

FUEL AND EMISSION CONTROL SYSTEMS (FUEL INJECTION FE DOHC)

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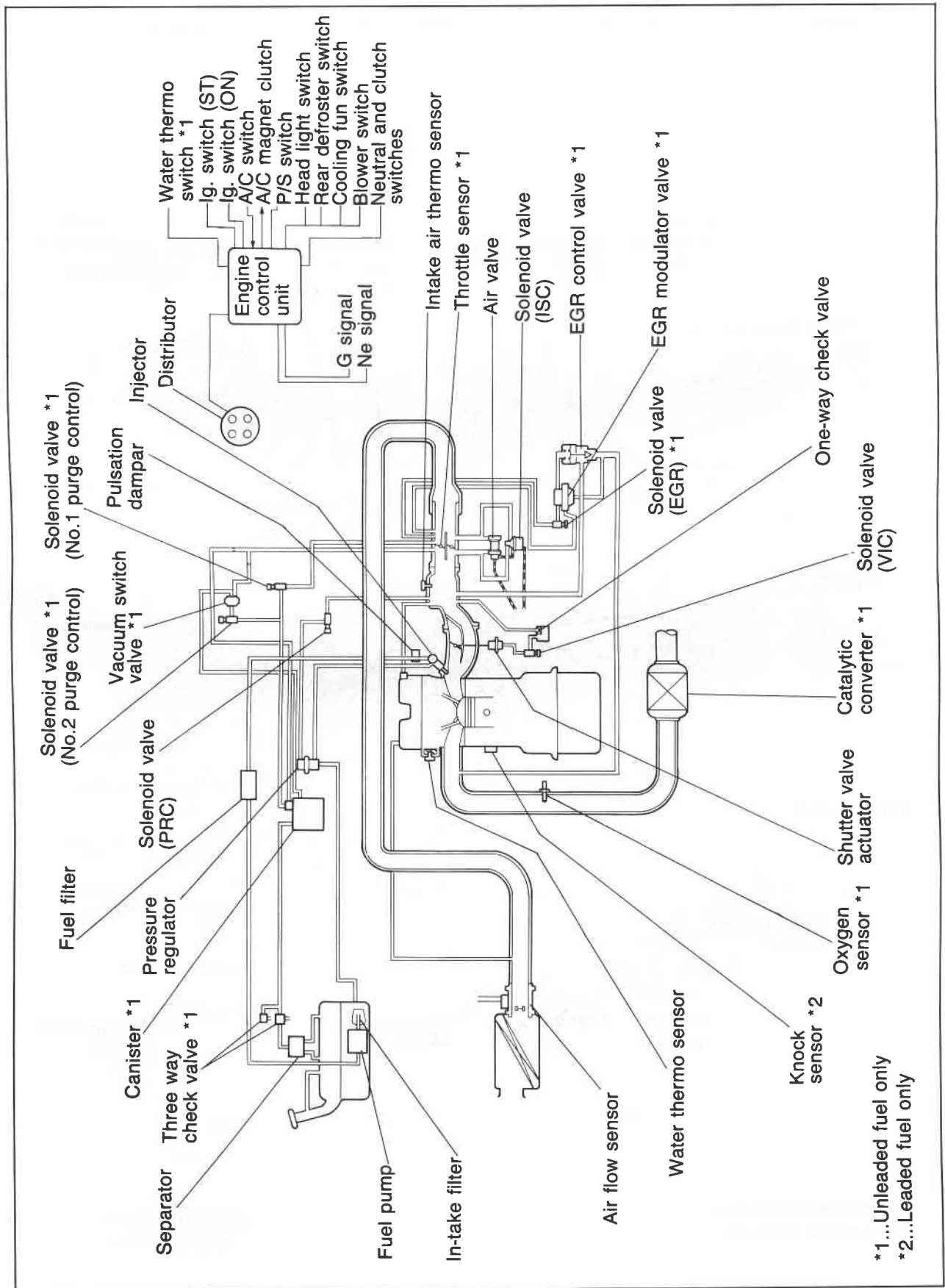
OUTLINE

COMPONENT APPLICATION

	Item	Unleaded fuel	Leaded fuel
INTAKE AIR SYSTEM	Air flow sensor (Hot wire type)	○	○
	Dynamic chamber with vacuum chamber	○	○
	Throttle body (Two bore)	○	○
	Throttle sensor	○	X
	Idle switch	○	○
	Resonance chamber	○	○
VARIABLE INERTIA CONTROL SYSTEM		○	○
IDLE SPEED CONTROL SYSTEM		○	○
FUEL SYSTEM	Injector	○	○
	Pressure regulator	○	○
	Pulsation damper	○	○
	Intank filter	○	○
	Transfer pump	○ (4WS)	○ (4WS)
	Transfer pump switch	○ (4WS)	○ (4WS)
	Fuel pump control unit	○ (4WS)	○ (4WS)
PRESSURE REGULATOR CONTROL SYSTEM		○	○
EVAPORATIVE EMISSION CONTROL SYSTEM	Canister	○	X
	Three-way check valve	○	X
	Two-way check valve	X	○
	Separator	○	○
	Solenoid valves	○	X
EGR SYSTEM	EGR control valve	○	X
	EGR modulator valve	○	X
	Solenoid valve	○	X
ELECTRONIC SPARK ADVANCE CONTROL SYSTEM	Igniter	○	○
	Knock control function	X	○
CONTROL SYSTEM	Water thermo sensor	○	○
	Water thermo switch	○	X
	Intake air thermo sensor	○	○
	Oxygen sensor	○	X
	Distributor	○	○
	Ne signal	○	○
	G signal	○	○
	Clutch switch	○	○
	Neutral switch	○	○
	Knock sensor	X	○
FAIL-SAFE CONTROL SYSTEM		○	○
MONITOR FUNCTION		○	○

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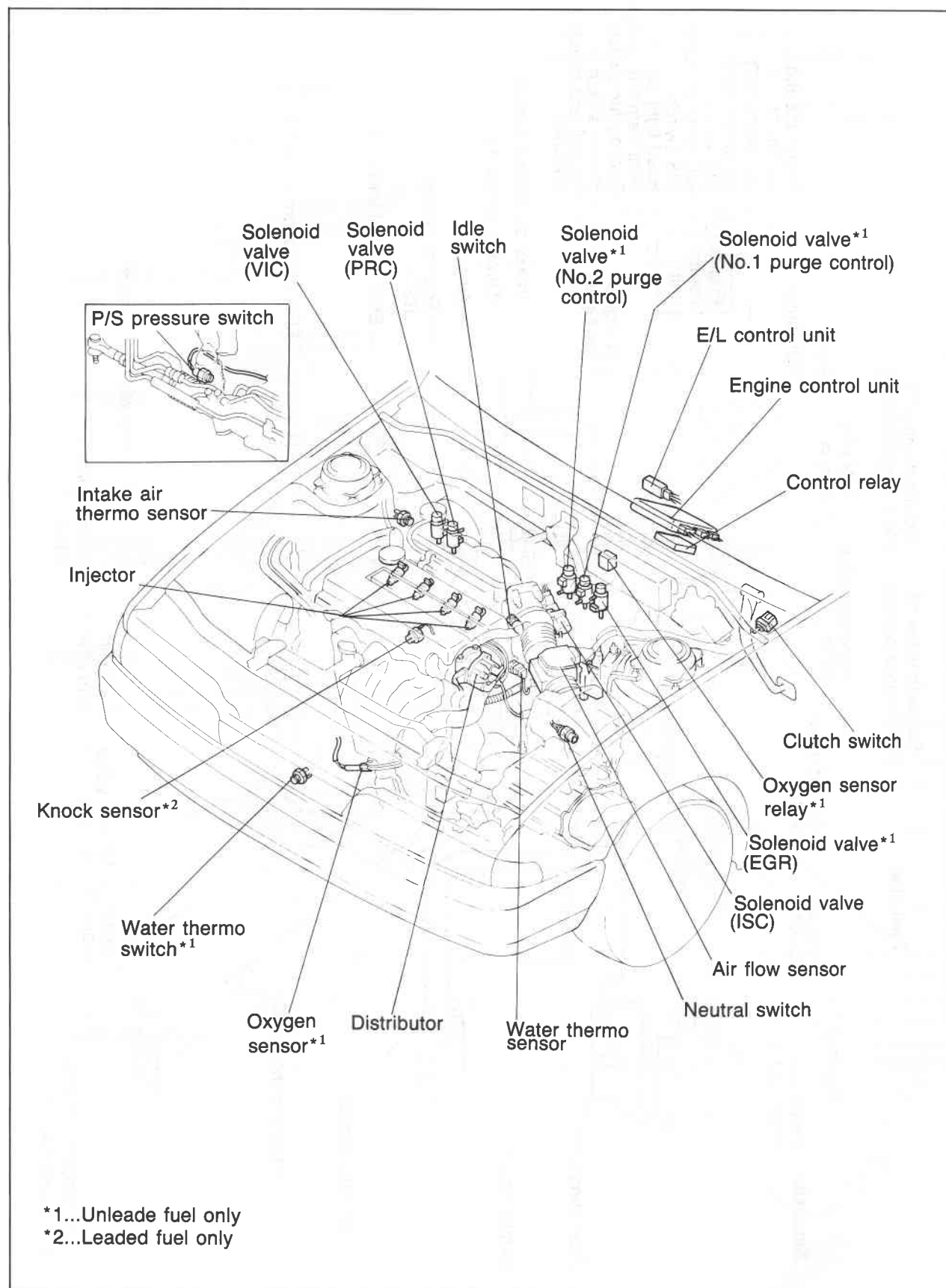
SYSTEM DIAGRAM



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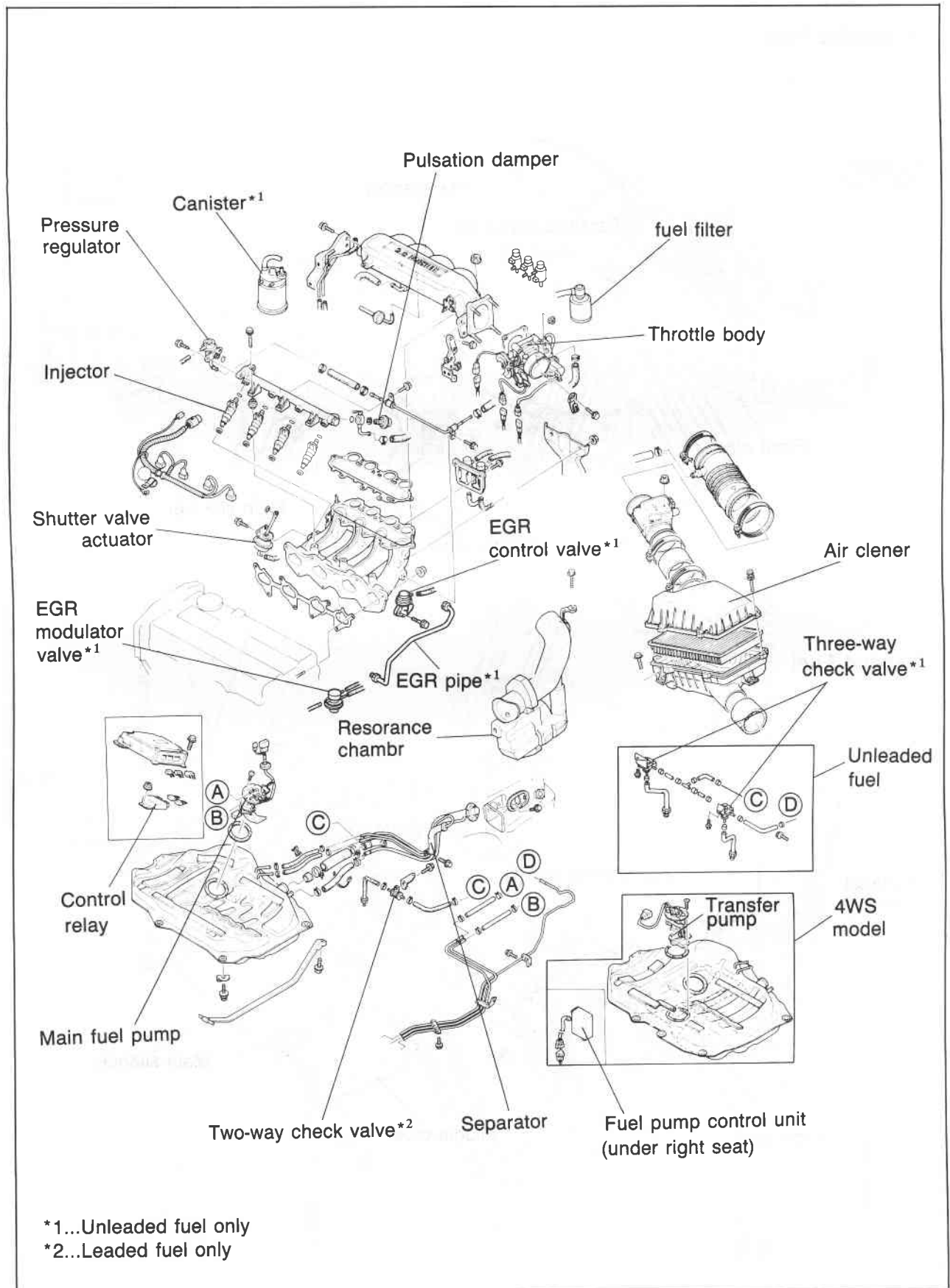
4C OUTLINE

COMPONENT LOCATION Input and Output Devices



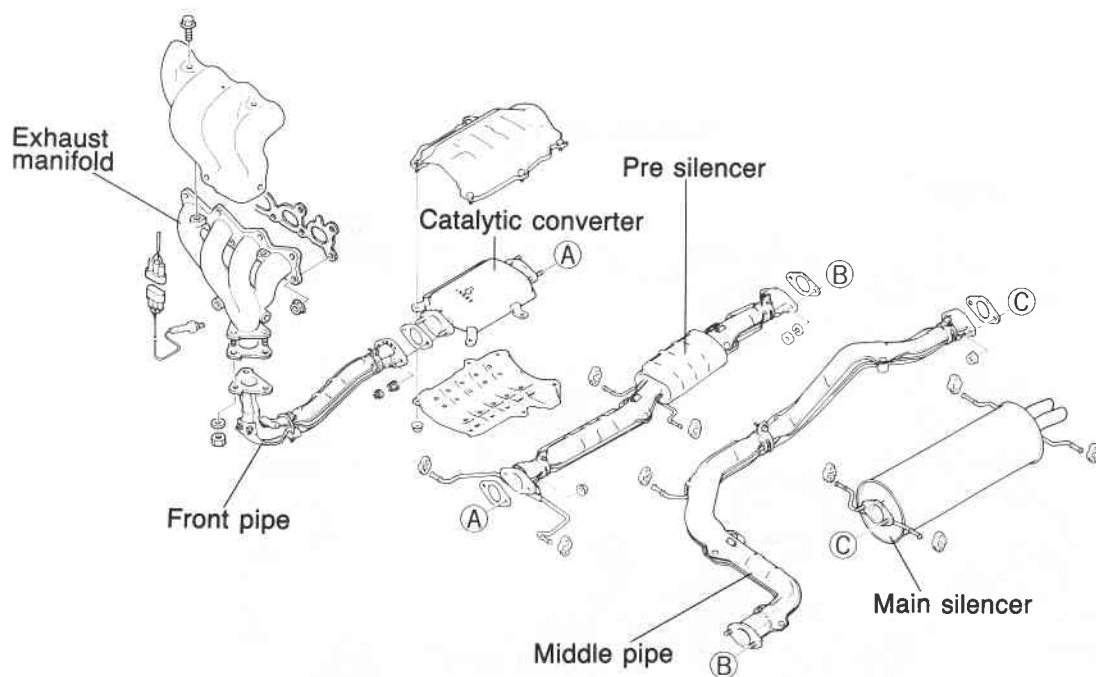
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Fuel System

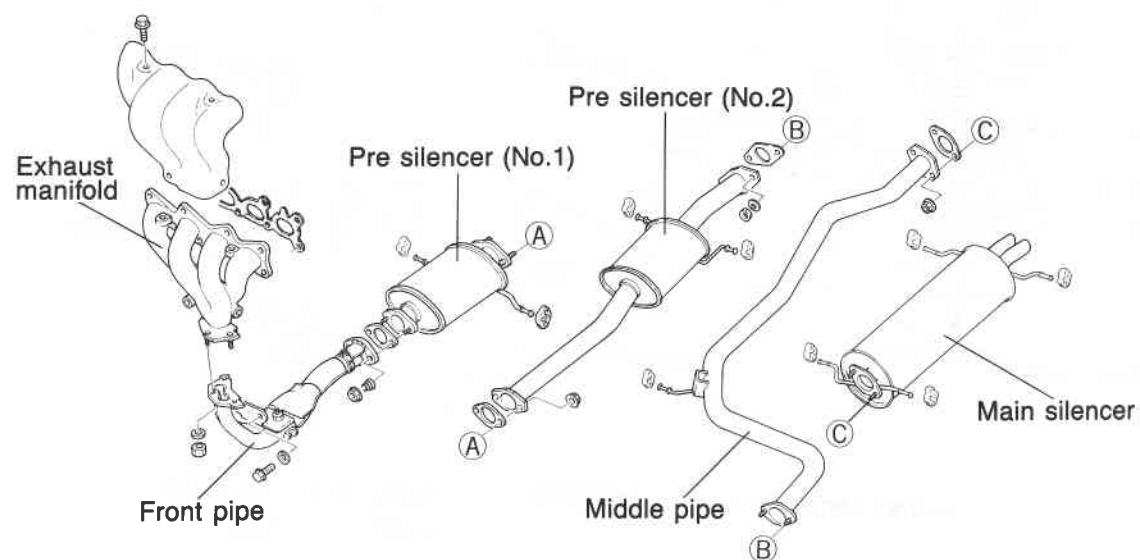


Exhaust System

Unleaded Fuel

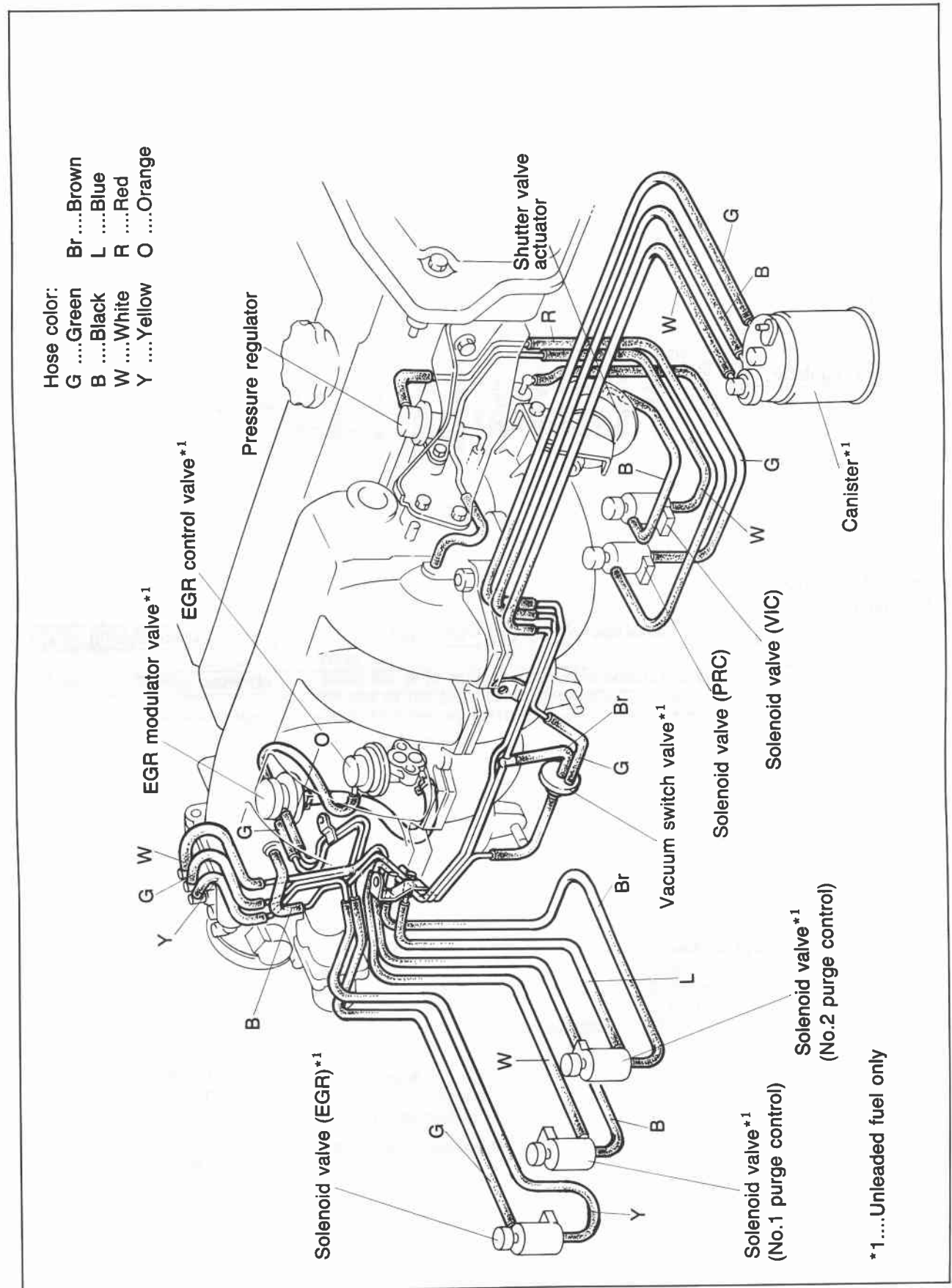


Leaded Fuel



76G04C-006

VACUUM HOSE ROUTING DIAGRAM



76G04C-007

SPECIFICATIONS

Item		Engine type	Unleaded Fuel	Leaded Fuel
Idle speed		rpm	750 ± 50	
Throttle body				
Type			Horizontal draft (2-barrel)	
Throat diameter	mm (in)	No. 1	46 (1.8)	
		No. 2	40 (1.6)	
Fuel pump				
Type			Impeller (in tank)	
Output pressure		kPa (kg/cm², psi)	Main pump: 441—588 (4.5—6.0, 64—85) Transfer pump: 20—25 (0.20—0.25, 2.8—3.6)	
Feeding capacity		cc (cu in)/10 sec.	Main pump: More than 220 (13.4) Transfer pump: More than 190 (11.6)	
Fuel filter				
Type	Low pressure side		Nylon element	
	High pressure side		Paper element	
Pressure regulator				
Type			Diaphragm	
Regulating pressure		kPa (kg/cm², 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), 57 (15.0, 12.5): 4-wheel steering vehicle	
Air cleaner				
Element type			Dry	
Fuel				
Specification			Unleaded (95 RON or more)	Leaded or unleaded fuel (95 RON or more)

76G04C-008

TROUBLESHOOTING GUIDE

This troubleshooting guide shows the malfunction 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)	Throttle sensor	Oxygen sensor	Feedback system	Solenoid valve (Pressure regulator control)	Solenoid valve (No. 1 purge control)	Solenoid valve (No. 2 purge control)	Solenoid valve (EGR)	Solenoid valve (Idle speed control)	Oxygen sensor relay	Solenoid valve (Variable inertia charging system)						
Symptom and No.		4C—16	4C—16	4C—17	4C—17	4C—18	4C—19	4C—19	4C—20	4C—21	4C—21	4C—22	4C—22	4C—23	4C—23	4C—24	4C—24						
1	Fault Indicated by SST Code No.	02	03	05 *1	08	09	11	12 *2	15 *2	17 *2	25	26 *2	27 *2	28 *2	34	36 *2	41						
2	Hard start or won't start (Crank OK)	<div><h3>TRoubleshooting Procedure</h3><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 4C—11.)</p><p>2nd: Check other switches with the SST. (Refer to page 4C—25.)</p><p>3rd: Check the following items:</p><table><tr><td>Electrical system 1) Battery condition 2) Fuses</td><td>Ignition system 1) Ignition spark 2) Ignition timing (with test connector grounded)</td></tr><tr><td>Fuel system 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded)</td><td>Intake air system 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable</td></tr><tr><td>Engine 1) Compression 2) Overheating</td><td>Others 1) Clutch slippage 2) Brake dragging</td></tr></table><p>4th: Check Fuel and Emission Control Systems. (Refer to page 4C—10.)</p></div>																Electrical system 1) Battery condition 2) Fuses	Ignition system 1) Ignition spark 2) Ignition timing (with test connector grounded)	Fuel system 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded)	Intake air system 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable	Engine 1) Compression 2) Overheating	Others 1) Clutch slippage 2) Brake dragging
Electrical system 1) Battery condition 2) Fuses	Ignition system 1) Ignition spark 2) Ignition timing (with test connector grounded)																						
Fuel system 1) Fuel level 2) Fuel leakage 3) Fuel filter 4) Idle speed (with test connector grounded)	Intake air system 1) Air cleaner element 2) Vacuum or air leakage 3) Vacuum hose routing 4) Accelerator cable																						
Engine 1) Compression 2) Overheating	Others 1) Clutch slippage 2) Brake dragging																						
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 consumption																						
10	Engine stalls or runs rough after hot starting																						
11	Knocking																						
12	Fails emission test																						

*1.....Leaded fuel

*2.....Unleaded fuel

76G04C-009

4C 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.

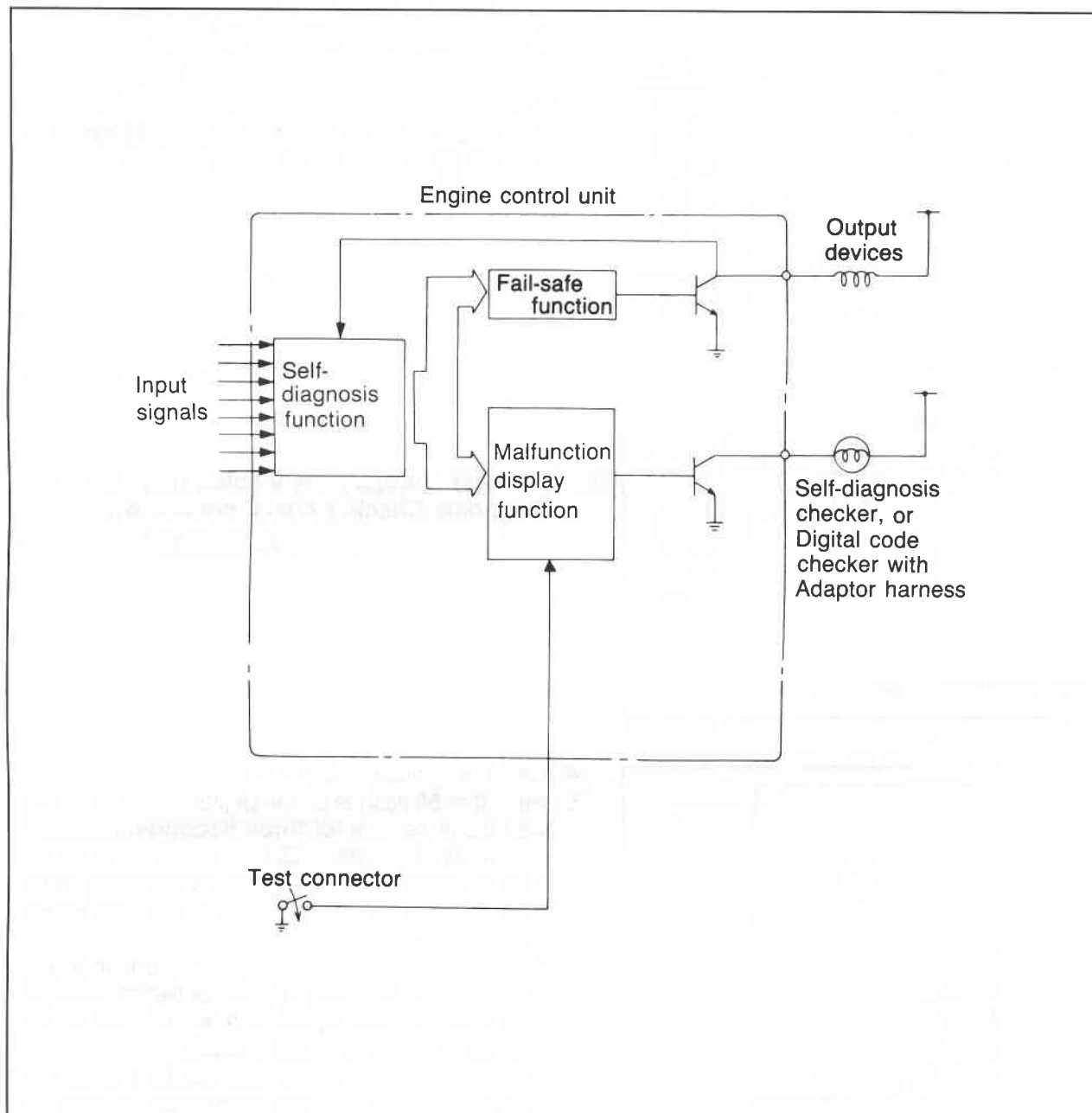
System		INTAKE AIR SYSTEM	FUEL SYSTEM	PRESSURE REGULATOR CONTROL (PRC) SYSTEM	IDLE SPEED CONTROL (ISC) SYSTEM	ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM	EXHAUST GAS RECIRCULATION (EGR) SYSTEM	EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM	POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	DECELERATION CONTROL SYSTEM	EXHAUST SYSTEM	VARIABLE INERTIA CONTROL (VIC) SYSTEM
		4C—31	4C—49	4C—68	4C—44	4C—75	4C—77	4C—80	4C—86	4C—72	4C—87 & 89	4C—39
Symptom No.	2	3	2	—	—	1	—	—	—	—	—	—
	3	4	3	—	1	—	2	—	—	—	—	—
		5	4	—	2	—	3	—	1	—	—	—
	4	5	4	—	1	—	3	—	2	—	—	—
		6	5	—	2	—	3	4	1	—	—	—
	5	2	3	—	1	—	—	—	—	—	—	—
	6	3	4	—	—	—	1	2	—	—	6	5
	7	4	3	—	2	—	—	—	—	1	—	—
	8	3	4	—	1	—	—	—	—	2	—	—
	9	—	2	—	—	—	3	—	—	1	5	4
	10	—	2	1	—	—	—	—	—	—	—	—
	11	—	—	—	—	1	—	—	—	—	—	—
	12	6	7	—	4	—	2	5	—	3	1	—

76G04C-010

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

76G04C-011

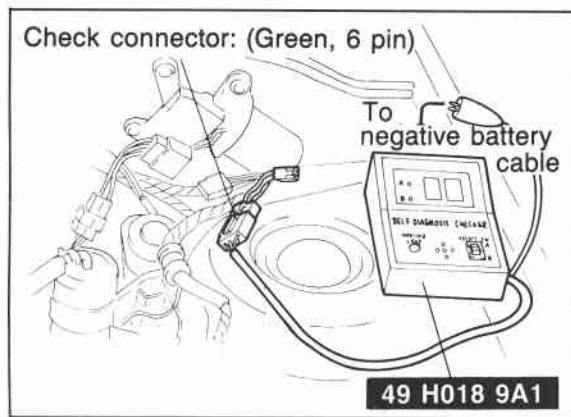
When troubles occur in the main input devices or output devices, check for the cause with the **SST (Self-Diagnosis checker 49 H018 9A1 or Digital code checker 49 G018 9A0 with Adaptor harness 49 9200 180)**.

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

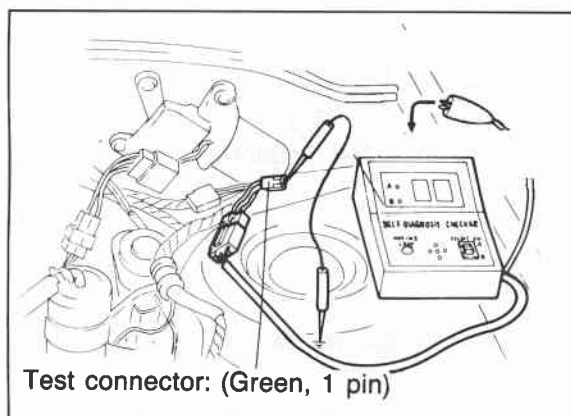
Note

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 the test connector is grounded.

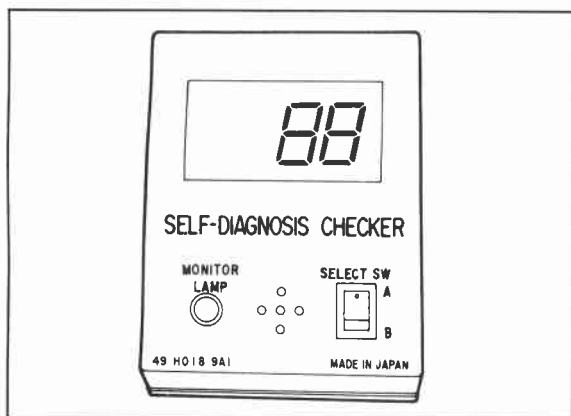
4C TROUBLESHOOTING WITH SST



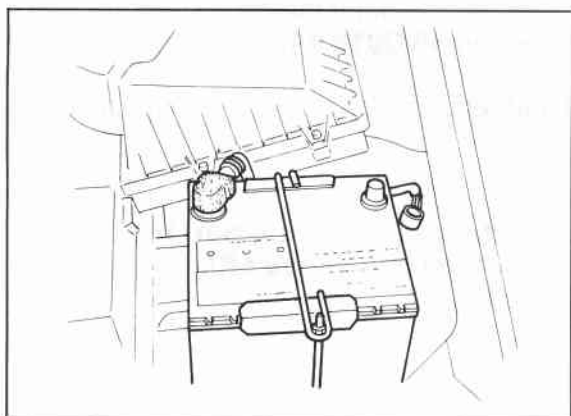
86U04A-011



86U04A-012



76G04C-012



76G04C-013

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.

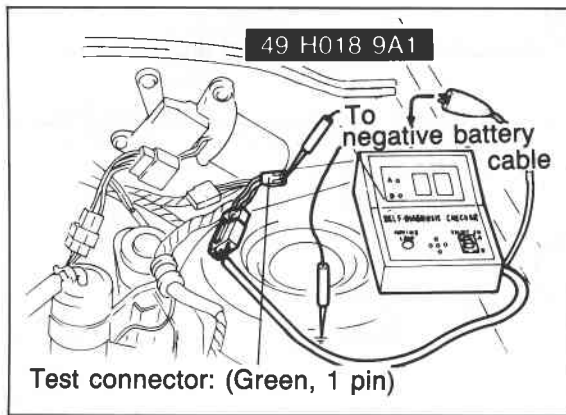
4. Turn the ignition switch ON.
5. Verify that **88** flashes on the digital display and that the buzzer sounds for **three seconds** after turning the ignition switch ON.
6. If **88** does not flash, check the control relay (refer to page 4C—96), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds** check the check connector wiring, then 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 **4C—16 to 4C—24**. 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 depress the brake pedal for at least **five** seconds.



86U04A-015

**Ignition switch: ON
for six seconds**

76G04C-014

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.

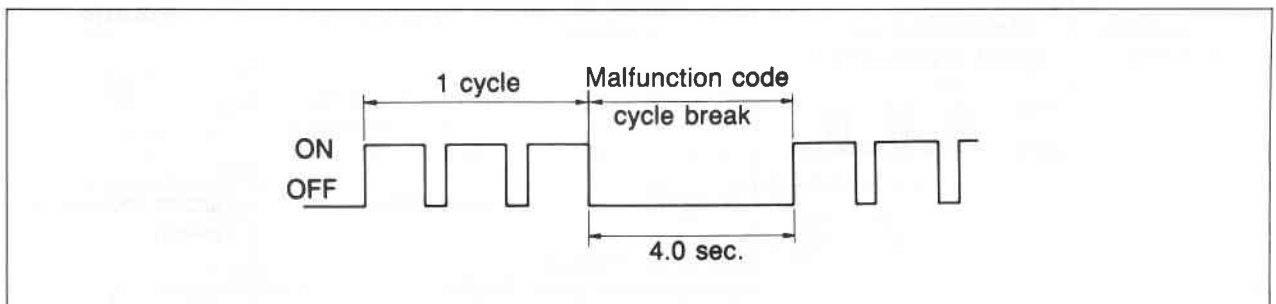
PRINCIPLE OF CODE CYCLE

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).

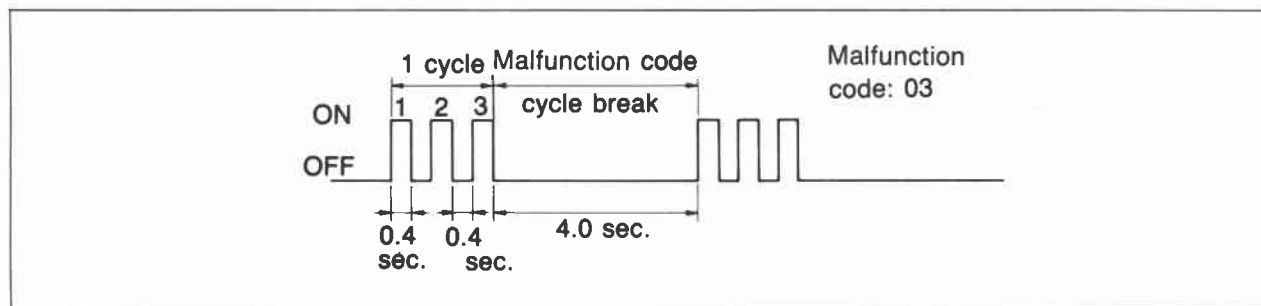


86U04A-018

4C 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.

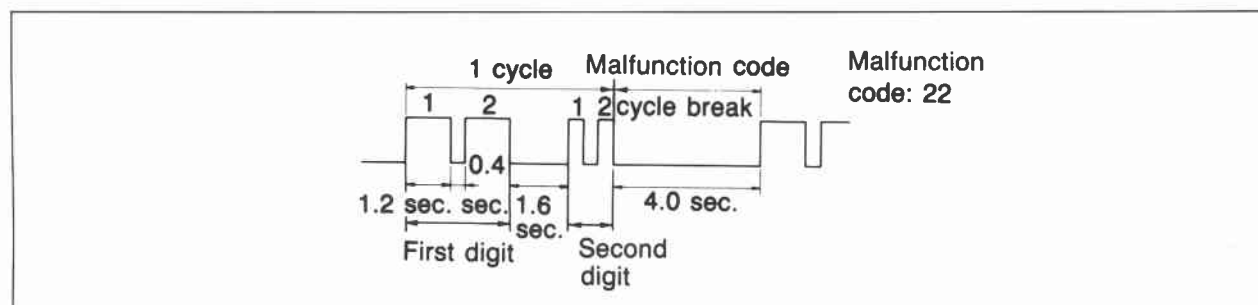


76G04C-015

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.



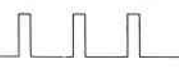












76G04C-016

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 craking	—
03	ON OFF	G signal	No G signal	Cancels sequential injection
05	ON OFF	Knock sensor (only leaded fuel)	Open or short circuit	<ul style="list-style-type: none"> Retards ignition timing 4°

76G04C-017

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
12	ON  OFF	Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
15	ON  OFF	Oxygen sensor	Sensor output continues less than 0.55V 120 sec. after engine starts (1,500 rpm or over)	Cancels EGI feedback operation
17	ON  OFF	Feedback system	Sensor output not changed 20 sec. after engine starts (1,500 rpm or over)	Cancels EGI feedback operation
25	ON  OFF	Solenoid valve (pressure regulator control)	Open or short circuit	—
26	ON  OFF	Solenoid valve (No.1 purge control)		—
27	ON  OFF	Solenoid valve (No.2 purge control)		—
28	ON  OFF	Solenoid valve (EGR)		—
34	ON  OFF	Solenoid valve (Idle speed control)		—
36	ON  OFF	Oxygen sensor relay		—
41	ON  OFF	Solenoid valve (Variable inertia control)		—

76G04C-018

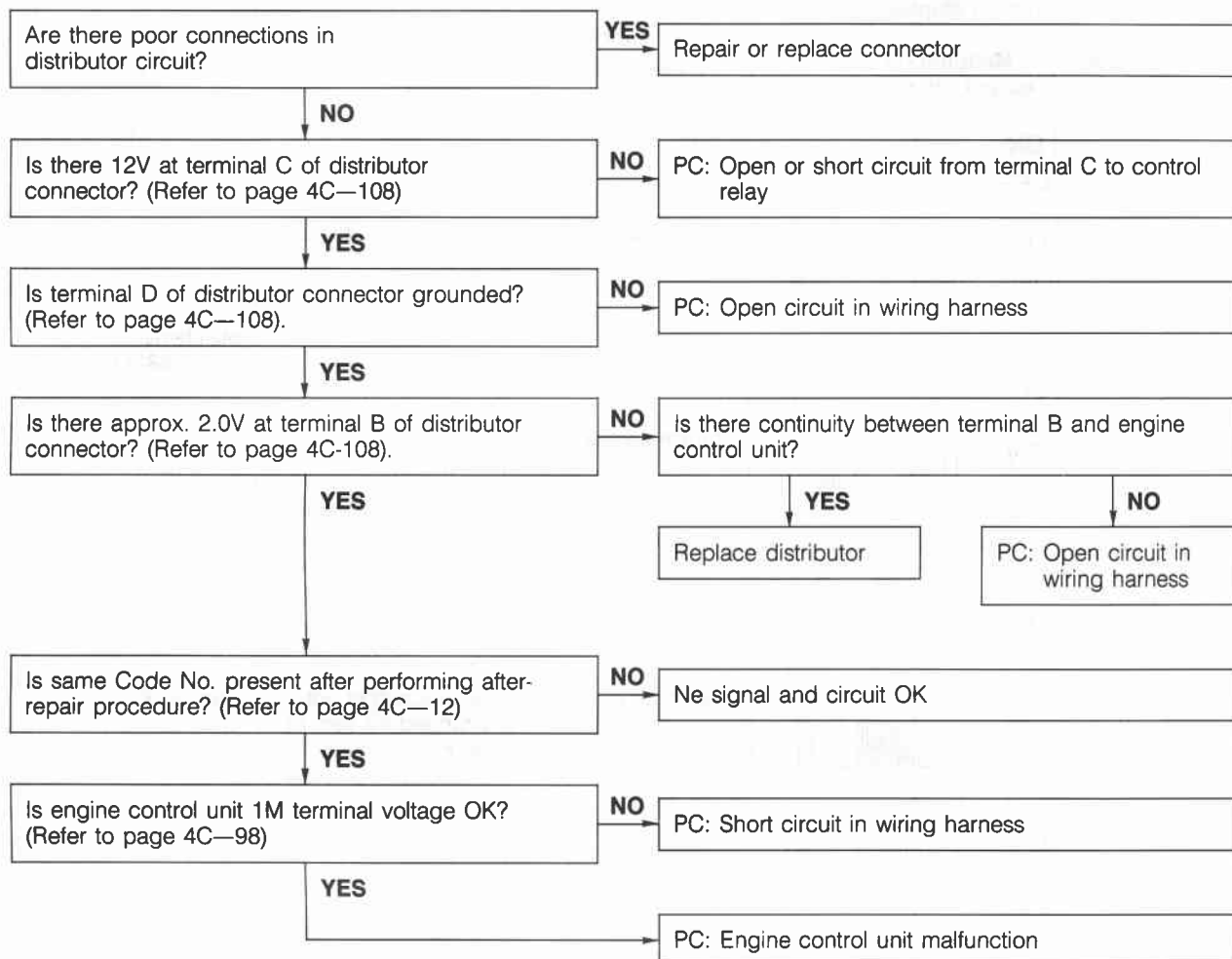
Caution

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

4C TROUBLESHOOTING WITH SST

Code No.2 (Ne signal)

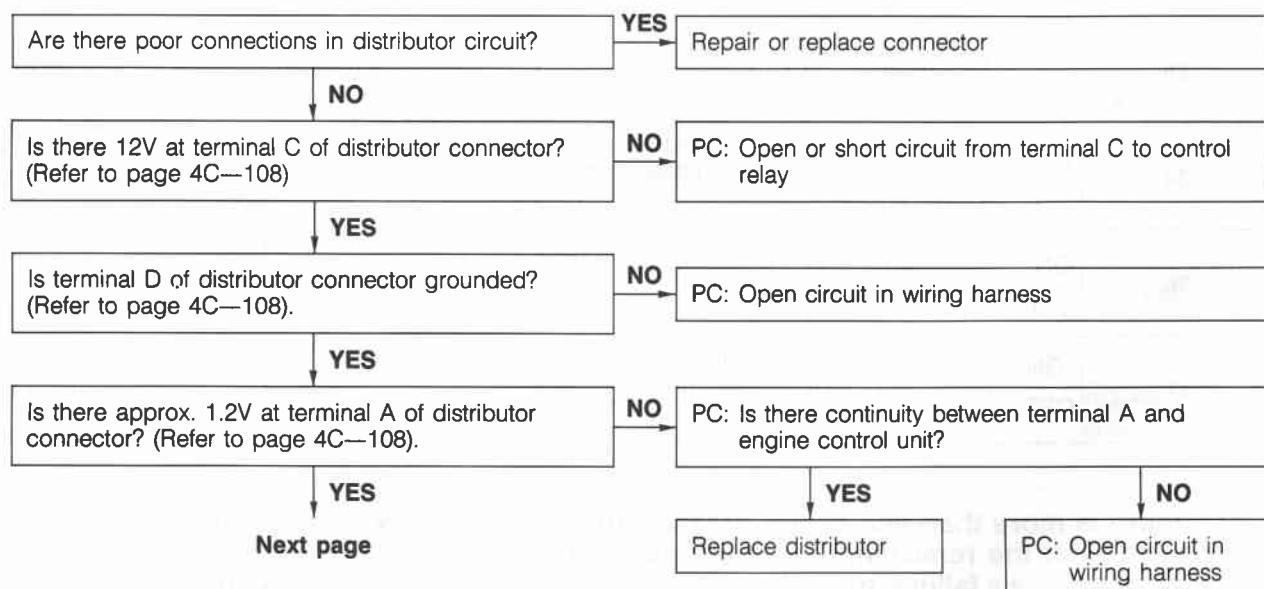
PC: Possible Cause

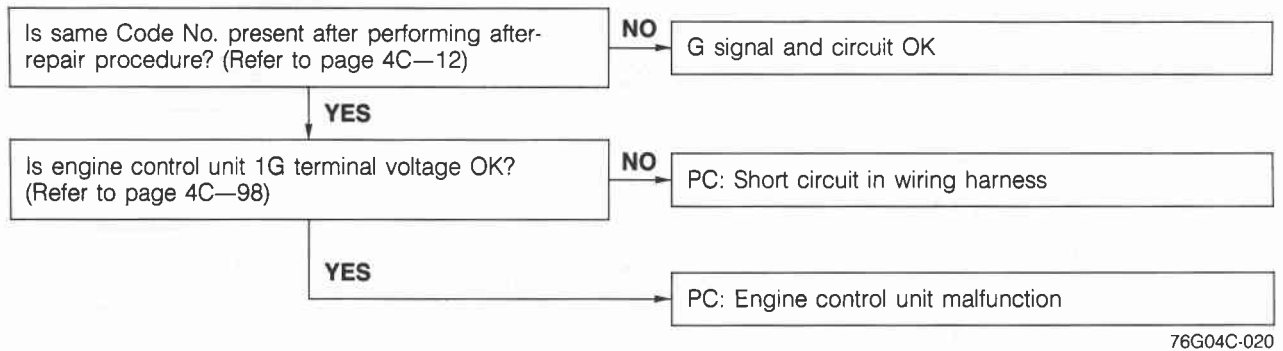


76G04C-019

Code No.3 (G signal)

