

Fuel and Emission

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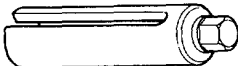
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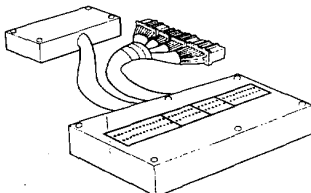


Special Tools

Special Tools				
Ref. No.	Tool Number	Description	Qty	Remarks
①	07LAA—PT50100	O ₂ Sensor Socket Wrench	1	— Component Tools
②	07LAJ—PT30100	Test Harness	1	
③	07411—0020000	Digital Circuit Tester	1	
④	07LAJ—PT30200	Test Harness	1	
⑤	07406—0040001	Fuel Pressure Gauge Set	1	
⑤-1	07406—0040100	Pressure Gauge	(1)	
⑤-2	07406—0040201	Hose Assy	(1)	



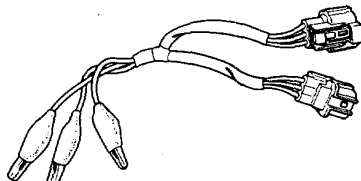
①



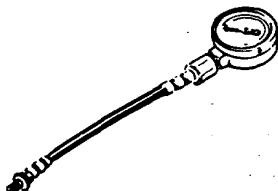
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③



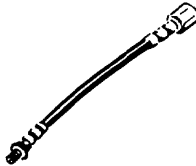
④



⑤



⑤-1



⑤-2

Component Locations



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[LHD]

EGR VALVE

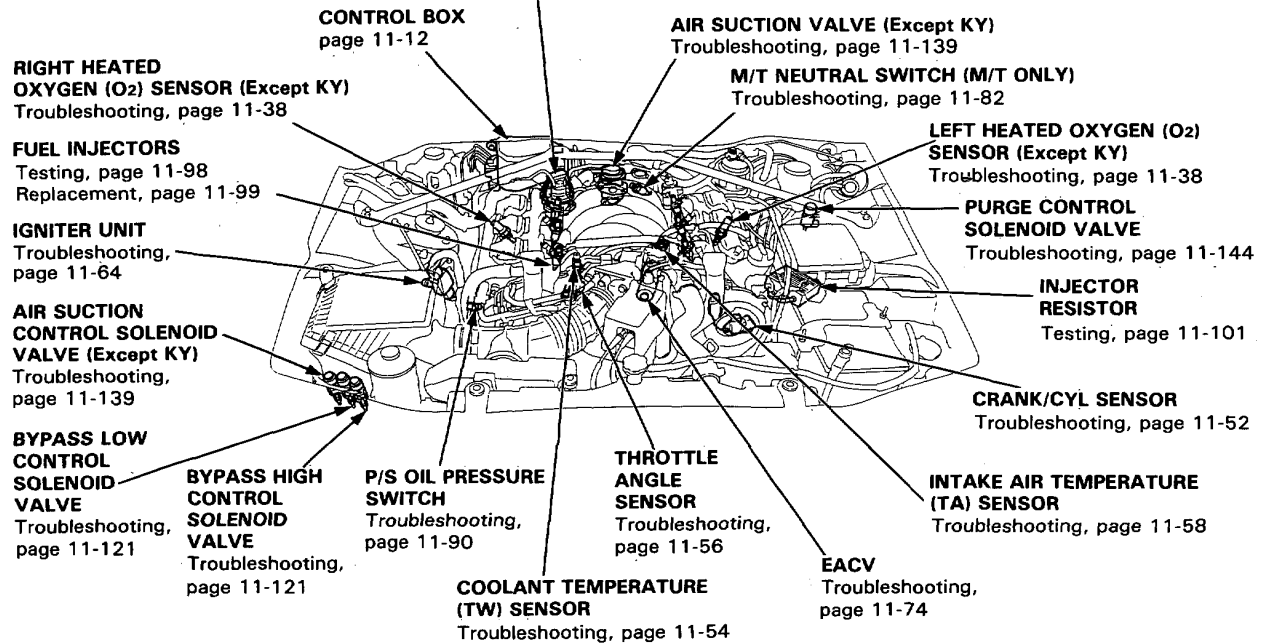
Troubleshooting, page 11-131

(with CATA): Clean and inspect every 5 years or 100,000 km (60,000 miles), whichever comes first.
(without CATA): Clean and inspect every 2 years or 40,000 km (24,000 miles), whichever comes first.

EGR VALVE FILTER (without CATA)

Replacement, page 11-137

Replace EGR valve filter every 4 years or 80,000 km (48,000 miles), whichever comes first.



[LHD]

[LHD]

SERVICE CHECK CONNECTOR

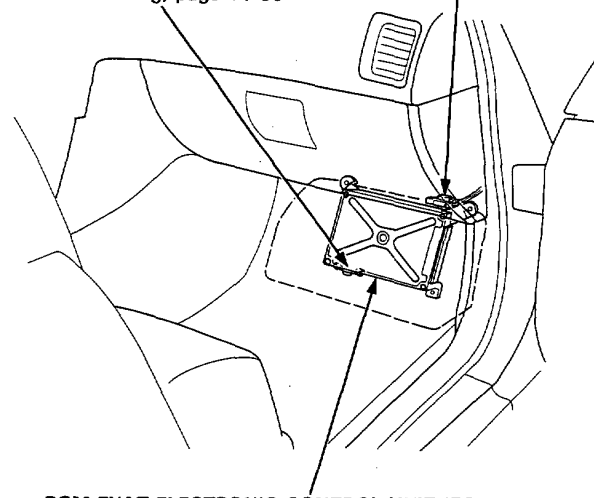
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IMA SENSOR (KY)

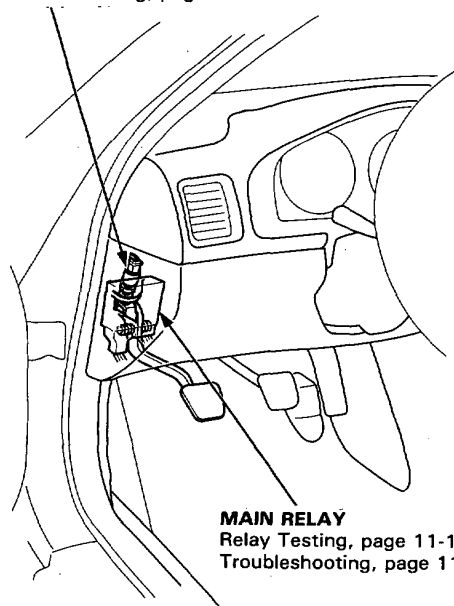
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PGM-FI/AT ELECTRONIC CONTROL UNIT (ECU)

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MAIN RELAY

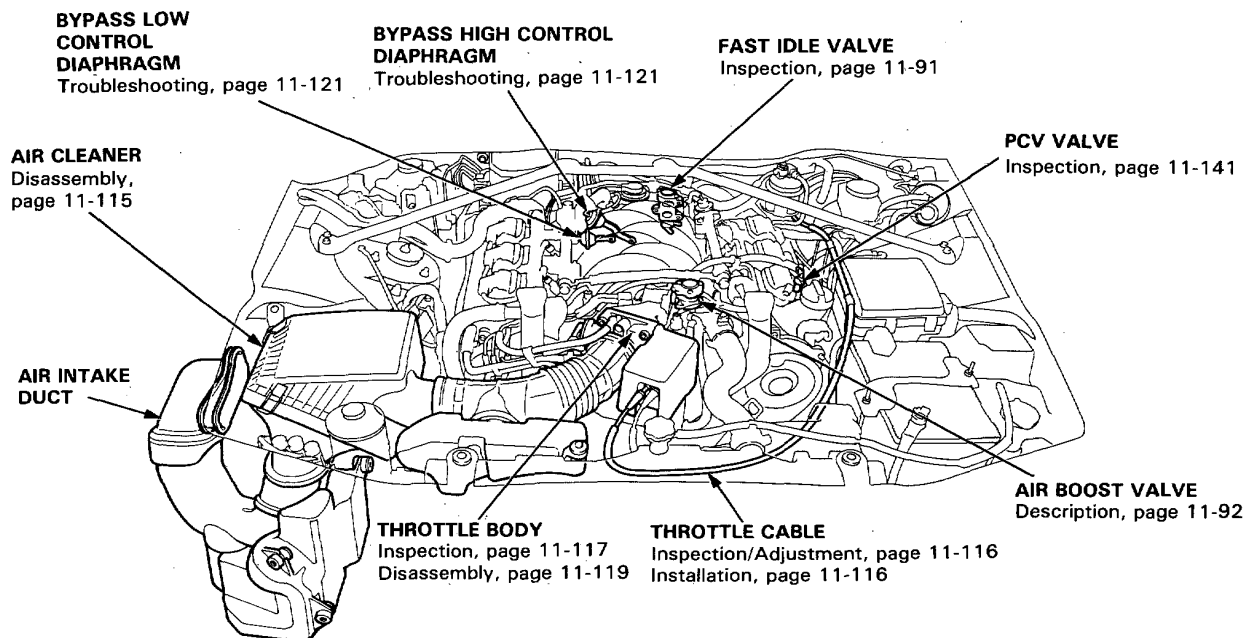
Relay Testing, page 11-109

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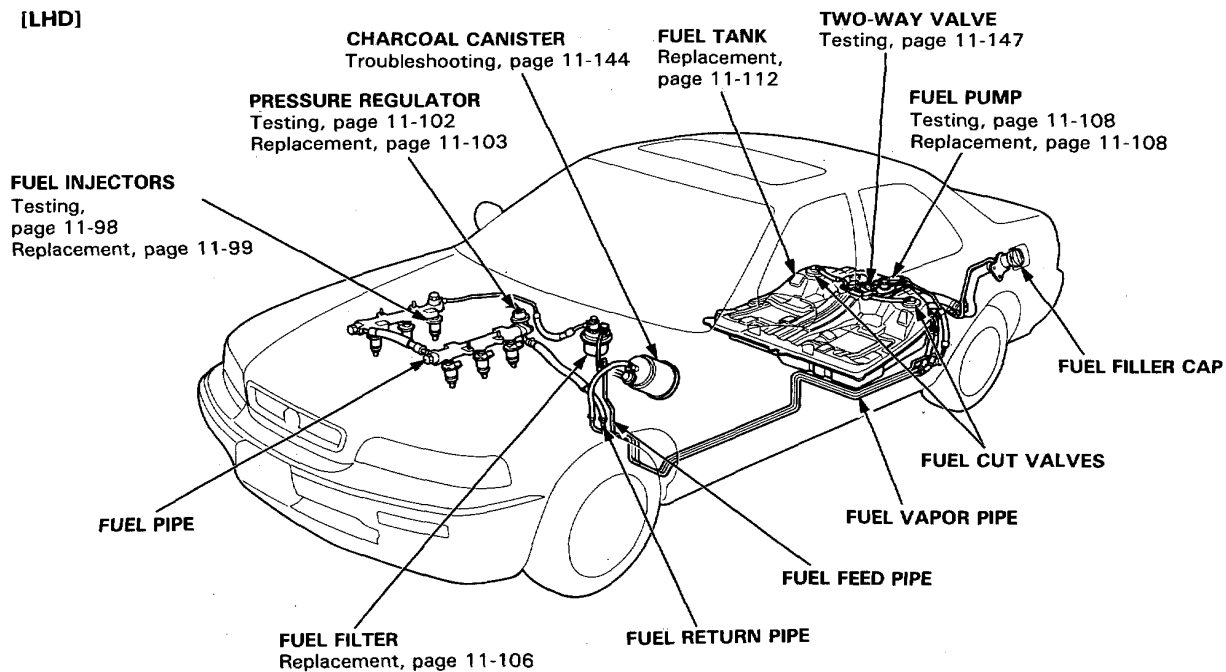
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[LHD]



