

FUEL SYSTEM

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[FBC SYSTEM]

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GENERAL SPECIFICATIONS

Fuel tank	
Capacity	45 lit. (11.9 U.S. gal., 9.9 Imp.gal.)
Fuel filter	
Type	High pressure type
Fuel pump	
Type	Electrical, in-tank type
Driven by	Electric motor
Throttle body	
Throttle position sensor (TPS)	
Type	Variable resistor type
Resistance	3.5-6.5 KΩ
Output voltage at curb idle	480-520 mV
Idle speed control (ISC) servo motor	
Type	Electric motor
Resistance	5-35 Ω at 20°C (68°F)
Idle position switch	
Type	Contact type within ISC servo
Motor position sensor (MPS)	
Type	Variable resistor type
Resistance	3.5-6.5 KΩ
Input sensor	
Air flow sensor (AFS)	
Type	Karman vortex type
Intake air temperature sensor	
Type	Thermistor type
Resistance	2.33-2.97 k Ω at 20°C (68°F)
Coolant temperature sensor	
Type	Thermistor type
Resistance	2.5 kΩ at 20°C (68°F)
Oxygen sensor	0.3 kΩ at 80°C (176°F)
Type	
Vehicle speed sensor	Zirconia sensor
Type	
No.1 cylinder TDC sensor	Reed switch type
Type	
Crank angle sensor	Photo diode sensor
Type	
Output actuator	Photo diode sensor
Injector	
Type	Electromagnetic type
Number	4
Coil resistance	13-16 Ω at 20°C (68°F)
Fuel pressure regulator	
Regulated pressure	330 KPa (3.35 kg/cm ² , 48 psi)

SEALANT

Coolant temperature sensor assy	LOCTITE 962T or equivalent
Coolant temperature gauge unit	Three bond No.2310 or equivalent

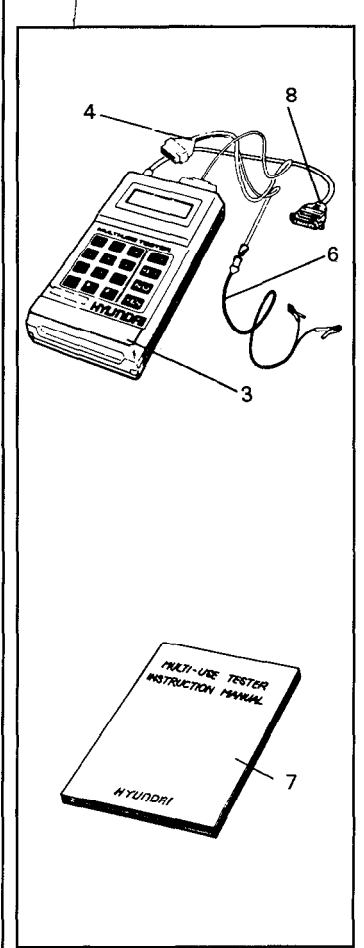
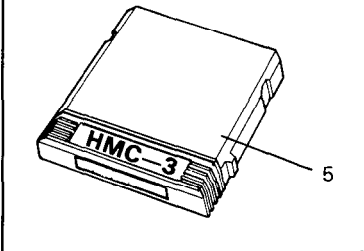
SERVICE STANDARD

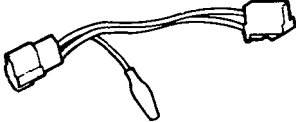
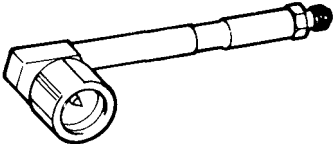
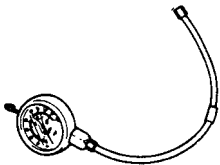
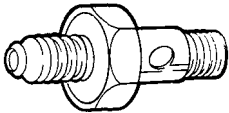
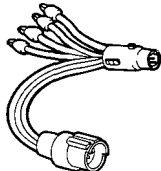
Basic ignition timing	BTDC $5^{\circ} \pm 2^{\circ}$ at curb idle
Curb idle speed	700 ± 100 rpm
Throttle-position sensor (TPS) adjustment voltage	480-520 mV at curb idle

TIGHTENING TORQUE

	Nm	Kg.cm	lb.ft
Delivery pipe installation bolts	10-13	100-130	7-9
Coolant temperature sensor	20-40	200-400	14-29
Oxygen sensor	40-50	400-500	29-36
Throttle position sensor (TPS) installation screw	1.5-2.5	15-25	1.1-1.8
Fuel pressure regulator bolts	8-10	80-100	6-7
High pressure hose and fuel filter	25-35	250-350	18-25
High pressure hose and fuel tank	30-40	300-400	22-29
Throttle body to surge tank bolts	15-22	150-220	11-16
Fuel tank drain plug	15-25	150-250	11-18
Fuel filter mounting bolts	9-14	90-140	7-10
Accelerator arm bracket bolts	9-14	90-140	7-10

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09391-33002 1. Multi-use tester assy (Without Adapter Ass'y)		
09391-33100 2. Multi-use tester sub assy		
09391-33200 3. Multi-use tester main body		Diagnostic tester for MPI, automatic transaxle and cruise control systems
09391-33300 4. Wiring harness		
09391-33402 5. Rom-pack (HMC-3) [For Federal] 09391-33451 Rom-pack (HRP-4) [For California]		
09391-33500 6. Battery harness		
09391-33600 7. Instruction manual		
09391-33700 8. P/C connector (RS-232C)		For connection to the external communication device such as personal computer etc. in using Multi-Use Tester.

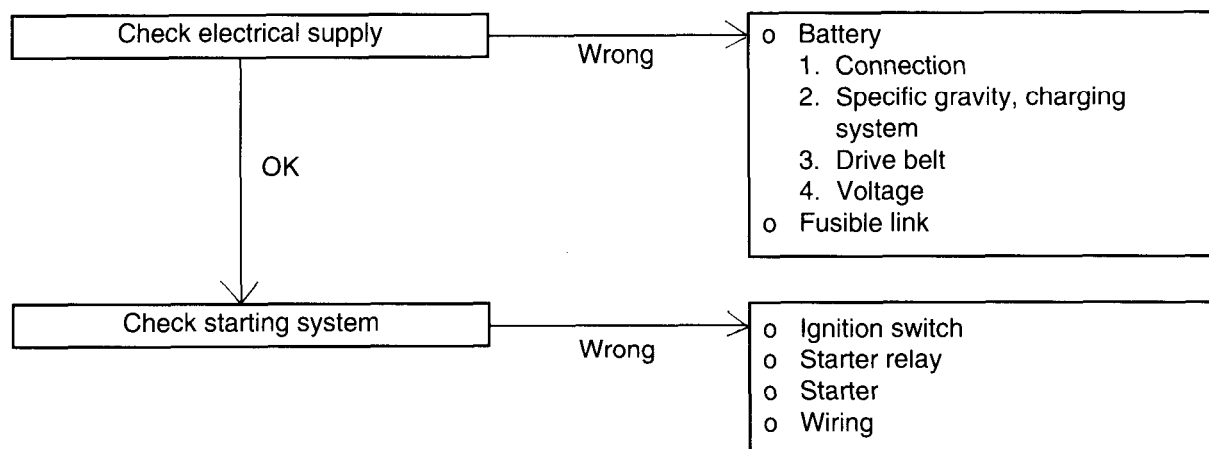
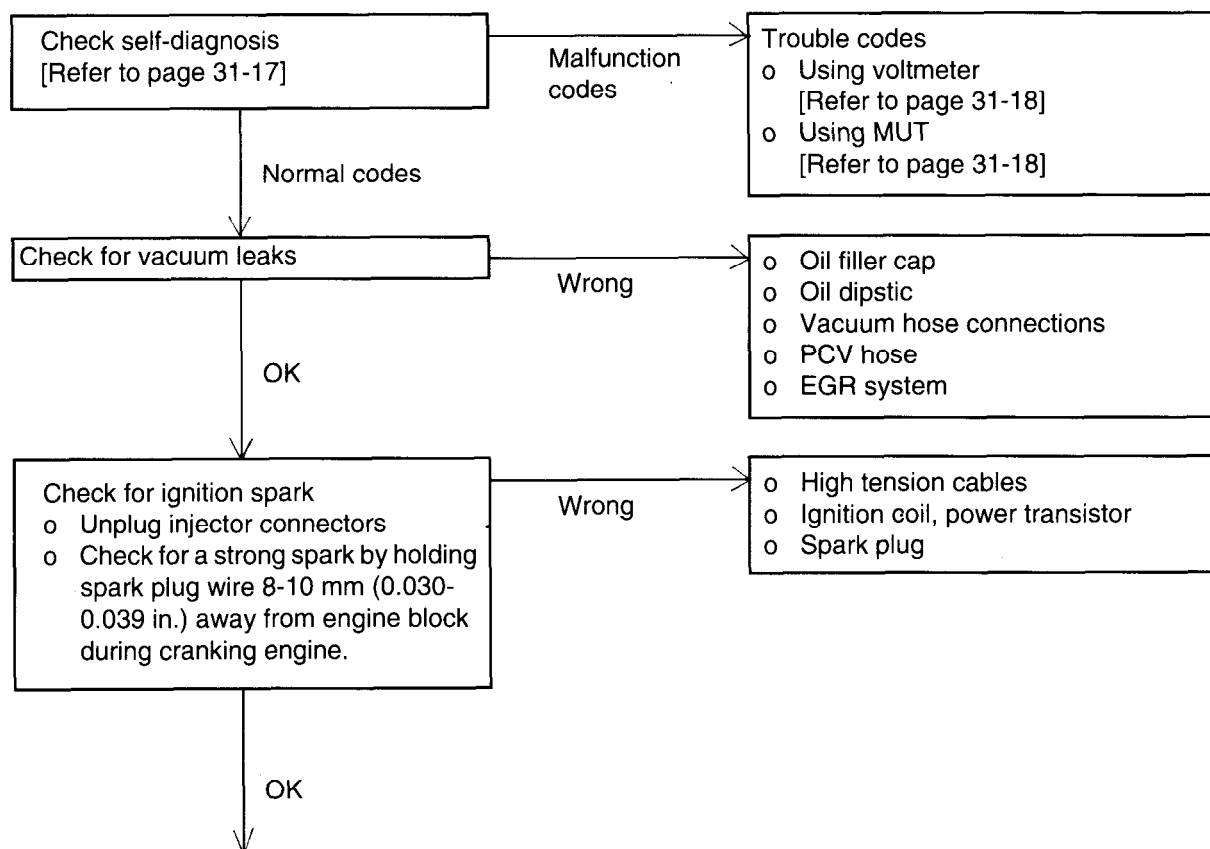
Tool (Number and name)	Illustration	Use
09273-24000 Test harness connector		Engine r.p.m. check
09353-24000 Fuel pressure gauge connector		Connection of fuel pressure gauge to delivery pipe for measurement of fuel pressure.
09353-24100 Fuel pressure gauge & hose		
09353-24200 Fuel pressure gauge adapter		
09392-33000 Test harness connector		TPS voltage check
J-38228 Fuel pressure gauge kit Includes-1 each 09353-24000 09353-24100 09353-24200		

