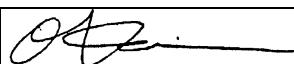




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# SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.  
MITSUBISHI MOTOR SALES EUROPE BV

<b>SERVICE BULLETIN</b>		No.: ESB-97E13-002	
		Date: 1998-02-28	<b>&lt;Model&gt;</b> (EC,EXP) CARISMA
<b>Subject:</b>	CORRECTION TO ENGINE CONTROL SYSTEM DESCRIPTIONS		<b>&lt;M/Y&gt;</b> 97-10
<b>Group:</b>	FUEL		
<b>INFORMATION</b>		 O. Kai - E.V.P. & G.M. After Sales Service Dept.	
<b>1. Description:</b> This Service Bulletin informs you of correction to the CARISMA GDI engine control system descriptions.			
<b>2. Applicable Manuals:</b>			
Manual	Pub. No.	Language	Page(s)
'98 CARISMA Workshop Manual chassis	PWDE9502-C	(English)	13J-3, 13J-5,
	PWDS9503-C	(Spanish)	13J-9, 13J-11,
	PWDF9504-C	(French)	13J-28, 13J-37,
	PWDG9505-C	(German)	13J-41, 13J-60
	PWDD9506-C	(Dutch)	13J-63, 13J-69,
	PWDW9507-C	(Swedish)	13J-86
	PWDI96E1-C	(Italian)	
<b>3. Details:</b>			

## OTHER CONTROL FUNCTIONS

### 1. Fuel Pump Control

Turn the fuel pump relay ON so that current is supplied to the fuel pump while the engine is cranking or running.

### 2. A/C Relay Control

Turns the compressor clutch of the A/C ON and OFF.

### 3. Fan Relay Control

The revolutions of the radiator fan and

condenser fan are controlled in response to the engine coolant temperature and vehicle speed.

### 4. Purge Control Solenoid Valve Control

Refer to GROUP 17.

### 5. EGR Control Servo Control

Refer to GROUP 17.

## GENERAL SPECIFICATIONS

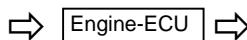
Items	Specifications	
Throttle body	Throttle bore mm	54
	Throttle position sensor	Variable resistor type
	Idle speed control servo	Stepper motor type (Stepper motor type by-pass air control system)
	Idle position switch	Rotary contact type, within throttle position sensor
Engine-ECU	Identification model No.	E2T68374
Sensors	Air flow sensor	Kaman vortex type
	Barometric pressure sensor	Semiconductor type
	Intake air temperature sensor	Thermistor type
	Engine coolant temperature sensor	Thermistor type
	Oxygen sensor	Zirconia type
	Vehicle speed sensor	Magnetic resistive element type
	Inhibitor switch	Contact switch type
	Camshaft position sensor	Hall element type
	Crank angle sensor	Hall element type
	Detonation sensor	Piezoelectric type
	Fuel pressure sensor	Metallic membrane type
	Power steering fluid pressure switch	Contact switch type

### <Correct>

Engine-ECU	Identification model No.	Except cars for Germany	E2T68374 <M/T> E2T68376 <A/T>
		Cars for Germany	E2T68375 <M/T> E2T68377 <A/T>

## GASOLINE DIRECT INJECTION SYSTEM DIAGRAM

*1 Oxygen ( $O_2$ ) sensor
*2 Air flow sensor
*3 Intake air temperature sensor
*4 Throttle position sensor
*5 Idle position switch
*6 Camshaft position sensor
*7 Crank angle sensor
*8 Barometric pressure sensor
*9 Engine coolant temperature sensor
*10 Detonation sensor
*11 Fuel pressure sensor
• Power supply
• Ignition switch - IG
• Ignition switch - ST
• Vehicle speed sensor
• A/C switch
• Inhibitor switch
• Power steering fluid pressure switch
• Alternator FR terminal
• M/T oil temperature sensor
• Electric load switch
• Brake lamp switch
• Injector wire open circuit check signal
• A/T-ECU



