

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

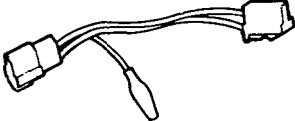
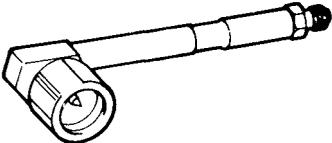
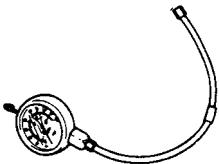
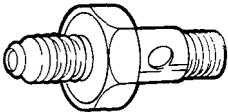
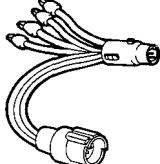
Basic ignition timing	BTDC $5^{\circ} \pm 2^{\circ}$ at curb idle
Curb idle speed	700 ± 100 rpm
Throttle-position sensor (TPS) adjustment voltage	480-520 mV at curb idle

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.

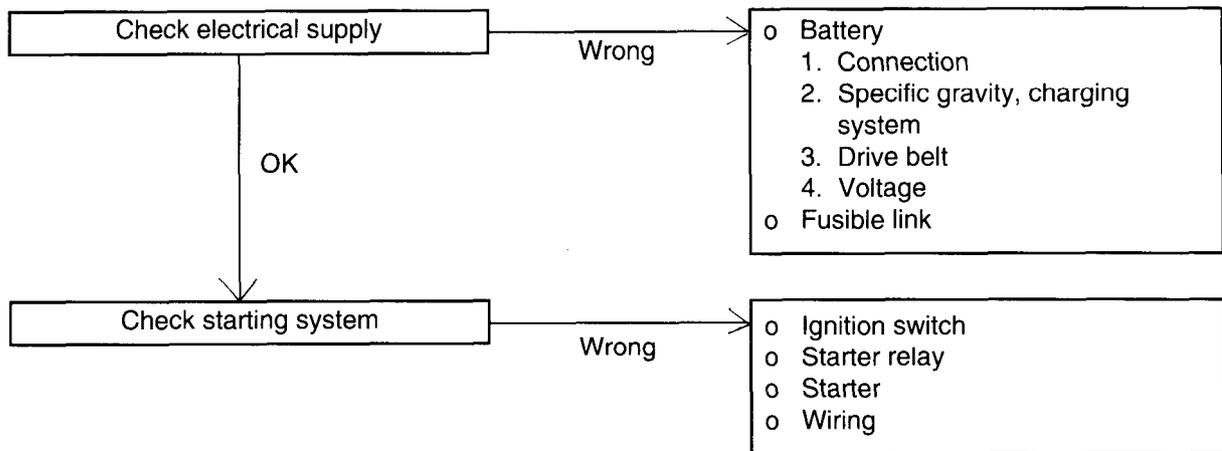
1. Power supply
 - 1) Battery
 - 2) Fusible link
 - 3) Fuse**
2. Body ground
3. Fuel supply
 - 1) Fuel line
 - 2) Fuel filter
 - 3) Fuel pump
4. Ignition system
 - 1) Spark plug
 - 2) High-tension cable
 - 3) Distributor
 - 4) Ignition coil
5. Emission control system
 - 1) PCV system
 - 2) EGR system**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

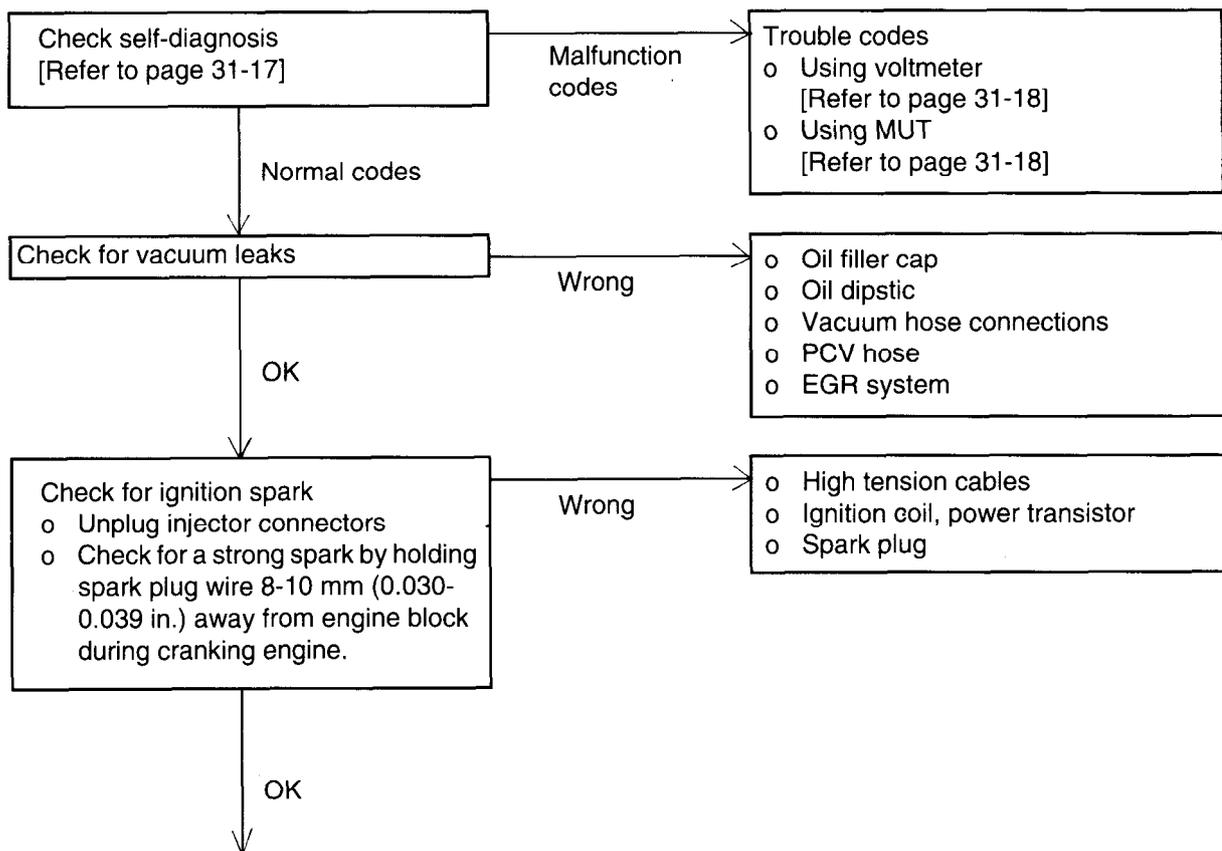
PROBLEM

Engine will not start

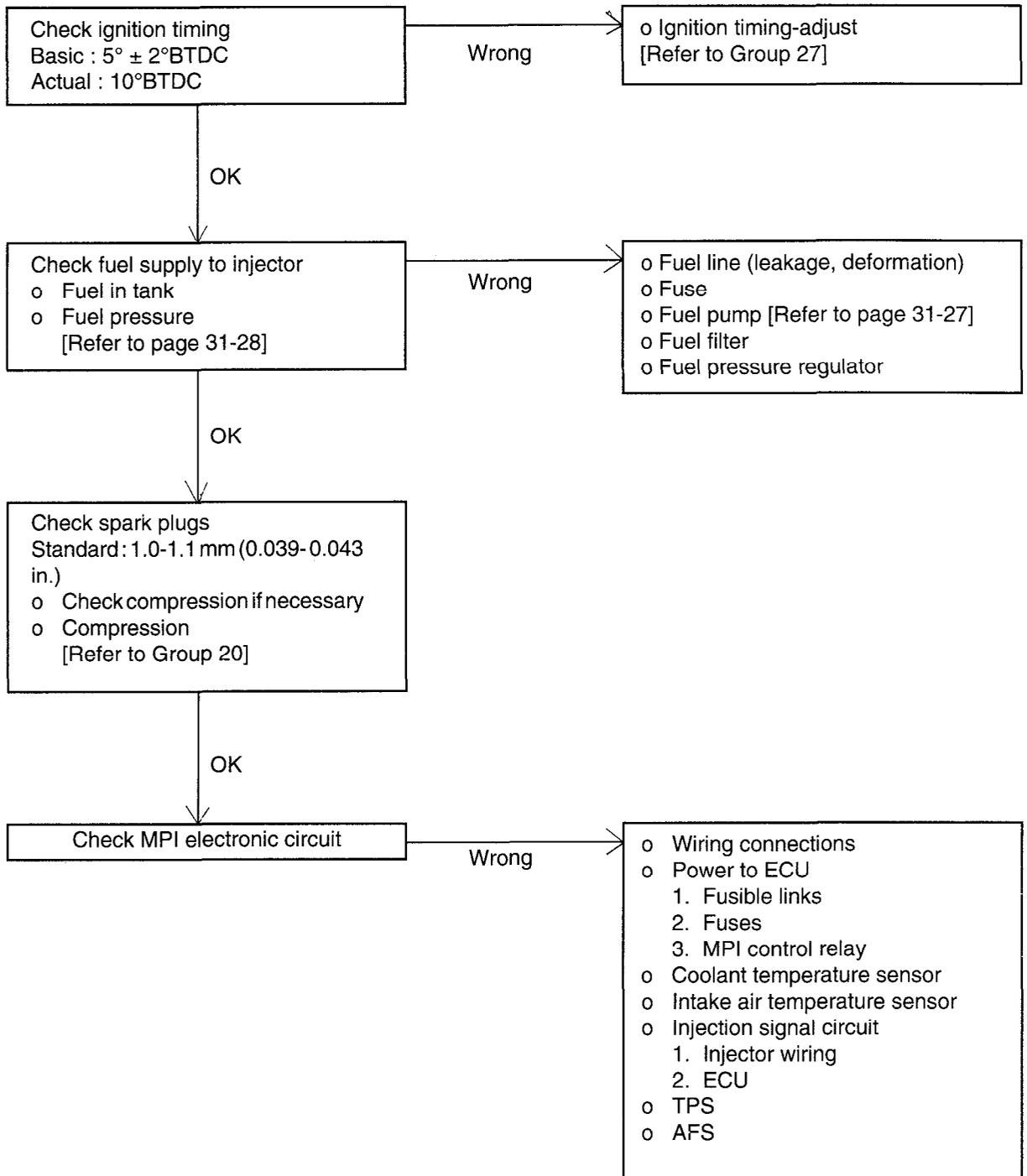


PROBLEM

Hard to start (Crank OK)

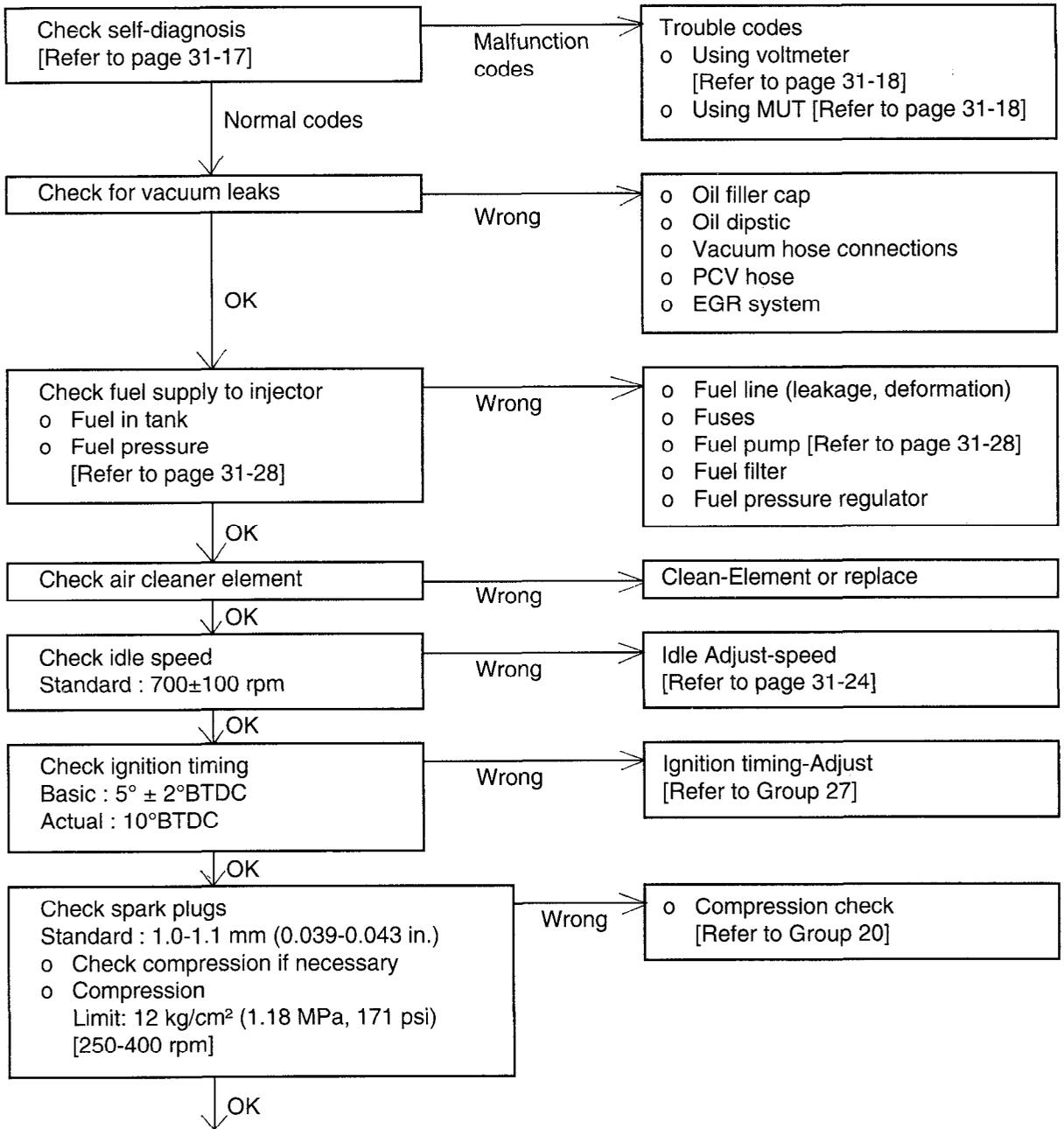


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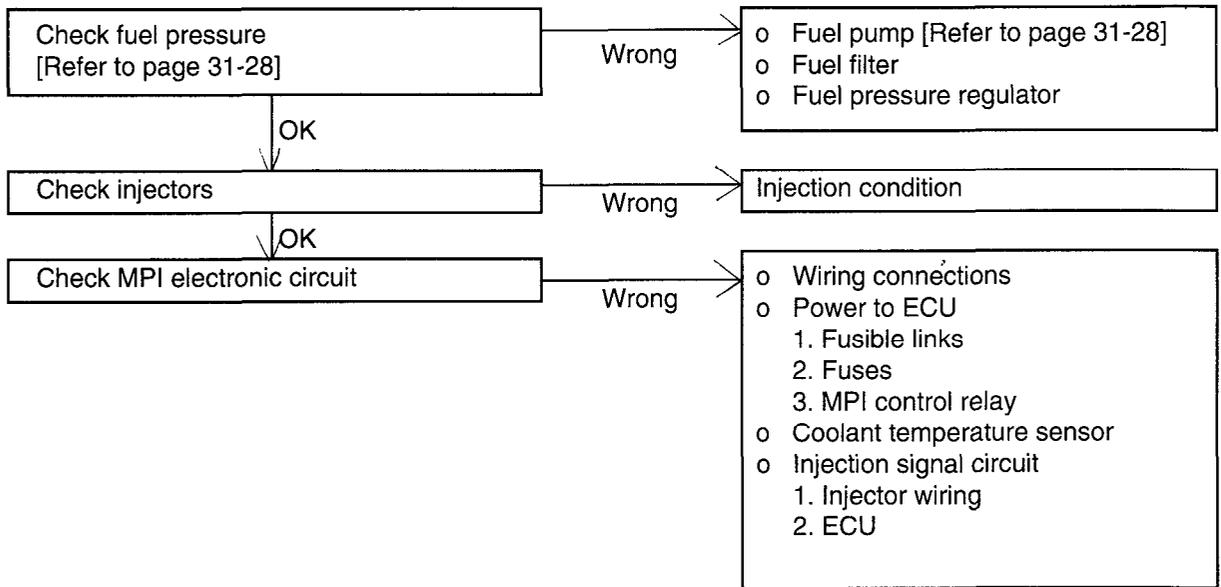


PROBLEM

Rough idle or engine stalls

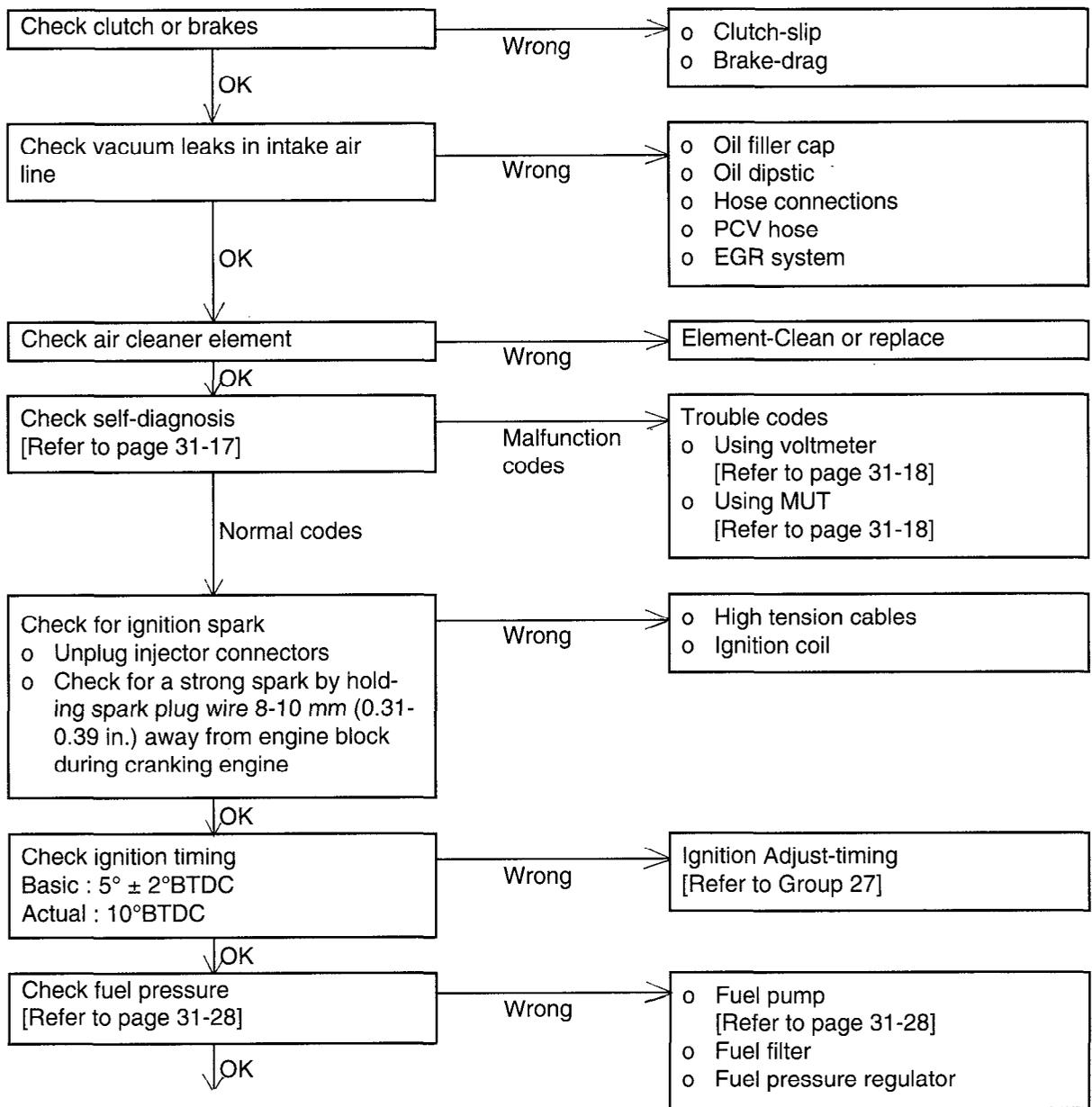


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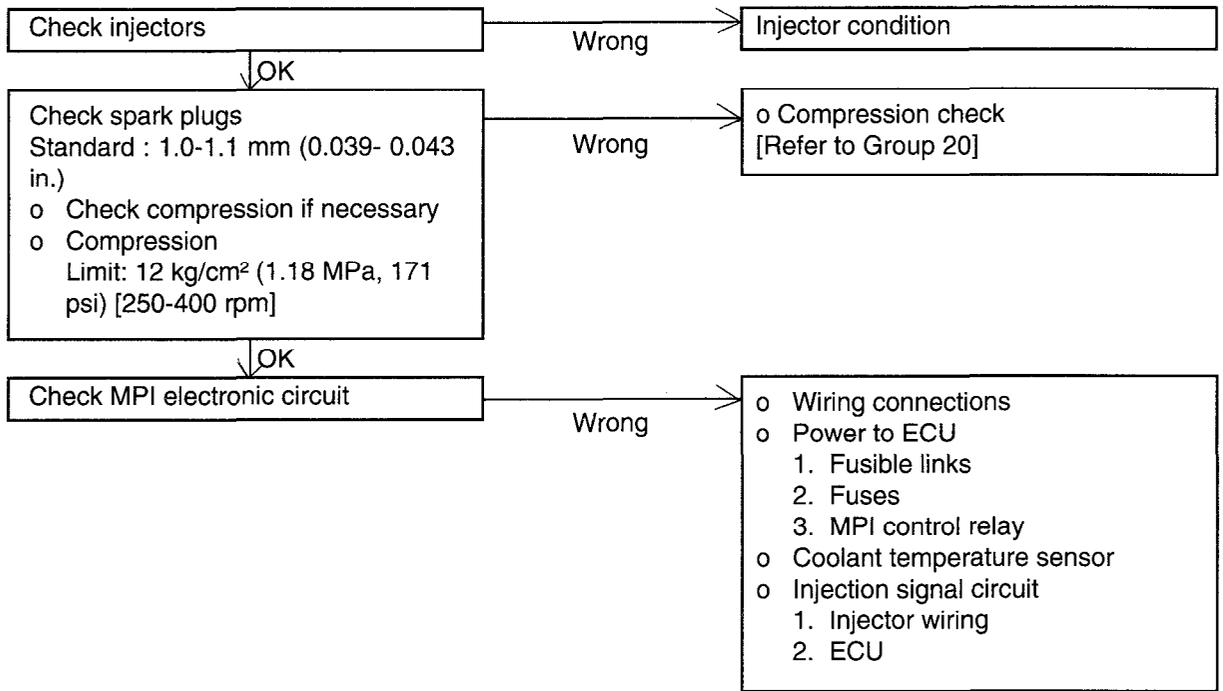


PROBLEM

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

TROUBLESHOOTING GUIDE CHART

Main Symptoms Sub-Symptoms' Check points	STARTING							Poor Idling					Poor Driving	
	Does not start			Hard to start				Incorrect fast idle	High idle speed	Low idle speed	Rough idling	Engine hesitates or accelerates poorly	Surging	Knocking
	Does not crank	Starter runs but engine does not crank	Incomplete combustion	Cranks slowly	Usually	When cold engine	When hot engine							
Starter relay	1													
Starter	2	1		1										
Inhibitor SW [A/T] or Ignition lock SW [M/T]	3	2												
Flywheel [M/T] or Torque converter [A/T]														
Air flow sensor circuit			1						4	11	8			
Idle speed actuator			2		3	3	3	3	3	2	8			2
Fuel pressure regulator			3		6	5	5				5	12	1	
Coolant temp. sensor circuit			4		4	1	1	2	2	1	2	9	6	
Compression			5		9						9	6		
Piston ring			6		10						10			
Ignition timing			7		11						12	14		
Timing belt			8								13			
Injectors			9		13	8	8		6	5	14	15	4	
ECU			10		14	9	9	4	7	6	16	16	5	
A/Con circuit				2					5					
Connecting rod bearing				3										
Crankshaft bearing				4										
Fuel quality					1	2	2				1	3	3	
Spark plug					2						4	5	2	
EGR system					5					3	3	4		
Fuel pump					7	6	6				6	12		
Fuel lines					8	7	7				7	13		
Ignition circuit					12						15			3
Intake air temp. sensor circuit					13	4	4		4			10		1
Accelerator pedal link								1	1			7		
TPS circuit									5					
Cylinder head											17			
Clutch [M/T]												1		
Brakes drag when released												2		
O ₂ Sensor circuit												11		

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)

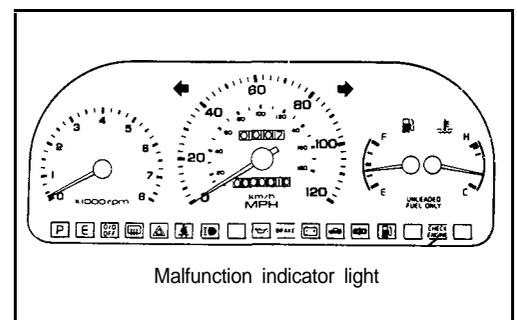
A malfunction indicator light comes on to notify the driver of the emission control items when an irregularity is detected.

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.

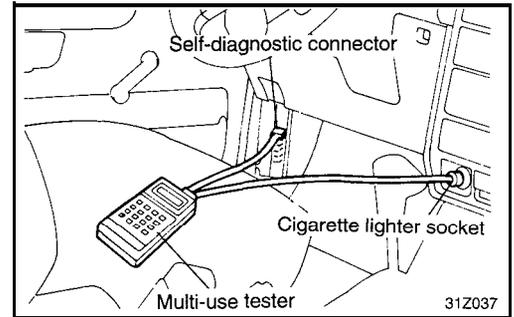
CHECKING PROCEDURE (SELF-DIAGNOSIS)

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.

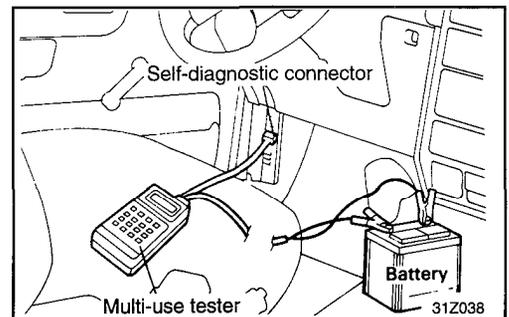


NOTE

- 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.

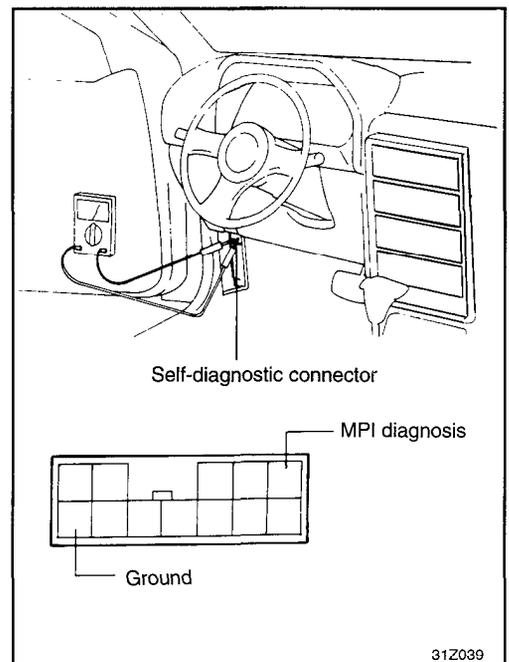
NOTE

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.



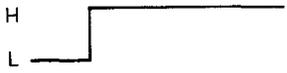
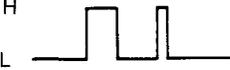
Inspection Procedure (Using Voltmeter)

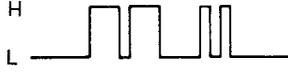
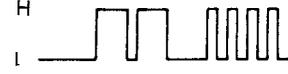
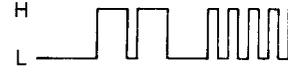
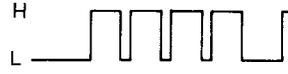
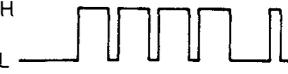
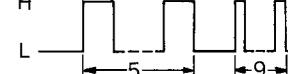
1. Connect the voltmeter to the self diagnosis terminal.
2. Turn the ignition switch, and the engine control unit memory contents will immediately start. After recording the abnormal item, check and repair each part according to the check items in "Diagnosis Chart".
3. When the defective parts have been 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.

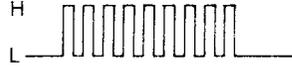


Diagnosis Chart

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	 <p style="text-align: right;">31J062</p>	-	-	(Replace engine control unit)
2	Oxygen sensor (Front)	 <p style="text-align: right;">31J063</p>	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	 <p style="text-align: right;">31Y064</p>	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	 <p style="text-align: right;">31Y065</p>	13	Retained	<ul style="list-style-type: none"> o Harness and connector o Air temperature sensor
5	Throttle position sensor	 <p style="text-align: right;">31Y066</p>	14	Retained	<ul style="list-style-type: none"> o Harness and connector o Throttle position sensor o Idle position switch
6	Motor position sensor	 <p style="text-align: right;">31Y067</p>	15	Retained	<ul style="list-style-type: none"> o Harness and connector o Motor position sensor
7	Coolant temperature sensor	 <p style="text-align: right;">31Y068</p>	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	 <p style="text-align: right;">31Y069</p>	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	 <p style="text-align: right;">31Y070</p>	23	Retained	<ul style="list-style-type: none"> o Harness and connector If harness and connector are normal, replace distributor assembly.)
10	Vehiclespeed sensor (reed switch)	 <p style="text-align: right;">31Y071</p>	24	Retained	<ul style="list-style-type: none"> o Harness and connector o Vehicle-speed sensor (reed switch)
11	Barometric pressure sensor	 <p style="text-align: right;">31Y072</p>	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	 <p style="text-align: right;">31Y073</p>	41	Retained	<ul style="list-style-type: none"> o Harness and connector o Injector coil resistance
13	Fuel pump	 <p style="text-align: right;">31Y074</p>	42	Retained	<ul style="list-style-type: none"> o Harness and connector o Control relay
14	EGR*	 <p style="text-align: right;">31Y075</p>	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)	 <p style="text-align: right;">31Y076</p>	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

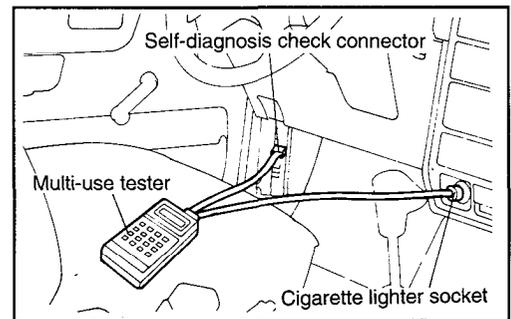
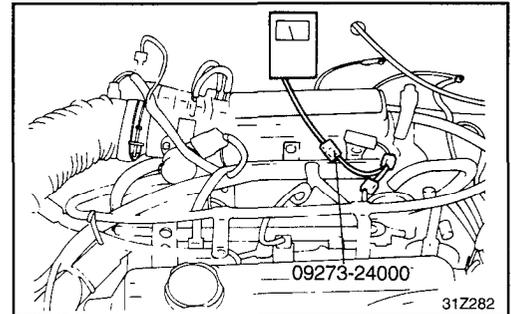
NOTE:

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.

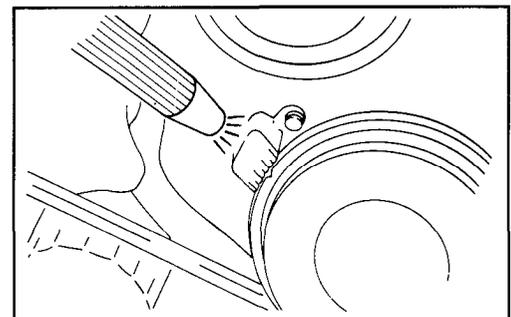
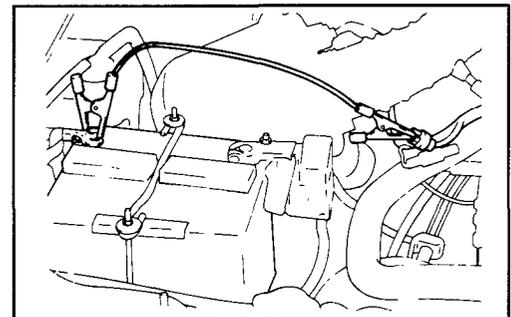
Idle speed 700 ± 100 rpm



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)



- 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.

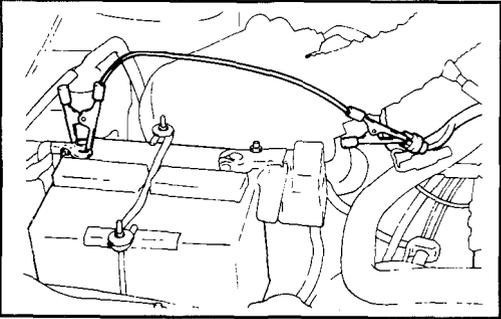
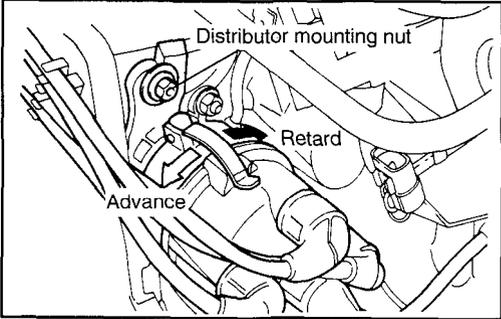
NOTE

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

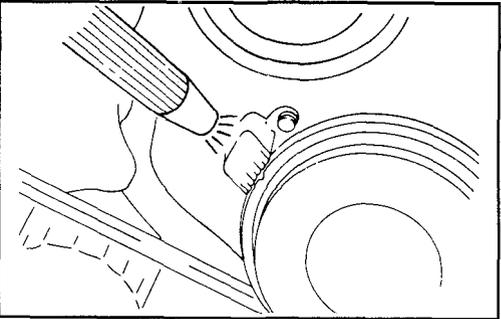
Be careful, when tightening the nut, that the distributor does not move.

- Stop the engine and disconnect the lead wire connected.



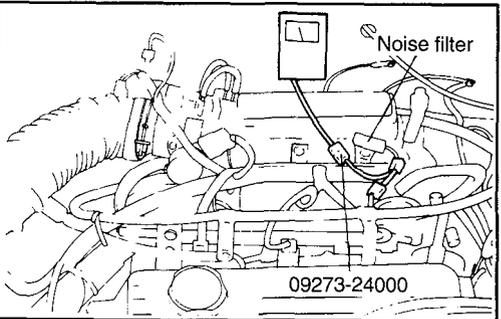
- Start and run the engine at idle speed and check that the actual ignition timing at idle is correct.

Actual ignition at idle : 10°BTDC



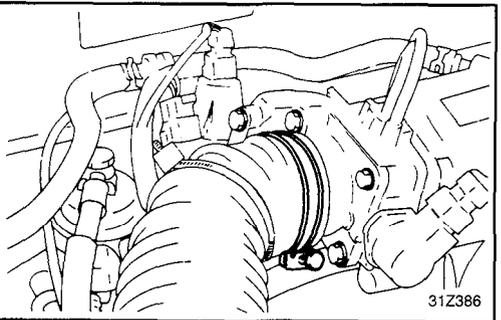
- Check the curb idle speed again. If the engine speed is out of specification, go to the next step.

Basic idle speed 700 ± 100 rpm



Throttle Valve Area Cleaning

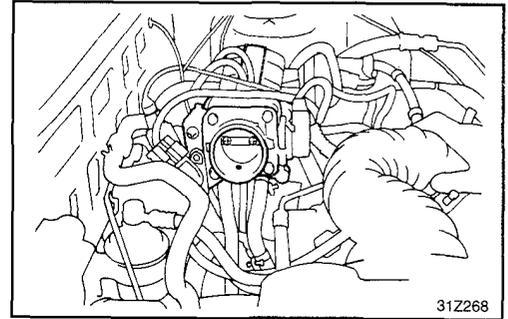
- Stop the engine and remove the air intake hose from the throttle body, check the throttle valve blade and throttle body bore for carbon deposits, rotating the valve.



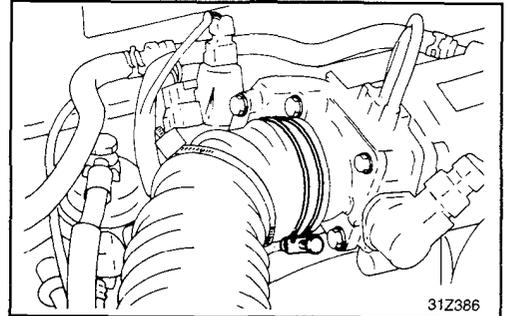
12. Using a shop towel, wipe out carbon deposits from the throttle valve blade and throttle body bore.

NOTE

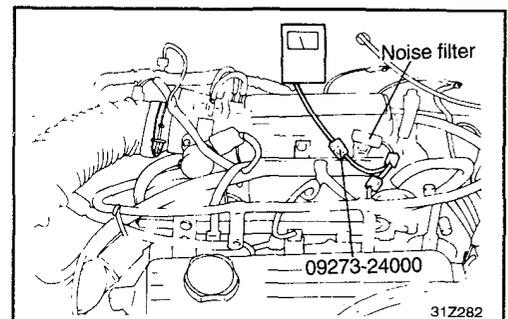
If necessary, spray cleaning solvent to the throttle valve area and leave it for about 5 minutes.



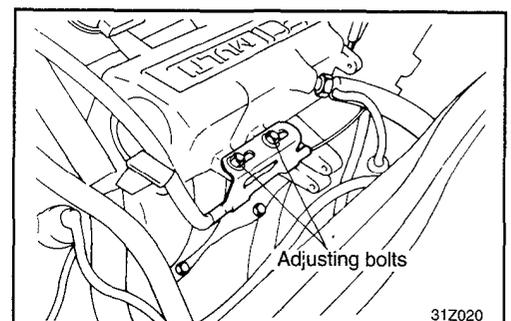
13. Attach the air intake hose.



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.

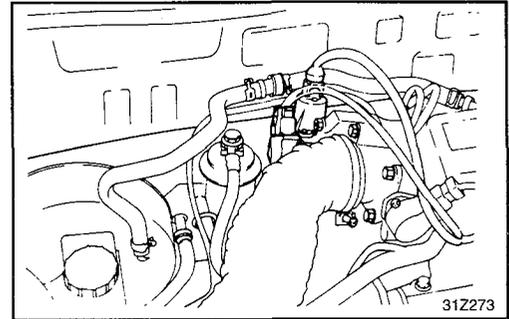


16. Turn the ignition switch to ON (do not start the engine) and leave it in that position for 15 seconds or longer; then check to be sure that the idle speed control servo is fully retracted to the curb idle position or the throttle valve cam is moved.

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.

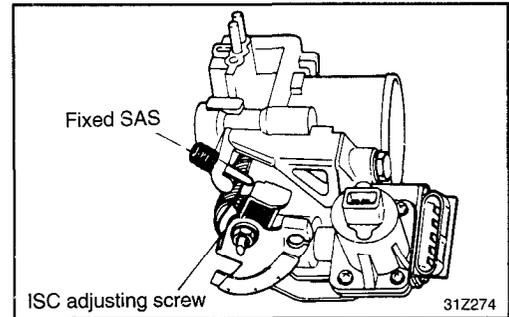
17. Turn the ignition switch OFF.
Disconnect the ISC motor connector.



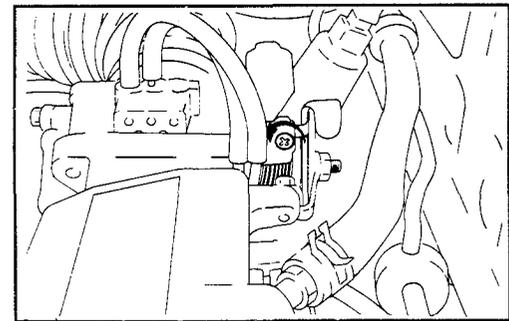
18. In order to prevent the throttle valve from sticking, open it two or three times; then release it to let it click shut, and sufficiently loosen the fixed SAS.
Start the engine and let it run at idle speed.
Adjust the ISC adjusting screw to obtain the standard rpm.

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.



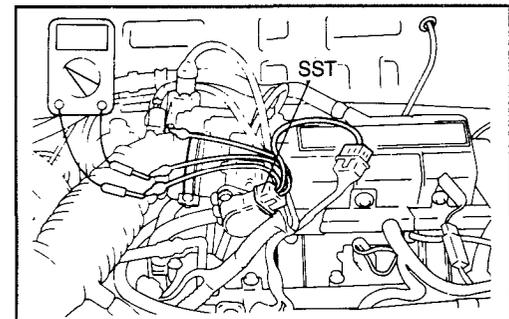
19. Tighten the fixed SAS until the engine speed starts to increase.
Then, loosen it until the engine speed ceases to drop (touch point) and then loosen a half turn from the touch point.
Stop the engine.



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



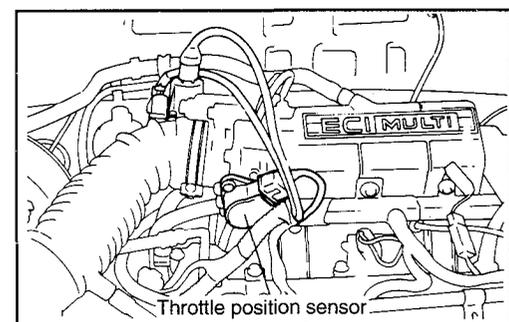
21. If it is out of specification, loosen TPS mounting screws and adjust by turning the TPS.

NOTE

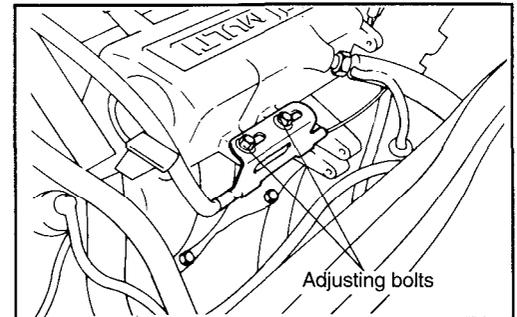
Turning the TPS clockwise increases the output voltage.

CAUTION

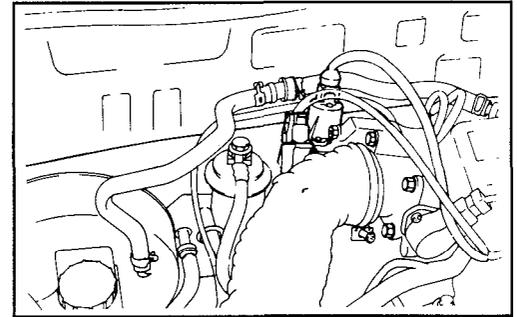
Tighten the screws securely after adjustment.



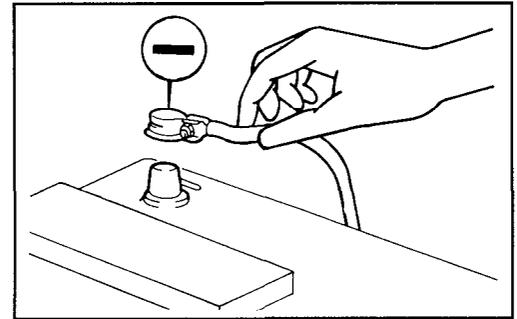
22. Turn the ignition switch to the OFF position. Adjust the accelerator cable.



23. Connect the ISC motor connector.

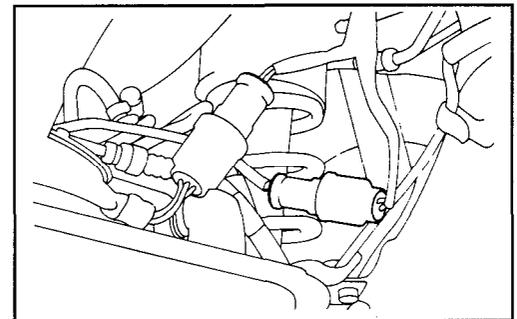


24. Start the engine and check to be sure that the idle speed is correct.
Turn the ignition switch OFF and disconnect the battery terminal for 15 seconds and then re-connect. (This erases the data stored in memory during the ISC adjustment).



Fuel Filter Replacement

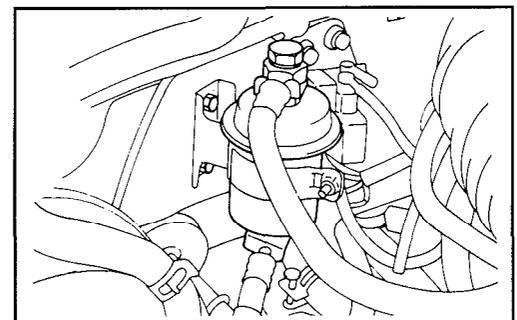
1. Reduce the internal pressure of the fuel pipes and hoses by completing the following operations.
 - o Disconnect the fuel pump harness connector at the rear of the fuel tank.
 - o Start the engine and after it stalls, turn the ignition switch to OFF.
 - o Disconnect the battery negative (-) terminal.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



CAUTION

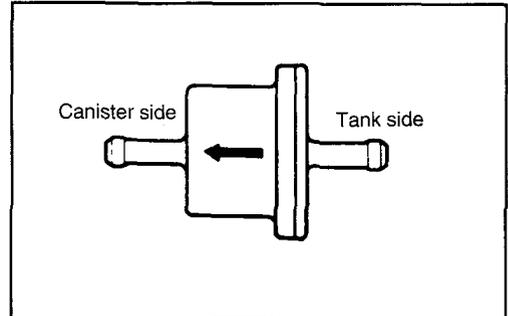
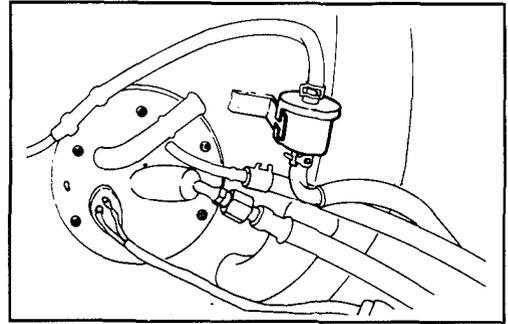
Cover with a shop towel to avoid gasoline from splashing.

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



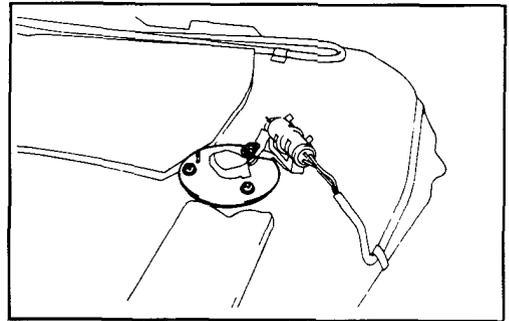
Overfill Limiter (Two-way Valve) Replacement

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.

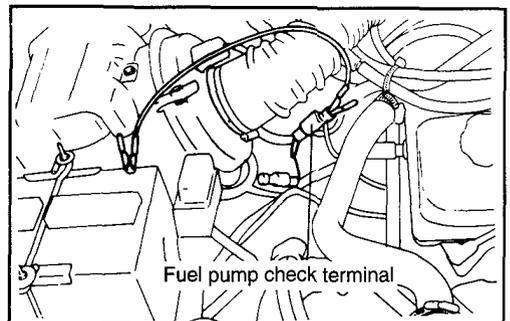


Fuel Pump Operation Check

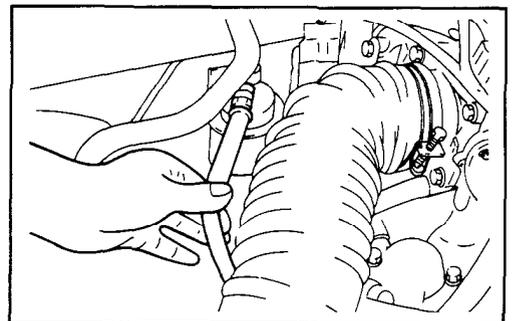
1. Turn the ignition switch to the OFF position.
2. Apply battery voltage to the fuel pump drive connector to check that the pump operates.

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.

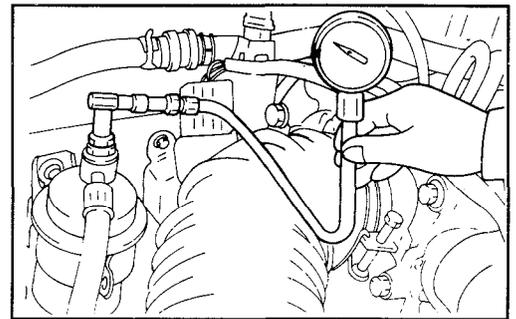
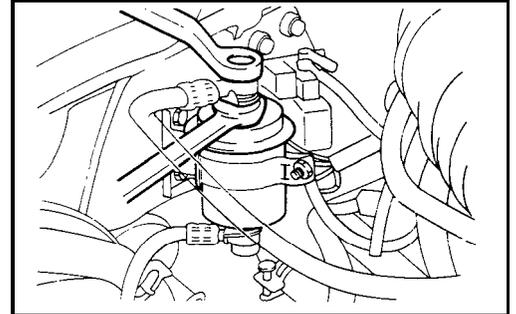
CAUTION

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

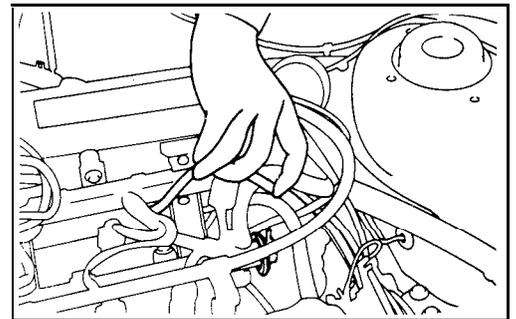
Fuel pressure gauge to fuel filter	
	25-35 Nm (250-350 kg.cm, 18-25 lb.ft)



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.

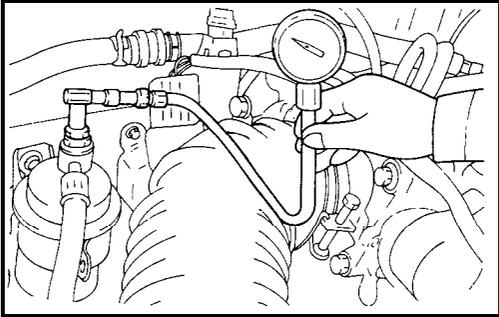
6. Disconnect the vacuum hose from the pressure regulator, and plug the hose end. Measure the fuel pressure at idle.

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.

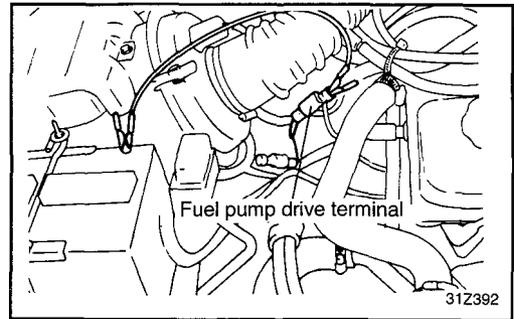
Condition	Probable cause	Remedy
Fuel pressure drops slowly after engine is stopped	a. Injector leakage	a. Replace injector
Fuel pressure drops immediately after engine is stopped	a. The check valve within the fuel pump is open	a. Replace fuel pump

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

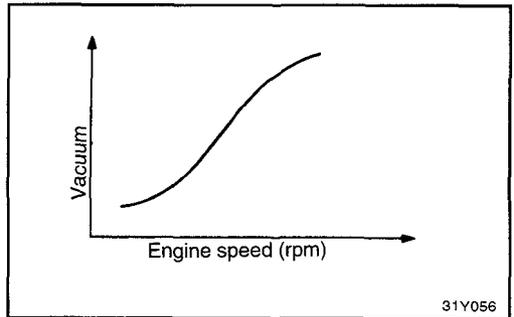
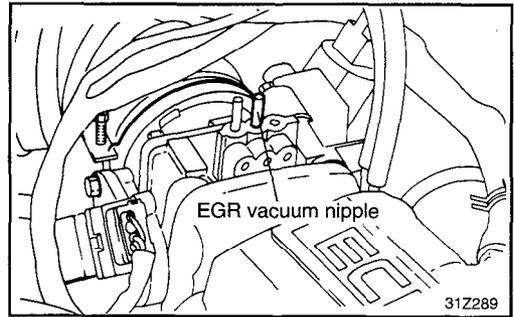
Checking Condition

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

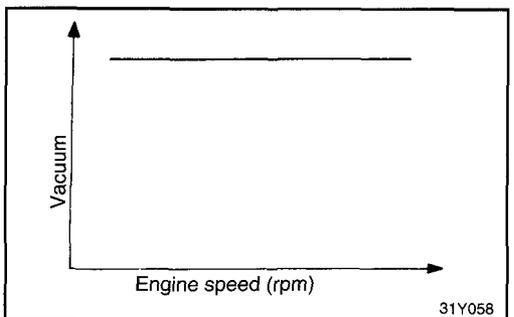
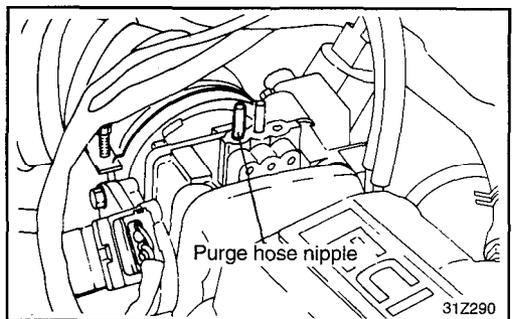
Checking Condition

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

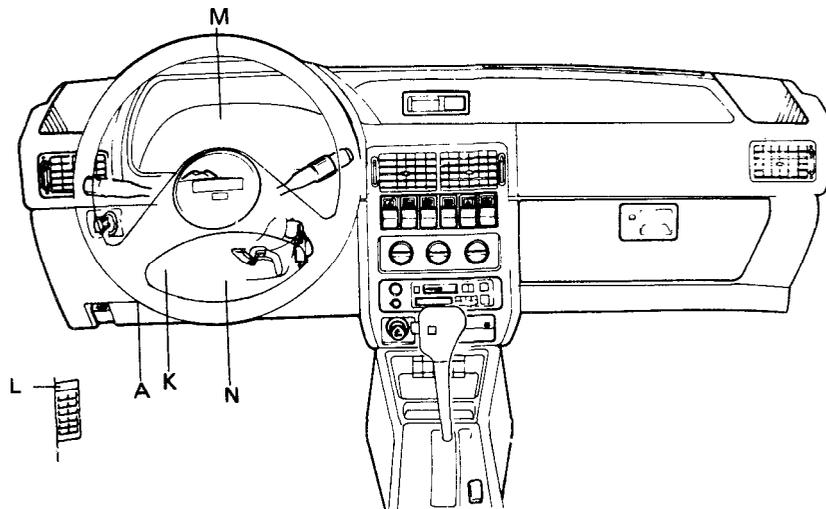
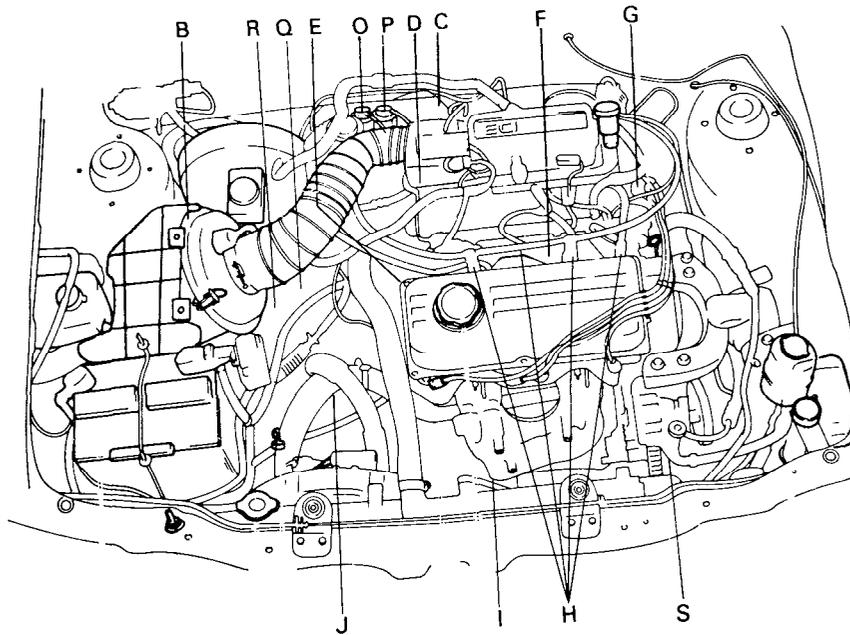
1. Disconnect the vacuum hose from the throttle body purge hose fitting and connect a vacuum pump.
2. Start the engine and check to see that, after increasing the engine speed, vacuum remains fairly constant.