TROUBLESHOOTING

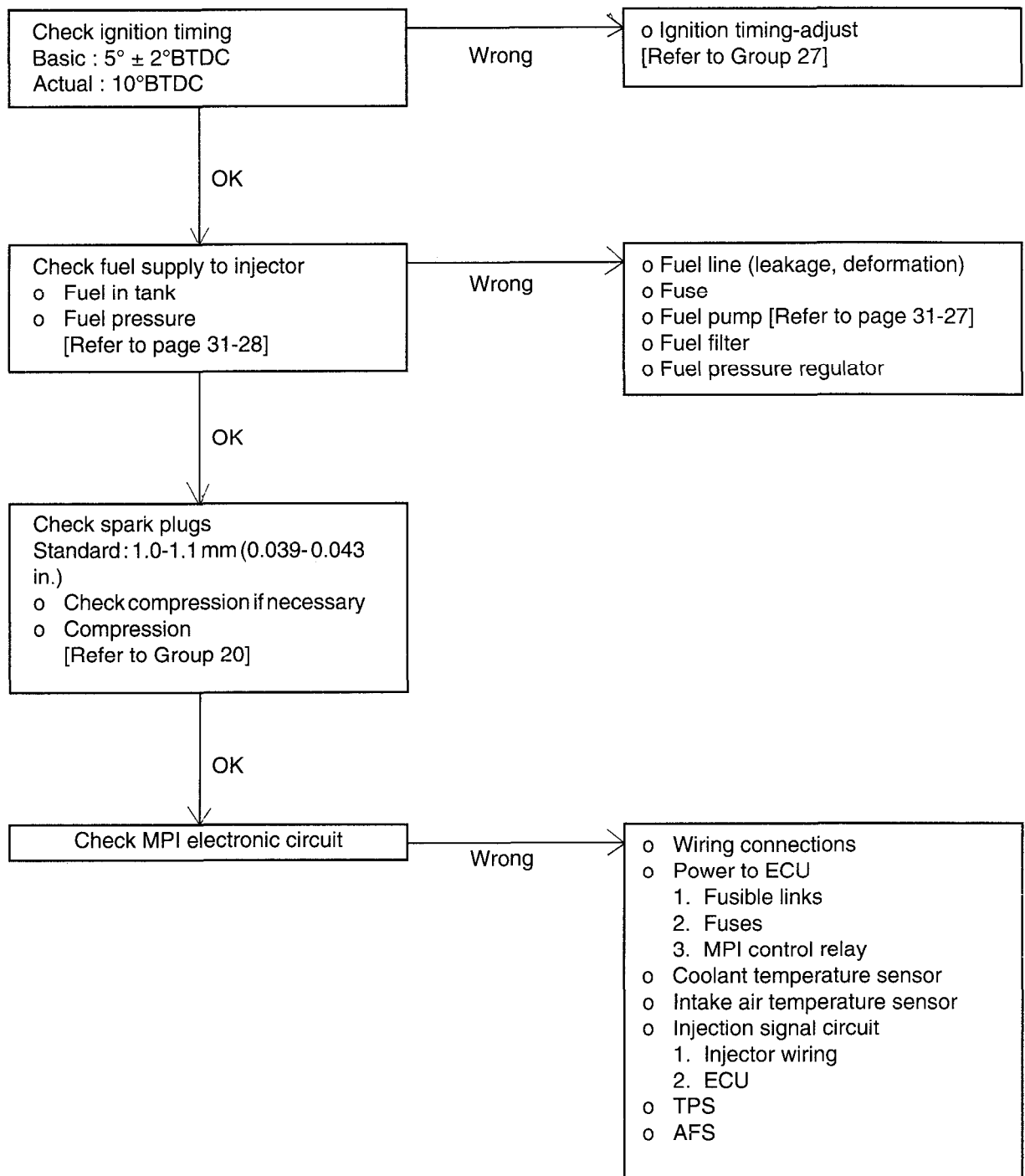
When checking engine troubles, it is important to start with an inspection of the basic systems. If one of the following conditions exists, (A) engine start failure, (B) unstable idling or (C) poor acceleration, begin by checking the following basic systems.

1. Power supply
 - 1) Battery
 - 2) Fusible link
 - 3) Fuse**
2. Body ground
3. Fuel supply
 - 1) Fuel line
 - 2) Fuel filter
 - 3) Fuel pump
4. Ignition system
 - 1) Spark plug
 - 2) High-tension cable
 - 3) Distributor
 - 4) Ignition coil
5. Emission control system
 - 1) PCV system
 - 2) EGR system**
 - 3) Vacuum leak
6. Others
 - 1) Ignition timing
 - 2) Idle speed

Troubles with the MPI system are often caused by poor contact of the harness connectors. It is important to check all harness connectors and verify that they are securely connected.

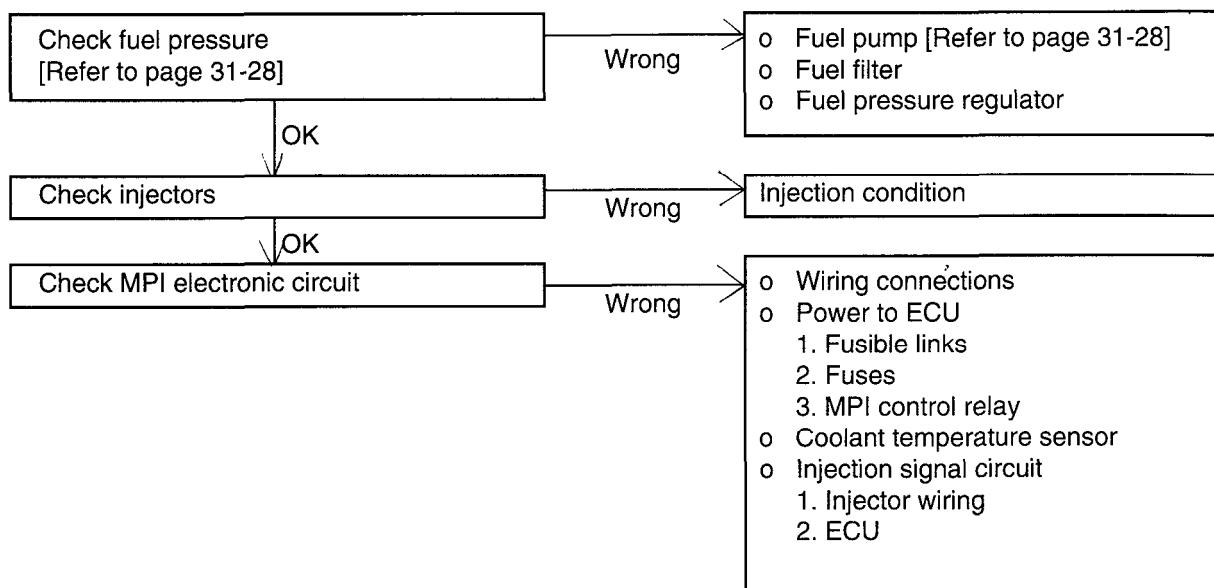
MPI TROUBLESHOOTING PROCEDURES**PROBLEM****Engine will not start****PROBLEM****Hard to start (Crank OK)**

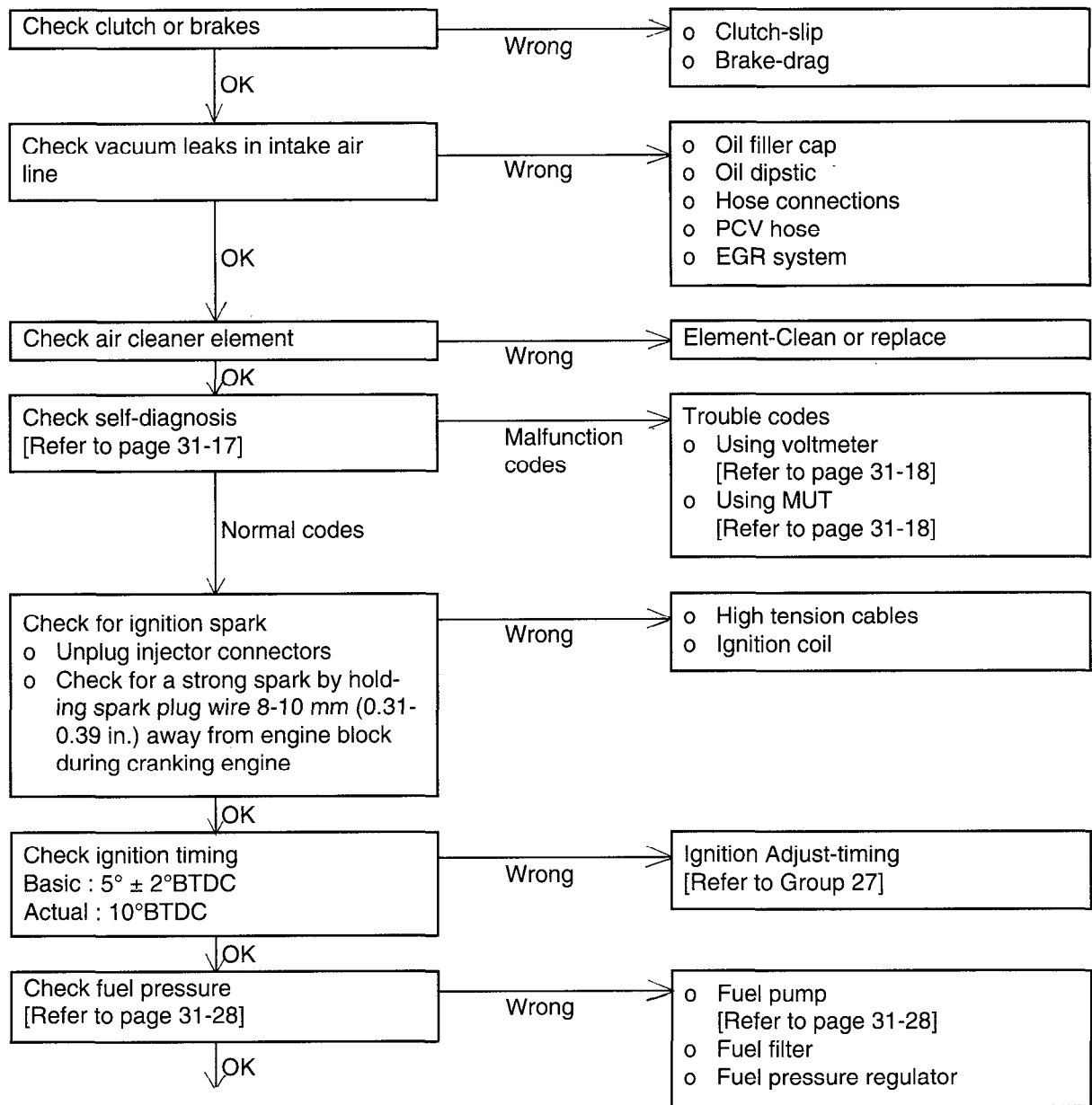
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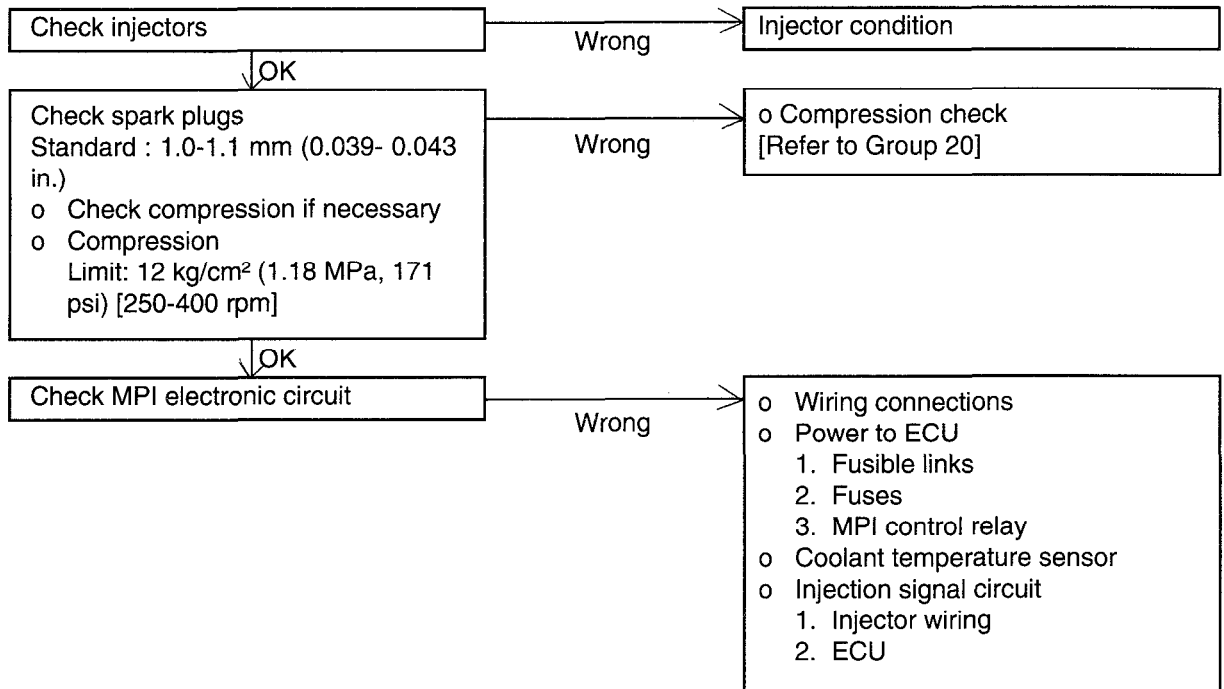
PROBLEM**Rough idle or engine stalls**

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PROBLEM**Engine hesitates or accelerates poorly**

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FUEL TANK AND FUEL LINE

Symptom	Probable cause	Remedy
Engine malfunctions due to insufficient fuel supply	Bent or kinked fuel pipe or hose Clogged fuel pipe or hose Clogged fuel filter or in-tank fuel filter Water in fuel filter Dirty or rusted fuel tank interior Malfunctioning fuel pump (Clogged filter in the pump)	Repair or replace Clean or replace Replace Replace the fuel filter or clean the fuel tank and fuel lines Clean or replace Replace
Evaporative emission control system malfunctions (when fuel filler cap is removed, pressure is released)	Incorrect routing of a vapor line Disconnected vapor line Folded, bent, cracked or clogged vapor line Faulty fuel tank cap Malfunctioning overfill limiter (Two-way valve)	Correct Correct Replace Replace Replace

Main Symptoms' Sub-Symptoms'	Engine Stalls					Others	
	Soon after starting	After accelerator pedal depressed	After accelerator pedal released	During A/Con ON	Excessive fuel	Engine overheats	Engine over cools
Check points							
Fuel quality	1				2		
Fuel pressure regulator	2	5					
Fuel pump	3						
Fuel lines	4	6					
EGR system	5	2	2		6		
Idle speed actuator	6		1	2			
AFS circuit	7	1	3		14		
Coolant temp sensor circuit	8				12		
Injectors	9	7			11		
ECU	10	8	4	3	17		
TPS circuit		3			13		
Spark plug		4			7	8	
A/Con circuit				1	15		
Fuel leakage					1		
Accelerator pedal link					3		
Clutch [M/T]					4		
Brakes drag when released					5		
Compression					8		
Piston ring					9		
Ignition timing					10		
O ₂ sensor circuit					16		
Intake air temp. sensor circuit					17		
Coolant leakage						1	
Cooling fan						2	1
Thermo switch						3	
Radiator and radiator cap						4	
Thermostat						5	2
Timing belt						6	
Water pump						7	
Oil pump						9	
Cylinder head						10	
Cylinder block						11	
Water temp gauge unit (sender)						12	3

NOTE

The number herein means the check order.

