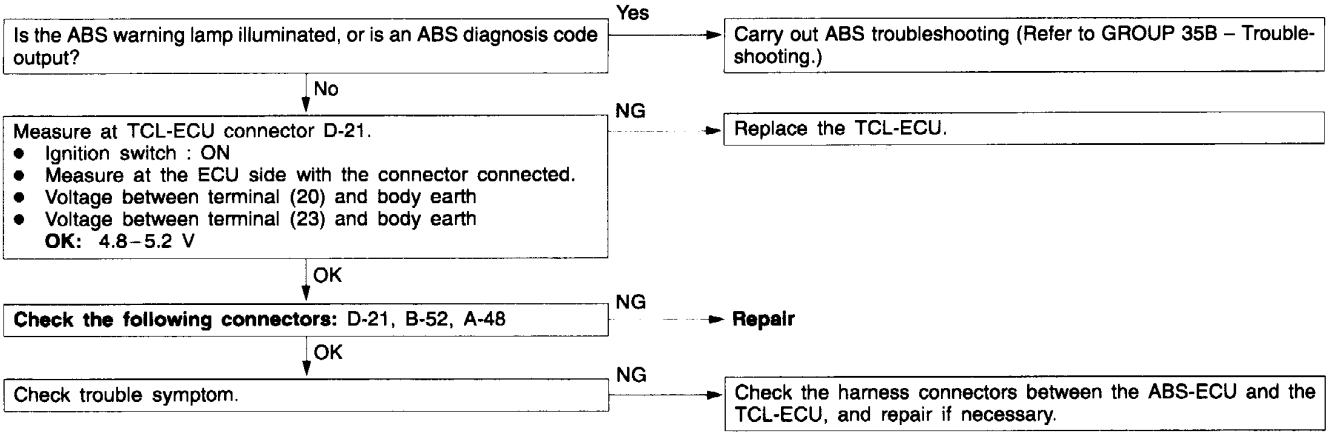
Code No. 31 Front right wheel speed sensor circuit system Code No. 32 Front left wheel speed sensor circuit system	Probable cause
These diagnosis codes are output if a pulse (from the front wheels) indicates that the difference between the front wheels and the rear wheels is 8 km/h or more because of an open or short circuit in a wheel speed sensor or a malfunction of sensor.	• Malfunction of front speed sensor • Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU

NOTE
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.



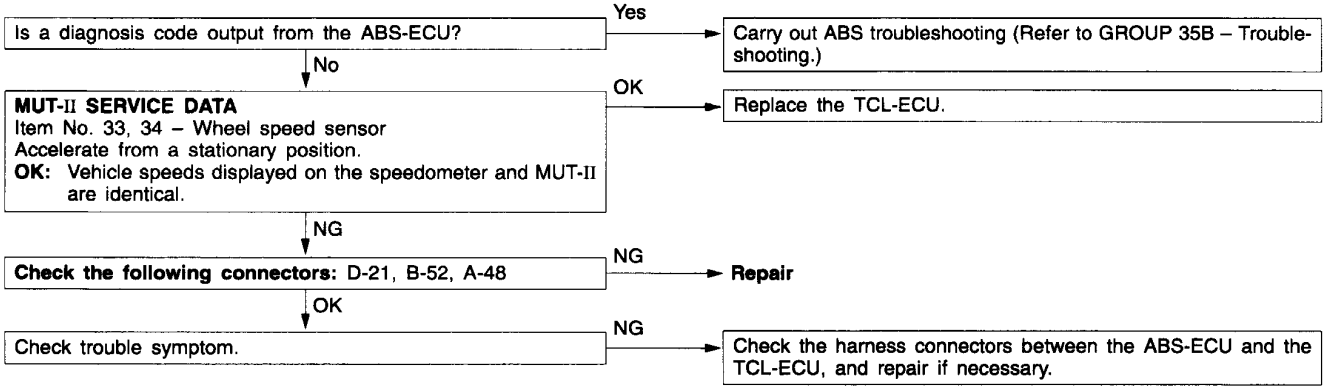
Code No. 33 Rear right wheel speed sensor circuit system Code No. 34 Rear left wheel speed sensor circuit system	Probable cause
These diagnosis codes are output if a pulse (from the wheels on one side of rear) indicates that the difference between the left wheel and the right wheel is 8 km/h or more because of an open or short circuit in a wheel speed sensor or a defective sensor.	• Malfunction of rear wheel speed sensor • Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU

NOTE
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.

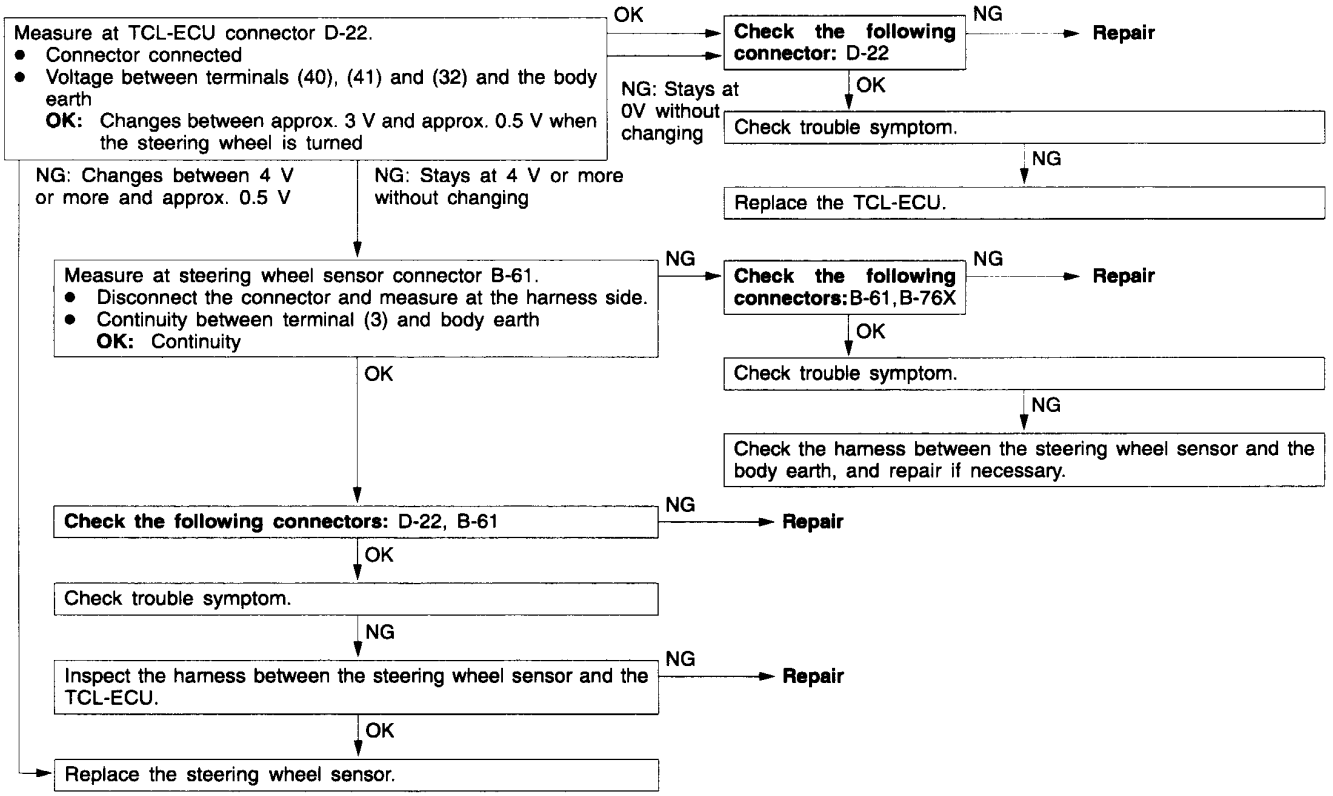


Code No. 35 Rear wheel speed sensor circuit system (1) Code No. 36 Rear wheel speed sensor circuit system (2)	Probable cause
Diagnosis code No. 35 is output if the pulse signal from a rear wheel sensor is momentarily interrupted (0.02 sec.) because of a transient open circuit in a rear wheel speed sensor. Diagnosis code No. 36 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.	• Malfunction of rear wheel speed sensor • Malfunction of harness or connector • Malfunction of ABS-ECU • Malfunction of TCL-ECU

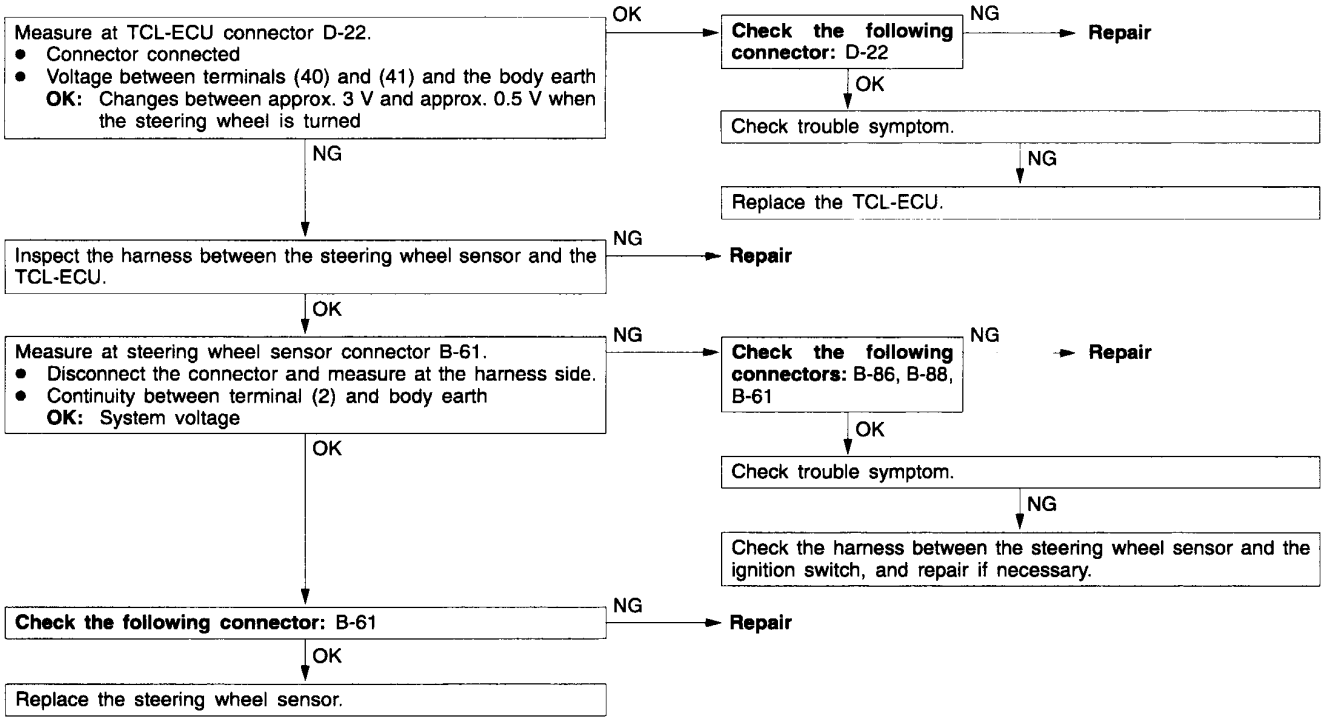
NOTE
(1) If the front wheels only are turning while the rear wheels are stationary (wheel slip), the TCL-OFF indicator will start flashing after 20 seconds, and the system will be isolated.
(2) When these diagnosis codes are output, erase the diagnosis code memory after carrying out repairs, and then carry out a road test at 20 km/h or more and check to be sure that the diagnosis codes are not output again.



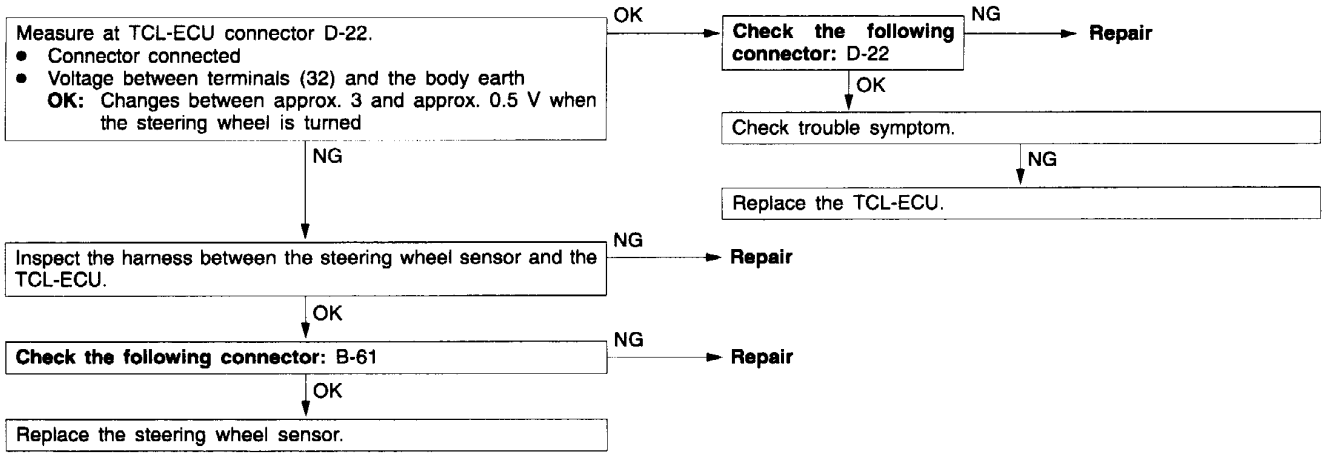
Code No. 41 Steering wheel sensor (ST-1) circuit system (open circuit) Code No. 42 Steering wheel sensor (ST-2) circuit system (open circuit) Code No. 43 Steering wheel sensor (ST-N) circuit system (open circuit)	Probable cause
These diagnosis codes are output if there is an open circuit in the output wire of the steering wheel sensor circuit.	• Malfunction of harness or connector • Malfunction of steering wheel sensor • Malfunction of TCL-ECU



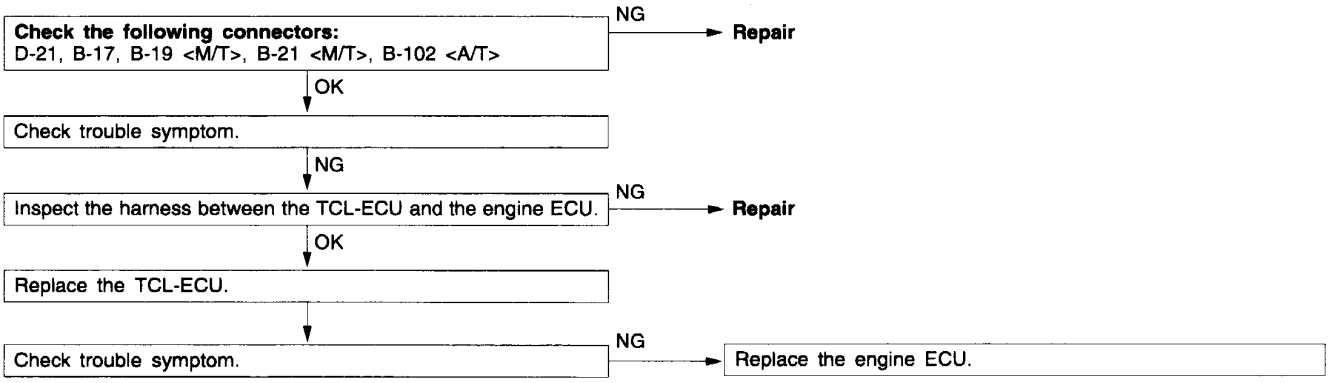
Code No. 44 Steering wheel sensor circuit system (short circuit)	Probable cause
This diagnosis code is output when no steering angle signal is output because there is a short-circuit in either steering wheel sensor ST-1 or steering wheel sensor ST-2 when the speed averages output by the left and right rear wheel speed sensors are 10 km/h or more.	• Malfunction of harness or connector • Malfunction of steering wheel sensor • Malfunction of TCL-ECU



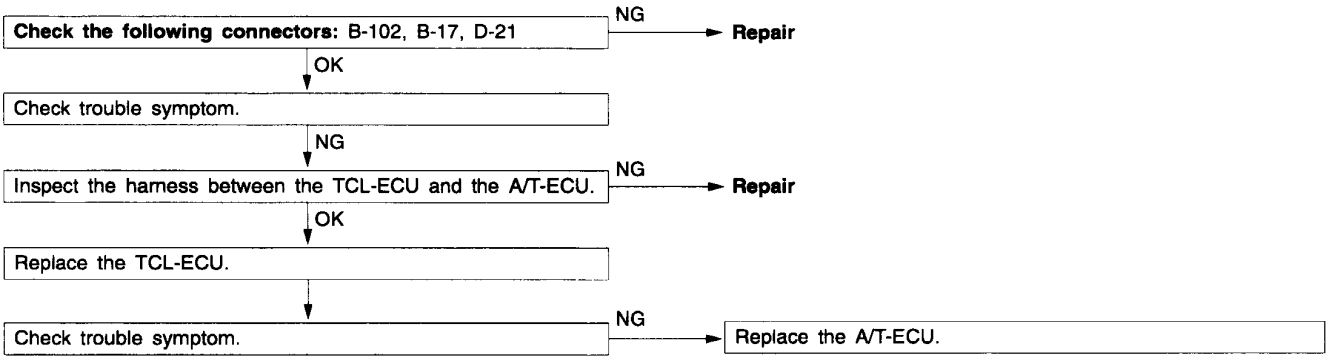
Code No. 45 Steering wheel sensor (ST-N) circuit system (short circuit)	Probable cause
This diagnosis code is output if it is considered that there is an abnormality in the steering wheel sensor (ST-N) circuit system when the straight-ahead position is continuously detected even though the steering wheel is turned 20° or more.	• Malfunction of steering wheel sensor • Malfunction of harness or connector • Malfunction of TCL-ECU



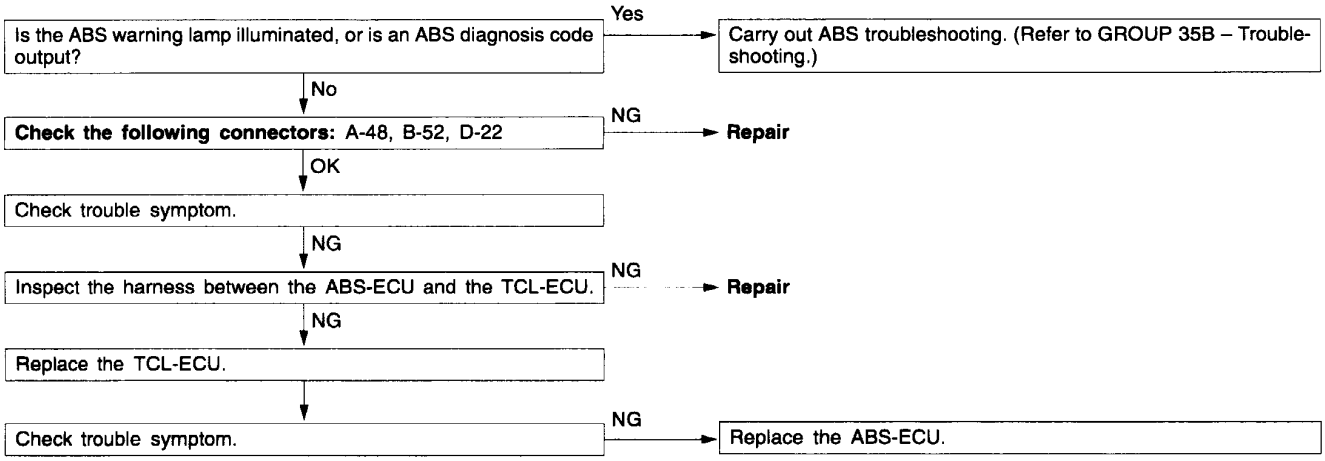
Code No. 71 Engine-ECU communication circuit system	Probable cause
This diagnosis code is output if an error is detected in the communication contents because of an open or short circuit in the serial communication circuit between the TCL-ECU and the engine ECU, a malfunction of ECU and a defective shielding of the shield wire.	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of engine ECU



Code No. 74 A/T-ECU communication circuit system	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 TCL-ECU and the A/T-ECU, a malfunction of ECU and a defective shielding of the shield wire.	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of A/T-ECU



Code No. 76 ABS circuit system	Probable cause
This diagnosis code is output if the ABS-ECU detects the system abnormality (when ABS warning lamp illumination is controlled).	• Malfunction of harness or connector • Malfunction of TCL-ECU • Malfunction of ABS-ECU



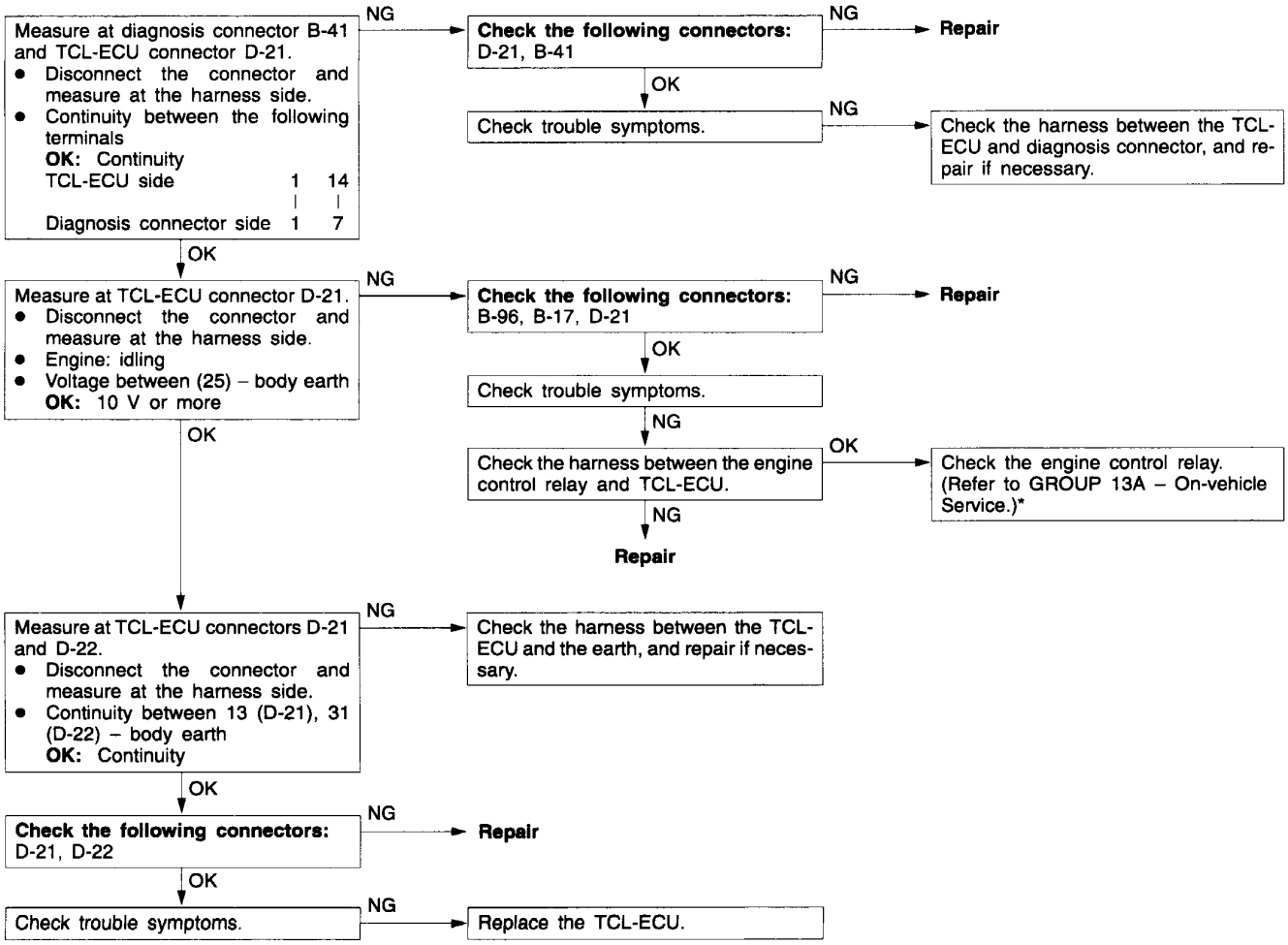
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure No.	Reference page
Communication with the MUT-II is not possible.	Communication with all systems is not possible.	1*	–
	Communication with TCL-ECU only is not possible.	2	13H-14
Malfunction of TCL indicator lamp display	None of the TCL indicator lamps (TCL OFF, TCL) illuminate when the ignition switch is ON.	3	13H-15
	One of the TCL indicator lamps does not illuminate when the ignition switch is ON (Another lamp does illuminate).	4	13H-15
	TCL OFF indicator lamp remains illuminated even after the engine is started.	5	13H-16
	TCL OFF indicator lamp flashes after the engine is started.		
	TCL remains illuminated even after the engine is started.	6	13H-16
	TCL OFF indicator lamp does not illuminate even if the TCL switch is continuously pressed to the OFF side while the engine is idling.	7*	–
Malfunction of TCL operation	TCL illuminates in the TCL operation range, but torque is not reduced.	8*	–
Poor starting Poor acceleration	Engine output is reduced in the TCL non-operation range (TCL indicator lamp does not illuminate) and starting and acceleration performance is poor.		

NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

Inspection Procedure 2

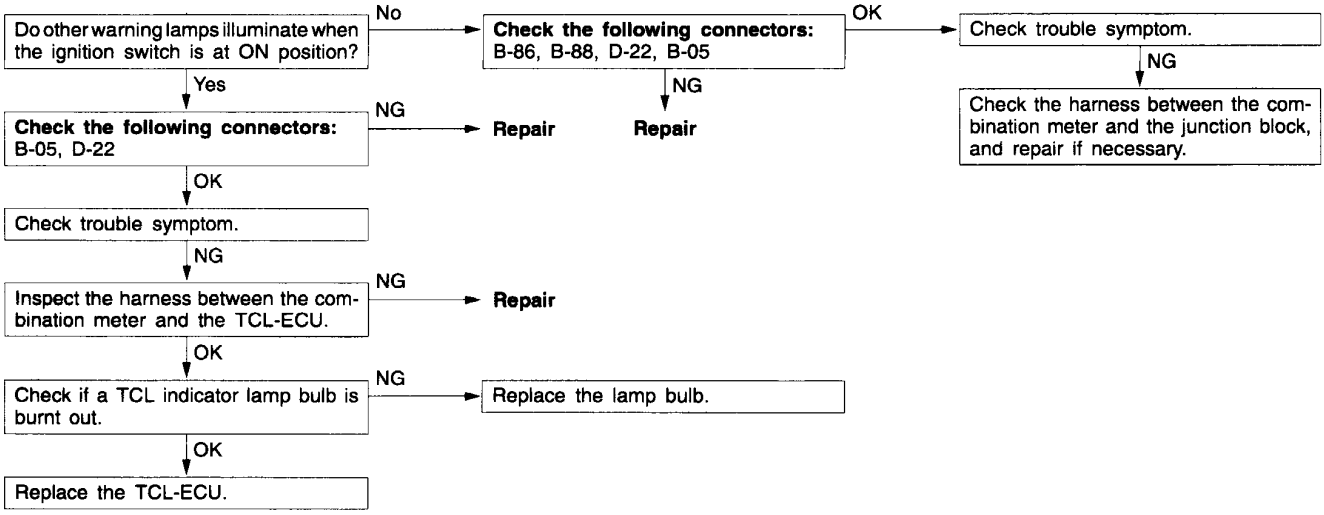
Communication with the MUT-II is not possible. (Communication with TCL-ECU only is not possible.)	Probable cause
If the MUT-II cannot communicate with the TCL-ECU only, the cause is probably an abnormality in the TCL diagnosis line or in the TCL-ECU power supply line or earth line.	• Malfunction of harness or connector • Malfunction of engine control relay • Malfunction of TCL-ECU



NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

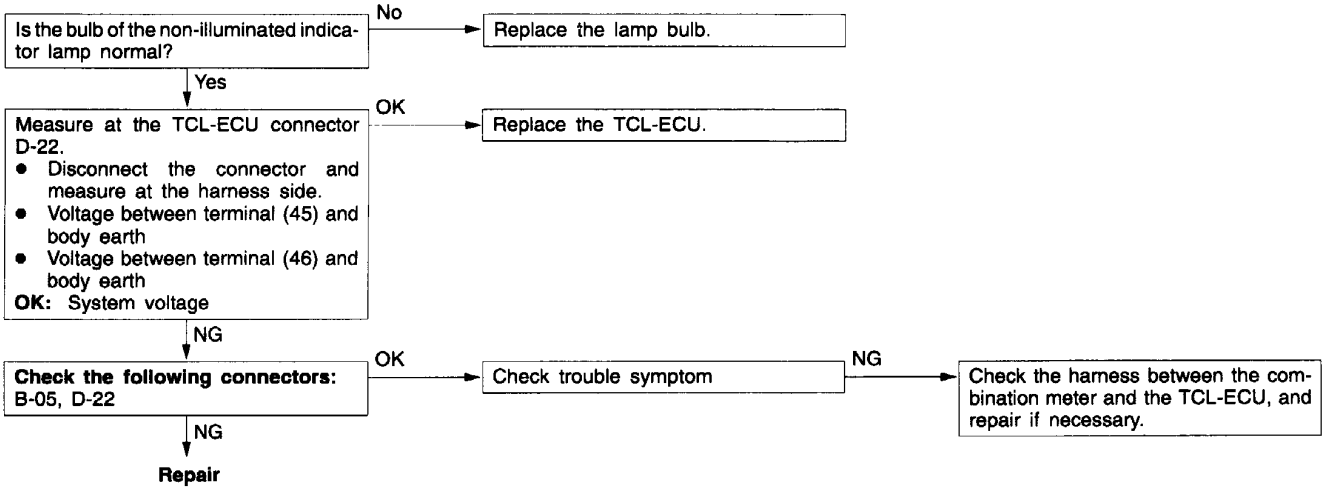
Inspection Procedure 3

None of the TCL indicator lamps (TCL OFF, TCL) illuminate when the ignition switch is 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 TCL-ECU • Malfunction of indicator lamp bulb



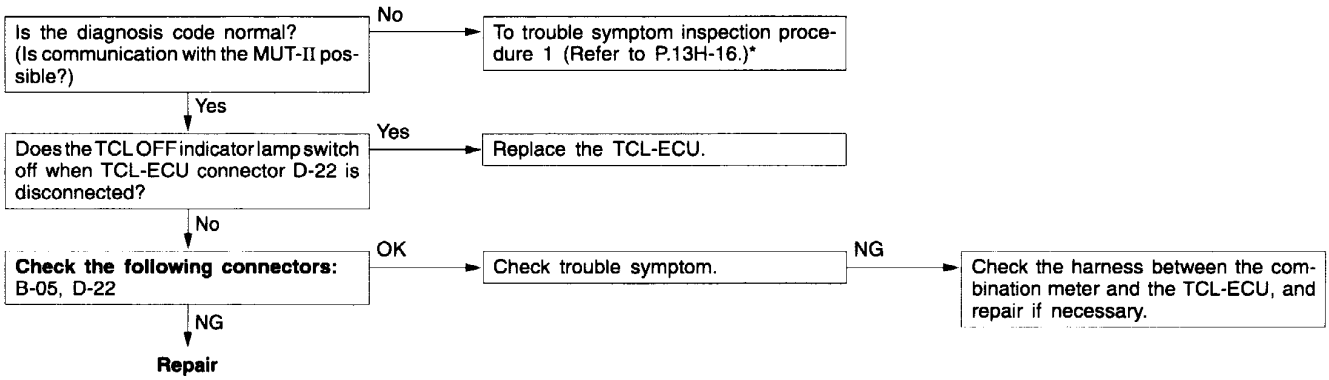
Inspection Procedure 4

One of the TCL indicator lamps does not illuminate when the ignition switch is ON.	Probable cause
Because the TCL indicators utilise shared power supply circuits, if one of the indicator lamps is illuminated, the power supply circuit can be judged to be normal.	• Open circuit in indicator lamp power supply circuit. • Burnt-out indicator lamp bulb



Inspection Procedure 5

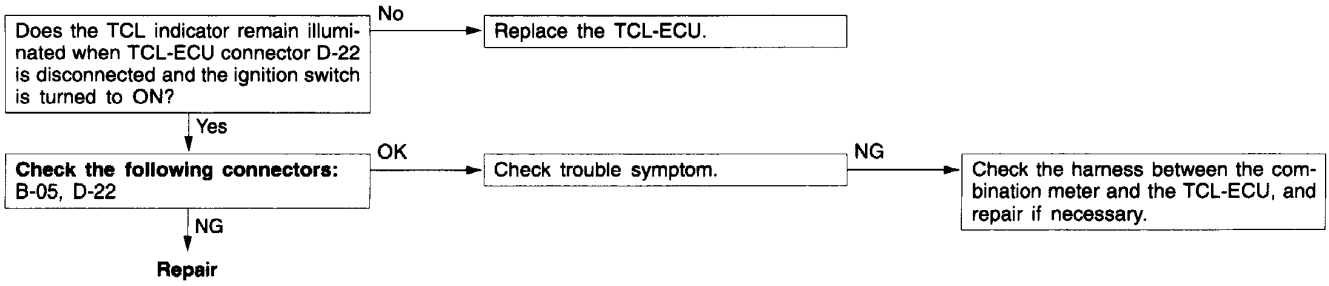
• TCL OFF indicator lamp remains illuminated even after the engine is started. • TCL OFF indicator lamp illuminate after the engine is started.	Probable cause
The TCL-OFF indicator is also used as a system warning indicator. If there is a system abnormality, this indicator will illuminate or flash.	• Other system related to the TCL • Malfunction of harness or connector



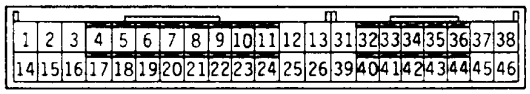
NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).

Inspection Procedure 6

TCL indicator lamp remains illuminated even after the engine is started.	Probable cause
The TCL indicator lamp only illuminates while the engine is running if the TCL is operating.	• Malfunction of TCL indicator power supply circuit • Malfunction of TCL-ECU • Malfunction of harness or connector



CHECK AT ECU TERMINALS



03U0061

Terminal No.	Check item	Measurement condition	Normal condition
1	Diagnosis control	Do not connect the MUT-II	Approx. 12 V
		Connect the MUT-II	0 V
13	Earth	At all times	0 V
14	Diagnosis data input	Connect the MUT-II	Serial communication with MUT-II
		Do not connect the MUT-II	1 V or less
15	A/T-ECU data communication	Engine: Idling	Other than 0 V
16	A/T-ECU data communication	Engine: Idling	Other than 0 V
17	Engine ECU data communication	Engine: Idling	Other than 0 V
18	Engine ECU data communication	Engine: Idling	Other than 0 V
19	APS output	Ignition switch: ON Accelerator pedal fully open	4.5 – 5.5 V
		Ignition switch: ON Accelerator pedal fully closed	0.3 – 1.0 V
20	Rear left wheel speed sensor input	Engine: Idling Vehicle slowly moving forward	Changes between 0 V and approx. 5 V
21	Front right wheel speed sensor input	Engine: Idling Vehicle slowly moving forward	Changes between 0 V and approx. 5 V
22	Front left wheel speed sensor input	Engine: Idling Vehicle slowly moving forward	Changes between 0 V and approx. 5 V
23	Rear right wheel speed sensor input	Engine: Idling Vehicle slowly moving forward	Flashes between 0 V and approx. 5 V
25	ECU power supply	Ignition switch: ON	System voltage
26	Earth	At all times	0 V
31	Earth	At all times	0 V
32	Steering wheel sensor STN input	Engine: Idling Steering wheel in straight-ahead position	0.5 V or less
		Engine: Idling Steering wheel turned 90° straight-ahead position	2.5 – 3.5 V

Terminal No.	Check item	Measurement condition	Normal condition
34	TCL ON switch	Ignition switch: ON TCL switch: Pressed to ON side	2 V or less
		Ignition switch: ON TCL switch: Release	System voltage
35	Ignition switch (IG2)	Ignition switch: ON	System voltage
39	ECU back-up power supply	Ignition switch: OFF	System voltage
40	Steering wheel sensor ST1 input	Ignition switch: ON Steering wheel turned slowly	Flashes between 0 V and approx. 3 V
41	Steering wheel sensor ST2 input	Ignition switch: ON Steering wheel turned slowly	Flashes between 0 V and approx. 3 V
42	TCL OFF switch	Ignition switch: ON TCL switch: Pressed to OFF side	2 V or less
		Ignition switch: ON TCL switch: Release	System voltage
43	Stop lamp switch input	Ignition switch: ON Brake pedal depressed	System voltage
		Ignition switch: ON Brake pedal released	0 V
44	ABS fail signal	During ABS fail	2 V or less
		When ABS is normal	System voltage
45	TCL OFF indicator	Ignition switch: ON TCL ON condition	System voltage
		Ignition switch: ON TCL OFF condition	2 V or less
46	TCL indicator	Ignition switch: ON TCL ON condition	2 V or less
		Ignition switch: ON TCL OFF condition	System voltage

GROUP 14
ENGINE COOLING

GENERAL

OUTLINE OF CHANGES

- The radiator specifications and service procedure have been changed.

