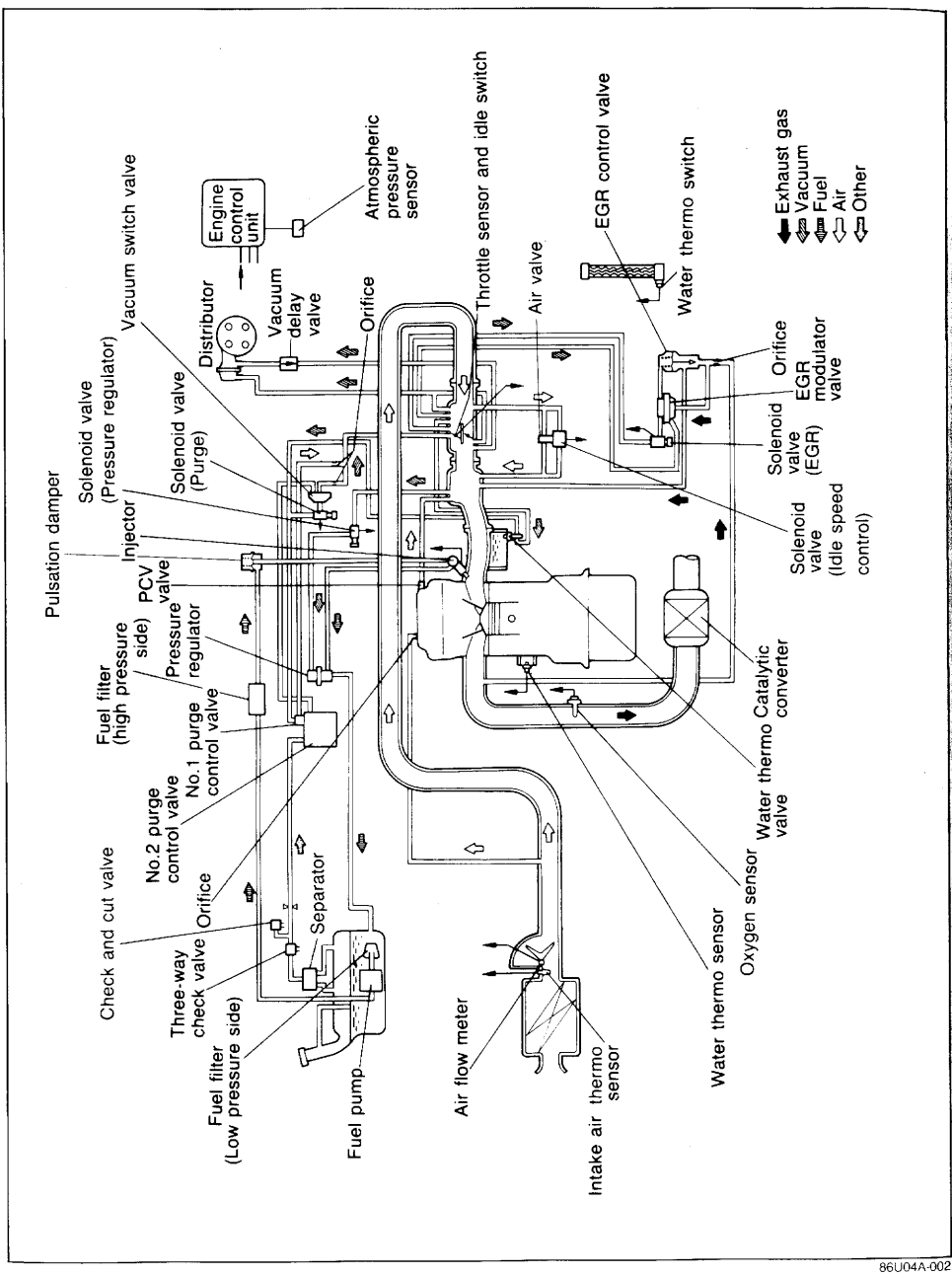
FUEL AND EMISSION CONTROL SYSTEM (NON-TURBO)

96U04A-001

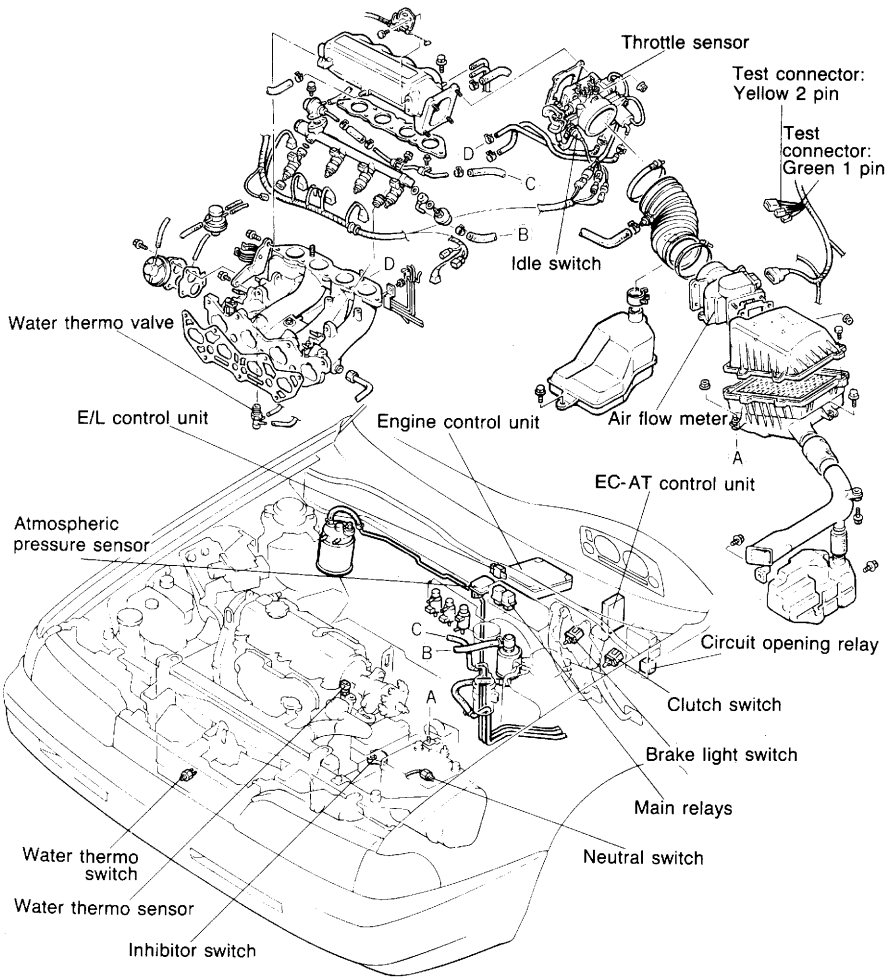
OUTLINE

SYSTEM DIAGRAM

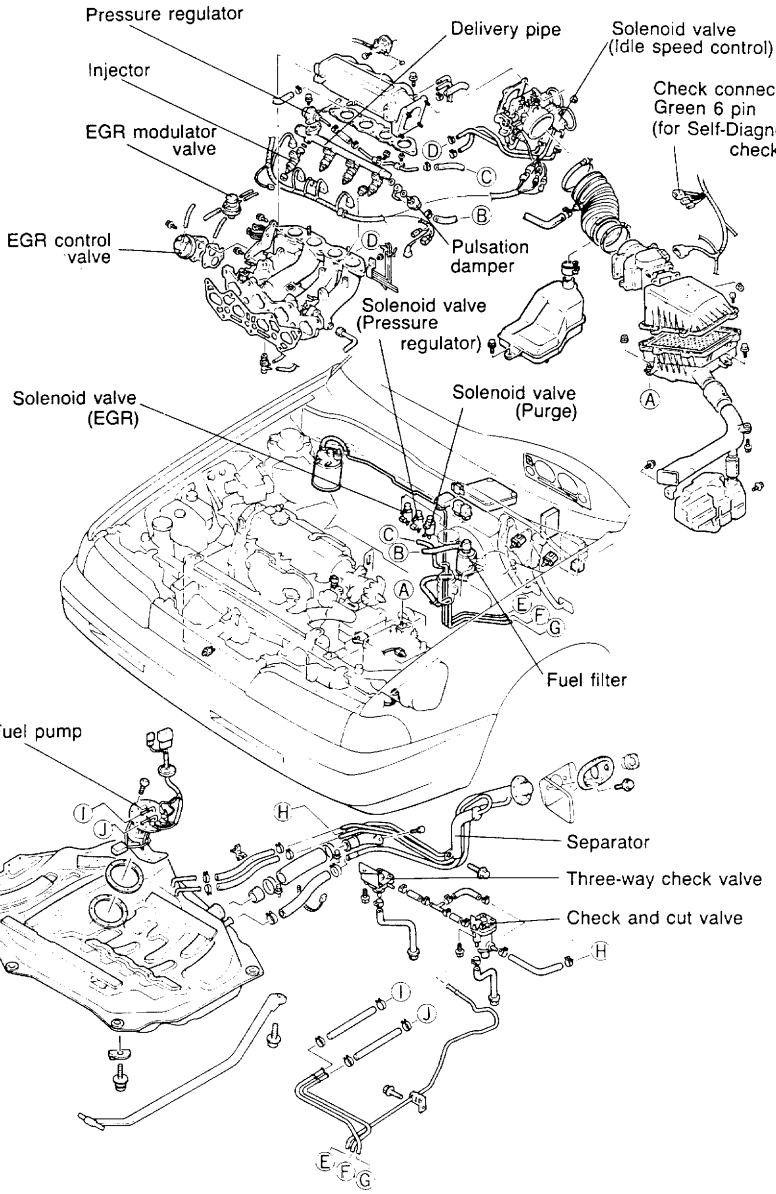


86U04A-002

COMPONENT LOCATION
Input Devices

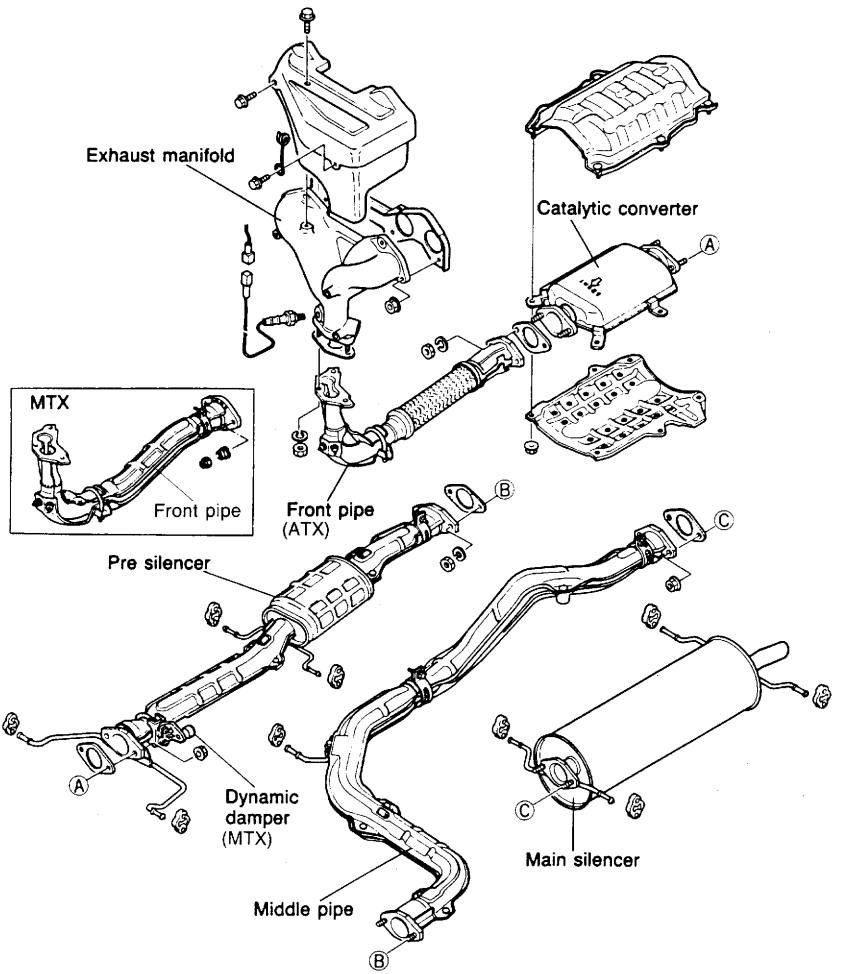


Fuel and Output Devices

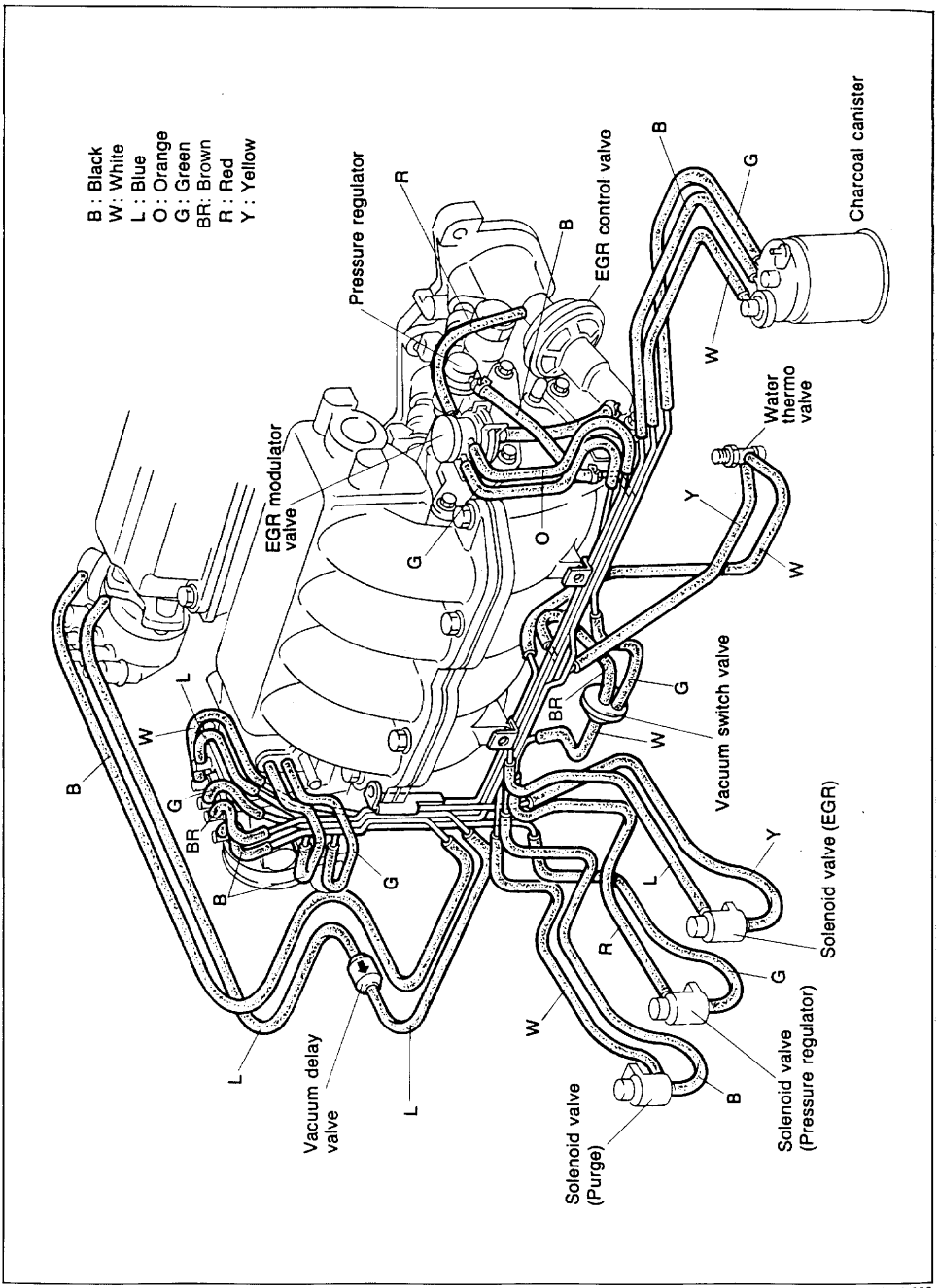


86U04A-004

Exhaust System



VACUUM HOSE ROUTING DIAGRAM



86U04A-006

SPECIFICATIONS

Item		Engine type	Non-Turbo Engine
Idle speed	rpm		750 ± 25 (ATX: P range)*
Throttle body			
Type			Horizontal draft (2-barrel)
Throat diameter	mm (in)	No. 1	MTX: 40 (1.6), ATX: 46 (1.8)
		No. 2	MTX: 46 (1.8), ATX: 40 (1.6)
Air flow meter			
Resistor	Ω	E_2—Vs	Fully closed: 20—400 Fully open: 20—1,000
		E_2—Vc	100—400
		E_2—V_B	200—400
		E_2—THA	−20°C (−4°F) 13,600—18,400 20°C (68°F) 2,210— 2,690 60°C (140°F) 493— 667
Fuel pump			
Type			Impeller (in tank)
Output pressure	kPa (kg/cm², psi)		441—588 (4.5—6.0, 64—85)
Feeding capacity	cc (cu in)/10 sec.		220 (13.4) min
Fuel filter			
Type		Low pressure side	Nylon element
		High pressure side	Paper element
Pressure regulator			
Type			Diaphragm
Regulating pressure	kPa (kg/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 seconds		44—61 (2.68—3.72)
Idle speed control valve			
Solenoid resistance	Ω		6.3—9.9
Fuel tank			
Capacity	liters (US gal, Imp gal)		60 (15.9, 13.2)
Air cleaner			
Element type			Oil permeated
Fuel			
Specification			Unleaded regular

* With test connector grounded

86U04A-007

TROUBLESHOOTING GUIDE

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

Possible cause / Page / Symptom		Input sensors and switches								Output solenoid valves			
		Ignition pulse	Air flow meter	Water thermo sensor	Intake air thermo sensor	Throttle sensor	Atmospheric pressure sensor	Oxygen sensor	Feedback system	Solenoid valve (Pressure regulator)	Solenoid valve (Purge)	Solenoid valve (EGR)	Solenoid valve (Idle speed control)
		4A—15	4A—16	4A—17	4A—18	4A—19	4A—20	4A—21	4A—22	4A—23	4A—23	4A—24	4A—24
1	Fault indicated by SST Code No.	01	08	09	10	12	14	15	17	25	26	28	34
2	Hard start or won't start (Cranks OK)												
3	Engine stalls — While warming up												
	Engine stalls — After warming up												
4	Rough idle — While warming up												
	Rough idle — After warming up												
5	High idle speed after warming 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 rough after hot starting												
11	Fails emission test												

TROUBLESHOOTING PROCEDURE

Note
Step 1 under symptom is to quickly determine what system or unit may be at fault by use of the SST. (Self-Diagnosis Checker 49 H018 9A1)

1st: Check input sensors and output solenoid valves with the **SST**. (Refer to page 4A—11.)

2nd: Check other switches with the **SST**. (Refer to page 4A—26.)

3rd: Check the following items:

Electrical system
1) Battery condition
2) Fuses

Fuel system
1) Fuel level
2) Fuel leakage
3) Fuel filter
4) Idle speed (with test connector grounded)

Engine
1) Compression
2) Overheating

Ignition system
1) Ignition spark
2) Ignition timing

Intake air system
1) Air cleaner element
2) Vacuum or air leakage
3) Vacuum hose routing
4) Accelerator cable

Others
1) Clutch slippage
2) Brake dragging

4th: Check Fuel and Emission Control Systems. (Refer to page 4A—9.)

86U04A-008

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

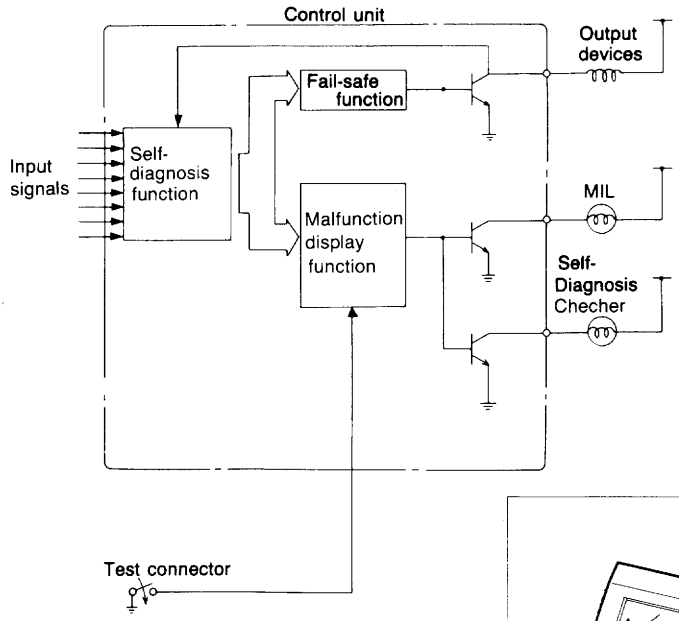
		Fuel and Emission Control Systems								
	Possible cause	Intake Air System (Poor connection of components, throttle body)	Fuel System (Fuel injection, Fuel pressure)	Pressure Regulator Control System	Idle Speed Control (ISC) System (Air valve, Idle speed control solenoid malfunction)	EGR System (EGR control valve stuck and open)	EEC system (Vacuum switch valve, No.1 purge valve malfunction)	PCV System (System clogged)	Deceleration System (Fuel cut operation malfunction)	Exhaust system (System clogged)
	Page	4A—32	4A—43	4A—52	4A—38	4A—65	4A—68	4A—72	4A—62	4A—74
Symptom	2	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			1					
	6	3	4			1	2			5
	7		3		2				1	
	8	3	4		1				2	
	9		2			3			1	4
	10		2	1						
	11	6	7		4	2	5		3	1

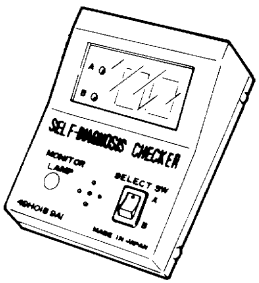
96U04A-002

The numbers of the list show the priorities of inspections from the most possible 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

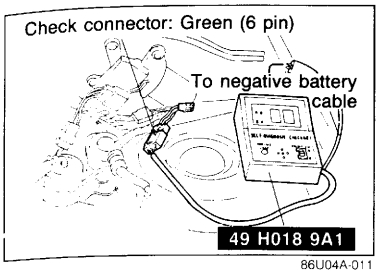




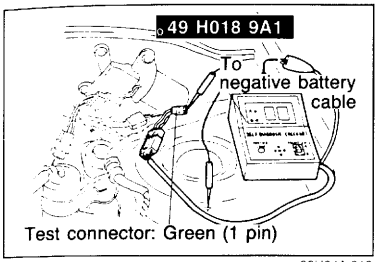
86U04A-010

When troubles occur in the main input devices or output devices, check for the cause using the **SST**. Failures of each input and output device are 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.



86U04A-011



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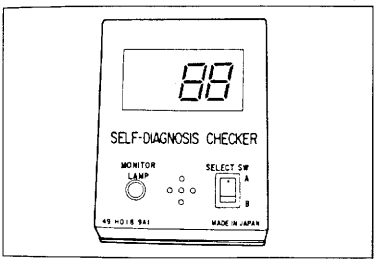
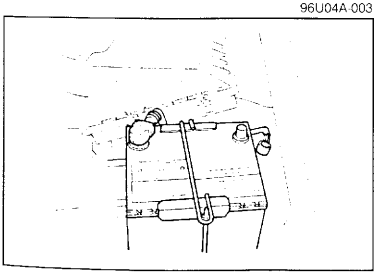
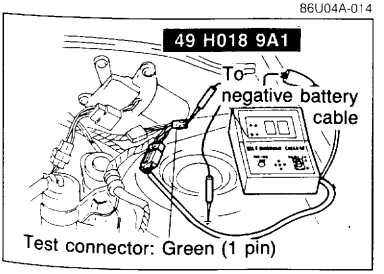


96U04A-003



86U04A-014



86U04A-015

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.

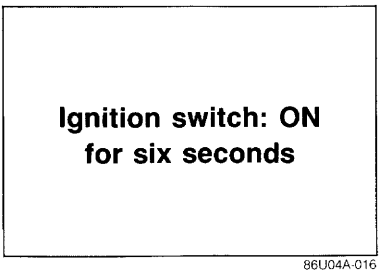
Note
The test connector is located near the Self-Diagnosis Checker check connector.

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 main relay (Refer to page 4A—78), power supply circuit, and check connector wiring.
7. If **88** flashes and the buzzer sounds continuously for more than **20 seconds**, 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 **from 4A—15 to 4A—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 depressing the brake pedal for **at least five seconds**; then reconnect the negative battery cable.
2. Connect the **SST** to the check connector.
3. Ground the test connector (Green, 1-pin) with a jumper wire.



86U04A-016

4. Turn the ignition switch ON, but do not start the engine for **six seconds**.
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.

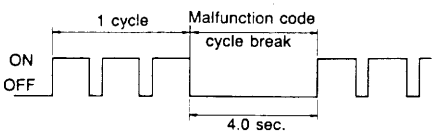
PRINCIPLE OF CODE CYCLE

Malfunction codes are determined as shown below

86U04A-017

1. Code cycle break

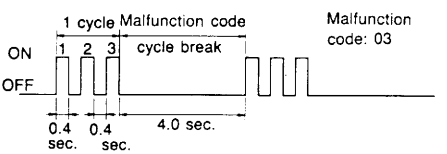
The time between malfunction code cycles is 4.0 sec (the time the light is off).



86U04A-018

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.