MPI SYSTEM INSPECTION

If the MPI system components (sensors, ECU, injector, etc.) fail, interruption or failure to supply the proper amount of fuel for various engine operating conditions will result. The following situations can be encountered.

1. Engine is hard to start or does not start at all.
2. Unstable idle
3. Poor driveability

If any of the above conditions is noted, first perform an inspection by self-diagnosis and subsequent basic engine checks (ignition system malfunction, incorrect engine adjustment, etc.), and then inspect the MPI system components with the multi-use tester (MUT).

NOTES

- 1) Before removing or installing any part, read the diagnosis code and then disconnect the battery negative (-) terminal.
- 2) Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of battery cable during engine operation or while the ignition switch is ON could cause damage to the ECU.
- 3) The control harnesses between the ECU and oxygen sensor are shielded wires with the shield grounded to the body in order to prevent the influence of ignition noises and radio interference. When the shielded wire is faulty the control harness must be replaced.

Malfunction Indicator Light (U.S.A. only)

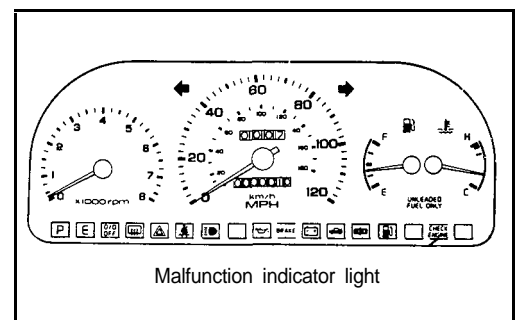
A malfunction indicator light comes on to notify the driver of the emission control items when an irregularity is detected.

However, when an irregular signal returns to normal, the malfunction indicator light will go out.

Immediately after the ignition switch is turned on, the malfunction indicator light is lit for 5 seconds to indicate that the malfunction indicator light operates normally.

Item Indicated By The MIL

- o Electronic Control Unit
- o Oxygen sensor
- o Air-flow sensor
- o Intake air temperature sensor
- o Throttle position sensor
- o Motor position sensor
- o Coolant temperature sensor



- o Crank angle sensor
- o No.1 cylinder top dead center sensor
- o Barometric pressure sensor
- o Injector
- o EGR temperature sensor (Only California Vehicles)

MIL (Malfunction Indicator Light) Inspection

1. Check that when the ignition switch is turned on the light illuminates for about 5 seconds and then goes out.
2. If the light does not illuminate, check for open circuit in harness, blown fuse and blown bulb.

SELF-DIAGNOSIS

The ECU monitors the input/output signals (some signals at all times and the others under specified conditions).

When the ECU detects that an irregularity memorize the trouble code, and outputs the signal to the self-diagnosis output terminal. There are 14 diagnosis items, including the normal state, and the diagnosis results can be read out with voltmeter or Multi-use tester. Trouble codes will remain in the ECU as long as battery power is maintained. The trouble codes will, however, be erased when the battery terminal or the engine control unit connector is disconnected.

NOTE

If the sensor connector is disconnected with the ignition switch turned on, the diagnosis code is memorized. In this case, disconnect the battery negative terminal (-) for 15 seconds or more, and the diagnosis memory will be erased.

CHECKING PROCEDURE (SELF-DIAGNOSIS)

NOTE

- 1) When battery voltage is low, trouble codes can not be read. Be sure to check the battery for voltage and other conditions before starting the test.
- 2) Diagnosis memory is erased if the battery or the ECU connector is disconnected. Do not disconnect the battery before the trouble codes are completely read.

Inspection Procedure (Using Multi-Use Tester)

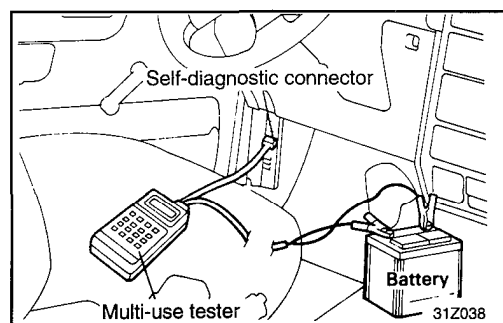
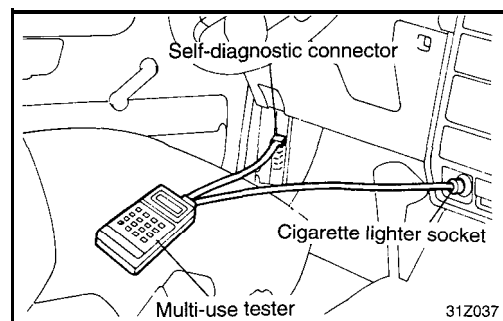
1. Turn OFF the ignition switch.
2. Connect the multi-use tester to the diagnosis connector in the fuse box.
3. Connect the power-source terminal of the multi-use tester to the cigarette lighter socket.
4. Turn ON the ignition switch.
5. Use the multi-use tester to check the self-diagnosis codes.
6. Repair the faulty part from the diagnosis chart.
7. Erase the malfunction code.

NOTE

- 1) Select 4. "SPECIAL TEST" from the function selection menu of the multi-use tester.
 - 2) Then select Item No.5 "ERASE DIAG".
 - 3) Press the YES key when "ERASE DIAG. CODE ?" is displayed.
 - 4) Enter ID code "19".
 - 5) Press the CLEAR key when "FINISHED ERASING DIAG. CODE" is displayed.
 - 6) Read the self-diagnosis output and check output of correct code.
8. Disconnect the multi-use tester.

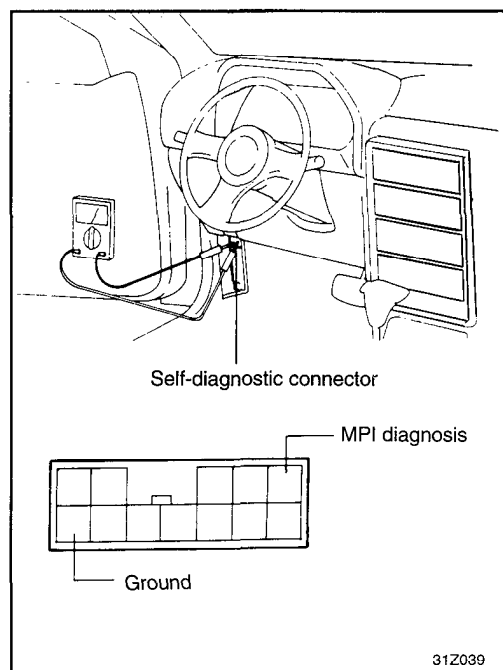
NOTE

When the ignition key is in the ST position, the cigarette lighter power is OFF. If a test needs to be made during cranking, use the battery clamp harness provided.






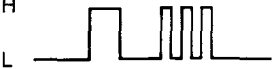



Inspection Procedure (Using Voltmeter)


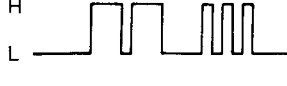

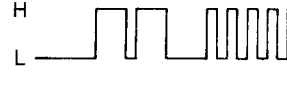


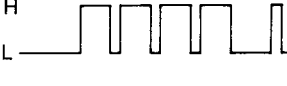
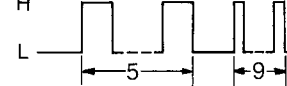
1. Connect the voltmeter to the self diagnosis terminal.
2. Turn the ignition switch, and the engine control unit memory contents will immediately start.
After recording the abnormal item, check and repair each part according to the check items in "Diagnosis Chart".
3. When the defective parts have been repaired, disconnect the negative terminal of the battery cable for 15 seconds or more and connect it again to make sure that the trouble code has been erased.

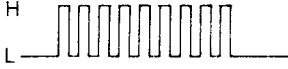


Diagnosis Chart

The 16 diagnosis items are provided as follows, and if plural items are activated, they are all indicated sequentially from the smallest code number.

Output preference order	Diagnosis item	Trouble code			Check item (Remedy)
		Output signal pattern	No.	Memory	
1	Engine control unit	 31J062	-	-	(Replace engine control unit)
2	Oxygen sensor (Front)	 31J063	11	Retained	<ul style="list-style-type: none"> o Harness and connector o Fuel pressure o Injectors (Replace if defective.) o Intake air leaks o Oxygen sensor (Front)
3	Air flow sensor	 31Y064	12	Retained	<ul style="list-style-type: none"> o Harness and connector (If harness and connector are normal, replace air flow sensor assembly.)
4	Air temperature sensor	 31Y065	13	Retained	<ul style="list-style-type: none"> o Harness and connector o Air temperature sensor
5	Throttle position sensor	 31Y066	14	Retained	<ul style="list-style-type: none"> o Harness and connector o Throttle position sensor o Idle position switch
6	Motor position sensor	 31Y067	15	Retained	<ul style="list-style-type: none"> o Harness and connector o Motor position sensor
7	Coolant temperature sensor	 31Y068	21	Retained	<ul style="list-style-type: none"> o Harness and connector o Coolant temperature sensor

Output preference order	Diagnosis item	Trouble code			Check item (Remedy)
		Output signal pattern	No.	Memory	
8	Crank angle sensor	 31Y069	22	Retained	<ul style="list-style-type: none"> o Harness and connector If harness and connector are normal, replace distributor assembly.)
9	No.1 cylinder top dead center sensor	 31Y070	23	Retained	<ul style="list-style-type: none"> o Harness and connector If harness and connector are normal, replace distributor assembly.)
10	Vehicle speed sensor (reed switch)	 31Y071	24	Retained	<ul style="list-style-type: none"> o Harness and connector o Vehicle-speed sensor (reed switch)
11	Barometric pressure sensor	 31Y072	25	Retained	<ul style="list-style-type: none"> o Harness and connector If harness and connector are normal, replace barometric pressure sensor assembly.)
12	Injector	 31Y073	41	Retained	<ul style="list-style-type: none"> o Harness and connector o Injector coil resistance
13	Fuel pump	 31Y074	42	Retained	<ul style="list-style-type: none"> o Harness and connector o Control relay
14	EGR*	 31Y075	43	Retained	<ul style="list-style-type: none"> o Harness and connector o EGR temperature sensor o EGR valve o EGR control solenoid valve o EGR valve control vacuum
15	Oxygen sensor (Rear)	 31Y076	59	Retained	<ul style="list-style-type: none"> o Harness and connector o Fuel pressure o Injectors o Intake air leaks o Oxygen sensor (Rear)

Output preference order	Diagnosis item	Trouble code			Check item (Remedy)
		Output signal pattern	No.	Memory	
16	Normal state		-	-	-

NOTE

1. Replace the engine control unit if a trouble code is read although the inspection reveals that there are no problems with the diagnosis item.
2. The diagnostic item marked* is applicable to the California vehicles only.

SERVICE ADJUSTMENT PROCEDURES

Idle Speed Check Procedures

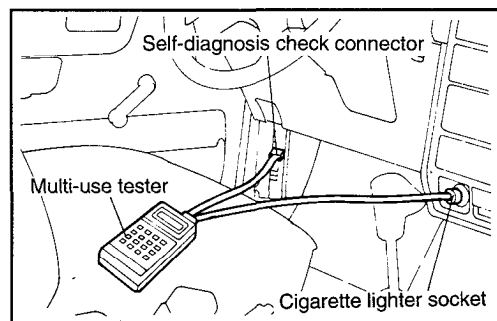
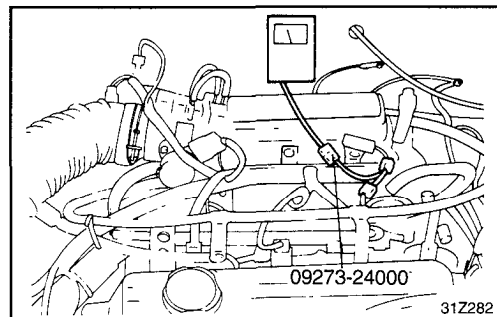
NOTE:

Before adjusting, check that the spark plugs, injectors, ISC servo, compression etc. are normal.

