

FUEL AND EMISSION CONTROL SYSTEMS (FUEL INJECTION FE DOHC)

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4B OUTLINE

OUTLINE

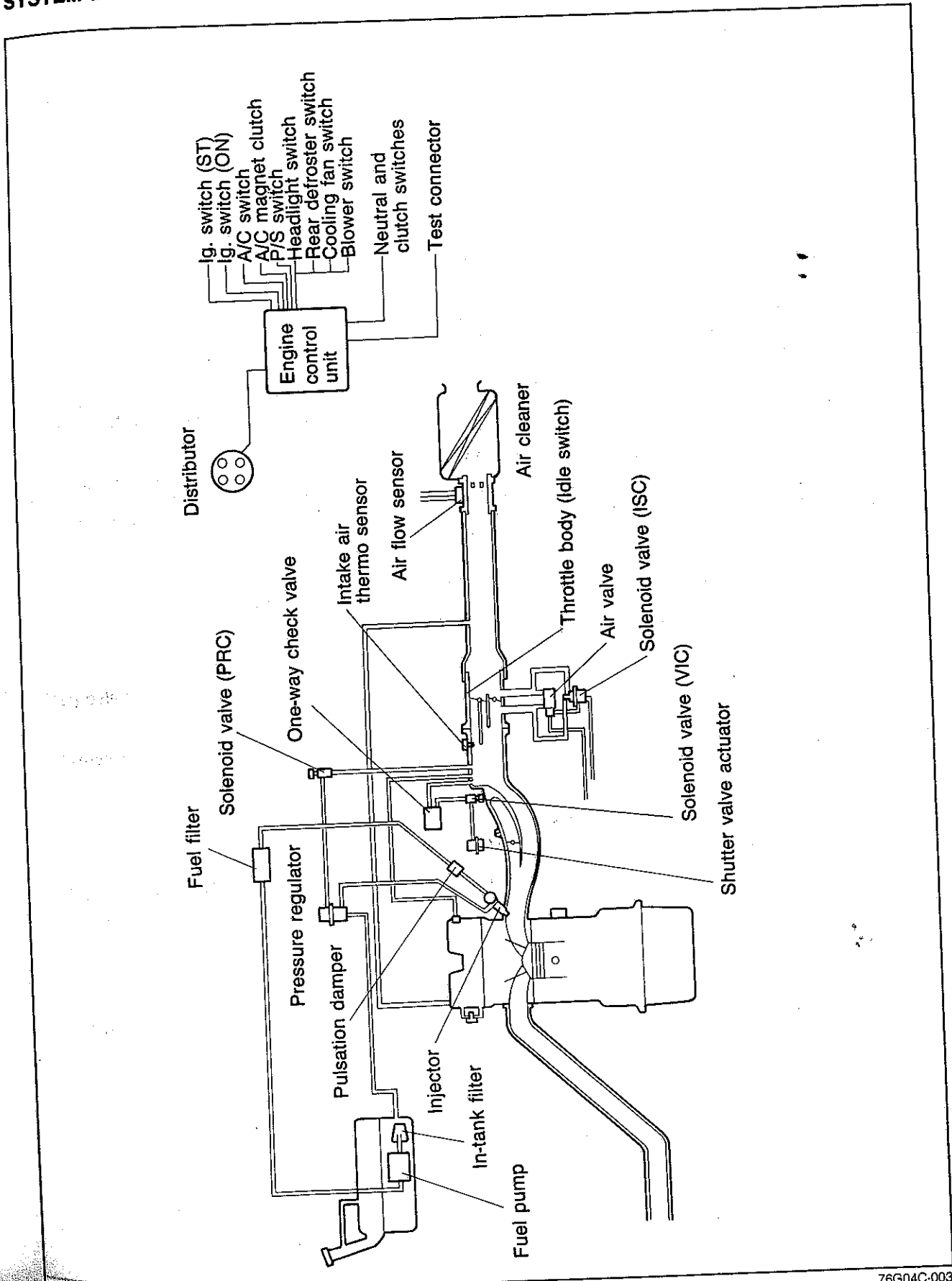
COMPONENT APPLICATION

Item		New	Previous	Remark
AIR INTAKE SYSTEM	Air flow sensor	○	○	Improved intake air amount measurement
	Dynamic chamber	○	○	
	Throttle body	○	○	New: 2 throttle valves Previous: 1 throttle valve
	Throttle sensor	X	○	Previous: Combined type
	Idle switch	○	○	
	Idle speed control (ISC) valve	○	X	Improved idle smoothness
	Air valve	○	○	New: Thermo wax type Previous: Bimetal type
	Resonance chamber	○	X	Minimized intake air noise
	Idle-up solenoid valve	X	○	System simplified (replaced by ISC valve)
	Dashpot	X	○ (MTX)	System simplified
	Secondary air injection	X	○	System simplified
FUEL SYSTEM	Pressure regulator control	○	X	
	Injector	○	○	Injection amount increased
CONTROL SYSTEM	Fuel injection pattern	Sequential injection (once per two revolutions)	1-group injection (once per two revolutions)	Improved engine response
	Fuel cut operation (Overspeed)	○	○	
ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM		○	X	Improved engine performance
KNOCK CONTROL SYSTEM		○	X	—
EVAPORATIVE EMISSION CONTROL SYSTEM	Separator	○	X	Improved product quality
	Two-way check valve	○	○	—
FAIL-SAFE CONTROL SYSTEM		○	○	Diagnosis function for output devices
MONITOR SWITCH FUNCTION		○	X	Improved serviceability

76F04C-999

○: Equipped
X: Not equipped

SYSTEM DIAGRAM

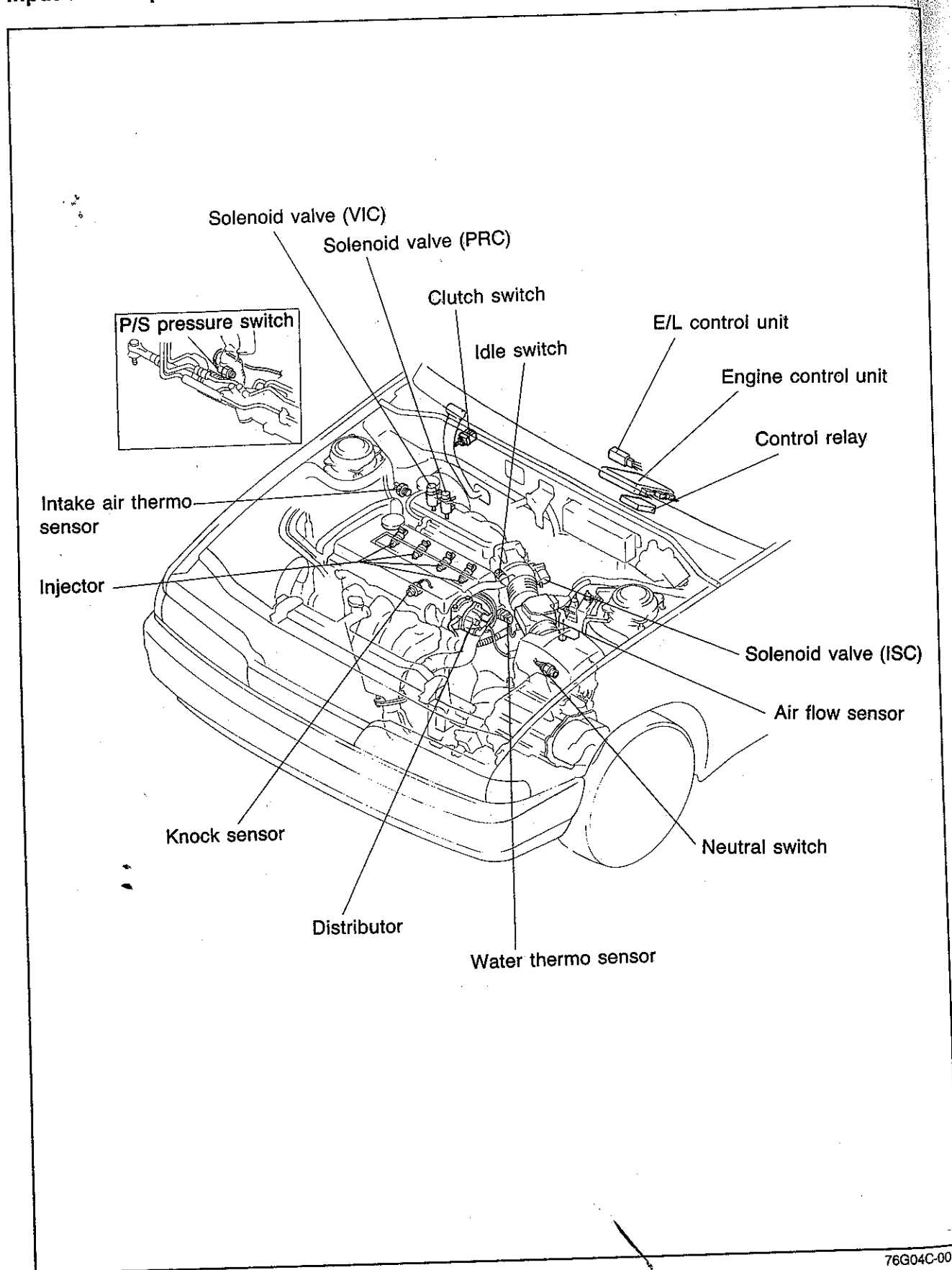


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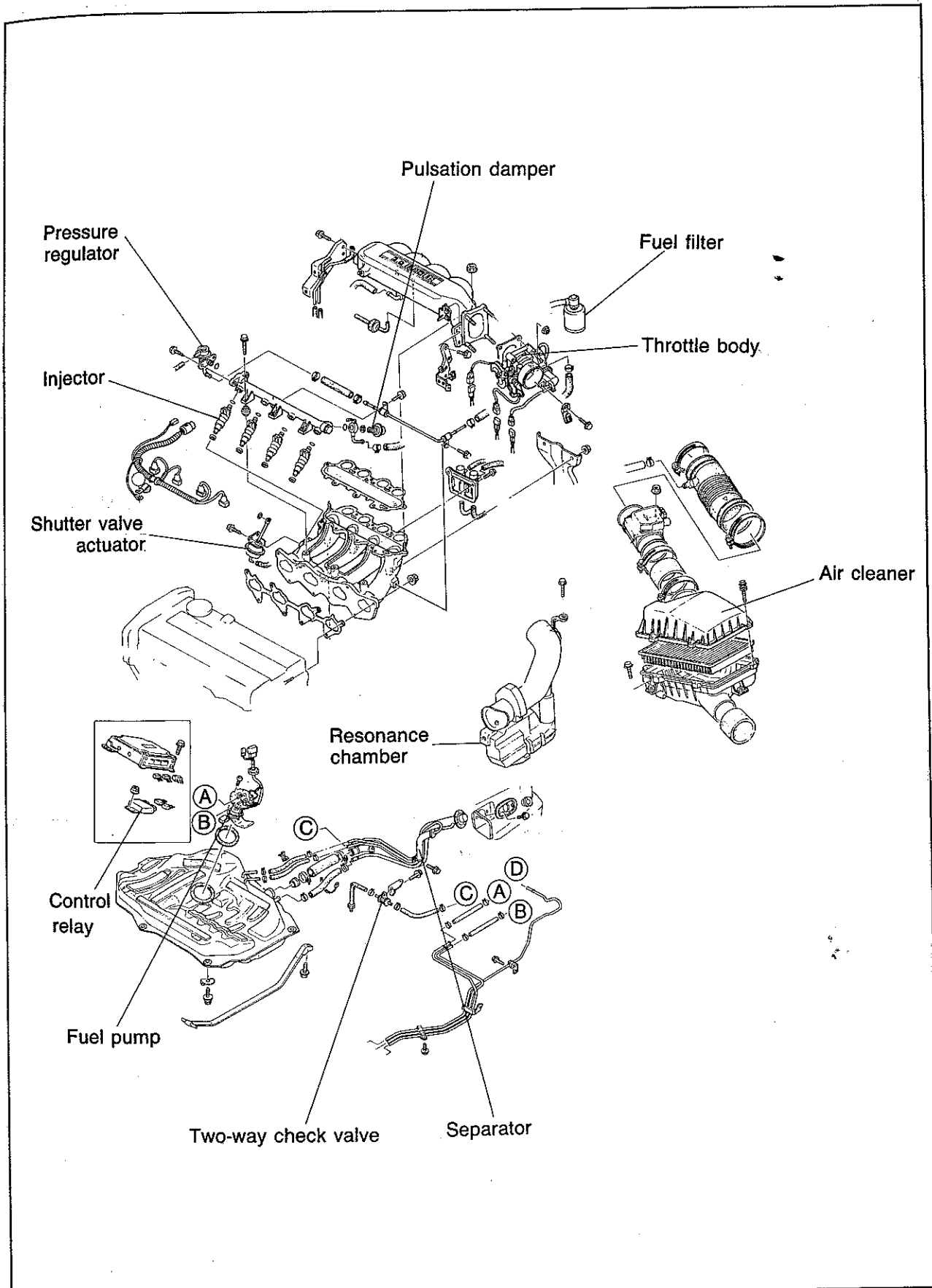
4B OUTLINE

COMPONENT LOCATION Input and Output Devices



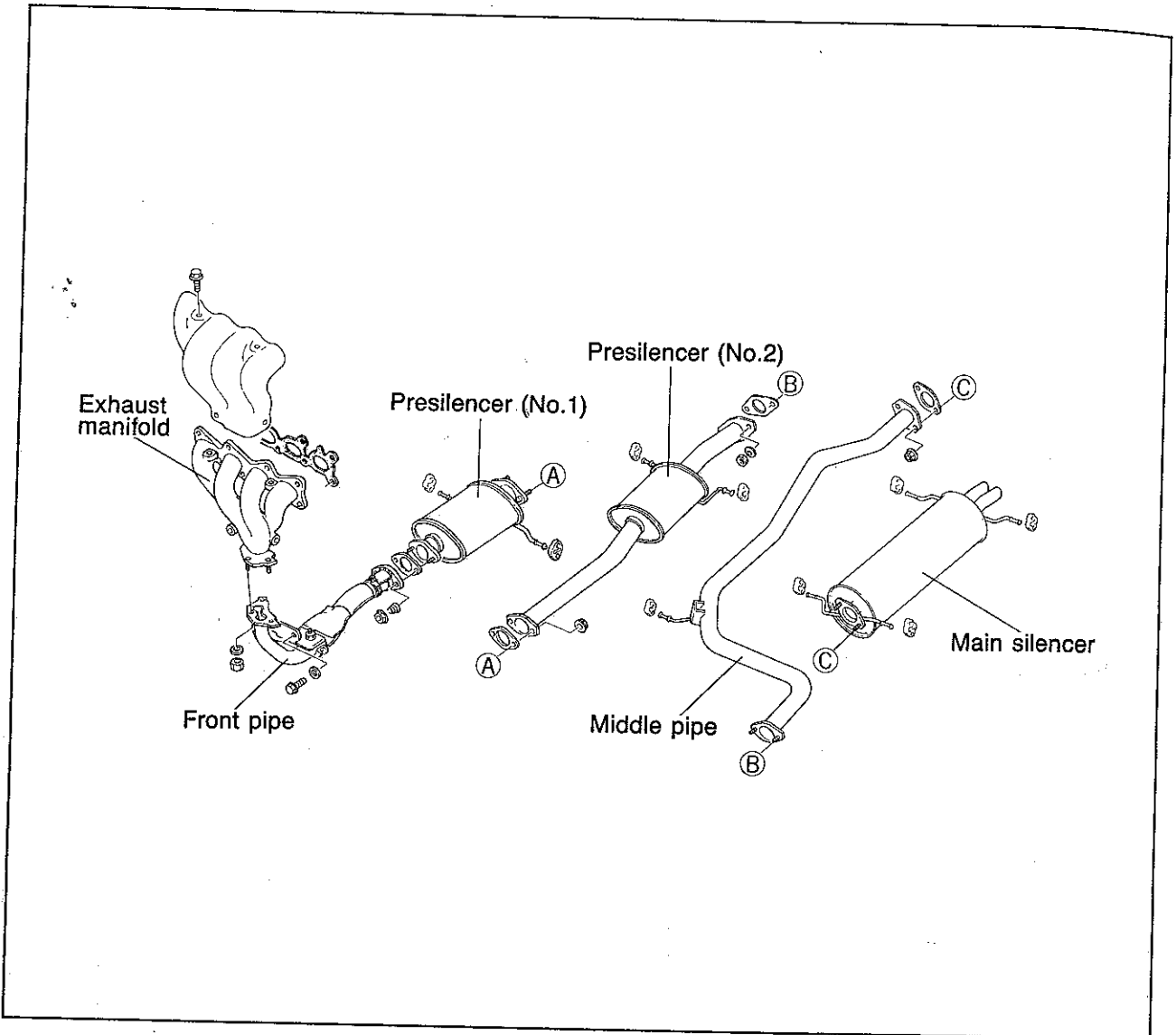
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Fuel System



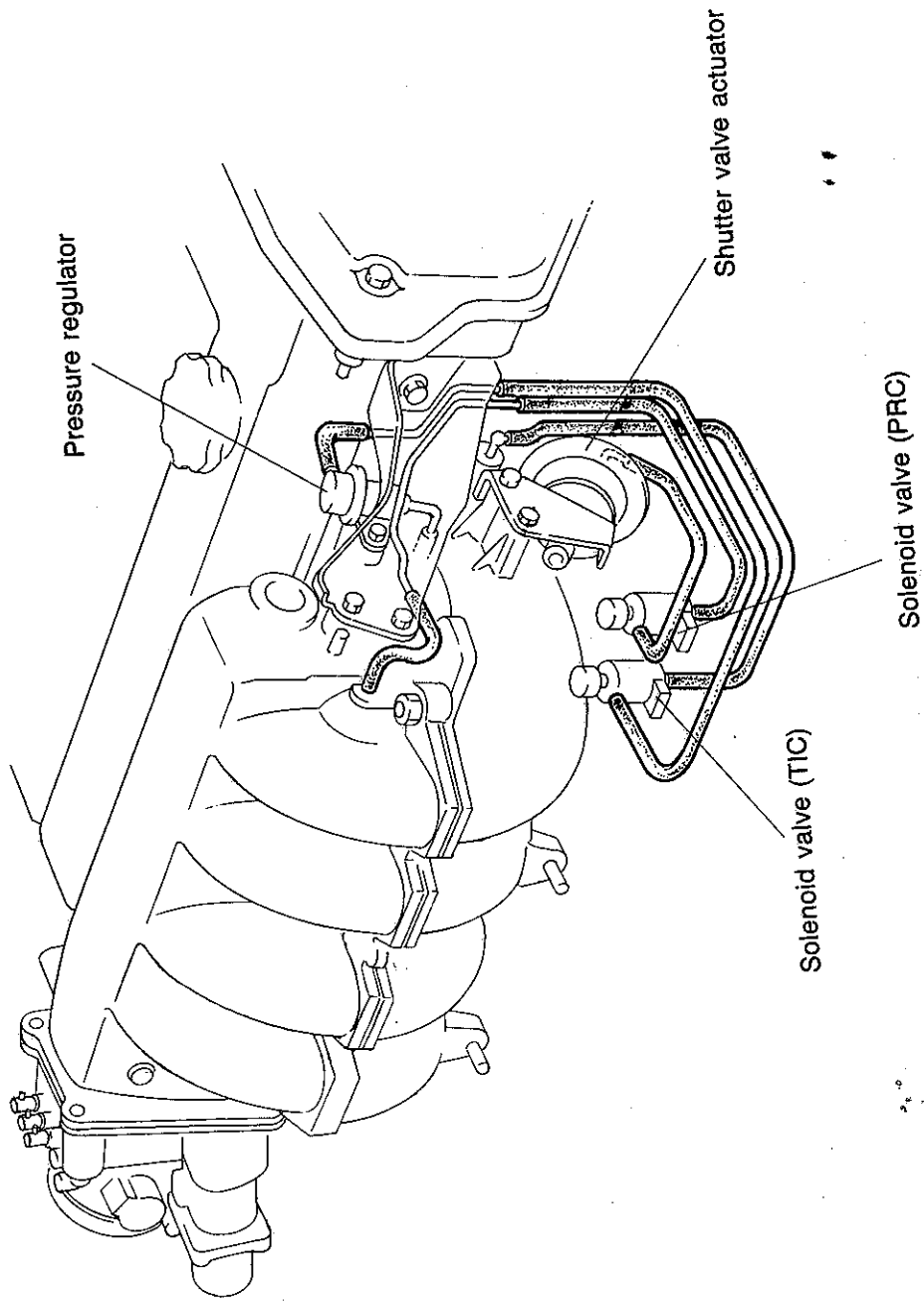
4B OUTLINE

Exhaust System



76G04C-006

VACUUM HOSE ROUTING DIAGRAM



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76G04C-006

76G04C-007

4B OUTLINE

SPECIFICATIONS

Item		Specification
Idle speed	rpm	With test connector grounded 750 ± 50
Throttle body		
Type		Horizontal draft (2-barrel)
Throat diameter	mm (in)	No. 1
		No. 2
Fuel pump		
Type		Impeller (in-tank)
Output pressure	kPa (kg/cm ² , psi)	441—588 (4.5—6.0, 64—85)
Feeding capacity	cc (cu in)/10 sec.	220 (13.4) min.
Fuel filter		
Type	Low pressure side	Nylon element
	High pressure side	Paper element
Pressure regulator		
Type		Diaphragm
Regulating pressure	kPa (kg/cm ² , psi)	235—275 (2.4—2.8, 34—40)
Injector		
Type		High-ohmic
Type of drive		Voltage
Resistance	Ω	12—16
Injection amount	cc (cu in)/15 sec.	66—91 (4.03—5.55)
Idle speed control valve		
Solenoid resistance	Ω	6.3—9.9
Fuel tank		
Capacity	liters (US gal, Imp gal)	60 (15.9, 13.2)
Air cleaner		
Element type		Dry
Fuel		
Specification		Leaded or unleaded premium

76F04B-002

TROUBLESHOOTING GUIDE

This troubleshooting guide shows the malfunction code numbers and the symptoms of various failures. Perform troubleshooting as described below.