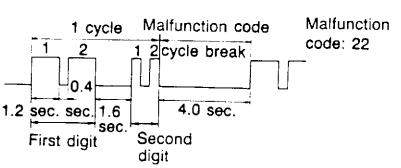


86U04A-019

3. First digit of warning code (tens position)

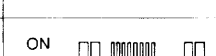
The digit in the tens position of the malfunction code represents the number of times the buzzer is on 1.2 sec during one cycle.

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



69G04C-554

CODE NUMBER

Malfunction display		Sensor or subsystem	Self-diagnosis	Fail-safe
Code No.	MIL output signal pattern			
01		Ignition pulse	No ignition signal	—
08		Air flow meter	Open or short circuit	Maintains basic signal at preset value
09		Water thermo sensor	Open or short circuit	Maintains constant command • 35°C (95°F) for EGI • 50°C (122°F) for ISC control use
10		Intake air thermo sensor (air flow meter)	Open or short circuit	Maintains constant 20°C (68°F) command
12		Throttle sensor	Open or short circuit	Maintains constant command of throttle valve fully open
14		Atmospheric pressure sensor	Open or short circuit	Maintains constant command of sea level pressure
15		Oxygen sensor	Sensor output continues less than 0.55V 120 sec. after engine starts (1,500 rpm)	Cancels EGI feedback operation
17		Feedback system	Sensor output not changed 20 sec. after engine exceeds 1,500 rpm	Cancels EGI feedback operation
25		Solenoid valve (pressure regulator)	Open or short circuit	—
26		Solenoid valve (purge control)		—
28		Solenoid valve (EGR)		—
34		Solenoid valve (Idle speed control)		—

86U04A-020

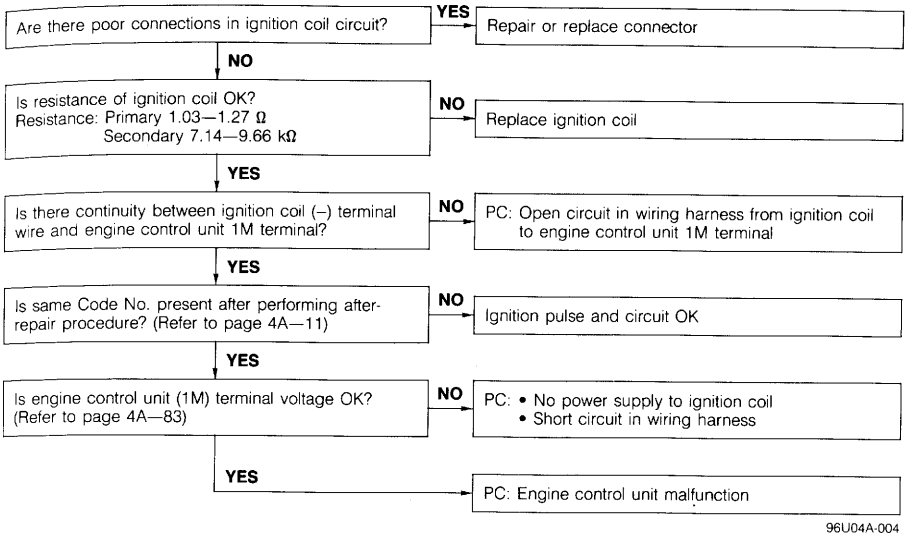
Caution

a) If there is more than one failure present, the lowest number malfunction code is displayed first, the remaining codes are displayed sequentially.

b) After repairing a failure, turn off the ignition switch and disconnect the negative battery cable and depress the brake pedal for at least 5 seconds to erase the memory of a malfunction code.

If a malfunction code number is shown on the **SST**, check the following chart along with the wiring diagram.

Code No. 01 (Ignition pulse) **PC: Possible Cause**



96U04A-004

Code No. 08 (Air flow meter)

PC: Possible Cause

Are there poor connections in air flow meter circuit?
- YES → Repair or replace connector
- NO ↓

Is there continuity between air flow meter and engine control unit?

Air flow meter	Control unit
V_B (R/B wire)	3I
V_C (R/W wire)	2B
V_S (R/B wire)	2E
E_2 (LG/Y wire)	2C

- NO → PC: Open circuit in wiring harness from air flow meter to engine control unit
- YES ↓

Is resistance of air flow meter OK?
Resistance:

Terminal	Fully closed (Ω)	Fully open (Ω)
E_2 ↔ V_S	20—400	20—1,000
E_2 ↔ V_C	100—400	
E_2 ↔ V_B	200—400	

- NO → Repair air flow meter
- YES ↓

Is same Code No. present after performing after-repair procedure? (Refer to page 4A—11)
- NO → Air flow meter and circuit OK
- YES ↓

Are engine control unit terminal voltages OK?
Check terminal: 2B, 2C, 2E, 3I
(Refer to page 4A—84 and 4A—85)
- NO → PC: Short circuit in wiring harness
- YES → PC: Engine control unit malfunction

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Code No. 09 (Water thermo sensor)

PC: Possible Cause

Are there poor connections at water thermo sensor circuit?
- YES → Repair or replace connector
- NO ↓

Is there continuity between water thermo sensor and control unit?

Water thermo sensor	Control unit
A (Y/B wire)	2I
B (LG/Y wire)	2C

- NO → PC: Open circuit in wiring harness from water thermo sensor to engine control unit
- YES ↓

Is resistance of the water thermo sensor OK?
Resistance:

Coolant temp	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

- NO → Replace water thermo sensor
- YES ↓

Is same Code No. present after performing after-repair procedure? (Refer to page 4A—11)
- NO → Water thermo sensor and circuit OK
- YES ↓

Are engine control unit 2I and 2C terminal voltages OK? (Refer to page 4A—84)
- NO → PC: Engine short circuit in wiring harness
- YES → PC: Engine control unit malfunction

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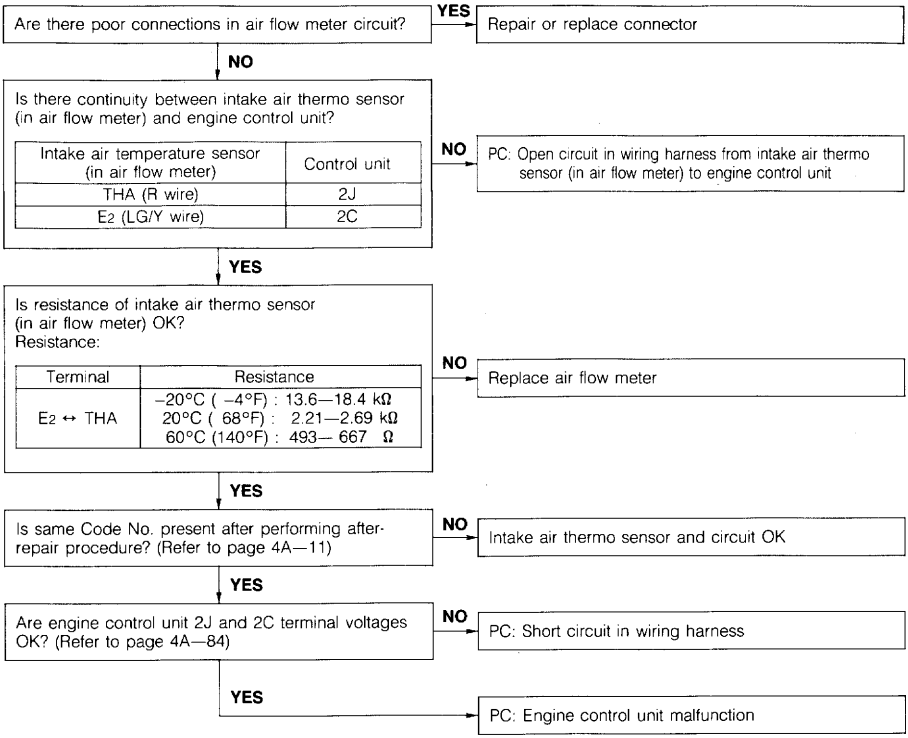
Code No. 10 (Intake air thermo sensor) **PC: Possible Cause**



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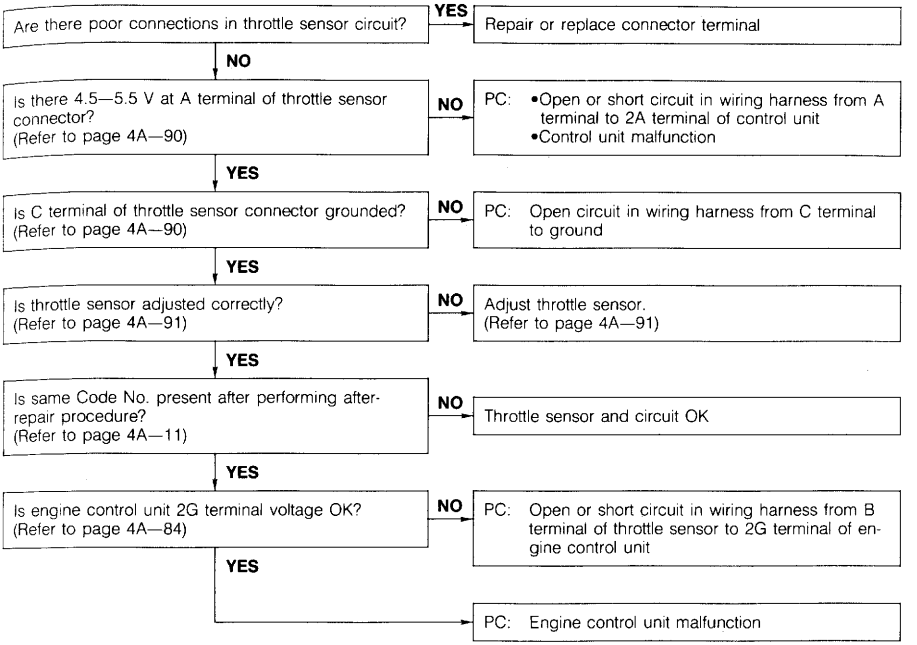
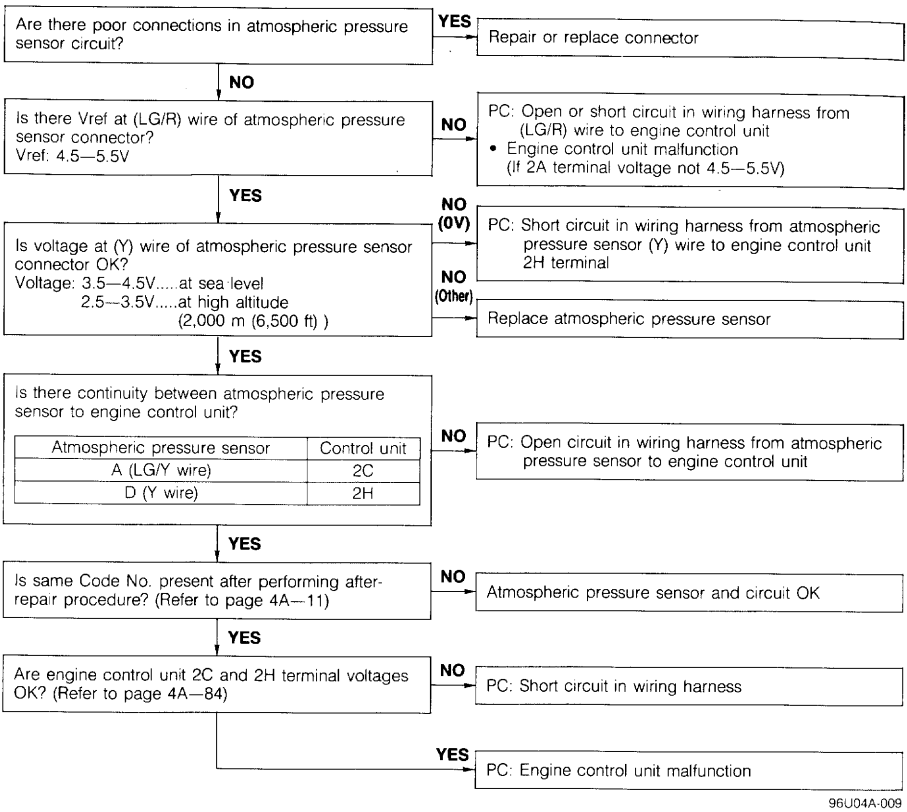
Code No. 12 (Throttle sensor) **PC: Possible cause**



96U04A-008

Code No. 14 (Atmospheric pressure sensor) **PC: Possible cause**

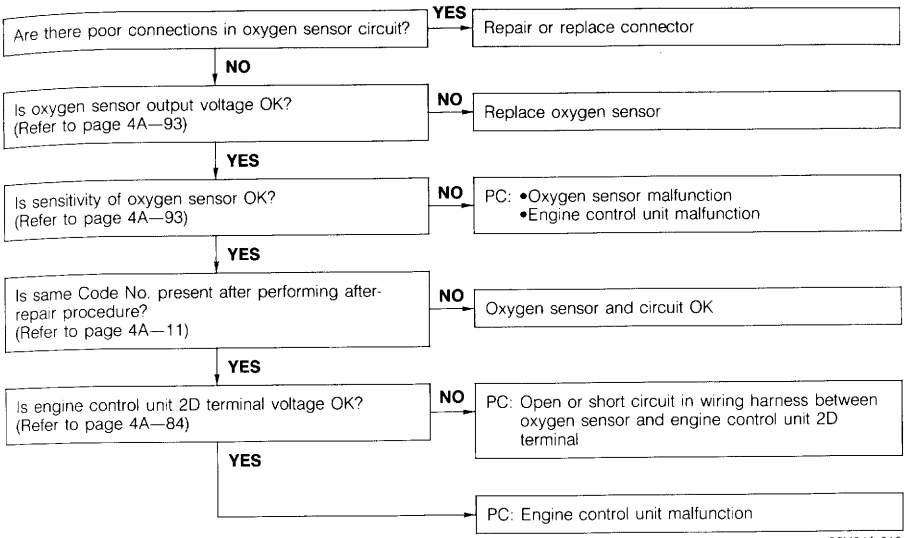


96U04A-009

Code No. 15 (Oxygen sensor)

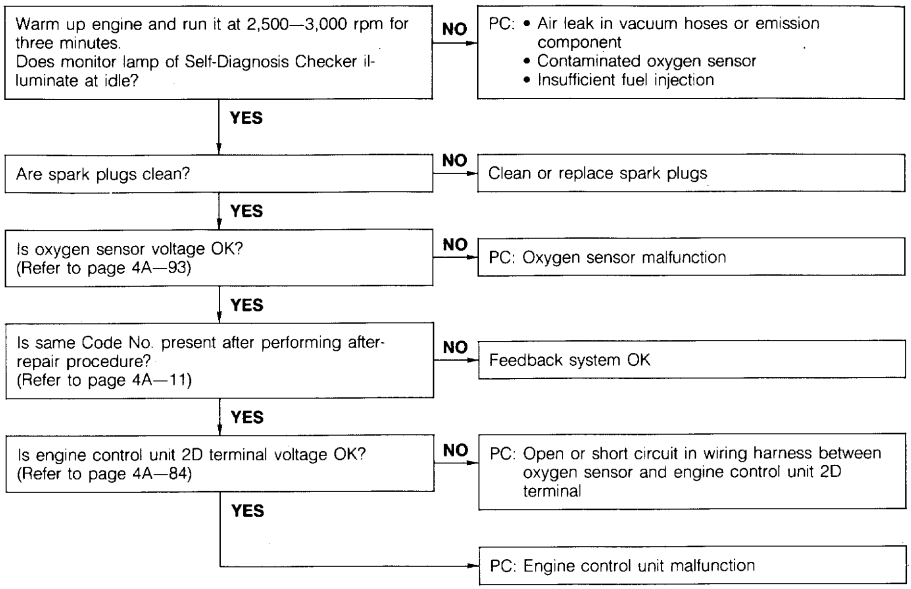
PC: Possible Cause

Note
When Codes No.15 and 17 are present at the same time, first perform the checking procedure for Code No.17. (Refer to page 4A—22.)



96U04A-010

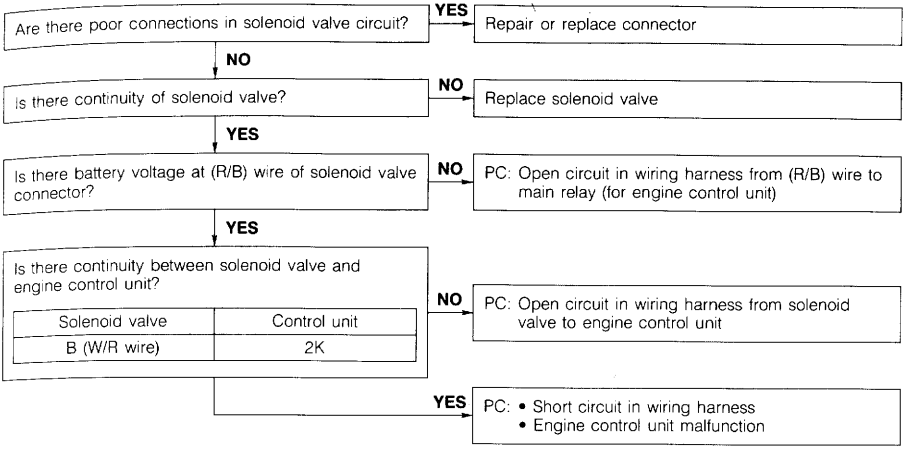
Code No. 17 (Feedback system) **PC: Possible Cause**



96U04A-011

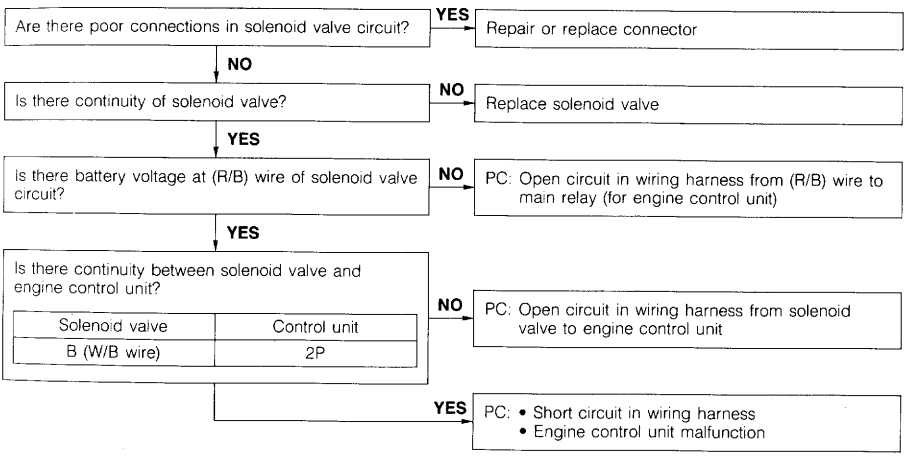
Code No. 25 (Solenoid valve-Pressure regulator)

PC: Possible Cause



86U04A-029

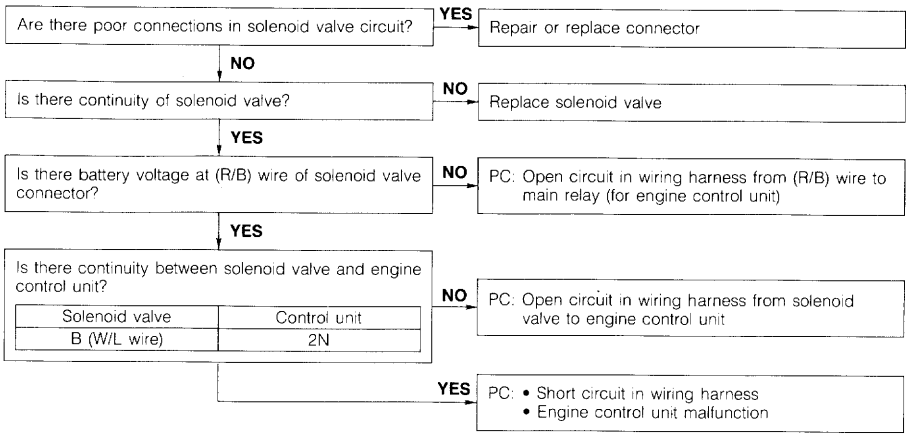
Code No. 26 (Solenoid valve-Purge)



86U04A-030

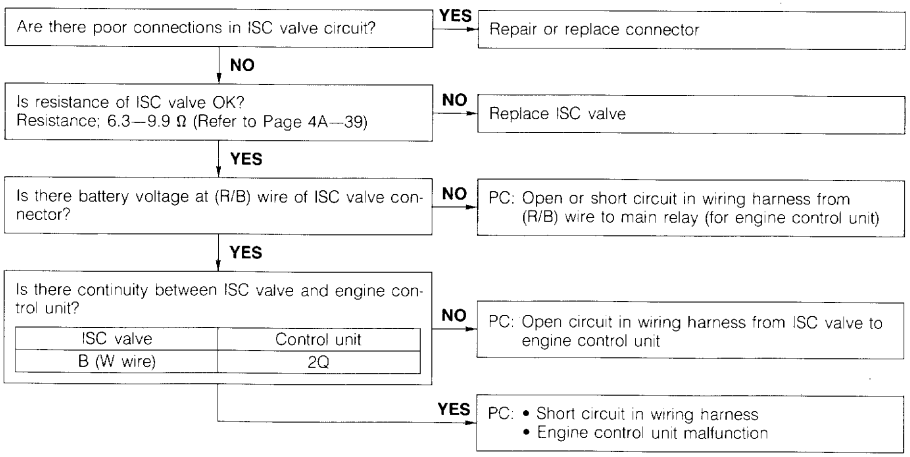
Code No. 28 (Solenoid valve—EGR)

PC: Possible Cause



86U04A-031

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

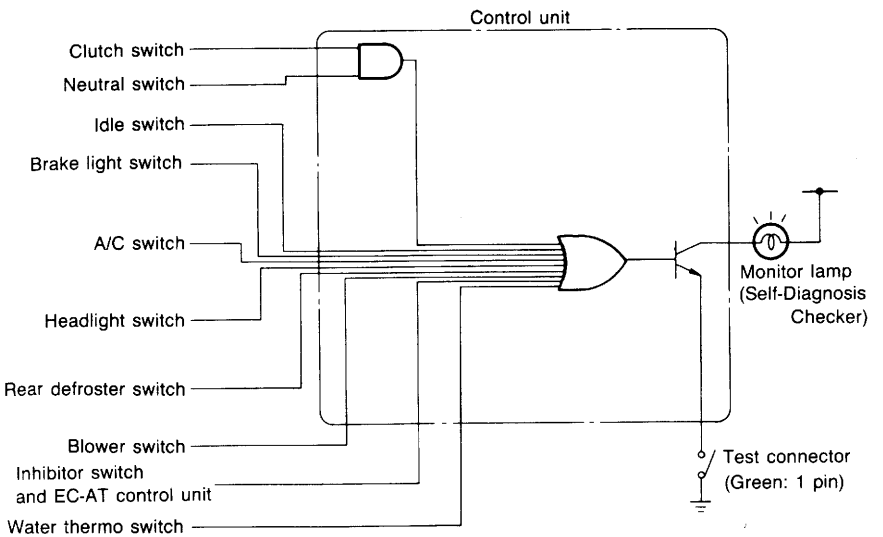


96U04A-012

SWITCH MONITOR FUNCTION

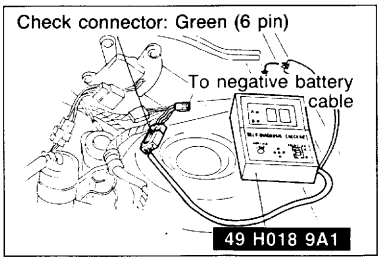
Individual switches can be monitored by the SST.