[LHD]





[RHD]

EGR VALVE

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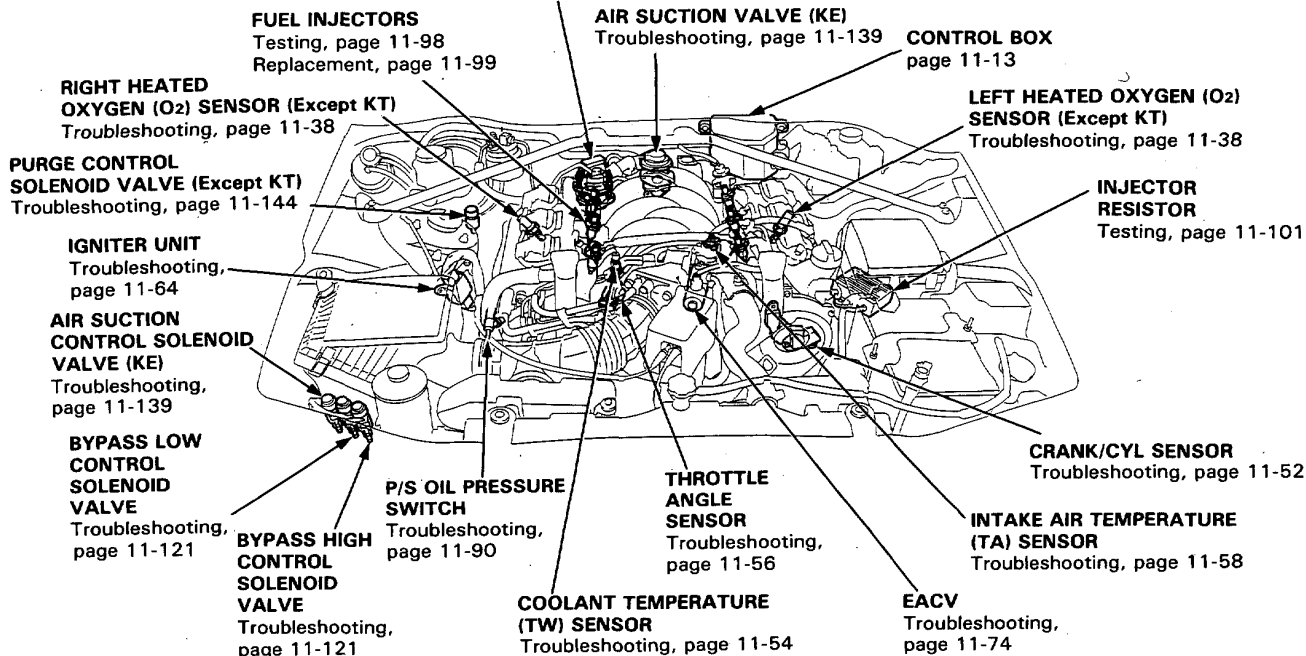
(with CATA): Clean and inspect every 5 years or 100,000 km (60,000 miles), whichever comes first.

(without CATA): Clean and inspect every 2 years or 40,000 km (24,000 miles), whichever comes first.

EGR VALVE FILTER (with CATA)

Replacement, page 11-137

Replace EGR valve filter every 4 years or 80,000 km (48,000 miles), whichever comes first.



[RHD]

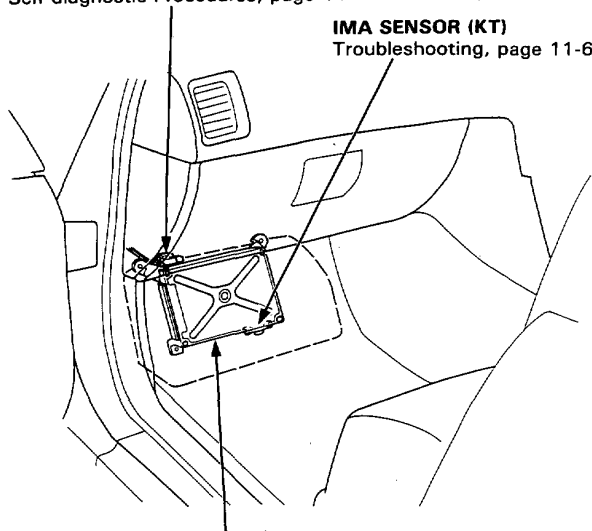
[RHD]

SERVICE CHECK CONNECTOR

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IMA SENSOR (KT)

Troubleshooting, page 11-60



PGM-FI/AT ELECTRONIC CONTROL UNIT (ECU)

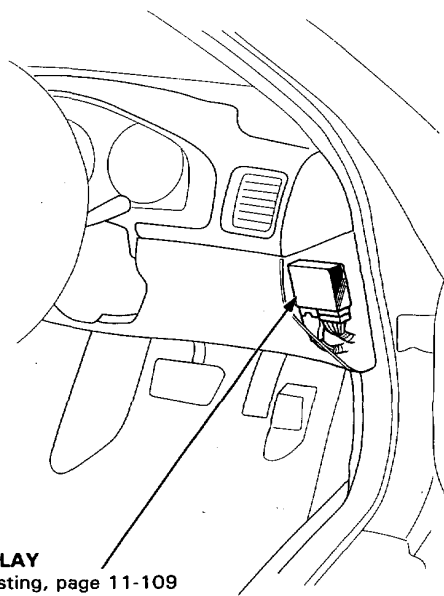
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MAIN RELAY

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Component Locations

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[RHD]

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[RHD]

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TWO-WAY VALVE

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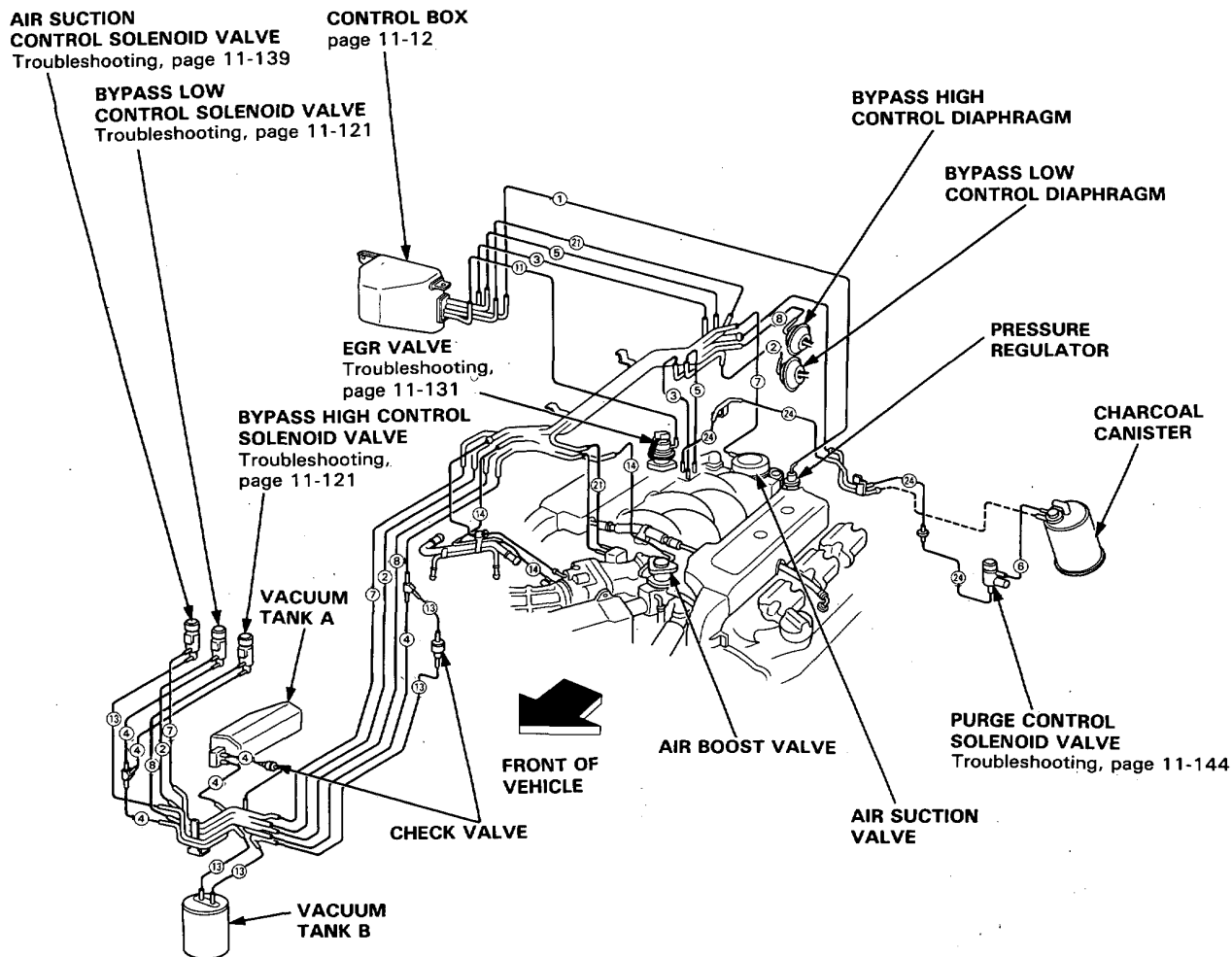
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System Description