GENERAL SPECIFICATIONS

<4G9-SOHC>

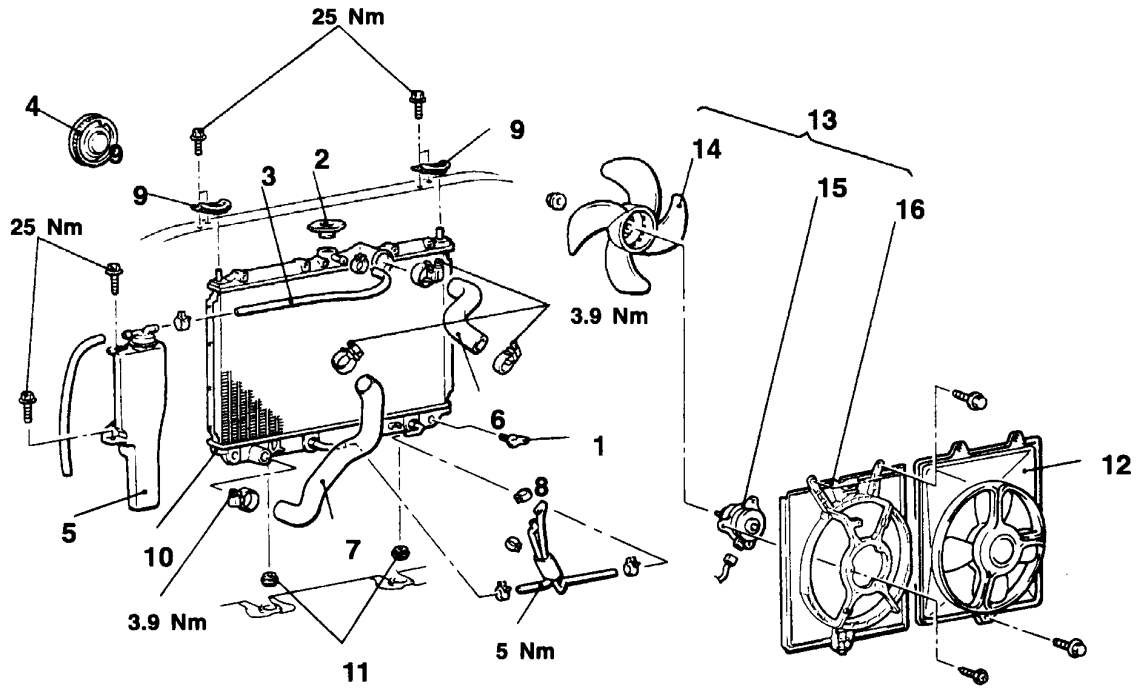
Items		Specifications
Radiator	Performance kJ/h	129,800
Automatic transmission oil cooler	Performance kJ/h	5,300

RADIATOR <4G9-SOHC>

REMOVAL AND INSTALLATION

Pre-removal Operation
- Engine Coolant Draining

Post-installation Operation
(1) Engine Coolant Supplying
(2) A/T Fluid Supplying and Checking



Radiator removal steps

1. Drain plug
2. Radiator cap
3. Overflow hose
4. Headlamp cap
5. Reserve tank
6. Radiator upper hose
7. Radiator lower hose
8. Transmission fluid cooler hose
9. Upper insulator
10. Radiator assembly
11. Lower insulator
12. Condenser fan motor assembly <Vehicles with A/C>
13. Radiator fan motor assembly
14. Fan
15. Radiator fan motor
16. Shroud

Radiator fan motor removal steps

4. Headlamp cap
5. Reserve tank
13. Radiator fan motor assembly
14. Fan
15. Radiator fan motor
16. Shroud

NOTE
For each service point, refer to Basic Manual.

GROUP 15
INTAKE AND EXHAUST

GENERAL

OUTLINE OF CHANGES

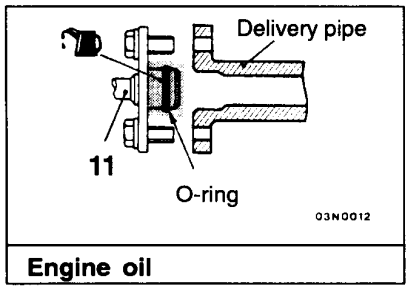
- The intake manifold service procedure has been changed.

INTAKE MANIFOLD <4G9-SOHC>

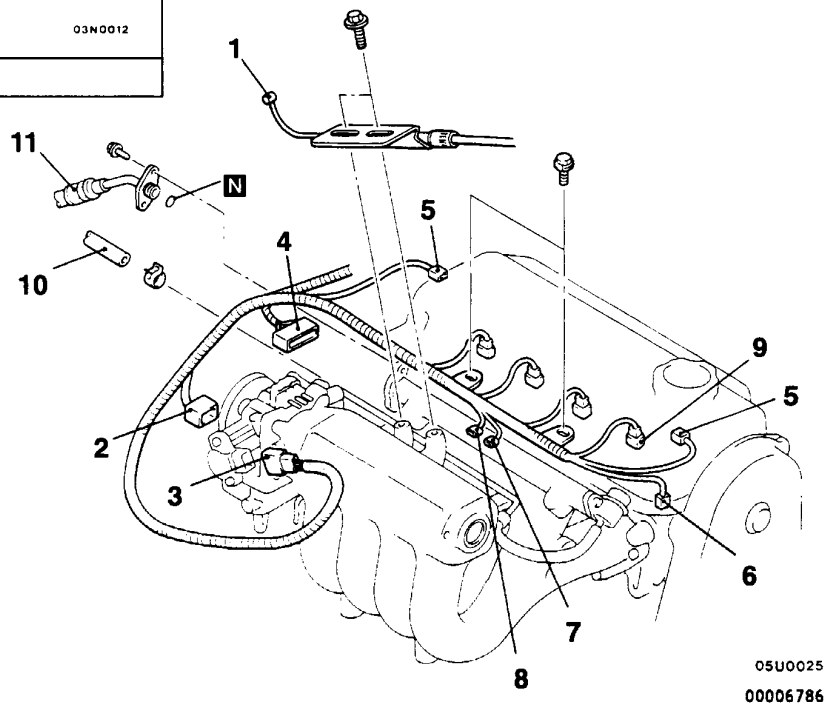
REMOVAL AND INSTALLATION

Pre-removal Operation
(1) Fuel Discharge Prevention
(2) Engine Coolant Draining
(3) Air Cleaner and Air Intake Hose Removal

Post-Installation Operation
(1) Engine Coolant Supplying
(2) Accelerator Cable Adjustment
(3) Air Cleaner and Air Intake Hose Installation

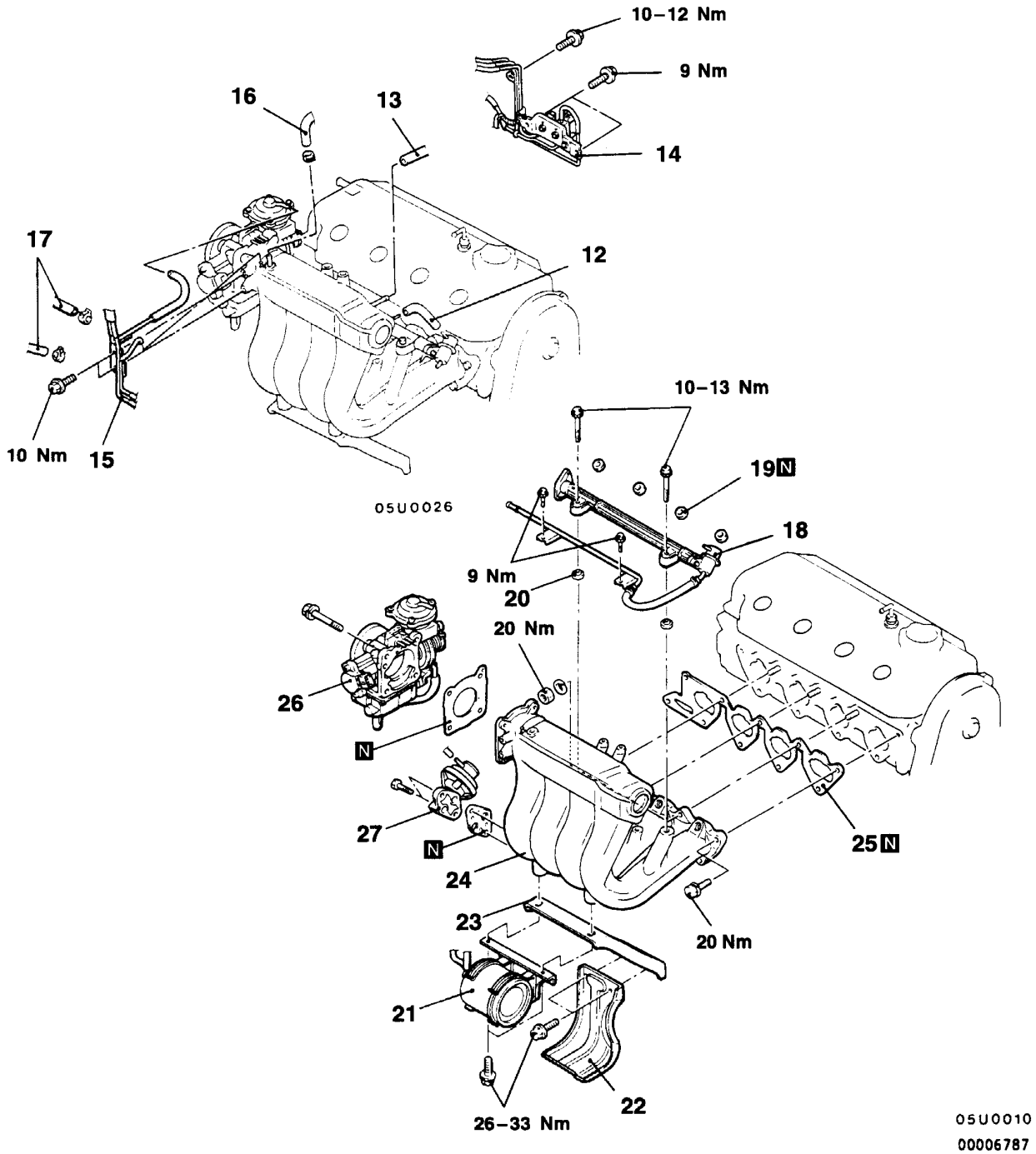


Engine oil



Removal steps
1. Accelerator cable connection
2. ISC connector
3. TPS connector
4. APS connector <Vehicles with TCL>
5. Ignition coil connector
6. Crank angle sensor connector
7. EGR solenoid valve connector
8. Purge control solenoid valve connector
9. Injector connector
10. Fuel return hose connection
▶A◀ 11. Fuel high pressure hose connection

NOTE
For each service point, refer to Basic Manual.



12. Vacuum hose connection
13. PCV hose connection
14. Solenoid valve and vacuum hose assembly connection
15. Vacuum hose and pipe assembly connection <Vehicles with TCL>
16. Brake booster vacuum hose connection
17. Water hose connection
◀A▶ 18. Delivery pipe, injector and pressure regulator assembly
19. Insulator
20. Insulator
21. Vacuum tank and vacuum tank bracket assembly <Vehicles with TCL>
22. Heat protector <4G93-M/T>
23. Intake manifold stay
24. Intake manifold
25. Intake manifold gasket
26. Throttle body
27. EGR valve

NOTE
For each service point, refer to Basic Manual.

ENGINE AND EMISSION CONTROL

CONTENTS

EMISSION CONTROL SYSTEM

GENERAL

OUTLINE OF CHANGE

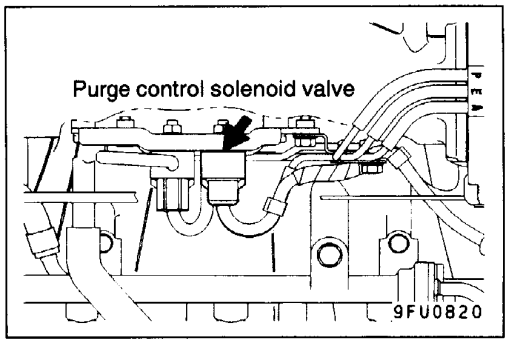
- Installation positions of the purge control solenoid valve and EGR control solenoid valve have been changed.
- Duty cycle type purge control solenoid valve has been adopted. (Inspection procedure is same as before.)
- Coil resistances of the purge control solenoid valve and EGR control solenoid valve have been changed.

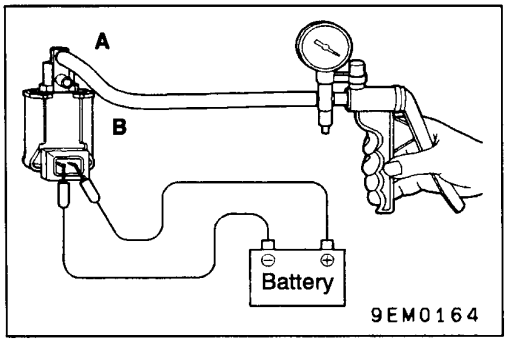
SERVICE SPECIFICATIONS

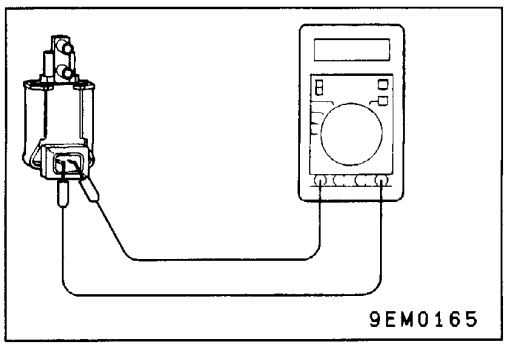
Items	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	36 – 44
EGR control solenoid valve coil resistance (at 20°C) Ω	36 – 44

EVAPORATIVE EMISSION CONTROL SYSTEM

COMPONENT LOCATION







PURGE CONTROL SOLENOID VALVE CHECK

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

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

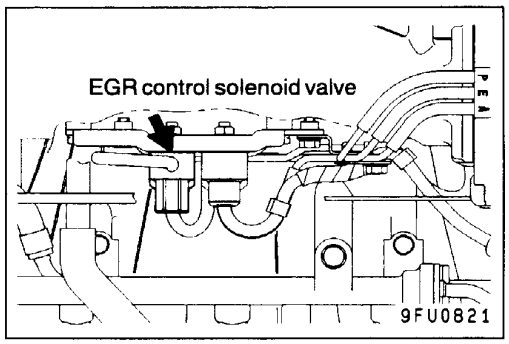
Battery voltage	Normal condition
Applied	Vacuum leaks
Not applied	Vacuum maintained

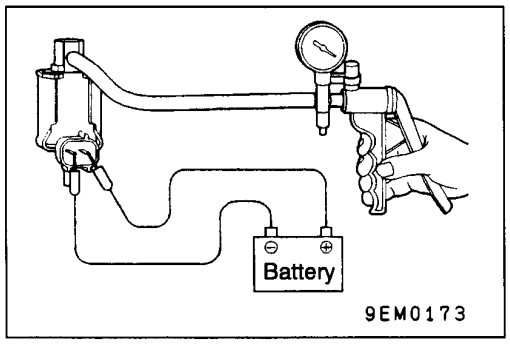
5. Measure the resistance between the terminals of the solenoid valve.

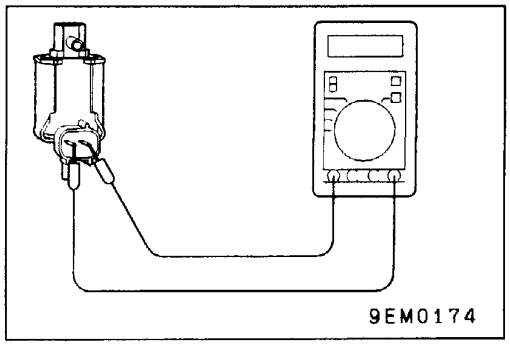
   Standard value: 36 – 44 Ω (at 20°C)

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

COMPONENT LOCATION







EGR 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 (yellow stripe, green stripe) from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to the nipple to which the green-striped vacuum hose was connected.
4. Check airtightness 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: 36 – 4Ω (at 20°C)

AUTOMATIC TRANSMISSION

CONTENTS

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

WARNING!

(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to driver and passenger (from rendering the SRS inoperative).

(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

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

GENERAL

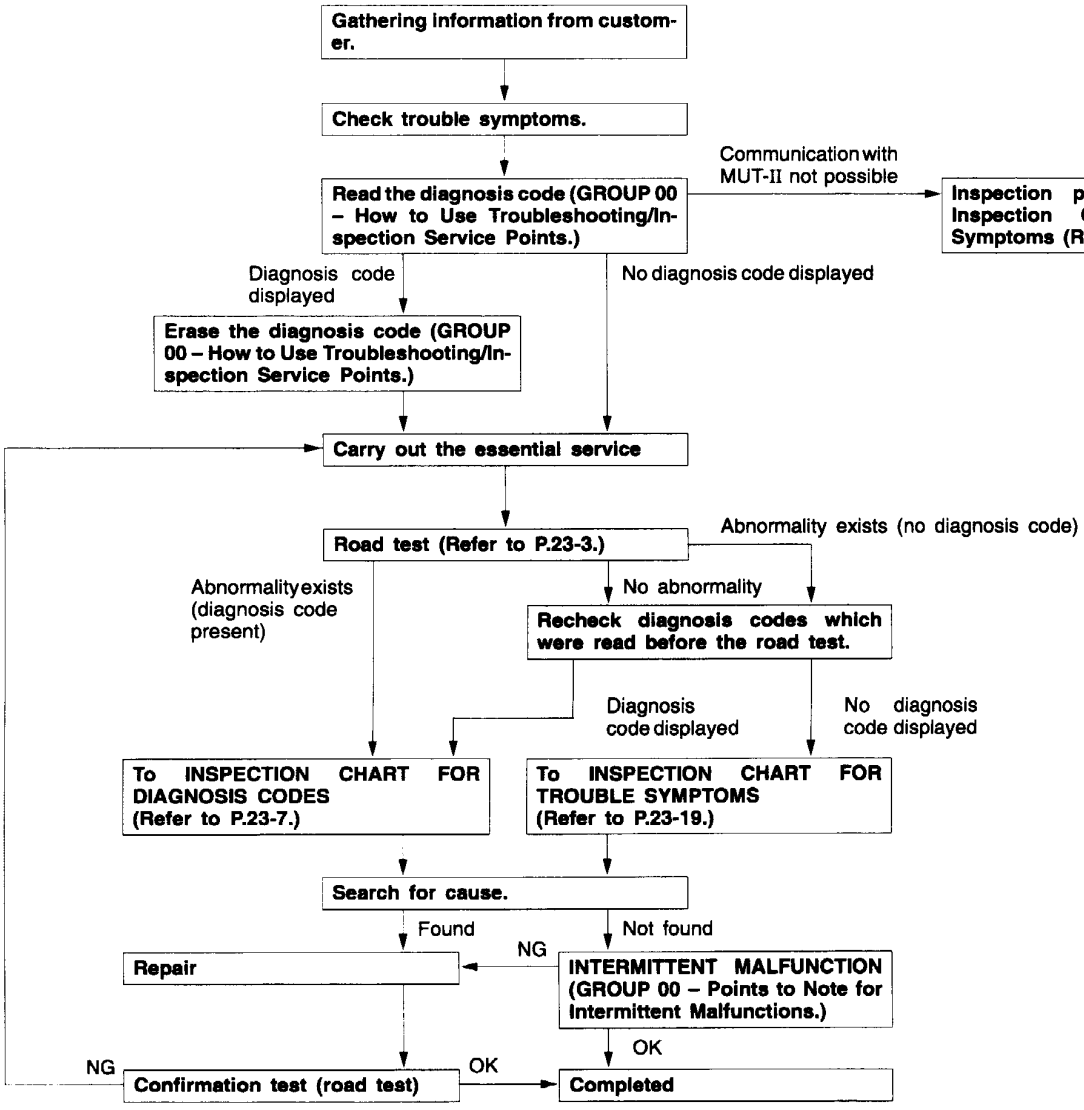
OUTLINE OF CHANGES

Maintenance service points have been established for places which are different as a result of the following changes.

- Integration of the engine-ECU and A/T-ECU
- Adoption of an electronic speedometer

TROUBLESHOOTING

STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING



ROAD TEST

23100780271

Check by the following procedure.

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
1	Ignition switch: OFF	Ignition switch (1) ON	Data list No. 54 Battery voltage [V]	Control relay	54	A/T Control relay system (23-18)
2	Ignition switch: ON Engine: Stopped Selector lever position: P	Selector lever position (1) P, (2) R, (3) N, (4) D, (5) 3, (6) 2, (7) L	Data list No. 61 (1) P, (2) R, (3)N, (4) D, (5) 3, (6) 2, (7) L	Inhibitor switch	–	Inhibitor switch system (23-29)
	Ignition switch: ON Engine: Stopped Selector lever position: P	Accelerator pedal (1) Released (2) Half depressed (3) Depressed	Data list No. 11 (1) 400 – 1,000 mV (2) Gradually rises from (1) (3) 4,500 – 5,500 mV	Throttle position sensor <Vehicles without TCL> Accelerator pedal position sensor <Vehicles with TCL>	11 12 14	Throttle position sensor system (23-8) Accelerator pedal position sensor system (23-8)
			Data list No. 25 (1) OFF (2) ON	Wide open throttle switch	25	Wide open throttle switch system (23-10)
		Mode control switch (1) HOLD (2) AUTO	Data list No.62 (1) ON (2) OFF	Mode control switch	–	Mode control switch system (23-29)
		Accelerator pedal (1) Released (2) Depressed	Data list No.25 (1) OFF (2) ON	Wide open throttle switch	25	Wide open throttle switch system (23-10)
		Brake pedal (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-11)
3	Ignition switch: ST Engine: Stopped	Starting test with lever P or N range	Starting should be possible	Starting possible or impossible	–	Starting impossible (23-21)
4	Warming up	Drive for 15 minutes or more so that the automatic fluid temperature becomes 70 – 90°C.	Data list No. 15 Gradually rises to 70 – 90°C	Oil temperature sensor	15	Oil temperature sensor system (23-8)

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
5	Engine: Idling Selector lever position: N	Brake pedal (Retest) (1) Depressed (2) Released	Data list No. 26 (1) ON (2) OFF	Stop lamp switch	26	Stop lamp switch system (23-11)
		A/C switch (1) ON (2) OFF	Data list No. 65 (1) ON (2) OFF	Dual pressure switch	–	Dual pressure switch system (23-30)
		Accelerator pedal (1) Released (2) Half depressed	Data list No. 64 (1) ON (2) OFF	Idle position switch	–	Idle position switch system (23-30)
			Data list No. 21 (1) 650 – 900 rpm Gradually rises from (1)	Crank angle sensor	21	Crank angle sensor system (23-9)
			Data list No. 57 (2) Data changes	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	51	Serial communication system (23-18)
		Selector lever position (1) N → D (2) N → R	Should be no abnormal shifting shocks Time lag should be within 2 seconds	Malfunction when starting	–	Engine stalling during shifting (23-23)
					–	Shocks when changing from N to D and large time lag (23-23)
					–	Shocks when changing from N to R and large time lag (23-24)
					–	Shocks when changing from N to D,N to R and large time lag (23-25)
				Driving impossible	–	Does not move forward (23-21)
					–	Does not reverse (23-22)
					–	Does not move (forward or reverse) (23-22)

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
6	Selector lever position: N (Carry out on a flat and straight road.)	Selector lever position and vehicle speed (1) Idling in L range (Vehicle stopped) (2) Driving at constant speed of 10 km/h in L position (3) Driving at constant speed of 30 km/h in 2 position (4) Driving at 50 km/h in 3 position with accelerator fully closed (5) Driving at constant speed of 50 km/h in D position (Each condition should be maintained for 10 seconds or more.)	Data list No. 63 (2) 1st, (4) 3rd, (3) 2nd, (5) 4th	Shift condition	–	–
			Data list No. 31 (2) 0 %, (4) 100 %, (3) 100 %, (5) 100 %	Low and reverse solenoid valve	31	Low and reverse solenoid valve system (23-11)
			Data list No. 32 (2) 0 %, (4) 0 %, (3) 0 %, (5) 100 %	Underdrive solenoid valve	32	Underdrive solenoid valve system (23-11)
			Data list No. 33 (2)100 %, (4) 100 %, (3) 0 %, (5) 0 %	Second solenoid valve	33	Second solenoid valve system (23-11)
			Data list No. 34 (2) 100 %, (4) 0 %, (3) 100 %, (5) 0 %	Overdrive solenoid valve	34	Overdrive solenoid valve system (23-11)
			Data list No. 29 (1) 0 km/h (4) 50 km/h	Vehicle speed sensor	–	Vehicle speed sensor system (23-31)
			Data list No. 22 (4) 1,900 – 2,100 rpm	Input shaft speed sensor	22	Input shaft speed sensor system (23-9)
			Data list No. 23 (4) 1,900 – 2,100 rpm	Output shaft speed sensor	23	Output shaft speed sensor system (23-10)
7	Selector lever position: 3 (Carry out on a flat and straight road.)	Selector lever position and vehicle speed (1) Release the accelerator pedal fully while driving at 50 km/h in 3rd gear. (2) Driving at constant speed of 50 km/h in 3rd gear.	Data list No. 36 (1) 0 % (2) Approx. 70 – 90 %	Damper clutch control solenoid valve	36 52	Damper clutch control solenoid valve system (23-12)
			Data list No. 52 (1) Approx. 100 – 300 rpm (2) Approx. 0 – 10 rpm			

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
8	Use the MUT-II to stop the INVECS-II function. Selector lever position: D (Carry out on a flat and straight road.)	Monitor data list No. 11, 23, and 63 with the MUT-II. (1) Accelerate to 4th gear at a throttle position sensor output of 1.5V (accelerator opening angle of 30 %). (2) Gently decelerate to a standstill. (3) Accelerate to 4th gear at a throttle position sensor output of 2.5 V (accelerator opening angle of 50%). (4) While driving at 60 km/h in 4th gear, shift down to 3 range. (5) While driving at 40 km/h in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h in 2nd gear, shift down to L range.	For (1), (2) and (3), the reading should be the same as the specified output shaft speed and no abnormal shocks should occur. For (4), (5) and (6), downshifting should occur immediately after the shifting operation is made.	Malfunction when shifting	–	Shocks and running up (23-25)
				Displaced shifting points	–	All points (23-26)
					–	Some points (23-27)
				Does not shift	–	No diagnosis code (23-27)
					22	Input shaft speed sensor system (23-9)
					23	Output shaft speed sensor system (23-10)
				Does not shift from 1 to 2 or 2 to 1	31	Low and reverse solenoid valve system (23-11)
					33	Second solenoid valve system (23-11)
					41	1st gear ratio is not specified (23-13)
					42	2nd gear ratio is not specified (23-14)
				Does not shift from 2 to 3 or 3 to 2	33	Second solenoid valve system (23-11)
					34	Overdrive solenoid valve system (23-11)
					42	2nd gear ratio is not specified (23-14)
					43	3rd gear ratio is not specified (23-15)
				Does not shift from 3 to 4 or 4 to 3	32	Underdrive solenoid valve system (23-11)
					33	Second solenoid valve system (23-11)
					43	3rd gear ratio is not specified (23-15)
					44	4th gear ratio is not specified (23-16)

No.	State prior to test and operation	Test and operation	Judgement value	Check item	Diagnosis code No.	Inspection procedure page if there is an abnormality
9	Selector lever position: N (Carry out on a flat and straight road.)	Monitor data list No. 22 and No. 23 with the MUT-II. (1) Move selector lever to R range, drive at constant speed of 10 km/h.	The ratio between data list No. 22 and No. 23 should be the same as the gear ratio when reversing.	Does not shift	22	Input shaft speed sensor system (23-9)
					23	Output shaft speed sensor system (23-10)
					46	Reverse gear ratio is not specified (23-17)

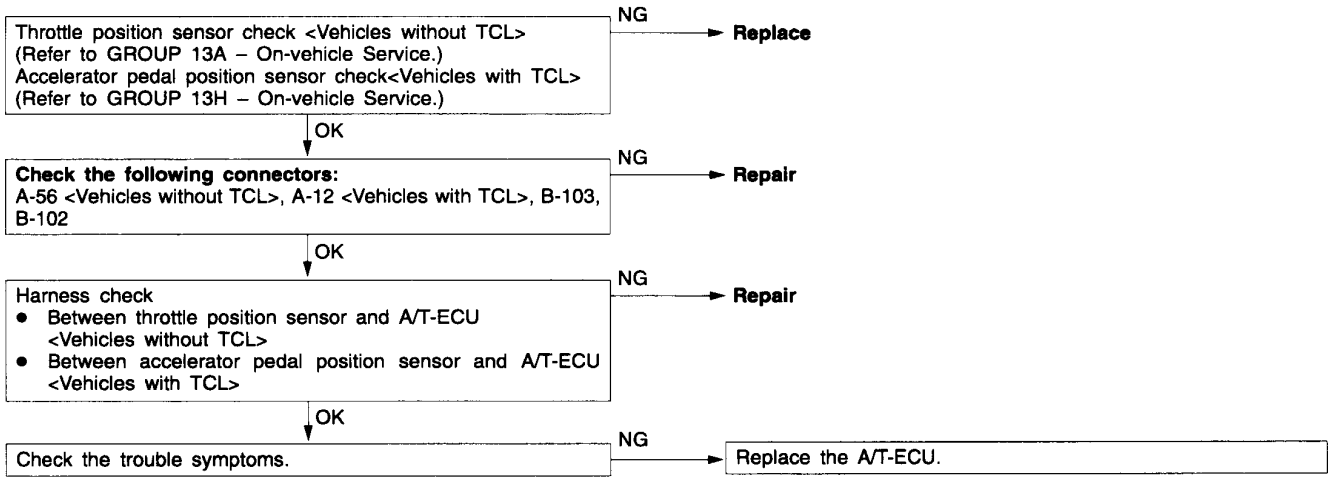
INSPECTION CHART FOR DIAGNOSIS CODE

Code	Diagnosis item		Reference page
11	Throttle position sensor system <Vehicles without TCL> Accelerator pedal position sensor system <Vehicles with TCL>	Short circuit	23-8
12		Open circuit	23-8
14		Sensor maladjustment	23-8
15	Oil temperature sensor system	Open circuit	23-8
21	Crank angle sensor system	Open circuit	23-9
22	Input shaft speed sensor system	Short circuit/open circuit	23-9
23	Output shaft speed sensor system	Short circuit/open circuit	23-10
25	Wide open throttle switch system	Short circuit	23-10
26	Stop lamp switch system	Short circuit/open circuit	23-11
31	Low and reverse solenoid valve system	Short circuit/open circuit	23-11
32	Underdrive solenoid valve system	Short circuit/open circuit	23-11
33	Second solenoid valve system	Short circuit/open circuit	23-11
34	Overdrive solenoid valve system	Short circuit/open circuit	23-11
36	Damper control clutch solenoid valve system	Short circuit/open circuit	23-12
41	1st gear ratio does not meet the specification		23-13
42	2st gear ratio does not meet the specification		23-14
43	3rd gear ratio does not meet the specification		23-15
44	4th gear ratio does not meet the specification		23-16
46	Reverse gear ratio does not meet the specification		23-17
51	Abnormal communication with engine-ECU <Vehicles without TCL> Abnormal communication with TCL-ECU <Vehicles with TCL>		23-18
52	Damper control clutch solenoid valve system	Defective system	23-12
54	A/T Control relay system	Short circuit to earth/ open circuit	23-18

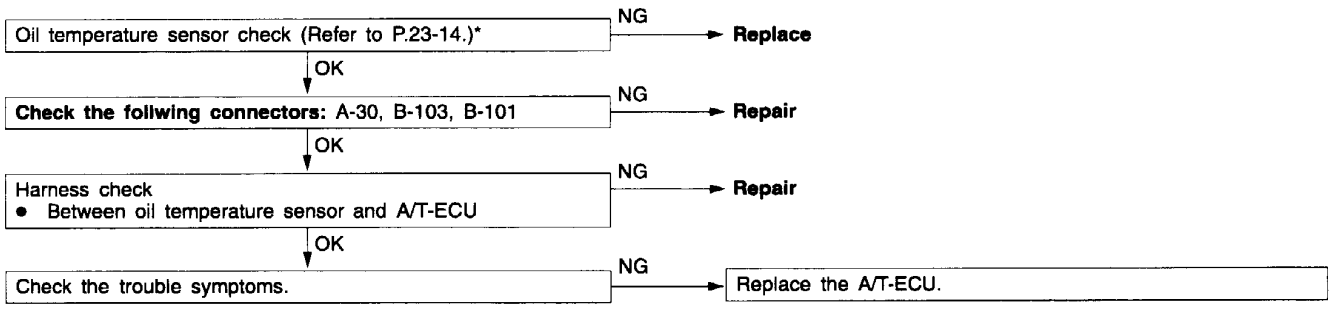
Code	Diagnosis item		Reference page
56	N range lamp system	Short circuit to earth	23-19
71	Malfunction of A/T-ECU		23-19

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

Code No. 11, 12, 14 Throttle position sensor system <Vehicles without TCL>, accelerator pedal position sensor <Vehicles with 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. Code No. 11 is also output if there is a problem with the APS and an APS fail-safe signal is received from the TCL-ECU. 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 <Vehicles without TCL> • Malfunction of the accelerator pedal position sensor <Vehicles with TCL> • Malfunction of connector • Malfunction of the A/T-ECU

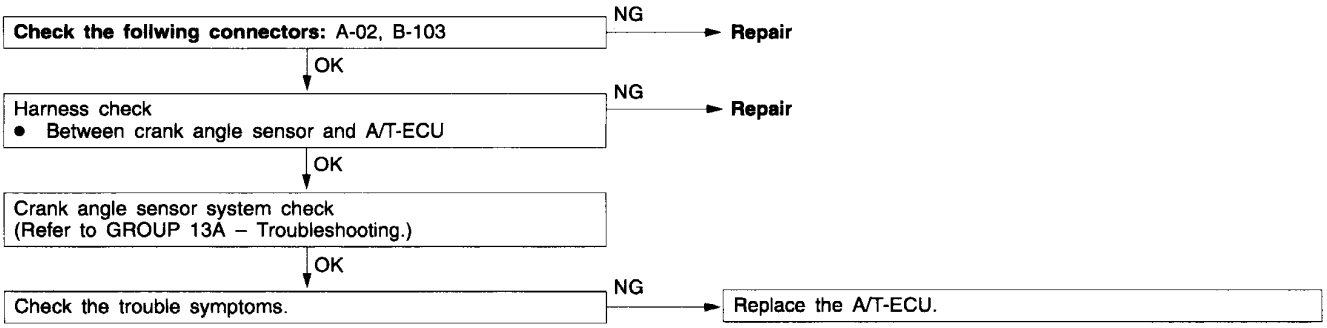


Code No. 15 Oil temperature sensor system	**Probale cause**
If the oil temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (if the oil temperature does not increase), it is judged that there is an open circuit in the oil temperature sensor and diagnosis code No. 15 is output.	• Malfunction of the oil temperature sensor • Malfunction of connector • Malfunction of the A/T-ECU



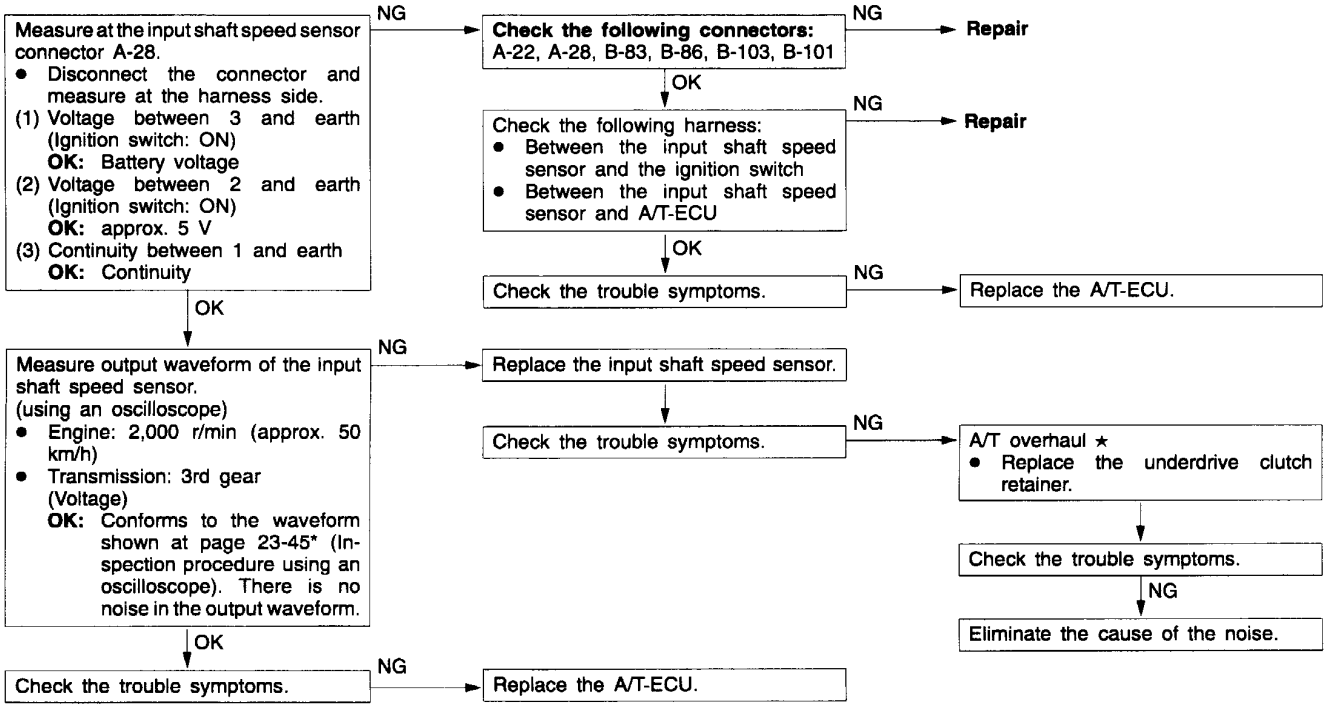
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 A/T-ECU



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 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 A/T-ECU

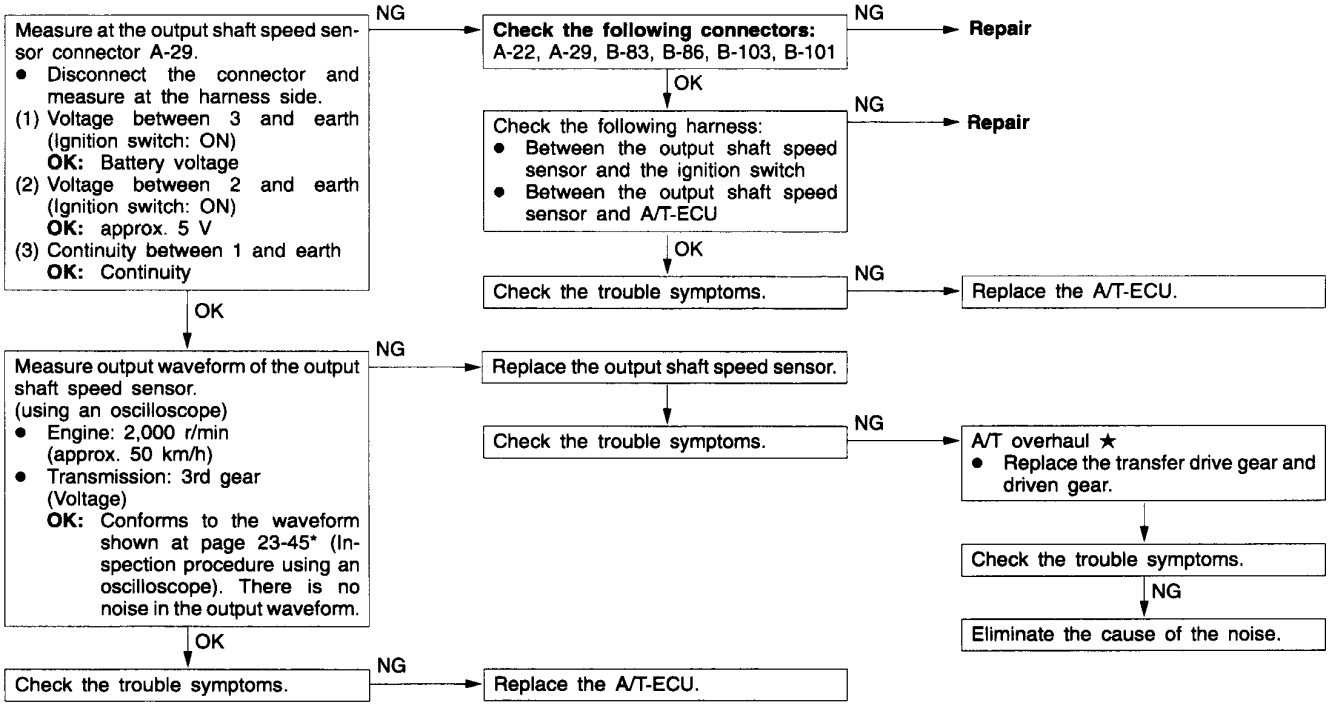
★: Refer to the Transmission Workshop Manual.