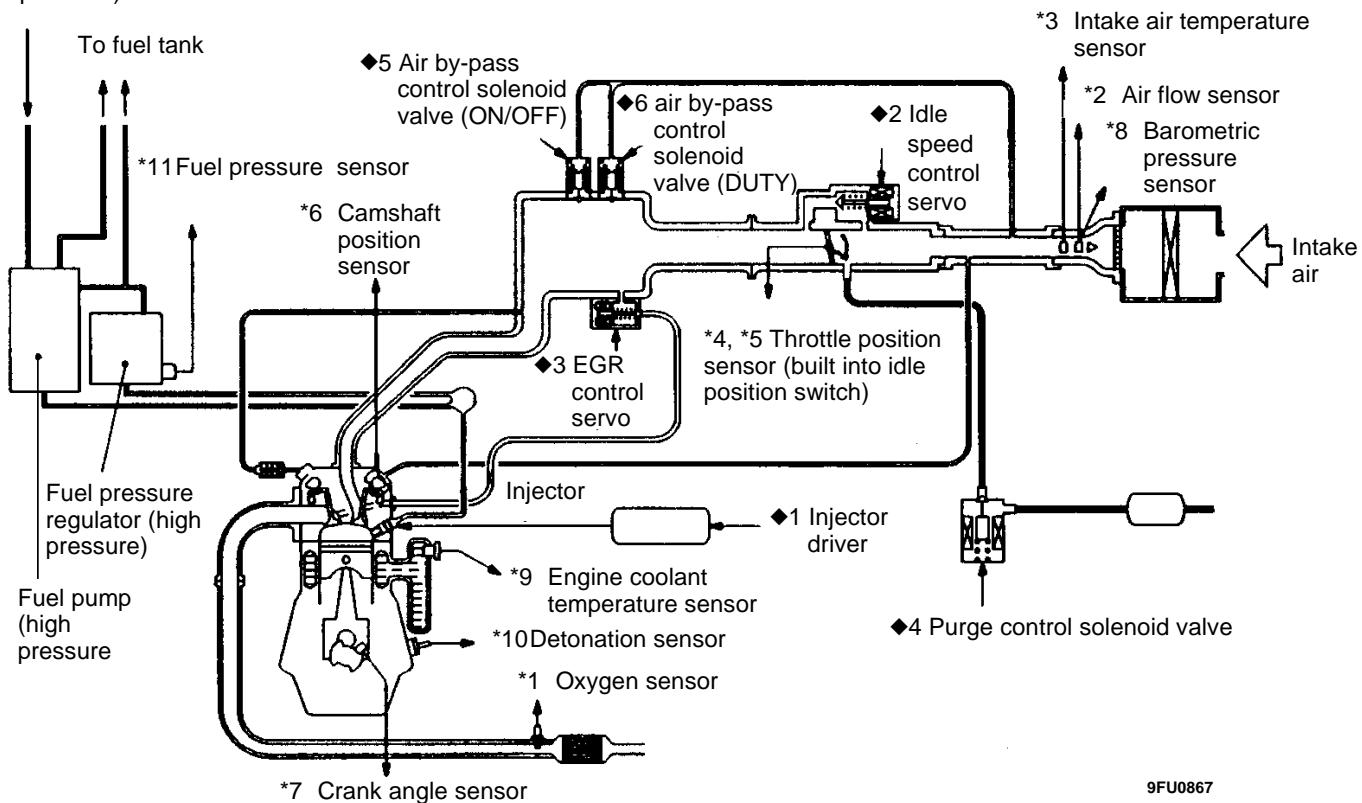
◆1 Injector driver (injector)
◆2 ISC servo
◆3 EGR control servo (stepper motor)
◆4 Purge control solenoid valve
◆5 Air bypass control solenoid valve (ON/OFF)
◆6 Air bypass control solenoid valve (DUTY)
• Control relay
• Fuel pump relay
• Injector driver control relay
• A/C relay
• Ignition coil
• Engine warning lamp
• Diagnosis output
• Alternator G terminal
• A/T-ECU