Possible cause		Input sensors and switches					Output solenoid valve					
		Ne signal	G signal	Knock sensor	Air flow sensor	Water thermo sensor	Intake air thermo sensor (Dynamic chamber)	Solenoid valve (Pressure regulator control)	Solenoid valve (Idle speed control)	Solenoid valve (Variable inertia charging system)		
Symptom and No.		4B—16	4B—16	4B—17	4B—17	4B—18	4B—19	4B—21	4B—23	4B—21		
1	Fault Indicated by SST Code No.	02	03	05	08	09	11	25	34	41		
2	Hard start or won't start (Crank OK)	<div style="text-align: center;">TROUBLESHOOTING PROCEDURE</div> <p>Note Code No. is to quickly determine which system or unit may be at fault by use of the SST. (Self-Diagnosis Checker 49 H018 9A1 or Digital Code Checker 49 G018 9A0 with Adaptor harness 49 9200 180)</p> <p>1st: Check input sensors and output solenoid valves with the SST. (Refer to page 4B—11.)</p> <p>2nd: Check other switches with the SST. (Refer to page 4B—22.)</p> <p>3rd: Check the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Electrical system</p> <ol style="list-style-type: none"> 1) Battery condition 2) Fuses <p>Fuel system</p> <ol style="list-style-type: none"> 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded) <p>Engine</p> <ol style="list-style-type: none"> 1) Compression 2) Overheating </td> <td style="width: 50%; vertical-align: top;"> <p>Ignition system</p> <ol style="list-style-type: none"> 1) Ignition spark 2) Ignition timing (with test connector grounded) <p>Intake air system</p> <ol style="list-style-type: none"> 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable <p>Others</p> <ol style="list-style-type: none"> 1) Clutch slippage 2) Brake dragging </td> </tr> </table> <p>4th: Check Fuel and Emission Control Systems. (Refer to page 4B—10.)</p>									<p>Electrical system</p> <ol style="list-style-type: none"> 1) Battery condition 2) Fuses <p>Fuel system</p> <ol style="list-style-type: none"> 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded) <p>Engine</p> <ol style="list-style-type: none"> 1) Compression 2) Overheating 	<p>Ignition system</p> <ol style="list-style-type: none"> 1) Ignition spark 2) Ignition timing (with test connector grounded) <p>Intake air system</p> <ol style="list-style-type: none"> 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable <p>Others</p> <ol style="list-style-type: none"> 1) Clutch slippage 2) Brake dragging
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3	Engine stalls										During warm up	After warm up
4	Rough idle										During warm up	After warm up
5	High idle speed after warm up											
6	Poor acceleration, hesitation, or lack of power											
7	Runs rough on deceleration											
8	Afterburn in exhaust system											
9	Poor fuel economy											
10	Engine stalls or runs rough after hot starting											
11	Knocking											
12	Fails emission test											

76F04B-003

4B TROUBLESHOOTING GUIDE

The Troubleshooting Guide lists the systems most likely to cause a given symptom. After finding which system(s) to check, refer to the pages shown for detailed guides.

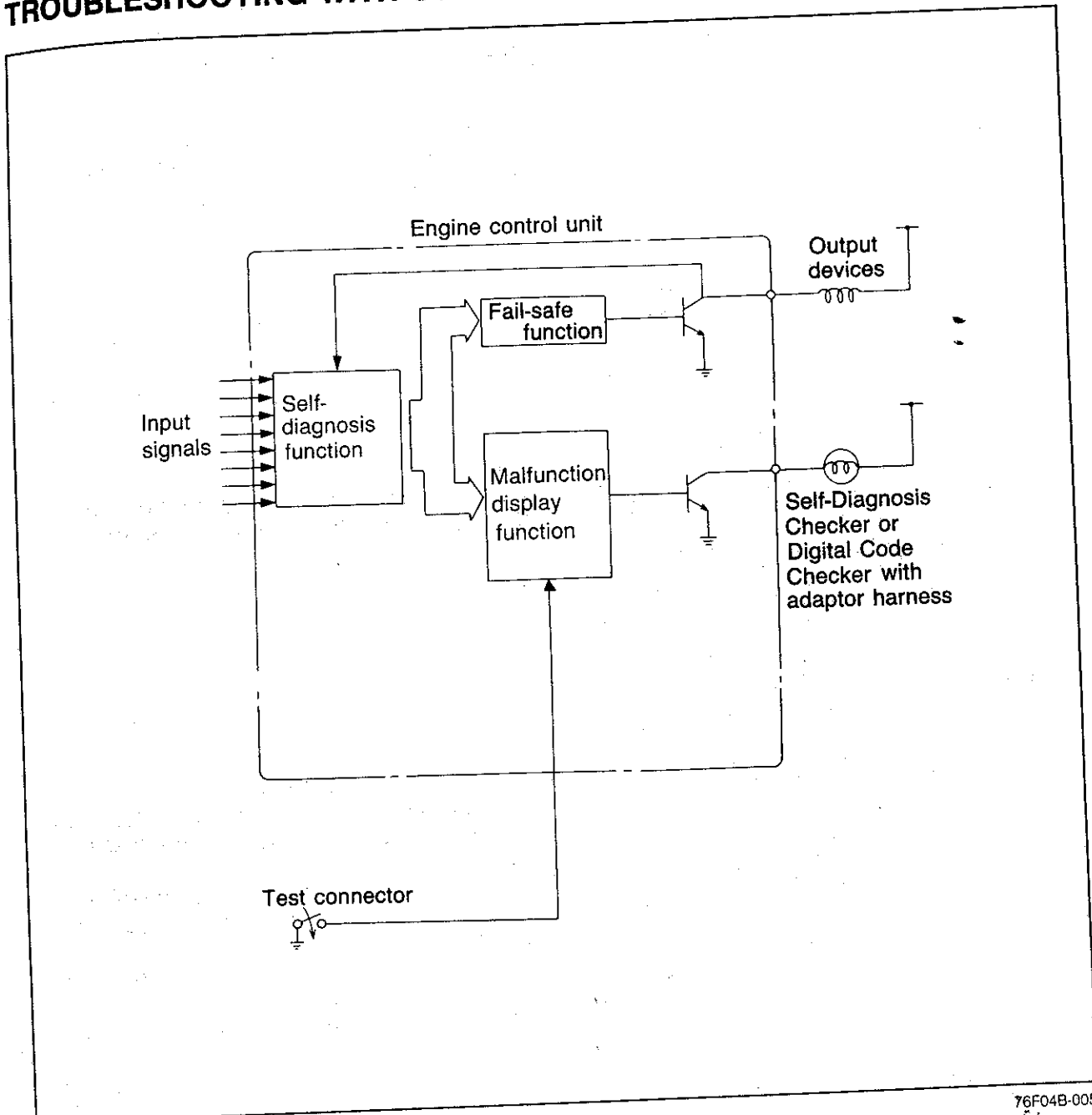
Symptom No.	System	INTAKE AIR SYSTEM	FUEL SYSTEM	PRESSURE REGULATOR CONTROL (PRC) SYSTEM	IDLE SPEED CONTROL (ISC) SYSTEM	ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM	POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	DECELERATION CONTROL SYSTEM	EXHAUST SYSTEM	VARIABLE INERTIA CONTROL (VIC) SYSTEM
	Page	4B-27	4B-45	4B-63	4B-40	4B-70	4B-73	4B-67	4B-74	4B-35
2	3	2	—	—	1	—	—	—	—	—
3	3	2	—	1	—	—	—	—	—	—
	4	3	—	2	—	1	—	—	—	—
4	4	3	—	1	—	2	—	—	—	—
	4	3	—	2	—	1	—	—	—	—
5	2	3	—	1	—	—	—	—	—	—
6	1	2	—	—	—	—	—	4	3	—
7	4	3	—	2	—	—	1	—	—	—
8	3	4	—	1	—	—	2	—	—	—
9	—	2	—	—	—	—	1	3	4	—
10	—	2	1	—	—	—	—	—	—	—
11	—	—	—	—	1	—	—	—	—	—
12	4	5	—	3	—	—	2	1	—	—

76F04B-004

The numbers of the list show the priorities of inspections, from the most possible system to that with the lowest possibility.

These were determined on the following basis:

- Ease of inspection
- Most possible system
- Most possible point in system

TROUBLESHOOTING WITH SST

76F04B-005

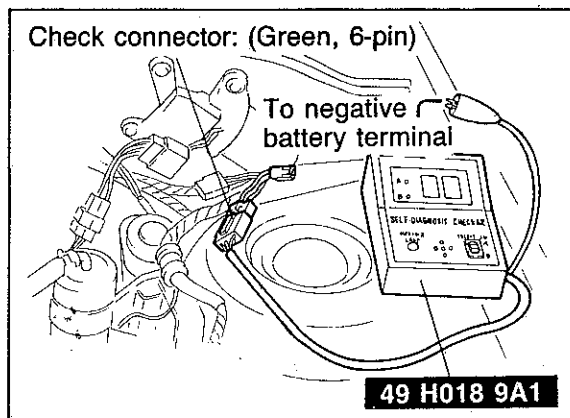
When troubles occur in the main input devices or output devices, check for the cause with the **SST (Self-Diagnosis Checker 49 H018 9A1 or Digital Code Checker 49 G018 9A0 with Adaptor harness 49 9200 180)**.

Failure of individual input and output devices is indicated and retrieved from the control unit as malfunction code numbers.

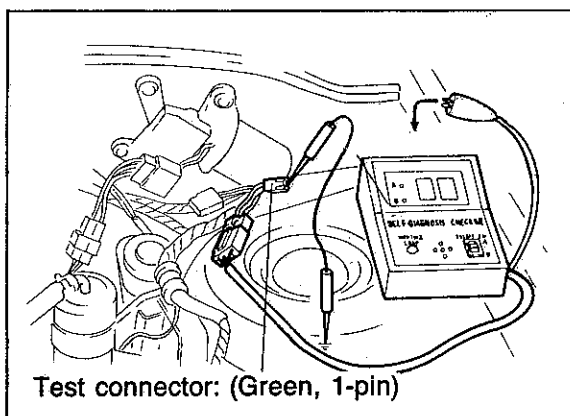
Note

The control unit constantly checks for malfunction of the input devices. But, the control unit checks for malfunction of output devices only in a 3 second period after the ignition switch is turned ON and with the test connector grounded.

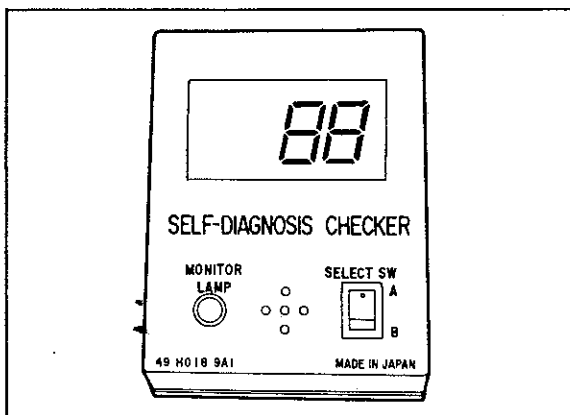
4B TROUBLESHOOTING WITH SST



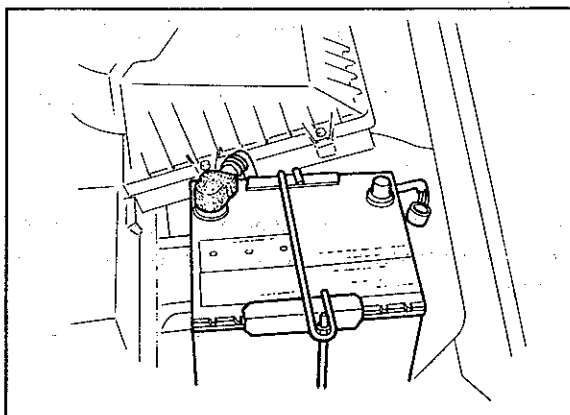
86U04A-011



86U04A-012



76F04B-006



76F04B-007

INSPECTION PROCEDURE

1. Connect the **SST** to the check connector. (Green, 6-pin) and the negative battery terminal.
2. Set the select switch to position A.

Note

The check connector is located at the rear of the left side wheel housing.

3. Ground the test connector (Green, 1-pin) with a jumper wire.

Note

The test connector is located near the Self-Diagnosis Checker check connector.

4. Turn the ignition switch ON.
5. Verify that **88** flashes on the digital display and that the buzzer sounds for **three seconds** after turning the ignition switch ON.
6. If **88** does not flash, check the control relay (refer to page 4B—78), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds** check the check connector wiring, or replace the engine control unit and perform steps 3 and 4 again.
8. Note the code numbers and check for the causes by referring to the check sequences shown on pages **4B—16 to 4B—21**. Repair as necessary.

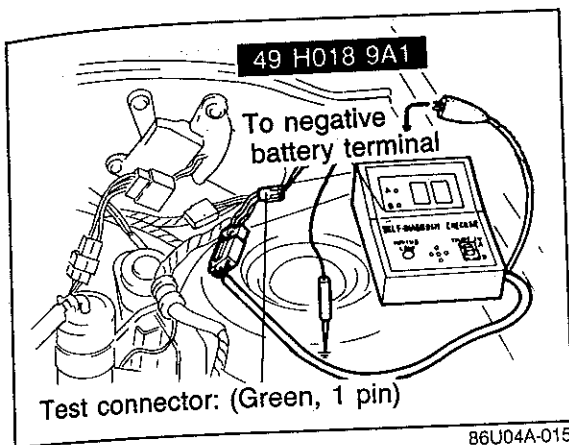
Note

Cancel the code numbers by performing the after-repair procedure after repairing.

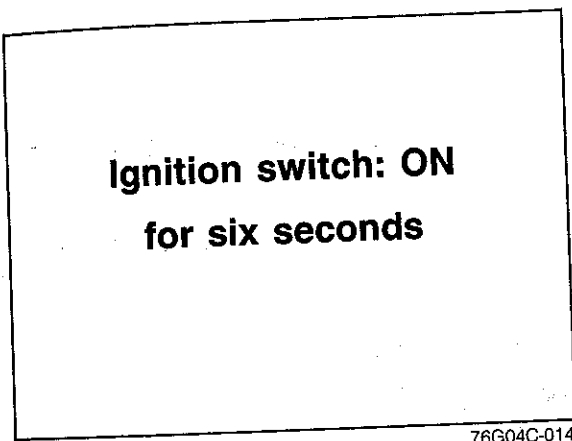
AFTER-REPAIR PROCEDURE

1. Cancel the memory of malfunctions by disconnecting the negative battery cable and depressing the brake pedal for at least **five** seconds.

TROUBLESHOOTING WITH SST 4B



2. Connect the **SST** to the check connector.
3. Ground the test connector (Green, 1-pin) with a jumper wire.



4. Turn the ignition switch ON for **six seconds** (do not start the engine).
5. Start and warm up the engine, then run it at **2,000 rpm** for **two minutes**.
6. Verify that no code numbers are displayed.

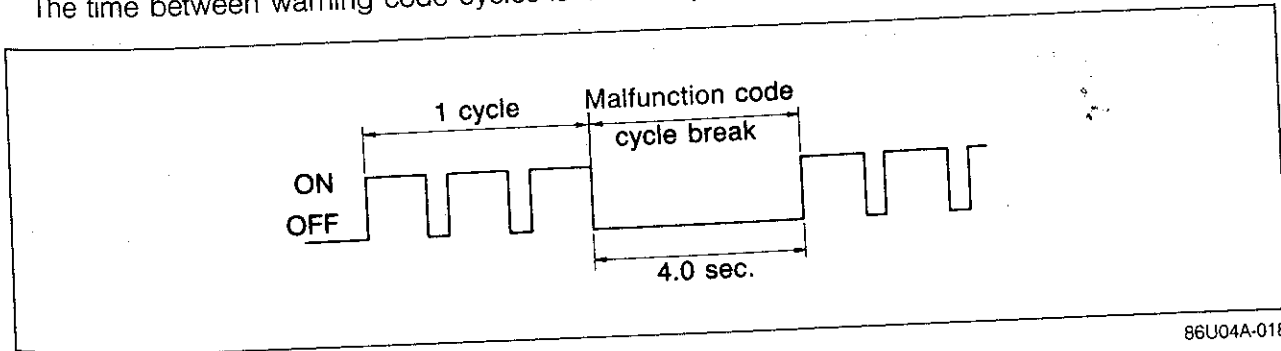
PRINCIPLE OF CODE CYCLE

Malfunction codes are determined as shown below.