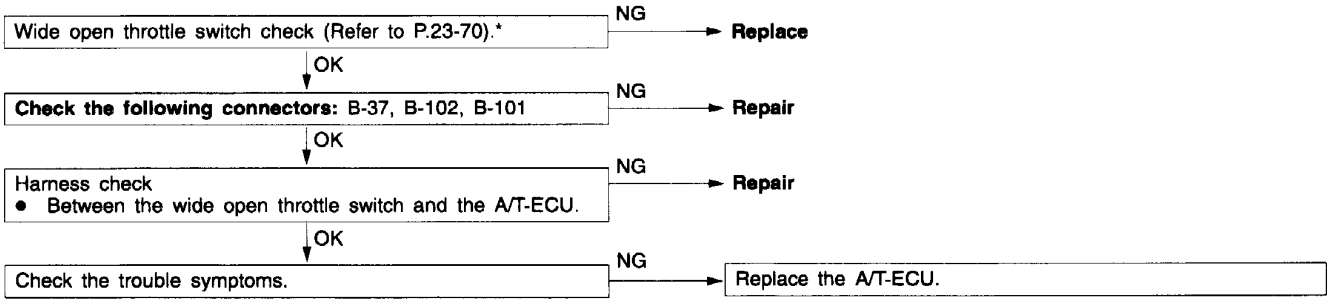
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 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 A/T-ECU

★: Refer to the Transmission Workshop Manual.

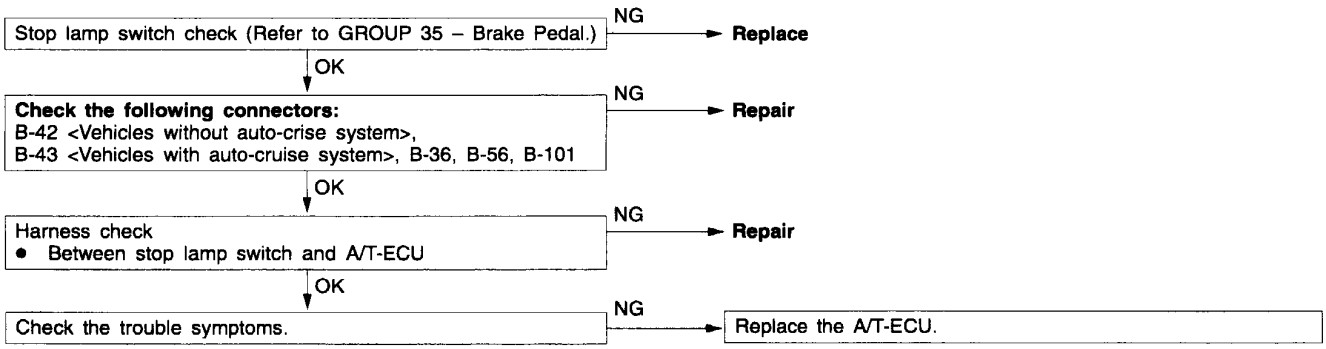


Code No. 25 Wide open throttle switch system	Probable cause
If the wide open throttle switch is on for 1 second or more with the throttle valve opening angle at 70% or less, it is judged that there is a short circuit in the wide open throttle switch and diagnosis code No. 25 is output.	• Malfunction of the wide open throttle switch • Malfunction of connector • Malfunction of A/T-ECU

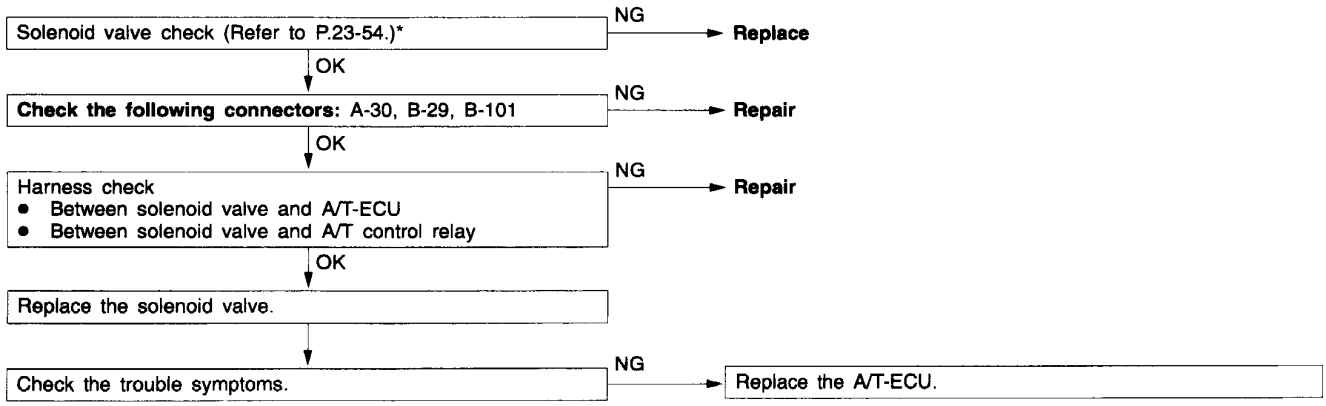


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 A/T-ECU

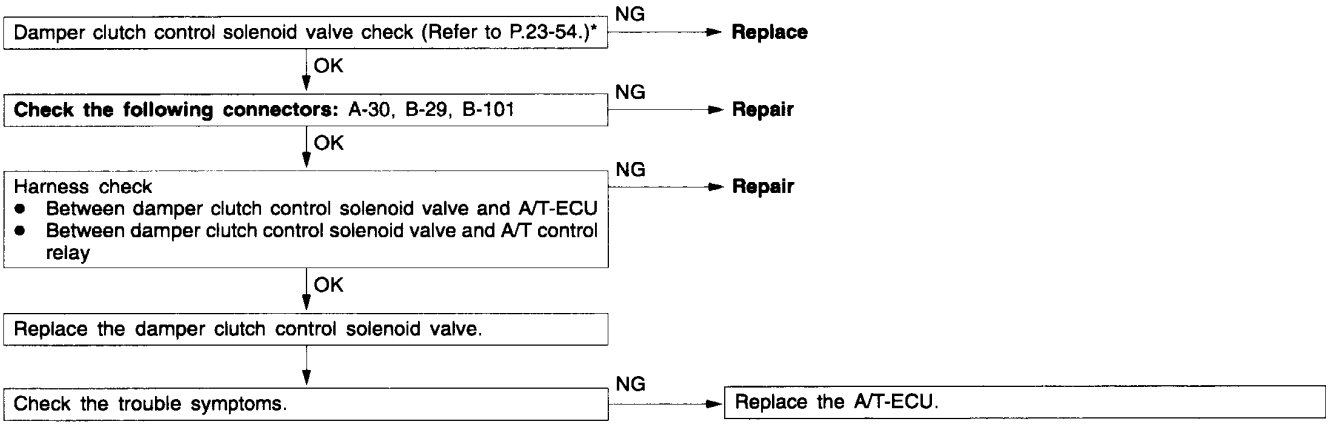


Code No. 31 Low and reverse solenoid valve system Code No. 32 Underdrive solenoid valve system Code No. 33 Second solenoid valve system Code No. 34 Overdrive solenoid valve system	Probable cause
If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit 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 A/T-ECU



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

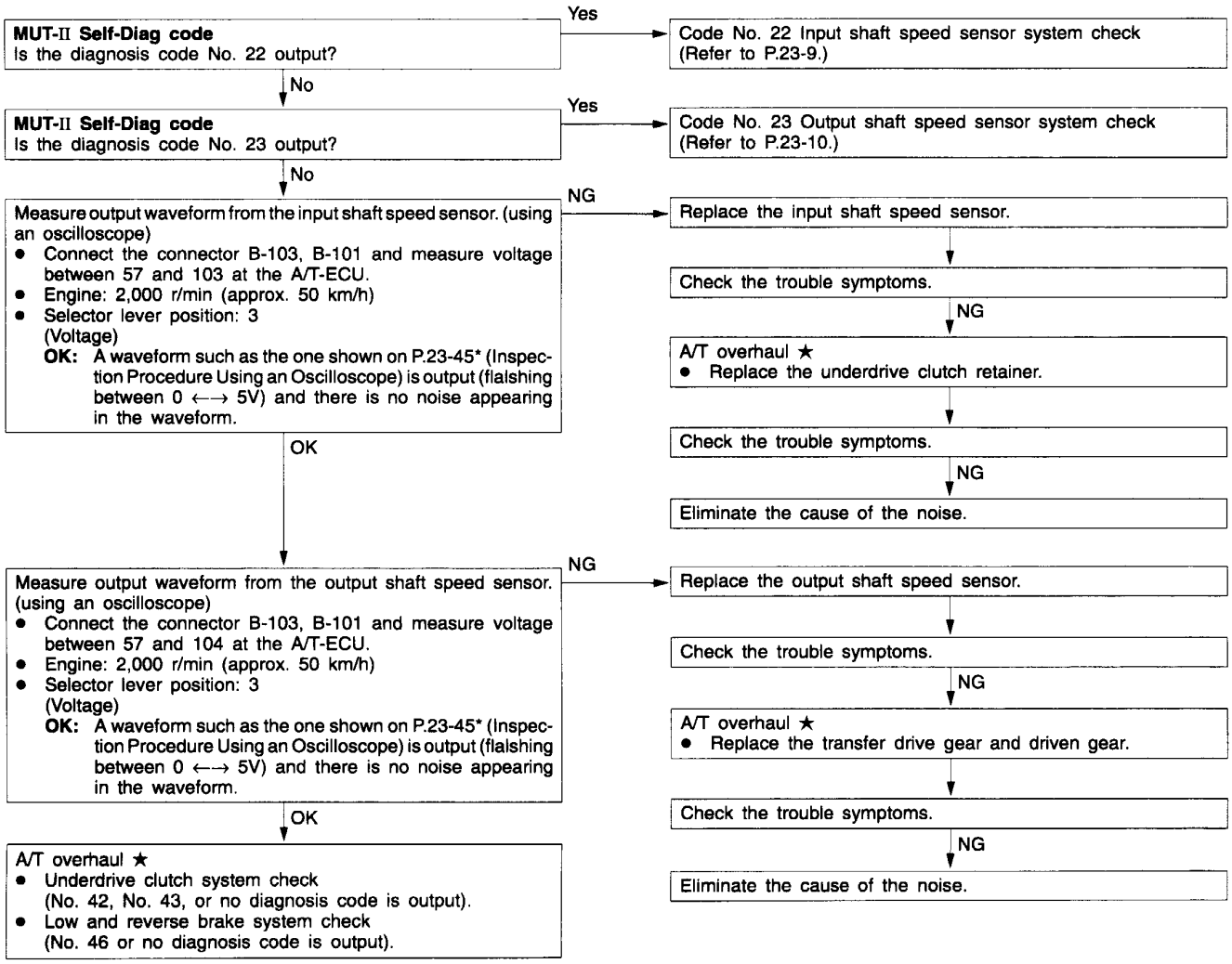
Code No. 36, 52 Damper clutch control solenoid valve system	Probable cause
If the resistance value for the damper clutch control solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the damper clutch control solenoid valve and diagnosis code No. 36 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 A/T-ECU



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 41 1st gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 1st gear ratio is not the same as the output from the input shaft speed sensor after shifting to 1st gear has been completed, diagnosis code No. 41 is output. If diagnosis code No. 41 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 • Malfunction of the underdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 42 2nd gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnosis code No. 42 is output. If diagnosis code No. 42 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 second brake system • Malfunction of the underdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code
Is the diagnosis code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23-9.)
No ↓

MUT-II Self-Diag code
Is the diagnosis code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23-10.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 103 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the input shaft speed sensor.
↓ Check the trouble symptoms.
NG → A/T overhaul ★
- Replace the underdrive clutch retainer.

↓ Check the trouble symptoms.
NG → Eliminate the cause of the noise.

OK ↓

Measure output waveform from the output shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 104 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the output shaft speed sensor.
↓ Check the trouble symptoms.
NG → A/T overhaul ★
- Replace the transfer drive gear and driven gear.

↓ Check the trouble symptoms.
NG → Eliminate the cause of the noise.

OK ↓

A/T overhaul ★
- Underdrive clutch system check
  (No. 41, No. 43, or no diagnosis code is output).
- Second brake system check
  (No. 44 or no diagnosis code is output).

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 43 3rd gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnosis code No. 43 is output. If diagnosis code No. 43 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 • Malfunciton of the transfer drive gear or driven gear • Malfunction of the underdrive clutch system • Malfunction of the overdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code
Is the diagnosis code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23-9.)
No ↓

MUT-II Self-Diag code
Is the diagnosis code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23-10.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 103 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the input shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the underdrive clutch retainer.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

OK ↓

Measure output waveform from the output shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 104 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the output shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the transfer drive gear and driven gear.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

OK ↓

A/T overhaul ★
- Underdrive clutch system check
  (No. 41, No. 42, or no diagnosis code is output).
- Overdrive clutch system check
  (No. 44 or no diagnosis code is output).

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 44 4th gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnosis code No. 44 is output. If diagnosis code No. 44 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 second brake system • Malfunction of the overdrive clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code
Is the diagnosis code No. 22 output?
Yes → Code No. 22 Input shaft speed sensor system check (Refer to P.23-9.)
No ↓

MUT-II Self-Diag code
Is the diagnosis code No. 23 output?
Yes → Code No. 23 Output shaft speed sensor system check (Refer to P.23-10.)
No ↓

Measure output waveform from the input shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 103 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the input shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the underdrive clutch retainer.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

OK ↓

Measure output waveform from the output shaft speed sensor. (using an oscilloscope)
- Connect the connector B-103, B-101 and measure voltage between 57 and 104 at the A/T-ECU.
- Engine: 2,000 r/min (approx. 50 km/h)
- Selector lever position: 3

(Voltage)
OK: A waveform such as the one shown on P.23-45* (Inspection Procedure Using an Oscilloscope) is output (flalshing between 0 ←→ 5V) and there is no noise appearing in the waveform.

NG → Replace the output shaft speed sensor.
↓
Check the trouble symptoms.
NG ↓
A/T overhaul ★
- Replace the transfer drive gear and driven gear.

↓
Check the trouble symptoms.
NG ↓
Eliminate the cause of the noise.

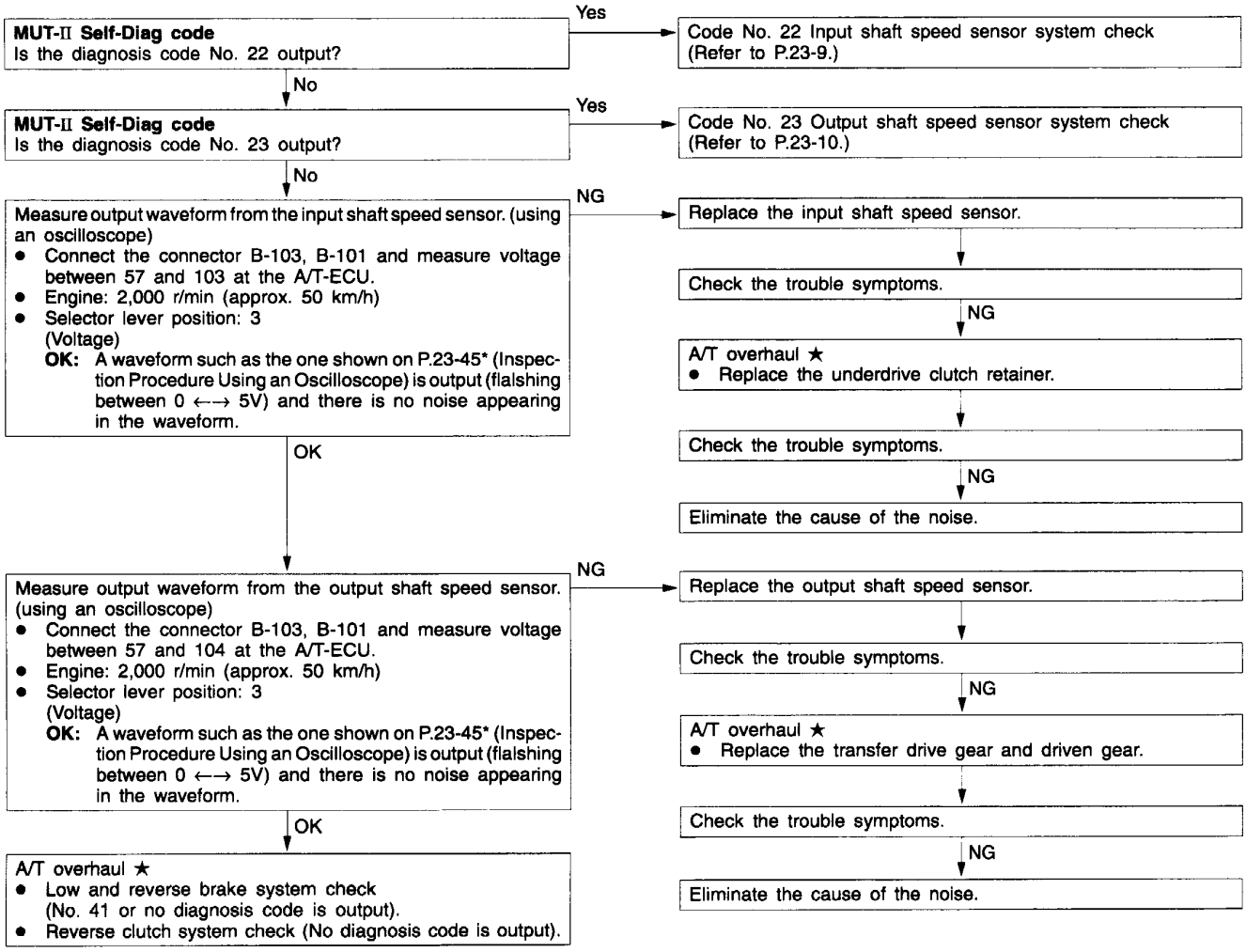
OK ↓

A/T overhaul ★
- Second brake system check (No. 42 or no diagnosis code is output).
- Overdrive clutch system check (No. 43 or no diagnosis code is output).

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 46 Reverse gear ratio does not meet the specification	Probable cause
If the output from the output shaft speed sensor multiplied by the reverse gear ratio is not the same as the output from the input shaft speed sensor after shifting to reverse gear has been completed, diagnosis code No. 46 is output. If diagnosis code No. 46 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 • Malfunciton of the transfer drive gear or driven gear • Malfunction of the low and reverse brake system • Malfunction of the reverse clutch system • Noise generated

★: Refer to the Transmission Workshop Manual.



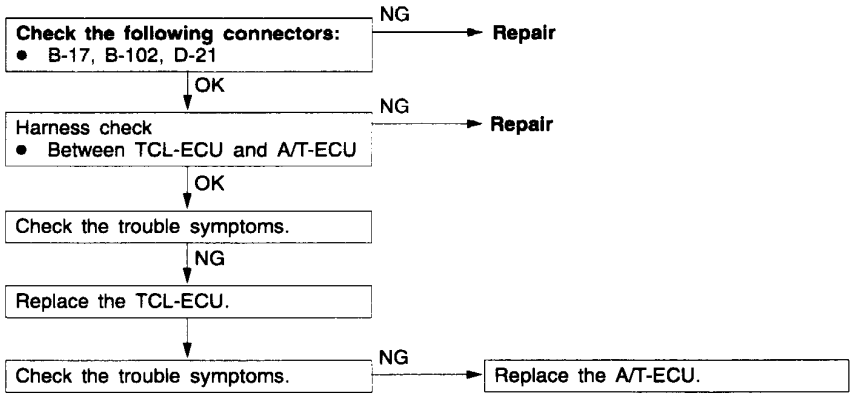
NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

Code No. 51 Abnormal communication with engine-ECU <Vehicles without TCL> Abnormal communication with TCL-ECU <Vehicles with TCL>	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 TCL-ECU <Vehicles with TCL> • Malfunction of the A/T-ECU

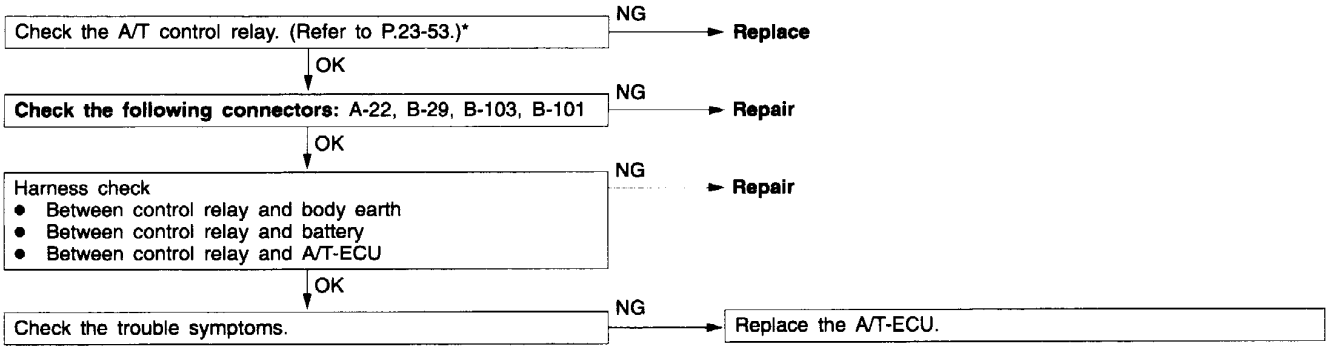
<Vehicles without TCL>

Replace the A/T-ECU.

<Vehicles with TCL>

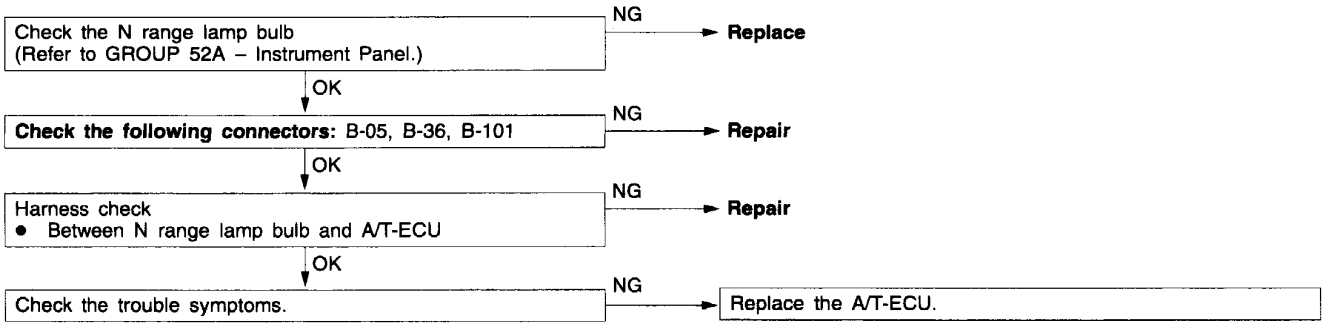


Code No. 54 A/T control relay system	Probable cause
If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay earth and diagnosis code No. 54 is output. Then the transmission is 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 A/T-ECU



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

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 A/T-ECU



Code No. 71 Malfunction of A/T-ECU	Probale cause
There is an abnormality in the A/T-ECU. The transmission is locked into 3rd gear as a fail-safe measure.	• Malfunction of the A/T-ECU

Replace the A/T-ECU.

INSPECTION CHART FOR TROUBLE SYMPTOMS

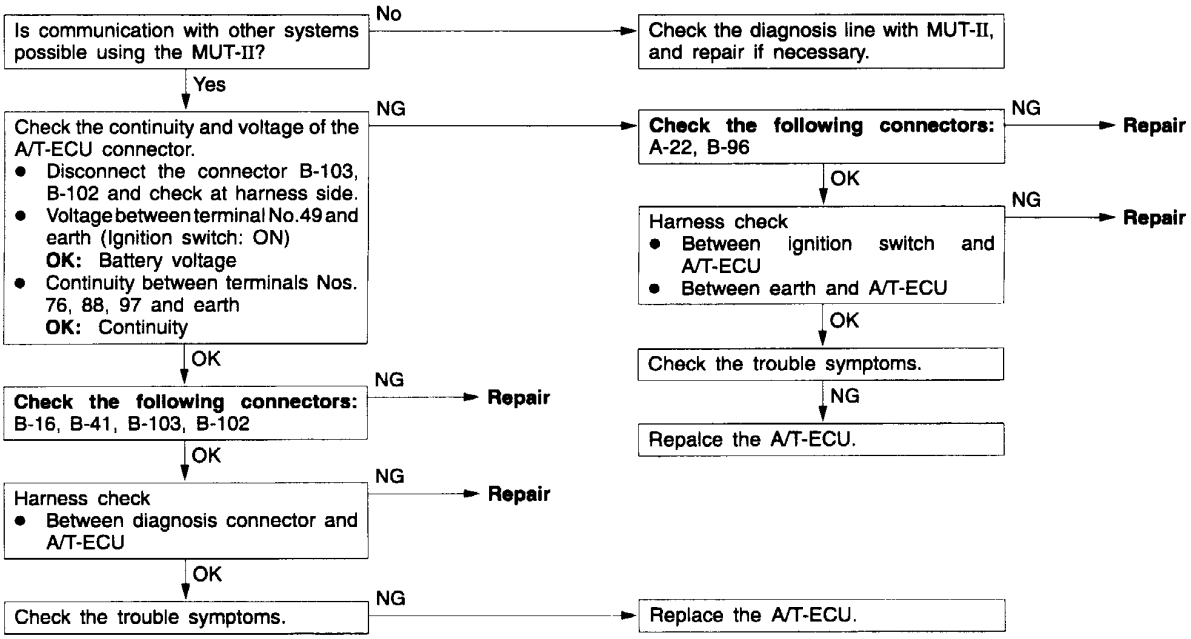
Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible		1	23-20
Driving impossible	Starting impossible	2	23-21
	Does not move forward	3	23-21
	Does not reverse	4	23-22
	Does not move (forward or reverse)	5	23-22
Malfunction when starting	Engine stalling when shifting	6	23-23
	Shocks when changing from N to D and large time lag	7	23-23
	Shocks when changing from N to R and large time lag	8	23-24
	Shocks when changing from N to D, N to R and large time lag	9	23-25
Malfunction when shifting	Shocks and running up	10	23-25

Trouble symptom		Inspection procedure No.	Reference page
Displaced shifting points	All points	11	23-26
	Some points	12	23-27
Does not shift	No diagnosis codes	13	23-27
Malfunction while driving	Poor acceleration	14	23-28
	Vibration	15	23-28
Inhibitor switch system		16	23-29
Mode control switch system		17	23-29
Idle position switch system		18	23-30
Dual pressure switch system		19	23-30
Vehicle speed sensor system		20	23-31
Auto-cruse-ECU signal system		21	23-31

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

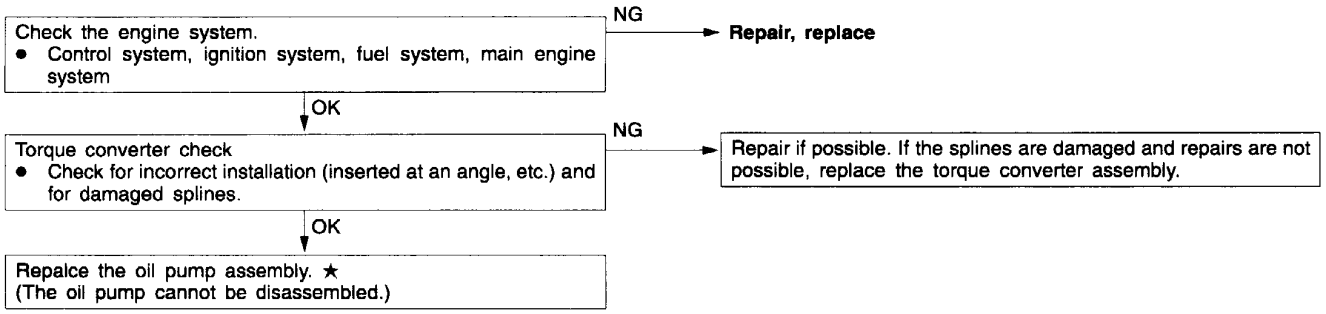
Communication with MUT-II is not possible	**Probable cause**
If communication with the MUT-II is not possible, the cause is probably a defective diagnosis line or the A/T-ECU is not functioning.	• Malfunction of diagnosis line • Malfunction of connector • Malfunction of the A/T-ECU



INSPECTION PROCEDURE 2

Starting impossible	Probable cause
Starting is not possible when the selector lever is in P or N range.In such cases, the cause is probably a defective engine system, torque converter or oil pump.	• Malfunction of the engine system • Malfunction of the torque converter • Malfunction of the oil pump

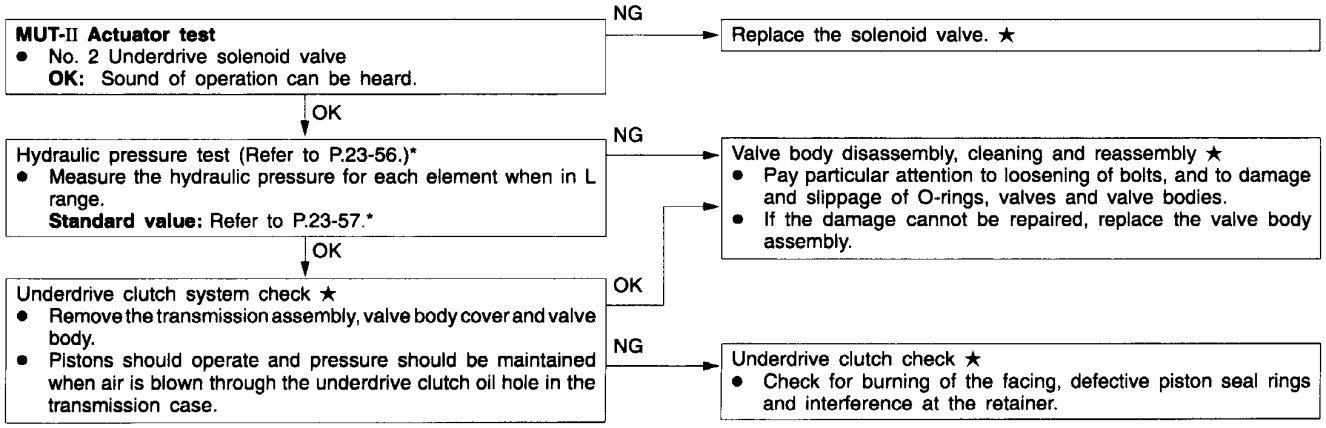
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 3

Does not move (forward)	Probable cause
If the vehicle does not move forward when the selector lever is shifted from N to D, 3, 2 or L range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body.	• Abnormal line pressure • Malfunction of the underdrive solenoid valve • Malfunction of the underdrive clutch • Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.

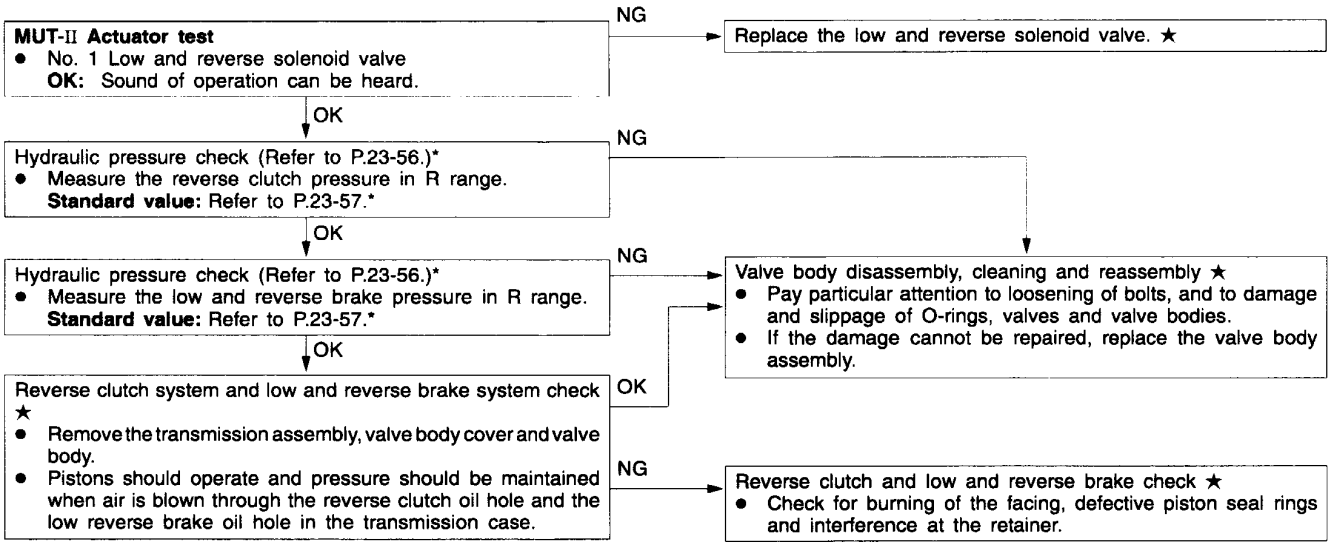


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 4

Does not reverse	Probable cause
If the vehicle does not reverse when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low and reverse brake or a malfunction of the reverse clutch, low and reverse brake or valve body.	• Abnormal reverse clutch pressure • Abnormal low and reverse brake pressure • Malfunction of the low and reverse solenoid valve • Malfunction of the reverse clutch • Malfunction of the low and reverse brake • Malfunction of the valve body

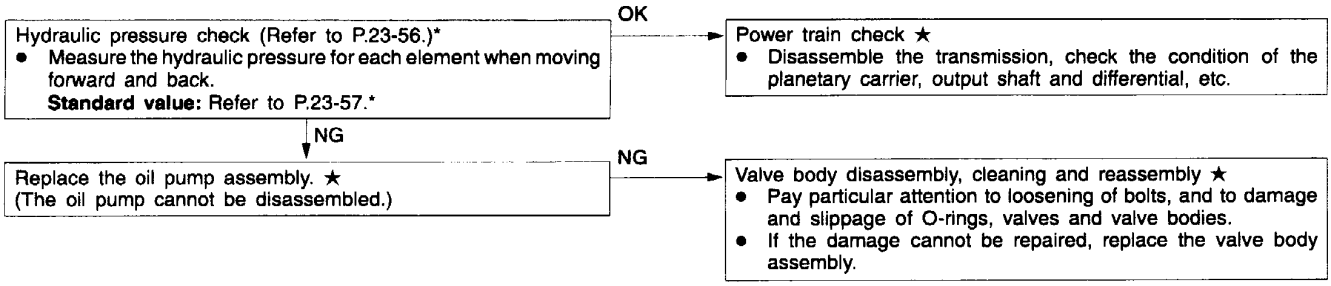
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 5

Does not move (forward or reverse)	Probable cause
If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body.	• Abnormal line pressure • Malfunction of power train • Malfunction of the oil pump • Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.

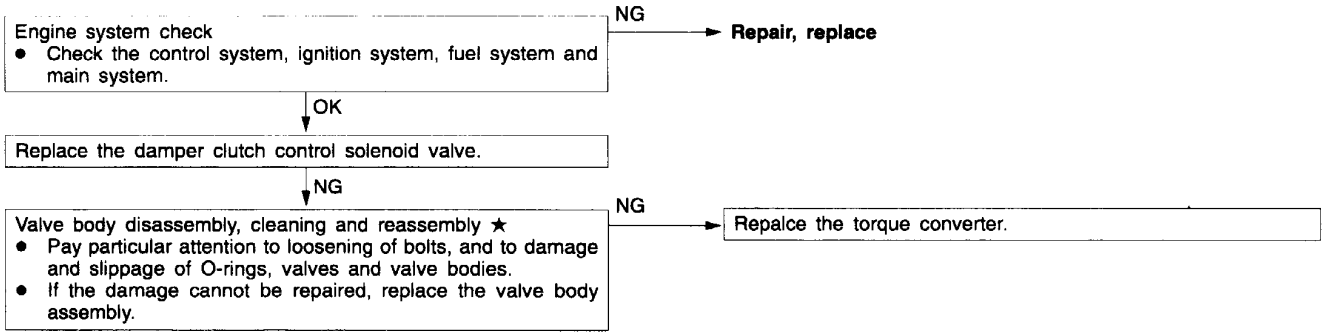


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 6

Engine stalling when shifting	Probable cause
If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch malfunction).	• Malfunction of the engine system • Malfunction of the damper clutch control solenoid valve • Malfunction of the valve body • Malfunction of the torque converter (Malfuction of the damper clutch)

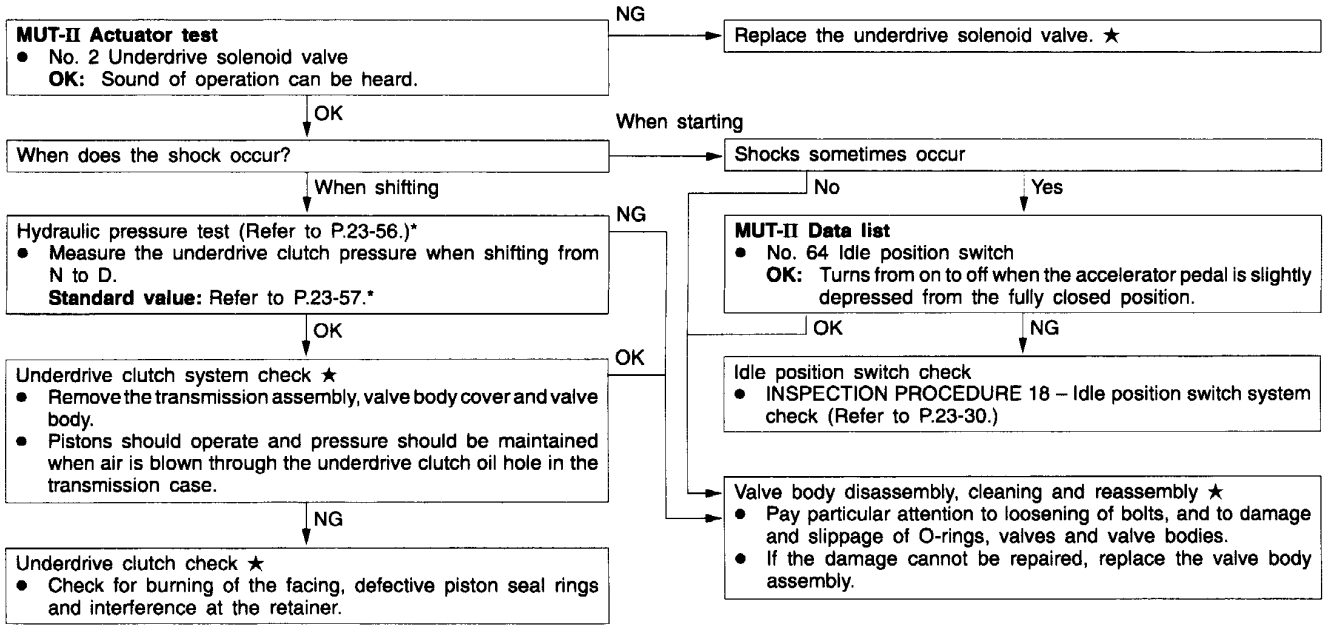
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 7

Shocks when changing from N to D and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body or idle position switch.	• Abnormal underdrive clutch pressure • Malfunction of the underdrive solenoid valve • Malfunction of the underdrive clutch • Malfunction of the valve body • Malfunction of the idle position switch

★: Refer to the Transmission Workshop Manual.