&lt;Incorrect&gt;

&lt;Correct&gt;

Small lamp switch

From fuel pump  
(low pressure)



## Engine warning lamp Inspection Items

Engine-ECU
Oxygen sensor
Air flow sensor
Intake air temperature sensor
Throttle position sensor
Engine coolant temperature sensor
Crank angle sensor
Camshaft position sensor
barometric pressure sensor
Detonation sensor
Injector
Abnormal combustion
Immobilizer system
fuel pressure sensor
Excessive intake air amount
Brake vacuum sensor
<b>&lt;Added&gt; Abnormal fuel system</b>

### METHOD OF READING AND ERASING DIAGNOSIS CODES

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

### INSPECTION USING MUT-II DATA LIST AND ACTUATOR TESTING

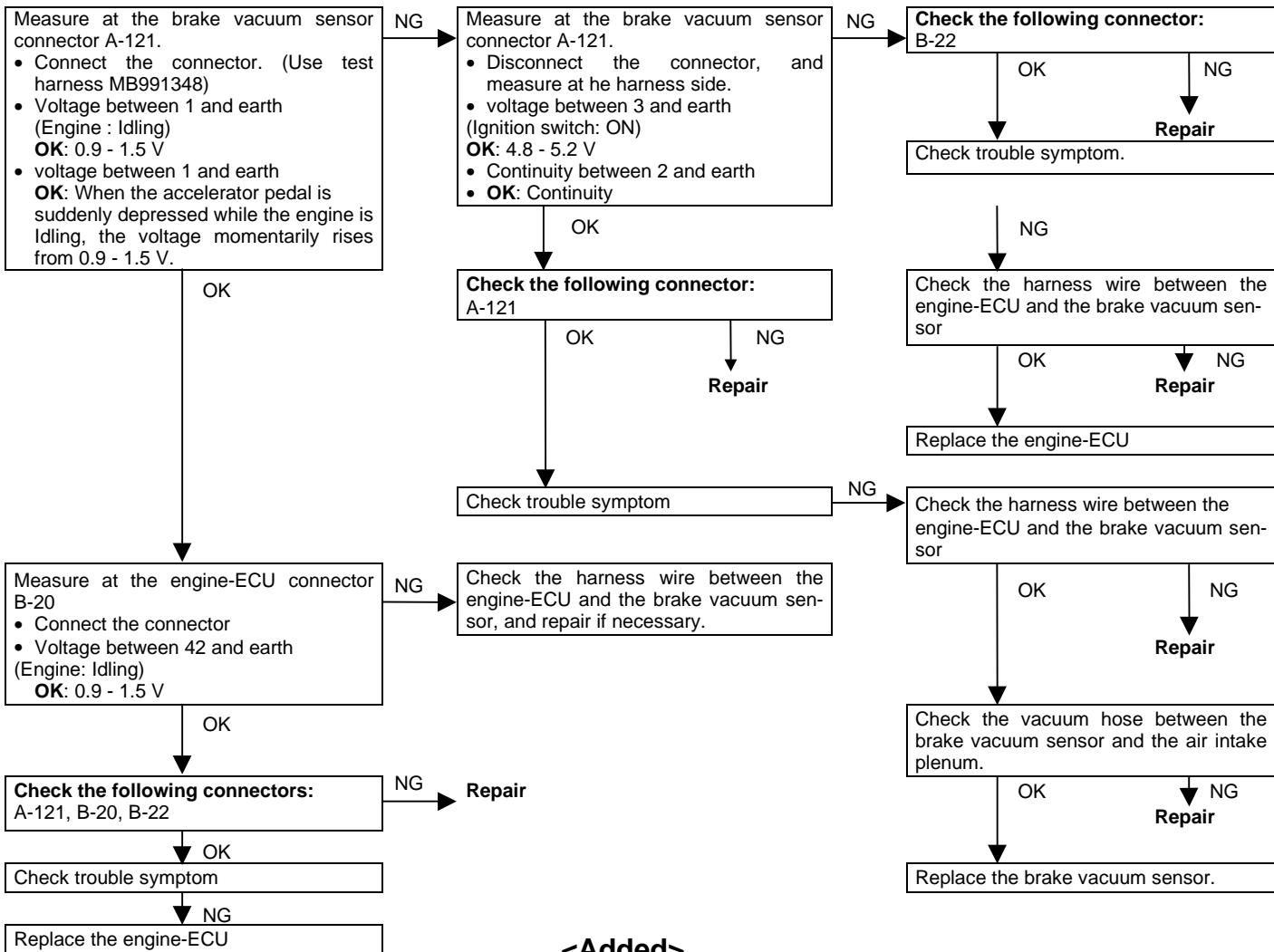
1. Carry out inspection by means of the data list and the actuator test function.  
If there is an abnormality, check and repair the chassis harnesses and components.
2. After repairing, re-check using the MUT-II and check that the abnormal input and output have returned to normal as a result of the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