NOTE

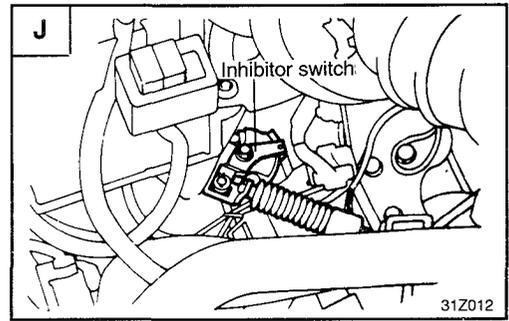
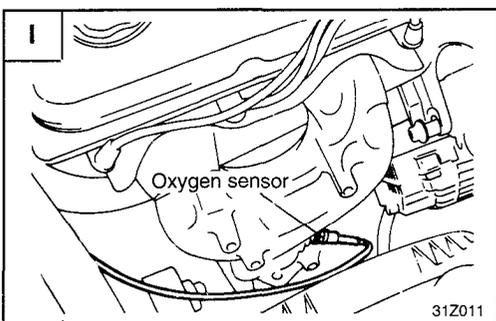
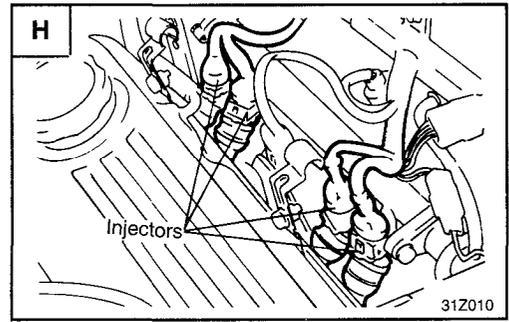
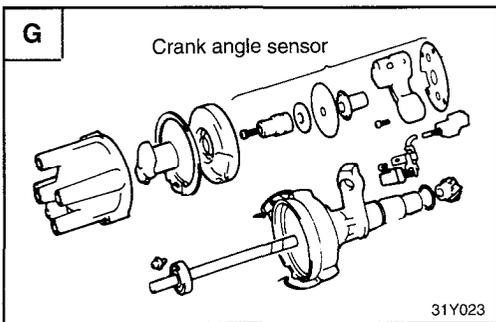
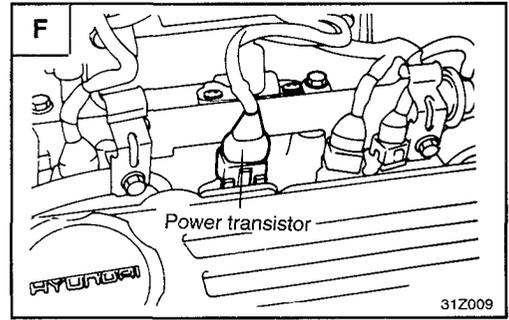
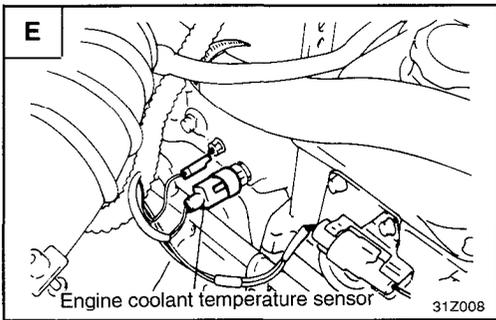
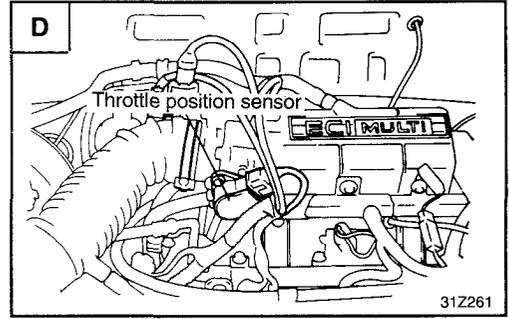
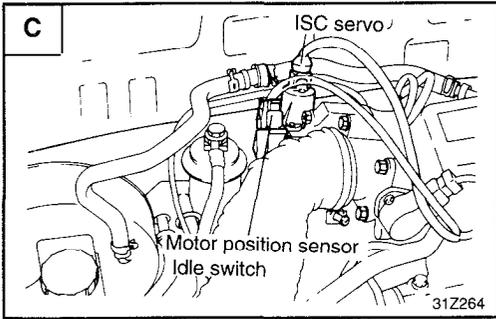
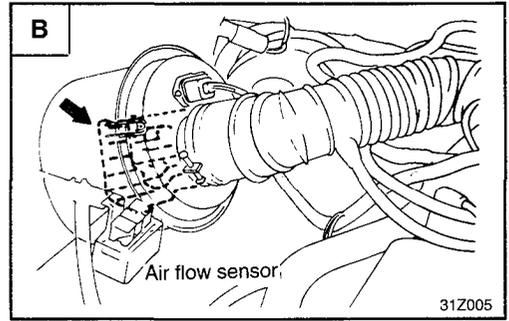
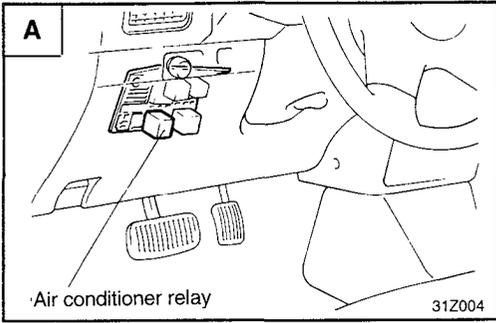
If there is no vacuum created, it is possible that the throttle body port may be restricted and required cleaning.

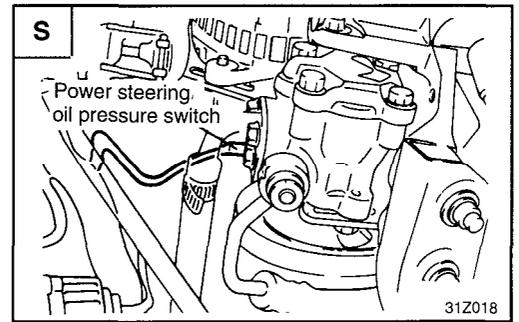
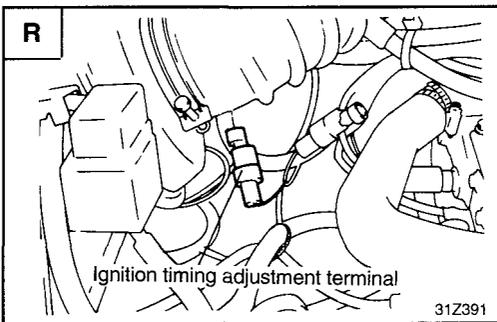
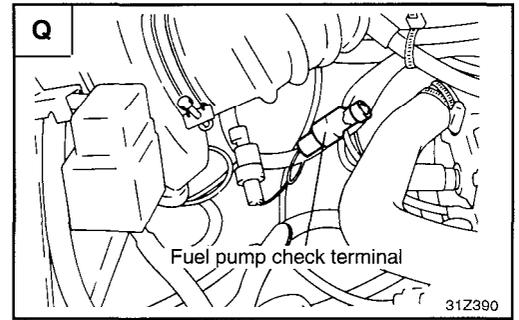
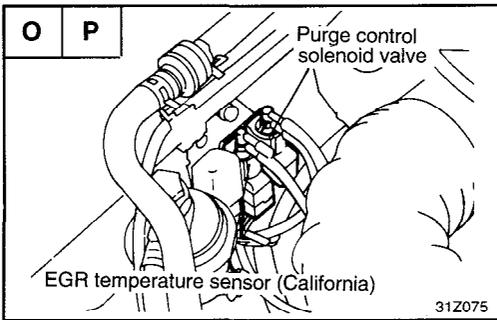
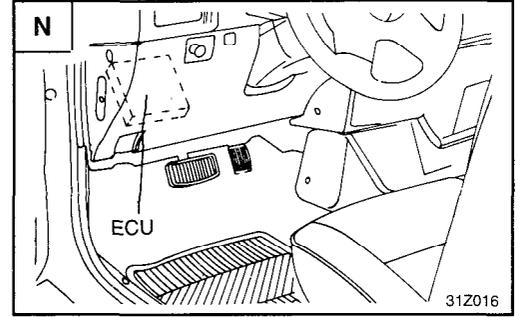
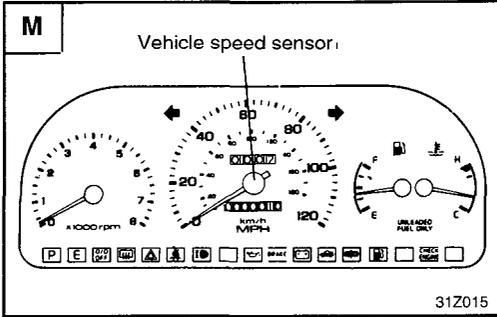
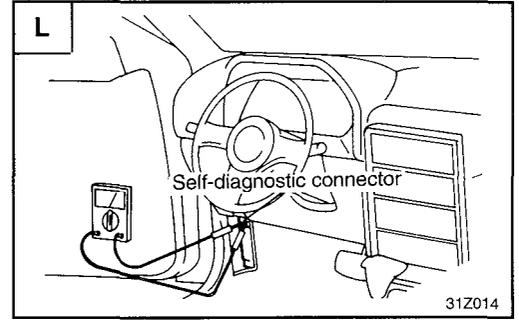
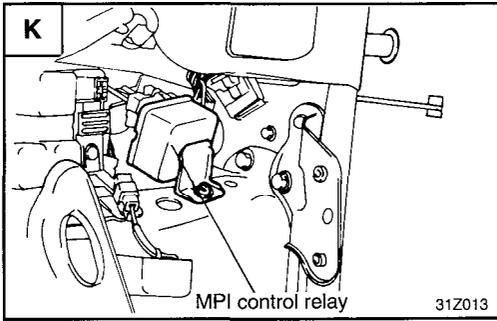


LOCATION OF MPI COMPONENTS



- | | |
|---|---|
| <ul style="list-style-type: none"> A. Air conditioner relay B. Air flow sensor (Including intake air temp sensor and barometric pressure sensor) C. ISC servo D. Throttle position sensor E. Coolant temperature sensor F. Power transistor G. Crank angle sensor and TDC sensor H. Injectors I. Oxygen sensor | <ul style="list-style-type: none"> J. Inhibitor switch K. MPI control relay L. Diagnosis terminal M. Vehicle speed sensor N. Electronic control unit O. EGR temperature sensor (California only) P. Purge control solenoid valve Q. Fuel pump check terminal R. Ignition timing adjustment terminal S. Power steering oil pressure switch |
|---|---|



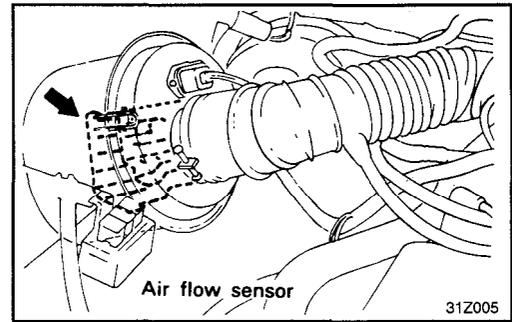


MPI COMPONENTS INSPECTION

AIR FLOW SENSOR (AFS)

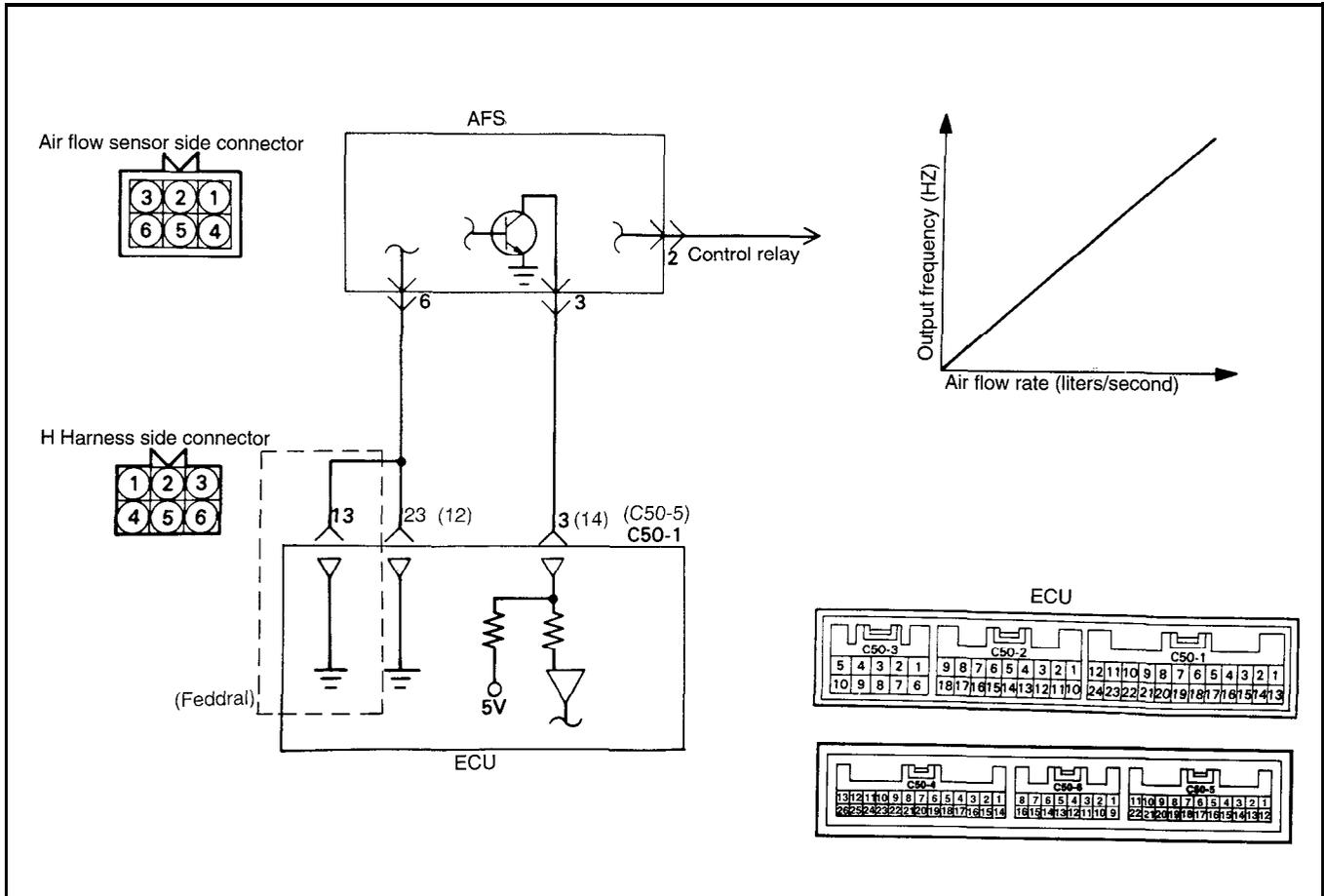
The AFS measures the intake air volume. It makes use of a Karman vortex to detect the air flow rate and sends it to the ECU as the intake air volume signal.

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

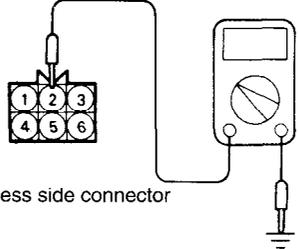
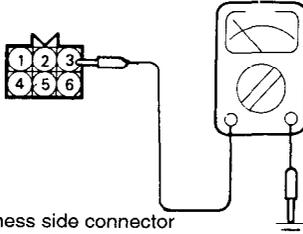
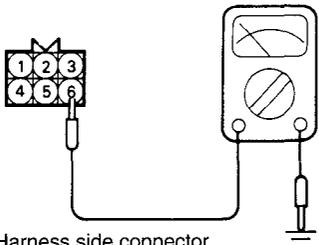
Check Item	Data display	Check conditions	Engine state	Test specification
Air flow sensor o Service data o Item No. 12	Sensor air volume (frequency)	<ul style="list-style-type: none"> o Engine coolant temperature: 80 to 95°C (176 to 205°F) o Lamps, electric cooling fan, accessory units: All OFF o Transaxle: 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

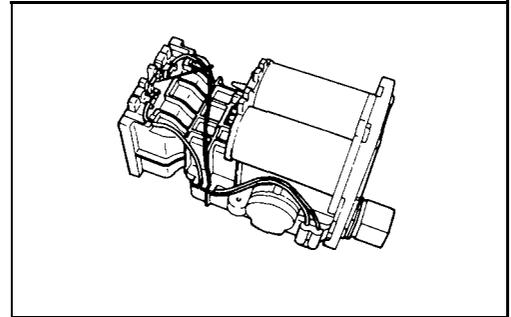
* California only

1	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J051</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK →</p> <p>NG →</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">2</div> <p>Repair the harness (H 2 - Control relay) or check the control relay.</p>
2	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J052</p>	<p>Measure the terminal voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V 	<p>OK →</p> <p>NG →</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">3</div> <p>Repair the harness. (H 3 - C50-1 3) * (H 3 - C50-5 14)</p>
3	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J053</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness. (H 6 - C50-1 23, 13) * (H 6 - C50-5 12)</p>

BAROMETRIC PRESSURE SENSOR

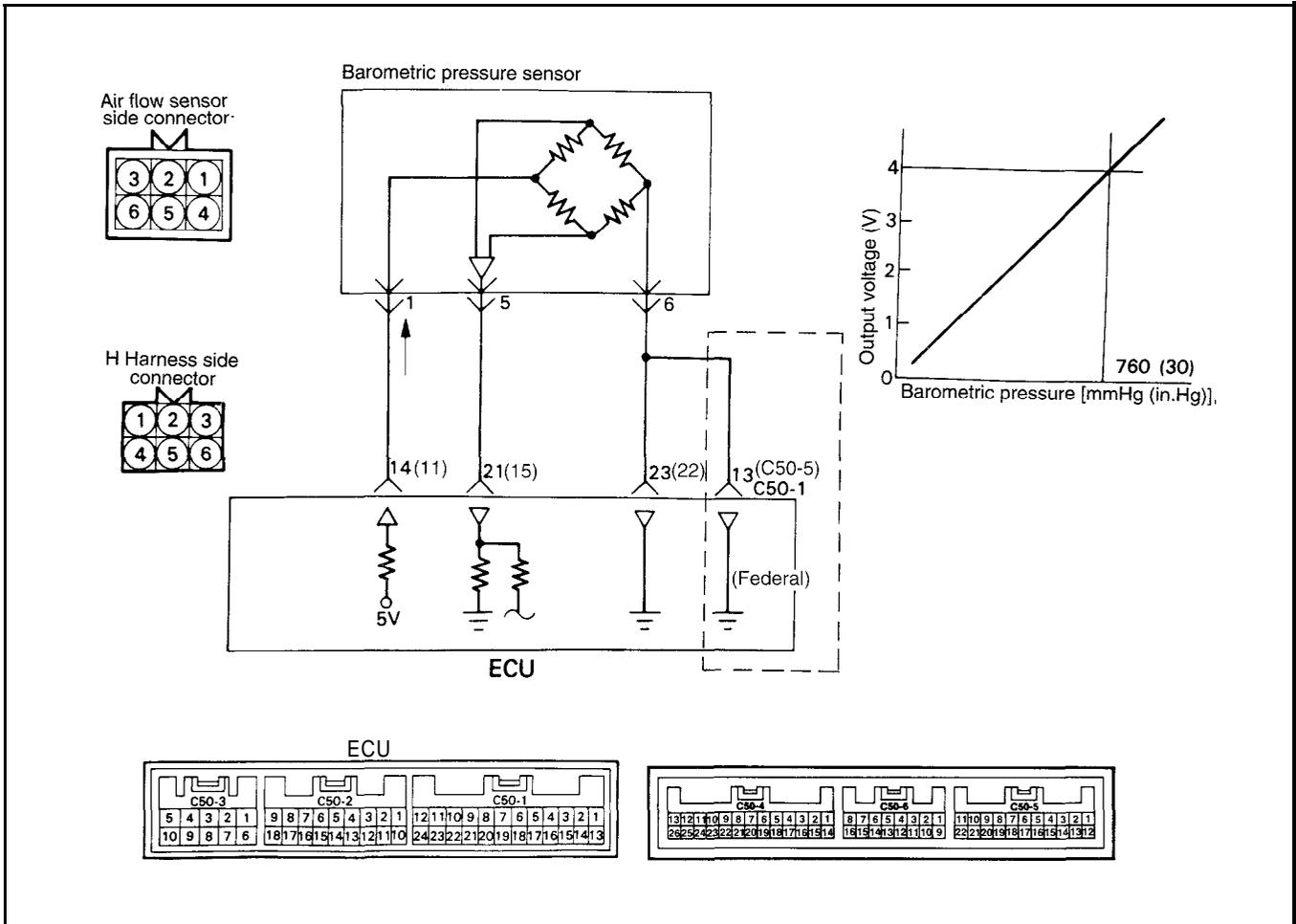
The barometric pressure sensor installed on the AFS senses the barometric pressure and converts it into a voltage which is sent to the ECU.

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

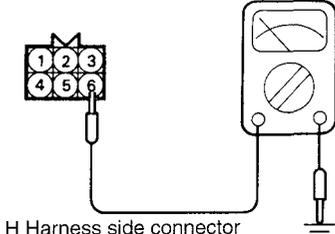
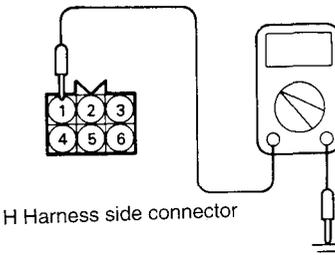
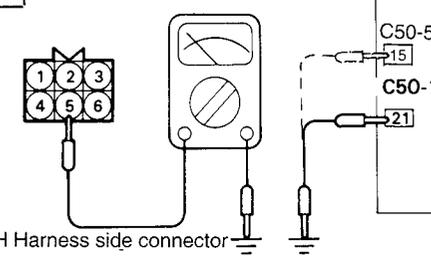
1. If the barometric pressure sensor is faulty, the vehicle will experience poor driveability.
2. If the pressure of the barometric pressure sensor drops greatly during high speed driving, check the air cleaner for clogging.

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

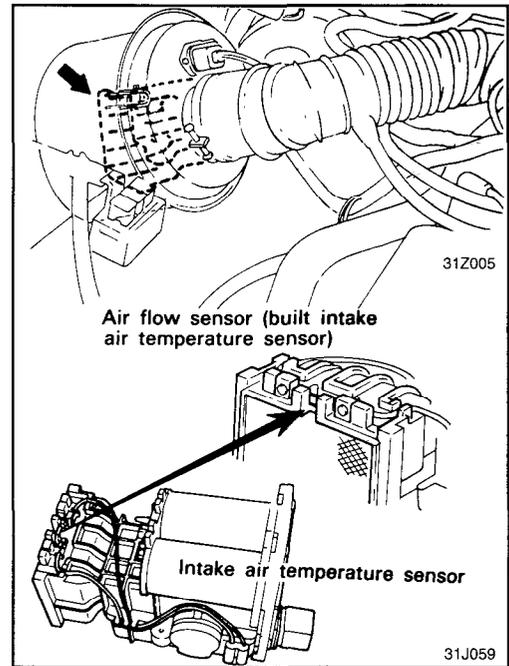
* California only

<p>1</p>  <p>H Harness side connector</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected <p>OK</p> <p>NG</p>	<p>2</p> <p>Repair the harness (H6-C50-1 23, 13) *(H6-C50-5 22)</p>
<p>2</p>  <p>H Harness side connector</p>	<p>Measure the power supply voltage of the barometric pressure sensor.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V <p>OK</p> <p>NG</p>	<p>3</p> <p>Repair the harness. (H1-C50-1 14) *(H1-C50-5 11)</p>
<p>3</p>  <p>ECU Harness side connector</p> <p>H Harness side connector</p>	<p>Check for an open-circuit, or a short-circuit to ground between the engine control unit and the barometric pressure sensor.</p> <ul style="list-style-type: none"> o Air flow sensor connector: Disconnected o Engine control unit connector: Disconnected <p>OK</p> <p>NG</p>	<p>END !</p> <p>Repair the harness. (H5-C50-1 21) *(H5-C50-5 15)</p>

INTAKE AIR TEMPERATURE SENSOR

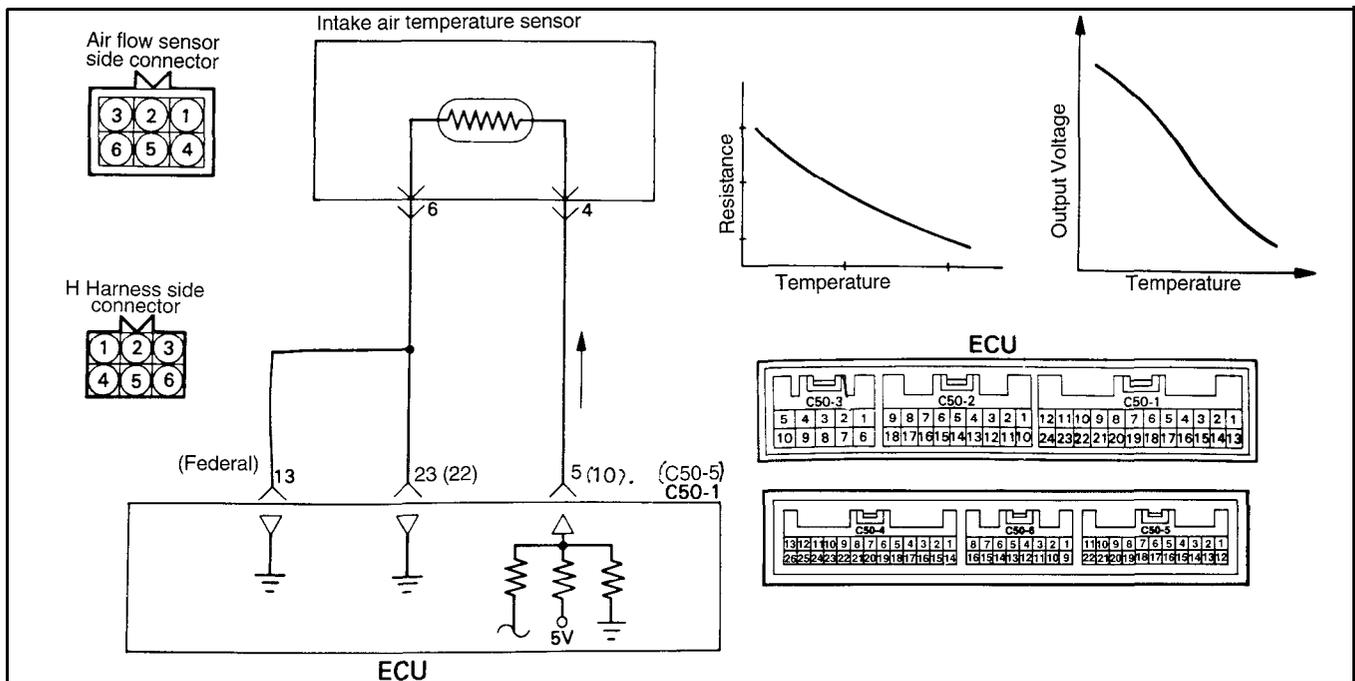
The intake air temperature sensor, located at the illustrated position on AFS, is a resistor-based sensor for detecting the intake air temperature.

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



Circuit Diagram

() : California only



Troubleshooting Hints

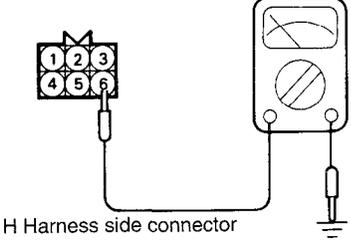
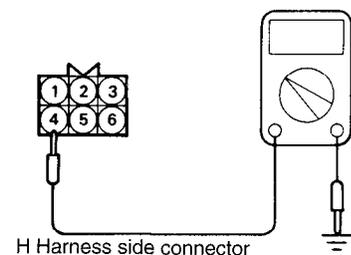
The intake air temperature sensor senses the intake air temperature in the air cleaner to indicate a temperature different from outside temperature.

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

<p>1</p>  <p>H Harness side connector</p> <p>31J061</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → 2</p> <p>NG → Repair the harness (H 6 - C50-1 23 , 13) * (H 6 - C50-5 22)</p>
<p>2</p>  <p>H Harness side connector</p> <p>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>OK → END !</p> <p>NG → Repair the harness. (H 4 - C50-1 5) * (H 4 - C50-5 10)</p>

Sensor Inspection

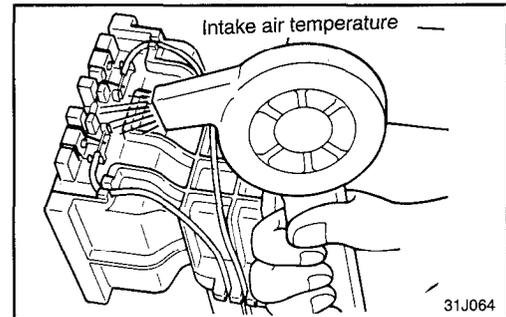
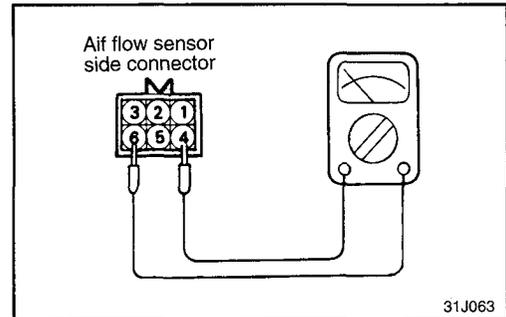
1. Disconnect the air flow sensor connectors.
2. Measure resistance between terminals 4 and 6.

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

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

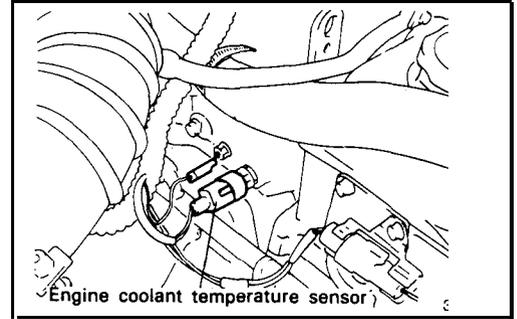
Temperature [C° (°F)]	Resistance (KΩ)
Higher	Smaller

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



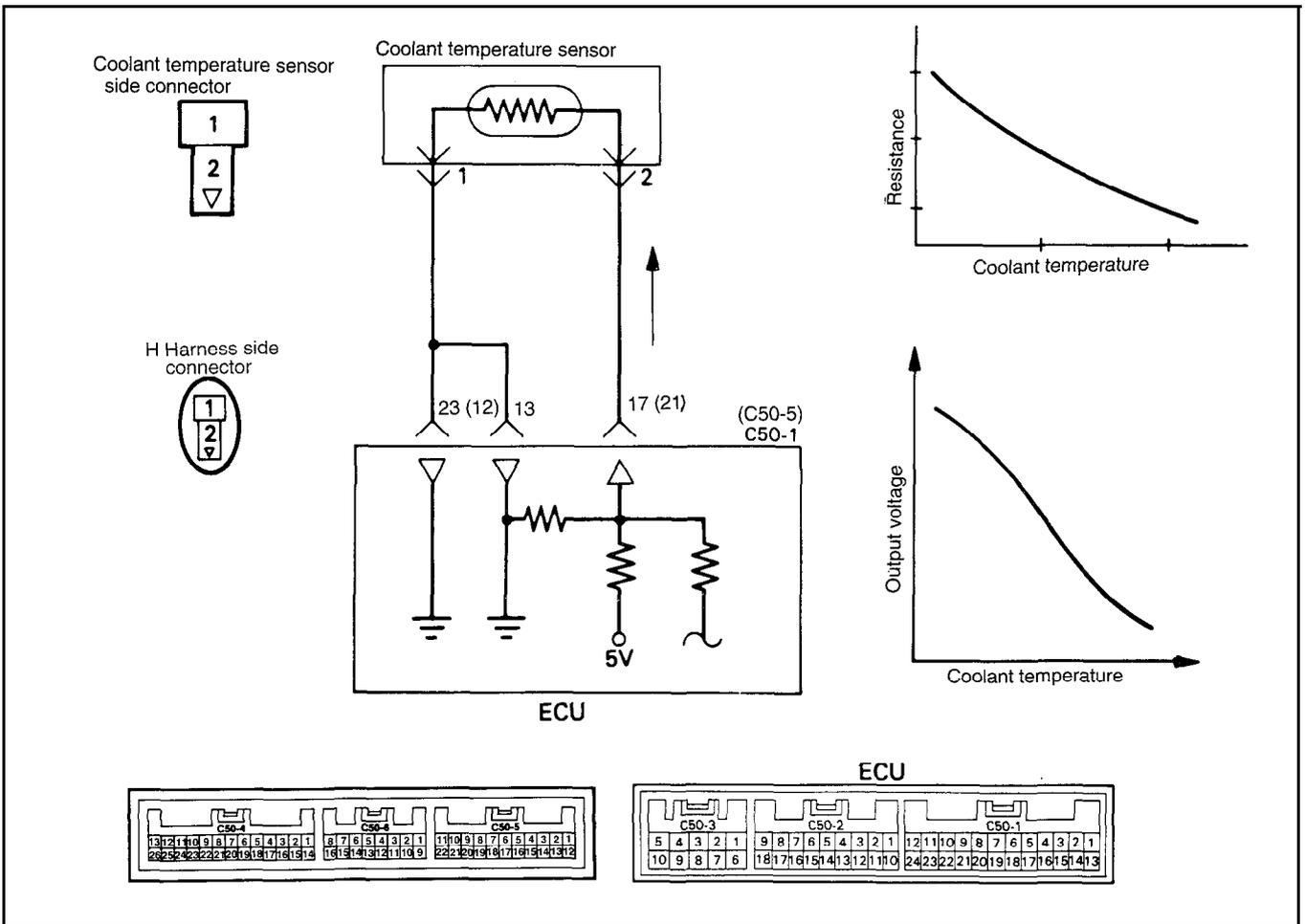
COOLANT TEMPERATURE SENSOR

The coolant temperature sensor is installed in the engine coolant passage of the cylinder head. The ECU judges engine temperature by the sensor output voltage and provides optimum fuel enrichment when the engine is cold.



Circuit Diagram

() : California only



Troubleshooting Hints

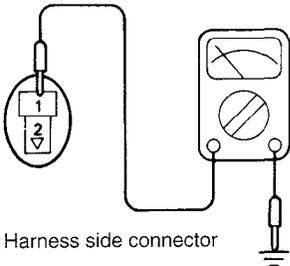
If the fast idle speed is not enough or the engine gives off dark smoke during the engine warm-up operation, the engine coolant temperature sensor might be the causes.

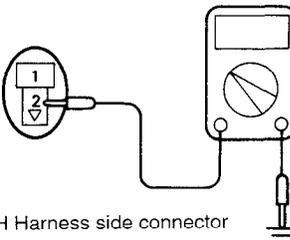
Using Multi-use Tester

Check Item	Data display	Check conditions	Coolant temperature	Test specification
Engine coolant temperature sensor o Service data o Item No. 21	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

1	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J066</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> 2 </div> <p>Repair the harness (H 1 - C50-1 23 , 13) * (H 1 - C50-5 12)</p>
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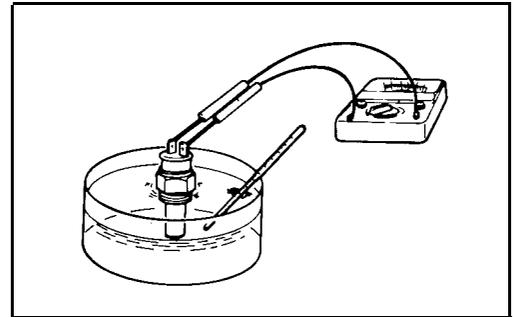
2	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J067</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.5-4.9V 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness. (H 2 - C50-1 17) * (H 2 - C50-5 21)</p>
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Sensor Inspection

1. Remove engine coolant temperature sensor from the intake manifold.
2. With temperature sensing portion of engine coolant temperature sensor immersed in hot water, check resistance.

Temperature °C (°F)	Resistance (KΩ)
0 (32)	5.9
20 (68)	2.5
40 (104)	1.1
80 (176)	0.3

3. If the resistance deviates from the standard value greatly, replace the sensor.



Installation

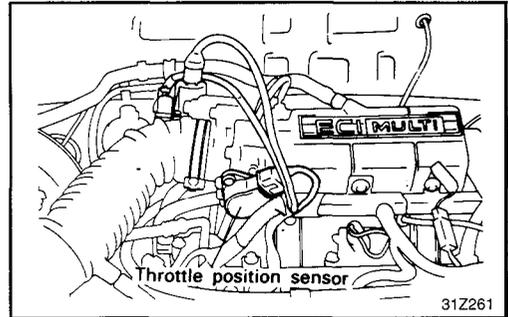
1. Apply sealant LOCTITE 962T or equivalent to threaded portion.
2. Install engine coolant temperature sensor and tighten it to specified torque.

Tightening torque 20-40 Nm (200-400 kg.cm, 14-29 lb.ft)

3. Connect the harness connector securely.

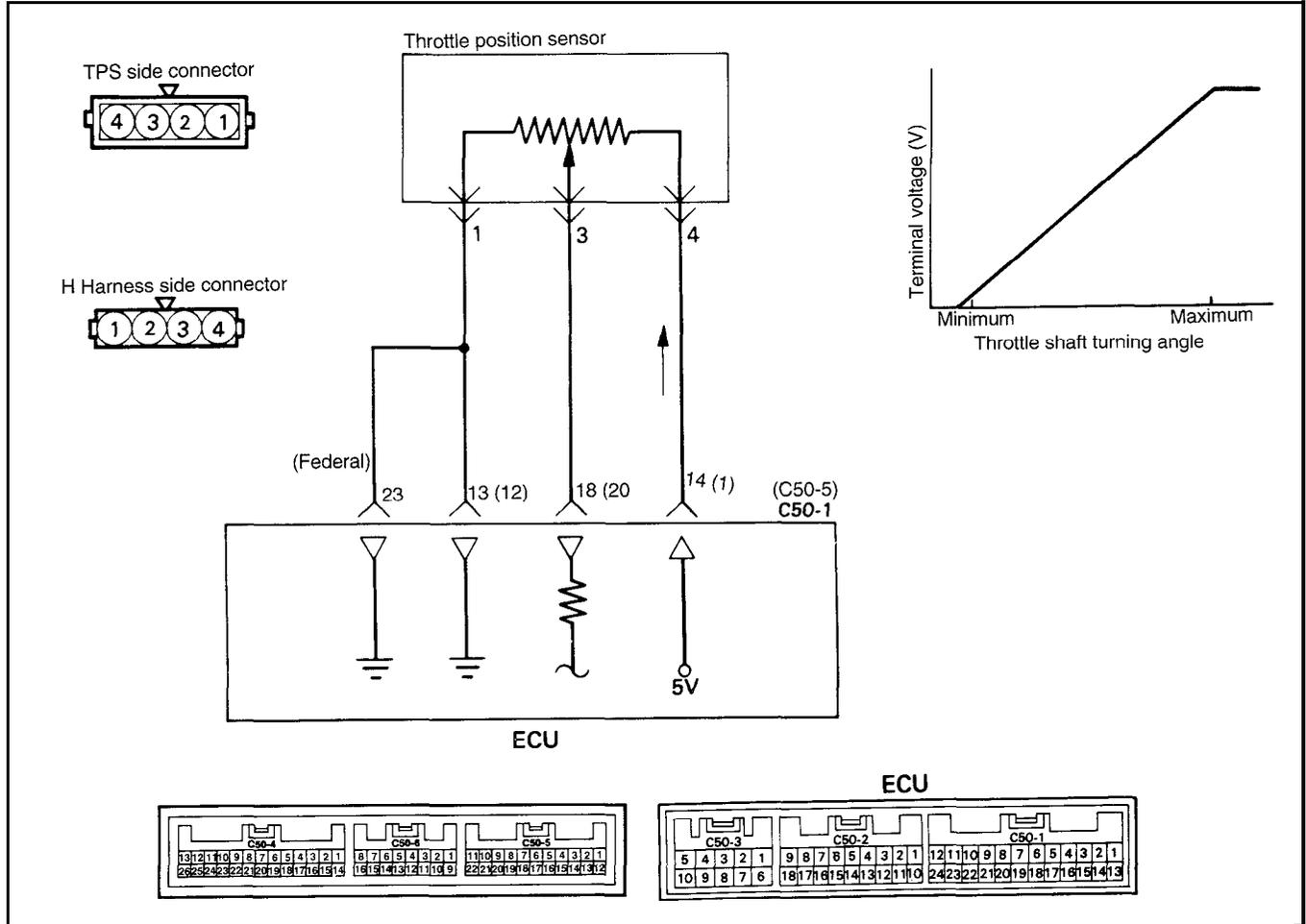
THROTTLE POSITION SENSOR (TPS)

The TPS is a rotating type variable resistor that rotates with the throttle body throttle shaft to sense the throttle valve angle. As the throttle shaft rotates, the output voltage of the TPS changes and the ECU detects the throttle valve opening based on the change of the voltage.



Circuit Diagram

() : California only



Troubleshooting Hints

1. The TPS signal is important in the control of automatic transaxle. Shift shock and other troubles will occur if the sensor is faulty.

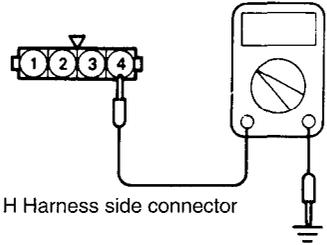
Using Multi-use Tester

Check Item	Data display	Check conditions	Throttle valve	Test specification
Throttle position sensor o Service data o Item No. 14	Sensor voltage	Ignition switch: ON	At idle position	450-550 mV
			Open slowly	Increases with valve opening
			Open widely	4,500-5,500 mV

Harness Inspection Procedures

* California only

1



H Harness side connector

31J069

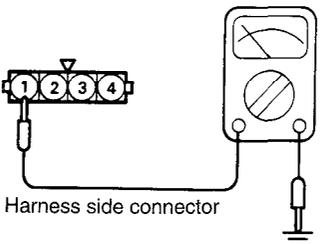
Measure the power supply voltage of the throttle position sensor.

- o Connector: Disconnected
- o Ignition switch: ON
- o Voltage: 4.8-5.2V

OK → **2**

NG →

2



H Harness side connector

31J070

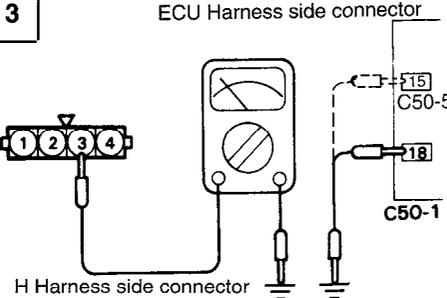
Check for continuity of the ground circuit.

- o Connector: Disconnected

OK → **3**

NG →

3



H Harness side connector

31J071

Check for an open-circuit, or a short-circuit to ground between the engine control unit and the throttle position sensor.

- o Throttle position sensor connector: Disconnected
- o Engine control unit connector: Disconnected

OK → **END !**

NG →

Repair the harness.
(H 4 - C50-1 14)
* (H 4 - C50-5 1)

Repair the harness.
(H 1 - C50-1 23 , 13)
* (H 1 - C50-5 12)

Repair the harness.
(H 3 - C50-1 18)
* (H 3 - C50-5 20)

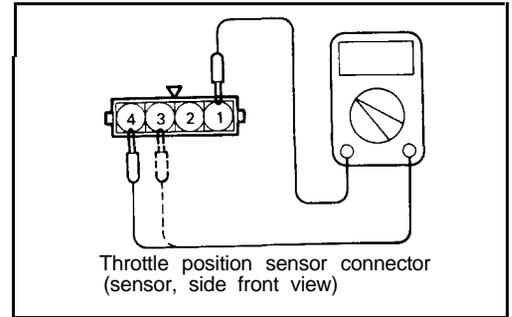
Sensor Inspection

1. Disconnect the throttle position sensor connector.
2. Measure resistance between terminal 1 (sensor ground) and terminal 4 (sensor power).

Standard value: 3.5-6.5 k Ω

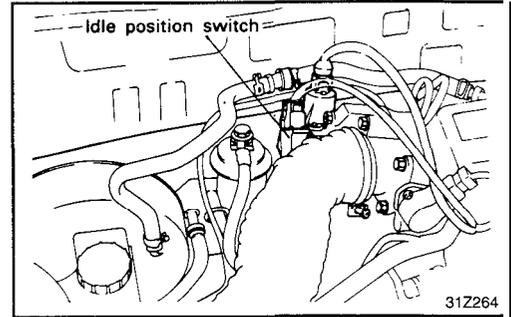
3. Connect a pointer type ohmmeter between terminal 1 (sensor ground) and terminal 3 (sensor output).
4. Operate the throttle valve slowly from the idle position to the full open position and check that the resistance changes smoothly in proportion with the throttle valve opening angle.
5. If the resistance is out of specification, or fails to change smoothly, replace the throttle position sensor.

TPS tightening torque
1.5-2.5 Nm (15-25 kg.cm, 1.1-1.8 lb.ft)



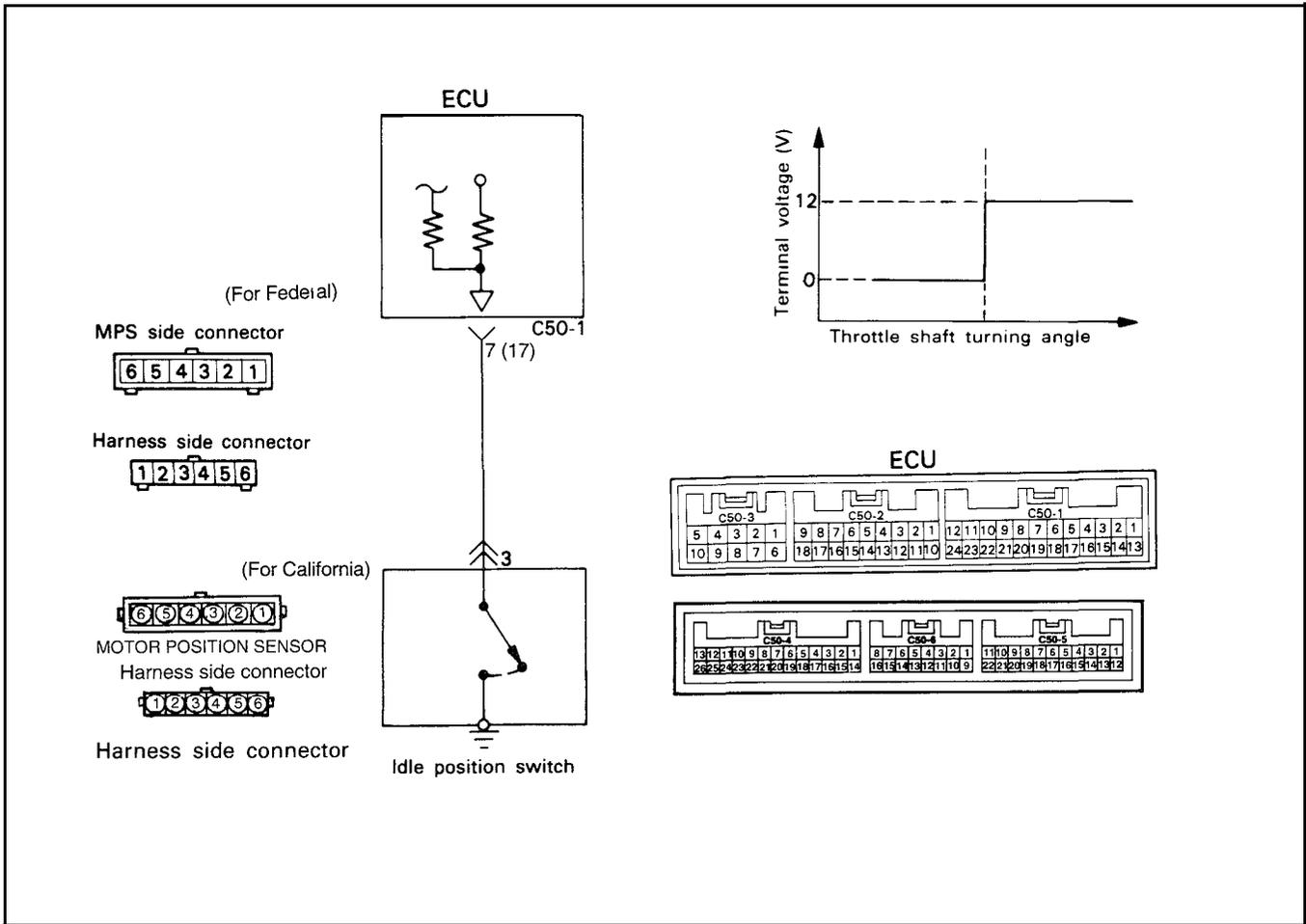
IDLE POSITION SWITCH

The idle switch, which is a contact type switch, senses accelerator operation. When the throttle valve is in the idle position, the ISC lever pushes the push pin to turn on the contact.



Circuit Diagram

() : California only



Troubleshooting Hints

If the idle position switch harness and individual part check results are normal but the idle position switch output is abnormal, check for the following items.

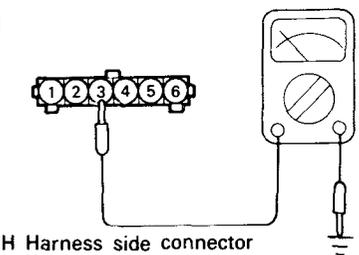
1. Poorly adjusted accelerator cable or auto-cruise control cable.
2. Poorly adjusted idle position switch (fixed SAS).

Using Multi-use Tester

Check Item	Data display	Check conditions	Throttle valve	Normal indication
Idle position switch o Service data o Item No. 26	Switch state	Ignition switch: ON (check by operating accelerator pedal repeatedly)	At idle position	ON
			Open a little	OFF

Harness Inspection Procedures

* California only

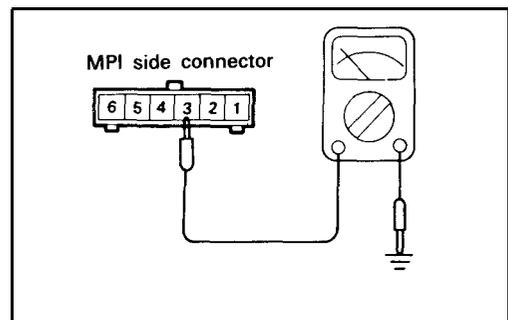
1	 <p>H Harness side connector</p>	<p>Measure the power supply voltage of the idle position switch.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4V or more 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness. (H3-C50-17) *(I3-C50-517)</p>
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Sensor Inspection

1. Disconnect the idle position switch connector.
2. Check the continuity between terminal 3 and sensor ground.

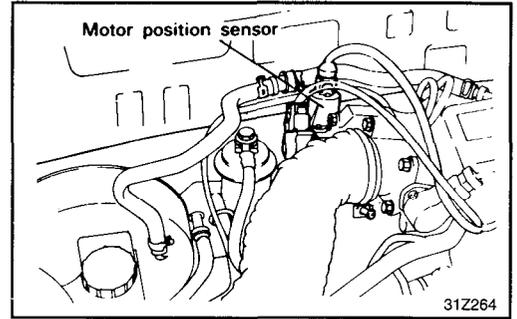
Accelerator pedal	Continuity
Depressed	Non-conductive ($\infty \Omega$)
Released	Conductive (0 Ω)

3. If out of specification, replace the idle position switch.

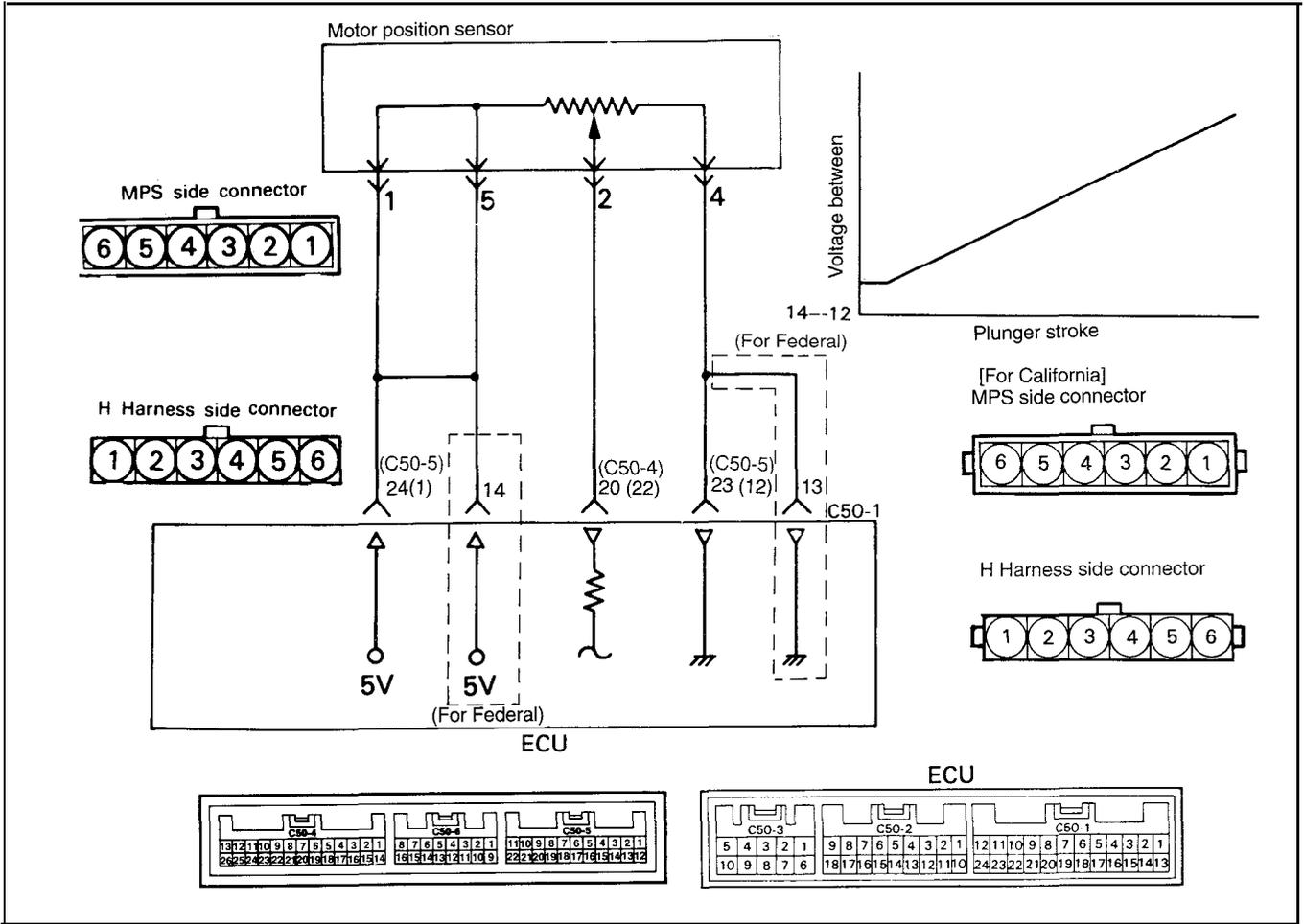


MOTOR POSITION SENSOR

The MPS converts the plunger position in the idle speed control servo into a voltage and inputs it to the ECU. The ECU then controls the idle speed control servo based on the input signal.



Circuit Diagram



Troubleshooting Hints

1. If troubles are caused when the air conditioner switch is turned on or off during idling or the engine load is changed, the motor position sensor is often faulty.
2. If the MPS harness and individual part check have resulted normal but the MPS voltage is out of specification, the following faults are suspected.
 - 1) Poorly adjusted idle speed.
 - 2) Deposit on the throttle valve
 - 3) Air leaking into the intake manifold through gasket gap, etc.
 - 4) Loose EGR valve seating.
 - 5) Poor combustion in the cylinder.

Using Multi-use Tester

Function	Item No.	Data display	Check conditions	Load state	Standard value
Data reading	15	Sensor Voltage	Check condition 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 o Idle position switch: ON (Compressor clutch to be operating in case air conditioner switch is ON) o Engine: At idle	Air conditioner switch: OFF	500-1,300 mV
				Air conditioner switch: ON	800-1,800 mV
				o Air conditioner switch: ON o Selector lever: Shift to D range	900-1,900 mV

NOTE

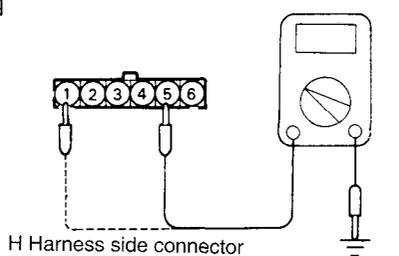
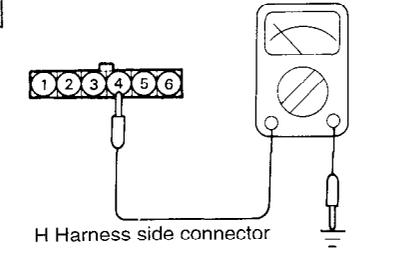
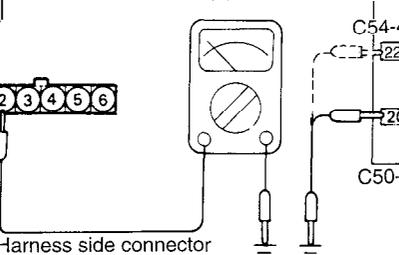
When the vehicle is new [within initial operation of about 500 km (300 miles)], the motor position sensor output voltage may be about 500 mV higher.