Vacuum Connections

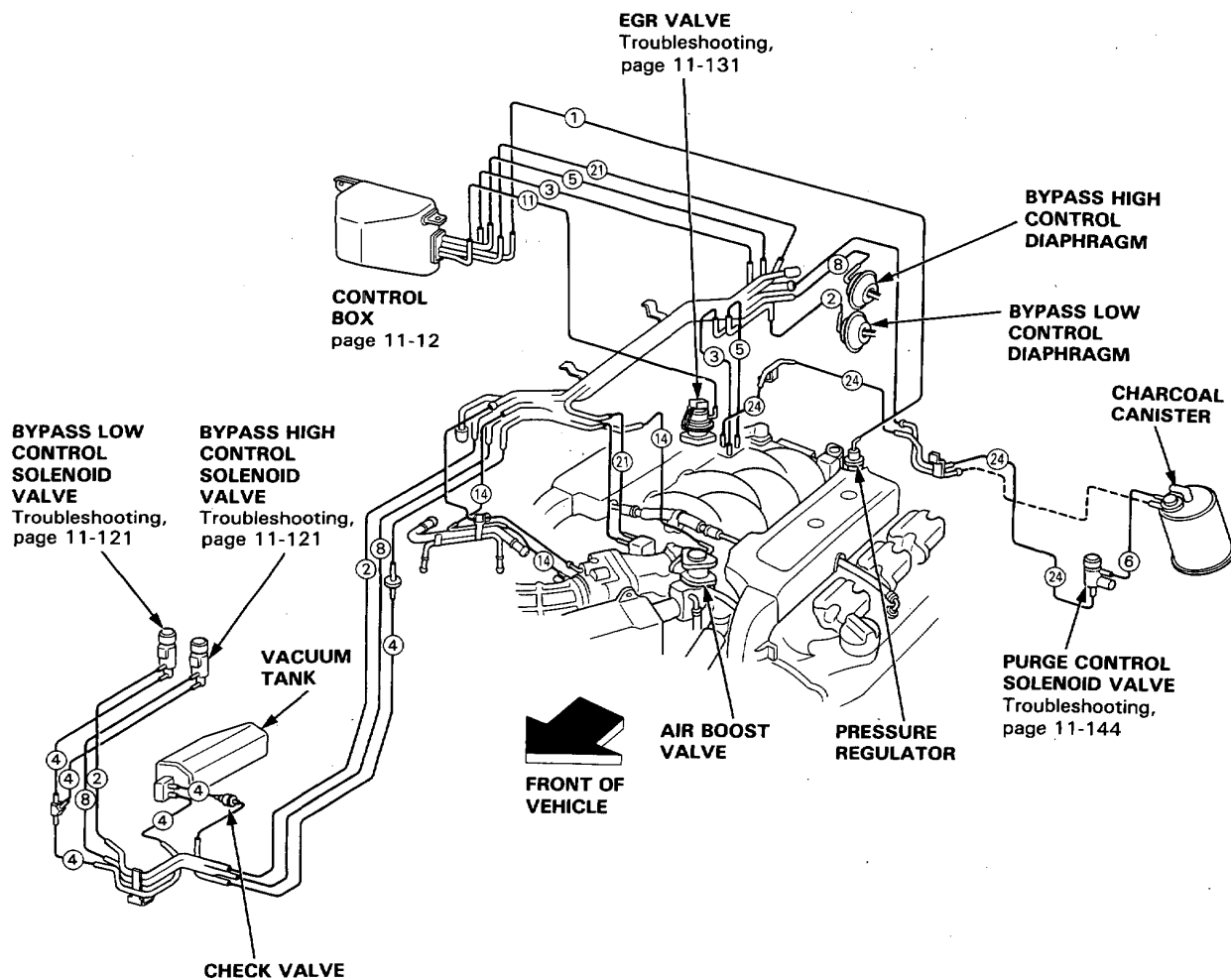
[KF, KG, KS, KX]



System Descriptions

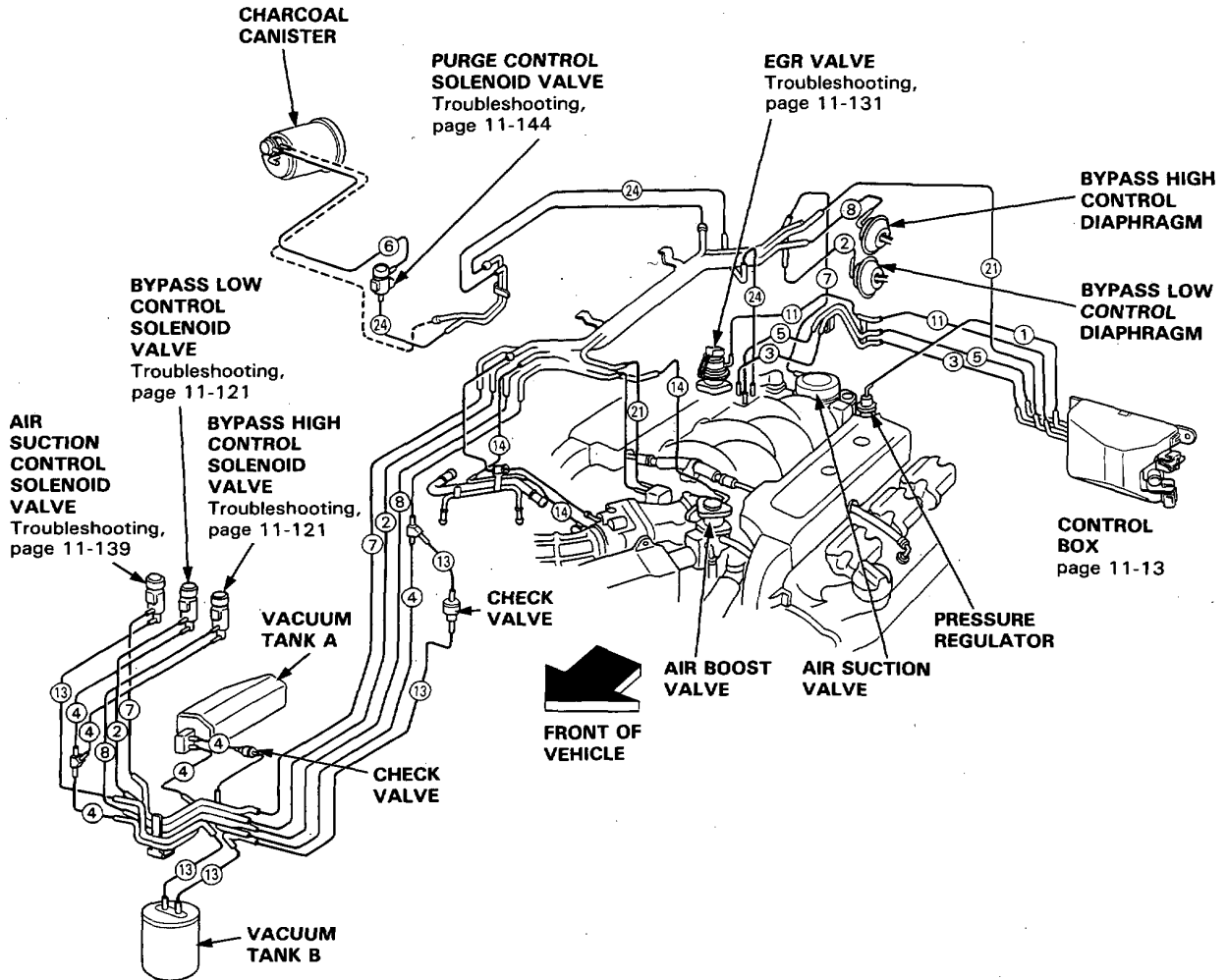
Vacuum Connections (cont'd)

[KY]





[KE]