## INSPECTION CHART FOR DIAGNOSIS CODES

Code No.	Diagnosis item	Reference page
11	Oxygen sensor system	13J - 12
12	Air flow sensor system	13J - 13
13	Intake air temperature sensor system	13J - 14
14	Throttle position sensor system	13J - 15
21	Engine coolant temperature sensor system	13J - 16
22	Crank angle sensor system	13J - 17
23	Camshaft position sensor system	13J - 18
24	Vehicle speed sensor system	13J - 19
25	Barometric pressure sensor system	13J - 20
31	Detonation sensor system	13J - 21
41	Injector system	13J - 22
44	abnormal combustion	13J - 23
54	Immobilizer system	13J - 24
56	Fuel pressure sensor system	13J - 25
58	Excessive intake air amount	13J - 26
61	communication wire A/T-ECU system	13J - 26
64	Alternator FR terminal system	13J - 27
66	Brake vacuum sensor system	13J - 28
89	Abnormal fuel system	13J - 28

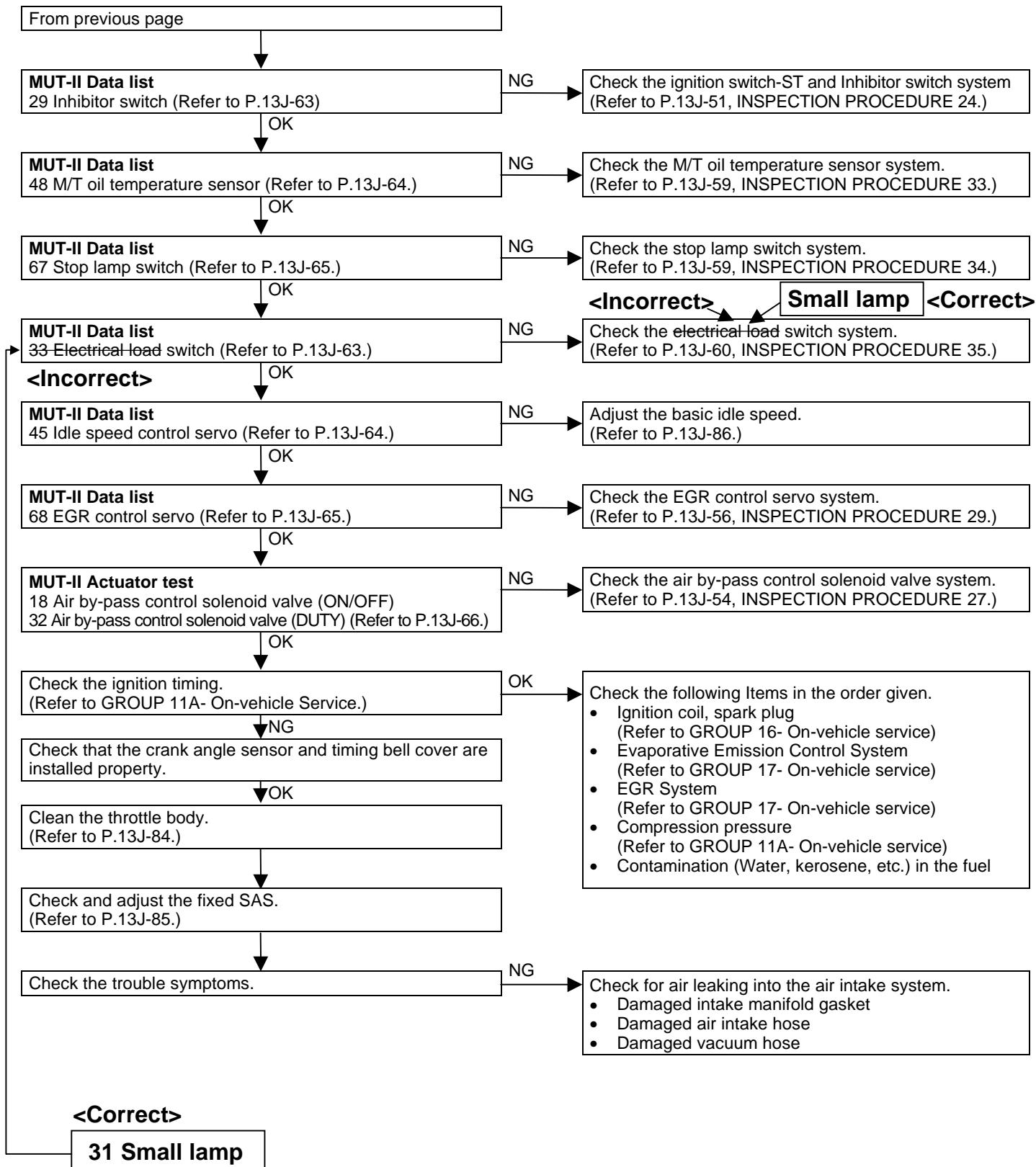
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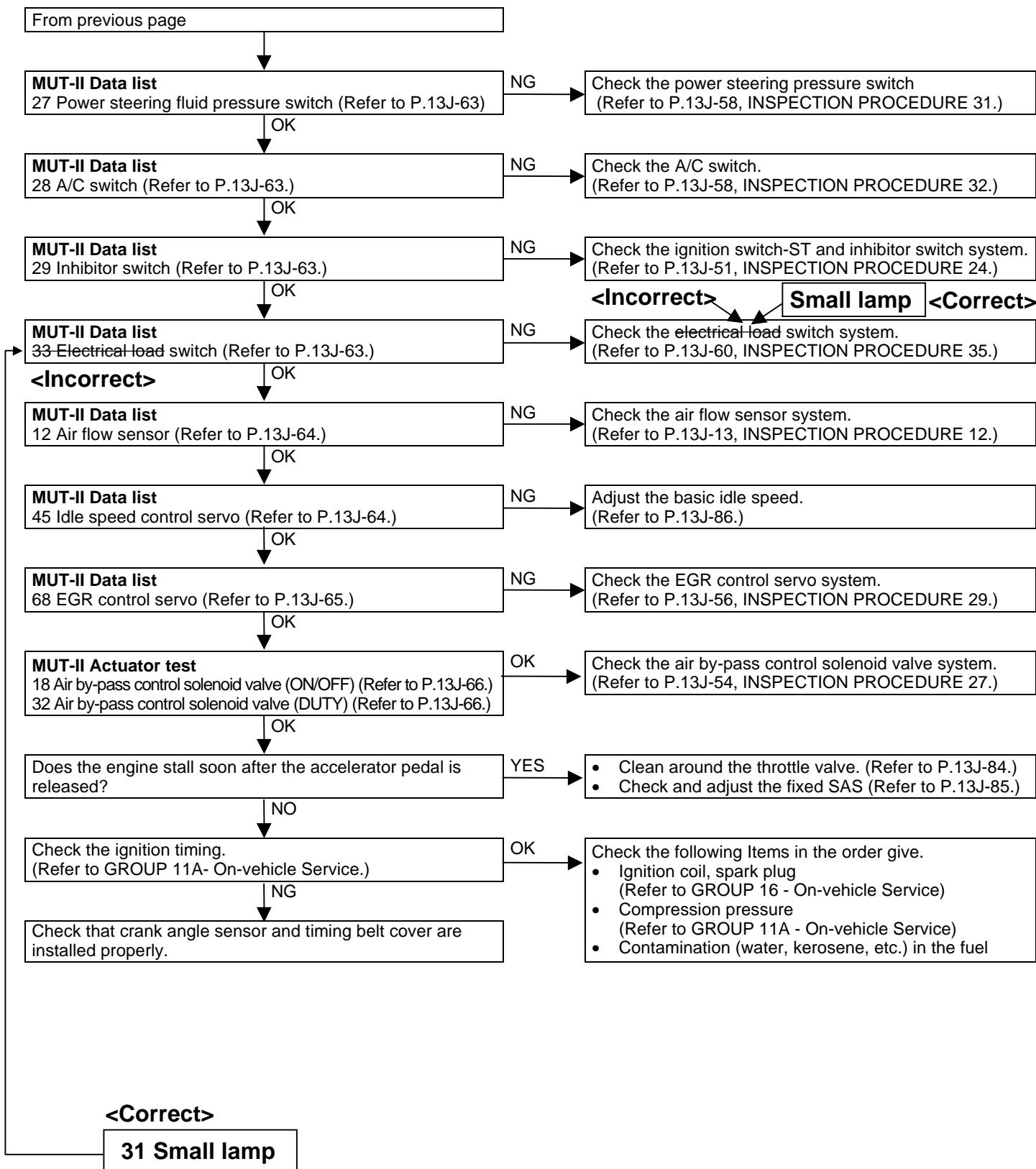
Code No.66 Brake vacuum sensor system	Probable cause
<p>Range of check</p> <ul style="list-style-type: none"> <li>• Ignition switch: ON</li> </ul> <p>Set conditions</p> <ul style="list-style-type: none"> <li>• Sensor output voltage is 4.8 V or more.</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>• Sensor output voltage is 0.2 V or less</li> </ul>	<ul style="list-style-type: none"> <li>• Malfunction of the brake vacuum sensor</li> <li>• Improper connector contact, open circuit or short-circuited harness wire of the brake vacuum sensor</li> <li>• Malfunction of the engine-ECU</li> </ul>