CAUTION

When shifting the selector lever to the D range, apply brake to prevent the vehicle from moving forward.

Harness Inspection Procedures

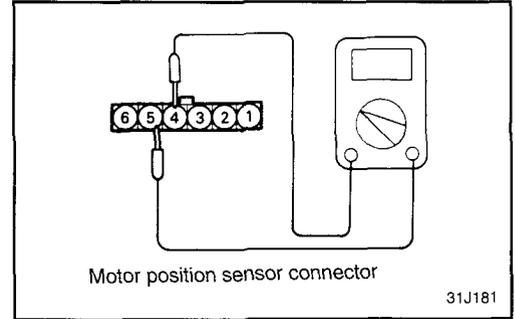
* California only

<p>1</p>  <p>H Harness side connector</p> <p>31J178</p>	<p>Measure the power supply voltage of the motor position sensor.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON <table border="1" data-bbox="694 1117 1029 1202"> <tr> <td>Voltage (V)</td> </tr> <tr> <td>4.8-5.2</td> </tr> </table>	Voltage (V)	4.8-5.2	<p>OK → 2</p> <p>NG →</p> <p>Repair the harness. (H 1 , 5 - C50-1 24, 14) * (I 1,5 - C50-5 1)</p>
Voltage (V)				
4.8-5.2				
<p>2</p>  <p>H Harness side connector</p> <p>31J179</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → 3</p> <p>NG →</p> <p>Repair the harness. (H 4 - C50-1 13, 23) * (I 4 - C50-5 12)</p>		
<p>3</p> <p>ECU harness side connector</p>  <p>H Harness side connector</p> <p>31J180</p>	<p>Check for an open-circuit, or a short-circuit to ground between the engine control unit and the motor position sensor.</p> <ul style="list-style-type: none"> o Engine control unit connector: Disconnected o Motor position sensor connector: Disconnected 	<p>OK → END !</p> <p>NG →</p> <p>Repair the harness. (H 2 - C50-1 20) * (I 2 - C50-4 22)</p>		

Sensor Inspection

1. Disconnect the motor position sensor connector.
2. Measure the resistance between terminals 4 and 5.

Standard value : 3.5-6.5 k Ω



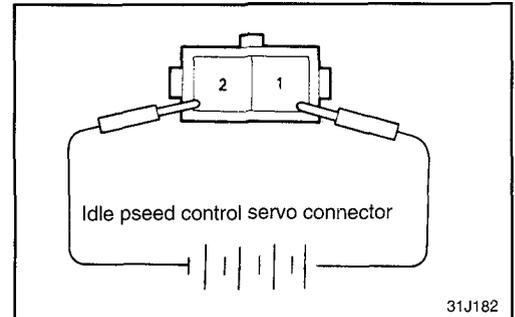
3. Disconnect the idle speed control servo connector.
4. Connect DC 6V between terminals 1 and 2 of idle speed control servo connector, and then measure the resistance between terminals 2 and 4 of the motor position sensor connector when the idle speed control servo is activated (caused to expand and contract).

Standard value: Increases or decreases smoothly as the plunger of the idle speed control servo extends or retracts.

CAUTION

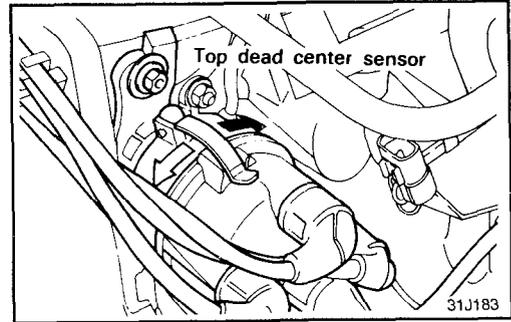
Apply only a 6V DC or lower voltage. Application of a higher voltage could cause locking of the servo gears.

5. If there is a deviation from the standard value, or if the change is not smooth, replace the idle speed control servo assembly.



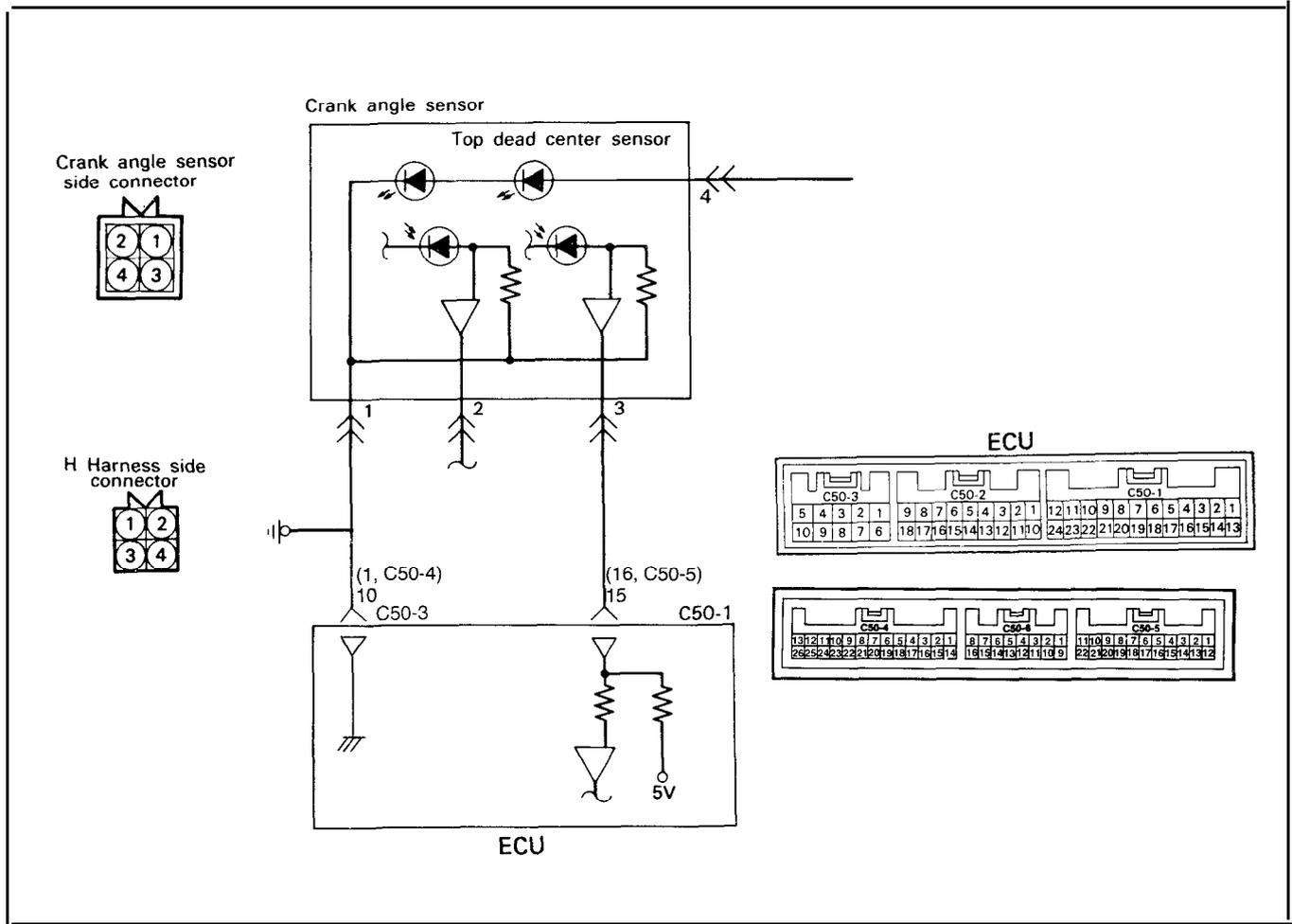
TOP DEAD CENTER (TDC) SENSOR

The TDC sensor senses the top dead center on compression stroke of the No. 1 and No. 4 cylinders, converts it into a pulse signal and inputs it to the ECU. The ECU then computes the fuel injection sequence, etc. based on the input signal.



Circuit Diagram

() : California only

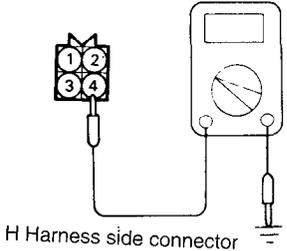
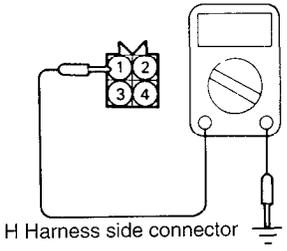
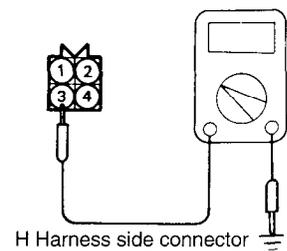


Troubleshooting Hints

If the TDC sensor does not operate correctly, correct sequential injection is not made so that the engine may stall or run irregularly at idle or fail to accelerate normally.

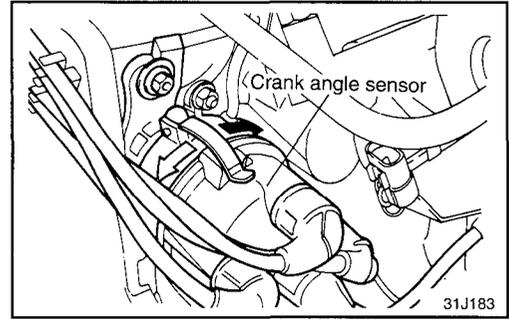
Harness Inspection Procedures

* California only

<p>1</p>  <p>H Harness side connector</p> <p>31J185</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK → 2</p> <p>NG → Repair the harness (H 4 - Ignition switch (IG1)</p>
<p>2</p>  <p>H Harness side connector</p> <p>31J186</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → 3</p> <p>NG → Repair the harness. (H 1 - C50-3 10, Ground) * (H 1 - C50-4 1)</p>
<p>3</p>  <p>H Harness side connector</p> <p>31J187</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V 	<p>OK → END !</p> <p>NG → Repair the harness. (H 3 - C50-1 15) * (H 3 - C50-5 16)</p>

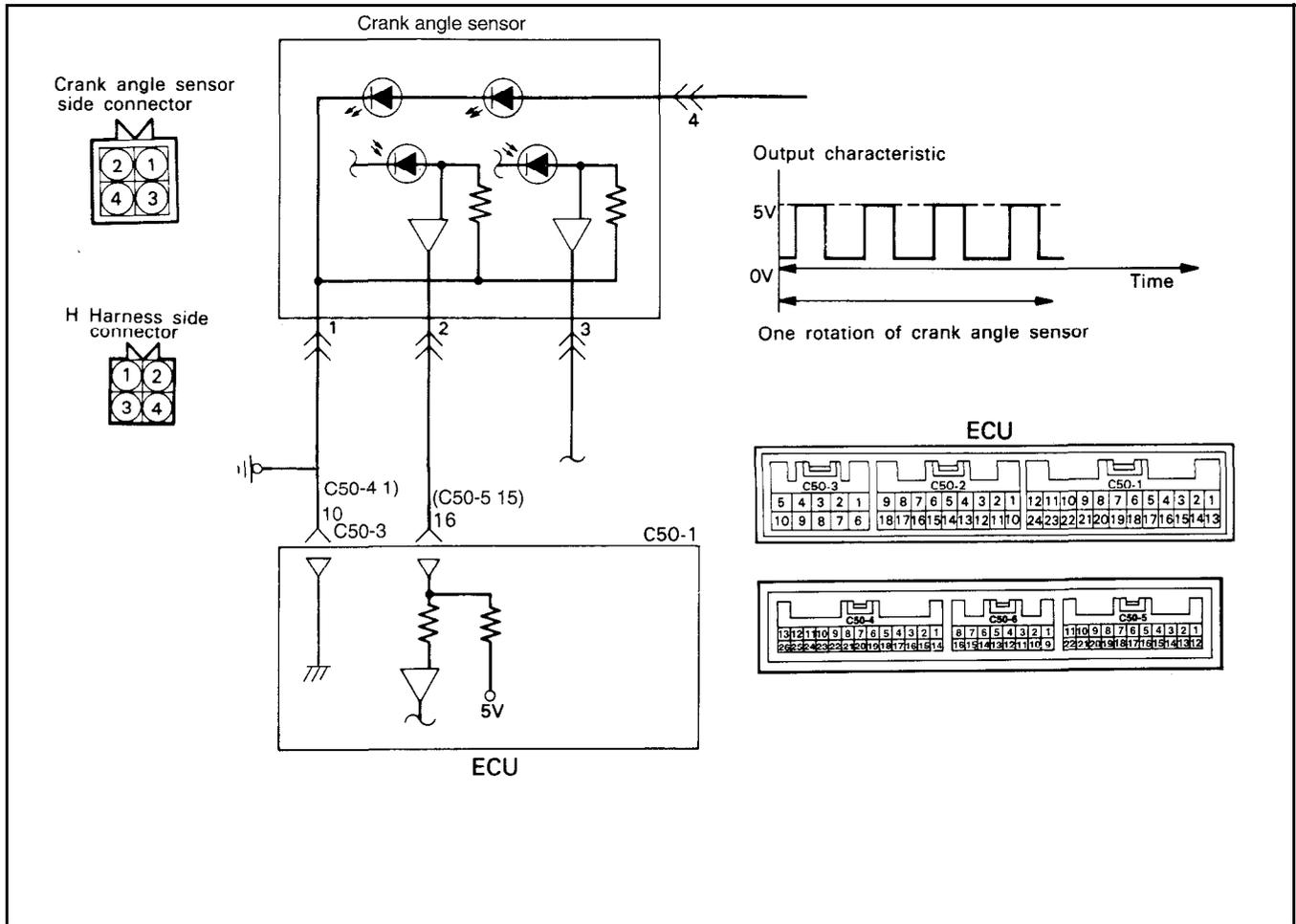
CRANK ANGLE SENSOR

The crank angle sensor senses the crank angle (piston position) of each cylinder, converts it into a pulse signal. The ECU computes the engine speed and controls the fuel injection timing and ignition timing based on the input signal.



Circuit Diagram

() : California only



Troubleshooting Hints

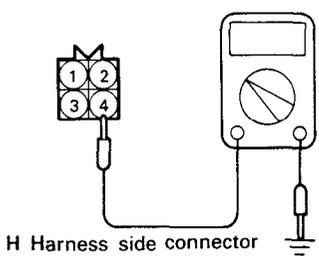
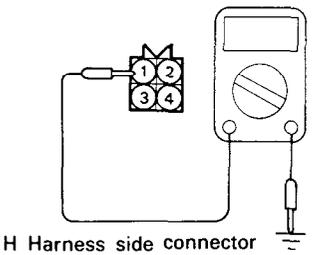
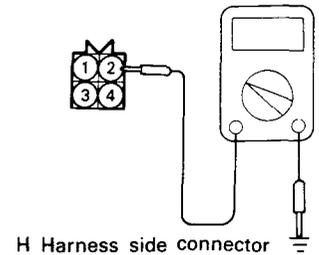
1. If unexpected shocks are felt during driving or the engine stalls suddenly, shake the crank angle sensor harness. If this causes the engine to stall, check for poor contact of the sensor connector.
2. If the tachometer reads 0 rpm when the engine is cranked, check for faulty crank angle sensor, broken timing belt or ignition system problems.
3. If the engine can be run at idle even if the crank angle sensor reading is out of specification, check the followings:
 - 1) Faulty engine coolant temperature sensor
 - 2) Faulty idle speed control servo
 - 3) Poorly adjusted reference idle speed

Using Multi-use Tester

Check Item	Data display	Check conditions	Check content	Normal state
Crank angle sensor o Service data o Item No. 22	Cranking speed	o Engine cranking o Tachometer connected (check on and off of primary current of ignition coil by tachometer)	Compare cranking speed and multi-tester reading	Indicated speed agrees
Check Item	Data display	Check conditions	Coolant temperature	Test specification
Crank angle sensor o Service data o Item No.22	Idle speed	Check condition o Engine: Running at idle o Idle position switch: ON	When -20°C (-4°F)	1,500-1,700 rpm
			When 0°C (32°F)	1,350-1,550 rpm
			When 20°C (68°F)	1,200-1,400 rpm
			When 40°C (104°F)	1,000-1,200 rpm
			When 80°C (176°F)	650-850 rpm

Harness Inspection Procedures

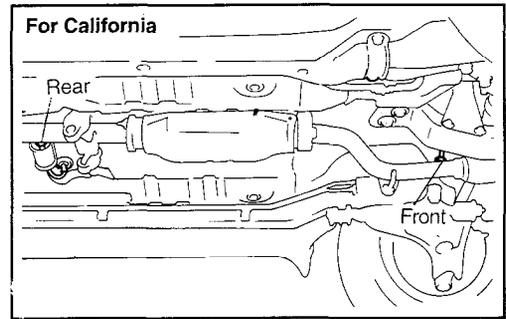
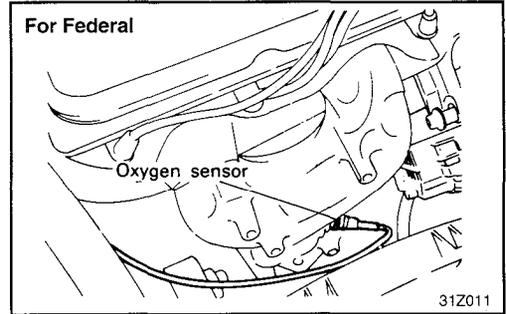
* California only

<p>1</p>  <p>H Harness side connector</p> <p>31J189</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK → 2</p> <p>NG → Repair the harness (H 4 -Ignition switch (IG1))</p>
<p>2</p>  <p>H Harness side connector</p> <p>31J190</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → 3</p> <p>NG → Repair the harness. (H 1 - C50-3 10, Ground) * (H 1 - C50-4 1)</p>
<p>3</p>  <p>H Harness side connector</p> <p>31J191</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.8-5.2V 	<p>OK → END !</p> <p>NG → Repair the harness. (H 2 - C50-1 16) * (H 2 - C50-5 15)</p>

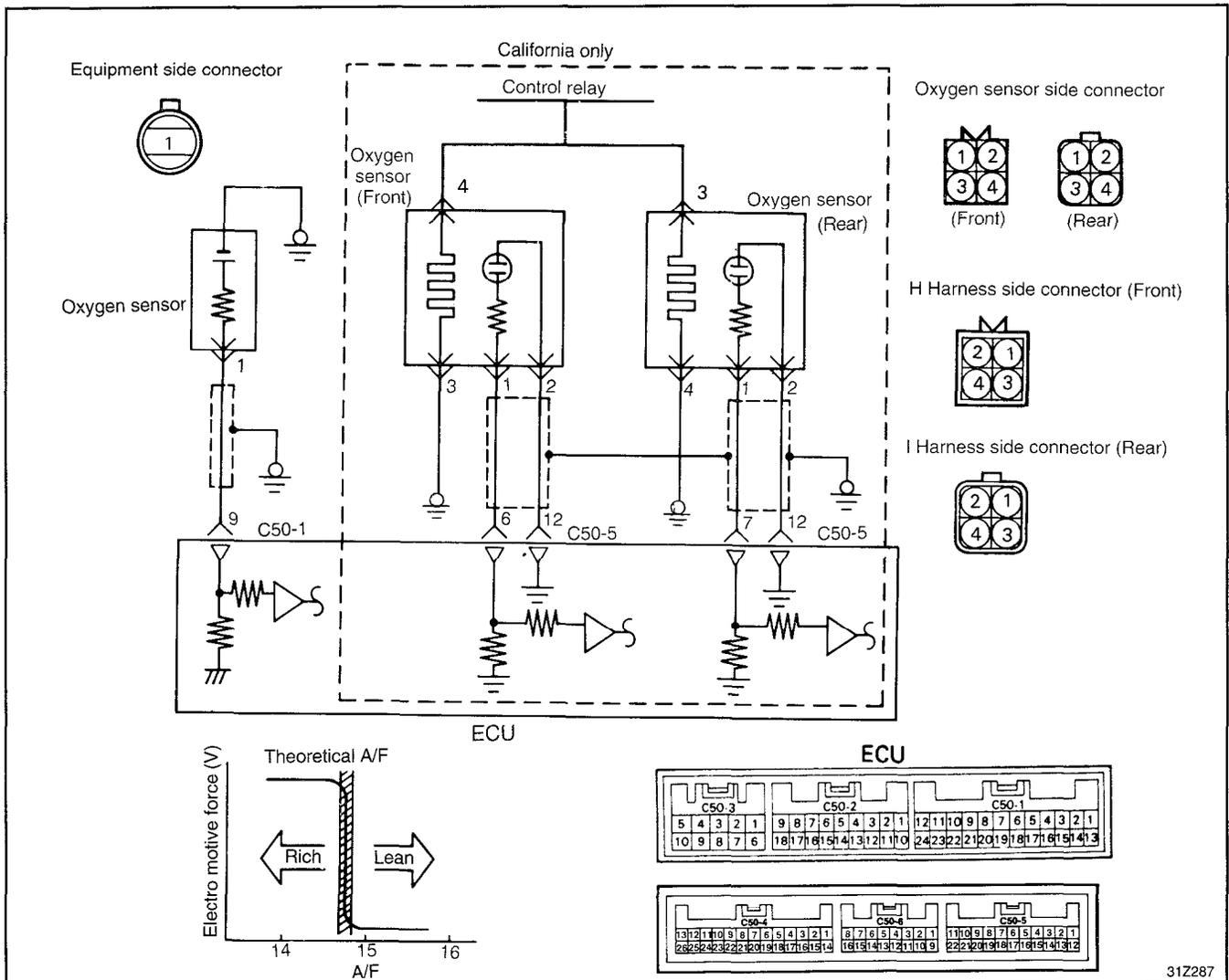
OXYGEN SENSOR

The oxygen sensor senses the oxygen concentration in exhaust gas, converts it into a voltage which is sent to the ECU. The oxygen sensor outputs about 1V when the air fuel ratio is richer than the theoretical ratio and outputs about 0V when the ratio is leaner (higher oxygen concentration in exhaust gas.).

The ECU controls the fuel injection ratio based on this signal so that the air fuel ratio is maintained at the theoretical ratio.



Circuit Diagram



Using Multi-use Tester

Check Item	Data display	Check conditions	Engine state	Test specification
Oxygen sensor o Service data o Item No.11, 59	Sensor voltage	Engine: Warm-up (make the mixture lean by engine speed reduction, and rich by racing)	When sudden deceleration from 4,000 rpm	200 mV or lower
			When engine is suddenly raced	600-1,000 mV
		Engine: Warm-up (using the oxygen sensor signal, check the air/fuel mixture ratio, and also check the condition of control by the ECU)	750 rpm (Idle)	400 mV or lower - (changes) 600-1,000 mV
			2,000 rpm	

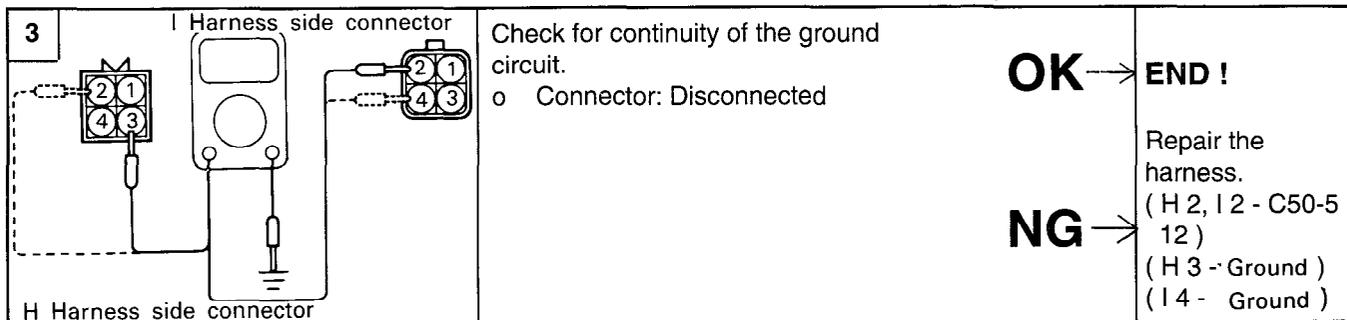
Harness inspection Procedures (For Federal)

1	<p>Engine control unit-harness side connector</p> <p>H Harness side connector</p>	<p>Check for an open-circuit, or a short-circuit to ground between the ECU and the oxygen sensor.</p> <ul style="list-style-type: none"> o Oxygen sensor connector: Disconnected o ECU connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness (H1-C50-1 9)</p>
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Harness Inspection Procedures (For California)

1	<p>(Front) (Rear)</p> <p>H, I Harness side connector</p>	<p>Measure the power supply voltage of the oxygen sensor.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK →</p> <p>NG →</p>	<p>2</p> <p>Repair the harness (H 4, I 3 - control relay)</p>
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2	<p>ECU Harness side connector</p> <p>H, I Harness side connector</p>	<p>Check for an open-circuit, or a short-circuit of ground between the engine control unit and the oxygen sensor.</p> <ul style="list-style-type: none"> o Oxygen sensor connector: Disconnected o ECU connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>3</p> <p>Repair the harness. (H 1 - C50-5 6) (I 1 - C50-5 7)</p>
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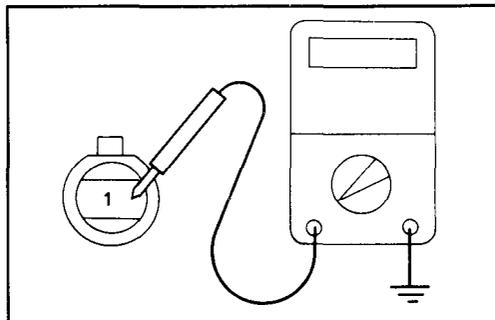


Sensor Inspection

[For Federal]

CAUTION

1. Before checking, warm up the engine until the engine coolant temperature reaches 80 to 95°C (176 to 205°F).
2. Use an accurate digital voltmeter.
1. Disconnect the oxygen sensor connector and connect a voltmeter to the oxygen sensor connector.
2. While repeatedly racing the engine, measure the oxygen sensor output voltage.



Engine	Oxygen sensor output voltage	Remarks
Race	Min 0.6 V	Make air-fuel mixture rich by accelerator operation

Sensor Inspection

[For California]

1. Disconnect the oxygen sensor connector, and measure the resistance between terminal 3 and terminal 4.

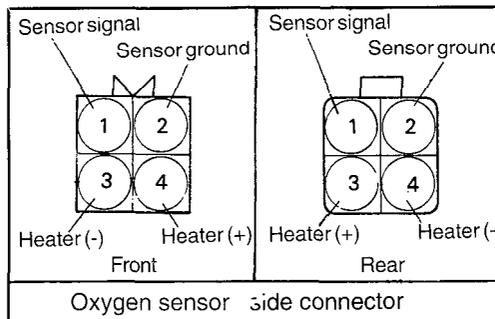
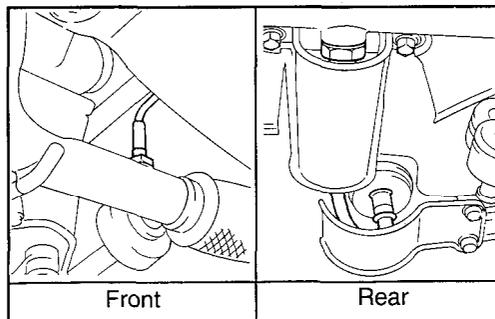
Standard value

Temperature °C (°F)	Resistance (Ω)
400 (752)	30 or more

2. Replace the oxygen sensor if there is malfunction.
3. Using the special tool (09392-33000), apply battery voltage directly between terminal 3 and terminal 4.

NOTE

Take care when applying the voltage, because damage will result if the terminals are incorrect or are short-circuited.



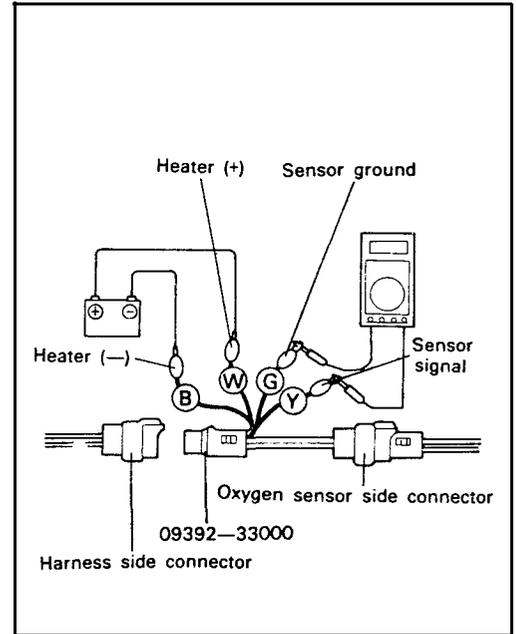
4. Connect a digital-type voltmeter between terminal 1 and terminal 2.
5. While repeatedly racing the engine, measure the oxygen sensor output voltage.

Engine	Oxygen sensor output voltage	Remarks
Race	Min. 0.6V	Makes the air/fuel mixture rich by increased engine speed

6. If there is a problem, it is probable that there is a malfunction of the oxygen sensor.

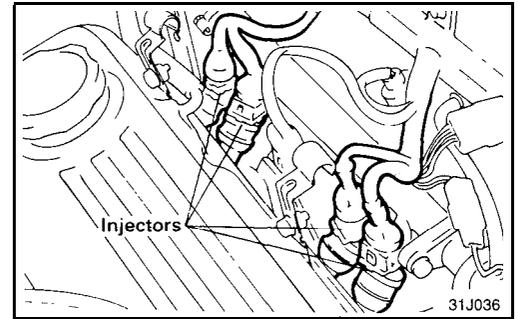
Tightening torque

Oxygen sensor 40-50 Nm (400-500 kg.cm, 29-36 lb.ft)



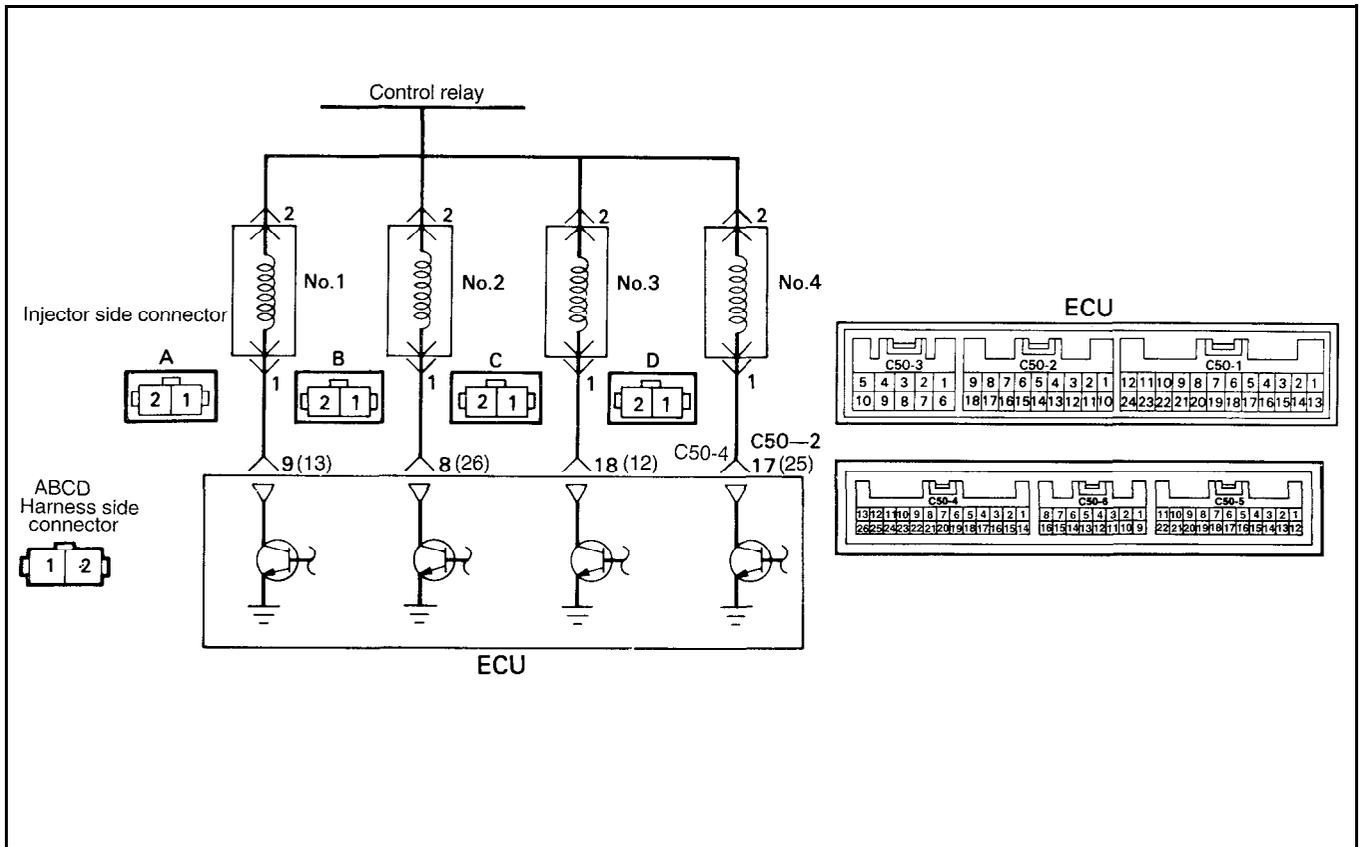
INJECTORS

The injectors inject fuel according to a signal coming from the ECU. The volume of fuel injected by the injector is determined by the time during which the solenoid valve is energized.



Circuit Diagram

() : California only



Troubleshooting Hints

1. If the engine is hard to start when hot, check for fuel pressure and injector leaks.
2. If the injector does not operate when the engine is cranked, then check the followings;
 - 1) Faulty power supply circuit to the ECU, faulty ground circuit
 - 2) Faulty control relay
 - 3) Faulty crank angle sensor, top dead center sensor
3. If there is any cylinder whose idle state remains unchanged when the fuel injection of injectors is cut one after another during idling, check for the following items about such cylinder.
 - 1) Injector and harness
 - 2) Ignition plug and high tension cable
 - 3) Compression pressure

If the injection system is ok but the injector drive time is out of specification, check for the following items.

 - 1) Poor combustion in the cylinder (faulty ignition plug, ignition coil, compression pressure, etc.)
 - 2) Loose EGR valve seating

Using Multi-use Tester

Check Item	Data display	Check conditions	Check content	Test specification
Injector o Service data o Item No. 41	Drive time* ¹	Engine: Cranking	0°C (32°F)* ²	Approx. 17 ms
			20°C (68°F)	Approx. 35 ms
			80°C (176°F)	Approx. 8.5 ms

Check Item	Data display	Check conditions	Engine state	Test specification
Injector o Service data o Item No. 41	Drive time	<ul style="list-style-type: none"> 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)	2.2-2.9 ms
			2,000 rpm	1.8-2.6 ms
			Rapid racing	To increase

NOTE

*1 : The injector drive time refers to when the supply voltage is 11 V and the cranking speed is less than 250 rpm.

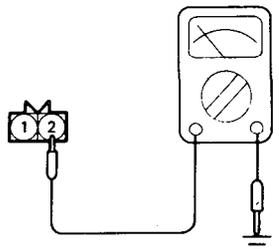
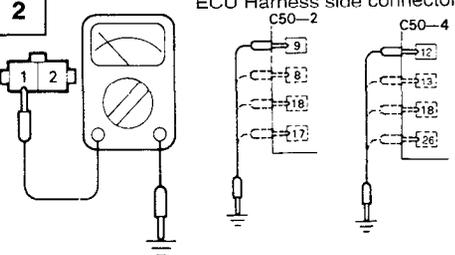
*2: When coolant temperature is lower than 0°C (32°F) the ECU fires all four cylinders simultaneously.

*3: When the vehicle is new [within initial operation of about 500 km (300 miles)], the injector drive time may be about 10% longer.

Check Item	Item No.	Drive content	Check condition	Normal state
Injector o Actuator test	01	No. 1 injector shut off	Engine: Idling after warm-up (Shut off the injectors in sequence during after engine warm-up, check the idling condition)	Idle should become unstable as injector shut off.
	02	No. 2 injector shut off		
	03	No. 3 injector shut off		
	04	No. 4 injector shut off		

Harness Inspection Procedures

* California only

<p>1</p>  <p>A B C D Harness side connector</p> <p>31J099</p>	<p>Measure the power supply voltage of the injector.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK → 2</p> <p>NG →</p> <p>Repair the harness. (A B C D 2 - Control relay) Check the power supply.</p>
<p>2</p>  <p>ABCD Harness side connector</p> <p>31J100</p>	<p>Check for an open-circuit, or a short-circuit to ground between the engine control unit and the injector.</p> <ul style="list-style-type: none"> o ECU connector: Disconnected o Injector connector: Disconnected 	<p>OK → END !</p> <p>NG →</p> <p>Repair the harness. (A B C D 1 - C50-2 9 , 8 , 18 , 17) * (A B C D 1 - C50-4 12 , 13 , 25 , 26)</p>

Actuator Inspection

Operation Check

Using a multi-use tester, check as described below.

- o Cut off the fuel injectors in sequence.
- o Check the operation time of the injectors.

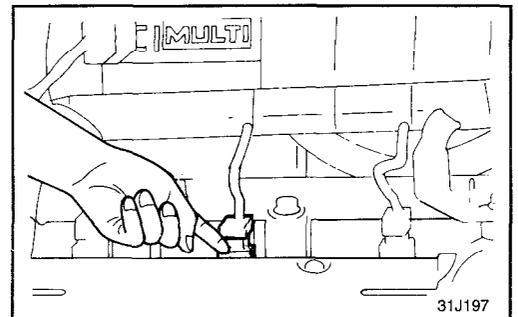
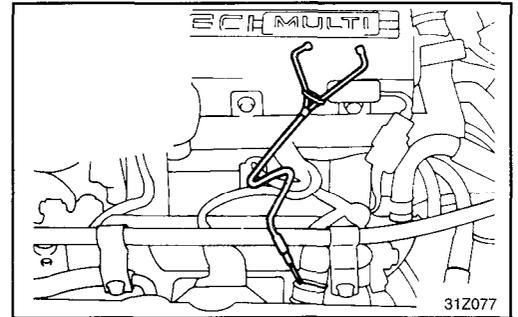
Operation Sound Check

1. Using a stethoscope, check the injectors for a clicking sound at idle. Check that the sound is produced at shorter intervals as the engine speed increases.

NOTE

Ensure that the sound from an adjacent injector is not being transmitted along the delivery pipe to an inoperative injector.

2. If a stethoscope is not available, check the injector operation with your finger.
If no vibrations are felt, check the wiring connector, injector, or injection signal from ECU.

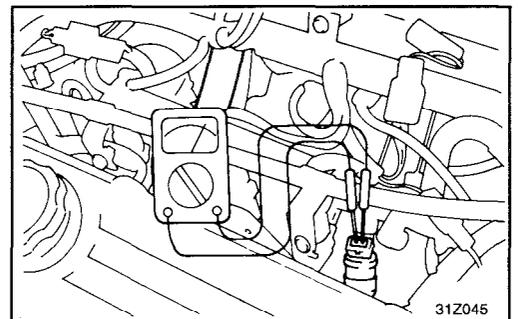


Resistance Measurement Between Terminals

1. Disconnect the connector at the injector.
2. Measure the resistance between terminals.

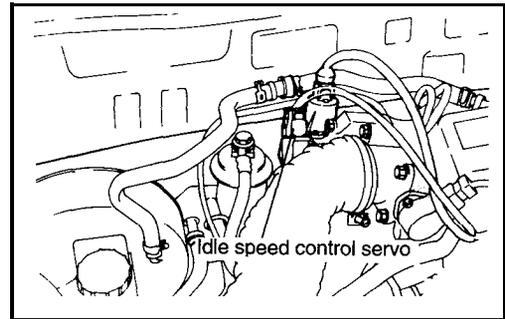
Standard value 13-16 Ω
[at 20°C (68°F)]

3. Connect the connector to the injector.



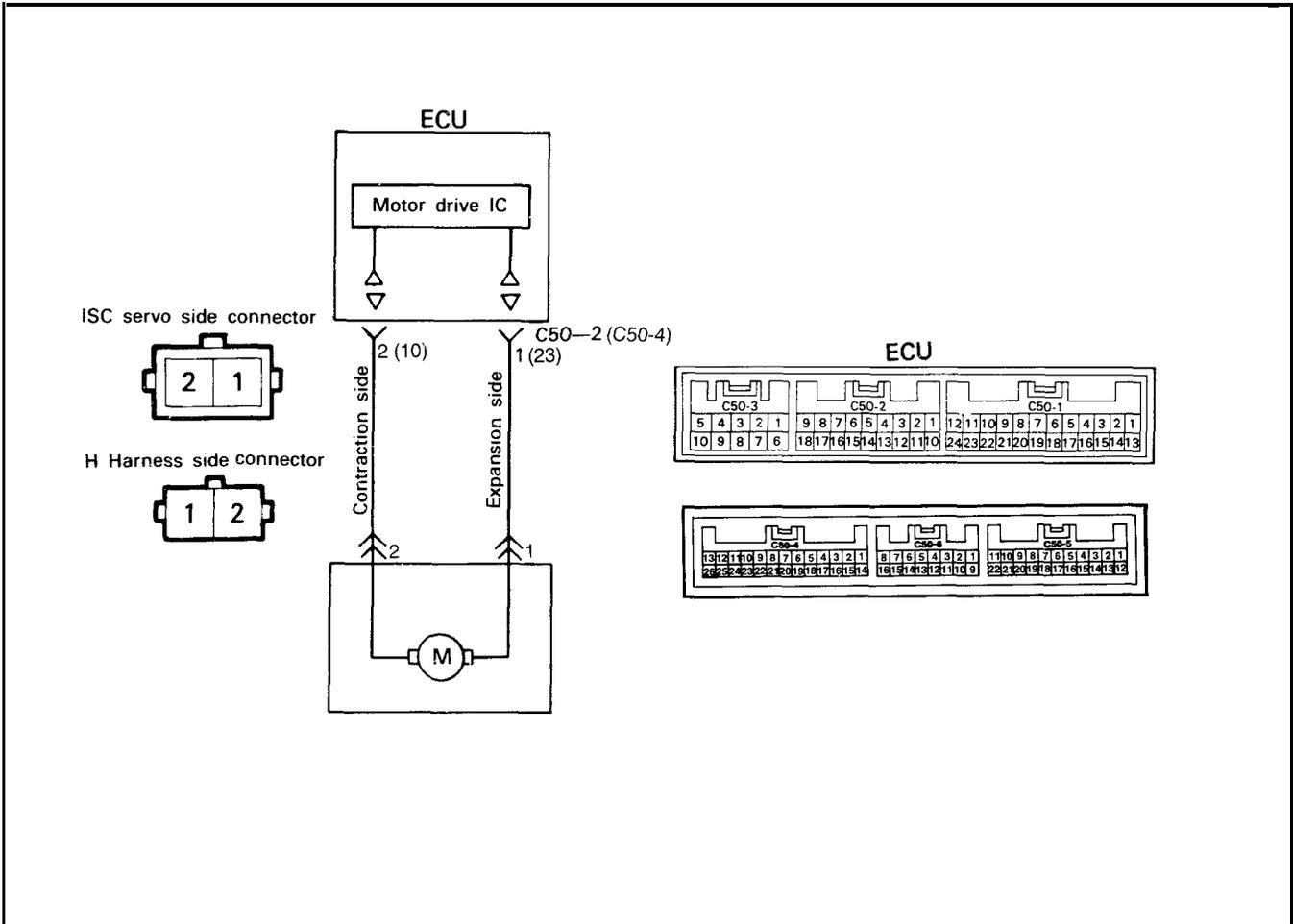
**IDLE SPEED CONTROL SERVO
(DC MOTOR TYPE)**

The servo plunger extends or retracts to open or close the throttle valve, thereby controlling the intake air volume. And the DC motor is driven in forward or backward direction according to the current flow switched by the motor drive IC in the ECU.



Circuit Diagram

() : California only



Troubleshooting Hints

In case irregular idling or engine stall is caused but the causes cannot be determined, turn ON the ignition switch for 15 seconds or more. Then disconnect the servo connector. This facilitates troubleshooting. If necessary, turn the idle speed control adjusting screw to adjust the engine.

Harness Inspection Procedures

* California only

1

H Harness side connector

ECU Harness side connector

31J199

Check for an open-circuit, or a short-circuit to ground between the ECU and the ISC servo.

OK → **END !**

NG → Repair the harness.
 (H 2-C50-2 2)
 (H 1-C50-2 1)
 * (H 2-C50-4 10)
 * (H 1-C50-4 23)

Actuator InSpeCtIOn

1. Disconnect the idle speed control servo connector.
2. Check continuity of the idle speed control servo coil.

CAUTION

During check the continuity, make sure the ambient air temperature.

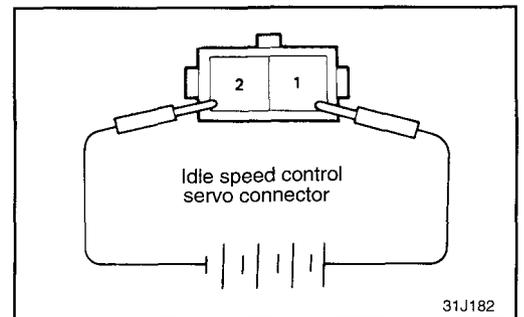
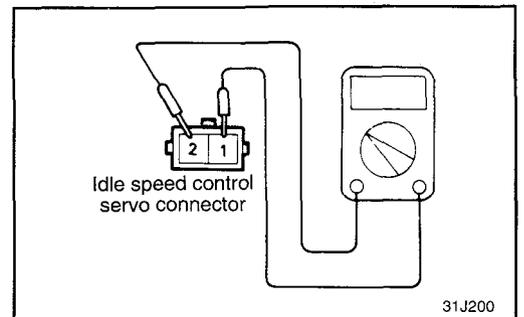
Measuring terminals	Continuity
1-2 conductive	5-70 Ω at 20°C (68°F)
	92 Ω at 100°C (212°F)

3. Connect 6V DC between terminal 1 and terminal 2 of the idle speed control servo connector, and check to be sure that the idle speed control operates.
4. If there is a deviation from the standard valve, but the idle speed control operate correctly. Then the idle speed control servo is normal.

CAUTION

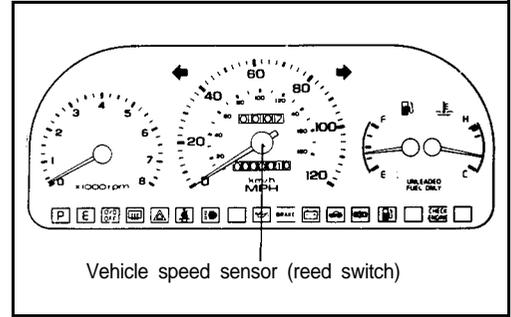
Apply only a 6V DC or lower voltage. Application of higher voltage could cause locking of the servo gears.

5. If not, operates, replace idle speed control servo as an assembly.



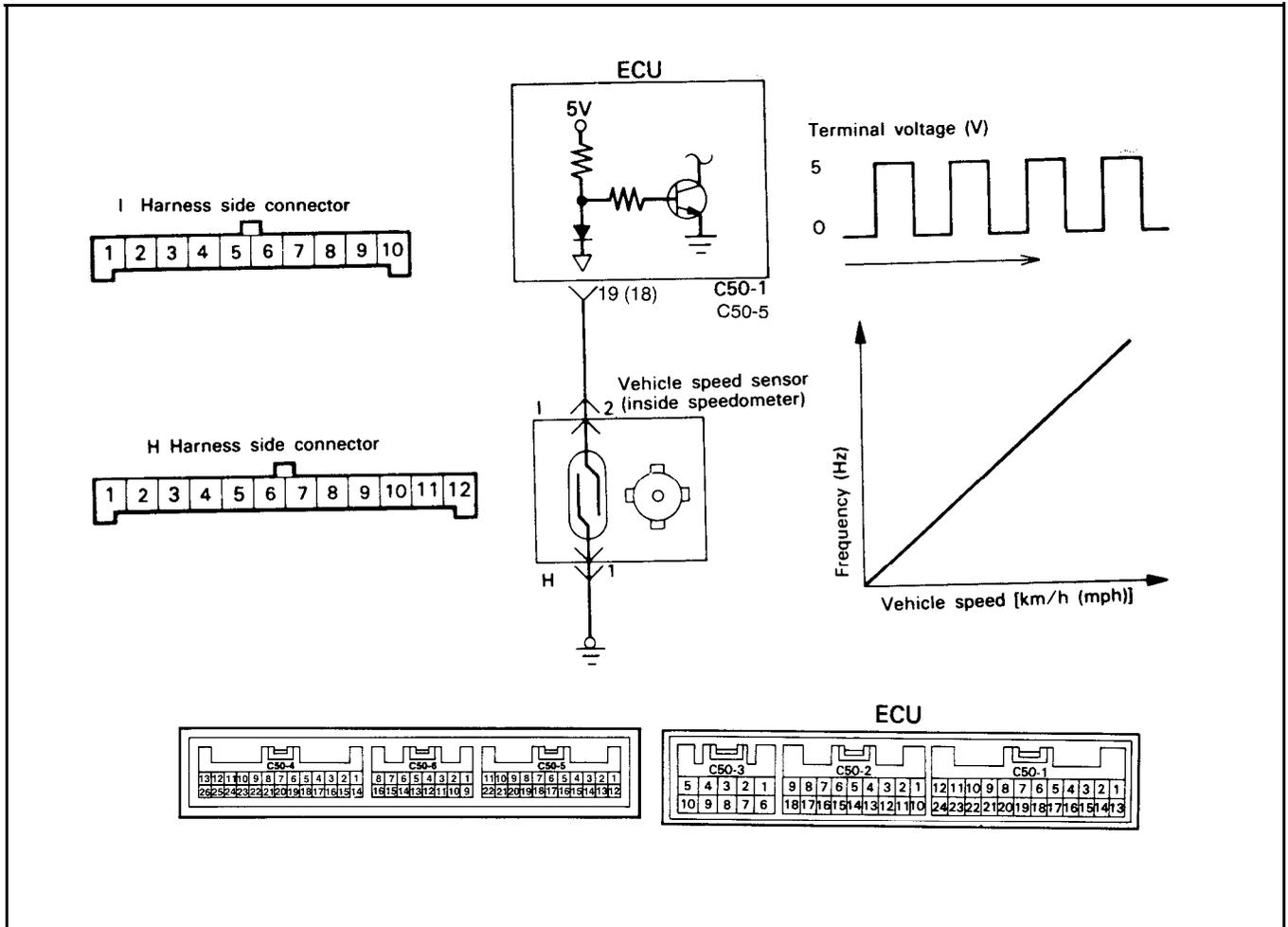
VEHICLE SPEED SENSOR

The vehicle speed sensor is a reed switch. The vehicle speed sensor is built into the speedometer and covers the transaxle gear revolutions into pulse signals, which are sent to ECU.



Circuit Diagram

() : California only

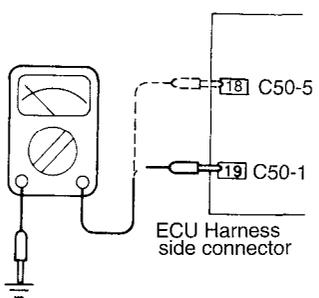


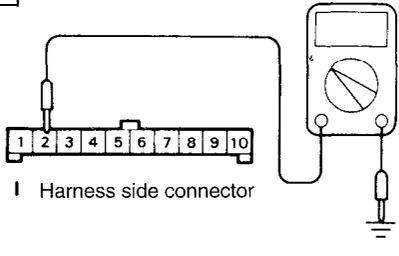
Troubleshooting Hints

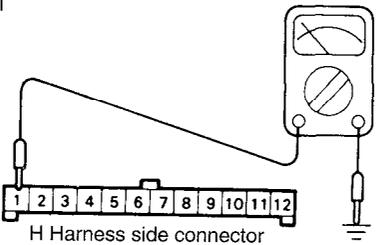
If there is an open or short circuit in the vehicle speed sensor signal circuit, the engine may stall when the vehicle is decelerated to stop.

Harness Inspection Procedures

* California only

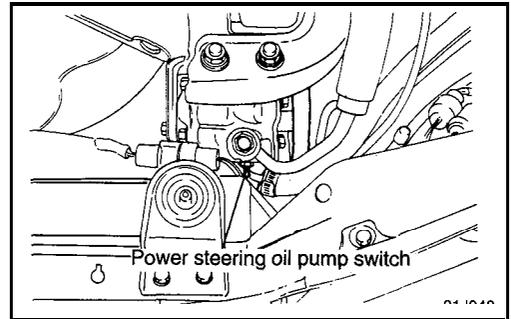
2	 <p style="text-align: center;">ECU Harness side connector</p> <p style="text-align: right; font-size: small;">31J089</p>	<p>Check the vehicle speed sensor output circuit for continuity</p> <ul style="list-style-type: none"> o Engine control unit connector: Disconnected o Move the vehicle 	<p>OK → END !</p> <p>NG → 2</p>
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2	 <p style="text-align: center;">I Harness side connector</p> <p style="text-align: right; font-size: small;">31J090</p>	<p>Measure the power supply voltage of the vehicle speed sensor</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.5-4.9V 	<p>OK → 3</p> <p>NG → Repair the harness (H 2 - C50-1 19) * (H 2 - C50-5 18)</p>
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3	 <p style="text-align: center;">H Harness side connector</p> <p style="text-align: right; font-size: small;">31J091</p>	<p>Check for continuity of the ground circuit</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → END !</p> <p>NG → Repair the harness (H 1-Ground)</p>
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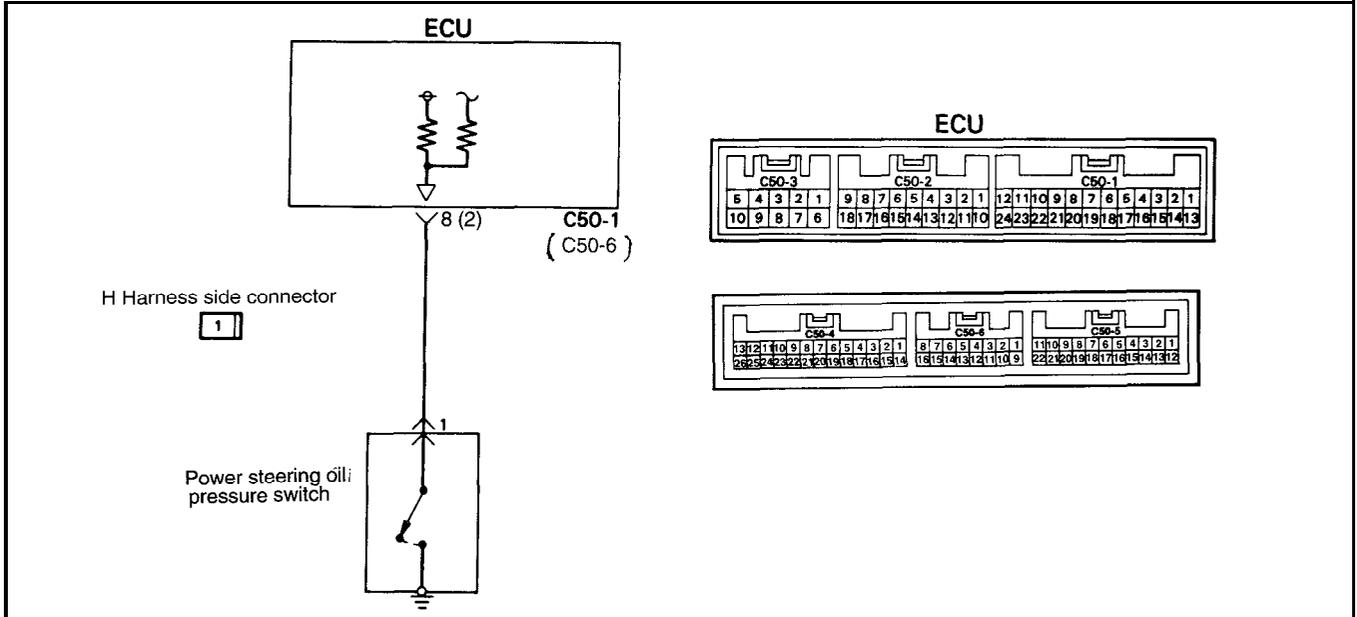
POWER STEERING OIL PRESSURE SWITCH

The power steering oil pressure switch senses the power steering load into low/high voltage and inputs it to ECU, which then controls the idle speed control servo based on this signal.