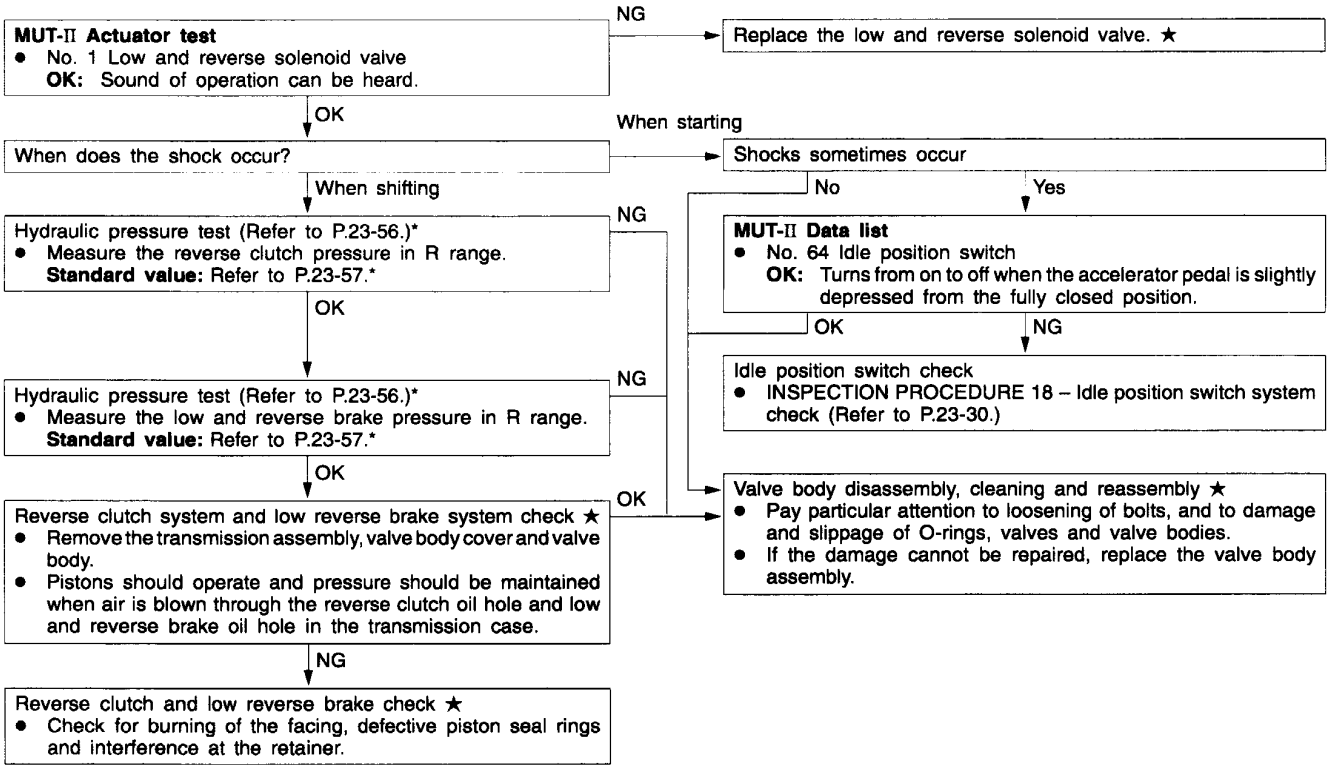


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 8

Shocks when changing from N to R and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body or idle position switch.	• Abnormal reverse clutch pressure • Abnormal low and reverse brake pressure • Malfunction of the low and reverse solenoid valve • Malfunction of the reverse clutch • Malfunction of the low and reverse brake • Malfunction of the valve body • Malfunction of the idle position switch

★: Refer to the Transmission Workshop Manual.

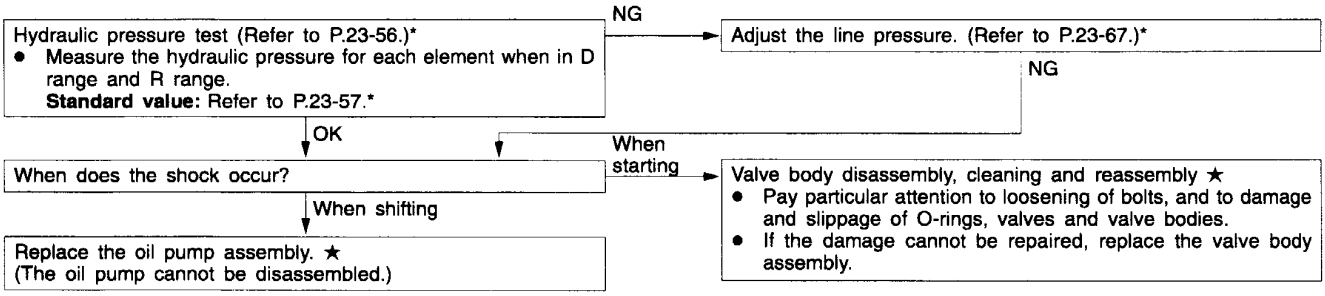


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 9

Shocks when changing from N to D, N to R and large time lag	Probable cause
If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range and from N to R range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the oil pump or valve body.	• Abnormal line pressure • Malfunction of the oil pump • Malfunction of the valve body

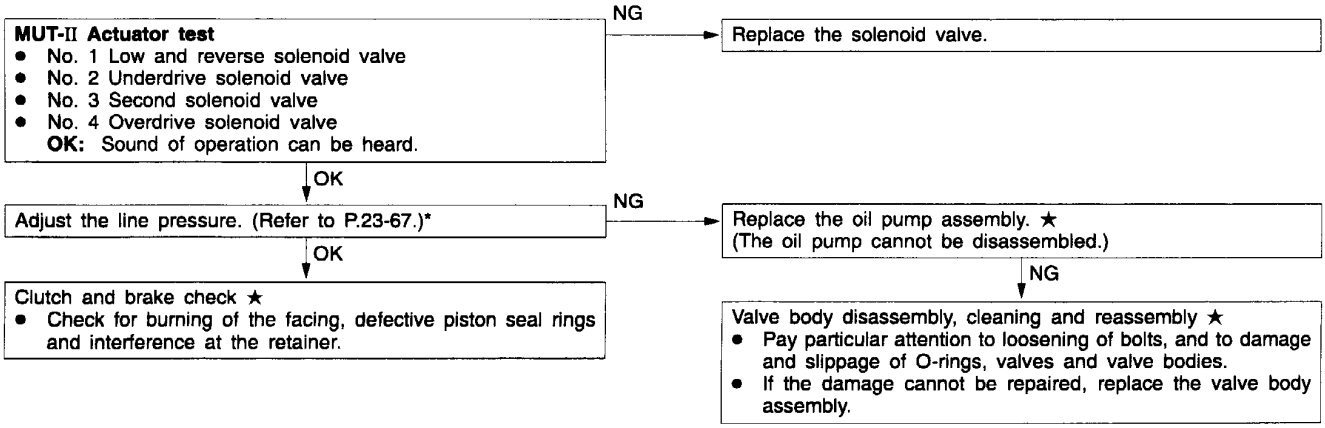
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 10

Shocks and running up	Probable cause
If shocks occur when driving due to upshifting or downshifting and the transmission speed becomes higher than the engine speed, the cause is probably abnormal line pressure or a malfunction of a solenoid valve, oil pump, valve body or of a brake or clutch.	• Abnormal line pressure • Malfunction of each solenoid valve • Malfunction of the oil pump • Malfunction of the valve body • Malfunction of each brake or each clutch

★: Refer to the Transmission Workshop Manual.

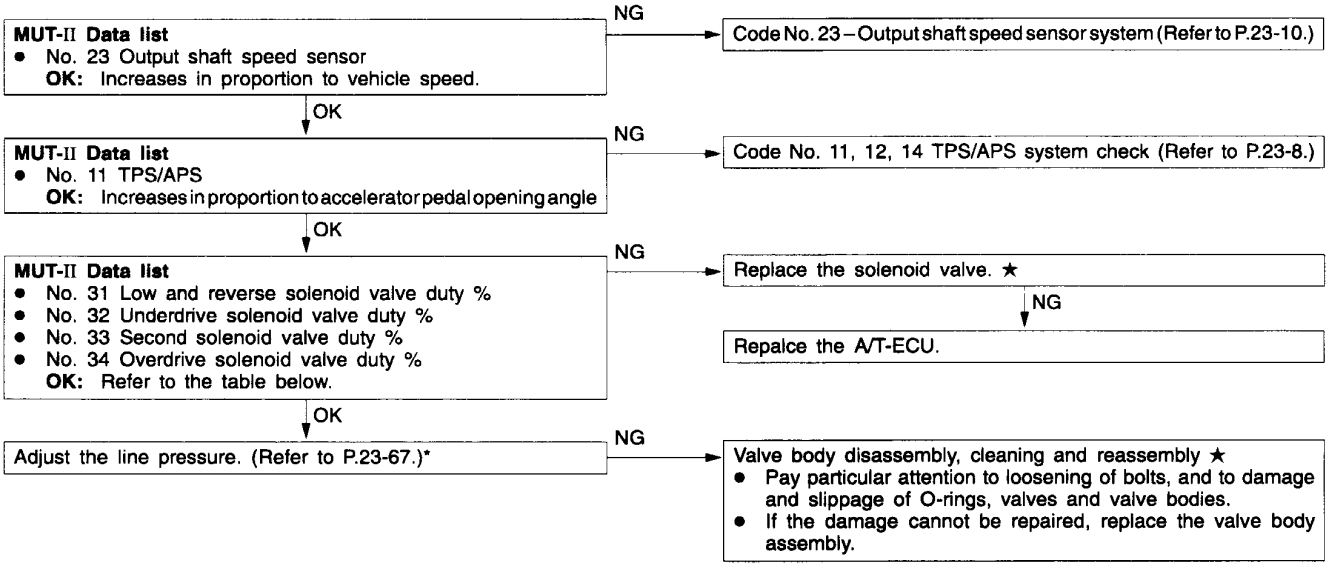


NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 11

All points (Displaced shifting points)	Probable cause
If all shift points are displaced while driving, the cause is probably a malfunction of the output shaft speed sensor, TPS or of a solenoid valve.	• Malfunction of the output shaft speed sensor • Malfunction of the throttle position sensor • Malfunction of each solenoid valve • Abnormal line pressure • Malfunction of the valve body • Malfunction of the A/T-ECU

★: Refer to the Transmission Workshop Manual.



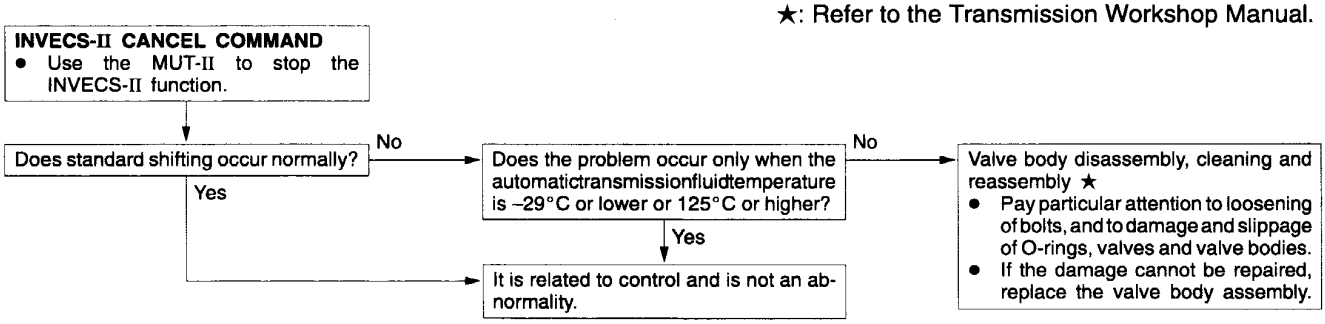
	No. 31	No. 32	No. 33	No. 34
Driving at constant speed in 1st gear	0 %	0 %	100 %	100 %
Driving at constant speed in 2nd gear	100 %	0 %	0 %	100 %
Driving at constant speed in 3rd gear	100 %	0 %	100 %	0 %
Driving at constant speed in 4th gear	100 %	100 %	0 %	0 %

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

INSPECTION PROCEDURE 12

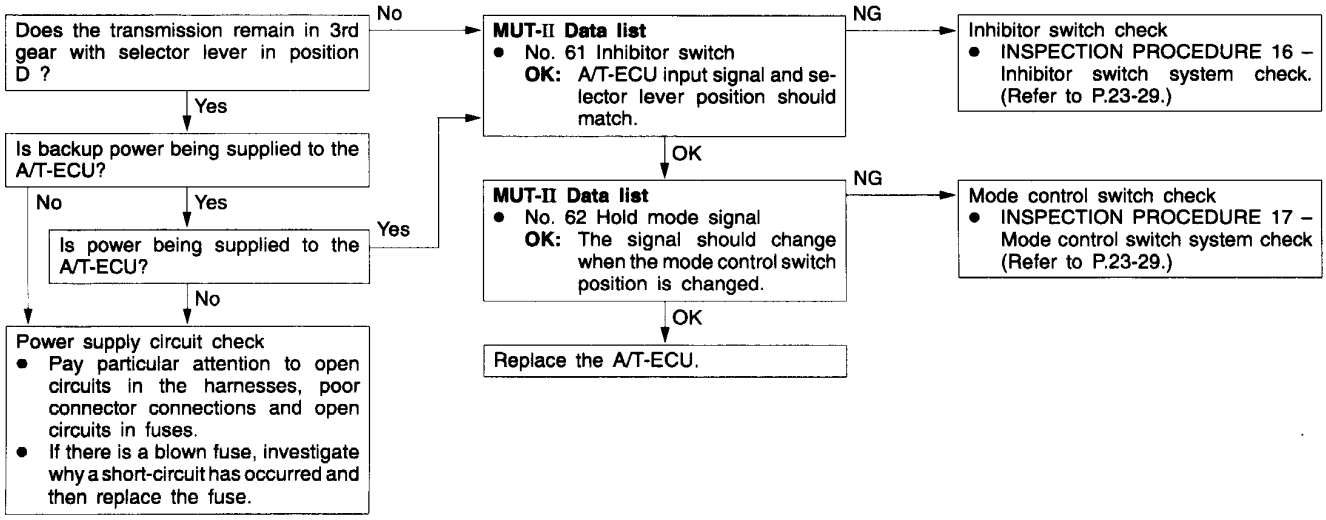
Some points (Displaced shifting points)	Probable cause
If some of the shift points are displaced while driving, the cause is probably a malfunction of the valve body, or it is related to control and is not an abnormality.	• Malfunction of the valve body

★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 13

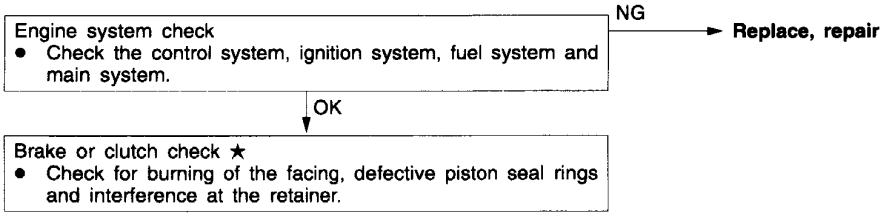
No diagnosis codes (Does not shift)	Probable cause
If shifting does not occur while driving and no diagnosis codes are output, the cause is probably a malfunction of the inhibitor switch, or A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the A/T-ECU



INSPECTION PROCEDURE 14

Poor acceleration	Probable cause
If acceleration is poor even if downshifting occurs while driving, the cause is probably a malfunction of the engine system or of a brake or clutch.	• Malfunction of the engine system • Malfunction of the brake or clutch

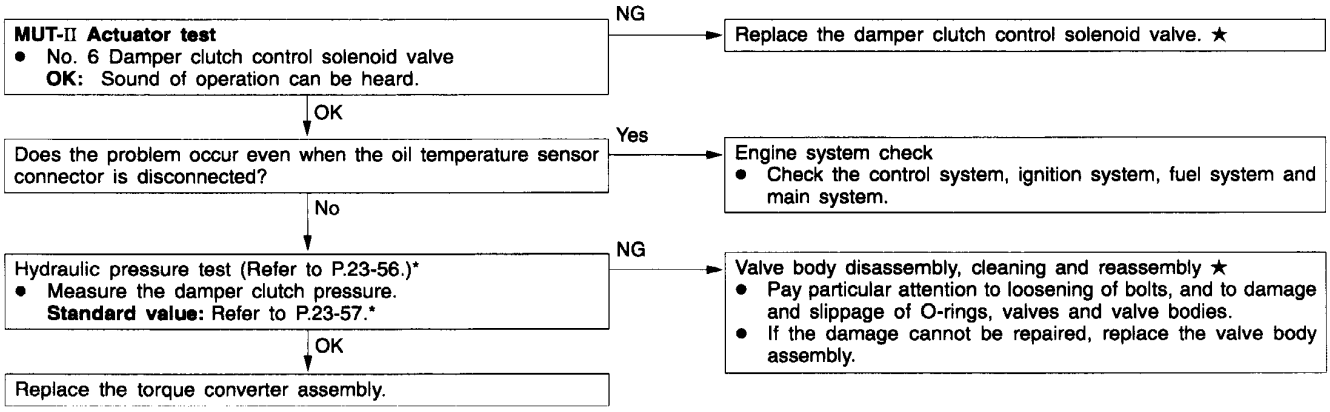
★: Refer to the Transmission Workshop Manual.



INSPECTION PROCEDURE 15

Vibration	Probable cause
If vibration occurs when driving at constant speed or when accelerating and deceleration in top range, the cause is probably abnormal damper clutch pressure or a malfunction of the engine system, damper clutch control solenoid valve, torque converter or valve body.	• Abnormal damper clutch pressure • Malfunction of the engine system • Malfunction of the damper clutch control solenoid valve • Malfunction of the torque converter • Malfunction of the valve body

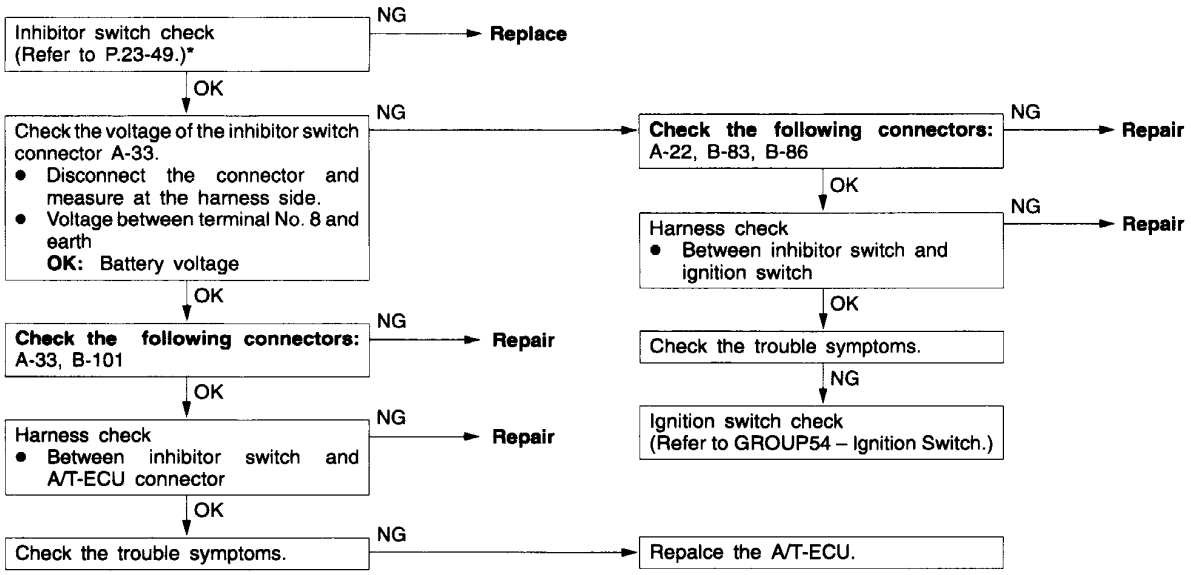
★: Refer to the Transmission Workshop Manual.



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

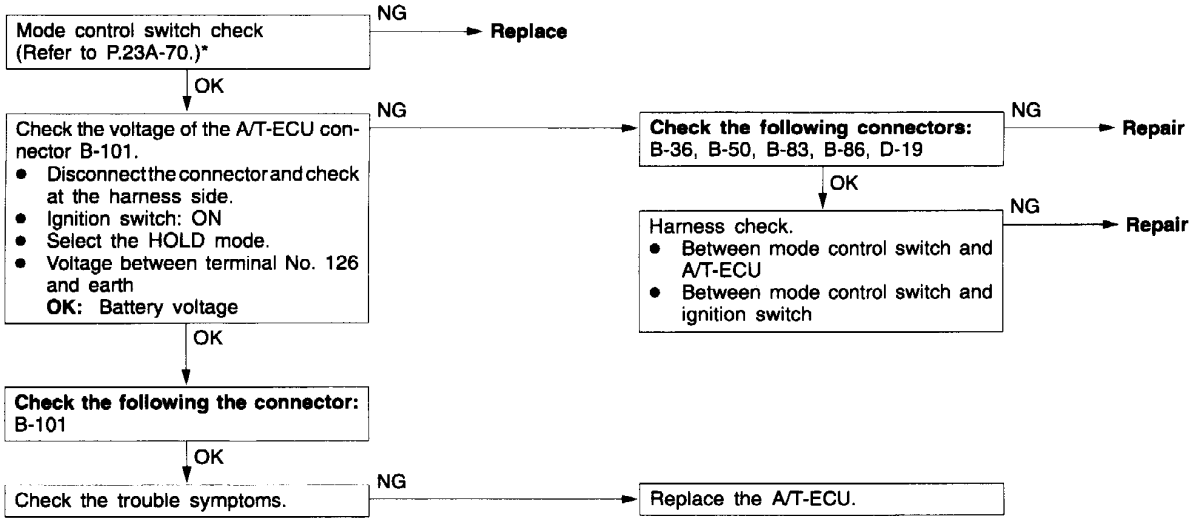
INSPECTION PROCEDURE 16

Inhibitor switch system	Probable cause
The cause is probably a malfunction of the inhibitor switch circuit, ignition switch circuit or a defective A/T-ECU.	• Malfunction of the inhibitor switch • Malfunction of the ignition switch • Malfunction of connector • Malfunction of the A/T-ECU



INSPECTION PROCEDURE 17

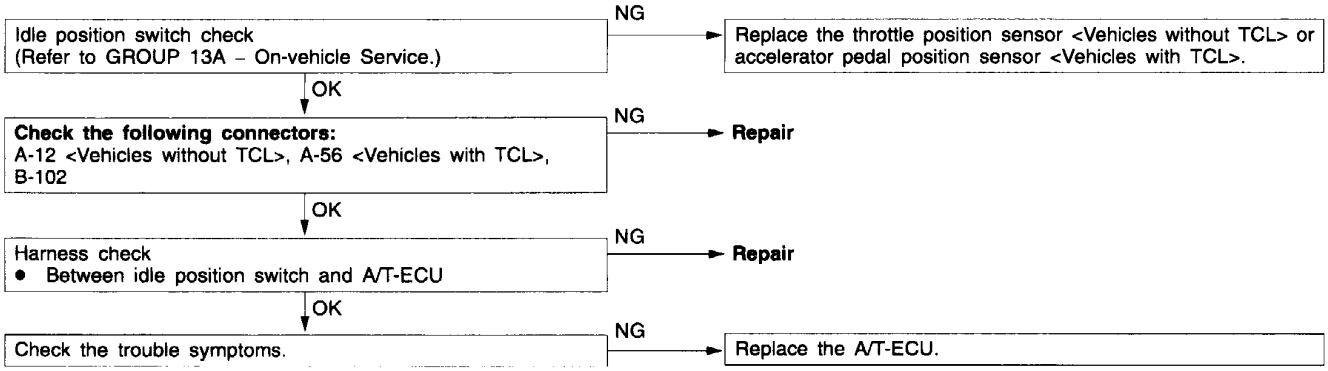
Mode control switch system	Probable cause
The cause is probably a defective mode control switch circuit or a defective A/T-ECU.	• Malfunction of the mode control switch • Malfunction of connector • Malfunction of the A/T-ECU



NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

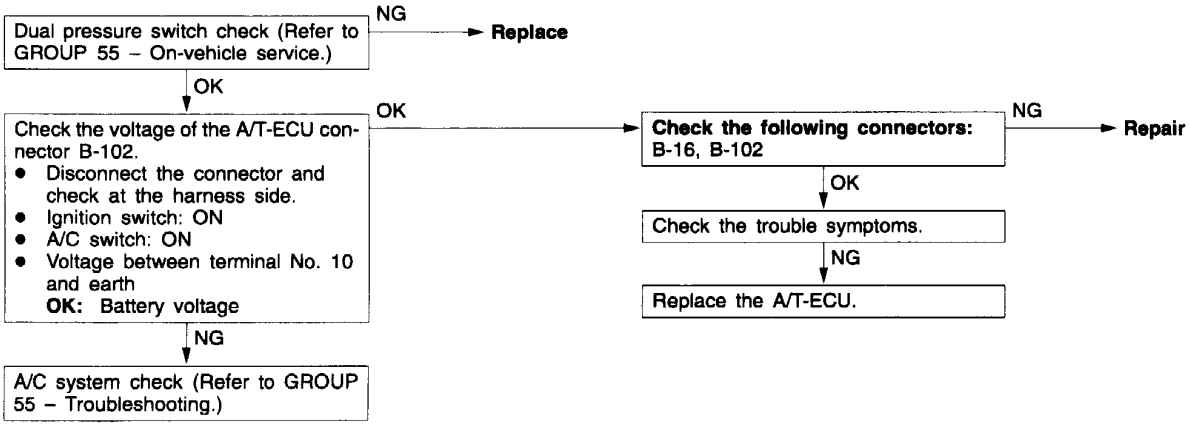
INSPECTION PROCEDURE 18

Idle position switch system	Probable cause
The cause is probably a defective idle position switch circuit or a defective A/T-ECU.	• Malfunction of the idle position switch • Malfunction of connector • Malfunction of the A/T-ECU



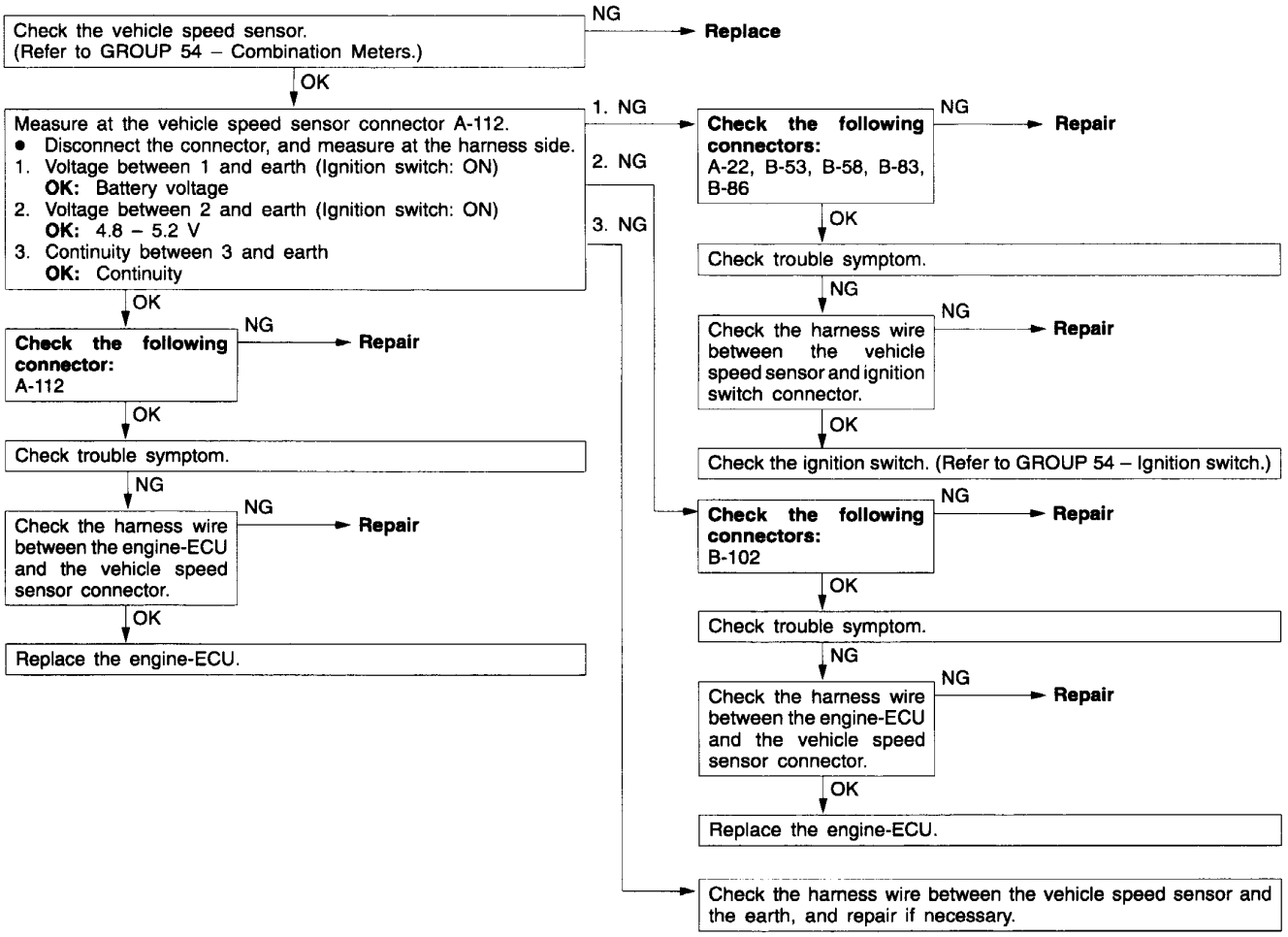
INSPECTION PROCEDURE 19

Dual pressure switch system	Probable cause
The cause is probably a defective dual pressure switch circuit or a defective A/T-ECU.	• Malfunction of the dual pressure switch • Malfunction of connector • Malfunction of A/C system • Malfunction of the A/T-ECU



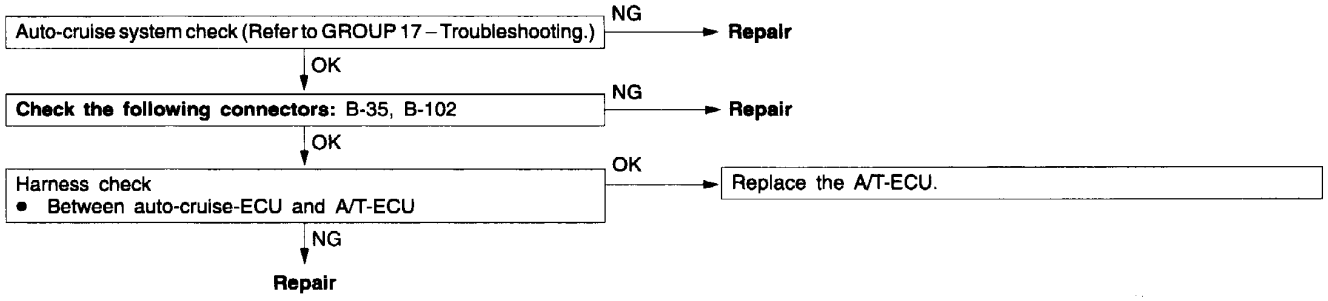
INSPECTION PROCEDURE 20

Vehicle speed sensor system	Probable cause
The cause is probably a defective vehicle speed sensor circuit or a defective A/T-ECU.	• Malfunction of the vehicle speed sensor • Malfunction of connector • Malfunction of the A/T-ECU

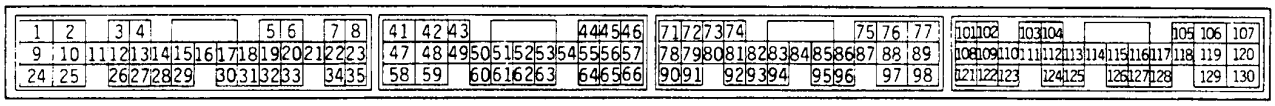


INSPECTION PROCEDURE 21

Auto-cruise-ECU signal system	Probable cause
The cause is probably a defective auto-cruise signal line circuit or a defective A/T-ECU.	• Malfunction of connector • Malfunction of the A/T-ECU • Malfunction of the auto-cruise-ECU



CHECK AT ENGINE AND A/T-ECU TERMINALS



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Terminal No.	Check item	Check requirement	Standard value
50	A/T control relay	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
57	Sensor earth	Always	0 V
75	Auto-cruise OD-OFF command	No OD-OFF request (Auto-cruise operating: Plane road)	Battery voltage
		OD-OFF request (Auto-cruise operating: Sloping road)	0V
76	Earth	Always	0 V
77	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
86	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	Engine: Idling Selector lever position: D	Other than 0 V
87	Communication with engine-ECU <Vehicles without TCL> Communication with TCL-ECU <Vehicles with TCL>	Engine: Idling Selector lever position: D	Other than 0 V
88	Earth	Always	0 V
89	Solenoid valve power supply	Ignition switch: OFF	0 V
		Ignition switch: ON	Battery voltage
97	Earth	Always	0 V
101	Inhibitor switch P	Selector lever position: P	Battery voltage
		Selector lever position: Other than above	0 V
102	Inhibitor switch D	Selector lever position: D	Battery voltage
		Selector lever position: Other than above	0 V

Terminal No.	Check item	Check requirement	Standard value
103	Input shaft speed sensor	Measure between terminal No. 57 and No. 103 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
104	Output shaft speed sensor	Measure between terminal No. 57 and No. 104 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 (3rd gear)	Refer to P.23-45*, Oscilloscope inspection procedure.
106	Second solenoid valve	Selector lever position: 2 (2nd gear)	Battery voltage
		Selector lever position: P	Approx. 7 – 9 V
107	Damper clutch control solenoid valve	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: 3 (50 km/h in 3rd gear)	Other than battery voltage
108	Inhibitor switch R	Selector lever position: R	Battery voltage
		Selector lever position: Other than above	0 V
109	Inhibitor switch 3	Selector lever position: 3	Battery voltage
		Selector lever position: Other than above	0 V
110	Inhibitor switch L	Selector lever position: L	Battery voltage
		Selector lever position: Other than above	0 V
115	Wide open throttle switch	Accelerator pedal: Released	4 V or more
		Accelerator pedal: Depressed	Less than 0.4 V
120	Underdrive solenoid valve	Selector lever position: L (1st gear)	Battery voltage
		Selector lever position: P	Approx.7 – 9 V
121	Inhibitor switch N	Selector lever position: N	Battery voltage
		Selector lever position: Other than above	0 V
122	Inhibitor switch 2	Selector lever position: 2	Battery voltage
		Selector lever position: Other than above	0 V
123	Stop lamp switch	Brake pedal: Depressed	Battery voltage
		Brake pedal: Released	0 V
124	Oil temperature sensor	ATF temperature: 25 °C	3.8 – 4.0 V
		ATF temperature: 80 °C	2.3 – 2.5 V

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub No. PWDE9502).

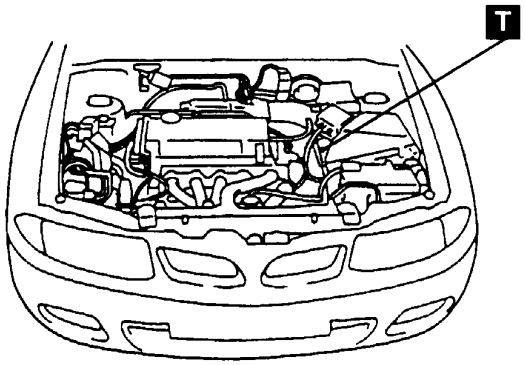
Terminal No.	Check item	Check requirement	Standard value
126	Mode control switch	Select HOLD mode	Battery voltage
		Select AUTO mode	0V
129	Low and reverse solenoid valve	Selector lever position: P	Battery voltage
		Selector lever position: 2 (2nd gear)	Approx. 7 – 9 V
130	Overdrive solenoid valve	Selector lever position: 3 (3rd gear)	Battery voltage
		Selector lever position: P	Approx. 7 – 9 V

ON-VEHICLE SERVICE

A/T CONTROL COMPONENT LOCATION

The vehicle speed sensor mounting position has been changed to correspond to the adoption of an electronic speedometer. (The sensor is now mounted on the transmission body.)

Name	Symbol
Vehicle speed sensor	T



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A/T CONTROL COMPONENT CHECK

VEHICLE SPEED SENSOR

Refer to GROUP 54 – Combination Meters.

GROUP 31
WHEEL AND TYRE

GENERAL

OUTLINE OF CHANGE

- Specifications for wheels and tyres have been changed.