Checking conditions;

- o Engine coolant temperature is 80 to 95°C (176 to 205°F).
 - o Lights, electric cooling fan and all accessories are off.
 - o Transaxle is in neutral ["P" or "N" range for A/T vehicles].
 - o Steering wheel is straight forward position (Vehicles with power steering).
1. Install the tachometer (Disconnect the noise filter connectors and connect the S.S.T 09273-24000 between them. Then, connect the tachometer to the S.S.T) and the timing light, or connect the multi-use tester to the diagnostic connector in the fuse box.
 2. Start and run the engine at curb idle speed.
 3. Run the engine for more than 5 seconds at an engine speed of 2,000 to 3,000 rpm.
Run the engine at idle for 2 minutes.
 4. Read the idling rpm. If the multi-use tester is used, press code No.22 and read the idling rpm. If it is not within specification the basic ignition timing need to be checked first.

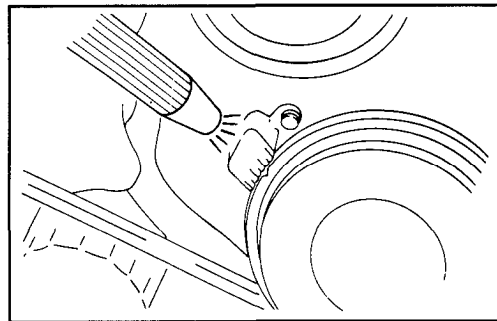
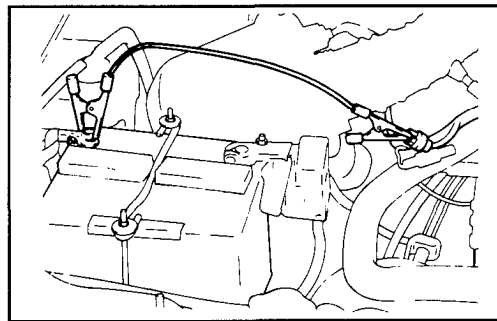
Idle speed 700 ± 100 rpm



Basic Ignition Timing Checking

5. With the engine stopped, connect a lead wire with alligator clips to the terminal for ignition-timing adjustment (located in the engine compartment), and ground it.
6. Start the engine and run at the curb idle speed. Check the basic ignition timing.

Basic ignition timing 5° ± 2° BTDC (At idle)



7. If there is a deviation from the standard value, loosen the distributor's holding nut, and then turn the distributor itself and make the necessary adjustment.

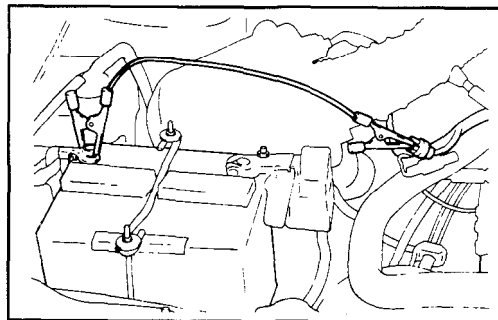
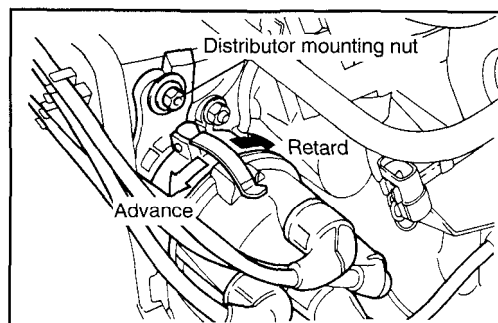
NOTE

The ignition timing will be advanced if the distributor is turned to the left and retarded if it is turned to the right. After adjustment, tighten the mounting nut.

CAUTION

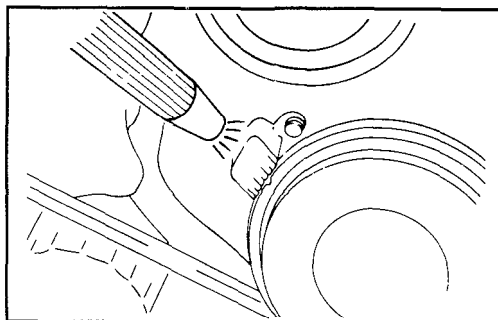
Be careful, when tightening the nut, that the distributor does not move.

8. Stop the engine and disconnect the lead wire connected.



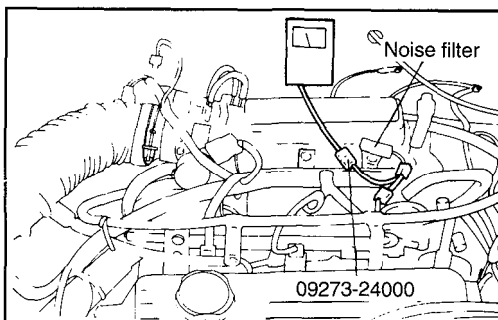
9. Start and run the engine at idle speed and check that the actual ignition timing at idle is correct.

Actual ignition at idle : 10°BTDC

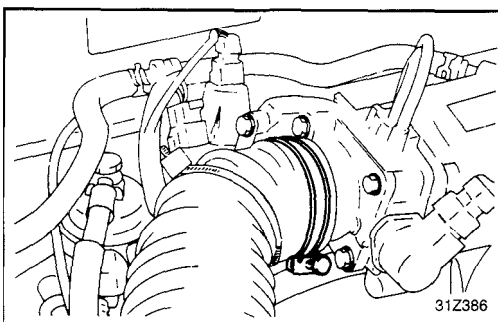


10. Check the curb idle speed again.
If the engine speed is out of specification, go to the next step.

Basic idle speed 700 ± 100 rpm

**Throttle Valve Area Cleaning**

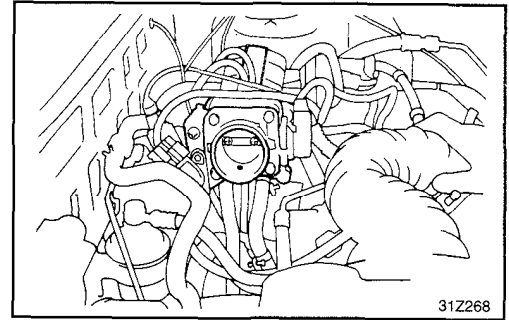
11. Stop the engine and remove the air intake hose from the throttle body, check the throttle valve blade and throttle body bore for carbon deposits, rotating the valve.



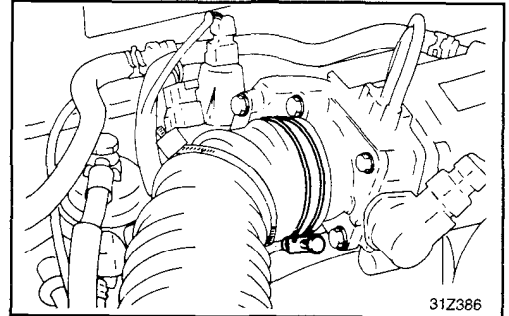
12. Using a shop towel, wipe out carbon deposits from the throttle valve blade and throttle body bore.

NOTE

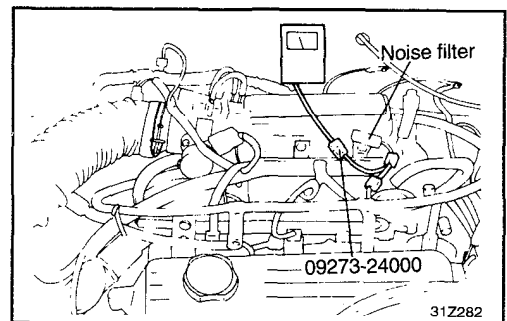
If necessary, spray cleaning solvent to the throttle valve area and leave it for about 5 minutes.



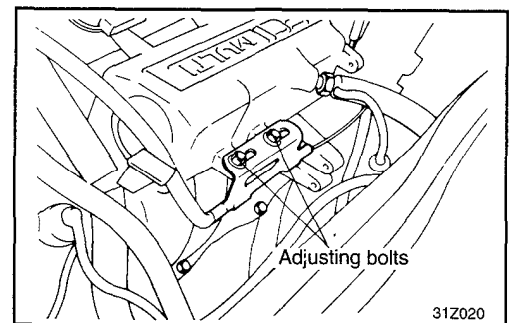
13. Attach the air intake hose.



14. Start the engine and check the curb idle speed under checking conditions.
If the engine speed is out of specification, follow the next step.

**Idle Speed Adjusting**

15. Loosen the accelerator cable.

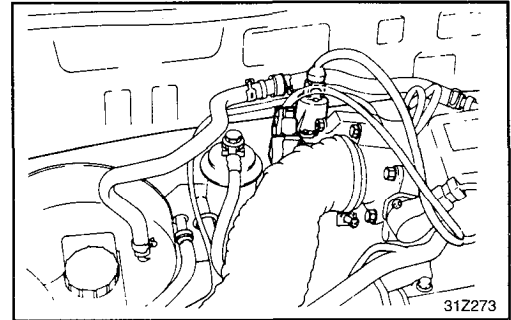


16. Turn the ignition switch to ON (do not start the engine) and leave it in that position for 15 seconds or longer; then check to be sure that the idle speed control servo is fully retracted to the curb idle position or the throttle valve cam is moved.

NOTE

When the ignition switch is turned to ON, the ISC plunger extends to the fast idle position opening; then, after 15 seconds, it retracts to the fully close (curb idle) position.

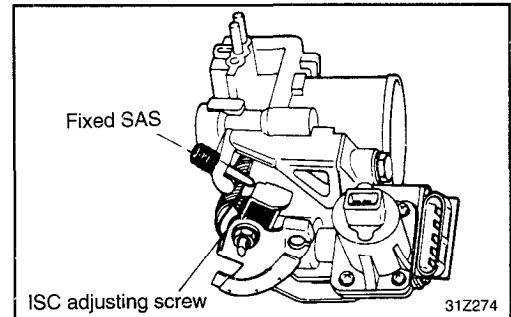
17. Turn the ignition switch OFF.
Disconnect the ISC motor connector.



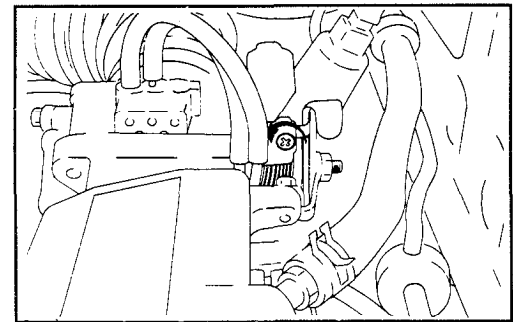
18. In order to prevent the throttle valve from sticking, open it two or three times; then release it to let it click shut, and sufficiently loosen the fixed SAS.
Start the engine and let it run at idle speed.
Adjust the ISC adjusting screw to obtain the standard rpm.

NOTE

The engine speed on a new vehicle driven less than 500 Km (300 miles) may be 20 to 100 rpm lower than specification, but no adjustment is necessary.



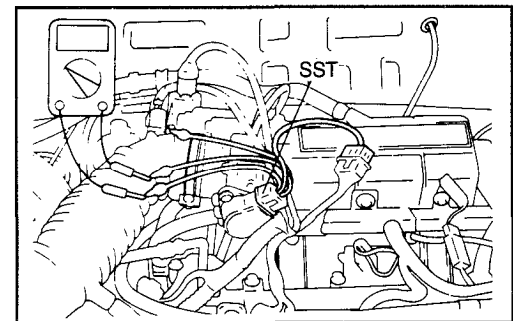
19. Tighten the fixed SAS until the engine speed starts to increase.
Then, loosen it until the engine speed ceases to drop (touch point) and then loosen a half turn from the touch point.
Stop the engine.



Throttle Position Sensor Adjusting

20. Turn the ignition switch to ON (do not start engine) and check that the TPS output voltage is as specified.
Using special service tool (09351-33000) connect a digital-type voltmeter.
If the multi-use tester is used, press code No.14 and read the voltage.

Standard value 480-520 mV



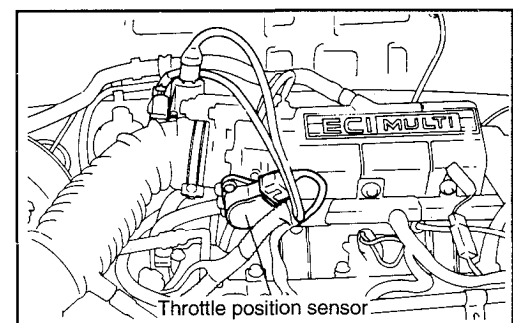
21. If it is out of specification, loosen TPS mounting screws and adjust by turning the TPS.