Circuit Diagram

() : California only



Using Multi-use Tester

Check Item	Data display	Check conditions	Steering wheel	Normal indication
Power steering oil pressure switch o Service data o Item No.27	Switch state	Engine: Idling	Steering wheel neutral position (wheels straight-ahead direction)	OFF
			Steering wheel half turn	ON

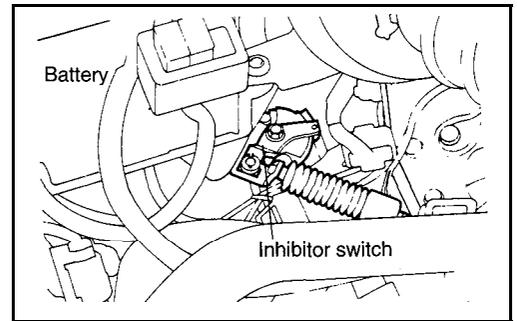
* California only

<p>3</p> <p>H Harness side connector</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness. (H 1 - C50-1 8) * (H 1 - C50 - 6 2)</p>
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IGNITION SWITCH-ST AND INHIBITOR SWITCH [A/T]

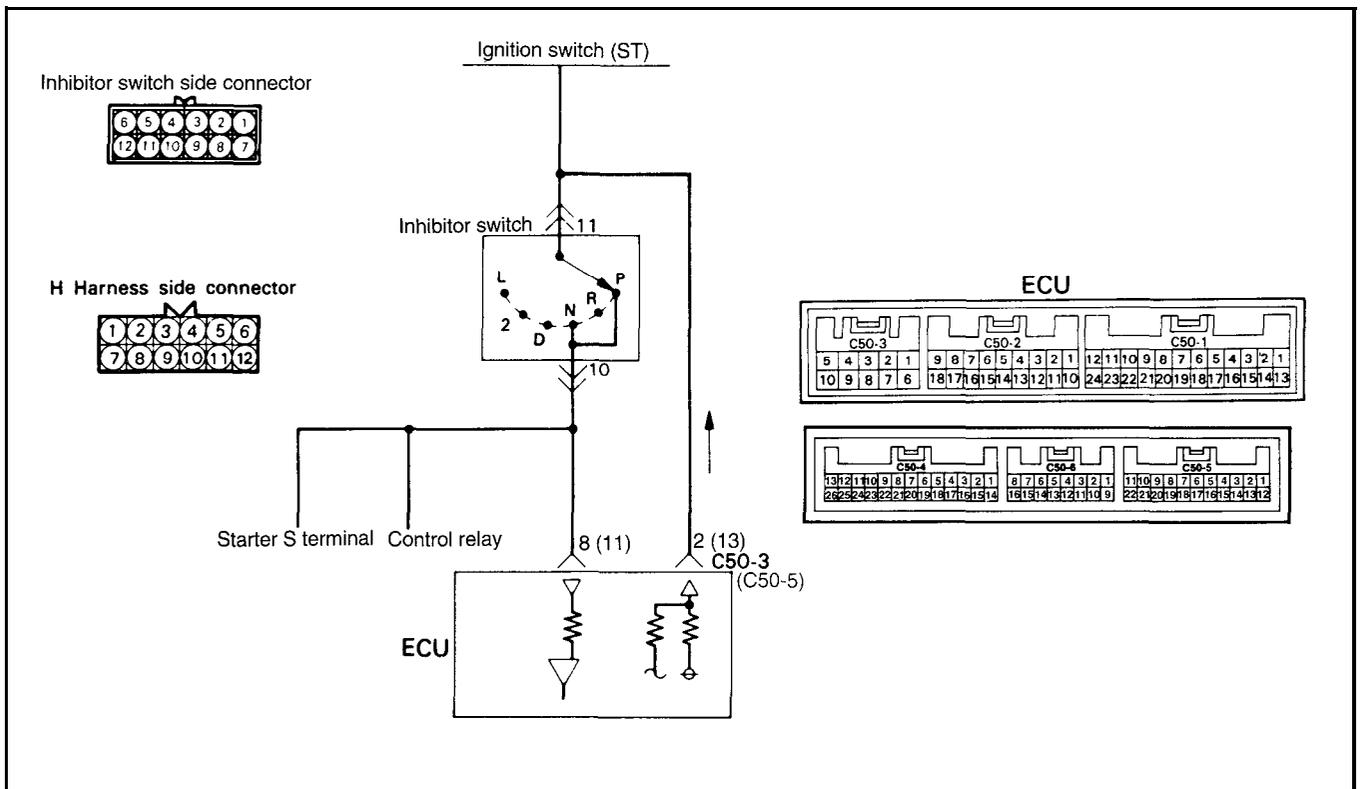
When the ignition switch is set ST position, the battery voltage is applied through the ignition switch and inhibitor switch to the ECU. If the selector lever is not P or N position, the battery voltage will not reach to the ECU.

Based on this signal, the ECU determines the automatic transaxle load and drives the idle speed actuator to maintain optimum idle speed.



Circuit Diagram

() : California only



Troubleshooting Hints

If the inhibitor switch harness check is normal but the inhibitor switch output is abnormal, check for the control cable adjustment.

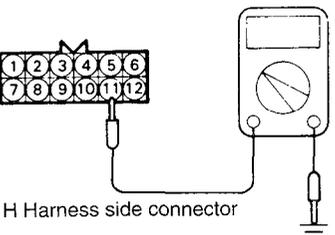
Using Multi-use Tester

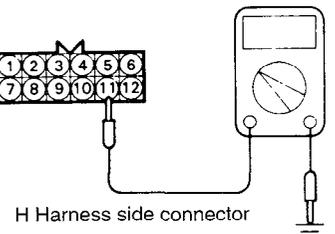
Check Item	Data display	Check conditions	Steering wheel	Normal indication
Crank signal o Service data o Item No. 18	Switch state	Ignition switch: ON	stop	OFF
			Cranking	ON

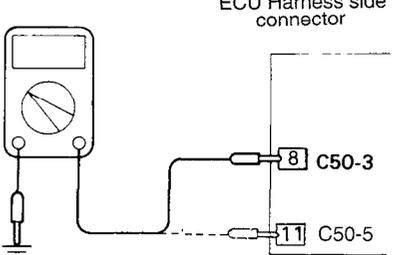
Check Item	Data display	Check conditions	Steering wheel	Normal indication
Inhibitor switch o Service data o Item No. 29	Switch state	Ignition switch: ON	P or N	P or N
			D, 2, L or R	D, 2, L or R

Harness Inspection

* California only

1	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J095</p>	<p>Measure the power supply voltage of the inhibitor switch</p> <ul style="list-style-type: none"> o ECU connector: Disconnected o Inhibitor switch connector: Disconnected o Ignition switch: START and ON o Voltage (V): System voltage 	<p>OK →</p> <p>NG →</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto; text-align: center; line-height: 30px;">2</div> <p>Check the power supply circuit.</p>
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2	 <p>H Harness side connector</p> <p style="text-align: right; font-size: small;">31J096</p>	<p>Measure the input voltage of engine control unit</p> <ul style="list-style-type: none"> o ECU connector: Connected o Inhibitor switch connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK →</p> <p>NG →</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto; text-align: center; line-height: 30px;">3</div> <p>Repair the harness (H 11 - C50-3 2) * (H 11 - C50-5 13)</p>
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2	 <p>ECU Harness side connector</p> <p style="text-align: right; font-size: small;">31J097</p>	<p>Measure the input voltage of engine control unit</p> <ul style="list-style-type: none"> o ECU connector: Disconnected o Inhibitor switch connector: Connected o Select lever: P range o Ignition switch: START o Voltage: 8V or more 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness (H 10 - C50-3 8) * (H 10 - C50-5 11)</p>
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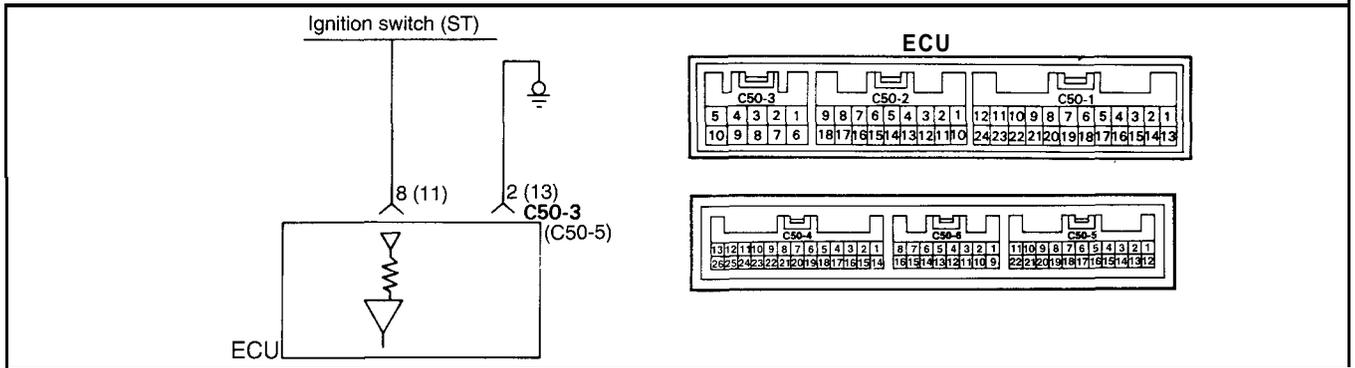
IGNITION SWITCH-ST [M/T]

The ignition switch-ST inputs a high signal to the ECU while the engine is cranking.

The ECU provides fuel injection control, etc. at engine start-up based on this signal.

Circuit Diagram

() : California only



Using Multi-use Tester

Function	Item No.	Data display	Check conditions	Engine	Normal indication
Data reading	18	Switch state	Ignition switch: ON	Stop	OFF
				Cranking	ON

Harness Inspection

. California only

1 ECU Harness side connector

31J195

Measure the input voltage to the ECU

- o ECU connector: Disconnected
- o Ignition switch: START
- o Voltage: 8V or more

OK → **2**

NG → Repair the harness (C50-3 8- Ignition switch)
* (C50-5 11 - Ignition switch)

2 Engine control unit harness side connector

31J196

Check for continuity of the ground circuit

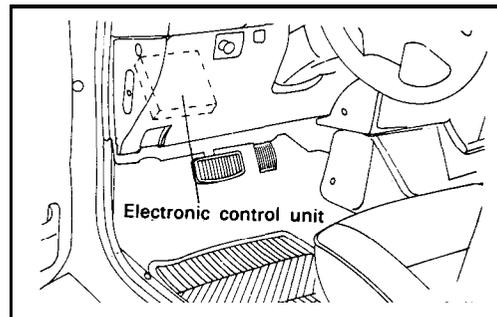
- o ECU connector: Disconnected

OK → **END !**

NG → Repair the harness (C50-3 2- Ground)
* (C50-5 13 - Ground)

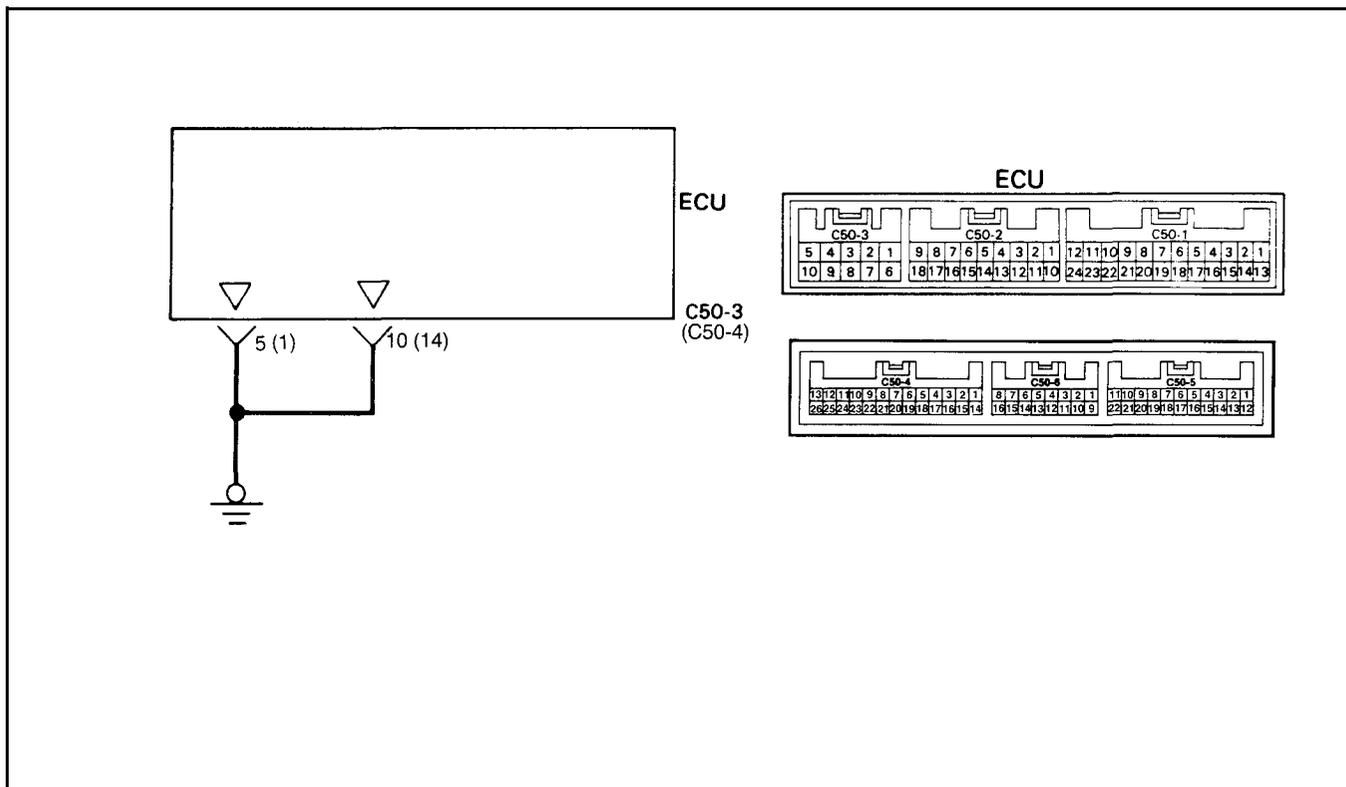
**ELECTRONIC CONTROL UNIT (ECU)-
POWER GROUND**

Grounds the electronic control unit.



Circuit Diagram

() : California only



Troubleshooting Hints

If the ground wire of the ECU is not connected securely to ground, the unit will not operate correctly.

Harness Inspection

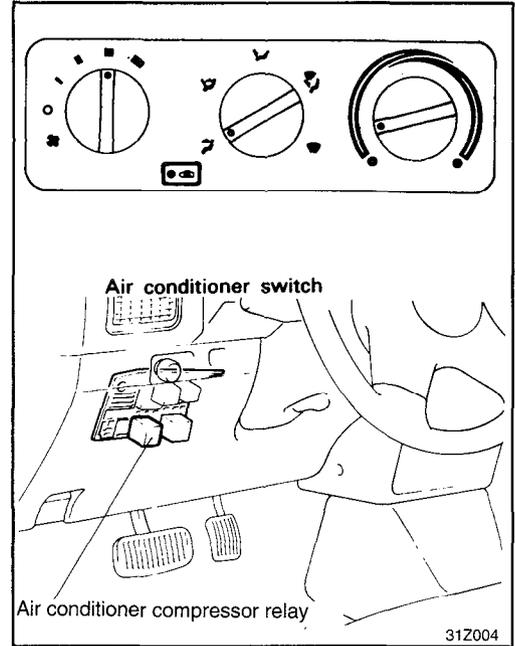
* California only

<p>1</p>	<p>ECU Harness side connector</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o ECU connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>END !</p> <p>Repair the harness (C50-3 5, 10 - Ground) * (C50-4 1, 14 - Ground)</p>
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31J118

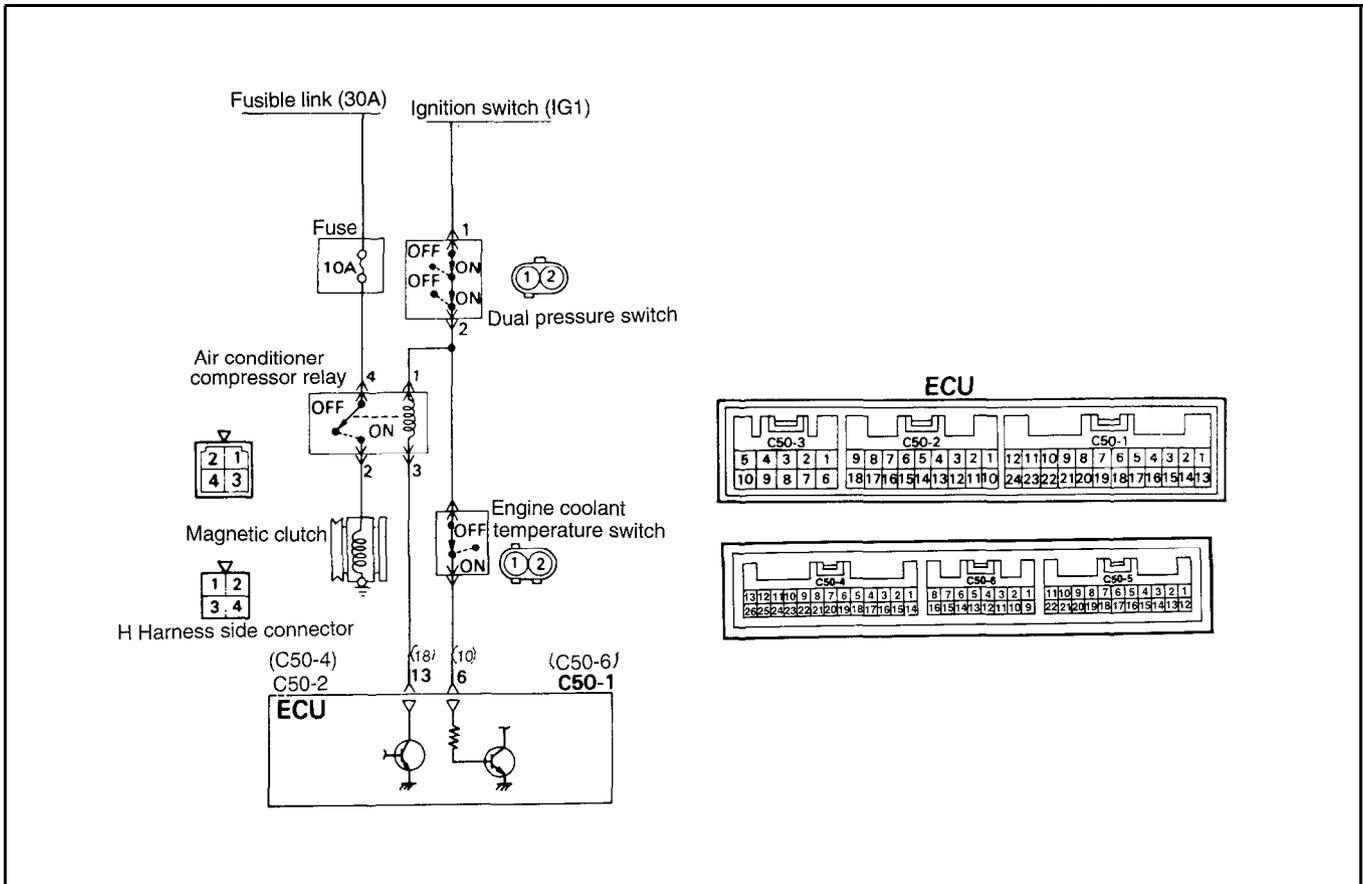
AIR CONDITIONER SWITCH AND AIR CONDITIONER RELAY

The air conditioner switch applies the battery voltage to the ECU when the air conditioner is turned on. When the air conditioner ON signal is input, the ECU drives the ISC servo and turns ON the power transistor. And then the air conditioner power relay coil is energized to turn on the relay switch, which activates the air compressor magnetic clutch.



Circuit Diagram

() : California only



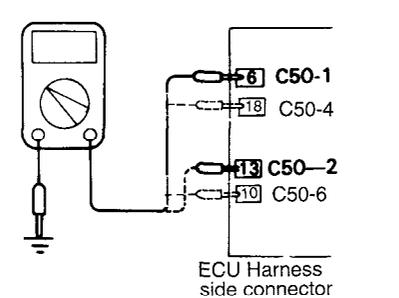
Troubleshooting Hints

If the air compressor magnet clutch is not activated when the air conditioner switch is turned on during idling, faulty air conditioner control system is suspected.

Using Multi-use Tester

Check Item	Data display	Check conditions	Air conditioner switch	Normal indication
Air conditioner switch o Service data o Item No.28	Switch state	Engine: Idling (air compressor to be running when air conditioner switch is ON)	OFF	OFF
			ON	ON
Air conditioner relay o Service data o Item No.49	Air conditioner relay state	Engine: Idling after warm-up	OFF	OFF (compressor clutch non-activation)
			ON	ON (compressor clutch activation)

Harness Inspection

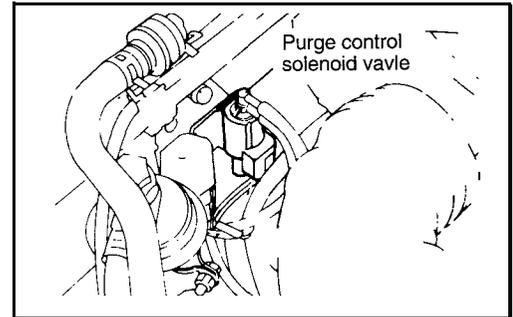
<p>1</p> 	<p>Measure the power supply voltage of the air conditioner circuit.</p> <ul style="list-style-type: none"> o Air conditioner switch: ON o Engine control unit connector: Disconnected o Ignition switch: ON o Voltage: System voltage 	<p>OK → END !</p> <p>NG → Check the air conditioner circuit</p>
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Air Conditioner Inspection

Refer to GROUP 97-Service Adjustment Procedures.

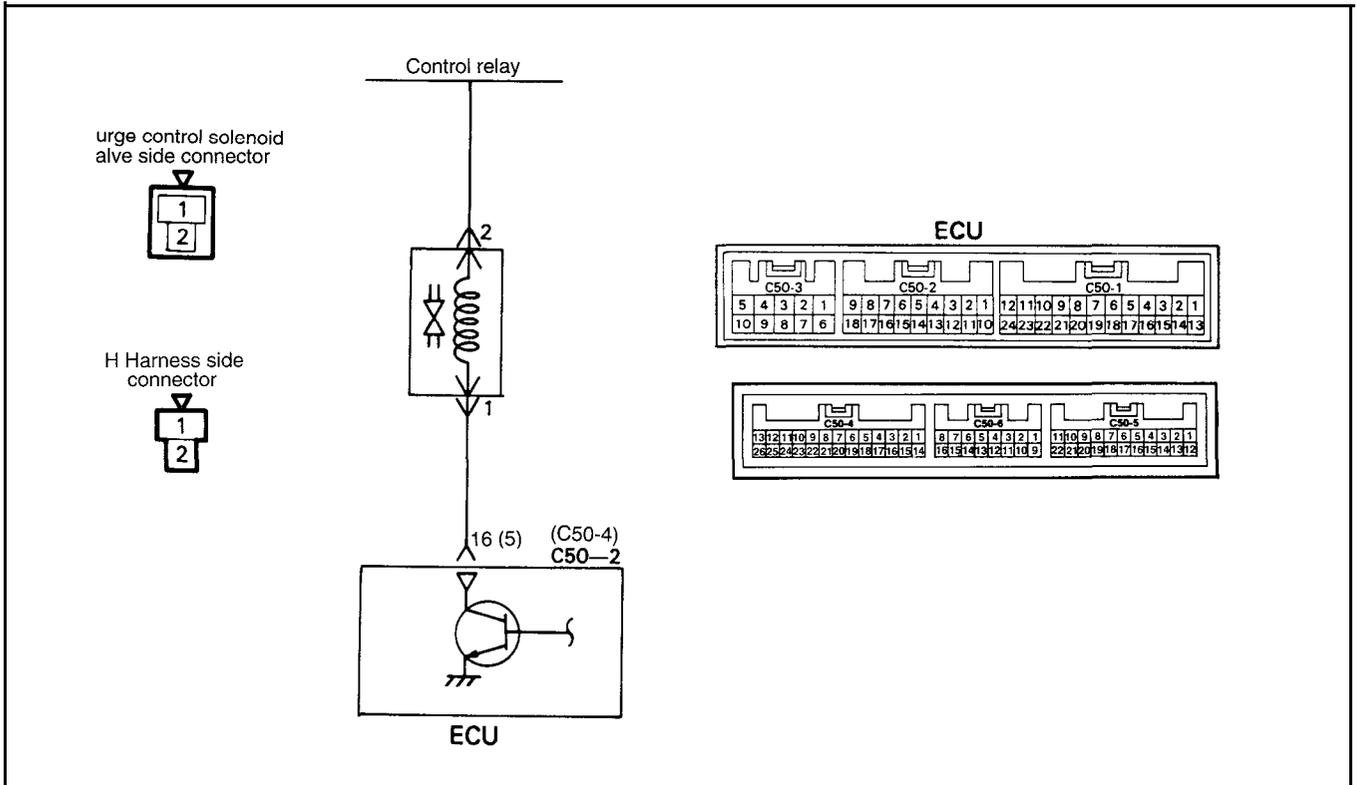
PURGE CONTROL SOLENOID VALVE

The purge control solenoid valve is an ON-OFF type, which controls introduction of purge air from the canister.



Circuit Diagram

() : California only

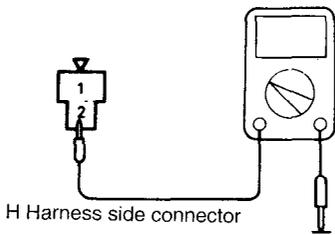


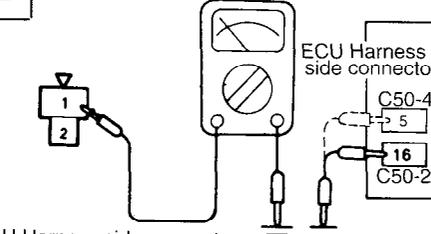
Using Multi-use Tester

Check Item	Drive content	Check condition	Normal state
Purg control solenoid vale o Service data o Item No.8	Solenoid valve from OFF to ON	Ignition switch: ON	Operating sound is heard when driven

Harness Inspection

* California only

1	 <p style="text-align: center;">H Harness side connector</p> <p style="text-align: right;">31J223</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: System voltage 	<p>OK → 2</p> <p>NG →</p>	<p>Repair the harness. (Control relay - H 2)</p>
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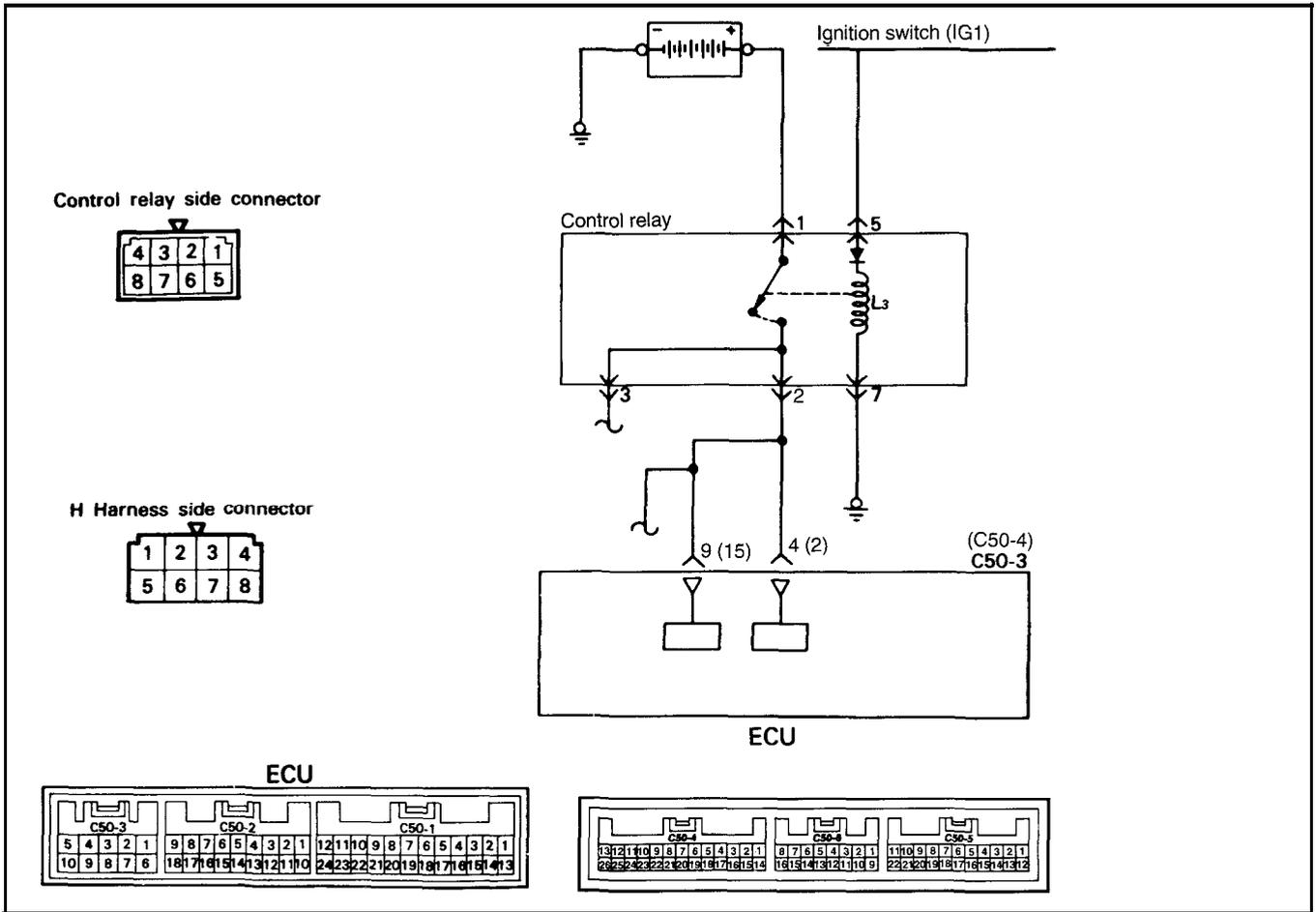
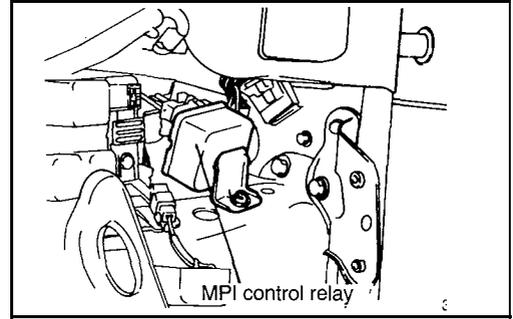
2	 <p style="text-align: center;">H Harness side connector</p> <p style="text-align: right;">31J224</p>	<p>Check for an open-circuit, or a short-circuit to ground between the purge control solenoid valve and the engine control unit.</p> <ul style="list-style-type: none"> o Engine control unit connector: Disconnected o Purge control solenoid valve connector: Disconnected 	<p>OK → END !</p> <p>NG →</p>	<p>Repair the harness. (H 1 - C50-2 16) * (H 1 - C50-4 5)</p>
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Actuator Inspection

Refer to GROUP 29-Evaporative Emission Control System.

CONTROL RELAY

When the ignition switch is on, battery power is supplied to the ECU, the injector, the air flow sensor, etc. While the ignition switch is turned on, current flows from the ignition switch through the current relay coil to ground.

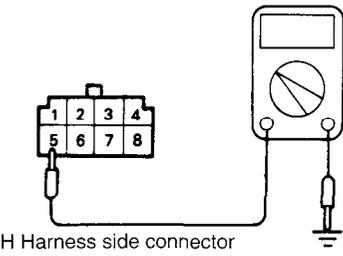
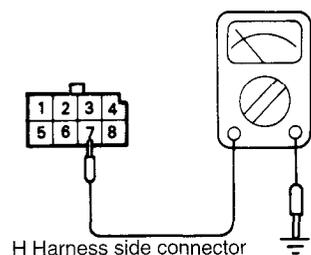
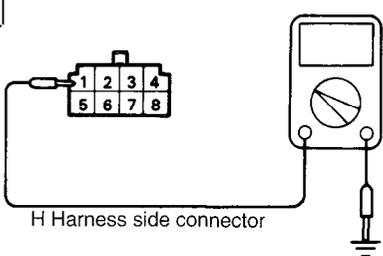
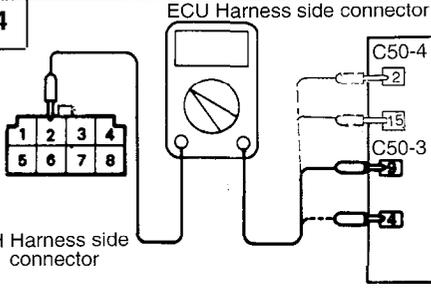


Using Multi-use Tester

Check Item	Data display	Check condition	Test specification
Battery voltage o Service data o Item No. 16	ECU power voltage	Ignition switch: ON	11-13V

Harness Inspection

* California only

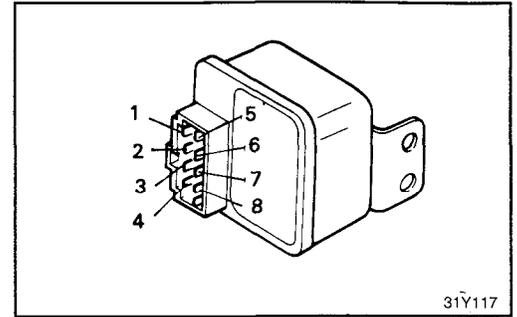
<p>1</p>  <p>H Harness side connector</p> <p>31J202</p>	<p>Measure the power supply voltage of the control relay.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK → 2</p> <p>NG → Repair the harness. (Ignition switch-H 5)</p>
<p>2</p>  <p>H Harness side connector</p> <p>31J203</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected 	<p>OK → 3</p> <p>NG → Repair the harness. (H 7-Ground)</p>
<p>3</p>  <p>H Harness side connector</p> <p>31J204</p>	<p>Measure the power supply voltage of the control relay.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Voltage (V): System voltage 	<p>OK → 4</p> <p>NG → Repair the harness. (Battery-H 1)</p>
<p>4</p>  <p>H Harness side connector</p> <p>ECU Harness side connector</p> <p>31J206</p>	<p>Check for open-circuit, or short-circuit to ground, between the engine control unit and the control relay.</p> <ul style="list-style-type: none"> o ECU connector: Disconnected o Control relay connector: Disconnected 	<p>OK → END !</p> <p>NG → Repair the harness. (H2-C50-3 9) (H2-C50-3 4) * (H2-C50-4 2) * (H2-C50-4 15)</p>

Control Relay Inspection

CAUTION

When applying battery voltage directly, make sure that it is applied to correct terminal. Otherwise, the relay could be damaged.

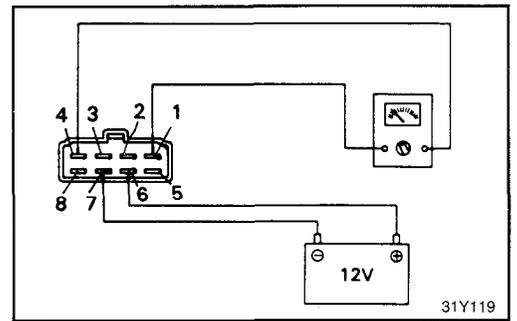
1. Check continuity of the control relay coil.



Measuring terminal	Continuity
2 - 8	Yes (approx. 95 Ω)
3 - 8	
6 - 7	Yes (approx. 35 Ω)
5 - 7	Yes, in one direction only

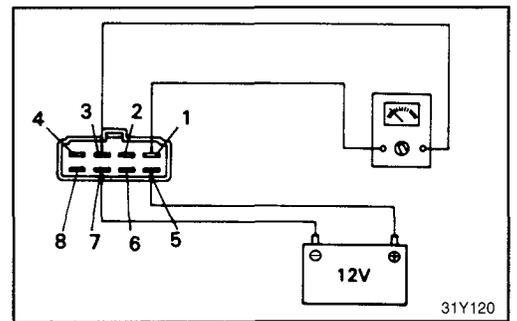
2. Check continuity of relay contacts between terminals 1 and 4.

Relay coil [between terminals 6 and 7.	Continuity
When de-energized	No ($\infty \Omega$)
When energized	Yes (0 Ω)



3. Check continuity of relay contacts between terminals 1 and 3.

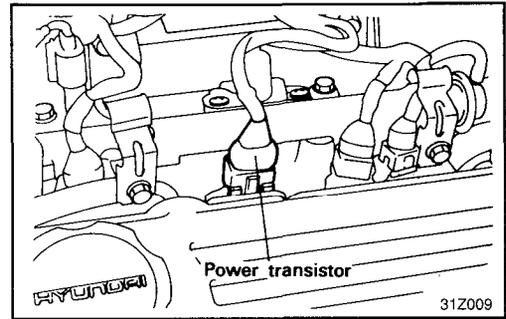
Relay coil (between terminals 5 and 7)	Continuity
When de-energized	No ($\infty \Omega$)
When energized	Yes (0 Ω)



4. If faulty, replace the control relay.

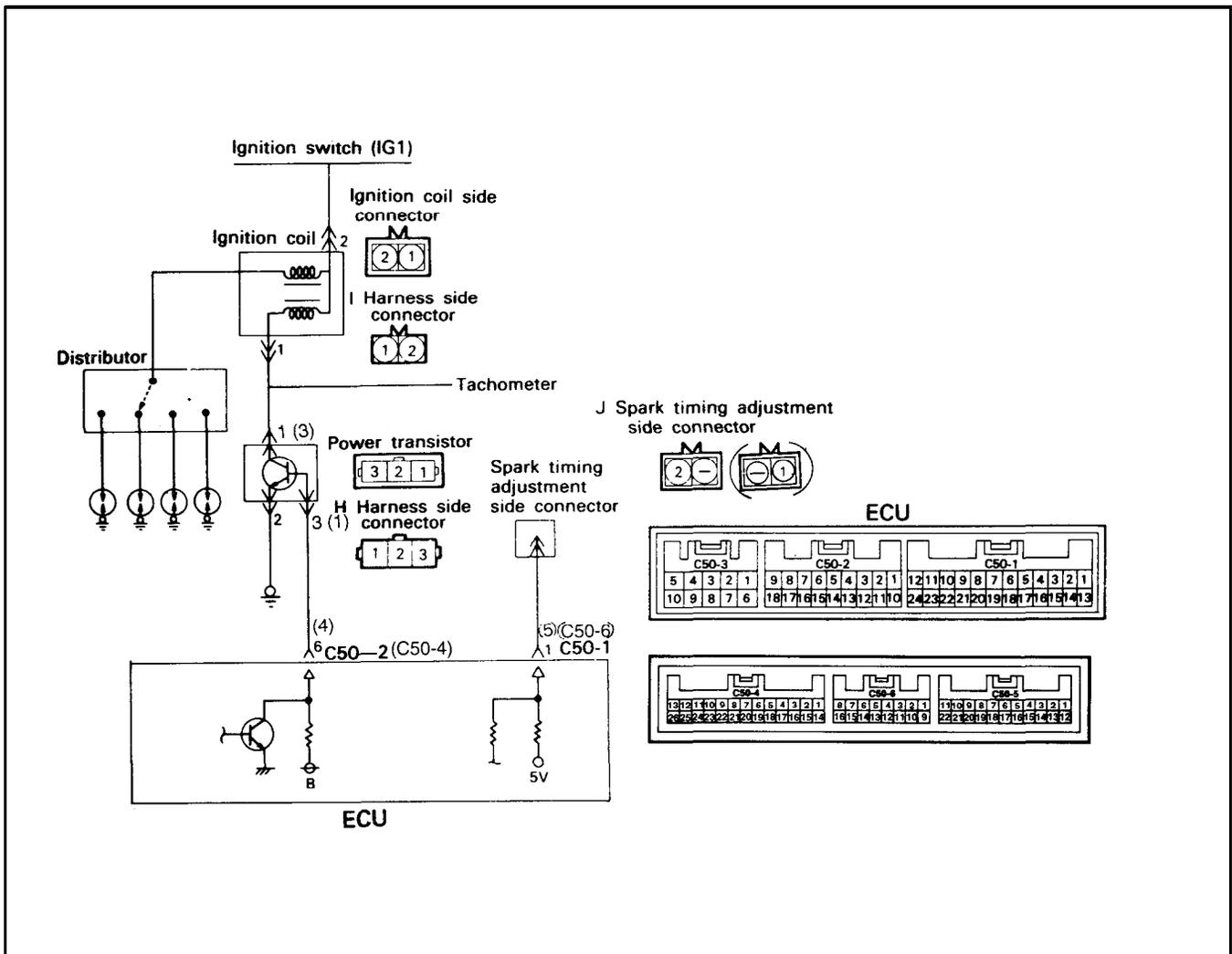
IGNITION COIL AND POWER TRANSISTOR

When the power transistor is turned ON by the signal from the ECU, primary current is shut off and a high voltage is induced in the secondary coil.



Circuit Diagram

() : California only

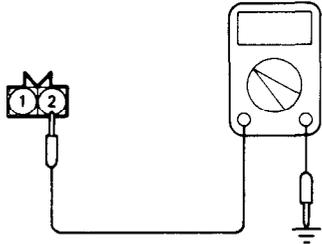
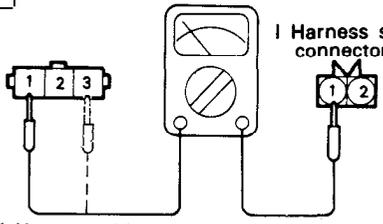
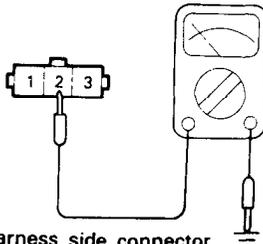
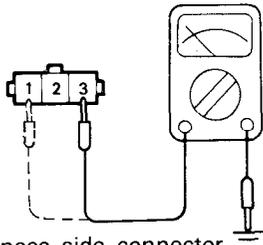
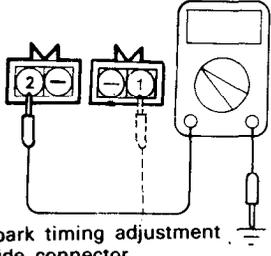


Using Multi-use Tester

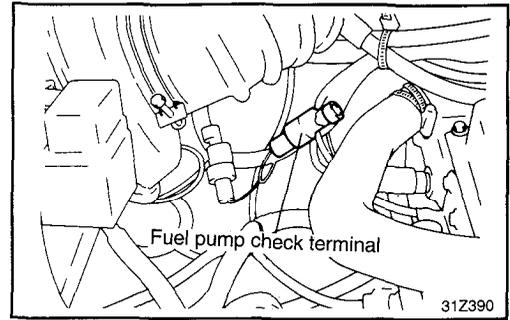
Check Item	Check condition	Engine state	Standard value
Ignition advance o Service data o Item No. 44	o Engine: Warmed up o Timing light: Set (set timing light to check actual ignition timing)	750 rpm (Idle)	8-12°BTDC
		2,000 rpm	26-34°BTDC

Harness Inspection

---, * California only

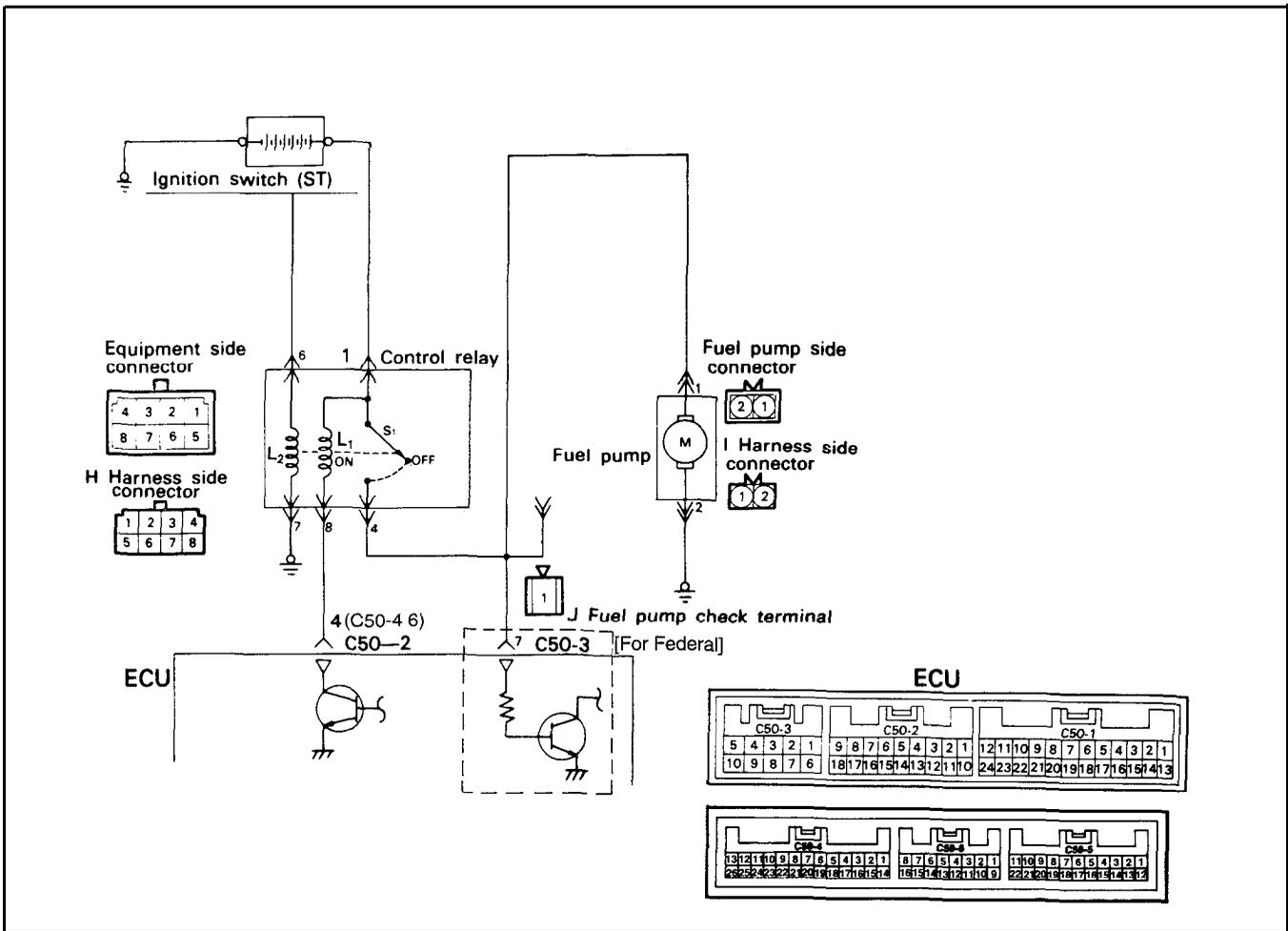
<p>1</p>  <p>I Harness side connector</p> <p>31J208</p>	<p>Measure the power supply voltage of the ignition coil.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage (V): System voltage 	<p>OK → 2</p> <p>NG → Repair the harness. (I 2-Ignition switch)</p>
<p>2</p>  <p>H Harness side connector</p> <p>I Harness side connector</p> <p>31J209</p>	<p>Check for an open-circuit, or a short-circuit to ground between the power transistor and the ignition coil.</p> <ul style="list-style-type: none"> o Ignition coil connector: Disconnected o Power transistor connector: Disconnected 	<p>OK → 3</p> <p>NG → Repair the harness. (H 1 - I 1) * (H 3 - I 1)</p>
<p>3</p>  <p>H Harness side connector</p> <p>31J210</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → 4</p> <p>NG → Repair the harness. (H 2-Ground)</p>
<p>4</p>  <p>H Harness side connector</p> <p>31J211</p>	<p>Measure the voltage of the control signal circuit of the power transistor.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: START o Voltage: 2 - 6 V 	<p>OK → 5</p> <p>NG → Repair the harness. (H 3 - C50-2 6) * (H 1 - C50-4 4)</p>
<p>5</p>  <p>J Spark timing adjustment side connector</p>	<p>Measure the voltage of the ignition timing adjustment terminal.</p> <ul style="list-style-type: none"> o Ignition switch: ON o Voltage: 4.0 - 5.2 V 	<p>OK → END !</p> <p>NG → Repair the harness. (J 2 - C50-1 1) * (J 1 - C50-6 5)</p>

FUEL PUMP



Circuit Diagram

() : California only

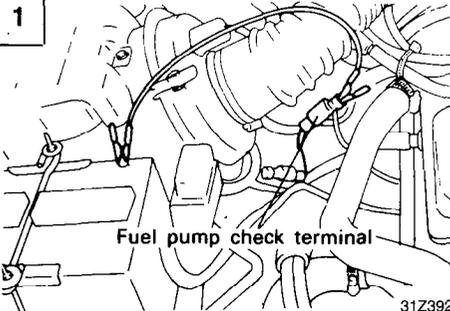
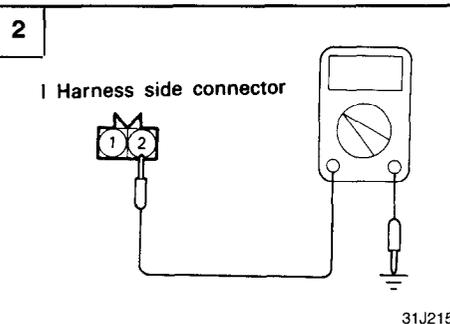
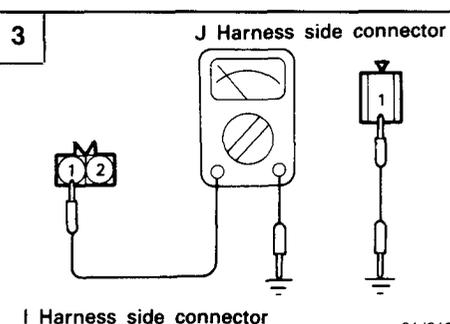
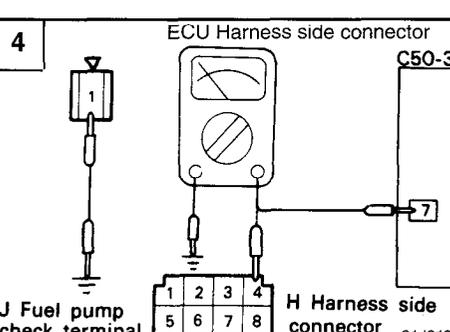


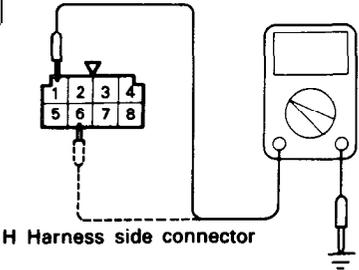
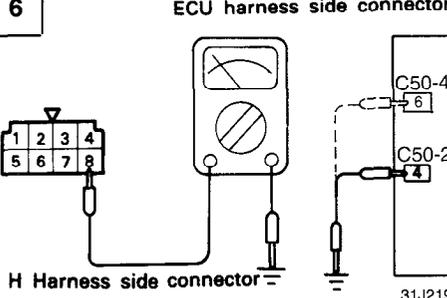
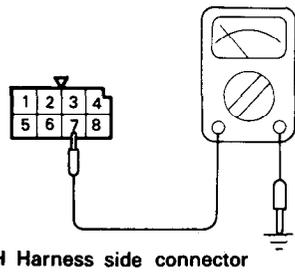
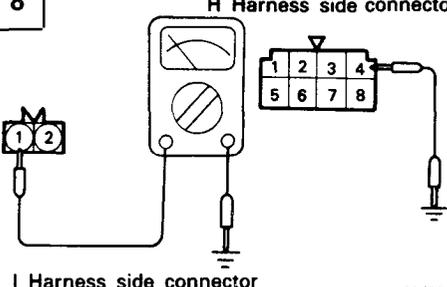
Using Multi-use Tester

Check Item	Drive	Check condition	Engine state	Normal state
Fuel pump o Actuator test o Item No.07	Fuel pump is driven to circulate fuel	o Engine cranking o Forced drive of fuel pump Check is made for above two conditions	Check content Hold return hose with fingers to feel pulsation indicating fuel flow	Pulsation is felt
			Listen to pump operating sound near fuel tank	Operating sound is heard

Harness Inspection

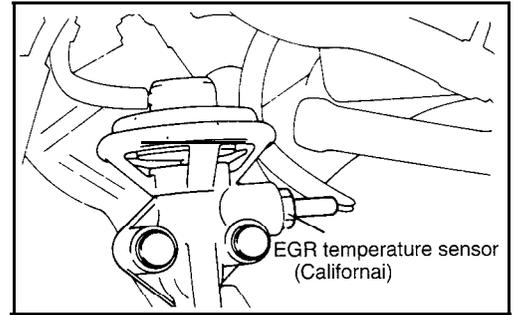
* California only

<p>1</p>  <p>Fuel pump check terminal</p> <p>31Z392</p>	<p>Check the fuel pump.</p> <ul style="list-style-type: none"> o Apply battery voltage to the checking terminal and operate the pump 	<p>OK →</p> <p>NG →</p>	<p>4</p> <p>2</p>
<p>2</p>  <p>I Harness side connector</p> <p>31J215</p>	<p>Check the ground circuit of the fuel pump.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>3</p> <p>Repair the harness. (I 2-Ground)</p>
<p>3</p>  <p>J Harness side connector</p> <p>I Harness side connector</p> <p>31J219</p>	<p>Check for continuity between the fuel pump and the checking terminal.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>4</p> <p>Repair the harness. (I 1 - J 1)</p>
<p>4</p>  <p>J Fuel pump check terminal</p> <p>ECU Harness side connector C50-3</p> <p>H Harness side connector</p> <p>31J217</p>	<p>Check for continuity between the checking terminal and the ECU, and between the control relay terminals.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected o ECU connector: Disconnected o Fuel pump connector: Disconnected 	<p>OK →</p> <p>NG →</p>	<p>5</p> <p>Repair the harness. (H 4- J 1) (J 1 - C50-3 7)</p>

<p>5</p>  <p>H Harness side connector</p> <p>31J218</p>	<p>Measure the power supply voltage of the control relay.</p> <ul style="list-style-type: none"> o Connector relay connector: Disconnected o Ignition switch: START (when H 6 checked) <table border="1" data-bbox="606 457 970 549"> <tr> <td style="text-align: center;">Voltage (V)</td> </tr> <tr> <td style="text-align: center;">8 or more</td> </tr> </table>	Voltage (V)	8 or more	<p>OK → 6</p> <p>NG → Repair the harness. (H 1 -Battery) (H 6 -Ignition switch)</p>
Voltage (V)				
8 or more				
<p>6</p>  <p>H Harness side connector</p> <p>ECU harness side connector</p> <p>31J219</p>	<p>Check for an open-circuit, or a short-circuit to ground between the control relay and the ECU.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected o ECU connector: Disconnected 	<p>OK → 7</p> <p>NG → Repair the harness. (H 8-C50-2 4) * (H 8 - C50-4 6)</p>		
<p>7</p>  <p>H Harness side connector</p> <p>31J220</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected 	<p>OK → 8</p> <p>NG → Repair the harness. (H 7 - Ground)</p>		
<p>8</p>  <p>H Harness side connector</p> <p>I Harness side connector</p> <p>31J221</p>	<p>Check for an open-circuit, or a short-circuit to ground between the control relay and the fuel pump.</p> <ul style="list-style-type: none"> o Control relay connector: Disconnected o Fuel pump connector: Disconnected 	<p>OK → END !</p> <p>NG → Repair the harness. (H 4 - I 1)</p>		

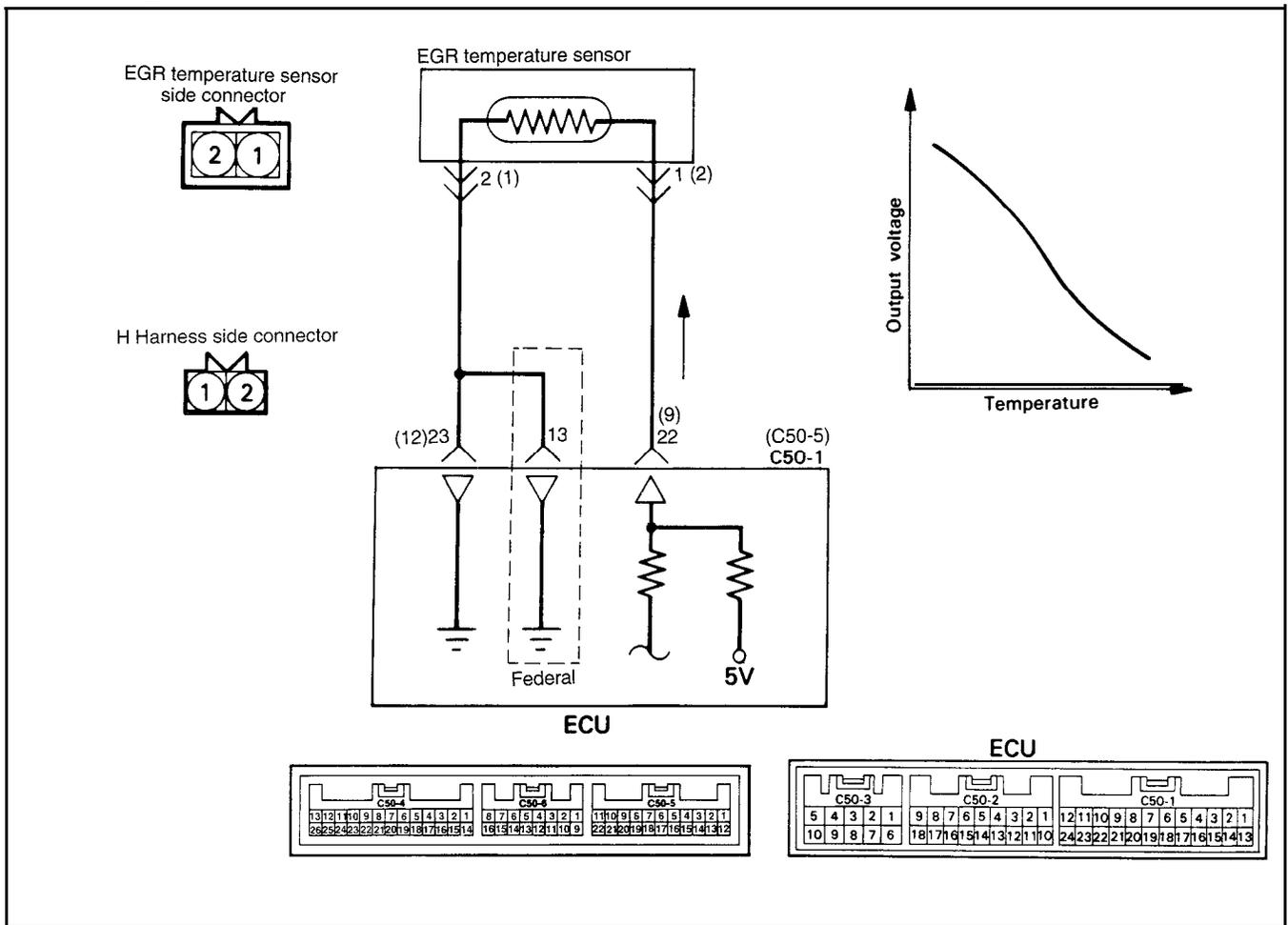
EGR TEMPERATURE SENSOR [California]

The EGR temperature sensor converts the temperature of EGR gas downstream from the EGR valve to voltage and inputs it to the ECU. The ECU judges the condition of the EGR by this signal. If there is abnormal condition, the engine warning light is turned on to notify the driver.