GENERAL SPECIFICATIONS

Items		1600, 1900	1800
Wheel	Type	Steel type	Steel type Aluminium type*
	Size	14 x 5.5J	14 x 5.5J 15 x 6.0J*
	Amount of wheel offset mm	44	44
	Pitch circle diameter (P.C.D.) mm	100.0	114.3
Tyre	Size	185/65R14 86H 175/70R14 84T* 195/60R14 86V*	185/65R14 86H 175/70R14 84T* 195/60R14 86V* 205/50R15 86V*
Spare wheel	Type	Steel type	Steel type Aluminium type*
	Size	15 x 4.0T	15 x 4.0T 14 x 5.5J* 15 x 6.0J*
	Amount of wheel offset mm	46	46 44*
	Pitch circle diameter (P.C.D.) mm	100.0	114.3
Spare tyre	Size	T125/70D15 (High pressure)	T125/70D15 (High pressure) 185/65R14 86H* 195/60R14 86V* 205/50R15 86V*

NOTE
*: Optional items

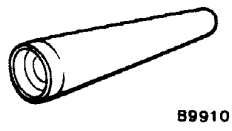
GROUP 35A
BASIC BRAKE SYSTEMS

GENERAL

OUTLINE OF CHANGES

- Service procedures have been established to correspond to change of the rear drum brake.

SPECIAL TOOL

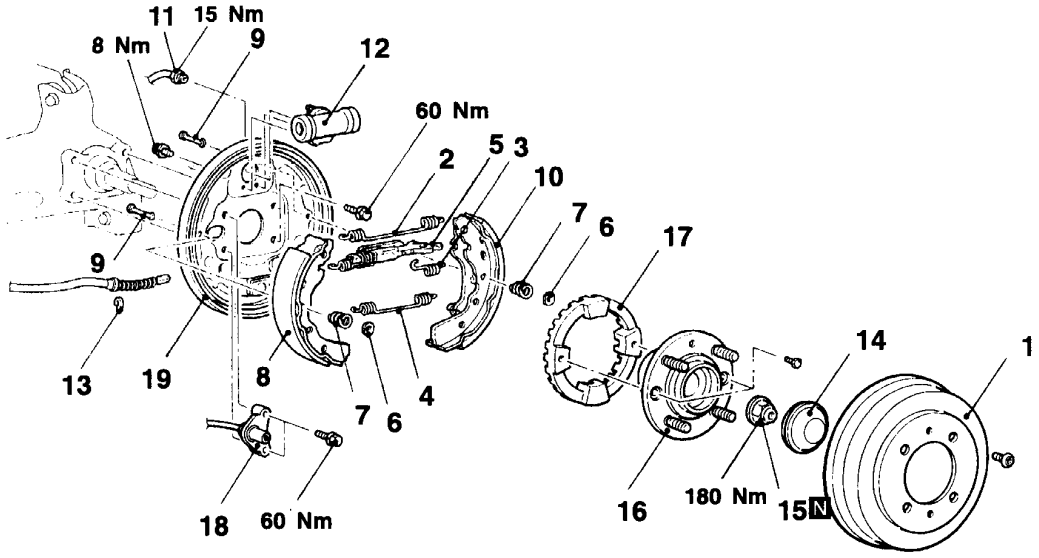
Tool	Number	Name	Use
 B991008	MB991008(F)	Wheel cylinder piston cup installer	Installation of drum brake wheel cylinder piston cup

REAR DRUM BRAKE

REMOVAL AND INSTALLATION

Pre-removal Operation
- Loosening the Parking Brake Cable Adjusting Nut.
- Brake Fluid Draining

Post-installation Operation
- Brake Line Bleeding
- Parking Brake Lever Stroke Adjustment



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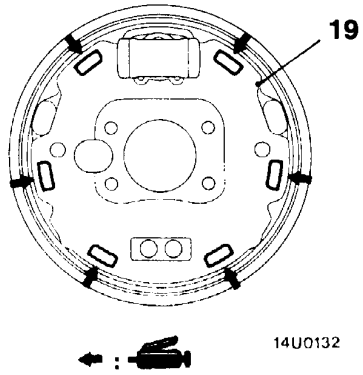


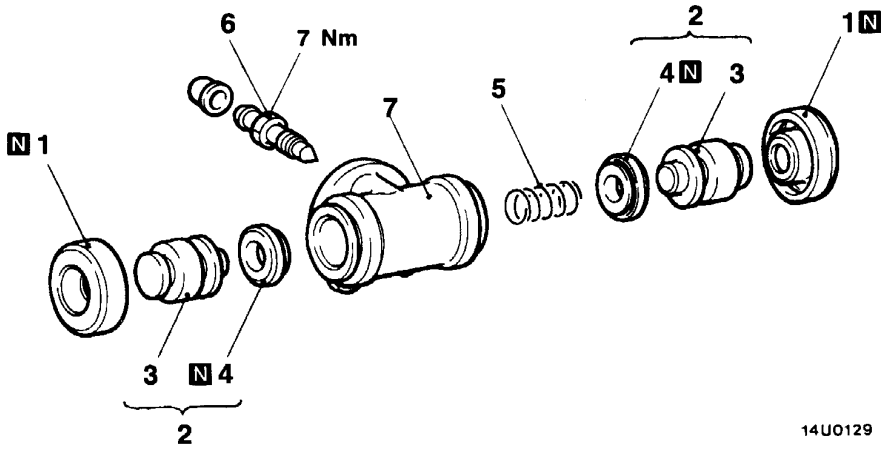
Specified grease:
Brake grease SAE J310, NLGI No.1

Rear drum brake removal steps

1. Brake drum
2. Return shoe spring
3. Strut retaining spring
4. Retaining shoe spring
5. Auto-adjuster assembly
6. Shoe hold-down cup
7. Shoe hold-down spring
8. Shoe and lining assembly
9. Shoe hold-down pin
10. Shoe, lining and lever assembly
11. Brake pipe connection
12. Wheel cylinder assembly
13. Snap ring
14. Hub cap
15. Flange nut
16. Rear hub assembly (Refer to GROUP 27 – Rear Axle Hub.)*
17. Rotor <Vehicles with ABS>
18. Wheel speed sensor <Vehicles with ABS>
19. Backing plate

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

WHEEL CYLINDER ASSEMBLY DISASSEMBLY AND REASSEMBLY



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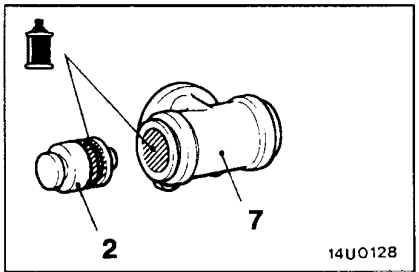
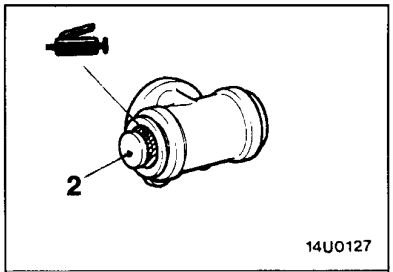
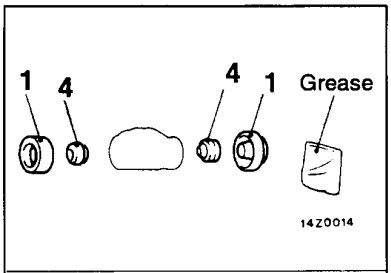


Brake fluid: DOT3 or DOT4



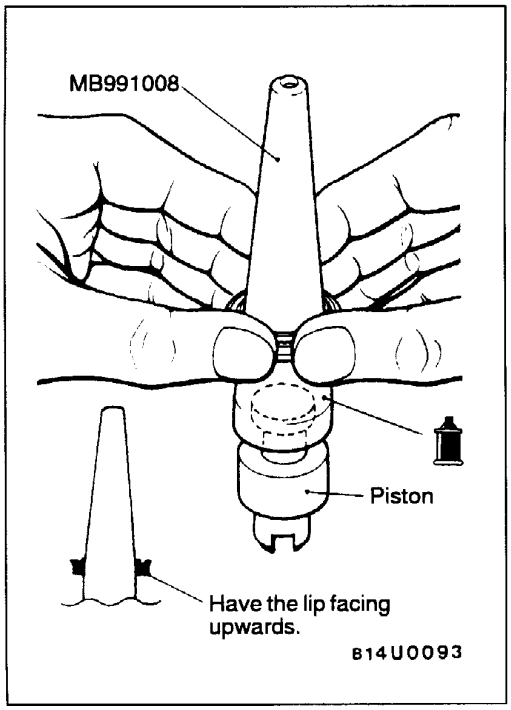
Grease: Repair kit grease



Wheel cylinder repair kit

Disassembly steps

1. Boots
2. Piston assembly
3. ▶A◀ Pistons
4. ▶A◀ Piston cups
5. Spring
6. Bleeder
7. Wheel cylinder body



REASSEMBLY SERVICE POINT

▶A◀ PISTON CUP/PISTON REASSEMBLY

(1) Use alcohol or specified brake fluid to clean the wheel cylinder and the piston.

(2) Apply the specified brake fluid to the piston cups and the special tool.

Specified brake fluid: DOT3 or DOT4

(3) Set the piston cup on the special tool with the lip of the cup facing up, fit the cup onto the special tool, and then slide it down the outside of the tool into the piston groove.

Caution
In order to keep the piston cup from becoming twisted or slanted, slide the piston cup down the tool slowly and carefully, without stopping.

GROUP 35B
ANTI-SKID BRAKING SYSTEM (ABS) <2WD>

GENERAL

OUTLINE OF CHANGES

- The hydraulic unit has been changed.
- ABS-ECU connectors have been changed. Correspond to this, troubleshooting and inspection procedure for the wheel speed sensor have been changed.

TROUBLESHOOTING

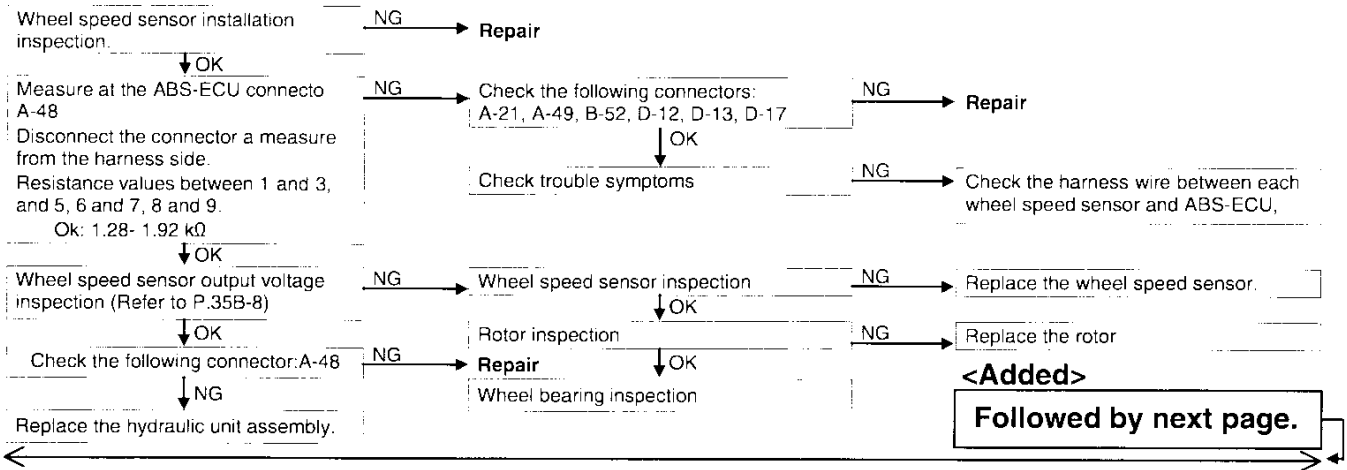
INSPECTION CHART FOR DIAGNOSIS CODES

Inspect according to the inspection chart that is appropriate for the malfunction code.

Diagnosis code No.	Inspection item	Diagnosis content	Reference page
11	Front right wheel speed sensor	Open circuit	35B-2
12	Front left wheel speed sensor		
13	Rear right wheel speed sensor		<Added>
14	Rear left wheel speed sensor		
15	**Wheel speed sensor**	**Abnormal output signal**	**See page 4 of this S/B**
16	Power supply system		35B-2
21	Front right wheel speed sensor	Short circuit	35B-2
22	Front left wheel speed sensor		
23	Rear right wheel speed sensor		
24	Rear left wheel speed sensor		
38	Stop lamp switch system		35B-3
41	Front right inlet solenoid valve		35B-9 (replace the hydraulic unit assembly)
42	Front left inlet solenoid valve		
43	Rear right inlet solenoid valve		
44	Rear left inlet solenoid valve		
45	Front right outlet solenoid valve		
46	Front left outlet solenoid valve		
47	Rear right outlet solenoid valve		
48	Rear left outlet solenoid valve		
51	Valve power supply		35B-3
53	Pump motor		35B-4
63	ABS-ECU		35B-9 (Replace the hydraulic unit assembly)

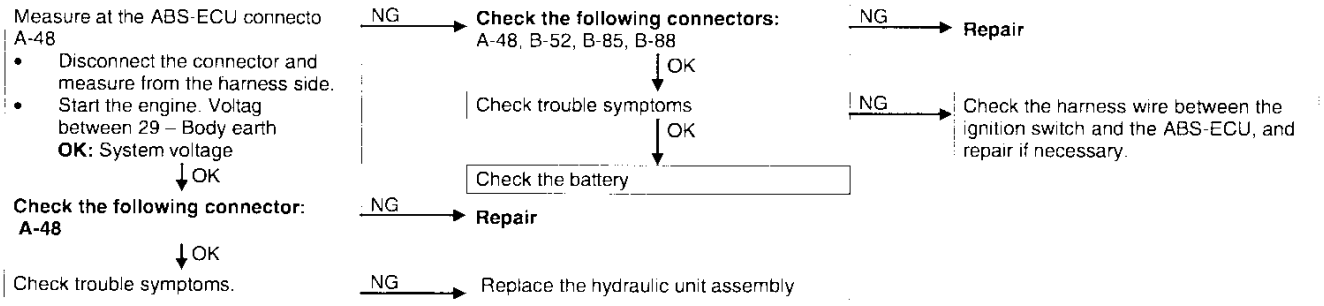
INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code Nos.11, 12, 13 and 14 Wheel speed sensor open circuit Code Nos.21, 22, 23 and 24 Wheel speed sensor short circuit	Probable cause
Code Nos.11,12, 13 and 14 are output if the ABS-ECU detects an open circuit in any one of the four wheel speed sensor	• Malfunction of wheel speed sensor • Malfunction of wiring harness or connector • Malfunction of ABS-ECU
Code Nos.21, 22, 23 and 24 are output in the following cases. • When there is input from any one of the four wheel speed sensors when travellin at 12 km/h or more, even though open circuit verified. • When a chipped or blocked-up ABS rotor is detected during driving at 12 km/h or more	• Malfunction of wheel speed sensor • Malfunction of wiring harness or connector • Malfunction of rotor • Malfunction of ABS-ECU • Malfunction of wheel bearing

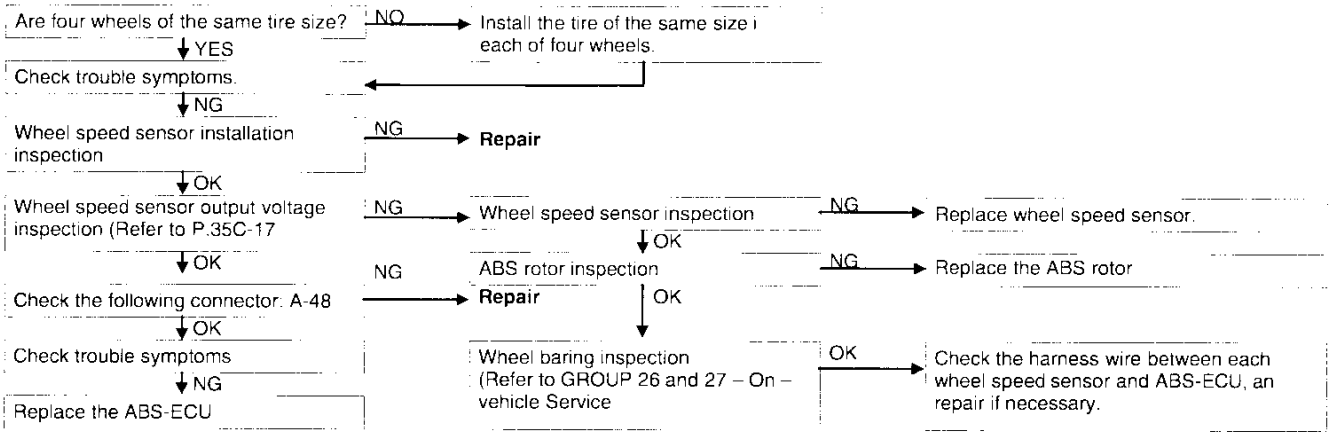


Code No. Power supply system	Probable cause
The voltage of the ABS-ECU power supply drops lower or rises higher than the specified value. If the voltage returns to the specified value, this code is no longer output.	• Malfunction of wiring harness or connector. • Malfunction of ABS-ECU

Caution
If battery voltage drops or rises during inspection, this code will be output as well. If the voltage returns to standard value, this code is no longer output.
Before carrying out the following inspection, check the battery level, and refill it if necessary.

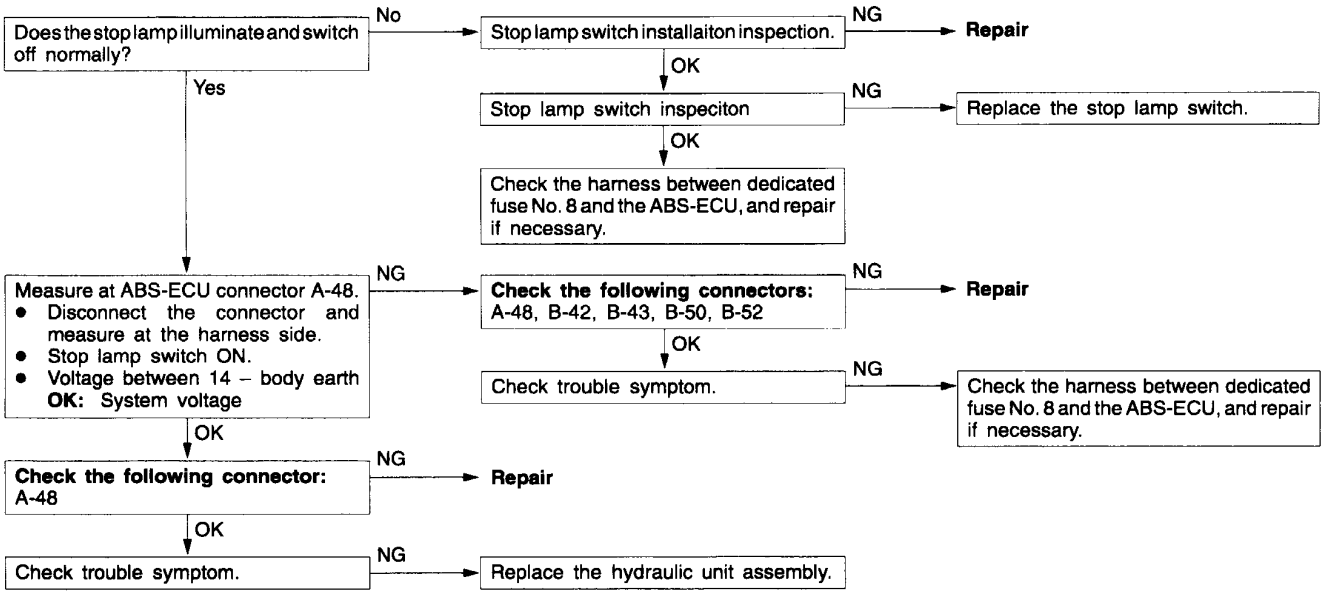


Code No. 15 Wheel speed sensor (Abnormal output signal)	Probable cause
A wheel speed sensor outputs an abnormal signal (Other than an open short-circuit).	• Tire sizes of four wheels not unified. • Improper installation of wheel speed sensor • Malfunction of wheel speed sensor • Malfunction of ABS rotor • Malfunction of wheel bearing • Malfunction of wiring harness or connector • Malfunction of ABS-ECU

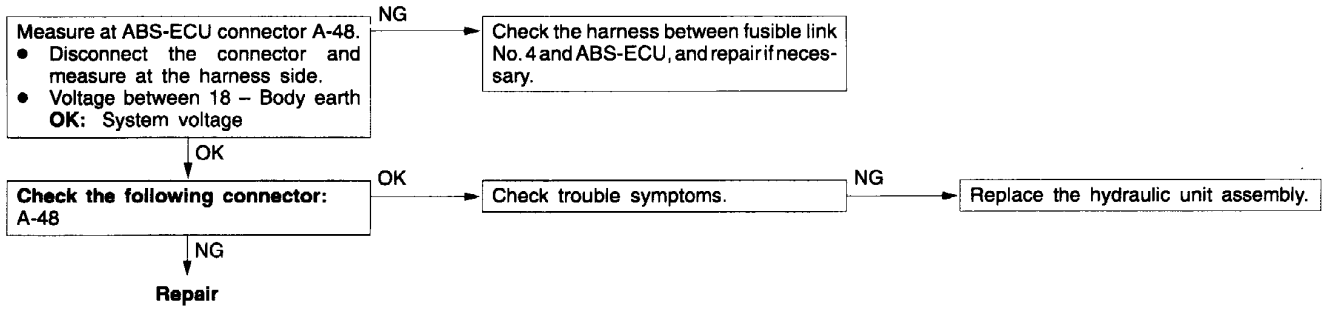


★: **Refer to Basic Manual (Pub. No. PWDE9502)**

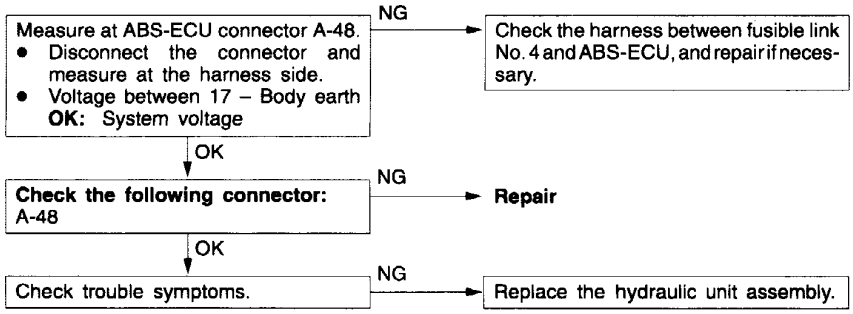
Code No. 38 Stop lamp switch system	Probable cause
These codes are output at the following times: • When the stop lamp switch is not be turned off (when the stop lamp switch stays on for 15 minutes or more although the ABS is not operating). • When the ABS-ECU determines that there is an open circuit in harness of the stop lamp switch system.	• Malfunction of stop lamp switch • Malfunction of harness or connector • Malfunction of ABS-ECU



Code No. 51 Valve power supply	Probable cause
This code is output when there is an abnormality in the solenoid valve power supply system.	• Malfunction of wiring harness or connector • Malfunction of ABS-ECU



Code No. 53 Pump motor	Probable cause
This code is output when there is an abnormality in the pump motor system.	• Malfunction of wiring harness or connector • Malfunction of hydraulic unit • Malfunction of ABS-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

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

Trouble symptoms		Inspection procedure No.	Reference page
Communication with MUT-II is not possible.	Communication with all systems is not possible.	1	*
	Communication with ABS only is not possible.	2	35B-5
Faulty ABS operation	Unequal braking power on both sides	5	35B-6
	Insufficient braking power		
	ABS operates under normal braking conditions		
	ABS operates before vehicle stops under normal braking conditions		
	Large brake pedal vibration (Caution 2.)	–	–

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub. No.PWDE9502).

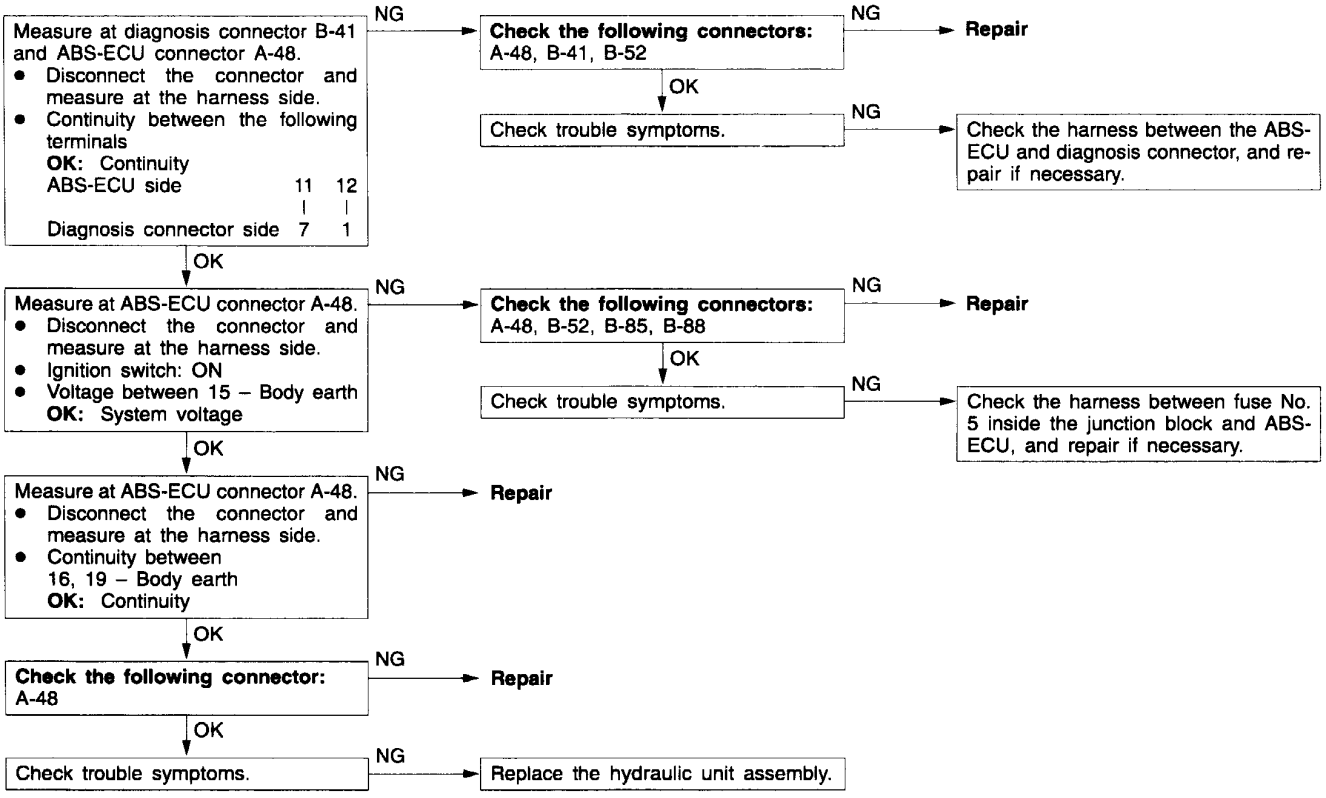
Caution

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

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

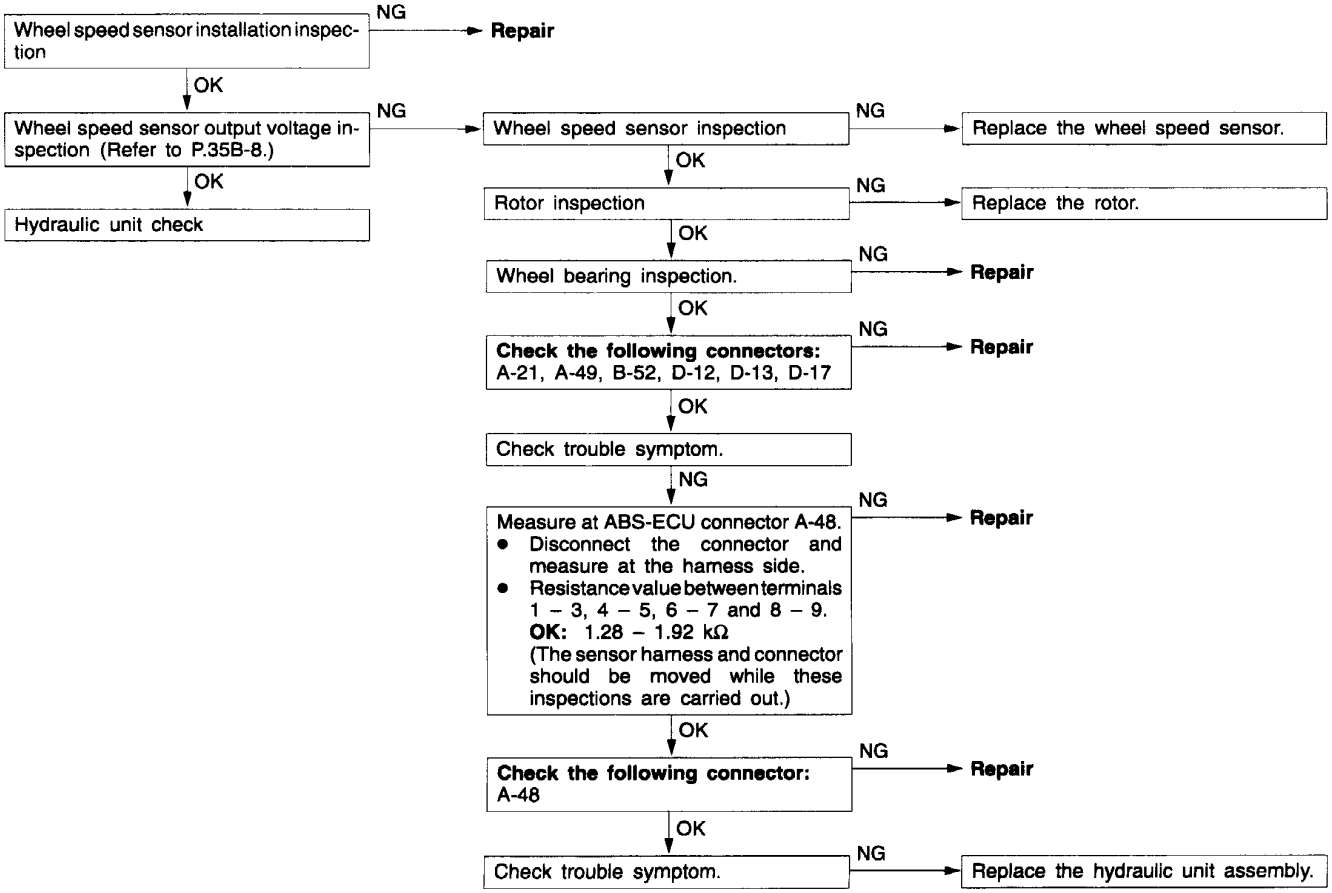
Inspection Procedure 2

Communication with MUT-II is not possible. (Communication with ABS only is not possible.)	Probable cause
When communication with the MUT-II is not possible, the cause is probably an open circuit in the ABS-ECU power circuit or an open circuit in the diagnosis output circuit.	• Blown fuse • Malfunction of wiring harness or connector • Malfunction of ABS-ECU



Inspection Procedure 5

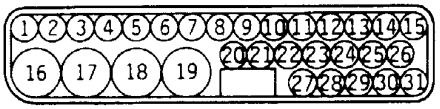
Brake operation is abnormal.	Probable cause
This varies depending on the driving conditions and the road surface conditions, so problem diagnosis is difficult. However, if a normal diagnosis code is displayed, carry out the following inspection.	• Improper installation of wheel speed sensor • Incorrect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



CHECK AT ABS-ECU

TERMINAL VOLTAGE CHECK CHART

1. Measure the voltages between terminals (16) and (19) (earth terminals) and each respective terminal.
2. The terminal layouts are shown in the illustrations below.



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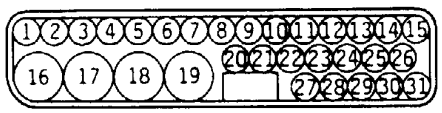
Connector terminal No.	Signal	Checking requirements		Normal condition
11	MUT-II	Connect the MUT-II.		Serial communication with MUT-II
		Do not connect the MUT-II.		1 V or less
12	Input from diagnosis indication selection	Connect the MUT-II.		0 V
		Do not connect the MUT-II.		Approx. 12 V
14	Input from stop lamp switch	Ignition switch: ON	Stop lamp switch: ON	System voltage
			Stop lamp switch: OFF	1 V or less
15	ABS-ECU power supply	Ignition switch: ON		System voltage
		Ignition switch: START		0 V
17	Pump motor power supply	Always		System voltage
18	Solenoid valve power supply	Always		System voltage
21	Output to ABS warning lamp	Ignition switch: ON	The lamp is switched off.	System voltage
			The lamp is illuminated.	0 – 2 V

RESISTANCE AND CONTINUITY BETWEEN HARNESS-SIDE CONNECTOR TERMINALS

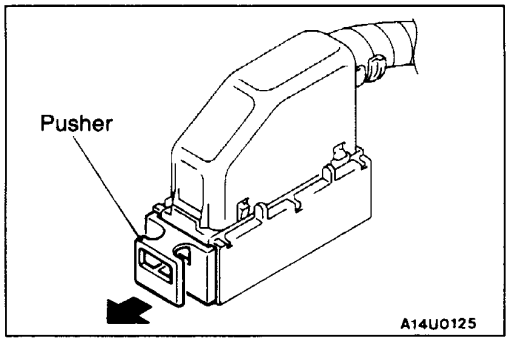
1. Turn the ignition switch off and disconnect the ABS-ECU connectors before checking resistance and continuity.
2. Check them between the terminals indicated in the table below.
3. The terminal layouts are shown in the illustrations below.

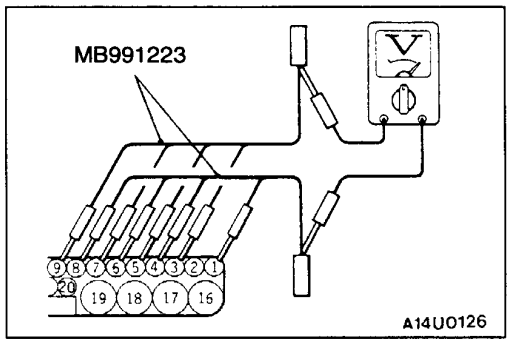


14U0122

Connector terminal No.	Signal	Normal condition
1 – 3	Rear-right wheel speed sensor (+ wire)	1.28 – 1.92 kΩ
4 – 5	Front-right wheel speed sensor (+ wire)	1.28–1.92 kΩ

Connector terminal No.	Signal	Normal condition
6 – 7	Front-left wheel speed sensor (+ wire)	1.28–1.92 kΩ
8 – 9	Rear-left wheel speed sensor (+ wire)	1.28–1.92 kΩ
16 – Body earth	ABS-ECU earth	Continuity
19 – Body earth		





ON-VEHICLE SERVICE

WHEEL SPEED SENSOR OUTPUT VOLTAGE CHECK

1. Lift up the vehicle and release the parking brake.
2. Pull the pusher in the direction indicated by the arrow and disconnect the connector.
3. Use the special tool (inspection harness for connector pin contact pressure) to measure the output voltage at the harness-side connector.
4. Rotate the wheel to be measured at approximately 1/2–1 rotation per second, and check the output voltage using a circuit tester or an oscilloscope.

Wheel speed sensor	Front left	Front right	Rear left	Rear right
Terminal No.	6	4	8	1
	7	5	9	3

Output voltage

When measuring with a circuit tester:
50 mV or more

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

5. If the output voltage is lower than the above values, the reason could be as follow:
   - Faulty wheel speed sensor.

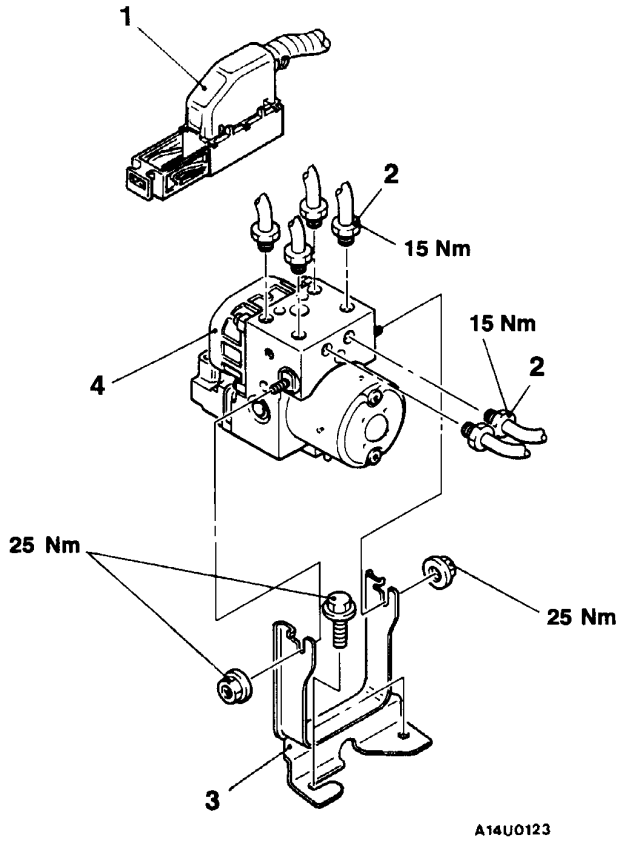
   So replace the wheel speed sensor.

HYDRAULIC UNIT

REMOVAL AND INSTALLATION

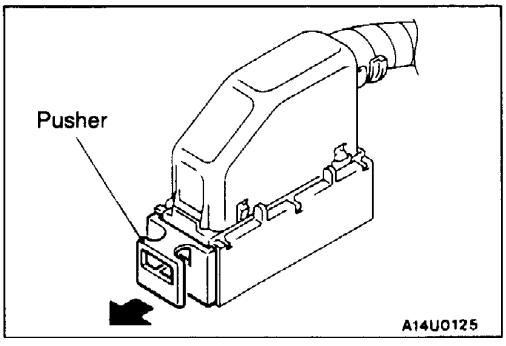
Pre-removal Operation
- Brake Fluid Draining
- A/C Relay Box Removal

Post-installation Operation
- A/C Relay Box Installation
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment



Removal steps

◀A▶ 1. ABS-ECU connector
▶A◀ 2. Brake pipe connection
3. Hydraulic unit bracket
◀B▶ 4. Hydraulic unit assembly



REMOVAL SERVICE POINTS

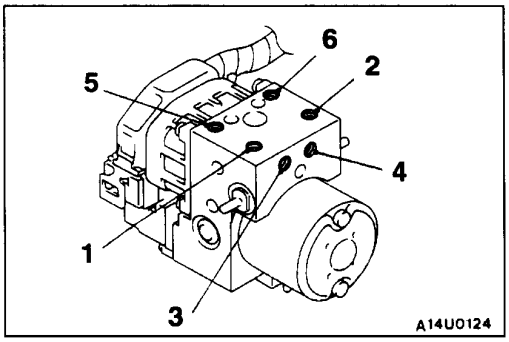
◀A▶ ABS-ECU CONNECTOR REMOVAL

Pull the pusher in the direction indicated by the arrow, and then disconnect the connector.