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

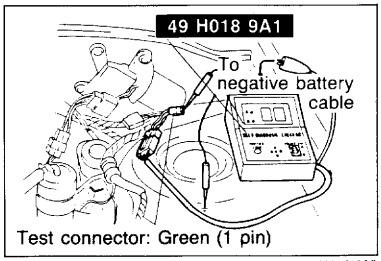


86U04A-033

Switch	Self-Diagnosis Checker (Monitor lamp)		Remarks
	Light ON	Light OFF	
Clutch switch	Pedal released	Pedal depressed	Gear: IN
Neutral switch	In gear	Neutral	Clutch pedal released
Idle switch	Pedal depressed	Pedal released	—
Brake light switch	Pedal depressed	Pedal released	—
A/C switch	ON	OFF	Blower motor position: "1" position
Headlight switch	ON	OFF	—
Rear defroster switch	ON	OFF	—
Blower switch	ON	OFF	Blower motor position: "3" or "4" position
Inhibitor switch and EC-AT control unit	D, 1, 2 and R range	P and N range	—
Water thermo switch (Electrical fan)	Terminal disconnected	Terminal connected	While fan not operating



86U04A-034



86U04A-035

INSPECTION PROCEDURE

1. Warm up the engine to normal operating temperature and stop it.
2. Connect the **SST** to the check connector (Green, 6-pin) and the negative battery terminal.
3. Connect a jumper wire between the test connector (Green, 1-pin) and a ground.
4. Turn the ignition switch ON. Check if monitor lamp illuminates when 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

Set conditions to deactivate each switch
- All accessories OFF
- Transmission in neutral
- All pedals released

Verify that monitor lamp does not illuminate

NO →

Check each switch and related wiring harness

• Clutch and Neutral switch	:Refer to page 4A—86
• Idle switch	:Refer to page 4A—92
• Brake light switch	:Refer to page 4A—86
• A/C switch	:Refer to section 15
• Headlight switch	:Refer to section 15
• Rear defroster switch	:Refer to section 15
• Blower switch	:Refer to section 15
• Inhibitor switch	:Refer to page 4A—87
• Water thermo switch	:Refer to section 3

YES

Check each switch as described

96U04A-013

Neutral and Clutch switch (MTX)

Shift transmission into gear
Check that monitor lamp illuminates with clutch pedal released

NO →

PC:
- Neutral or clutch switch malfunction (Refer to page 4A—86)
- Open circuit in related wiring harness
- Engine control 3D terminal malfunction (Refer to page 4A—85)

YES

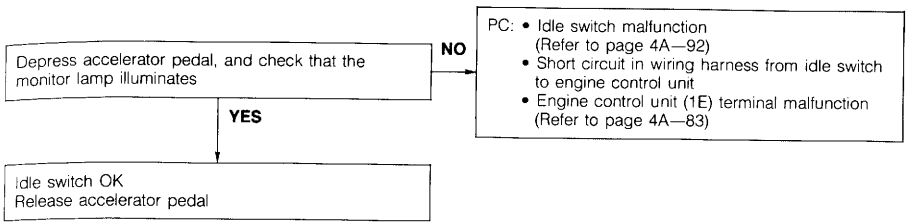
Depress clutch pedal
Check that monitor lamp does not illuminate
Return transmission to neutral

NO →

PC:
- Clutch switch malfunction (Refer to page 4A—86)

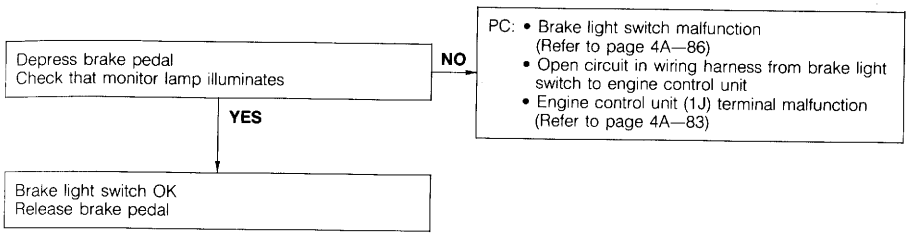
96U04A-014

Idle switch



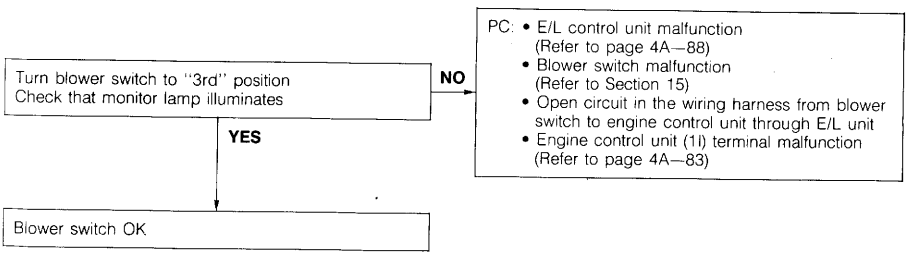
96U04A-015

Brake light switch



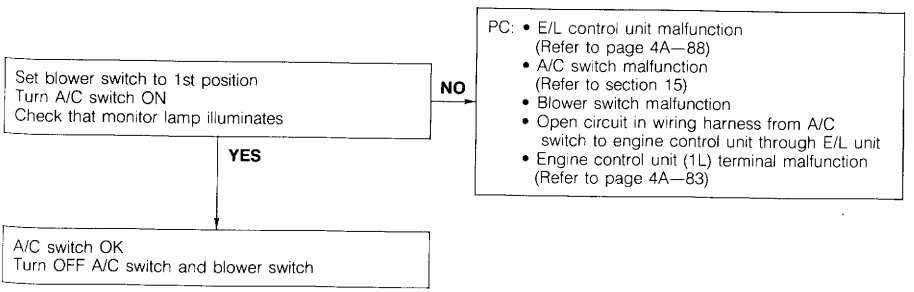
96U04A-016

Blower switch



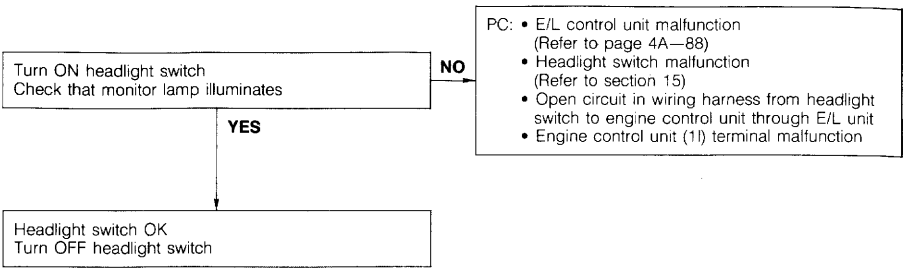
96U04A-017

A/C switch



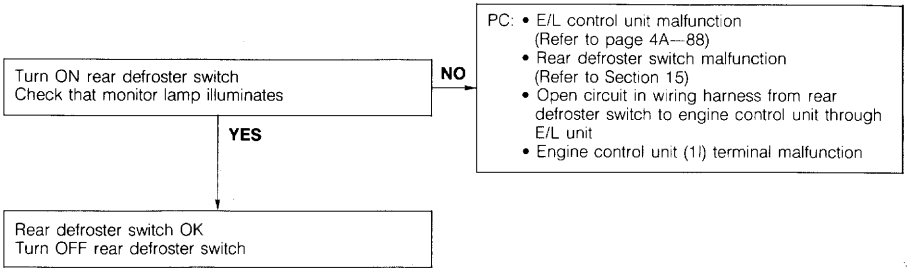
96U04A-018

Headlight switch



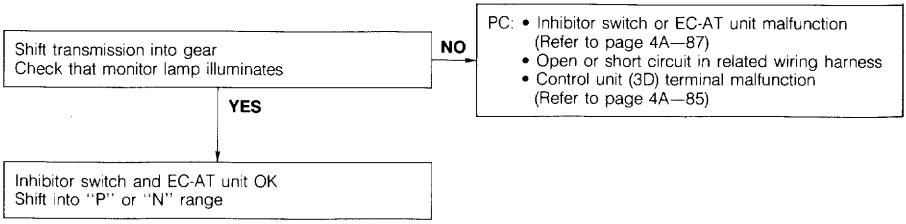
96U04A-019

Rear defroster switch



96U04A-020

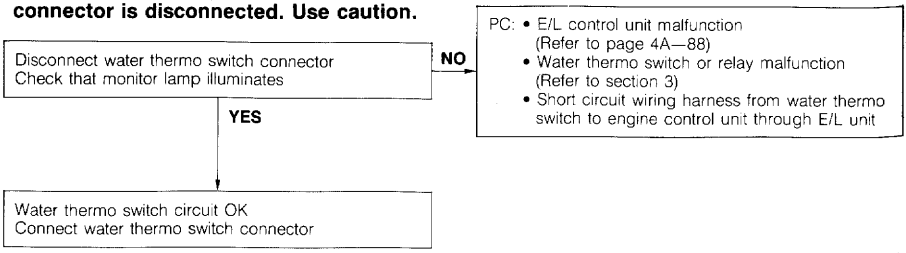
Inhibitor switch



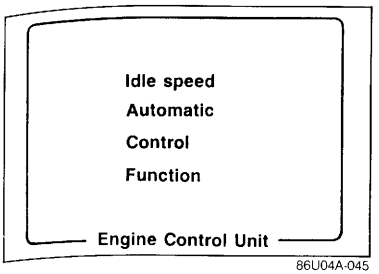
96U04A-021

Water thermo switch circuit (not included in switch inspection)

Warning
The electrical fan operates when the connector is disconnected. Use caution.



96U04A-022

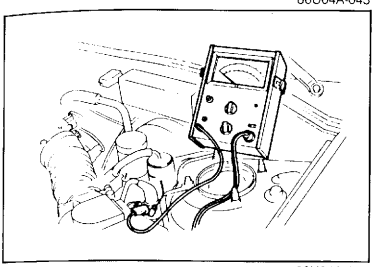


86U04A-045

IDLE ADJUSTMENT

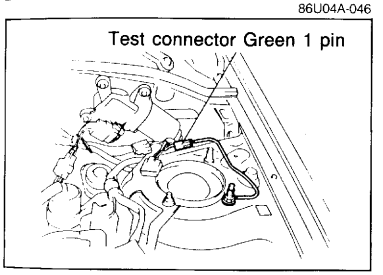
IDLE SPEED

Because the idle speed is controlled automatically by the engine control unit through the idle speed control (ISC) solenoid valve, usually it is not necessary to check and adjust the idle speed.
However, the idle speed should be adjusted when rough idling occurs when the test connector (Green, 1-pin) is grounded.


86U04A-046

Preparation

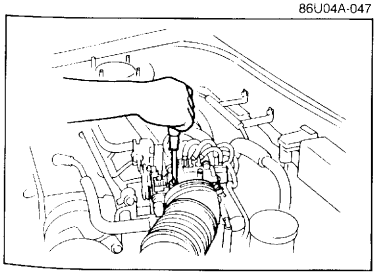
1) Check the condition of the engine (plugs, leaks in hoses, etc.).
2) Make sure all accessories are OFF.
3) Warm up the engine and run it for **Three minutes at 2,500—3,000 rpm** in neutral.
4) Check the initial ignition timing and adjust if necessary.



86U04A-047

Inspection and Adjustment

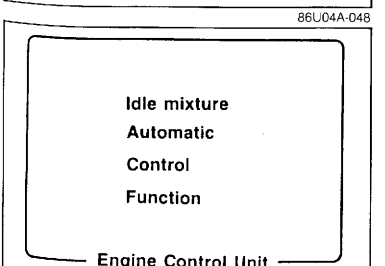
1. Ground the test connector with a jumper wire.


86U04A-048

2. Check that the idle speed is within specification.

Idle speed: 750 ± 25 rpm MTX: Neutral
ATX: P range

3. If the idle speed is not within specification, remove the blind cap from the throttle body and adjust it by turning the air adjust screw.
4. After adjusting the idle speed, install the blind cap and disconnect the jumper wire from the test connector.

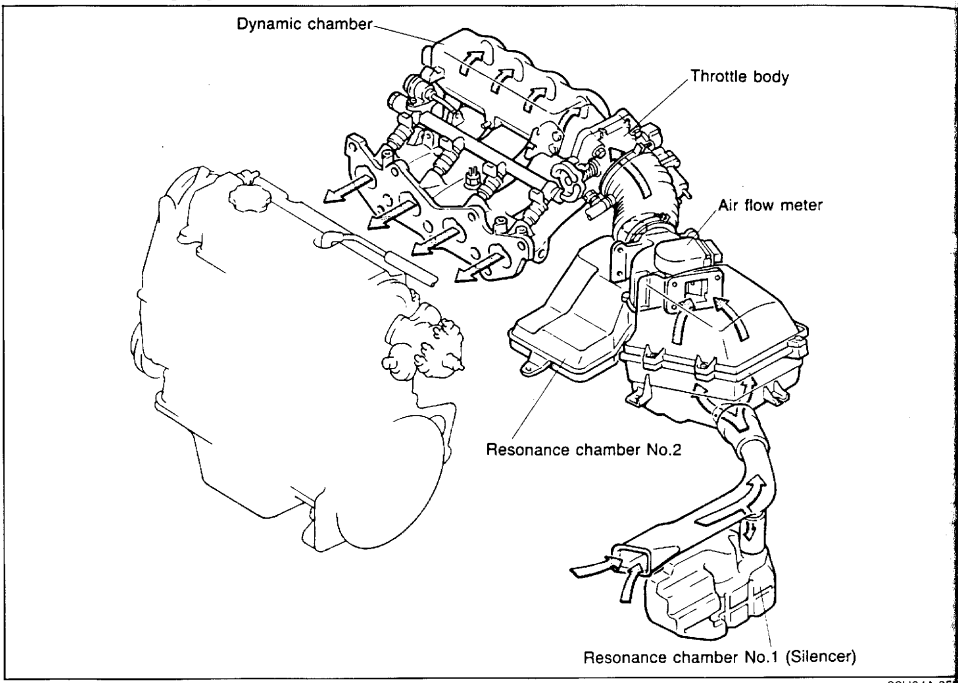


86U04A-049

IDLE MIXTURE

Because 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.

INTAKE AIR SYSTEM



86U04A-05

This system controls the air required by the engine for operation. The system consists of the air duct, air cleaner, air flow meter, throttle body, dynamic chamber, and intake manifold.
This system also has a resonance chamber to improve mid-range torque characteristics.

COMPONENT DESCRIPTIONS

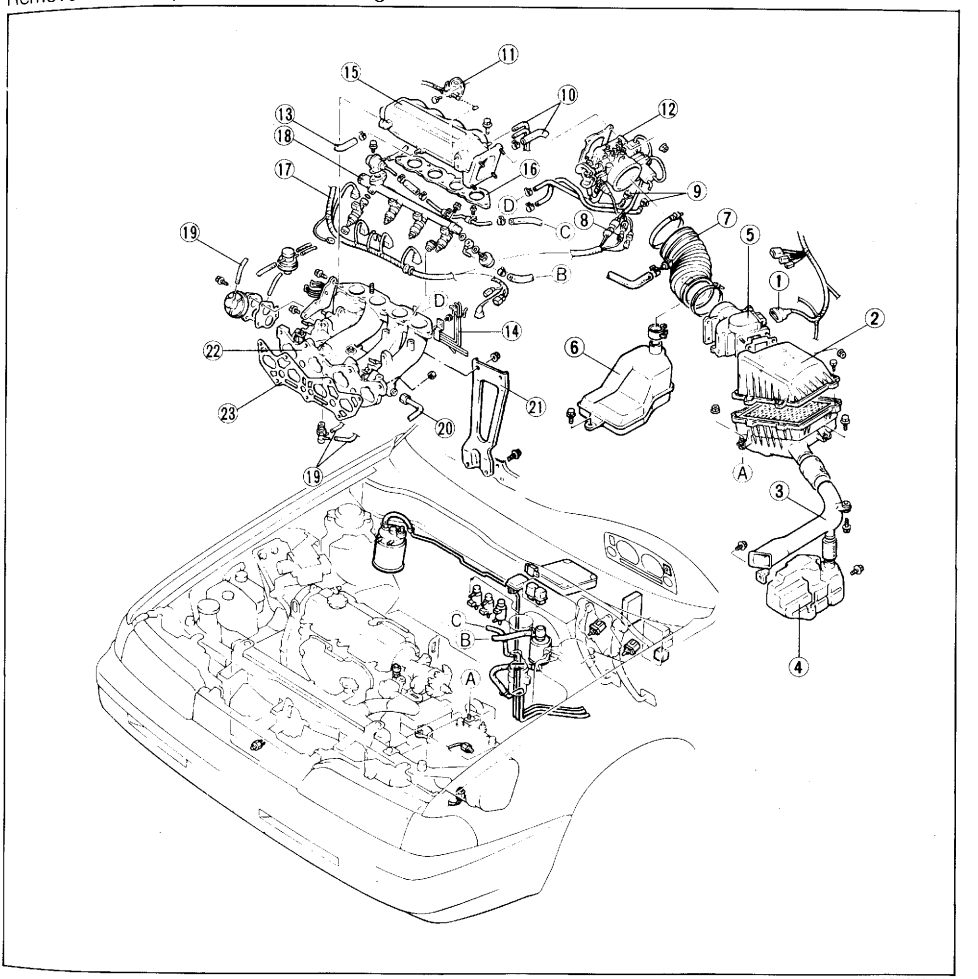
Component	Function	Remarks	Application	
			New model	Previous model
Air cleaner	Filters air into throttle body		○	○
Air flow meter	Detects amount of intake air; sends signal to control unit	Intake air temp sensor and fuel pump switch are integrated	○	○
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body	○	○
Throttle body	Controls intake air quantity	Integrated throttle sensor and idle switch	○	○

86U04A-051

REMOVAL

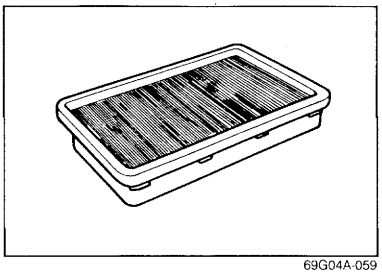
Caution
Before removing the following parts, release the fuel pressure from fuel system to reduce the possibility of injury or fire. (Refer to page 4A—44.)

Remove in the sequence shown in the figure.



96U04A-023

1. Air flow meter connector
2. Air cleaner
3. Air duct
4. Resonance chamber No.1
5. Air flow meter
6. Resonance chamber No.2
7. Air hose
8. Connectors
9. Water hoses
10. Vacuum hoses
11. Accelerator cable
12. Throttle body
13. PCV hose
14. Vacuum pipe assembly
15. Dynamic chamber
16. Gasket
17. Wiring harness
18. Delivery pipe assembly
19. Vacuum hoses
20. EGR pipe
21. Intake manifold bracket
22. Intake manifold
23. Gasket



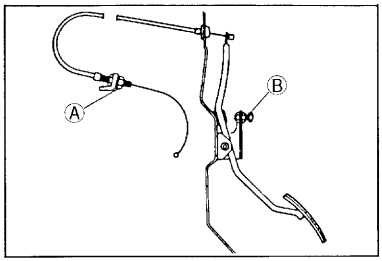
69G04A-059

PARTS INSPECTION

Air Cleaner Element

1. Check the condition of the air cleaner element.
2. Replace, if necessary.

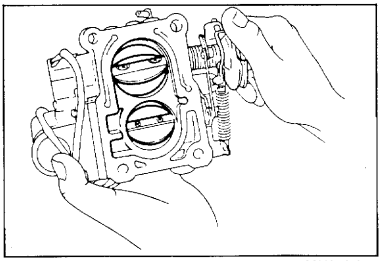
Caution
Do not use the compressed air to clean the air cleaner element.



86U04A-053

Accelerator Cable

1. Inspect the deflection of the cable. If the deflection 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.

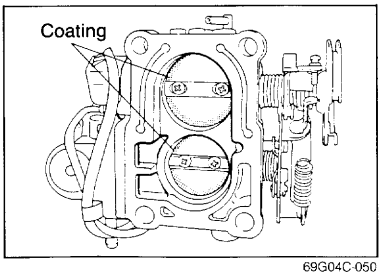


86U04A-054

Throttle Body

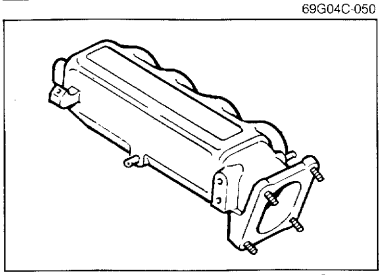
Note
The No. 2 throttle valve is preset at the factory to begin opening after the No. 1 throttle valve has opened approx. 25 degrees (MTX) or 10 degrees (ATX).

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

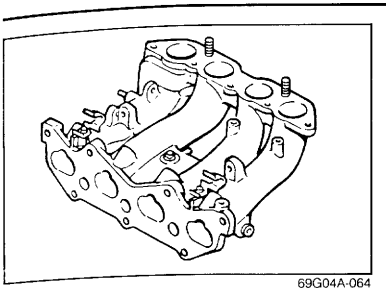
Caution
Do not remove the thin sealing coating from the throttle valve or bore.



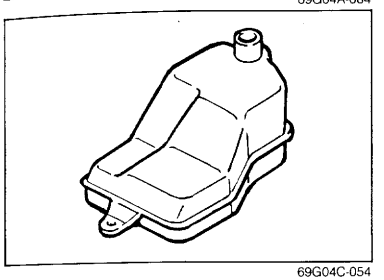
69G04A-062

Dynamic Chamber

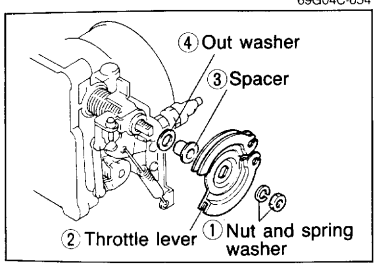
1. Visually check the dynamic chamber for damage.
2. Replace, if necessary.


69G04A-064

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


69G04C-054

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



69G04C-130

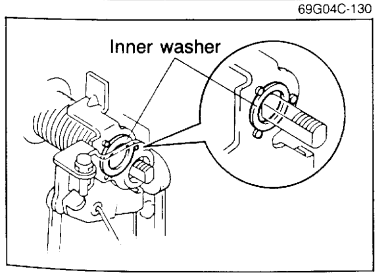
REPLACEMENT

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

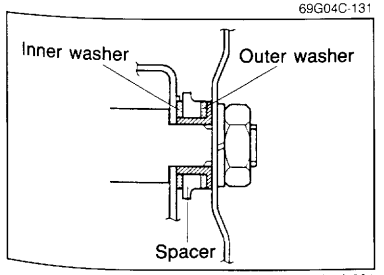
1. Check that the inner washer is in the proper position as shown in the figure.
2. Assemble the spacer and outer washer and install them onto the throttle shaft.
3. Install the throttle lever onto the throttle shaft.

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

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 4A—92)

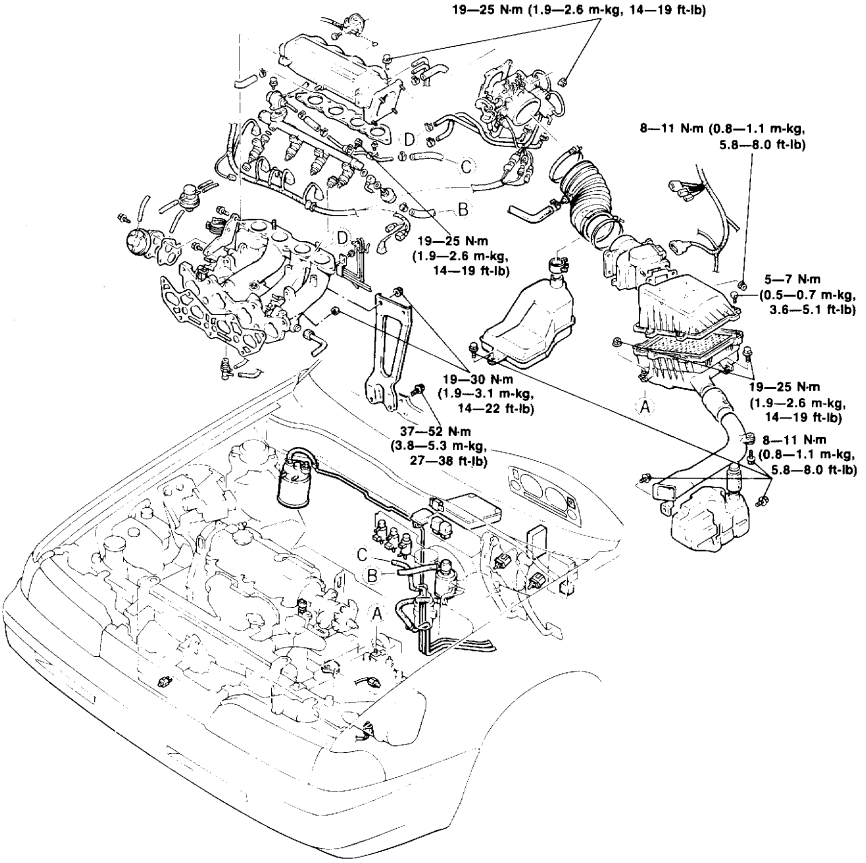


96U04A-024

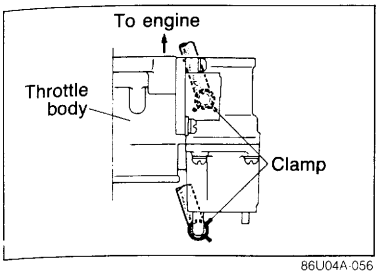
INSTALLATION

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

Torque Specification



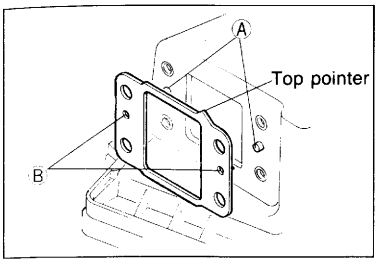
86U04A-055



86U04A-056

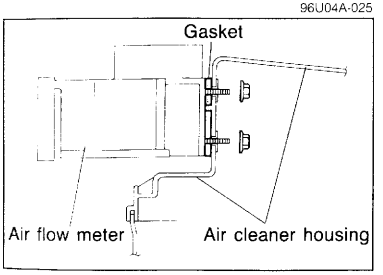
Installation Note
Water hose spring clamps
Face the clamp end as shown in the figure.

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



96U04A-025

Air flow meter
1. Mount the gasket onto the air cleaner housing, being sure that the holes Ⓑ are fit over pins Ⓐ.
2. Make sure the top pointer of the gasket faces upward.



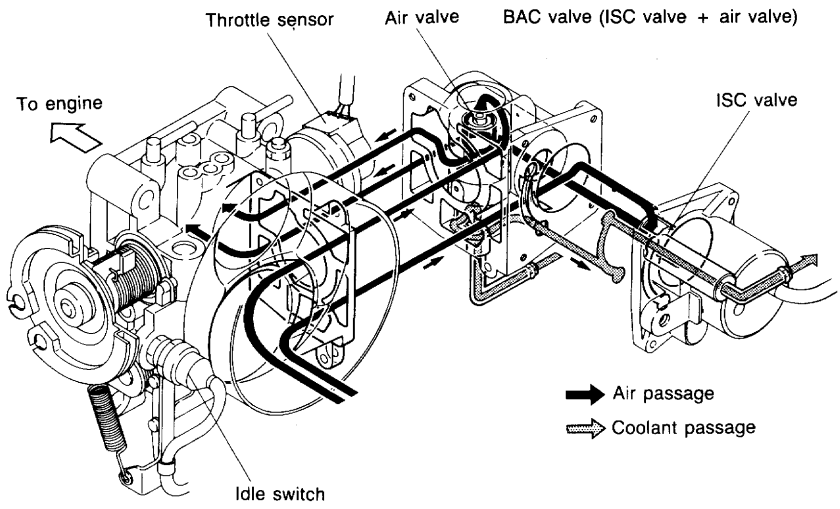
96U04A-026

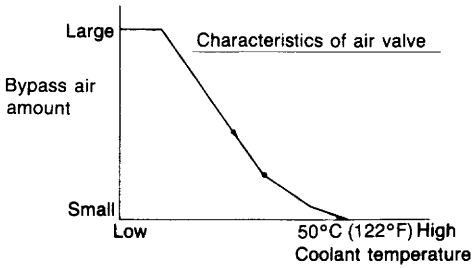
3. Install the air flow meter.