86U04A-017

1. Code cycle break

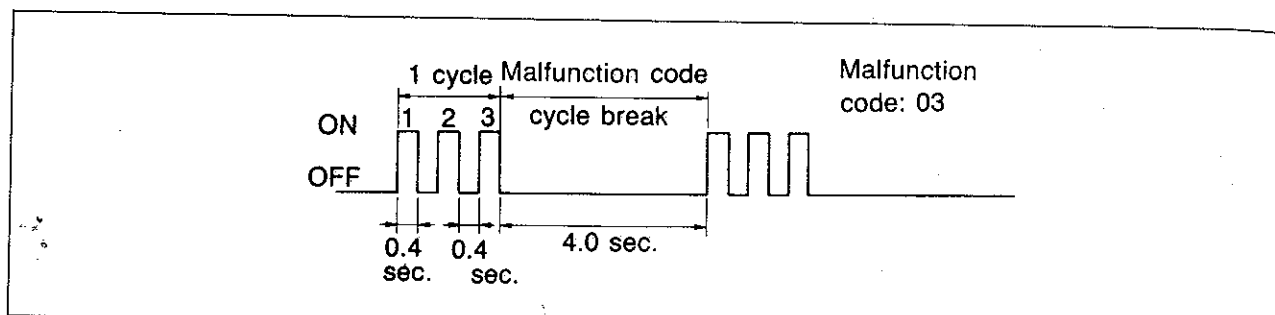
The time between warning code cycles is 4.0 sec (the time the light is off).



4B TROUBLESHOOTING WITH SST

2. Second digit of malfunction code (ones position)

The digit in the ones position of the malfunction code represents the number of times the buzzer is on 0.4 sec during one cycle.

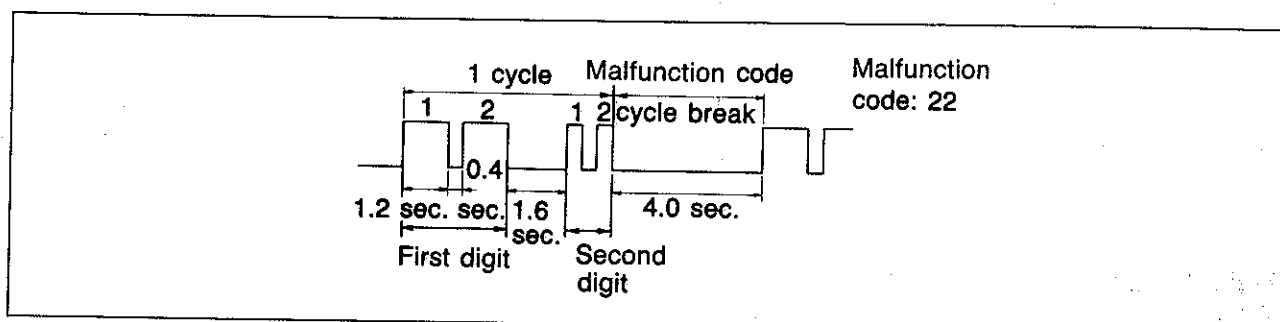


76G04C-015

3. First digit of malfunction code (tens position)

The digit in the tens position of the malfunction code represents the number of times the buzzer is on 1.2 sec during one cycle.

It should also be noted that the light goes off for 1.6 sec. between the long and short pulses of the buzzer.








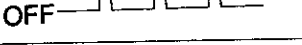

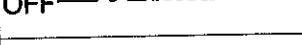

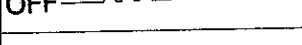
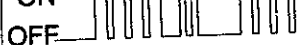
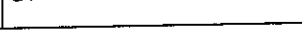
76G04C-016

CODE NUMBER

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Malfunction code no.	Malfunction code output signal pattern			
02	ON OFF	Ne signal	No Ne signal from crank angle sensor during cranking	—
03	ON OFF	G signal	No G signal	Cancels sequential injection
05	ON OFF	Knock sensor	Open or short circuit	<ul style="list-style-type: none"> Retards ignition timing 4°

76F04B-008

TROUBLESHOOTING WITH SST 4B

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Malfunction code no.	Malfunction code output signal pattern			
08	ON  OFF 	Air flow sensor	Open or short circuit	Maintains basic signal at preset value
09	ON  OFF 	Water thermo sensor	Open or short circuit	Maintains constant 35°C (95°F) command
11	ON  OFF 	Intake air thermo sensor (dynamic chamber)	Short circuit	Maintains constant 20°C (68°F) command
25	ON  OFF 	Solenoid valve (pressure regulator control)	Open or short circuit	—
34	ON  OFF 	Solenoid valve (idle speed control)		—
41	ON  OFF 	Solenoid valve (Variable inertia control)		—

76F04B-009

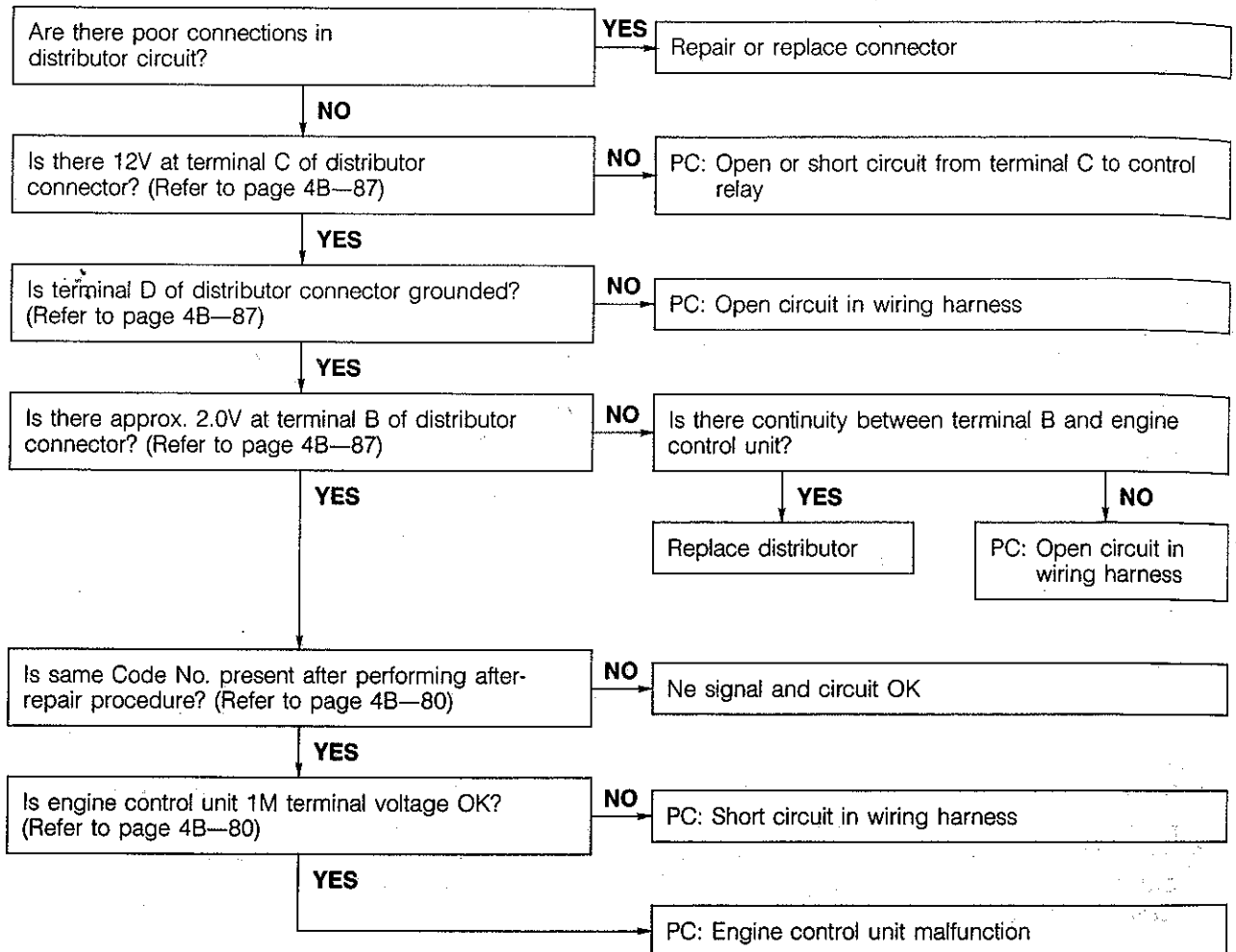
Caution

- a) If there is more than one failure present, the lowest number malfunction code is displayed first, the remaining codes are displayed sequentially.
- b) After repairing a failure, turn off the ignition switch disconnect the negative battery cable and depress the brake pedal for at least 5 seconds to erase the memory of a malfunction code.

4B TROUBLESHOOTING WITH SST

Code No.2 (Ne signal)

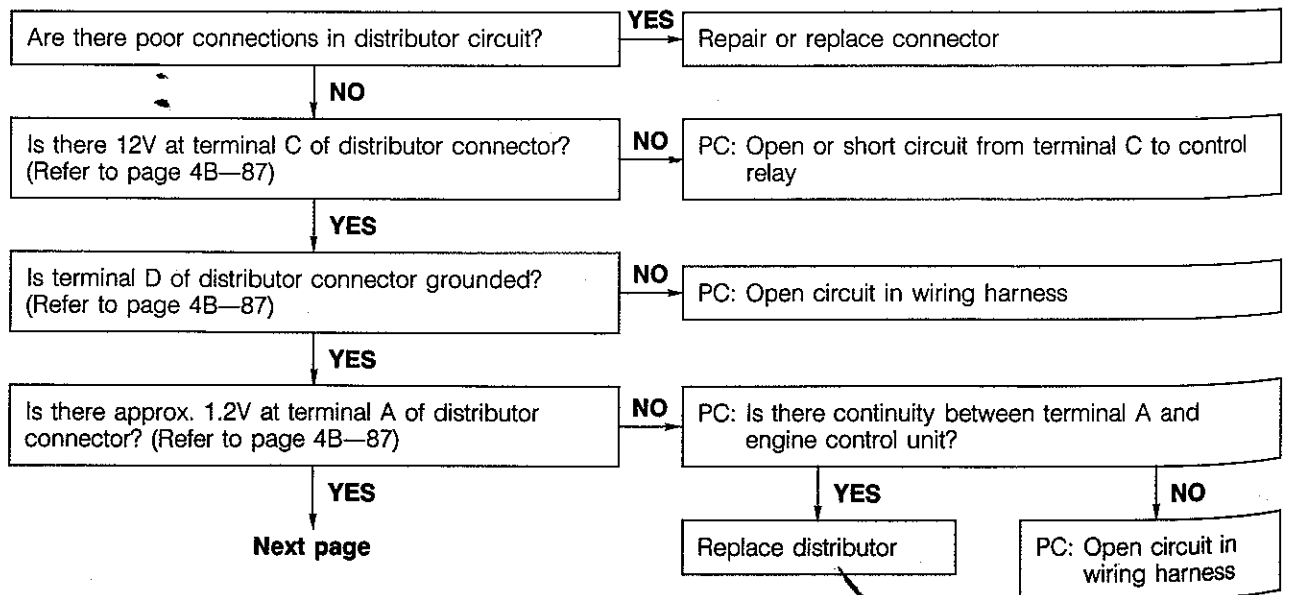
PC: Possible Cause

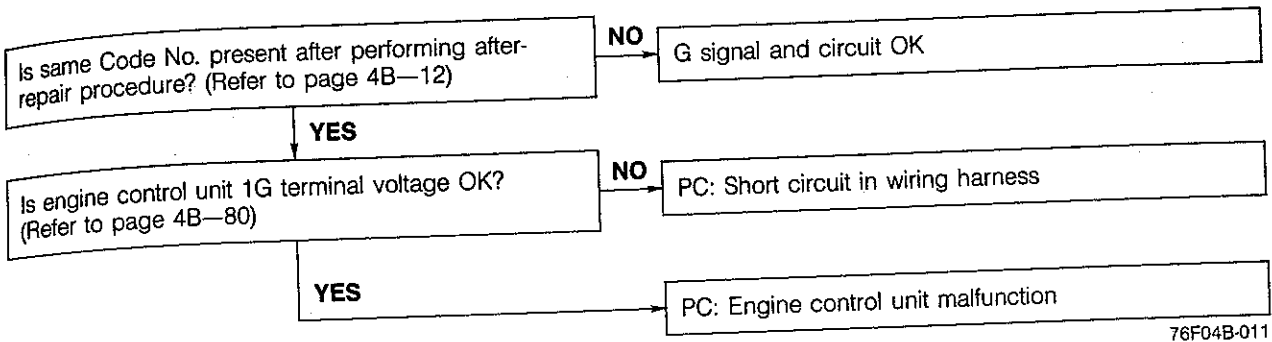


76F04B-010

Code No.3 (G signal)

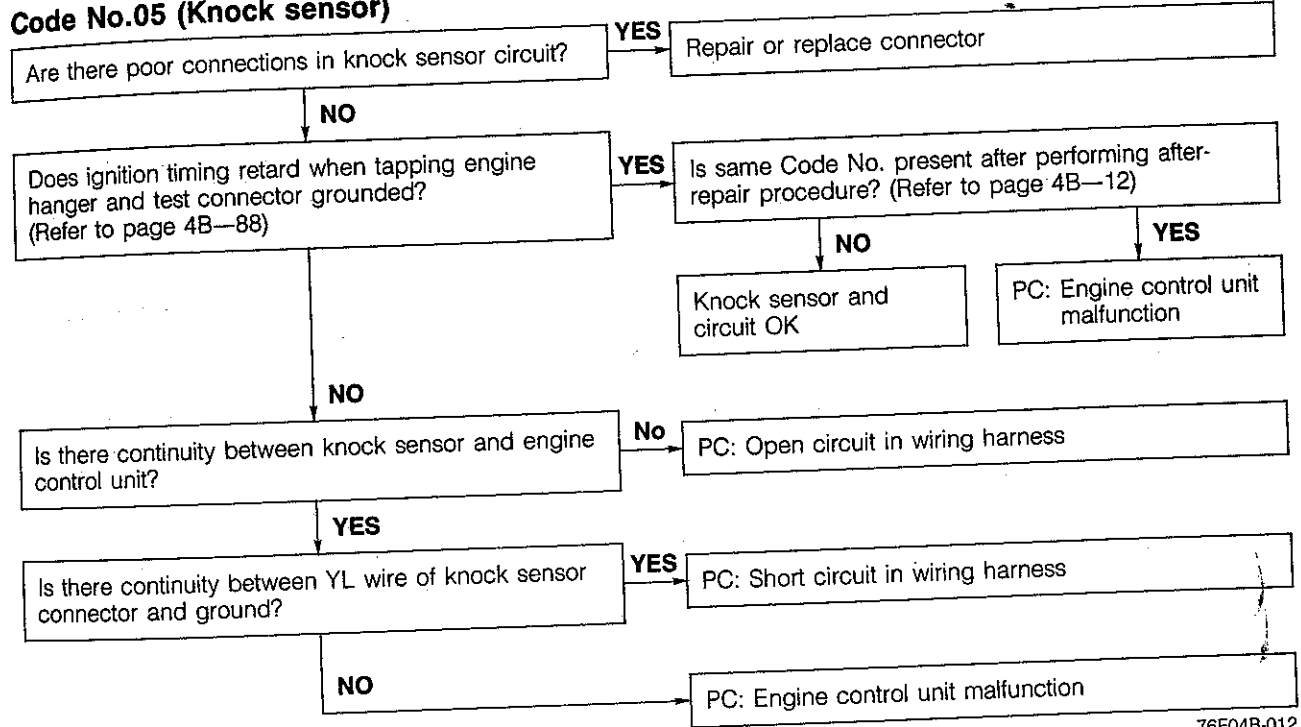
PC: Possible Cause





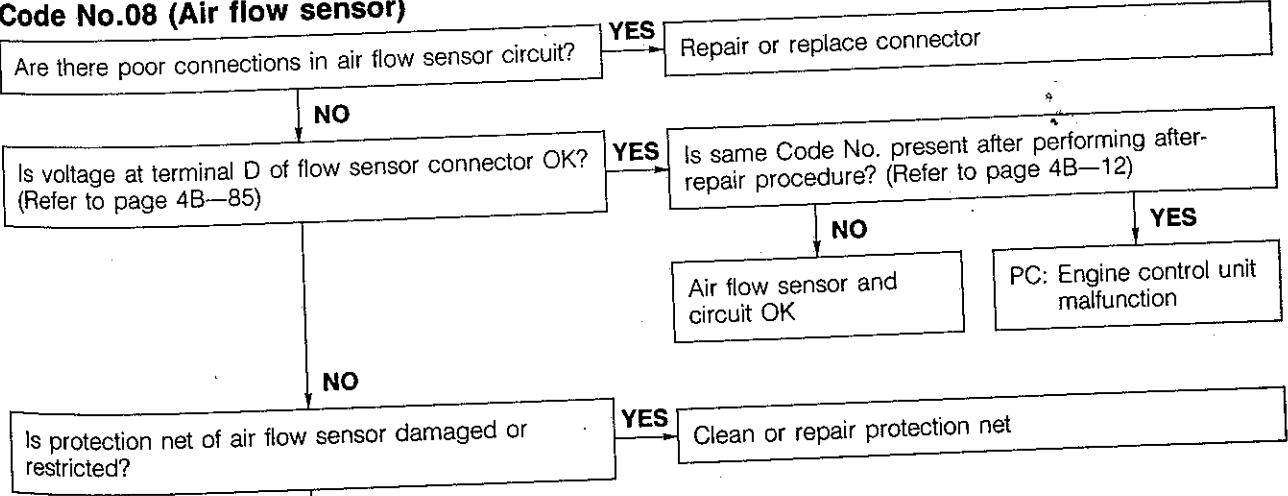
Code No.05 (Knock sensor)

PC: Possible Cause



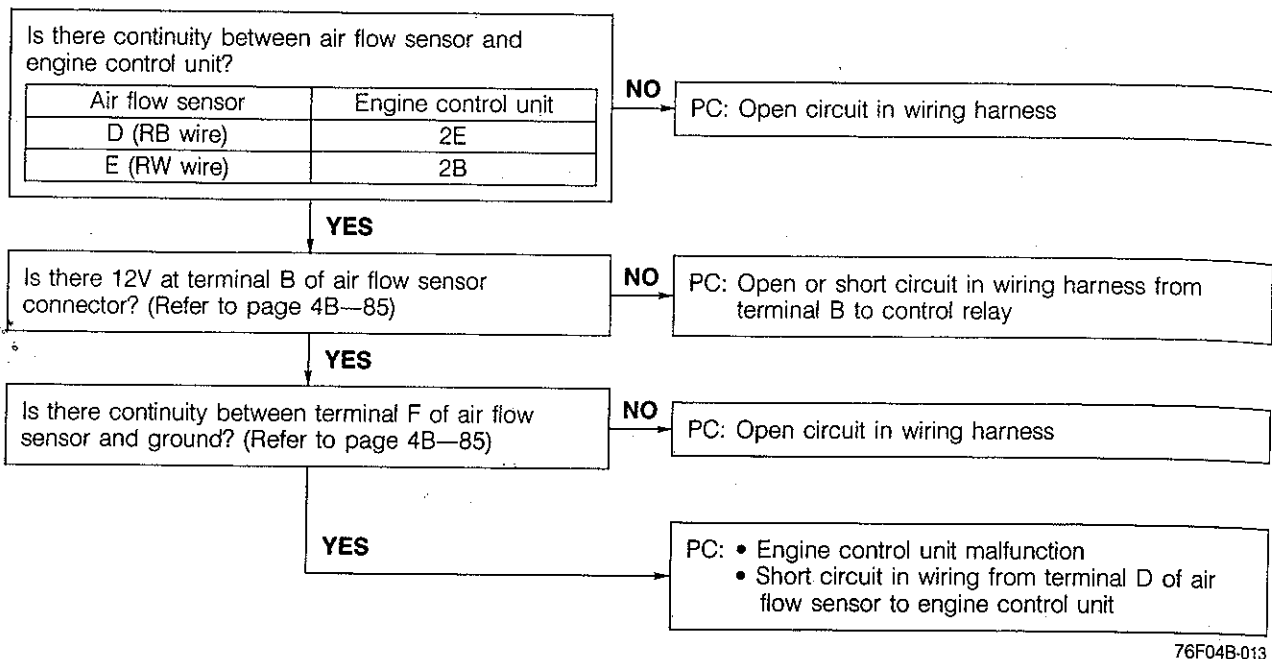
Code No.08 (Air flow sensor)