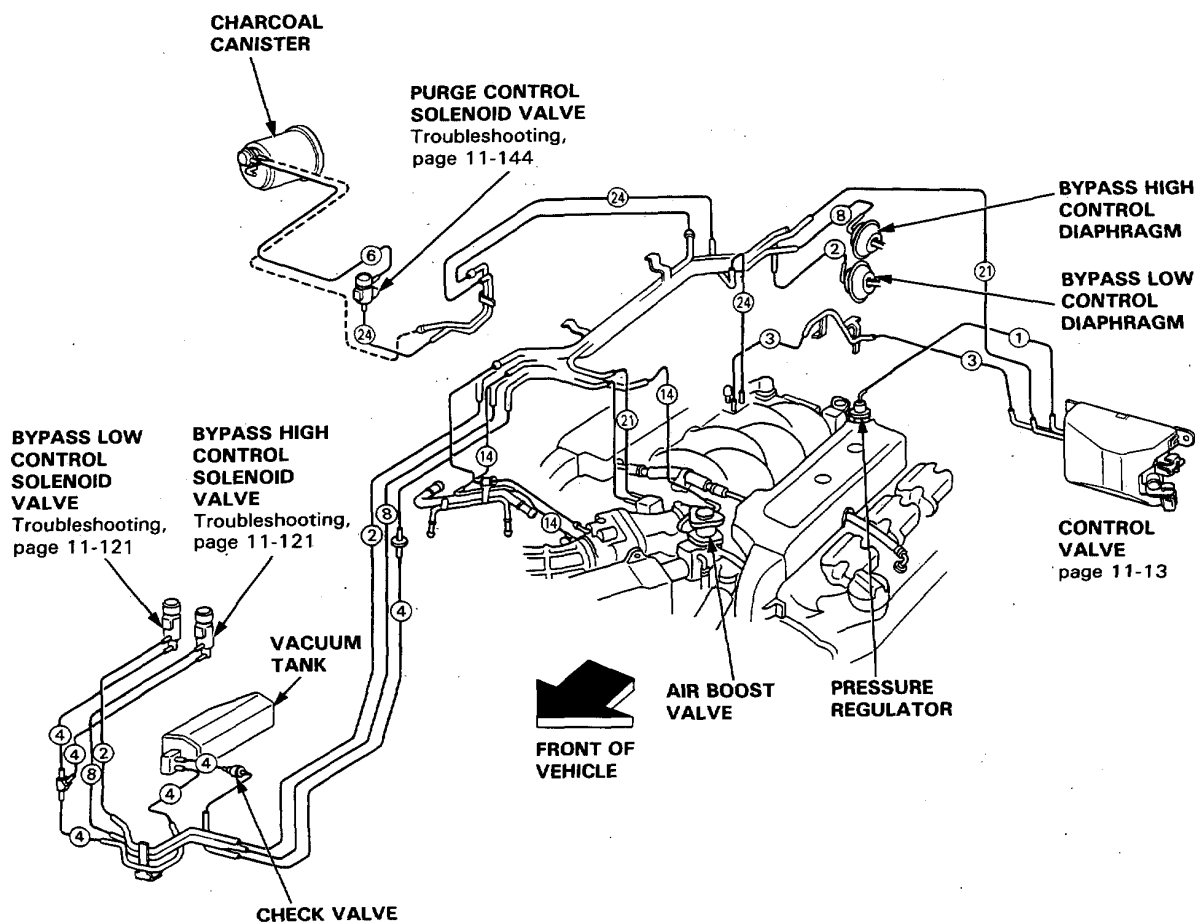


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System Description

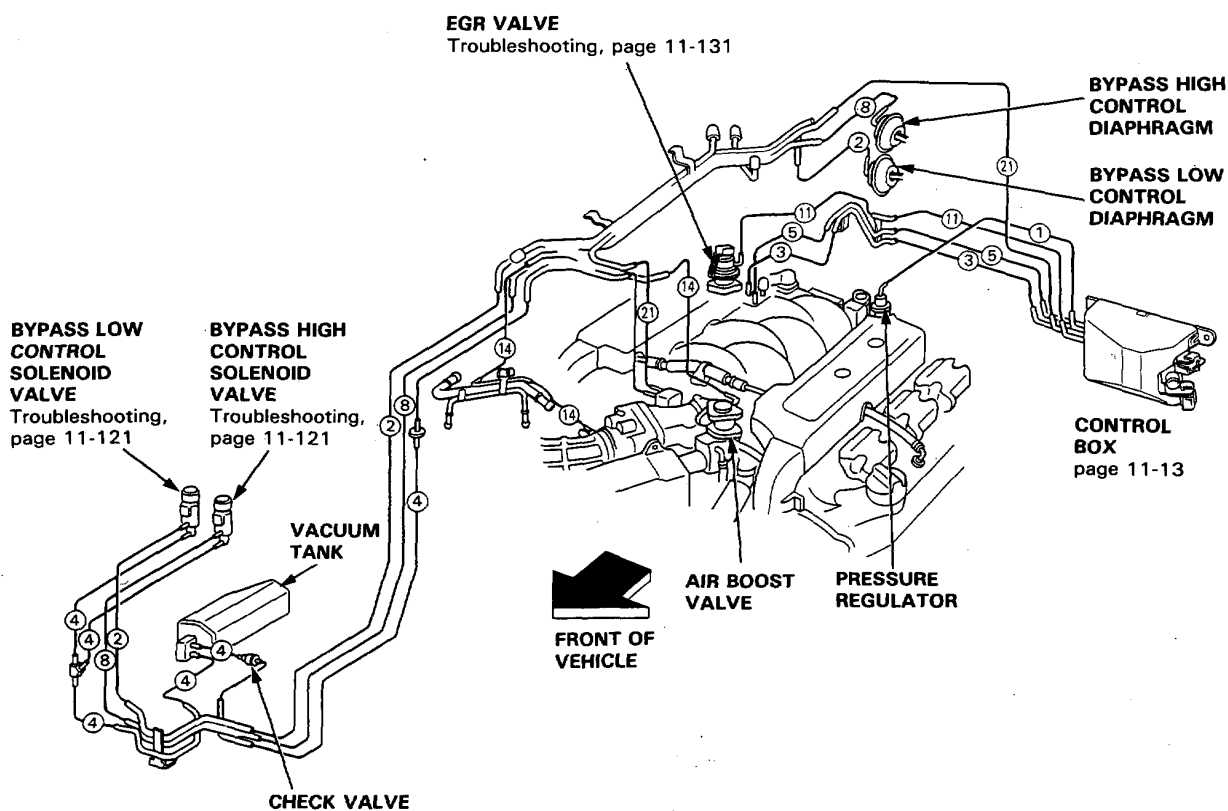
Vacuum Connections (cont'd)

[KQ]





[KT]

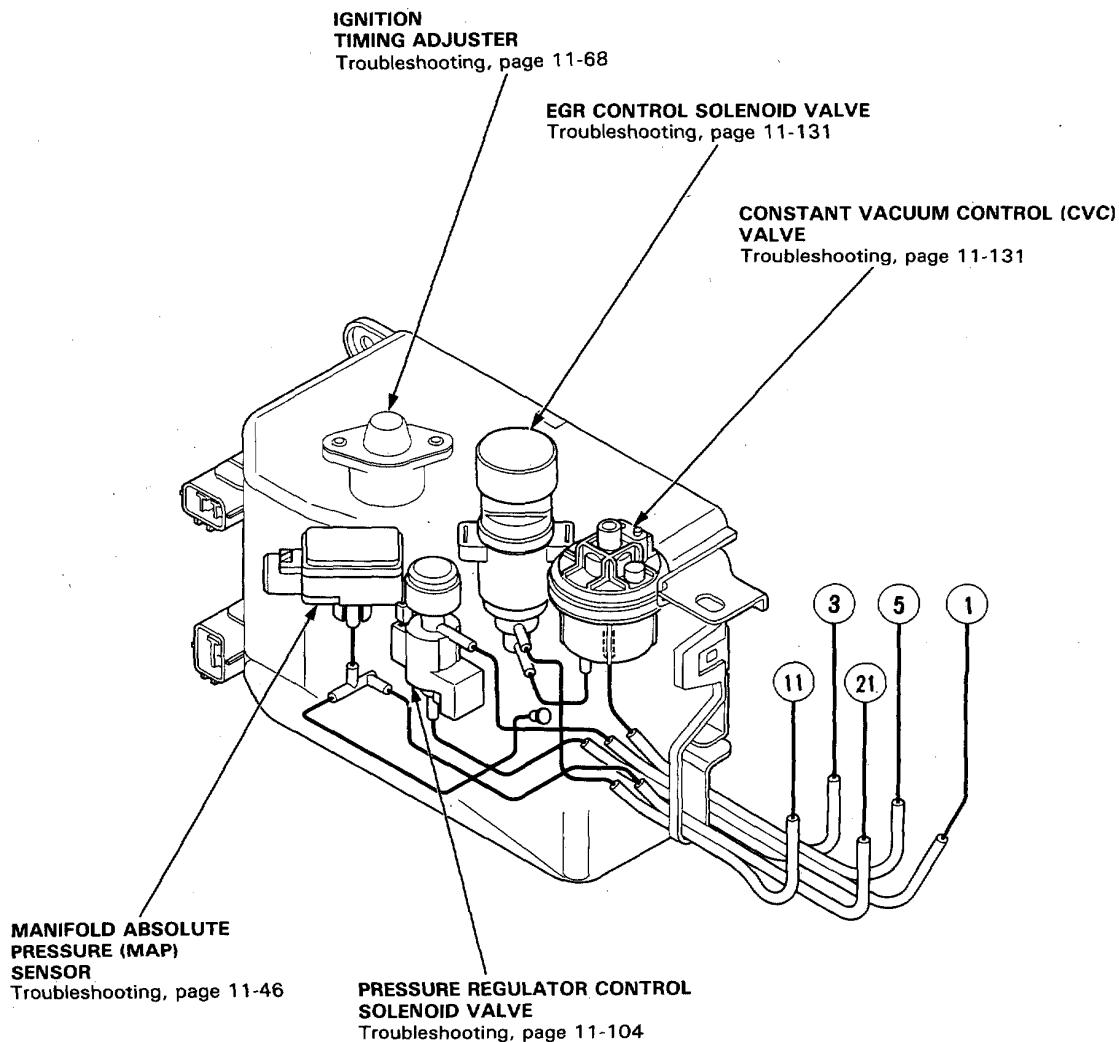


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System Description

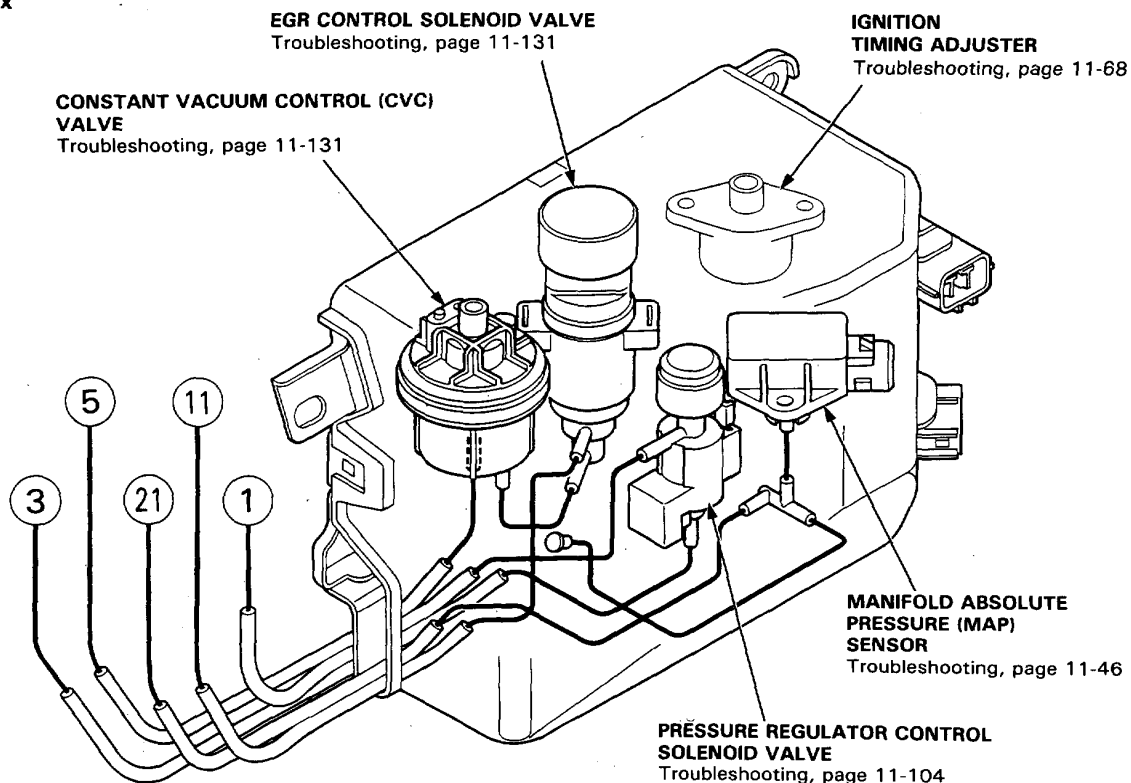
Vacuum Connections (cont'd)

Control Box
[KF, KG, KS, KX, KY]

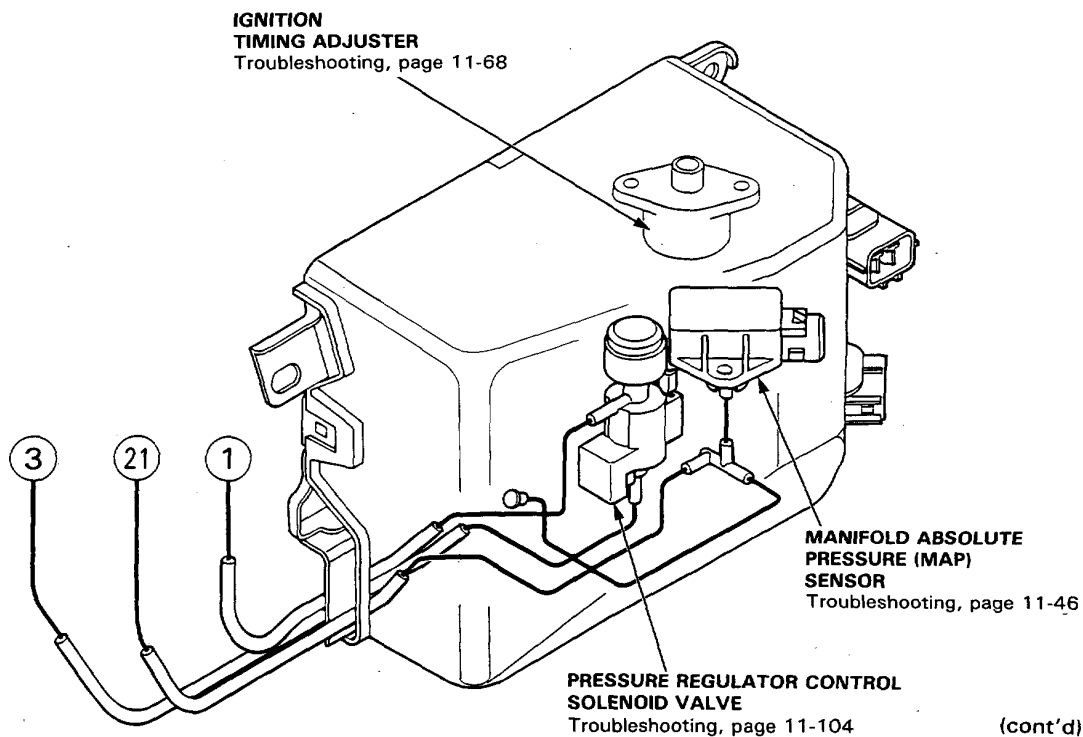




**Control Box
[KE,KT]**



[KQ]