◀B▶ HYDRAULIC UNIT ASSEMBLY REMOVAL

Caution

1. **The hydraulic unit assembly is heavy, and so care should be taken when removing it.**
2. **The hydraulic unit assembly is not to be disassembled; its nuts and bolts should absolutely not be loosened.**
3. **The hydraulic unit assembly must not be dropped or otherwise subjected to impact shocks.**
4. **The hydraulic unit assembly must not be turned upside down or laid on its side.**



INSTALLATION SERVICE POINT

▶A◀ BRAKE PIPE CONNECTION

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

1. From the master cylinder (Primary)
2. From the master cylinder (Secondary)
3. To the proportioning valve (RH)
4. To the proportioning valve (LH)
5. To the front brake (LH)
6. To the front brake (RH)

GROUP 36
PARKING BRAKES

GENERAL

OUTLINE OF CHANGES

- Service procedures for parking brake cable have been established to correspond to change of the rear drum brake.

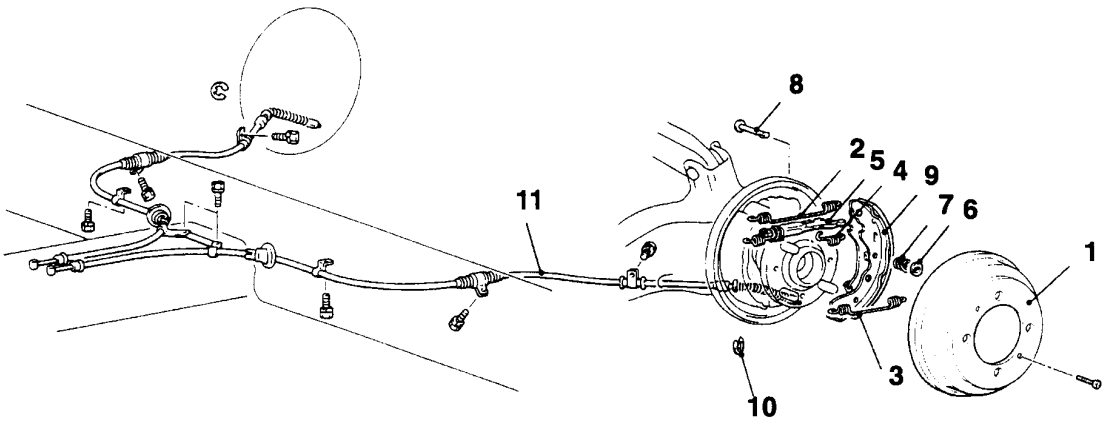
PARKING BRAKE CABLE

REMOVAL AND INSTALLATION

Pre-removal Operation
- Floor Console Removal

Post-installation Operation
- Parking Brake Lever Stroke Adjustment
- Floor Console Installation

<Vehicles with rear drum brakes>



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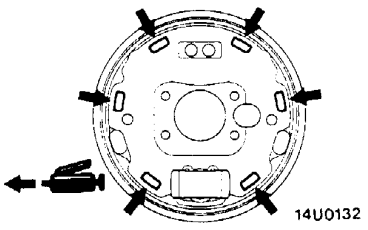


Brake grease:
Brake grease SAE J310, NLGI No. 1

Removal steps
<Vehicles with rear drum brakes>

1. Rear brake drum
2. Return shoe spring
3. Strut retaining spring
4. Retaining shoe spring
5. Auto-adjuster assembly
6. Shoe hold-down cup
7. Shoe hold-down spring
8. Shoe hold-down pin
9. Shoe, lining and lever assembly
10. Clip
11. Parking brake cable

GROUP 42
BODY

GENERAL

OUTLINE OF CHANGES

- Troubleshooting and inspection procedure for door lock-ECU have been established to correspond to change of the door lock-ECU.
- Inspection procedure for door lock switch has been established to correspond to addition of the door lock switch.
- Theft-alarm system has been abolished. Theft-alarm connector (harness side) has been abolished to correspond to this.

DOOR

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom		Inspection procedure	Reference page
Power windows	Driver's power window cannot be operated by the power window main switch.	1*	–
	No power window can be operated by the power window main switch (but they can be operated by the sub-switches).	2*	–
	No power window can be operated by the power window sub-switches (but they can be operated by the main switch).	3*	–
	No power window can be operated by the power window sub-switches (nor can they be operated by the main switch).	4*	–
	Automatic operation is not possible.	5*	–
	When the glass is raised, it then lowers automatically.	6*	–
	The window does not lower if it clamps something, or it lowers automatically after closing fully.	7*	–
	The key off timer does not operate.	8*	–
	If the driver's side door is opened while the key off timer is operating, the power windows do not operate for a further 30 seconds after the door is opened.	9*	–

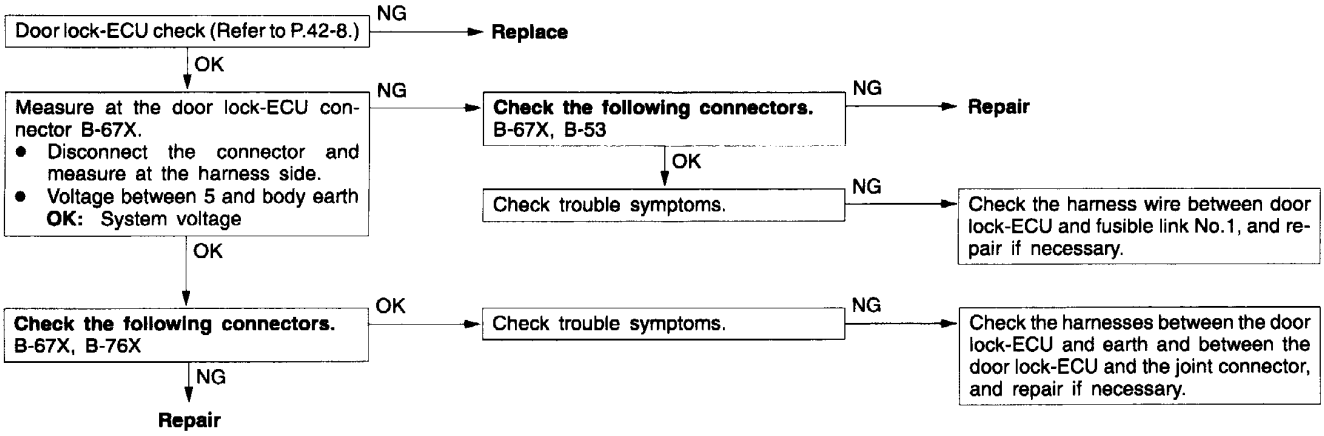
Trouble symptom			Inspection procedure	Reference page
Door locking mechanism	Vehicles without keyless entry system	None of the door lock functions operate.	10	42-2
		Doors do not lock or unlock when the key cylinders (except the one at the driver's side door) are operated.	11	42-3
		None of the doors lock or unlock when the door lock switch is operated. However, they lock and unlock when the key cylinder is operated.	12	42-4
		Some doors do not lock or unlock.	13	42-5
	Vehicles with keyless entry system	None of the door lock functions operate. (The keyless entry system also does not operate.)	14	42-6
		The doors do not lock or unlock when the door lock switch is operated.	15	42-6
		The doors do not lock or unlock when the key cylinders are operated.	16	42-7
		Some doors do not lock or unlock.	17*	–

NOTE
*: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

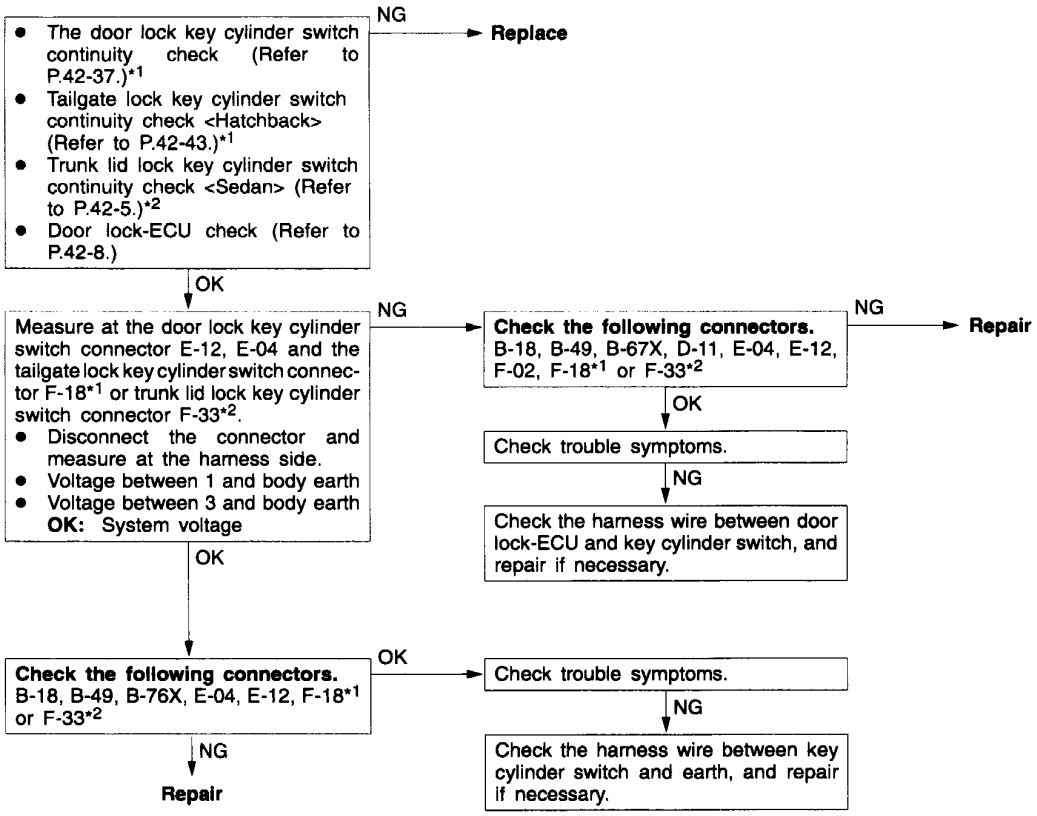
Inspection Precedure 10

None of the door lock functions operate.	Probable cause
Power circuit system or earth circuit system of the door lock control unit may be defective.	• Malfunction of door lock-ECU • Malfunction of wiring harness or connector



Inspection Procedure 11

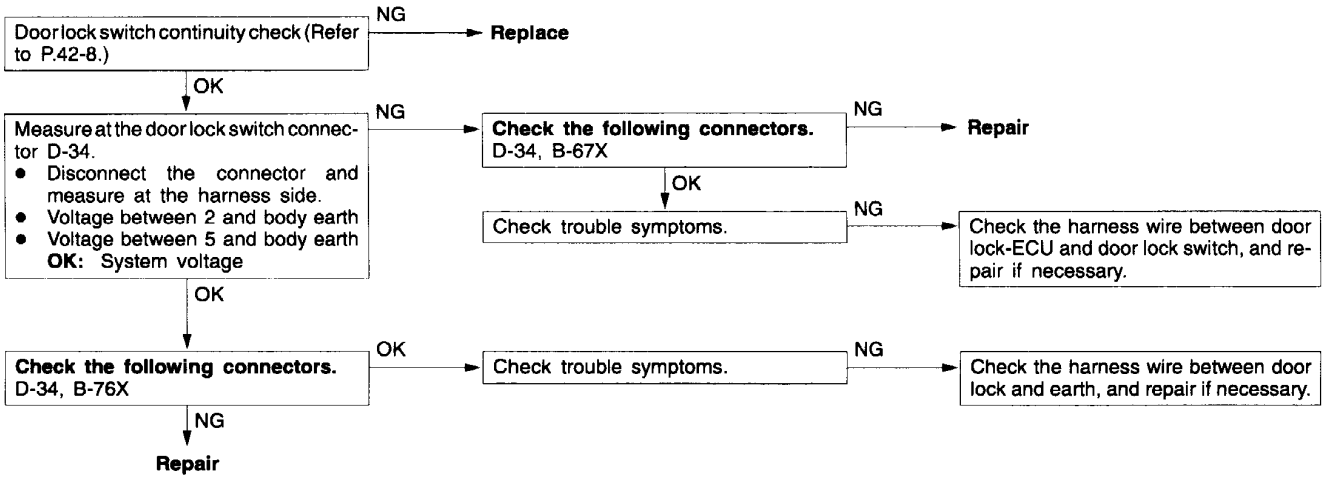
Doors do not lock or unlock when the key cylinders (except the one at the driver's side door) are operated.	Probable cause
The key cylinder switch or the door lock-ECU may be defective.	• Malfunction of the door lock key cylinder switch • Malfunction of the tailgate lock key cylider switch • Malfunction of the door lock-ECU • Malfunction of harness or connector



NOTE
*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

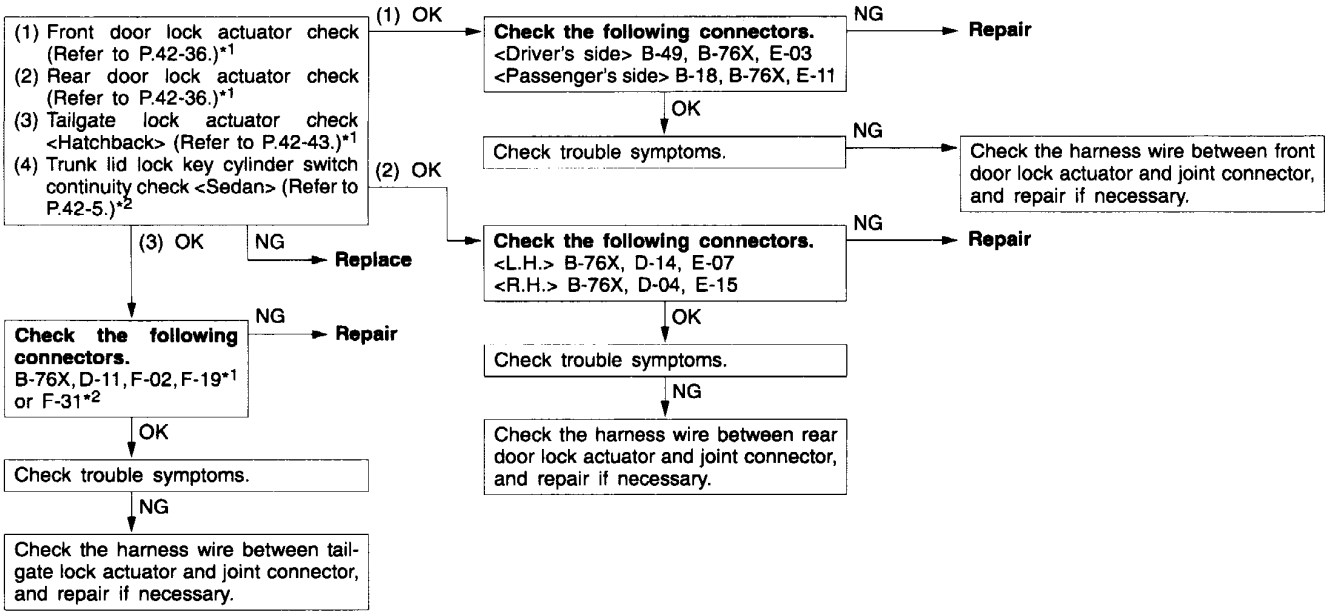
Inspection Procedure 12

None of the doors lock or unlock when the door lock switch is operated. However, they lock and unlock when the key cylinder is operated.	Probable cause
The door lock switch may be defective.	• Malfunction of the door lock switch • Malfunction of the harness or connector



Inspection Procedure 13

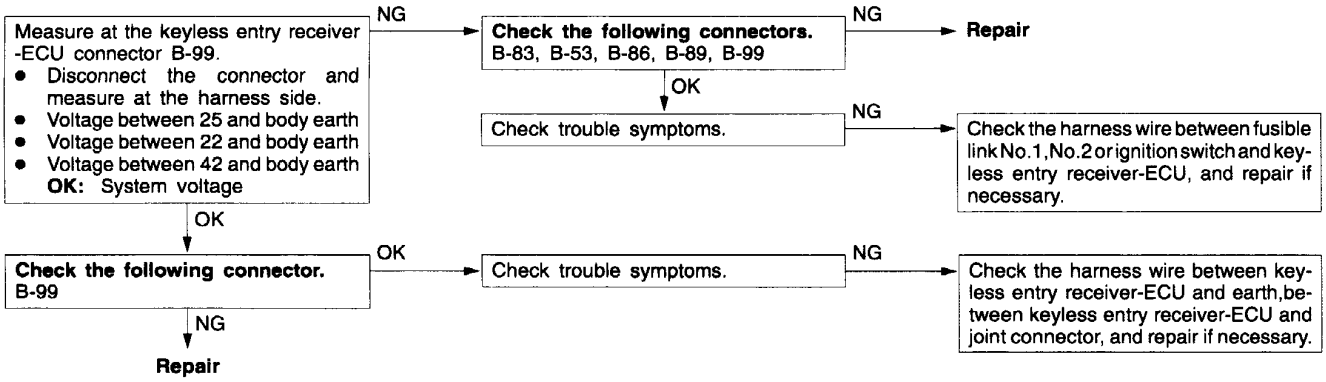
Some doors do not lock or unlock.	Probable cause
The door lock actuator, a harness or connector may be defective.	• Malfunction of door lock actuator • Malfunction of wiring harness or connector



NOTE
*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).

Inspection Procedure 14

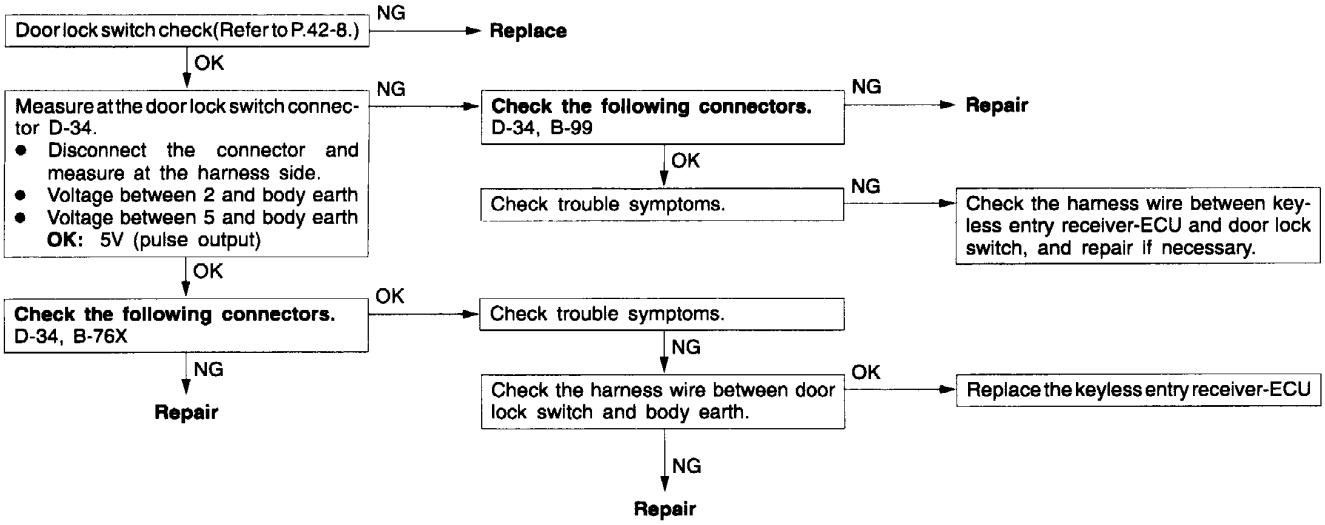
None of the door lock functions operate.(The keyless entry system does not operate,either.)	Probable cause
Power circuit system or earth circuit system of the keyless entry receiver-ECU may be defective.	• Malfunction of keyless entry receiver-ECU • Malfunction of wiring harness or connector



NOTE
If the keyless entry or central door locking system is operated while the No.2 fuse in the junction block is melted or disconnected, the keyless entry receiver-ECU judges its circuit as defective. Then the system will not function after connecting No.2 fuse correctly. In this case, the wiring harness abnormal signal is stored inside the ECU. This signal can be cleared by disconnecting and reconnecting the No.3 fuse in the engine compartment relay box. After clearing this signal, the system will be restored.

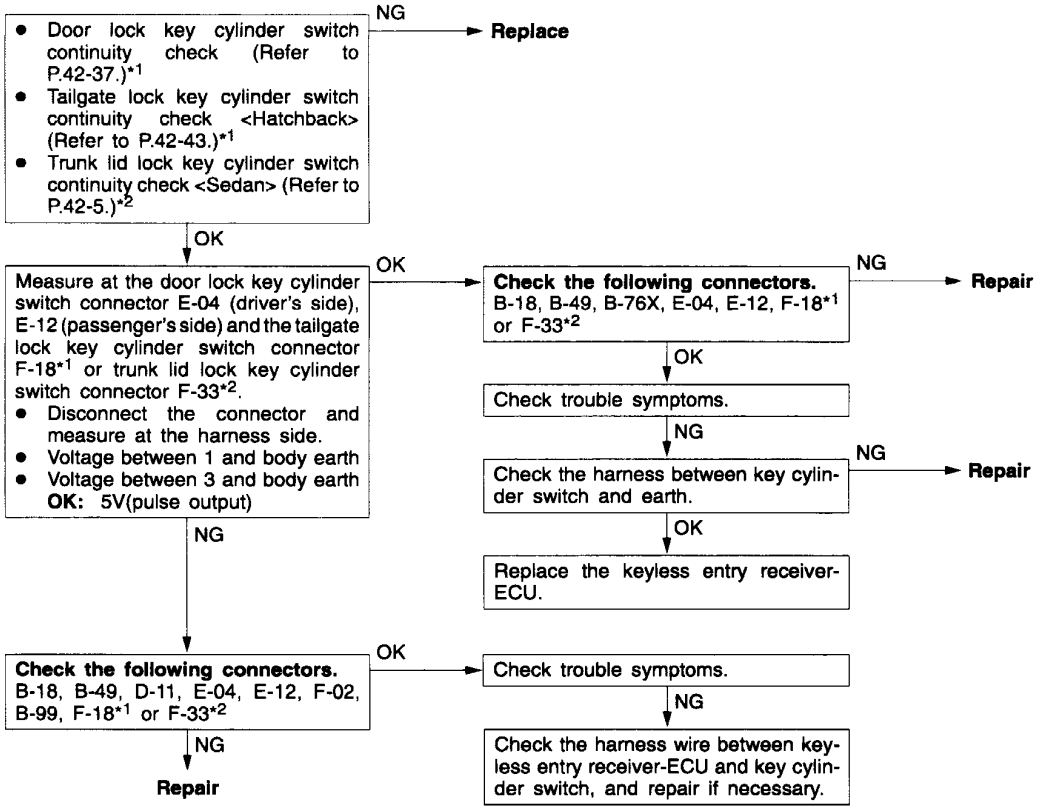
Inspection Procedure 15

The doors do not lock or unlock when the door lock switch is operated.	Probable cause
The door lock switch or the keyless entry receiver-ECU may be defective.	• Malfunction of the door lock switch • Malfunction of the keyless entry receiver-ECU • Malfunction of harness or connector

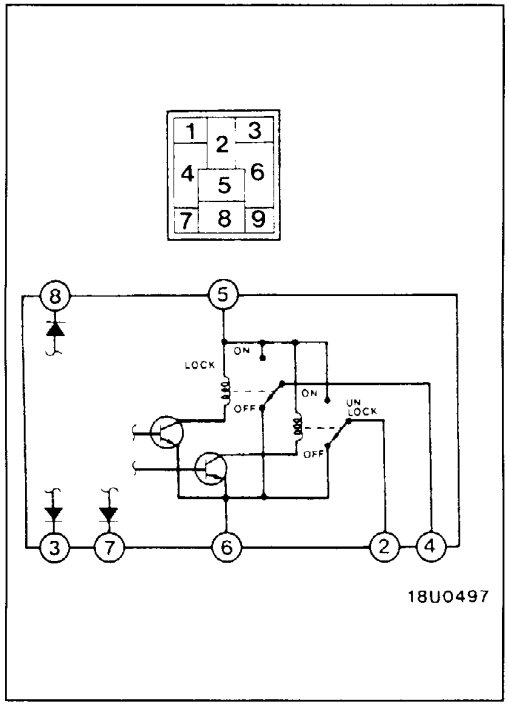


Inspection Procedure 16

The doors do not lock or unlock when the key cylinders are operated.	Probable cause
The keyless entry receiver-ECU or the key cylinder switch may be defective.	• Malfunction of the door lock key cylinder switch • Malfunction of the tailgate lock key cylinder switch • Malfunction of the keyless entry receiver-ECU • Malfunction of harness or connector



NOTE
*1: Refer to '96 CARISMA Workshop Manual (Pub. No. PWDE9502).
*2: Refer to '97 CARISMA Workshop Manual (Pub. No. PWDE9502-A).



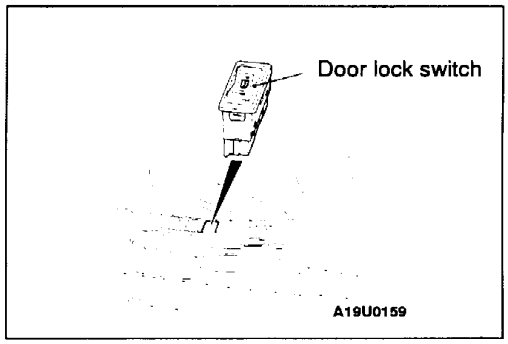
INSPECTION

DOOR LOCK-ECU CHECK

1. Apply battery voltage to terminal 5, and connect terminal 6 to earth.
2. Use a needle-type multimeter to measure the voltage under the measurement conditions given below.

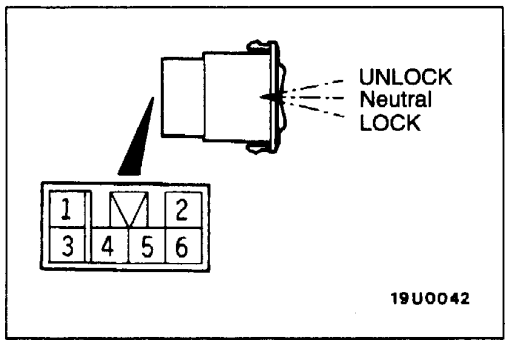
Measurement condition	Terminal No.	
	2	4
Connect terminal (8) to earth.	Needle swings at the point when terminal is earthed.	0 V
Disconnect earth from terminal (8).	0 V	Needle swings at the point when earth is disconnected.
Connect terminal (3) to earth.	0 V	Needle swings at the point when terminal is earthed.
Connect terminal (7) to earth.	Needle swings at the point when terminal is earthed.	0 V

3. Check the continuity between terminals 2, 4, 6.



DOOR LOCK SWITCH

REMOVAL AND INSTALLATION



INSPECTION

DOOR LOCK SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1	2	4	5	3	–	6
UNLOCK	○	○					
Neutral					○	○	○
LOCK	○			○			

GROUP 51
EXTERIOR

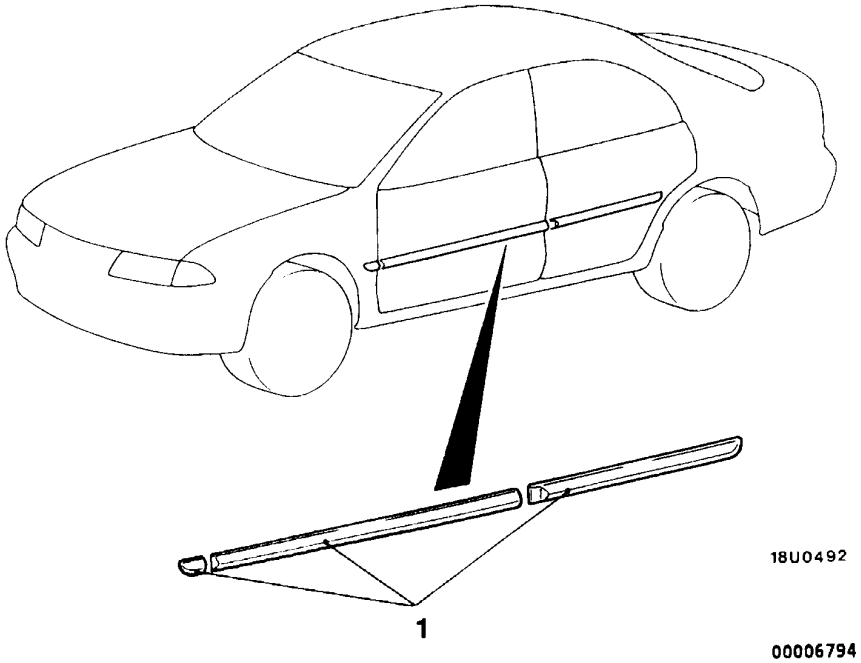
GENERAL

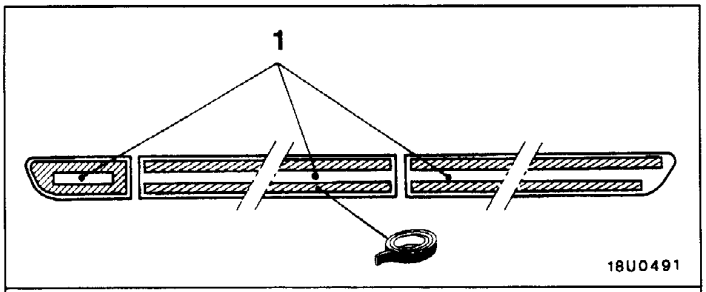
OUTLINE OF CHANGE

- Side protect mouldings have been newly installed. <Some models>

MOULDING

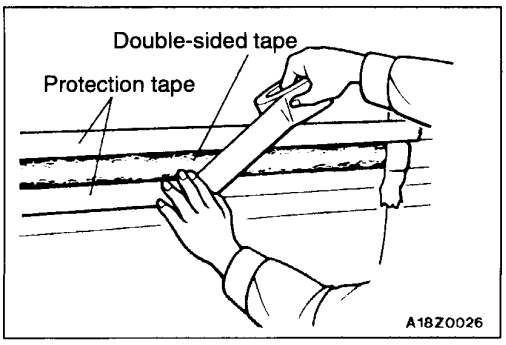
REMOVAL AND INSTALLATION





Adhesive tape: double-side tape (10 mm width and 1.0 mm thickness)

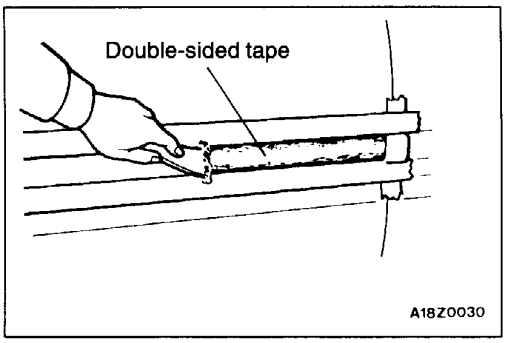
◀A▶ ▶A◀ 1. Side protect moulding



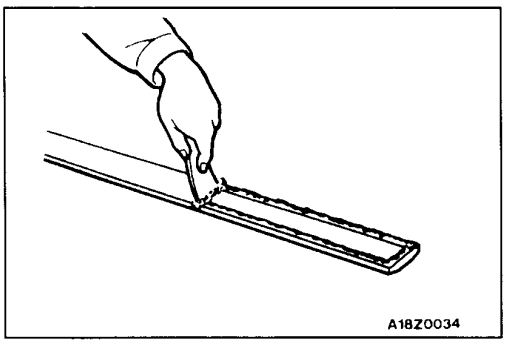
REMOVAL SERVICE POINT

◀A▶ SIDE PROTECT MOULDING REMOVAL

1. Attach protection tape all the way along the edges of the double-sided tape which is still adhering to the body.



2. Use a resin spatula to scrape off the double-sided tape.
3. Peel off the protection tape.
4. Wipe the body surface and clean it with a rag moistened with isopropyl alcohol.



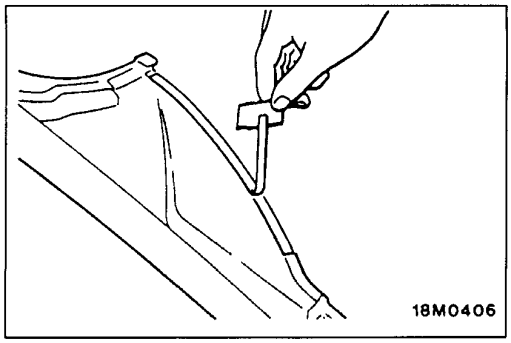
INSTALLATION SERVICE POINT

▶A◀ SIDE PROTECT MOULDING INSTALLATION

Double-sided tape affixing to the side protect moulding (when reusing)

1. Installation procedure
   (1) Scrape off the double-sided tape with a resin spatula or gasket scraper.
   (2) Wipe the side protect moulding adhesion surface and clean it with a rag moistened with isopropyl alcohol.
   (3) Affix specified pressure sensitive double-sided tape to the side protect moulding.

   Specified adhesive tape:
   Double-sided tape [10 mm wide and 1.0 mm thick]



(4) Remove strip paper from the pressure sensitive double-sided tape.

NOTE
Affix double-sided tape to the end of strip paper for ease of strip paper removal.

(5) Install the side protect moulding.

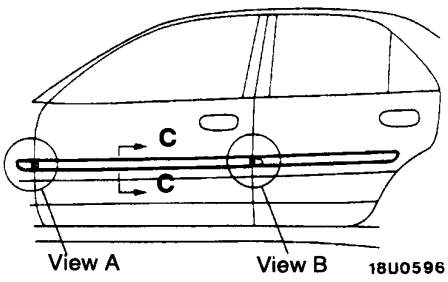
NOTE
If it is hard to affix the pressure sensitive double-sided tape in winter, heat the application surfaces at both the vehicle body and the side protect moulding.

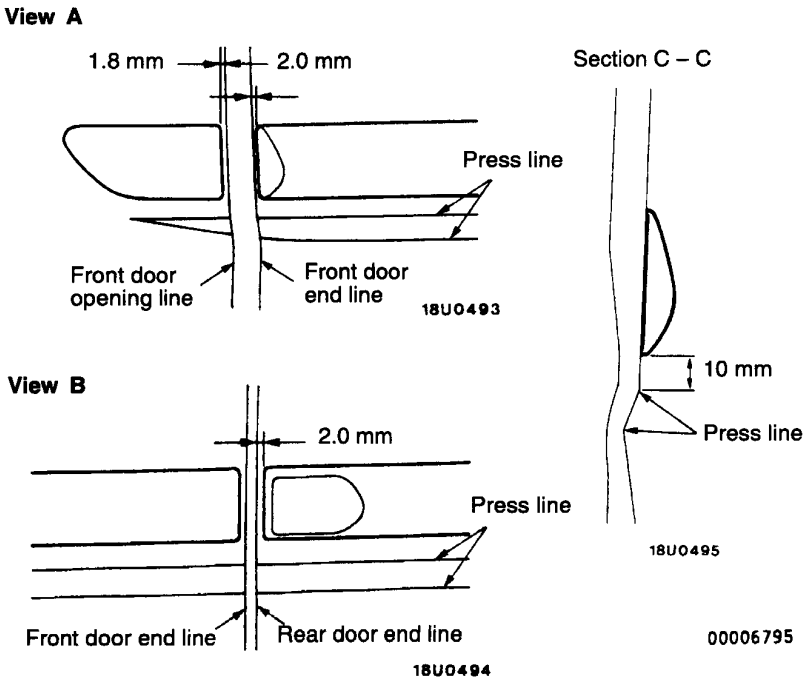
Body ..... 40–60°C

Side protect moulding ..... 20–30°C

Apply pressure fully to the side protect moulding.

2. Installation position





INTERIOR AND SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

GROUP 52A
INTERIOR

GENERAL

OUTLINE OF CHANGES

The following maintenance service points have been added to correspond to the addition of an SRS side air bag. Maintenance service points not listed below are the same as those given in the '96 CARISMA Basic Manual (Pub. No. PWDE9502).

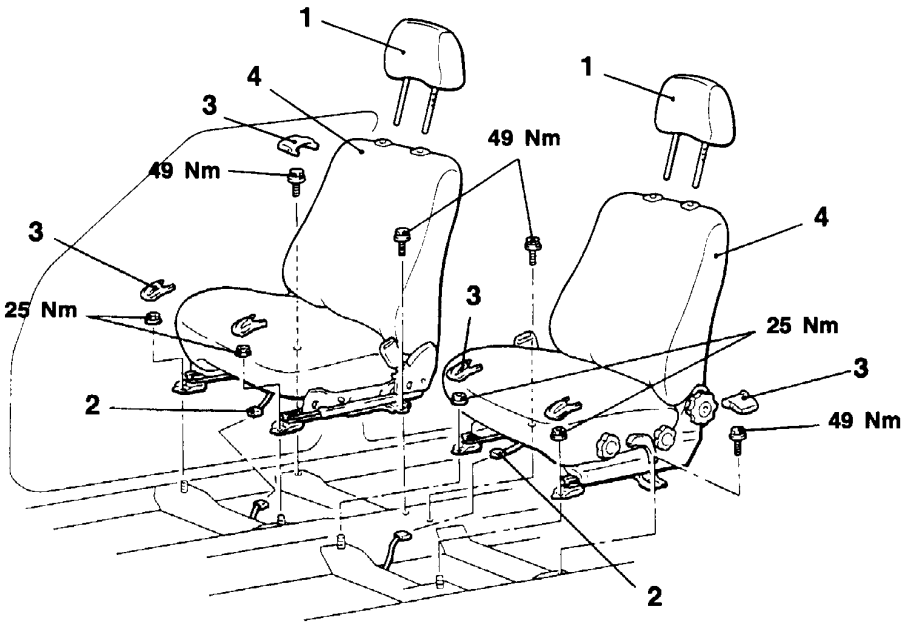
SEAT

FRONT SEAT

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Rear Floor Console Assembly Removal and Installation (Refer to '96 CARISMA Basic Manual.)
- Before removal of the seat equipped with the side air bag module, refer to GROUP 52B – SRS Service Precautions and Air Bag Module.

CAUTION: SRS
When removing and installing the rear floor console (vehicles equipped with SRS), do not let it bump against the SRS-ECU.