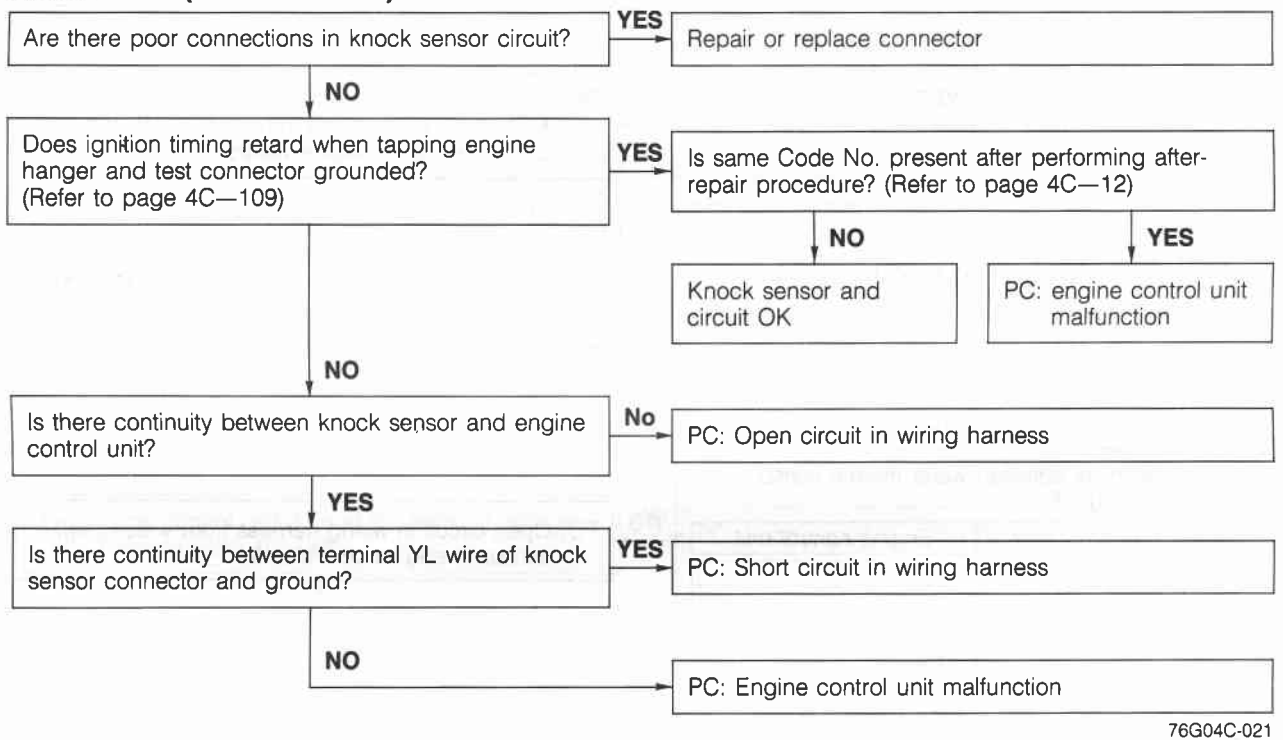
PC: Possible Cause





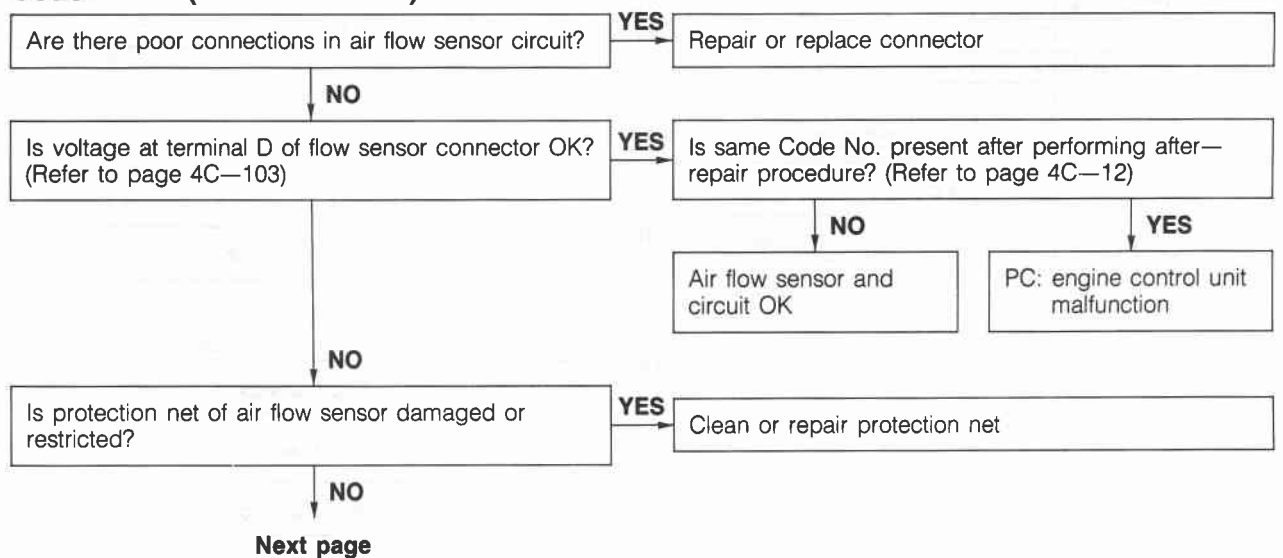
Code No.05 (Knock sensor)

PC: Possible Cause

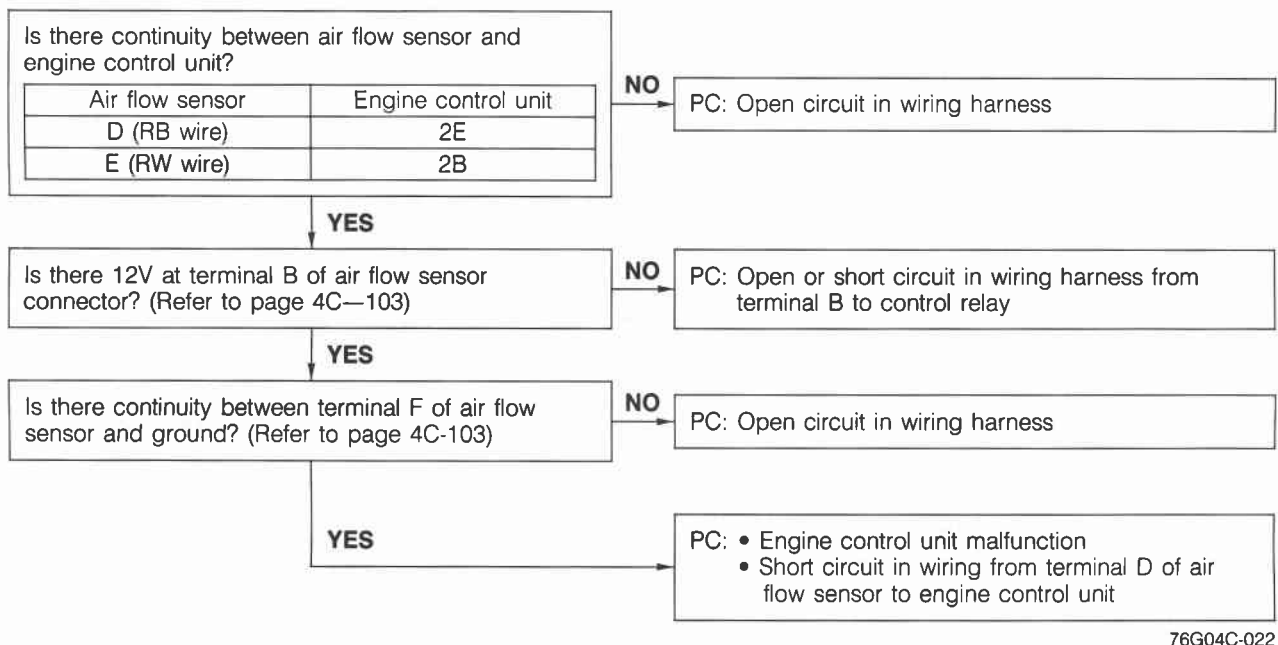


Code No.08 (Air flow sensor)

PC: Possible Cause

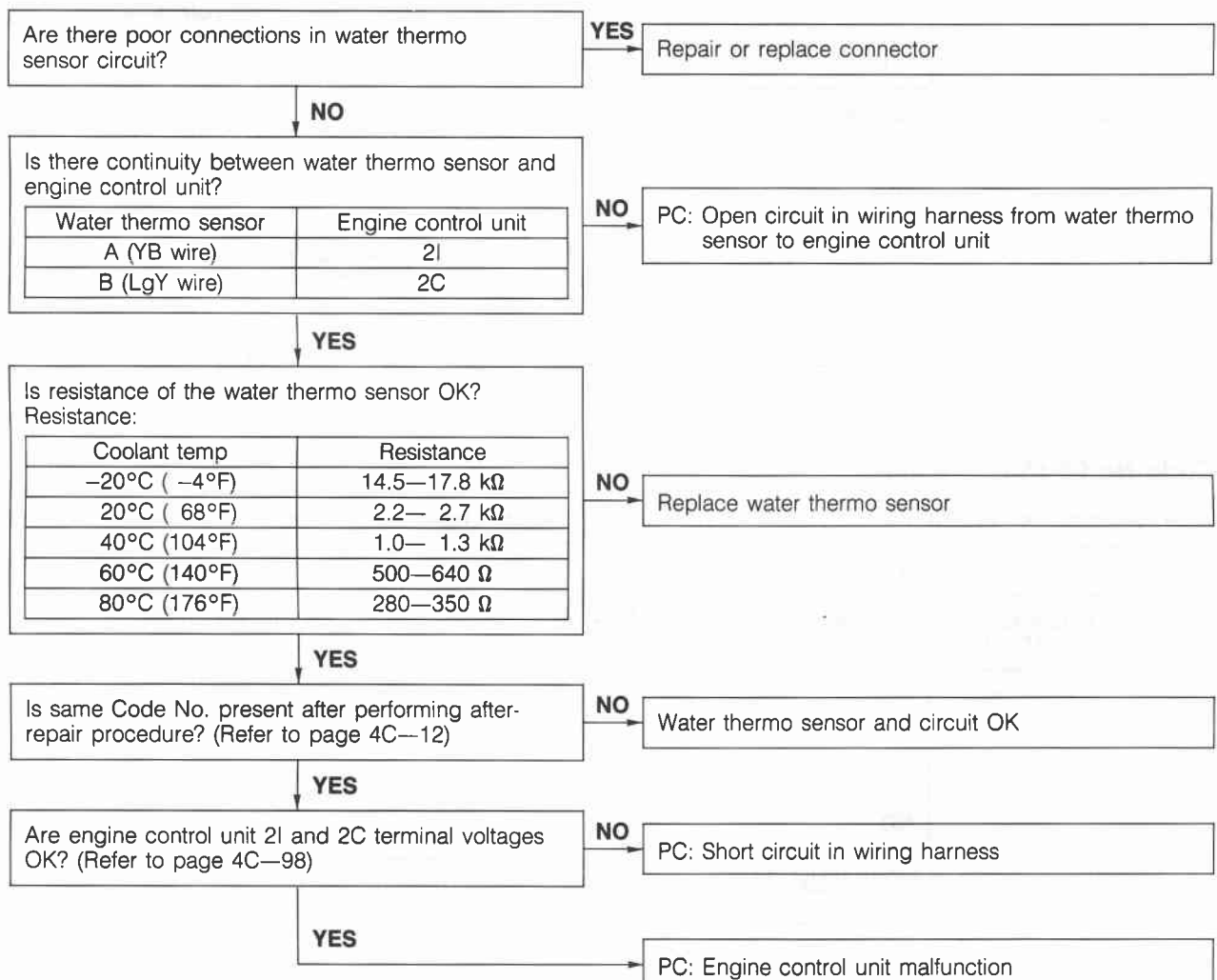


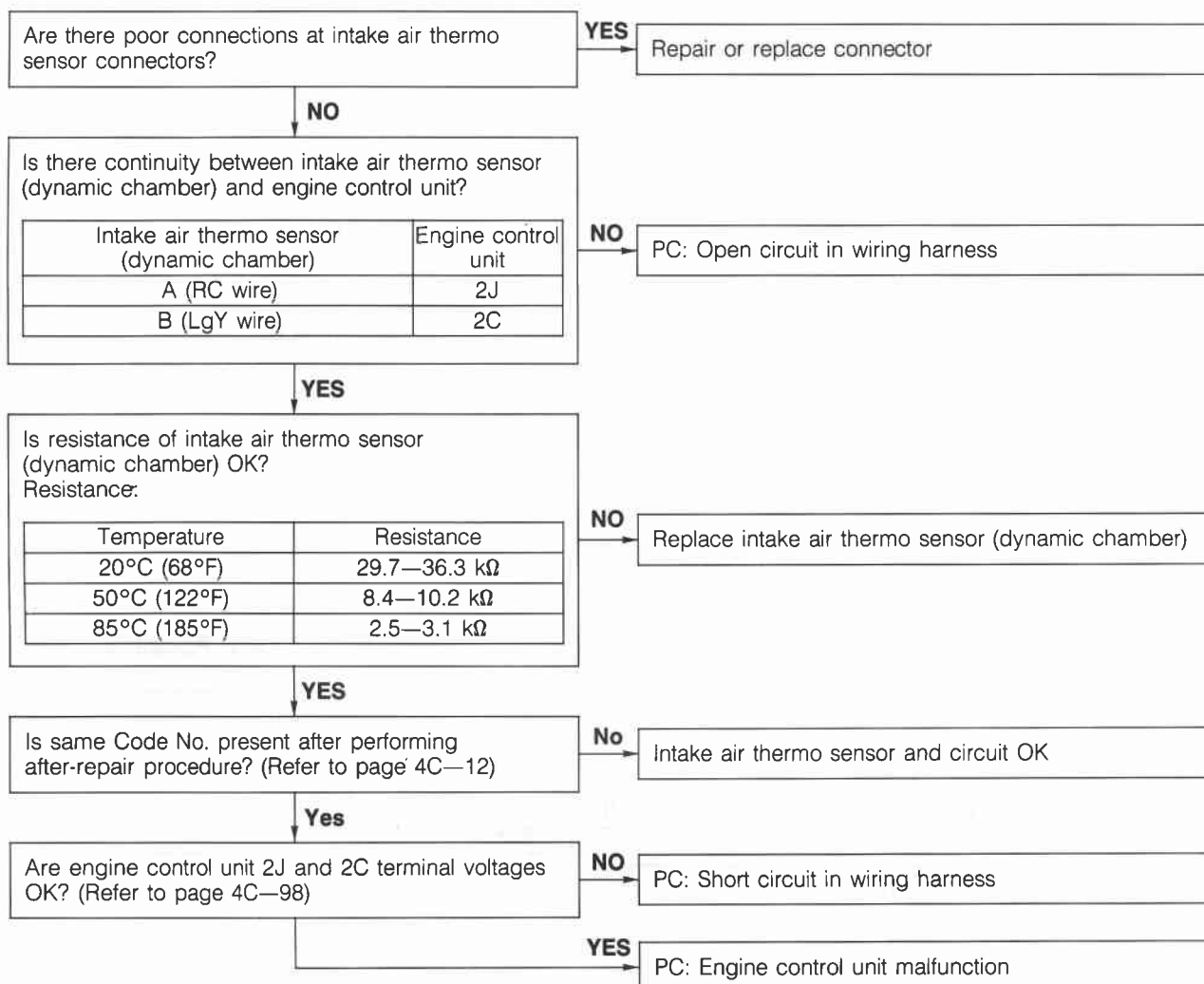
4C TROUBLESHOOTING WITH SST



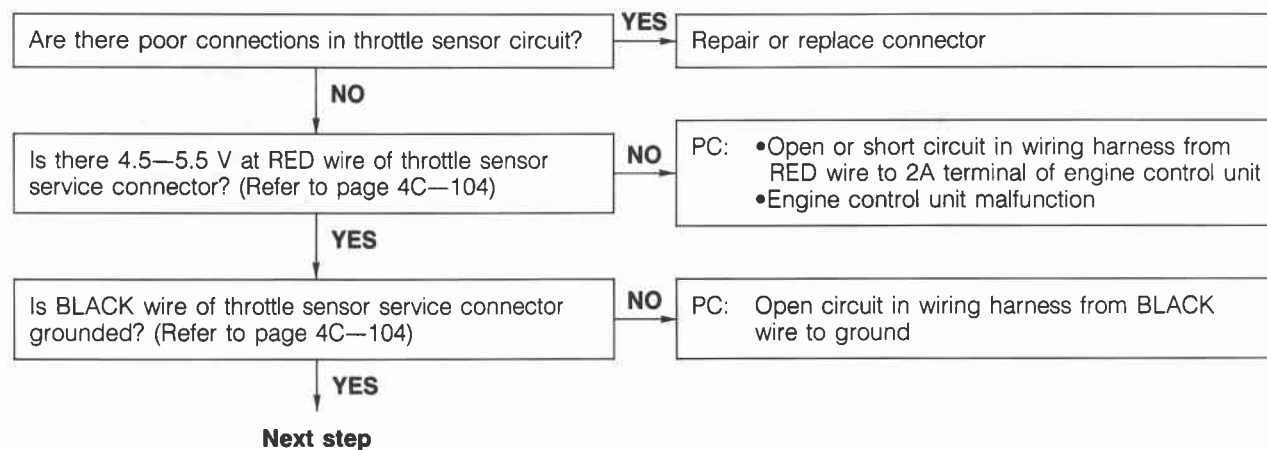
Code No. 09 (Water thermo sensor)

PC: Possible Cause

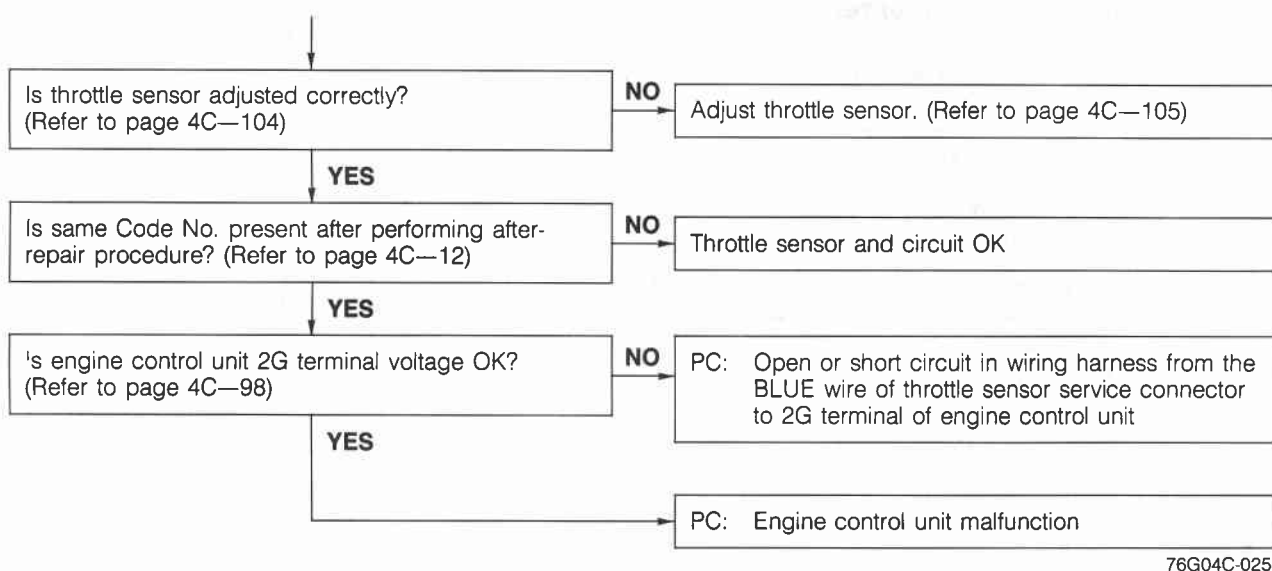


No. 11 Code (Intake air thermo sensor)**PC: Possible Cause**

76G04C-024

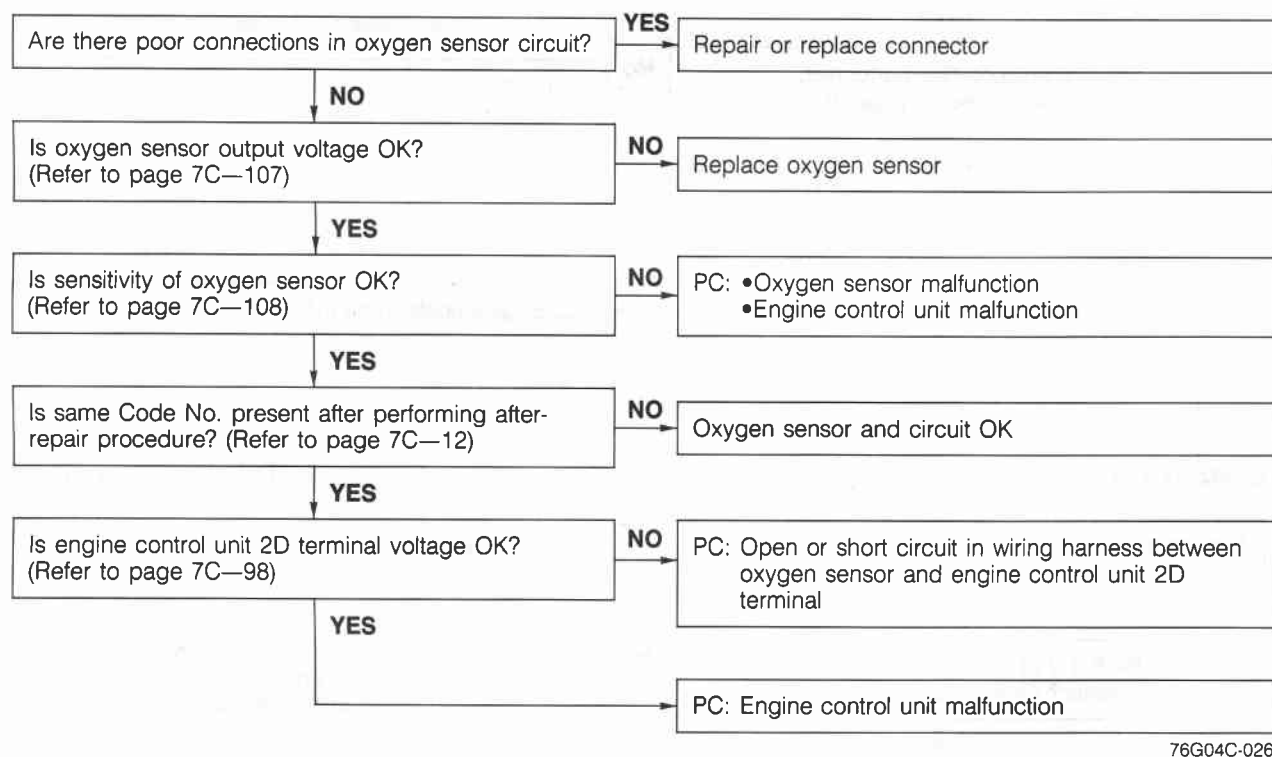
Code No. 12 (Throttle sensor)**PC: Possible cause**

4C TROUBLESHOOTING WITH SST



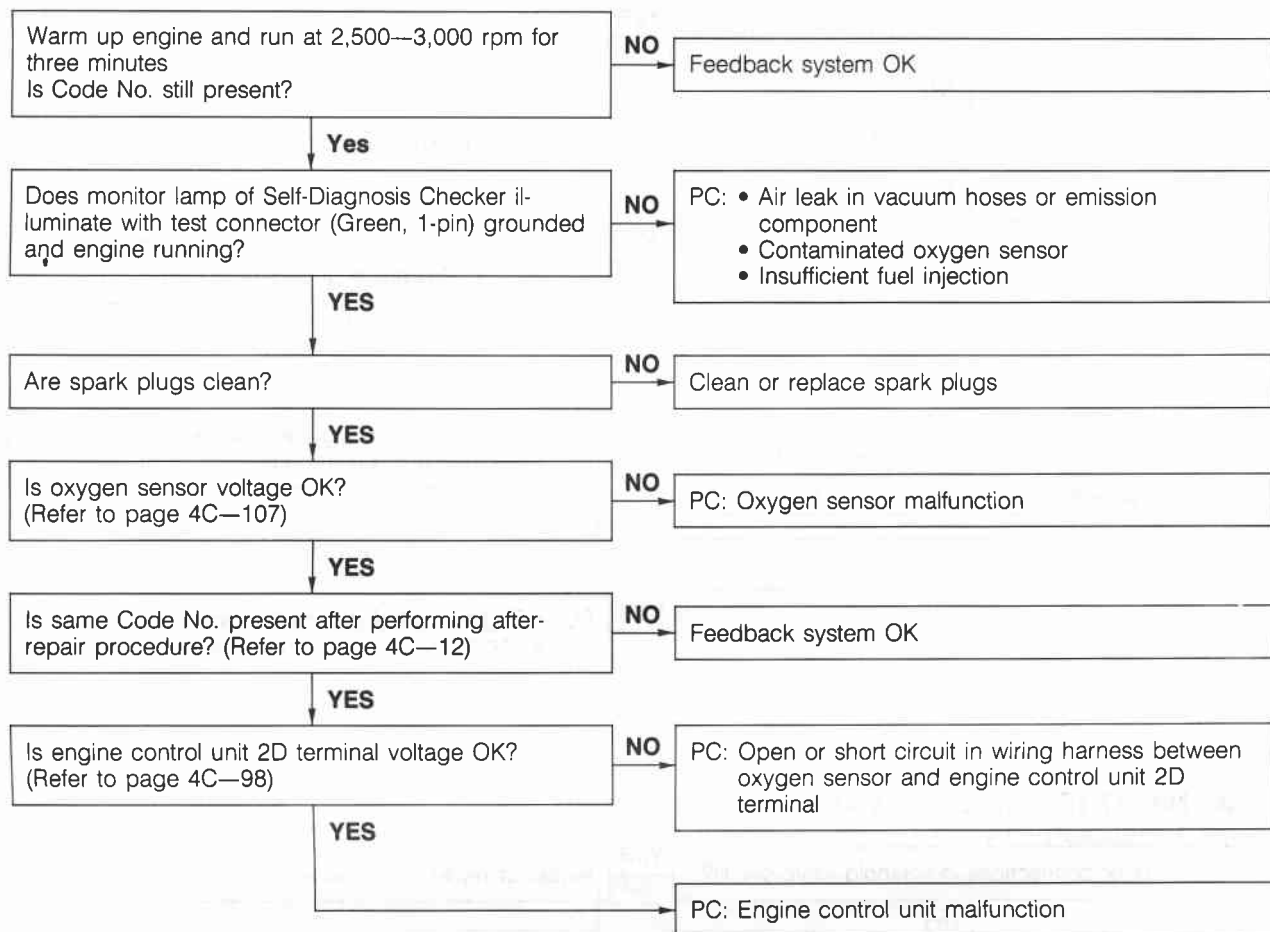
Code No. 15 (Oxygen sensor)

PC: Possible Cause



Code No. 17 (Feedback system)

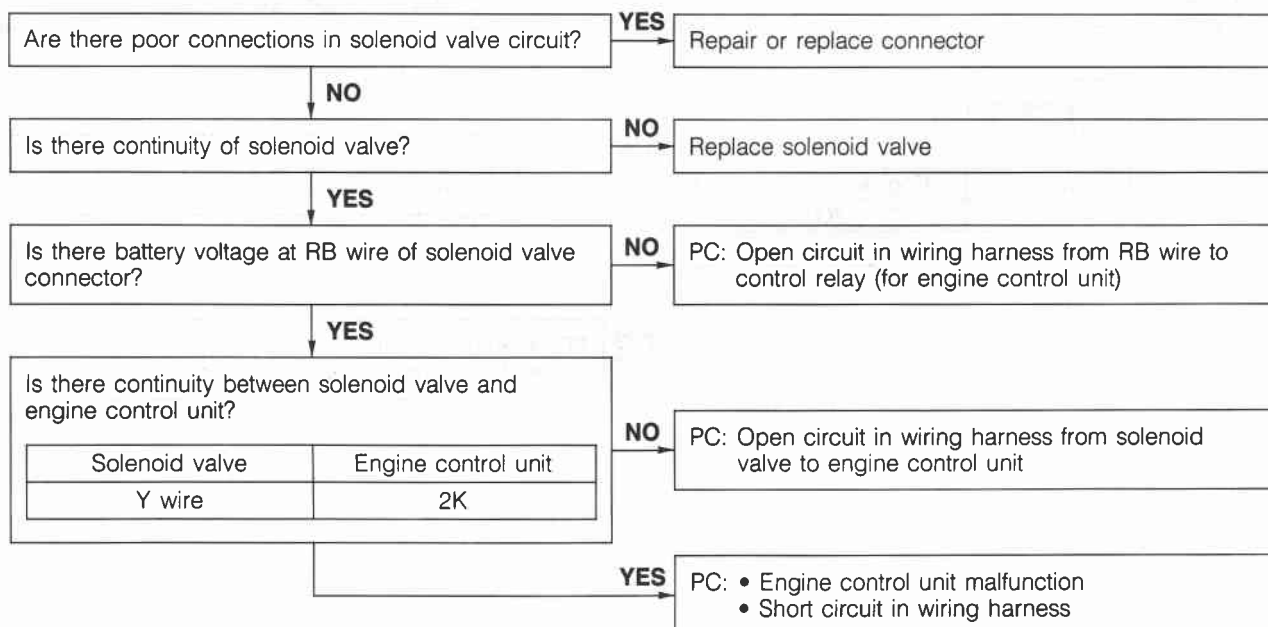
PC: Possible Cause



76G04C-027

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

PC: Possible Cause

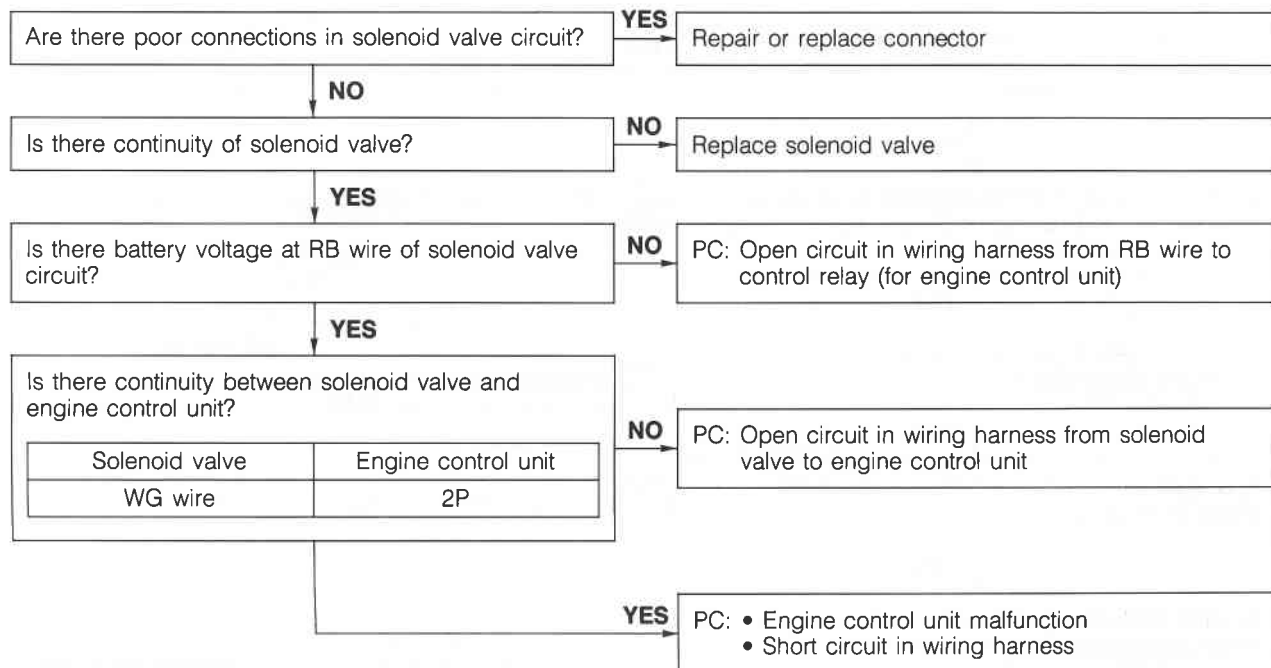


76G04C-028

4C TROUBLESHOOTING WITH SST

Code No. 26 (Solenoid valve—No. 1 purge control)

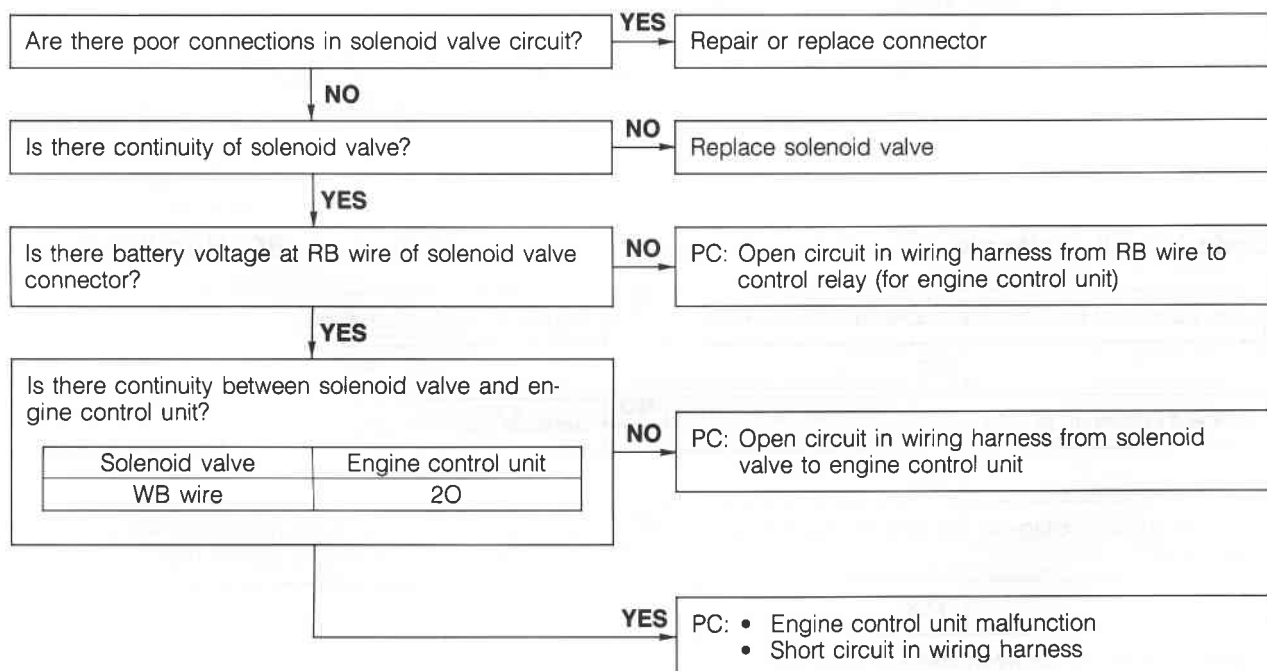
PC: Possible Cause



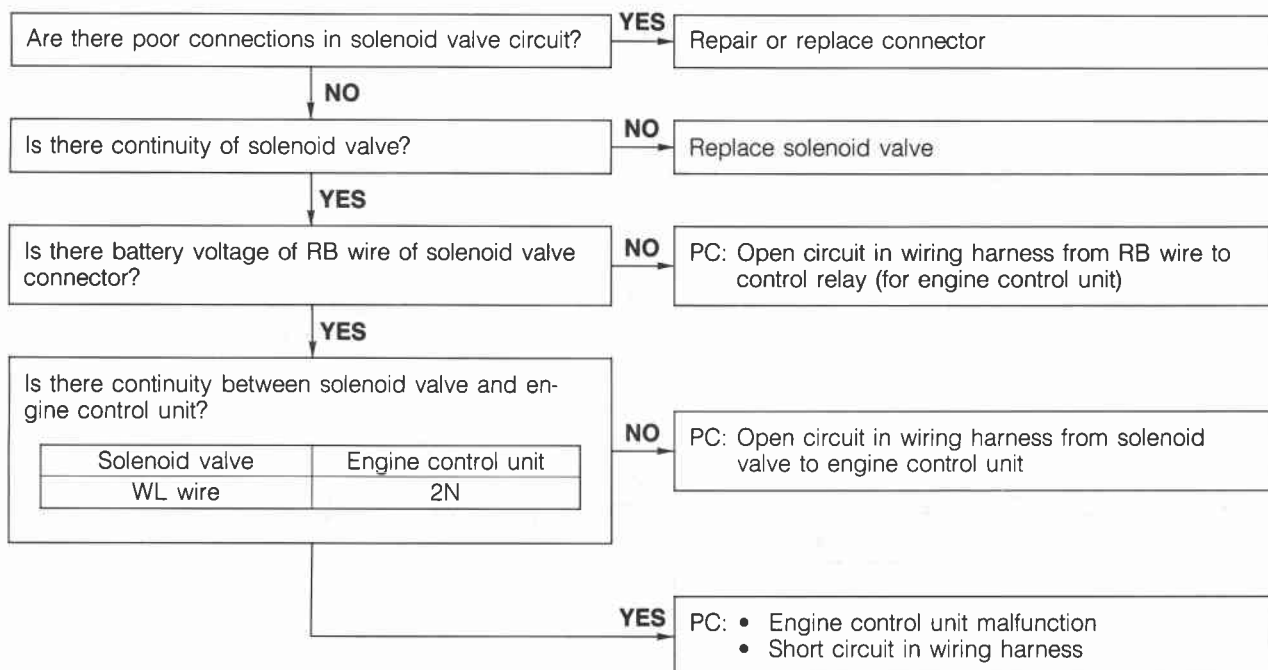
76G04C-029

Code No. 27 (Solenoid valve—No. 2 purge control)

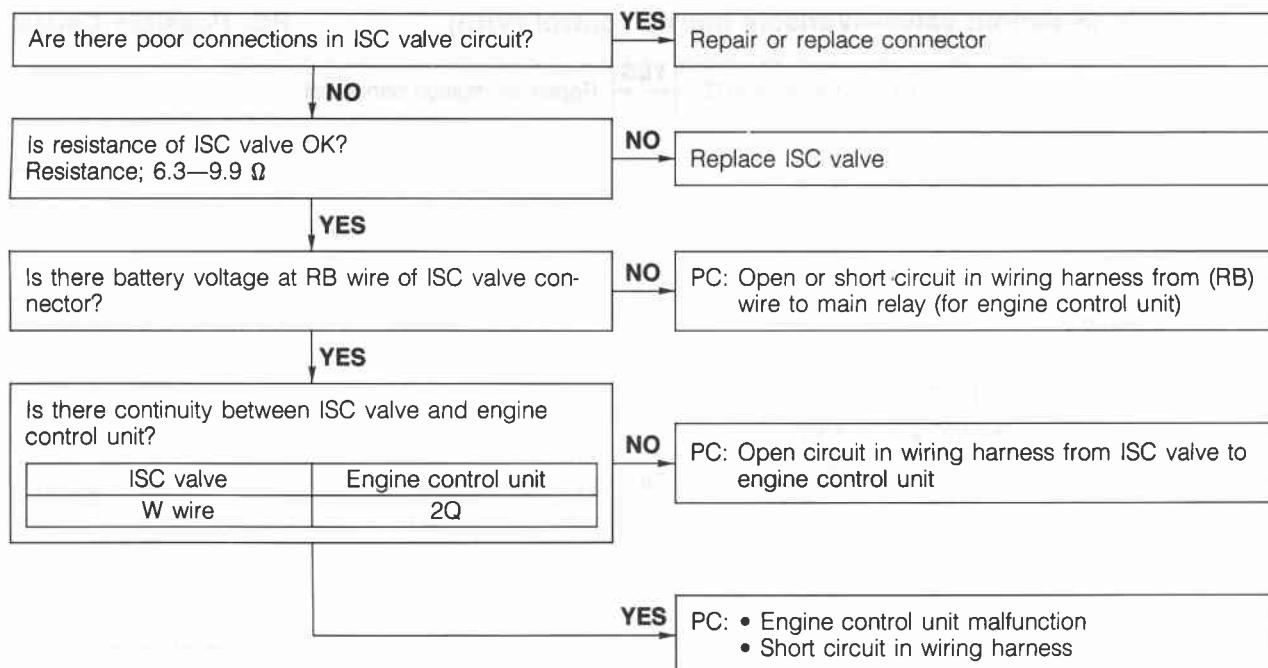
PC: Possible Cause



76G04C-030

Code No. 28 (Solenoid valve—EGR)**PC: Possible Cause**

76G04C-031

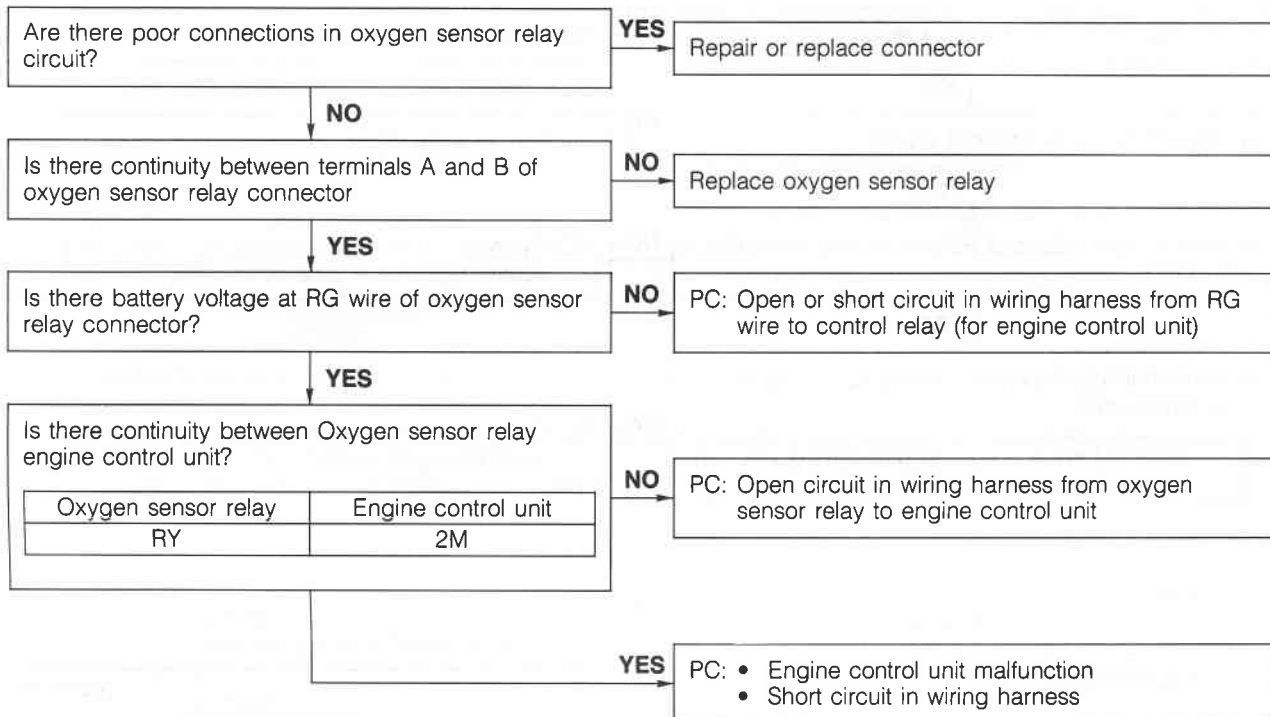
Code No. 34 (Solenoid valve—Idle speed control (ISC))**PC: Possible Cause**

76G04C-032

4C TROUBLESHOOTING WITH SST

No.36 Code (Oxygen sensor relay)

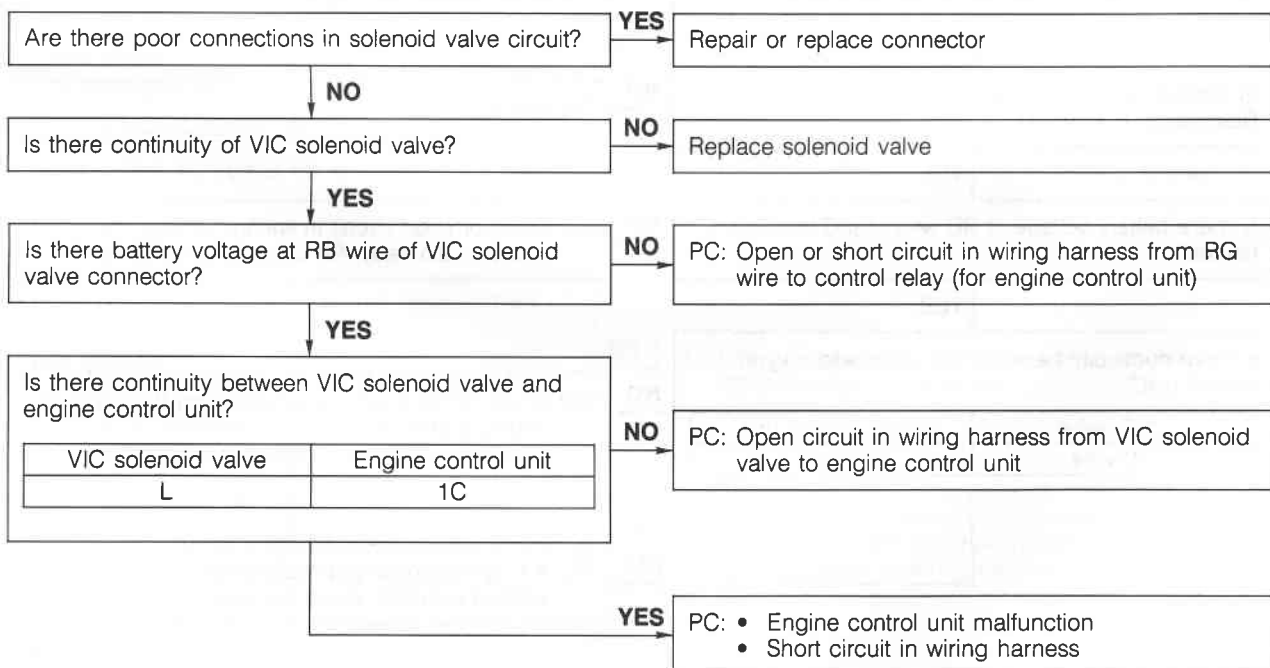
PC: Possible Cause



76G04C-033

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

PC: Possible Cause



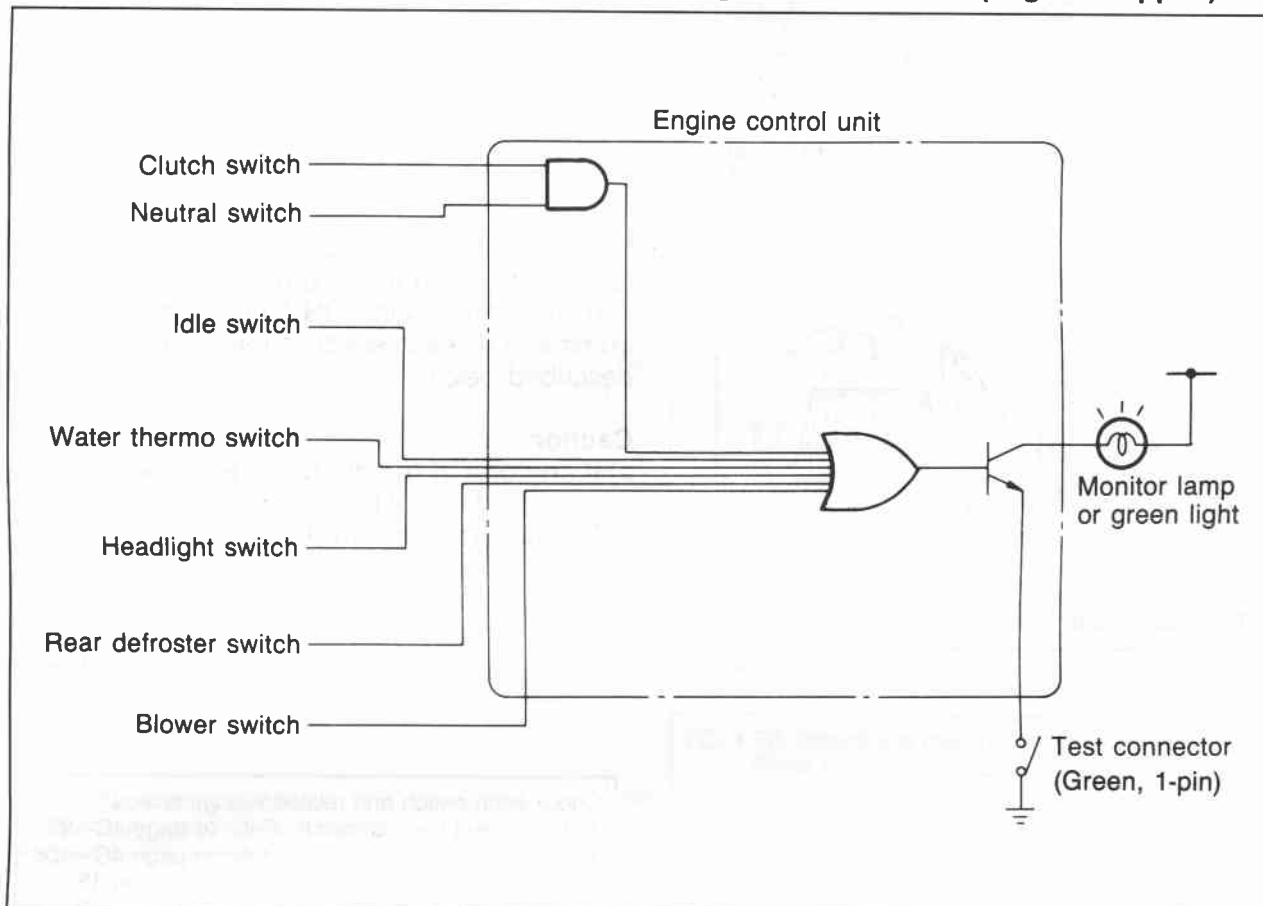
76G04C-034

SWITCH MONITOR FUNCTION

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

Note

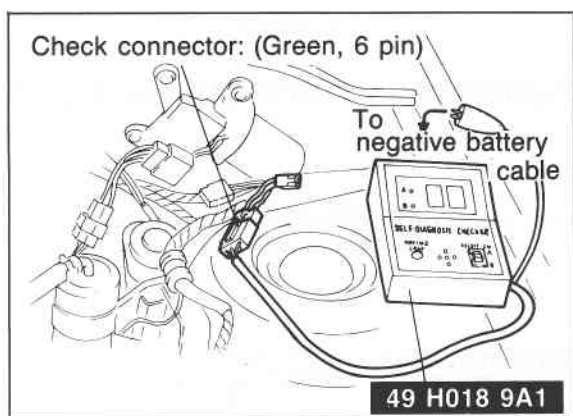
The test connector must be grounded and the ignition switch ON (engine stopped).