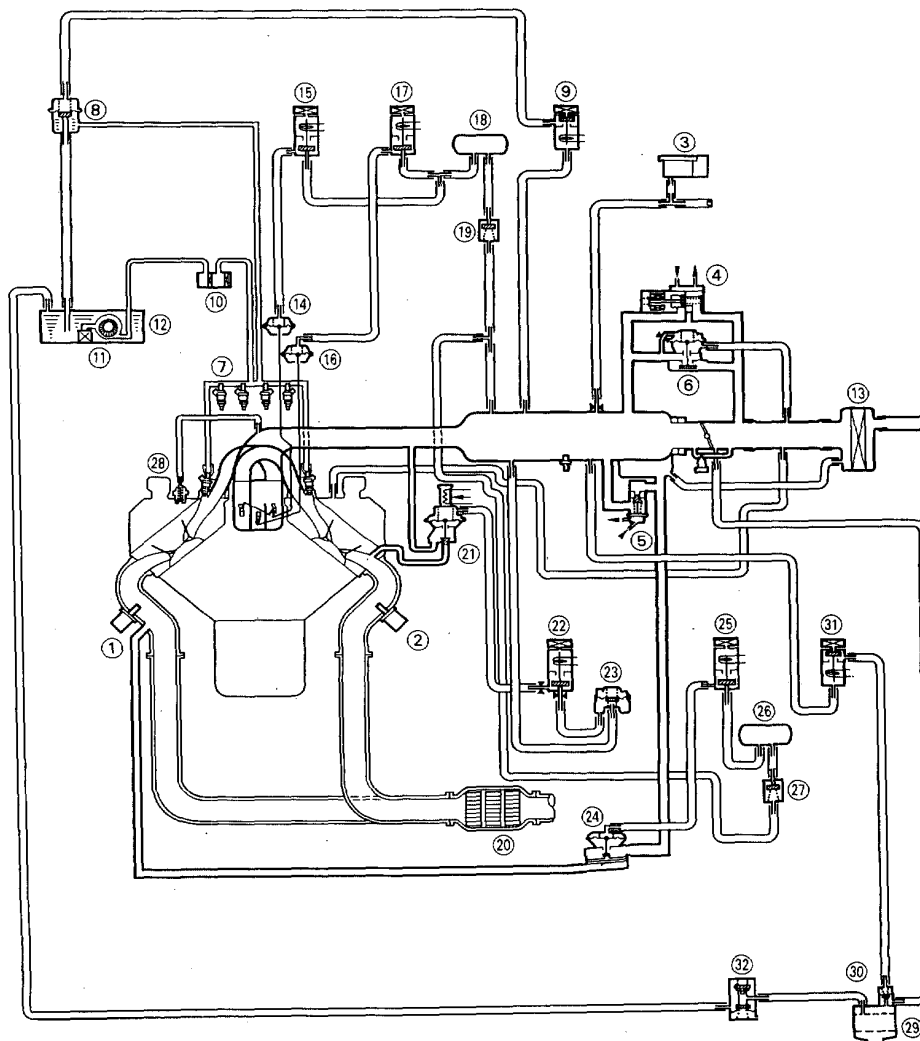


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System Description

Vacuum Connections (cont'd)

[KF, KG, KS, KX, KE]

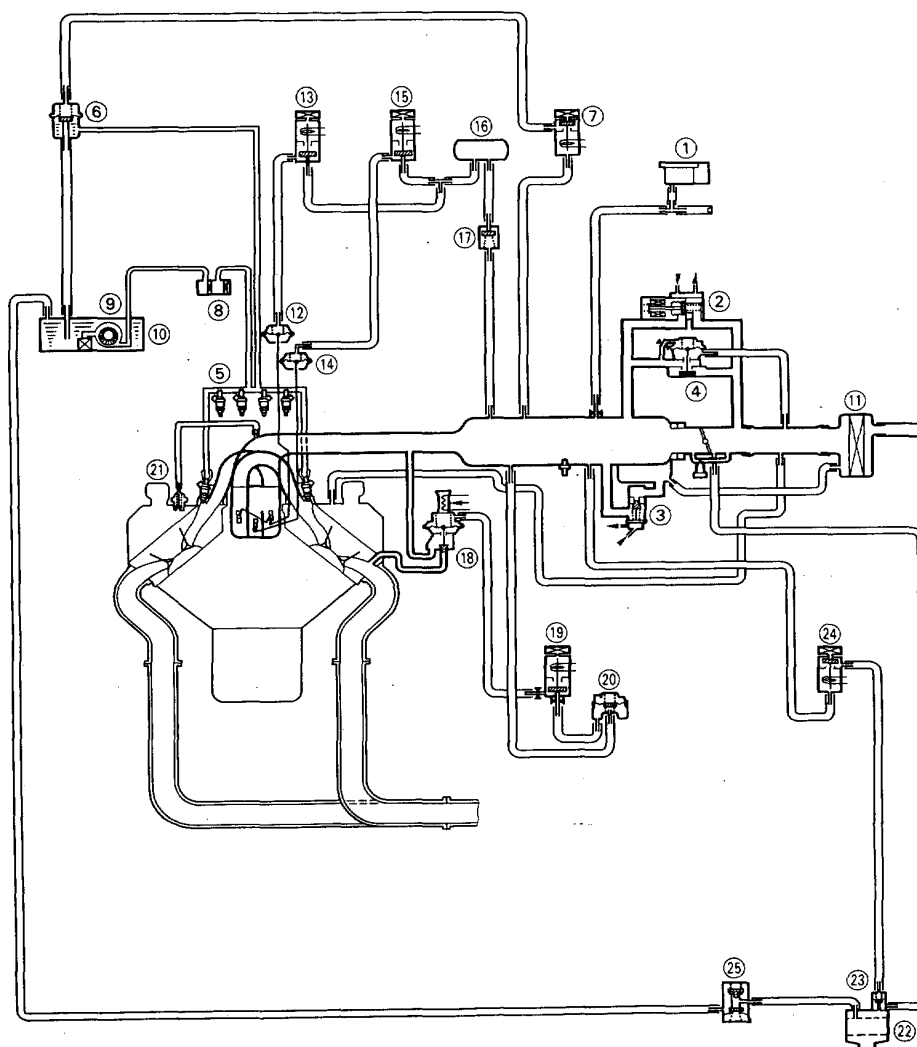


- ① LEFT OXYGEN (O₂) SENSOR
- ② RIGHT OXYGEN (O₂) SENSOR
- ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ④ ELECTRONIC AIR CONTROL VALVE (EACV)
- ⑤ FAST IDLE VALVE
- ⑥ AIR BOOST VALVE
- ⑦ FUEL INJECTOR
- ⑧ PRESSURE REGULATOR
- ⑨ PRESSURE REGULATOR CONTROL SOLENOID VALVE
- ⑩ FUEL FILTER
- ⑪ FUEL PUMP
- ⑫ FUEL TANK
- ⑬ AIR CLEANER
- ⑭ BYPASS LOW CONTROL DIAPHRAGM
- ⑮ BYPASS LOW CONTROL SOLENOID VALVE
- ⑯ BYPASS HIGH CONTROL DIAPHRAGM

- ⑰ BYPASS HIGH CONTROL SOLENOID VALVE
- ⑱ VACUUM TANK A
- ⑲ CHECK VALVE
- ⑳ CATALYTIC CONVERTER
- ㉑ EGR VALVE
- ㉒ EGR CONTROL SOLENOID VALVE
- ㉓ CONSTANT VACUUM CONTROL (CVC) VALVE
- ㉔ AIR SUCTION VALVE
- ㉕ AIR SUCTION CONTROL SOLENOID VALVE
- ㉖ VACUUM TANK B
- ㉗ CHECK VALVE
- ㉘ PCV VALVE
- ㉙ CHARCOAL CANISTER
- ㉚ PURGE CONTROL DIAPHRAGM VALVE
- ㉛ PURGE CONTROL SOLENOID VALVE
- ㉜ TWO-WAY VALVE



[KY]



- ① MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ② ELECTRONIC AIR CONTROL VALVE (EACV)
- ③ FAST IDLE VALVE
- ④ AIR BOOST VALVE
- ⑤ FUEL INJECTOR
- ⑥ PRESSURE REGULATOR
- ⑦ PRESSURE REGULATOR CONTROL SOLENOID VALVE
- ⑧ FUEL FILTER
- ⑨ FUEL PUMP
- ⑩ FUEL TANK
- ⑪ AIR CLEANER
- ⑫ BYPASS LOW CONTROL DIAPHRAGM
- ⑬ BYPASS LOW CONTROL SOLENOID VALVE
- ⑭ BYPASS HIGH CONTROL DIAPHRAGM