A19U0134

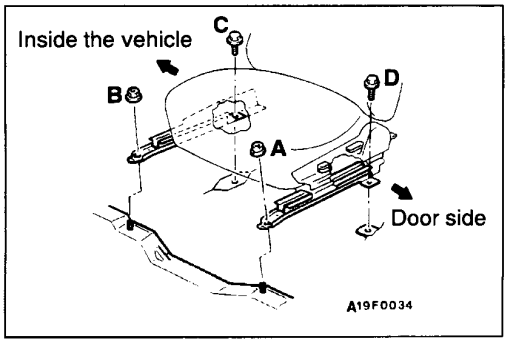
1. Headrestraint

Front seat assembly removal steps

2. Harness connector
3. Seat anchor cover
4. Front seat assembly

▶A◀

NOTE
After provisionally tightening the seat assembly mounting nuts and bolts in every installation location, fully tighten them to the specified torque.



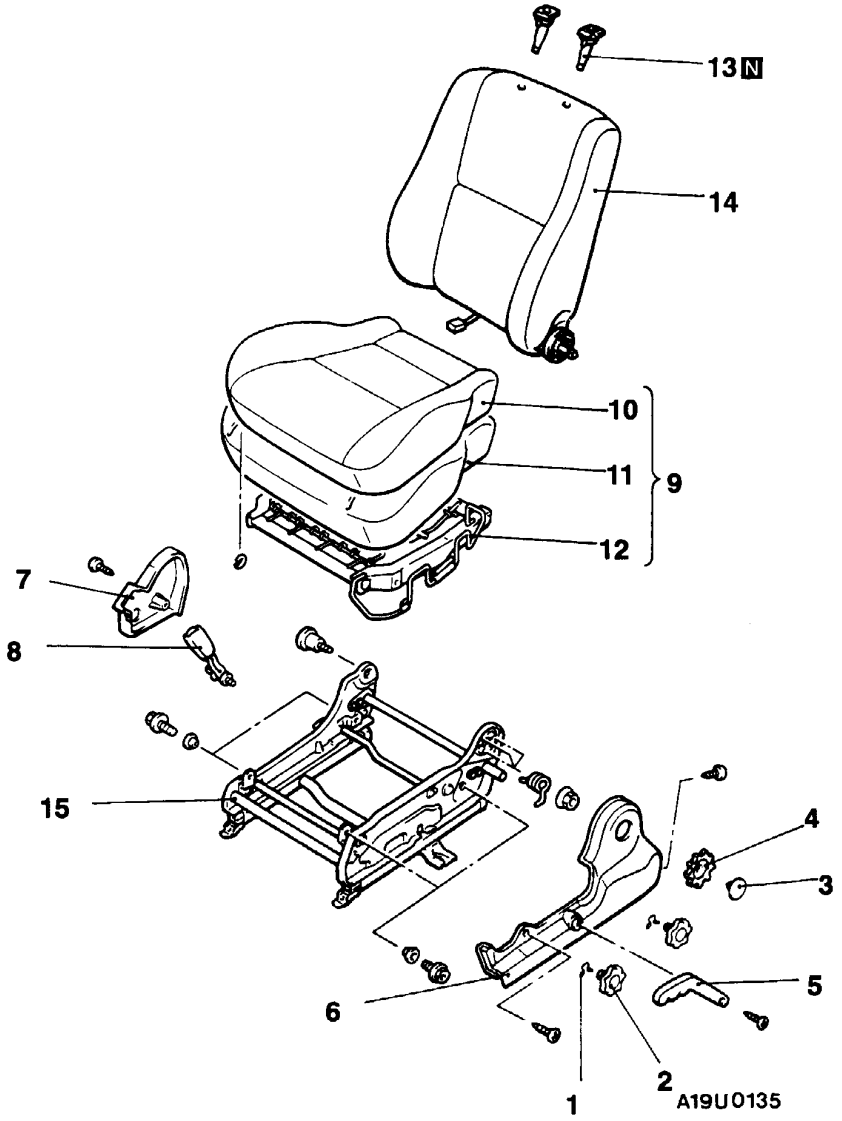
INSTALLATION SERVICE POINT

▶A◀ FRONT SEAT ASSEMBLY INSTALLATION

Tighten the front seat mounting bolts in the order A, B, C, and D.

DISASSEMBLY AND REASSEMBLY

Caution
Do not disassemble the front seatback assembly with built-in side air bag module.



Seat disassembly steps

1. Shaft snap ring
2. Height adjuster knob
3. Cap
4. Reclining knob
5. Seat adjuster lever
6. Front seat side shield cover
7. Front seat hinge cover
8. Inner seat belt
9. Front seat cushion assembly
10. Front seat cushion cover
11. Front seat cushion pad
12. Front seat cushion frame
13. Headrestraint guide
14. Front seatback assembly

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

CAUTION

- **Carefully read and observe the information in the SERVICE PRECAUTIONS (P.52B-2.) prior to any service.**
- **For information concerning troubleshooting or maintenance, always observe the procedures in the Troubleshooting (P.52B-6.) section.**
- **If any SRS components are removed or replaced in connection with any service procedures, be sure to follow the procedures in the INDIVIDUAL COMPONENT SERVICE section (P.52B-20.) for the components involved.**
- **If you have any questions about the SRS, please contact your local distributor.**

GENERAL

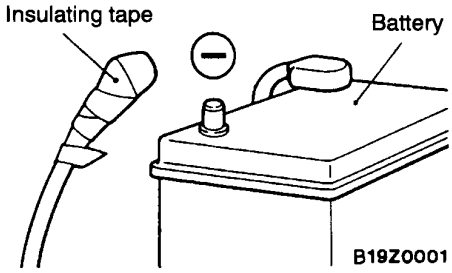
OUTLINE OF CHANGES

The following maintenance service points have been established to correspond to the addition of an SRS side air bag and changes in the SRS-ECU (vehicles without SRS side air bag). Maintenance service points not listed below are the same as those given in the '96 CARISMA Basic Manual (Pub. No. PWDE9502).

SRS SERVICE PRECAUTIONS

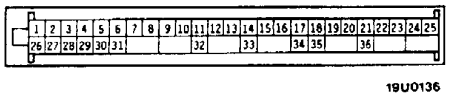
1. In order to avoid injury to yourself or others from accidental deployment of the air bag and accidental operation of the seat belt with pre-tensioner during servicing, read and carefully follow all the precautions and procedures described in this manual.
2. Do not use any electrical test equipment on or near SRS components, except those specified on P.52B-5. <Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502)>
3. **Never Attempt to Repair the Following Components:**
   - Side air bag module
   - Side impact sensor

   NOTE
   If any of these components are diagnosed as faulty, they should only be replaced, in accordance with the INDIVIDUAL COMPONENTS SERVICE procedures in this manual, starting at page 52B-20.



4. **After disconnecting the battery cable, wait 60 seconds or more before proceeding with the following work. The SRS system is designed to retain enough voltage to deploy the air bag for a short time even after the battery has been disconnected, so serious injury may result from unintended air bag deployment if work is done on the SRS system immediately after the battery cables are disconnected.**

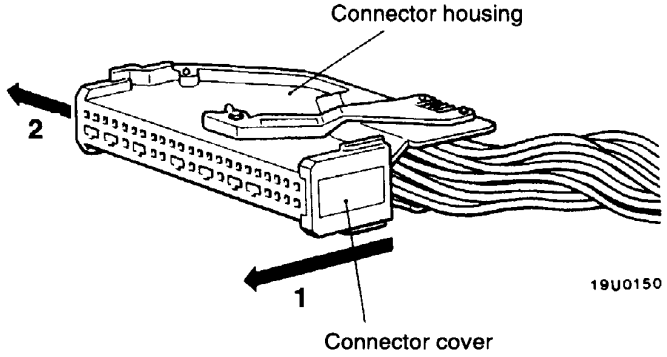
SRS-ECU connector

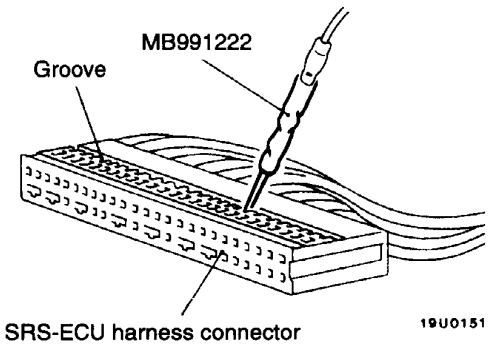


5. Do not attempt to repair the wiring harness connectors of the SRS. If any of the connectors are diagnosed as faulty, replace the wiring harness. If the wires are diagnosed as faulty, replace or repair the wiring harness according to the following table.

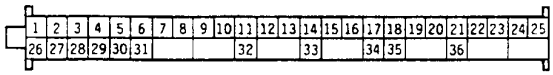
SRS-ECU Terminal No.	Destination of harness	Corrective action
1 to 4	–	–
5, 14	Body wiring harness → Side impact sensor (RH)	Correct or replace each wiring harness.
6, 34	Body wiring harness → Side impact sensor (LH)	
7, 8	Body wiring harness → Side air bag module (RH)	
9, 10	Body wiring harness → Side air bag module (LH)	
11	–	–
12, 13	Body wiring harness → Air bag module (Front passenger's side)	Correct or replace each wiring harness.
15, 16	Body wiring harness → Clock spring → Air bag module (Driver's side)	Correct or replace the dash wiring harness. Replace the clock spring.
17	Body wiring harness → Diagnosis connector	Correct or replace each wiring harness.
18	Body wiring harness → Junction block (fuse No.4)	
19	Body wiring harness → Combination meter (SRS warning lamp)	
20, 35	Body wiring harness → Earth	
21	Body wiring harness → Junction block (fuse No.11)	
22, 23	Body wiring harness → Seat belt with pre-tensioner (Front passenger's side)	
24, 25	Body wiring harness → Seat belt with pre-tensioner (Driver's side)	
26 to 33, 36	–	–

6. Inspection of the SRS-ECU harness connector should be carried out by the following procedure.
   After removing the harness connector cover by sliding it in the direction of the arrow 1 in the illustration, remove the connector housing by sliding it in the direction of the arrow 2.
   Insert the special tool (ultra-fine probe in harness set) into the groove in the SRS-ECU harness connector and connect this to the tester in order to carry out inspection. If any tool other than the designated special tool is used, it will damage the harness and other parts. In addition, do not take the measurements by touching the probe directly to any terminals other than the groove shown in the illustration. The connector terminals are plated in order to increase their conductivity, so that if they are touched by the probe, it could cause the plating to peel off, which will adversely affect the reliability of the connector performance.





SRS-ECU harness connector (seen from the rear)

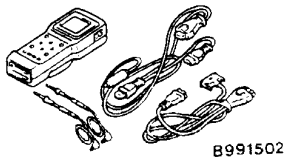
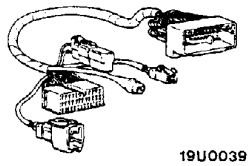
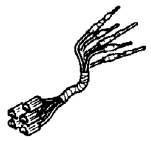
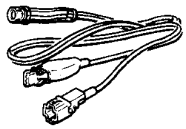
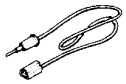
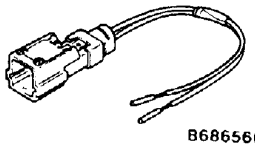


19U0137
00006542

7. SRS components and seat belt with pre-tensioner should not be subjected to heat, so remove the SRS-ECU, air bag module (driver's side and front passenger's side), clock spring, side impact sensors, front seat assemblies (side air bag module), and seat belts with pre-tensioner before drying or baking the vehicle after painting.
   - SRS-ECU, air bag module, clock spring, side impact sensor: 93°C or more
   - Seat belt with pre-tensioner: 90°C or more
8. Whenever you finish servicing the SRS, check warning lamp operation to make sure that the system functions properly. (Refer to '96 CARISMA Basic Manual.)
9. Make certain that the ignition switch is OFF when the MUT-II is connected or disconnected.
10. If you have any questions about the SRS, please contact your local distributor.

NOTE
SERIOUS INJURY CAN RESULT FROM UNINTENDED AIR BAG DEPLOYMENT, SO USE ONLY THE PROCEDURES AND EQUIPMENT SPECIFIED IN THIS MANUAL.

SPECIAL TOOLS

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub assembly	• Reading diagnosis codes • Erasing diagnosis code • Reading trouble period • Reading erase times
 19U0039	MB991613	SRS check harness	Checking the SRS electrical circuitry
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Check harness B: LED harness C: LED harness adapter D: Probe	Checking the continuity and measuring the voltage at the SRS-ECU harness connector
 B686560	MB686560	SRS air bag adapter harness A	Deployment of side air bag module outside the vehicle

TROUBLESHOOTING

INSPECTION CHART FOR DIAGNOSIS CODES

Inspect according to the inspection chart that is appropriate for the malfunction code.

Code No.	Diagnosis Item		Reference page
14*	Analog G-sensor system in the SRS-ECU		–
15*, 16*	Front impact safing G sensor system inside SRS-ECU		–
17	Side impact safing G sensor system inside SRS-ECU		52B-7
21, 22, 61, 62	Driver's side air bag module (squib) system		52B-8
24, 25, 64, 65	Front passenger's side air bag module (squib) system		52B-9
26*, 27*	Driver's side pre-tensioner (squib) system		–
28*, 29*	Front passenger's side pre-tensioner (squib) system		–
31*, 32*	SRS-ECU capacitor system		–
35*	SRS-ECU (deployed air bag) system		–
41*[1]	IG_1 (A) power circuit system		52B-9
42*[1]	IG_1 (B) power circuit system		52B-10
43	SRS warning lamp drive circuit system	Lamp does not illuminate.*[1]	52B-10
		Lamp does not switch off.	52B-10
44*	SRS warning lamp drive circuit system		–
45*	Internal circuit system of non-volatile memory (EEPROM) inside SRS-ECU		–
51*, 52*	Driver's side air bag module (squib ignition drive circuit) system		–
54*, 55*	Front passenger's side air bag module (squib ignition drive circuit) system		–
56*, 57*	Driver's side pre-tensioner (squib ignition drive circuit) system		–
58*, 59*	Passenger's side pre-tensioner (squib ignition drive circuit) system		–
66, 67	Driver's side pre-tensioner (squib) system		52B-11
68, 69	Front passenger's side pre-tensioner (squib) system		52B-12
71, 72, 75, 76	Side air bag module (L.H) (squib) system		52B-13
73, 74	Side air bag module (L.H.) (squib) ignition drive circuit system		52B-13
81, 82, 85, 86	Side air bag module (R.H.) (squib) system		52B-14
83, 84	Side air bag module (R.H.) (squib) ignition drive circuit system		52B-14

Code No.	Diagnosis Item	Reference page
91*1	Side impact sensor (L.H.) power supply circuit system	52B-14
92	Side impact sensor (L.H.) system	52B-15
93	Side impact sensor (L.H.) communication system	52B-15
94*1	Side impact sensor (R.H.) power supply circuit system	52B-15
95	Side impact sensor (R.H.) system	52B-15
96	Side impact sensor (R.H.) communication system	52B-16

NOTE
(1) *: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502).
(2) *1: If the vehicle condition returns to normal, the diagnosis code will be automatically erased, and the SRS warning lamp will return to normal.
(3) If the vehicle has a discharged battery it will store the fault codes 41 or 42. When these diagnosis codes are displayed, check the battery.

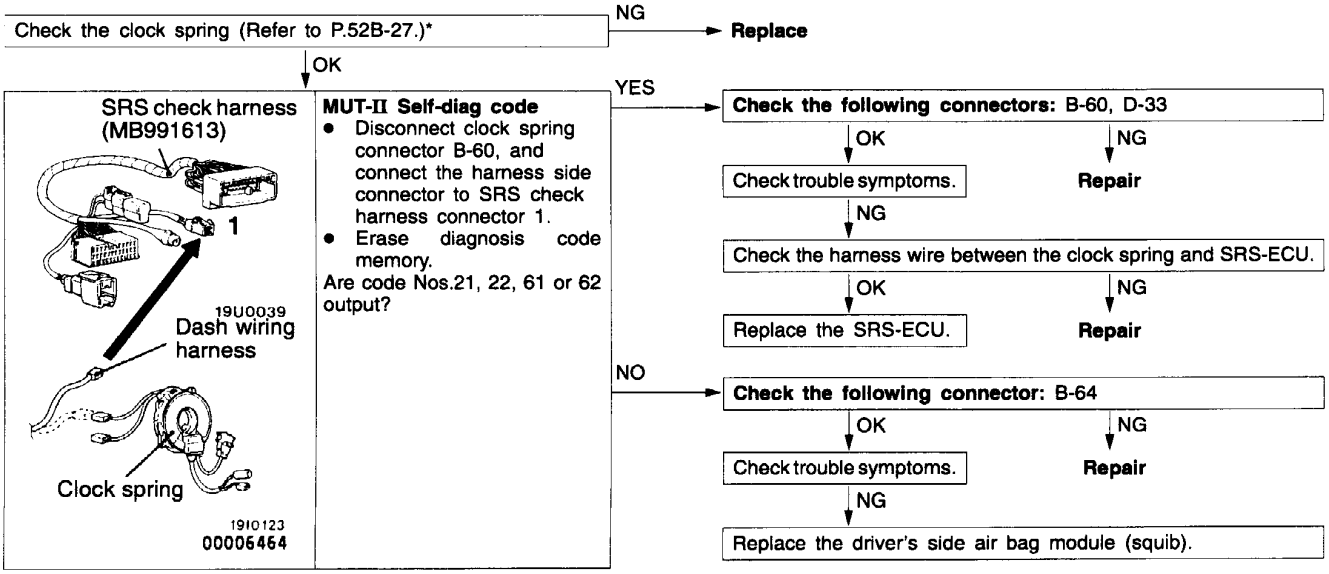
INSPECTION PROCEDURE CLASSIFIED BY DIAGNOSIS CODE

Code No.17 Side impact safing G sensor system inside SRS-ECU	**Probable cause**
This code is output if the following are detected from the side impact safing G sensor output. • Safing G sensor is not operating • Safing G sensor characteristics are abnormal • Safing G sensor output is abnormal	Malfunction of SRS-ECU

Replace the SRS-ECU.

Code No.21, 22, 61 or 62 Driver's side air bag module (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the driver's side air bag module (squib). The trouble causes for each diagnosis code No. are as follows.	• Malfunction of clock spring • Partial disconnection due to incorrect clock spring neutral position • Malfunction of wiring harnesses or connectors • Malfunction of driver's side air bag module (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
21	• Short in driver's side air bag module (squib) or harness short • Short in clock spring
22	• Open circuit in driver's side air bag module (squib) or open harness • Open circuit in clock spring • Disconnected driver's side air bag module (squib) connector • Partial disconnection due to incorrect clock spring neutral position • Malfunction of connector contact
61	• Short in driver's side air bag module (squib) harness leading to the power supply
62	• Short in driver's side air bag module (squib) harness leading to the earth

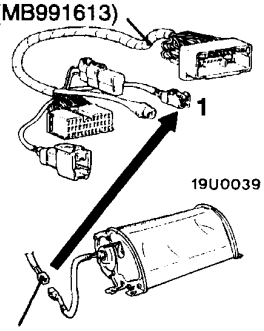


NOTE
*: Refer to '96 CARISMA Basic Manual (Pub. No. PWDE9502)

Code No.24, 25, 64 or 65 Front passenger's side air bag module (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the front passenger's side air bag module (squib). The trouble causes for each diagnosis code No. are as follows.	• Malfunction of wiring harnesses or connectors • Malfunction of front passenger's side air bag module (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
24	• Short in front passenger's side air bag module (squib) or harness short
25	• Open circuit in front passenger's side air bag module (squib) or open harness • Malfunction of connector contact
64	• Short in front passenger's side air bag module (squib) harness leading to the power supply
65	• Short in front passenger's side air bag module (squib) harness leading to the earth

SRS check harness (MB991613)



MUT-II Self-diag code
- Disconnect front passenger's side air bag module connector B-12, and connect the harness side connector to SRS check harness connector 1.
- Erase diagnosis code memory.

Are code Nos.24, 25, 64 or 65 output?

YES → **Check the following connectors:** D-33, B-12
- OK → Check trouble symptoms.
  - NG → **Repair**
- NG → Check the harness wire between the front passenger's side air bag module (squib) and SRS-ECU.
  - OK → Replace the SRS-ECU.
  - NG → **Repair**

NO → Replace the front passenger's side air bag module (squib).

Code No.41 IG_1 (A) power circuit system	Probable cause
This diagnosis code is output if the voltage between the IG_1 (A) terminal and the earth is lower than the specified value for a continuous period of 5 seconds or more. However, if the vehicle condition returns to normal, diagnosis code No.41 will be automatically erased, and the SRS warning lamp will switch off.	• Malfunction of wiring harnesses or connectors • Malfunction of SRS-ECU

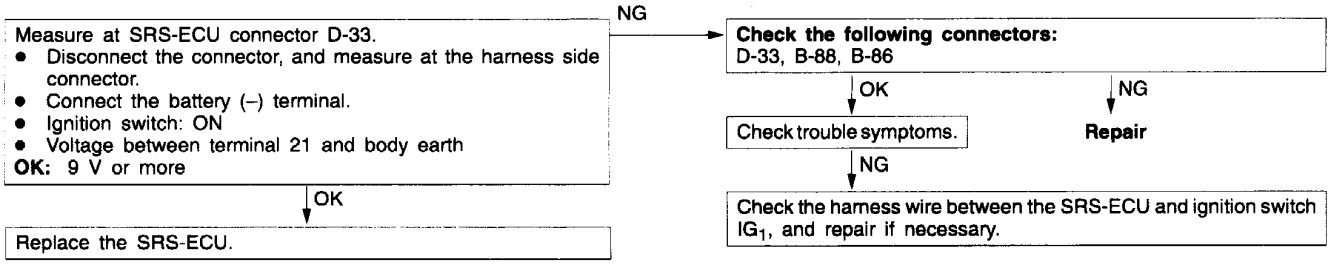
Measure at SRS-ECU connector D-33.
- Disconnect the connector, and measure at the harness side connector.
- Connect the battery (–) terminal.
- Ignition switch: ON
- Voltage between terminal 18 and body earth

OK: 9 V or more

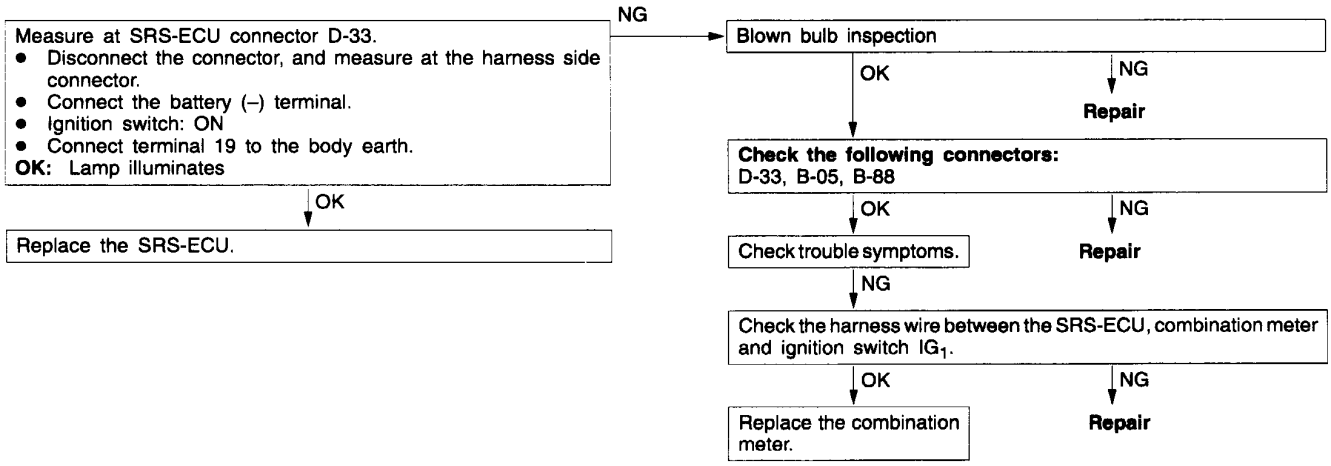
NG → **Check the following connectors:** D-33, B-88, B-86
- OK → Check trouble symptoms.
  - NG → **Repair**
- NG → Check the harness wire between the SRS-ECU and ignition switch IG_1, and repair if necessary.

OK → Replace the SRS-ECU.

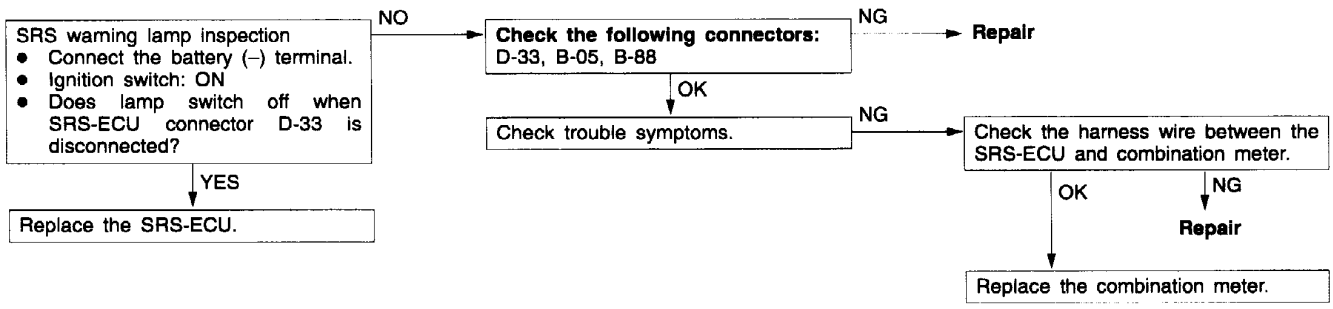
Code No.42 IG_1 (B) power circuit system	Probable cause
This diagnosis code is output if the voltage between the IG_1 (B) terminal and the earth is lower than the specified value for a continuous period of 5 seconds or more. However, if the vehicle condition returns to normal, diagnosis code No.42 will be automatically erased, and the SRS warning lamp will switch off.	• Malfunction of wiring harnesses or connectors • Malfunction of SRS-ECU



Code No.43 SRS warning lamp drive circuit system (Lamp does not illuminate.)	Probable cause
This diagnosis code is output when an open circuit occurs for a continuous period of 5 seconds while the SRS-ECU in monitoring the SRS warning lamp and the lamp is OFF (transistor OFF). However, if this code is output due to an open circuit, if the vehicle condition returns to normal, this diagnosis code No.43 will be automatically erased, and the SRS warning lamp will return to normal.	• Malfunction of wiring harnesses or connectors • Blown bulb • Malfunction of SRS-ECU • Malfunction of combination meter

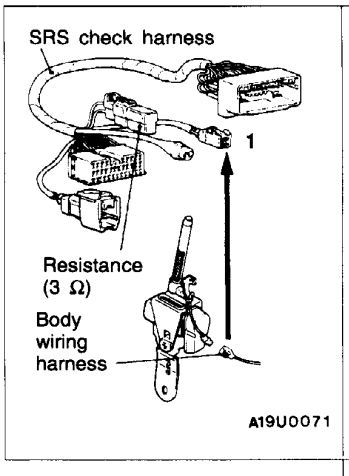


Code No.43 SRS warning lamp drive circuit system (Lamp does not switch off.)	Probable cause
This diagnosis code is output when a short to earth occurs in the harness between the lamp and the SRS-ECU while SRS-ECU is monitoring the SRS warning lamp and the lamp is ON.	• Malfunction of wiring harnesses or connectors • Malfunction of SRS-ECU • Malfunction of combination meter



Code No. 66 or 67 Driver's side pre-tensioner (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the driver's side pre-tensioner (squib). The trouble causes for each code No. are as follows.	• Malfunction of harnesses or connectors • Malfunction of driver's side pre-tensioner (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
66	• Short in driver's side pre-tensioner (squib) harness leading to the power supply
67	• Open circuit in driver's side pre-tensioner (squib) harness leading to the earth



MUT-II Self-diag code
- Disconnect driver's side pre-tensioner connector. D-15
- Connect SRS check harness connector (1)
- Erase diagnosis code memory

Are code Nos. 66 and 67 output?

Yes → **Check the following connector:** D-15, D-33 → NG → **Repair**

OK → Check trouble symptom.

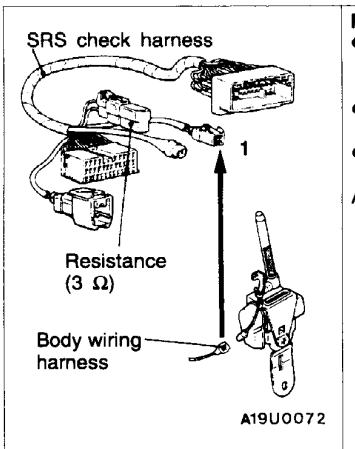
NG → Check the harness between the SRS-ECU and driver's side pre-tensioner. → NG → **Repair**

OK → Replace the SRS-ECU.

No → Replace the front driver's side pre-tensioner.

Code No. 68 or 69 Front passenger's side pre-tensioner (squib) system	Probable cause
These diagnosis codes are output if there is abnormal resistance between the input terminals of the front passenger's side pre-tensioner (squib). The trouble causes for each code No. are as follows.	• Malfunction of harnesses or connectors • Malfunction of front passenger's side pre-tensioner (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
68	• Short in front passenger's side pre-tensioner (squib) harness leading to the power supply
69	• Open circuit in front passenger's side pre-tensioner (squib) harness leading to the earth



MUT-II Self-diag code
- Disconnect front passenger's side pre-tensioner connector D-03.
- Connect SRS check harness connector (1)
- Erase diagnosis code memory

Are code Nos. 68 and 69 output?

Yes → **Check the following connector:** D-03, D-33 — NG → **Repair**

OK ↓ Check trouble symptom.

NG ↓ Check the harness between the SRS-ECU and front passenger's side pre-tensioner. — NG → **Repair**

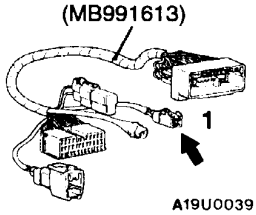
OK ↓ Replace the SRS-ECU.

No ↓ Replace the front passenger's side pre-tensioner.

Code No.71, 72, 75 or 76 Side air bag module (L.H.) (squib) system	Probable cause
These diagnosis codes are output if the resistance value between the side air bag module (L.H.) (squib) input terminals of the SRS-ECU is abnormal. The problems which cause these codes to be output are as follows.	• Malfunction of wiring harnesses or connectors • Malfunction of side air bag module (L.H.) (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
71	Short in side air bag module (L.H.) (squib) or harness short
72	• Open circuit in side air bag module (L.H.) (squib) or open harness • Malfunction of connector contact
75	Short in side air bag module (L.H.) (squib) harness leading to the power supply
76	Short in side air bag module (L.H.) (squib) harness leading to the earth

SRS check harness (MB991613)



MUT-II Self-diag code
- Disconnect side air bag module (squib) connector D-32, and connect the harness side connector to SRS check harness connector 1.
- Erase diagnosis code memory.

Are code Nos.71, 72, 75 or 76 output?

YES → **Check the following connectors:** D-33, D-32

OK → Check trouble symptoms.

NG → **Repair**

NG → Check the harness wire between the side air bag module (L.H.) (squib) and SRS-ECU.

OK → Replace the SRS-ECU.

NG → **Repair**

NO → Replace the seat back assembly of the front seat (L.H.).

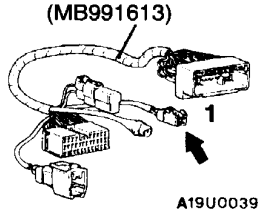
Code No.73 or 74 Side air bag module (L.H.) (squib) ignition drive circuit system	Probable cause
These diagnosis codes are output if there is a short-circuit (code No.73) or an open circuit (code No.74) in the squib ignition drive circuit.	Malfunction of SRS-ECU

Replace the SRS-ECU.

Code No.81, 82, 85 or 86 Side air bag module (R.H.) (squib) system	Probable cause
These diagnosis codes are output if the resistance value between the side air bag module (R.H.) (squib) input terminals of the SRS-ECU is abnormal. The problems which cause these codes to be output are as follows.	• Malfunction of wiring harnesses or connectors • Malfunction of side air bag module (R.H.) (squib) • Malfunction of SRS-ECU

Code No.	Trouble cause
81	Short in side air bag module (R.H.) (squib) or harness short
82	• Open circuit in side air bag module (R.H.) (squib) or open harness • Malfunction of connector contact
85	Short in side air bag module (R.H.) (squib) harness leading to the power supply
86	Short in side air bag module (R.H.) (squib) harness leading to the earth

SRS check harness (MB991613)



MUT-II Self-diag code
- Disconnect side air bag module (R.H.) (squib) connector D-29, and connect the harness side connector to SRS check harness connector 1.
- Erase diagnosis code memory.

Are code Nos.81, 82, 85 or 86 output?

YES → **Check the following connectors:** D-33, D-29
- OK → Check trouble symptoms.
  - NG → **Repair**
- NG → Check the harness wire between the side air bag module (R.H.) (squib) and SRS-ECU.
  - OK → Replace the SRS-ECU.
    - NG → **Repair**

NO → Replace the seat back assembly of the front seat (R.H.).

Code No.83 or 84 Side air bag module (R.H.) (squib) ignition drive circuit system	Probable cause
These diagnosis codes are output if there is a short-circuit (code No.83) or an open circuit (code No.84) in the squib ignition drive circuit.	Malfunction of SRS-ECU

Replace the SRS-ECU.

Code No.91 Side impact sensor (L.H.) power supply circuit system	Probable cause
This diagnosis code is output if the power supply voltage of the side impact sensor (L.H.) drops below the rated value for a continuous period of 5 seconds or more. However, code No.91 will be automatically cleared and the SRS warning lamp will switch off if the condition returns to normal.	• Malfunction of wiring harnesses or connectors • Malfunction of side impact sensor (L.H.) • Malfunction of SRS-ECU

Measure at side impact sensor (L.H.) connector D-31.
- Disconnect the connector, and measure at the harness side connector.
- Voltage between terminal 3 and body earth

OK: 9 V or more

Continuity between terminal 1 and body earth

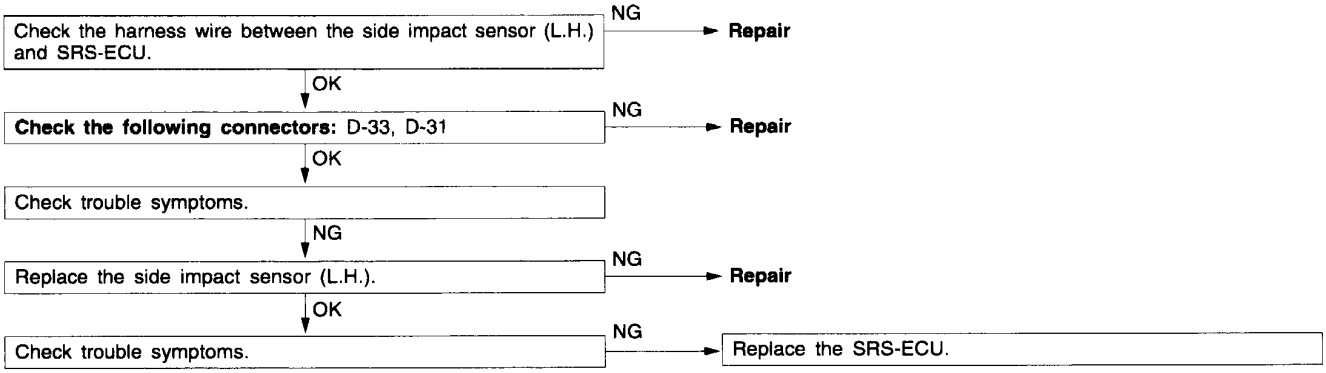
NG → **Check the following connectors:** D-33, D-31
- OK → Check trouble symptoms.
  - NG → **Repair**
- NG → Check the harness wire between the side impact sensor (L.H.) and SRS-ECU.
  - OK → Replace the SRS-ECU.
    - NG → **Repair**

OK → Replace the side impact sensor (L.H.).

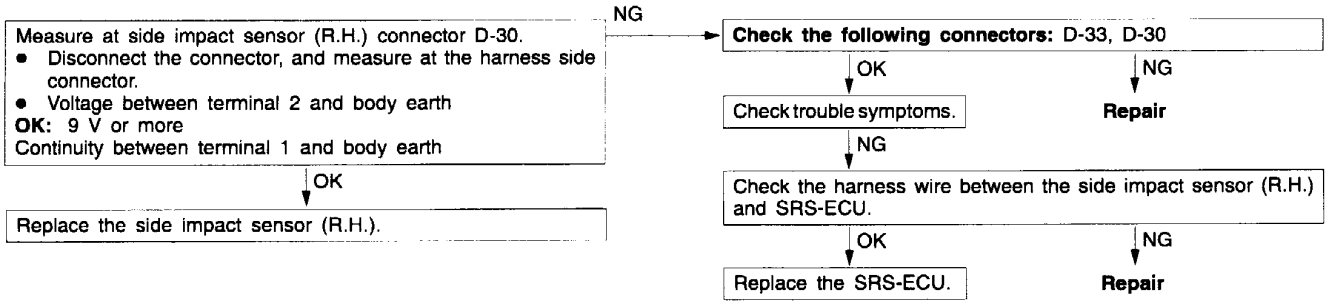
Code No.92 Side impact sensor (L.H.) system	Probable cause
This diagnosis code is output if the following are detected from the analog G-sensor output. • Analog G-sensor is not operating. • Analog G-sensor characteristics are abnormal. • Analog G-sensor output is abnormal.	• Malfunction of side impact sensor (L.H.)

Replace the side impact sensor (L.H.).