76G04C-035

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 released
Idle switch	Pedal depressed	Pedal released	—
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position: "3" or "4"
Water thermo switch (Electrical fan)	Terminal disconnected	Terminal connected	While fan not operating

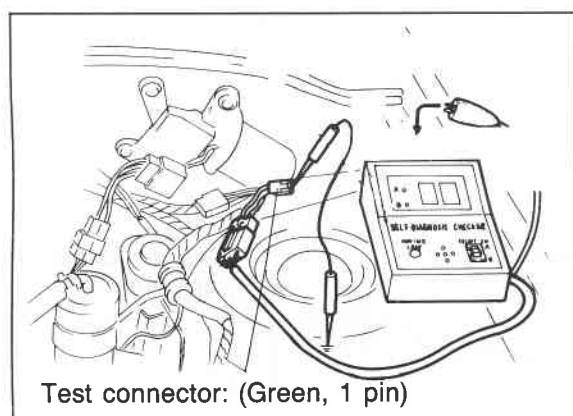
4C SWITCH MONITOR FUNCTION



86U04A-034

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.



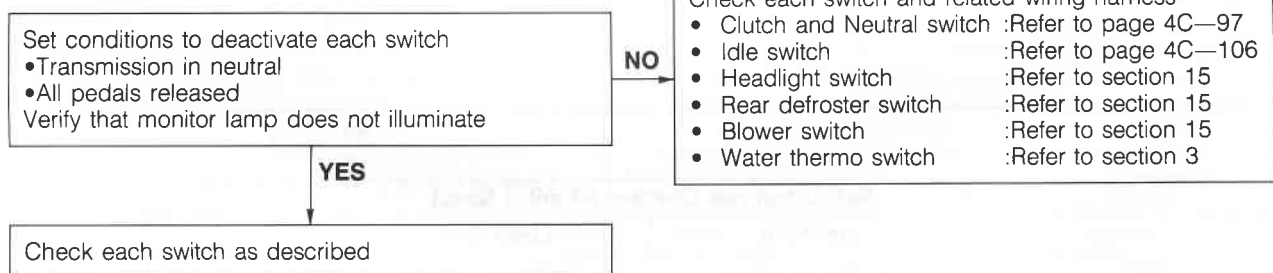
76G04C-036

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

Caution

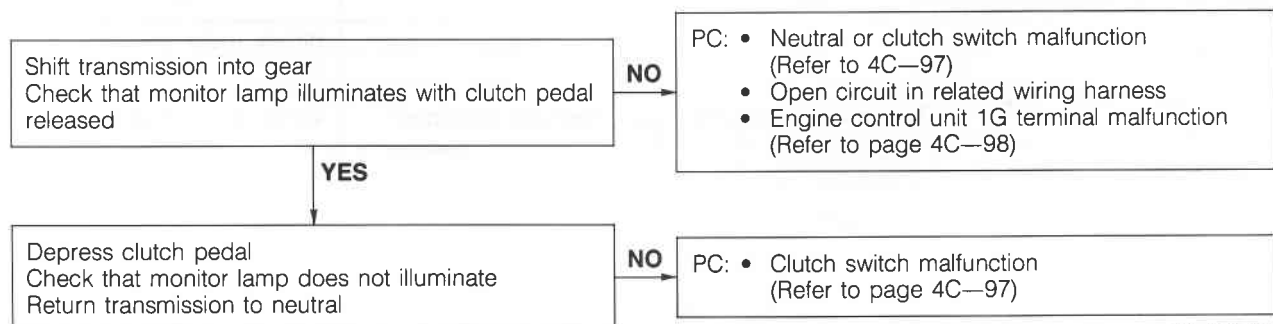
- a) If any one of the switches is activated, the monitor lamp will stay on.
- b) Do not start the engine.

Procedure



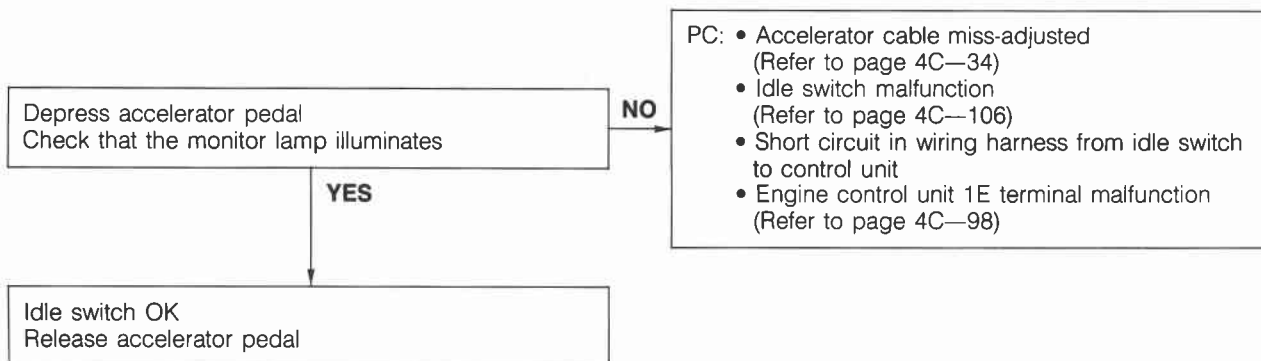
76G04C-037

Neutral and Clutch switch



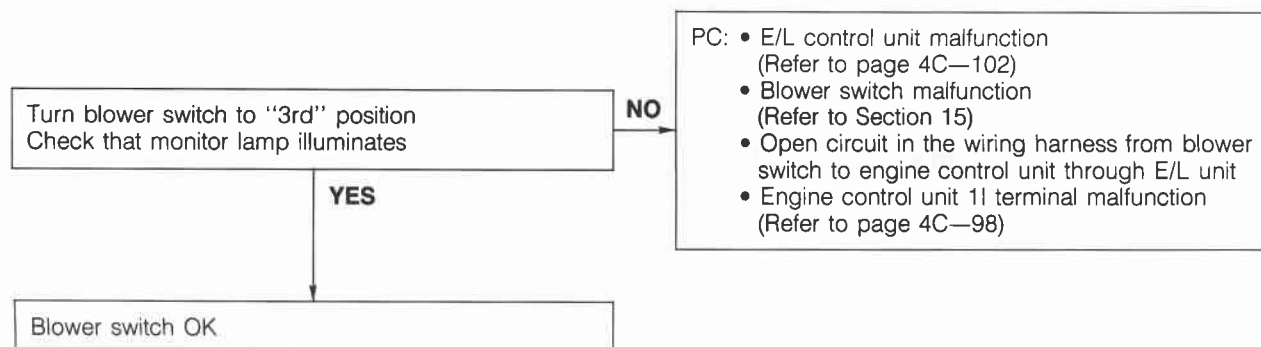
76G04C-038

Idle switch



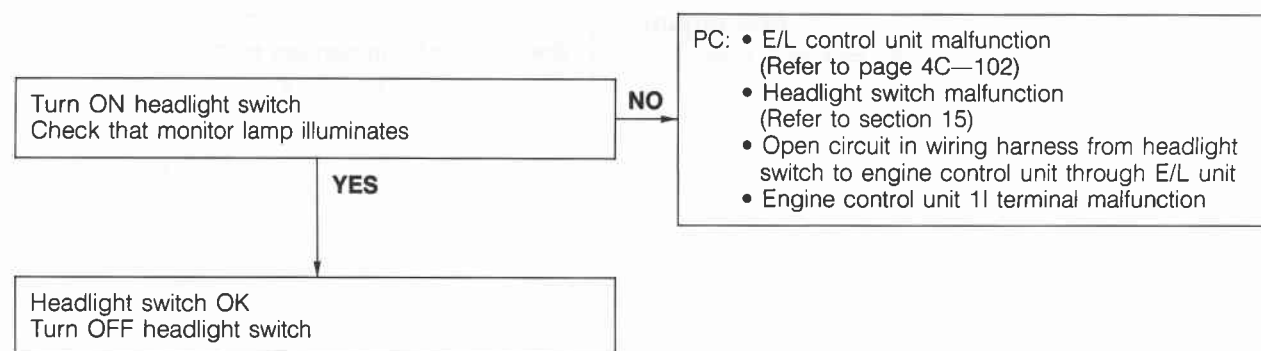
76G04C-039

Blower switch



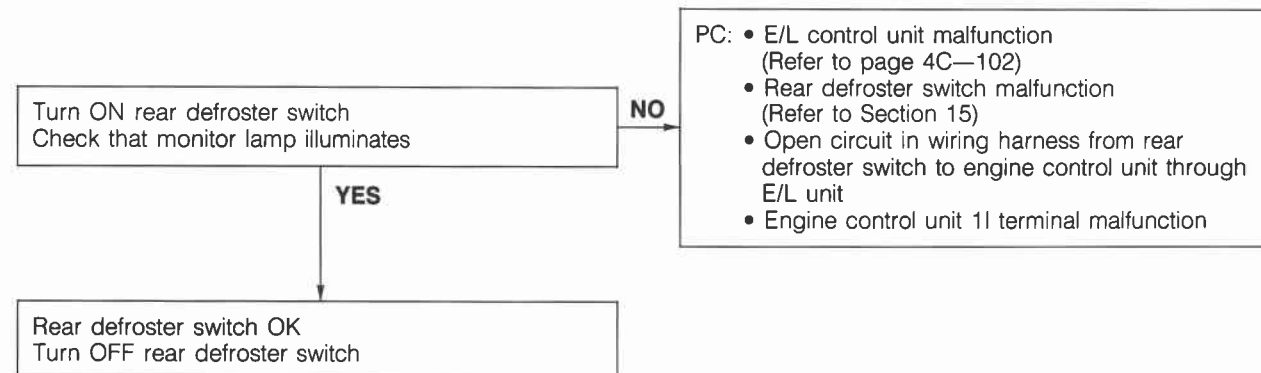
76G04C-040

Headlight switch



76G04C-041

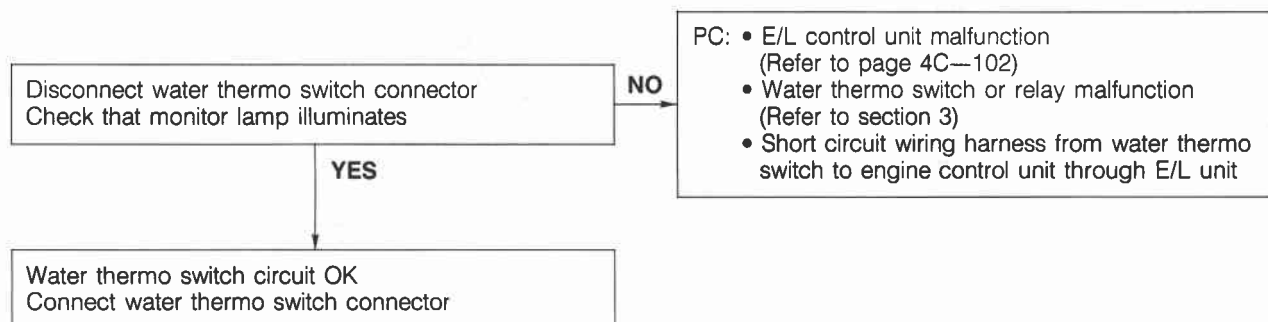
Rear defroster switch



76G04C-042

4C SWITCH MONITOR FUNCTION

Water thermo switch circuit



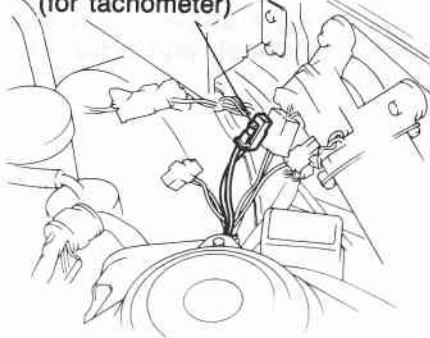
76G04C-043

Idle speed Automatic Control Function

Engine Control Unit

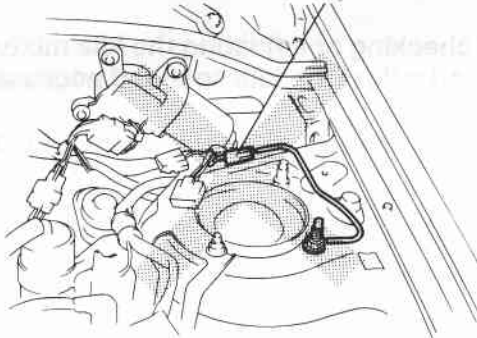
76G04C-044

Check connector (White)
(for tachometer)



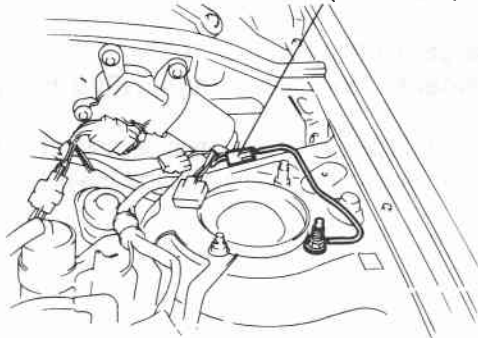
76G04C-045

Test connector (Green, 1 pin)



76G04C-046

Test connector (Green, 1 pin)



76G04C-047

IDLE ADJUSTMENT

IDLE SPEED

The idle speed is controlled automatically by the engine control unit through the idle speed control (ISC) solenoid valve, it is not necessary to adjust the idle speed.

However, if the idle speed is not within specification, the idle speed must be adjusted.

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:

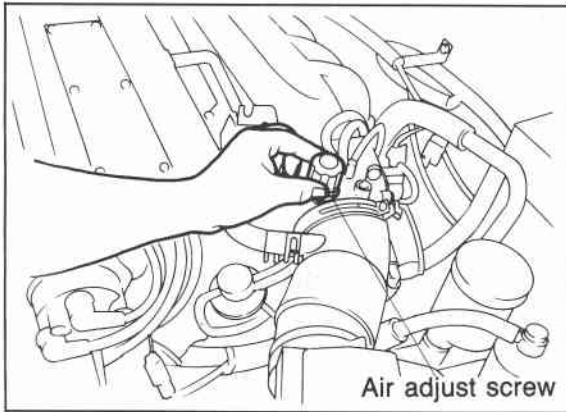
Applied load	Idle speed
No load	750 ± 50 rpm
P/S load	750 ± 50 rpm
A/C and/or E/L load	800 ± 50 rpm

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

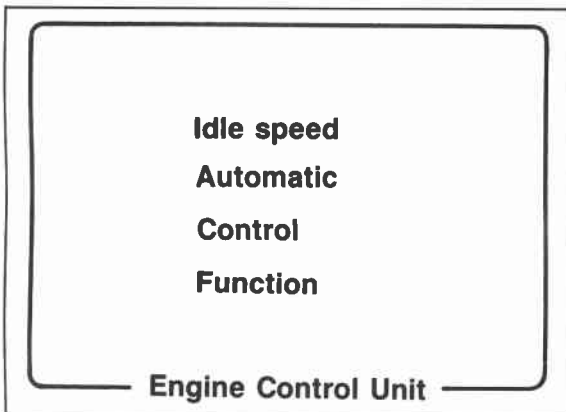
Adjustment

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

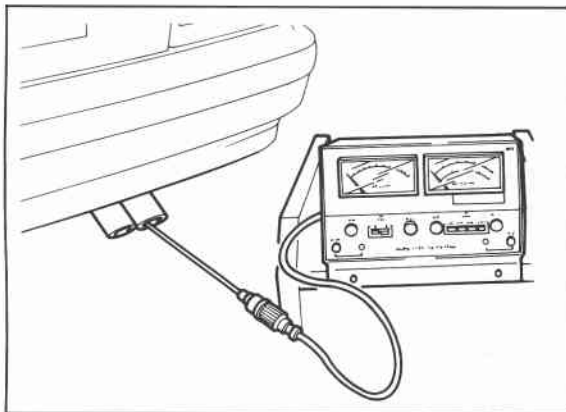
4C IDLE ADJUSTMENT



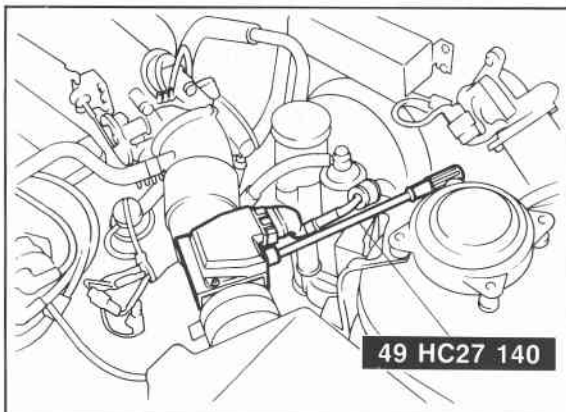
76G04C-048



76G04C-049



76G04C-050



76G04C-051

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.

IDLE MIXTURE (Unleaded Fuel)

An automatic compensation function for air/fuel mixture is built into the engine control unit, it is not necessary to check and adjust the idle mixture.

IDLE MIXTURE (Leaded Fuel)

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.

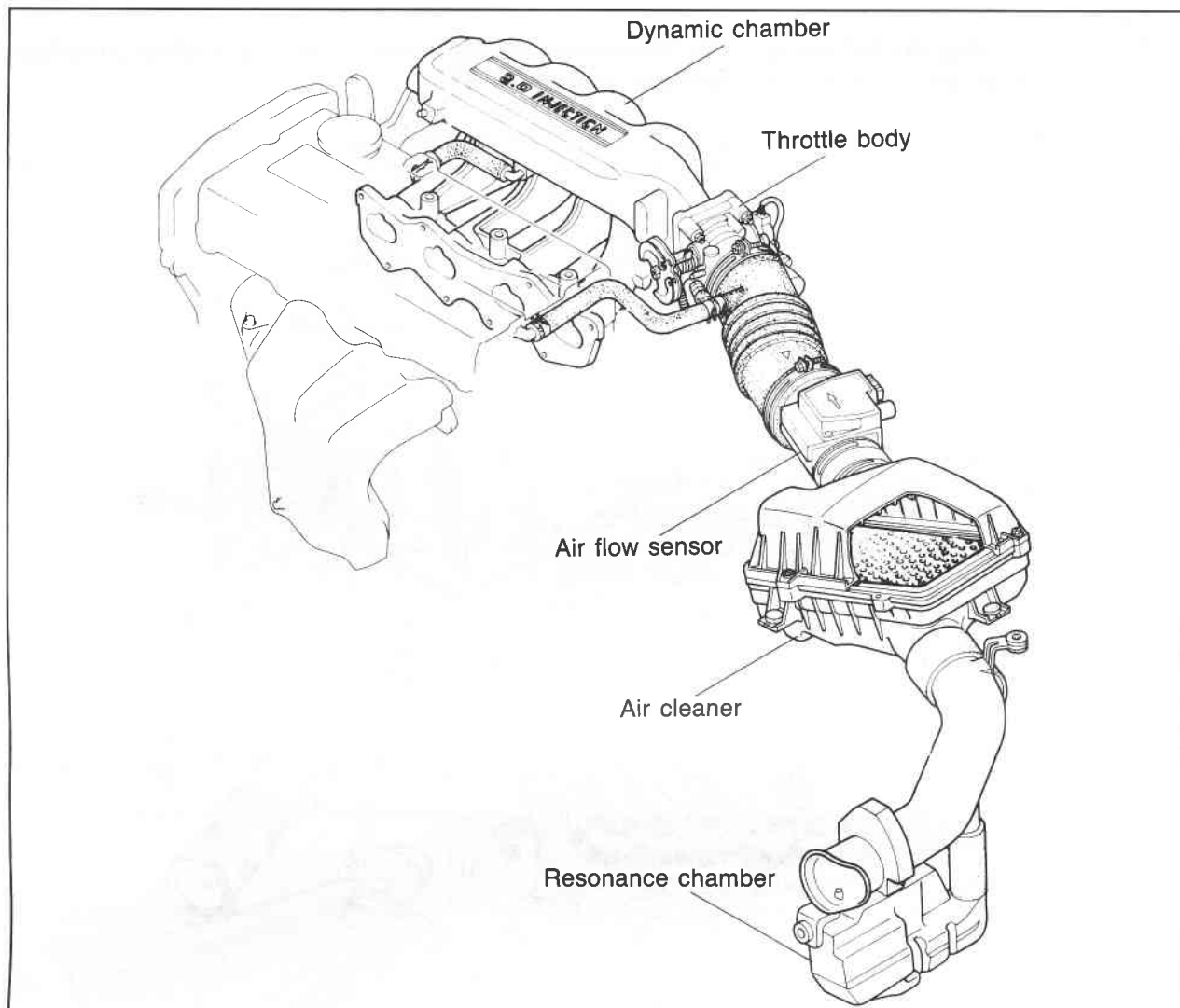
2. Check that the CO and HC concentrations are within specification.

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

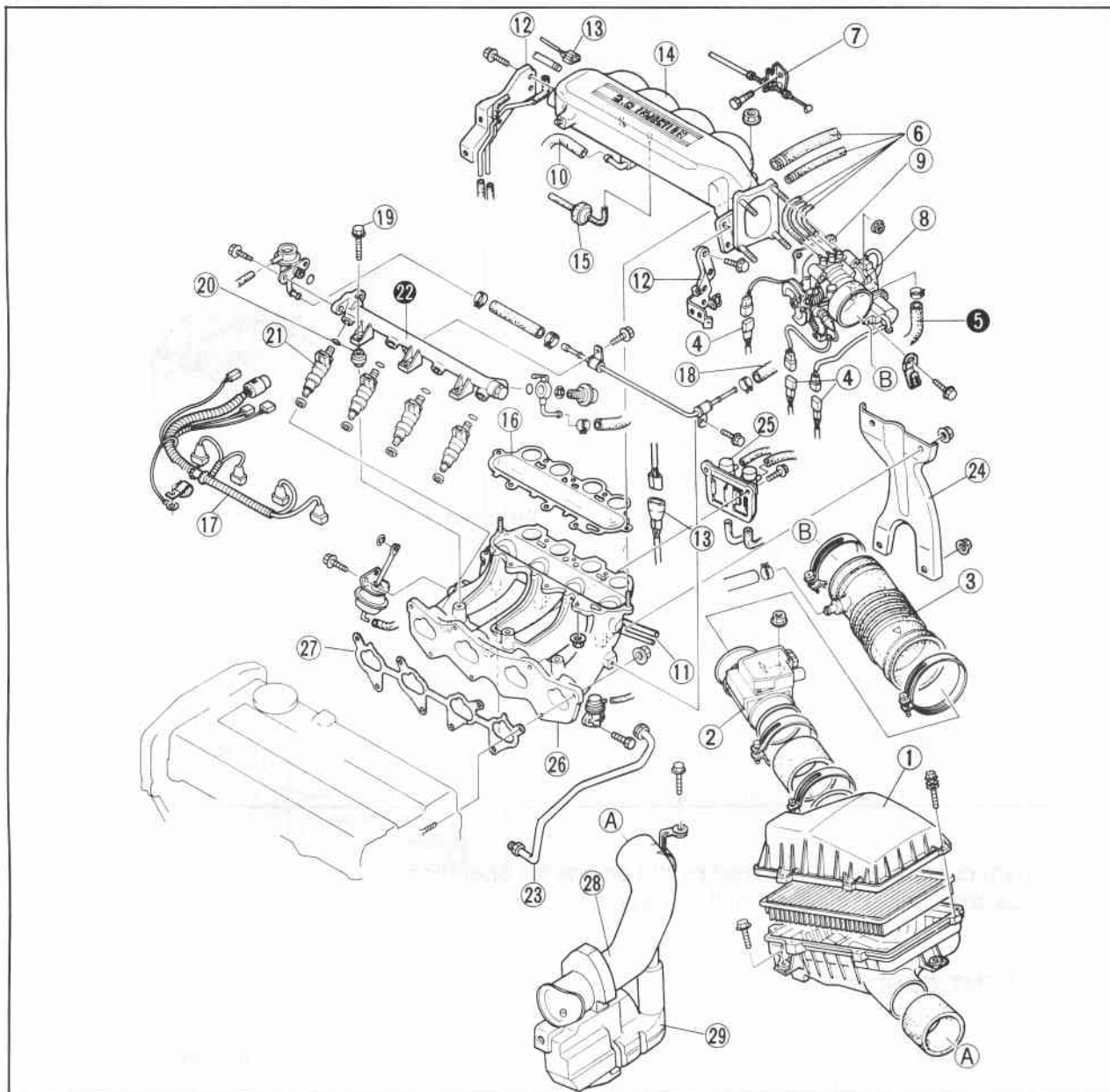
4C INTAKE AIR SYSTEM

REMOVAL

Caution

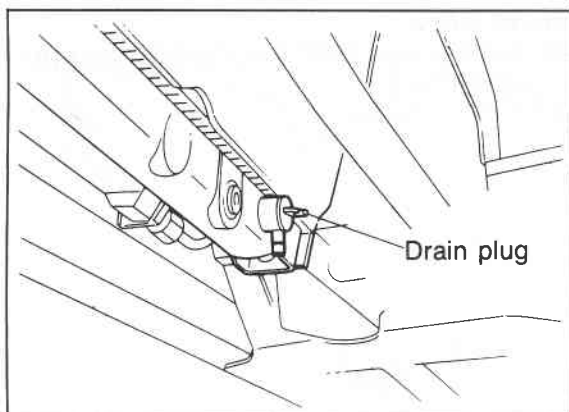
Before removing the following parts, release the fuel pressure from fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)

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



76G04C-053

- | | | |
|--|--|--|
| 1. Air cleaner | 11. Vacuum pipe assembly
(Unleaded fuel) | 19. Delivery pipe assembly
mounting bolt. |
| 2. Air flow sensor | 12. Dynamic chamber brackets | 20. Heat insulator |
| 3. Air hoses | 13. Connectors (Knock sensor,
Intake air thermo sensor) | 21. Injectors |
| 4. Connectors (Idle switch,
ISC, Throttle sensor) | 14. Dynamic chamber | 22. Delivery pipe assembly |
| 5. Water hoses | 15. One-way check valve | 23. EGR pipe |
| 6. Vacuum hoses | 16. Gasket | 24. Intake manifold bracket |
| 7. Accelerator cable | 17. Wiring harness
(for injectors) | 25. Solenoid valve |
| 8. Throttle body | 18. Fuel hoses | 26. Intake manifold |
| 9. Gasket | | 27. Gasket |
| 10. PCV hose | | 28. Air duct |
| | | 29. Resonance chamber |

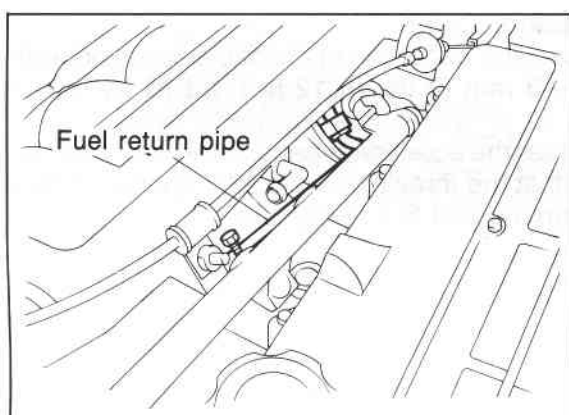


76G04C-054

Removal Note

Water hose

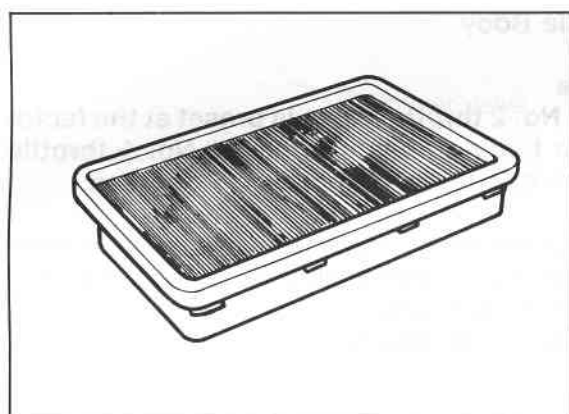
Before disconnecting the water hose, drain two liters of engine coolant.



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.



76G04C-056

PARTS INSPECTION

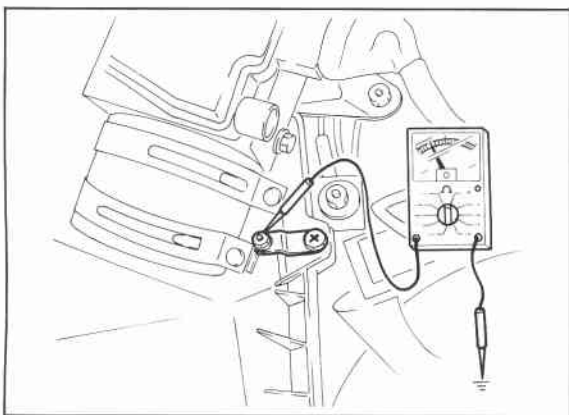
Air Cleaner Element

1. Check the condition of the air cleaner element.
2. Blow out the dust 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.

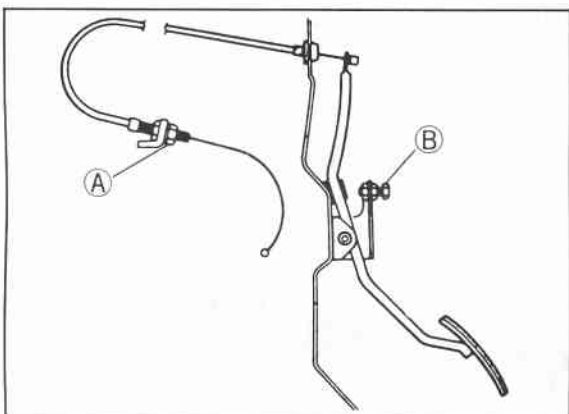
4C INTAKE AIR SYSTEM



76G04C-058

Air Cleaner Case

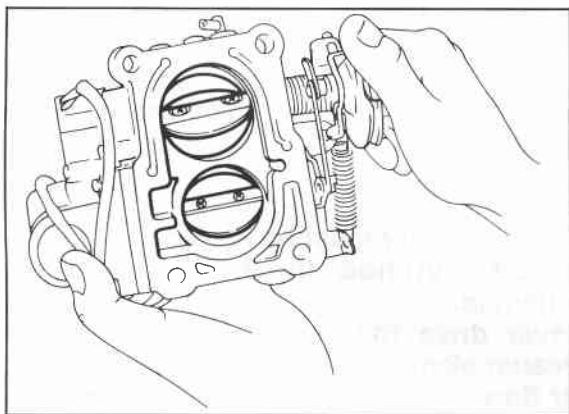
1. Check that the steel plate mounted on the upper case is grounded.
2. Replace, if necessary.



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.



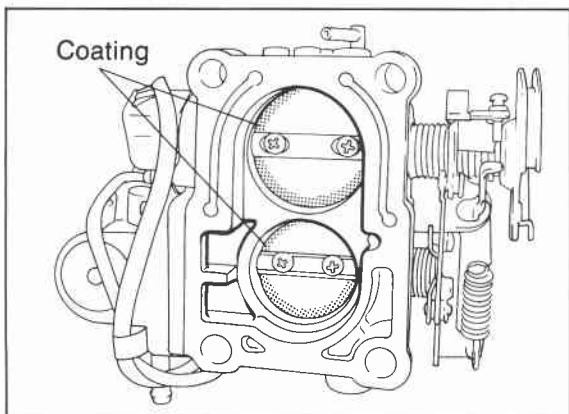
76G04C-060

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.

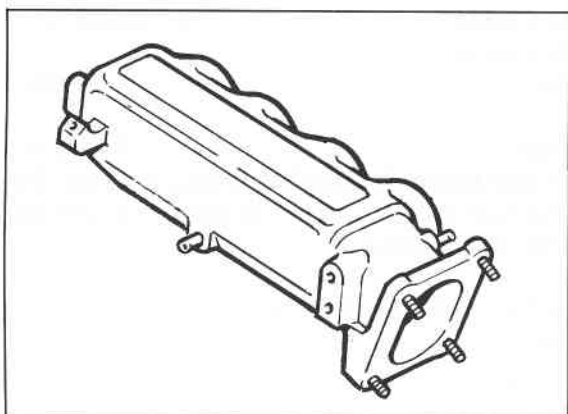
1. Check that the No. 1 and No. 2 throttle valves move smoothly when the throttle lever is moved from fully closed to fully open.
2. Replace, if necessary.



69G04C-050

Caution

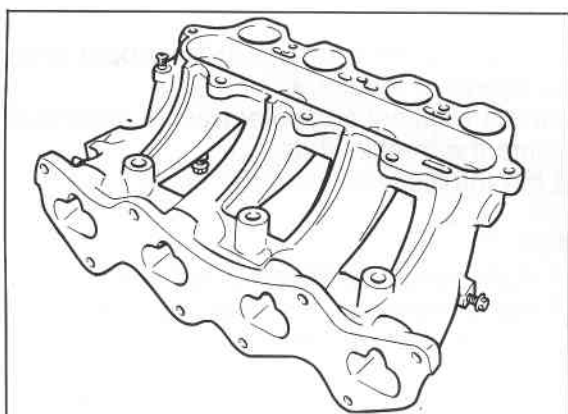
Do not remove the thin sealing coating from the throttle valve or bore.



69G04A-062

Dynamic Chamber

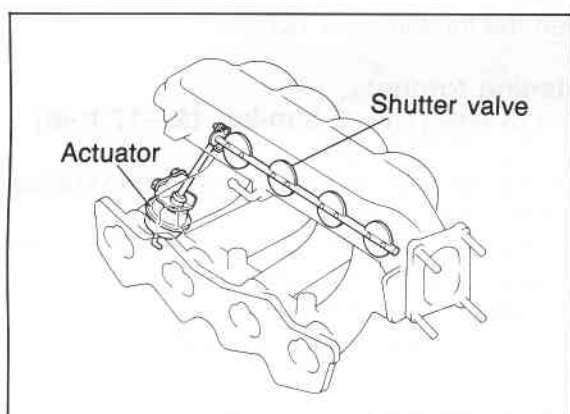
1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.



69G04A-064

Intake Manifold

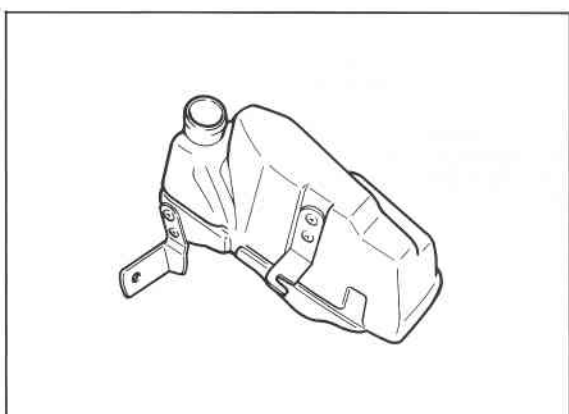
1. Visually check the intake manifold for damage.
2. Replace, if necessary.



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.

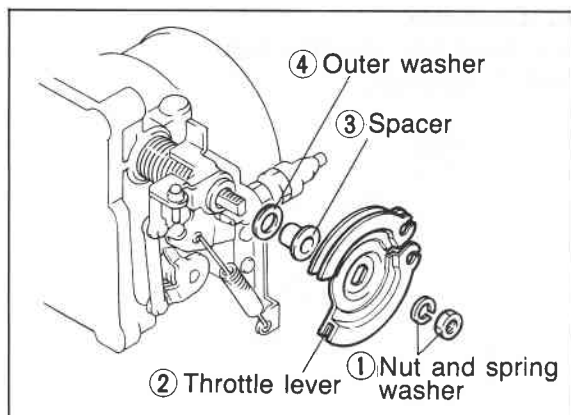


69G04C-054

Resonance Chamber

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

4C INTAKE AIR SYSTEM



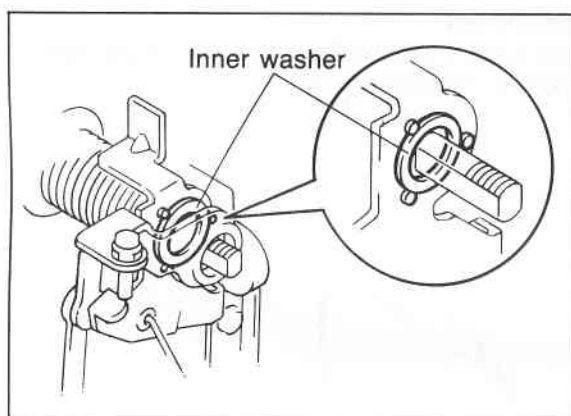
69G04C-130

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.



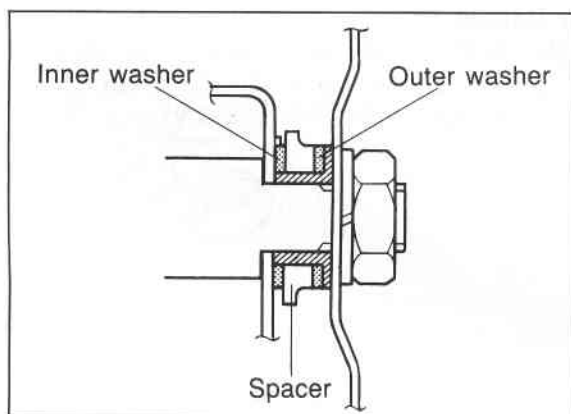
69G04C-131

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 stopper lever.



76G04C-061

4. Tighten the throttle lever nut.

Tightening torque:

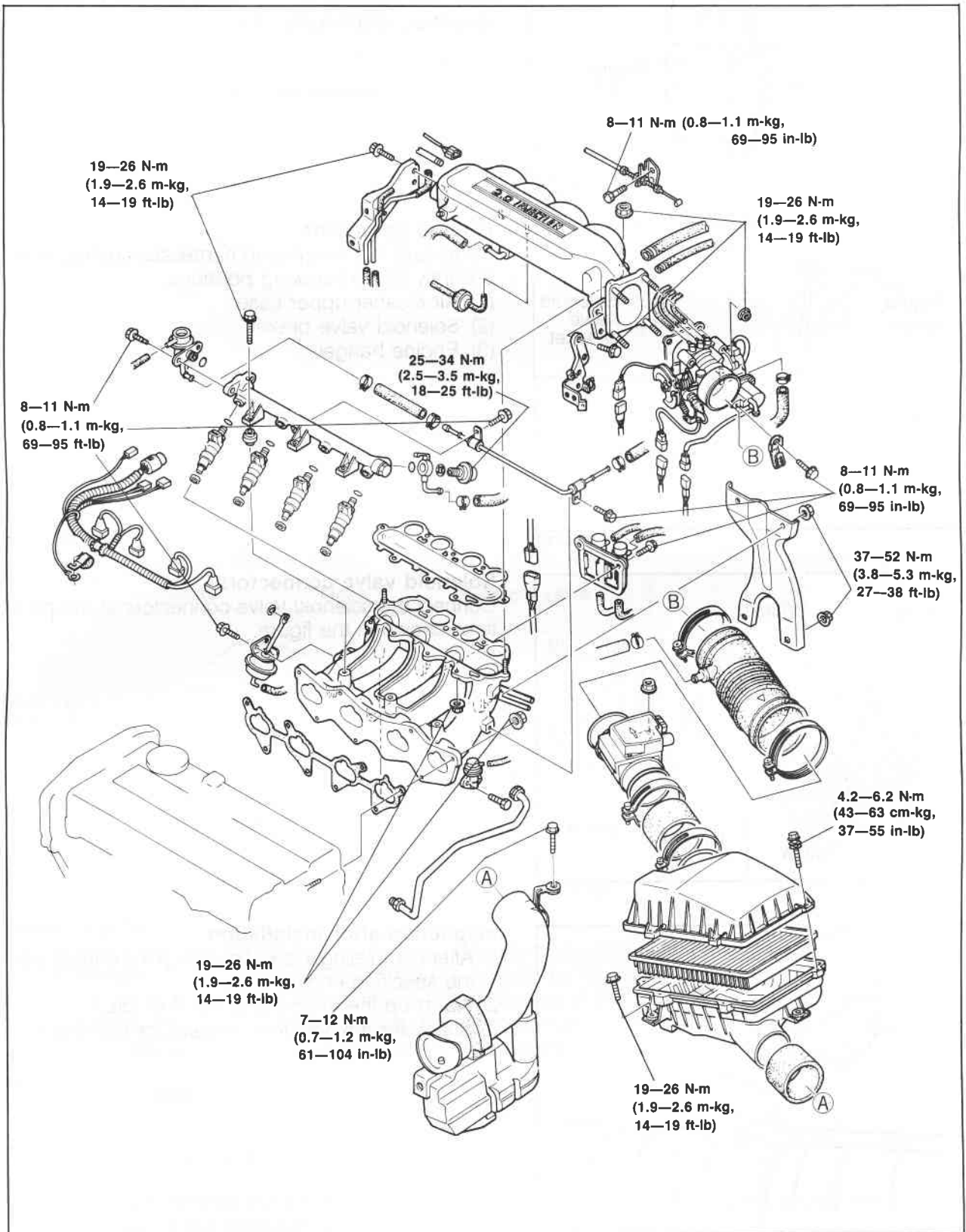
16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

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 4C—106.)

INSTALLATION

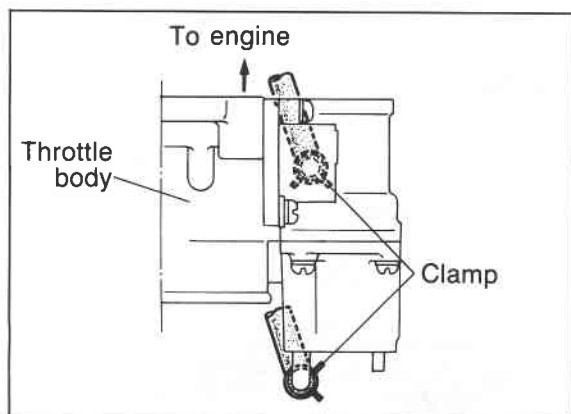
Install in the reverse order of removal, referring to the installation note.