**<Added>**

Code No. 89 Abnormal fuel system	Probable cause
Range of check	
• Engine: When at idle (during stoichiometric feedback operation)	
Set conditions	
• 10 seconds or more passed with fuel injection amount correction values in an abnormally low condition.	
or	
• 10 Seconds or more passed with fuel injection amount correction values in an abnormally high condition	
MUT-II Data list	
13 intake air temperature sensor (Refer to P.13J-62.)	
↓OK	
Check the intake air temperature sensor system.	
(Refer to P.13J-14, Code No.13)	
MUT-II Data list	
25 Barometric pressure sensor (Refer to P.13J-63)	
↓OK	
Check the barometric pressure sensor system.	
(Refer to P.13J-20, Code No.25)	
MUT-II Data list	
12 Air flow sensor (Refer to P.13J-61.)	
↓OK	
Check the air flow sensor system.	
(Refer to P.13J-13, code No. 12)	
Replace fuel pump (high pressure)	





## INSPECTION PROCEDURE 35

Small lamp &lt;Correct&gt;

&lt;Incorrect&gt;

## Electrical load switch

During idling, the ON/OFF condition of switches in equipment which have a large electrical load is input to the engine ECU.  
The engine ECU controls the idle speed control servo based on this input

## Probable cause

- Improper connector contract, open circuit or short-circuited harness wire in the taillamp relay circuit.
- Malfunction of the engine-ECU

&lt;Incorrect&gt;

Measure at the engine-ECU connector B-20

- Disconnect the connector, and measure at the harness side.
- Voltage between 52 and earth  
(Lighting switch: ON)  
OK: System voltage

NG

Check the taillamp relay circuit. (Refer to ELECTRICAL WIRING.)