Code No.93 Side impact sensor (L.H.) communication system	Probable cause
This diagnosis code is output if communication between the side impact sensor (L.H.) and the SRS-ECU is abnormal.	• Malfunction of wiring harnesses or connectors • Malfunction of side impact sensor (L.H.) • Malfunction of SRS-ECU



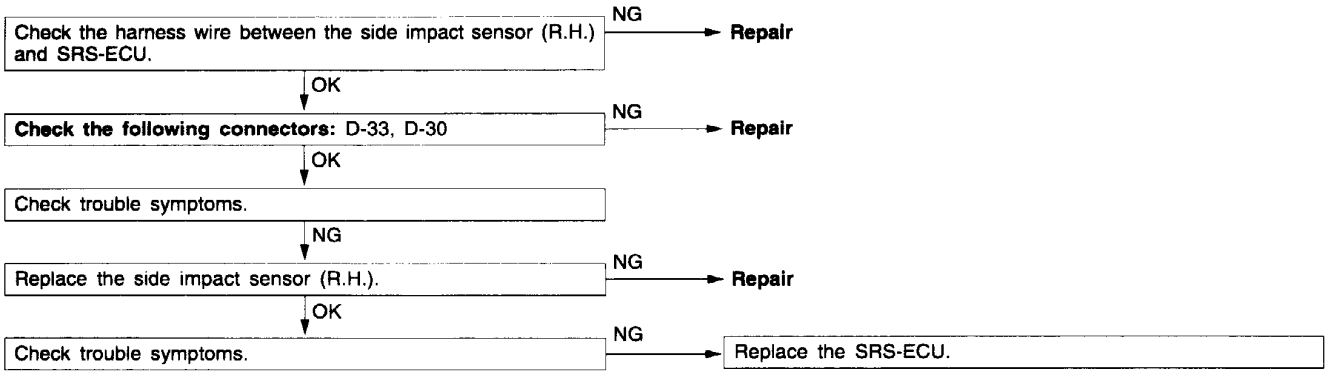
Code No.94 Side impact sensor (R.H.) power supply circuit system	Probable cause
This diagnosis code is output if the power supply voltage of the side impact sensor (R.H.) drops below the rated value for a continuous period of 5 seconds or more. However, code No.94 will be automatically cleared and the SRS warning lamp will switch off if the condition returns to normal.	• Malfunction of wiring harnesses or connectors • Malfunction of side impact sensor (R.H.) • Malfunction of SRS-ECU



Code No.95 Side impact sensor (R.H.) system	Probable cause
This diagnosis code is output if the following are detected from the analog G-sensor output. • Analog G-sensor is not operating. • Analog G-sensor characteristics are abnormal. • Analog G-sensor output is abnormal.	• Malfunction of side impact sensor (R.H.)

Replace the side impact sensor (R.H.).

Code No.96 Side impact sensor (R.H.) communication system	Probable cause
This diagnosis code is output if communication between the side impact sensor (R.H.) and the SRS-ECU is abnormal.	• Malfunction of wiring harnesses or connectors • Malfunction of side impact sensor (R.H.) • Malfunction of SRS-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

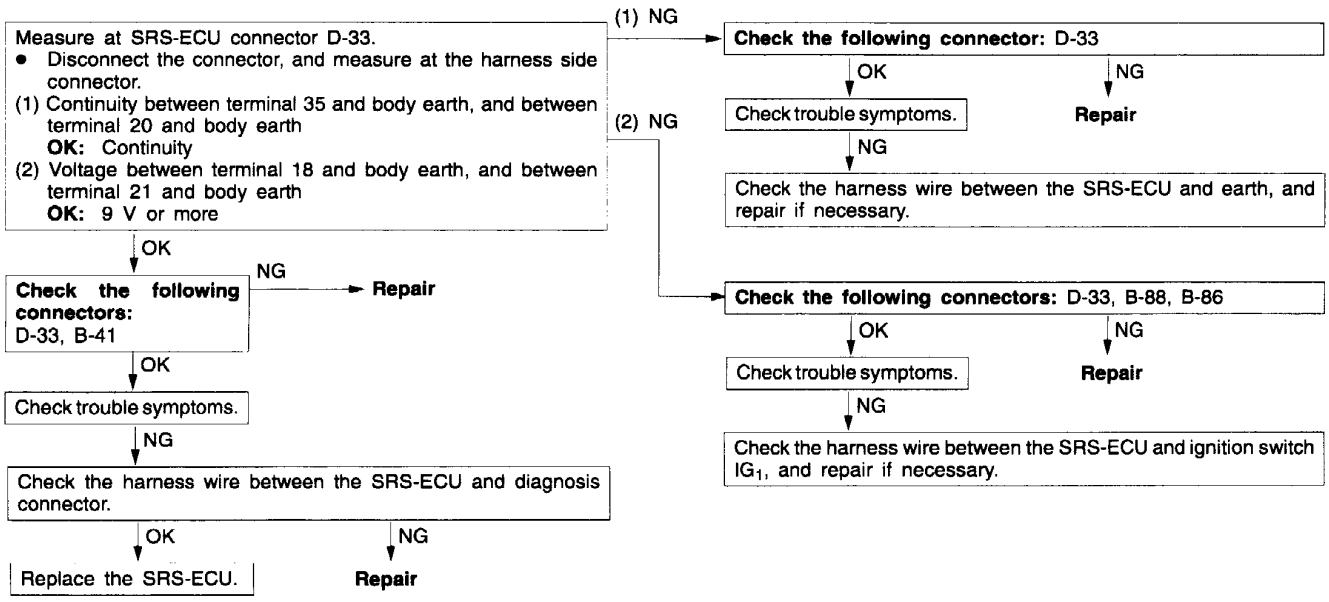
Get an understanding of the trouble symptoms and check according to the inspection procedure chart.

Trouble symptom		Inspection procedure No.	Reference page
Communication with MUT-II is not possible.	Communication with all systems is not possible.	1	Refer to '96 CARISMA Basic Manual
	Communication is not possible with SRS only.	2	52B-17
When the ignition key is turned to ON (engine stopped), the SRS warning lamp does not illuminate.		Refer to diagnosis code No.43.	52B-10
After the ignition switch is turned to ON, the SRS warning lamp is still on after approximately 7 seconds have passed.		Refer to diagnosis code No.43.	52B-10
		Refer to diagnosis code No.44.	Refer to '96 CARISMA Basic Manual

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

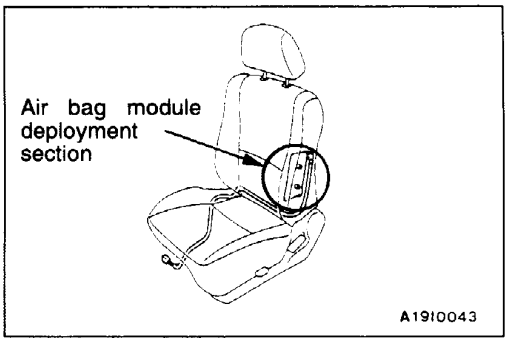
Inspection Procedure 2

Communication with MUT-II is not possible. (Communication is not possible with SRS only.)	**Probable cause**
If communication is not possible with the SRS only, the cause is probably an open circuit in the diagnosis output circuit of the SRS or in the power circuit (including earth circuit).	• Malfunction of wiring harnesses or connectors • Malfunction of SRS-ECU



SRS MAINTENANCE

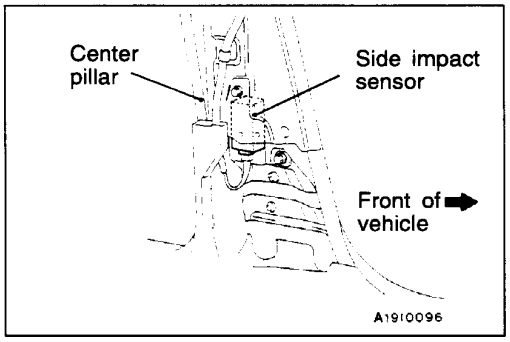
The SRS must be inspected by an authorized dealer 10 years after the date of vehicle registration.



SRS COMPONENT VISUAL CHECK

FRONT SEAT BACK ASSEMBLY (SIDE AIR BAG MODULE)

1. Check that there is no abnormality in the seat air bag module deployment section.
2. Check that there is no connector damage, bent terminals or clamping of the harness.



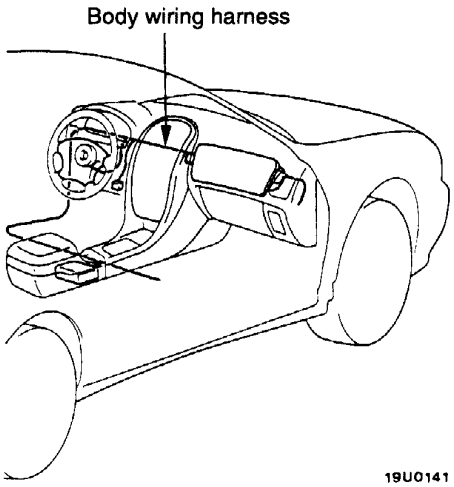
SIDE IMPACT SENSORS

1. Check that there is no bending or corrosion in the center pillar.
2. Check that there is no denting, breakage, bending or corrosion of the side impact sensor.
3. Check that there is no clamping of the harness, connector damage or bent terminals.

NOTE
The illustration at left shows the side impact sensor (L.H.). The position of the side impact sensor (R.H.) is symmetrical to this.

Caution
The SRS may not activate if the side impact sensors are not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

BODY WIRING HARNESS/FLOOR WIRING HARNESS



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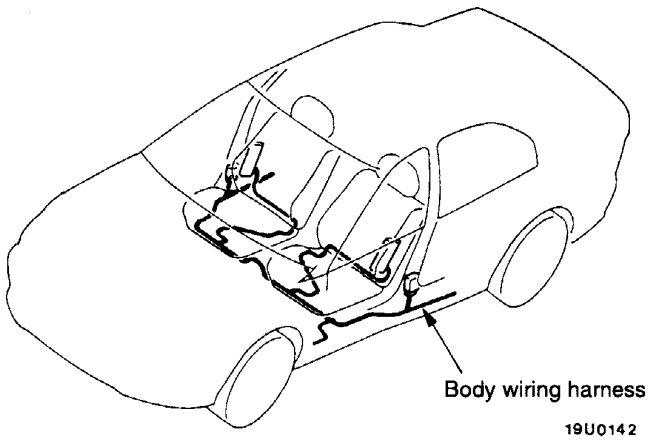

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1. Check connector for poor connection.
2. Check harnesses for binds, connectors for damage, and terminals for deformation.
   REPLACE ANY CONNECTORS OR HARNESSES THAT FAIL THE VISUAL INSPECTION. (Refer to P.52B-3.)
   Caution
   The SRS may not activate if SRS harnesses or connectors are damaged or improperly connected, which could result in serious injury or death to the vehicle's driver or front passenger.

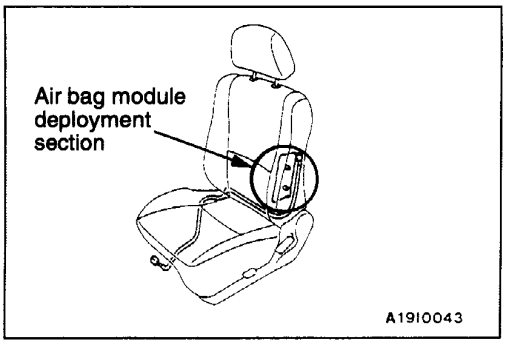
POST-COLLISION DIAGNOSIS

To inspect and service the SRS after a collision (whether or not the air bags have deployed), perform the following steps.

REPAIR PROCEDURE

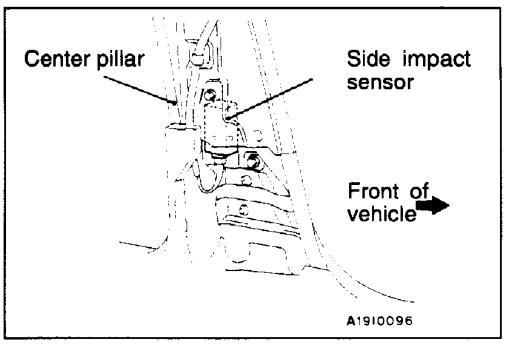
WHEN SRS SIDE AIR BAG DEPLOYS OR SEAT BELT PRE-TENSIONER OPERATES IN A COLLISION

1. Replace the following parts with new ones.
   - SRS-ECU (Refer to '96 CARISMA Basic Manual.)
   - Side impact sensor (Refer to P.52B-22.)
   - Front seat back assembly (Refer to GROUP 52A – Seat.)
2. Check harnesses for binding, connectors for damage, poor connections, and terminals for deformation. (Refer to P.52B-3.)



Front seat back assembly (Side air bag module)

1. Check that there is no abnormality in the seat air bag module deployment section.
2. Check that there is no connector damage, bent terminals or clamping of the harness.



Side impact sensor

1. Check that there is no bending or corrosion in the center pillar.
2. Check that there is no denting, breakage or bending of the side impact sensor.
3. Check that there is no clamping of the harness, connector damage or bent terminals.
   NOTE
   The illustration at left shows the side impact sensor(L.H.). The position of the side impact sensor (R.H.) is symmetrical to this.

INDIVIDUAL COMPONENT SERVICE

If the SRS components are to be removed or replaced as a result of maintenance, troubleshooting, etc., follow each procedure (P.52B-20 – P.52B-23).

Caution

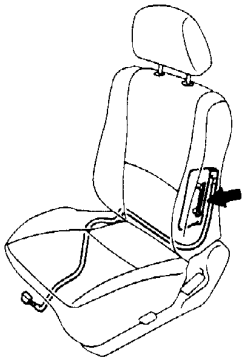
1. **SRS components should not be subjected to heat, so remove the SRS-ECU, front seat assemblies (side air bag module) and side impact sensors before drying or baking the vehicle after painting.**
   - **SRS-ECU, side impact sensor: 93°C or more**

   Recheck SRS system operability after re-installing them.
2. **If the SRS components are removed for the purpose of check, sheet metal repair, painting, etc., they should be stored in a clean, dry place until they are reinstalled.**

WARNING/CAUTION LABELS

A number of caution labels relating to the SRS are found in the vehicle, as shown in the following illustration. Follow label instructions when servicing SRS. If labels are dirty or damaged, replace them with new ones.

Side air bag module (driver's seat and front passenger's seat)



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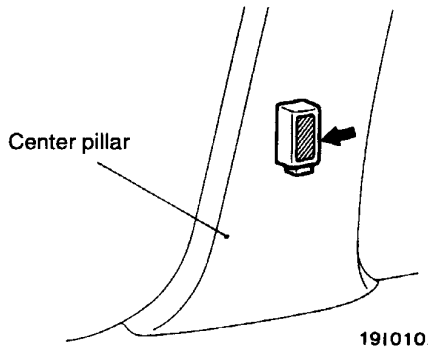
Side impact sensor



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AIR BAG MODULES

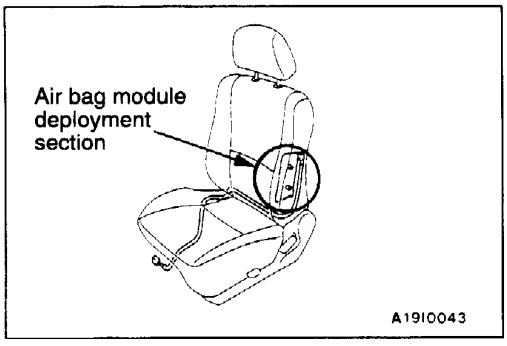
Caution

1. **When a side air bag has been deployed, the front seat back assembly (driver's seat or passenger's seat) should be replaced with a new assembly.**
2. **An undeployed air bag module should only be disposed of in accordance with the procedures (Refer to P.52B-24.)**

REMOVAL AND INSTALLATION

<Side air bag module>

For removal and installation of the front seat back assembly with side air bag module, refer to GROUP 52A – Front Seat.



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INSPECTION

FRONT SEAT BACK ASSEMBLY WITH SIDE AIR BAG MODULE CHECK

If any improper part is found during the following inspection, replace the front seat back assembly with a new one. Dispose the old one according to the specified procedure. (Refer to P.52B-24.)

Caution
Never attempt to measure the circuit resistance of the air bag module (squib) even if you are using the specified tester. If the circuit resistance is measured with a tester, accidental air bag deployment will result in serious personal injury.

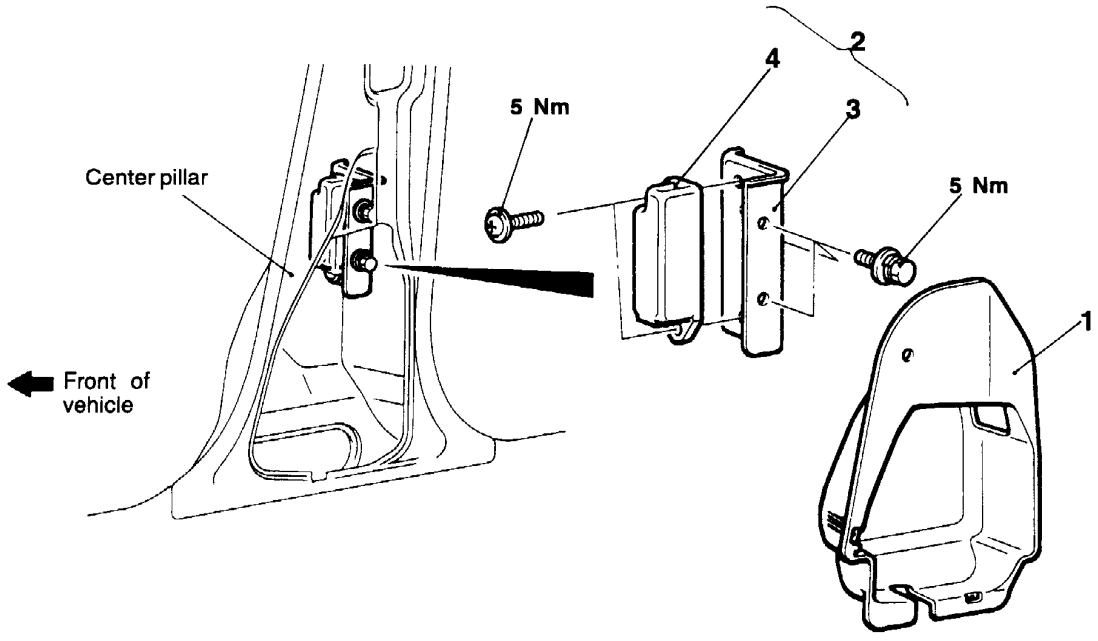
1. Check the air bag module deployment section for dents or deformation.
2. Check connector for damage, terminals for deformation, and harness for binds.

SIDE IMPACT SENSOR

Caution
1. **Disconnect the battery (–) terminal and wait for 60 seconds or more before starting work. Furthermore, the disconnected battery terminal should be covered with tape to insulate it. (Refer to P.52B-2.)**
2. **Never attempt to disassemble or repair the side impact sensor. If faulty, replace it.**
3. **Do not drop or subject the side impact sensor to impact or vibration. If denting, cracking, deformation, or rust are discovered in the side impact sensor, replace it with a new side impact sensor. Discard the old one.**
4. **After deployment of an air bag, replace the side impact sensor with a new one.**

REMOVAL AND INSTALLATION

Pre-removal Operation
Turn the ignition key to the "LOCK" position.



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Removal steps

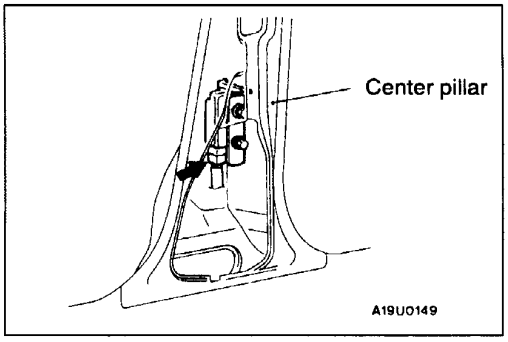
▶C◀ • Post-installation inspection
• Negative (–) battery cable connection
• Center pillar lower trim (Refer to '96 CARISMA Basic Manual.)
• Seat belt with pre-tensioner (Refer to '96 CARISMA Basic Manual.)
1. Water proof cover
2. Side impact sensor and bracket
3. Bracket
▶B◀ 4. Side impact sensor
▶A◀ • Pre-installation inspection

NOTE
The illustration above shows the side impact sensor (L.H.). The position of the side impact sensor (R.H.) is symmetrical to this.

INSTALLATION SERVICE POINTS

▶A◀ PRE-INSTALLATION INSPECTION

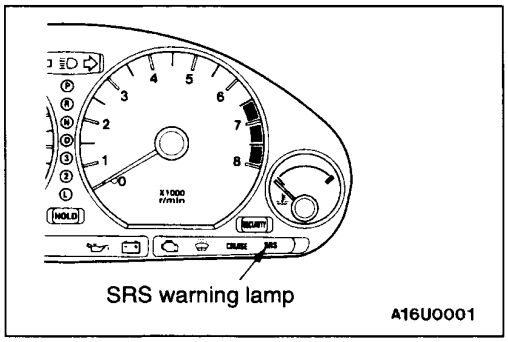
Check the side impact sensor for dents, breakage and bending and measure the resistance between the terminals, even when installing a new side impact sensor.



▶B◀ SIDE IMPACT SENSOR INSTALLATION

Securely connect the connector.

Caution
If the side impact sensor is not installed securely and correctly, the side air bag may not operate normally.



▶C◀ POST-INSTALLATION INSPECTION

1. Reconnect the negative battery terminal.
2. Turn the ignition key to the "ON" position.
3. Does the SRS warning lamp illuminate for about 7 seconds, and then remain extinguished for at least 5 seconds after turning the ignition key to "OFF" position?
4. If yes, SRS system is functioning properly. If no, consult page 52B-6.

INSPECTION

- Check the side impact sensor and bracket for dents, cracks or deformation.
- Check connector for damage, and terminals for deformation.

  Caution
  If a dent, crack, deformation or rust is discovered, replace the side impact sensor with a new one.

  NOTE
  For checking of the side impact sensor other than described above, refer to the section concerning troubleshooting. (Refer to P.52B-6.)
- Check that there is no bending or corrosion in the center pillar.

AIR BAG MODULE DISPOSAL PROCEDURES

Before disposing of a vehicle which is equipped with air bags or when disposing of the air bags themselves, the following procedures must be used to deploy the air bags before disposal.

UNDEPLOYED AIR BAG MODULE DISPOSAL

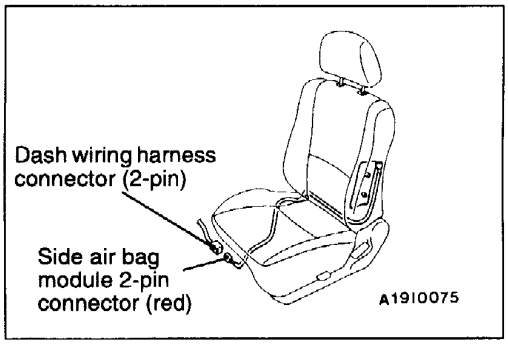
Caution

1. **If the vehicle is to be scrapped or otherwise disposed of, deploy the air bags inside the vehicle.**
2. **If the vehicle will continue to be operated and only the front seat back assembly is to be disposed of, deploy the air bag outside the vehicle.**
3. **Since a large amount of smoke is produced when the air bag is deployed, avoid residential areas whenever possible.**
4. **Since there is a loud noise when the air bags are deployed, avoid residential areas whenever possible. If anyone is nearby, give warning of the impending noise.**
5. **Suitable ear protection should be worn by personnel performing these procedures or by people in the immediate area.**

Deployment Inside The Vehicle

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

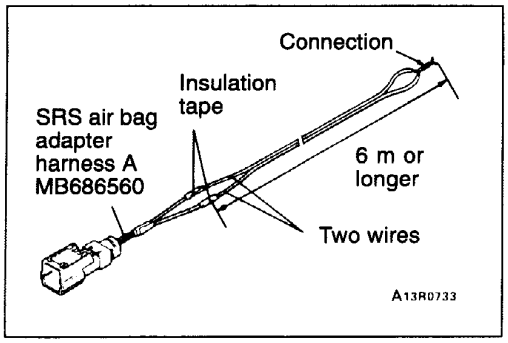
   Caution
   Wait at least 60 seconds after disconnecting the battery cables before doing any further work. (Refer to P.52B-2.)



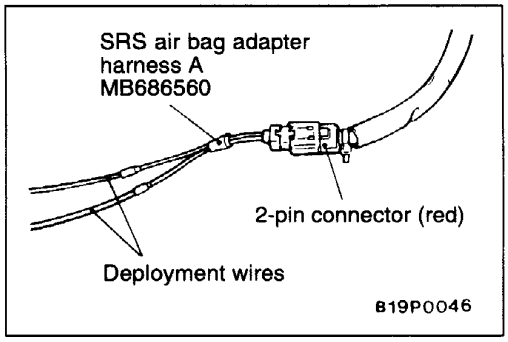
3. To deploy the side air bag module:
   Remove the connection between the side air bag module connector (red 2-pin) and the dash wiring harness connector.

   Caution
   The side air bag modules for both the driver's-side and passenger's-side should be deployed.

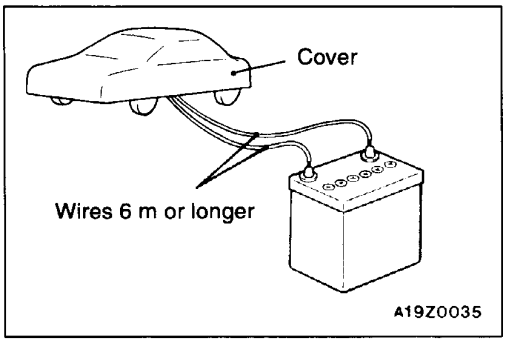
   NOTE
   If the side air bag module connector is disconnected from the dash wiring harness, both electrodes of the side air bag module connector will be automatically shorted to prevent unintended deployment of the side air bag due to static electricity, etc.



4. Connect two wires, each six meters or longer, to the two leads of SRS air bag adapter harness A and cover the connections with insulation tape. The other ends of the two wires should be connected to each other (short-circuited), to prevent sudden unexpected deployment of the air bag.



5. Connect the side air bag module 2-pin connector (red) to SRS air bag adapter harness A and pass the deployment wires out of the vehicles.



6. Fully close all door windows, close the doors and place a cover over the vehicle to minimize the amount of noise.

   Caution
   If the glass is damaged, it may break, so the car must be covered.

7. At a location as far away from the vehicle as possible, disconnect the two connected wires from each other, and connect them to the two terminals of the battery (which has been removed from the vehicle) to deploy the air bag.

   Caution
   (1) Before deploying the air bag in this manner, first check to be sure that there is no one in or near the vehicle. Wear safety glasses.
   (2) The inflator will be quite hot immediately following the deployment, so wait at least 30 minutes to allow it to cool before attempting to handle it. Although not poisonous, do not inhale gas from air bag deployment.
   See Deployed Air Bag Module Disposal Procedures (P.52B-27.) for post-deployment handling instructions.
   (3) If the air bag module fails to deploy when the procedures above are followed, do not go near the module. Contact your local distributor.

8. After deployment, dispose of air bag module according to the Deployed Air Bag Module Disposal Procedures. (Refer to P.52B-27.)

Deployment Outside the Vehicle

Caution

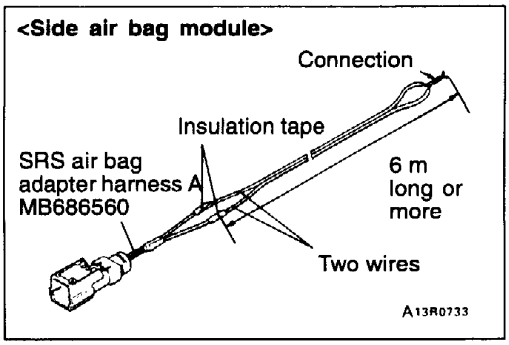
1. **This should be carried out in a wide, flat area at least 6 m away from obstacles and other people.**
2. **Do not perform deployment outside, if a strong wind is blowing, and if there is even a slight breeze, the air bag module should be placed and deployed downwind from the battery.**

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

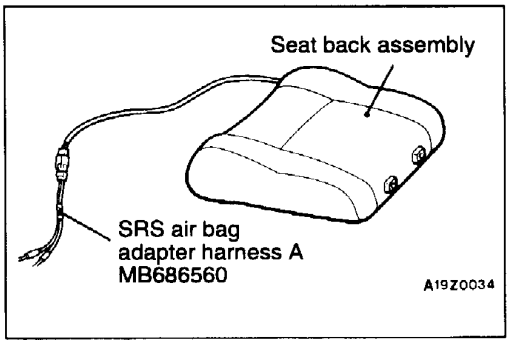
   Caution
   Wait at least 60 seconds after disconnecting the battery cables before doing any further work. (Refer to P.52B-2.)

2. Remove the front seat back assemblies with built-in side air bag module from the vehicle. (Refer to GROUP 52A – Front Seat.)

   Caution
   The air bag modules should be stored on flat surface and placed so that the air bag deployment surfaces are facing upward. Do not place anything on top of them.



3. Connect two wires, each six meters or longer, to the two leads of SRS air bag adapter harness A, and cover the connections with insulation tape. The other ends of the two wires should be connected to each other (short-circuited), to prevent sudden unexpected deployment of the air bag module.



4. Set the air bag modules as follows:
   (1) Place the seat back assembly so that the rear of the assembly is lying on the ground.
   (2) Connect SRS air bag adapter harness A (which is connected to the deployment harness) to the side air bag module connector.

5. At a location as far away from the air bag module as possible, and from a shielded position, disconnect the two connected wires from each other, and connect them to the two terminals of the battery (which has been removed from the vehicle) to deploy the air bag.

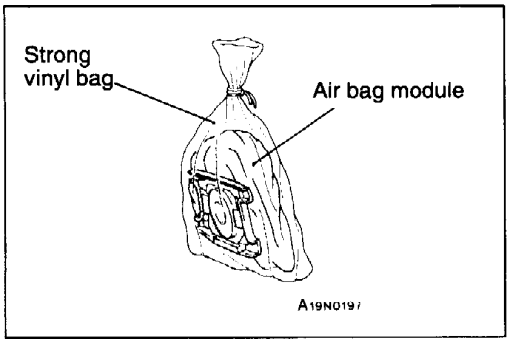
   Caution
   (1) Before deployment, check carefully to be sure that no one is nearby.
   (2) The inflator will be quite hot immediately following deployment, so wait at least 30 minutes to allow it to cool before attempting to handle it. Although the gas resulting from air bag deployment is not poisonous, it should not be inhaled. Refer to the Deployed Air Bag Module Disposal Procedures (P.52B-27) for post-deployment handling instructions.
   (3) If the air bag fails to deploy when the procedures above are followed, do not go near the module. Contact your local distributor.

6. After deployment, dispose of air bag module according to the Deployed Air Bag Module Disposal Procedures. (Refer to P.52B-27.)

DEPLOYED AIR BAG MODULE DISPOSAL PROCEDURES

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

1. The inflator will be quite hot immediately following deployment, so wait at least 30 minutes to allow it cool before attempting to handle it.
2. Do not put water or oil on the air bag after deployment.
3. There may be, adhered to the deployed air bag module, material that could irritate the eye and/or skin, so wear gloves and safety glasses when handling a deployed air bag module. IF AFTER FOLLOWING THESE PRECAUTIONS, ANY MATERIAL DOES GET INTO THE EYES OR ON THE SKIN, IMMEDIATELY RINSE THE AFFECTED AREA WITH A LARGE AMOUNT OF CLEAN WATER.
   IF ANY IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.



4. Tightly seal the air bag module in a strong vinyl bag for disposal.

   NOTE
   The side air bag module does not contain any toxic sodium azides, so that the seat back assembly with built-in side air bag module can be disposed of in the same way as a seat without a side air bag.

5. Be sure to always wash your hands after completing this operation.

GROUP 54
CHASSIS ELECTRICAL

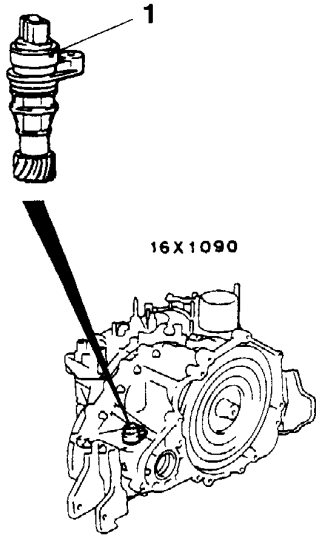
GENERAL

OUTLINE CHANGES

- The inspection procedure and the maintenance procedure have been established to correspond to the change of the combination meter.
- The inspection procedure and the maintenance procedure have been established to correspond to the addition of the outside air temperature sensor. (Vehicles without fully automatic air conditioner)
- The inspection procedure has been established to correspond to the change of the rear window defogger switch.

COMBINATION METERS

REMOVAL AND INSTALLATION



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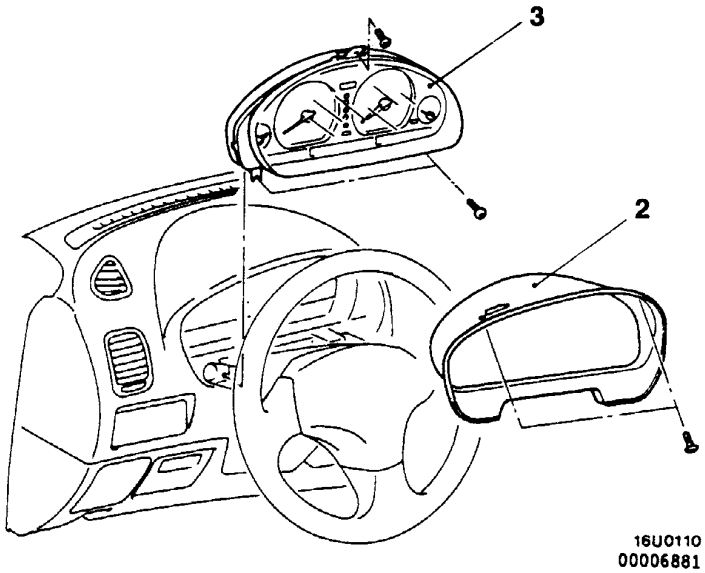

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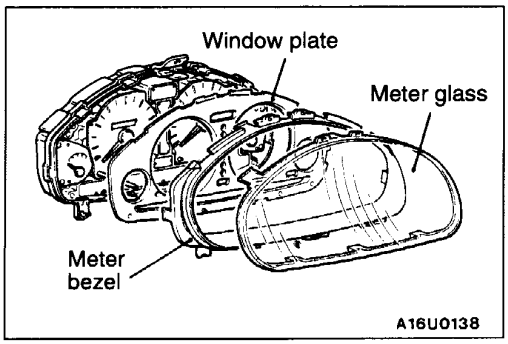
Vehicle speed sensor removal steps

- Air cleaner, air intake hose

1. Vehicle speed sensor

Combination meter removal steps

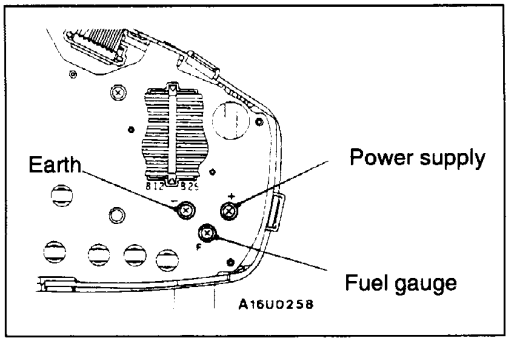
2. Meter bezel
3. Combination meter



INSPECTION

FUEL GAUGE RESISTANCE CHECK

(1) Remove the meter glass, meter bezel and window plate.

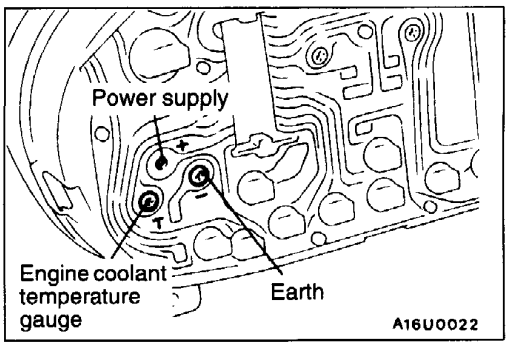


(2) Use a circuit tester to measure the resistance value between the terminals.

NOTE
The terminal positions are indicated by (F), (+) and (–).

Standard value:
Power supply (+) – Earth (–): 117 – 143 Ω
Power supply (+) – Fuel gauge (F): 46 – 57 Ω
Fuel gauge (F) – Earth (–): 71 – 87 Ω

Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.



ENGINE COOLANT TEMPERATURE GAUGE RESISTANCE CHECK

1. Remove the power supply tightening screw.
2. Use a circuit tester to measure the resistance value between the terminals.

NOTE
The terminal positions are indicated by (T), (–) and (+).

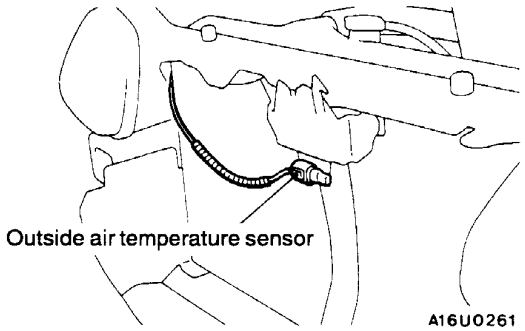
Standard value:
Power supply (+) – Earth (–): 190 – 232 Ω
Power supply (+) – Engine coolant temperature gauge (T): 51 – 62 Ω
Engine coolant temperature gauge (T) – Earth (–): 240 – 294 Ω

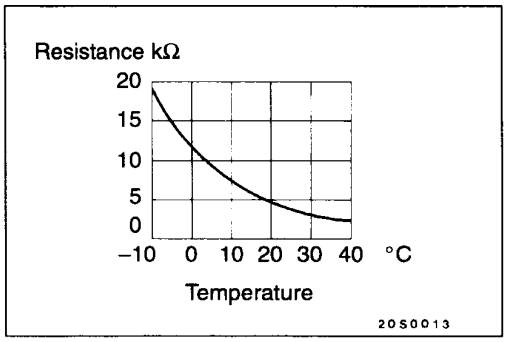
Caution
When inserting the testing probe into the power supply terminal, be careful not to touch the printed board.

OUTSIDE AIR TEMPERATURE SENSOR (VEHICLES WITHOUT FULLY AUTOMATIC AIR CONDITIONER)

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Front Bumper Removal and Installation





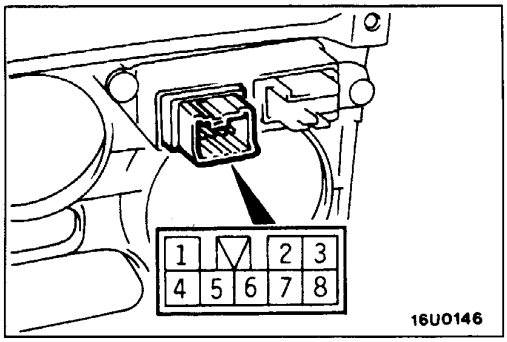
INSPECTION

When the resistance value between the sensor terminals is measured under two or more temperature conditions, the resistance value should be close to the values shown in the graph.

NOTE
The temperature conditions when testing should not exceed the range of the characteristic curve in the graph.

REAR WINDOW DEFOGGER

REAR WINDOW DEFOGGER SWITCH



INSPECTION

DEFOGGER SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	4		6	3	5		7
OFF		ILL					
ON		ILL				IND	