Torque Specification



86U04A-055

4C INTAKE AIR SYSTEM



86U04A-056

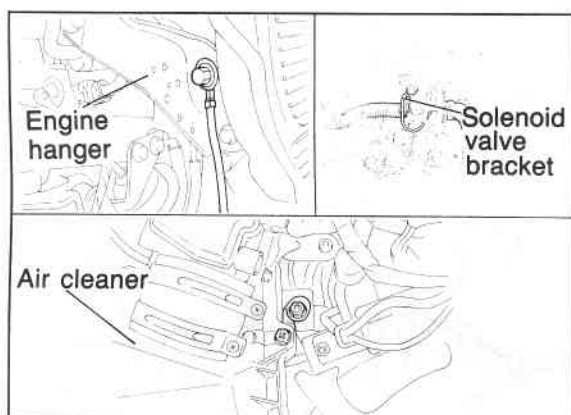
Installation Note

Water hose spring clamps

Face the clamp end as shown in the figure.

Gasket

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

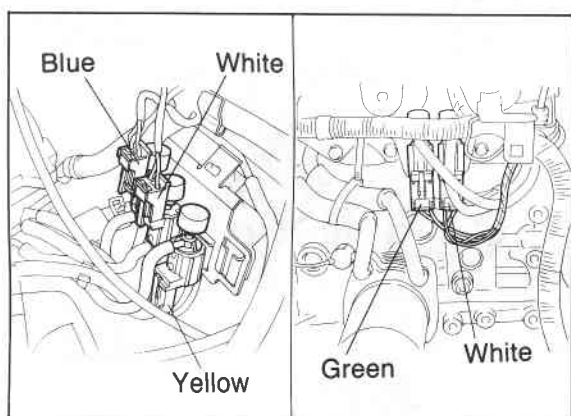


76G04C-062

Ground harnesses

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

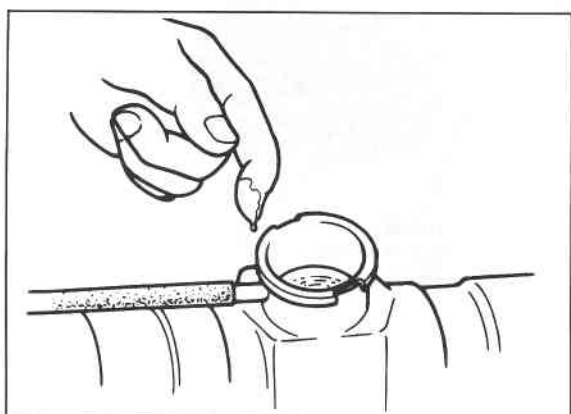
- (1) Air cleaner upper case
- (2) Solenoid valve bracket
- (3) Engine hanger



76G04C-063

Solenoid valve connectors

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



76G04C-064

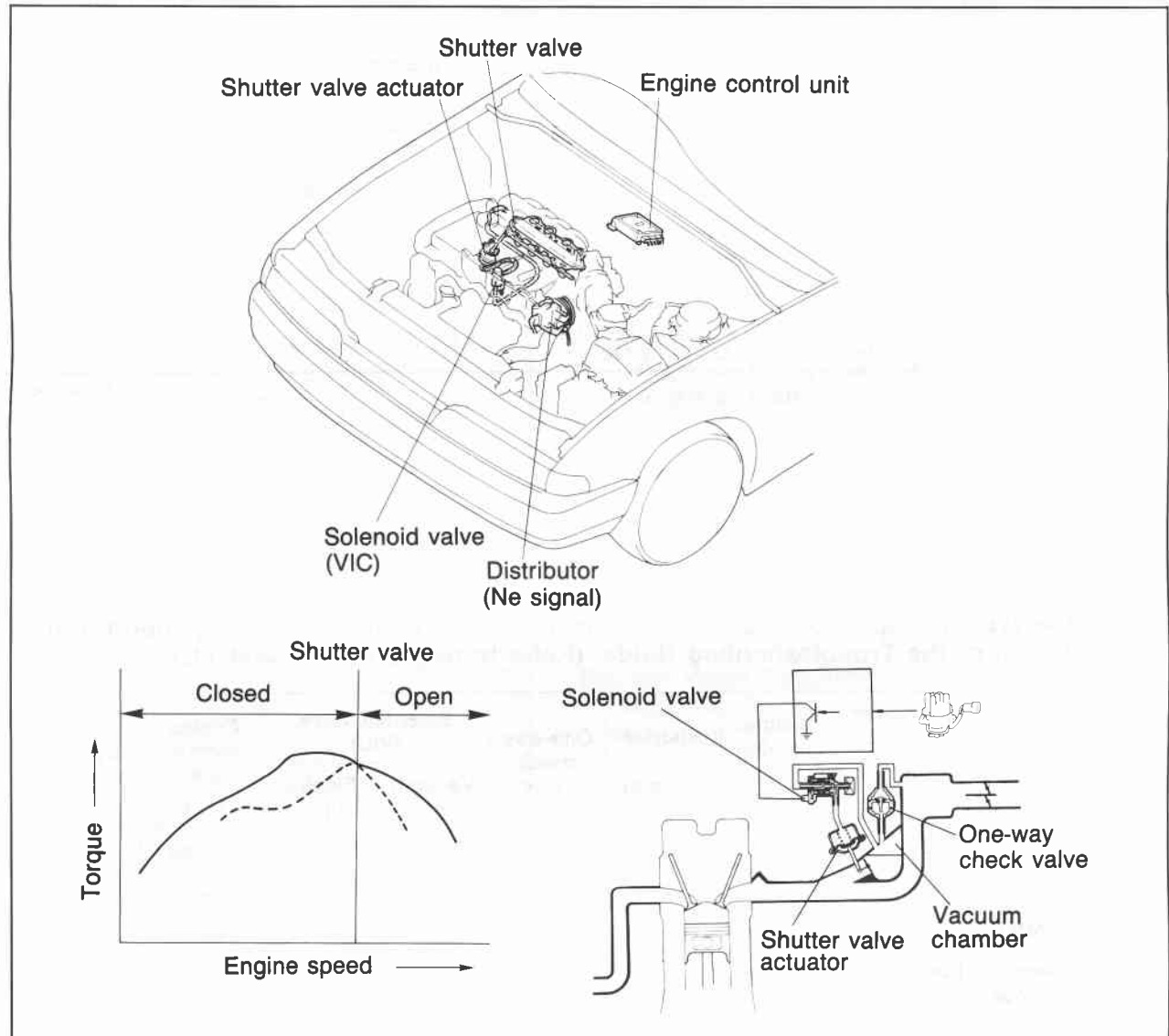
Inspection after installation

1. After completing installation, fill up 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.

7C 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	Unleaded fuel: ON at above 5200 rpm Leaded fuel: ON at above 5400 rpm
Intake manifold	Provides short and long length of intake travel	Integrates 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 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	

76G04C-066

TROUBLESHOOTING

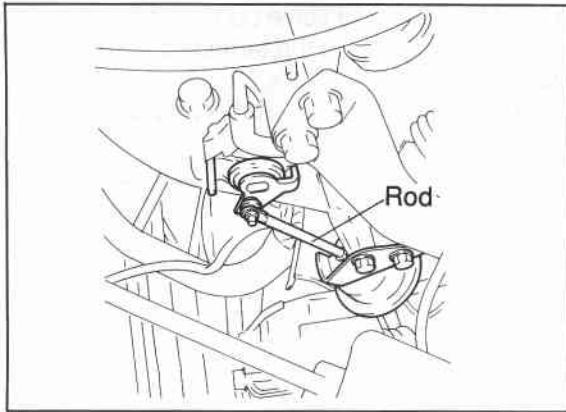
Check the condition of the wiring harness and connectors before checking the sensor or switches.

Note

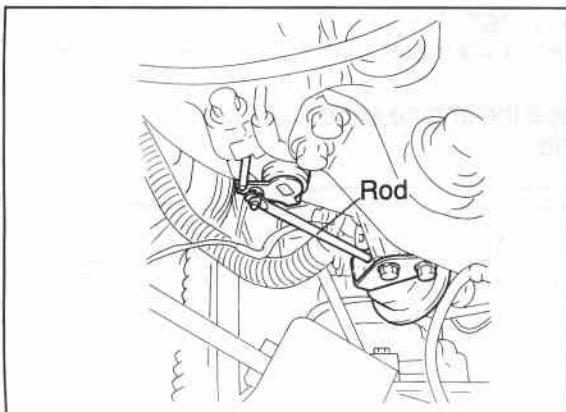
Make the system inspection first. If no problem is found, continue with inspection of the next system of the Troubleshooting Guide. (Refer to pages 4C—10 and 11.)

Possible cause Page		Vacuum chamber (Vacuum leak)	Shutter valve actuator	One-way check valve	Solenoid valve (VIC)		Engine control unit (1C)	System inspection
					Vacuum signal	Electric signal		
Symptom		4C—42	4C—41	4C—43	4C—42		4C—98	4C—41
Rough idle	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

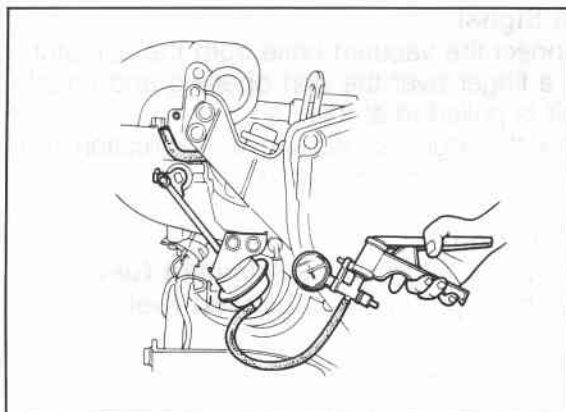
76G04C-067



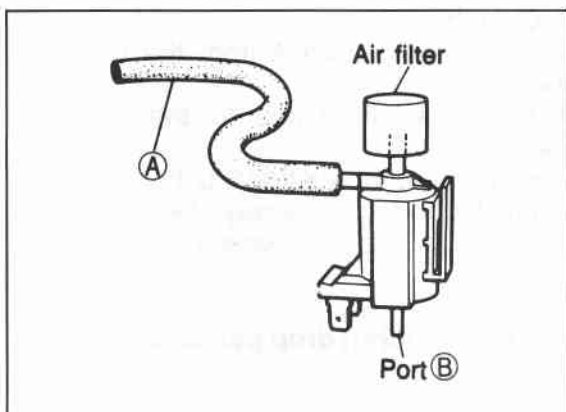
76G04C-068



76G04C-069



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. 5,200 rpm....Unleaded fuel

Approx. 5,400 rpm....Leaded fuel

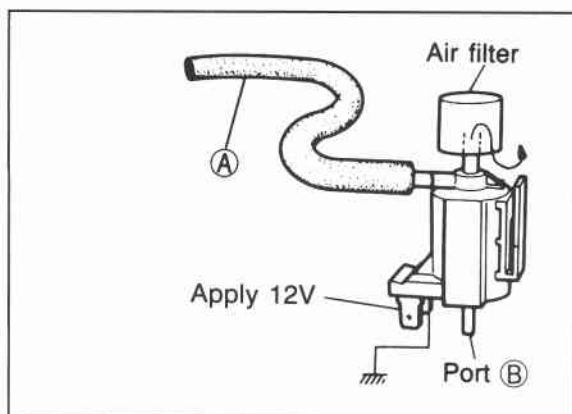
Shutter Valve Actuator

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

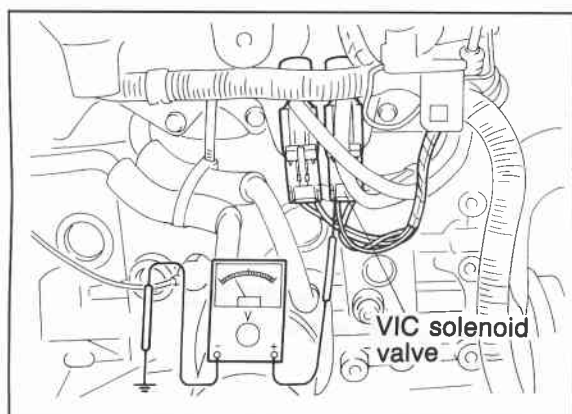
1. Disconnect the vacuum hoses from the solenoid valve.
2. Blow through the valve from port A and check that air flows from port B.

4C 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.

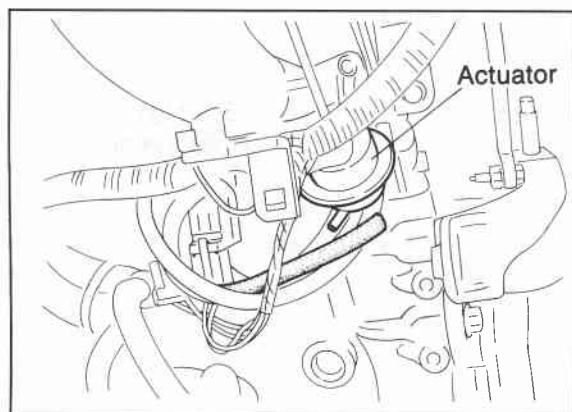


76G04C-073

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	Unleaded fuel	Leaded fuel
Approx. 12V	Below 5,200 rpm	Below 5,400 rpm
Below 2.0V	Approx. 5,100 rpm	Approx. 5,300 rpm



76G04C-074

Vacuum Signal

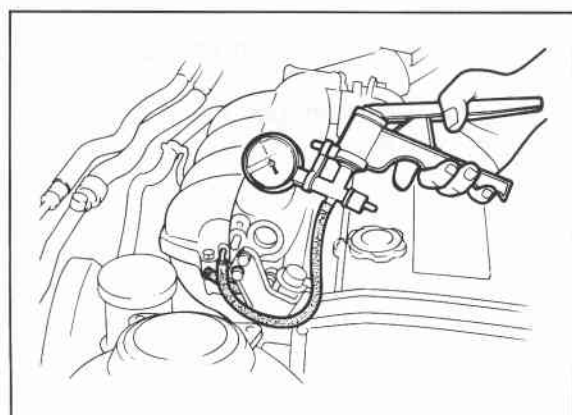
1. Disconnect the vacuum hose from the actuator.
2. Place a finger over the port opening and check that air is pulled in at idle.
3. Increase the engine speed above specification and check that air is not pulled in.

Specification:

Approx. 5,200 rpm.....Unleaded fuel

Approx. 5,400 rpm.....Leaded fuel

4. Connect the vacuum hose.



76G04C-075

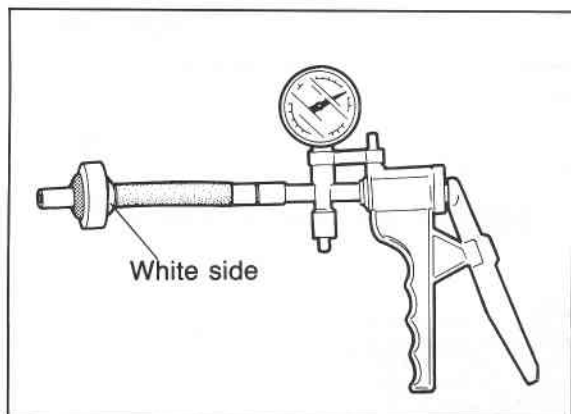
Vacuum Chamber

1. Disconnect vacuum hose A from the dynamic chamber.
2. Connect the 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 4C—43.)

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.

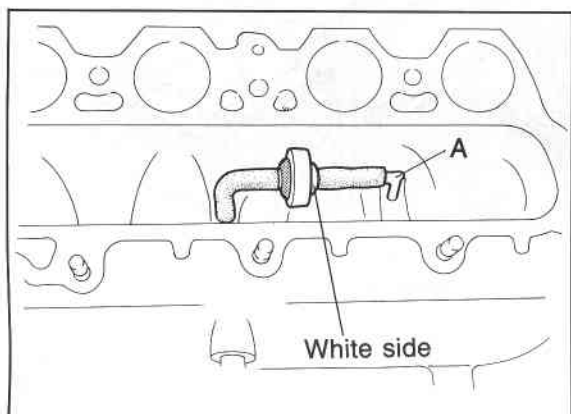


76G04C-076

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.



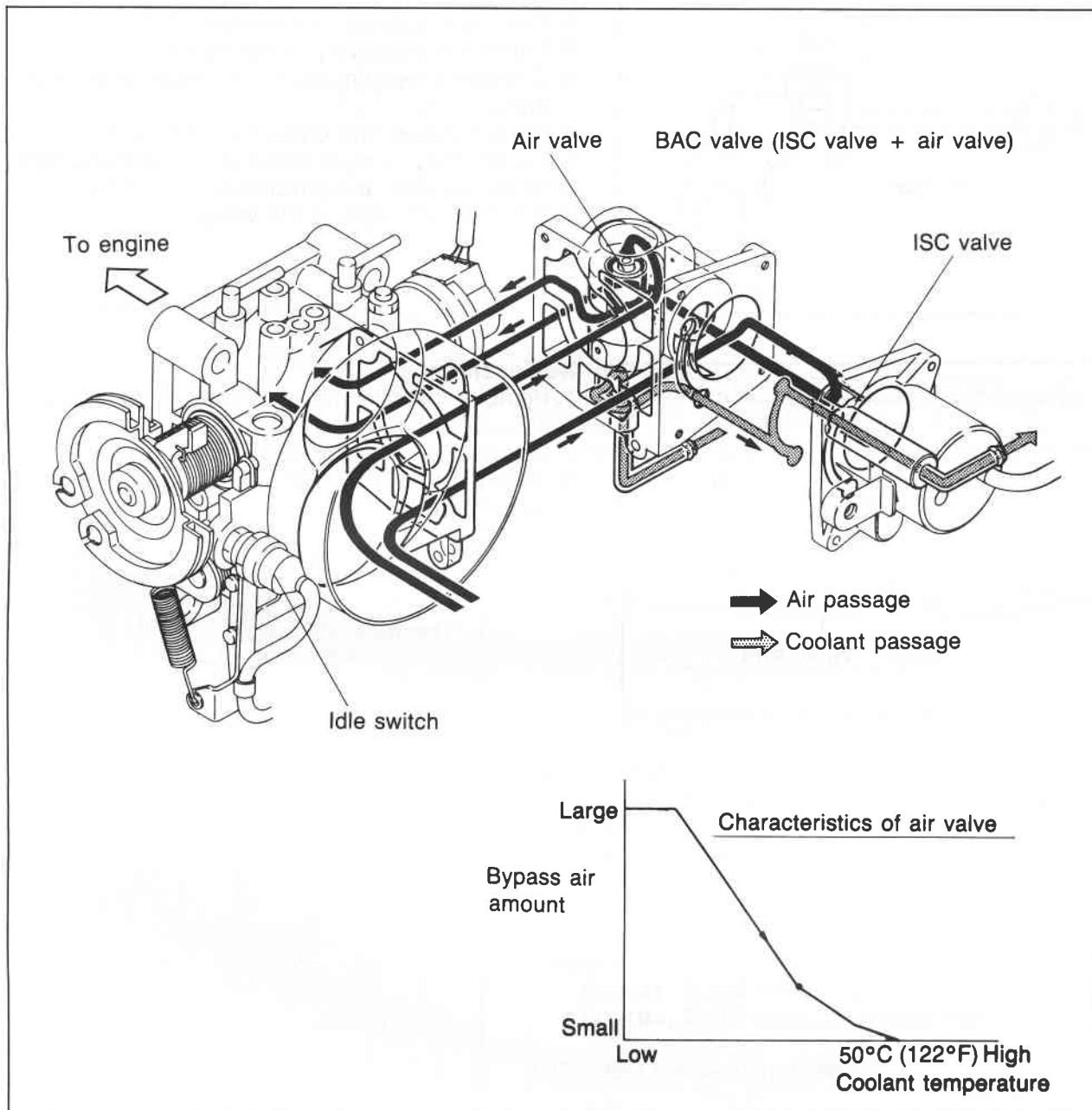
76G04C-210

Replacement

1. Remove the dynamic chamber. (Refer to page 4C—32)
2. Remove the one-way check valve.
3. Install a new valve so that the white side of the valve faces to the port A.

4C 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"> • Gerni, 1-pin • Idle speed feedback control cancelled when connector grounded
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

76G04C-078

4C ISC SYSTEM

TROUBLESHOOTING

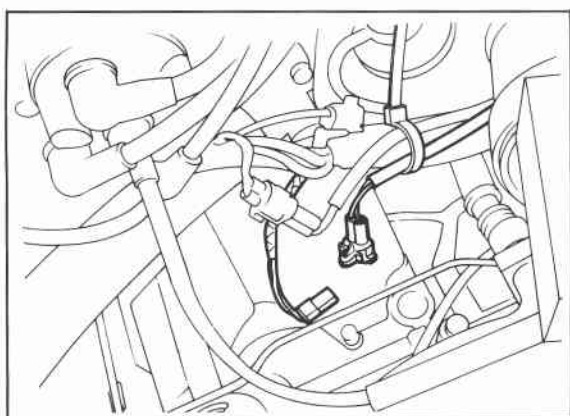
Check the condition of the wiring harness and connectors before checking the sensors or switches.

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 4C—10 and 11.)

Possible cause Page		Air valve	P/S pressure switch	Solenoid valve (Idle speed control)	Water thermo sensor	Engine control unit terminal			System inspection
						1L	1W	2Q	
Symptom		4C—47	4C—97	4C—48	4C—107	4C—98			4C—46
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
Falls emission test		2	—	3	—	—	4	5	1

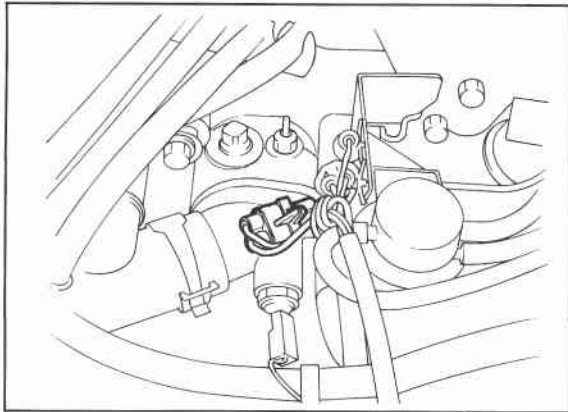
76G04C-079



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.



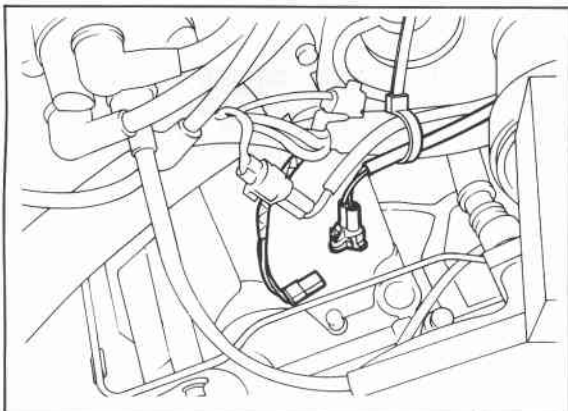
76G04C-081

(ISC valve)

6. Connect the ISC valve connector.

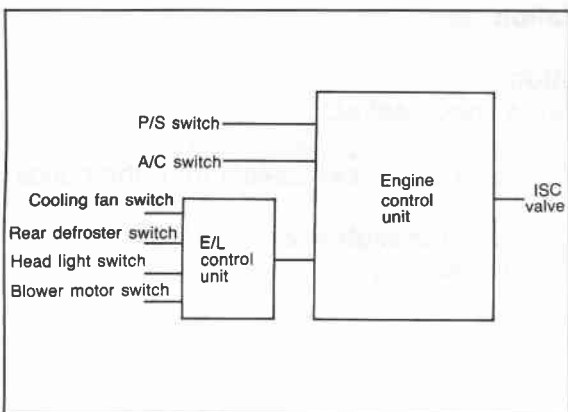
Note

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



76G04C-082

- 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.

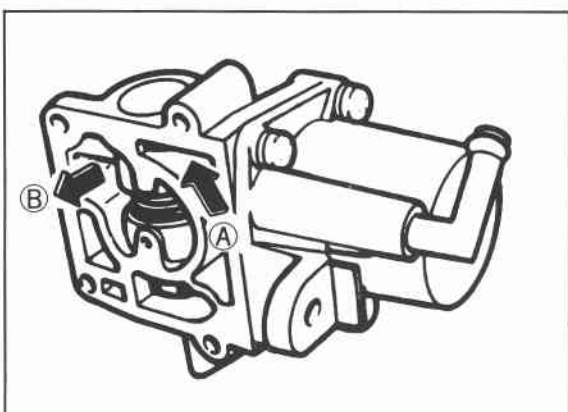


76G04C-083

(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



86U04A-063

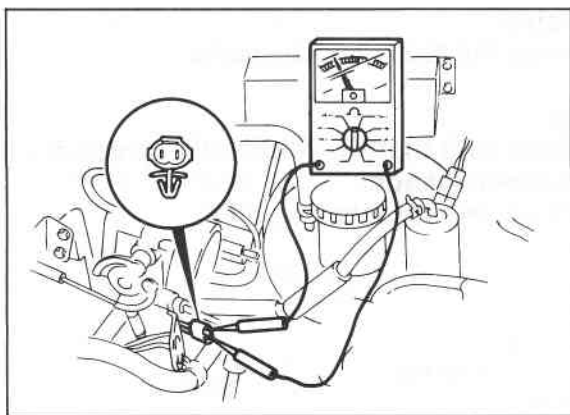
BAC Valve

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.

Note

Refer to "Installation" on this page for the BAC valve installation.



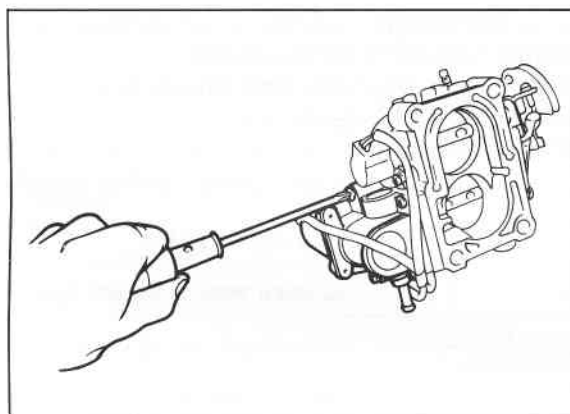
76UG4C-212

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°C)): 6.3—9.9 Ω

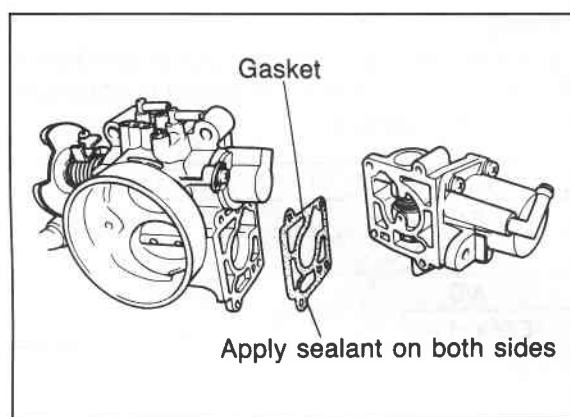
4. If not correct, replace the BAC valve.



76G04C-085

REMOVAL

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



76G04C-086

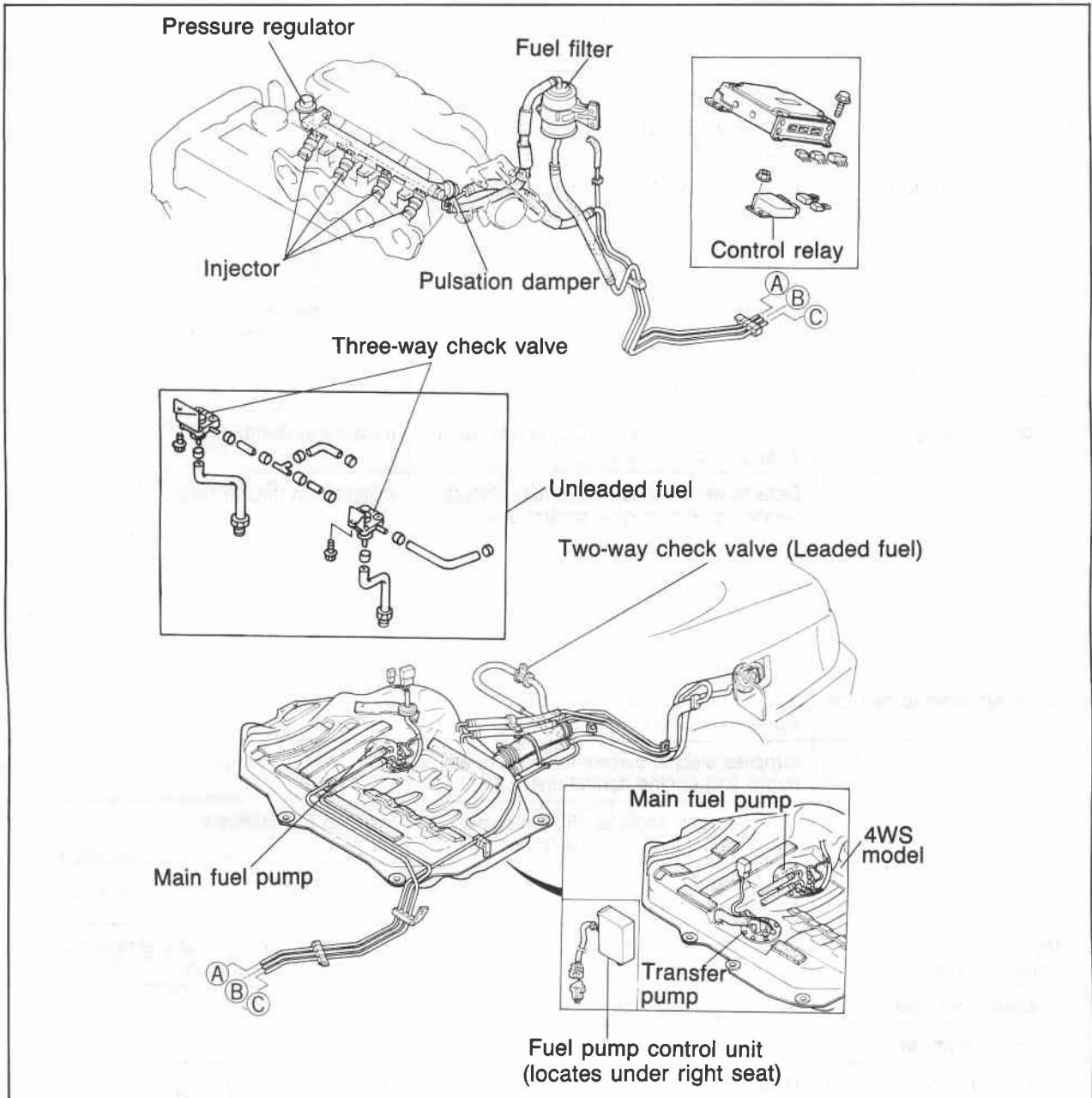
Installation

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.

FUEL SYSTEM



76G04C-087

This system supplies the necessary fuel for combustion at a constant pressure to the injectors. Fuel is metered and injected into the intake manifold according to the injection control signals from the engine control unit. It consists of the fuel pump, fuel filters, delivery pipe, pulsation damper, pressure regulator, injectors, fuel pump control unit, and the control relay.

The fuel pump is mounted in the fuel tank to minimize the operating noise of the fuel pump. The injectors directly supplied with battery voltage through the control relay. The connector of the injectors is white to distinguish the injectors for FE DOHC from those of other engines.

Due to the installation of the steering angle transfer shaft for the 4-wheel steering (4WS) the fuel tank of 4WS vehicles is designed with separate right and left sections. A transfer pump is used to pump fuel from the left side to the right side.

4C FUEL SYSTEM

COMPONENT DESCRIPTION

Component	Function	Remark
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	
Clutch switch	Detects in-gear condition; sends signal to engine control unit	Switch ON when clutch pedal released
Engine control unit	Detects signals from input sensors and switches; controls injector and fuel pump operations	
Fuel filter	Filters fuel	
Fuel pump	Provides fuel to injectors	<ul style="list-style-type: none"> Operates while engine running Installed in fuel tank
Fuel pump control unit (4WS)	Monitors fuel level in left section; controls transfer pump operation	
G signal pick-up	Detects No.1 cylinder TDC; sends signal to engine control unit	Installed in distributor
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Injector	Injects fuel into intake port	<ul style="list-style-type: none"> Controlled by signals from engine control unit High-ohmic injector
Intake air thermo sensor	Detects intake air temperature; send signal to engine control unit	
Control relay	Supplies electric current to injectors fuel pump and engine control unit	
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
Oxygen sensor (Unleaded fuel)	Detects oxygen concentration; sends signal to engine control unit	<ul style="list-style-type: none"> Zirconia ceramic and platinum coating Integrated heater coil
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Pulsation damper	Absorbs fuel pulsation	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Installed on throttle body
Transfer pump (4WS)	Pumps fuel from the left to the right side	Controlled by fuel pump control unit
Transfer pump switch (4WS)	Detects fuel level in left section; sends signal to control unit	
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch (Unleaded fuel)	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04C-088

TROUBLESHOOTING

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

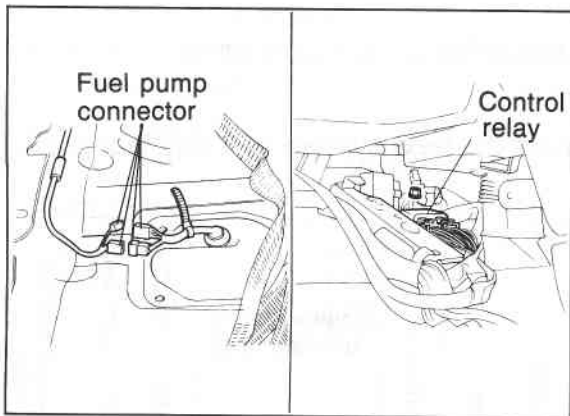
Note

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

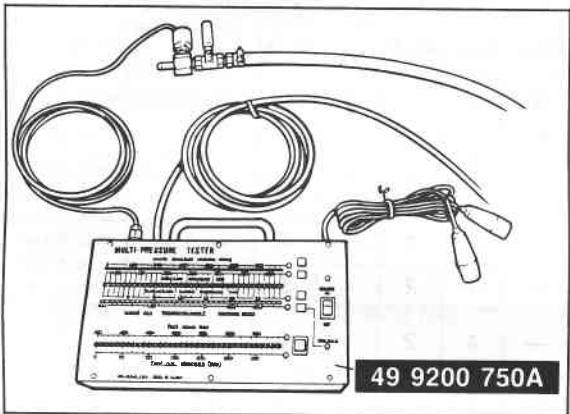
Possible cause		Page															
		Air flow sensor	Intake air thermo sensor	Oxygen sensor	Throttle sensor	Water thermo sensor	Water thermo switch	Fuel pump	Injector	Fuel pressure	Engine control unit terminal			Transfer pump (4WS)	Transfer pump switch (4WS)	Fuel pump control unit (4WS)	
											1Q	3C,3E 3F,3H	3B				
Symptom		4C-103	4C-110	4C-107	4C-104	4C-107	4C-106	4C-56	4C-57	4C-54	4C-98			4C-59			
Unleaded fuel	Hard start or won't start (Crank OK)		—	—	—	—	9	—	1	7	—	2	8	6	3	4	5
	Engine stalls	During warm up	4	—	—	—	3	—	—	2	1	—	5	—	—	—	—
		After warm up	1	—	—	—	—	—	—	3	2	—	4	—	—	—	—
	Rough idle	During warm up	5	—	—	—	3	—	—	2	1	—	4	—	—	—	—
		After warm up	1	6	—	—	4	—	—	3	2	—	5	—	—	—	—
	Poor acceleration, hesitation, or lack of power		1	—	—	3	5	—	—	4	2	—	6	—	—	—	—
	Runs rough on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Afterburn on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Poor fuel consumption		6	—	5	—	4	—	—	2	1	—	3	—	—	—	—
	Engine stalls or runs rough after hot starting		1	5	—	—	—	—	—	3	2	—	4	—	—	—	—
Falls emission test		—	—	1	—	—	2	—	3	—	—	4	—	—	—	—	
Leaded fuel	Hard start or won't start (Crank OK)		—	—	—	—	9	—	1	7	—	2	8	6	3	4	5
	Engine stalls	During warm up	4	—	—	—	3	—	—	2	1	—	5	—	—	—	—
		After warm up	1	—	—	—	—	—	—	3	2	—	4	—	—	—	—
	Rough Idle	During warm up	5	—	—	—	3	—	—	2	1	—	4	—	—	—	—
		After warm up	1	6	—	—	4	—	—	3	2	—	5	—	—	—	—
	Poor acceleration, hesitation, or lack of power		1	—	—	—	4	—	—	3	2	—	5	—	—	—	—
	Runs rough on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Afterburn on deceleration		1	—	—	—	—	—	—	2	—	—	3	—	—	—	—
	Poor fuel consumption		5	—	—	—	4	—	—	2	1	—	3	—	—	—	—
	Engine stalls or runs rough after hot starting		1	5	—	—	—	—	—	3	2	—	4	—	—	—	—
Falls emission test		—	—	—	—	—	—	—	1	—	—	2	—	—	—	—	

76G04C-089

4C FUEL SYSTEM



76G04C-090



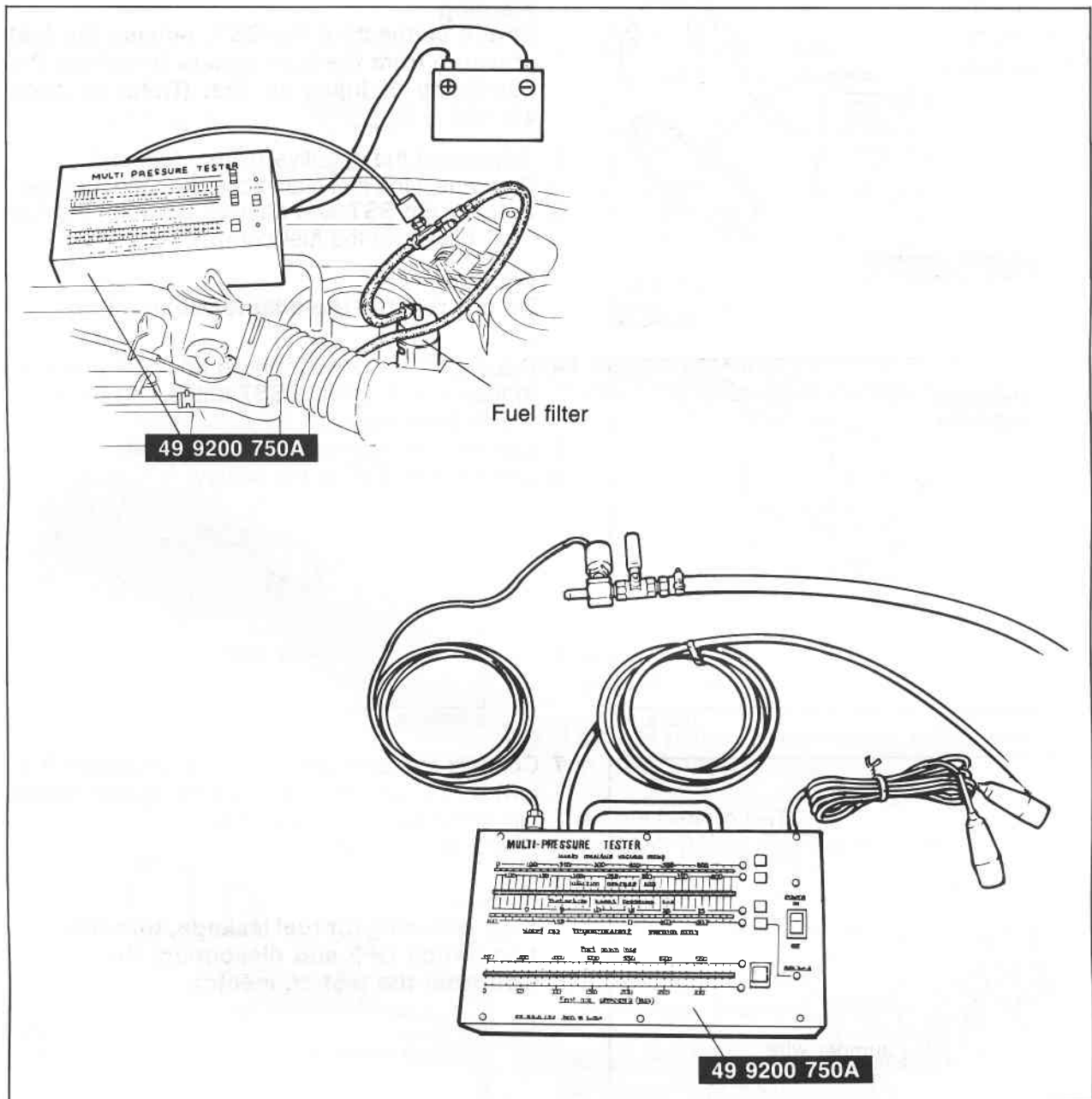
86U04A-069

FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

Fuel in the fuel system remains under high pressure even when the engine is not running.

- a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
 1. Start the engine.
 2. Disconnect the 4-pin connector from the control relay or the fuel pump connector (5-pin or 6-pin).
 3. After the engine stalls, turn OFF the ignition switch.
 4. Reconnect the relay or fuel pump connector.
- b) Use a rag as protection from fuel spray when disconnecting the hoses.
Plug the hoses after removal.
- c) When inspecting the fuel system, use the **SST**.

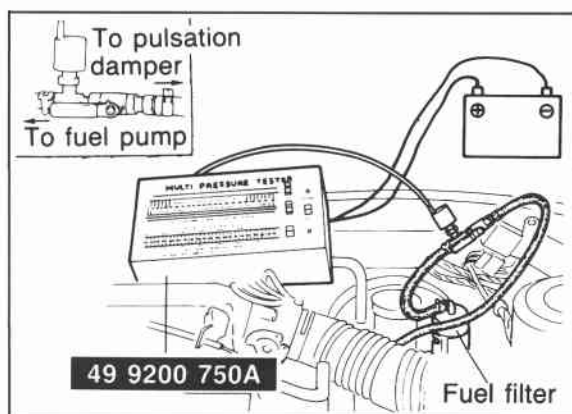
MULTI-PRESSURE TESTER (49 9200 750A)



76G04C-091

The **MULTI-PRESSURE TESTER** (49 9200 750A) has been developed to check the fuel pressure and the intake manifold vacuum.

4C FUEL SYSTEM



76G04C-092

How to Connect Multi-Pressure Tester

Warning

Before connecting the SST, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)

1. Disconnect the negative battery terminal.
2. Disconnect the fuel main hose from the fuel filter.
3. Connect the **SST** and adapter between the fuel main hose and the fuel pump.

Caution

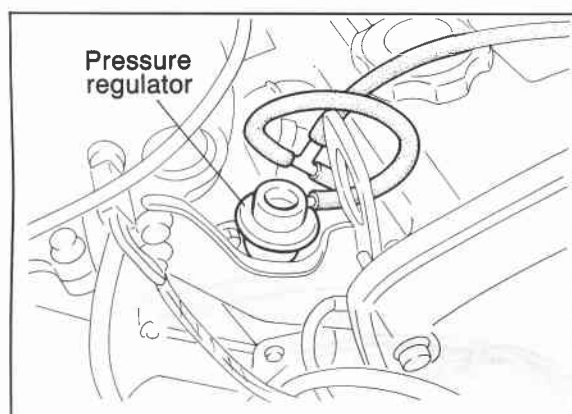
Do not reverse the adapter connection.

4. Disconnect the vacuum hose from the pressure regulator. Connect the **SST** to the vacuum hose with a three-way joint.
5. Connect the negative battery terminal.
6. Connect the **SST** to the battery.

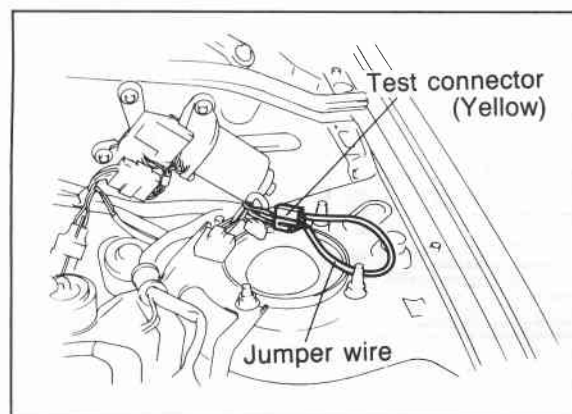
7. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON to operate the fuel pump.
8. Check for fuel leaks.

Caution

After checking for fuel leakage, turn the ignition switch OFF and disconnect the jumper wire from the test connector.



76G04C-093



86U04A-072

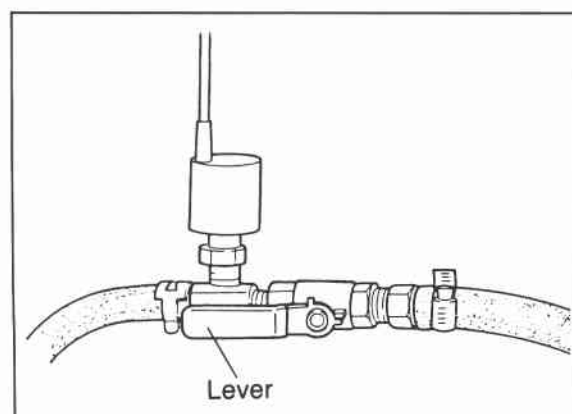
FUEL PRESSURE

Note

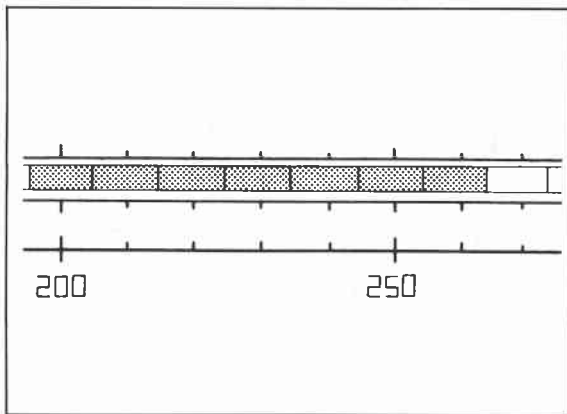
Warm up the engine to normal operating temperature.

Injection Pressure

1. Set the lever on the adapter as shown in the figure.



76G04C-094

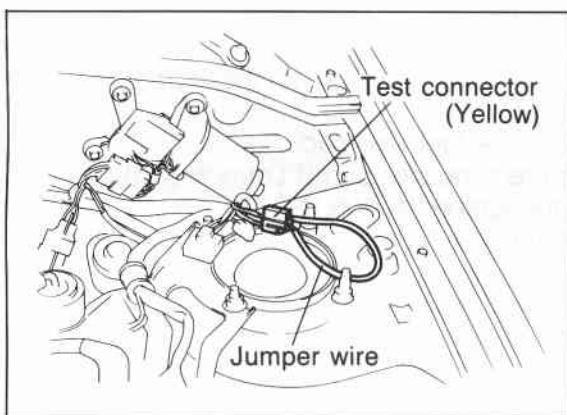


86U04A-074

2. Run the engine and measure the injection pressure at various speeds.

**Injection pressure: Approx. 235—275 kPa
(2.4—2.8 kg/cm², 34—40 psi)**

3. If not within specification, check the fuel pump pressure and fuel line pressure.



86U04A-075

Fuel Pump Pressure

1. Connect the terminals of the test connector (Yellow) with a jumper wire.
2. Turn the ignition switch ON to operate the fuel pump.