Torque specification:
8—11 N·m (0.8—1.1 m-kg, 5.8—8.0 ft-lb)

Caution
If nuts are tightened below specified torque, the nuts loosen and the loose of nuts may cause damage to the engine.

IDLE SPEED CONTROL (ISC) SYSTEM





86U04A-057

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 during cold engine conditions **(below 50°C (122°F))** and the ISC valve which works throughout the entire engine speed range.

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
Air valve	When cold, supplies bypass air into dynamic chamber	• Engine speed increased to shorten warm-up period • Thermo wax type • Installed in BAC valve	○	○
Clutch switch	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released	○	○
E/L control unit	Detects that E/L is being applied; sends signal to control unit		○	X
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 control unit	Installed on throttle body	○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Inhibitor switch	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range	○	○
Neutral switch	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear	○	○
P/S pressure switch	Detects P/S operation; sends signal to control unit	P/S: ON when steering wheel turned right or left	○	○
Solenoid valve (Idle speed control)	Controls bypass air amount	• Controlled by duty signal from control unit • With integrated air valve • Works idle-up	○	X
Test connector	For Self-Diagnosis Checker and idle speed adjustment	1-pin connector (Green)	○	X
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body	○	○

86U04A-058

TROUBLESHOOTING

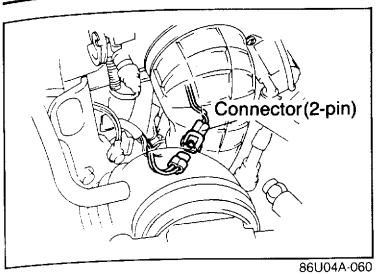
Check the condition of the wiring harness and connectors before checking the sensors or switch.

Note

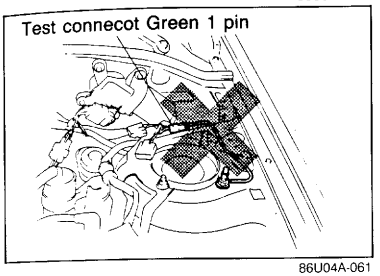
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4A—8 and 9.)

Symptom \ Possible cause / Page		Air valve	P/S pressure switch	Solenoid valve (Idle speed control)	Electrical load control unit	Engine control unit terminal			System inspection
						1K	1W	2Q	
		4A—39	4A—87	4A—39	4A—88	4A—83	4A—84	4A—85	4A—39
Engine stalls	While warming up	4		1			2	3	
	After warming up		2	1	3	5	4	6	
Rough idle	While warming up	5		2			3	4	1
	After warming up		3	2	4	6	5	7	1
High idle speed after warming up		8	3	2	4	6	5	7	1
Runs rough on deceleration				2			3	4	1
Afterburn in exhaust system		5		2			3	4	1
Fails emission test		5		2			3	4	1

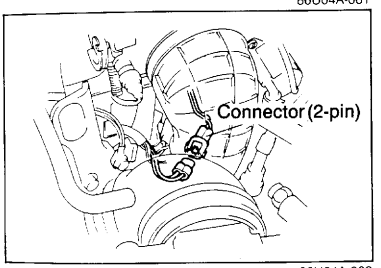
96U04A-027



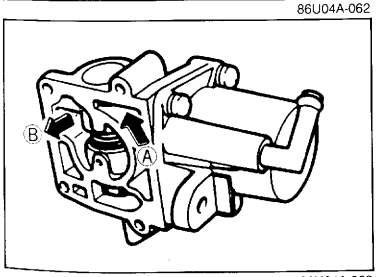
86U04A-060



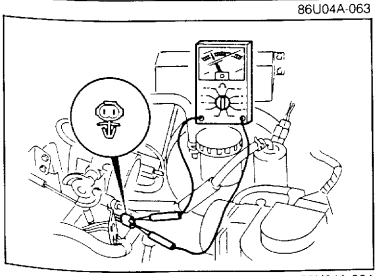
86U04A-061



86U04A-062



86U04A-063


86U04A-064

System Inspection
(Air valve)

1. Disconnect the ISC valve connector when the engine is cold and idling.
2. Note the engine speed and reconnect the connector.
3. Warm up the engine to the normal operating temperature and disconnect the connector again.
4. Check that the engine speed is lower when the connector is disconnected warm than when disconnected when it is cold.

(ISC valve)

5. Connect the ISC valve connector.

Note
Make sure that the test connector is not grounded and that the idle speed is set to specification.

6. Again disconnect the ISC valve connector with the engine is at normal operating temperature.
7. Check that the engine speed decreases.
8. Reconnect the ISC valve connector.

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.

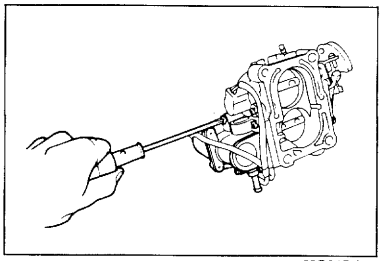
Note
Refer to "Installation" on this page for the BAC valve installation.

ISC valve

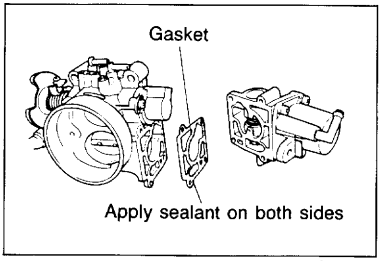
1. Disconnect the ISC valve connector.
2. Connect an ohmmeter to the terminals of the ISC valve.
3. Check the resistance.

Resistance (normal operating temperature):
6.3—9.9 Ω

4. If not correct, replace the BAC valve.



69G04C-070



69G04C-071

Removal

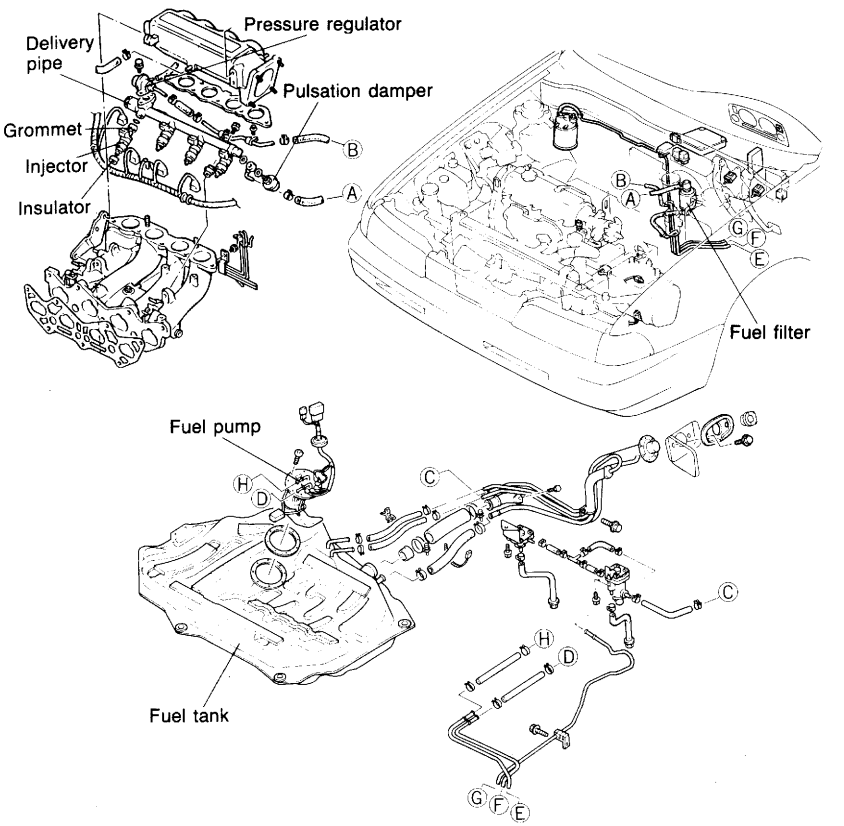
1. Remove the screws.
2. Remove the BAC valve from the throttle body.

Installation

Caution
Use 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



86U04A-065

This system supplies the fuel necessary 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 switch (incorporated in the air flow meter), and the circuit opening relay.
The fuel pump is mounted in the fuel tank to minimize the operating noise of the fuel pump. The injectors are directly supplied with battery voltage through the main relay. The connector of the injectors is blue to distinguish the injectors for the non-turbocharged engine from those of the turbocharged engine.

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
Air flow meter	Detects amount of intake air; sends signal to control unit	Intake air temp sensor and fuel pump switch are integrated	○	○
Atmospheric pressure sensor	Detects atmospheric pressure; sends signal to control unit		○	○
Circuit opening relay	Voltage for fuel pump while engine running		○	○
Clutch switch	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released	○	○
EC-AT control unit	Detects N or P range; sends signal to control unit		○	X
Engine control unit	Detects signals from input sensors and switches; controls injector operation		○	○
Fuel filter	Filters particles from fuel		○	○
Fuel pump	Provides fuel to injectors	• Operates while engine running • Installed in fuel tank	○	○
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body	○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Ignition switch (ST position)	Sends engine cranking signal to control unit		○	○
Inhibitor switch	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range	○	○
Injector	Injects fuel into intake port	• Controlled by signals from control unit • High-ohmic injector	○	○
Intake air thermo sensor	Detects intake air temperature; sends signal to control unit	Installed in air flow meter	○	○
Main relay	Supplies electric current to injectors and control unit		○	○
Neutral switch	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear	○	○
Oxygen sensor	Detects Oxygen concentration; sends signal to control unit	Zirconia ceramic and platinum coating	○	○
Pressure regulator	Adjusts fuel pressure supplied to injectors		○	○
Pulsation damper	Absorbs fuel pulsation		○	○
Speedometer	Detects vehicle speed; sends signal to control unit	ON: Above 113 mph (180 km/h)	○	X
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body	○	○
Water thermo sensor	Detects coolant temperature; sends signal to control unit		○	○
Water thermo switch	Detects radiator coolant temperature; sends signal to control unit	ON: above 17°C (63°F)	○	○

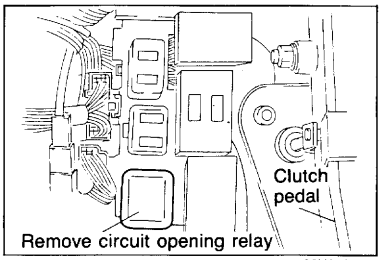
86U04A-066

TROUBLESHOOTING

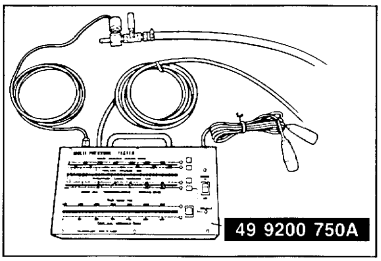
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Symptom \ Possible cause / Page		Air flow meter	Atmospheric pressure sensor	Oxygen sensor	Throttle sensor	Water thermo sensor	Water thermo switch	Fuel pump	Injector	Fuel pressure	Engine control unit terminal	
											3C 3E	3B
		4A—89	4A—94	4A—93	4A—90	4A—92	4A—93	4A—47	4A—48	4A—46	4A—85	4A—85
Hard start or won't start (Cranks OK)			5			4		1	3			2
Engine stalls	While warming up	4				3			2	1	5	
	After warming up	1							3	2	4	
Rough idle	While warming up	4				3			2	1		
	After warming up	1	2						4	3		
Poor acceleration, hesitation, or lack of power		1			3				4	2		
Runs rough on deceleration		1							2			
Afterburn on deceleration		1							2			
Poor fuel consumption		5	6	4		3			2	1		
Fails emission test				1			2					
Engine stalls or rough after hot starting		1							3	2		

96U04A-028



86U04A-068



86U04A-069

FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

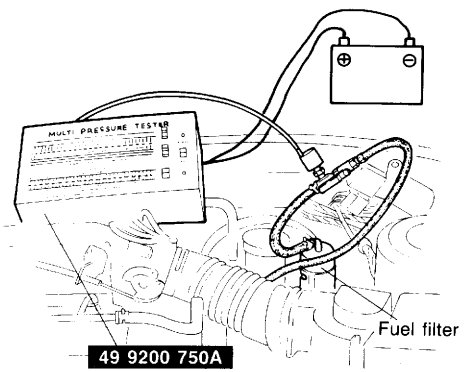
Fuel in the fuel system remains under high pressure even when the engine is not running.

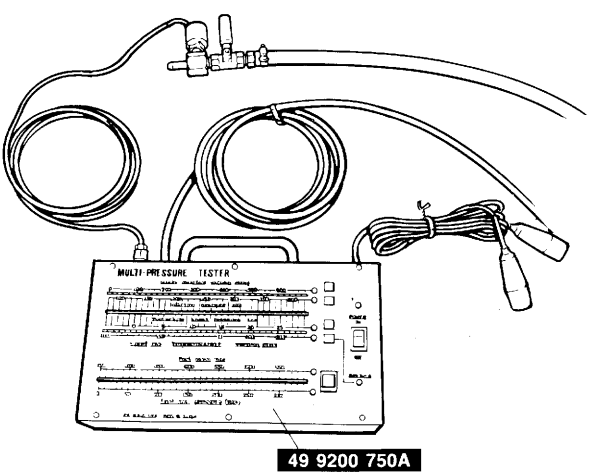
a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
   1. Start the engine.
   2. Disconnect the circuit opening relay.
   3. After the engine stalls, turn OFF the ignition switch.
   4. Reconnect the circuit opening relay.

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**.

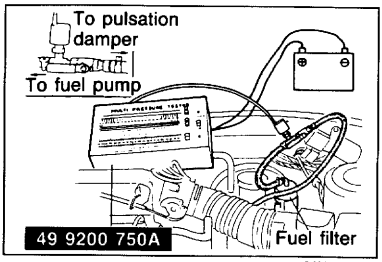
MULTI-PRESSURE TESTER (49 9200 750A)





69G04A-099

The **MULTI-PRESSURE TESTER** (49 9200 750A) has been developed to check the fuel pressure and intake manifold vacuum. These can easily be inspected by setting the buttons on the tester.



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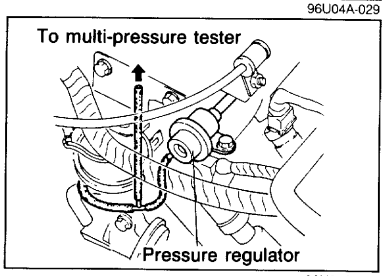

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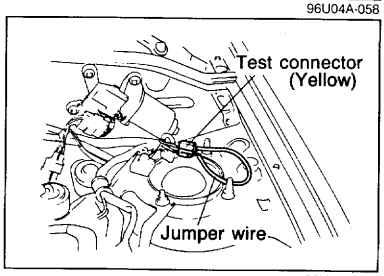
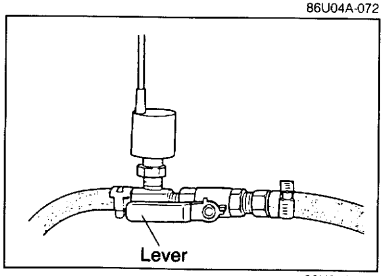


86U04A-072



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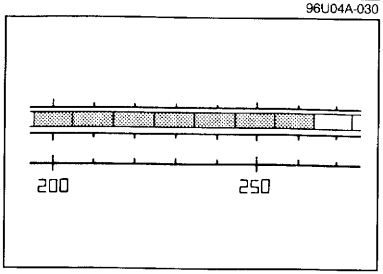


86U04A-074

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 4A—44.)

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

Caution
Do not reverse the adapter connection.

4. Disconnect the vacuum hose from the pressure regulator and connect the **SST** 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.

FUEL PRESSURE

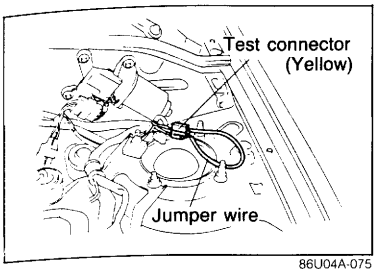
Note
a) When inspecting fuel pressure, use the SST. (Refer to page 4A—46).
b) Warm up the engine to normal operating temperature.

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

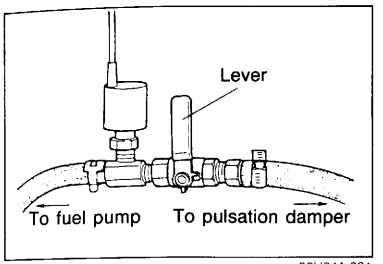
2. Run the engine and measure the injection pressure at various speeds.

Injection pressure:
Approx. 235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

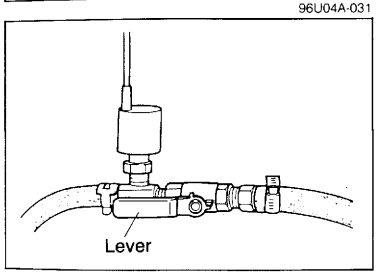
3. If not within specification, check the fuel pump pressure and fuel line pressure.



86U04A-075



96U04A-031



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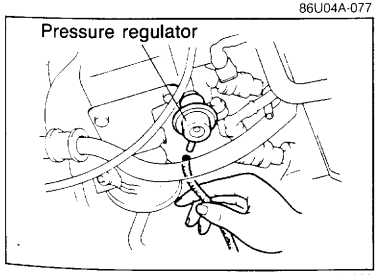
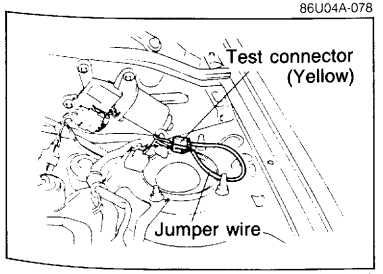


86U04A-078



86U04A-079

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/cm^2, 64—85 psi)

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

No pressure
•Fuel pump operation (Refer to page 4A—47.)
Low pressure
•Fuel pump feeding capacity (Refer to page 4A—48.)
High pressure
•Replace the fuel pump

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

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/cm^2, 27—33 psi)

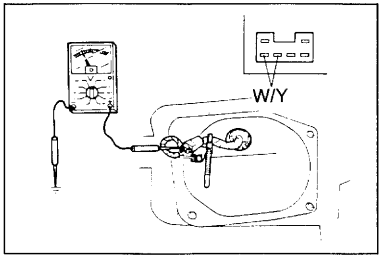
4. If not within specification, check the vacuum hose.
5. Disconnect the vacuum hose from pressure regulator, and place a finger over the end of the hose.
6. Check the fuel line pressure.

Fuel line pressure:
235—275 kPa (2.4—2.8 kg/cm^2, 34—40 psi)

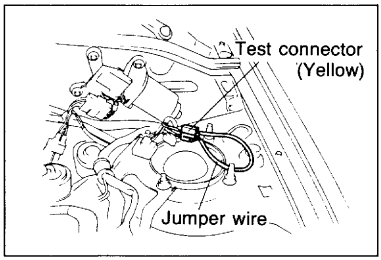
7. If not within specification, replace the pressure regulator.
8. Connect the vacuum hose to pressure regulator.

FUEL PUMP
Operation Test

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



96U04A-032



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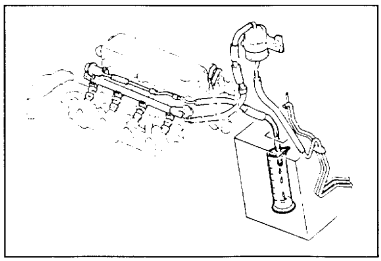

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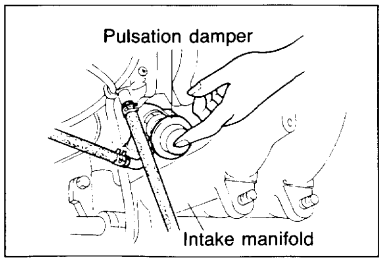

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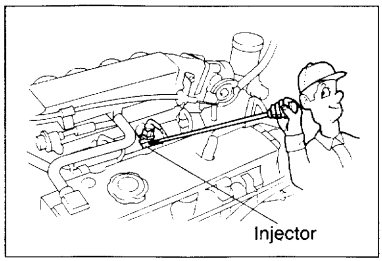


86U04A-084

6. If no sound is heard, check the voltage at the fuel pump connector (W/Y wire and a ground).

Voltage: 12V

7. If the voltage is normal, replace the fuel pump.
8. If not correct, check the circuit opening relay (Refer to page 4A—80) and its circuits.
9. Disconnect the jumper wire.

Volume Test

Warning
Before performing following procedures, release the fuel pressure to reduce the possibility of injury or fire. (Refer to page 4A—44)

1. Connect a jumper wire to test connector (Yellow).
2. Disconnect the fuel return hose from fuel return pipe.
3. Turn the ignition switch ON for 10 seconds, and check the feeding capacity with graduated cylinder.

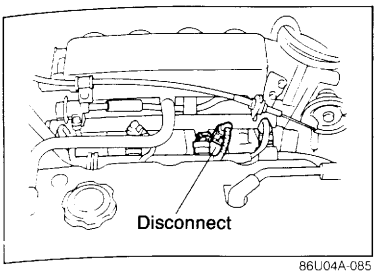
Feeding capacity: 220 cc (13.4 cu in) min/10 sec.

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

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.

INJECTOR
On-vehicle Inspection
Engine does not start
Perform "Quick Inspection for Electrical Signal" below.

Engine runs
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.



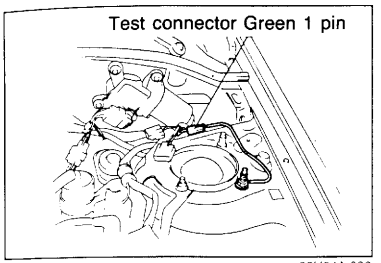
86U04A-085

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

No operating sound and no speed drop
Perform "Quick Inspection for Electrical Signal" below.
No speed drop only
Injector resistance
Injection volume of injector

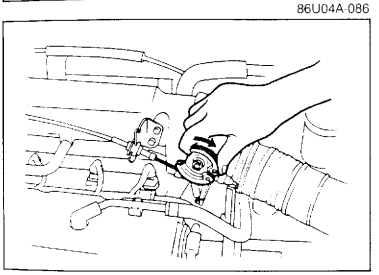
Quick Inspection for Electrical Signal

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



86U04A-086

2. Turn the ignition switch ON.
3. Open the throttle valve and check for a "click" at the injector with a screwdriver or sound scope as it is opened.
4. If nothing is heard, check the injector wiring circuit.
5. If nothing is heard at all injectors, check the main relay (Refer to page 4A—78) and circuit.



96U04A-034

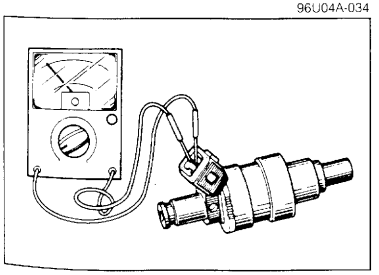
Inspection

There are 3 inspections which must be performed for the injectors.

Resistance

1. Remove the injectors from the engine. (Refer to page 4A—54.)
2. Check the resistance of each injector with an ohmmeter.
3. If not correct, replace the injector.

Resistance: 12—16 Ω

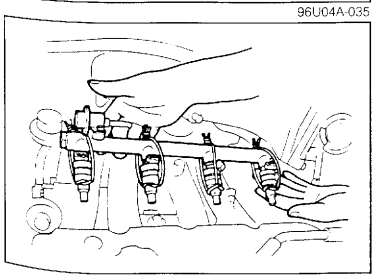


96U04A-035

Fuel leakage test and volume test

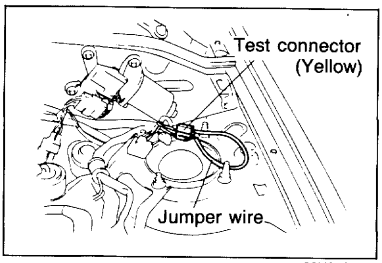
1. Lift the dynamic chamber upward.
2. Remove the injectors and delivery pipe. (Refer to pages 4A—54 and 56.)
3. Affix the injectors to the delivery pipe with wire.

Caution
Affix the injectors firmly to the delivery pipe so that no movement of the injectors is possible.