PC: Possible Cause



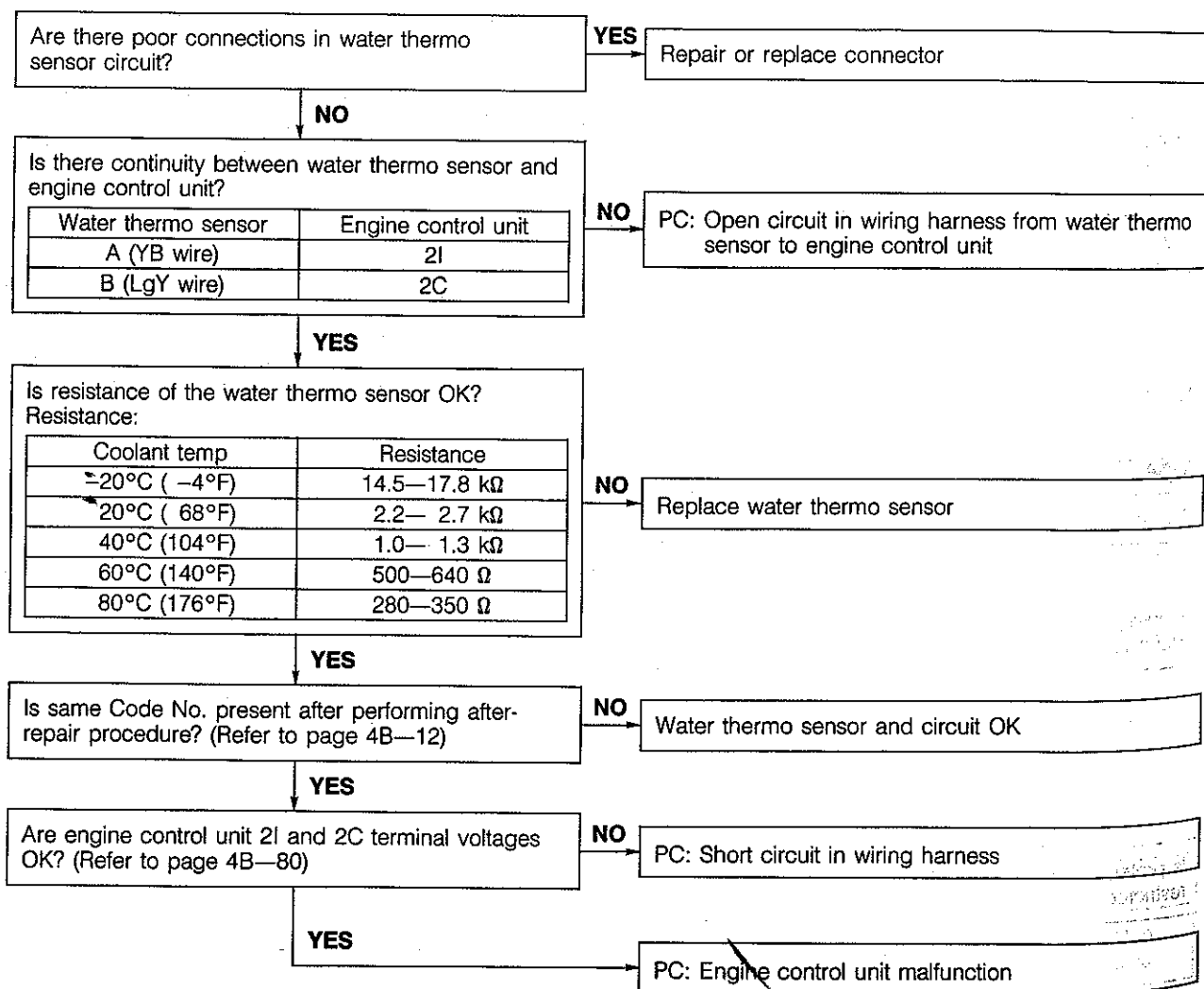
Next page

4B TROUBLESHOOTING WITH SST



Code No. 09 (Water thermo sensor)

PC: Possible Cause



No. 11 Code (Intake air thermo sensor)

PC: Possible Cause

Are there poor connections at intake air thermo sensor connectors?

YES

Repair or replace connector

NO

Is there continuity between intake air thermo sensor (dynamic chamber) and engine control unit?

Intake air thermo sensor (dynamic chamber)	Engine control unit
A (RC wire)	2J
B (LgY wire)	2C

NO

PC: Open circuit in wiring harness

YES

Is resistance of intake air thermo sensor (dynamic chamber) OK?
Resistance:

Temperature	Resistance
20°C (68°F)	29.7—36.3 kΩ
50°C (122°F)	8.4—10.2 kΩ
85°C (185°F)	2.5—3.1 kΩ

NO

Replace intake air thermo sensor (dynamic chamber)

YES

Is same Code No. present after performing after-repair procedure? (Refer to page 4B—12)

No

Intake air thermo sensor and circuit OK

Yes

Are engine control unit 2J and 2C terminal voltages OK? (Refer to page 4B—80)

NO

PC: Short circuit in wiring harness

YES

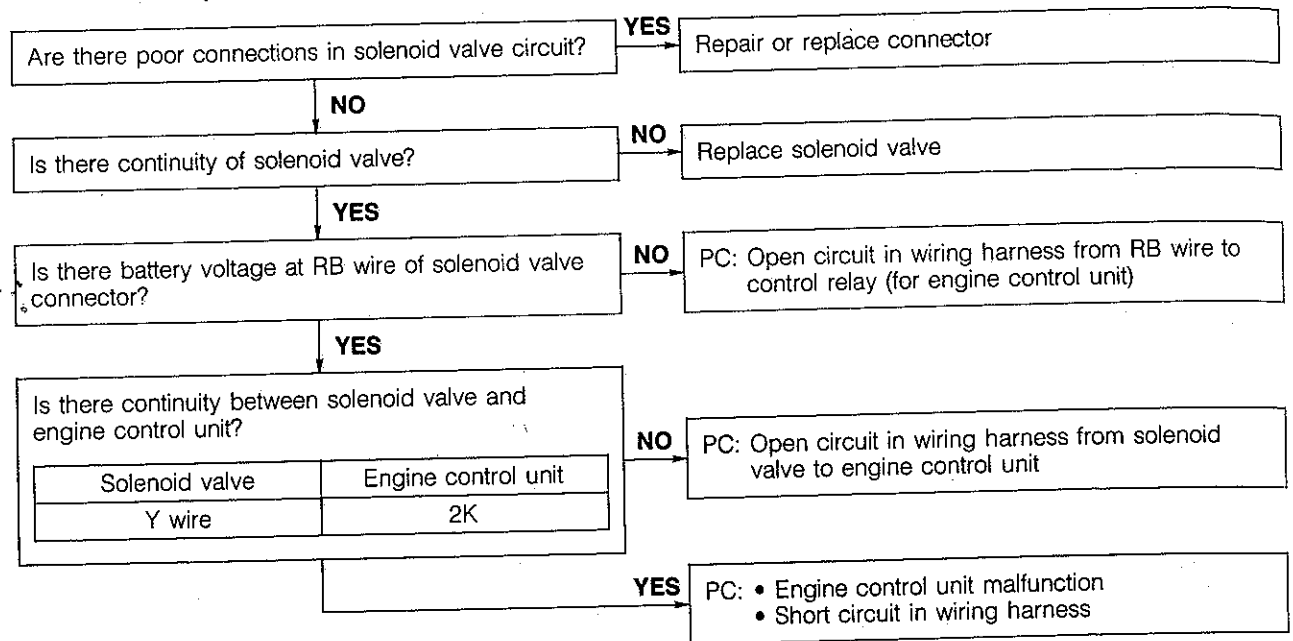
PC: Engine control unit malfunction

76F04B-015

4B TROUBLESHOOTING WITH SST

Code No. 25 (Solenoid valve—Pressure regulator control (PRC))

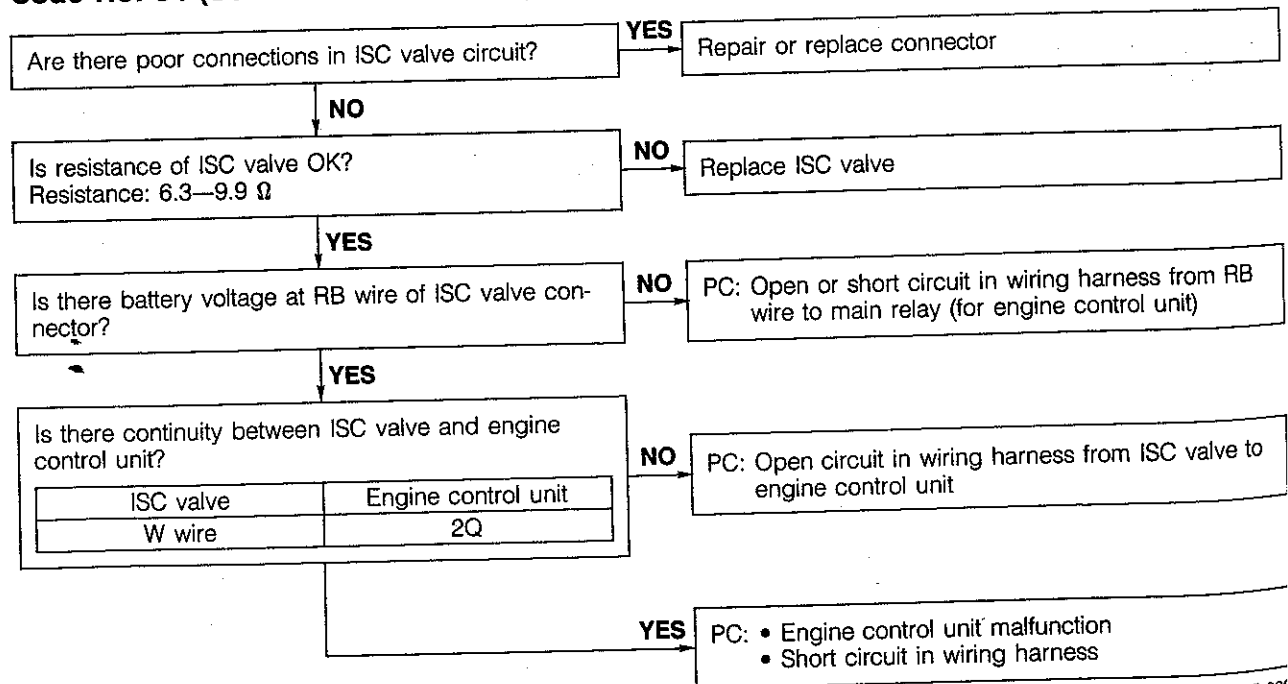
PC: Possible Cause



76G04C-028

Code No. 34 (Solenoid valve—Idle speed control (ISC))

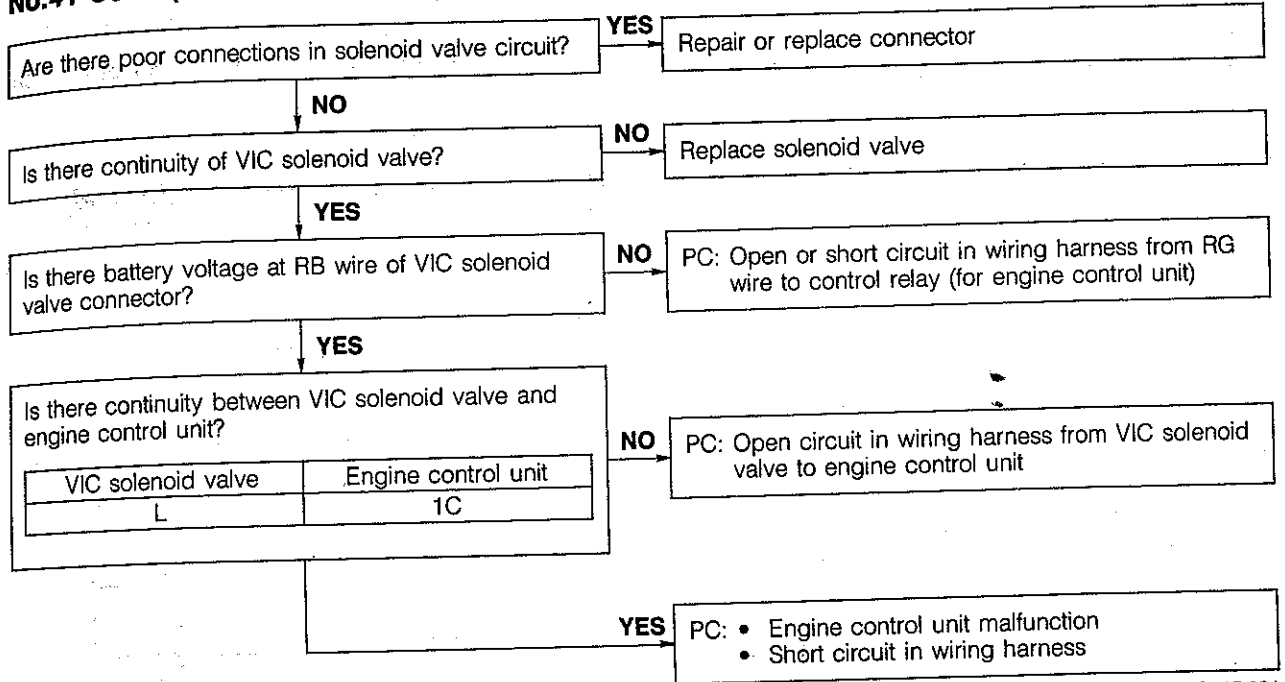
PC: Possible Cause



76G04C-031

No.41 Code (Solenoid valve—Variable inertia control (VIC))

PC: Possible Cause



76G04C-034

Cause

to

4C-028

use

B

to

032

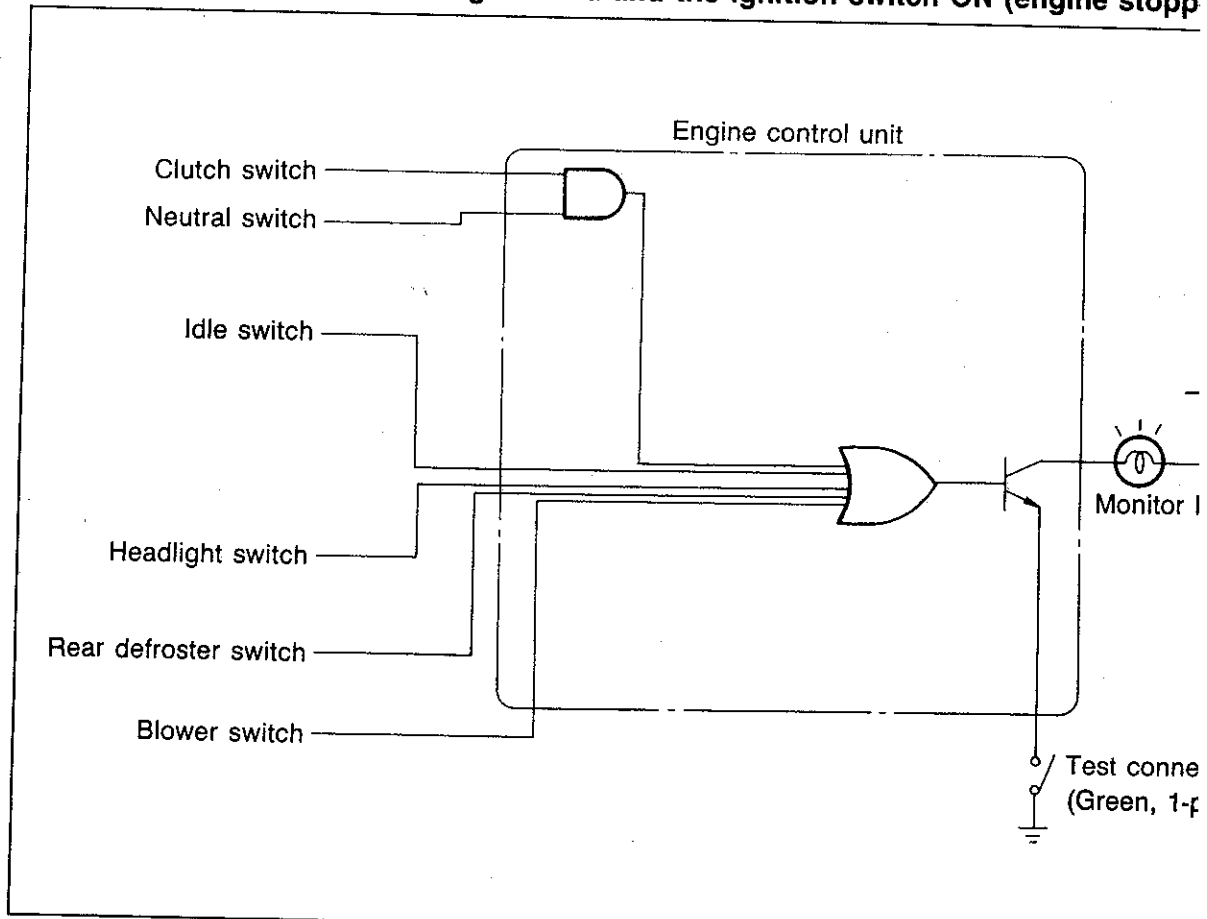
4B SWITCH MONITOR FUNCTION

SWITCH MONITOR FUNCTION

Individual switches can be monitored by the **SST (Self-Diagnosis Checker 49 G018 9A0 or Code Checker 49 9200 180)**.