3. Set the lever on the adapter as shown in the figure.
4. Check the fuel pump pressure.

**Fuel pump pressure: 441—588 kPa
(4.5—6.0 kg/cm², 64—85 psi)**

5. If the fuel pump pressure is not within specification, check the following;

No pressure

- Fuel pump operation (Refer to page 4C—56.)

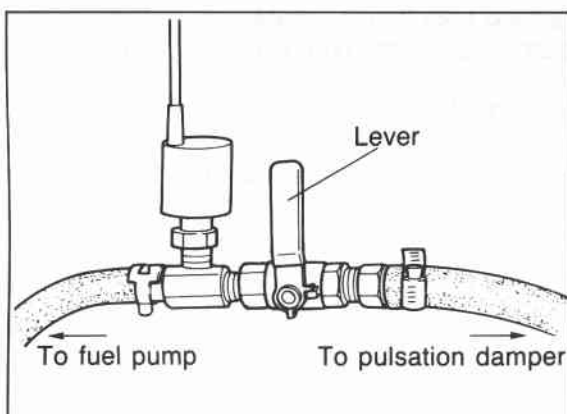
Low pressure

- Fuel pump feeding capacity (Refer to page 4C—56.)

High pressure

- Replace the fuel pump

6. After checking the fuel pump pressure, disconnect the jumper wire from the test connector.



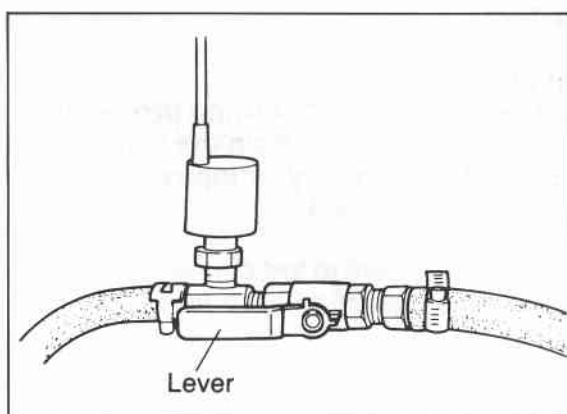
76G04C-095

Fuel Line Pressure

1. Start the engine and run it idle.
2. Set the lever on the adapter as shown in the figure.
3. Check the fuel line pressure.

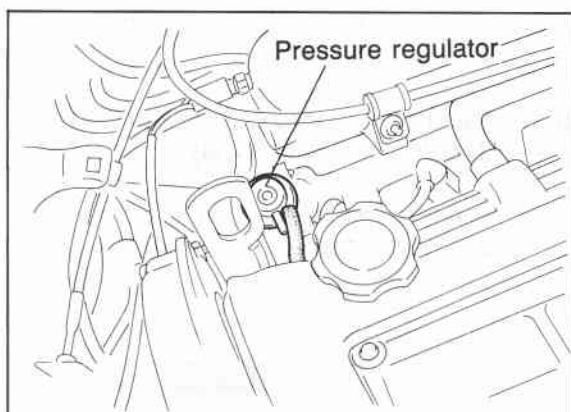
**Fuel line pressure: Approx. 186—226 kPa
(1.9—2.3 kg/cm², 27—33 psi)**

4. If not within specification, check the pressure regulator vacuum hose.



76G04C-096

4C FUEL SYSTEM

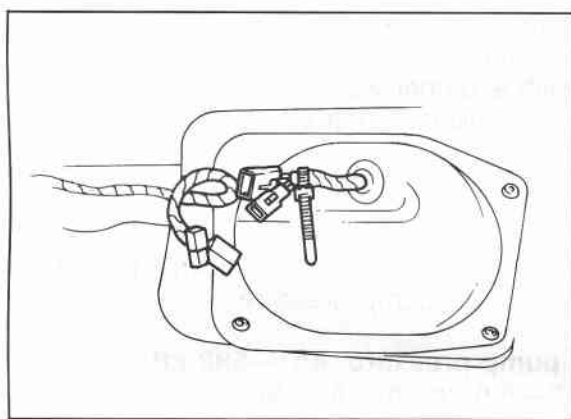


86U04A-078

5. Disconnect the vacuum hose from pressure regulator, and place a finger over the end of the hose.
6. Check the fuel line pressure.

**Fuel line pressure: 235—275 kPa
(2.4—2.8 kg/cm², 34—40 psi)**

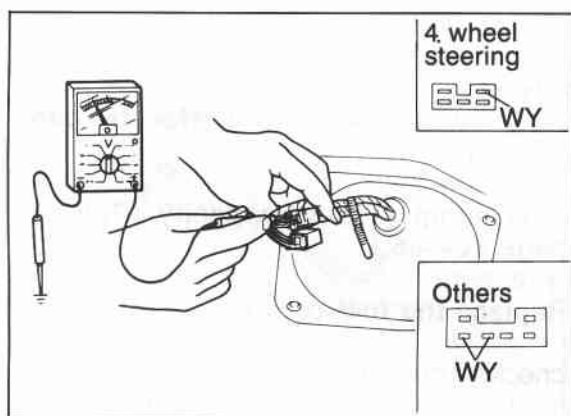
7. If not within specification, replace the pressure regulator.
8. Connect the vacuum hose to pressure regulator.



76G04C-097

FUEL PUMP Operation Test

1. Connect a jumper wire to the test connector (Yellow).
2. Remove the fuel filler cap.
3. Disconnect transfer pump connector (8-pin).
4. Turn the ignition switch ON.
5. Listen for operational sound of the fuel pump at the filler inlet.
6. Install the fuel filler cap.

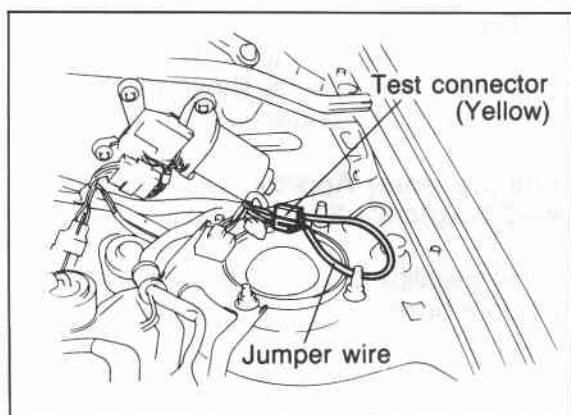


76G04C-098

7. If no sound was heard, check the voltage at the fuel pump connector (WY wire and a ground).

Voltage: 12V

8. If the voltage is normal, replace the fuel pump.
9. If not correct, check the control relay and circuit (Refer to page 4C—96.)
10. Disconnect the jumper wire.



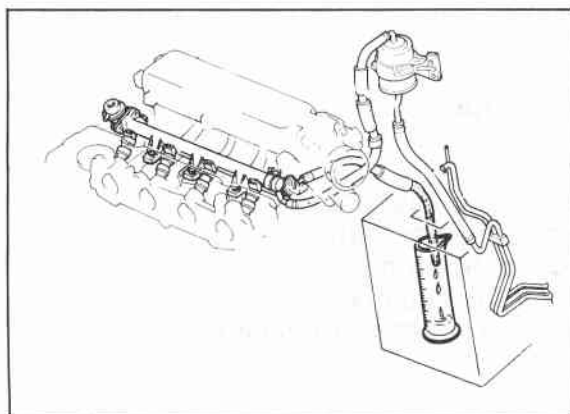
76G04C-099

Volume Test

Warning

Before performing the following procedures, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52)

1. Connect a jumper wire to test connector (Yellow).
2. Disconnect the fuel return hose from fuel return pipe.



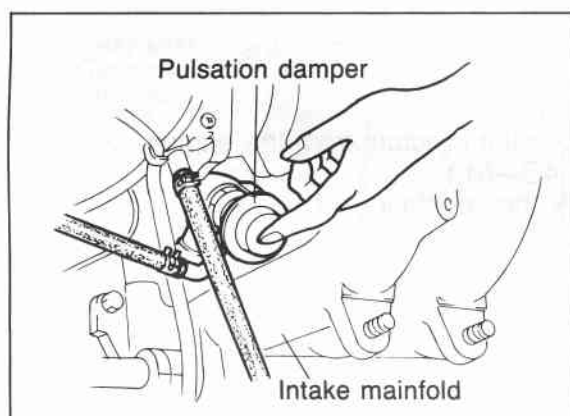
76G04C-100

3. Turn the ignition switch ON for 10 seconds, and check the feeding capacity with graduated cylinder.

Feeding capacity:

Minimum 220 cc (13.4 cu in)/10 sec.

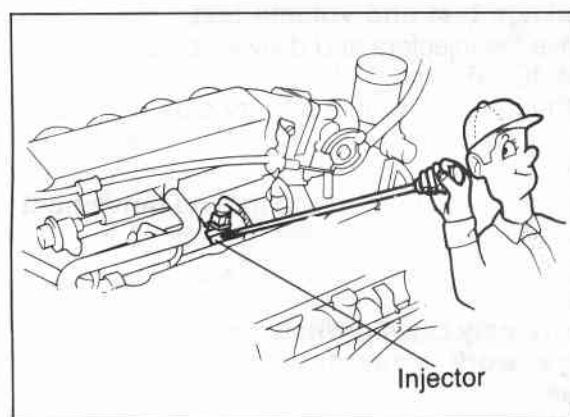
4. If not within specification, check the fuel filter, fuel lines and fuel pump.
5. Turn the ignition switch OFF and disconnect the jumper wire.



86U04A-083

PULSATION DAMPER

1. Run the engine at idle.
2. Place a finger on the screw of the pulsation damper head.
3. Check that pulsation is felt.

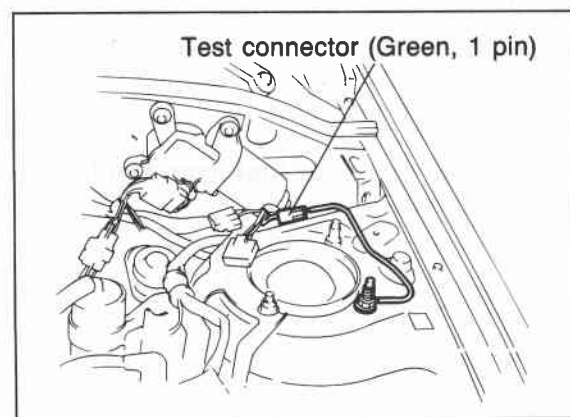


76G04C-101

INJECTOR

On-vehicle Inspection

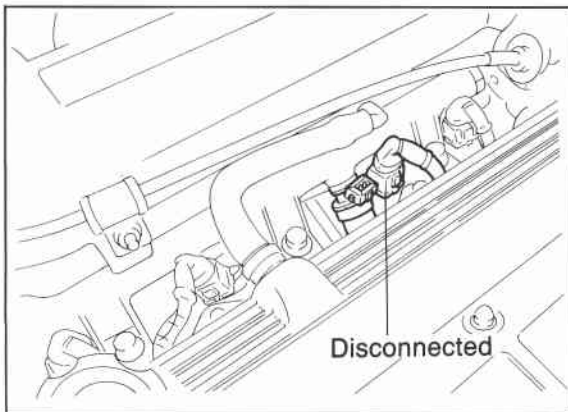
1. Warm up the engine and run it at idle.
2. Listen for operational sound of the injector with a screwdriver or a sound scope.



76G04C-102

3. Ground the test connector (Green, 1-pin).

4C FUEL SYSTEM



76G04C-103

4. Disconnect the connector from each injector respectively.
5. Check that the engine speed decreases about **100—200 rpm** each time.
6. If not correct, check the following:

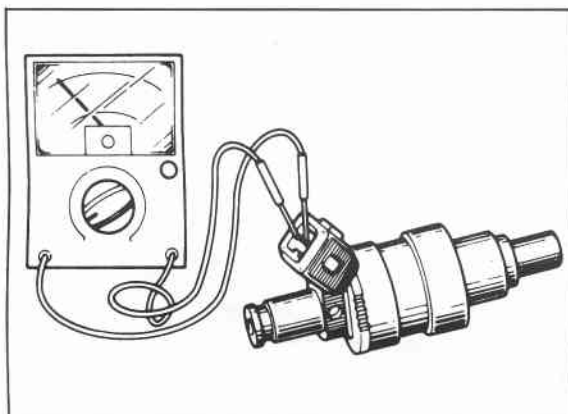
No operating sound and no speed drop

Check injector wiring harness

No speed drop only

Injector resistance

Injection volume of injector



76G04C-104

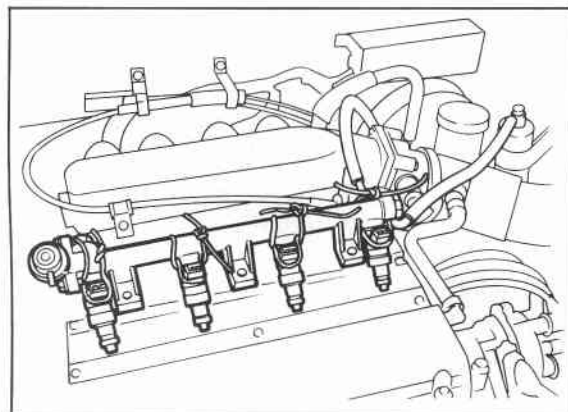
Inspection

Perform the following inspections.

Resistance

1. Remove the injectors from the engine. (Refer to page 4C—61.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

Resistance: 12—16 Ω



76G04C-105

Fuel leakage test and volume test

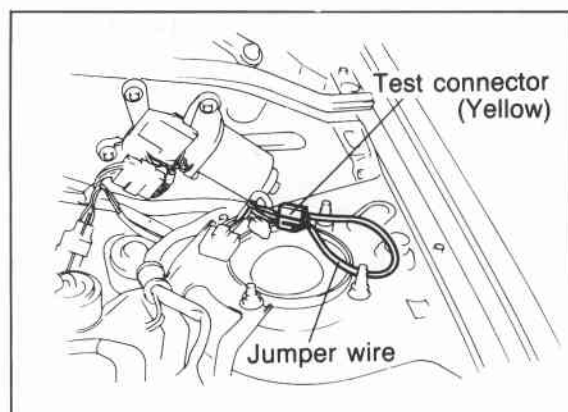
1. Remove the injectors and delivery pipe. (Refer to pages 4C—61 and 63.)
2. Affix the injectors to the delivery pipe with wire.

Caution

Affix the injectors firmly so that no movement is possible.

Warning

Be extremely careful when working with fuel. Always work away from sparks or open flames.

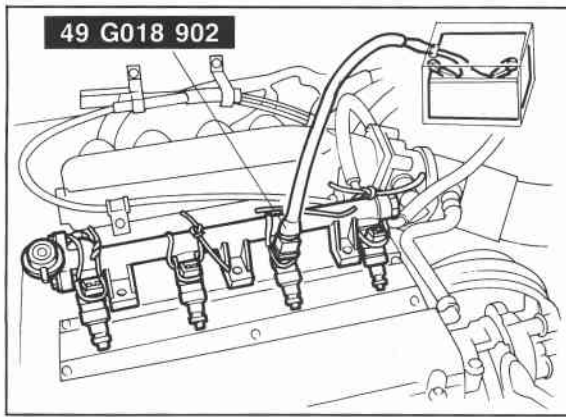


76G04C-106

3. Connect the terminals of the test connector (Yellow) with a jumper wire. Turn the ignition switch ON.
4. Check that no fuel leaks from the injector nozzles.

Note

After 1 minute, a drop of fuel from the injector is acceptable.



76G04C-107

5. Connect the **SST** to the battery and injector.
6. Check the injection volume with a graduated container.

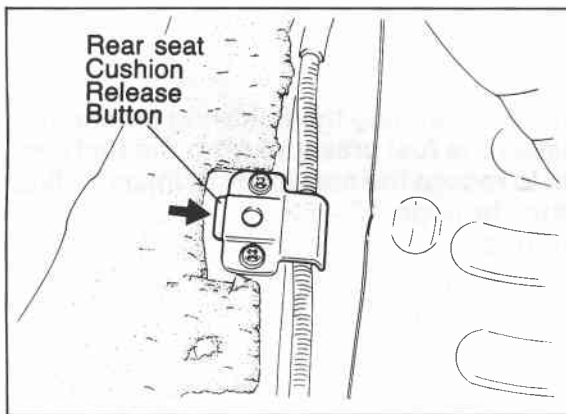
Injection volume:

Approx. 66—91 cc (4.03—5.55 cu in) /15 sec.

Caution

When using the SST, make sure of the SST number and use correct one.

7. If not correct, replace the injector.



76G04C-108

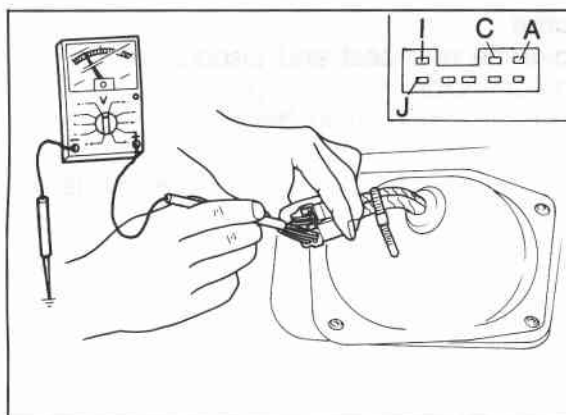
TRANSFER PUMP CONTROL SYSTEM (4 WHEEL STEERING)

1. Remove the rear seat. (Refer to 14 section.)
2. Remove the fuel filler cap.
3. Turn the ignition switch ON.

Note

a) The tank should be more than 1/3 full.

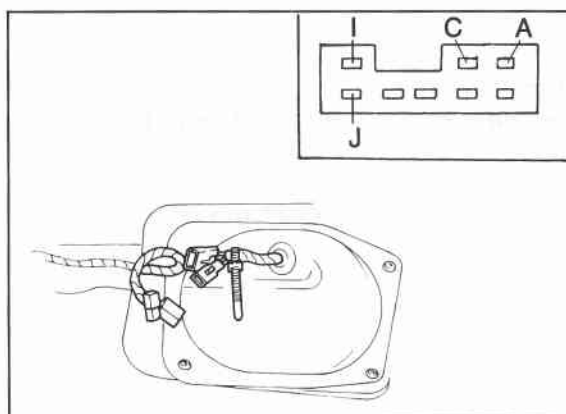
b) Due to the delay timer, transfer pump operation begins approx. 10 sec. after the ignition switch is turned ON.



86U04B-075

4. Listen for the operational sound of the transfer pump.
5. Install the fuel filler cap.
6. If no sound was heard, check the voltage at the transfer pump connector.

Terminal (wire)	Voltage
A, C (WG)	Approx. 12V
I, J (B)	0V



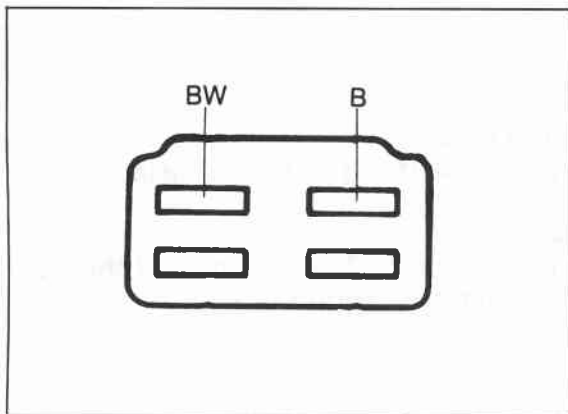
76G04C-211

7. If the voltages are correct, replace the transfer pump.
8. If not correct, disconnect the transfer pump connector.
9. Check the voltage at the terminals below.

Terminal (wire)	Voltage
A, C (WG)	Approx. 12V
I, J (B)	0V

10. If the voltages are correct, replace the transfer pump.

4C FUEL SYSTEM

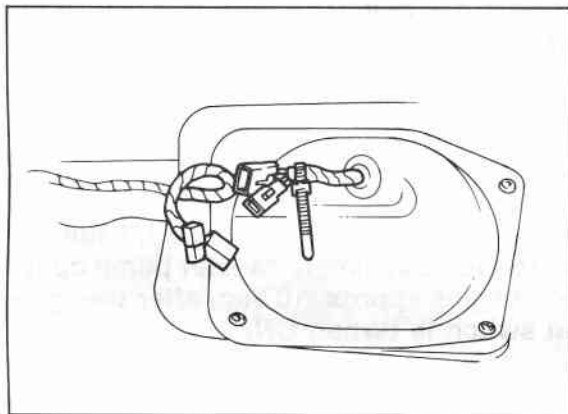


76G04C-109

11. If not correct, check the voltage at terminals of the fuel pump control unit.

Terminal (wire)	Voltage
A (B)	Approx. 12V
C (BW)	0V

12. If the voltages are correct, replace the fuel pump control unit.
13. If not correct, repair the power supply circuit or the ground circuit for the fuel pump control unit.



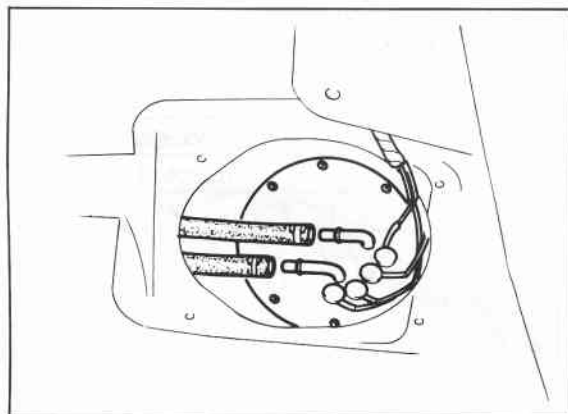
76G04C-110

REPLACEMENT

Caution

A) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)

b) When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.



86U04A-101

Fuel Pump

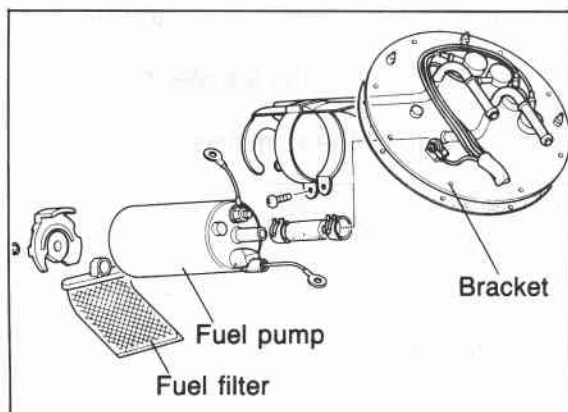
1. Remove the rear seat and disconnect the fuel pump connector.
2. Remove the service hole cover.
3. Disconnect the fuel hoses.
4. Remove the fuel pump and fuel tank gauge assembly.

5. Replace the fuel pump.

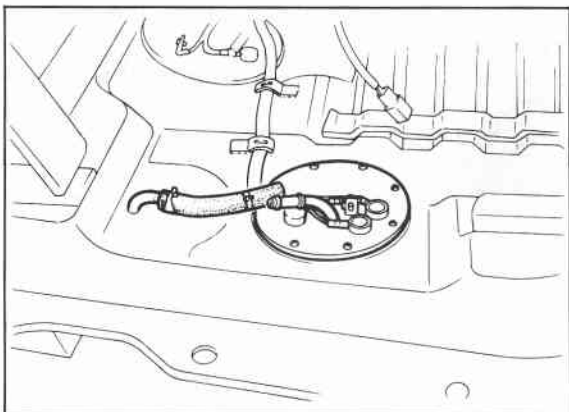
Caution

Secure the fuel pump terminals and fuel hoses tightly.

6. Install in the reverse order of removal.



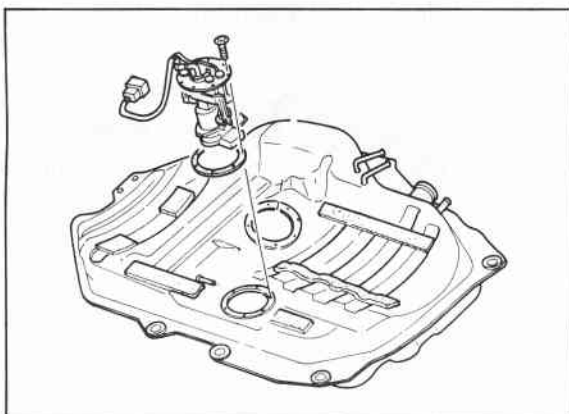
76G04C-111



76G04C-112

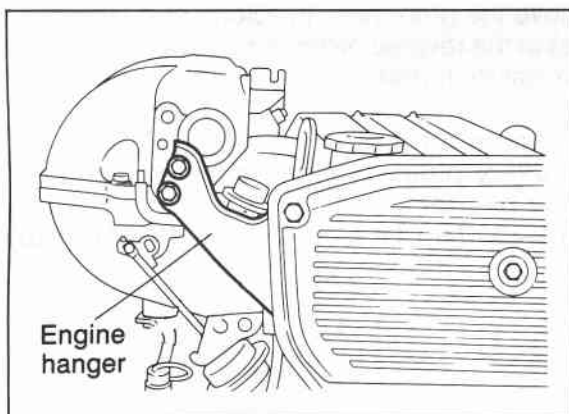
Transfer Pump

1. Remove the fuel tank. (Refer to page 4C—65.)
2. Disconnect the fuel hoses from the transfer pump.



86U04B-083

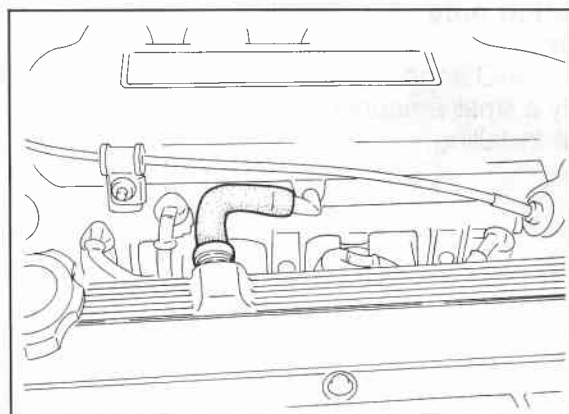
3. Remove the transfer pump.
4. Install in the reverse order of removal.



76G04C-113

Injector

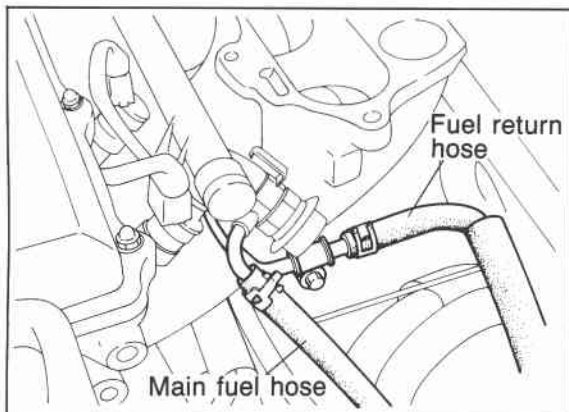
1. Remove the engine hanger.
2. Remove the wiring harness bracket.



76G04C-114

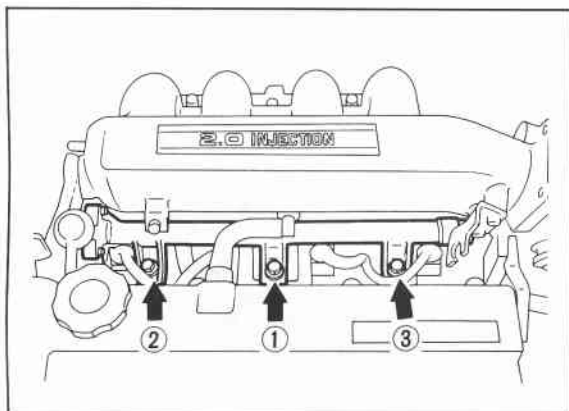
3. Disconnect the PCV valve and hose from the dynamic chamber.

4C FUEL SYSTEM



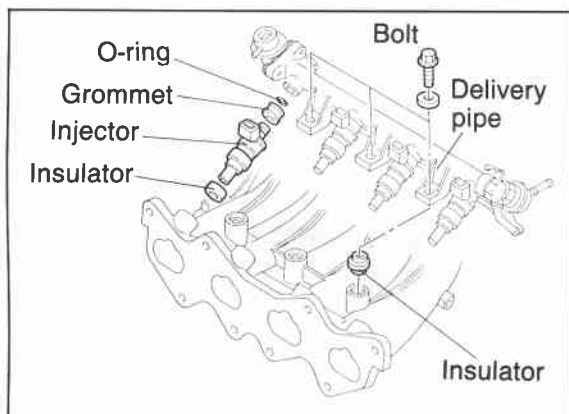
76G04C-115

4. Disconnect the main fuel hose from the delivery pipe assembly.
5. Disconnect the fuel return hose from the fuel return pipe.
6. Remove fuel return pipe mounting bolt.



76G04C-116

7. Remove the delivery pipe assembly mounting bolts and insulators.



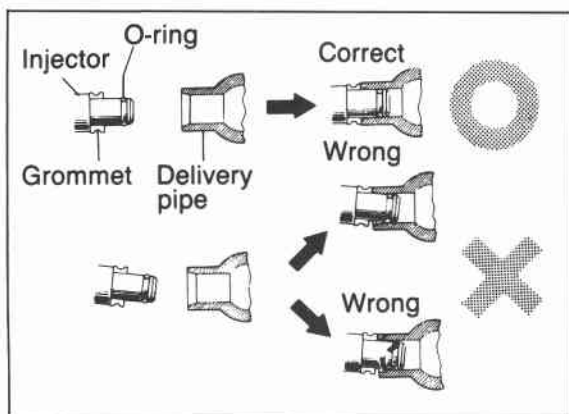
76G04C-117

8. Remove the grommets, injectors, and insulators.
9. Install in the reverse order of removal, referring to the installation note.

Tightening torque:

Delivery pipe, dynamic chamber, and engine hanger

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

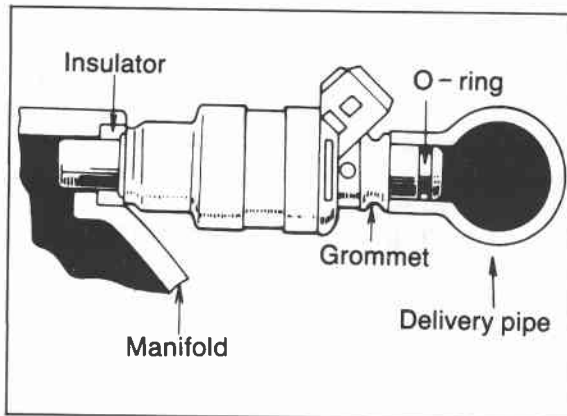


86U04A-108

Installation note

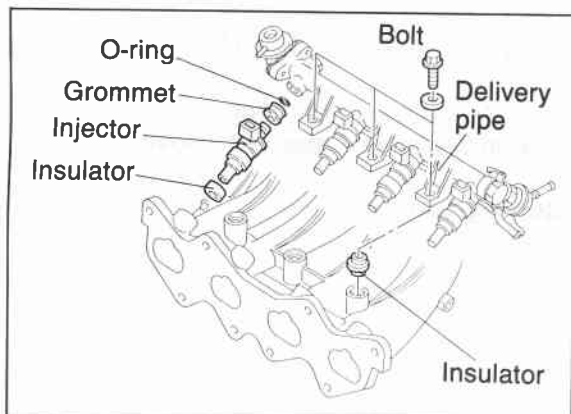
Injector

1. Use new O-rings.
2. Apply a small amount of engine oil to the O-rings when installing.



86U04A-109

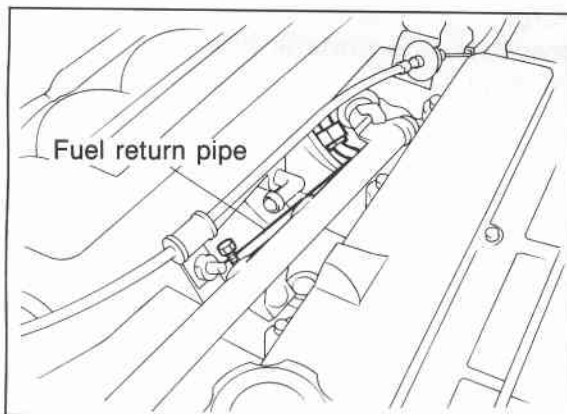
3. Install the injectors and the injector insulators.



76G04C-118

Insulator

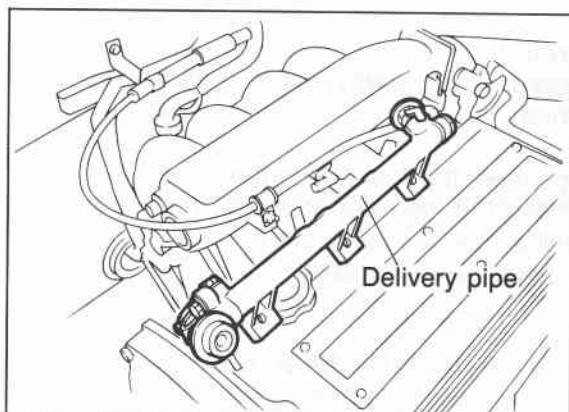
Install the insulators between the intake manifold and the delivery pipe.



76G04C-119

Delivery Pipe

1. Remove the injectors. (Refer to page 4C—61.)
2. Separate the fuel return pipe from the delivery pipe assembly.



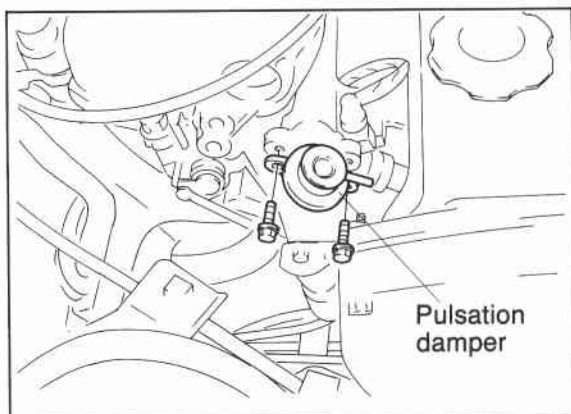
76G04C-120

3. Replace the delivery pipe.
4. Install in the reverse order of removal, referring to the installation note.

Tightening torque:

**Fuel return pipe 8—11 N·m
(0.8—1.1 m·kg, 69—95 in·lb)**

4C FUEL SYSTEM



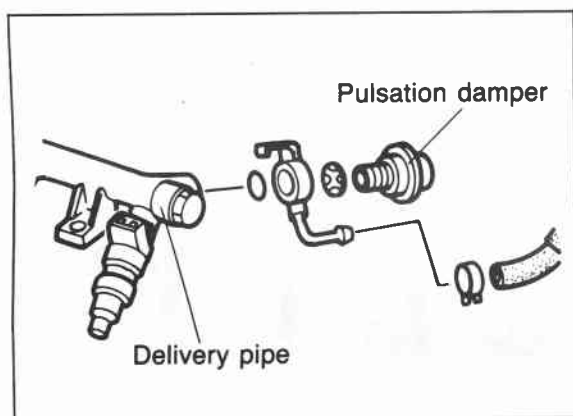
76G04C-121

Pressure Regulator

1. Remove the engine hanger.
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the pressure regulator.
4. Install in the reverse order of removal.

Tightening torque:

8—11 N·m (0.8—1.1 m·kg, 69—95 in·lb)



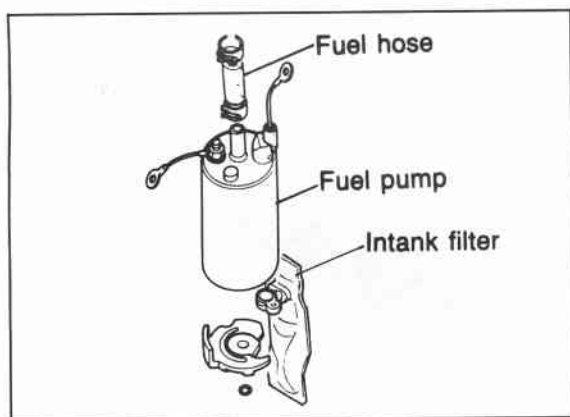
76G04C-122

Pulsation Damper

1. Remove the delivery pipe assembly. (Refer to page 4C—63.)
2. Remove the pulsation damper.
3. Install in the reverse order of removal.

Tightening torque:

25—34 N·m (2.5—3.5 m·kg, 18—25 ft·lb)



76G04C-123

Fuel Filter

Low pressure side (In-tank filter)

Refer to page 4C—60.

High pressure side

The fuel filter must be replaced at the intervals outlined in the maintenance schedule.

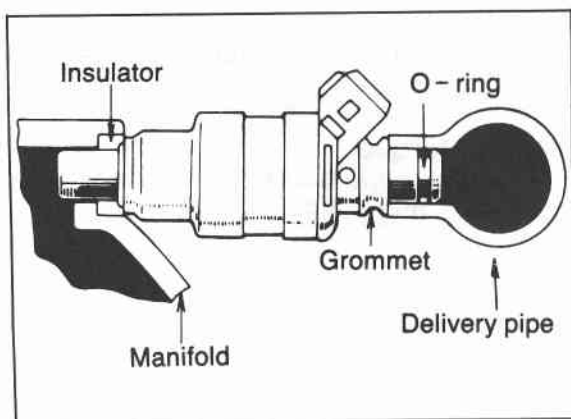
Warning

Always work away from sparks or open flames.

1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

Note

When installing the filter, push the fuel hoses fully onto the fuel filter and secure them with spring clamps.



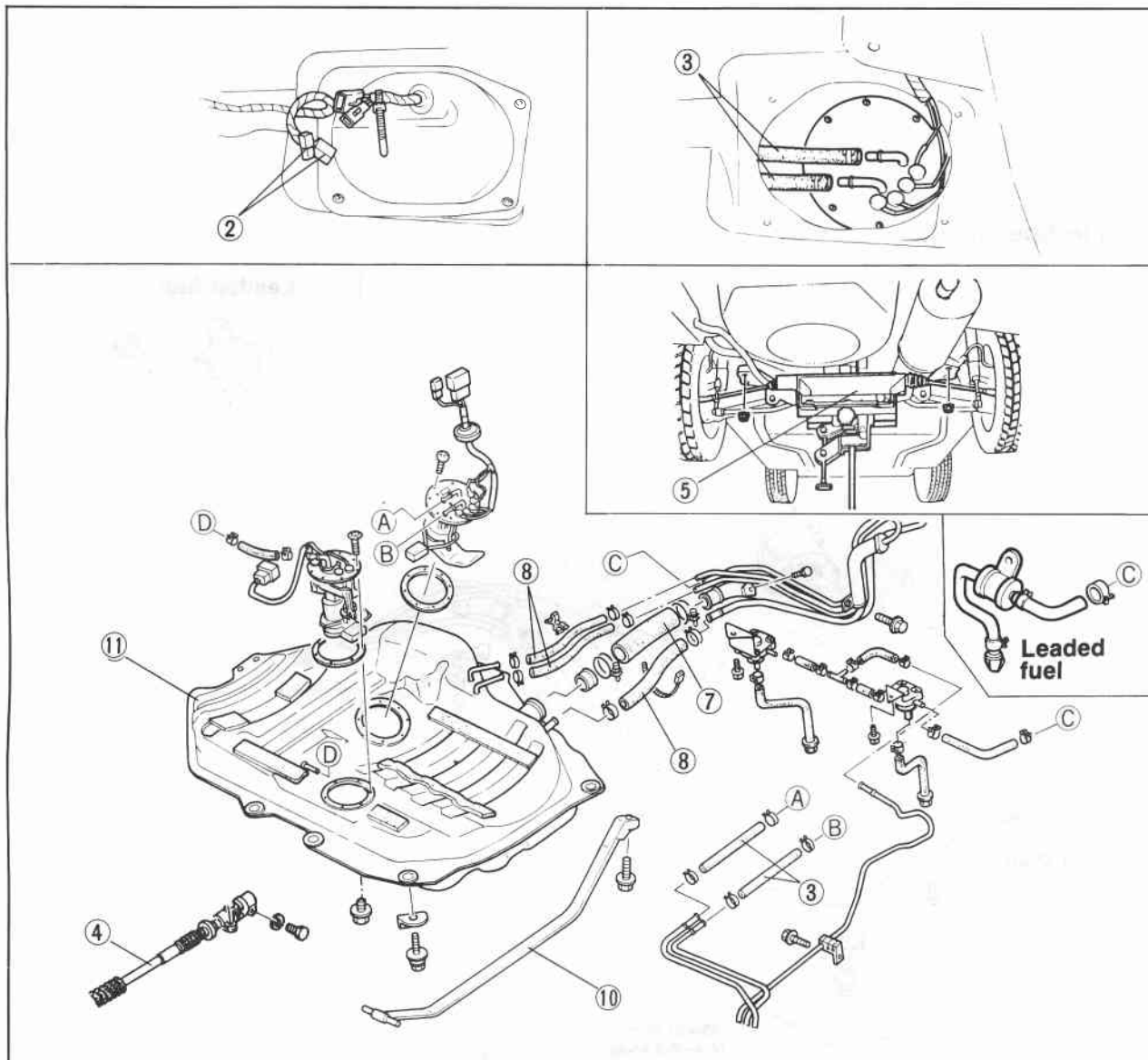
76G04C-124

FUEL TANK Removal

Caution

- a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page 4C—52.)
- b) When removing the fuel tank, keep sparks, cigarettes, and open flames away from the fuel tank.

Remove in the sequence shown in the figure.



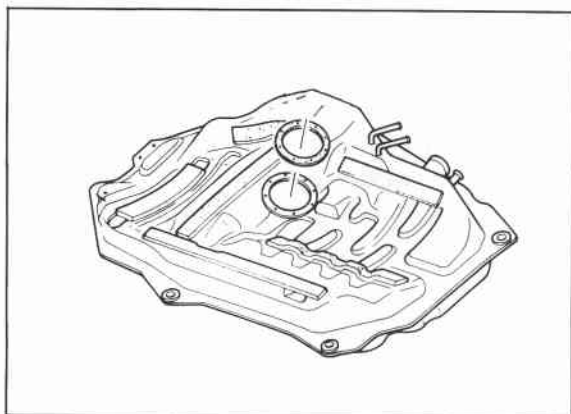
76G04C-125

Note

Drain the fuel from the fuel tank before removing the tank.

- | | |
|--|------------------------------------|
| 1. Remove fuel filler cap. | 5. Cross member (4-wheel steering) |
| 2. Fuel pump connectors | 6. Evaporative hoses |
| 3. Fuel hoses | 7. Fuel filler hose |
| 4. Steering angle transfer shaft (4-wheel steering)
(Refer to section 10) | 8. Breather hose |
| | 9. Parking cable bracket |
| | 10. Fuel tank strap |
| | 11. Fuel tank |

4C FUEL SYSTEM



76G04C-126

Inspection

1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

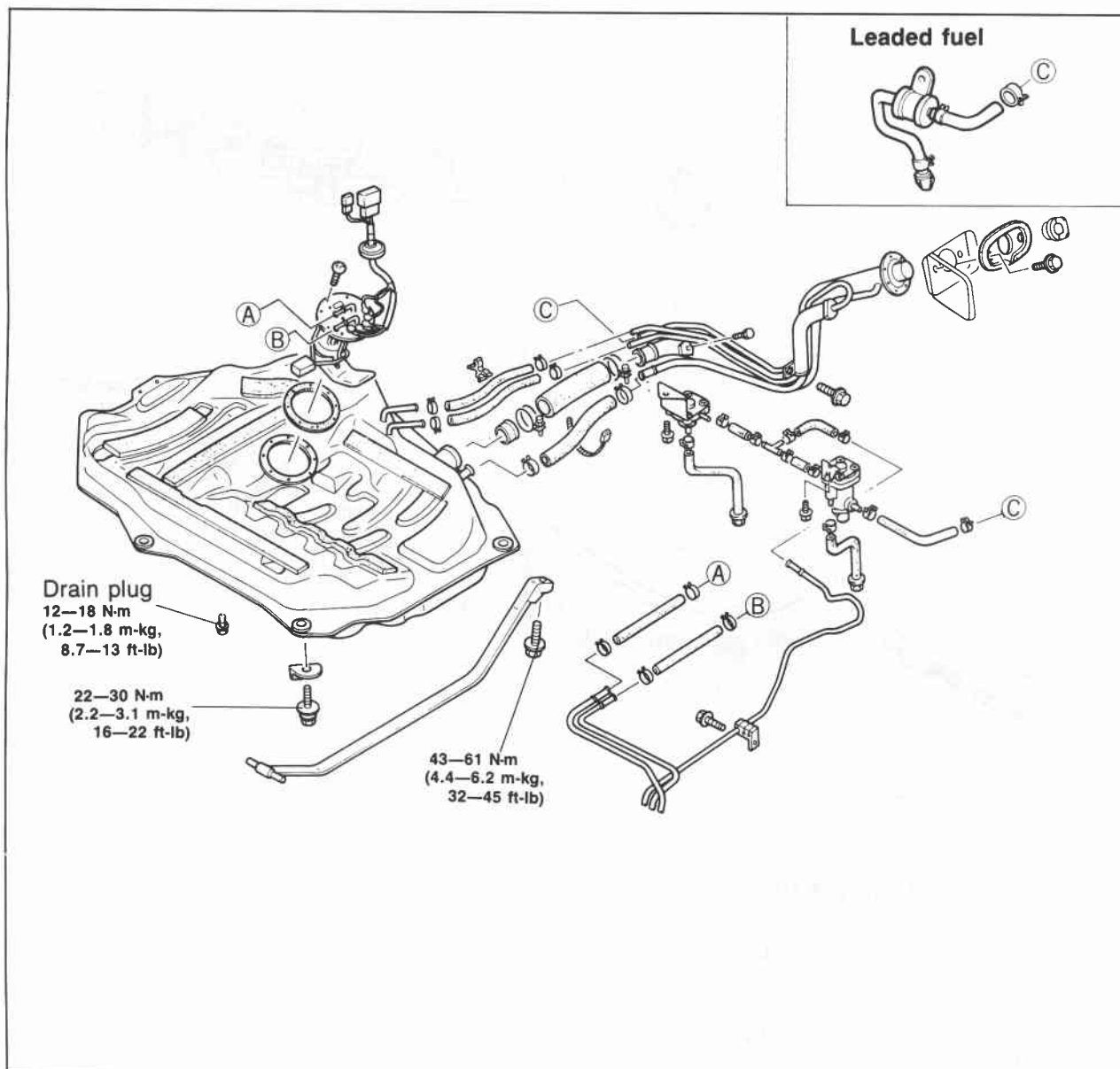
Warning

Before repairing, clean the fuel tank thoroughly with steam to remove all explosive fuel and fumes.