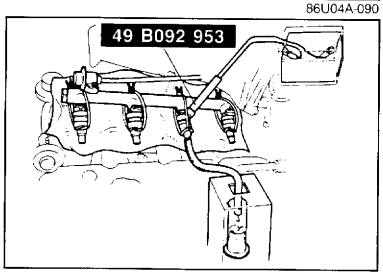


96U04A-036

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



86U04A-090



86U04A-091

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

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

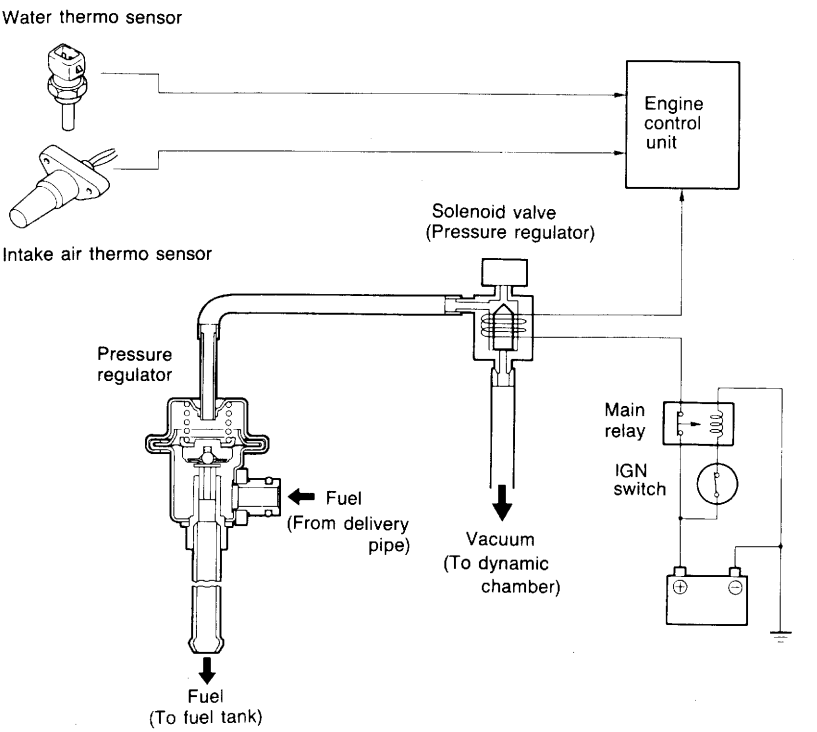
6. Connect the **SST** to the battery and injector.
7. Check the injection volume with a graduated container.

Injection volume:
Approx. 44—61 cc (2.68—3.72 cu in) /15 sec.

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

8. If not correct, replace the injectors.

PRESSURE REGULATOR CONTROL SYSTEM



86U04A-092

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 20°C (68°F)

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Pressure regulator control)		○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Ignition switch (ST position)	Sends engine cranking signal to control unit		○	○
Intake air thermo sensor	Detects intake air temperature; sends signal to control unit	Installed in air flow meter	○	○
Pressure regulator	Adjusts fuel pressure supplied to injectors		○	○
Solenoid valve (Pressure regulator control)	Controls vacuum line to pressure regulator	Closes vacuum line when hot	○	○
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body	○	○
Water thermo sensor	Detects coolant temperature; sends signal to control unit		○	○

86U04A-093

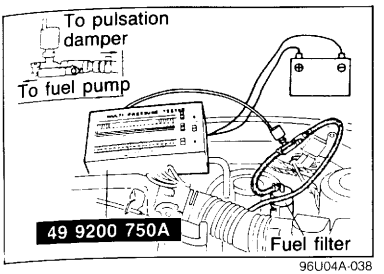
TROUBLESHOOTING

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

Note
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4A—8 and 9.)

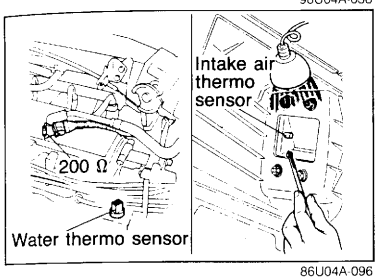
Possible cause / Page / Sympton	Solenoid valve (Pressure regulator control)	Water thermo sensor	Intake air thermo sensor	Throttle sensor	Engine control unit terminal	System inspection
					2K	
	4A—53	4A—92	4A—89	4A—90	4A—84	4A—53
Engine stalls or rough after hot starting	2	3	4	5	6	1

96U04A-037



96U04A-038

System Inspection
1. Connect the **SST** to the engine. (Refer to page 4A—46.)
2. Start the engine.



86U04A-096

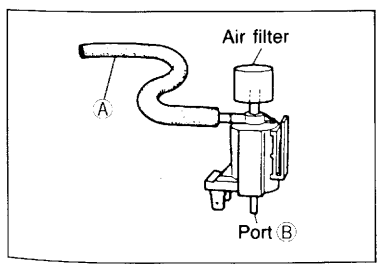
3. Warm up the engine to normal operating temperature and stop the engine.

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. Lift the air cleaner upper cover assembly.
6. Heat the intake air thermo sensor to **above 30°C (86°F)**.
7. Restart the engine.
8. Check the fuel line pressure and operating times as shown in the chart.

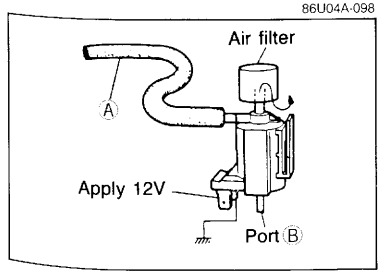
Operating time	Fuel line pressure kPa (kg/cm², psi)
After starting: for 120 sec.	235—275 (2.4—2.8, 34—40)
After 120 sec.	186—226 (1.9—2.3, 27—33)

86U04A-097



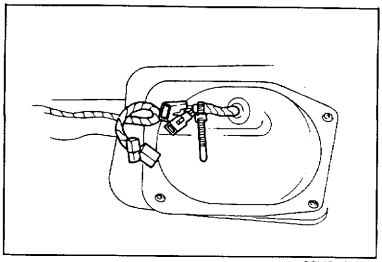
86U04A-098

Solenoid Valve (Pressure Regulator Control) Inspection
1. Disconnect the vacuum hose from the solenoid valve and vacuum pipe.
2. Blow through the solenoid valve from vacuum hose A.
3. Check that air flows from port B.

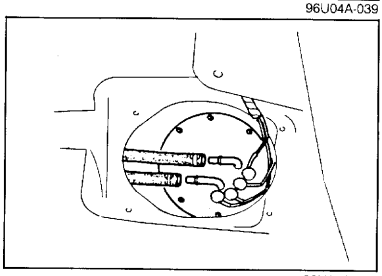


86U04A-099

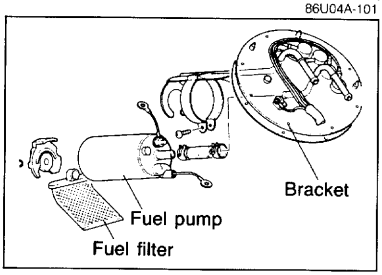
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from the vacuum hose A.
7. Check that air flows from the valve air filter.



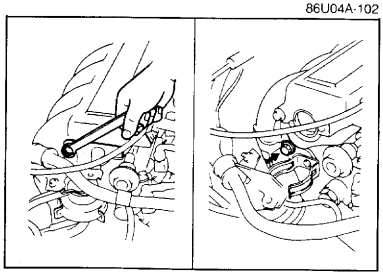
96U04A-039



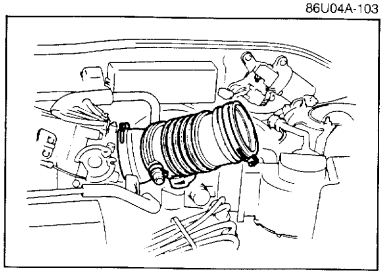
86U04A-101



86U04A-102



86U04A-103



86U04A-104

REPLACEMENT

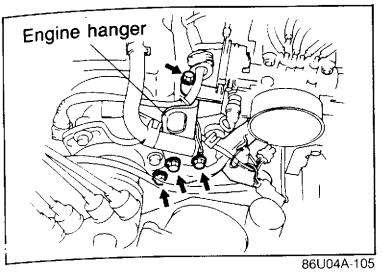
Caution
a) Before performing the following procedure, release the fuel pressure from the fuel system to reduce the possibility of injury or fire (Refer to page 4A—44).
b) When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.

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 securely.

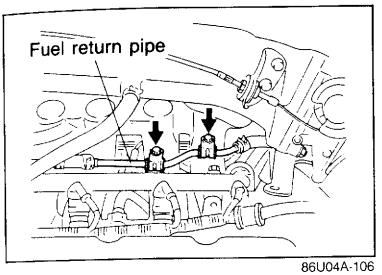
6. Install in the reverse order of removal.

Injector
1. Remove the wiring harness bracket.
2. Remove the EGR modulator valve bracket.
3. Disconnect the vacuum pipe mounting bolts.
4. Disconnect the air hose from the throttle body.



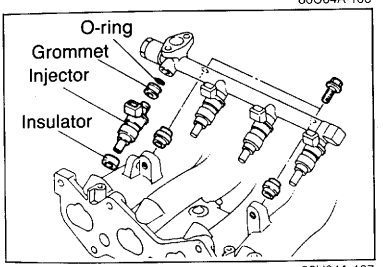
86U04A-105

5. Remove the engine hanger.
6. Remove the dynamic chamber mounting bolts and nuts.



86U04A-106

7. Lift the dynamic chamber.
8. Disconnect the fuel return pipe bracket from the intake manifold.
9. Disconnect the injector connectors.
10. Remove the delivery pipe along with the pressure regulator and pulsation damper.

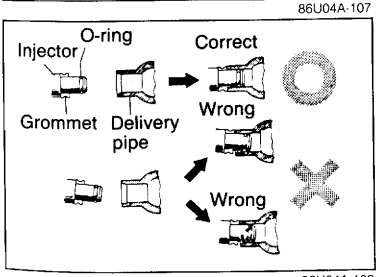


86U04A-107

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

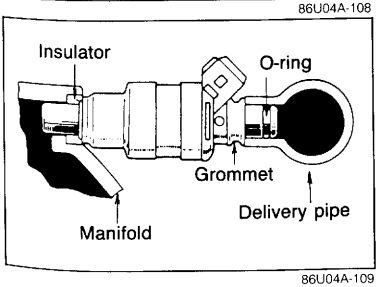
Tightening torque:

Delivery pipe	**19—25 N·m**
Dynamic chamber	**(1.9—2.6 m-kg, 14—19 ft-lb)**
Engine hanger	



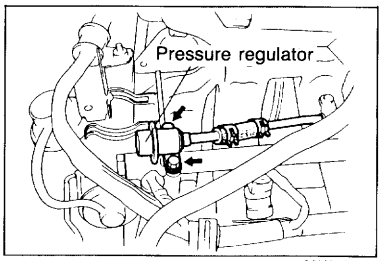
86U04A-108

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

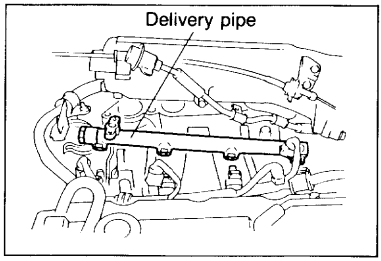


86U04A-109

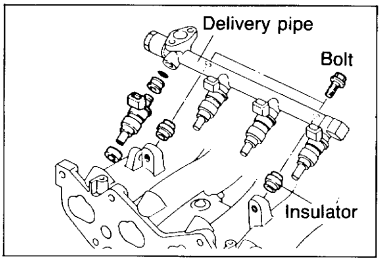
3. Install the injectors and the injector insulators.



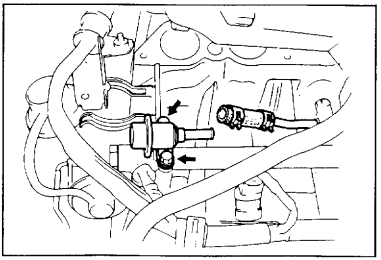
96U04A-040

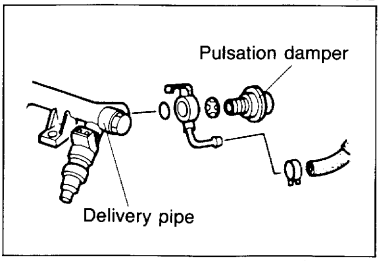


86U04A-111



96U04A-041


96U04A-042



96U04A-043

Delivery Pipe

1. Perform steps 1 to 7 of removal procedure for injectors. (Refer to page 4A—54.)
2. Remove the pulsation damper, pressure regulator, and injectors.
3. Replace the delivery pipe.
4. Install in the reverse order of removal, referring to installation note.

Tightening torque:

Pressure regulator	**8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)**
Delivery pipe	**19—25 N·m**
Engine hanger	**(1.9—2.6 m-kg, 14—19 ft-lb)**
Dynamic chamber	

Installation note

Insulator

Install the insulators between the intake manifold and delivery pipe.

Injector

Refer to page 4A—55.

Pressure Regulator

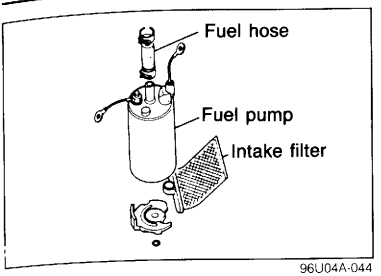
1. Perform steps 1 to 8 of removal procedure for the injector. (Refer to page 4A—54.)
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the pressure regulator.
4. Install in the reverse order of removal.

Tightening torque:

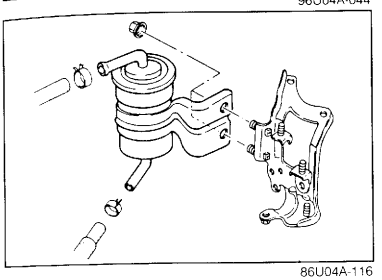
8—11 N·m (0.8—1.1 m-kg, 69—95 in-lb)

Pulsation Damper

1. Perform steps 1 to 7 of removal procedure for the injectors. (Refer to page 4A—54.)
2. Remove the pulsation damper.
3. Install in the reverse order of removal.



96U04A-044



86U04A-116

Fuel Filter
Low pressure side
Refer to page 4A—54.

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.

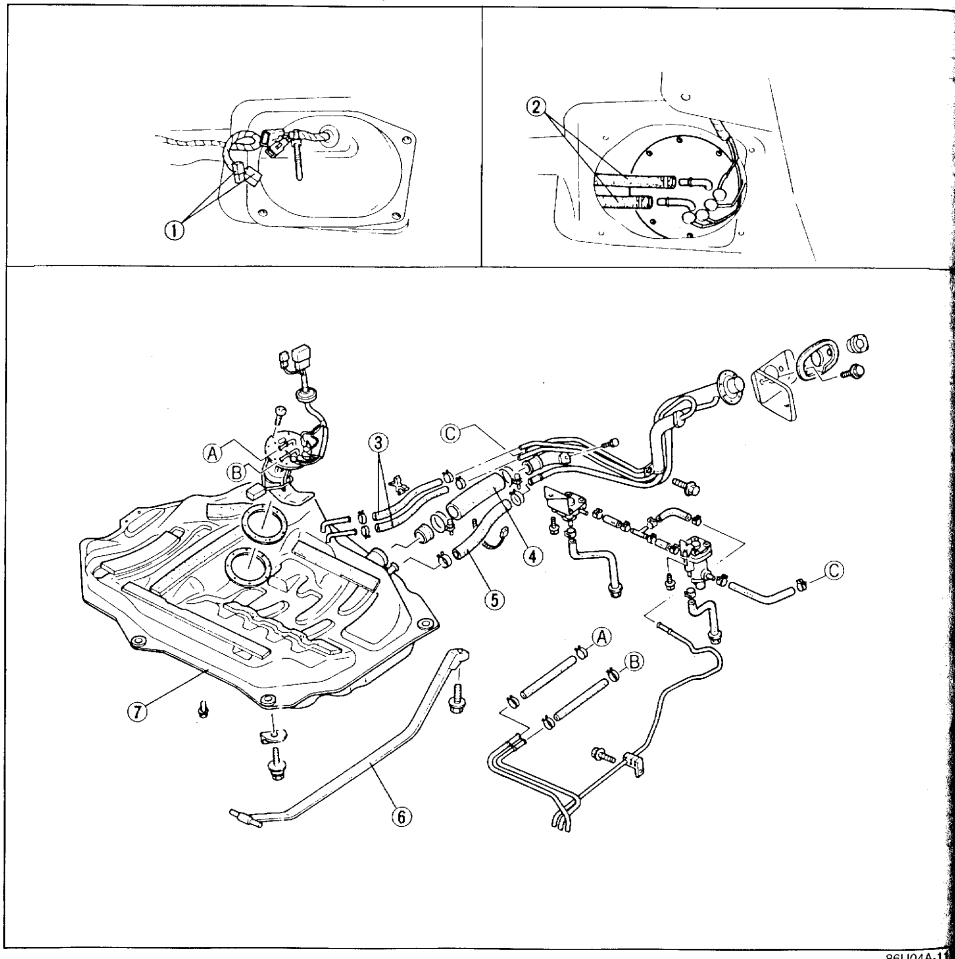
1. Disconnect the fuel hoses from the fuel filter.
2. Remove the fuel filter and the bracket.
3. Install a new filter and the bracket.
4. Connect the fuel hoses.

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

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 4A—44)
b) When removing the fuel tank, keep sparks, cigarettes, and open flames away from the fuel tank

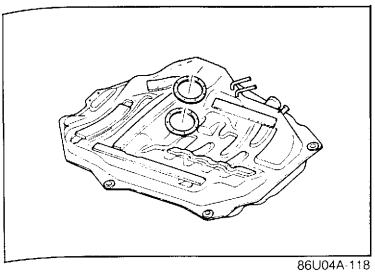
Remove in the sequence shown in the figure.



86U04A-11

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

1. Fuel pump connectors
2. Fuel hoses
3. Evaporative hoses
4. Fuel filler hose
5. Breather hose
6. Fuel tank strap
7. Fuel tank



86U04A-118

Inspection

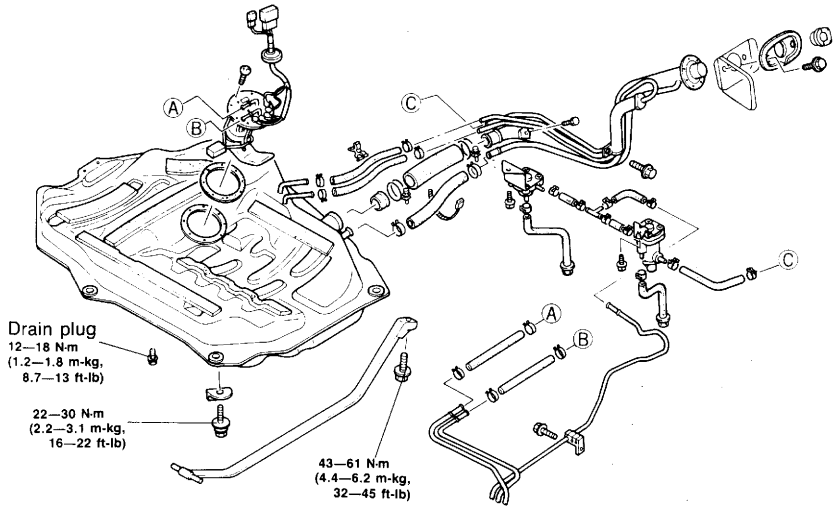
1. Check the fuel tank for cracks and corrosion.
2. If any defect is found, repair or replace the tank.

Warning
Before repairing, clean the fuel tank thoroughly with steam to sufficiently remove all explosive gas.

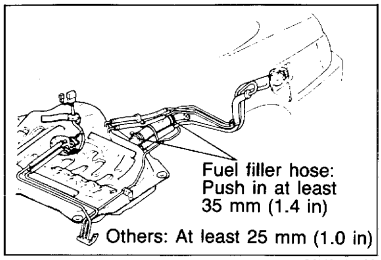
Installation

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

Torque Specifications



86U04A-119

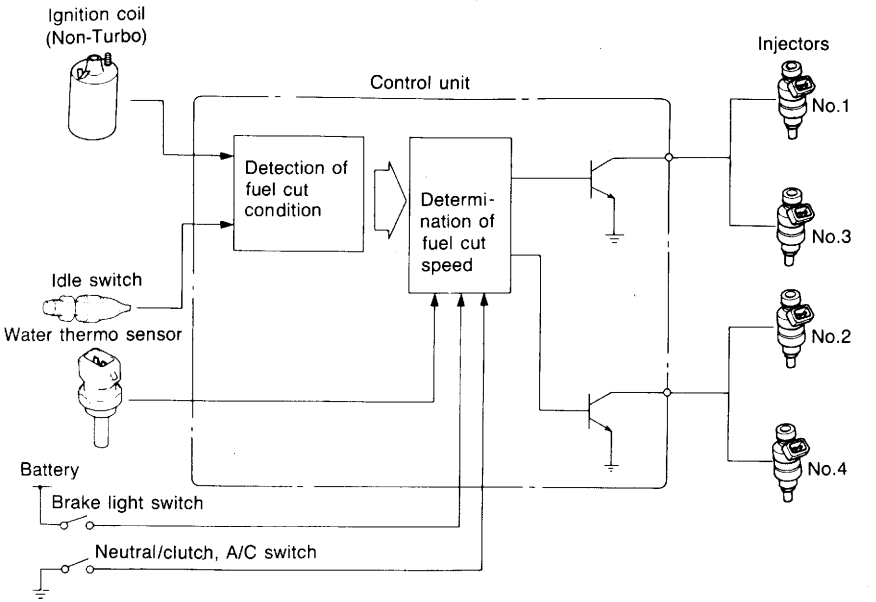


86U04A-120

Installation note

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

DECELERATION CONTROL SYSTEM



86U04A-121

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

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
Brake light switch	Detects braking operation (deceleration); sends signal to control unit		○	○
Clutch switch	Detects in-gear condition; sends signal to control unit	Switch ON when clutch pedal released	○	○
EC-AT control unit	Detects N or P range; sends signal to control unit		○	X
Engine control unit	Detects signals from input sensors and switches; cuts fuel injection		○	○
Idle switch	Detects when throttle valve fully closed; sends signal to control unit	Installed on throttle body	○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Inhibitor switch	Detects in-gear condition; sends signal to EC-AT control unit	Switch ON in "N" or "P" range	○	○
Neutral switch	Detects in-gear condition; sends signal to control unit	Switch ON when in-gear	○	○
Water thermo sensor	Detects coolant temperature; sends signal to control unit		○	○

86U04A-122

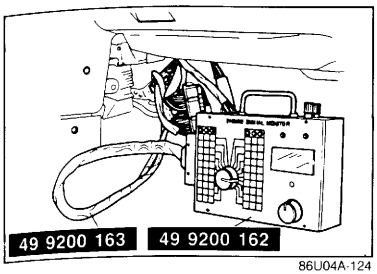
TROUBLESHOOTING

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

Note
Make the system inspection first. If no problem is found, continue with the next system inspe tion of the Troubleshooting Guide. (Refer to page 4A—8 and 9.)

Possible cause	Water thermo sensor	System inspection
Page	**4A—92**	**4A—63**
Checking order	2	1

96U04A-045

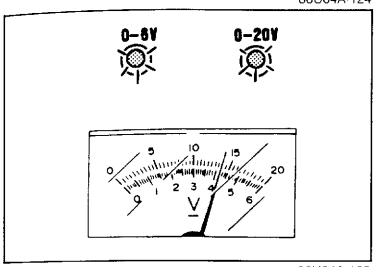


86U04A-124

System Inspection (Electrical Signal)

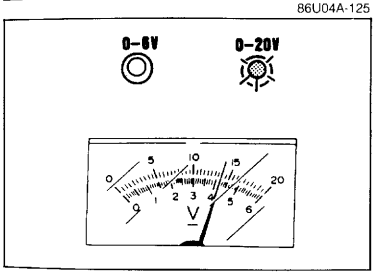
1. Connect the **SST** between the wiring harness and control unit.
2. Set 3C or 3E position on the **SST**.

Note
3C — For No. 2 and No. 4 injectors
3E — For No. 1 and No. 3 injectors



86U04A-125

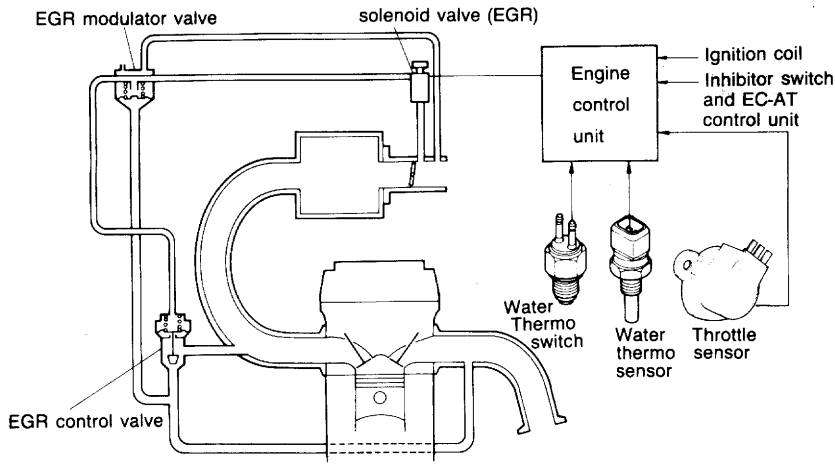
3. Check that the indicator lamps alternately flash at idle.



86U04A-126

4. Increase the engine speed to **4,000 rpm**, then suddenly decrease the engine speed.
5. Check that the red indicator lamp stays illuminated during deceleration.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM



86U04A-12

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

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
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)		○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Solenoid valve (EGR)	Controls vacuum line to EGR control valve		○	○
Throttle sensor	Detects throttle valve opening angle; sends signal to control unit	Installed on throttle body	○	○
Water thermo sensor	Detects coolant temperature; sends signal to control unit		○	○
Water thermo switch	Detects radiator coolant temperature; sends signal to control unit	ON: above 17°C (63°F)	○	○

86U04A-128

TROUBLESHOOTING

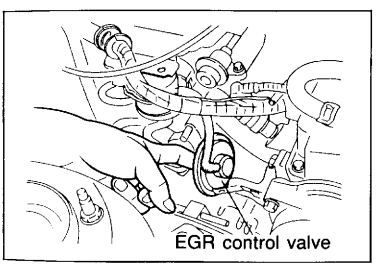
Check the condition of the wiring harness and connectors before checking the sensors or switches.