Note

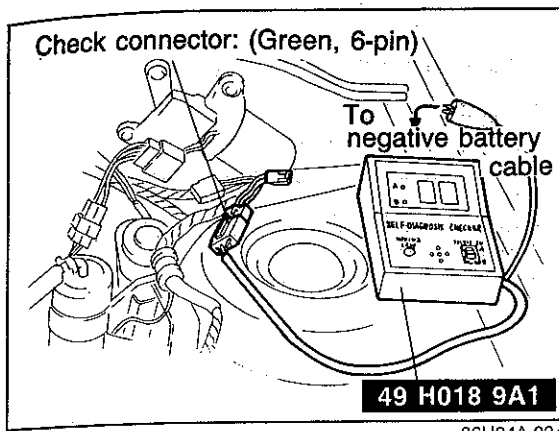
The test connector must be grounded and the ignition switch ON (engine stopp



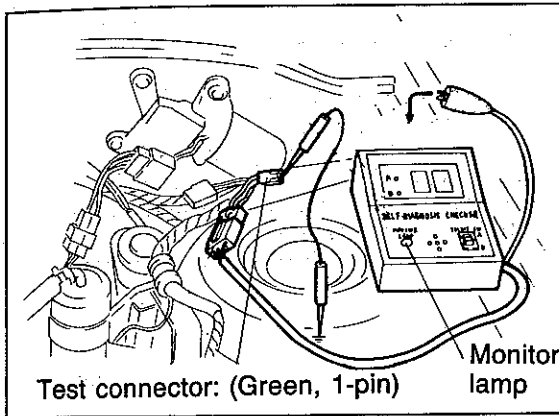
76

Switch	Self-Diagnosis Checker (Monitor lamp)		Remark
	Light ON	Light OFF	
Clutch switch	Pedal released	Pedal depressed	In gear
Neutral switch	In gear	Neutral	Clutch pedal release
Idle switch	Pedal depressed	Pedal released	—
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position or "4"

SWITCH MONITOR FUNCTION 4B



86U04A-034



76F04B-017

INSPECTION PROCEDURE

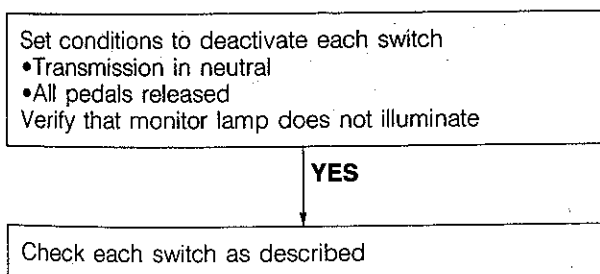
1. Warm up the engine to normal operating temperature and stop it.
2. Connect the **SST** to the check connector (Green, 6-pin) and the negative battery terminal.

3. Connect a jumper wire between the test connector (Green, 1-pin) and a ground.
4. Turn the ignition switch ON. Check if the monitor lamp illuminates as each switch is operated as described below.

Caution

- a) If any one of the switches remains activated, the monitor lamp will stay on.
- b) Do not start the engine.

Procedure

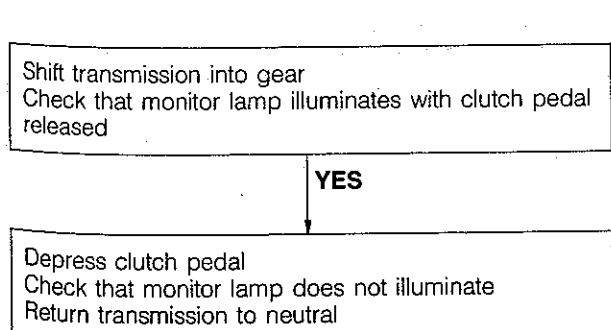


- Check each switch and related wiring harness
- Clutch and neutral switches :Refer to page 4B-79
 - Idle switch :Refer to page 4B-86
 - Headlight switch :Refer to section 15
 - Rear defroster switch :Refer to section 15
 - Blower switch :Refer to section 15
 - Water thermo switch :Refer to section 3

76F04B-018

Neutral and Clutch switches

PC: Possible Cause



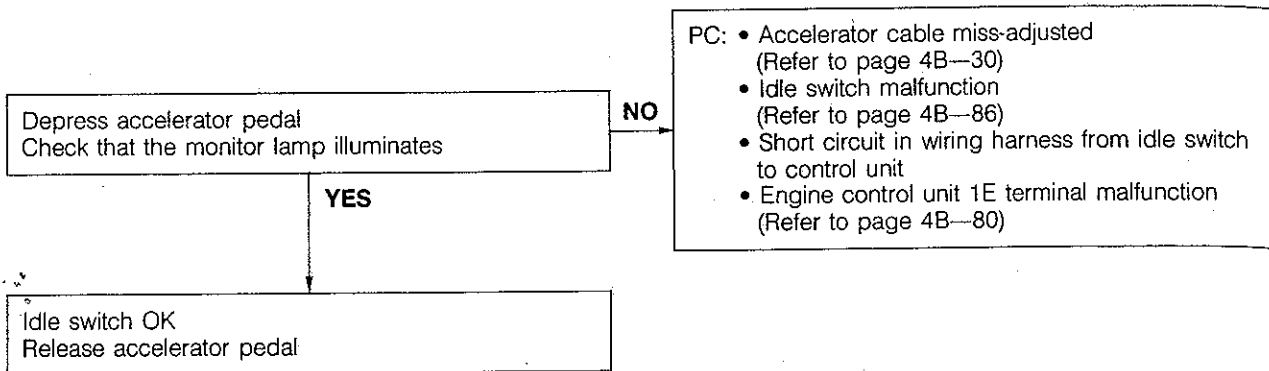
- PC: • Neutral or clutch switch malfunction (Refer to 4B-79)
- Open circuit in related wiring harness
 - Engine control unit 1G terminal malfunction (Refer to page 4B-80)

- PC: • Clutch switch malfunction (Refer to page 4B-79)

76F04B-019

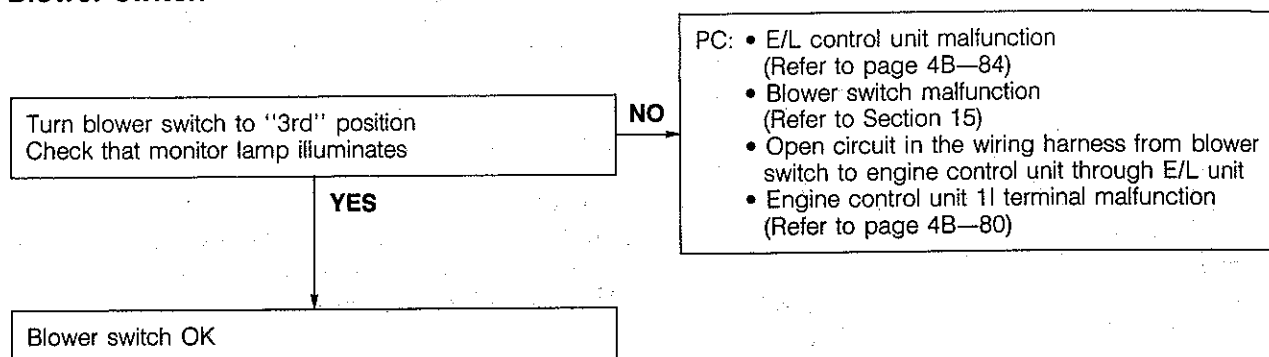
4B SWITCH MONITOR FUNCTION

Idle switch



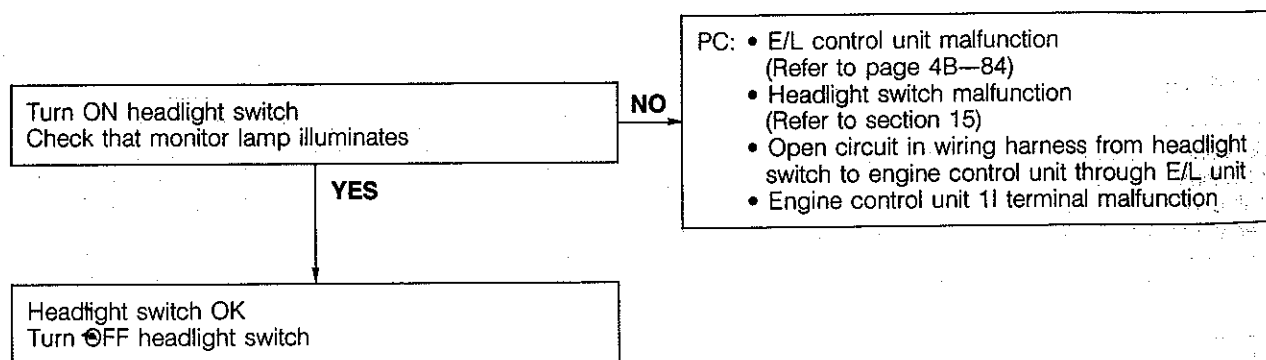
76F04B-020

Blower switch



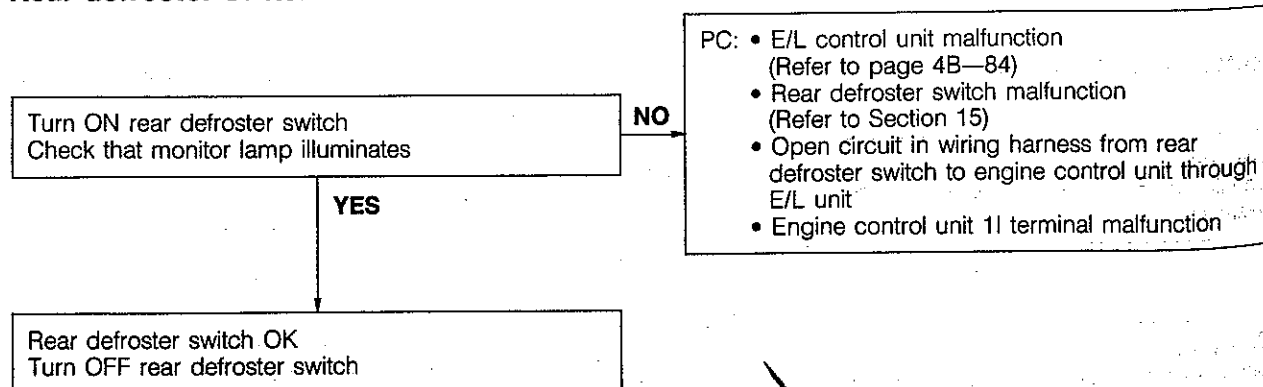
76F04B-021

Headlight switch



76F04B-022

Rear defroster switch



76F04B-023

IDLE ADJUSTMENT

IDLE SPEED Preparation

- 1) Check the condition of the engine (plugs, leaks in hoses, etc.).
- 2) Make sure all accessories are OFF.
- 3) Warm up the engine and run it for **three minutes at 2,500—3,000 rpm** in neutral.
- 4) Check the initial ignition timing and adjust it if necessary.

Inspection

1. Check that the idle speed is within specification without grounding the test connector (Green, 1-pin).

Specification:

Applied load	Idle speed
No load	750 ± 50 rpm
P/S load	750 ± 50 rpm
A/C and/or E/L load	800 ± 50 rpm

2. If not correct, adjust the initial idle speed.

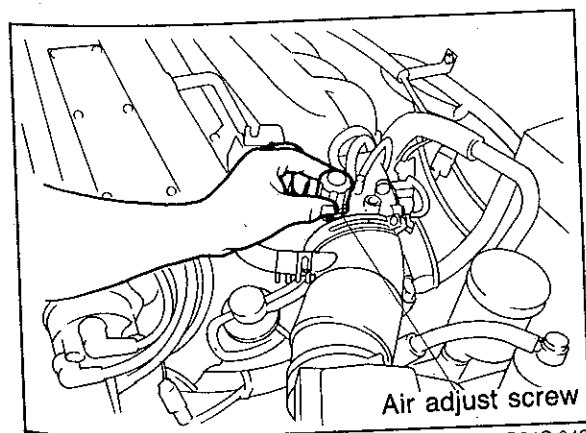
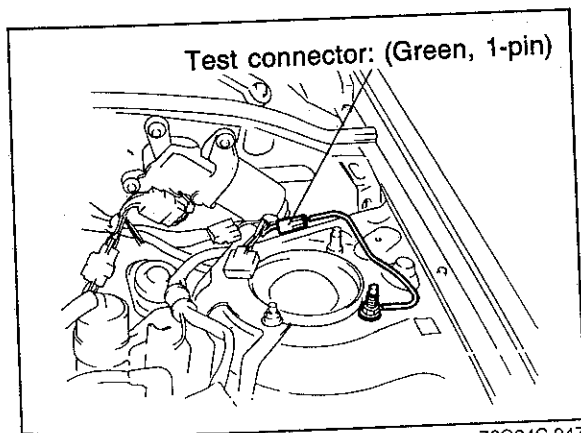
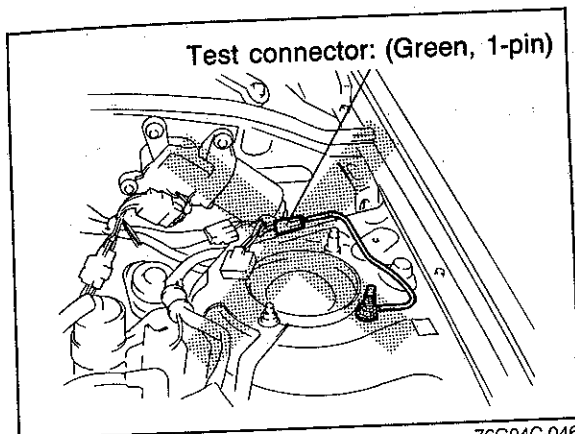
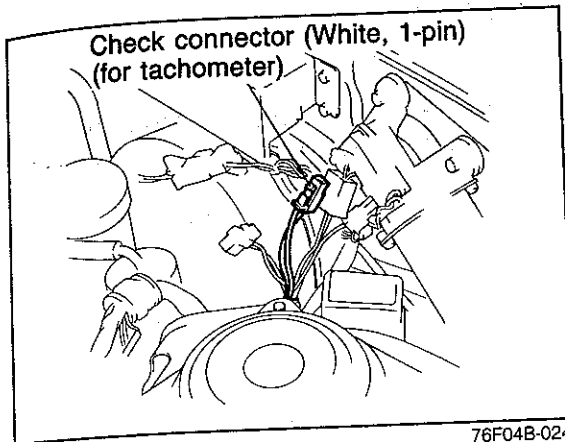
Adjustment

1. Ground the test connector (Green, 1-pin) with a jumper wire.
2. Turn all accessories and loads OFF.

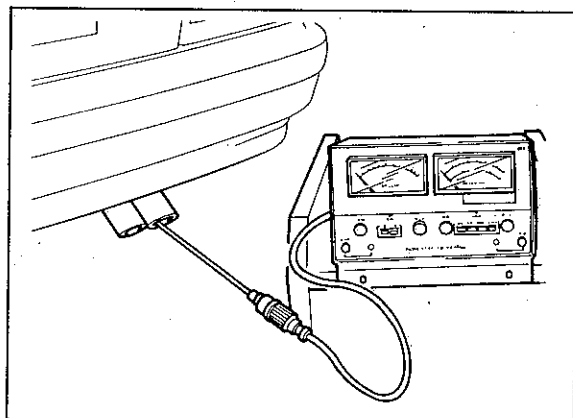
3. Remove the blind cap and adjust the initial idle speed to specification by turning the air adjust screw.

Initial idle speed: 750 ± 50 rpm

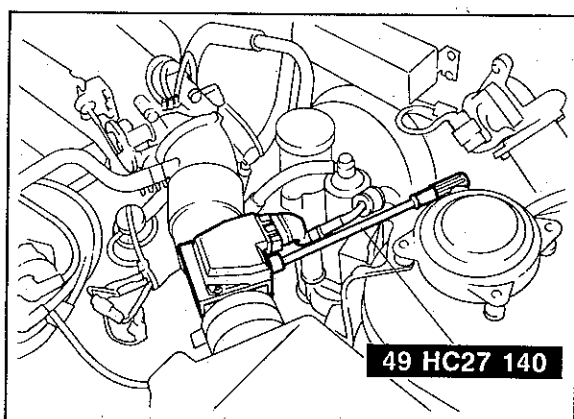
4. After adjusting the idle speed, install the blind cap and disconnect the jumper wire from the test connector.
5. Recheck the idle speed.
6. If not within specification, check the idle speed control (ISC) system.



4B IDLE ADJUSTMENT



76F04B-025



49 HC27 140

76G04C-051

IDLE MIXTURE

Note

Before checking or adjusting the idle mixture, check and adjust the idle speed, if necessary.

1. Insert a gas analyzer pick-up into the tail pipe.

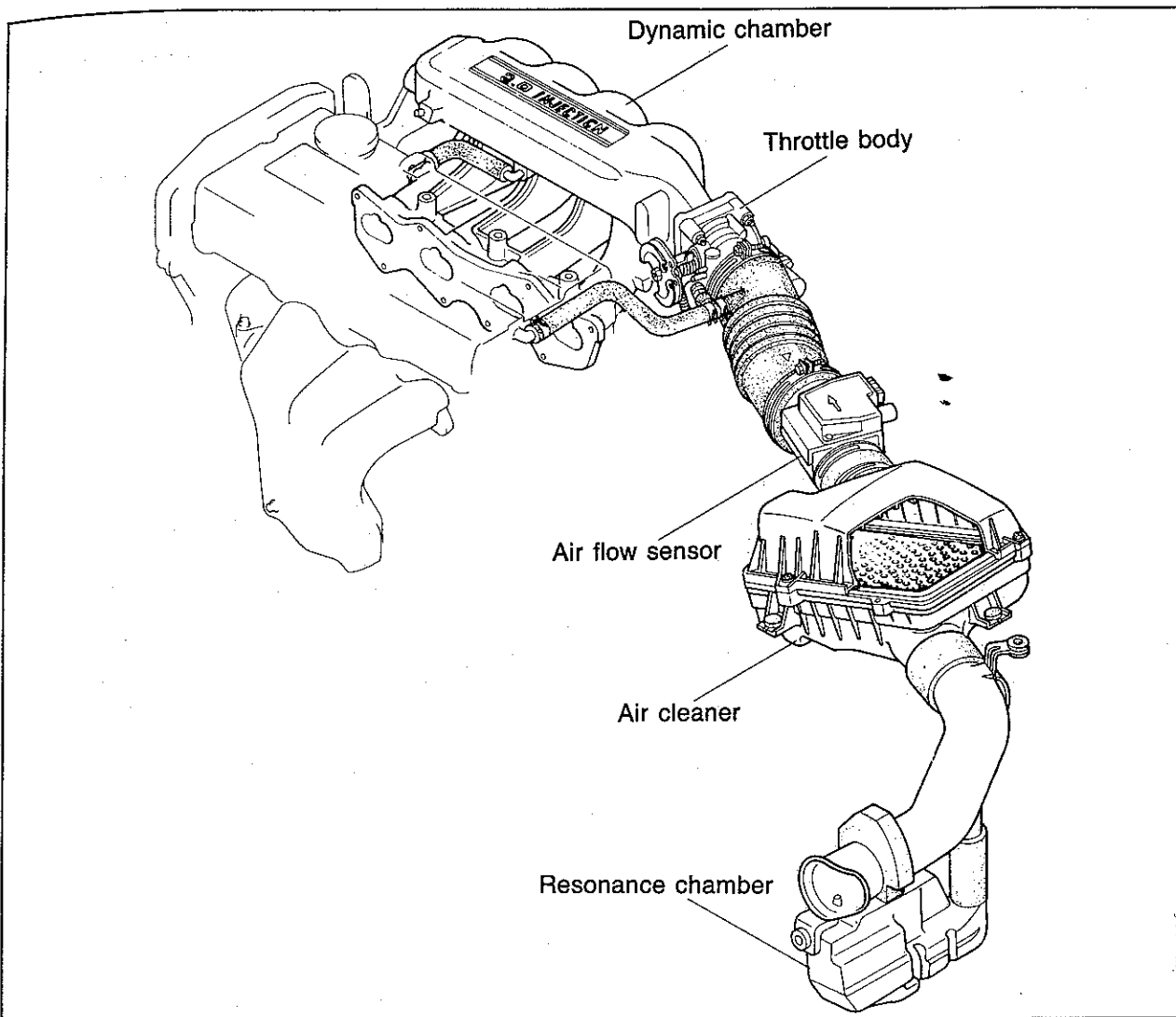
2. Check that the CO and HC concentrations are within specification.