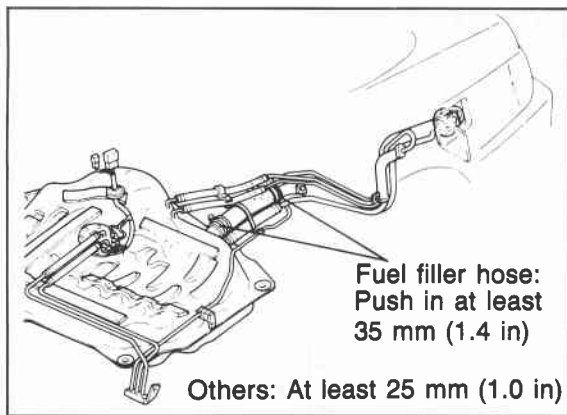
Installation

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

Torque Specifications



86U04A-119



76G04C-127

Installation note

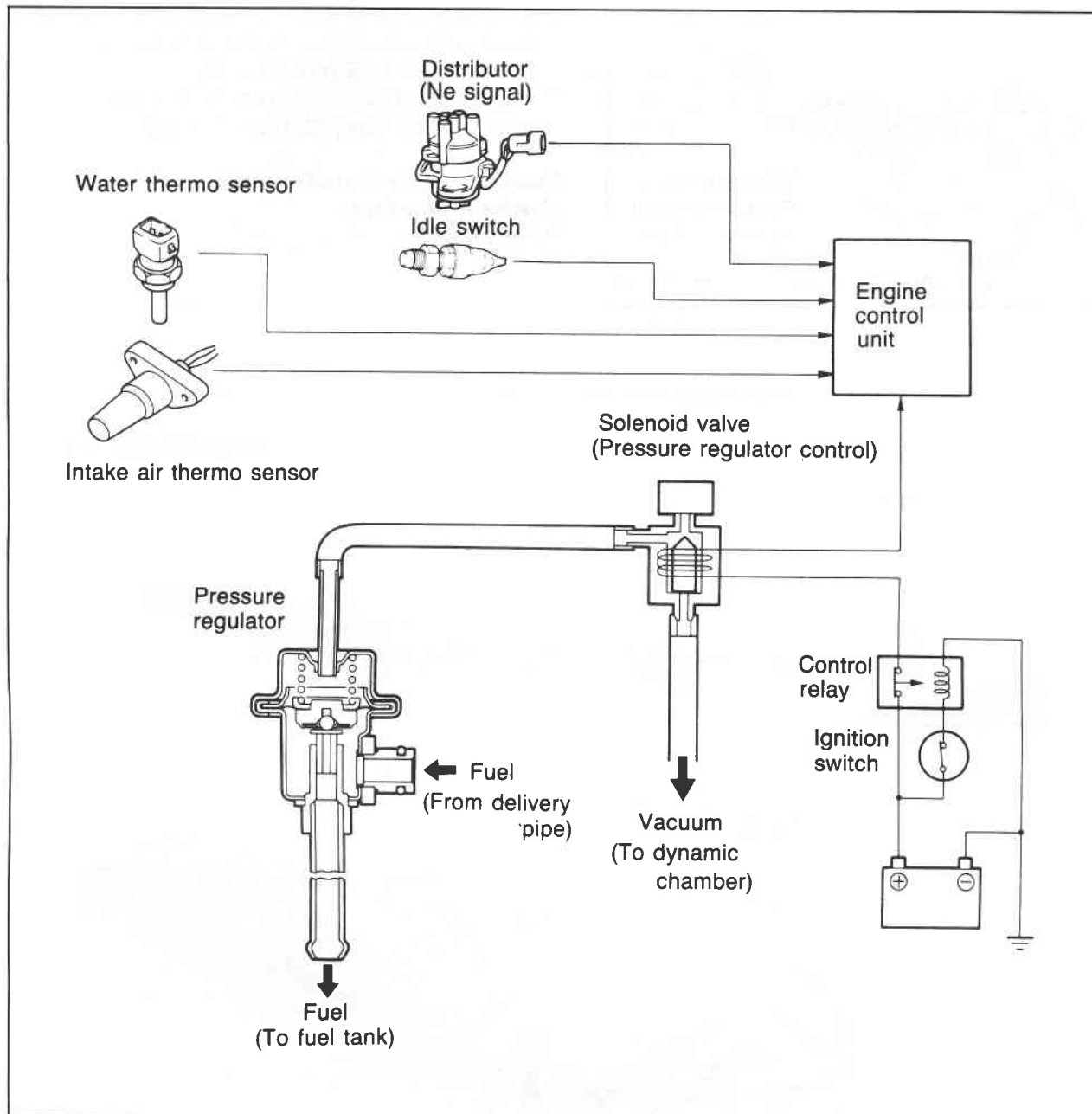
Hoses

1. Push the ends of the main fuel hose, fuel return hose, and evaporation hoses onto the fuel tank fittings **at least 25 mm (1.0 in)**.
2. Push the fuel filler hose onto the fuel tank pipe and filler pipe **at least 35 mm (1.4 in)**.

Steering angle transfer shaft (4-wheel steering)

Refer to section 10

PRESSURE REGULATOR CONTROL (PRC) SYSTEM



76G04C-128

To prevent percolation of the fuel during idle after the engine is restarted, vacuum is cut to the pressure regulator, increasing the fuel pressure.

Specified time: Approx. 120 sec.

Operating condition: Coolant temperature — above 70°C (158°F)

**Intake air temperature — above 30°C (86°F)....Unleaded fuel
above 50°C (122°F)....Leaded fuel**

COMPONENT DESCRIPTION

Component	Function	Remark
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Intake air thermo sensor	Detects intake air temperature; sends signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Pressure regulator	Adjusts fuel pressure supplied to injectors	
Solenoid valve (Pressure regulator control)	Controls vacuum to pressure regulator	Cuts vacuum when hot
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Idle switch	Detects when throttle valve closed; sends signal to engine control unit	ON at idle

76G04C-129

TROUBLESHOOTING

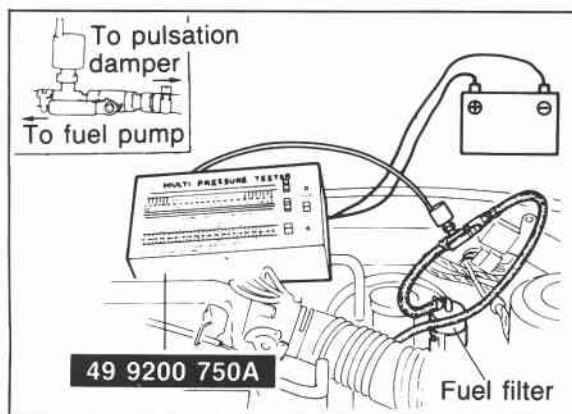
Check the condition of the wiring harness and connections before checking the sensors or switches.

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 4C—10 and 11.)

<div> <div>Possible cause</div> <div>Page</div> <div>Symptom</div> </div>	Solenoid valve (Pressure regulator control)	Water thermo sensor	Intake air thermo sensor	Engine control unit terminal	System inspection
				2K	
	4C—70	4C—107	4C—110	4C—98	4C—70
Engine stalls or runs rough after hot starting	2	3	4	5	1

76G04C-130



76G04C-131

System Inspection

1. Connect the **SST** to the engine. (Refer to page 4C—53.)
2. Start the engine.

3. Warm up the engine to normal operating temperature and stop the engine.

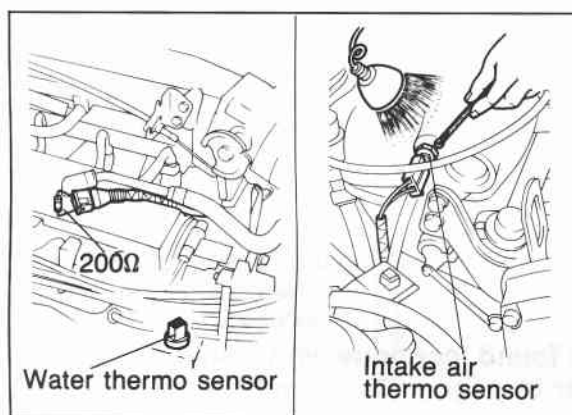
Warning

Be careful when disconnecting the water thermo sensor connector because the surrounding area is very hot.

4. Disconnect the water thermo sensor connector. Connect a resistor (**200 Ω**) to the sensor connector.
5. Heat the intake air thermo sensor to above specification.

**Specification: 30°C (86°F)....unleaded fuel
50°C (122°F)....leaded fuel**

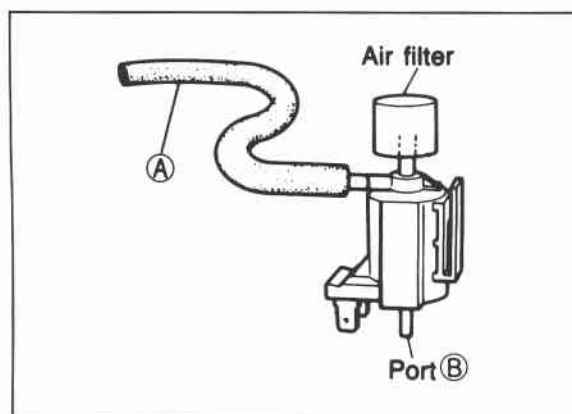
6. Restart the engine.
7. Check the fuel line pressure and operating times as shown in the chart.



76G04C-132

Operating time	Fuel line pressure kPa (kg/cm ² , psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

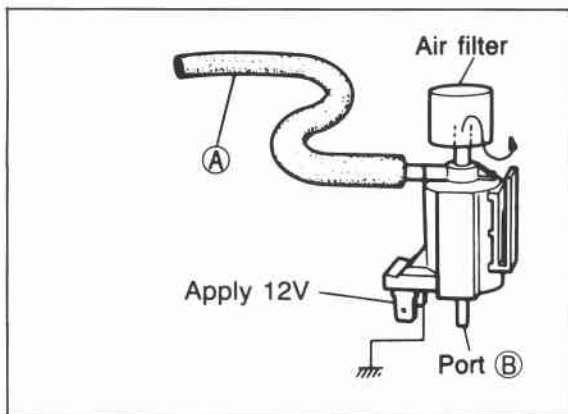
76G04C-133



76G04C-134

Solenoid Valve (Pressure Regulator Control) Inspection

1. Disconnect the vacuum hose from the vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.

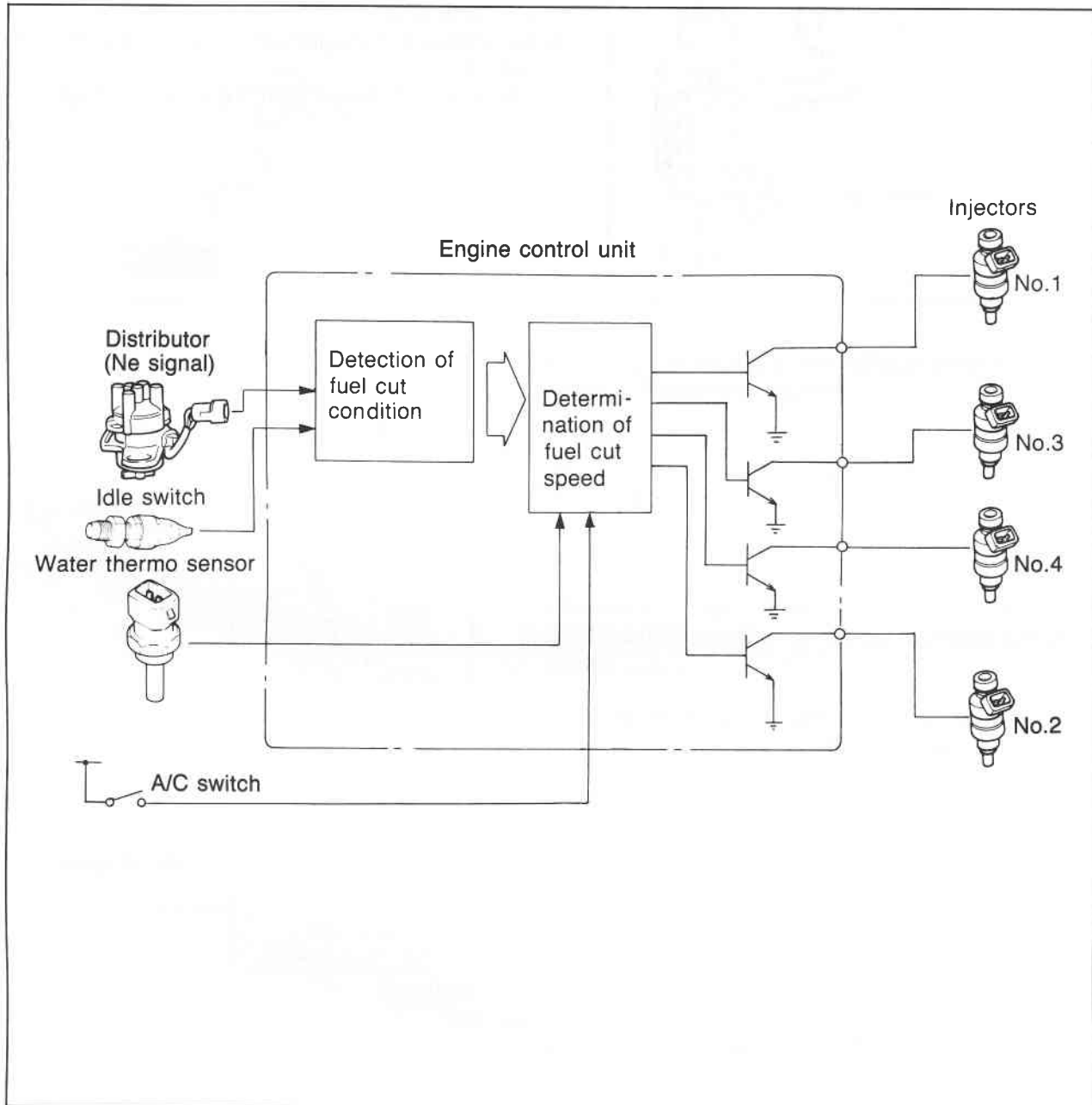


86U04A-099

4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from the vacuum hose A.
7. Check that air flows from the valve air filter.

4C DECELERATION CONTROL SYSTEM

DECELERATION CONTROL SYSTEM



86U04A-121

The fuel cut system is provided as a deceleration control system.
This system is to improve fuel consumption.

COMPONENT DESCRIPTION

Component	Function	Remarks
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	ON at idle
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	

76G04C-135

TROUBLESHOOTING

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

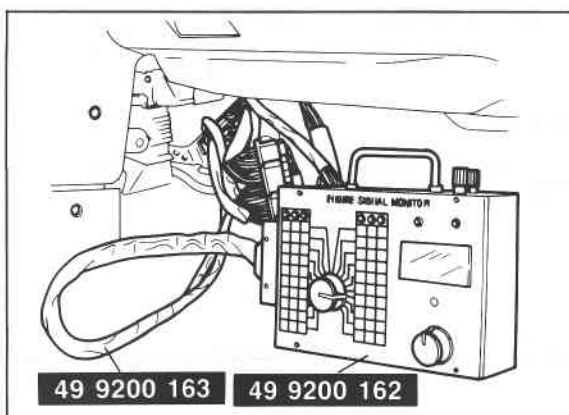
Note

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

Possible cause	Water thermo sensor	System inspection
Page	4C—107	4C—74
Checking order	2	1

76G04C-136

4C DECELERATION CONTROL SYSTEM



76G04C-137

System Inspection (Electrical Signal)

1. Connect the **SST** between the wiring harness and control unit.
2. Set 3C, 3E 3F, or 3H position on the **SST**.

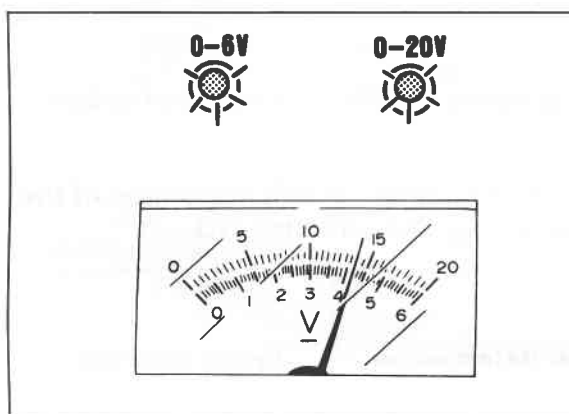
Note

3C — For No. 2 injector

3E — For No. 1 injector

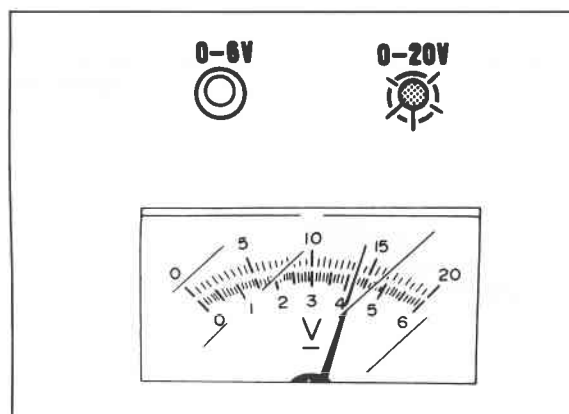
3F — For No. 4 injector

3H — For No. 3 injector



86U04A-125

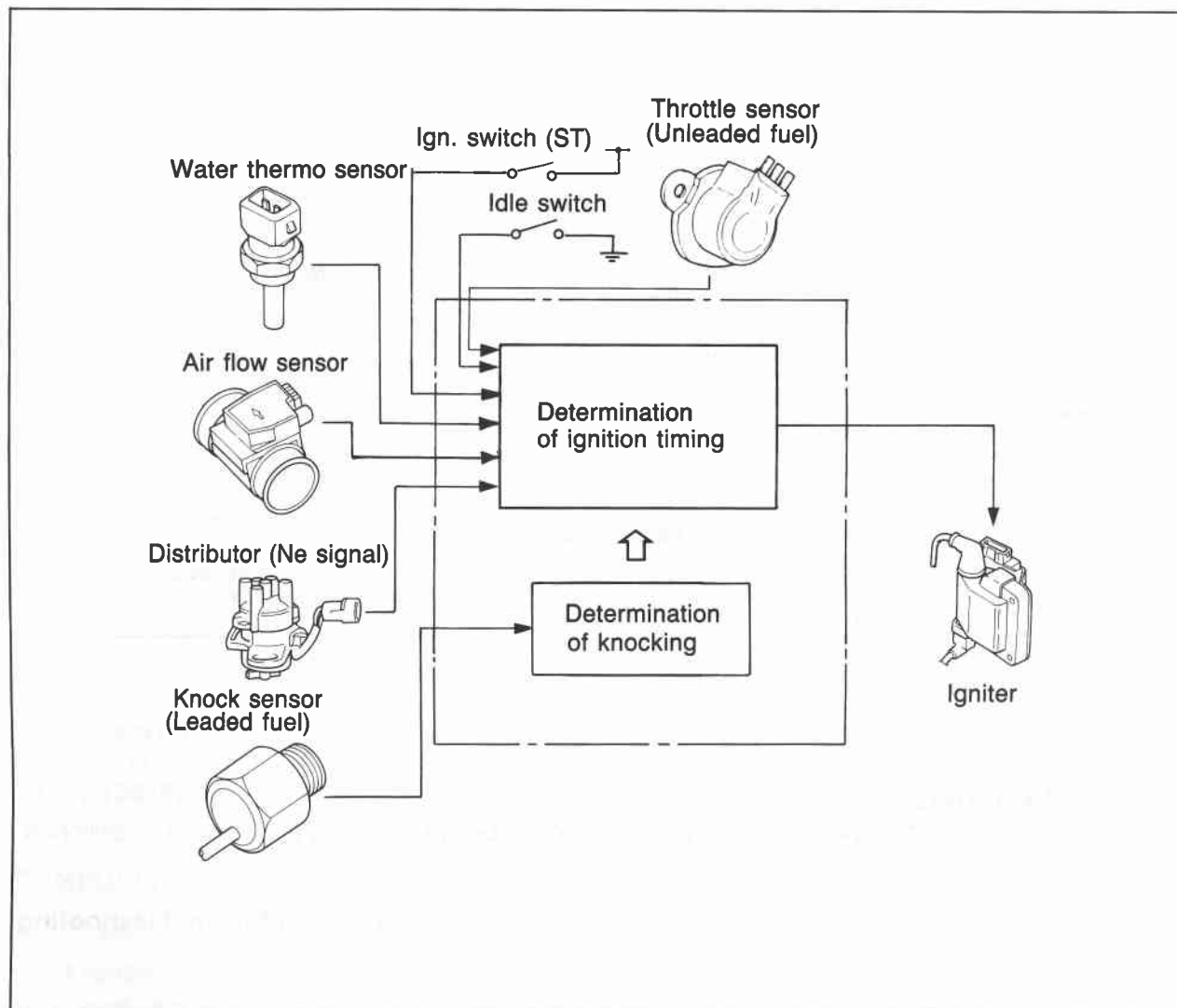
3. Check that the indicator lamps alternately flash at idle.



76G04C-138

4. Increase the engine speed to **4,000 rpm**, then suddenly decrease the engine speed.
5. Check that the green indicator lamp is OFF during deceleration.
6. Accelerate and check that the voltage decreases.

ELECTRONIC SPARK ADVANCE (ESA) CONTROL SYSTEM



76G04C-139

This system electronically controls the ignition timing to obtain better engine performance. The best ignition timing is determined and set within the engine control unit based on signals from the various sensors and switches. The knock control function is used only with leaded fuel engines.

4C ESA CONTROL SYSTEM

COMPONENT DESCRIPTION

Component	Function	Remark
Air flow sensor	Detects amount of intake air; sends signal to engine control unit	
Distributor	Has Ne and G signal pick-up and distributes high voltage to spark plugs	
Engine control unit	Detects signals from input sensors and switches; decides best ignition timing	
Idle switch	Detects when throttle valve fully closed; sends signal to engine control unit	Installed on throttle body
Igniter	Receives spark signal from engine control unit and generates high voltage in ignition coil	
Ignition switch (ST position)	Sends engine cranking signal to engine control unit	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor
Knock sensor (leaded fuel)	Detects engine knocking; sends signal to knock control unit	
Throttle sensor	Detects throttle opening angle; sends signal to engine control unit	Installed on throttle body

76G04C-140

TROUBLESHOOTING

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

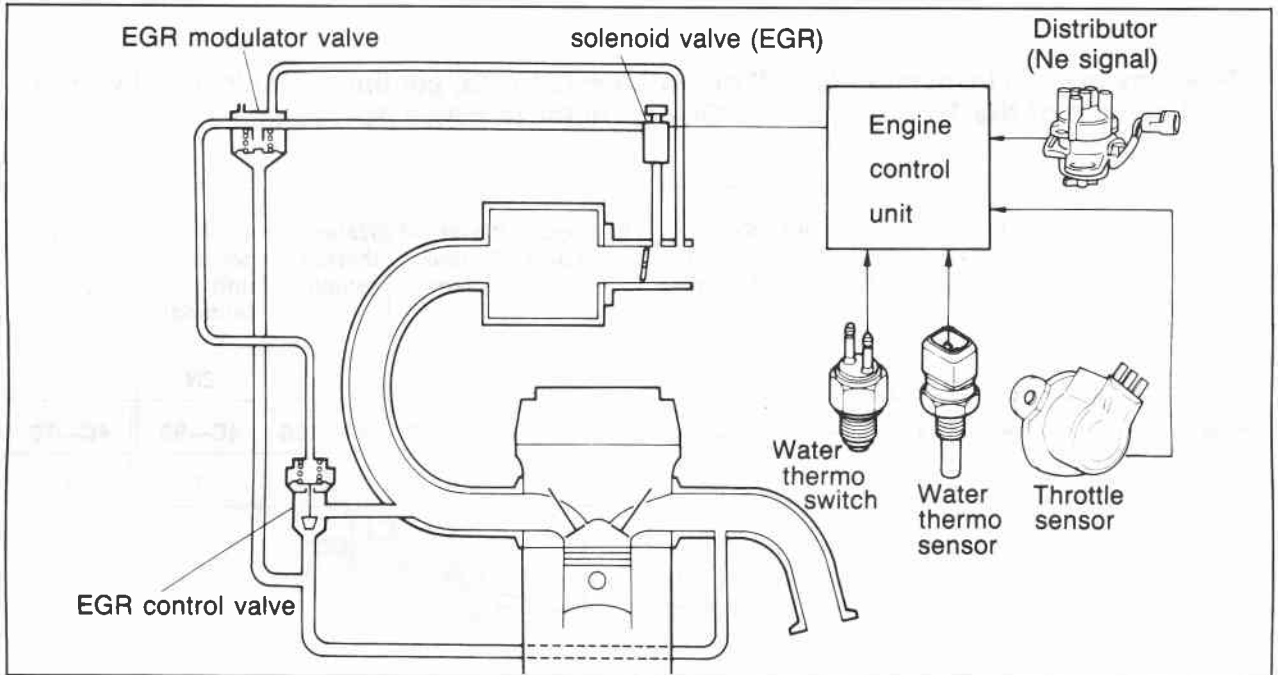
Note

If no problem is found, continue with inspection of the next system of the troubleshooting Guide. (Refer to page 4C—10 and 11)

Symptom	Possible cause	Air flow sensor	Igniter	Engine control unit terminal	Knock sensor
	Page	4C—103	Refer to section 5	1X 4C—98	4C—109
Hard start or won't start (Crank OK)		3	1	2	—
Knocking		—	—	—	1

76G04C-141

EXHAUST GAS RECIRCULATION (EGR) SYSTEM (UNLEADED FUEL)



76G04C-142

This system introduces exhaust gas into the intake manifold to reduce NOx emissions. It operates depending on the engine load, engine speed (**1,500—3,500 rpm**), engine coolant temperature (**above 70°C, 158°F**), and radiator coolant temperature (**above 17°C, 63°F**).

COMPONENT DESCRIPTION

Component	Function	Remark
EGR control valve	Recirculates portion of exhaust gas	
EGR modulator valve	Controls vacuum acting on EGR control valve	
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (EGR)	
Ne signal pick-up	Detects crank angle at 180° intervals; sends signal to engine control unit	
Solenoid valve (EGR)	Controls vacuum to EGR control valve	
Throttle sensor	Detects throttle valve opening angle; sends signal to engine control unit	Installed on throttle body
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit	
Water thermo switch	Detects radiator coolant temperature; sends signal to engine control unit	ON: above 17°C (63°F)

76G04C-143

4C EGR SYSTEM (UNLEADED FUEL)

TROUBLESHOOTING

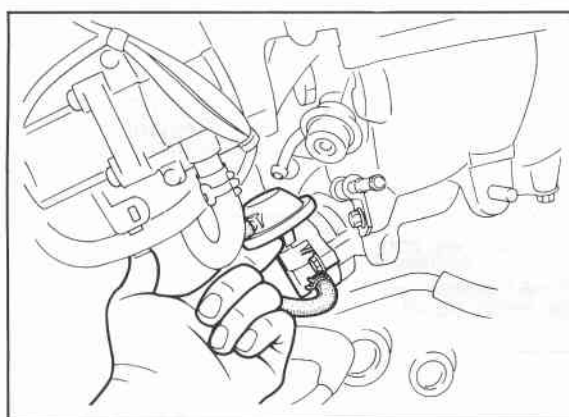
Check the condition of the wiring harness and connectors before checking the sensors or switches.

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 4C—10 and 11.)

Possible cause	Throttle sensor	Solenoid valve (EGR)	EGR modulator valve	EGR control valve	Water thermo sensor	Water thermo switch	Engine control unit terminal	System inspection
							2N	
Page	4C—104	4C—78	4C—79	4C—79	4C—107	4C—106	4C—98	4C—78
Checking order	8	2	4	3	6	5	7	1

76G04C-144



76G04C-145

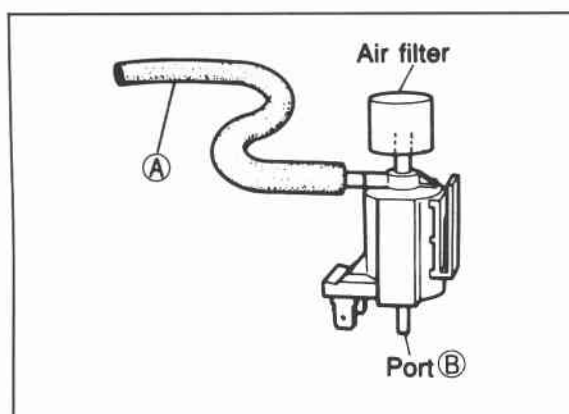
System Inspection

1. Start the engine.
2. Accelerate the engine while still cold and verify that the diaphragm of the EGR control valve does not move.
3. Warm up the engine to normal operating temperature and run it at idle.

Warning

Be careful when checking the EGR control valve, the surrounding area is very hot.

4. Accelerate the engine and check that the diaphragm of the EGR control valve moves.

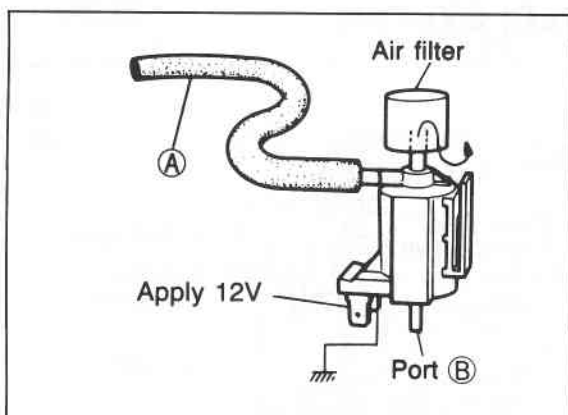


76G04C-146

Solenoid Valve (EGR)

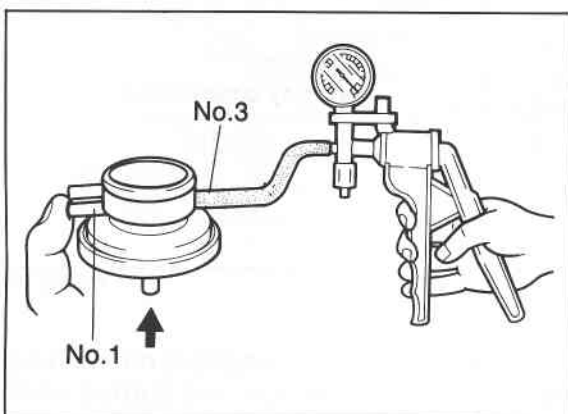
1. Disconnect the vacuum hose from the vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.

EGR SYSTEM (UNLEADED FUEL) 4C



76G04C-147

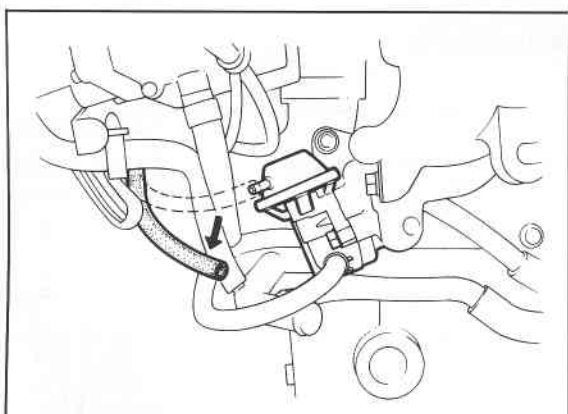
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the air filter.



86U04A-133

EGR Modulator Valve

1. Remove the EGR modulator valve.
2. Plug the No. 1 port and connect a vacuum pump to the No. 3 port.
3. Blow into the exhaust gas port. Operate the vacuum pump and verify that vacuum is held.
4. Release the exhaust gas port and confirm that vacuum is released.



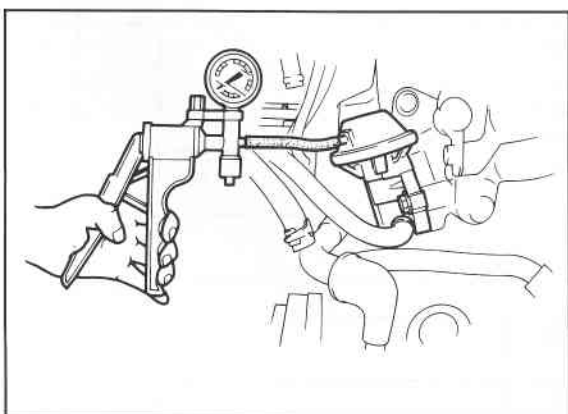
76G04C-148

EGR Control Valve

1. Warm up the engine and run at idle.
2. Disconnect the vacuum hose from the EGR control valve and plug it.
3. Verify that the engine runs smoothly.
4. If not correct, clean the exhaust gas passage in the valve or replace the valve.

Note

Before replacing the EGR control valve, check the intake air and control systems.



76G04C-149

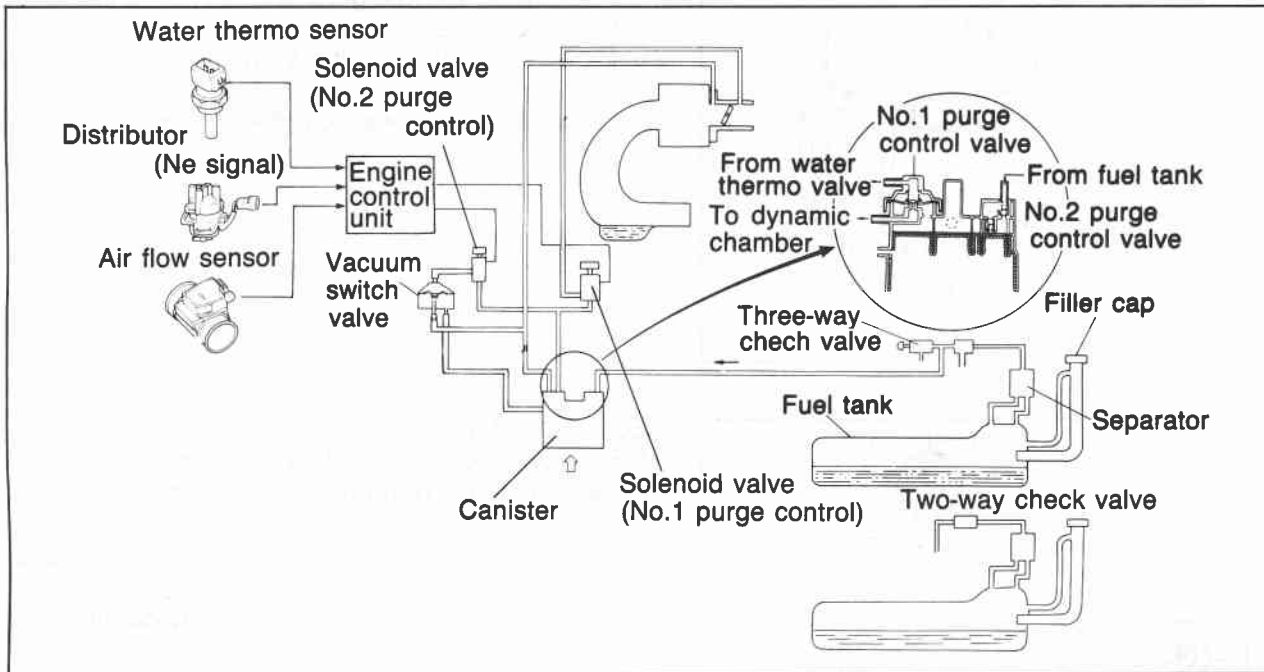
5. Connect a vacuum pump to the valve and apply vacuum.
6. Verify that the engine runs roughly or stalls at more than the specified vacuum.

Specification:

40—60 mmHg (1.6—2.4 inHg)

7. If not correct, replace the EGR control valve.

EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM



76G04C-150

Unleaded fuel:

This system stores fuel vapor generated in the fuel tank in the canister when the engine is not running. The fuel vapor is stored in the canister until it is drawn into the dynamic chamber and burned when the engine is started.

Leaded fuel:

Fuel vapor generated in the fuel tank flows out to the atmosphere.

COMPONENT DESCRIPTION

Component	Function	Remark	Application	
			New model	Previous model
Air flow sensor	Detects amount of intake air; sends signal to engine control unit		○	X
Charcoal canister	Stores fuel tank fumes while engine stopped		○	X
Engine control unit	Detects signals from input sensors and switches; controls solenoid valves (Purge control)		○	X
Ne signal pick-up	Detect crank angle at 180° intervals; sends signal to engine control unit	Installed in distributor	○	X
Separator	Prevents fuel from flowing into charcoal canister		○	○
Solenoid valve (No.1 purge control)	Controls vacuum to solenoid valve (No.2 purge control) and vacuum switch valve		○	X
Solenoid valve (No.2 Purge control)	Controls vacuum to vacuum switch valve		○	X
Three-way check valve	Controls pressure in fuel tank		○	X
Two-way check valve	Controls pressure in fuel tank		X	○
Vacuum switch valve	Regulates evaporative fumes from canister to intake manifold		○	X
Water thermo sensor	Detects coolant temperature; sends signal to engine control unit		○	X

76G04C-151

TROUBLESHOOTING

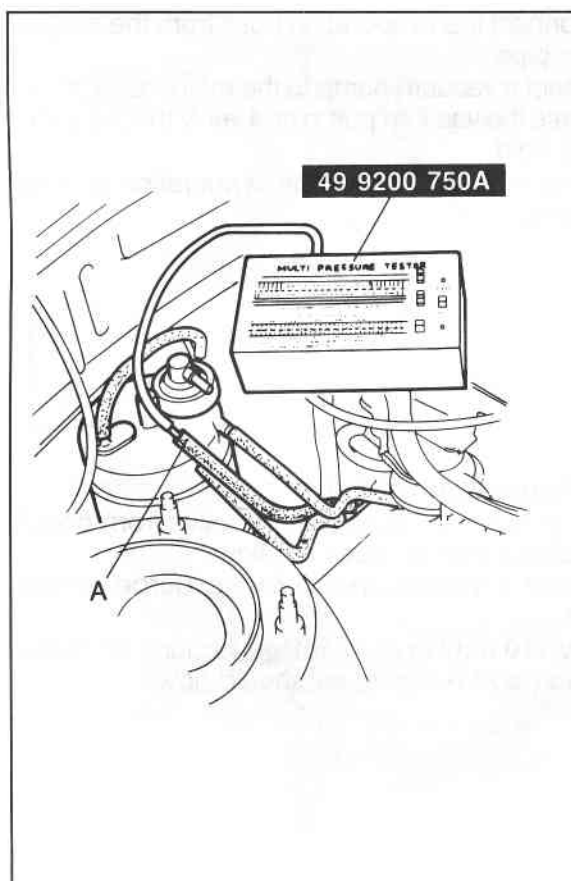
Check the condition of the wiring harness and connectors before checking the sensors or switches.

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 4C—10 and 11.)

Possible cause	Vacuum switch valve	Solenoid valve (No. 1 purge control)	Solenoid valve (No. 2 purge control)	Two-way check valve	Three-way check valve	Separator	No.1 purge control valve	No.2 purge control valve	Water thermo switch	Water thermo sensor	Engine control unit terminal	System inspection
											2P,2O	
Page	4C—83	4C—84	4C—84	4C—84	4C—83	4C—85	4C—82	4C—83	4C—106	4C—107	4C—98	4C—81
Checking order (Unleaded fuel)	4	2	3	—	10	11	5	6	7	8	9	1
Checking order (Leaded fuel)	—	—	—	1	—	2	—	—	—	—	—	—

76G04C-152



76G04C-153

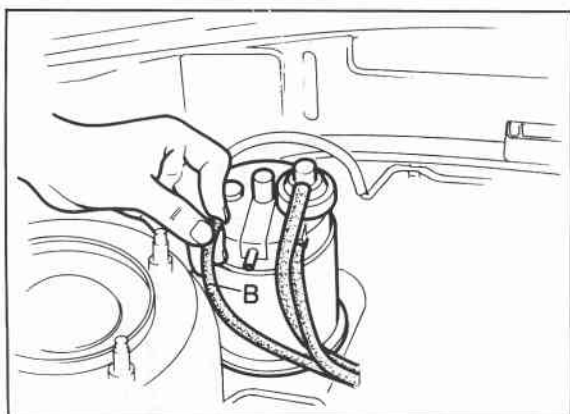
System Inspection

1. Check the vacuum hose routing.
2. If there is a poor connection, clog, or leak, repair or replace as necessary.
3. Warm up the engine and run it at idle.
4. Disconnect vacuum hose A from No. 1 purge control valve and connect the **SST** to the hose.

86U04A-140

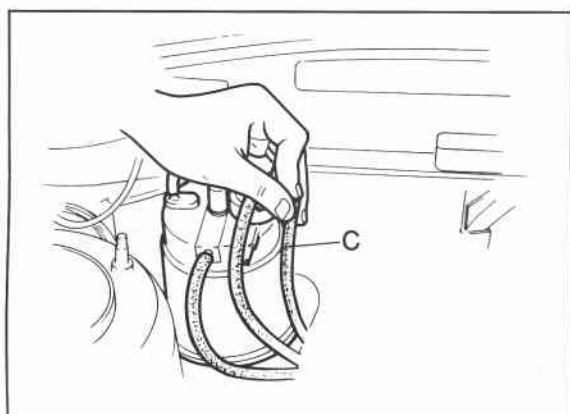
5. Increase the engine speed to above **2,500 rpm** and verify that the gauge shows more than **150 mmHg (5.9 inHg)**.
6. If not correct, check the solenoid valve (No. 1 purge control).
7. Reconnect hose A to No. 1 purge control valve.

4C EEC SYSTEM



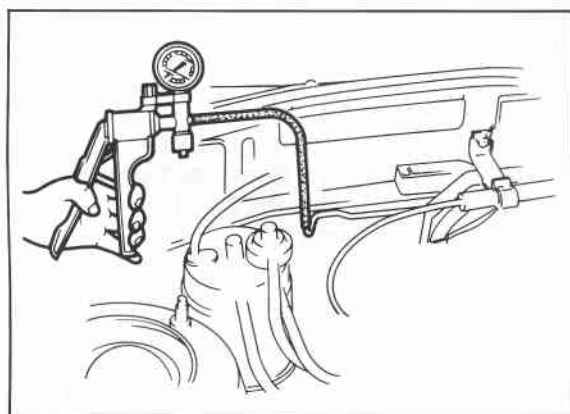
76G04C-154

8. Disconnect vacuum hose B from the canister and place a finger over the end of the hose.
9. Accelerate the engine rapidly and check that vacuum is felt at **above 1,700 rpm**.
10. Reconnect hose B to the canister.
11. If not correct, check the vacuum switch valve and the solenoid valve (No. 2 purge control).



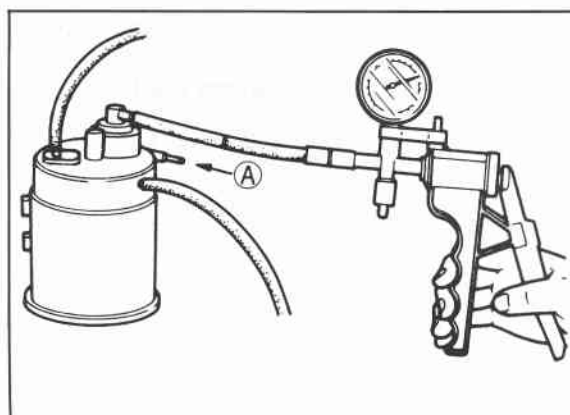
76G04C-155

12. Disconnect vacuum hose C from the canister and place a finger over the end of the hose.
13. Check that vacuum is felt.
14. If not correct, check the vacuum line between the canister and the dynamic chamber for clogging.



76G04C-156

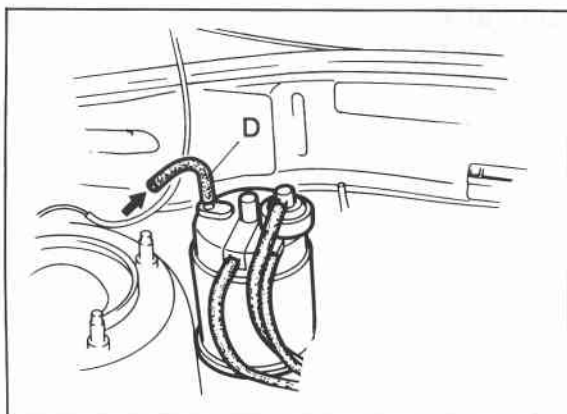
15. Disconnect the evaporation hose from the evaporation pipe.
16. Connect a vacuum pump to the evaporation pipe.
17. Operate the vacuum pump and verify that no vacuum is held.
18. If vacuum is held, check the evaporation pipe for clogging.



86U04A-144

No. 1 Purge Control Valve

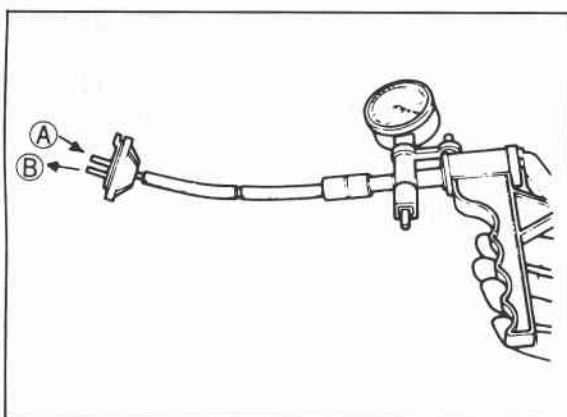
1. Blow through the purge control valve from port A and check that air does not flow.
2. Connect a vacuum pump to the purge control valve.
3. Apply **110 mmHg (4.33 inHg)** vacuum, and blow through port A again; air should flow.



76G04C-157

No. 2 Purge Control Valve

1. Disconnect vacuum hose D from the evaporation pipe.
2. Blow through the hose and verify that air flows freely.



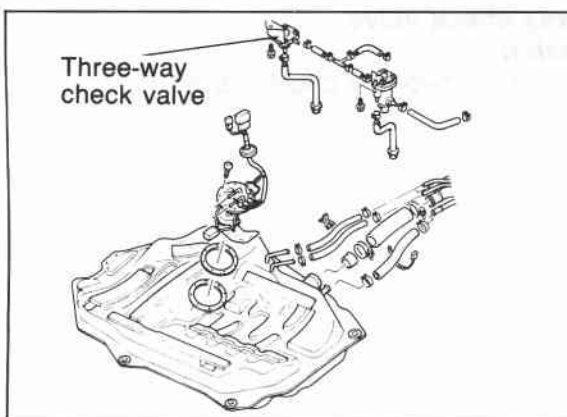
76G04C-158

Vacuum Switch Valve

1. Remove the vacuum switch valve.
2. Connect a vacuum pump to the valve.
3. Blow through the valve from port A and verify that air comes out of port B when vacuum is applied.