Note

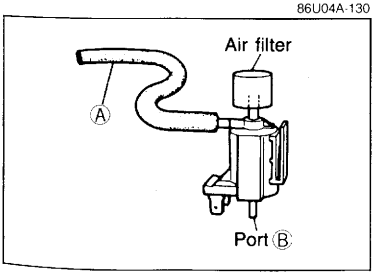
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4A—8 and 9.)

Possible cause	Solenoid valve (EGR)	EGR modulator valve	EGR control valve	Water thermo sensor	Water thermo switch	Engine control unit terminal		System inspection
						1H	2N	
Page	4A—65	4A—66	4A—66	4A—92	4A—93	4A—83	4A—85	4A—65
Checking order	3	2	4	6	5	7	8	1

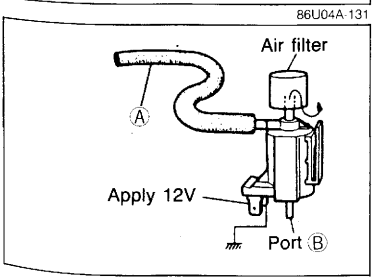
96U04A-046



86U04A-130



86U04A-131



86U04A-132

System Inspection

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

Warning

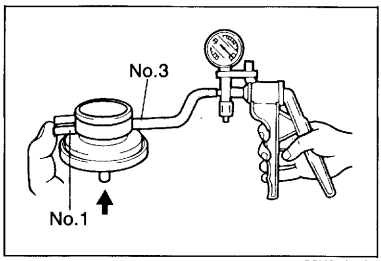
Be careful when checking the EGR control valve because the surrounding area is very hot.

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

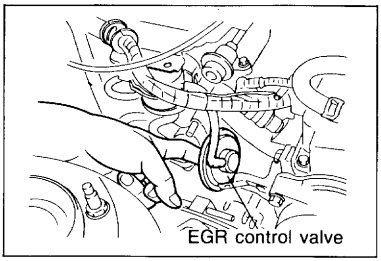
Solenoid Valve (EGR)

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

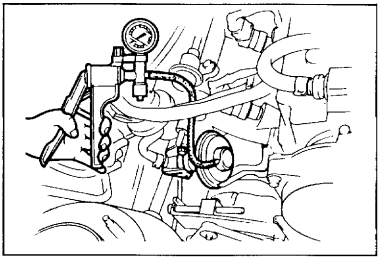
4. Disconnect the solenoid valve connector.
5. Connect 12V and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from vacuum hose A.
7. Check that air flows from the valve air filter.



86U04A-133



86U04A-134



86U04A-135

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.

EGR Control Valve

1. Manually actuate the valve by pushing on the diaphragm with finger.
2. Check that the spring resistance is present and the diaphragm moves freely with no sticking or binding.

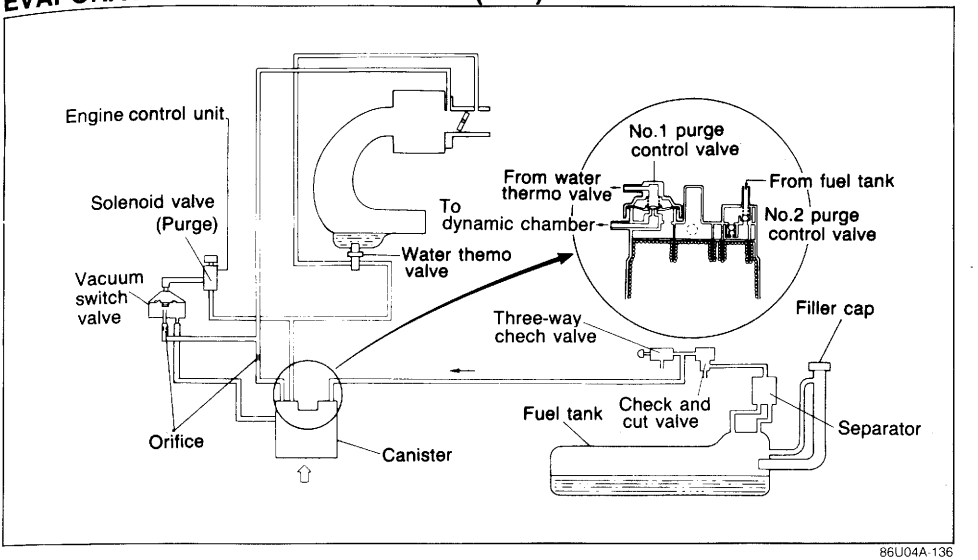
Note
Before replacing the EGR control valve, check the intake air and control systems.

3. Warm up the engine and run it at idle.
4. Connect a vacuum pump to the valve and apply vacuum.
5. Check that the engine runs roughly or stalls at more than the specified vacuum.

Specification: 40—60 mmHg (1.6—2.4 inHg)

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

EVAPORATIVE EMISSION CONTROL (EEC) SYSTEM



86U04A-136

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.

COMPONENT DESCRIPTIONS

Component	Function	Remarks	Application	
			New model	Previous model
Air flow meter	Detects amount of intake air; sends signal to control unit	Intake air temp sensor and fuel pump switch are integrated	○	○
Charcoal canister	Stores gas tank fumes when engine stopped		○	○
Check and cut valve	Releases excessive pressure or vacuum in fuel tank to atmosphere		○	X
Engine control unit	Detects signals from input sensors and switches; controls solenoid valve (Purge control)		○	○
Ignition coil (–) terminal	Detects engine speed; sends signal to control unit		○	○
Separator	Prevents fuel from flowing into charcoal canister		○	X
Solenoid valve (Purge control)	Controls vacuum line to vacuum switch valve		○	○
Three-way check valve	Controls pressure in fuel tank		○	○
Vacuum switch valve	Regulates evaporative fumes from canister to intake manifold		○	○
Water thermo sensor	Detects coolant temperature; sends signal to control unit		○	○
Water thermo valve	Controls vacuum applied to No.1 purge control valve and solenoid valve (Purge)	Opens vacuum line above 54°C (129°F)	○	○

86U04A-137

TROUBLESHOOTING

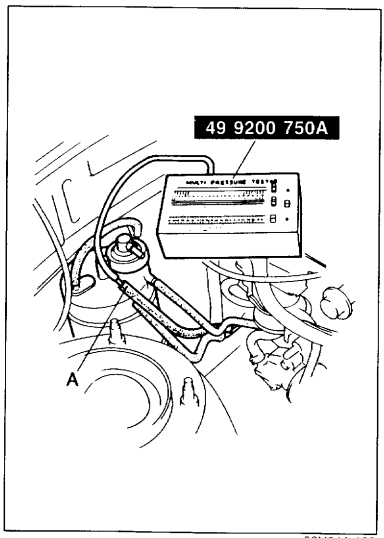
Check the condition of the wiring harness or connectors before checking the sensors or switches.

Note

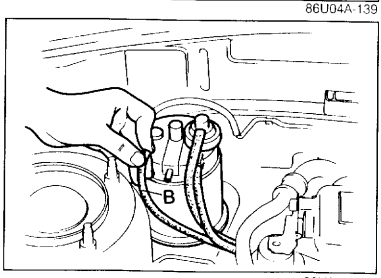
Make the system inspection first. If no problem is found, continue with the next system inspection of the Troubleshooting Guide. (Refer to pages 4A—8 and 9.)

Possible cause	Vacuum switch valve	Solenoid valve (Purge control)	Three-way check valve	Check and cut valve	Separator	No.1 purge valve	No.2 purge valve	Water thermo valve	Water thermo sensor	Engine control unit terminal 2P	System inspection
Page	4A—69	4A—70	4A—70	4A—71	4A—71	4A—69	4A—69	4A—70	4A—92	4A—85	4A—68
Checking order	3	2	9	10	11	4	5	6	7	8	1

96U04A-046



86U04A-139



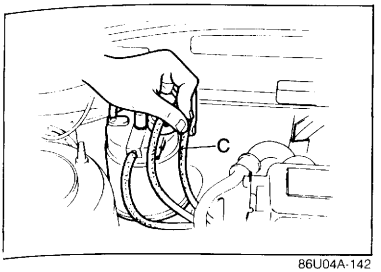
86U04A-141

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.

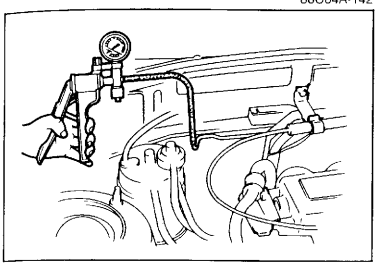
86U04A-140

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 water thermo valve.
7. Reconnect hose A to No. 1 purge control valve.
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 1,500 rpm**.
10. Reconnect hose B to the canister.

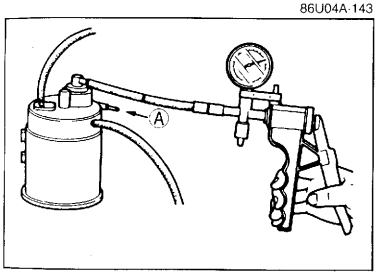


86U04A-142

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


86U04A-143

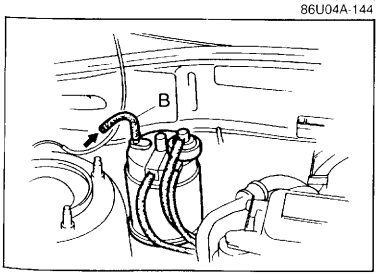
14. Disconnect the evaporation hose from the evaporation pipe.
15. Connect the vacuum pump to the evaporation pipe.
16. Operate the vacuum pump and verify that no vacuum is held.
17. If vacuum is held, check the evaporation pipe for clogging.



86U04A-144

No. 1 Purge Control Valve

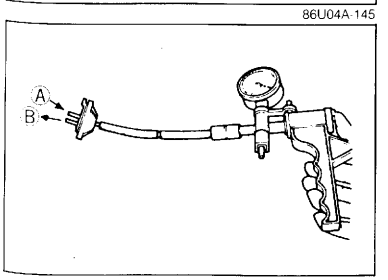
1. Blow through the purge control valve from port A and check that air does not flow.
2. Connect a vacuum pump to the purge control valve.
3. Apply **110 mmHg (4.33 inHg)** vacuum, and blow through port A again; air should flow.



86U04A-145

No. 2 Purge Control Valve

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

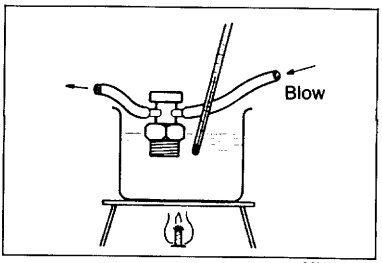


86U04A-146

Vacuum Switch Valve

1. Remove 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.

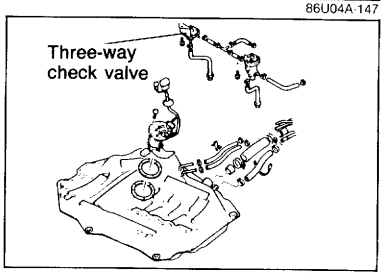
Specified vacuum: 66—106 mmHg (2.6—4.2 inHg)



86U04A-147

Water Thermo Valve

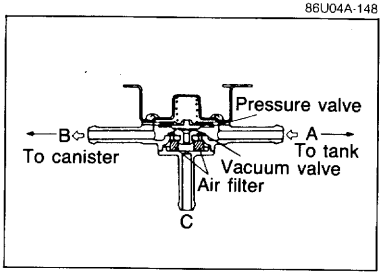
1. Remove the water thermo valve.
2. Immerse the valve in a water-filled container.
3. Heat the water gradually and observe the temperature.
4. Blow through the valve from one vacuum port and verify that air comes out of the other port at **46—54°C (115—129°F)**.



86U04A-148

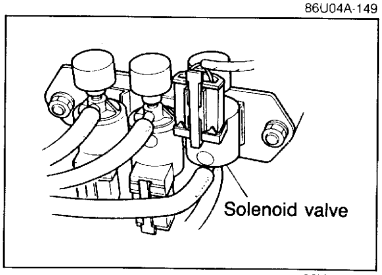
Three-Way Check Valve

1. Remove the check valve.



86U04A-149

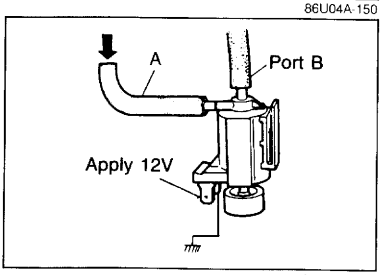
2. Blow through the valve from port A, and check that air comes out of port B.
   Next, block port B and check that air comes out of port C.
3. Block port B.
4. Connect a vacuum pump to port A and verify that no vacuum is held.



86U04A-150

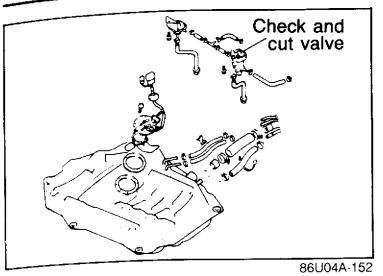
Solenoid Valve (Purge)

1. Remove the solenoid valve.

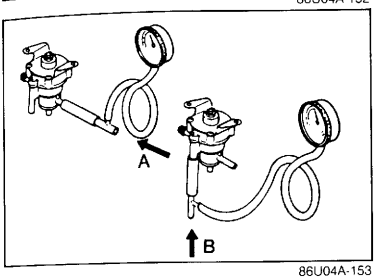


86U04A-151

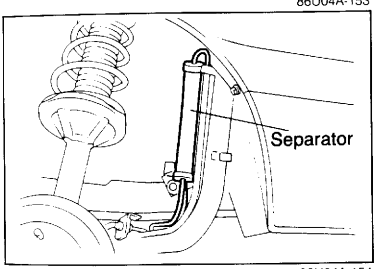
2. Connect vacuum hoses to the valve as shown in the figure.
3. Blow air through the valve from hose A and check that air comes out of the valve air filter.
4. Apply 12V and ground the solenoid valve with jumper wires.
5. Blow air through the valve from hose A and check that the air comes out of port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



86U04A-152



86U04A-153



86U04A-154

Check and Cut Valve

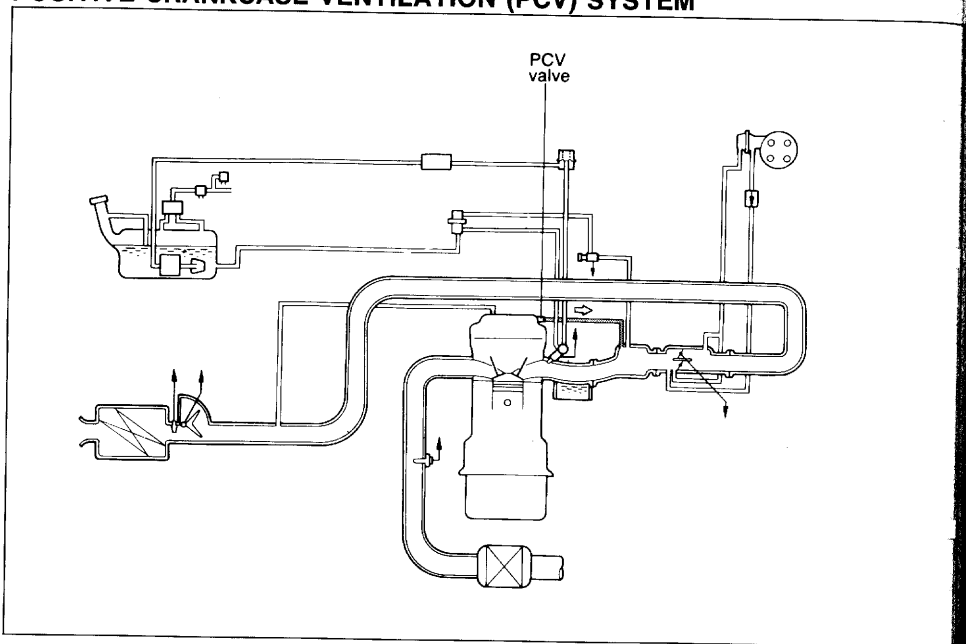
1. Remove the check and cut valve.
2. Connect a pressure gauge to the passage that normally is connected to the fuel tank.
3. Blow through the valve from port A. Verify that the valve opens at **5.39—6.87 kPa (0.055—0.07 kg/cm^2, 0.78—1.00 psi)**.
4. Remove the pressure gauge and connect it to the passage to atmosphere.
5. Blow through the valve from port B. Verify that the valve opens at **0.98—4.91 kPa (0.01—0.05 kg/cm^2, 0.14—0.71 psi)**.

Note
The test must be performed with the valve horizontal. Otherwise, the ball in the valve will move out of position and close the passage.

Separator

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

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

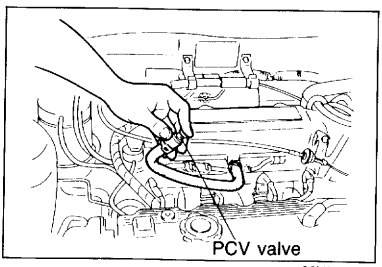


86U04A-15

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	Remarks	Application	
			New model	Previous model
PCV valve	Controls blowby gas amount pulled into engine		○	○

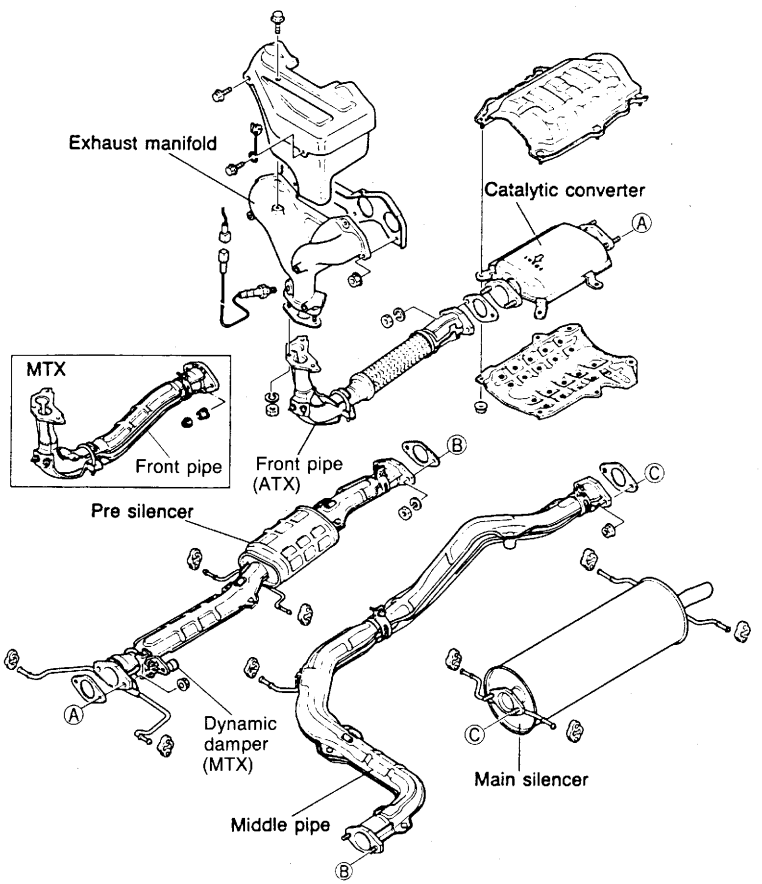


86U04A-157

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



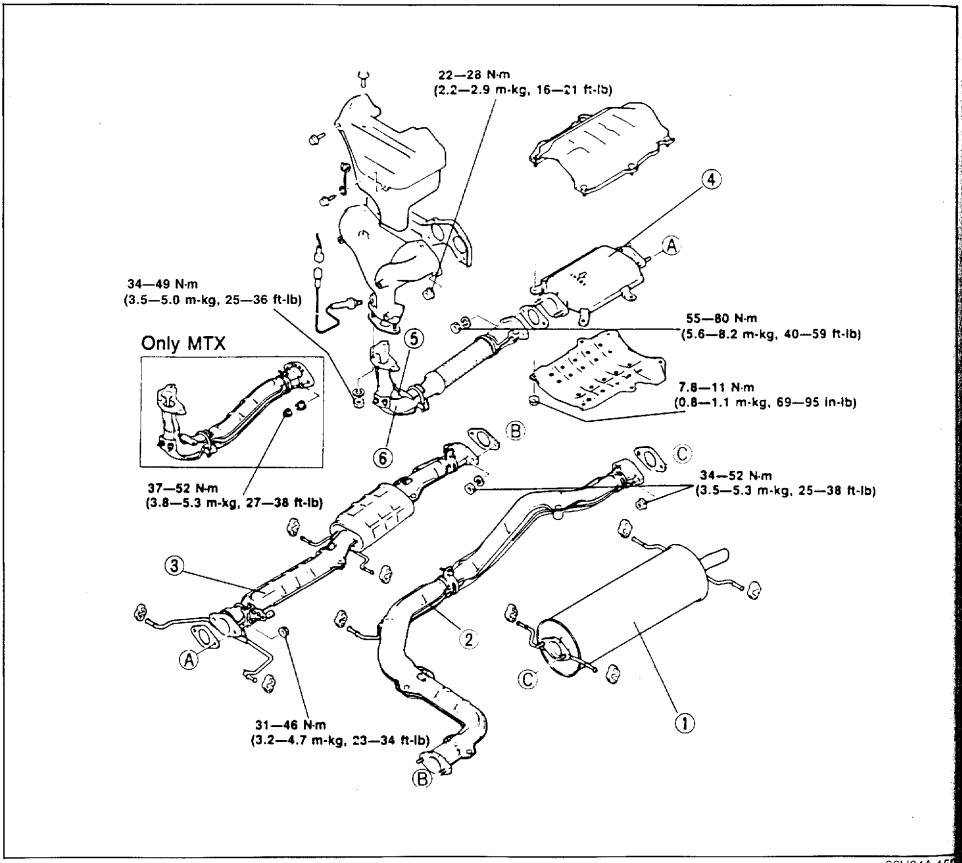
86U04A-158

The catalytic converter is used to reduce CO, HC and NOx. The converter contains a compound of platinum and rhodium. It is a three-way catalyst type with a volume of **2,100 cc (128 cu in)**.

REMOVAL AND INSTALLATION

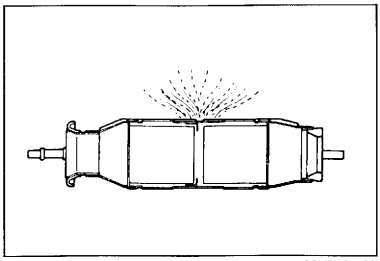
1. Remove in the sequence shown in the figure.
2. Install in the reverse order of removal.