CO concentration: $1.5 \pm 0.5\%$

HC concentration: Less than 1,000 PPM

3. If the CO or HC concentration is not within specification, turn the adjust screw with the **SST** to adjust.

INTAKE AIR SYSTEM



76G04C-052

This system controls the air required by the engine for operation. The system consists of the air duct, resonance chamber, air cleaner, air flow sensor, throttle body, dynamic chamber, and intake manifold.

COMPONENT DESCRIPTION

Component	Function	Remark
Air cleaner	Filters air entering throttle body	Dry type
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	Hot-wire type
Resonance chamber	Minimizes intake air noise	
Throttle body	Controls intake air quantity	Integrated throttle sensor and idle switch

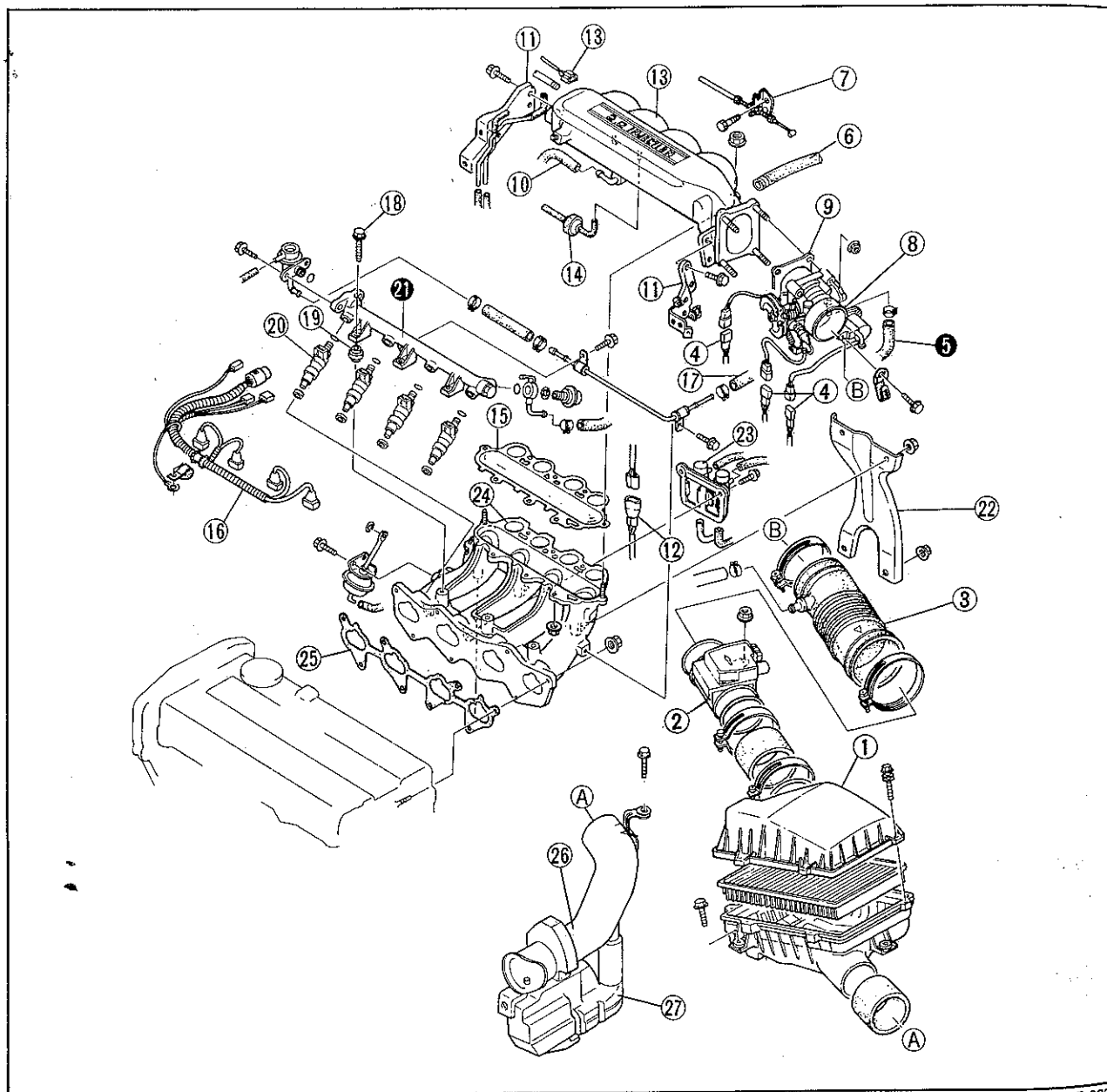
4B INTAKE AIR SYSTEM

REMOVAL

Caution

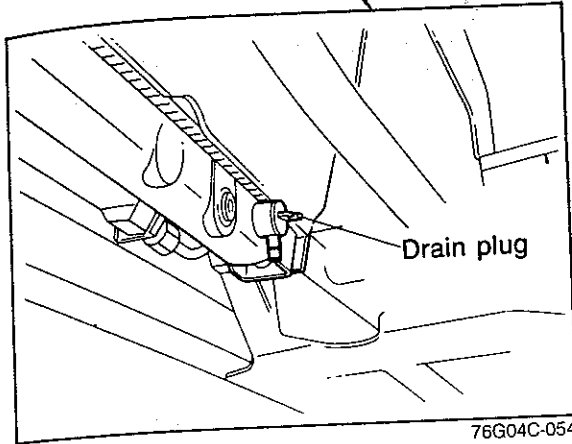
Before removing the following parts, release the fuel pressure from fuel system to reduce the possibility of injury or fire. (Refer to page 4B-48.)

Remove in the sequence shown in the figure, referring to the removal note.



- | | | |
|----------------------------------|---|-----------------------------|
| 1. Air cleaner | 11. Dynamic chamber brackets | 19. Heat insulator |
| 2. Air flow sensor | 12. Connectors (Knock sensor, Intake air thermo sensor) | 20. Injectors |
| 3. Air hoses | 13. Dynamic chamber | 21. Delivery pipe assembly |
| 4. Connectors (Idle switch, ISC) | 14. One-way check valve | 22. Intake manifold bracket |
| 5. Water hoses | 15. Gasket | 23. Solenoid valve |
| 6. Vacuum hose | 16. Wiring harness (Injectors) | 24. Intake manifold |
| 7. Accelerator cable | 17. Fuel hoses | 25. Gasket |
| 8. Throttle body | 18. Delivery pipe assembly mounting bolt | 26. Air duct |
| 9. Gasket. | | 27. Resonance chamber |
| 10. PCV hose | | |

76F04B-026

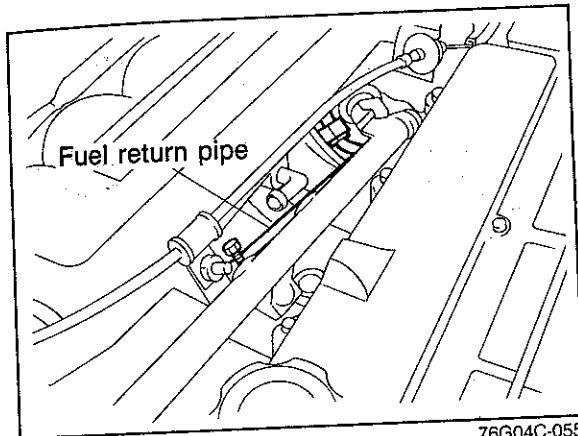


76G04C-054

Removal Note

Water hose

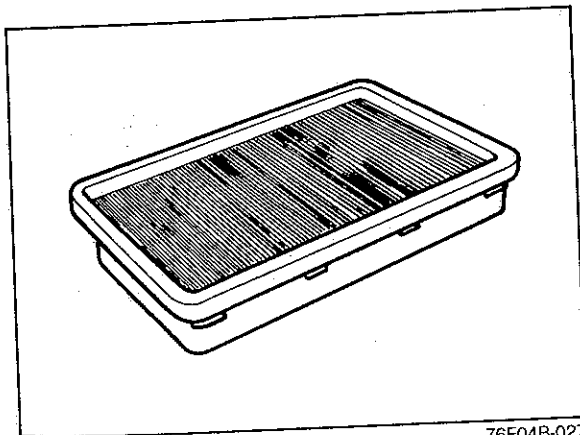
Before disconnecting the water hose, drain two liters of engine coolant.



76G04C-055

Delivery pipe assembly

1. Separate the fuel return pipe from the delivery pipe assembly.
2. Remove the delivery pipe assembly and the fuel return pipe.



76F04B-027

PARTS INSPECTION

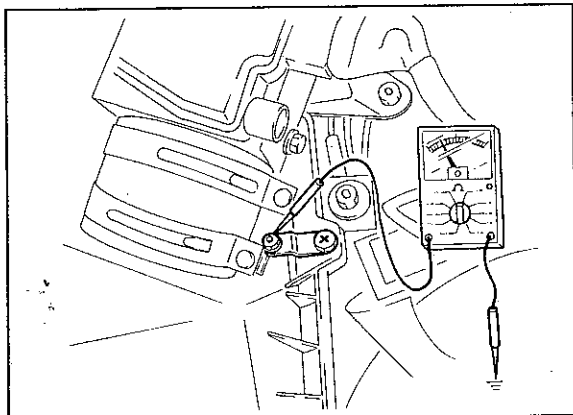
Air Cleaner Element

1. Check the condition of the air cleaner element.
2. Blow clean with compressed air, if necessary.

Caution

- a) The air cleaner must be replaced at the intervals outlined in the maintenance schedule.
- b) Never drive the vehicle without the air cleaner element, otherwise, damage to the air flow sensor (hot-wire) will occur.
- c) Never use an oil permeated air cleaner element, otherwise, contamination of the hot-wire will occur.

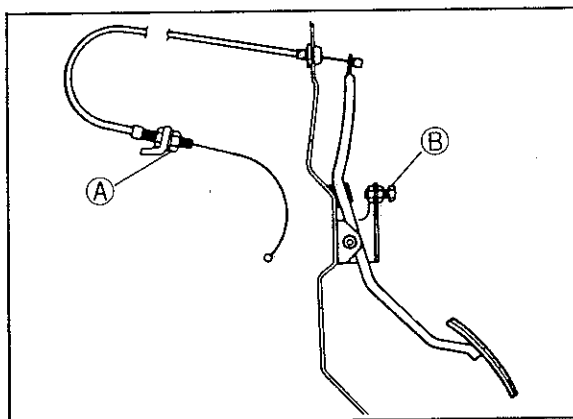
4B INTAKE AIR SYSTEM



76G04C-058

Air Cleaner Case

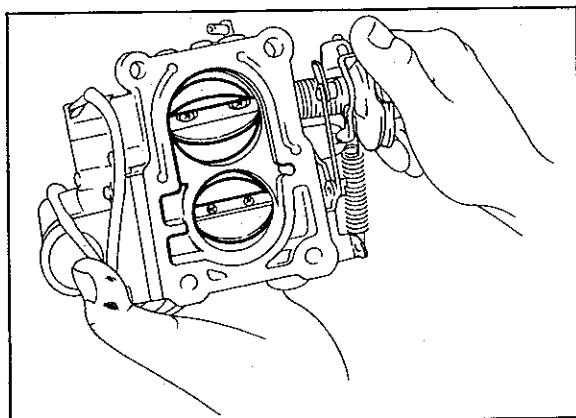
1. Check that the steel plate mounted on the upper case is grounded.
2. Replace, if necessary.



76G04C-059

Accelerator Cable

1. Inspect the deflection of the cable. If it is not within **1—3 mm (0.04—0.12 in.)**, adjust by turning nuts A.
2. Depress the accelerator pedal to the floor and confirm that the throttle valve is fully opened. Adjust by turning bolt B if necessary.



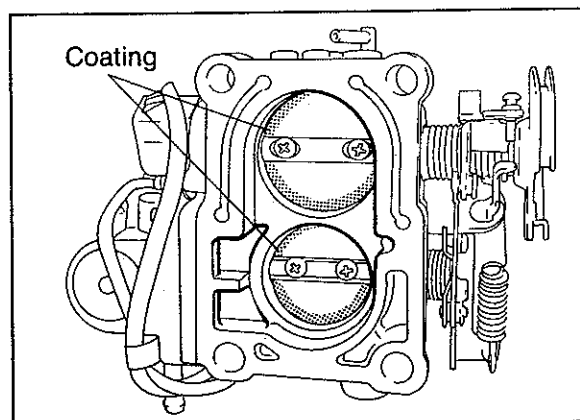
76G04C-060

Throttle Body

Note

The No. 2 throttle valve is preset at the factory to begin opening after the No. 1 throttle valve has opened approx. 25 degrees.

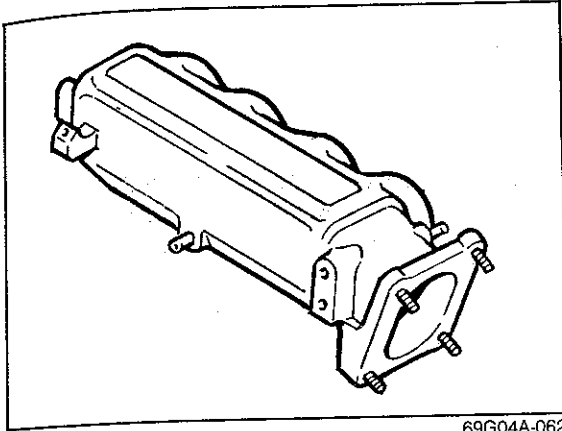
1. Check that the No. 1 and No. 2 throttle valves move smoothly when the throttle lever is moved from fully closed to fully open.
2. Replace, if necessary.



76F04B-028

Caution

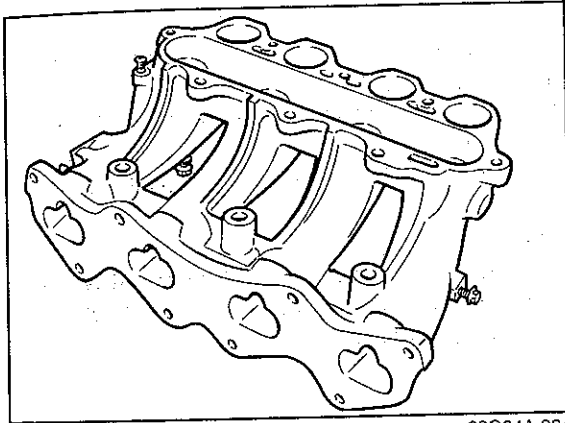
Do not remove the thin sealing coating from the throttle valves or bores.



69G04A-062

Dynamic Chamber

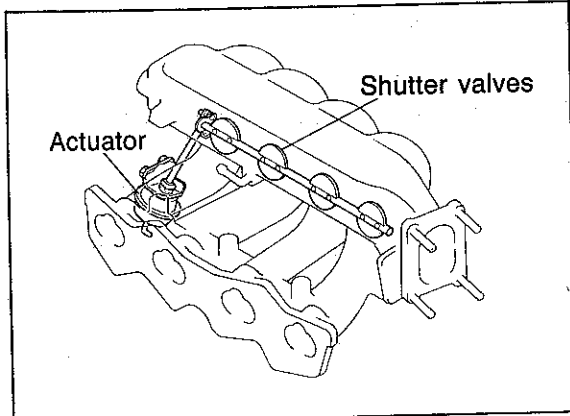
1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.



69G04A-064

Intake Manifold

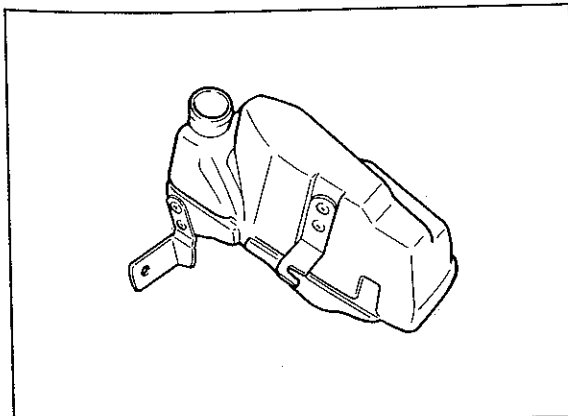
1. Visually check the intake manifold for damage.
2. Replace, if necessary.



69G04C-051

Shutter Valves

1. Visually check the shutter valves for damage.
2. Check that the shutter valves close and open fully.
3. Adjust or replace them, if necessary.

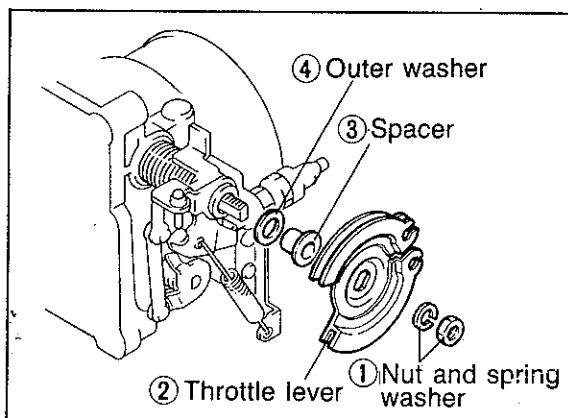


69G04C-054

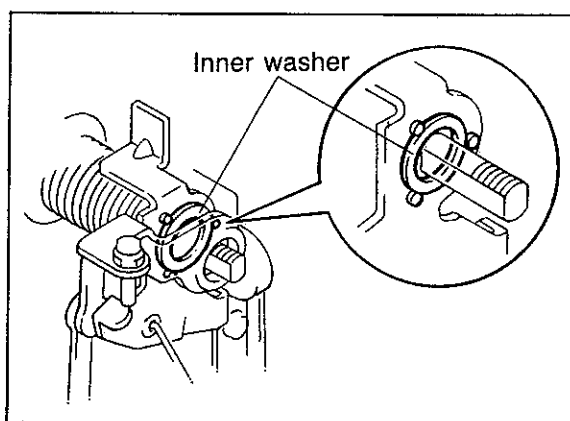
Resonance Chamber

1. Visually check the resonance chamber for damage.
2. Replace, if necessary.

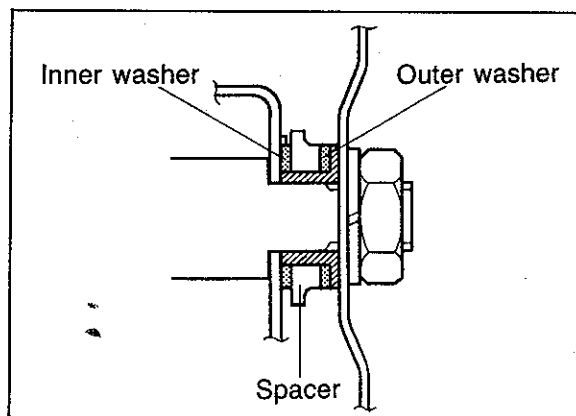
4B INTAKE AIR SYSTEM



69G04C-130



76F04B-029



76F04B-030

REPLACEMENT Throttle Lever Removal

Caution

When loosening the throttle lever nut, hold the throttle valves fully open to prevent damaging the idle switch.

Remove the throttle lever in the sequence shown in the figure.