NOTE

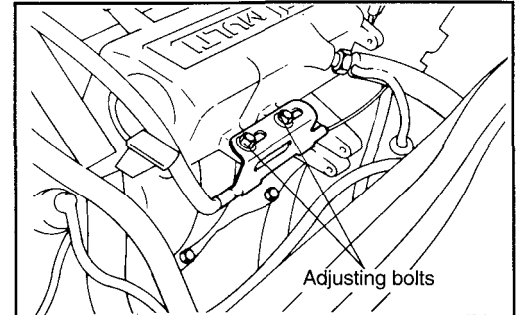
Turning the TPS clockwise increases the output voltage.

CAUTION

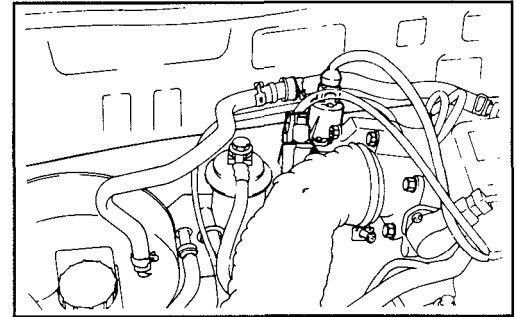
Tighten the screws securely after adjustment.



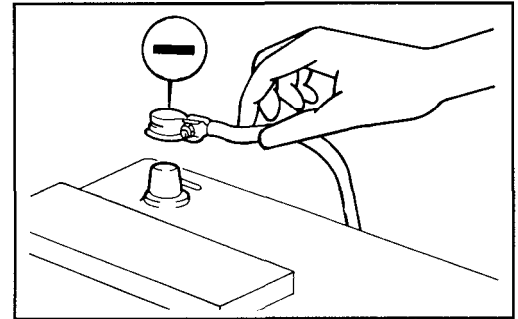
22. Turn the ignition switch to the OFF position. Adjust the accelerator cable.



23. Connect the ISC motor connector.

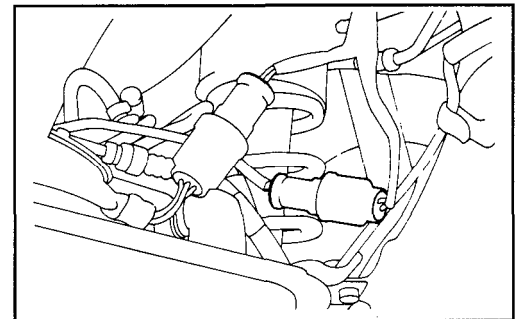


24. Start the engine and check to be sure that the idle speed is correct.
Turn the ignition switch OFF and disconnect the battery terminal for 15 seconds and then re-connect. (This erases the data stored in memory during the ISC adjustment).



Fuel Filter Replacement

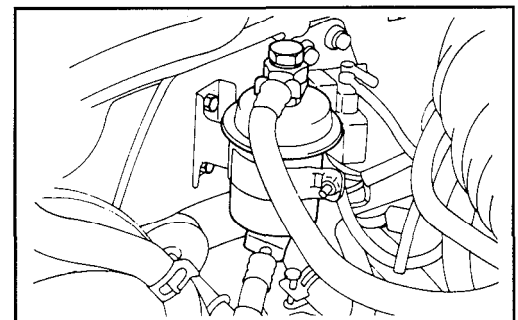
1. Reduce the internal pressure of the fuel pipes and hoses by completing the following operations.
 - o Disconnect the fuel pump harness connector at the rear of the fuel tank.
 - o Start the engine and after it stalls, turn the ignition switch to OFF.
 - o Disconnect the battery negative (-) terminal.
 - o Connect the fuel pump harness connector.
2. Remove the eye bolts while holding the fuel filter nuts securely.



CAUTION

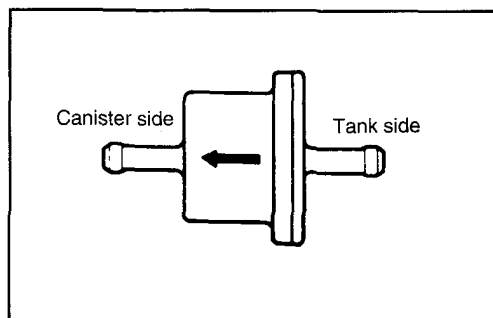
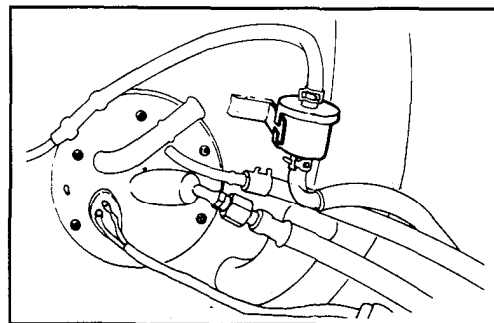
Cover with a shop towel to avoid gasoline from splashing.

3. Remove the fuel filter mounting bolts, then remove the fuel filter clamp.
4. After replacing the fuel filter, check for fuel leaks.

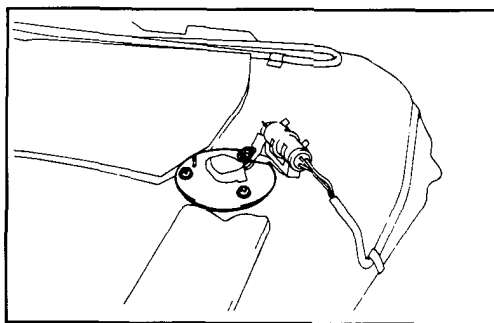


Overfill Limiter (Two-way Valve) Replacement

1. Disconnect the vapor hoses, and then remove the overfill limiter.
2. Connect the overfill limiter in the correct direction

**Fuel Sender Replacement**

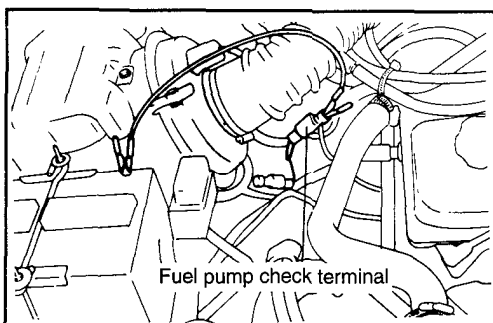
1. Remove the fuel tank cap to lower the fuel tank's internal pressure.
2. Remove the fuel sender installation screws, then remove the fuel sender from the fuel tank.

**Fuel Pump Operation Check**

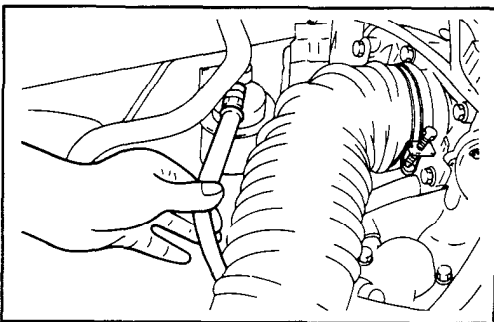
1. Turn the ignition switch to the OFF position.
2. Apply battery voltage to the fuel pump drive connector to check that the pump operates.

NOTE

The fuel pump is in-tank type and its operating sound is hard to hear without removing the fuel tank cap.



3. Pinch the hose to check that fuel pressure is felt.



Fuel Pressure Test

1. Reduce the internal pressure of the fuel pipes and hoses by the following procedures.
 - o Disconnect the fuel pump harness connector at the rear of the fuel tank.
 - o Start the engine and after it stops by itself, turn the ignition switch to the OFF position.
 - o Disconnect the battery negative (-) terminal
 - o Connect the fuel pump harness connector.
2. Remove the upper eye bolt while holding the fuel filter nut securely.

CAUTION

Cover the hose connection with a shop towel to prevent splashing of fuel caused by residual pressure in the fuel line.

3. Using the fuel pressure gauge adapter (09353-24000, 09353-24100, 09353-24200), install the fuel-pressure gauge to the fuel filter. Tighten the bolt to the specified torque.

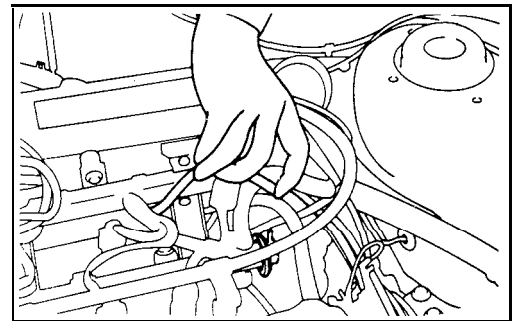
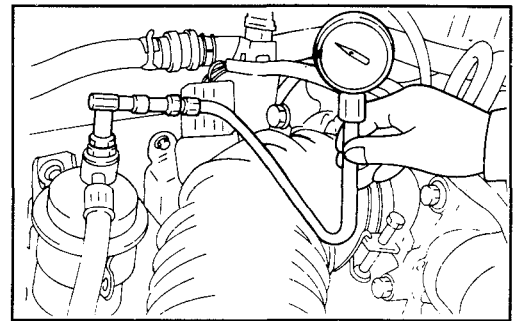
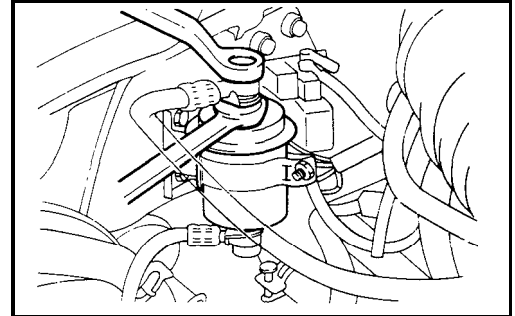
Tightening torque

Fuel pressure gauge to fuel filter
25-35 Nm (250-350 kg.cm, 18-25 lb.ft)

4. Connect the battery's negative (-) terminal.
5. Apply battery voltage to the terminal for the pump drive and activate the fuel pump; then, with fuel pressure applied, check that there is no fuel leakage from the pressure gauge or connection part.

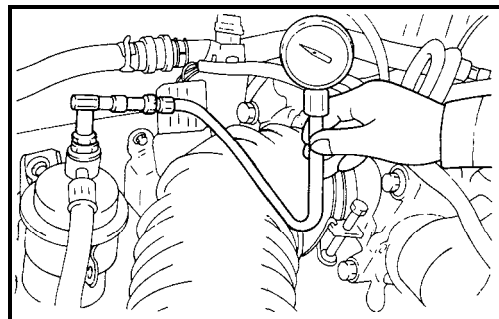
6. Disconnect the vacuum hose from the pressure regulator, and plug the hose end. Measure the fuel pressure at idle.

Standard value
320-340 KPa (3.26-3.47 kg/cm ² , 46-49 psi)



7. Measure the fuel pressure when the vacuum hose is connected to the pressure regulator.

Standard value
Approx. 270 KPa (2.75 kg/cm², 39psi)



8. If the results of the measurements made in steps (6) and (7) are not within the standard value, use the table next page to determine the probable cause, and make the necessary repairs.

Condition	Probable cause	Remedy
Fuel pressure too low	a. Clogged fuel filter. b. Fuel leakage to the return side, caused by poor seating of the fuel-pressure regulator. c. Low discharge pressure of the fuel pump	a. Replace fuel filter b. Replace fuel pressure regulator. c. Check the in-tank fuel hose for leakage or replace the fuel pump
Fuel pressure too high	a. Sticking fuel-pressure regulator b. Clogged or bent fuel return hose or pipe.	a. Replace fuel pressure regulator b. Repair or replace hose or pipe.
There is no difference in fuel pressure when the vacuum hose is connected and when it is not.	a. Clogging, or damaged vacuum hose of the nipple. b. Sticking or poor seating of the fuel-pressure regulator.	a. Repair or replace the vacuum hose or the nipple b. Repair or replace hose or pipe.

9. Stop the engine and check for a change in the fuel pressure gauge reading, which should hold for approximately 5 minutes. If the gauge indication drops, observe the rate of drop. Determine and remove the causes according to the following table.

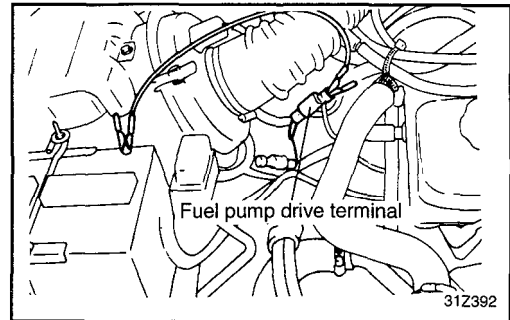
Condition	Probable cause	Remedy
Fuel pressure drops slowly after engine is stopped	a. Injector leakage	a. Replace injector
Fuel pressure drops immediately after engine is stopped	a. The check valve within the fuel pump is open	a. Replace fuel pump

10. Reduce the fuel pressure in the fuel line.
 11. Disconnect the high pressure hose and remove the fuel pressure gauge from the delivery pipe.

CAUTION

Cover the hose connection with a shop towel to prevent splashing of fuel caused by residual pressure in the fuel line.