Torque Specifications



86U04A-159

1. Main silencer
2. Middle pipe
3. Pre-silencer
4. Catalytic converter
5. Bracket
6. Front pipe



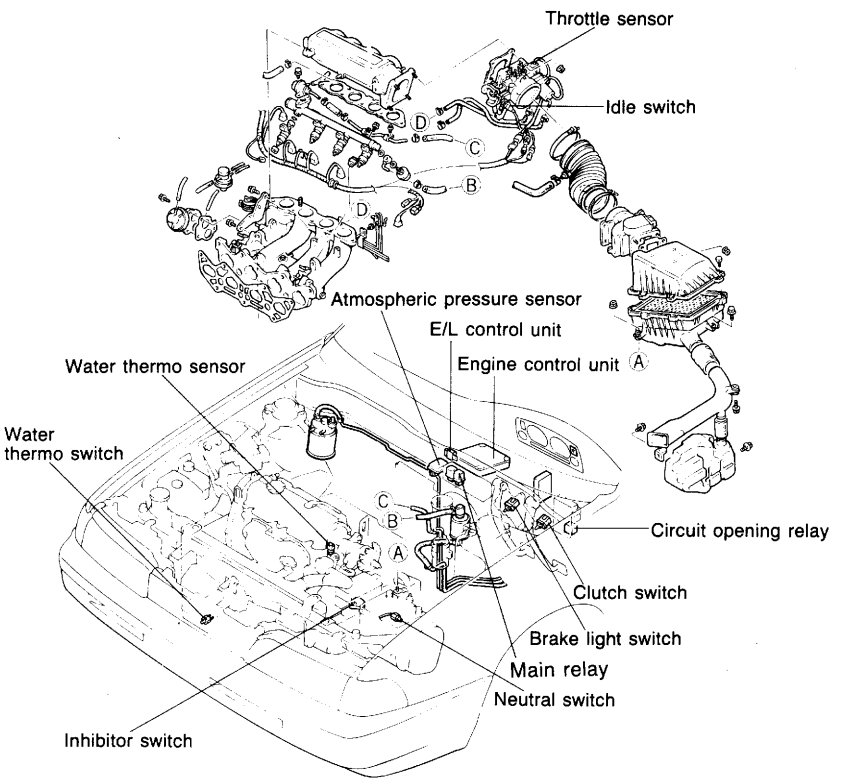
86U04A-160

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

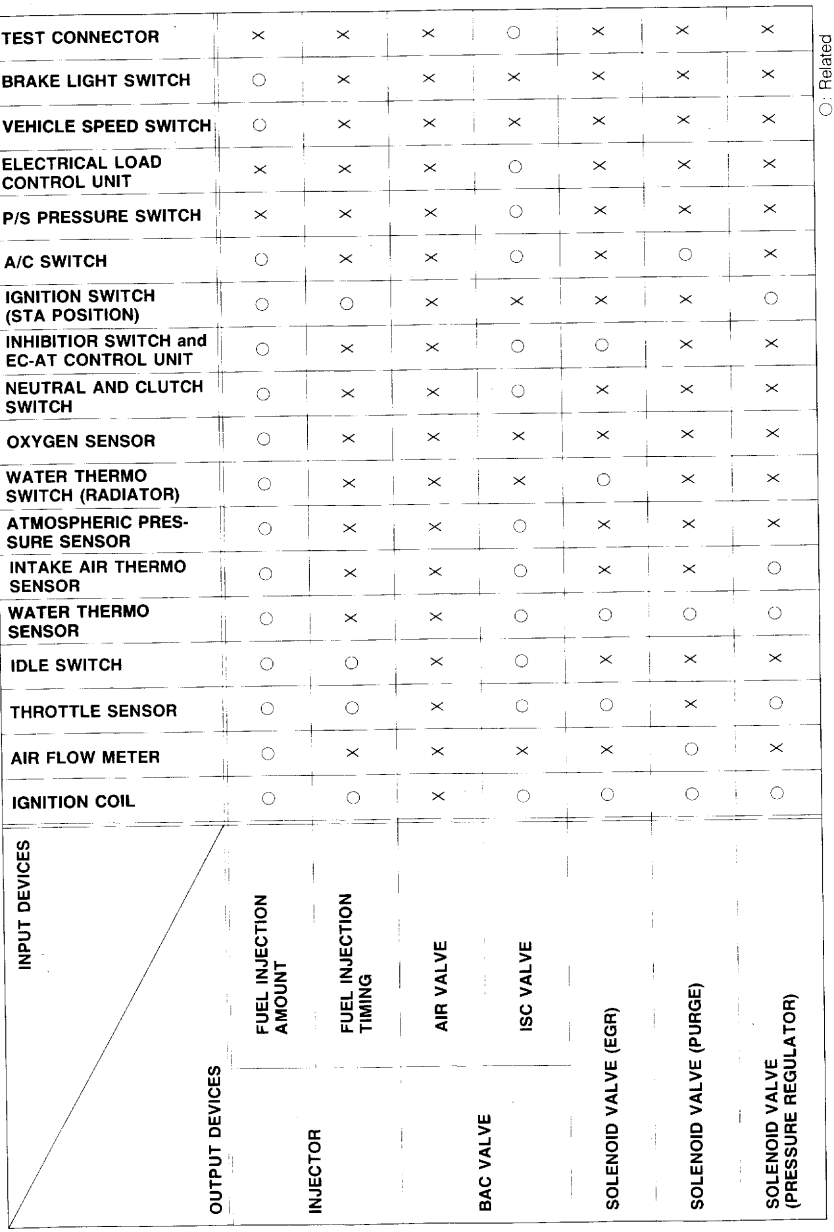
CONTROL SYSTEM



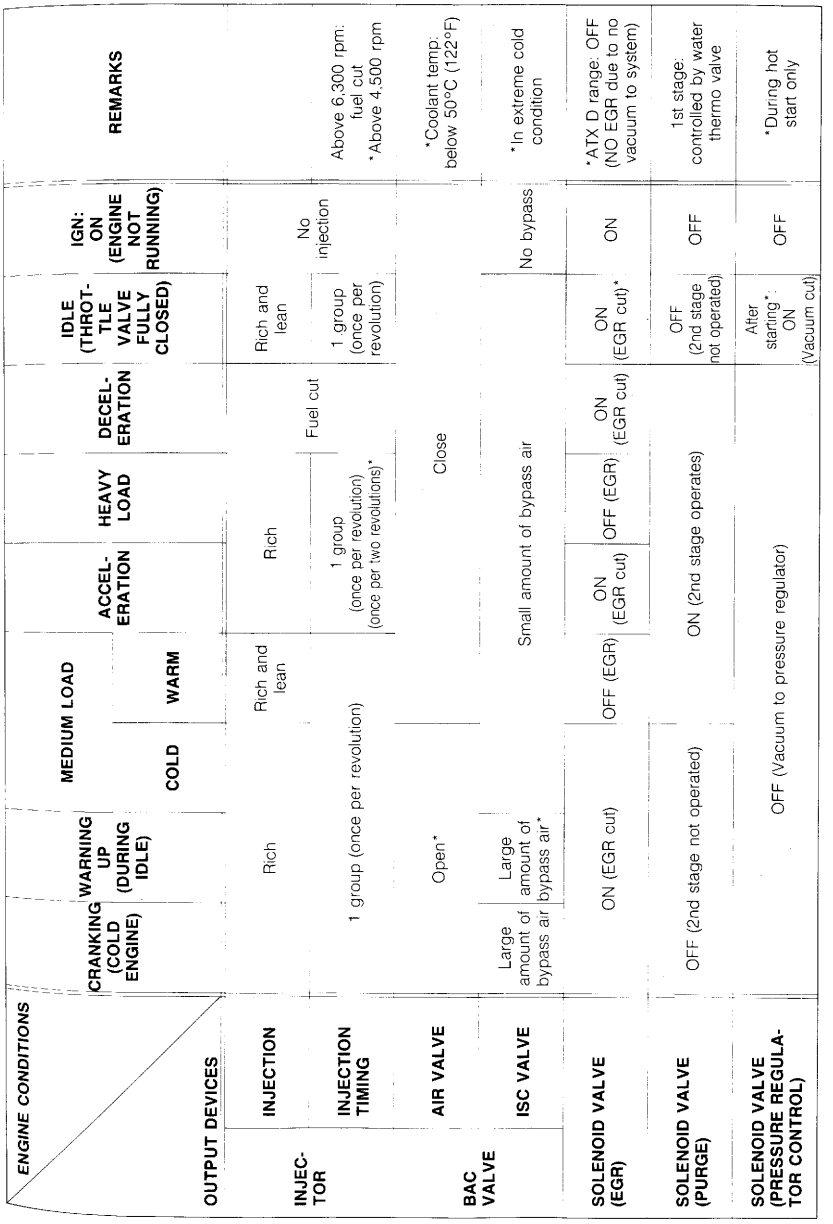
86U04A-166

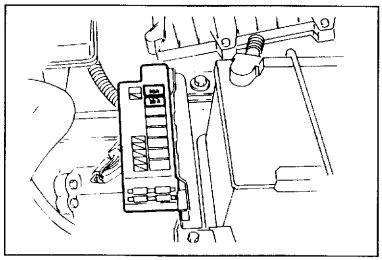
The control system consists of the input devices and the control unit. The control unit controls the fuel injection amount (EGI), fuel injection pressure, bypass air amount, switch monitor function, and fail-safe function.

RELATIONSHIP CHART
Output Devices and Input Devices



Output Devices and Engine Conditions



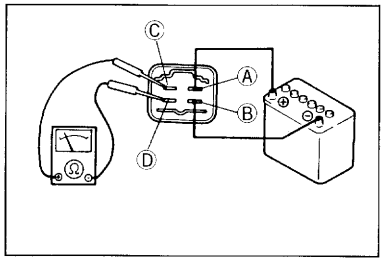


69G04A-161

EGI MAIN FUSE

Inspection

Check the continuity of EGI main fuse.

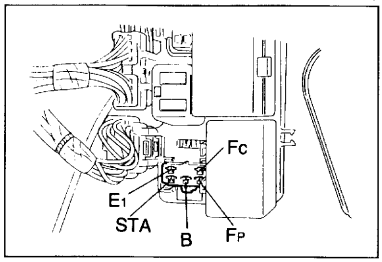


86U04A-169

MAIN RELAY

1. Check that a "clicking" sound is heard at the main relay when turning the ignition switch ON and OFF.
2. Apply 12V and a ground to (A) and (B) terminals of the main relay.
3. Check continuity at terminals using an ohmmeter.

Terminals \ Operation	12V Not applied	12V Applied
ⓒ — ⓓ	No continuity	Continuity



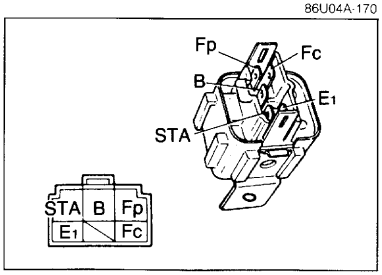
86U04A-170

CIRCUIT OPENING RELAY

Relay Circuit

1. Remove the circuit opening relay.
2. Check the circuit as described.

Terminal	Checking item	Correct result
Fp	Resistance	0.2—30Ω
Fc	Continuity (cranking)	∞
B	Voltage (ign: ON)	Battely voltage
STA	Voltage (Cranking)	Approx. 9V
E_1	Continuity	∞



69G04A-164

Circuit Opening Relay

1. Apply 12V and a ground to the terminals below and check the circuit opening relay as described.

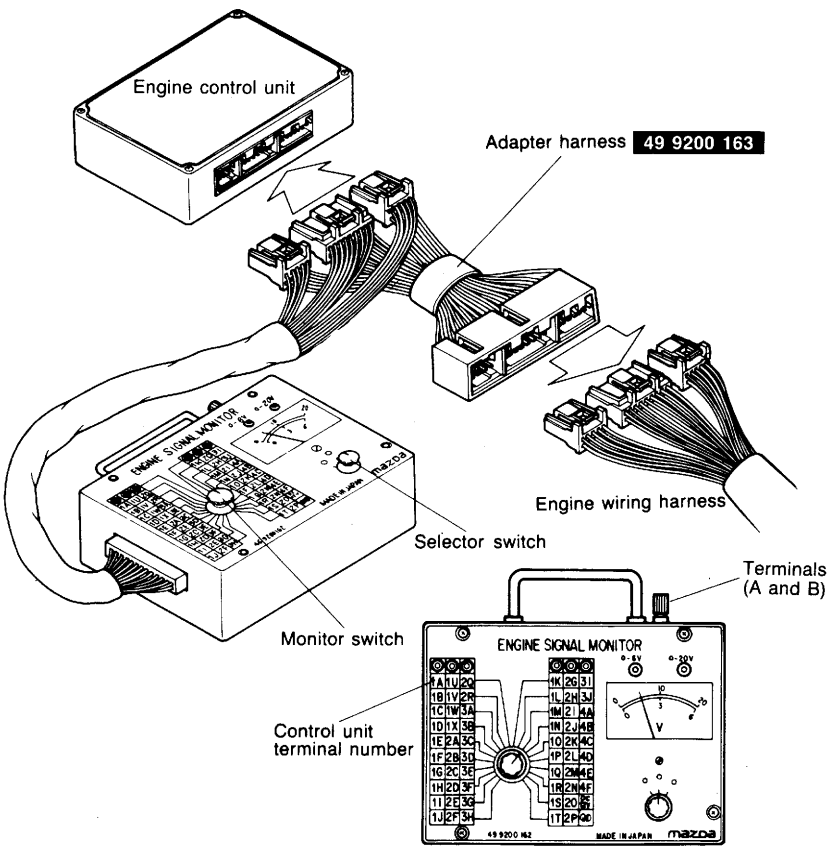
12V	Grounded	Correct result
STA	E_1	B ↔ FP: Continuity
B	Fc	Fp: Battery voltage

Resistance

Check the resistance between the terminals using an ohmmeter.

Between terminals	Resistance (Ω)
STA ↔ E1	15—30
B ↔ Fc	80—150
B ↔ Fp	∞

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



86U04A-171

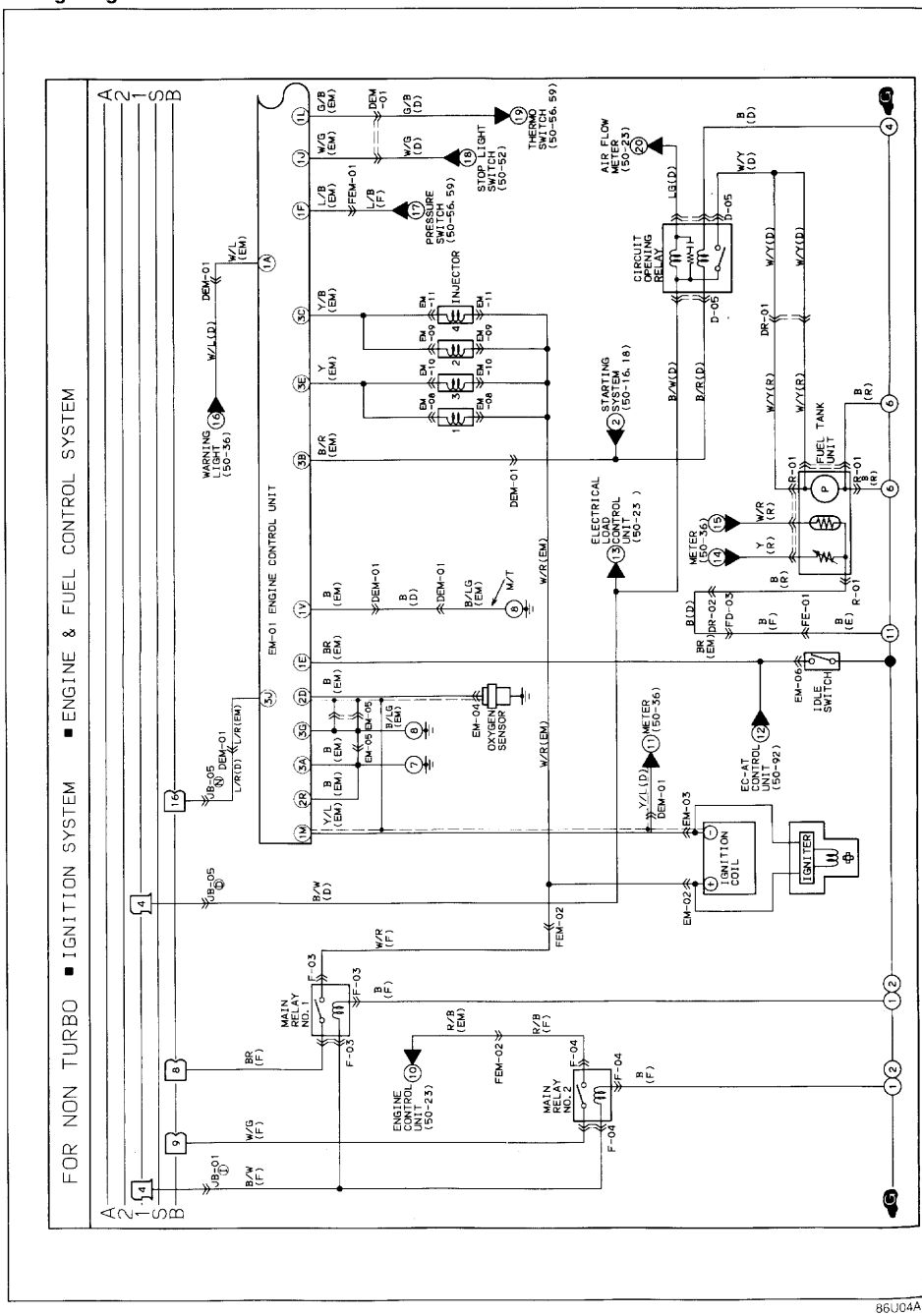
The **Engine Signal Monitor** (49 9200 162) was developed to check the control unit terminal voltages. This monitor easily inspects the individual terminal voltages through selection of the monitor switch.

How to Use the Engine Signal Monitor

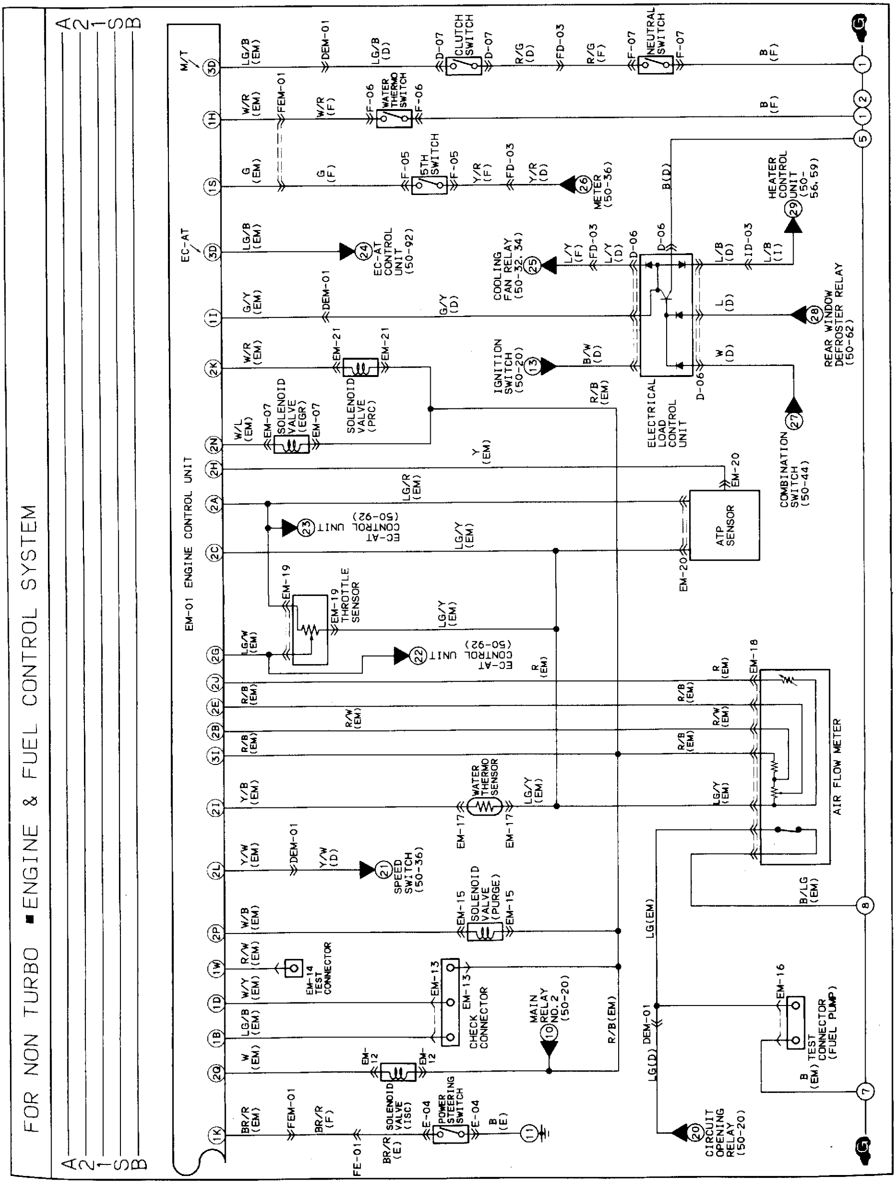
1. Connect the **Engine Signal Monitor** (49 9200 162) between the engine control unit and the engine harness using the **adapter** (49 9200 163).
2. Turn the selector switch and monitor switch to select the terminal number.
3. Check the terminal voltage.

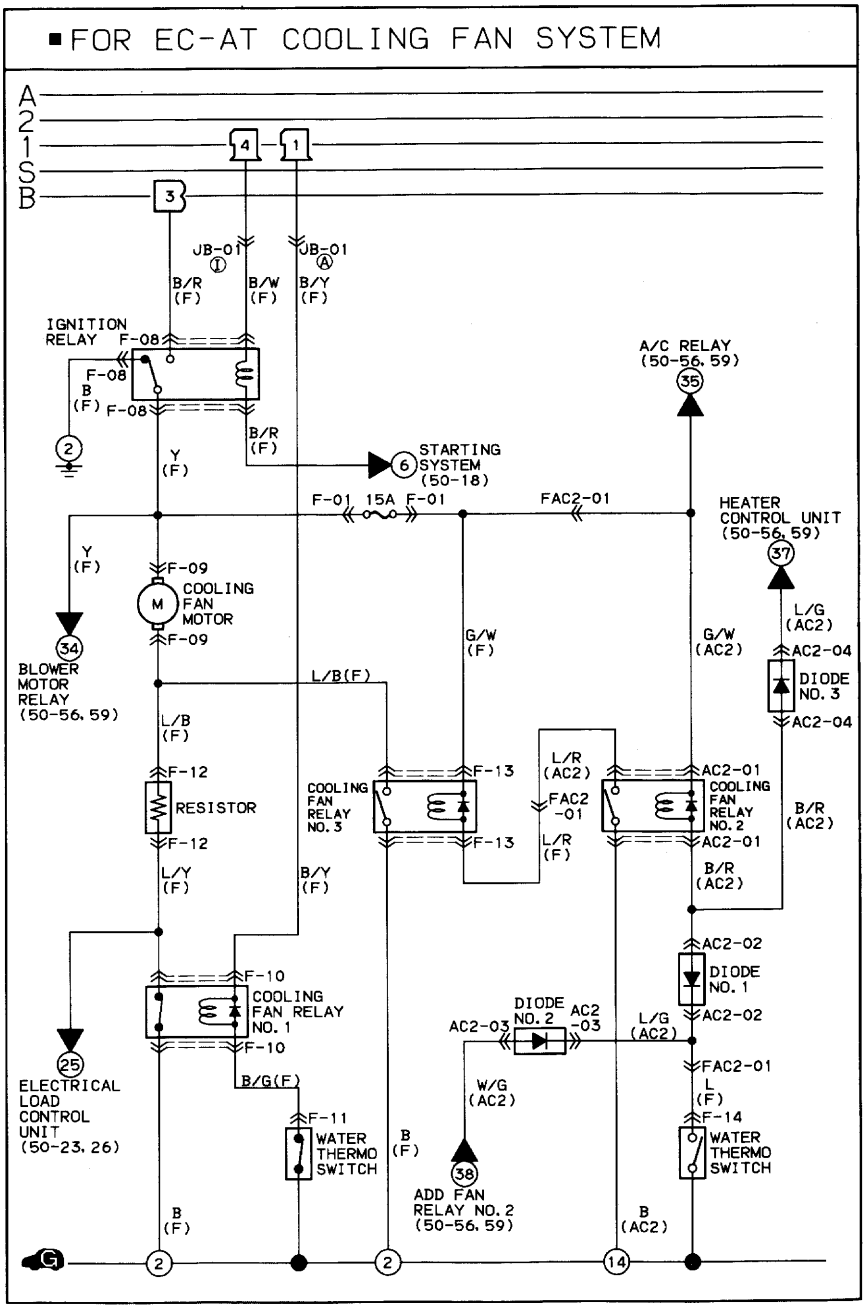
Caution
Never apply voltage to terminals A and B.

Wiring Diagram



86U04A-1


FOR NON TURBO ■ENGINE & FUEL CONTROL SYSTEM
EM-01 ENGINE CONTROL UNIT
CLUTCH SWITCH
NEUTRAL SWITCH
WATER THERMO SWITCH
5TH SWITCH
METER (50-36)
HEATER CONTROL UNIT (50-56, 59)
EC-AT CONTROL UNIT (50-92)
COOLING FAN RELAY (50-32, 34)
REAR WINDOW DEFROSTER RELAY (50-62)
IGNITION SWITCH (50-20)
ELECTRICAL LOAD CONTROL UNIT
SOLENOID VALVE (PRC)
SOLENOID VALVE (EGR)
COMBINATION SWITCH (50-44)
ATP SENSOR
THROTTLE SENSOR
AIR FLOW METER
WATER THERMO SENSOR
SPEED SWITCH (50-36)
SOLENOID VALVE (PURGE)
TEST CONNECTOR
CHECK CONNECTOR
MAIN RELAY NO.2 (50-20)
TEST CONNECTOR (FUEL PUMP)
SOLENOID VALVE (ISC)
POWER STEERING SWITCH
CIRCUIT OPENING RELAY (50-20)


■FOR EC-AT COOLING FAN SYSTEM
A
2
1
S
B
4
1
3
JB-01 Ⓘ
JB-01 Ⓐ
B/R (F)
B/W (F)
B/Y (F)
IGNITION RELAY
F-08
F-08
B (F)
F-08
B/R (F)
2
Y (F)
6 STARTING SYSTEM (50-18)
A/C RELAY (50-56, 59)
35
F-01 15A F-01
FAC2-01
HEATER CONTROL UNIT (50-56, 59)
37
Y (F)
F-09
M COOLING FAN MOTOR
F-09
34 BLOWER MOTOR RELAY (50-56, 59)
G/W (F)
G/W (AC2)
L/G (AC2)
AC2-04
DIODE NO. 3
AC2-04
L/B(F)
L/B (F)
F-12
RESISTOR
F-12
L/Y (F)
B/Y (F)
COOLING FAN RELAY NO. 3
F-13
F-13
L/R (AC2)
FAC2 -01
L/R (F)
AC2-01
COOLING FAN RELAY NO. 2
AC2-01
B/R (AC2)
B/R (AC2)
AC2-02
DIODE NO. 1
AC2-02
L/G (AC2)
DIODE NO. 2
AC2 -03
AC2-03
F-10
COOLING FAN RELAY NO. 1
F-10
25 ELECTRICAL LOAD CONTROL UNIT (50-23, 26)
B/G(F)
FAC2-01
L (F)
F-14
F-11
WATER THERMO SWITCH
B (F)
W/G (AC2)
38 ADD FAN RELAY NO. 2 (50-56, 59)
WATER THERMO SWITCH
B (F)
B (AC2)
G
2
2
14

Terminal Voltage

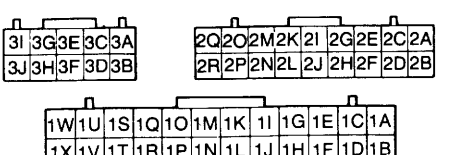
If the input and output devices and related wiring are normal, but the engine control unit terminal voltage is incorrect, replace the engine control unit.