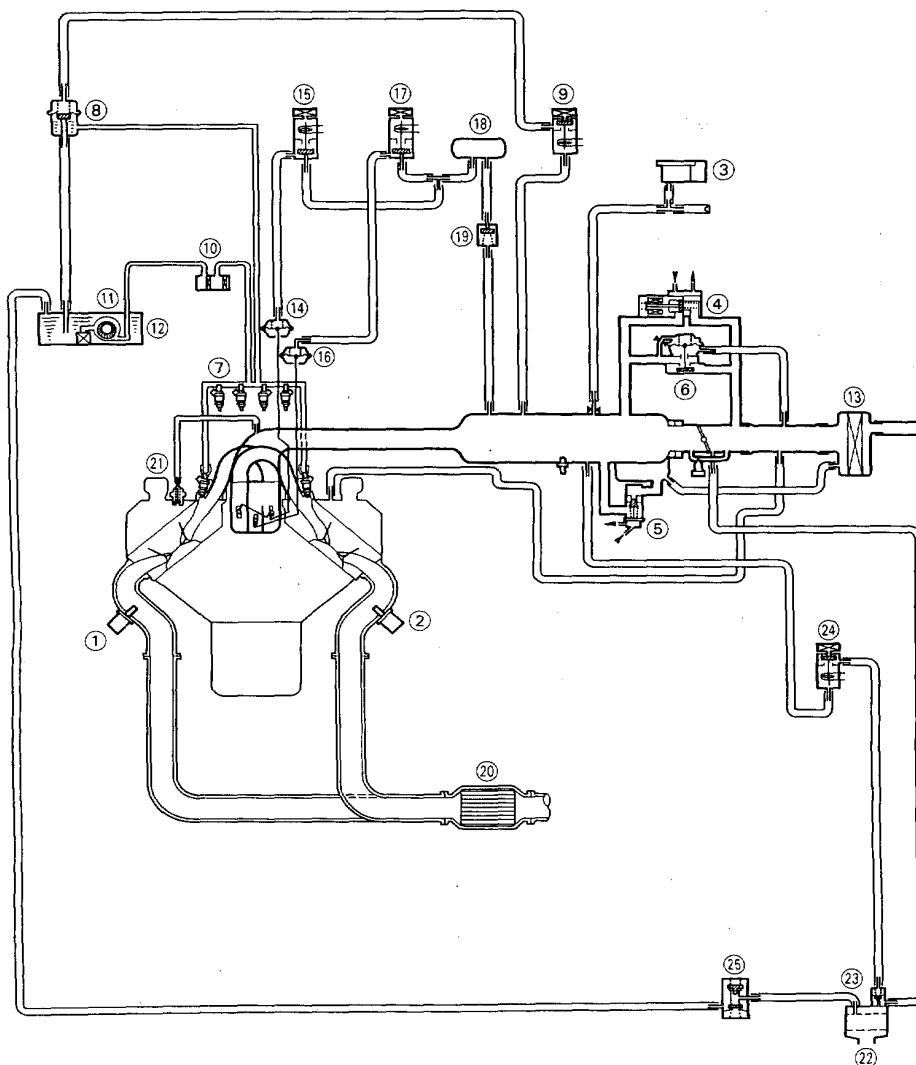
- ⑮ BYPASS HIGH CONTROL SOLENOID VALVE
- ⑯ VACUUM TANK A
- ⑰ CHECK VALVE
- ⑱ EGR VALVE
- ⑲ EGR CONTROL SOLENOID VALVE
- ⑳ CONSTANT VACUUM CONTROL (CVC) VALVE
- ㉑ PCV VALVE
- ㉒ CHARCOAL CANISTER
- ㉓ PURGE CONTROL DIAPHRAGM VALVE
- ㉔ PURGE CONTROL SOLENOID VALVE
- ㉕ TWO-WAY VALVE

(cont'd)

System Description

Vacuum Connections (cont'd)

[KQ]



- ① LEFT OXYGEN (O₂) SENSOR
- ② RIGHT OXYGEN (O₂) SENSOR
- ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ④ ELECTRONIC AIR CONTROL VALVE (EACV)
- ⑤ FAST IDLE VALVE
- ⑥ AIR BOOST VALVE
- ⑦ FUEL INJECTOR
- ⑧ PRESSURE REGULATOR
- ⑨ PRESSURE REGULATOR CONTROL SOLENOID VALVE
- ⑩ FUEL FILTER
- ⑪ FUEL PUMP
- ⑫ FUEL TANK
- ⑬ AIR CLEANER

- ⑭ BYPASS LOW CONTROL DIAPHRAGM
- ⑮ BYPASS LOW CONTROL SOLENOID VALVE
- ⑯ BYPASS HIGH CONTROL DIAPHRAGM
- ⑰ BYPASS HIGH CONTROL SOLENOID VALVE
- ⑱ VACUUM TANK A
- ⑲ CHECK VALVE
- ⑳ CATALYTIC CONVERTER
- ㉑ PCV VALVE
- ㉒ CHARCOAL CANISTER
- ㉓ PURGE CONTROL DIAPHRAGM VALVE
- ㉔ PURGE CONTROL SOLENOID VALVE
- ㉕ TWO-WAY VALVE

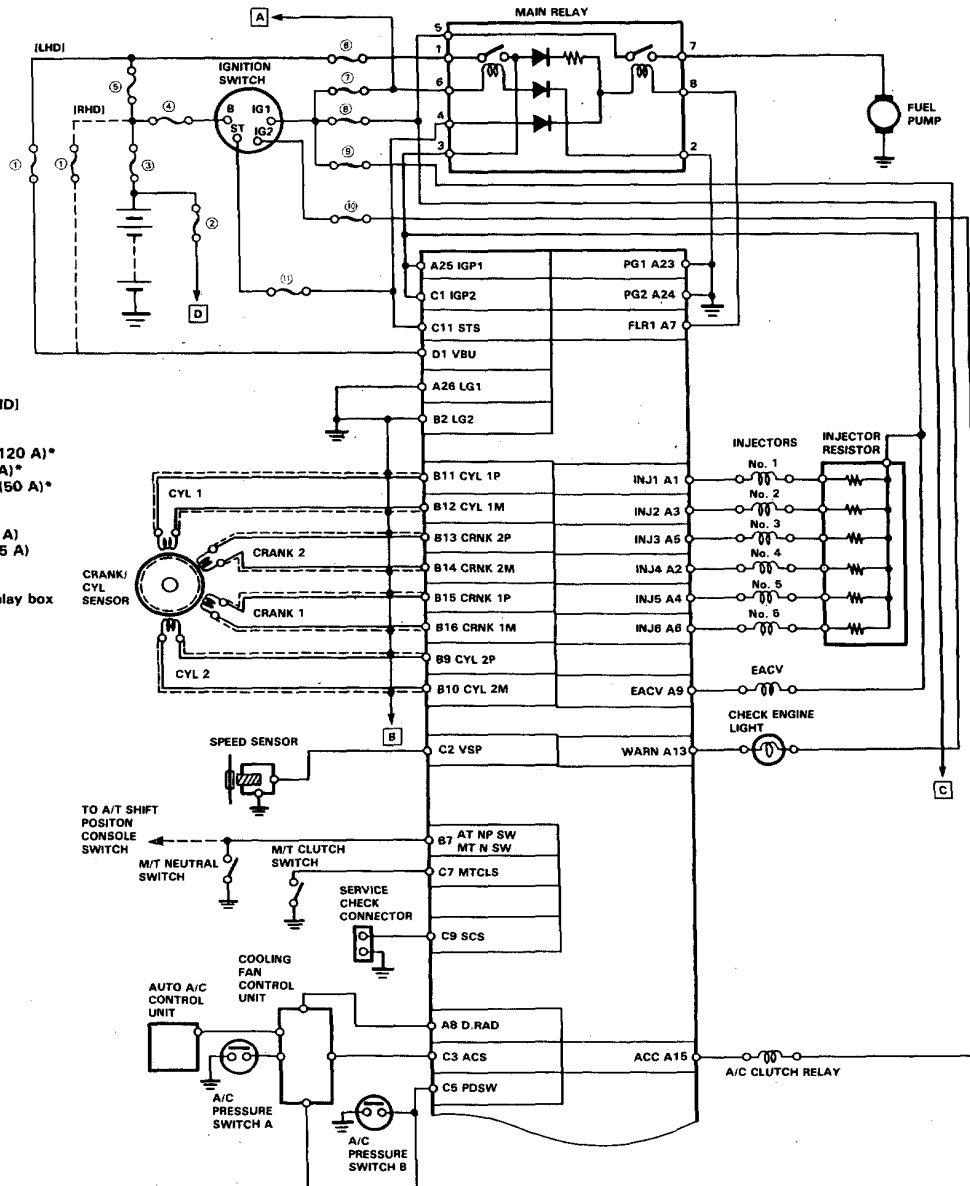
System Description

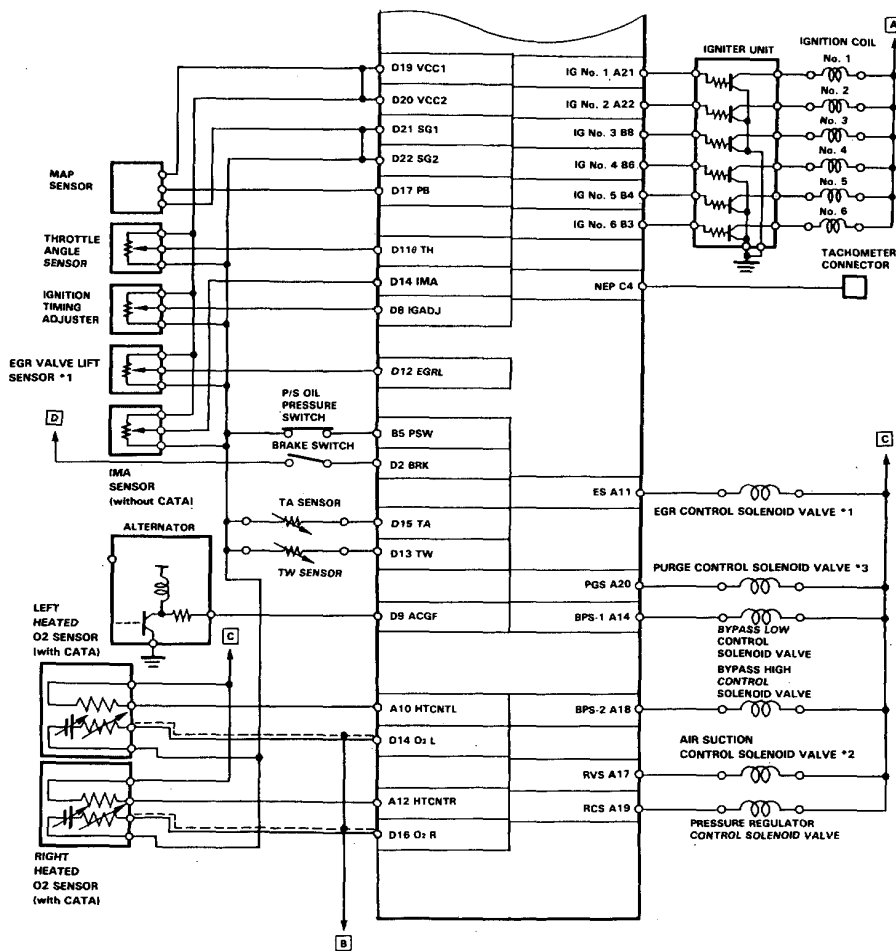
Electrical Connections

FUSES

- ① No. 15 (ACG) (7.5 A) [LHD]
- ② BACK UP (7.5A)*[RHD]
- ③ STOP & HORN (20 A)*
- ④ MAIN FUSE (BATTERY) (120 A)*
- ⑤ MAIN FUSE (IG SW) (50 A)*
- ⑥ MAIN FUSE (FUSE BOX) (50 A)*
- ⑦ No. 5 (20 A)
- ⑧ No. 25 (IG COIL) (30 A)
- ⑨ No. 22 (FUEL PUMP) (20 A)
- ⑩ No. 13 (BACK UP LT) (7.5 A)
- ⑪ No. 3 (RR DEF) (15 A)
- ⑫ No. 14 (EFI STS) (7.5 A)

*: In the under-hood fuse/relay box





A1	A3	A5	A7	A8	A11	A13	A15	A17	A18	A21	A23	A25	B1	B3	B5	B7	B9	B11	B13	B15	C1	C3	C5	C7	C9	C11	D1	D3	D5	D7	D9	D11	D13	D15	D17	D19	D21		
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
A2	A4	A6	A10	A12	A14	A16	A19	A20	A22	A24	A26	B2	B4	B6	B8	B10	B12	B14	B16	C2	C4	C6	C8	C10	C12	D2	D4	D6	D8	D10	D12	D14	D16	D18	D20	D22			
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Troubleshooting

Troubleshooting Guide [with CATA]

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE	SYSTEM	PGM-FI								
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL
	SYMPTOM	26	30, 32, 36	46, 50	52	54	56	58	62	64
	CHECK ENGINE LIGHT TURNS ON	 or 								
	CHECK ENGINE LIGHT BLINKS	 or 	 or 	 or 	 or 					
	ENGINE WON'T START	①				③				③
	DIFFICULT TO START ENGINE WHEN COLD	BU		③	③	①			③	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU				②				
	ROUGH IDLE	BU		③						
	WHEN WARM ENGINE SPEED TOO HIGH	BU				②				
	WHEN WARM ENGINE SPEED TOO LOW	BU								
FREQUENT STALLING	WHILE WARMING UP	BU				③				
	AFTER WARMING UP	BU							③	
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU		②	③					
	FAILS EMISSION TEST	BU	③	②						
	LOSS OF POWER	BU		③			②			

* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

BU : When the Check Engine light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.