12. Install a new O-ring in the groove at the end of the high-pressure hose.
13. Connect the high pressure fuel hose to the delivery pipe, and tighten the screws to the specified torque.
14. Check for fuel leaks.
 - o Apply battery voltage to the fuel pump drive terminal to operate the fuel pump.
 - o With pressure, check the fuel line for leaks.



EGR Valve Control Vacuum Check

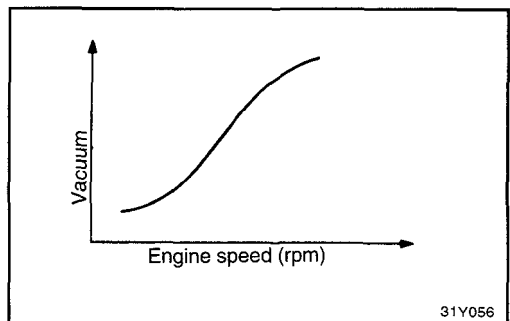
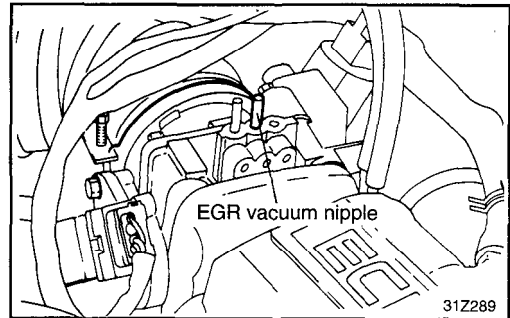
Checking Condition

Engine coolant temperature: 80-95°C (176-205°F)

1. Disconnect the vacuum hose from the throttle body EGR vacuum fitting and connect a hand vacuum pump to the fitting.
2. Start the engine and check to see that, after increasing the engine speed, vacuum raises proportionately to engine speed.

NOTE

If there is a problem with the change in vacuum, it is possible that the throttle body port may be restricted and require cleaning.



Purge Port Vacuum Check

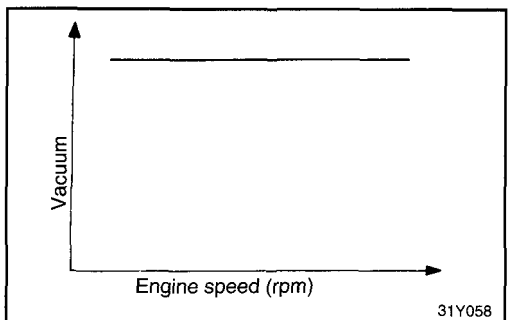
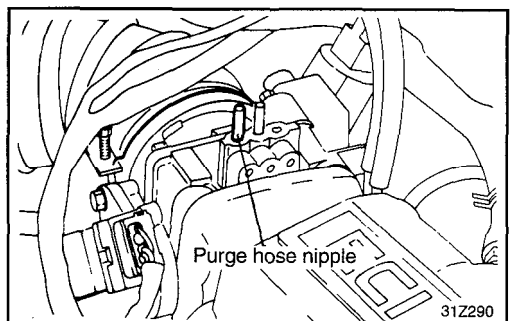
Checking Condition

Engine coolant temperature: 80-95°C (176-205°F)

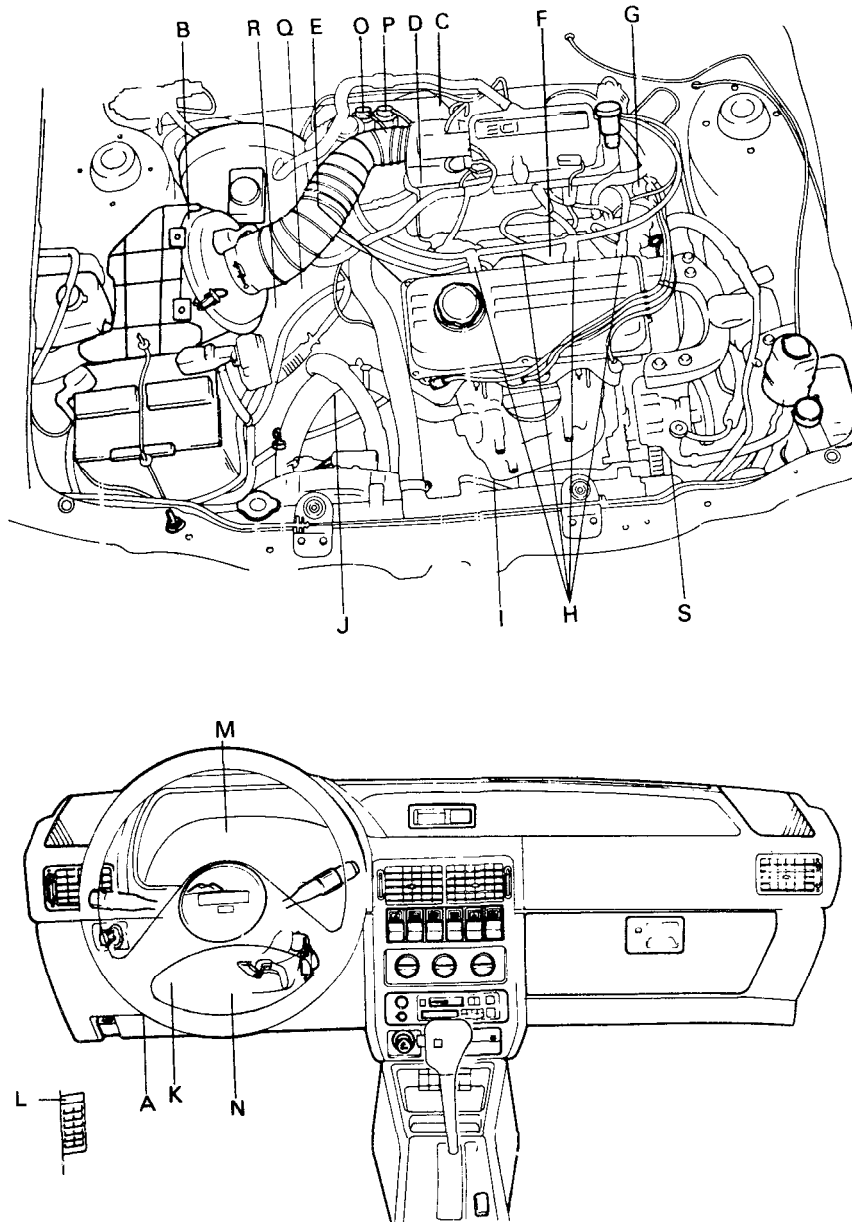
1. Disconnect the vacuum hose from the throttle body purge hose fitting and connect a vacuum pump.
2. Start the engine and check to see that, after increasing the engine speed, vacuum remains fairly constant.

NOTE

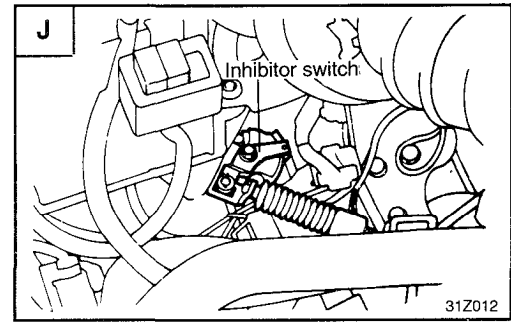
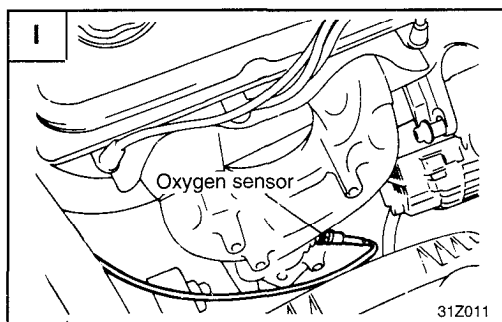
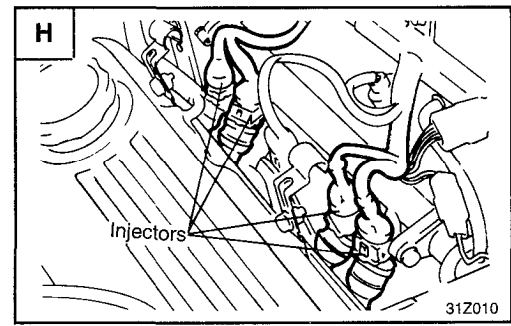
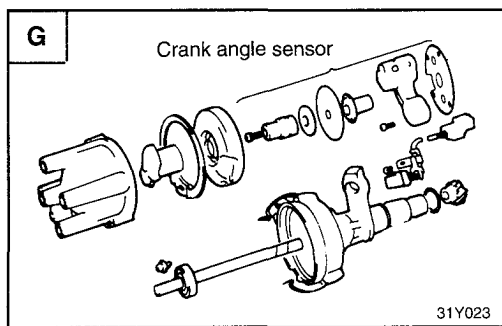
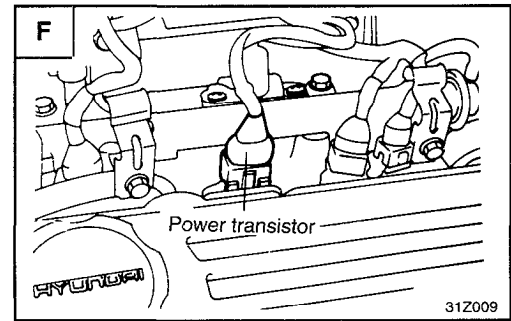
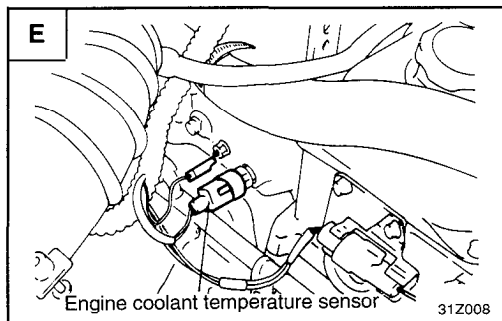
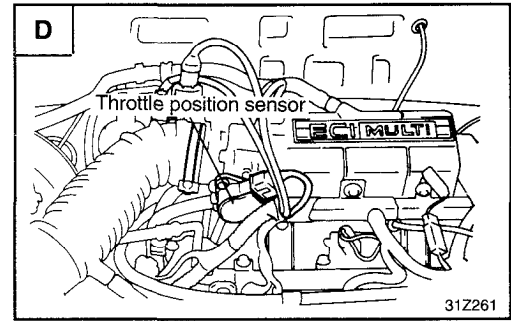
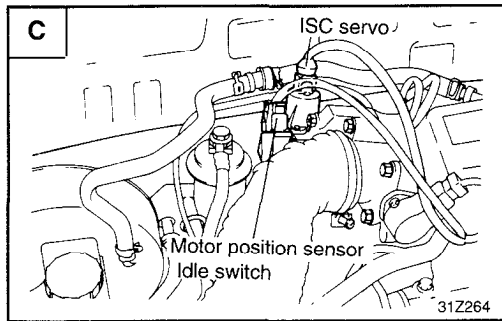
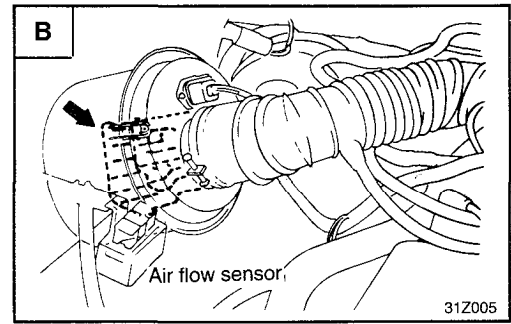
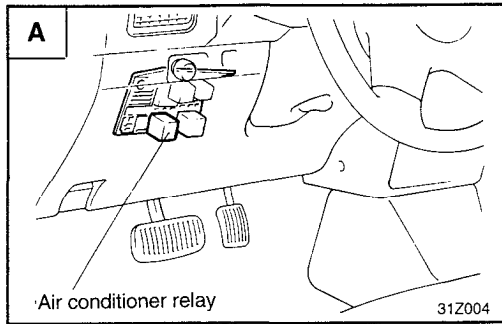
If there is no vacuum created, it is possible that the throttle body port may be restricted and required cleaning.