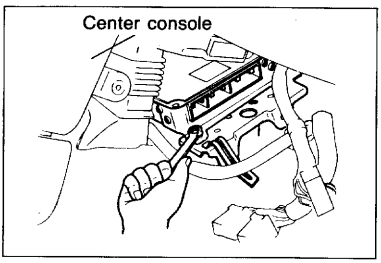
Terminal	Input	Output	Connection to	Voltage (After warming-up)		Remarks
				IGN: ON	Idle	
1A		○	Malfunction indicator light	For 3sec. after ignition switch OFF → ON: below 4.8V (light illuminates) After 3sec.: Battery voltage (light does not illuminate)		• Test connector grounded • Light illuminates: below 4.8V • Light does not illuminate: Battery voltage
1B		○	Self-Diagnosis Checker (Code number)	For 3sec. after ignition switch OFF → ON: below 6.2V (Buzzer sounds) After 3sec.: Battery voltage (Buzzer does not sound)		• Using Self-Diagnosis Checker and test connector grounded • Buzzer sounds: below 6.2V • Buzzer does not sound: Battery voltage
1C	—	—	—	—		—
1D		○	Self-Diagnosis Checker (Monitor lamp)	Test connector grounded For 3sec. after ignition switch OFF → ON: below 6.2V (light illuminates) After 3sec.: Battery voltage (light does not illuminate)	(Test connector grounded) approx. 5V (Test connector not grounded) Monitor lamp ON: below 6.2V Monitor lamp OFF: Battery voltage	With Self-Diagnosis Checker
1E	○		Idle switch	Accelerator pedal released: below 0.5V Accelerator pedal depressed: above 7.7V		
1F		○	A/C relay	Battery voltage	A/C switch ON: below 2.5V A/C switch OFF: Battery voltage	Blower motor ON
1G	—	—	—	—		—
1H	○		Water thermo switch	Above 7.3V		Radiator temp.: below 17°C (63°F)
				Below 1.5V		Radiator temp.: above 17°C (63°F)
1I	○		Electrical load control unit	Electrical load ON: below 1.5V Electrical load OFF: above 7.3V		Electrical load: Rear defroster Headlight Blower motor (3rd & 4th position) Electrical fan
1J	○		Brake light switch	Brake pedal released: below 3.6V Brake pedal depressed: above 10.0V		
1K	○		P/S pressure switch	Constant above 10.5V	P/S ON: below 1.5V P/S OFF: above 10.5V	
1L	○		A/C switch	A/C switch ON: below 1.5V A/C switch OFF: above 10.0V		Blower motor: ON
1M	○		Ignition coil ⊖ terminal	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor: green and red lights flash
1N	—	—	—	—		—

Terminal	Input	Output	Connection to	Voltage (After warming-up) IGN: ON	Voltage (After warming-up) Idle	Remarks
1O	—	—	—	—		—
1P	—	—	—	—		—
1Q	—	—	—	—		—
1R	—	—	—	—		—
1S	—	—	—	—		—
1T	—	—	—	—		—
1U	—	—	—	—		—
1V	○		—	Constant below 1.5V		MTX
				Constant above 10.5V		ATX
1W	○		Test connector	Test connector grounded: below 0.5V Test connector not grounded: above 10.5V		Green connector, 1-pin
1X	—	—	—	—		—
2A		○	V ref	4.5—5.5V		
2B	○		Air flow meter (Vc)	7—9V		
2C	—	—	Ground (E2)	0V		
2D	○		Oxygen sensor	0V	0—1.0V	• Cold engine: 0V at idle • After warming-up: Increase engine speed: 0.5—1.0V Deceleration: 0—0.4V
2E	○		Air flow meter (Vs)	Approx. 1.7V	Approx. 3—5V	Increase engine speed: voltage increases
2F	—	—	—	—		—
2G	○		Throttle sensor	Accelerator pedal released: approx. 0.5V (depends on 2A terminal voltage)		Max. voltage (Throttle valve fully open): approx. 4.3V
2H	○		Atmospheric pressure sensor	At sea level: approx. 4.0V		
2I	○		Water thermo sensor	0.3—0.6 V		Engine coolant temp. 20°C (68°F): approx. 2.5V
2J	○		Air flow meter (Intake air thermo sensor)	Approx. 2.5V at 20°C (68°F)		
2K		○	Solenoid valve (Pressure regulator control)	For 120 sec. after ignition switch OFF → ON: below 3.5V	For 120 sec. after starting: below 3.5V	Hot condition: Coolant temp. above 70°C (158°F) Intake air temp. above 20°C (63°F)
				Battery voltage		Other conditions
2L	○		Speedometer	Battery voltage		• Above 113 mph (180 km/h): below 1.0V
2M	—	—	—	—		—

Terminal	Input	Output	Connection to	Voltage (After warming-up) IGN: ON	Voltage (After warming-up) Idle	Remarks
2N		○	Solenoid valve (EGR)	Below 3.5V		• Cold engine: below 3.5V Radiator coolant temp.—below 17°C (63°F) or Engine coolant temp.—below 70°C (158°F) • Engine above approx. 1,500 rpm: Battery voltage
2O	—	—	—	—		—
2P		○	Solenoid valve (Purge control valve)	Battery voltage		• Medium and high load: below 3.5V
2Q		○	Solenoid valve (Idle speed control valve)	Approx. 1.7—11V		
2R	—	—	Ground (E_{02})	0V		
3A	—	—	Ground (E_{01})	0V		
3B	○		Ignition switch (Start position)	Below 2.5V		While cranking: battery voltage
3C		○	Injector (No. 4 and No. 2)	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor green and red lights flash
3D	○		Inhibitor switch through EC-AT unit	"N" or "P" range: below 2.5V Other ranges: battery voltage		ATX
			Neutral and clutch switch	In-gear condition Clutch pedal depressed: battery voltage Clutch pedal released: below 0.5V		MTX (Neutral: constant battery voltage)
3E		○	Injector (No. 1 and No. 3)	Battery voltage	*1 Battery voltage	*1 Engine Signal Monitor: green and red lights flash
3F	—	—	—	—		—
3G	—	—	Ground (E_1)	0V		
3H	—	—	—	—		—
3I	○	—	Main relay	Battery voltage		
3J	—	—	Battery	Battery voltage		For back-up

96U04A-056

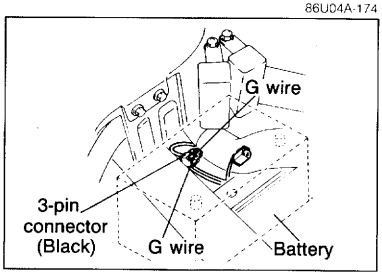




86U04A-174

Replacement

1. Disconnect the negative battery cable.
2. Remove the front console covers (right and left).
3. Disconnect the connectors from the control unit.
4. Replace the control unit.



69G04A-171

NEUTRAL SWITCH

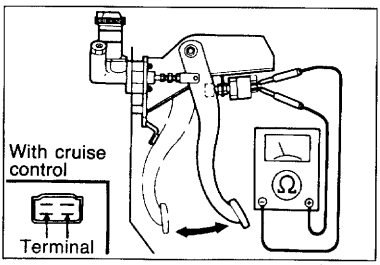
Inspection

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. After checking, connect the switch connector.

Note
Refer to section 7A for replacement of the neutral switch.



69G04A-172

CLUTCH SWITCH

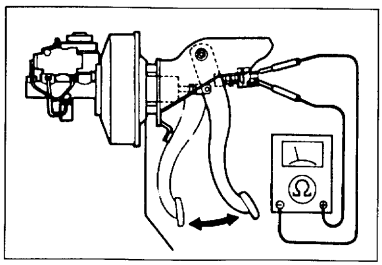
Inspection

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. After checking, connect the switch connector.

Note
Refer to section 6 for replacement of the clutch switch.



86U04A-175

BRAKE LIGHT SWITCH

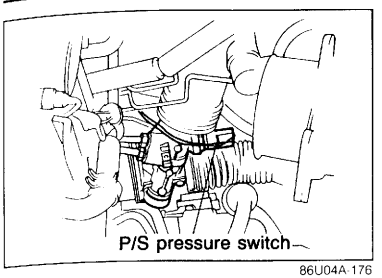
Inspection

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

Pedal	Continuity
Depressed	Yes
Released	No

4. After checking, connect the switch connector.

Note
Refer to section 11 for replacement of the brake switch.



86U04A-176

P/S PRESSURE SWITCH

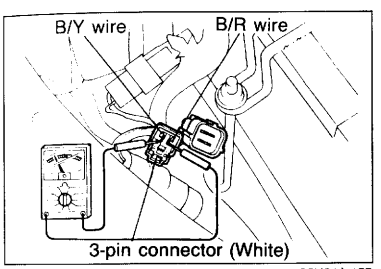
Inspection

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. Connect the switch connector after checking.

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



86U04A-177

INHIBITOR SWITCH

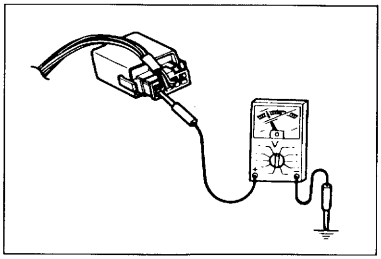
Inspection

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

Position	Continuity
P and N ranges	Yes
Other ranges	No

4. Connect the switch connector after checking.

Note
Refer to Section 7B for replacement of the inhibitor switch.



96U04A-057

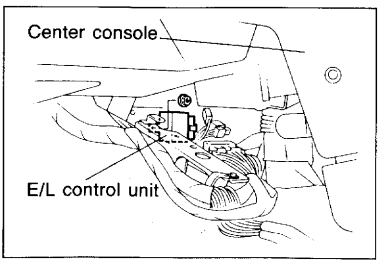
E/L CONTROL UNIT

Inspection

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

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

86U04A-179

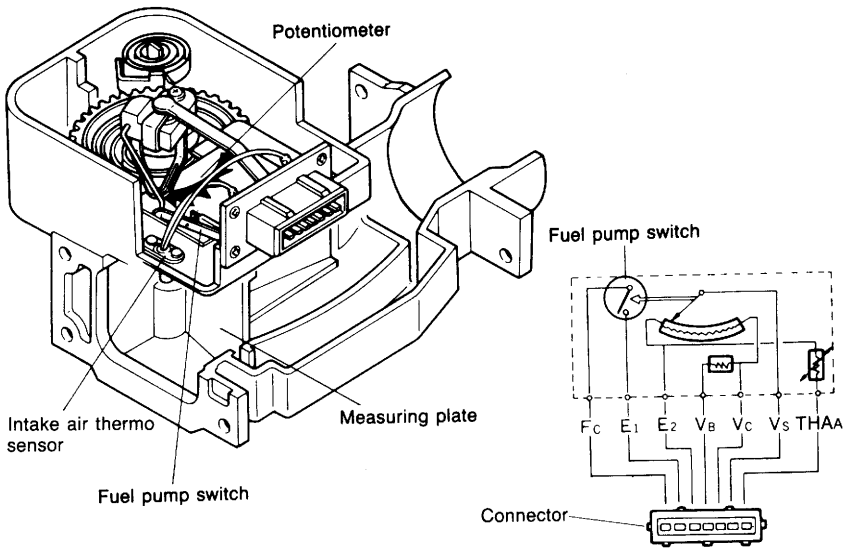


96U04A-049

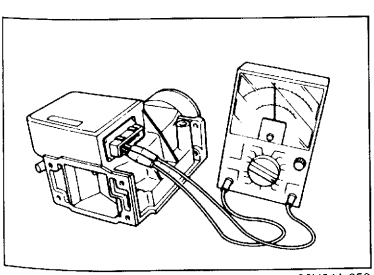
Replacement

1. Remove the engine control unit. (Refer to page 4A—86)
2. Replace the E/L control unit.
3. Install in the reverse order of removal.

AIR FLOW METER



69G04C-100



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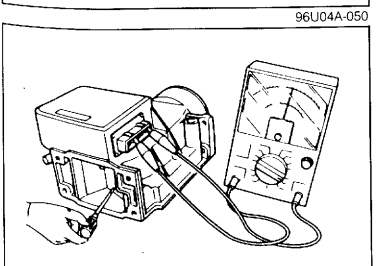


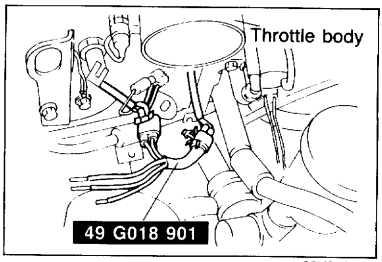
96U04A-051

Inspection

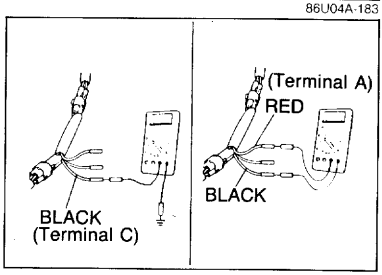
1. Remove the air flow meter. (Refer to page 4A—31)
2. Check the air flow meter body for cracks.
3. Verify that the measuring plate moves smoothly.
4. Disconnect the connector from the air flow meter.
5. Using an ohmmeter, check resistance between the terminals with the measuring plate fully closed and fully open.
6. Connect the connector to the air flow meter after inspecting.

Terminal	Resistance (Ω)	
	Fully closed	Fully open
E2↔Vs	20—400	20—1,000
E2↔Vc	100—400	
E2↔VB	200—400	
E2↔THA (Intake air thermo sensor)	−20°C (−4°F) 20°C (68°F) 60°C (140°F)	13.6—18.4 kΩ 2.21—2.69 kΩ 493—667 Ω
E1↔Fc	∞	0

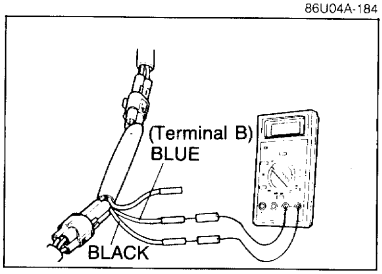
Note
Refer to page 4A—31 for replacement of the air flow meter.



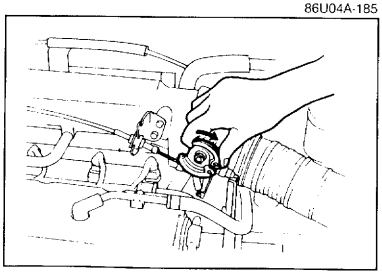
86U04A-183



86U04A-184



86U04A-185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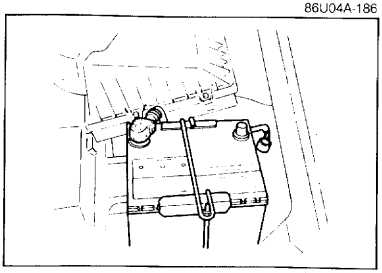

96U04A-052

THROTTLE SENSOR

Caution
Use a precision voltmeter with a scale of 0.01V to inspect or adjust the throttle sensor.

Inspection
1. Remove the air hose from the throttle body.
2. Disconnect the throttle sensor connector (3-pin).
3. Connect the **SST** between the throttle sensor and the wiring harness.
4. Turn the ignition switch ON.
5. Make sure that the throttle valve is fully closed.

6. Measure **BLACK** and **RED** wire voltages. Check that the voltages are as specified.

Specification:
BLACK wire — Approx. 0V
RED wire — 4.5—5.5V

7. If not correct, check the battery voltage and wiring harness. If these are OK, replace the engine control unit.
8. Record the **RED** wire voltage.

9. Check that **BLUE** wire voltage for the recorded **RED** wire voltage is as specified below.

Specification:

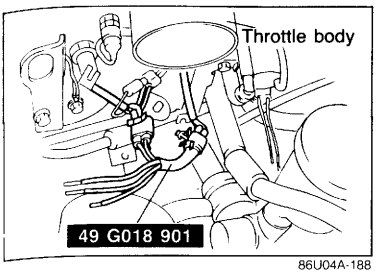
RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	0.37—0.54	5.10—5.19	0.42—0.61
4.60—4.69	0.38—0.55	5.20—5.29	0.43—0.62
4.70—4.79	0.39—0.56	5.30—5.39	0.44—0.63
4.80—4.89	0.40—0.57	5.40—5.49	0.44—0.64
4.90—4.99	0.40—0.58	5.50	0.44—0.66
5.00—5.09	0.41—0.60		

10. Hold the throttle valve fully open.
11. Check that **BLUE** wire voltage for the recorded **RED** wire voltage is as specified.

Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	3.58—4.23	5.10—5.19	4.05—4.79
4.60—4.69	3.66—4.32	5.20—5.29	4.13—4.88
4.70—4.79	3.74—4.41	5.30—5.39	4.21—4.98
4.80—4.89	3.82—4.51	5.40—5.49	4.29—5.07
4.90—4.99	3.90—4.60	5.50	4.29—5.17
5.00—5.09	3.97—4.70		

12. Check that **BLUE** wire voltage increases smoothly when opening the throttle valve from closed to fully open.
13. If not correct, replace the throttle sensor.
14. Turn the ignition OFF.
15. Disconnect the **SST** and reconnect the throttle sensor connector.
16. Disconnect the negative battery terminal and depress the brake pedal for at least 5 seconds to eliminate the control unit malfunction memory.



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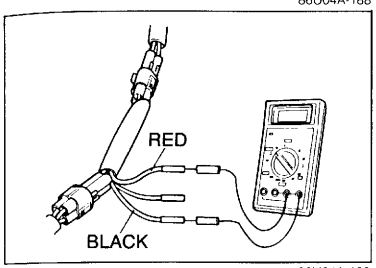

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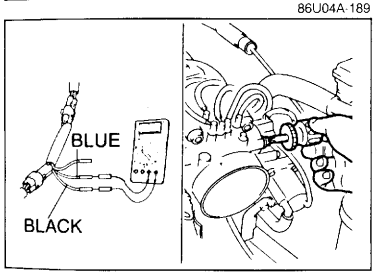

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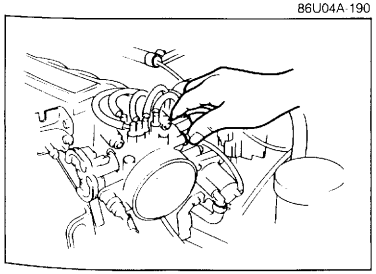
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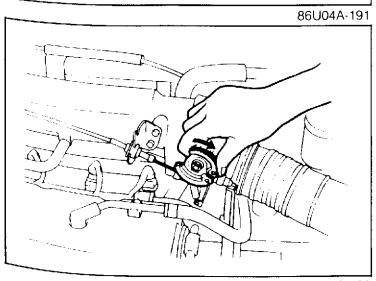

86U04A-192

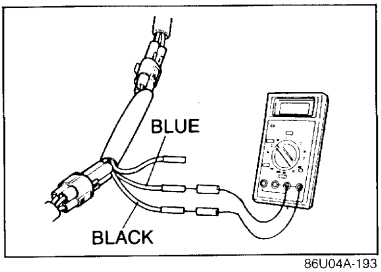
Adjustment

1. Remove the air hose from the throttle body.
2. Disconnect the throttle sensor connector (3-pin).
3. Connect the **SST** between the throttle sensor and the wiring harness.
4. Turn the ignition switch ON.
5. Make sure the throttle valve is fully closed.
6. Measure **RED** wire voltage and record it.
7. Change the voltmeter connection to the **BLUE** wire.
8. Loosen the throttle sensor mounting screws.
9. Turn the throttle sensor to adjust **BLUE** wire voltage within the range specified for the recorded **RED** wire voltage.

Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	0.37—0.54	5.10—5.19	0.42—0.61
4.60—4.69	0.38—0.55	5.20—5.29	0.43—0.62
4.70—4.79	0.39—0.56	5.30—5.39	0.44—0.63
4.80—4.89	0.40—0.57	5.40—5.49	0.44—0.64
4.90—4.99	0.40—0.58	5.50	0.44—0.66
5.00—5.09	0.41—0.60		

10. Tighten the throttle sensor mounting screws.
11. Recheck that **BLUE** wire voltage is within specification.
12. Hold the throttle valve fully open.



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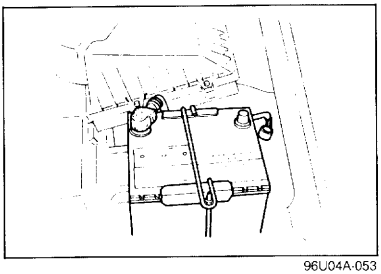
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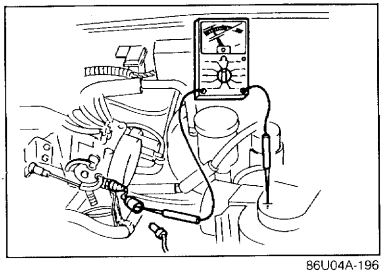
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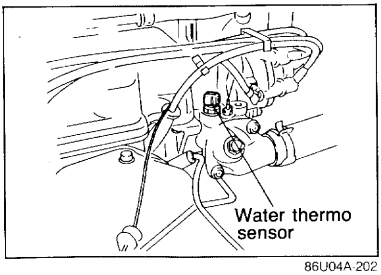
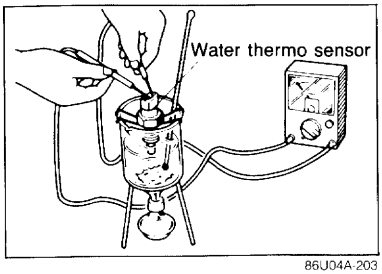


86U04A-202



86U04A-203

13. Check that **BLUE** wire voltage is within specification.

Specification:

RED wire voltage (V)	BLUE wire voltage (V)	RED wire voltage (V)	BLUE wire voltage (V)
4.50—4.59	3.58—4.23	5.10—5.19	4.05—4.79
4.60—4.69	3.66—4.32	5.20—5.29	4.13—4.88
4.70—4.79	3.74—4.41	5.30—5.39	4.21—4.98
4.80—4.89	3.82—4.51	5.40—5.49	4.29—5.07
4.90—4.99	3.90—4.60	5.50	4.29—5.17
5.00—5.09	3.97—4.70		

14. Check that **BLUE** wire voltage increases smoothly when opening the throttle valve from closed to fully open.
15. If not correct, replace the throttle sensor.
16. Turn the ignition OFF.
17. Disconnect the **SST** and reconnect the throttle sensor connector.
18. Disconnect the negative battery terminal and depress the brake pedal for at least 5 seconds to eliminate the control unit malfunction memory.

IDLE SWITCH

Inspection

1. Disconnect the idle switch connector (1-pin).
2. Check continuity between the switch and ground.

Throttle valve condition	Continuity
Fully closed	Yes*
Open	No

* Less than 30Ω is acceptable

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

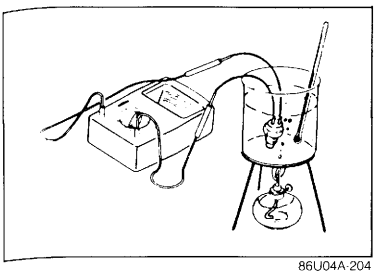
WATER THERMO SENSOR

Inspection

1. Remove the water thermo sensor from the cylinder head.
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.



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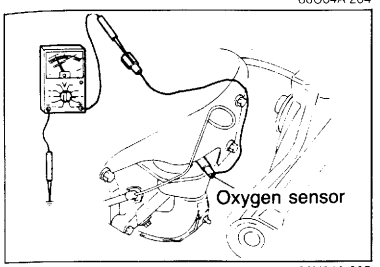
WATER THERMO SWITCH

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. 17°C (63°F)	No

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



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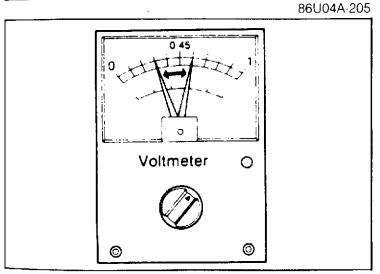
OXYGEN SENSOR

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 ground.
4. Run the engine at **4,500 rpm** until the voltmeter indicates **approx. 0.7V**.



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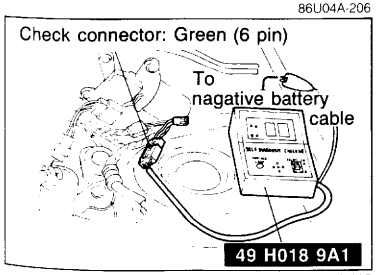
5. Increase and decrease the engine speed suddenly several times. Check to see that when the speed is increased the meter reads between **0.5V—1.0V**, and when the speed is decreased it reads between **0V—0.4V**.
6. If the voltmeter dosen't indicate as specified, replace the oxygen sensor.



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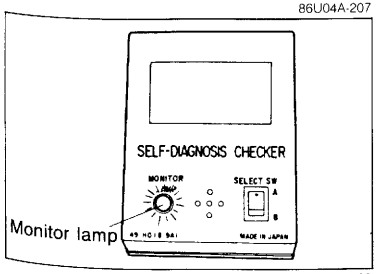
Inspection of Sensitivity

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



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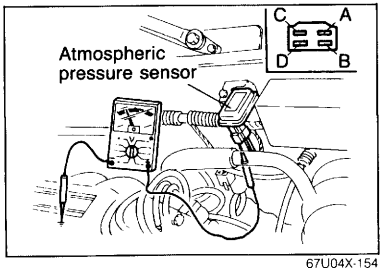
3. Increase the engine speed to between **2,000 and 3,000 rpm**, and check that the monitor lamp flashes for 10 seconds.

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



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ATMOSPHERIC PRESSURE SENSOR

Inspection

1. Connect a voltmeter to the atmospheric pressure sensor (D terminal.
2. Turn the ignition switch on and take a voltage reading.

Voltage: 3.5—4.5V at sea level 2.5—3.5V at high altitude [2,000m (6,500 ft)]

3. Replace the sensor if necessary.