Circuit Diagram

() : California only

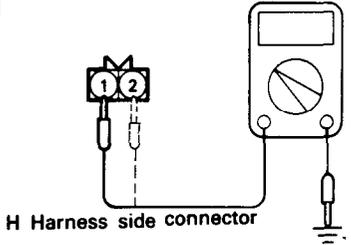
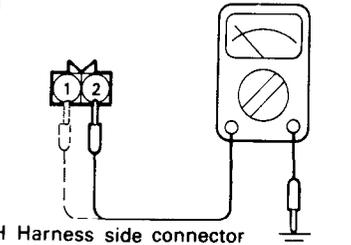


Using Multi-use Tester

Check Item	Data display	Check condition	Engine state	Test specification
EGR temperature sensor o Service data o Item No. 43	Sensor temperature	Engine: Warmed up Engine is maintained in a constant state for 2 minutes or more	750 rpm (Idle)	70°C (158°F) or less
			3,500 rpm	70°C (158°F) or more

Harness Inspection

* California only

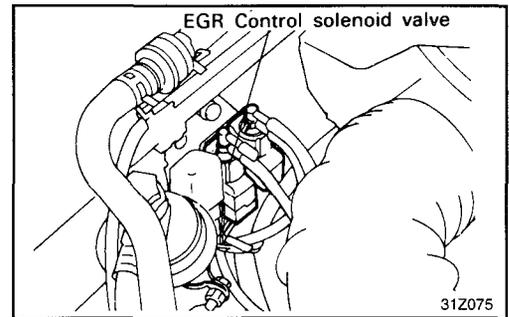
<p>1</p>  <p>H Harness side connector</p> <p>31J126</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: 4.3-4.7V 	<p>OK → 2</p> <p>NG → Repair the harness. (H 1 - C50-1 22) * (H 2 - C50-5 9)</p>
<p>2</p>  <p>H Harness side connector</p> <p>31J127</p>	<p>Check for continuity of the ground circuit.</p> <ul style="list-style-type: none"> o Connector: Disconnected 	<p>OK → END !</p> <p>NG → Repair the harness. (H 2 - C50-1 13, 23) * (H 1 - C50-5 12)</p>

Sensor Inspection

Refer to GROUP 29-Exhaust Gas Recirculation (EGR) System.

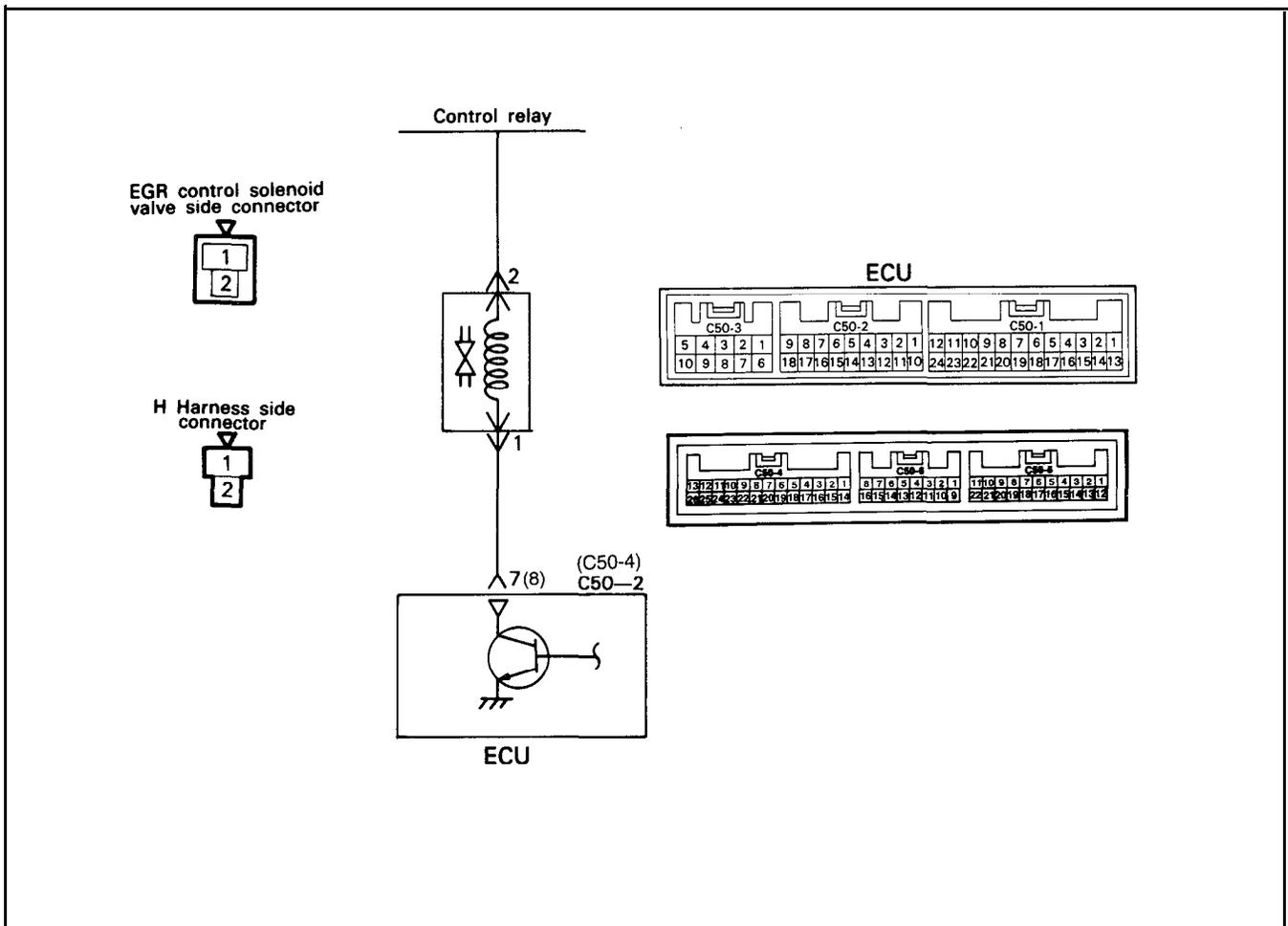
EGR CONTROL SOLENOID VALVE (California)

The EGR control solenoid valve is a duty control type solenoid valve, which makes control by leaking EGR valve operating negative pressure to the throttle body a port.



Circuit Diagram

() : California only



Troubleshooting Hint

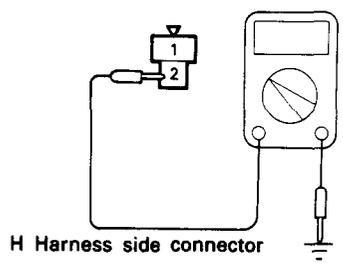
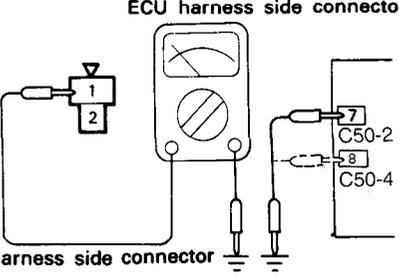
if the results of EGR control solenoid valve on-vehicle and off-vehicle inspections are normal but the self-diagnosis code for EGR system failure is displayed, check the EGR valve, vacuum hose and EGR passage for blocking.

Using Multi-use Tester

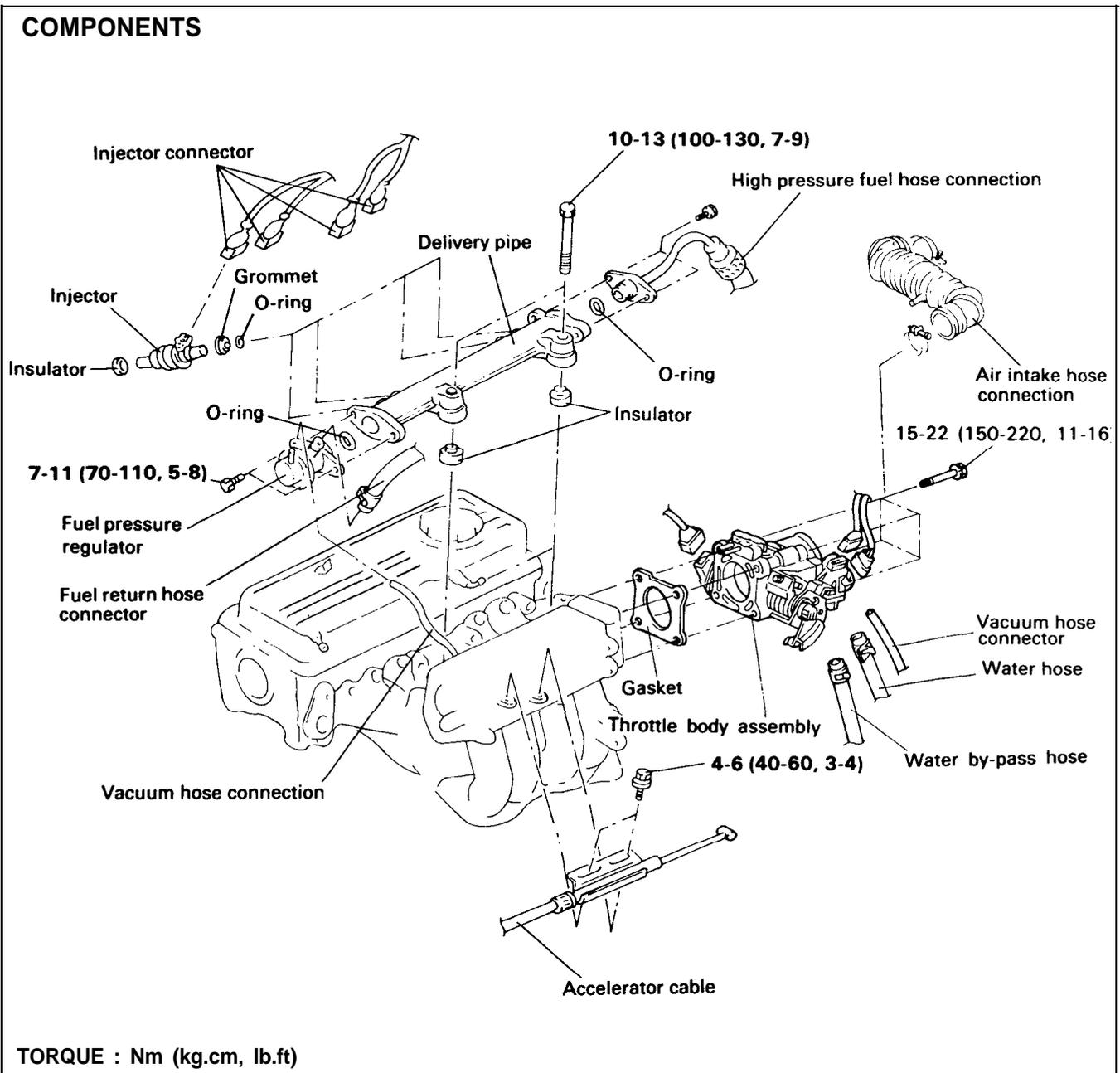
Check Item	Drive content	Check condition	Normal state
EGR control solenoid valve o Service data o Item No. 10	Change solenoid valve from OFF to ON state	Ignition switch: ON	Operating sound is heard when driven

Harness Inspection

* California only

<p>1</p>  <p>H Harness side connector</p> <p>31J227</p>	<p>Measure the power supply voltage.</p> <ul style="list-style-type: none"> o Connector: Disconnected o Ignition switch: ON o Voltage: System Voltage 	<p>OK → 2</p> <p>NG → Repair the harness. (H2 - Control relay)</p>
<p>2</p>  <p>ECU harness side connector</p> <p>H Harness side connector</p> <p>31J228</p>	<p>Check for an open-circuit, or a short-circuit to ground between the EGR control solenoid valve and engine control unit.</p> <ul style="list-style-type: none"> o EGR control solenoid valve connector: Disconnected o ECU connector: Disconnected 	<p>OK → END !</p> <p>NG → Repair the harness. (H 1 - C50-2 7) * (H 1 - C50-4 8)</p>

INJECTOR AND THROTTLE BODY



REMOVAL

1. Release residual pressure from the fuel line to prevent fuel from spilling.

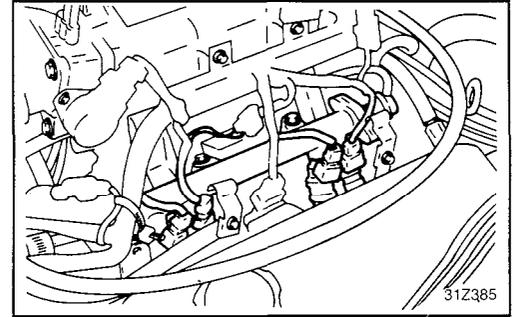
CAUTION

Cover the hose connection with rags to prevent splashing of fuel that could be caused by residual pressure in the fuel line.

- Remove the delivery pipe with the fuel injector and pressure regulator.

CAUTION

- Be careful not to drop any injectors when removing the delivery pipe.
- Be aware that fuel may flow out when removing the injector.

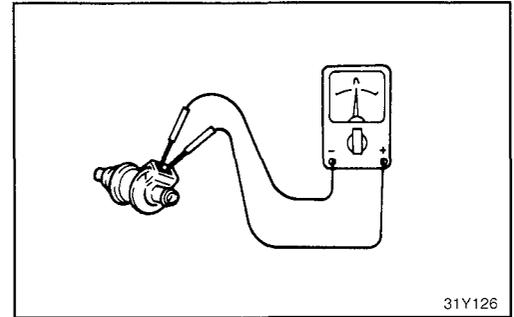


INSPECTION

- Measure the resistance of the injectors between the terminals using an ohmmeter.

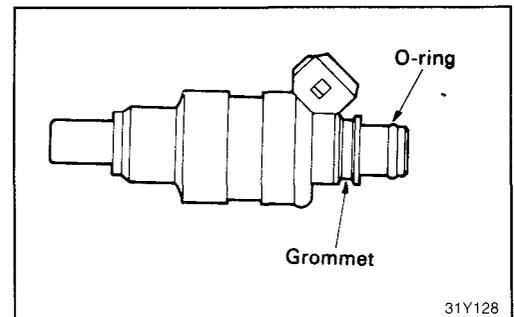
Resistance **13-16Ω** [at 20°C (68°F)]

- If the resistance is not within specifications, replace the injector.



INSTALLATION

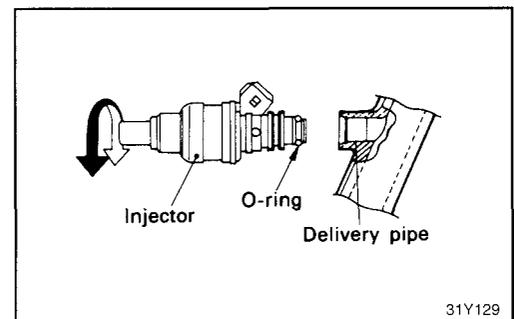
- Install a new grommet and O-ring to the injector.
- Apply a coating of solvent, spindle oil or gasoline to the O-ring of the injector.

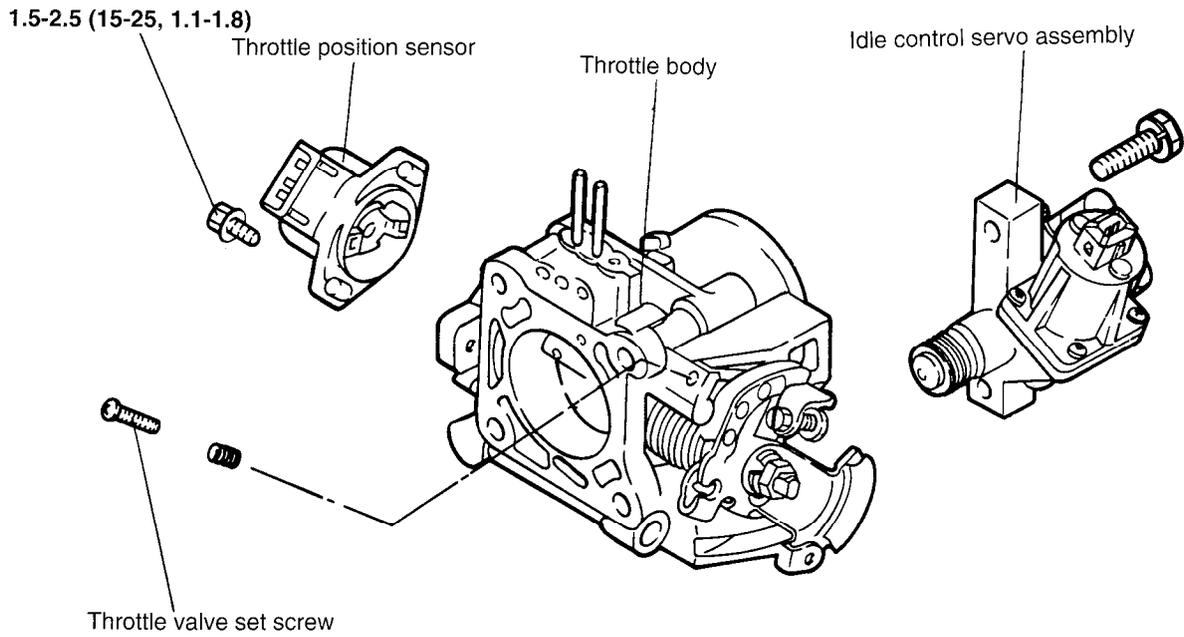


- While turning the injector to the left and right, install it on to the delivery pipe.
- Be sure the injector turns smoothly.

NOTE

If it does not turn smoothly, the O-ring may be jammed; remove the injector and re-insert it into the delivery pipe and re-check.



THROTTLE BODY**COMPONENTS**

TORQUE : Nm (kg.cm, lb.ft)

REMOVAL**CAUTION**

The throttle valve must not be removed.

1. Remove the throttle position sensor by unscrewing the philips-head screws.

NOTE

Except when necessary for replacement, the throttle position sensor must not be removed.

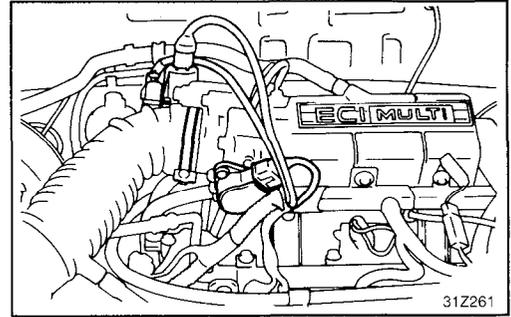
2. Remove the ISC servo assembly.

NOTE

1) Except when necessary for replacement, the ISC servo assembly should not be removed.

2) The ISC servo assembly should not be disassembled.

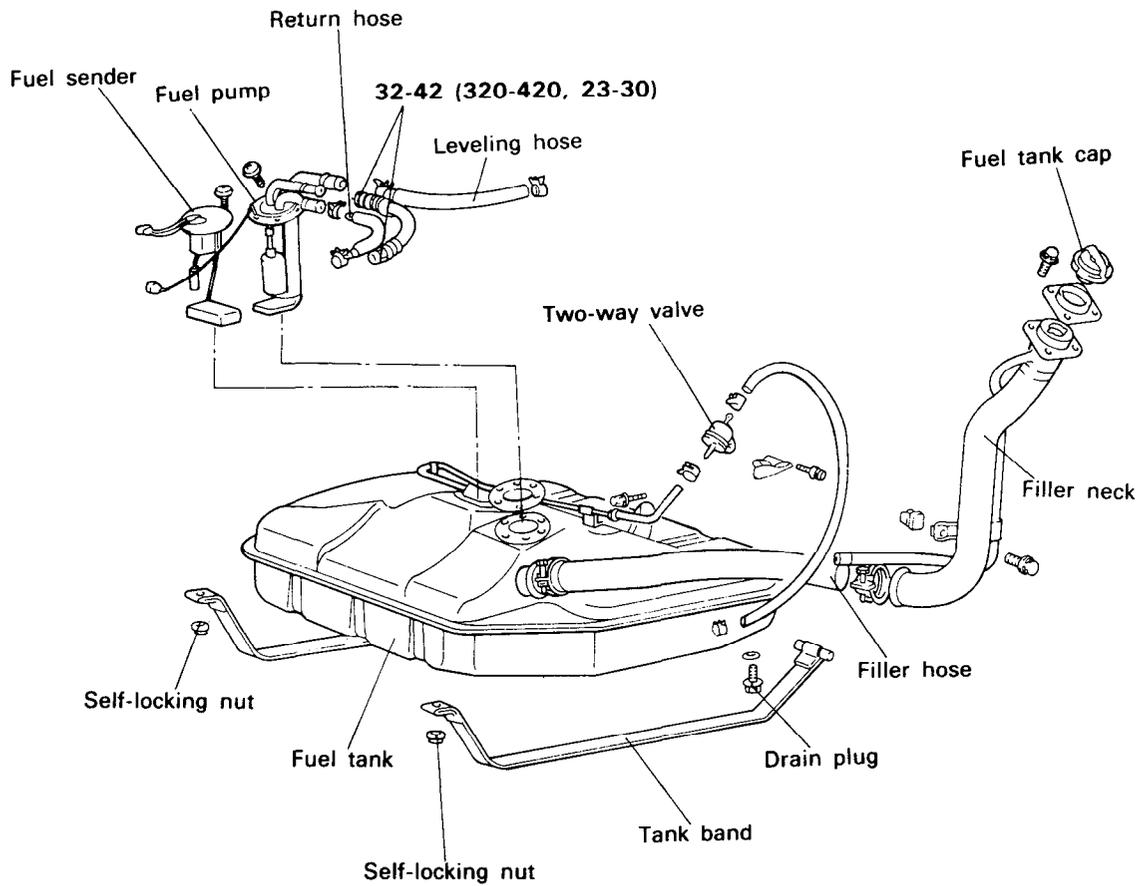
3. Use an open-end wrench or box wrench to remove the adjustment screw.

**INSPECTION****Cleaning Throttle Body Components**

1. Clean all components. The following components must not be cleaned by immersion in cleaning solvents.
 - o Throttle position sensor
 - o ISC servo assembly
 - o Idle position switchThe insulation of these components will be damaged if they are immersed in cleaning solvent. They should be cleaned by using a piece of cloth.
2. Check for restriction of the vacuum port or passage. Clean the vacuum passage by using compressed air.

FUEL TANK

COMPONENTS



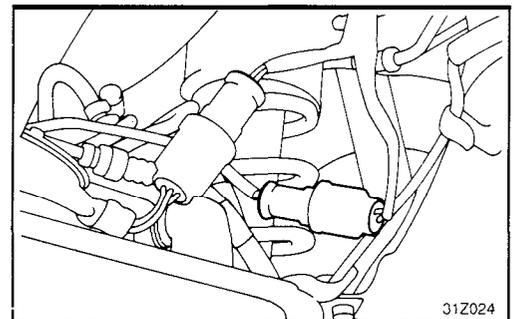
TORQUE ; Nm (kg.cm, lb.ft)

REMOVAL

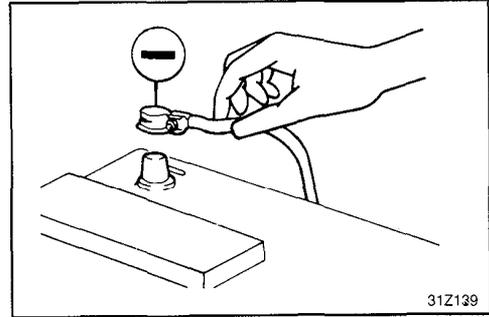
1. To reduce the internal pressure of the fuel lines and hoses, first start the engine and then disconnect the electrical fuel pump connector.

NOTE

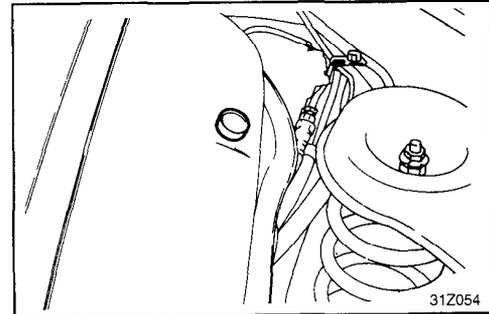
Be sure to reduce the fuel pressure before disconnecting the fuel main pipe and hose otherwise fuel will spill out.



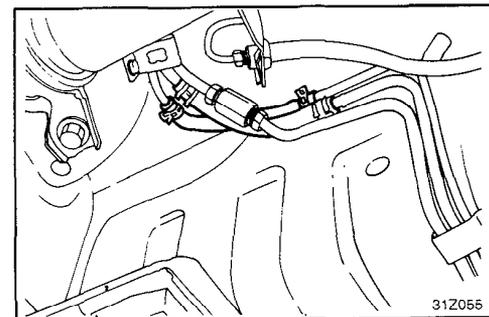
2. Disconnect the battery cable from the negative terminal of the battery.



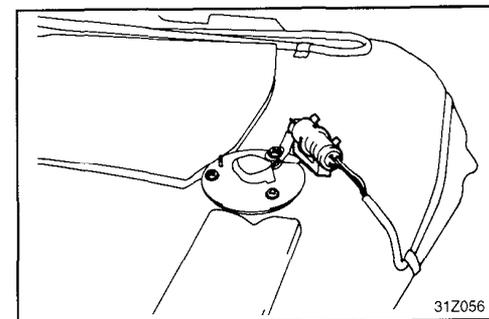
3. Remove the fuel tank cap.
4. Remove the drain plug and drain the fuel



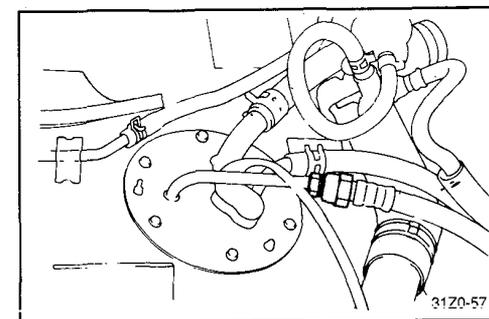
5. Disconnect the return hose and vapor hose



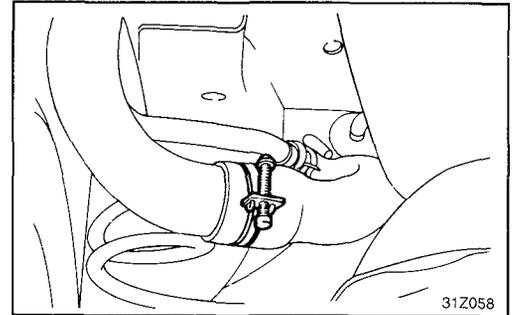
6. Disconnect the fuel gauge unit connector.



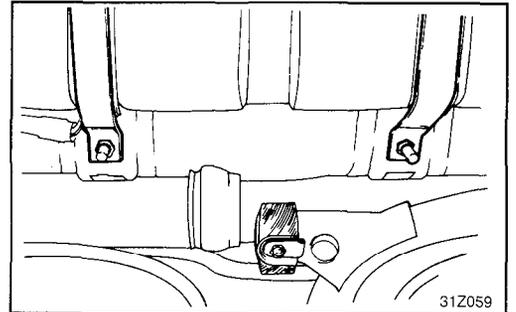
7. Disconnect the high pressure hose from the fuel tank.



8. Detach the fuel filler hose and leveling hose

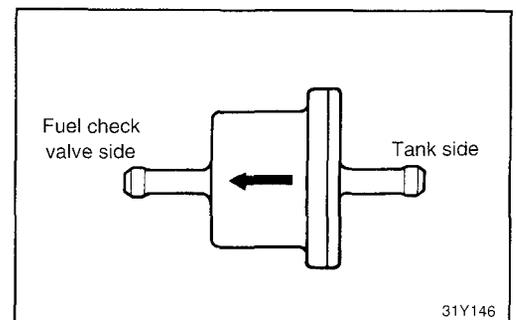


9. Loosen the two self-locking nuts, that hold the tank in position and remove the two tank bands.
10. Remove the fuel vapor hose and the fuel tank.



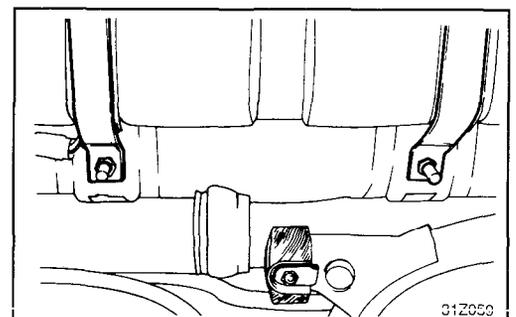
INSPECTION

1. Check the hoses and the pipes for cracks or damage.
 2. Check the fuel tank cap for proper operation.
 3. Check the fuel tank for deformation, corrosion or cracking.
 4. Check the inside fuel tank for dirt or foreign material.
 5. Check the in-tank fuel filter for damage or restriction.
-
6. Test the two-way valve for proper operation.
 7. To check the two-way valve, lightly breathe into the inlet and outlet. If air passes through after slight resistance, then the valve is good.

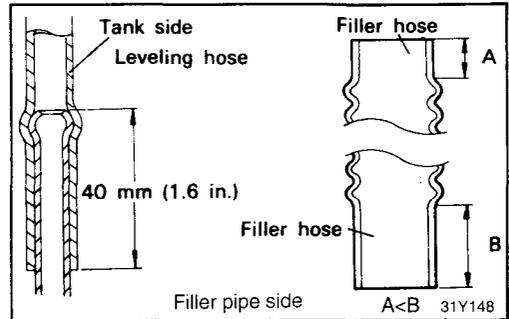


INSTALLATION

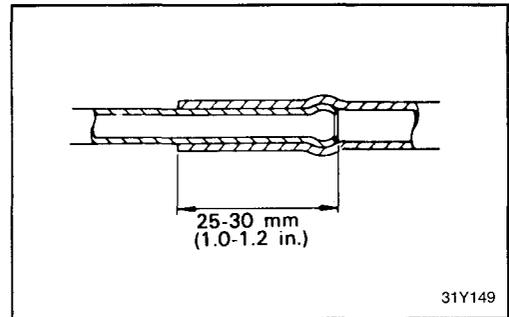
1. Confirm that the pad is fully bonded to the fuel tank, and install the fuel tank by tightening the self-locking nuts to the tank bands until the rear end of the tank band contacts the body.



2. Connect the leveling hose to the tank and approximately 40 mm (1.6 in.) at the filler neck.
3. When connecting the filler hose, the end with the shorter straight pipe should be connected to the tank side.



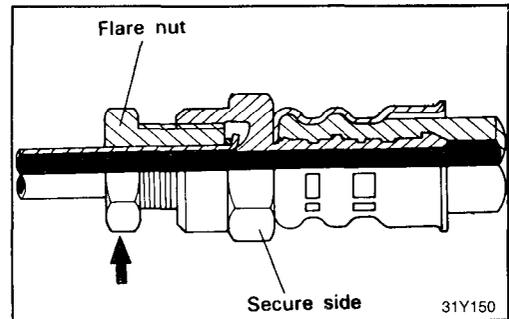
4. Connect the vapor hose and return hose. When attaching the fuel hose to the line, be sure that the hose is attached as shown in the illustration.



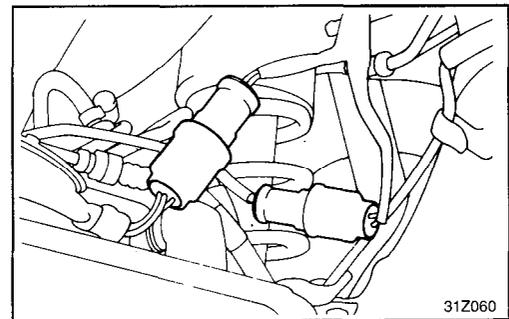
5. To connect the high pressure hose to the fuel pump, temporarily the flare nut by hand, and then tighten it to the specified torque. Be careful that the fuel hose does not twist.

Tightening torque	
High pressure hose flare nut	32-42 Nm (320-420 kg.cm, 23-30 lb.ft)

CAUTION
 When tightening the flare nut, be careful not to bend or twist the line to prevent damage to the fuel pump connection.

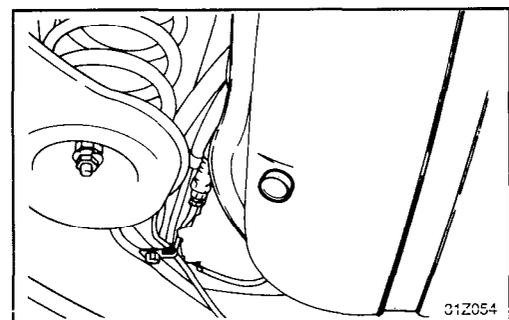


6. Connect the electrical fuel pump and fuel gauge unit connector.



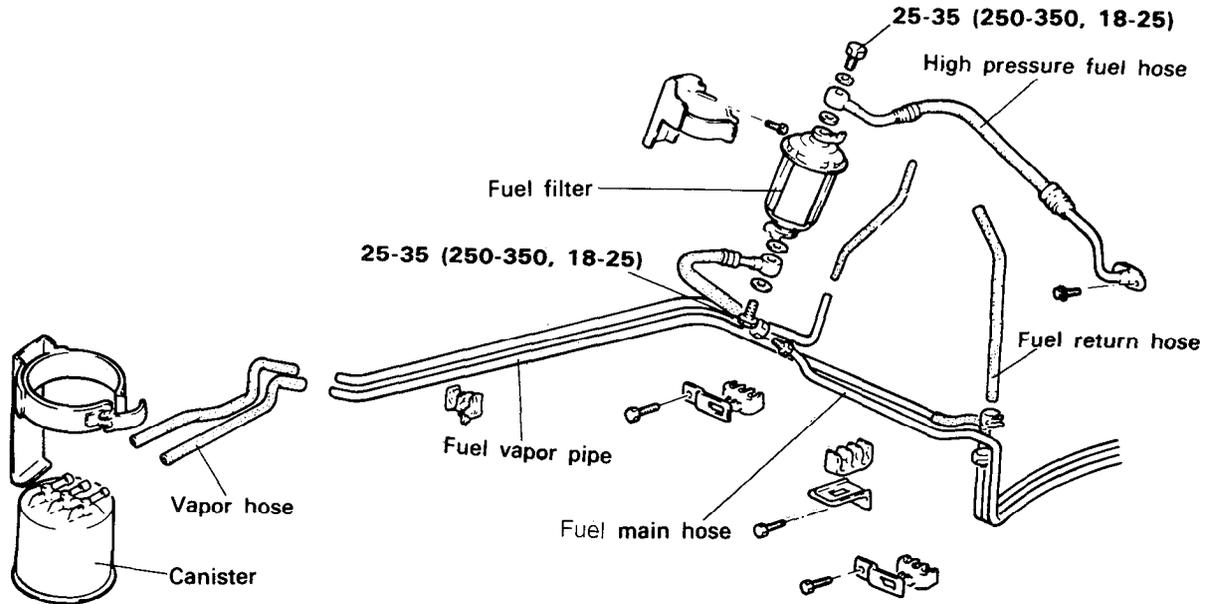
7. Tighten the drain plug to the specified torque.

Tightening torque	
Drain plug	15-25 Nm (150-250 kg.cm, 11-18 lb.ft)



FUEL LINE AND VAPOR LINE

COMPONENTS



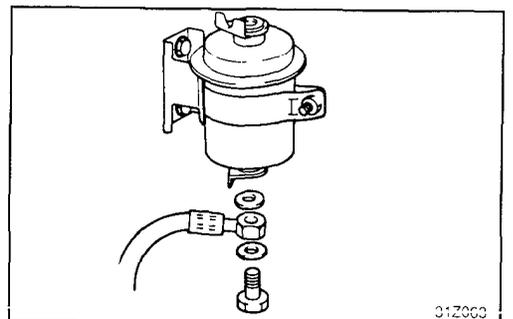
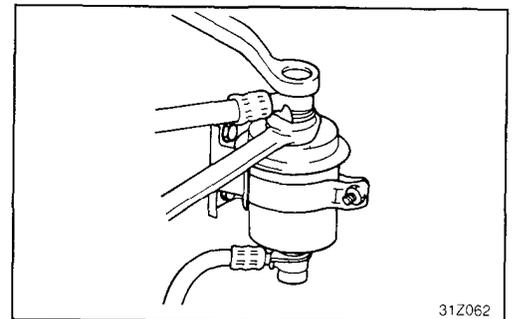
TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Remove the upper eye bolt while holding the fuel filter nut securely and remove the high pressure fuel hose.

CAUTION

- 1) Be sure to reduce the fuel pressure before disconnecting the fuel line and hose, otherwise fuel will spill out.
 - 2) Cover the hose connection with a shop towel to prevent splashing of fuel that could be caused by residual pressure in the fuel line.
2. Remove the lower eye bolt while holding the fuel filter nut assembly.
 3. Remove the fuel filter mounting bolts, then remove the fuel filter from the bracket.
 4. Remove the fuel return hose and line.
 5. Remove the fuel vapor hose and line.

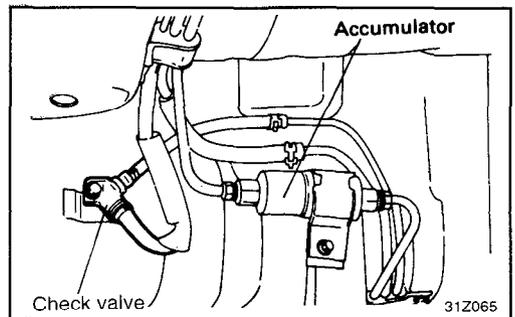
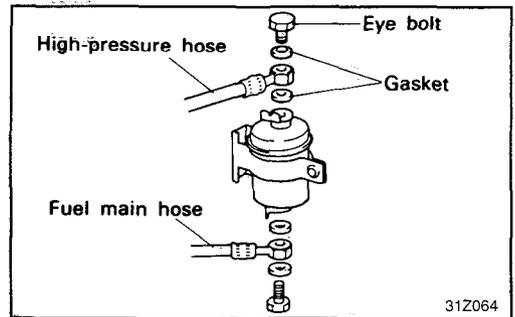
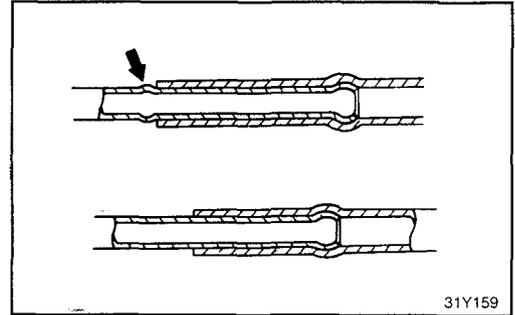


INSPECTION

1. Check the hoses and pipes for cracking bending, deformation or restrictions.
2. Check the canister for restrictions.
3. Check the fuel filter for restrictions and damage.
If a problem is found, repair or replace parts as necessary.

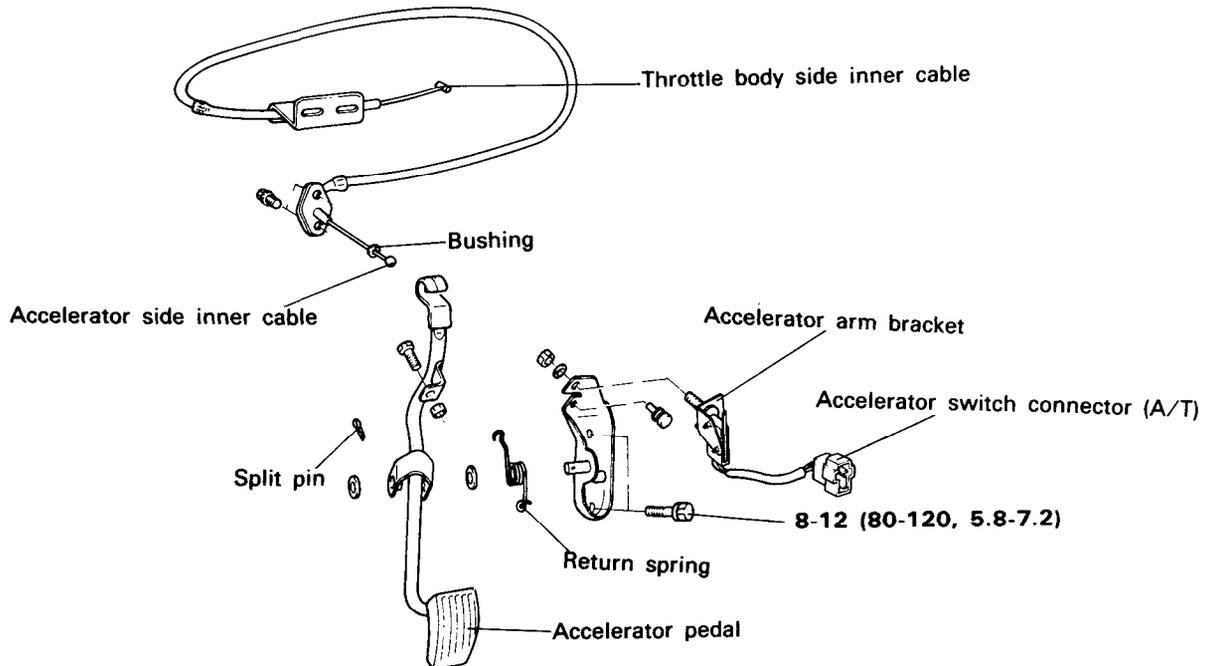
INSTALLATION

1. Install the fuel vapor hose and return hoses.
 - o If the fuel line has a stepped section, connect the fuel hose to the line securely, as shown in the illustration.
 - o If the fuel line does not have a stepped section, connect the fuel hose to the line securely.
2. Install the fuel filter, and tighten the fuel filter bracket.
3. Insert the main line on the filter and tighten the eye bolts while holding the fuel filter nuts.
4. Install the clips and make sure that they do not interfere with other components.
5. When installing the check valve, install it so that the valve is facing in the direction as shown in the illustration.



ENGINE CONTROL

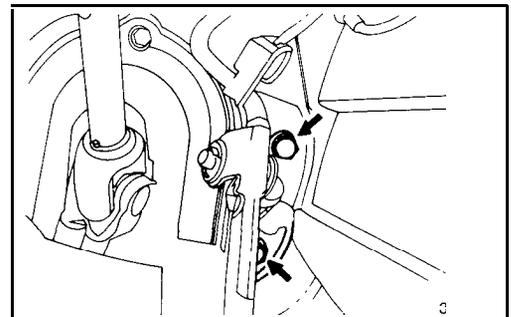
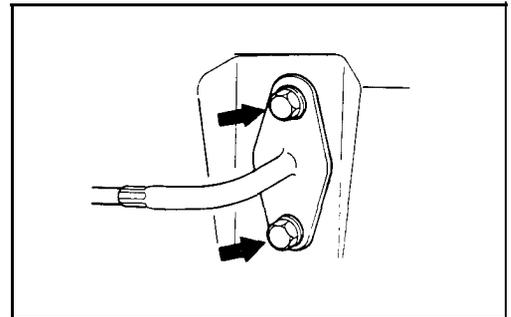
COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

REMOVAL

1. Remove the bushing and inner cable of the accelerator arm side.
2. After disconnecting the accelerator switch connector, loosen the bolts of the accelerator arm bracket and remove.

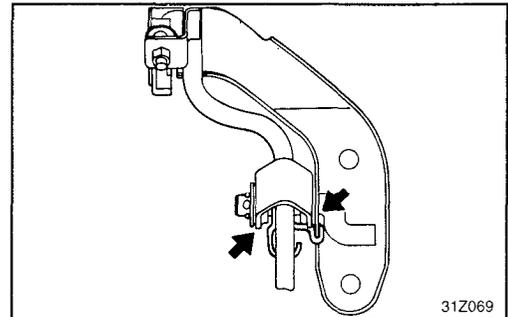


INSPECTION

1. Check the inner and outer cable for damage.
2. Check the cable for smooth movement.
3. Check the accelerator arm for deformation.
4. Check the return spring for deterioration.
5. Check the connection of the bushing to end metal fitting.
6. Check the accelerator switch proper operation.

INSTALLATION

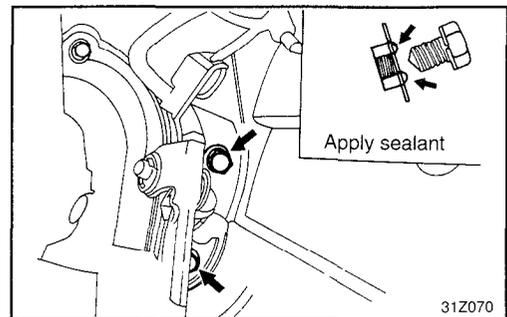
1. When installing the return spring and accelerator arm, apply multi-purpose grease around each moving point of the accelerator arm.



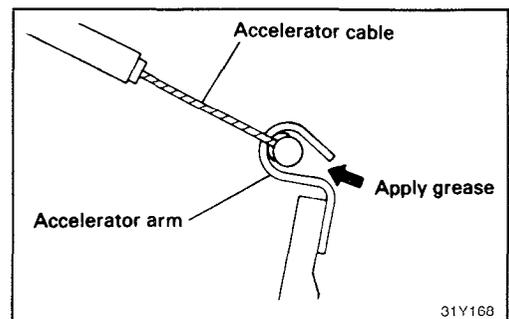
2. Apply sealant to the bolt mounting hole, and tighten the accelerator arm bracket.

Tightening torque

Accelerator arm bracket bolts	8-12 Nm (80-120 kg.cm, 5.8-7.2 lb.ft)
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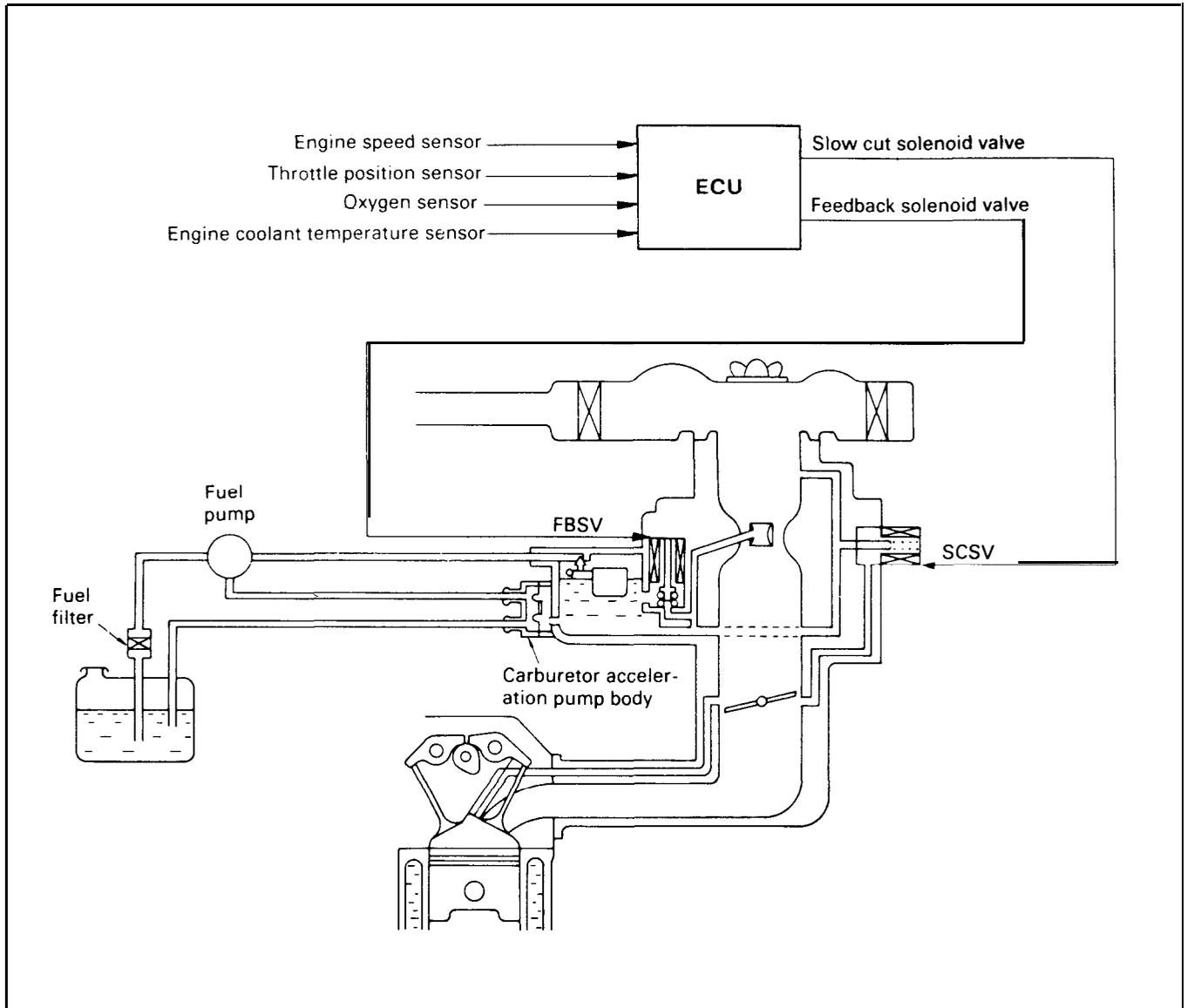
3. Securely install the resin bushing of the accelerator cable on the end of the accelerator arm.
4. Apply multipurpose grease around the cable end.



GENERAL INFORMATION (FBC SYSTEM)

The Feedback Carburetor (FBC) system provides a positive air-fuel ratio control for maximum reduction of emissions. The Electric Control Unit (ECU) receives signals from various sensors and then modulates two solenoid valves (FBSV, SCSV) installed on the carburetor to control the air-fuel ratio.

The ECU also controls the ignition timing, electric choke, throttle opener by switching on-off the solenoid valves.



FBSV : Feedback Solenoid Valve

SCSV : Slowcut Solenoid Valve

ECU : Electric Control Unit

GENERAL SPECIFICATIONS

Fuel tank	
Capacity	45 lit. (11.9 U.S. gal., 9.9 Imp.gal.)
Fuel filter	
Type [In-line filter]	Cartridge type
Type [In-tank filter]	Open type
Fuel pump	
Type	Mechanical diaphragm type
Driven by	Camshaft
Feed pressure	19-25 kPa (2.76-3.63 psi) at 2,500 rpm
Carburetor	
Type	Down-draft, 2-barrel, feed back type
Identification mark	
M/T	472 (For Canada), 474 (For Federal)
A/T	475 (For Federal)
Throttle bore	
Primary	30 mm (1.181 in.)
Secondary	32 mm (1.260 in.)
Feedback solenoid valve (FBSV)	
Type	Duty cycle solenoid
Coil resistance	54-66 Ω [At 20°C (68°F)]
Slow cut solenoid valve (SCSV)	
Type	duty cycle solenoid
Coil resistance	48-60 Ω [At 20°C (68°F)]
Throttle position sensor (TPS)	
Type	Variable resistor type (Rotary type)
Regulating voltage (When throttle valve fully closed)	0.25V
Coil resistance	3.5-6.5 K Ω
Bow vent valve (BVV)	
Type	Vacuum type
Vacuum orifice	0.3 mm (0.012 in.)
Mixture control valve (MCV)	
Type	Vacuum type
Dash pot	
Type	Conventional type
Operating rpm (When SAS 2 touches free lever)	Approx. 1,800 rpm
Outer venturi dia.	
Primary	20 mm (0.787 in.)
Secondary	25 mm (0.984 in.)
Inner venturi dia.	
Primary	9-14 mm (0.354-0.551 in.)
Secondary	9-12 mm (0.354-0.472 in.)

Main jet	
Primary	#83.8
Secondary	#145
Main air jet	
Primary - First	#80
Second	#60
Secondary	#70
Pilot jet	
Primary	#46.3
Secondary	#70
Pilot air jet	
Primary - First	#120
Second	#200
Secondary	#100
Main nozzle	
Primary	2.6 mm (0.102 in.)
Secondary	2.8 mm (0.110 in.)
Throttle valve plate	
Thickness	
Primary	1.0 mm (0.040 in.)
Secondary	1.5 mm (0.060 in.)
Fuel closing angle	
Primary	8°
Secondary	15°
Full opening angle	90°
Enrichment jet	#50
Slow air jet	#110
Accelerating pump	
Diaphragm dia.	24 mm (0.945 in.)
Pump jet dia.	0.35 mm (0.014 in.)
Choke	
Type	Automatic (Electric type)
Choke valve operating angle	25° (When fully closed) 90° (When fully opened)
Bimetal	
Temperature constant	1.0 deg/°C
Spring constant	60 gr.mm/deg.
Choke breaker opening	
First stage	1.4-1.6 mm (0.056-0.064 in.)
Second stage	2.9-3.1 mm (0.116-0.124 in.)
Input sensor	
Engine coolant temperature sensor	
Type	Thermistor type
Resistance	2.5 KΩ [at 20°C (68°)] 0.3 KΩ [at 80°C (176°F)]

SERVICE STANDARD

Basic ignition timing	BTDC $5^{\circ} \pm 1^{\circ}$
Curb idle speed	700 ± 50 rpm
Throttle opener adjusting rpm for electrical load	800 ± 50 rpm
Throttle opener adjusting rpm for air conditioner load	900 ± 25 rpm

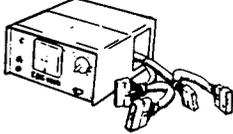
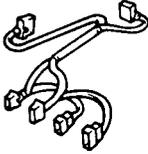
TIGHTENING TORQUE

	Nm	kg.cm	lb.ft
Accelerator arm bracket to body	8-12	80-120	5.8-8.7
Accelerator cable guide to body	3-5	30-50	2.2-3.6
Carburetor attaching bolt	15-20	150-200	11-14
Engine coolant temperature sensor	20-40	200-400	14-29
Oxygen sensor	40-50	400-500	29-36
Fuel tank drain plug	80-100	800-1,000	58-72

LUBRICANT

Grease for accelerator arm pin and return spring	Multipurpose grease SAE J310a, NLGI grade #3 or equivalent
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SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09341-21000 FBC checker		Diagnosis and inspection of FBC system (Use with 09391-21101)
09391-21101 Harness connector for FBC		Inspection for FBC system (Use with 09341-21000)

TROUBLESHOOTING

When checking and correcting engine troubles, it is important to start with inspection of the basic systems. If you experience one of the followings, (A) engine start failure, (B) unstable idling or (C) poor acceleration, you should first check 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 FBC system are often caused by poor contact of harness connector. It is, therefore, important to check harness connector contact.