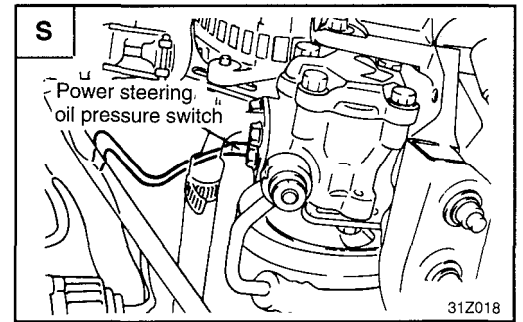
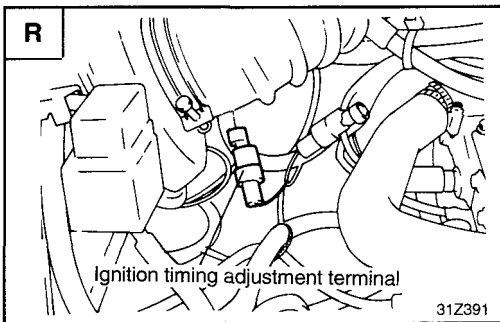
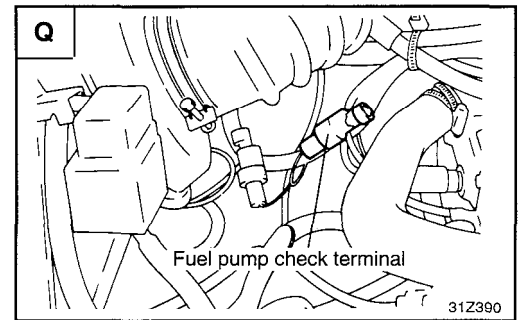
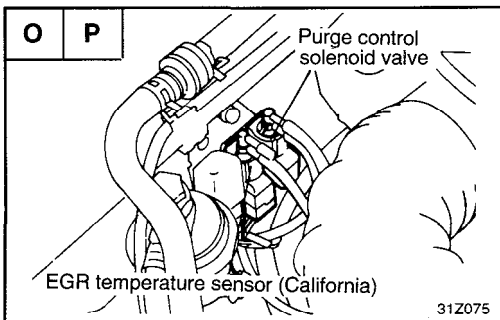
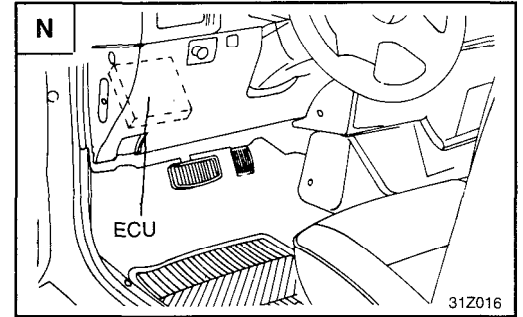
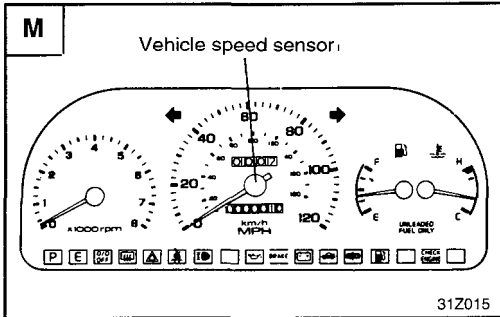
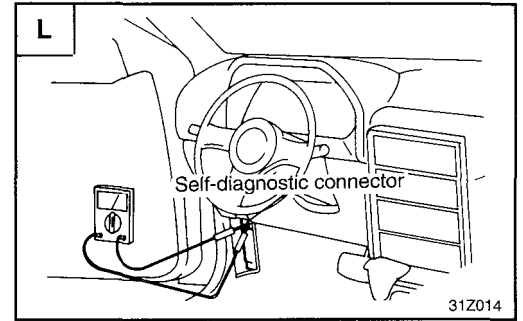
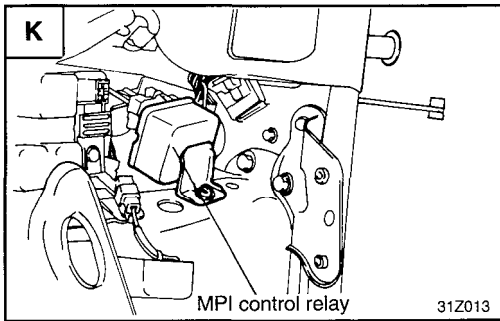


LOCATION OF MPI COMPONENTS



- | | |
|--|---|
| A. Air conditioner relay | J. Inhibitor switch |
| B. Air flow sensor (Including intake air temp sensor and barometric pressure sensor) | K. MPI control relay |
| C. ISC servo | L. Diagnosis terminal |
| D. Throttle position sensor | M. Vehicle speed sensor |
| E. Coolant temperature sensor | N. Electronic control unit |
| F. Power transistor | O. EGR temperature sensor (California only) |
| G. Crank angle sensor and TDC sensor | P. Purge control solenoid valve |
| H. Injectors | Q. Fuel pump check terminal |
| I. Oxygen sensor | R. Ignition timing adjustment terminal |
| | S. Power steering oil pressure switch |



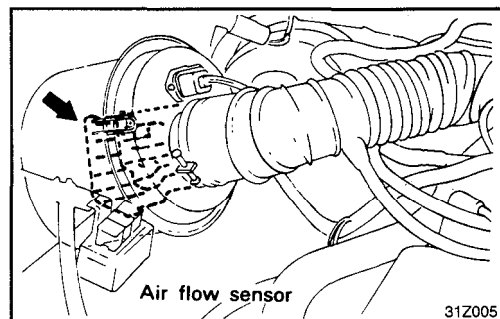


MPI COMPONENTS INSPECTION

AIR FLOW SENSOR (AFS)

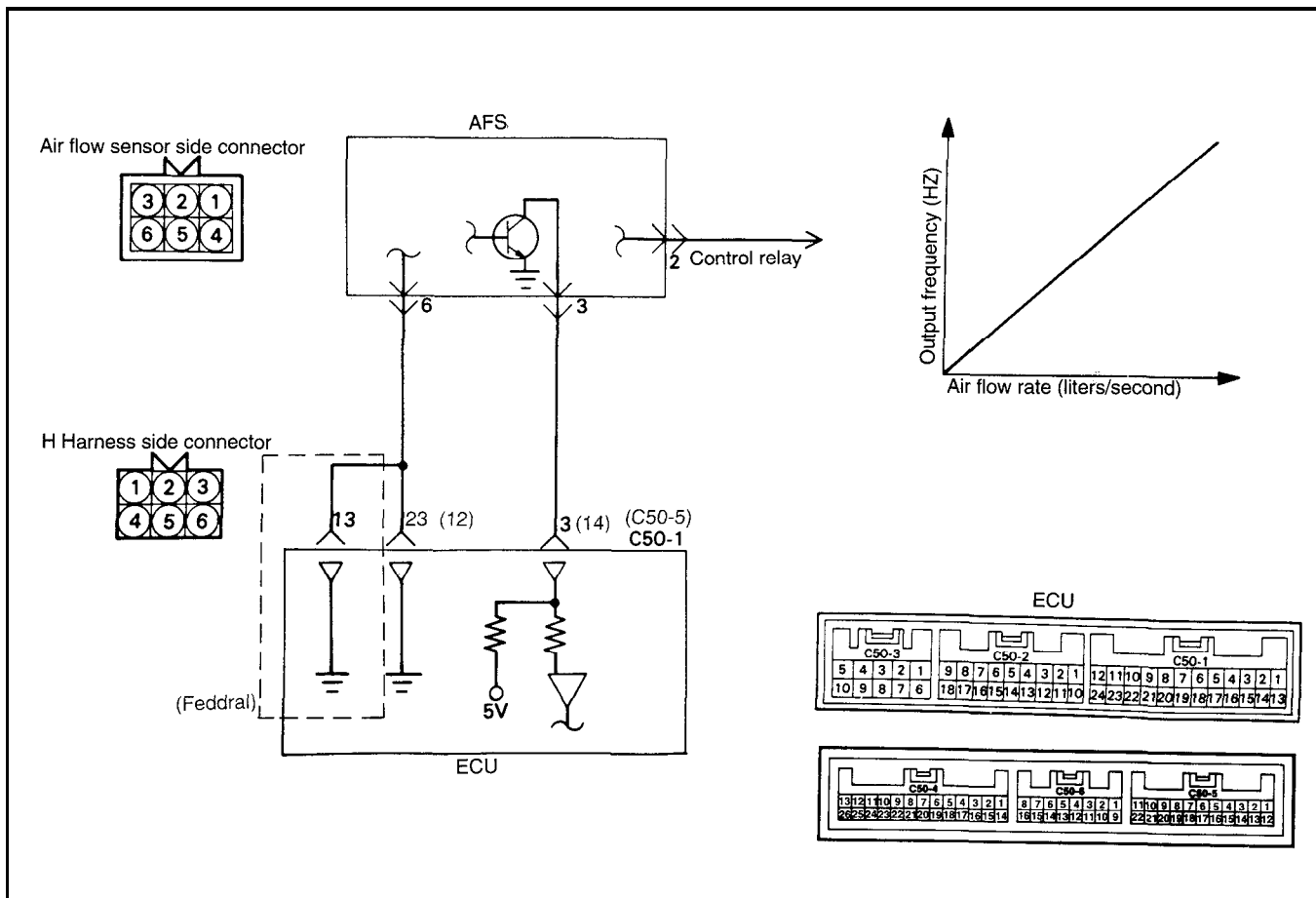
The AFS measures the intake air volume. It makes use of a Karman vortex to detect the air flow rate and sends it to the ECU as the intake air volume signal.

The ECU uses this intake air volume signal to decide the basic fuel injection duration.



Circuit Diagram

() : California only



Troubleshooting Hints

1. If the engine stalls occasionally, crank the engine and shake the AFS harness. If the engine stalls, check for the poor contact of the AFS connector.
2. If the AFS output frequency is other than 0 when the ignition switch is turned on (do not start the engine), Check for the faulty AFS or ECU.
3. If the engine can be idle even if the AFS output frequency is out of specification, check for the following conditions:
 - 1) Disturbed air flow in the AFS.
Disconnected air duct, clogged air cleaner element.
 - 2) Poor combustion in the cylinder.
Faulty ignition plug, ignition coil, injector, incorrect compression.
 - 3) Air leaks in the intake manifold.
 - 4) Loose EGR valve seat.

Using Multi-use Tester

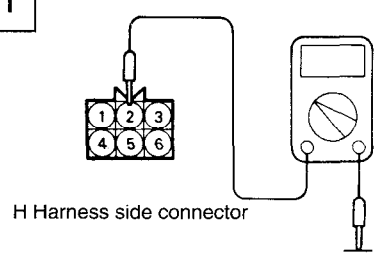
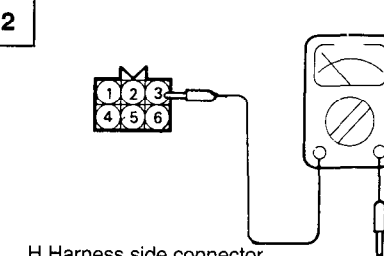
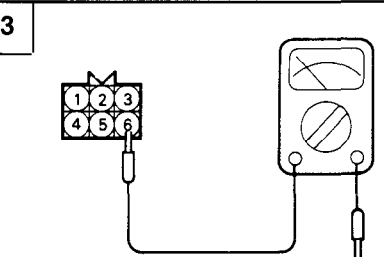
Check Item	Data display	Check conditions	Engine state	Test specification
Air flow sensor o Service data o Item No. 12	Sensor air volume (frequency)	o Engine coolant temperature: 80 to 95°C (176 to 205°F) o Lamps, electric cooling fan, accessory units: All OFF o Transaxle: Neutral (P range for vehicle with A/T) o Steering wheel: Neutral	750 rpm (Idle)	27-33 Hz
			2,000 rpm	60-80 Hz
			Racing	Frequency increases with racing

NOTE

When the vehicle is new [within initial operation of about 500 km (300 miles)], the airflow sensor output frequency may be about 10% higher.