11-21

Troubleshooting

Troubleshooting Guide [without CATA]

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE		SYSTEM		PGM-FI						
		ECU	MANIFOLD ABSOLUTE PRESSURE SENSOR	CRANK/CYL SENSOR	COOLANT TEMPERA- TURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERA- TURE SENSOR	IMA SENSOR	ATMOS- PHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL
SYMPTOM		34	46, 50	52	54	56	58	60	62	64
CHECK ENGINE LIGHT TURNS ON		 or 								
CHECK ENGINE LIGHT BLINKS		 or 	 or 	 or 						
ENGINE WON'T START		①			③					③
DIFFICULT TO START ENGINE WHEN COLD		Ⓑⓤ	③	③	①				③	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	Ⓑⓤ			②					
	ROUGH IDLE	Ⓑⓤ	③							
	WHEN WARM ENGINE SPEED TOO HIGH	Ⓑⓤ			②					
	WHEN WARM ENGINE SPEED TOO LOW	Ⓑⓤ								
FREQUENT STALLING	WHILE WARMING UP	Ⓑⓤ			③					
	AFTER WARMING UP	Ⓑⓤ							③	
POOR PERFORM- ANCE	MISFIRE OR ROUGH RUNNING	Ⓑⓤ	②	③						
	FAILS EMISSION TEST	Ⓑⓤ	②							
	LOSS OF POWER	Ⓑⓤ	③			②				

* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

(BU) : When the Check Engine light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.



PGM-FI		IDLE CONTROL		FUEL SUPPLY		AIR INTAKE	EMISSION CONTROL	
VEHICLE SPEED SENSOR	IGNITION TIMING ADJUSTER	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY		EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
66	68	74	70	98	95	113	131	127
				②	③			
			①		②			
			①					
			①	②				
			①					
			①	②				
			①		②			
			①		②		③	
		③		①			③	
				②	③			①
				③	①	③		③

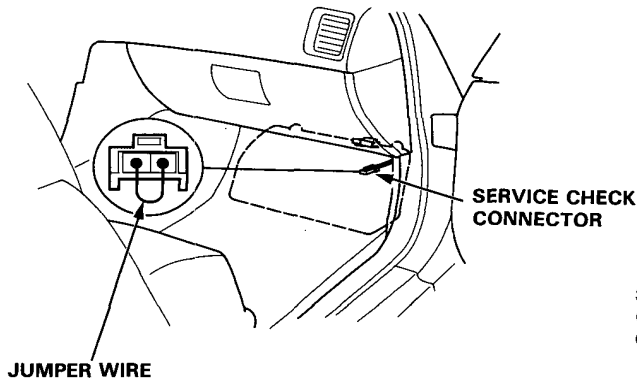
Troubleshooting

Self-diagnostic Procedures

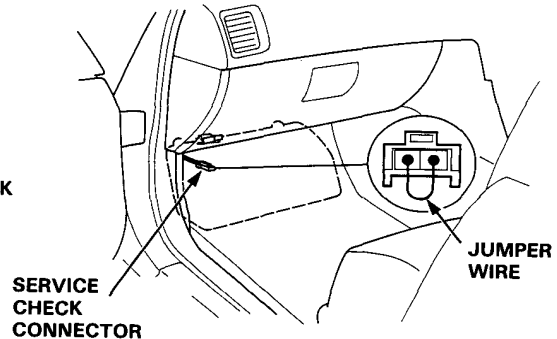
1. When the Check Engine light has been reported on, do the following:

1. Connect the Service Check Connector terminals with a jumper wire as shown (the Service Check Connector is located under the dash on the passenger side of the car). Turn the ignition switch on.

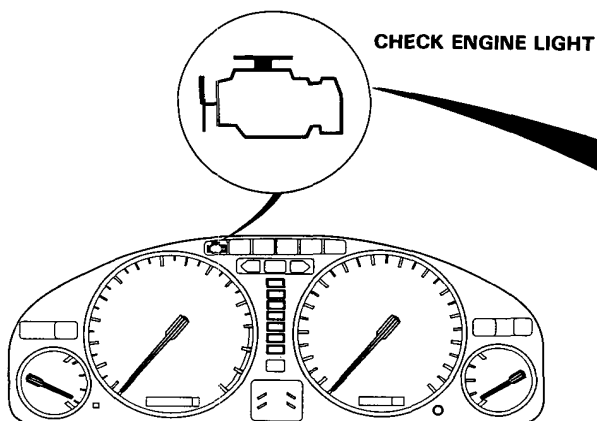
[LHD]



[RHD]



2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by individual short blinks. Problem codes 10 through 59 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit.



Separate Problems:

Short

- = See Problem CODE 1
- = See Problem CODE 3
- = See Problem CODE 13

Long short

Simultaneous Problems:

- = See Problem CODE 1 and 3
- = See Problem CODE 3 and 4
- = See Problem CODE 3 and 14



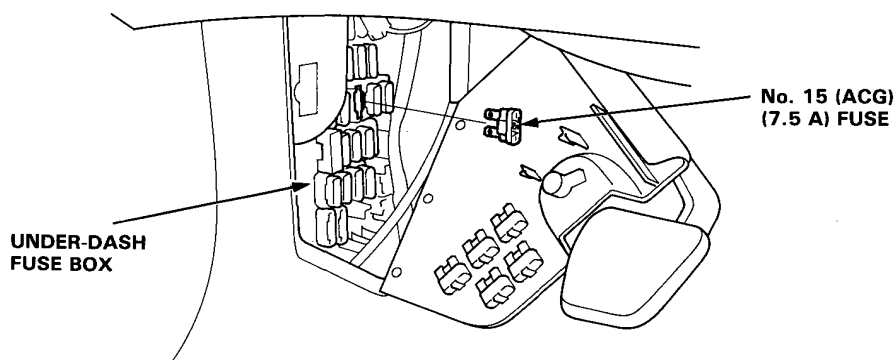
II. ECU Reset Procedure

1. Turn the ignition switch off.

2. LHD:

Remove the No. 15 (ACG) fuse (7.5 A) from the under-dash fuse box for 10 seconds to reset the ECU.

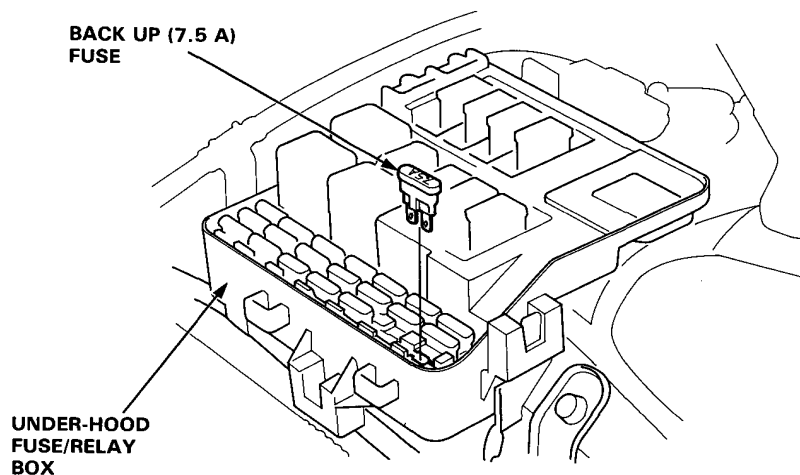
NOTE: Disconnecting the No. 15 fuse also cancels the power seat setting.



RHD:

Remove the BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset ECU.

NOTE: Disconnecting the BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



(cont'd)

Troubleshooting

Self-diagnostic Procedures (cont'd)

III. Final Procedure (this procedure must be done after any troubleshooting)

1. Remove the Jumper Wire.

NOTE: If the Service Check Connector is jumpered, the Check Engine light will stay on.

2. Do the ECU Reset Procedure.
3. Set the radio preset stations and clock setting [RHD].



SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	11-34
1	LEFT OXYGEN SENSOR (with CATA)	11-38
2	RIGHT OXYGEN SENSOR (with CATA)	11-38
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	11-46
5		
4		
6	COOLANT TEMPERATURE (TW SENSOR)	11-54
7	THROTTLE ANGLE	11-56
9	No. 1 CYLINDER POSITION 1 (CYL SENSOR)	11-52
10	INTAKE AIR TEMPERATURE (TA SENSOR)	11-58
11	IDLE MIXTURE ADJUSTMENT (IMA SENSOR) (without CATA)	11-60
12	EXHAUST GAS RECIRCULATION SYSTEM (EGR) (Except KQ)	11-131
13	ATMOSPHERIC PRESSURE (PA SENSOR)	11-62
14	ELECTRONIC AIR CONTROL (EACV)	11-74
15	IGNITION OUTPUT SIGNAL	11-64
17	VEHICLE SPEED SENSOR	11-66
18	IGNITION TIMING ADJUSTMENT	11-68
41	LEFT OXYGEN SENSOR HEATER (with CATA)	11-40
42	RIGHT OXYGEN SENSOR HEATER (with CATA)	11-40
43	LEFT FUEL SUPPLY SYSTEM (with CATA)	11-44
44	RIGHT FUEL SUPPLY SYSTEM (with CATA)	11-44
54	CRANK ANGLE 2	11-52
59	No. 1 CYLINDER POSITION 2 (CYL SENSOR)	11-52

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.
- The Check Engine light may come on, indicating a system problem when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine light and D4 indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 or 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D4 indicator light. If it comes on, see page 14-52, 53.