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 line Clean or replace Replace
Evaporative emission control malfunctions (Pressure released when fuel tank cap is removed)	Misrouted vapor lines Disconnected vapor line piping joint Folded, bent, cracked or clogged vapor line Faulty fuel tank cap Malfunctioning overfill limiter (two-way valve)	Correct Correct Replace Replace Replace

Carburetor and FBC System

Symptom	Probable cause	Remedy	
Engine will not start or start to hard	Carburetor	Choke valve remains open-cold engine Improper choke breaker operation Electric choke malfunction Needle valve sticking or clogged	Clean choke bore and linkage Check and adjust choke breaker Check electric choke body and choke valve operation Repair or replace
	FBC system	Engine coolant temperature sensor malfunction Vacuum hose disconnected or damaged Slow-cut solenoid valve malfunction Feedback solenoid valve malfunction Vacuum switch malfunction-cold engine Faulty ECU Harness broken/short-circuited or loose connection	Check by using checker (Check component and replace if faulty) Repair or replace Check component Check component Check component Replace Repair or replace
Rough idle or engine stalls	Carburetor	Choke valve malfunction Improper fast idle-cold engine Improper idle adjustment Electric choke malfunction Primary pilot jet clogged Dash pot malfunction	Clean choke bore and link Adjust fast idle speed Adjust idle speed Check choke body and choke valve operation Clean up or replace Adjust
	FBC system	Slow-cut solenoid valve malfunction Engine coolant temperature sensor malfunction Vacuum hose disconnected or damaged Throttle position sensor malfunction Engine speed sensor malfunction Timing control system malfunction Throttle opener control system malfunction Harness broken/short-circuited or connector not connected securely	Check drive signal by using checker Check component Check by using checker (Check component and replace if faulty) Repair or replace Check component and adjust Check by using checker Check harness for continuity Check system. If faulty, check components Check system. If faulty, check components Repair or replace

Symptom		Probable cause	Remedy
Engine hesitates or poor acceleration	Carburetor	Acceleration pump malfunction Choke valve remains open-cold engine Choke valve remains closed-hot engine Main jet clogged Enrichment jet clogged Secondary valve operation abnormal	Clean pump discharge rate Clean choke bore and link Check choke valve operation Clean choke bore and link Check choke valve operation Clean up Clean up Check valve operation
	FBC system	Feedback solenoid valve malfunction Vacuum switch malfunction Timing control system malfunction Engine coolant temperature sensor malfunction Throttle position sensor malfunction Engine speed sensor malfunction Cold mixture heater relay control system malfunction-cold engine Harness broken/short-circuited or connector not connected properly Air conditioner power relay control system malfunction	Check drive signal by using checker Check component Check with checker (Replace if faulty) Check system. If faulty, check components Check by using checker (Check components and replace if faulty) Check component and adjust Check by using checker Check harnesses for continuity Check system. If faulty, check components Repair or replace Check system
Engine dieseling	Carburetor	Engine idle speed too high	Adjust idle speed
(runs after ignition FBC system switch is turned off)	FBC system	Slow-cut solenoid valve malfunction	Check component
Poor fuel mileage	Carburetor	Choke valve operation abnormal Engine idle speed too high Electric choke malfunction Enrichment valve kept open	Check valve operation Adjust idle speed Check choke body and valve operation Repair or replace

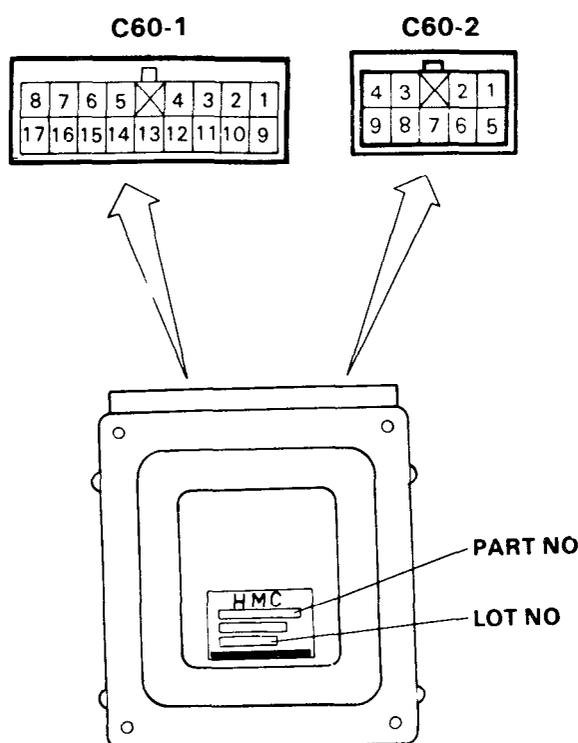
Symptom		Probable cause	Remedy
Poor fuel mileage	FBC system	<p>Engine coolant temperature sensor malfunction</p> <p>Oxygen sensor malfunction</p> <p>Timing control system malfunction</p> <p>Feedback solenoid valve malfunction</p> <p>Slow-cut solenoid valve malfunction</p> <p>Throttle position sensor malfunction</p> <p>Engine speed sensor malfunction</p> <p>Harness broken/short-circuited or connector not connected securely</p>	<p>Check by using checker (Check component and replace if faulty)</p> <p>Check by using checker (Check component and replace if faulty)</p> <p>Check system. If faulty, check components</p> <p>Check drive signal by using checker</p> <p>Check component Check drive signal by using checker</p> <p>Check components</p> <p>Check component and adjust</p> <p>Check by using checker</p> <p>Check harness for continuity</p> <p>Repair or replace</p>

FBC System Component

1. Electric Control Unit (ECU)

Based on the information from various sensors, the ECU determines (computes) ideal setting for varying operating conditions and drives the output actuators to control the air-fuel ratio.

The ECU consists of an 8-bit microprocessor, random access memory (RAM), read only memory (ROM) and input/output (I/O) interface.



C60-1

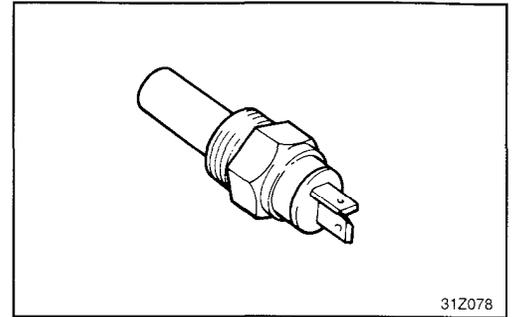
1. Feedback solenoid valve
2. Idle up control solenoid valve
3. Distributor advance vacuum exchange solenoid valve
4. Electric choke relay
5. Ignition coil negative termina;
6. Ground
- 7.
8. Battery back up
9. Slow cut solenoid valve
10. Secondary air control solenoid valve
11. Air conditioner cut relay
12. -
13. Vacuum switch
14. Cold spark advance control solenoid valve
15. O₂ sensor checker
16. Ignition 1
17. Ignition 2
18. -

C60-2

1. Cold mixture heater relay (-)
2. -
3. Throttle position sensor (output)
4. Throttle position sensor (source)
5. -
6. O₂ sensor (output)
7. -
8. Coolant temperature sensor (output)
9. Coolant temperature sensor (ground)

2. Engine Coolant Temperature Sensor

The engine coolant temperature sensor is installed in the engine coolant passage of the intake manifold. This coolant sensor is a thermistor. The ECU determines engine temperature by the sensor output voltage and utilize it to provide optimum fuel enrichment when the engine is cold.

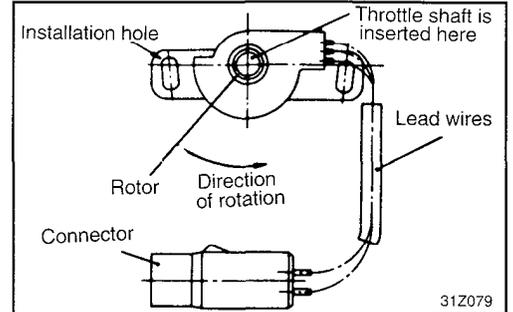


31Z078

3. Throttle Position Sensor (TPS)

The TPS is a rotary type variable resistor that rotates together with the carburetor throttle shaft to sense the throttle valve angle. As the throttle shaft rotates, the TPS output voltage changes and the ECU detects the throttle valve opening based on the change of the voltage.

Using the TPS output signal, engine speed signal and other signals, the ECU maintains the optimum air-fuel ratio.

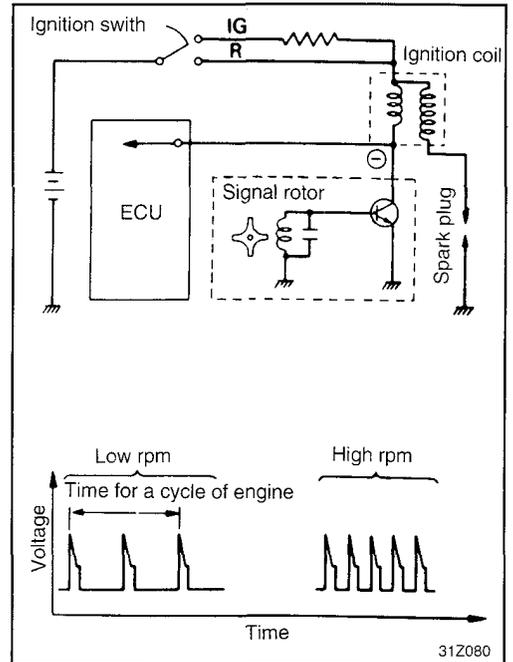


31Z079

4. Engine Speed Sensor

The ignition coil negative terminal voltage makes sudden increase twice per crankshaft revolution synchronously with ignition timing.

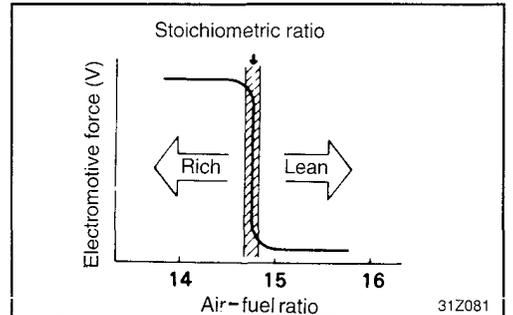
By sensing this ignition coil negative terminal voltage change and measuring the time between peak voltages, the ECU computes the engine speed, judges the engine operating mode and controls the air-fuel ratio and ignition timing.



31Z080

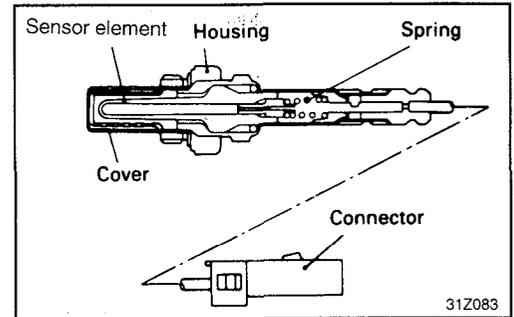
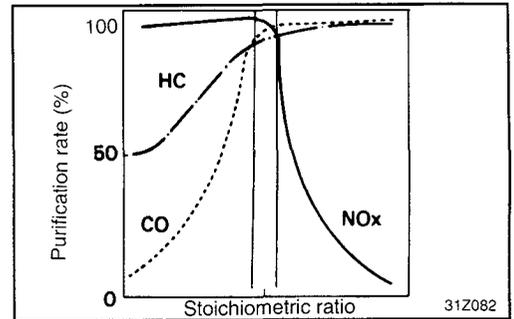
5. Oxygen Sensor

1) The oxygen sensor installed on the exhaust manifold makes use of the principles of solid electrolyte oxygen concentration cell. The oxygen concentration cell is characterized by sharp change of the output voltage in the vicinity of the stoichiometric air-fuel ratio.



31Z081

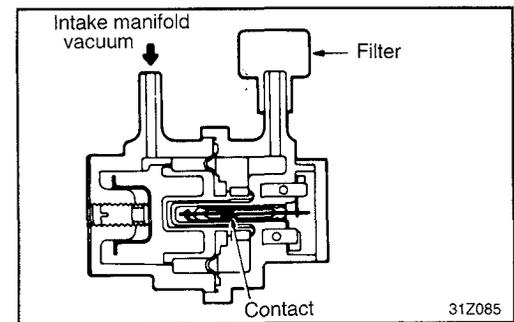
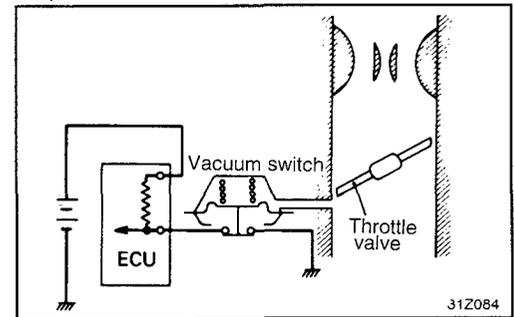
- 2) Using such characteristics, the oxygen sensor senses the oxygen concentration in the exhaust gas and feeds it to the ECU. The ECU then judges if the air-fuel ratio is richer or leaner as compared to the stoichiometric ratio and provides feedback control to adjust the air-fuel ratio to the stoichiometric ratio where the emission purification rate of the three way catalytic converter is the optimum.



6. Vacuum Switch

The vacuum switch is a contact type switch that is operated by intake manifold vacuum. When the throttle valve closes, the intake manifold vacuum acts on the vacuum switch to close its contact.

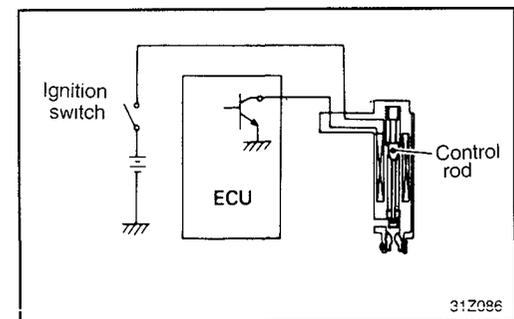
By this action, the voltage on the ECU side is grounded and the ECU senses that the throttle valve opening is near idle.



7. Feedback Solenoid Valve (FBSV)

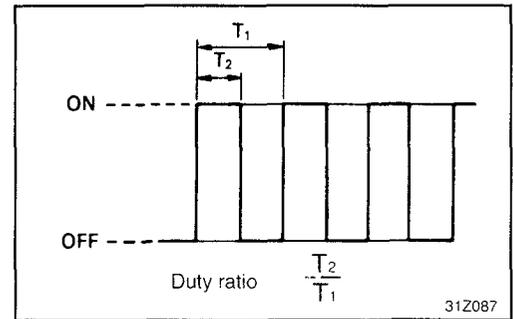
The FBSV is installed in the carburetor float chamber cover. The ECU controls the air-fuel ratio by controlling the duty cycle of the FBSV.

The higher is the duty ratio, the leaner becomes the air-fuel ratio.



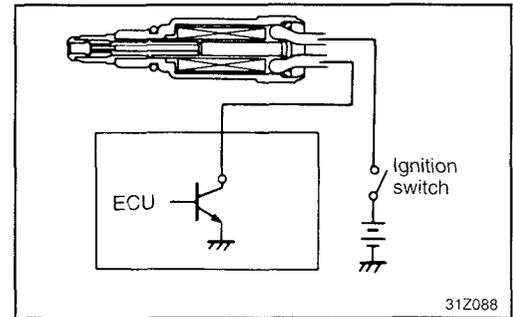
NOTE

The duty cycle control means control of the solenoid valve energization rate by changing the ON time ratio T_2/T_1 (called duty ratio) of 10 Hz pulse.



8. Slow Cut Solenoid Valve (SCSV)

The SCSV is located in the carburetor float chamber cover. The ECU controls the carburetor slow system fuel flow by controlling the duty cycle of the SCSV.



FBC System Operation

1. The air-fuel ratio control is maintained by the ECU in one of two operating modes.

1) Closed loop control (Feedback control)

After engine warm-up, the air-fuel ratio control is made by the feedback control based on the oxygen sensor signal. The oxygen sensor output voltage changes sharply at the stoichiometric ratio. The control unit senses this oxygen sensor signal and provides feedback control to the FBSV maintaining the stoichiometric ratio that will give the best purification rate of the 3-catalyst converter may be accurately kept. In this state, the SCSV is kept wide open (100% duty)

2) Open loop control (No feedback control)

During engine start, warm-up operation, high load operation and deceleration, the air-fuel ratio is in open-loop. The ECU controlled based on map values* established previously for engine speed, throttle valve opening angle and engine coolant temperature, to improve startability and driveability.

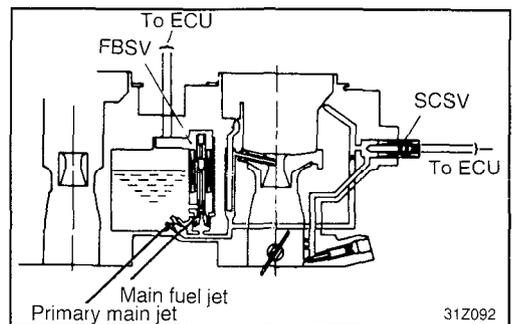
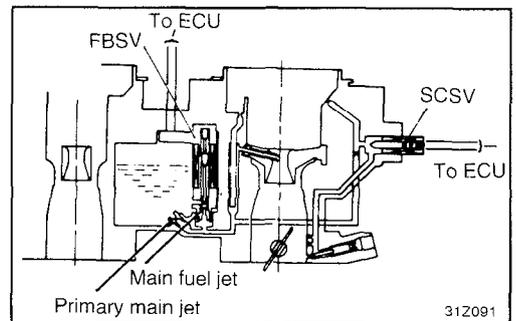
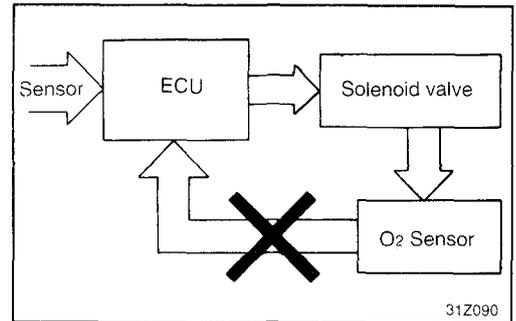
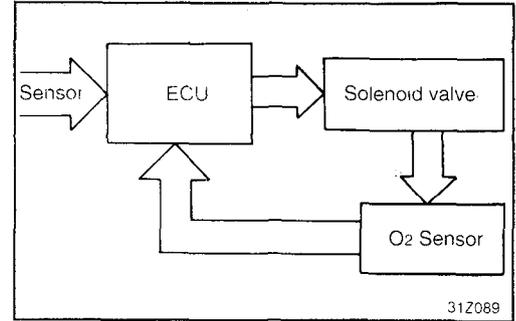
During deceleration, the SCSV limits fuel flow for better fuel economy and for prevention of overheating of the catalyts, *Map value is a value previously established and stored in ROM in ECU.

2. When the FBSV is energized, the main fuel jet is closed to leaving the primary main jet passage as the only fuel passage. This reduces the amount of fuel, resulting in leaner air-fuel mixture.

3. When the FBSV is de-energized, the main fuel jet is opened to provide two fuel passages including the primary main jet passage. Since this will increase the amount of fuel, richer air-fuel mixture is obtained.

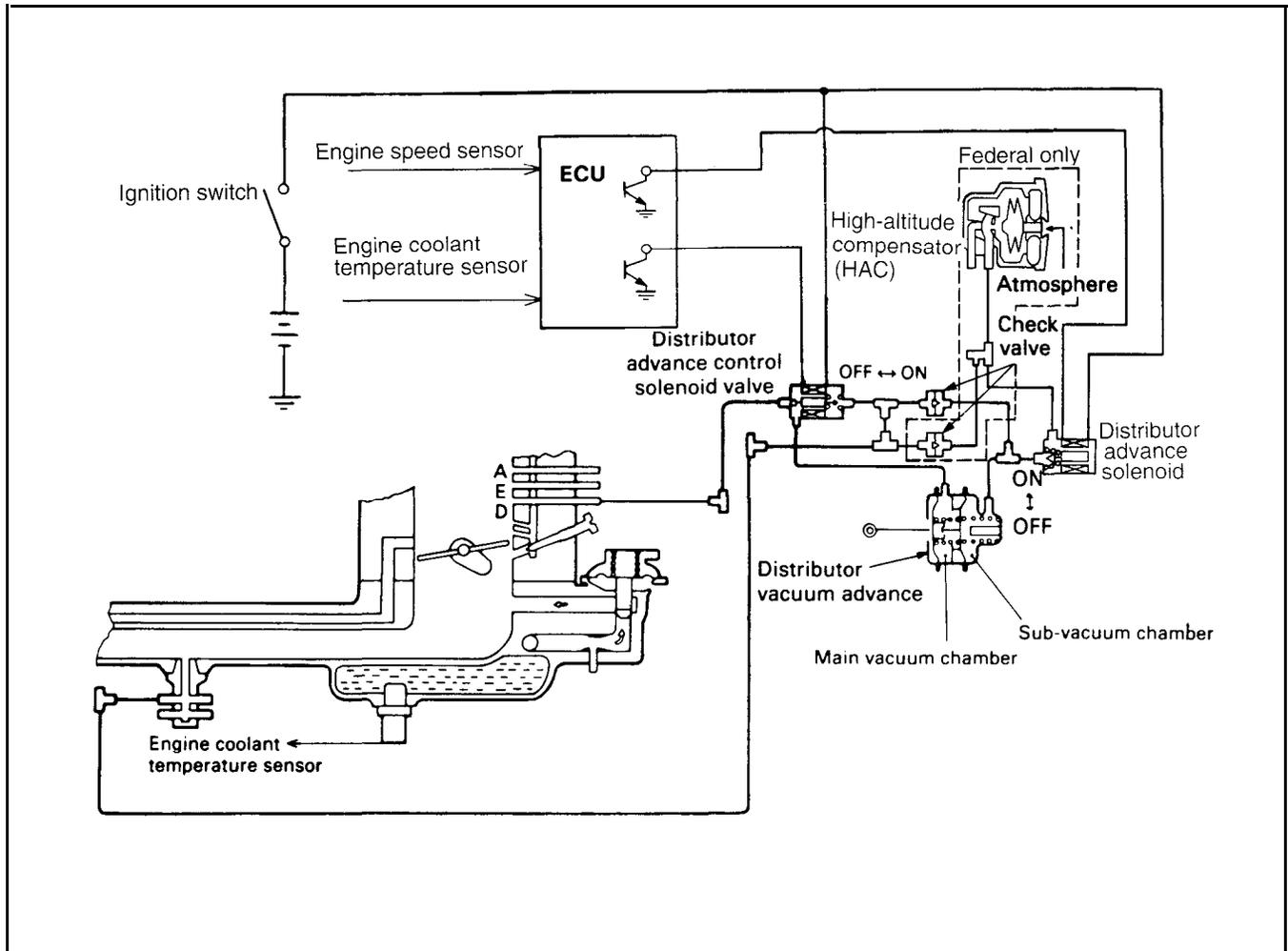
With the ON-OFF operation of SCSV, the slow fuel passage is opened and closed.

The air-fuel ratio at deceleration is controlled in this manner.



Distributor Advance Control System (Ignition Timing Control System)

The distributor vacuum advance is a dual diaphragm type having main vacuum chamber and sub-vacuum chamber. To control the ignition timing, the ECU energizes the solenoid valves in the respective vacuum circuits of main vacuum chamber and subvacuum chamber.



1. Main Vacuum Timing Control

- 1) When the engine speed is near the-idle speed (1,200 rpm or less), the ECU energizes the distributor advance control solenoid valve. By this action the carburetor D port vacuum is introduced to the main vacuum chamber which resets the ignition timing.

NOTE

The D port vacuum is zero when the throttle valve is at idle position, and increases with the valve opening angle.

- 2) When the engine speed increases to 1,200 rpm the ECU turns off the distributor advance control solenoid valve. Intake manifold vacuum is routed to the main vacuum chamber increasing ignition advance. When the engine starts to warm up] engine coolant temperatures: below 80°C (176°F), the solenoids are energized, allowing D port vacuum to reach main vacuum chamber.

2. Sub-vacuum Timing Control

- o Control at low altitude [approx. 1,200 m (3,900ft.) or lower]
 - 1) When the engine coolant temperature is low [50°C (122°F) or lower], the ECU energizes the distributor cold advance control solenoid valve. By this action, the intake manifold vacuum no longer leaks to atmosphere and instead is introduced to the sub-vacuum chamber. As a result, the timing advanced by the main vacuum advance is additionally advanced by a fixed angle (5° in crank angle).
 - 2) During warm-up operation or when the engine coolant temperature is high [over 50°C (122°F)], the ECU de-energizes the distributor cold advance control solenoid valve circuit. As a result, the intake manifold vacuum leaks to atmosphere, which prevents timing advance.
- o Control at high altitude [approx, 1,200 m (3,900 ft.) to over)

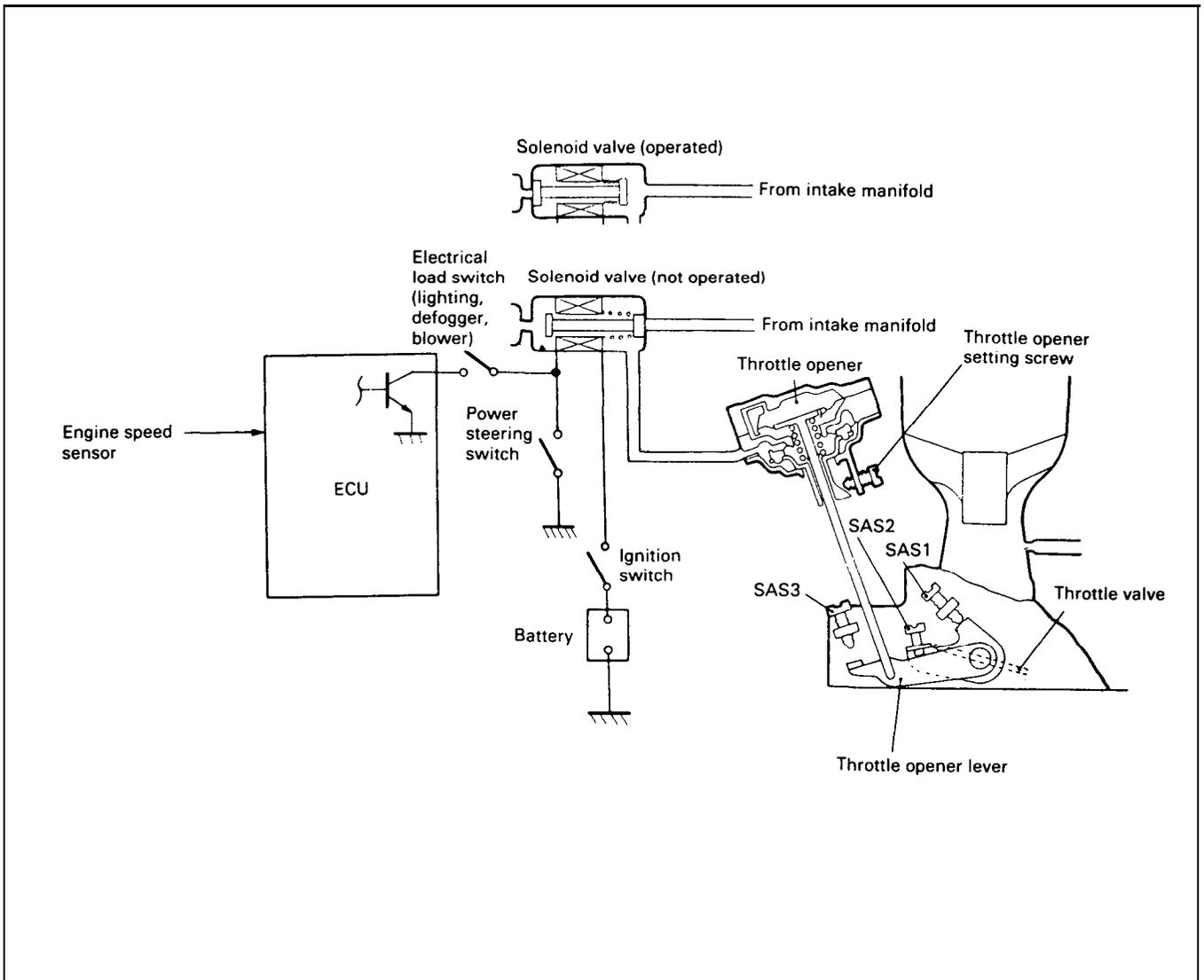
At high altitude, the HAC is closed and hence the intake manifold vacuum does not leak to atmosphere from the HAC.

Independently of the distributor cold advance control solenoid valve, the intake manifold vacuum acts on the sub-vacuum chamber, causing the timing to advance by a fixed angle (5° in crank angle). [For Federal]

Throttle Opener System (For power steering, electrical load)

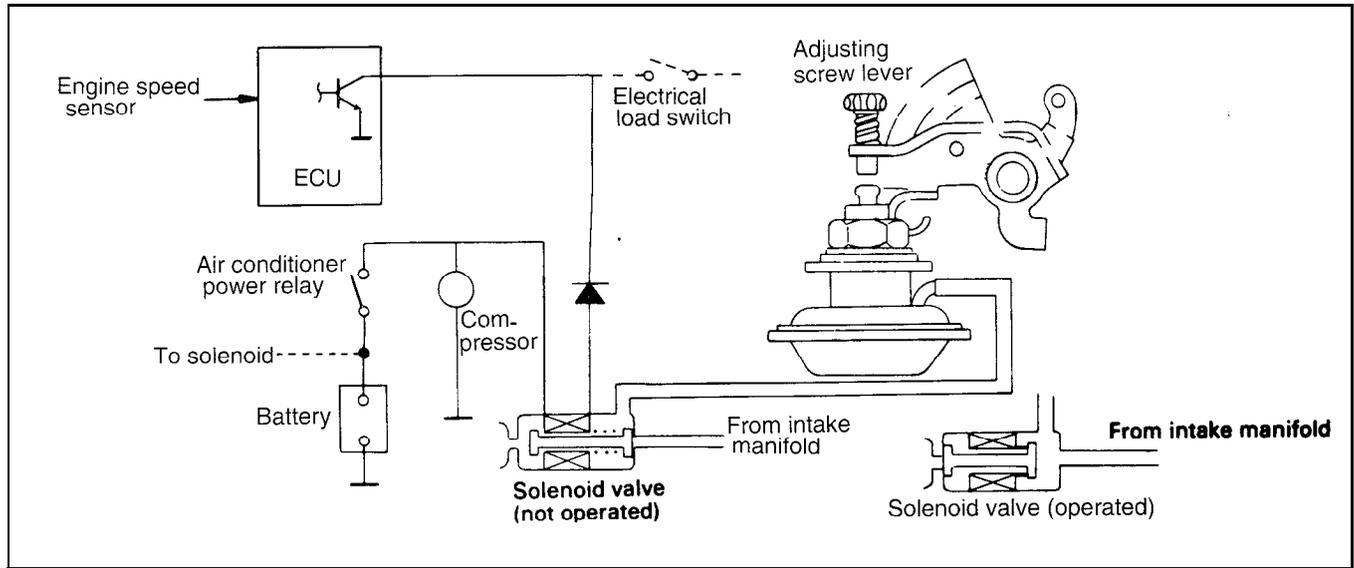
If the power steering oil pressure switch is turned on by high pump pressure the throttle opener control solenoid valve is energized to introduce intake manifold vacuum to the throttle opener. The throttle valve opens slightly, preventing engine speed drop caused by power steering load.

When the engine speed drops below the set speed (1,200 rpm), the ECU keeps the power transistor on. When the electrical load switch is turned on for lighting etc., the throttle opener control solenoid valve is energized, allowing intake manifold vacuum to the throttle opener to open the throttle valve slightly, preventing engine speed drop caused by electrical load.



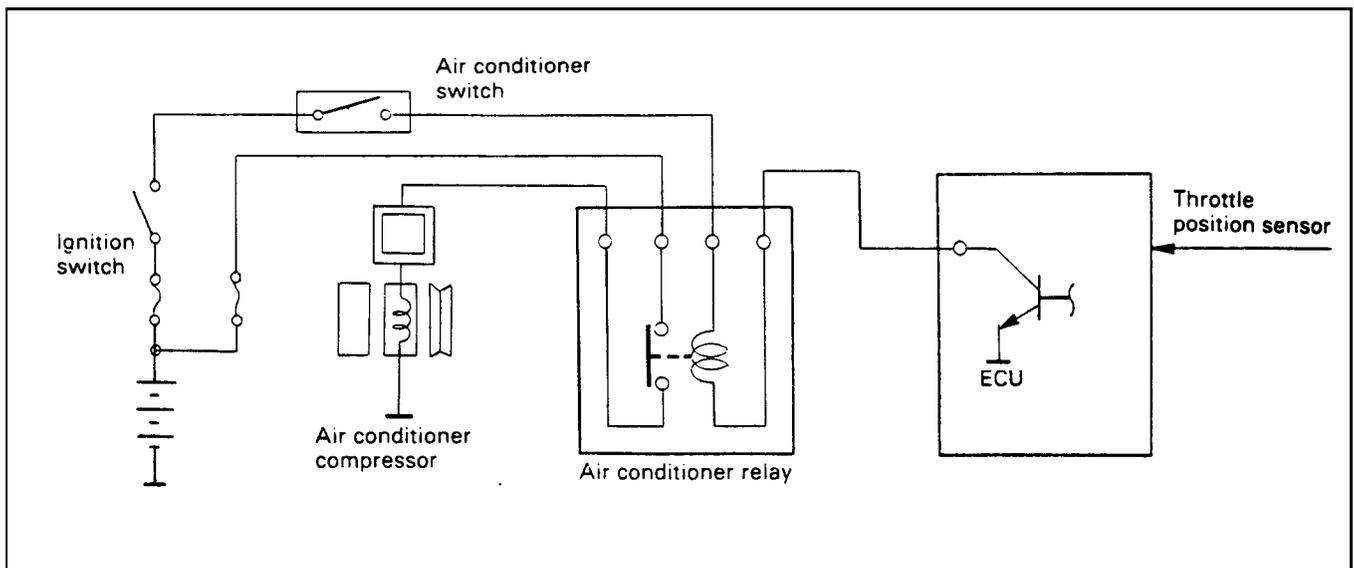
Throttle Opener System (For A/C)

When the engine speed is below the set speed (1,200 rpm), the ECU keeps the power transistor on. When the air conditioner relay is turned on the throttle opener control solenoid valve is energized to introduce intake manifold vacuum to the throttle opener. The throttle valve opens slightly preventing engine speed drop caused by air conditioner load.



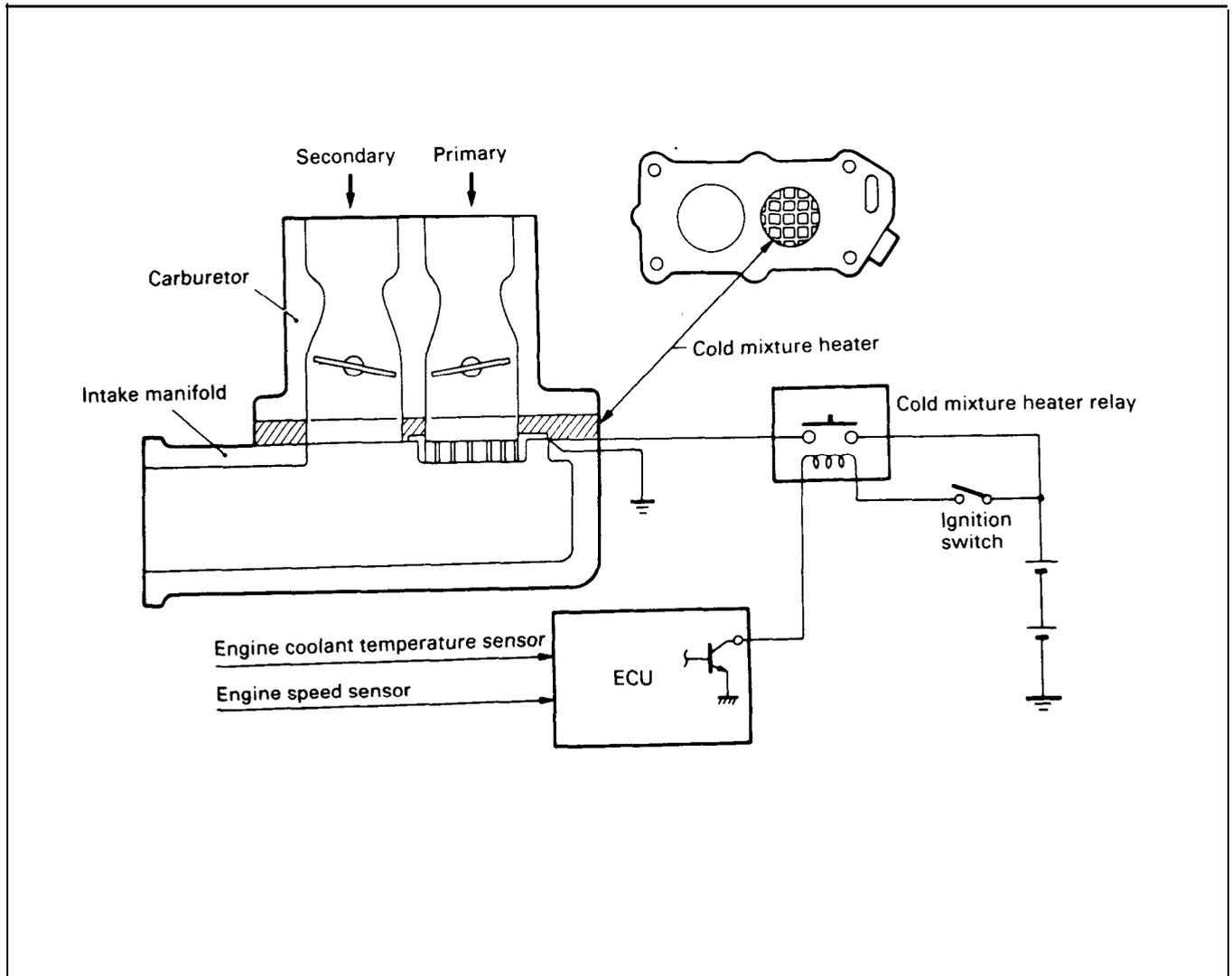
Air Conditioner Power Relay Control System (For A/T)

When the throttle valve opening increases (over 74°) during acceleration etc., the ECU turns off the air conditioning power relay for about 5 seconds. As a result, even if the air conditioner switch is on, the air compressor is not driven and hence the engine load is reduced, improving acceleration performance.



Cold Mixture Heater (CMH) Relay Control System

The cold mixture heater is a Positive Temperature Coefficient (PTC) heater installed between the carburetor and intake manifold. When the engine coolant temperature is below 60°C (140°F) the ECU energizes the cold mixture heater relay. The closed relay supplies voltage to the cold mixture heater. The cool air-fuel mixture is heated and atomized by the heater before it reaches the combustion chamber for improved combustion.

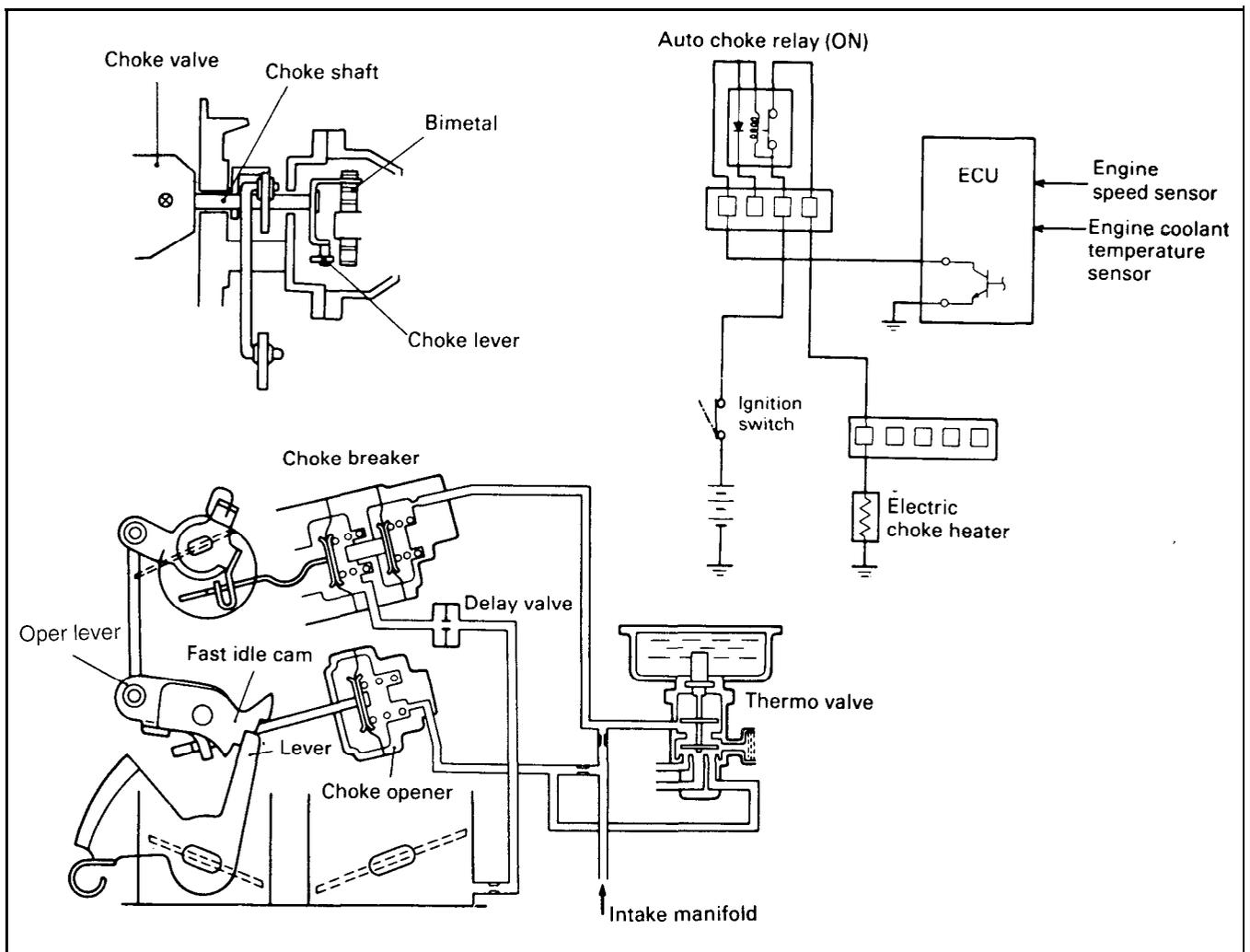


Electric Auto Choke System

In the carburetor electric choke system, a bimetal choke spring is heated by an electric heater (PTC heater*).

As the bimetal spring is heated by the heater after start-up, the bimetal opens the choke valve gradually by thermal expansion and pushes down the stopper lever.

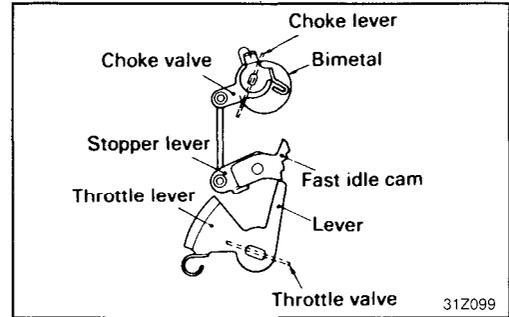
The lower the temperature when the engine is started, the tighter the bimetal closes the choke valve, thus improving at cold weather starting.



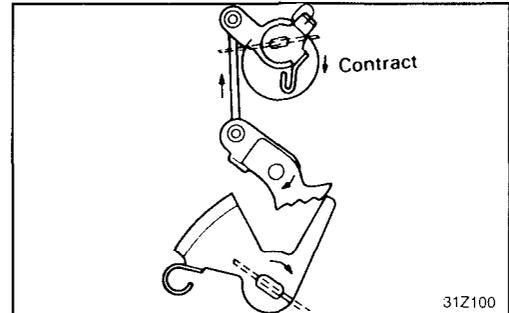
*PTC heater : Positive Temperature Coefficient heater

1. Choke Valve and Fast Idle Cam Operation

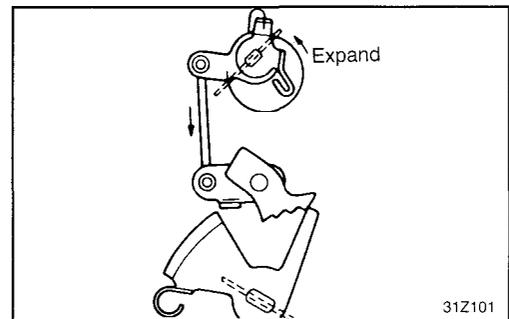
- 1) Before starting the engine, the throttle valve is in normal idle opening state.



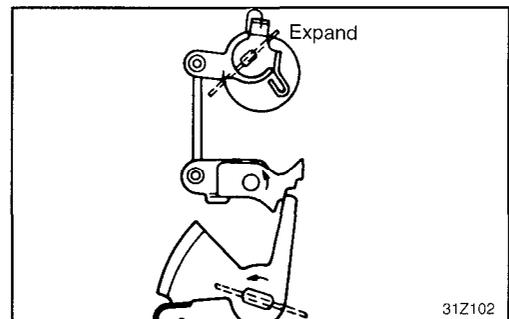
- 2) Before starting the engine, depress the accelerator pedal to the floor, and the fast idle cam will turn clockwise. Release the accelerator pedal, and the lever will ride on the fast idle cam and the throttle valve will open.
- 3) When the engine starts, the intake manifold vacuum is applied to the choke breaker to slightly open the choke valve, preventing a rich air-fuel mixture.



- 4) Shortly after starting of engine, the bimetal is heated by the heater and expands to open the choke valve gradually and push down the stopper lever. At this time, the engine speed increases gradually.



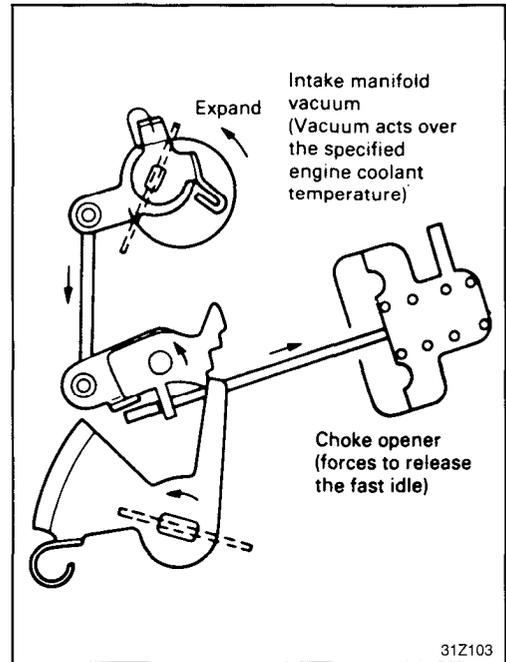
- 5) Depress the accelerator pedal, and the fast idle cam will turn counterclockwise. Release the accelerator pedal and the lever will ride on the lower step of fast idle cam and the throttle valve will close slightly, decreasing the engine speed. After warming up the engine for a while, depress the accelerator pedal and the throttle valve will be further closed. By repeating this procedure, the fast idle cam is released and the throttle valve comes to have a normal idle opening.



2. Operation of Choke Opener

If the engine has been started with the throttle valve lever on the highest fast idle cam step then the engine speed will increase with the engine coolant temperature. This results in the engine overrun. In order to prevent such overrun, the choke opener is provided.

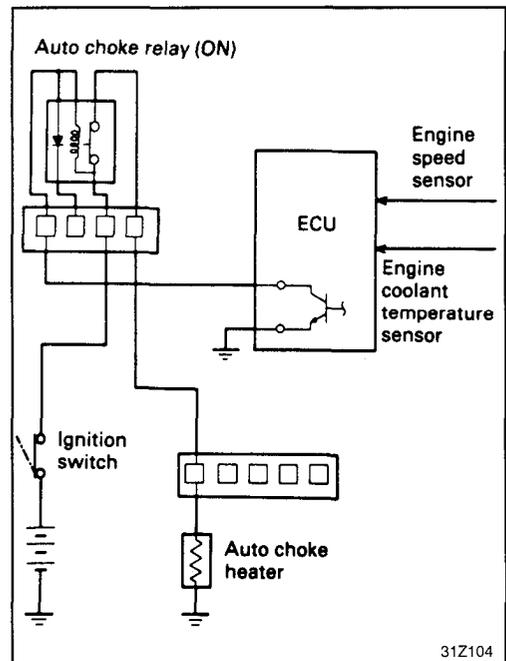
- 1) When the thermo valve closes as the engine coolant temperature rises [65°C (149°F)], the intake manifold vacuum acts on the fast idle breaker.
- 2) The fast idle breaker forces the fast idle cam to counter clockwise so that the lever will rest on the lowest detent of cam, closing the throttle valve to decrease the engine speed.



3. Electric Auto Choke Relay

The electric choke relay is normally closed (ON) and it opens when its coil is energized.

During engine cranking or for approx. 80 seconds at an engine coolant temperature of -10 to 18°C (-14 to 64°F), the ECU energizes the electric choke relay coil. This prevents heating of the electric choke heater, until the engine has started.



SERVICE ADJUSTMENT PROCEDURES

FBC SYSTEM

Inspection

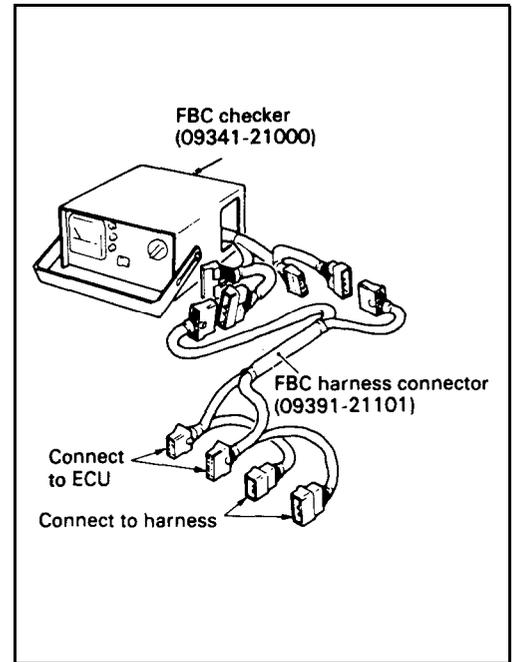
If FBC system components (sensors, carburetor control unit-computer, solenoid, etc.) fail, one of the following situations may be encountered.

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

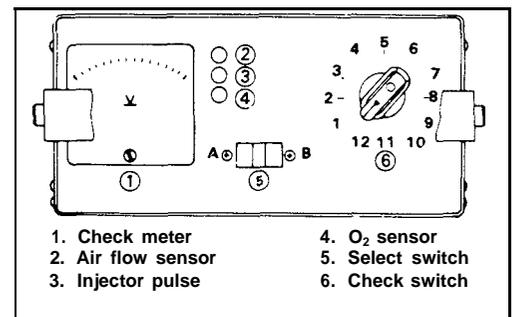
If any of above conditions is noted, first perform basic engine checks (ignition system malfunctions, incorrect engine adjustment, etc.). The FBC system can be checked by use of FBC checker and FBC harness connector. Inspection procedure is as follows.

CAUTION

- 1) Before battery terminals are disconnected, make sure that ignition switch is OFF. If battery terminals are disconnected while engine is running or when ignition switch is in ON position, malfunction of computer could result.
- 2) Disconnect battery cables before charging battery.
- 3) When battery is connected, be sure not to reverse polarity.
- 4) Make sure that harness connectors are securely connected. Take care not to allow entry of water or oil into connectors.



1. Turn ignition switch to OFF.
2. Remove the harness connector "A" (13 poles) and connector "B" (7 poles) from carburetor control unit (computer).
3. Set check switch of FBC checker to OFF.
4. Set select switch of checker to A.
5. Connect the FBC harness connector to the connectors of FBC checker, and then connect FBC harness connector to carburetor control unit and harness connectors. Place FBC checker on front passenger's seat.
6. Perform checks according to the "FBC System Check Procedure Chart".
7. If check shows any departure from specifications, check corresponding sensor and related electrical wiring, repair or replace.
8. After repair or replacement, recheck with FBC checker to confirm that repaired or replaced parts is performing well.
9. Set check switch of FBC checker to OFF.
10. Turn the ignition switch to OFF.
11. Disconnect connectors of FBC checker and FBC harness connector from carburetor control unit and body side harness connectors.
12. Connect body side harness connector to carburetor control unit.



Check Procedure Chart

FBC checker setting		Check item	ECU Terminal # checked	Condition		Test specification	
Select switch	Check switch						
"A"	1	Power supply A-2	8 (C60-1)	Ignition switch "LOCK" "ON"		11V-13V	
	2	Spark advance control A-13 solenoid valve	3 (C60-1)	Idling (warm engine)		0V-0.6V	
				Start engine. Drive vehicle at a speed higher than 8 km/h (5 mph), then hold 2,000 rpm (warm engine)		13V-15V	
	3	Throttle position B-9 sensor (TPS)	3 (C60-2)	Ignition switch "LOCK" "ON" (warm engine)	Accelerator fully closed	0.4V-0.7V	
					Accelerator fully opened	4.5V-5.5V	
	4	Engine coolant B-3 temperature sensor	8 (C60-2)	Ignition switch "LOCK" ; "ON"	0°C (32°F)	3.4V-3.6V	
					20°C (68°F)	2.4V-2.7V	
					40°C (104°F)	1.5V-1.8V	
					80°C (176°C)	0.5V-0.7V	
	5						
	6	Vacuum switch for A-6 idle position	13 (C60-1)	Ignition switch "LOCK" ; "ON"		9V-13V	
				Idling (warm engine)		0V-0.6V	
7	Idle up (throttle opener) A-12 control solenoid valve	2 (C60-1)	Idling	Power steering switch ON or lighting switch ON	0V-0.6V		
			2,000 rpm		9V-15V		
8	Electric choke relay A-	4 (C60-1)	Ignition switch "LOCK" ; "ON"		0V-0.6V		
			Idling		13V-15V		
9	Air conditioner cut-off A-8	11 (C60-1)	Ignition switch "LOCK" ; "ON" and air conditioner switch "ON" *1	Accelerator fully closed	0V-0.6V		
				Accelerator fully opened	M/T	0V-0.6V	
					A/T	13V-15V	
10	Power supply for B-1 sensor	16 (C60-1) 17 (C60-1)	Ignition switch "LOCK" ; "ON"		4.5V-5.5V		
11							
12	Secondary air control A-9 solenoid valve	10 (C60-1)	Idling, 70 seconds after start of warm engine		0V-0.6V then 13V-15V		
			Quick deceleration from above 2,000 rpm to idling with gear in "N" position		Momentarily drop		

*1 : ON means compressor clutch engaged

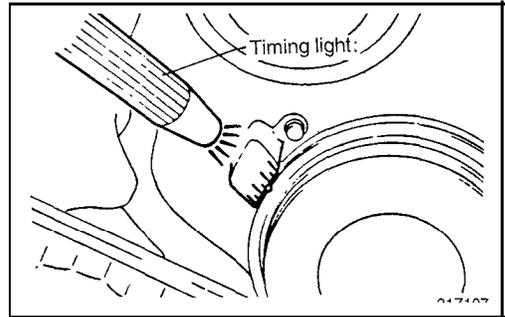
FBC checker setting		Check item	ECU	Condition	Test specification
Select switch	Check switch		Terminal # checked		
	1				
	2	Feed back solenoid valve (FBSV)	1 (C60-1)	Ignition switch "LOCK" "ON"	11V-13V
				Idling (warm engine)	2V-12V
	3				
	4	Ignition pulse	5 (C60-1)	Ignition switch "LOCK" "START"	2V-8V
	5				
	6				
	7	Slow cut solenoid valve	9 (C60-1)	Idling	0V-0.6V
				Quick deceleration from above 4,000 rpm to idle with transaxle in position	Momentarily 13V-15V
	8	Oxygen sensor	6 (C60-2)	Hold speed constant above 1,300 rpm, 70 seconds after start of warm engine	0V-1V (Pulsates) 2V-3V
	9				
	10				
	11				
	12				

SERVICE ADJUSTMENT PROCEDURES

IDLE SPEED CHECK AND ADJUSTMENT

Checking Conditions:

- o Engine coolant temperature is 80 to 95°C (176 to 205°F).
- o Engine lubricant temperature is over 80°C (176°F).
- o Lights, electric cooling fan and all accessories are off.
- o Transaxle is in neutral.
- 1. Set timing light and tachometer.
- 2. Start the engine and let it idle.
- 3. Check the basic ignition timing and adjust if necessary.



Ignition timing BTDC 5° ± 1°

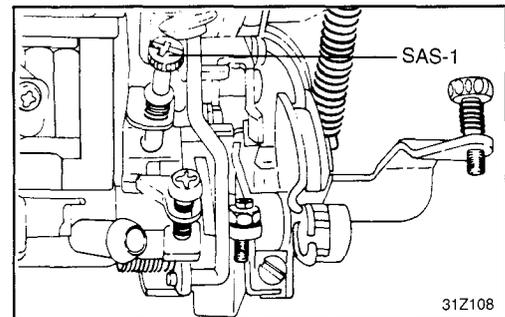
NOTE

When the basic ignition timing is to be adjusted at a high altitude, disconnect the vacuum hose (yellow stripe hose) from the distributor sub-vacuum chamber and temporarily close the disconnected hose end with an appropriate plug.

- 4. Run the engine for more than 5 seconds at an engine speed of 2,000 to 3,000 rpm.
- 5. Run the engine at idle for 2 minutes.

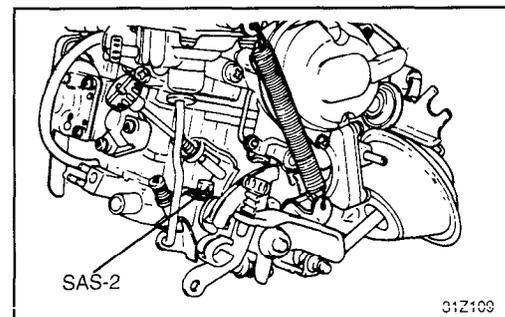
- 6. Set the engine speed to the specified valve body adjusting the idle speed adjusting screw No. 1 (SAS-1).