Installation

1. Check that the inner washer is in the proper position as shown in the figure.
2. Assemble the spacer and outer washer and install them onto the throttle shaft.
3. Install the throttle lever onto the throttle shaft.

Caution

When tightening the throttle lever nut, hold the throttle valves fully closed to prevent bending the stop lever.

4. Tighten the throttle lever nut.

Tightening torque:

16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

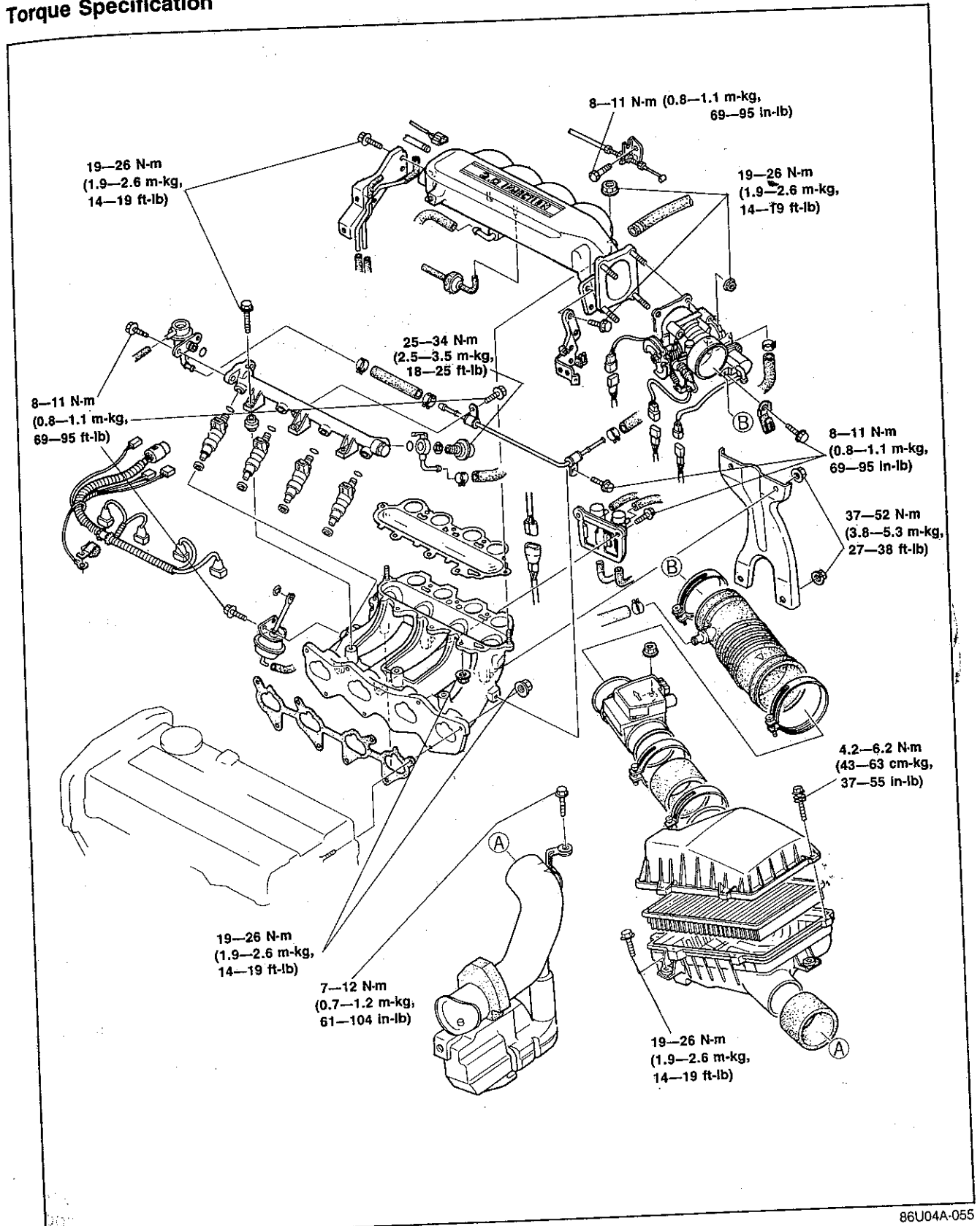
5. Check that the inner and outer washer and spacer are assembled correctly as shown.
6. Check that No.1 and No.2 throttle valves move smoothly and that No.2 throttle valve is closed completely when the No.1 throttle valve is closed.
7. Check the operation of the idle switch. (Refer to page 4B—86.)

INTAKE AIR SYSTEM 4B

INSTALLATION

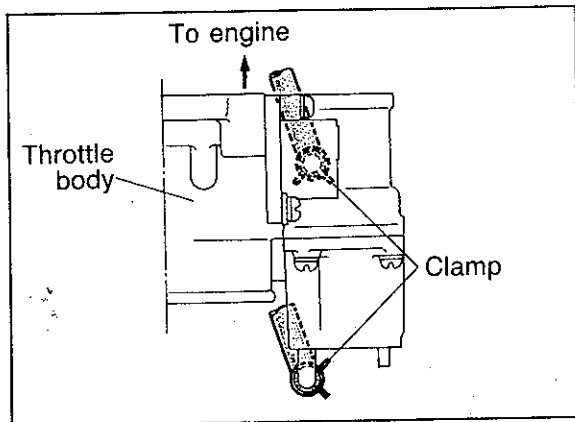
Install in the reverse order of removal, referring to the installation note.

Torque Specification

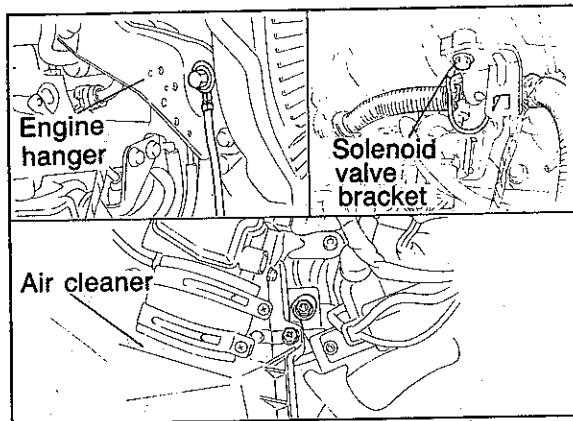


86U04A-055

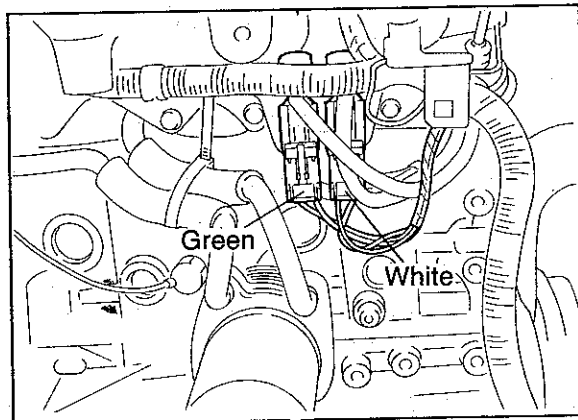
4B INTAKE AIR SYSTEM



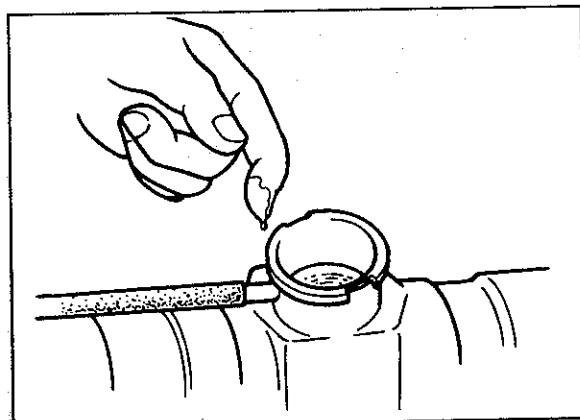
76F04B-Q31



76G04C-062



76G04C-063



76F04B-032

Installation Note

Water hose spring clamps

Face the clamp ends as shown in the figure.

Gasket

Use new gaskets at the intake manifold, dynamic chamber, and throttle body.

Ground harnesses

Make sure that the ground harnesses are tightened securely at the following positions.

- (1) Air cleaner upper case
- (2) Solenoid valve bracket
- (3) Engine hanger

Solenoid valve connectors

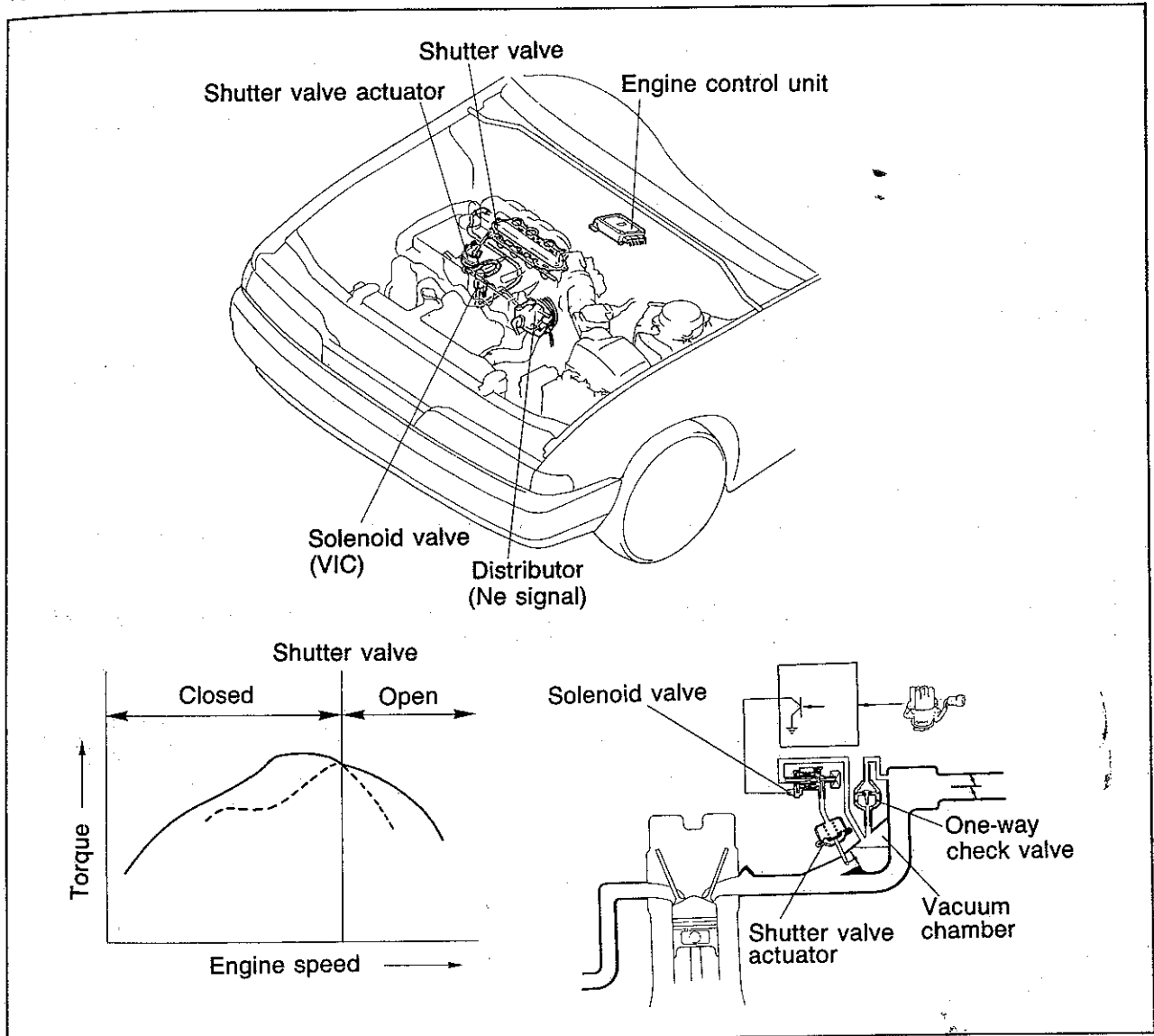
Connect the solenoid valve connectors at the positions shown in the figure.

Inspection after installation

1. After completing installation, fill the engine with the specified engine coolant.
2. Warm up the engine and run it at idle.
3. Check for any vacuum, coolant, or fuel leaks.

VARIABLE INERTIA CONTROL (VIC) SYSTEM

The VIC system supplements the intake air's inertial effect to create a torque band that runs from low rpm through the high rpm range. The system consists of the intake manifold, shutter valves, dynamic chambers, actuator, one-way check valve, three-way solenoid valve, and engine control unit.



76G04C-065

Intake Inertia Effect

The air within the dynamic chamber and intake manifold begins to flow during the first half of the air intake process. This air flow pushes air into the cylinder by its own inertial force during the second half of the air intake process. This improves the charging of the cylinder.

To most effectively put this inertia charging to use, the length of the manifold leading to the dynamic chamber needs to be changed in response to the engine rpm.

Length of intake manifold	Intake inertia effect
Long	Effective at low and middle speed
Short	Effective at high speed

The VIC system controls the length of the intake manifold travel by switching the shutter valve either open or closed at the specified engine rpm.

4B VIC SYSTEM

COMPONENT DESCRIPTION

Component	Function	Remark
Dynamic chamber	Provides chamber for VIC system operation	Integrates one-way check valve
Engine control unit	Monitors engine rpm, controls solenoid valve	ON: above 5400 rpm
Intake manifold	Incorporates short and long intake passages	Contains shutter valve
One-way check valve	Holds vacuum in vacuum chamber	Installed between dynamic chamber and vacuum chamber
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Solenoid valve (VIC)	Controls vacuum to shutter valve actuator	
Shutter valve	Closes short intake port	
Shutter valve actuator	Actuates shutter valve according to vacuum from solenoid valve	

76F04B-033

TROUBLESHOOTING

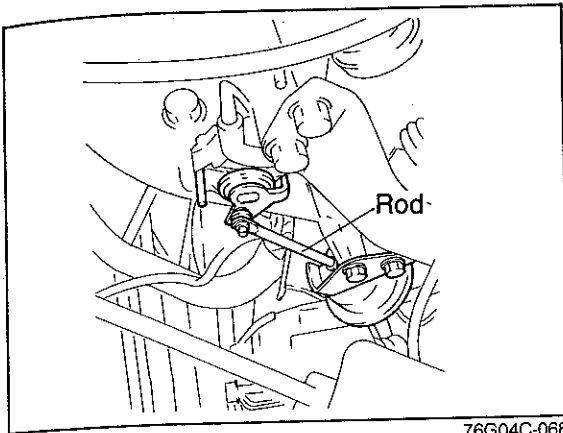
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note

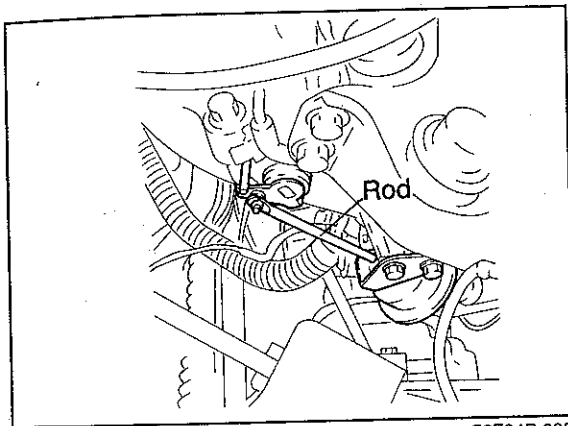
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4B—10 and 11.)

Possible cause		Vacuum chamber (Vacuum leak)	Shutter valve actuator	One-way check valve	Solenoid valve (VIC)		Engine control unit (1C)	System inspection
					Vacuum signal	Electric signal		
Page		4B—38	4B—37	4B—39	4B—38		4B—80	4B—37
Symptom	During warm up	2	3	4	—	—	—	1
	After warming up	2	3	4	—	—	—	1
Poor acceleration, hesitation, or lack of power		6	5	7	2	3	4	1
Poor fuel consumption		6	5	7	2	3	4	1

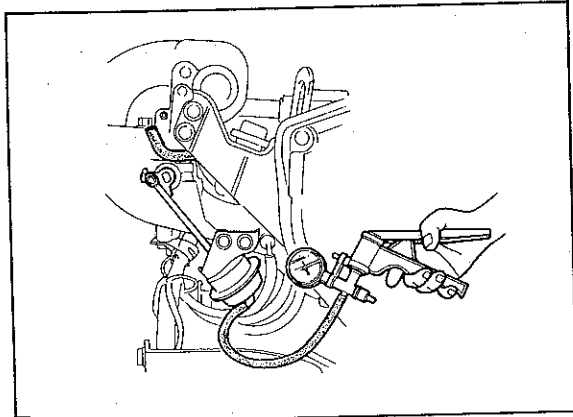
76F04B-034



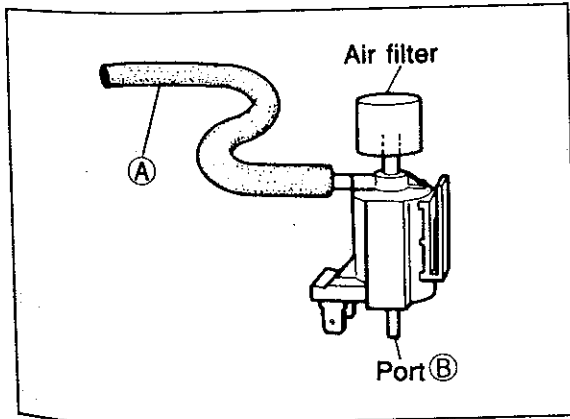
76G04C-068



76F04B-035



76G04C-070



76G04C-071

System Inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Check that the rod has been pulled into the actuator.

3. Increase the engine speed and check that the rod is released above specification.

Specification: Approx. 5,400 rpm

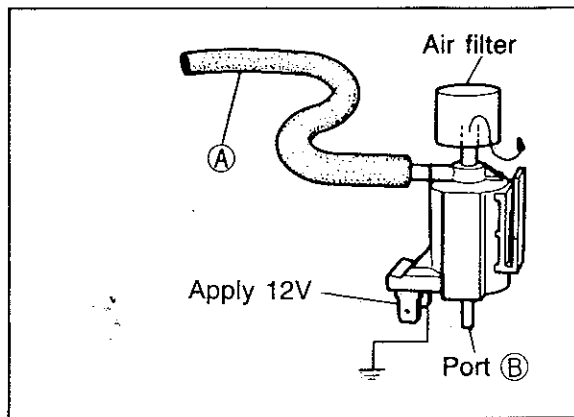
Shutter Valve Actuator

1. Disconnect the vacuum hose from the actuator, and connect a vacuum pump to the actuator.
2. Apply **approx. 200 mmHg (7.9 inHg)** vacuum and check that the rod is pulled into the actuator.

VIC Solenoid Valve

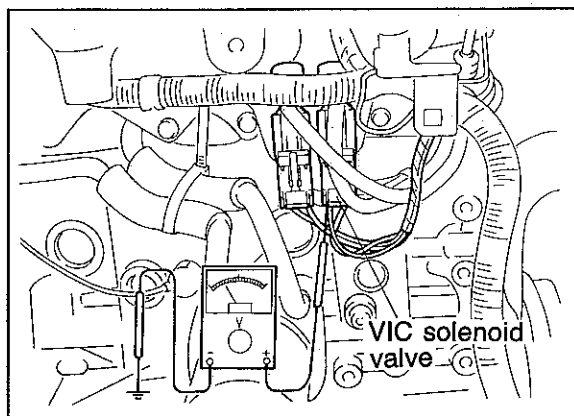
1. Disconnect the vacuum hoses from the solenoid valve.
2. Blow through the valve from port A and check that air flows from port B.