Harness Inspection Procedures

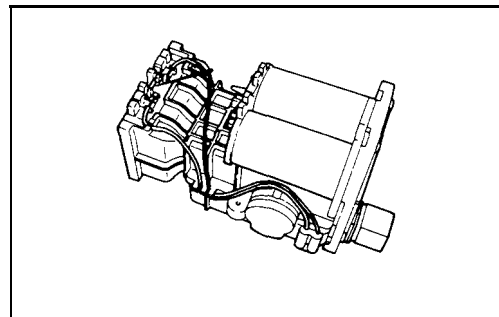
* California only

1  H Harness side connector <small>31J051</small>	Measure the power supply voltage. o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage OK → 2 NG → Repair the harness (H 2 - Control relay) or check the control relay.
2  H Harness side connector <small>31J052</small>	Measure the terminal voltage. o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V OK → 3 NG → Repair the harness. (H 3 - C50-1 3) * (H 3 - C50-5 14)
3  H Harness side connector <small>31J053</small>	Check for continuity of the ground circuit. o Connector: Disconnected OK → END ! NG → Repair the harness. (H 6 - C50-1 23, 13) * (H 6 -C50-5 12)

BAROMETRIC PRESSURE SENSOR

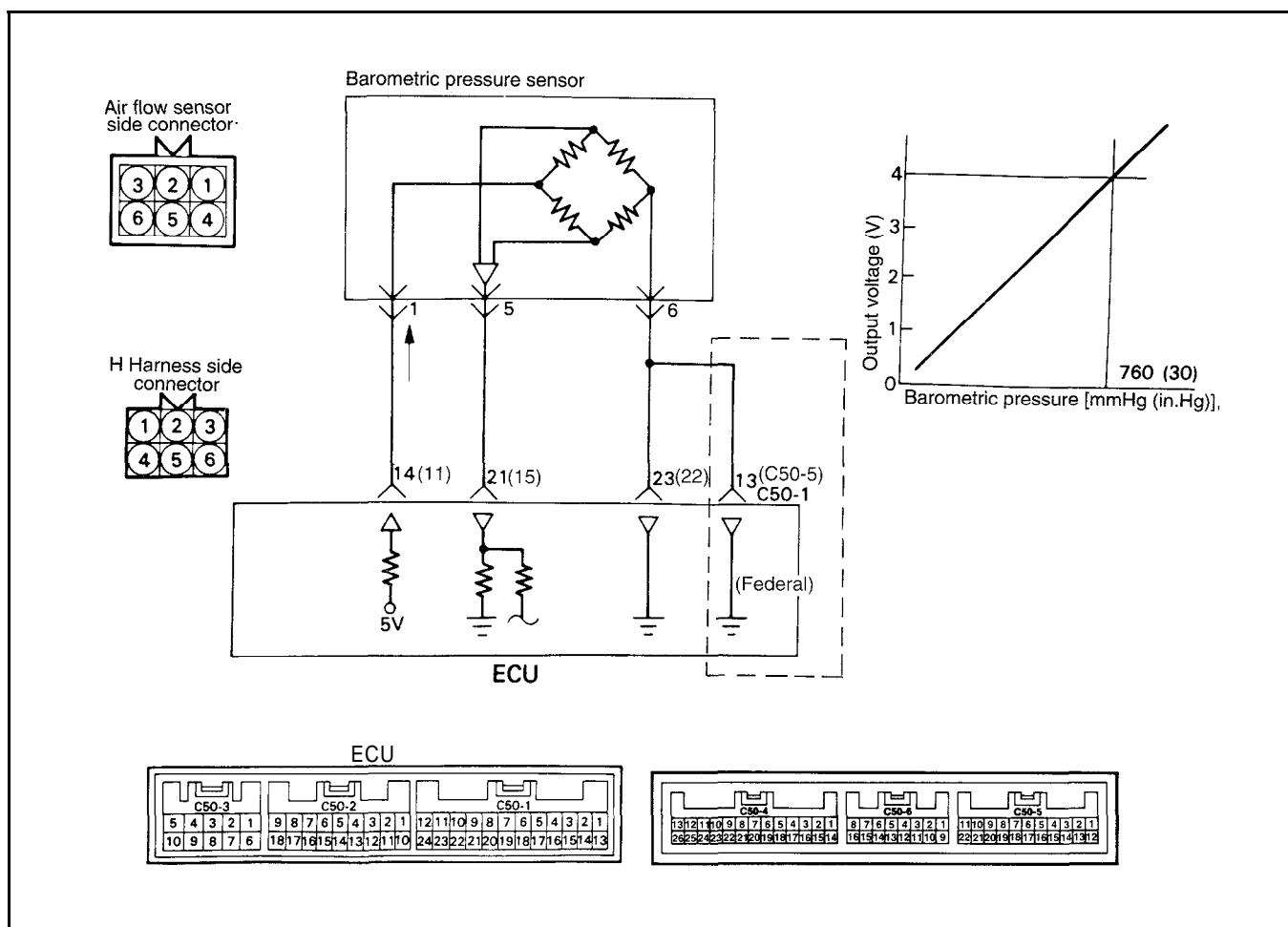
The barometric pressure sensor installed on the AFS senses the barometric pressure and converts it into a voltage which is sent to the ECU.

The ECU uses this signal to compute the altitude at which the vehicle is running and corrects the air-fuel ratio and the ignition timing, thus improving driveability at high altitude.



Circuit Diagram

() : California only



Troubleshooting Hints

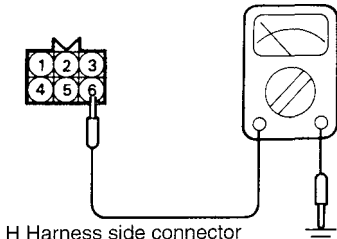
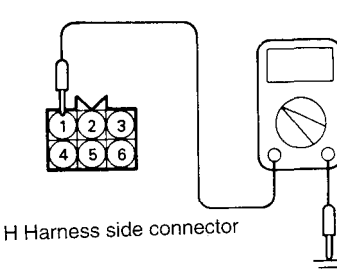
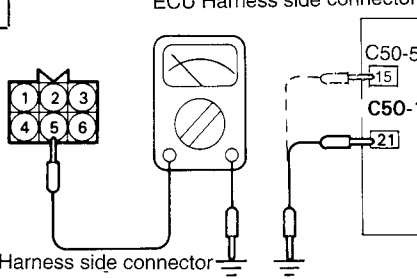
1. If the barometric pressure sensor is faulty, the vehicle will experience poor driveability.
2. If the pressure of the barometric pressure sensor drops greatly during high speed driving, check the air cleaner for clogging.

Using Multi-use Tester

Check Item	Data display	Check conditions	Altitude	Test specification
Barometric pressure sensor o Service data o Item No. 25	Sensor pressure	Check conditions Ignition switch: ON	When 0 m (0 ft.)	760 mmHg
			When 600 m (1,969 ft.)	710 mmHg
			When 1,200 m (3,937 ft.)	660 mmHg
			When 1,800 m (5,906 ft.)	610 mmHg

Harness Inspection Procedures

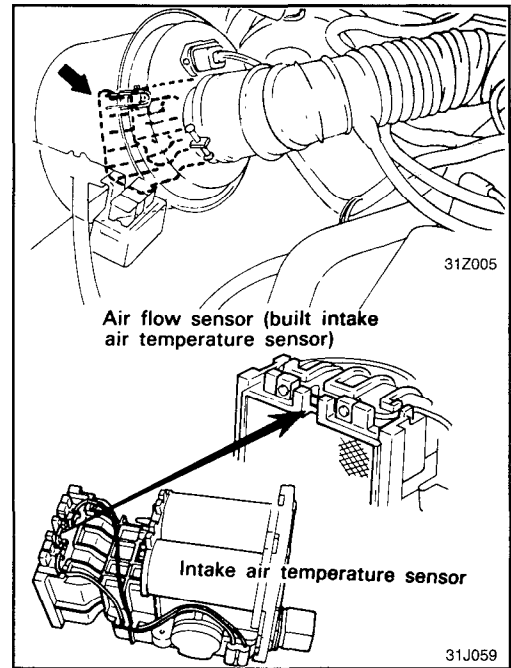
* California only

1  H Harness side connector	Check for continuity of the ground circuit. o Connector: Disconnected OK NG	2 Repair the harness (H6-C50-1 23, 13) *(H6-C50-5 22)
2  H Harness side connector	Measure the power supply voltage of the barometric pressure sensor. o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V OK NG	3 Repair the harness. (H1-C50-1 14) *(H1-C50-5 11)
3  H Harness side connector ECU Harness side connector	Check for an open-circuit, or a short-circuit to ground between the engine control unit and the barometric pressure sensor. o Air flow sensor connector: Disconnected o Engine control unit connector: Disconnected OK NG	END ! Repair the harness. (H5-C50-1 21) *(H5-C50-5 15)

INTAKE AIR TEMPERATURE SENSOR

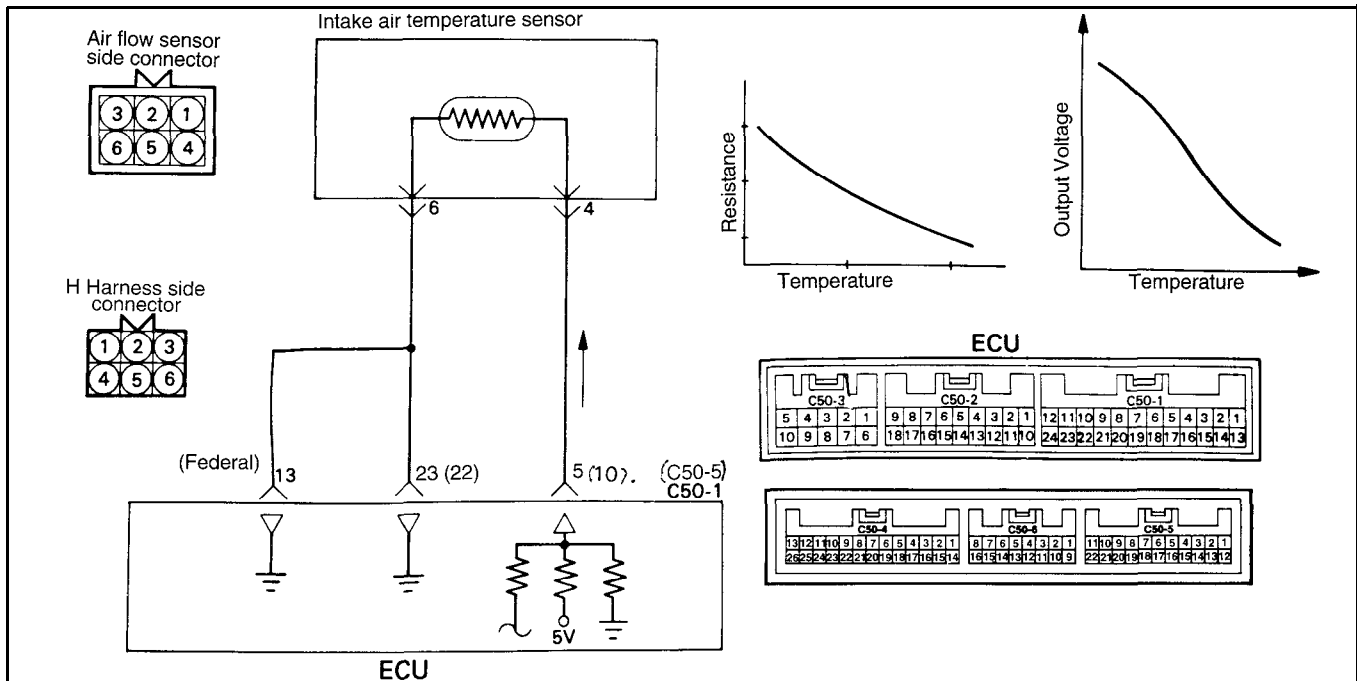
The intake air temperature sensor, located at the illustrated position on AFS, is a resistor-based sensor for detecting the intake air temperature.

According to the intake air temperature information from the sensor, the ECU provides necessary fuel injection amount control.



Circuit Diagram

() : California only



Troubleshooting Hints

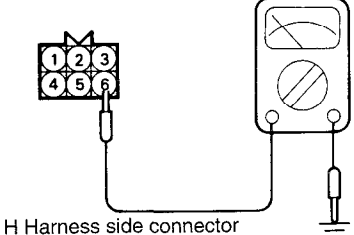
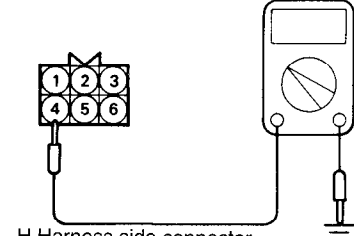
The intake air temperature sensor senses the intake air temperature in the air cleaner to indicate a temperature different from outside temperature.

Using Multi-use Tester

Check Item	Data display	Check conditions	Intake air temperature	Test specification
Intake air temperature sensor o Service data o Item No. 13	Sensor temperature	Ignition switch: ON or engine running	When -20°C (-4°F)	-20°C
			When 0°C (32°F)	0°C
			When 20°C (68°F)	20°C
			When 40°C (104°F)	40°C
			When 80°C (176°F)	80°C

Harness Inspection Procedures

* California only

<div style="border: 1px solid black; padding: 5px; width: 40px; float: left; text-align: center;">1</div>  <p>H Harness side connector</p> <p style="text-align: right;">31J061</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected <p style="text-align: right;">OK →</p> <p style="text-align: right;">NG →</p>	<div style="border: 1px solid black; padding: 5px; width: 40px; float: left; text-align: center;">2</div> <p>Repair the harness (H 6 - C50-1 23 , 13) * (H 6 - C50-5 22)</p>
<div style="border: 1px solid black; padding: 5px; width: 40px; float: left; text-align: center;">2</div>  <p>H Harness side connector</p> <p style="text-align: right;">31J062</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.5-4.9V <p style="text-align: right;">OK →</p> <p style="text-align: right;">NG →</p>	<p>END !</p> <p>Repair the harness. (H 4 - C50-1 5) * (H 4 -C50-5 10)</p>

Sensor Inspection

1. Disconnect the air flow sensor connectors.
2. Measure resistance between terminals 4 and 6.

Temperature [°C (°F)]	Resistance (K Ω)
0 (32)	6.0
20 (68)	2.7
80 (176)	0.4

3. Measure resistance while heating the sensor using a hair drier.

Temperature [C° (°F)]	Resistance (K Ω)
Higher	Smaller

4. If the value deviates from the standard value or the resistance remains unchanged, replace the air flow sensor assembly.