Curb idle rpm 700 ± 50 rpm



CAUTION

Do not touch SAS-2. The idle speed adjusting screw (SAS-2) is the preset screw that determines the relationship between the throttle valve and free lever, and has been accurately set at the factory. If this setting is disturbed, throttle opener adjustment and dash pot adjustment cannot be done accurately.



THROTTLE OPENER ADJUSTMENT

For Operation Under Electrical Load

The procedure that follows is to check and adjust the idle speed control operation of the throttle opener when electric load is applied.

1. Make sure curb idle speed is within the specified speed. If outside the specified limits, readjust the speed to the nominal specification.
2. By using the auxiliary lead wire, activate the idle-up control solenoid valve, apply the intake manifold vacuum to the idle-up actuator and activate the idle-up actuator.
3. Open the throttle slightly (to an engine speed of about 2,000 rpm), and then slowly close it.
4. Adjust the engine speed to the specified speed with the idle-up adjusting screw.

Throttle opener adjusting rpm (For electrical load)
 800 ± 50 rpm

5. After repeating step 3, check the engine speed.
6. Remove the auxiliary lead wire used in step 2, and reconnect the idle-up solenoid valve wiring.

For Operation Under Air Conditioner Load

The procedure that follows is to check and adjust the idle speed control operation of the throttle opener when air conditioning load is applied.

1. Start the engine.
2. Set the tachometer
3. Turn on the air conditioner switch.

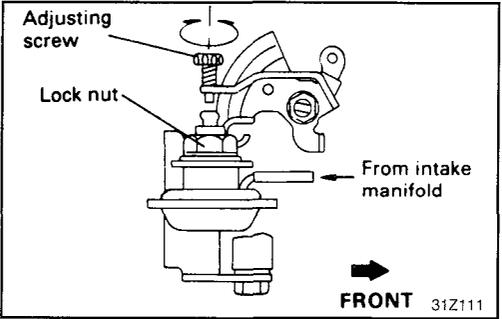
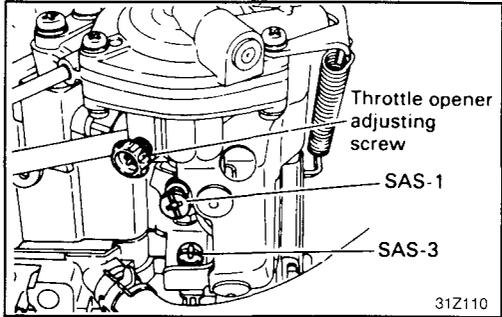
NOTE

The solenoid valve with open and the intake manifold vacuum will act on the throttle opener to fully actuate it.

4. Check the engine speed during this operation.

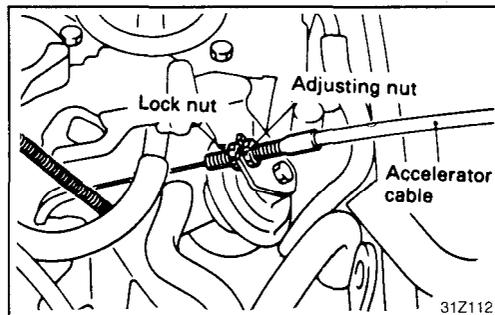
Throttle opener adjusting rpm (For A/CON)
 900 ± 25 rpm

5. If the engine speed is out of specification, adjust using the throttle (for air conditioner) adjusting screw.



THROTTLE POSITION SENSOR (TPS) ADJUSTMENT

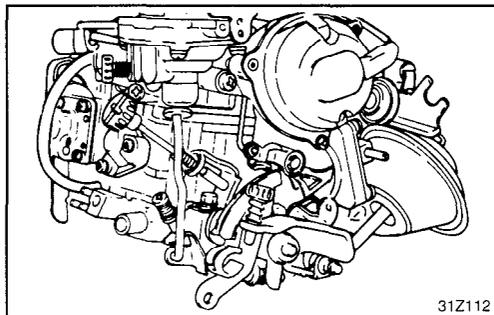
1. Loosen the accelerator cable enough.



2. Loosen the speed adjusting screw No. 1 (SAS 1) and No. 2 (SAS 2) sufficiently to close the throttle valve completely. Record the number of turns loosened.

NOTE

Turning the screw counterclockwise closes the valve. At this time, the fast idle control should have been released (the lever not resting on the fast idle cam).



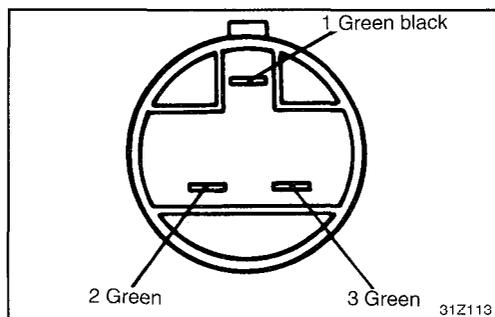
3. Connect voltmeter (digital type) between 2 and 3 of TPS connector pins.

NOTE

Do not disconnect the TPS connector from the chassis harness.

4. Turn the ignition switch to ON. (Engine will not start.)
5. Measure the TPS output voltage.

Standard value : 250 mV

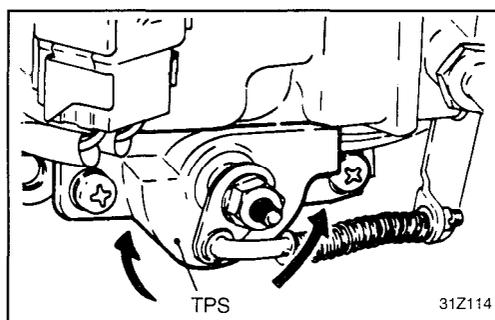


6. If the output voltage is not correct turn the TPS body to adjust to specification.

NOTE

Turning the TPS body clockwise increases the output voltage.

7. Turn the ignition switch to OFF.
8. Tighten SAS 1 and SAS 2 by the same number of turns as loosened in step (2) to return them to initial state.
9. Adjust free play of the accelerator cable.
10. Start the engine and check that the idle speed as specified.

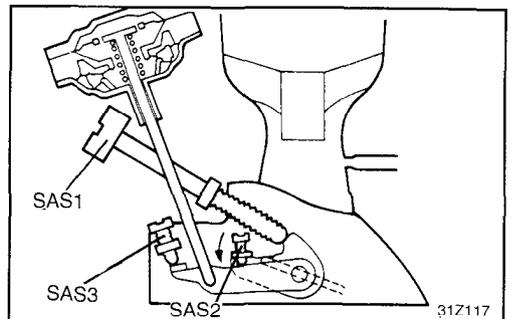
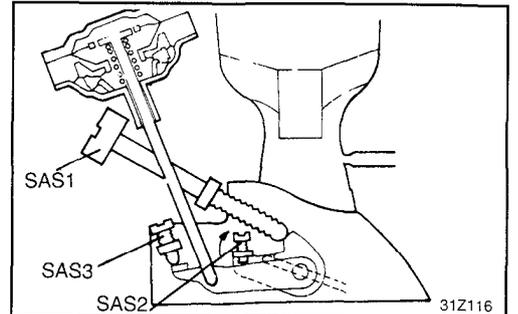
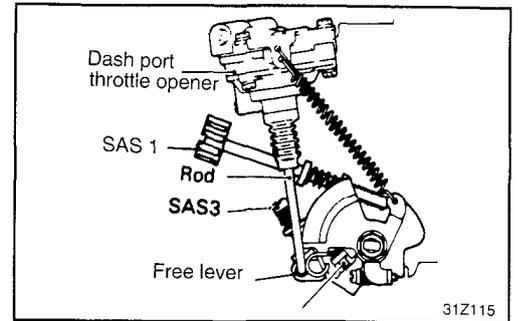


DASH POT CHECK AND ADJUSTMENT**Checking Conditions:**

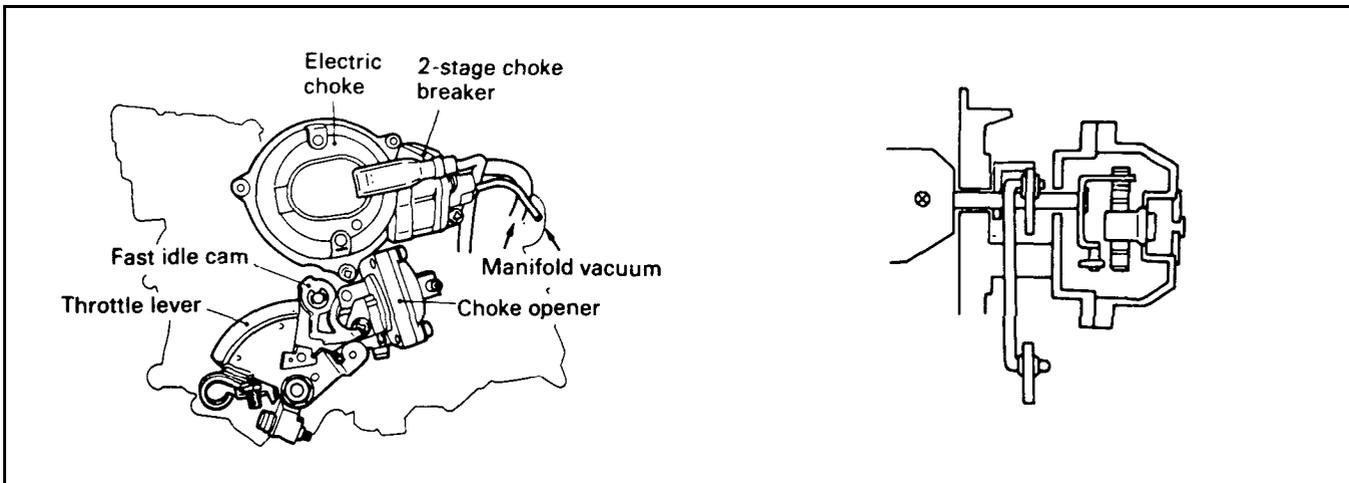
- o Engine coolant temperature : 80 to 95°C (176 to 205°F).
- o Lights, electric cooling fan and accessories : Set to OFF
- o Transaxle : Neutral.

1. Start the engine and run at idle.
2. Open the throttle valve for full stroke of the rod until the free lever contacts SAS3.

3. Close the throttle valve until SAS2 contacts the free lever and check the engine speed at that moment.
4. If engine is not as specified, adjust dash pot setting by turning SAS3.
5. Release the free lever and verify that the engine returns to idle speed slowly.



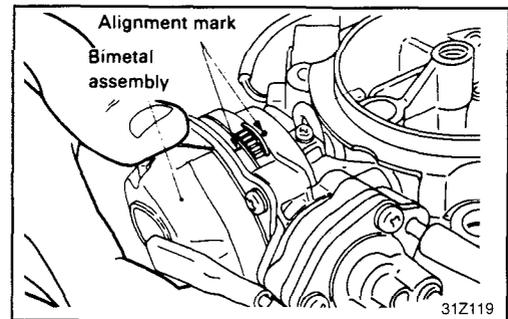
ELECTRIC CHOKE SYSTEM CHECK AND INSPECTION



CAUTION

All carburetors have a tamper-proof choke. The choke-related parts are factory adjusted. The choke adjustment is not required during service, except when major carburetor overhaul or choke calibration related parts adjustments are needed by state or local inspections.

1. Check that the alignment marks on the electric choke and bimetal assembly are lined up.
If not, align the marks,



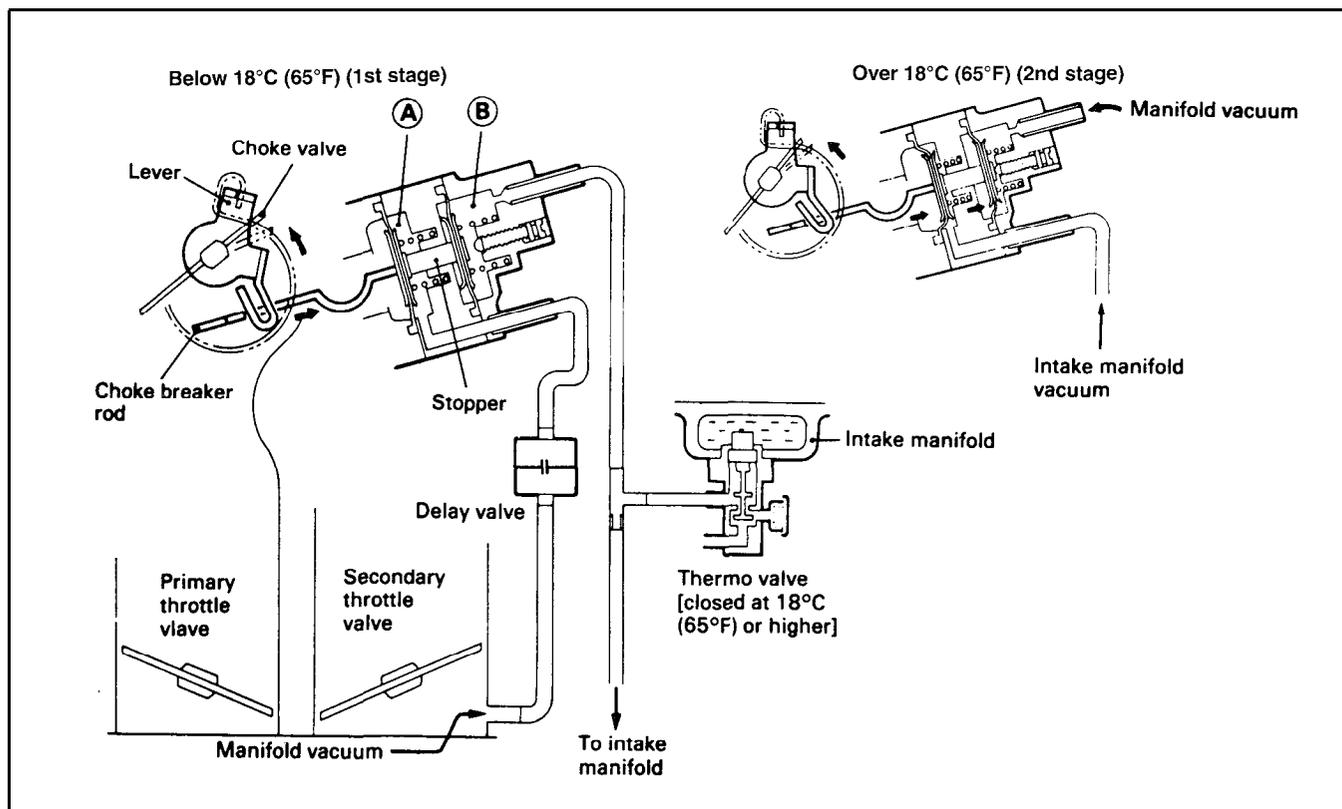
Misalignment	Symptom
Clockwise deviation	Better startability but plugs more likely to be sooty
Counterclockwise deviation	Poorer startability and more likely to stall

2. Check that the engine coolant temperature is below 10°C (50°F).
3. Start the engine and check operation of the choke valve and fast idle cam, with hand on the electric choke body.

Electric choke body	Gets gradually hotter after engine start
Choke valve	Opens as bimetal temperature rises
Fast idle cam	Fast idle control is released as engine coolant temperature rises and fast idle breaker operates

4. If the electric choke body remains cool even after the engine is started, check the electric choke.

INSPECTION OF CHOKE BREAKER SYSTEM

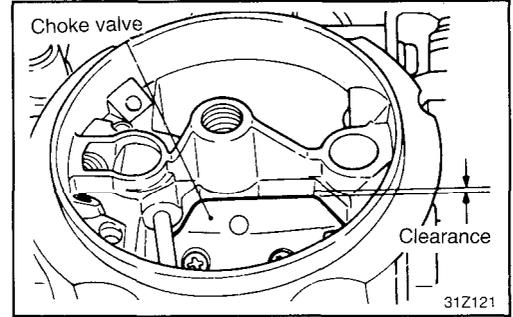


o Check conditions of the choke valve according to procedures given in the table below.

Step	Engine coolant temperature	Checking condition	Normal choke valve operation	Probable cause of trouble
1	Lower than 10°C (50°F)	Before engine start	Closes fully	Faulty bimetal assembly of linkage operation
2	Lower than 10°C (50°F)	Start engine and run idle (fully depress accelerator pedal and then start)	Opens slowly and slightly (immediately after starting) [gap approx. 1.5 mm (0.059)]	o Clogged delay valve o Broken diaphragm (chamber A)
3	Lower than 10°C (50°F)	Disconnect vacuum hose (yellow stripe) from choke breaker during idling	Stationary	o Faulty thermo valve
4	Higher than 25°C (77°F)	Connect vacuum hose (yellow stripe) and run engine idle	When closed lightly with finger, stops at larger opening than step 2 [gap approx. 3 mm (0.118 in.)]	o Faulty thermo valve o Broken diaphragm (chamber B)

1. After inspection of the choke breaker system, disconnect the vacuum hose from the choke breaker and make the following check.
2. With the engine idling, close the choke valve lightly with a finger until the choke valve stops. Then, measure the choke valve to choke bore clearance.

Standard value : 1.4-1.6 mm (0.055-0.063 in.)



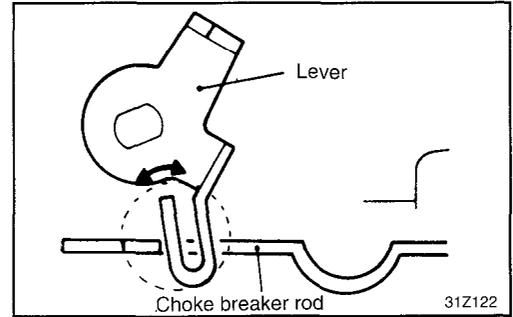
3. If the clearance is not as specified, stop the engine, remove the bimetal assembly and adjust the rod end opening for standard clearance.

NOTE

When removing the bimetal assembly, put a mark on the electric choke body.

Information

Rod end opening	Valve clearance	Expected result
Large	Large	Poorer startability and stall more likely
Small	Small	Plug likely to get sooty



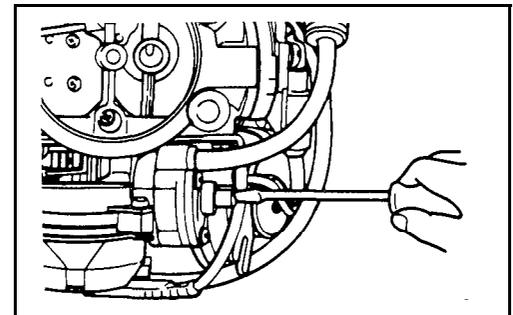
4. Reconnect the removed yellow stripe vacuum hose and measure the choke valve to choke bore clearance as in step (2).

Standard value : 2.0-3.1 mm (0.114-0.122 in.)

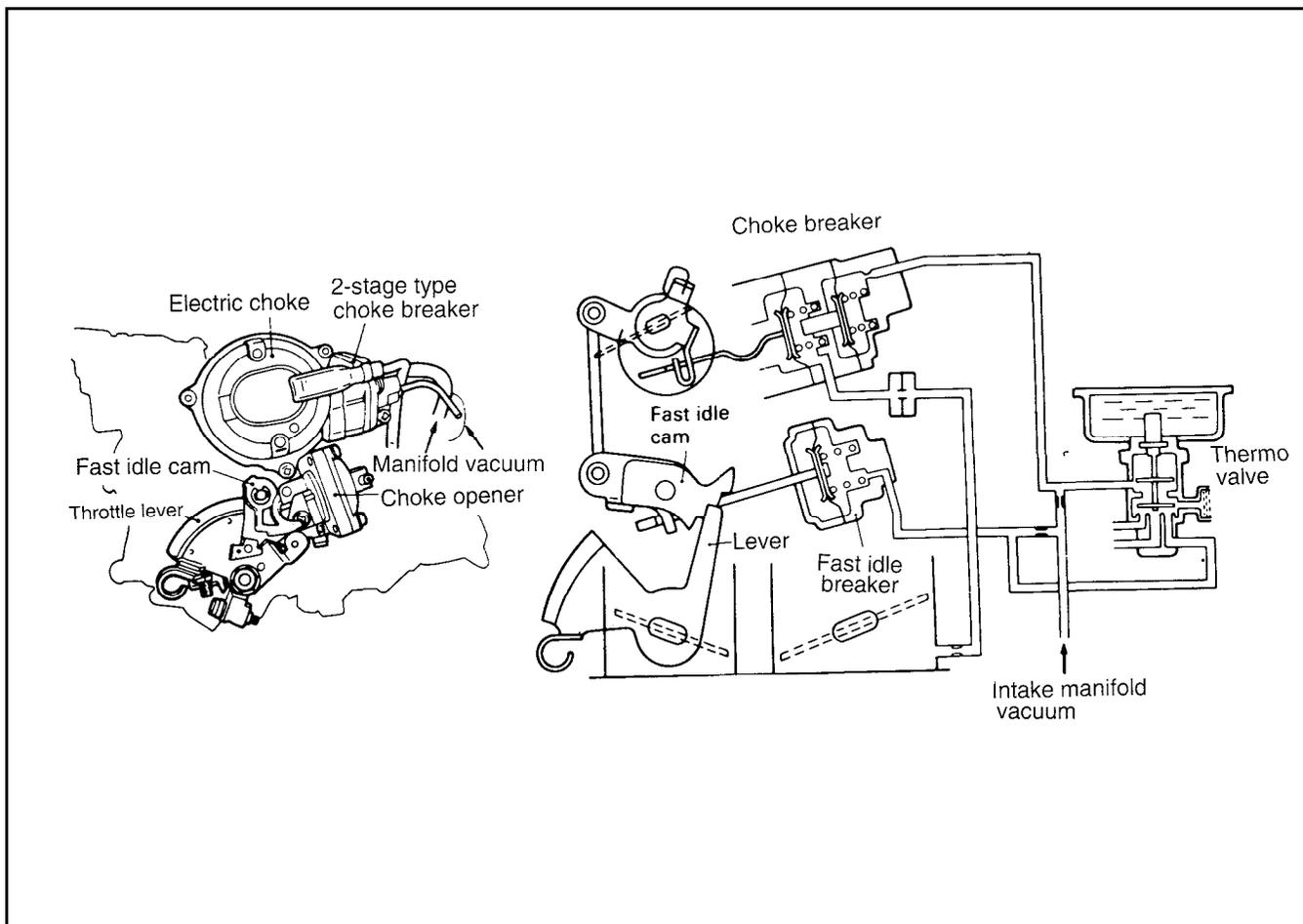
5. If the clearance is out of specification, adjust by the adjusting screw.

Information

Adjusting screw turning direction	Valve clearance	Expected result
Clockwise	Small	Better startability but plug more likely to get sooty
Counterclockwise	Large	Poor startability and stall more likely



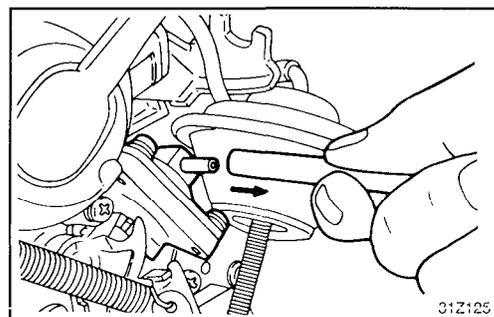
Fast Idle And Adjustment



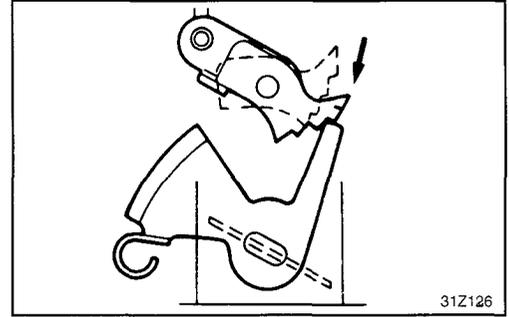
Inspection Conditions

- o Engine coolant temperature : 80 to 95°C (176 to 205°F).
- o Lights, electric cooling fan and accessories : Set to OFF.
- o Transaxle : Neutral
- o Air cleaner : Removed
- o Tachometer installed

1. Disconnect the vacuum hose (white stripe) from the choke opener.



- Set the lever on the second highest step of fast idle cam.



- Start the engine and check the fast idle speed.

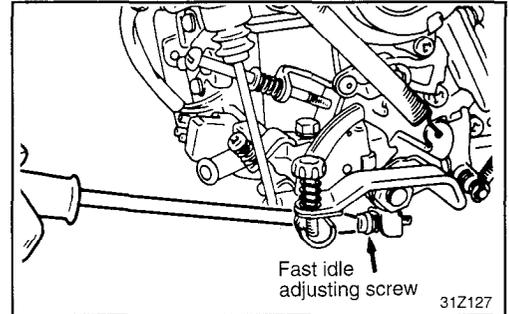
Standard value:

Vehicles with a manual transaxle 2,800 rpm
Vehicles with an automatic transaxle 2,700 rpm

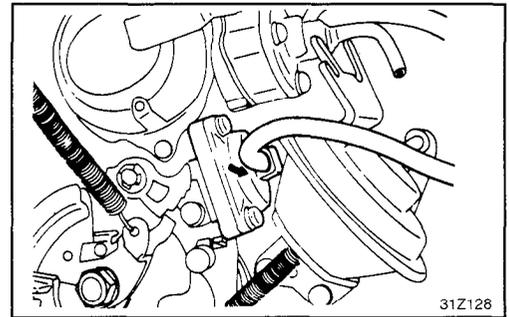
- If the fast idle speed is out of specification, adjust with the fast idle adjusting screw.

Information

Adjusting direction	Valve	Fast idle speed
Clockwise	Large	Increases
Counterclockwise	Small	Decreases



- Connect the vacuum hose removed in step 1 to the choke opener and check that the choke opener cancels fast idle.



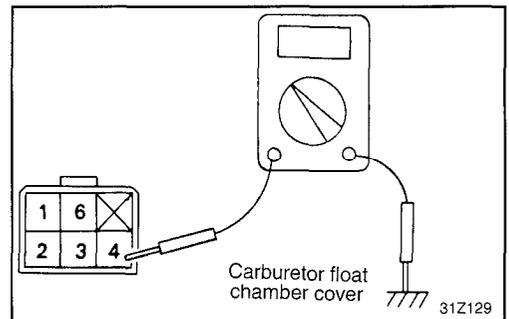
Choke Heater Inspection

- Disconnect the electric choke heater connector and check continuity of the heater.

Normal state:

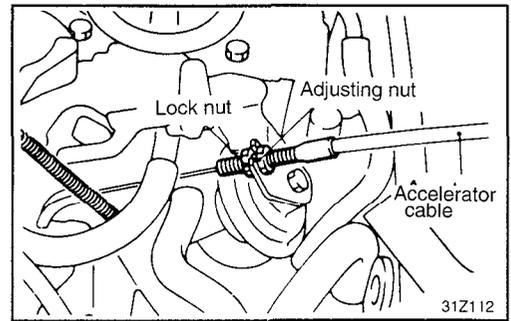
Should be conductive [approx. 6Ω resistance at 20°C 68°F]

- If the heater is not conductive, replace the electric choke body (Bimetal assembly).



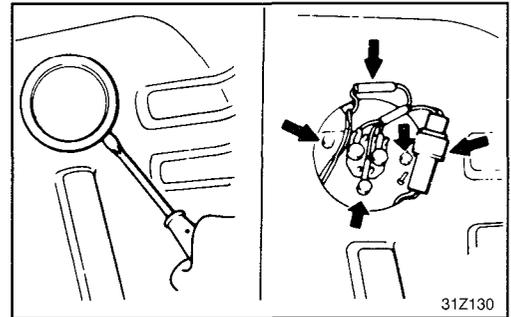
INSPECTION AND ADJUSTMENT OF ACCELERATOR CABLE FREE PLAY

1. Run the engine until it reaches the specified idle speed.
2. Confirm that the accelerator inner cable has no slack.
3. If it shows slack, adjust it as follows:
 - 1) Loosen the adjusting nut so that the throttle lever is free.
 - 2) Turn the accelerator adjusting nut to the point where the throttle lever just starts moving, then back off one turn and secure the lock nut.



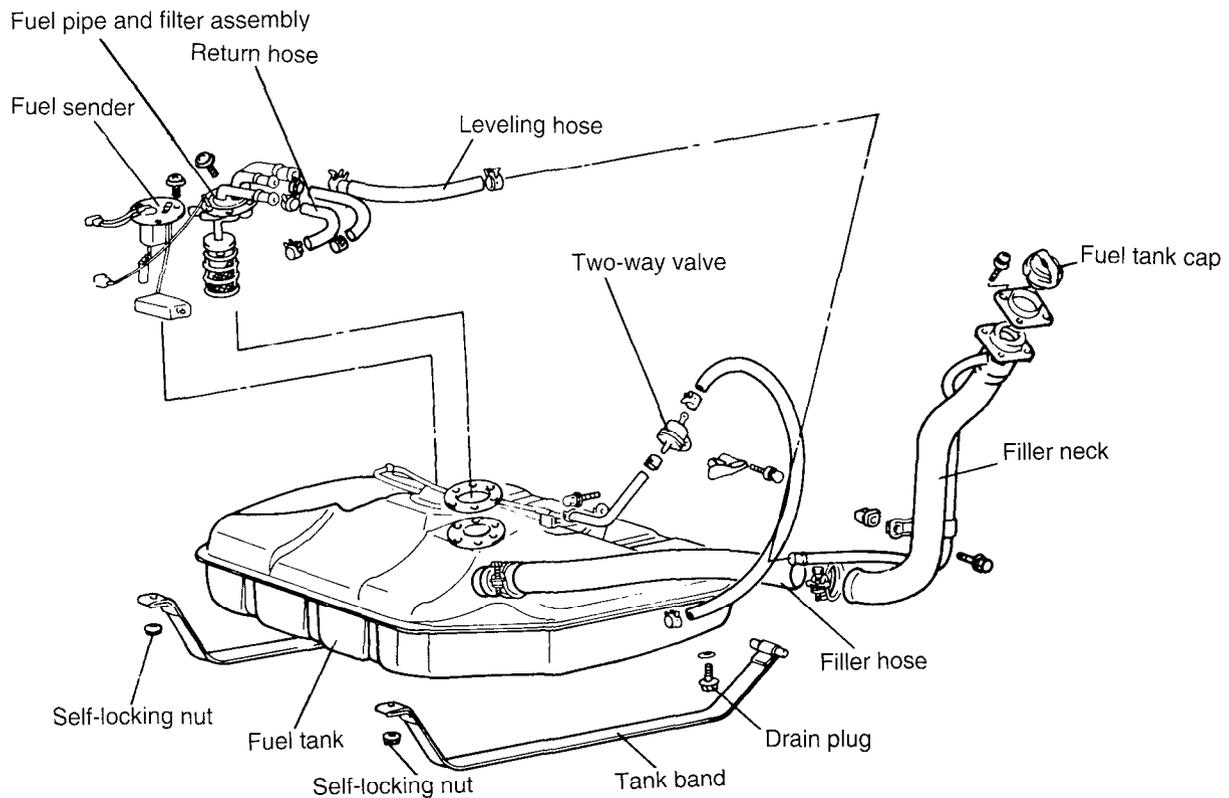
FUEL GAUGE UNIT REPLACEMENT

1. Remove the plug located on the trunk floor.
2. Disconnect the fuel gauge unit connectors.
3. Remove the fuel gauge unit.
4. After installing the fuel gauge unit, confirm that the unit is grounded.
5. When installing the plug on trunk floor, apply a specified sealant around the plug mounting surface.



FUEL TANK

COMPONENTS



REMOVAL

CAUTION

When removing parts such as a fuel tank, rear suspension, etc., use a garage jack at the front of vehicle (Refer to GENERAL GROUP), to prevent the vehicle from tilting.

When working on fuel tank, be sure the ignition is switched off. Avoid any source of heat or sparks, such as lights, smoking, etc.

Prior to working on the fuel tank or lines, remove the fuel filler cap to release any pressure in the tank.

1. Remove the drain plug to drain the fuel tank.

NOTE

Do not disconnect the in-tank filter except when the filter is replaced.

2. Loosen the fuel hose (main and return) clamps and disconnect the fuel hoses.
3. Disconnect the filler hose and breather hose from the filler neck.
4. After removing the protector (if so equipped) and fuel tank mounting band, drop the fuel tank slightly and disconnect the fuel gauge unit harness.
5. Remove the fuel tank.
6. Remove the fuel gauge unit as necessary.

INSPECTION

Check the following and replace defective parts as necessary.

1. Leaky fuel tank
If leaks are evident, clean the fuel tank interior and exterior and check for rust formation, corrosion, damage and cracks. A badly corroded or damaged fuel tank should be replaced.
2. Clogged, cracked, damaged or rusty fuel pipe.

NOTE

When cleaning the fuel tank, avoid using cleaners which may affect the terne-coated inside surface of the tank. Use trichloroethylene, neutral emulsion type cleaner, etc.

3. Peeled or damaged pad on top of tank
If the pad is to be rebonded, clean the top surface of the tank, apply adhesive to the entire pad bonding area, and bond the pad securely.
4. Test two-way valve for proper operation.
To check the two-way valve, lightly breathe into the inlet and outlet. If the air passes through after slight resistance, then the valve is good.

INSTALLATION

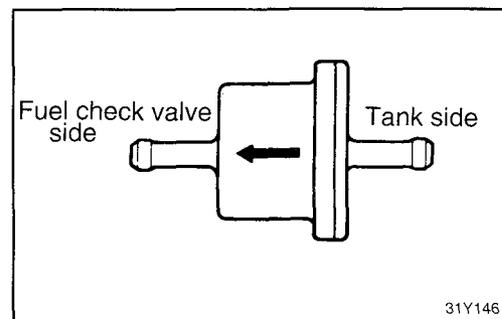
1. Confirm that the pad is fully bonded to the fuel tank, then install the fuel tank by tightening the tank band until its end touches the floor.
2. Connect all hoses and tubes correctly.

CAUTION

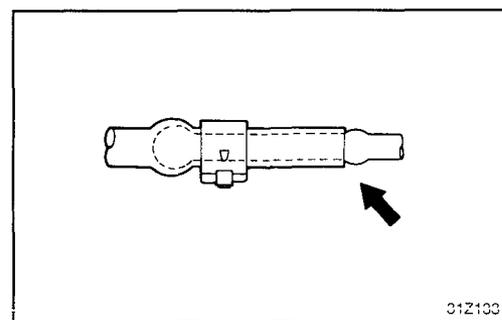
When installing the hoses. Be sure not to mix up the hoses.

Improper installation can cause fuel leakage.

3. Slowly slide the in-tank filter over the in-tank outlet pipe and tighten the drain plug to the specified torque.



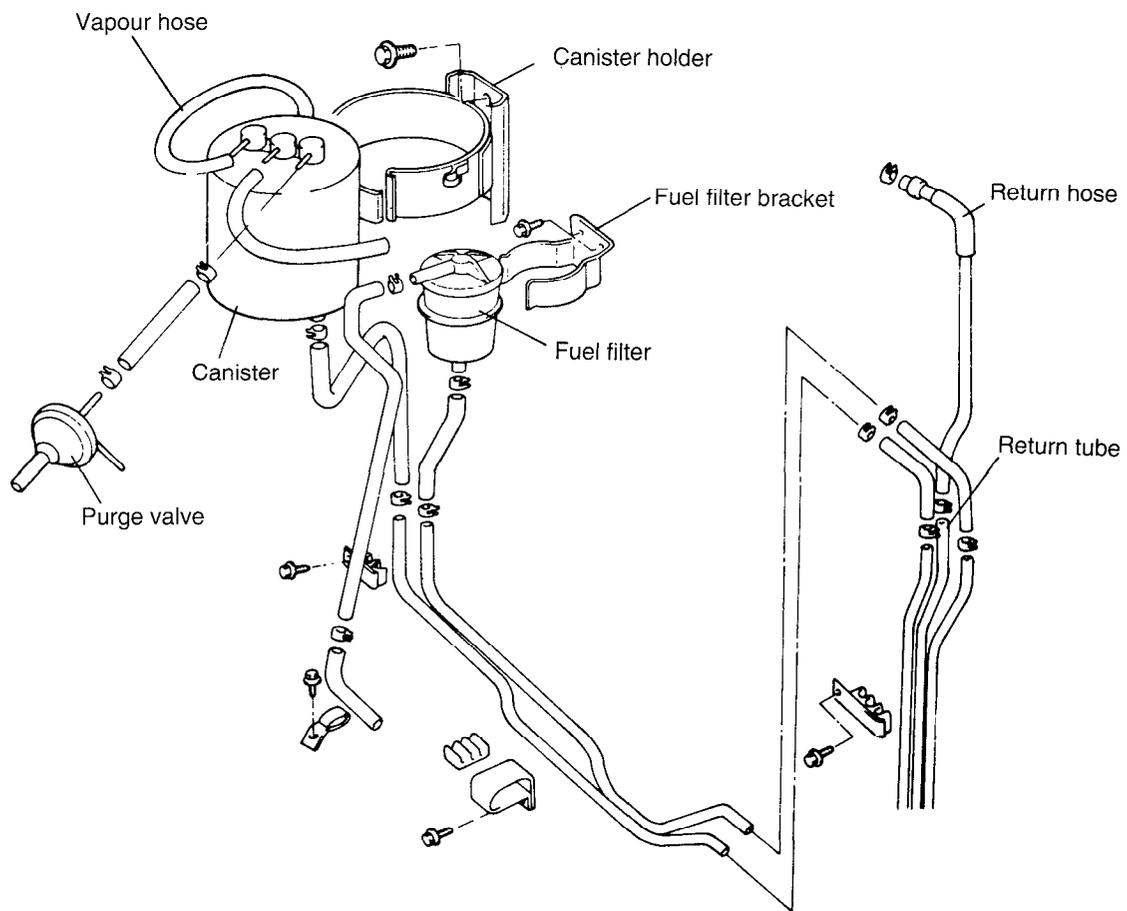
31Y146



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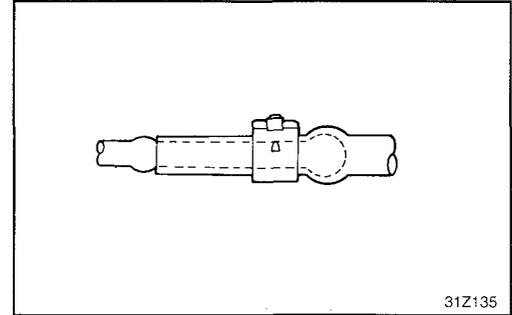
FUEL LINE

COMPONENTS



REMOVAL AND INSTALLATION

1. Pipes should be secured firmly with clips and clamps to prevent looseness.
2. With the hoses and pipes are installed, make sure that they are not distorted or loose.
3. Route the hoses and tubes correctly and fit their ends securely.
4. Install clips and clamps in correct direction to make sure that they do not interfere with neighboring objects.



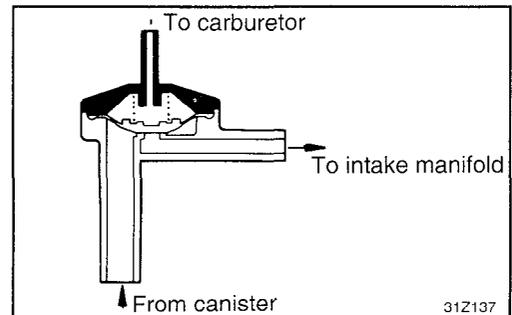
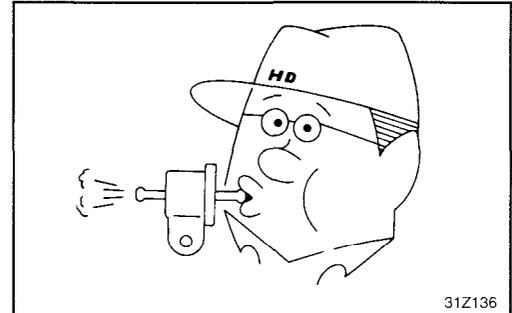
INSPECTION

1. Check the hoses and pipes for cracks, bend, deformation, deterioration or clogging.
2. Check the fuel filter for clogging or damage.
3. Check the canister for clogging.
4. Check the overfill limiter (two-way valve) and the fuel check valve for malfunction.,

Overfill Limiter Simple Test

A simple way of inspecting the overfill limiter is to remove, and then air is lightly blown into either the inlet or outlet by mouth. If the air passes after a slight resistance, overfill limiter is in good condition.

5. Check purge control valve as follows:
 - 1) Make sure that the engine coolant is between 80 and 95°C (176 and 205°F).
 - 2) Disconnect the purge control hose from the carburetor and blow into the purge hose. The valve should not allow airflow. Then start the engine and increase the engine speed to 1,500 to 2,000 rpm and blow into the purge hose. If the valve is not open, check for clogged or broken vacuum hose, or malfunctioning thermo valve.

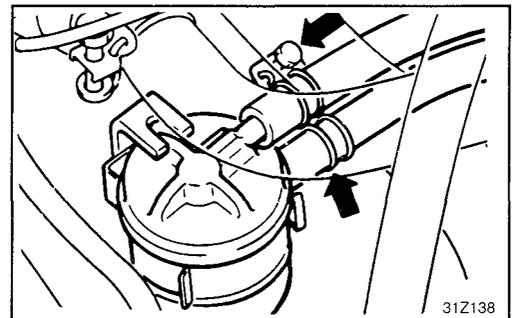


FUEL FILTER REPLACEMENT

1. Remove the fuel tank cap to release the fuel tank pressure.
2. Disconnect the fuel hoses from the fuel filter, and then remove the fuel filter.

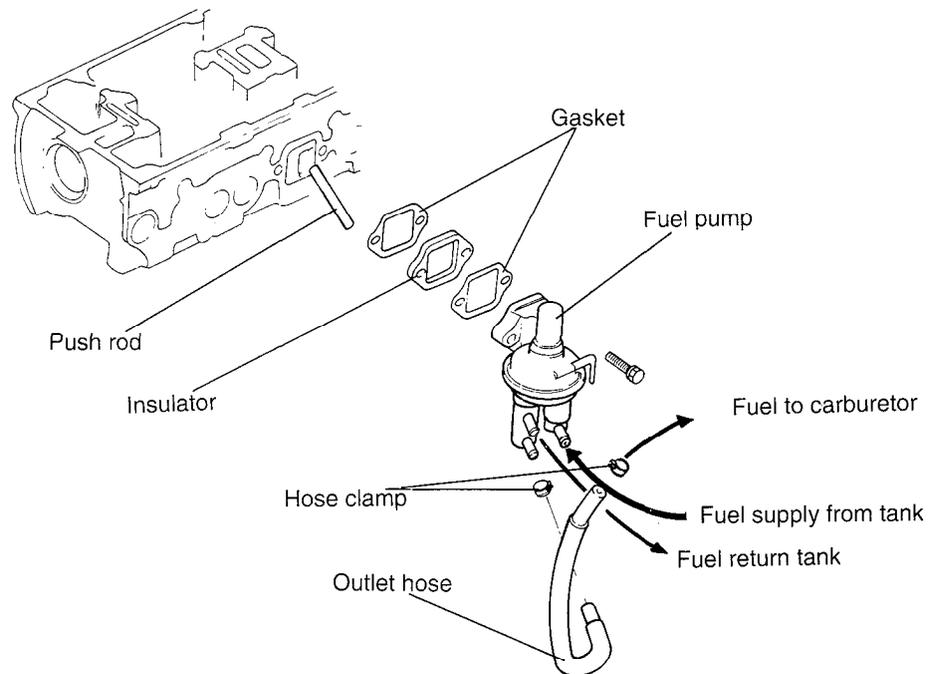
CAUTION

- 1) Whenever the fuel filter is replaced, always inspect the flex hoses for deterioration and cracking, and replace as necessary.
- 2) Ensure the installation is secure and the fuel line routing is in the original configuration.



FUEL PUMP

COMPONENTS



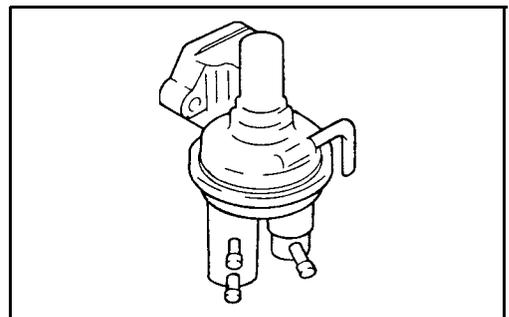
REMOVAL

1. Disconnect the battery ground cable.
2. Disconnect the fuel inlet, outlet and return hoses at fuel pump.
3. Remove the two fuel pump mounting bolts, and remove the fuel pump and push rod.
4. Remove the fuel pump gaskets and insulator.

INSPECTION

Checking Leakage

If there is oil or fuel leaks from breather hole, oil seal or diaphragm in fuel pump is defective. Replace fuel pump assembly.



Inlet Valve Test

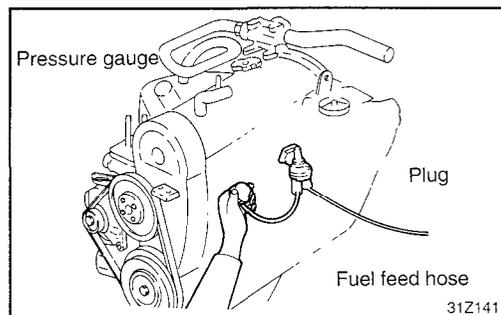
To test the inlet valve, connect a vacuum gauge on the inlet fitting while the line is disconnected.

1. Start engine or turn over with starting motor.
2. There should be a noticeable vacuum present.
3. If blow-back is present, inlet valve is not seating properly and a new pump should be installed.
4. If fuel pump does not perform to above test requirements, a new fuel pump should be installed.

Pressure Test

1. Disconnect the hose at the carburetor and connect a fuel pressure gauge.
2. Disconnect the fuel return hose from the pump and plug the fuel pump return pipe as shown in illustration.
3. Check pressure while the engine is idling. Replace the pump, if required.

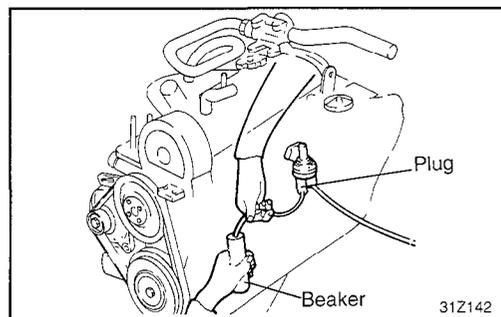
Standard pressure (at camshaft rpm 2,500)
 19-25 kPa (0.19-0.26 kg/cm², 2.76-3.63 psi)



Fuel Flow Rate Test (Volume)

1. Disconnect the carburetor fuel hose and insert the end into a beaker.
2. Disconnect the fuel return hose from the fuel pump and plug the fuel pump return pipe.
3. Start the engine and measure the amount of fuel pumped within one minute.

Volume (at camshaft rpm 2,500)
 0.6 lit/min. (0.85 U.S.qt, 0.72 Imp.qt.)



INSTALLATION

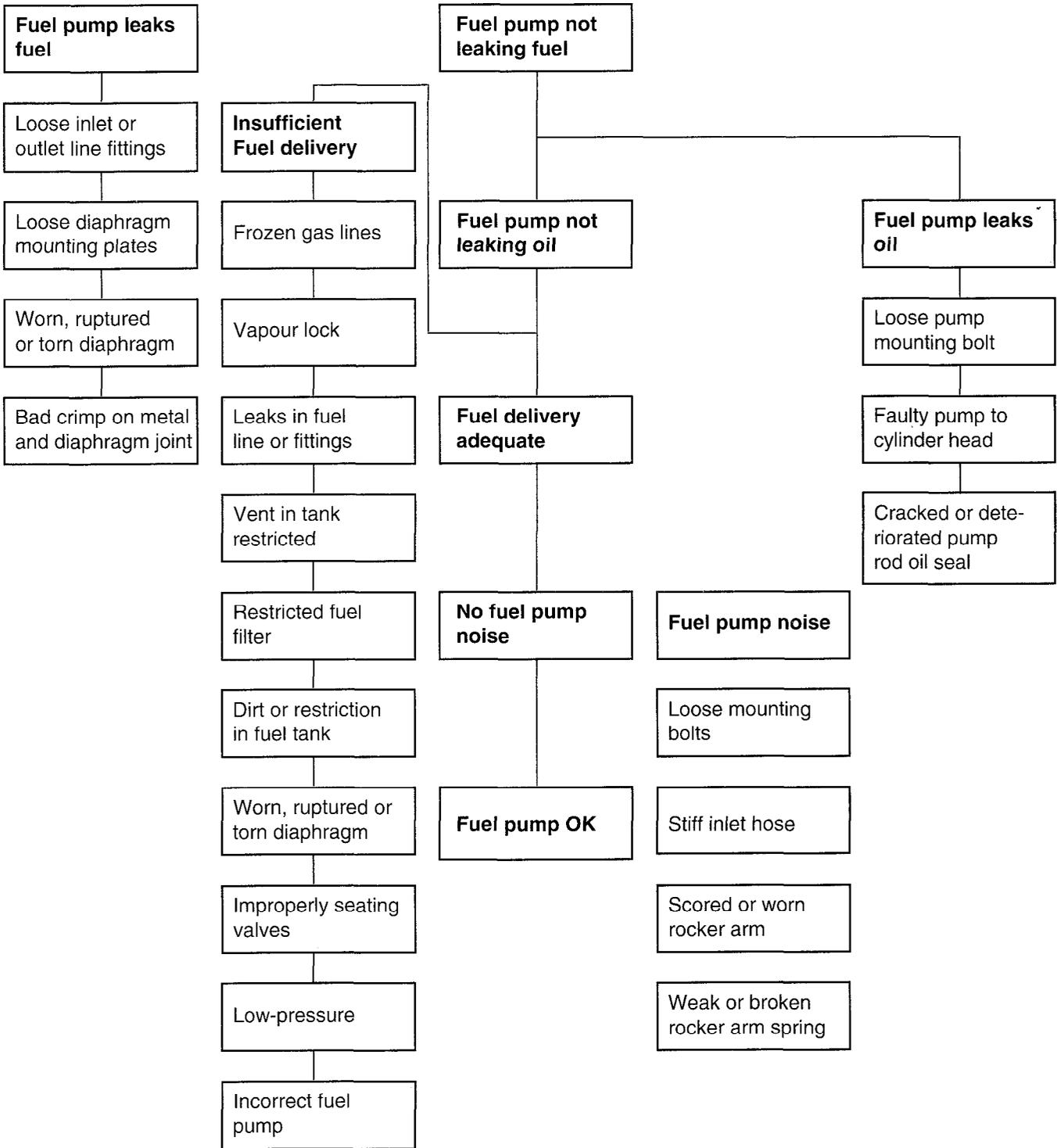
1. Turn crankshaft to place piston in No. 1 cylinder at top dead center on compression stroke.

NOTE

This is to minimize cam lift for ease of installation.

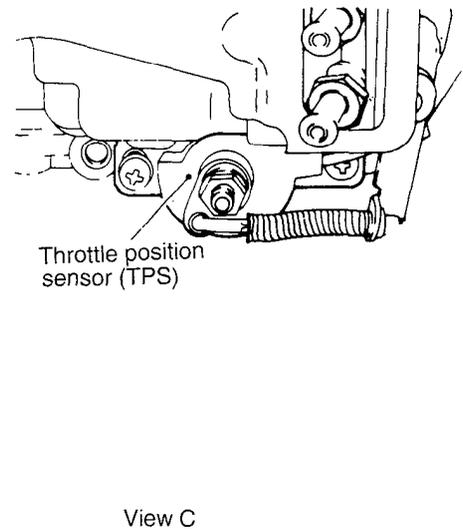
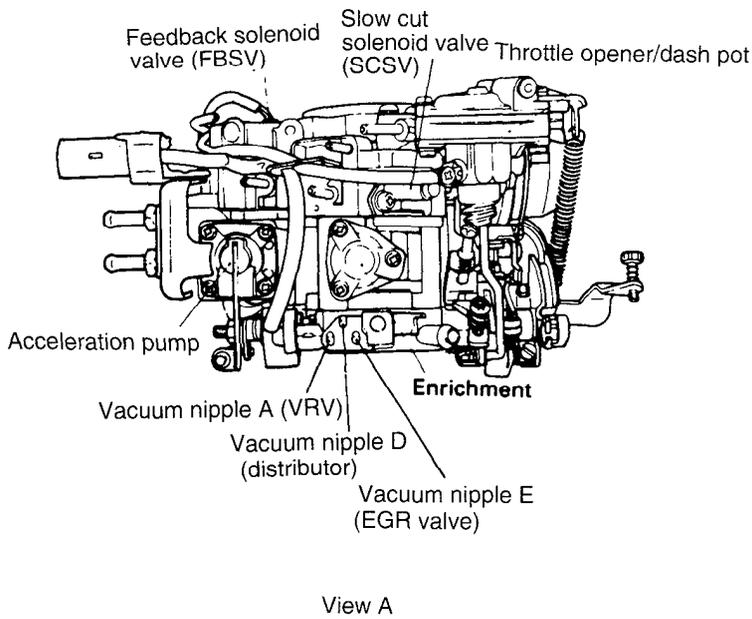
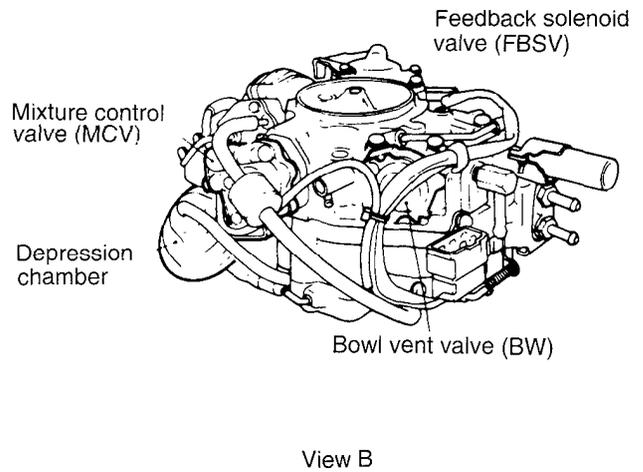
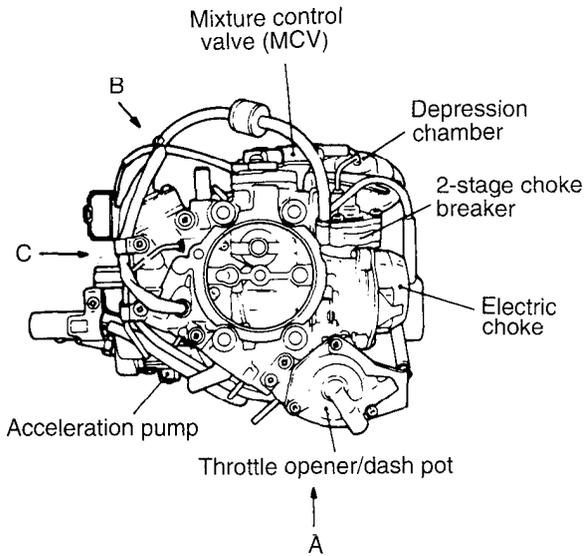
2. Insert the push rod into the cylinder head.
3. Install the new gasket and insulator, and then install the fuel pump. Tighten the bolts firmly.
4. Reconnect the fuel hoses to the fuel pump nipples and install the hose clamps.
5. Start and run the engine. Check for fuel or oil leak.