4B VIC SYSTEM



76G04C-072

3. Disconnect the solenoid valve connector and connect 12V and a ground to the terminals of the solenoid valve.
4. Blow through the valve from port A and check that air flows from the air filter.

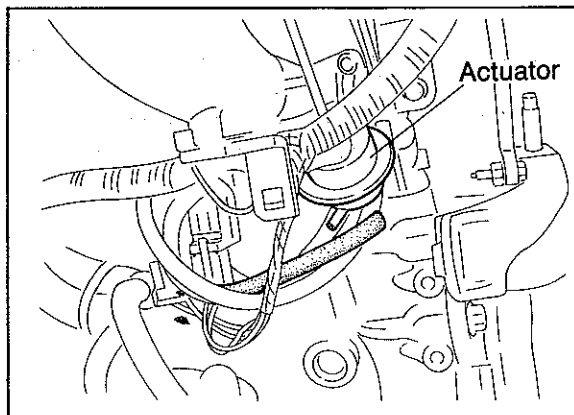


76F04B-036

Electrical Signal

1. Connect a voltmeter to the VIC solenoid valve (O wire).
2. Increase the engine speed and note the voltmeter reading.

Voltmeter reading	Engine speed
Approx. 12V	Below 5,300 rpm
Below 2.0V	Above 5,400 rpm



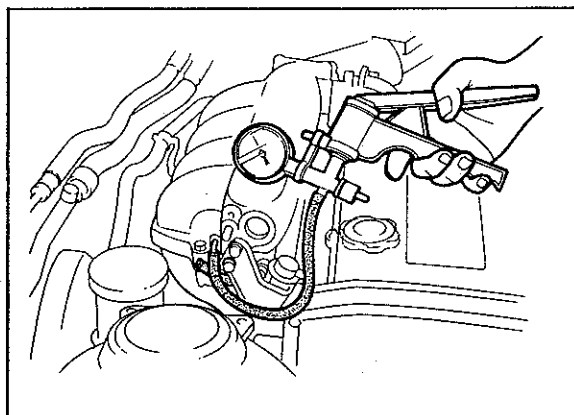
76F04B-037

Vacuum Signal

1. Disconnect the vacuum hose from the actuator.
2. Place a finger over the port opening and check that vacuum is felt at idle.
3. Increase the engine speed above specification and check that no vacuum is felt.

Specification: Approx. 5,400 rpm

4. Connect the vacuum hose.



76F04B-038

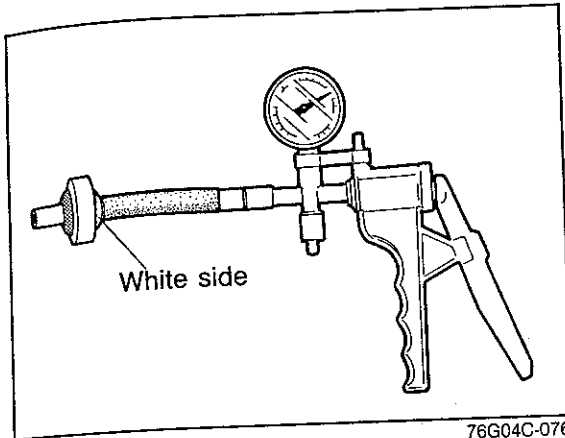
Vacuum Chamber

1. Disconnect the vacuum hose from the dynamic chamber.
2. Connect a vacuum pump to the dynamic chamber.
3. Apply vacuum and check that it is held.
4. If not correct, check the one-way check valve for vacuum leakage. (Refer to page 4B-39.)

Note

10 mm Hg (0.39 inHg) drop per 30 seconds is allowable.

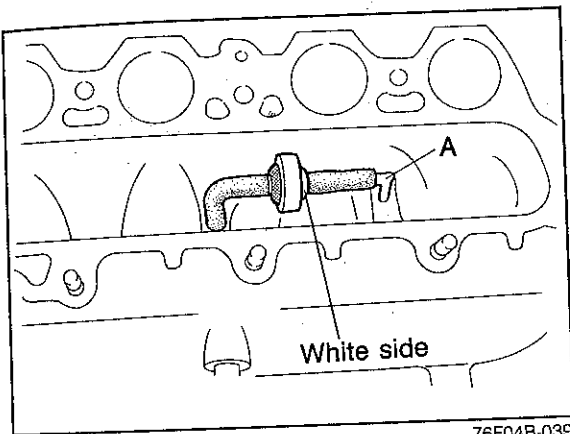
5. If the one-way check valve is good, check the dynamic chamber.



76G04C-076

One-way Check Valve Inspection

1. Remove the dynamic chamber.
2. Remove the one-way check valve.
3. Connect a vacuum pump as shown in the illustration.
4. Apply vacuum and check that it is held.
5. Connect the vacuum pump to the opposite port.
6. Apply vacuum and check that it is not held.
7. If not correct, replace the valve.



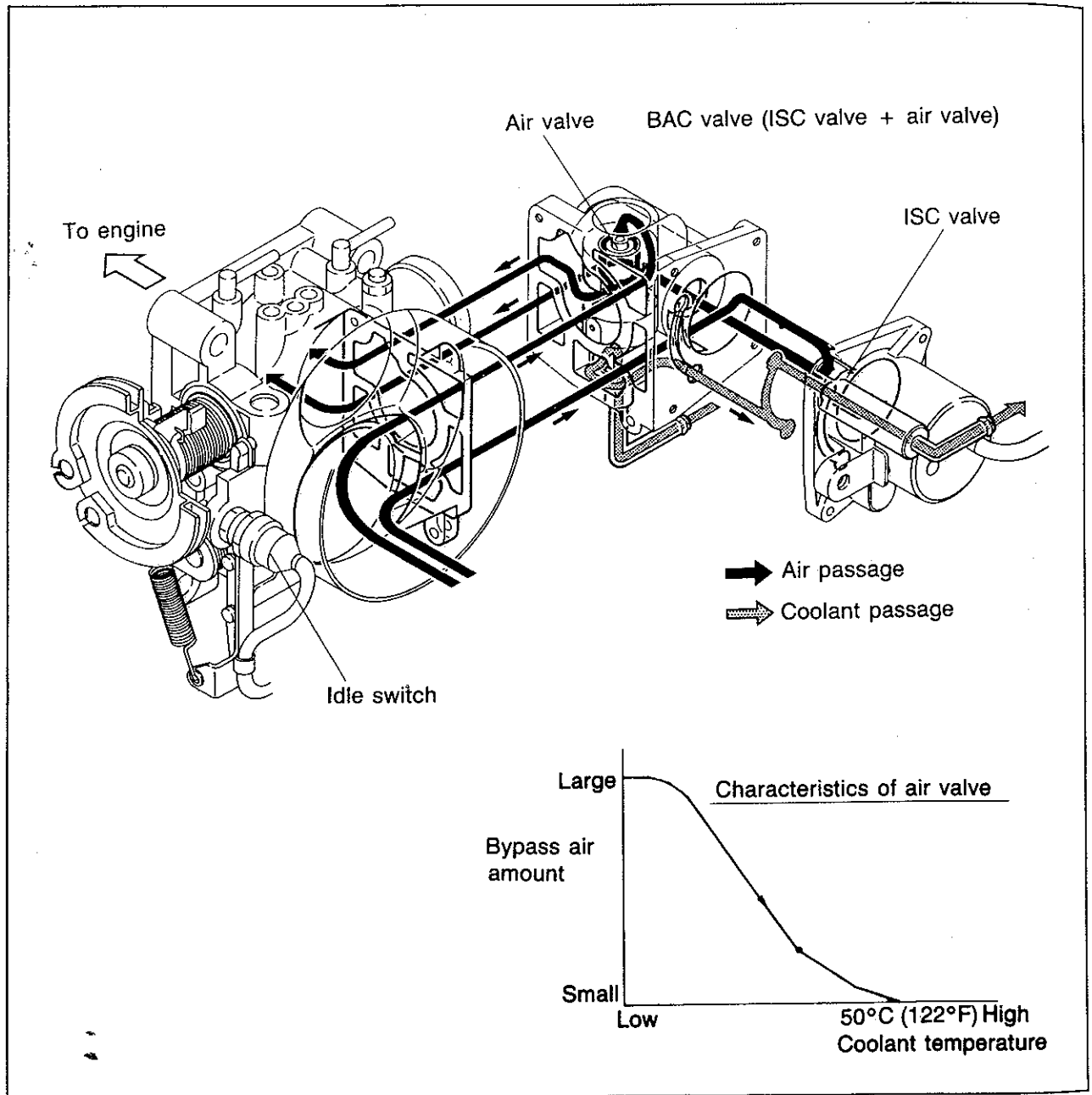
76F04B-039

Replacement

1. Remove the dynamic chamber. (Refer to page 4B-28.)
2. Remove the one-way check valve.
3. Install a new valve with the white side of the valve facing port A.

4B ISC SYSTEM

IDLE SPEED CONTROL (ISC) SYSTEM



76G04C-077

To improve idle smoothness, the ISC system controls the intake air amount by regulating the bypass air amount that passes through the throttle body. This system consists of the BAC valve and the control system.

The BAC valve consists of the air valve which functions only when the engine is cold (**below 50°C (122°F)**) and the ISC valve which works throughout the entire engine speed range.

COMPONENT DESCRIPTION

Component	Function	Remark
A/C switch	Detects air conditioner operation; sends signal to engine control unit	Switch ON when air conditioner operating
Air valve	When cold, supplies bypass air into dynamic chamber	<ul style="list-style-type: none"> • Engine speed increased to shorten warm-up period • Thermo wax type • Installed in BAC valve
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
E/L control unit	Detects that E/L is being applied; sends signal to engine control unit	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Idle speed control)	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Neutral switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when in gear
P/S pressure switch	Detects P/S operation; sends signal to engine control unit	Switch ON when steering wheel turned right or left
Solenoid valve (Idle speed control)	Controls bypass air amount	<ul style="list-style-type: none"> • Controlled by duty signal from engine control unit • Installed in BAC valve • Operates idle-up
Test connector	For initial idle speed adjustment	<ul style="list-style-type: none"> • Green, 1-pin • Idle speed feedback control cancelled when connector grounded
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

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4B ISC SYSTEM

TROUBLESHOOTING

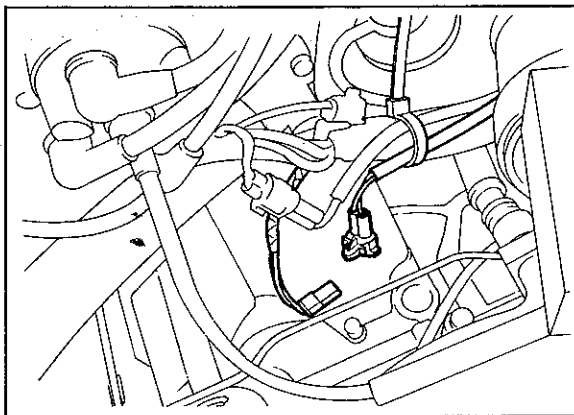
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note

Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4B—10 and 11.)

Symptom	Possible cause	Air valve	P/S pressure switch	Solenoid valve (Idle speed control)	Water thermo sensor	Engine control unit terminal			System inspection
						1L	1W	2Q	
	Page	4B—43	4B—79	4B—44	4B—86	4B—80			4B—42
Engine stalls	During warm up	2	—	3	4	—	5	6	1
	After warm up	—	4	2	—	3	5	6	1
Rough idle	During warm up	2	—	3	—	—	4	5	1
	After warm up	—	4	2	—	3	5	6	1
High idle speed after warm up		2	5	3	—	4	6	7	1
Runs rough on deceleration		—	—	2	—	—	3	4	1
Afterburn in exhaust system		2	—	3	—	—	4	5	1
Fails emission test		2	—	3	—	—	4	5	1

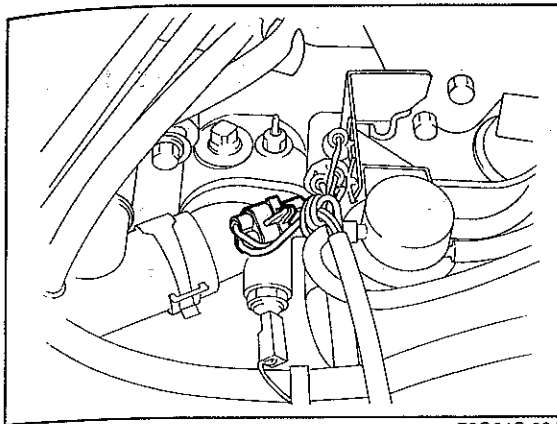
76F04B-040



76G04C-080

System Inspection (Air valve)

1. Ground the test connector (Green, 1-pin) with a jumper wire.
2. Disconnect the ISC valve connector (Gray, 2-pin) at idle while the engine is cold.
3. Note the engine speed and reconnect the connector.
4. Warm up the engine to the normal operating temperature and disconnect the connector again.
5. Check that the engine speed is lower than that when cold.



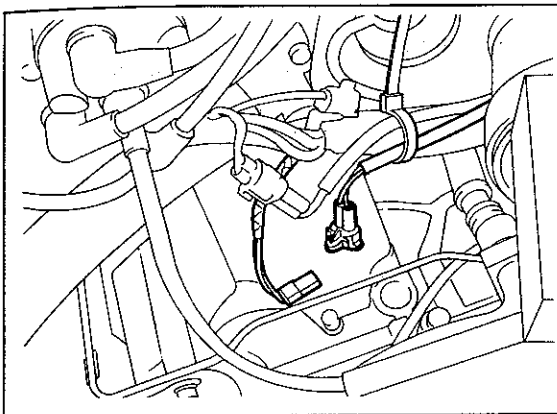
76G04C-081

(ISC valve)

6. Connect the ISC valve connector.

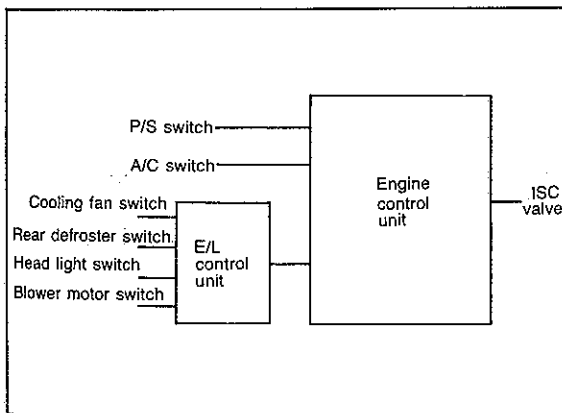
Note

- a) Make sure that the initial idle speed is set to specification.
- b) All accessory must be OFF.



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- 7. Again disconnect the ISC valve connector (engine at normal operating temperature).
- 8. Check that the engine speed decreases.
- 9. Reconnect the ISC valve connector.
- 10. Remove the jumper wire from the test connector and make sure that the idle speed is within specifications.

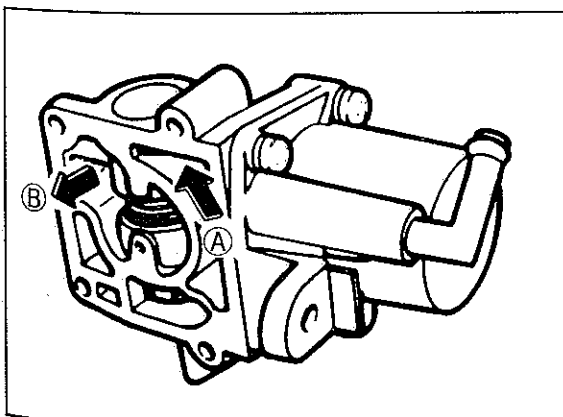


76G04C-083

(Load Test)

11. Apply power steering, electrical, and air conditioner loads and check that the idle speed is controlled to within specifications.

Load	Idle speed
P/S	750 ± 50
E/L	800 ± 50
A/C	800 ± 50
E/L and A/C	800 ± 50

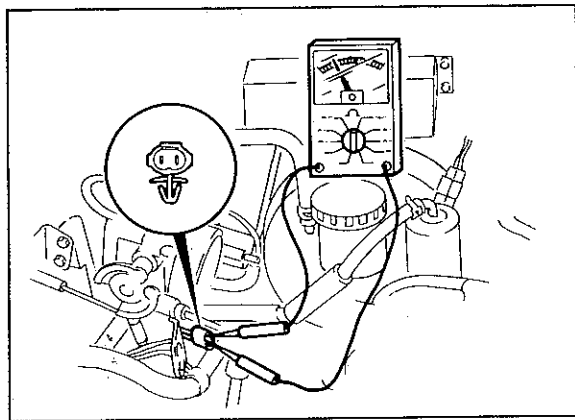


76F04B-041

BAC Valve Air valve

- 1. Remove the BAC valve from the throttle body.
- 2. Blow air through the valve from port A and check that air comes out of port B when the BAC valve is cold.
- 3. If not correct, replace the BAC valve. (Refer to page 4B-44.)

4B ISC SYSTEM



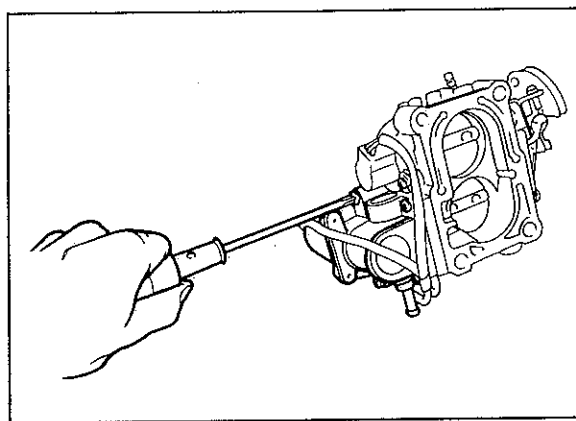
76F04B-042

ISC valve

1. Disconnect the ISC valve connector.
2. Connect an ohmmeter to the terminals of the ISC valve.
3. Check the resistance.

Resistance (at 20°C (68°F)): 6.3—9.9 Ω

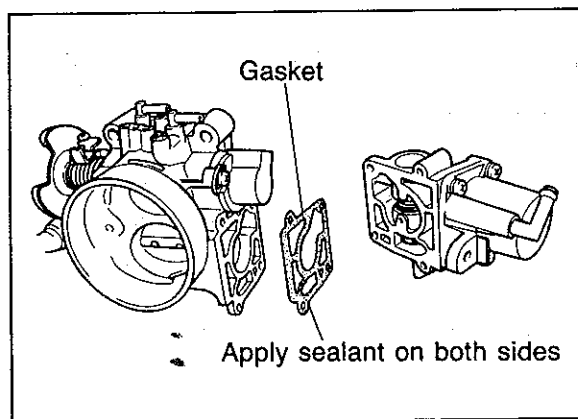
4. If not correct, replace the BAC valve.



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REMOVAL

1. Remove the screws.
2. Remove the BAC valve from the throttle body.



76G04C-086

Installation

Caution
Install a new gasket.

1. Remove any dirt or old sealant from the contact surfaces.
2. Apply sealant to both sides of the gasket.
3. Tighten the screws.