OK

Check the following connector: B-20

OK

Repair

OK

Check the trouble symptoms.

NG

Replace the engine-ECU

**The ON/OFF condition of the small lamp switch is input to the engine ECU.**

**The engine ECU controls power generation at time of drive-away based on this input.**

&lt;Correct&gt;

Item No.	Inspection item	Inspection contents	Normal condition	Inspection procedure No.	Reference page
22	Crank angle sensor	<ul style="list-style-type: none"> <li>• Engine: Cranking</li> <li>• Tachometer: Connected</li> </ul> Compare the engine speed readings on the tachometer and the MUT-II	Accord	Code No. 22	13J-17
		<ul style="list-style-type: none"> <li>• Engine: Idling</li> <li>• Idle position switch: ON</li> </ul>	When engine coolant temperature is -20°C	1,300 - 1,500 rpm	
			When engine coolant temperature is 0°C	1,150 - 1,250 rpm	
			When engine coolant temperature is 20°C	1,000 - 1,200 rpm	
			When engine coolant temperature is 40°C	750 - 950 rpm	
			When engine coolant temperature is 80°C	550 - 850 rpm	
25	Barometric pressure sensor	Ignition switch: ON	At altitude of 0 m At altitude of 600 m At altitude of 1,200 m At altitude of 1,800 m	101 kPa 95 kPa 88 kPa 81 kPa	Code No. 25 13J-20
26	Idle position switch	Ignition switch: ON check by operating accelerator pedal repeatedly	Throttle valve: Set to idle position Throttle valve: Slightly open	ON OFF <sup>★2</sup>	Procedure No.25 13J-52
27	Power steering fluid pressure switch	Engine: Idling	Steering wheel stationary Steering wheel turning	OFF ON	Procedure No.31 13J-58
28	A/C switch	Engine: Idling (when A/C switch is ON, A/C compressor should be operating.)	A/C switch: OFF A/C switch: ON	OFF ON	Procedure No.32 13J-58
29	Inhibitor switch <A/T>	Ignition switch: ON	P or N D, 2, L or R	P or N D, 2, L or R	Procedure No. 24 13J-51
33	Electrical load switch	All accessories : OFF	Lighting switch only: OFF → ON	OFF → ON	Procedure No.35 13J-60

→  
↑  
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<Incorrect>

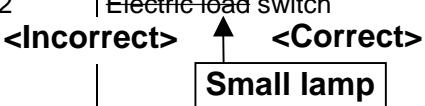
31 <Correct>

Small lamp

<Correct>

Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
34	Air flow sensor reset signal	Engine: After having warmed up	engine is idling	ON	Code No. 12	13J-13
			3,000 r/min	OFF		
37	Volumetric efficiency	<ul style="list-style-type: none"> <li>• Engine coolant temperature: 80-95°C</li> <li>• Lights, electric cooling fan and accessories: OFF</li> <li>• Transmission: Neutral (A/T: P range)</li> </ul>	Engine is idling	15 - 35%	-	-
			2,500 r/min	15 - 35%		
			Engine is suddenly raced	volumetric efficiency increases in response to racing		
38	Crank angle sensor	<ul style="list-style-type: none"> <li>• Engine: Cranking [reading is possible at 2,000 r/min or less]</li> <li>• Tachometer: Connected</li> </ul>		Engine speeds displayed on the MUT-II and tachometer are identical.	-	-