Specified vacuum:

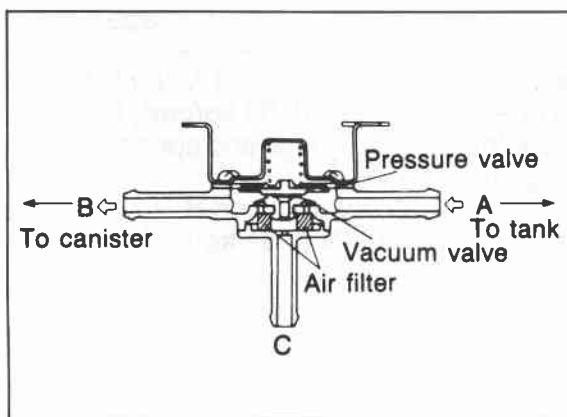
66—106 mmHg (2.6—4.2 inHg)



86U04A-148

Three-Way Check Valve

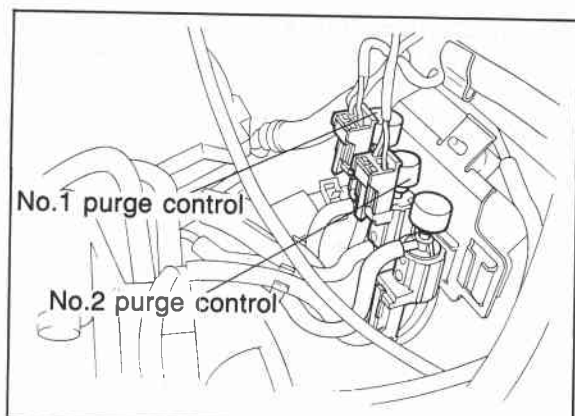
1. Remove the check valve.



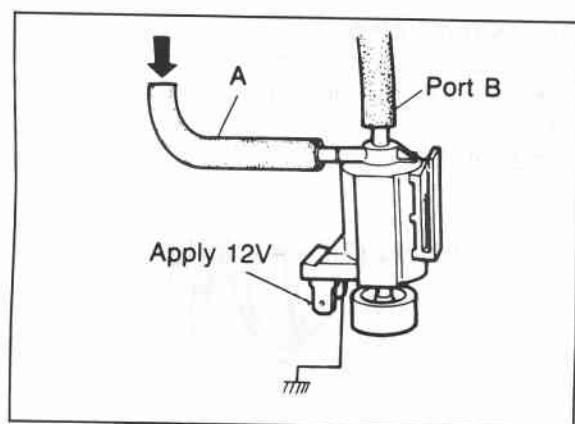
86U04A-149

2. Blow through the valve from port A, and check that air comes out of port B.
Next, block port B and check that air comes out of port C.
3. Block port B.
4. Connect a vacuum pump to port A and verify that no vacuum is held.

4C EEC SYSTEM



76G04C-159

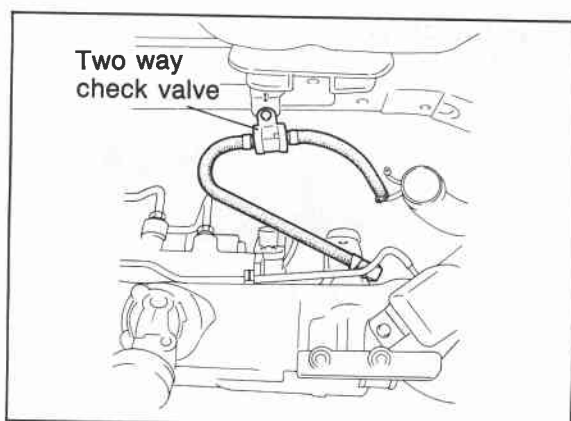


86U04A-151

Solenoid Valve

1. Remove the solenoid valve.

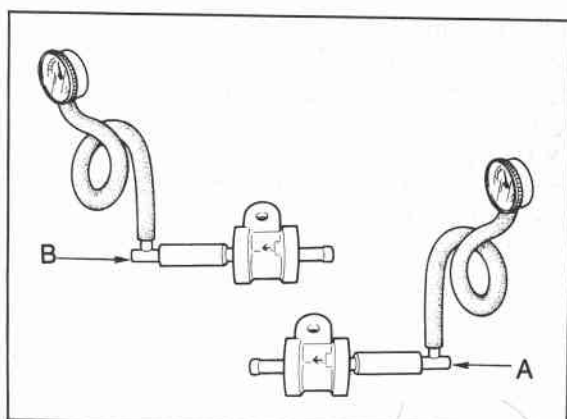
2. Connect vacuum hoses to the valve as shown in the figure.
3. Blow air through the valve from hose A and check that air comes out of the valve air filter.
4. Apply 12V and ground the solenoid valve with jumper wires.
5. Blow air through the valve from hose A and check that the air comes out of port B.
6. Replace, if necessary.



76G04C-160

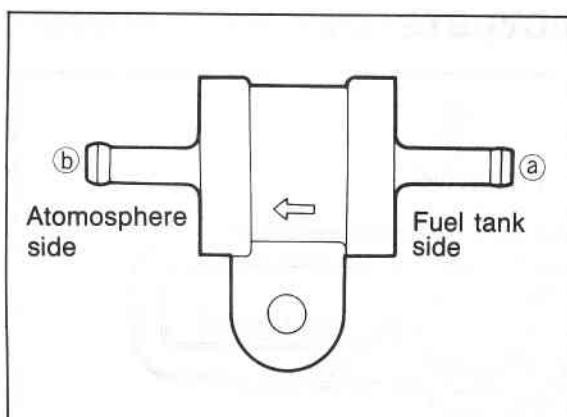
Two-way check valve Inspection

1. Remove the two-way check valve.



76G04C-161

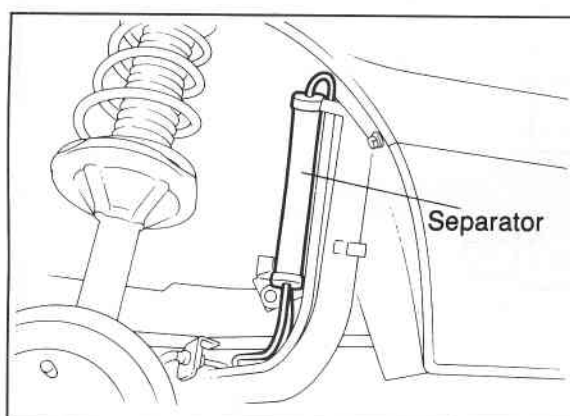
2. Connect a pressure gauge to the passage that normally is connected to the fuel tank.
3. Blow through the valve from port A. Verify that the valve opens at **2.94 kPa (0.03 kg/cm², 0.43 psi)**.
4. Remove the pressure gauge and connect it to the passage to atmosphere.
5. Blow through the valve from port B. Verify that the valve opens at **0.98 kPa (0.01 kg/cm², 0.14 psi)**.



76G04C-212

Replacement

1. Remove the two-way check valve.
2. Install a new valve so that the arrow on the valve faces atmosphere side.



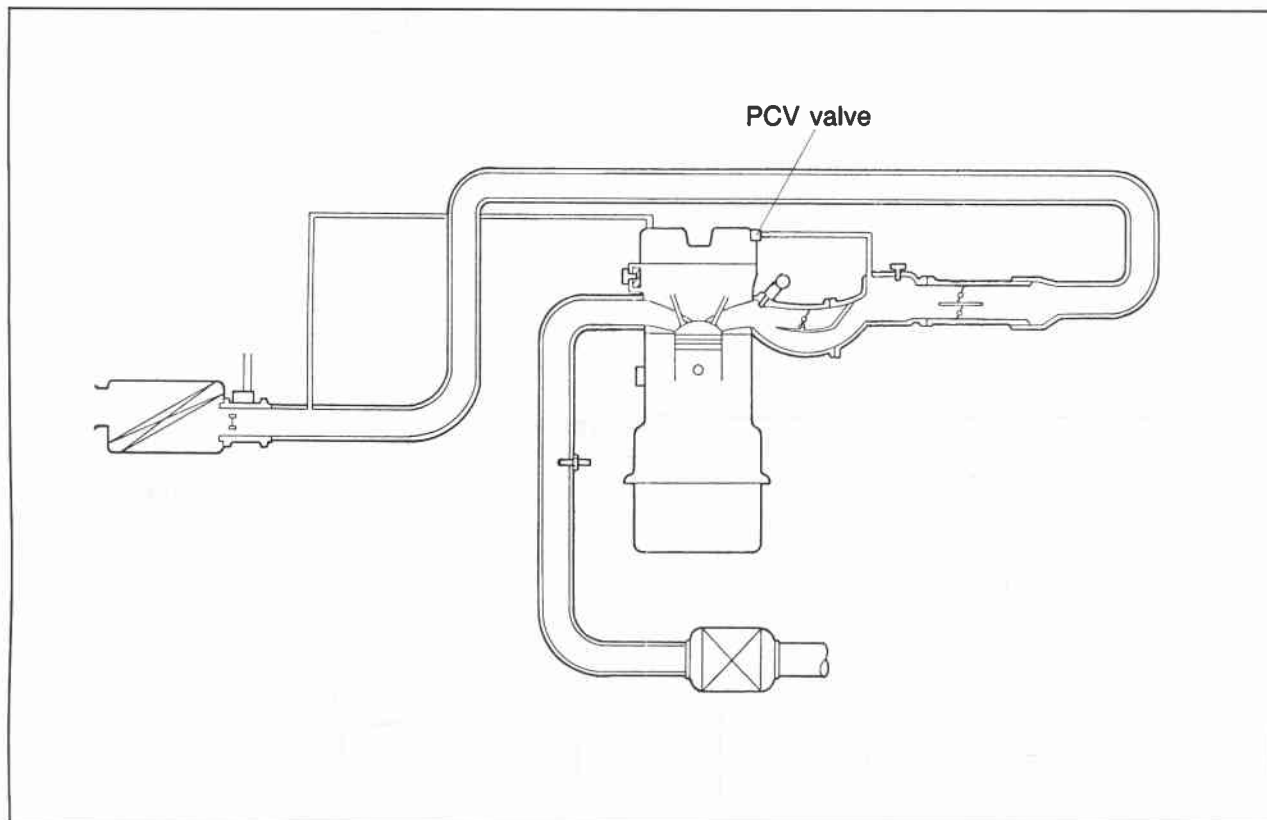
86U04A-154

Separator

1. Remove the separator.
2. Visually check the separator for damage.
3. Replace, if necessary.

4C PCV SYSTEM

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



76G04C-162

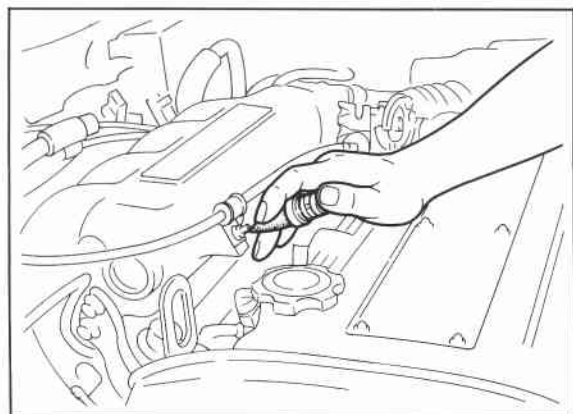
The PCV valve is operated by the intake manifold vacuum.

When the engine is running at idle, the PCV valve is opened slightly and a small amount of blow-by gas is drawn into the dynamic chamber.

At high engine speeds, the PCV valve is further opened and a larger amount of blow-by gas is drawn into the dynamic chamber.

COMPONENT DESCRIPTION

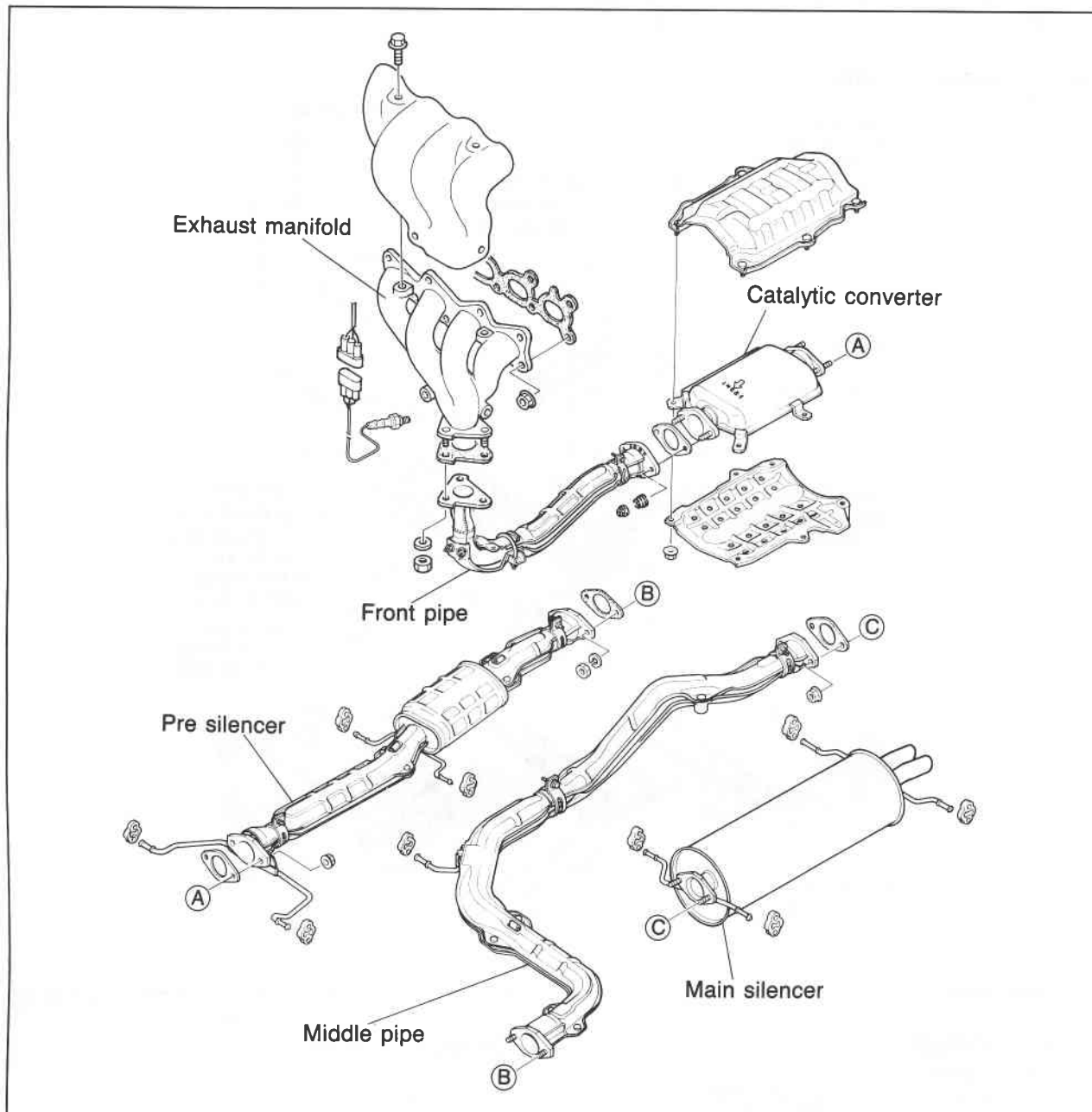
Component	Function	Remark
PCV valve	Controls blowby gas amount pulled into engine	



86U04A-157

PCV VALVE

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Disconnect the PCV valve and the ventilation hose from the cylinder head cover.
3. Close the PCV valve opening.
4. Check that vacuum is felt.

EXHAUST SYSTEM (UNLEADED FUEL)

76G04C-163

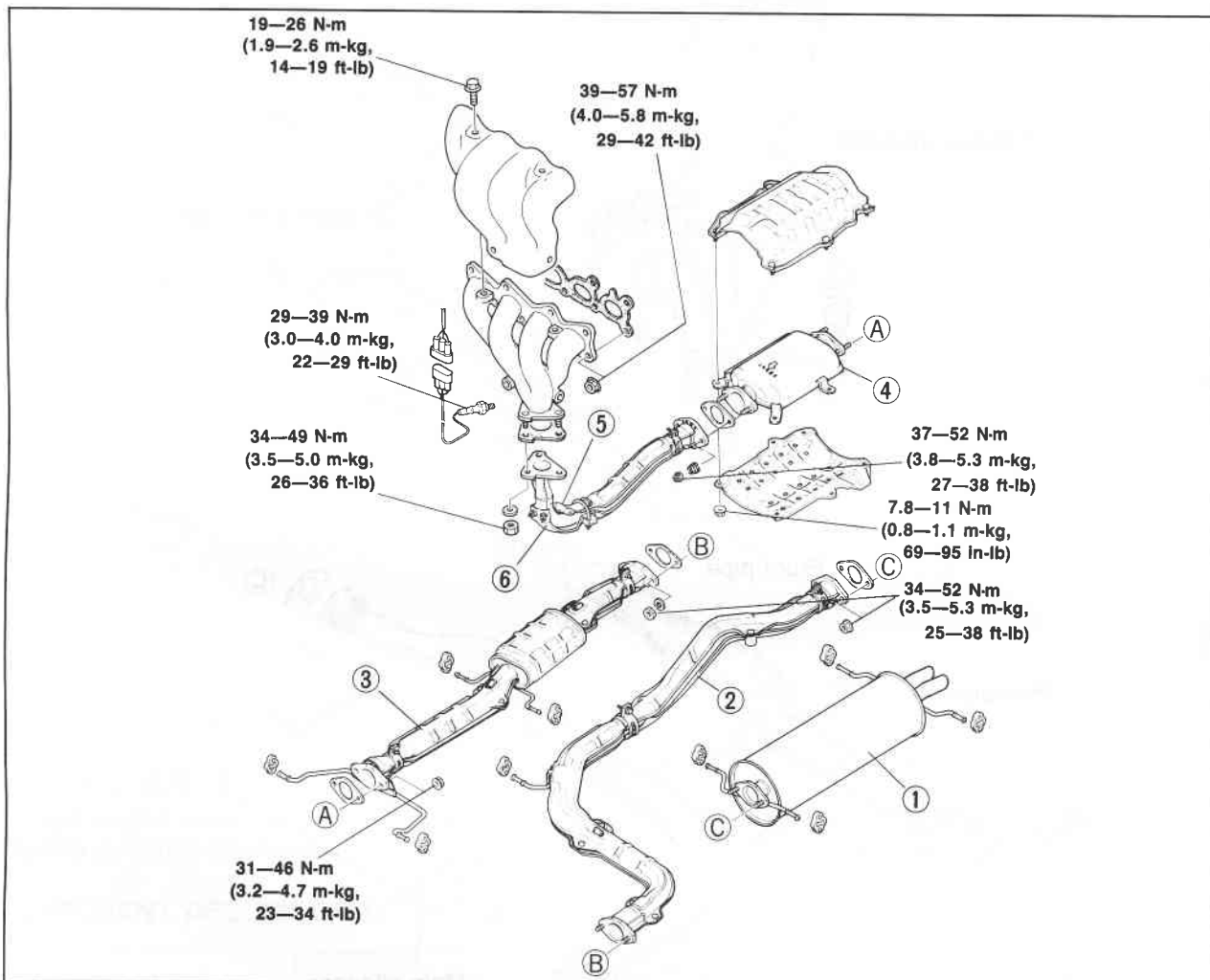
The catalytic converter is used to reduce CO and HC. The converter contains a compound of platinum and rhodium. It is a two-way catalyst type with a volume of **2,300 cc (140 cu in)**.

4C EXHAUST SYSTEM (UNLEADED FUEL)

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

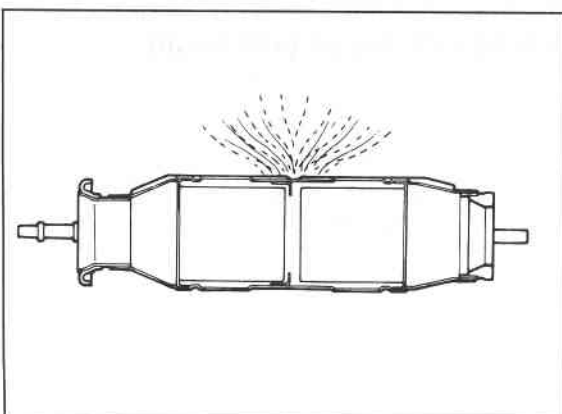
Torque Specifications



86U04A-159

1. Main silencer
2. Middle pipe
3. Pre-silencer

4. Catalytic converter
5. Bracket
6. Front pipe



86U04A-160

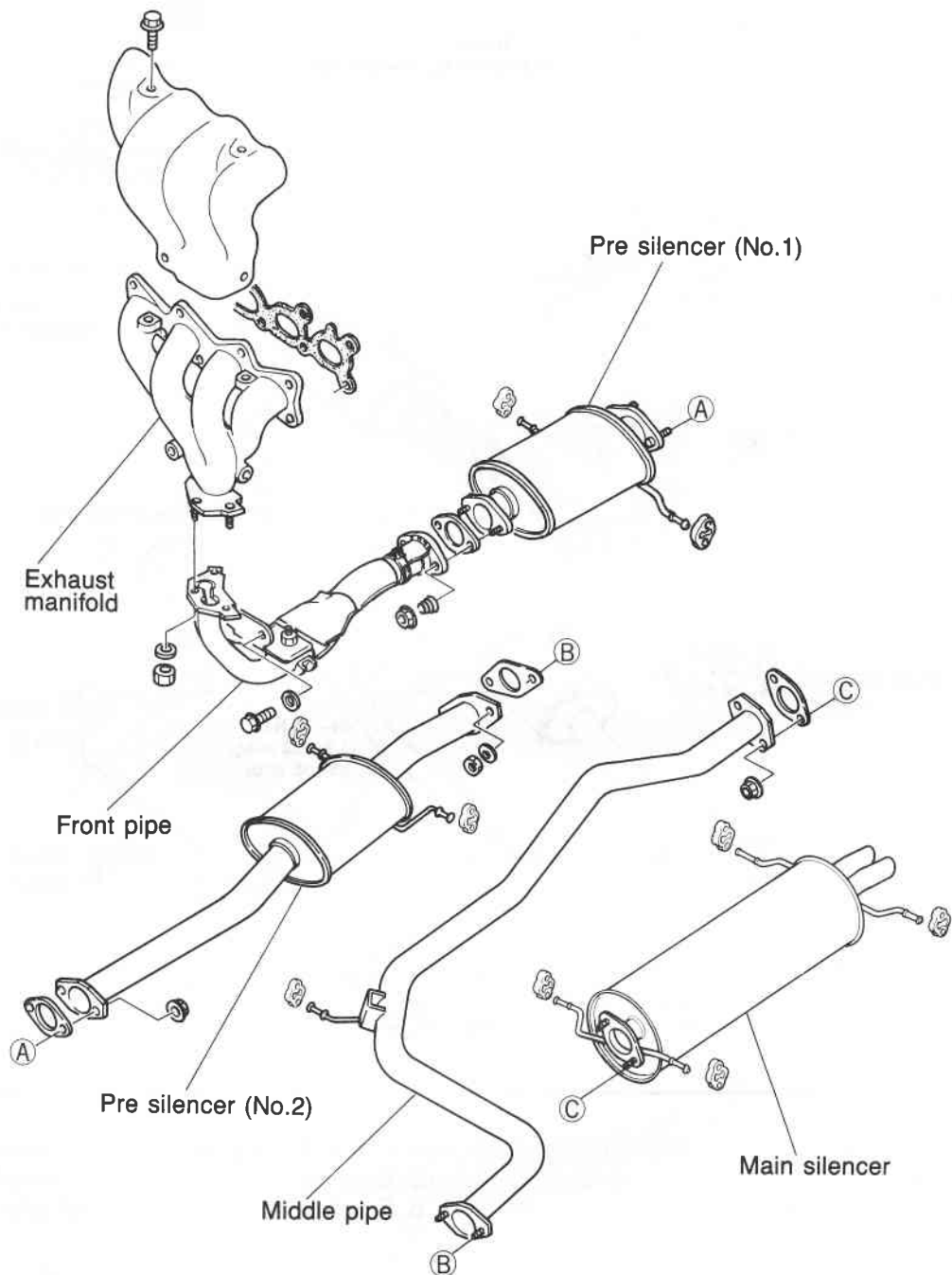
INSPECTION

1. Check the catalytic converter and exhaust pipe for deterioration or restriction.
2. Check the insulation covers welded onto the catalytic converter for damage.

Note

If the insulation cover is touching the catalytic converter housing, excessive heat at the floor will occur.

EXHAUST SYSTEM (LEADED FUEL)

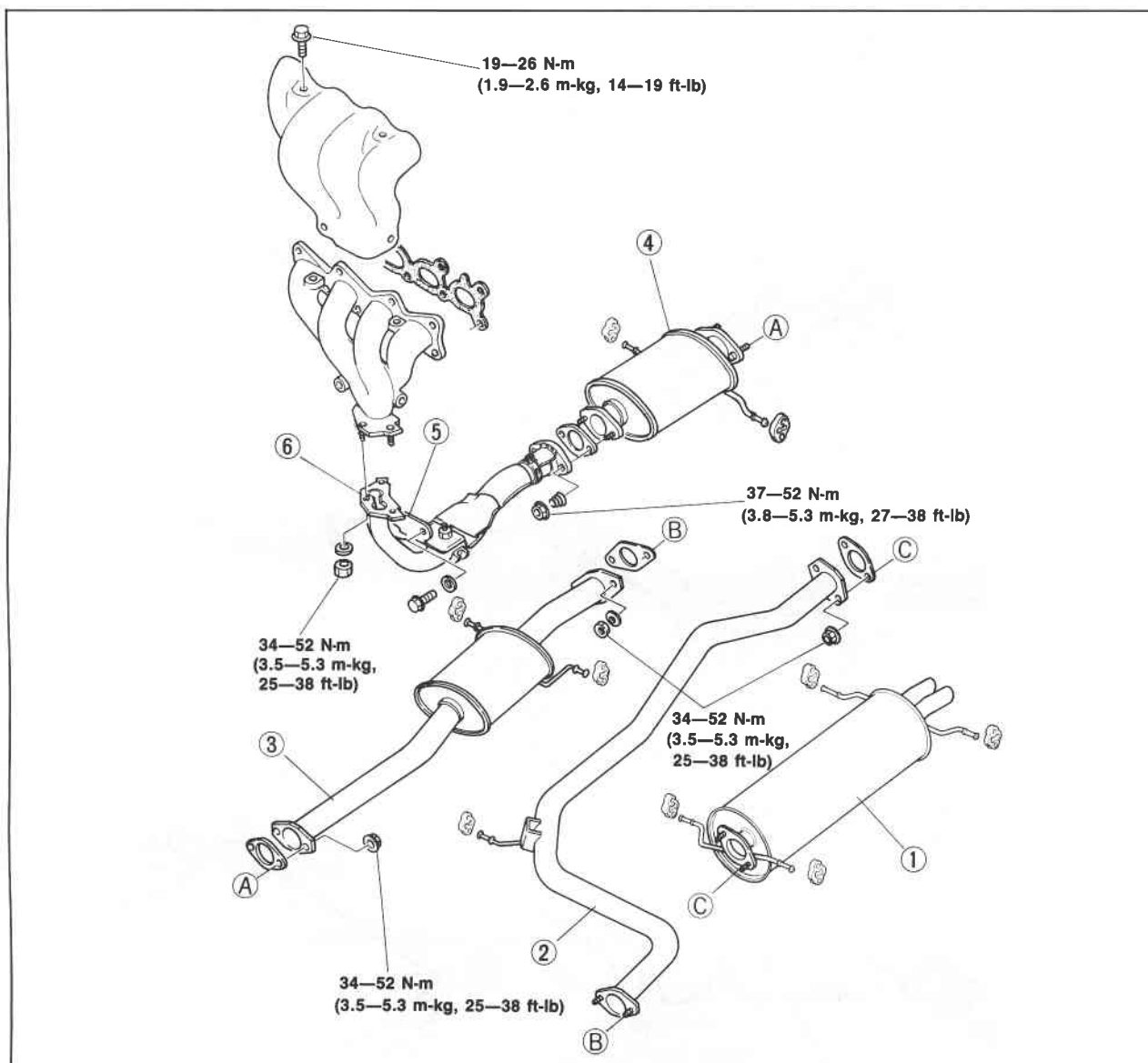


4C EXHAUST SYSTEM (LEADED FUEL)

REMOVAL AND INSTALLATION

1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

Torque Specifications

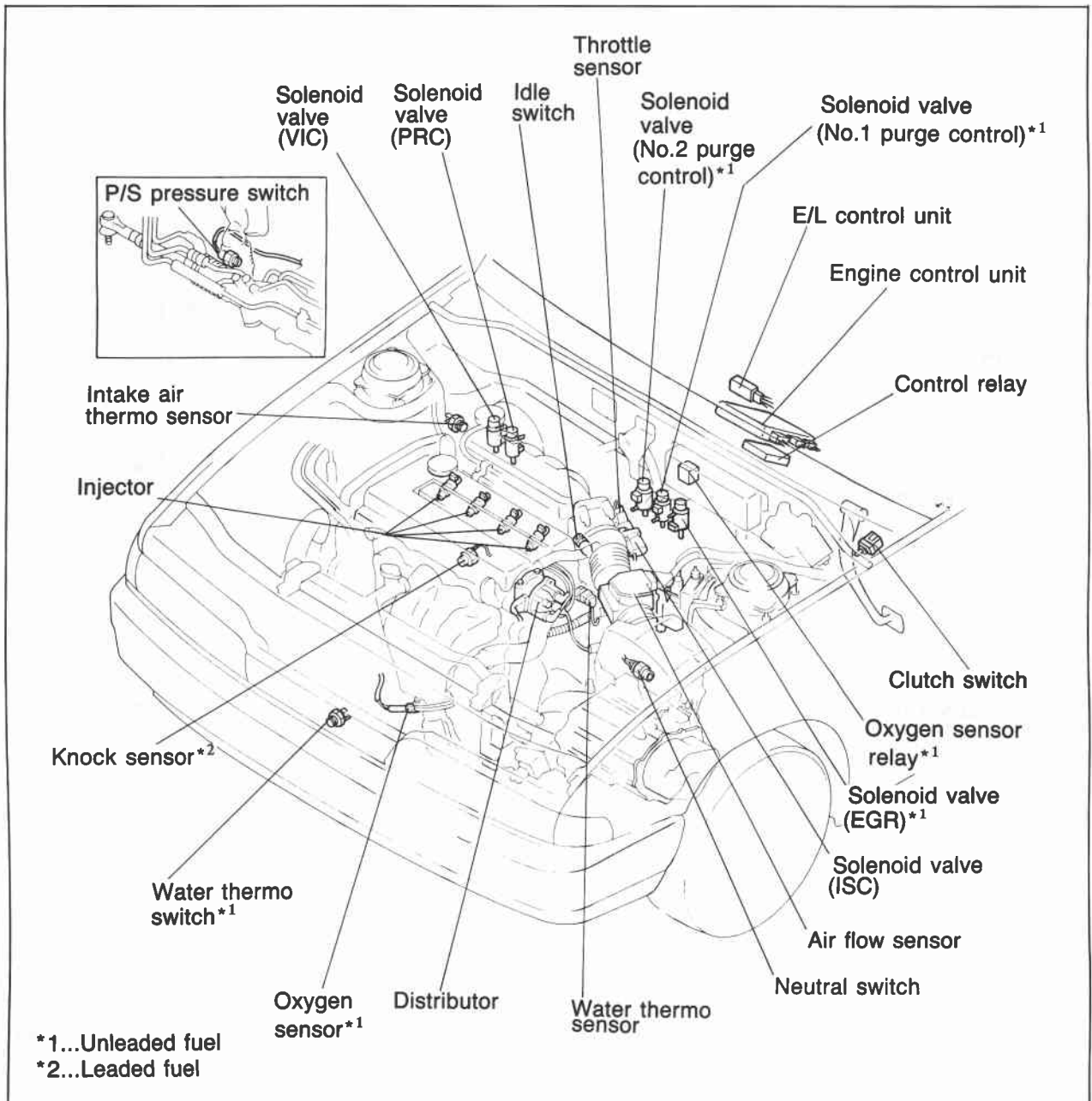


76G04C-165

1. Main silencer
2. Middle pipe
3. No. 2 pre-silencer

4. No. 1 pre-silencer
5. Bracket
6. Front pipe

CONTROL SYSTEM



76G04C-166

The control system consists of the input devices and the engine control unit. The control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, ignition timing, switch monitor function, and fail-safe function.

4C CONTROL SYSTEM

RELATIONSHIP CHART

Output Devices and Input Devices (Unleaded fuel)

INPUT DEVICE	OUTPUT DEVICE	IGNITION SWITCH (ON POSION)		X	X	X	X	X	X	○	X	X	X	X	X	X	○		
		TEST CONNECTOR		X	X	X	○	X	X	X	X	X	X	X	X	○	X		
		ELECTRICAL LOAD CONTROL UNIT		X	X	X	○	X	X	X	X	X	X	X	X	X	X		
		P/S PRESSURE SWITCH		X	X	X	○	X	X	X	X	X	X	X	X	X	X		
		A/C SWITCH		X	X	X	○	X	X	X	X	X	X	X	○	X	X		
		IGNITION SWITCH (STA POSITION)		○	○	X	○	○	X	X	X	X	○	X	X	X	○	X	
		NEUTRAL AND CLUTCH SWITCH		○	X	X	○	X	X	X	X	X	X	X	X	X	X	X	
		OXYGEN SENSOR		○	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		WATER THERMO SWITCH (RADIATOR)		○	X	X	X	X	X	X	X	○	X	X	X	X	X	X	
		INTAKE AIR THERMO SENSOR		X	X	X	X	X	X	X	X	X	○	X	X	X	X	X	
		WATER THERMO SENSOR		○	X	X	○	X	X	○	○	○	○	X	X	X	○	○	
		IDLE SWITCH		○	X	X	○	X	X	X	X	X	○	X	X	X	○	X	
		THROTTLE SENSOR		○	X	X	X	X	X	X	X	○	X	X	X	X	○	X	
		AIR FLOW SENSOR		○	X	X	X	X	X	X	○	X	X	X	X	X	○	○	
		Ne SIGNAL		○	○	X	○	○	X	X	○	○	○	○	○	X	○	○	
		G SIGNAL		X	○	X	X	X	X	X	X	X	X	X	X	X	X	X	
				INJECTOR	FUEL INJECTION AMOUNT														
					FUEL INJECTION TIMING														
		BAC VALVE	AIR VALVE																
			ISC VALVE																
		CONTROL RELAY	FUEL PUMP CONTROL																
			MAIN POWER CONTROL																
		SOLENOID VALVE (No.1 PURGE)																	
		SOLENOID VALVE (No.2 PURGE)																	
		SOLENOID VALVE (EGR)																	
		SOLENOID VALVE (PRESSURE REGULATOR CONTROL)																	
		SOLENOID VALVE (VARIABLE INERTIA CONTROL)																	
		OXYGEN SENSOR RELAY																	
		A/C RELAY																	
		IGNITER																	
		AIR FLOW SENSOR (BURN-OFF)																	

76G04C-167

Output Devices and Input Devices (Leaded fuel)

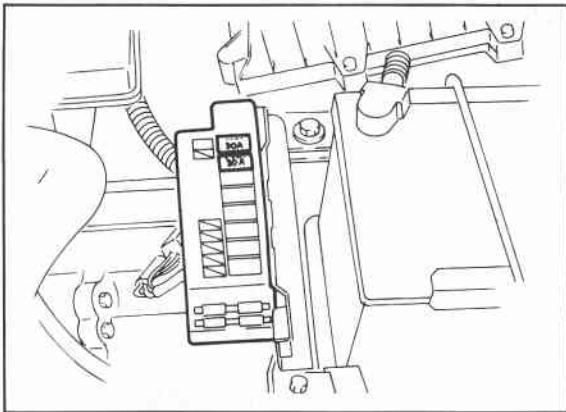
IGNITION SWITCH (ON POSITION)	X	X	X	X	X	O	X	X	X	X	O	
TEST CONNECTOR	X	X	X	O	X	X	X	X	X	O	X	
KNOCK SENSOR	X	X	X	X	X	X	X	X	X	O	X	
ELECTRICAL LOAD CONTROL UNIT	X	X	X	O	X	X	X	X	X	X	X	
P/S PRESSURE SWITCH	X	X	X	O	X	X	X	X	X	X	X	
A/C SWITCH	X	X	X	O	X	X	X	X	O	X	X	
IGNITION SWITCH (STA POSITION)	O	O	X	O	O	X	O	X	X	O	X	
NEUTRAL AND CLUTCH SWITCH	O	X	X	O	X	X	X	X	X	X	X	
INTAKE AIR THERMO SENSOR	X	X	X	X	X	X	O	X	X	X	X	
WATER THERMO SENSOR	O	X	X	O	X	X	O	X	X	O	O	
IDLE SWITCH	O	X	X	O	X	X	O	X	X	O	X	
VARIABLE RESISTOR (IN AIR FLOW SENSOR)	O	X	X	X	X	X	X	X	X	X	X	
AIR FLOW SENSOR	O	X	X	X	X	X	X	X	X	O	O	
Ne SIGNAL	O	O	X	O	O	X	O	O	X	O	O	
G SIGNAL	X	O	X	X	X	X	X	X	X	X	X	
INPUT DEVICE	OUTPUT DEVICE	FUEL INJECTION AMOUNT	FUEL INJECTION TIMING	AIR VALVE	ISC VALVE	FUEL PUMP CONTROL	MAIN POWER CONTROL	SOLENOID VALVE (PRESSURE REGULATOR CONTROL)	SOLENOID VALVE (VARIABLE INERTIA CONTROL)	A/C RELAY	IGNITER	AIR FLOW SENSOR (BURN-OFF)
		INJECTOR		BAC VALVE		CONTROL RELAY						

4C CONTROL SYSTEM

Output Devices and Engine Conditions (Unleaded fuel)

ENGINE CONDITION		CRANKING (COLD ENGINE)	WARMING UP (DURING IDLE)	MEDIUM LOAD		ACCE- RATION	HEAVY LOAD	DECELE- RATION	IDLE (THROTTLE VALVE FULLY CLOSED)	IGN: ON (ENGINE NOT RUNNING)	REMARK
OUTPUT DEVICE		Rich		WARM		Rich and lean		Rich and lean		No injection	
INJECTOR	FUEL INJECTION AMOUNT	Rich		COLD		Rich and lean		Rich and lean			No injection
	FUEL INJECTION TIMING	1 group (twice per revolution)	Sequential (once per two revolutions)		Rich and lean		Rich and lean				
BAC VALVE	AIR VALVE	*Open		Closed		Closed		Closed		*Coolant temp.: below 50°C (122°F)	
	ISC VALVE	Large amount of bypass air		Small amount of bypass air		Small amount of bypass air		No bypass			
CONTROL RELAY	FUEL PUMP CONTROL	ON (main fuel pump operates)		ON (main fuel pump operates)		ON (main fuel pump operates)		OFF (main fuel pump not operated)			
	MAIN POWER CONTROL	ON		ON		ON		ON			
SOLENOID VALVE (No.1 PURGE)	*OFF (1st stage not operated)		ON (1st stage operates)		ON (1st stage operates)		ON (1st stage operates)		* ¹ Coolant temp: below 70°C (158°F) * ² Engine speed above 1,700 rpm * ³ Engine speed: 1,500—3,500 rpm		
SOLENOID VALVE (NO.2 PURGE)	* ¹ OFF (2nd stage not operated)		* ² ON (2nd stage operates)		* ² ON (2nd stage operates)		OFF				
SOLENOID VALVE (EGR)	* ¹ ON (EGR cut)		* ³ OFF (EGR)		* ³ OFF (EGR)		ON (EGR cut)				
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)	OFF (Vacuum to pressure regulator)		OFF (Vacuum to pressure regulator)		OFF (Vacuum to pressure regulator)		OFF		* During hot start only		
SOLENOID VALVE (VARIABLE INERTIA CONTROL)	OFF	*ON (Vacuum to shutter valve actuator)		*ON (Vacuum to shutter valve actuator)		*ON (Vacuum to shutter valve actuator)		OFF		* Engine speed: above 5,200 rpm	
OXYGEN SENSOR RELAY	ON	*OFF(current to oxygen sensor relay)		*OFF(current to oxygen sensor relay)		*OFF(current to oxygen sensor relay)		ON		*Engine speed: above 3,000 rpm	
A/C RELAY	OFF	*ON		*ON		*ON		*ON		*Delays 0.5 second	
IGNITER	Fixed at BTDC 6°	Fixed at BTDC 12°	Advanced: depends on engine conditions		Advanced: depends on engine conditions		Advanced: depends on engine conditions		—		
AIR FLOW SENSOR (BURN-OFF)	OFF (Burn-off does not function)		OFF (Burn-off does not function)		OFF (Burn-off does not function)		OFF (Burn-off does not function)				

4C CONTROL SYSTEM

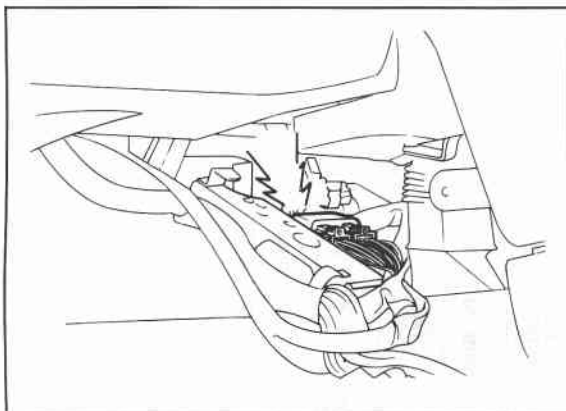


69G04A-161

EGI MAIN FUSE

Inspection

Check the continuity of EGI main fuse.



76G04C-171

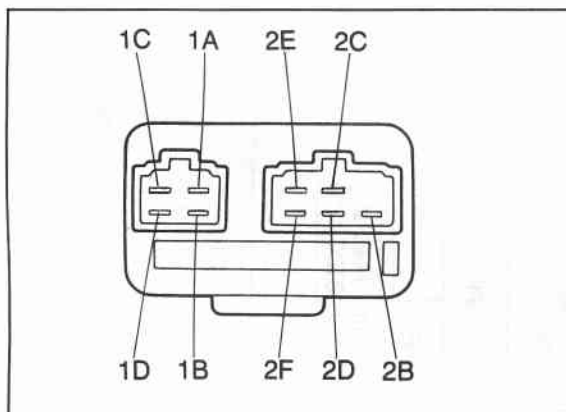
CONTROL RELAY

Power Supply Circuit

1. Check that a "clicking" sound is heard at the control relay when turning the ignition switch ON and OFF.

Note

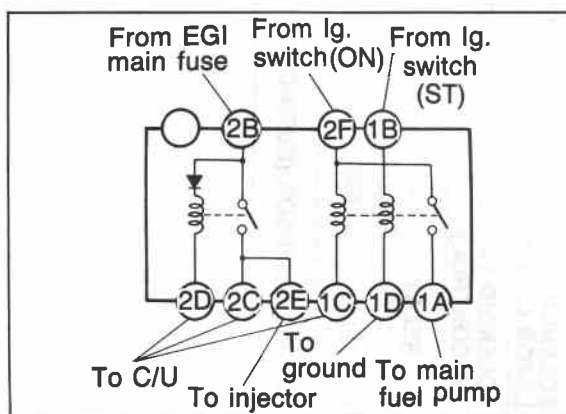
The control relay is located under the center console.



76G04C-172

2. Apply 12V to the 2B terminal and ground the 2D terminal of the control relay.
3. Check voltage at the terminals with a voltmeter.

Terminals	2D terminal	
	Grounded	Not grounded
2C	12V	0V
2E	12V	0V

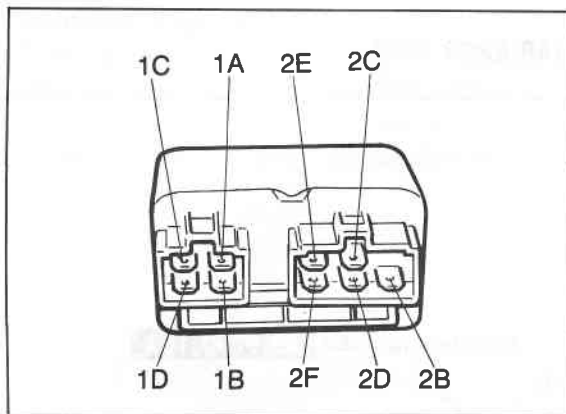


76G04C-173

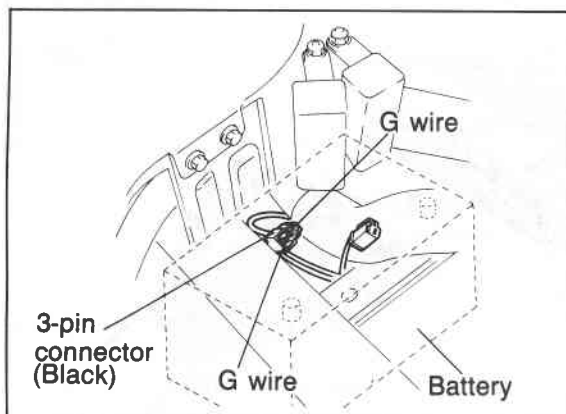
Fuel Pump Circuit

1. Apply 12V and a ground to the terminals described below and check the terminals with an ohmmeter or voltmeter.

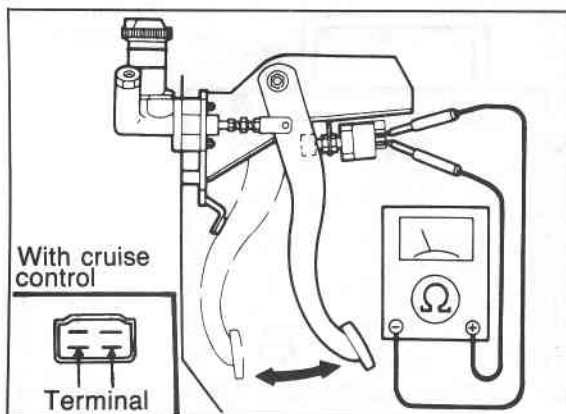
Terminal applied 12V	Terminal grounded	Terminal checked	Correct condition
1B	1D	2F-1A	Continuity
2F	1C	1A	Approx. 12V



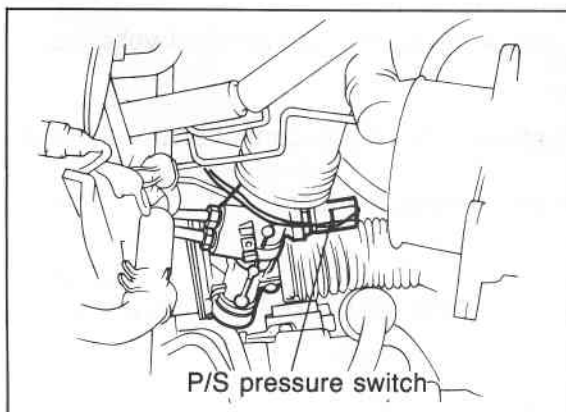
76G04C-174



76G04C-175



76G04C-176



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Resistance

Check resistance between the terminals with an ohmmeter.