FUEL PUMP TROUBLESHOOTING

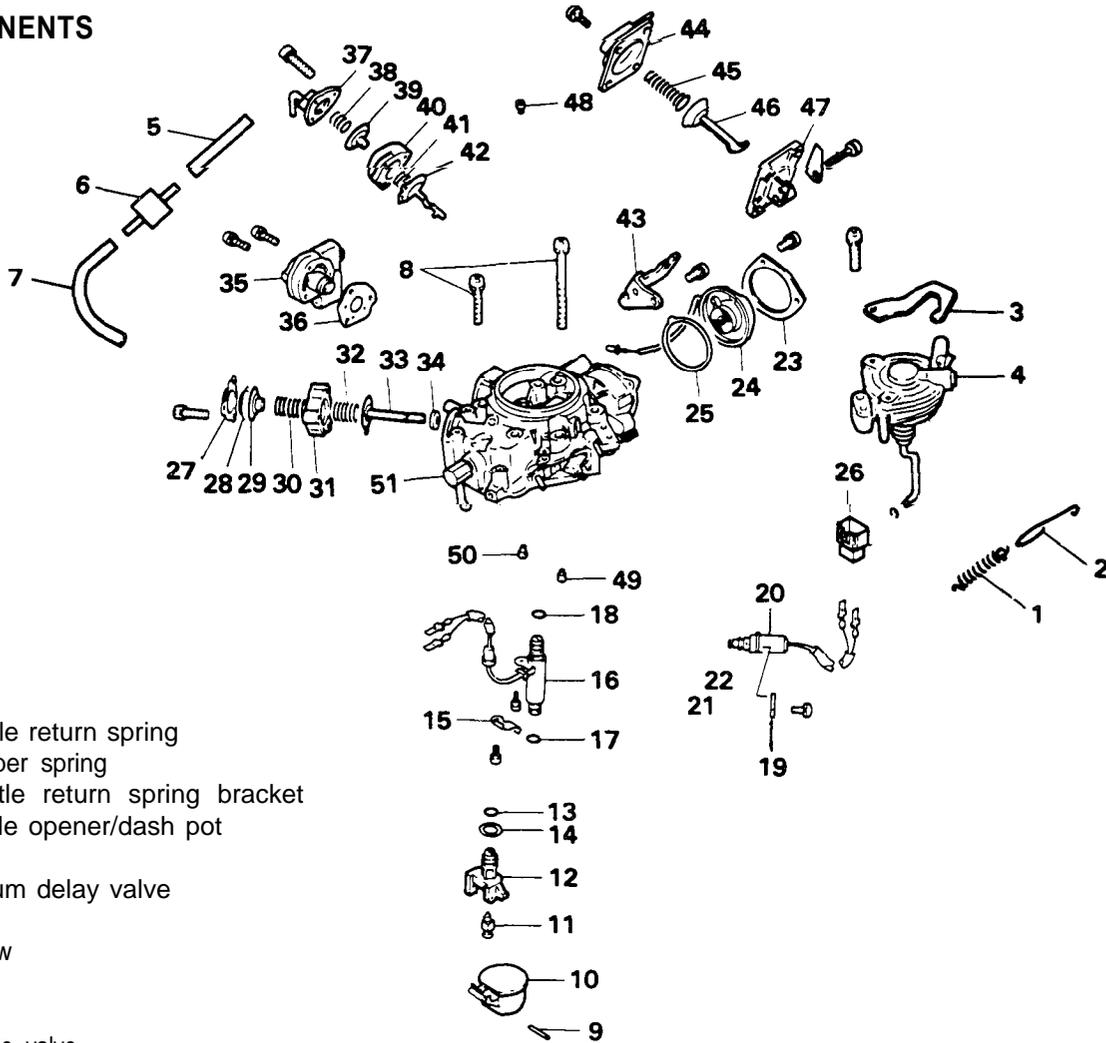


CARBURETOR

CONSTRUCTION



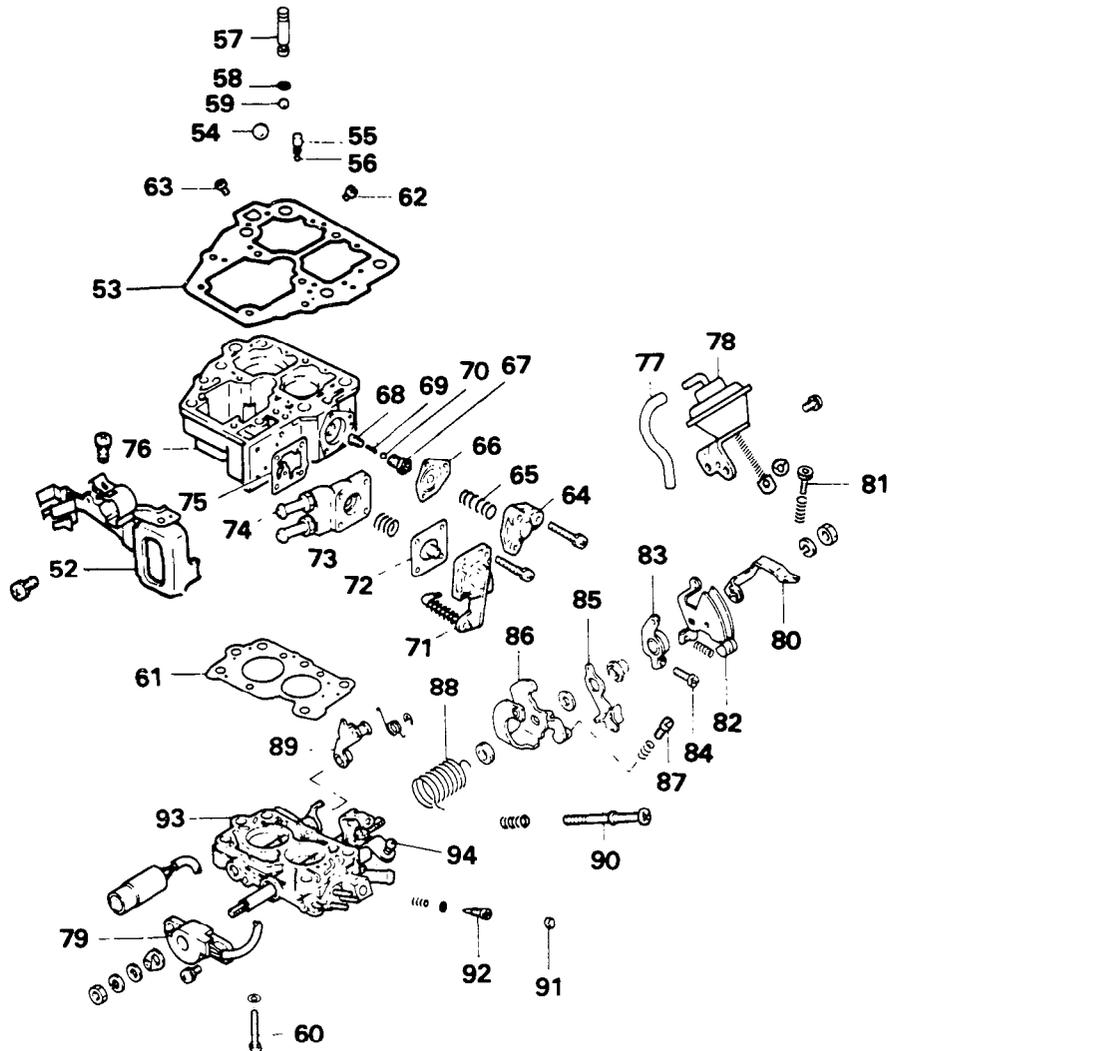
COMPONENTS



- 1. Throttle return spring
- 2. Damper spring
- 3. Throttle return spring bracket
- 4. Throttle opener/dash pot
- 5. Hose
- 6. Vacuum delay valve
- 7. Hose
- 8. Screw
- 9. Pin
- 10. Float
- 11. Needle valve
- 12. Needle valve seat
- 13. O-ring
- 14. Packing
- 15. Retainer
- 16. Feedback solenoid valve (FBSV)
- 17. O-ring
- 18. O-ring
- 19. Retainer
- 20. Slow cut solenoid valve (SCSV)
- 21. O-ring
- 22. O-ring
- 23. Plate
- 24. Bimetal assembly
- 25. Packing
- 26. Connector
- 27. Cover
- 28. Diaphragm
- 29. Spring seat
- 30. Spring
- 31. Housing

- 32. Spring
- 33. Diaphragm
- 34. Valve
- 35. Mixture control valve (MCV) assembly
- 36. Gasket
- 37. Cover
- 38. Spring
- 39. Diaphragm
- 40. Body
- 41. Spring
- 42. Diaphragm
- 43. Bracket
- 44. Cover
- 45. Spring
- 46. Diaphragm
- 47. Body
- 48. Main air jet (primary)
- 49. Pilot jet (primary)
- 50. Pilot jet (secondary)
- 51. Float chamber cover

COMPONENTS



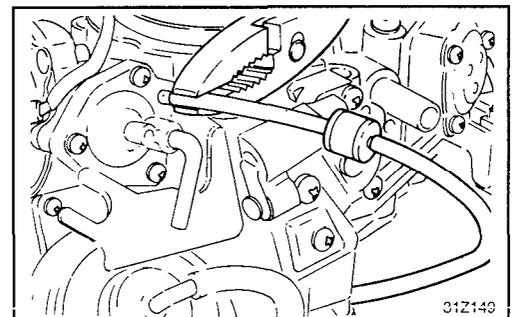
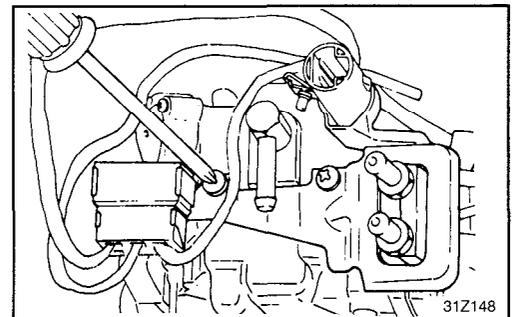
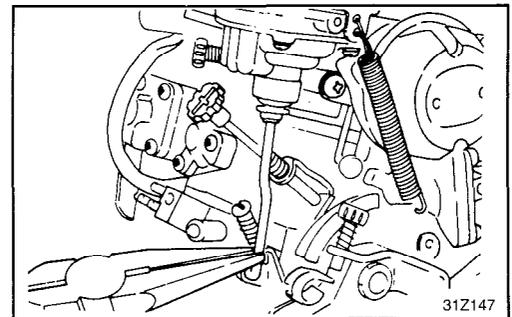
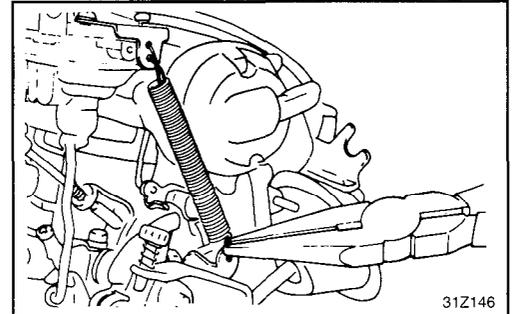
- | | | |
|--------------------------------|------------------------------------|--|
| 52. Bracket | 67. Enrichment jet valve | 82. Throttle lever |
| 53. Float chamber cover gasket | 68. Enrichment jet | 83. Cam follower |
| 54. Steel ball | 69. Spring | 84. Fast idle adjusting screw |
| 55. Weight | 70. Ball | 85. Free lever |
| 56. Ball | 71. Pump cover assembly | 86. Abutment plate |
| 57. Plug | 72. Diaphragm | 87. Idle speed adjusting screw (SAS-2) |
| 58. O-ring | 73. Spring | 88. Spring |
| 59. Ball | 74. Pump body | 89. Secondary lever |
| 60. Screw | 75. Gasket | 90. Idle speed adjusting screw (SAS-1) |
| 61. Gasket | 76. Mixing body | 91. Plug |
| 62. Main jet (primary) | 77. Vacuum hose | 92. Mixture adjusting screw (MAS) |
| 63. Main jet (secondary) | 78. Depression chamber | 93. Throttle body |
| 64. Cover | 79. Throttle position sensor (TPS) | 94. Idle speed adjusting screw (SAS-3) |
| 65. Spring | 80. Lever | |
| 66. Diaphragm | 81. Adjusting screw | |

REMOVAL

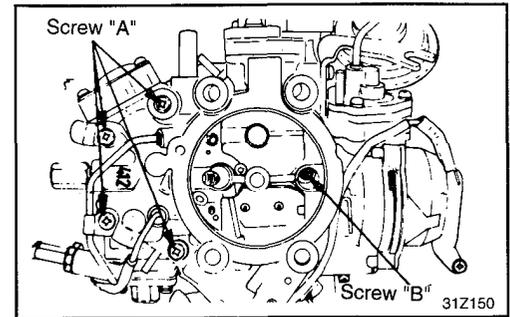
1. Disconnect battery ground cable.
2. Remove air cleaner.
3. Disconnect the throttle cable from carburetor.
4. Disconnect the vacuum hoses from carburetor.
5. Disconnect connectors for solenoid valves and TPS.
6. Place a container under fuel fittings of carburetor to catch any fuel that may be trapped in fuel line and disconnect the fuel hoses from the carburetor inlet nipples.
7. Remove carburetor mounting bolts and carefully remove the carburetor from engine. Hold carburetor level to avoid spilling fuel from fuel bowl.

DISASSEMBLY

1. Remove the throttle return spring from the throttle lever and throttle return spring bracket unscrewing two screws.
2. Remove the dash pot rod from the free lever.
3. Unscrewing two screws, remove the bracket with two connectors and off the connectors.
4. Pull the hose with delay valve off the nipple of choke breaker.



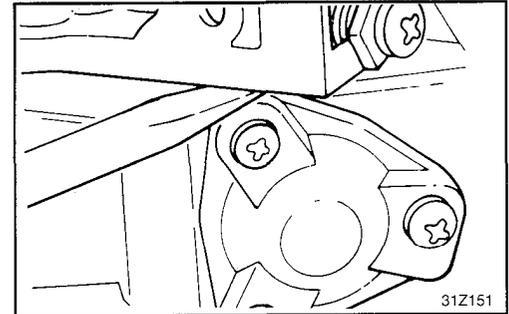
5. Remove the float chamber cover screws "B" to remove the throttle body.
6. Remove the screws "A" to remove the float chamber cover from main body.



7. To remove the float chamber cover assembly, insert a screw driver blade between the enrichment cover and the float chamber cover as illustrated and lightly pry and lift up slowly.

CAUTION

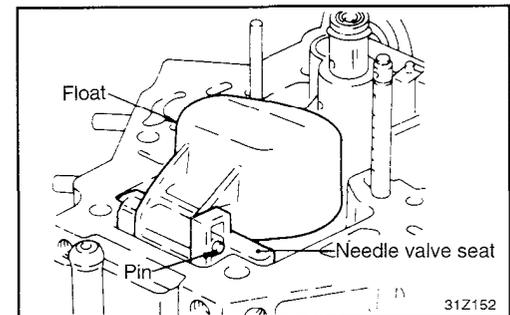
Do not apply excessive force.



8. Remove the pin and then remove the float and needle valve.

CAUTION

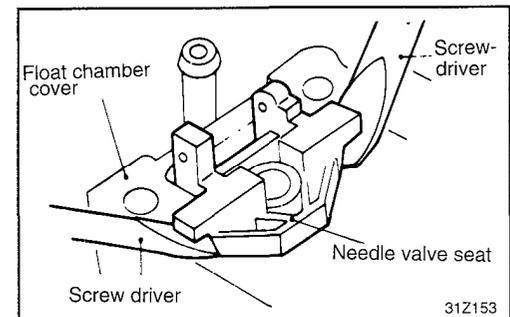
- 1) Do not let the float drop or supply collapsing load.
- 2) Use care not to damage the end of the needle valve.



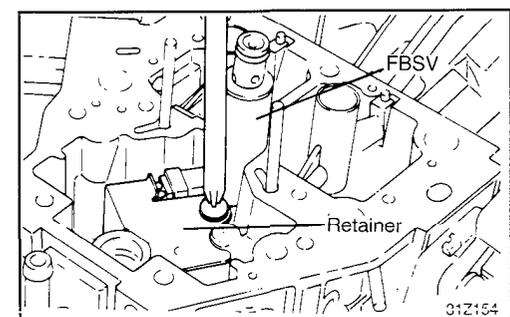
9. Using flat blade screwdrivers, pry up the needle valve seat at both edges to remove.

CAUTION

Use care not to damage the float chamber cover when pushing up the needle valve seat.



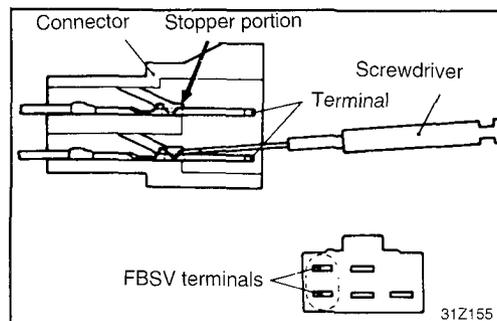
10. Remove the retainer of the feedback solenoid valve (FBSV).



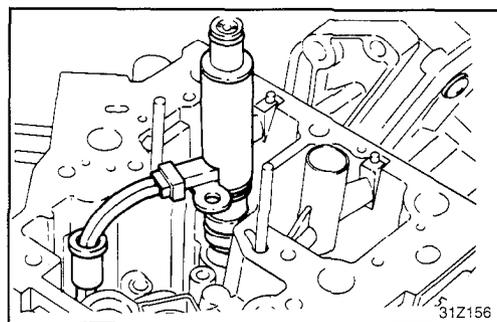
- Using a screwdriver or other tool with a thin flat end, push the stopper portion and remove the two terminals from behind the connector.

NOTE

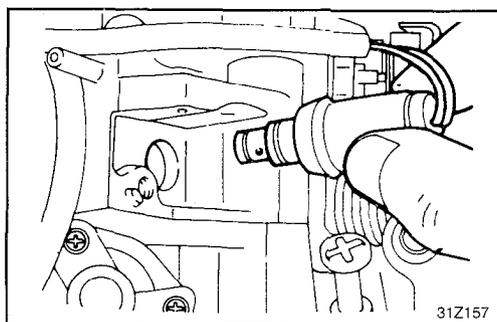
Unless the terminals are removed from the connector, the feedback solenoid valve cannot be removed from the float chamber cover.



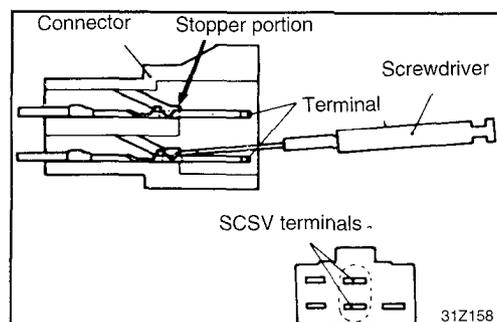
- Pull out the FBSV from the float chamber cover



- Remove the retainer and pull out the slow cut solenoid valve

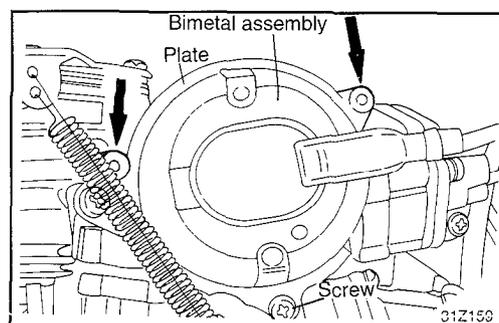


- Using a screwdriver or other tool with a thin flat end, push the stopper section and remove the two terminals from behind the connector.

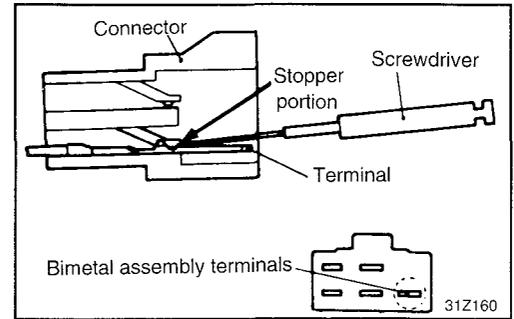


- To remove the bimetal assembly, grind away the head of the two rivets of the bimetal assembly using a hand grinder or other tool and remove the screw.

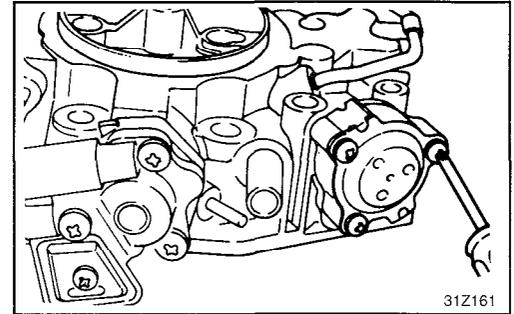
- Remove the plate and the bimetal assembly.



17. Using a screwdriver or other tool with a thin flat end, push the stopper section and remove the terminal from behind the connector.



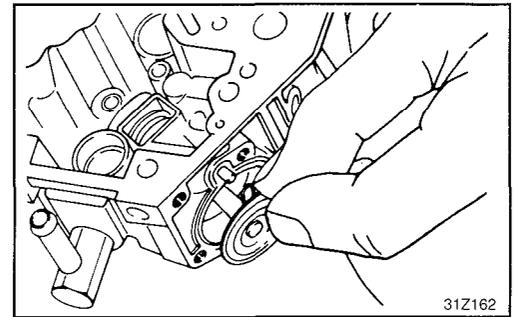
18. Remove the three screws attaching the Bowl Vent Valve (BVV) cover to the float chamber.
19. Remove the plastic vent hosing, housing cover and the two springs.



20. Remove the bowl vent valve diaphragm shaft.

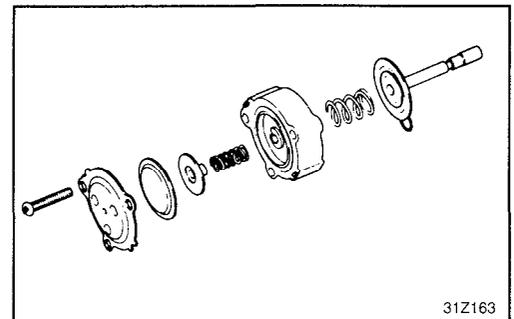
CAUTION

Carefully pull the diaphragm out of the float chamber cover so that rubber vent seal slides off the diaphragm shaft.

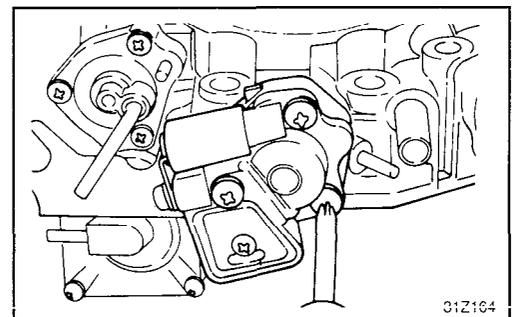


NOTE

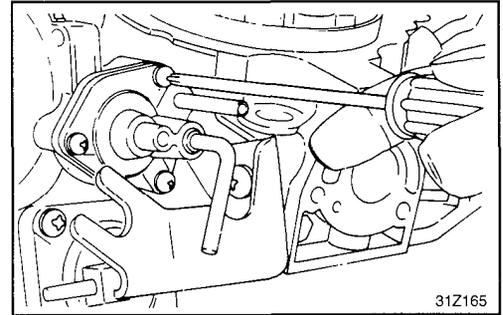
Be careful not to misplace the two small springs positioned on either side of the plastic vent housing.



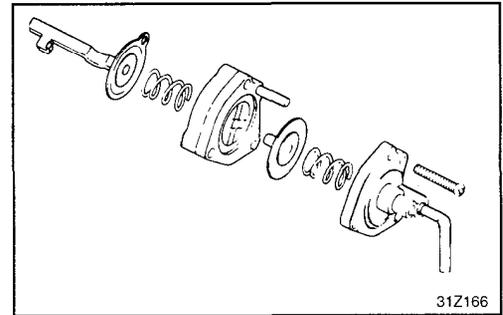
21. Unscrewing the three screws attaching the Mixture Control Valve (MCV) assembly, remove the MCV assembly.



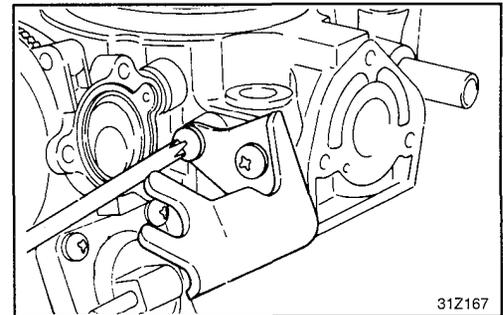
22. Remove the three screws attaching the choke vacuum breaker cover, then remove the choke break cover, springs, diaphragm and linkage assembly.



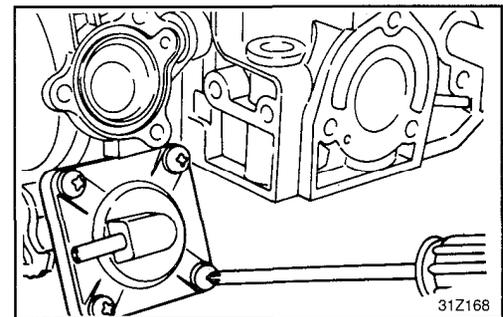
NOTE
Of the two diaphragm springs, the outer one is longer.



23. Remove the choke bracket.

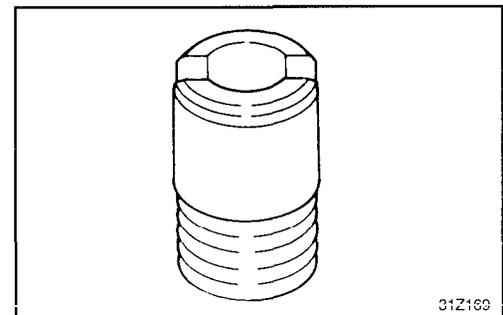


24. Unscrewing the four screws, remove the choke opener.



25. Remove the pilot jets and main air jet.

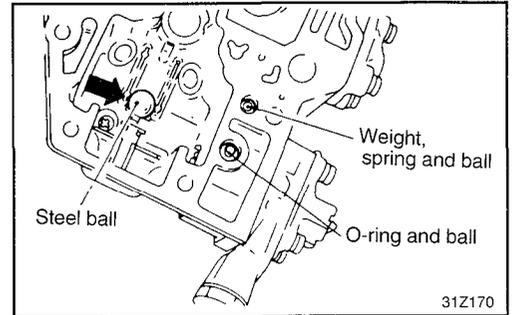
NOTE
When removing the jets, use a screwdriver that is an exact fit for their slot and work carefully to prevent damage.



26. Carefully lift and swing up the roll-over device weight from the bottom of the float chamber, then use a magnet to remove the roll-over steel ball.

NOTE

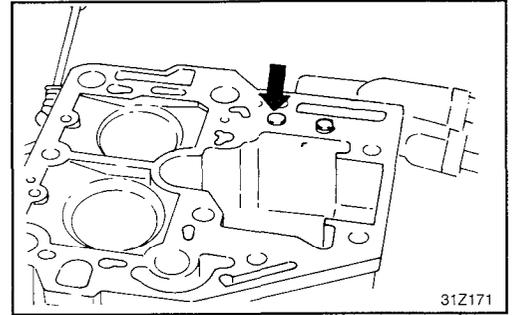
Remove the float chamber gasket and pour the remaining fuel contained in the float chamber into a container.



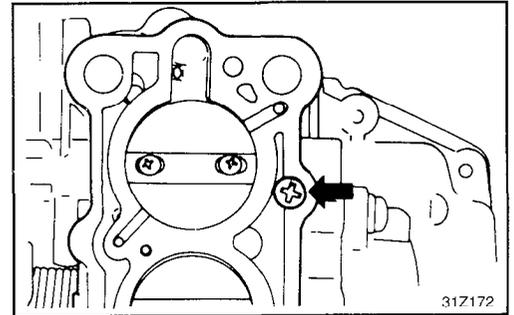
27. Remove the accelerator pump outlet check ball and weight.

NOTE

Invert the chamber to remove the accelerator pump outlet check ball and weight located at the gasket surface.



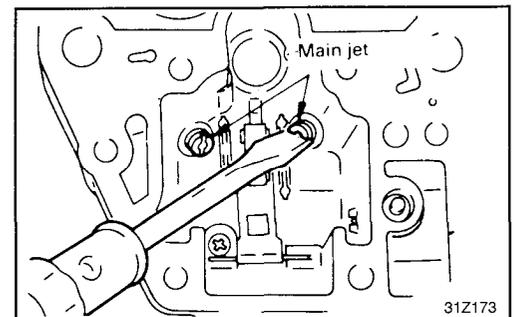
28. Separate the float chamber from the throttle body.



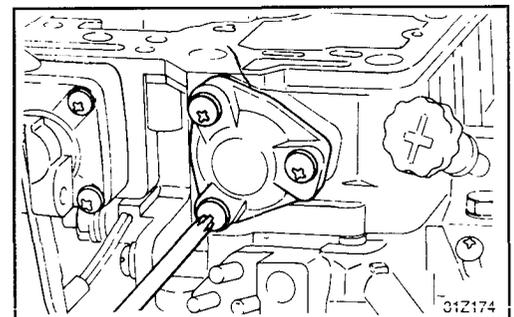
29. Remove the main jets.

NOTE

When removing the main jets, use a screwdriver that is an exact fit and work carefully to prevent damage.



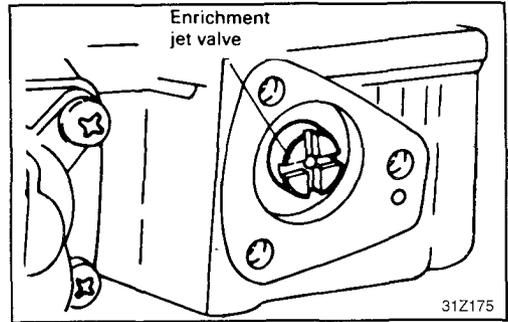
30. Remove the three screws attaching the enrichment valve cover to the enrichment housing on the float chamber.
 31. Remove the cover, spring and diaphragm.
 32. Unscrew the enrichment valve from the housing.



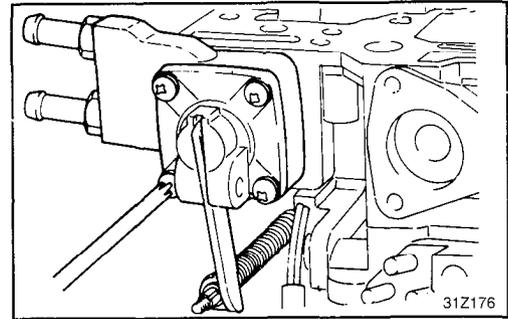
33. Using a screwdriver, loosen the enrichment jet and take out the spring and ball from the enrichment jet valve.

CAUTION

The valve has many small parts. Do not lose them.

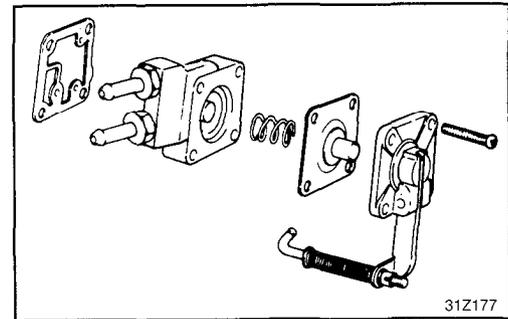


34. Remove the four screws (thread sealant supplied) attaching the accelerator pump cover to the float chamber.
35. Remove the accelerator pump cover, diaphragm, spring, pump body and gaskets.

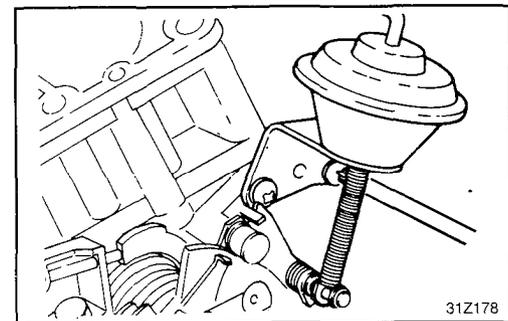


NOTE

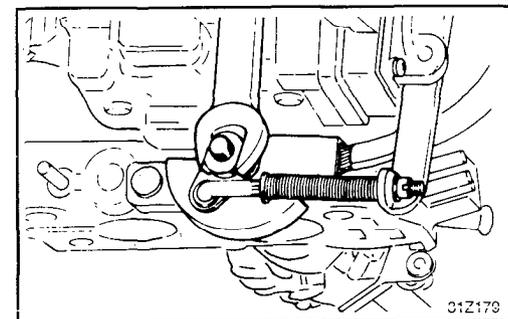
When reinstalling, apply thread sealant to the screws and be sure the pump body, gasket and cover are properly positioned.



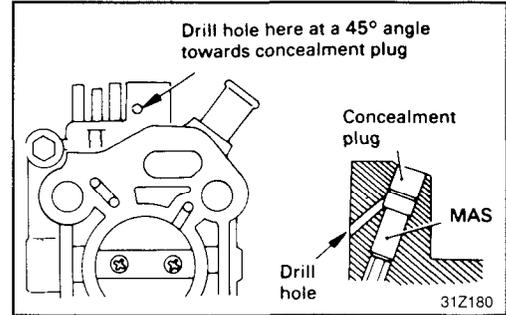
36. Remove the E-clip and outside washer on the secondary throttle shaft and slide the diaphragm spring link off the throttle shaft.
37. Remove the two screws attaching the diaphragm bracket to throttle body and remove the secondary throttle diaphragm.



38. Using a 10 mm wrench, remove the nut attaching the accelerator pump lever to the throttle shaft. With the impact driver, remove two screws attaching the throttle position sensor to the throttle body.
39. Remove the E-clip holding the throttle position sensor onto the throttle shaft.



40. For removal of plug, clamp carburetor in a vice and drill a 2mm (5/64 in.) pilot hole in the casting surrounding the idle mixture adjusting screw (MAS) then redrill the hole to 3mm (1/8 in.)
41. Insert a blunt punch into the hole and drive out plug.



REASSEMBLY

Perform reassembly in reverse of disassembly procedure, paying special attention to the following items:

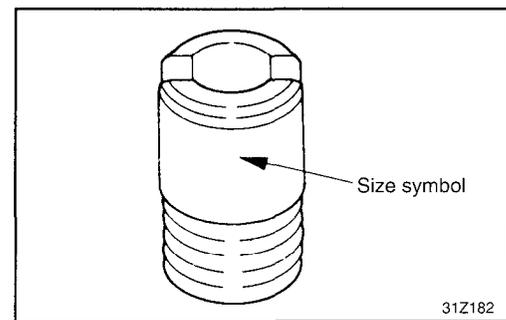
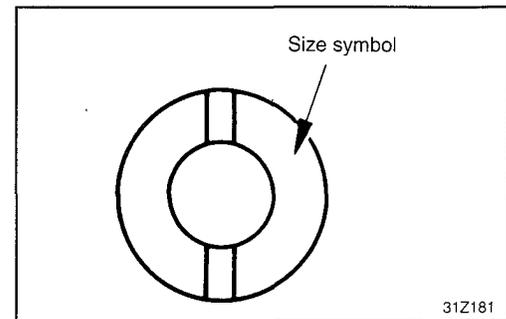
1. Clean all parts before assembly.
2. Check to be sure that no clogging is in the air passages and fuel passages.
3. Check for smooth operation of throttle and choke linkage. If the operation is not smooth, clean them up. Then may be replaced at this time to ensure proper carburetor performance.
4. When replacing a main or a pilot jet, the old jet and the new jet must be of the same size, because the jet is selected after exact flow measurement by factory.
5. Do not reuse the O-rings and gasket. Replace them with new ones at every reassembly.

Service Point of Reassembly

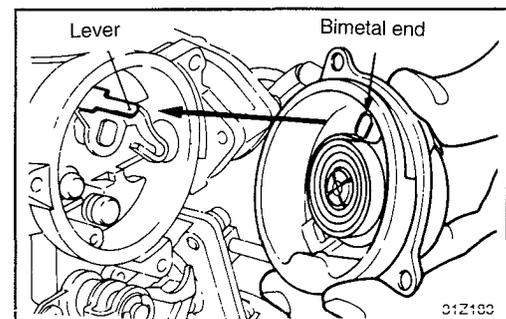
1. Make sure that correct jets are installed at correct positions. Note the size symbol stamped on each jet for identification.

Identification mark

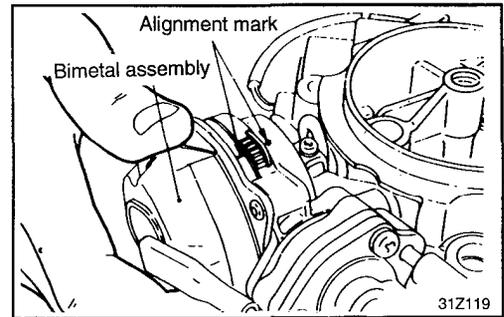
Main jet	
Primary	# 83.8
Secondary	# 145
Pilot jet	
Primary	# 46.3
Secondary	# 70



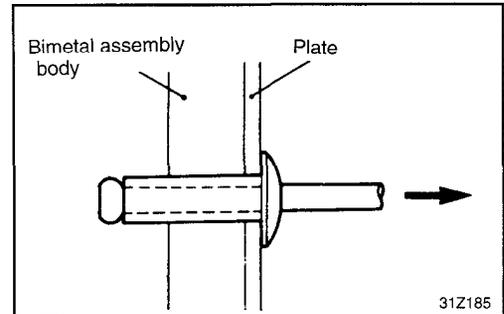
2. Bimetal assembly
 - 1) Fit the bimetal end over the choke valve lever.



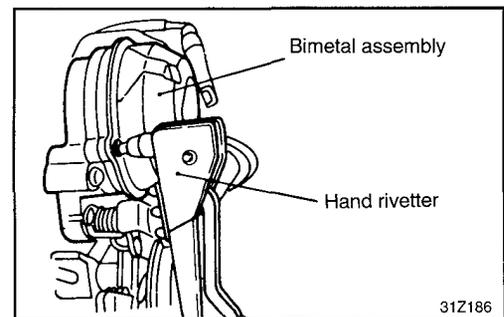
- 2) Install the plate and temporarily tighten the screw.
- 3) Align the mating marks.



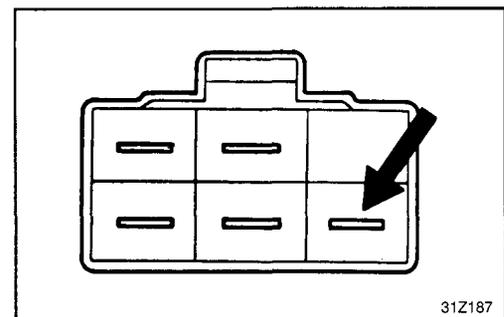
- 4) Set the rivet as illustrated.



- 5) While keeping the mating marks aligned, install the bimetal assembly with a hand riveter or similar tool.
- 6) Tighten the screw.



- 7) Install terminal to the connector at correct position.



INSPECTION

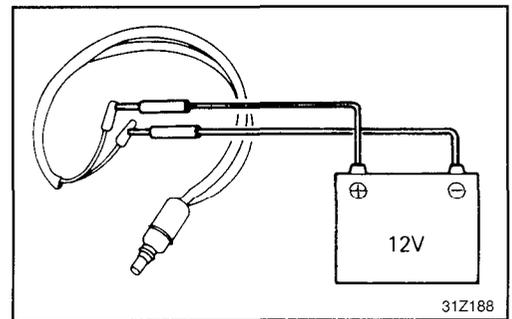
General Description

Check the following and repair or replace parts if necessary.

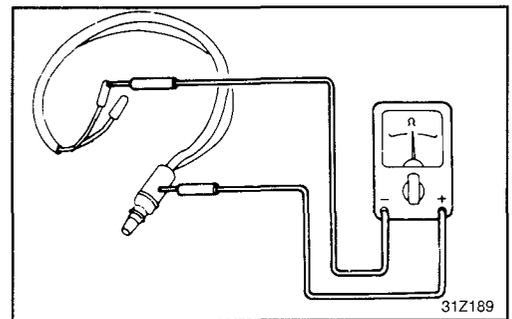
1. Check the fuel paths (jets) and air paths (jets or orifices) for clogging. If clogged, wash thoroughly with cleaning solvent or detergent and blow by compressed air. Do not use metal wire or other metal pieces.
2. Check the diaphragms for damage and cracks.
3. Check that the needle valve operates lightly. If the valve is hard to slide or is binding, repair or replace. If there is overflow, poor valve to seat contact is suspected. Check thoroughly.
4. Check the fuel inlet filter (located above the needle valve) for clogging and damage.
5. Check the float operation. Check the float and lever for deformation and damage and replace if necessary.
6. Check operation of the throttle valve, chock valve and link. If they do not operate lightly, wash well and apply engine oil sparingly to their shaft.
7. Check the float chamber cover and main body for damage and cracks.

Slow Cut Solenoid Valve (SCSV)

1. Apply battery voltage directly to the slow cut solenoid valve terminals.
2. Check that the valve operates with a click.

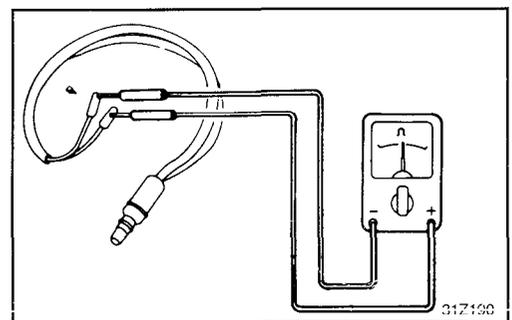


3. Using a circuit tester, check that there is no continuity between the solenoid valve body and terminals.



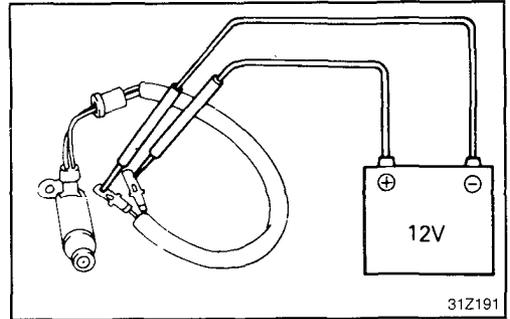
4. Measure resistance between the terminals.

SCSV coil resistance.. 48-60 Ω [at 20°C (68°F)]

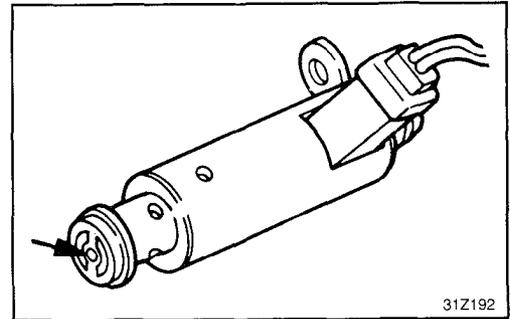


Feedback Solenoid Valve (FBSV)

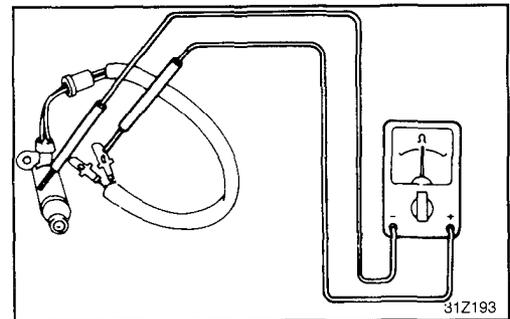
- 1. Apply battery voltage directly to the feedback solenoid valve terminals.
- 2. Check that the valve operates with a click.



- 3. Check that the jet is free from clogging.

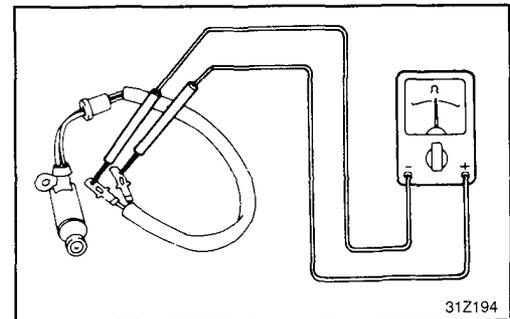


- 4. Using a circuit tester, check that there is not continuity between the solenoid valve body and terminals.



- 5. Measure resistance between the terminals.

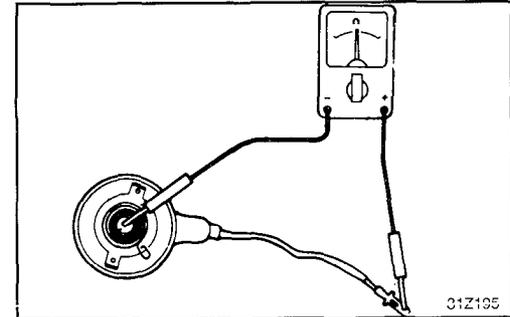
FBSV coil resistance 54-66 Ω [at 20°C (68°F)]



Bimetal Assembly

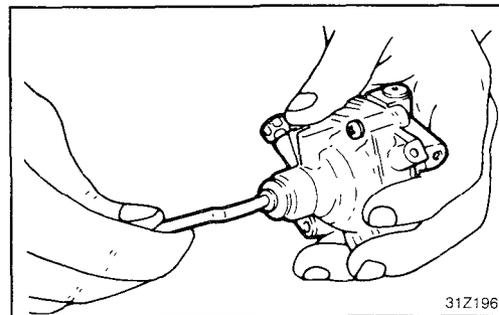
Using a circuit tester, measure resistance between the terminal and body.

Bimetal resistance Approx. 6Ω [at 20°C (68°F)]



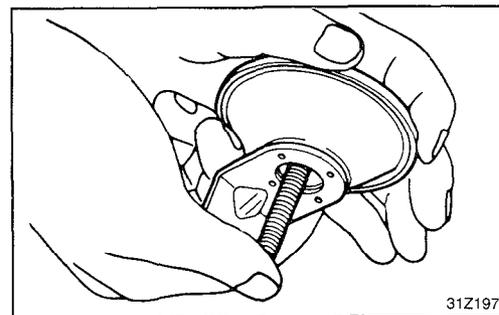
Dash Pot

Check that the dash pot operates normally. Resistance must be felt when the dash pot is pulled. When the rod is released it must return quickly to the original position. If no resistance is felt when it is pulled, the diaphragm or the check valve is broken. If the rod returns slowly, the check valve is binding. In either case, replace the dash pot.



Secondary Throttle Chamber (Depression Chamber)

Check the secondary throttle chamber diaphragm for damage. First, push up fully and closing tightly the nipple with a finger, release the rod. The diaphragm is intact if the rod does not return to the initial position while the nipple is held closed with a finger. If the rod returns, the diaphragm is broken. Replace the secondary throttle chamber.

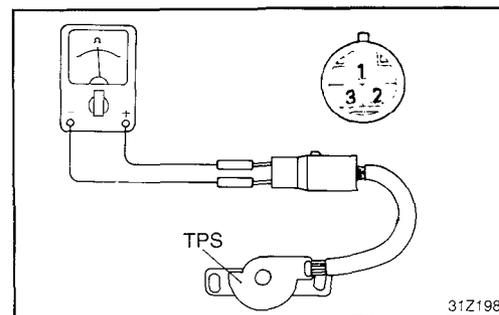


Throttle Position Sensor (TPS)

1. Measure resistance between terminals 1 and 2 of the throttle position sensor.

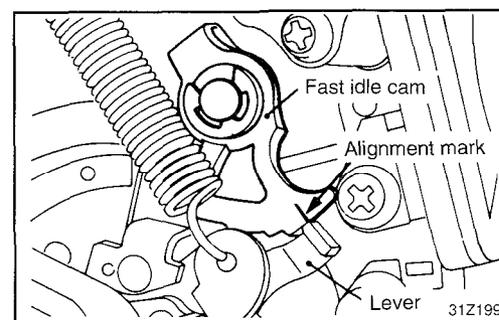
TPS resistance	3.5-6.5 KΩ
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2. Check the body for crack and damage.



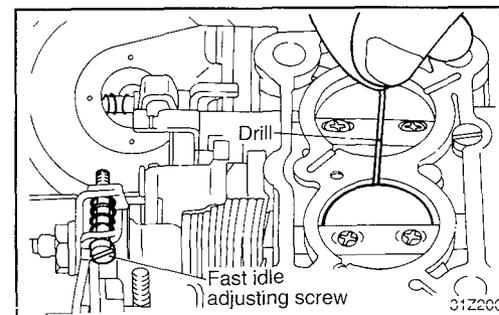
Fast Idle Opening

1. Set the lever on the mark (scribed line) of fast idle cam.



2. Measure the primary valve to throttle bore clearance.

Fast opening (drill diameter)	
M/T	0.93 mm (0.037 in.)
A/T	1.02 mm (0.040 in.)



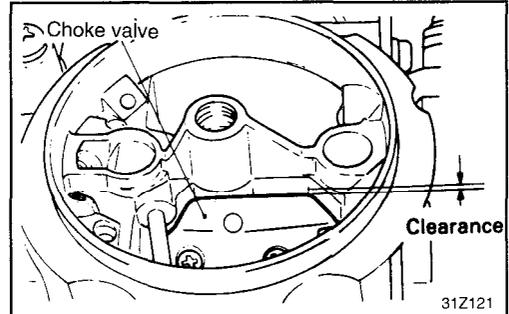
- If the clearance is out of specification, adjust using the fast idle adjusting screw for the standard value.

Adjusting screw	Valve opening	Fast idle rpm
Clockwise	Larger	Increases
Counterclockwise	Smaller	Decreases

Unloader Opening

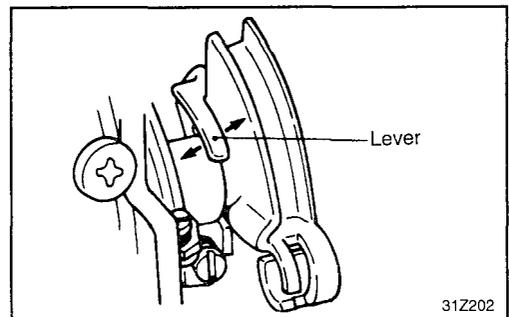
- Lightly press the choke valve with a finger to fully close it.
- In this state, fully open the throttle valve and measure the choke valve to choke bore clearance.

Standard value 1.9-2.1 mm (0.075-0.083 in.)



- If the clearance is out of specification, bend the throttle lever at illustrated portion to adjust the clearance to the standard value.

Direction	Clearance	Remarks
Up	Larger	Power response
Down	Smaller	Lower output (Plug likely to get sooty)



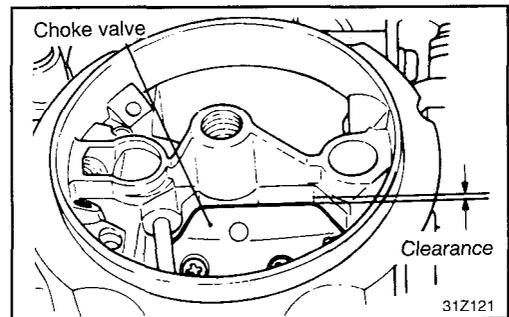
Choke Breaker

CAUTION

Check and adjust with the bimetal assembly removed.

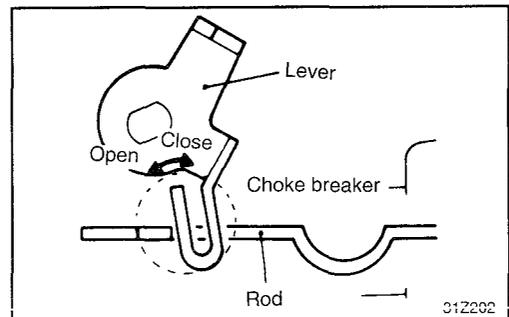
- Lightly press the choke valve with a finger to fully close it.
- Push the choke breaker rod toward the diaphragm and measure the choke valve to choke bore clearance.

Standard value
 1st stage 1.4-1.6 mm (0.055-0.063 in.)
 2nd stage 2.9-3.1 mm (0.14-0.122 in.)



- If the clearance is out of specification, adjust by bending the throttle lever at illustrated portion.

Bending	Clearance	Remarks
Open	Larger	Poor startability, more likely to stall
Close	Smaller	Plug likely to get sooty



INSTALLATION

1. Inspect the mating surfaces of carburetor and intake manifold. Be sure both surfaces are clean and free of nicks, burrs or other damage.
2. Place a new carburetor gasket on intake manifold surface.
3. Carefully place the carburetor on intake manifold.
4. Install carburetor mounting bolts and tighten alternately, a little at time, to compress carburetor gasket evenly. The bolts must be drawn down tightly to prevent vacuum leakage between the carburetor and intake manifold.
5. Connect the throttle cable, vacuum hoses and fuel hoses.
6. Check carefully for worn or loose vacuum hose connections.
7. Check to be sure the choke valve opens and closes fully when operated.
8. Check to see that full throttle travel is obtained.
9. Install air cleaner. The air cleaner should be cleaned or replaced at this time to ensure proper carburetor performance.
10. Connect battery cable.

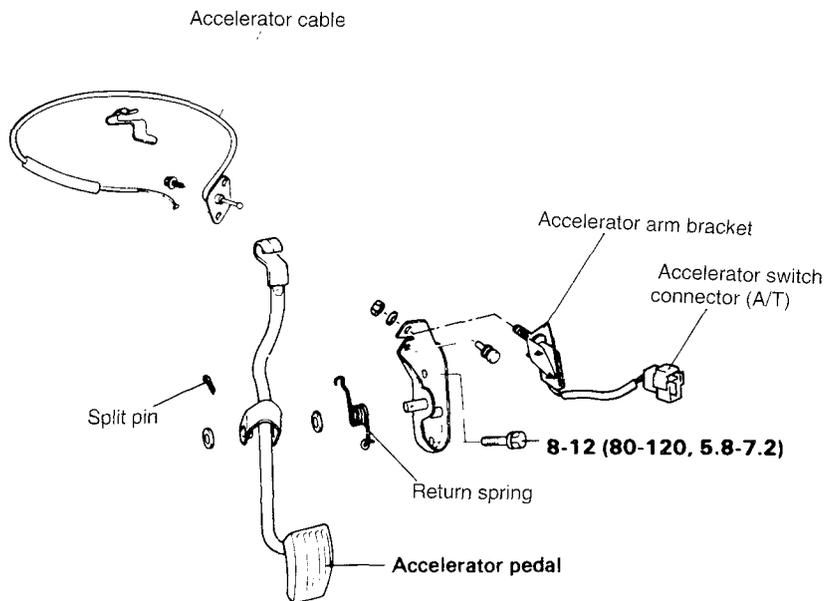
CAUTION

The practice of priming an engine by pouring gasoline into the carburetor air horn for starting after servicing the fuel system should be strictly avoided. Cranking the engine and priming by depressing the accelerator pedal several times should be adequate.

11. Set carburetor idle speed and mixture adjustment.

ENGINE CONTROL

COMPONENTS

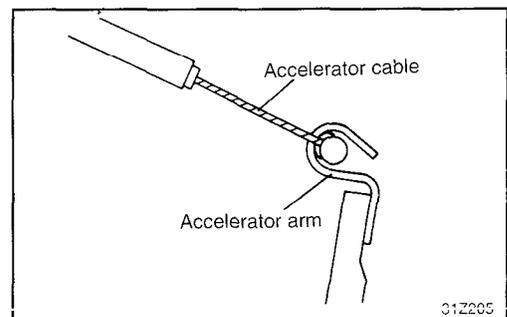
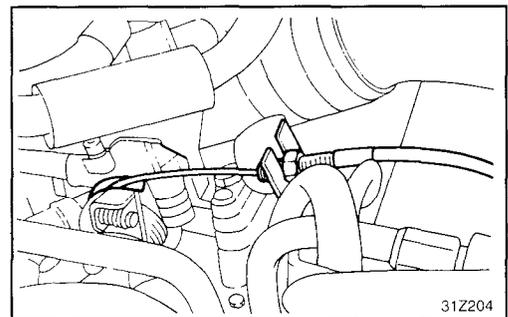


TORQUE : Nm (kg.cm, lb.ft)

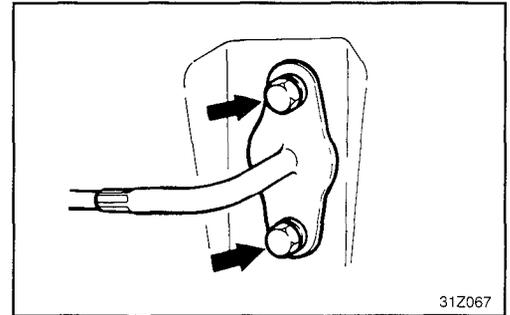
REMOVAL

Accelerator Cable

1. Loosen the accelerator cable adjusting nut.
2. Disconnect the accelerator cable from either the throttle lever.
3. Disconnect the accelerator cable from the accelerator arm.

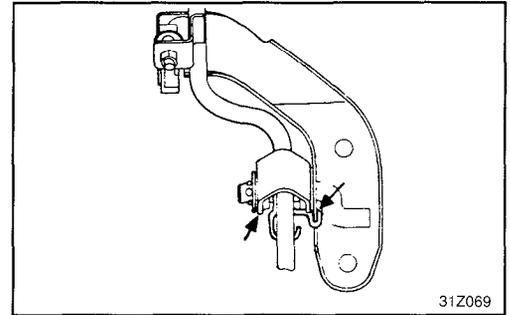


4. Disconnect the accelerator cable guide from the fire wall, and then remove the accelerator cable.



Accelerator Pedal

1. Loosen the accelerator cable adjusting nut, and disconnect the accelerator cable from the accelerator arm and remove the accelerator pedal.
2. Remove the return spring from the accelerator arm.
3. Remove the cotter pin from the accelerator arm shaft, and then remove the accelerator arm from the accelerator arm bracket.



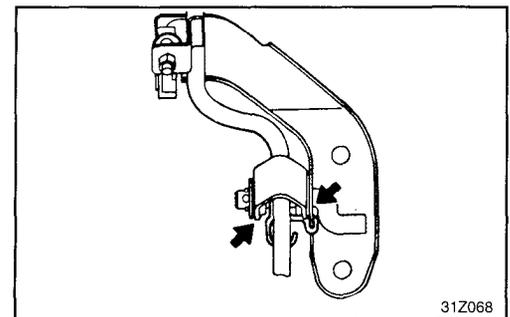
INSPECTION

1. Check the inner and outer cables for damage.
2. Check the cable for smooth movement.
3. Check the accelerator arm for bending.
4. Check the return spring for deterioration.
5. Check for connection of accelerator cable to end fitting

INSTALLATION

1. Apply the specified multipurpose grease around the each moving point of the pedal.

Recommended multipurpose grease
 Multipurpose grease SAE J310a, NLGI
 grade #2 or equivalent



2. To prevent entry of exhaust fumes, apply semi-drying type sealant to the bolt mounting hole, and then tighten the accelerator arm bracket.
3. Make sure that the accelerator cable is laid without sharp bends.
4. inspect the play of accelerator cable.
5. Install parts and torque to specification.