**<Added>**

Terminal No.	Check item	Check condition (Engine condition)		Normal condition
36	Engine warning lamp	Ignition switch: OFF → ON		0 - 0.1 V → System voltage (after several seconds have passed)
37	Power steering fluid pressure switch	Steering wheel: Neutral position		System voltage
		Steering wheel: Turned		0 - 0.1 V
38	Control relay	Ignition switch: ON		0 - 1 V
		Ignition switch: OFF		System voltage
42	Brake vacuum sensor	Engine: Accelerator pedal is suddenly depressed while the engine is idling after having warmed up.		Voltage drops slightly
45	A/C switch	Engine: Idling	A/C switch: OFF	0 - 0.1 V
			A/C switch: ON	System voltage
51	Injector open circuit check	Engine Idling		0 ↔ 5 V (changes repeatedly)
52	Electric load switch  	Engine Idling	Turn off the lighting switch	0 - 3 V
			Turn on the lighting switch	System voltage
54	Fan motor relay (HI)	Radiator fan is not operating (Engine coolant temperature is 90°C or less)		System voltage
		Radiator fan is operating (Engine coolant temperature is 105°C or more)		0 - 3 V
56	Diagnosis control terminal	-		-
62	Diagnosis output terminal	Ignition switch: ON At normal condition (no diagnosis output)		4 - 5 V
57	Purge control solenoid valve	Ignition switch: ON	Engine: Stopped	System voltage
			Engine: Running at 2,500 r/min after having warmed up	0 - 3 V
58	Tachometer	Engine: Cranking		0 ↔ 5 V (changes repeatedly)
60	Oxygen sensor heater control	Ignition switch: ON	Engine: Stopped	System voltage
			Engine: After starting	0 - 0.5 V
76	Oxygen sensor	Engine: Running at 2,500 r/min after having warmed up		0 ↔ 1 V (changes repeatedly)

## BASIC IDLE SPEED ADJUSTMENT

### NOTE

- (1) The standard idling speed has been adjusted by the speed adjusting screw (SAS) by the manufacturer, and there should usually be no need for readjustment.
- (2) If the adjustment has been changed by mistake, the idle speed may become too high or the idle speed may drop too low when loads from components such as the A/C are placed on the engine. If this occurs, adjust by the following procedure.
- (3) The adjustment, if made, should be made after first confirming that the spark plugs, the injectors, the idle speed control servo, the compression pressure, etc., are all normal.

1. Before inspection and adjustment, set the vehicle to the pre-inspection condition.
2. Connect the MUT-II to the diagnosis connector (16-pin).

### NOTE

When the MUT-II is connected, the diagnosis control terminal should be earthed.

3. Start the engine and run at idle.
4. Select the item No.30 of the MUT-II Actuator test.

### NOTE

This holds the ISC servo at the basic step to adjust the basic idle speed.

5. Check the idle speed.

### Standard value:

$750 \pm 50$  r/min

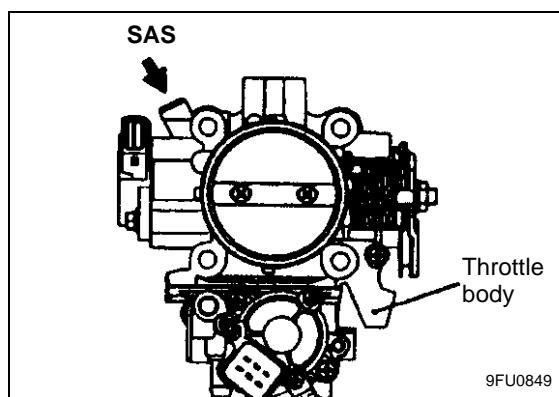
### NOTE

- (1) The engine speed may be 20 to 100 r/min lower than indicated above for a new vehicle [driven approximately 500 km or less], but no adjustment is necessary.
- (2) If the engine stalls or the engine speed is low even though the vehicle has been driven approximately 500 km or more, it is probable that deposits are adhered to the throttle valve, so clean it. (Refer to P.13J-84.)

6. If not within the standard value range, turn the speed adjusting screw (SAS) to make the necessary adjustment.

### NOTE <Incorrect>

If the idling speed is higher than the standard value range even when the SAS is fully closed, check whether or not there is any indication that the fixed SAS has been moved. If there is any indication that it has been moved, adjust the fixed SAS.



<Correct>

- (1) When the SAS is turned for adjustment, use a screwdriver 30 mm or less in overall height.
- (2) If the idling speed is higher than the standard value range even when the SAS is fully closed, check whether or not there is any indication that the fixed SAS has been moved. If there is any indication that it has been moved, adjust the fixed SAS.