Between terminals	Resistance (Ω)
1B \leftrightarrow 1D	More than approx. 20
2F \leftrightarrow 1C	More than approx. 60
2F \leftrightarrow 1A	∞
2B \leftrightarrow 2D	More than approx. 60
2B \leftrightarrow 2C	∞

NEUTRAL SWITCH

Inspection

1. Disconnect the neutral switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Transmission	Continuity
In neutral	No
In other ranges	Yes

4. Reconnect the switch connector.

Note

Refer to Section 7A for replacement of the neutral switch.

CLUTCH SWITCH

Inspection

1. Disconnect the clutch switch connector.
2. Connect an ohmmeter to the switch.
3. Check continuity of the switch.

Pedal	Continuity
Depressed	No
Released	Yes

4. Reconnect the switch connector.

Note

Refer to Section 6 for replacement of the clutch switch.

P/S PRESSURE SWITCH

Inspection

1. Disconnect the P/S pressure switch connector.
2. Connect an ohmmeter to the switch.
3. Start the engine. Check continuity of the switch while turning the steering wheel at idle.

P/S	Continuity
Turning	Yes
Not turning	No

4. Reconnect the switch connector.

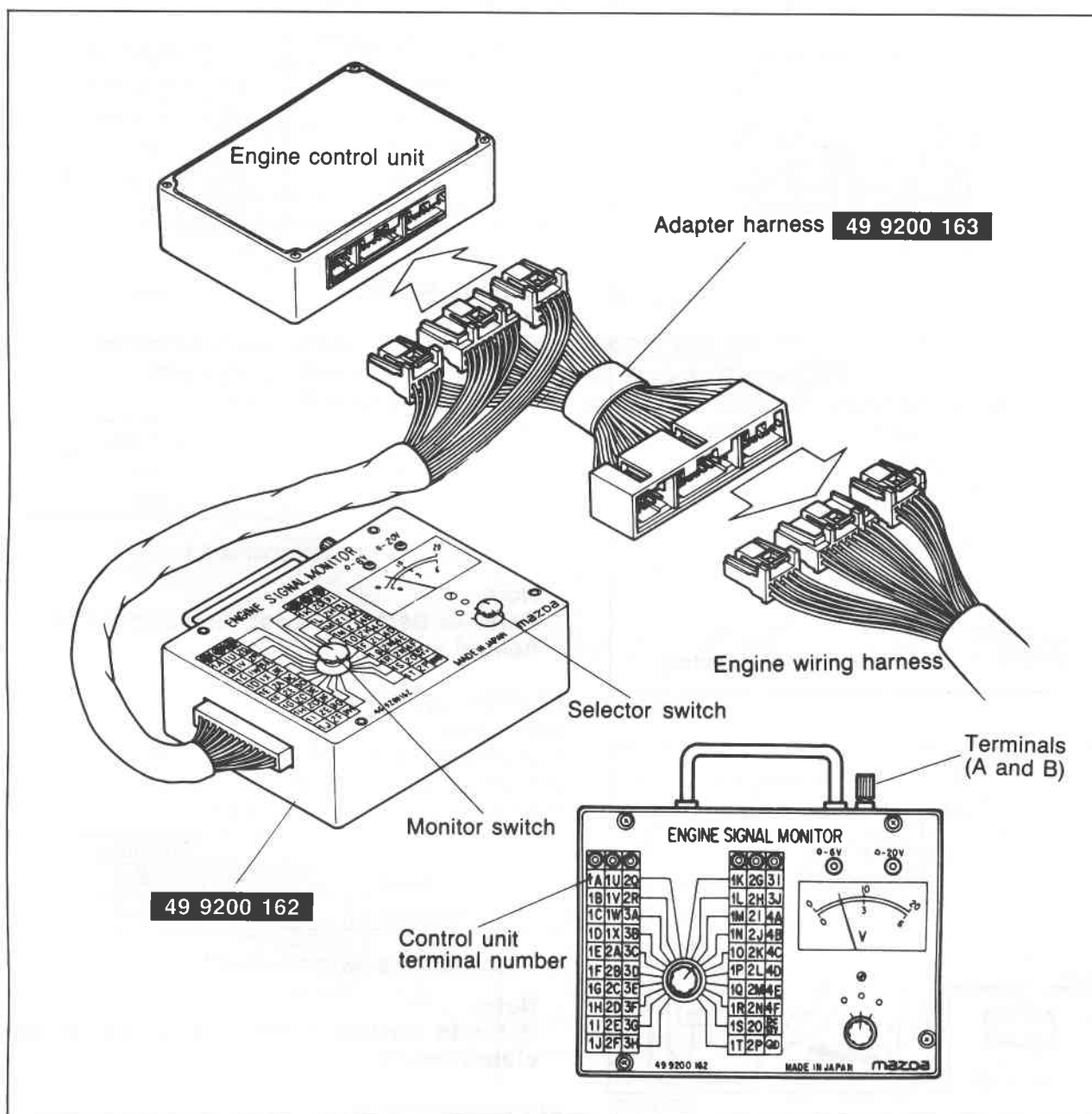
Note

Refer to Section 10 for replacement of the P/S pressure switch.

4C CONTROL SYSTEM

ENGINE CONTROL UNIT

Engine Signal Monitor (49 9200 162) and Adapter (49 9200 163).



76G04C-178

The **Engine Signal Monitor** (49 9200 162) is used to check the control unit terminal voltages.

How to Use the Engine Signal Monitor

1. Connect the **Engine Signal Monitor** (49 9200 162) between the engine control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

Caution

Never apply voltage to terminals A and B.

Terminal Voltage

If the input and output devices wiring are normal, but the engine control unit terminal voltage is incorrect, replace the engine control unit.

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
1A	—	—	—	—	—	—
1B		○	Self-Diagnosis Checker (Code No.)	For 3sec. after ignition switch OFF → ON: below 2.5V (Buzzer sounds) After 3sec.: approx. 12V (Buzzer does not sound)		<ul style="list-style-type: none"> Using Self-Diagnosis Checker and test connector grounded Buzzer sounds: below 2.5V Buzzer does not sound: approx. 12V
1C		○	Solenoid valve (Variable inertia control)	Approx. 12V		Above 5200 rpm (Unleaded fuel) or 5400 rpm (Leaded fuel): Below 2.5V
1D		○	Self-Diagnosis Checker (Monitor lamp)	For 3sec. after ignition switch OFF → ON: approx. 5V (light illuminates) After 3sec.: approx. 12V (light does not illuminate)	(Test connector grounded) approx. 5V (Test connector not grounded) Monitor lamp ON: approx. 5V Monitor lamp OFF: approx. 12V	With Self-Diagnosis Checker
1E	○		Idle switch	Accelerator pedal released: 0V Accelerator pedal depressed: approx. 12V		
1F		○	A/C relay	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor ON
1G	○		Neutral or clutch switch	In-gear condition Clutch pedal depressed: approx. 12V Clutch pedal released: 0V		MTX (Neutral: constant approx. 12V)
1H (U/F)	○		Water thermo switch	Approx. 12V		Radiator temp.: below 17°C (63°F)
				0V		Radiator temp.: above 17°C (63°F)
1I	○		Electrical load control unit	E/L switch ON: below 2.5V E/L switch OFF: approx. 10—12V		Electrical load: Rear defroster switch Headlight switch Blower motor switch (3rd & 4th position) Electrical fan switch
1J	—	—	—	—	—	—
1K	○		P/S pressure switch	Constant approx. 12V	P/S ON: below 2.5V P/S OFF: approx. 12V	
1L	○		A/C switch	A/C switch ON: below 2.5V A/C switch OFF: approx. 12V		Blower motor: ON
1M	○		Distributor (Ne signal)	0V or 5V	Approx. 2.0V	
1N	○		Distributor (G signal)	0V or 5V	Approx. 1.2V	

Note

Terminals labeled "U/F" are only for unleaded fuel.

4C CONTROL SYSTEM

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
1O		○	Air flow sensor (Burn-off control)	Below 2.5V		White burning off: Approx. 8—12V
1P		○	Control relay (Power supply circuit)	Below 2.5V		Ignition switch OFF: Approx. 12V
1Q		○	Control relay (Fuel pump circuit)	Approx. 12V	Below 2.5V	
1R (L/F)	○		Knock sensor	0V or 2—7V		While knocking: Approx. 0.001
1S	—	—	—	—		—
1T	○		Ignition switch (ON position)	Approx. 12V		
1U	—	—	—	—		—
1V	—	—	—	—		—
1W	○		Test connector	Test connector grounded: 0V Test connector not grounded: approx. 12V		Green connector, 1-pin
1X		○	Igniter	Approx. 12V	*Approx. 1V	*Engine Signal Monitor: green and red lights flash
2A (U/F)		○	V ref	4.5—5.5V		
2B	○		Air flow sensor (Ground)	0V		
2C	—	—	Ground (E2)	0V		
2D (U/F)	○		Oxygen sensor	0V	0—1.0V	<ul style="list-style-type: none"> • Cold engine: 0V at idle • After warming-up: Increase engine speed: 0.7—1.0V Deceleration: 0—0.2V
2E	○		Air flow sensor (Intake air mass)	1.0—1.6V	1.7—2.3V	Increase engine speed: voltage increases
2F	—	—	—	—		—
2G (U/F)	○		Throttle sensor	Accelerator pedal released: approx. 0.5V		Max. voltage (Throttle valve fully opened): approx. 4.3V
2H (L/F)	○		Air flow sensor (Variable resistor)	0—5V		Depends on adjustment
2I	○		Water thermo sensor	Approx. 0.4V		Engine coolant temp. 20°C (68°F): approx. 2.5
2J	○		Intake air thermo sensor (Dynamic chamber)	Approx. 2.5V at 20°C (68°F)		
2K		○	Solenoid valve (Pressure regulator control)	For 120 sec. after ignition switch OFF → ON: below 2.5V	For 120. sec after starting: below 2.5V	During hot condition: Coolant temp. above 70°C (158°F) Intake air temp. above 30°C (86°F) ...Unleaded fuel above 50°C (122°F) ...Leaded fuel
2L	—	—	—	Approx. 12V		Other conditions

Note

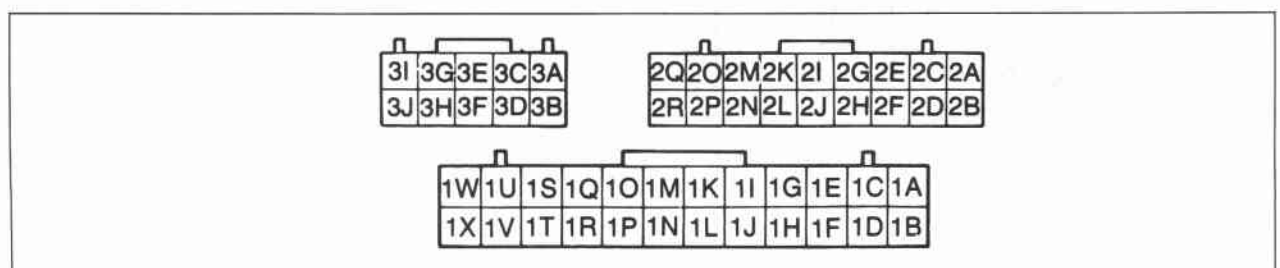
- a) Terminal labeled "U/F" are only for unleaded fuel.
 b) Terminal labeled "L/F" are only for leaded fuel.

Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remark
				Ign: ON	Idle	
2M (U/F)		○	Oxygen sensor heater	Below 2.5V		Above 3000 rpm: Approx. 12V
2N (U/F)		○	Solenoid valve (EGR)	Below 2.5V		<ul style="list-style-type: none"> Radiator temp. below 17°C (62.6°F) or coolant temp. below 70°C (158°F): constant below 2.5V 1,500—3,500 rpm: approx. 12V
2O (U/F)		○	Solenoid valve (No.2 purge control)	Approx. 12V		<ul style="list-style-type: none"> Coolant temp. below 75°C (167°F): constant approx. 12V During medium and high load of above 1,700 rpm: below 2.5V
2P (U/F)		○	Solenoid valve (No.1 purge control)	Below 2.5V		Coolant temp. below 70°C (158°F): approx. 12V
2Q		○	Solenoid valve (Idle speed control)	Approx. 9—11V		
2R	—	—	Ground (E02)	0V		
3A	—	—	Ground (E01)	0V		
3B	○		Ignition switch (Start position)	Below 2.5V		While cranking: approx. 10V
3C		○	Injector (No.2)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor green and red lights flash
3D	—	—	—	—		—
3E		○	Injector (No.1)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor: green and red lights flash
3F		○	Injector (No.4)	Approx. 12V	*1 Approx. 12V	*1 Engine Signal Monitor: green and red lights flash
3G	—	—	Ground (E1)	0V		
3H		○	Injector (No.3)	Approx. 12V	*Approx. 12V	*1 Engine Signal Monitor: green and red lights flash
3I	○	—	Control relay	Approx. 12V		
3J	—	—	Battery	Approx. 12V		For back-up

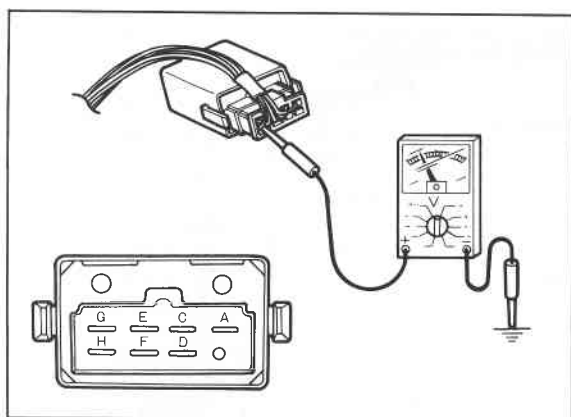
76G04C-179

Note
Terminals labeled “U/F” are only for unleaded fuel.

Terminal Location



4C CONTROL SYSTEM



76G04C-180

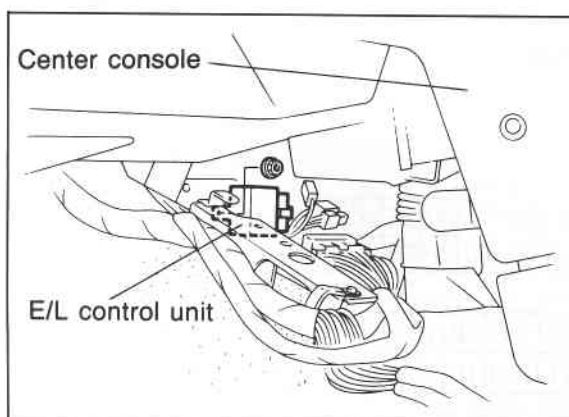
E/L CONTROL UNIT

Inspection

1. Connect a voltmeter between the E/L control unit and a ground.
2. Start the engine and check the terminal voltages as described below.

Terminal	Input	Output	Connection to	Voltage (after warm-up)		Remarks
				Ignition switch: ON	Idle	
A (BW)	—	—	Ignition switch	Approx. 12V		
B	—	—	—	—	—	—
C (B)	—	—	Ground	0V		
D (LY)	○		Electrical fan relay	Approx. 12V		Coolant temp.: below 97°C (207°F)
				Below 1.5V		Coolant temp.: above 97°C (207°F)
E (GY)		○	Control unit (1I)	0V		E/L: ON
				Approx. 12V		E/L: OFF
F (W)	○		Headlight switch	Approx. 12V		Headlight switch: ON
				Below 1.5V		Headlight switch: OFF
G (LB)	○		Blower motor switch	Below 1.5V		Blower motor switch: ON (3rd or 4th position)
				Approx. 5V		Others
H (BL)	○		Rear defroster switch	Below 1.5V		Rear defroster switch: ON
				Approx. 12V		Rear defroster switch: OFF

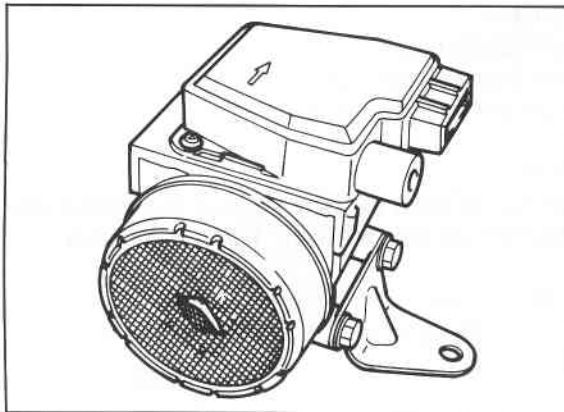
76G04C-181



76G04C-182

Replacement

1. Replace the E/L control unit.
2. Install in the reverse order of removal.

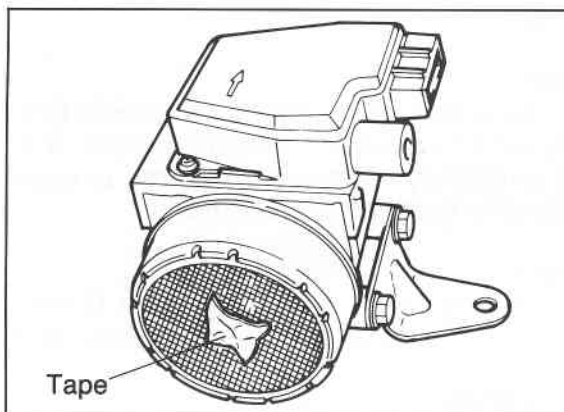


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AIR FLOW SENSOR

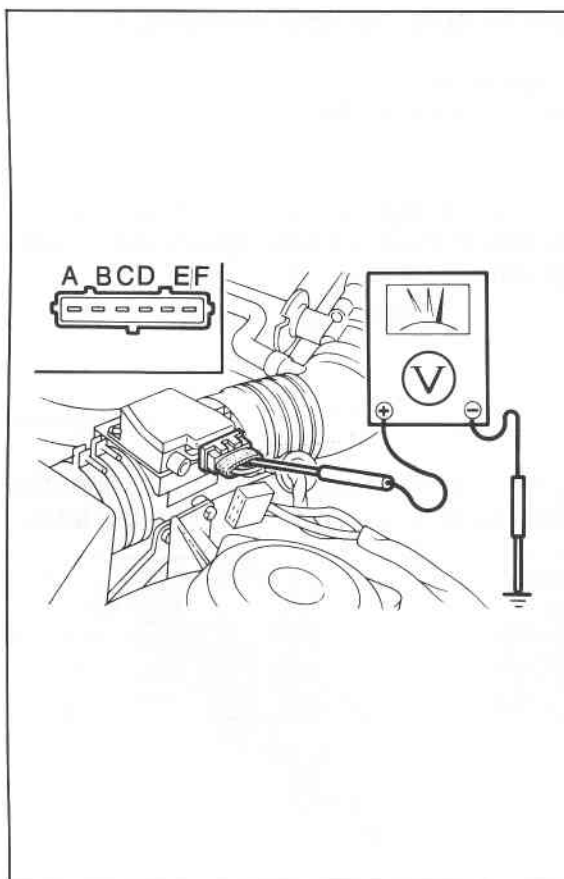
Visual Inspection

1. Remove the air hose.
2. Check the air flow sensor visually for the following:
 - a) Torn protection net (air cleaner side)



76G04C-184

- b) Restricted protection net



76G04C-185

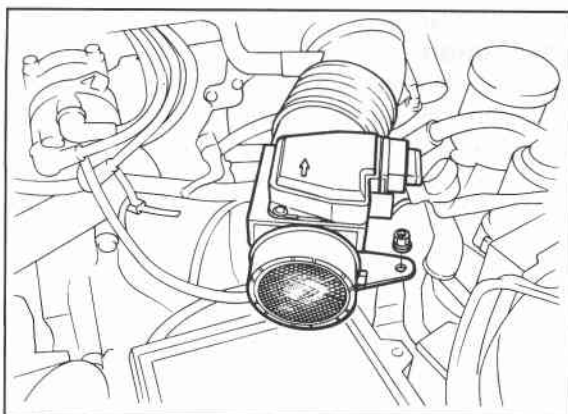
Output Voltage Inspection

1. Remove the rubber boot from the air flow sensor connector.
2. Check terminal voltage with a voltmeter.

Terminal	Condition	Ign. switch:ON	Engine running
A (Idle mixture)		0—5V	
B (Power supply)		Approx. 12V	
C (Burn-off)		0V	
D (Air flow mass)		1.0—1.6V	1.7V—5V
E (Ground)		0V	
F (Ground)		0V	

6. If not correct, check the wiring harness for an open or short circuit
7. If the wiring harness is OK, replace the air flow sensor.

4C CONTROL SYSTEM



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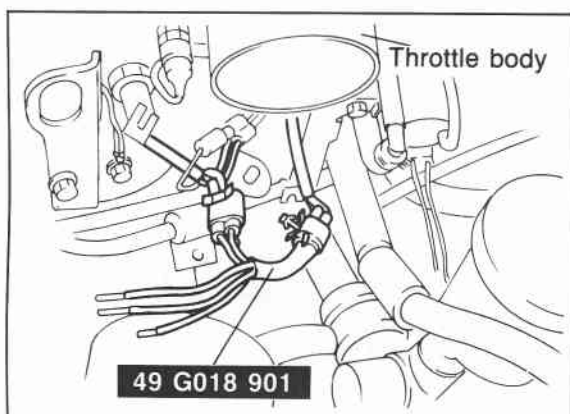
Replacement

1. Disconnect the connector.
2. Loosen the air hose clamps.
3. Replace the air flow sensor.

Caution

Install the air flow sensor so that the arrow on the sensor aligns with air flow direction.

4. Tighten the hose clamps.
5. Reconnect the connector to the sensor.



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THROTTLE SENSOR

Caution

Use a precision voltmeter with a scale of 0.01V to inspect or adjust the throttle sensor. If it is not available, replace the throttle sensor and throttle body as an assembly.

Inspection

1. Disconnect the throttle sensor connector (3-pin).
2. Connect the **SST** between the throttle sensor and the wiring harness.
3. Turn the ignition switch ON.

4. Measure **BLACK** and **RED** wire voltages.

Specifications:

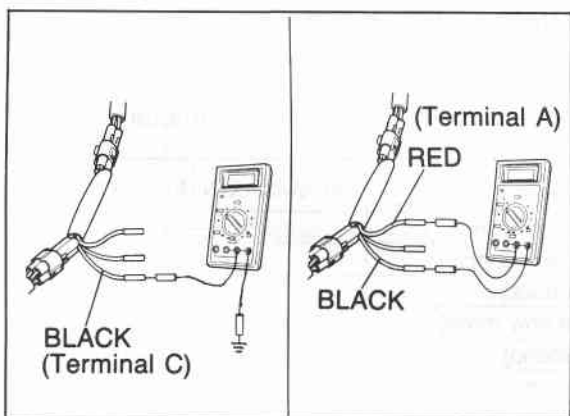
BLACK—Approx. 0V

RED—4.5—5.5V

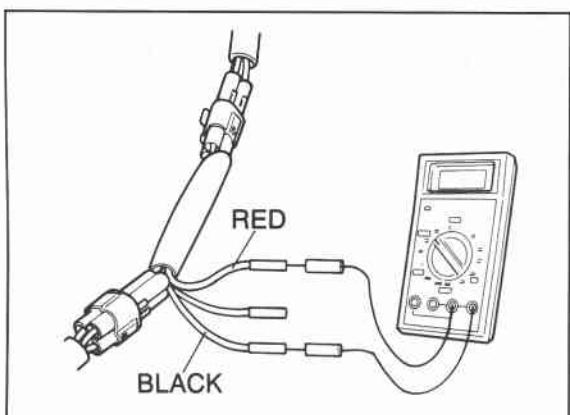
5. If not correct, check the battery voltage and wiring harness. If these are OK, replace the engine control unit.

6. Using the RED wire voltage as a guide, find the specified BLUE wire voltage ranges in the table.

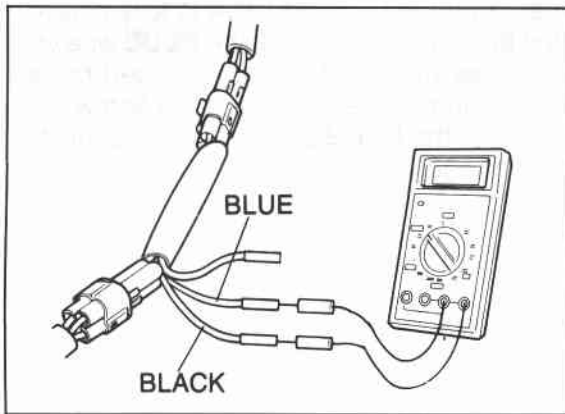
RED wire voltage	Specified range (V)	
	Fully close	Fully open
4.90—4.99V	0.40—0.58	3.90—4.60
5.00—5.09V	0.41—0.60	3.97—4.70
5.10—5.19V	0.42—0.61	4.05—4.79



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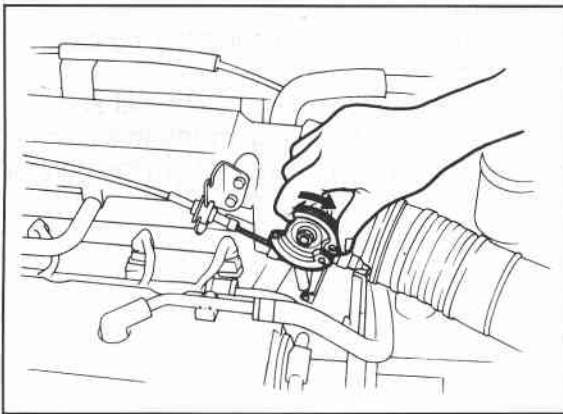


76G04C-109



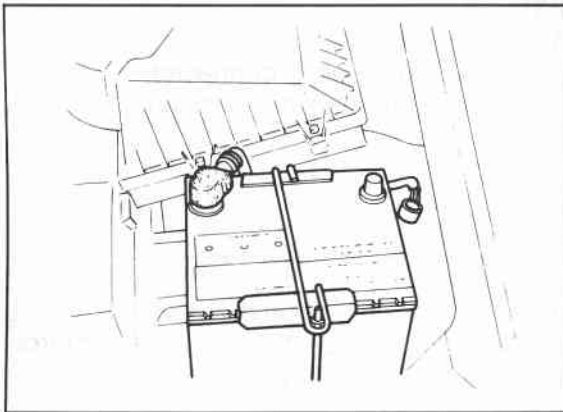
76G04C-191

7. Make sure that the throttle valve is fully closed.
8. Check that the **BLUE** wire voltage is within the specified range.
9. Adjust the throttle sensor if necessary



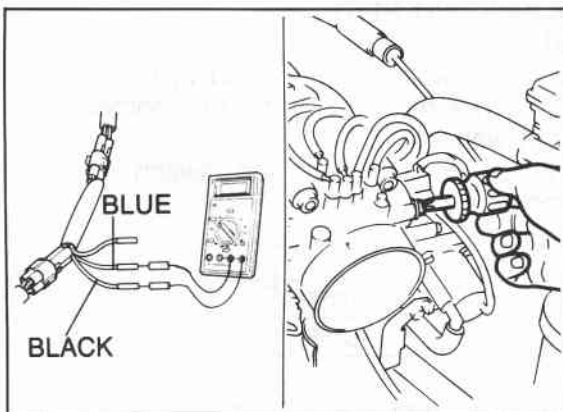
76G04C-192

10. Open the throttle valve fully.
11. Check that **BLUE** wire voltage is within the specified range.
12. If not correct, replace the throttle sensor.



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13. Turn the ignition switch OFF.
14. Disconnect the SST and reconnect the throttle sensor connector.
15. Disconnect the negative battery terminal and depress the brake pedal for **5 seconds** to eliminate the malfunction memory from the control unit.

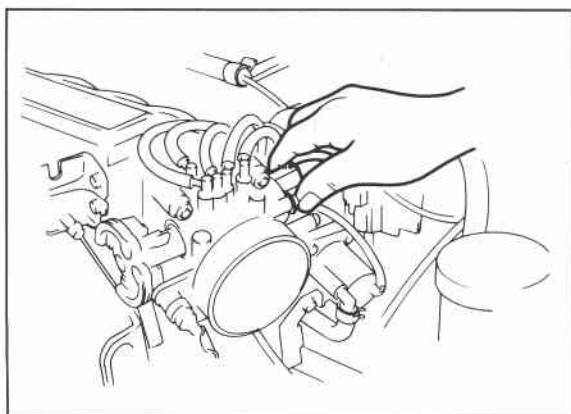


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Adjustment

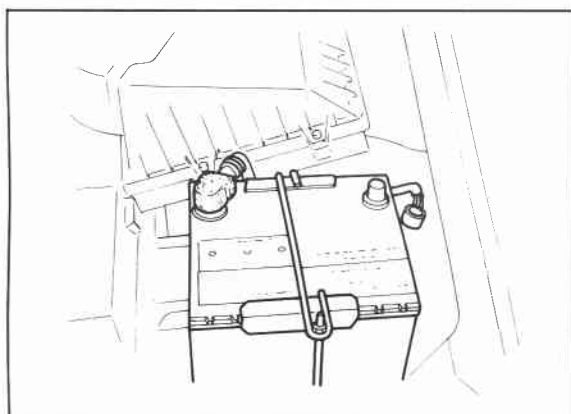
1. Perform steps 1 to 7 in the inspection procedure.
2. Connect the voltmeter to the **BLUE** wire.
3. Loosen the throttle sensor mounting screw.

4C CONTROL SYSTEM



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4. Make sure that the throttle valve is fully closed.
5. Turn the throttle sensor so that the **BLUE** wire voltage indicates within the specified closed range.
6. Tighten the throttle sensor mounting screw.
7. Recheck that the **BLUE** wire voltage is within the specified range.



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8. Turn the ignition switch OFF.
9. Disconnect the SST and reconnect the throttle sensor connector.
10. Disconnect the negative battery terminal and depress the brake pedal for **5 seconds** to eliminate the from the malfunction memory from the control unit.



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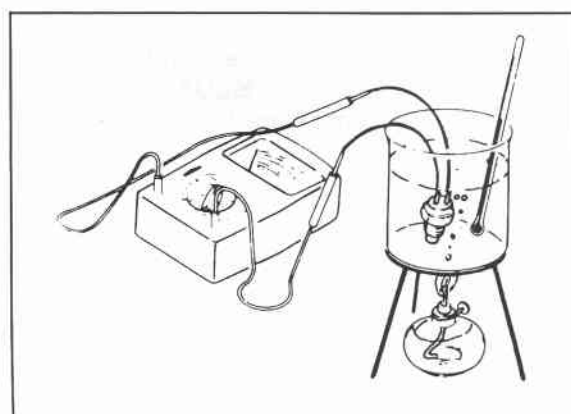
IDLE SWITCH

Inspection

1. Disconnect the idle switch connector.
2. Check continuity between the switch and a ground.

Throttle valve condition	Continuity
Fully closed	Yes
Open	No

3. If not correct, check condition of the wiring harness of the idle switch. Replace the idle switch and throttle body as an assembly, if necessary.



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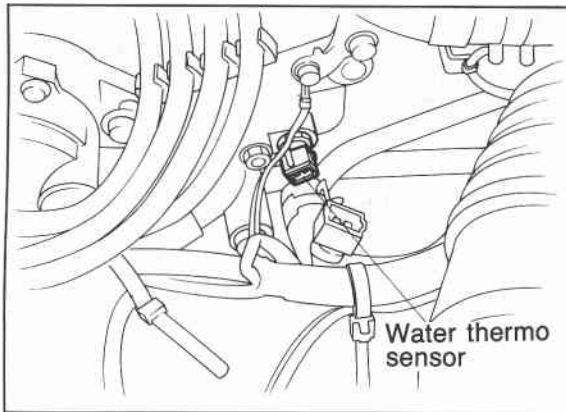
WATER THERMO SWITCH

Inspection

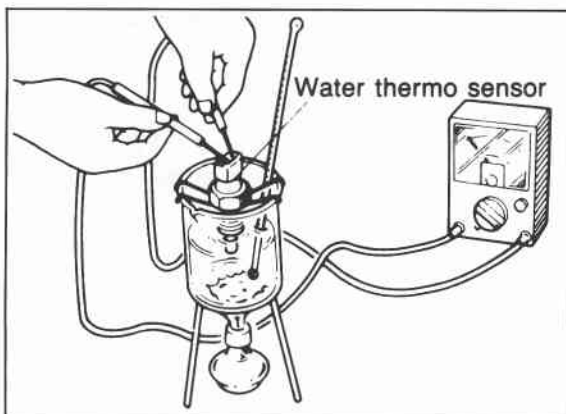
1. Remove the switch from the radiator.
2. Place the switch in water with a thermometer and heat the water gradually.
3. Check for continuity of the switch with an ohmmeter.

Coolant temp.	Continuity
More than approx. 17°C (63°F)	Yes
Less than approx. 10°C (63°F)	No

4. If not correct, replace the water thermo switch.



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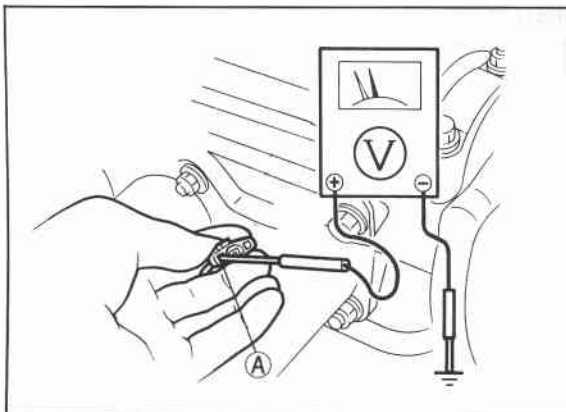
WATER THERMO SENSOR

Inspection

1. Remove the water thermo sensor.
2. Place the sensor in water with a thermometer and heat the water gradually.
3. Check resistance of the sensor with an ohmmeter.

Coolant	Resistance
-20°C (-4°F)	14.5—17.8 kΩ
20°C (68°F)	2.2—2.7 kΩ
40°C (104°F)	1.0—1.3 kΩ
60°C (140°F)	500—640 Ω
80°C (176°F)	280—350 Ω

4. If not correct, replace the water thermo sensor.

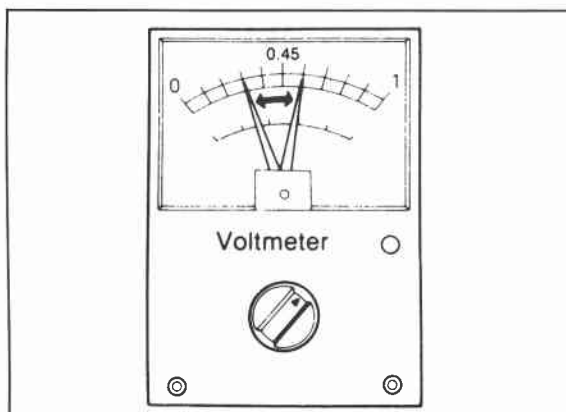


76G04C-200

OXYGEN SENSOR

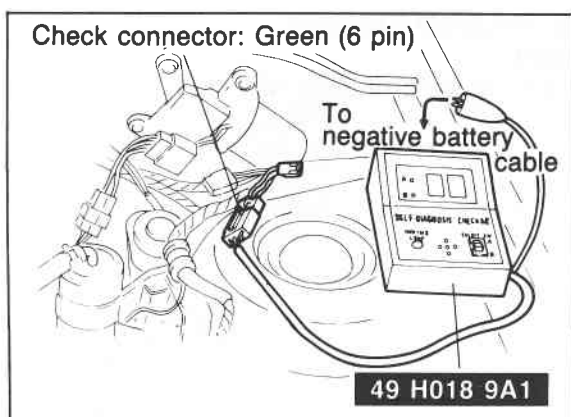
Inspection of Output Voltage

1. Warm up the engine and run it at idle.
2. Disconnect the oxygen sensor connector.
3. Connect a voltmeter between the oxygen sensor and a ground.
4. Run the engine at **4,500 rpm** until the voltmeter indicates **approx. 0.7V**.
5. Increase and decrease the engine speed suddenly several times. Check to see that when the speed is increased the meter reads between **0.5V—1.0V**, and when the speed is decreased it reads between **0V—0.4V**.
6. If the voltmeter doesn't indicate as specified, replace the oxygen sensor.



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4C CONTROL SYSTEM



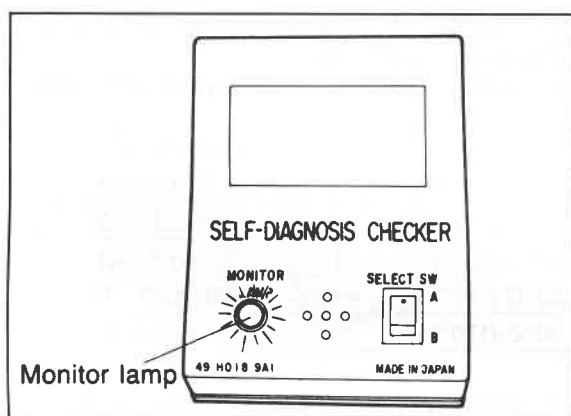
76G04C-213

Inspection of Sensitivity

1. Warm up the engine to the normal operating temperature and run it at idle.
2. Connect the **SST** to the check connector.

Note

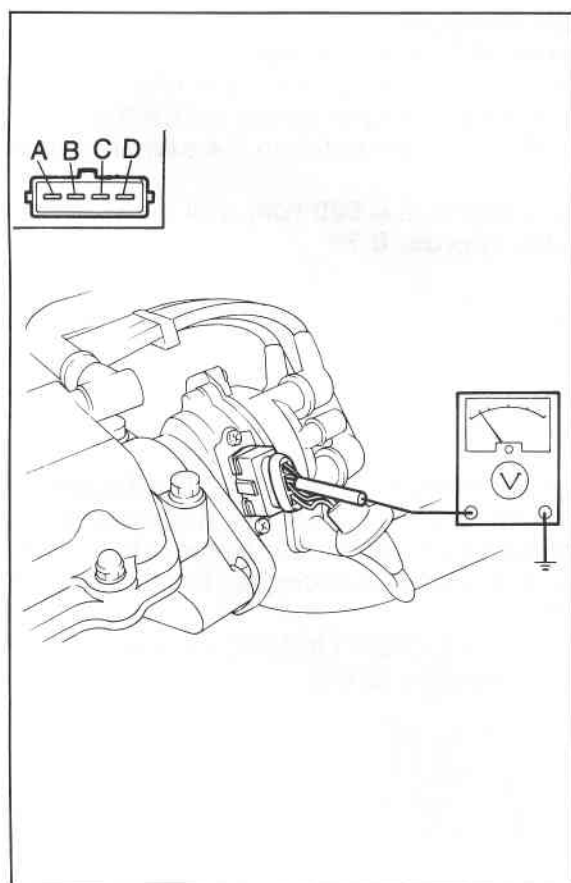
Digital code checker (49 G018 9A0) can be used.



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3. Increase the engine speed to between **2,000 and 3,000 rpm**, and check that the monitor lamp flashes for 10 seconds.

Monitor lamp: Flashes ON and OFF more than 8 times/10 sec



76G04C-201

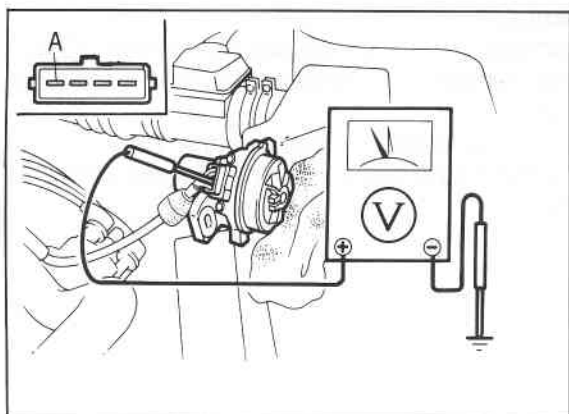
DISTRIBUTOR

On-vehicle Inspection

1. Remove the rubber boot from the distributor connector.
2. Run the engine at idle.
3. Check terminal voltage with a voltmeter.

Terminal	Voltage
A (G signal)	1.0—2.4
B (Ne signal)	1.8—2.2
C (Power supply)	Approx. 12V
D (Ground)	0V

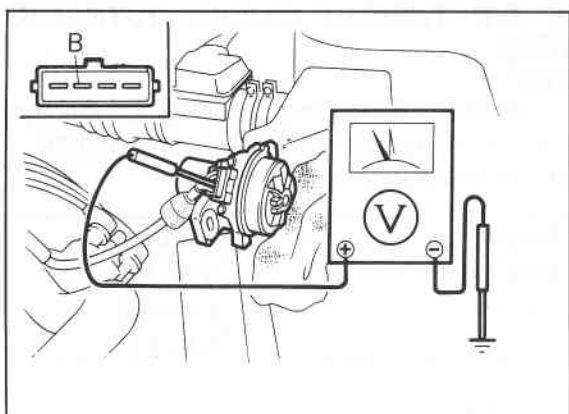
4. If not correct, check the wiring harness for an open or short circuit, then check the distributor for G signal or Ne signal.



76G04C-203

G Signal Inspection

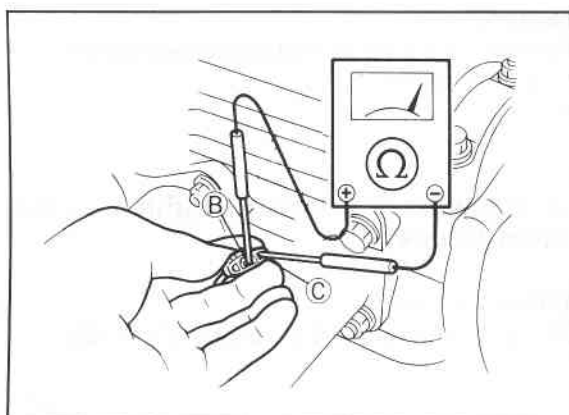
1. Remove the distributor. (Refer to section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a volt meter between the A terminal and a ground.
5. Turn the shaft and check that the distributor generates one pulse signal I per one turn.



76G04C-204

Ne signal Inspection

1. Remove the distributor. (Refer to Section 5.)
2. Reconnect the distributor to the wiring harness.
3. Remove the rubber boot from the distributor connector.
4. Connect a voltmeter between the B terminal and a ground.
5. Turn the shaft and check that the distributor generates four pulse signals per one turn.

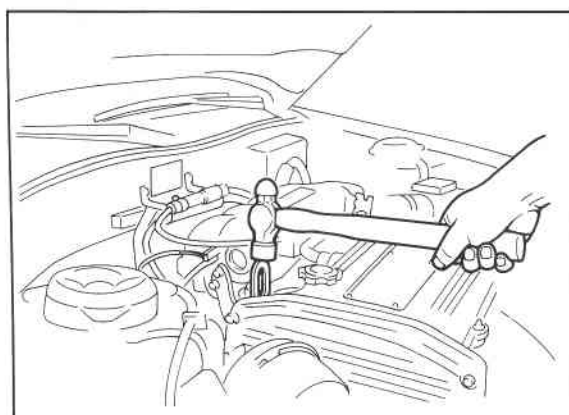


76G04C-205

Oxygen Sensor Heater

1. Disconnect the oxygen sensor connector.
2. Check resistance between terminals B and C.

Specification: approx. 6 Ω

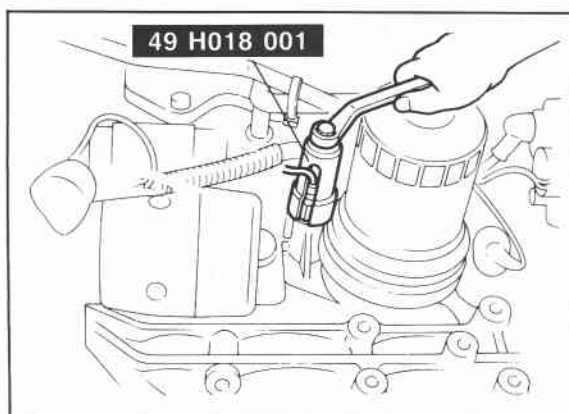


76G04C-206

Knock Sensor (Leaded fuel)

1. Warm up the engine and run it at idle.
2. Ground the test connector (Green, 1-pin) with a jumper wire.
3. Tap the engine hanger with a hammer and verify that the ignition timing retards.
4. If not correct, check the knock sensor.

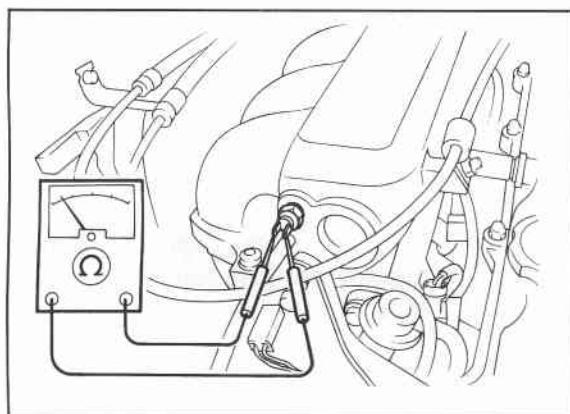
4C CONTROL SYSTEM



76G04C-207

Replacement

1. Disconnect the knock sensor connector.
2. Lift the vehicle and remove the intake manifold bracket.
3. Remove the knock sensor with the **SST**.
4. Install the knock sensor in the reverse order of removal.



76G04C-208

INTAKE AIR THERMO SENSOR (DYNAMIC CHAMBER)

Inspection

1. Disconnect the intake air thermo sensor connector.
2. Connect an ohmmeter to the sensor terminals.
3. Check the resistance of the sensor.

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

4. Reconnect the sensor connector.

Replacement

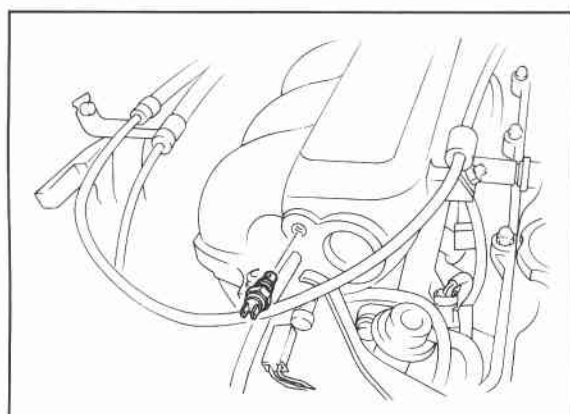
1. Disconnect the intake air thermo sensor connector.
2. Remove the sensor.
3. Install the sensor.

Note

When installing the sensor, tighten to the specified torque.

Specified torque:

6.9—8.8 N·m (0.7—0.9 m·kg, 72 in·lb)



76G04C-209