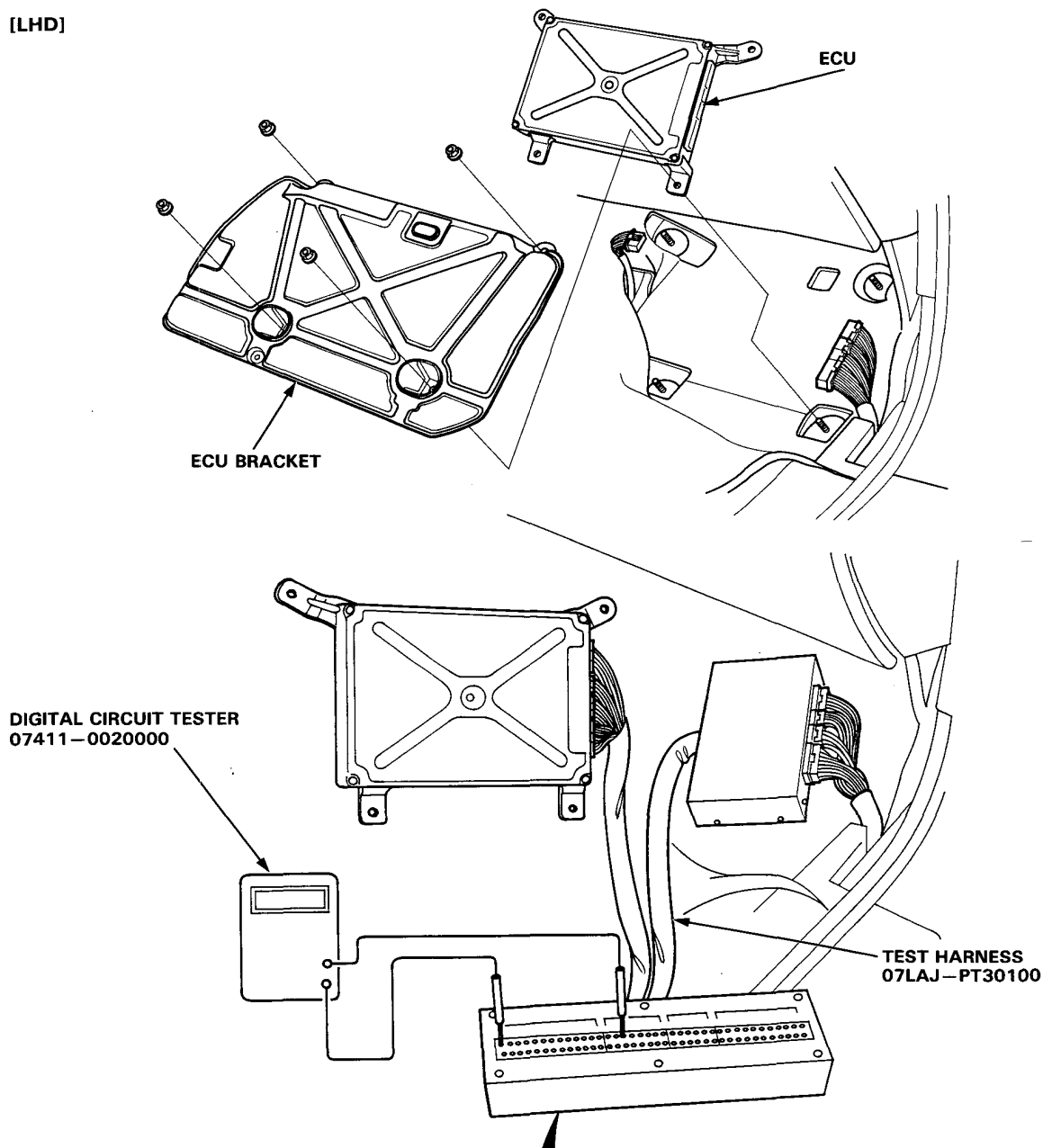
(cont'd)

Troubleshooting

Self-diagnostic Procedures (cont'd)

If the inspection for a particular failure code requires the test harness, remove the right door sill molding and the small cover on the right kick panel and pull the carpet back to expose the ECU. Unbolt the ECU bracket. Then disconnect the connector from the cooling fan control unit and connect the test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.

[LHD]



A1	A3	A5	A7	A9	A11	A13	A15	A17	A19	A21	A23	A25	B1	B3	B5	B7	B9	B11	B13	B15	C1	C3	C5	C7	C9	C11	D1	D3	D5	D7	D9	D11	D13	D15	D17	D19	D21
A2	A4	A6	A8	A10	A12	A14	A16	A18	A20	A22	A24	A26	B2	B4	B6	B8	B10	B12	B14	B16	C2	C4	C6	C8	C10	C12	D2	D4	D6	D8	D10	D12	D14	D16	D18	D20	D22

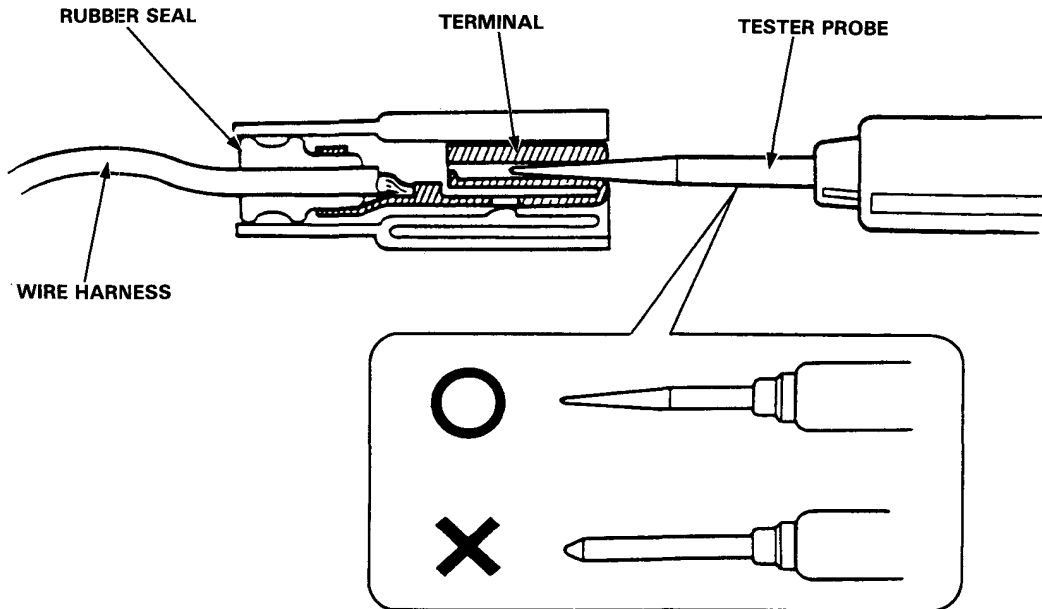
TERMINAL LOCATION

Troubleshooting

Self-diagnostic Procedures (cont'd)

CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.





How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: if you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START

(bold type)

Describes the conditions or situation to start a troubleshooting flowchart.

ACTION

Asks you to do something; perform a test, set up a condition etc.

DECISION

Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.

STOP

(bold type)

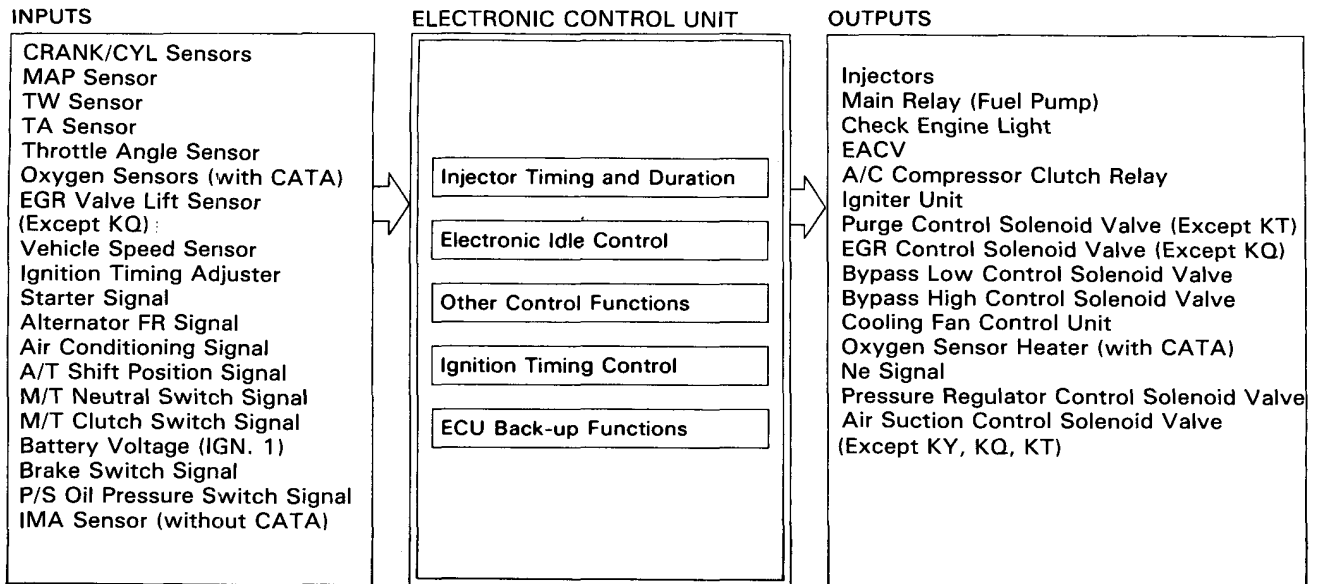
The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests. In any event, if the Check Engine light on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting.
- Most of the troubleshooting flowcharts have you reset the ECU and try to duplicate the problem code. If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly a needlessly replaced ECU.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECU's), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the test harness, check the test harness connections before proceeding.

PGM-FI Control System

System Description



Injector Timing and Duration

The ECU contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Electronic Air Control

Electronic Air Control Valve (EACV)

When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only) or the alternator is charging, the ECU controls current to the EACV to maintain correct idle speed.

Ignition Timing Control

- The ECU contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for coolant temperature.

Other Control Functions

1. Starting Control
When the engine is started, the ECU provides a rich mixture.
2. Fuel Pump Control
 - When the ignition switch is initially turned on, the ECU supplies ground to the main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
 - When the engine is running, the ECU supplies ground to the main relay that supplies current to the fuel pump.
 - When the engine is not running and the ignition is on, the ECU cuts ground to the main relay which cuts current to the fuel pump.
3. Fuel Cut-off Control
 - During deceleration with the throttle valve closed, current to the injectors is cut off to improve fuel economy at speeds over 1,050 min⁻¹ (rpm) (M/T) or 1,000 min⁻¹ (rpm) (A/T).
 - Fuel cut-off action also takes place when engine speed exceeds, 6,500 min⁻¹ (rpm) regardless of the position of the throttle valve to protect the engine from over-revving.



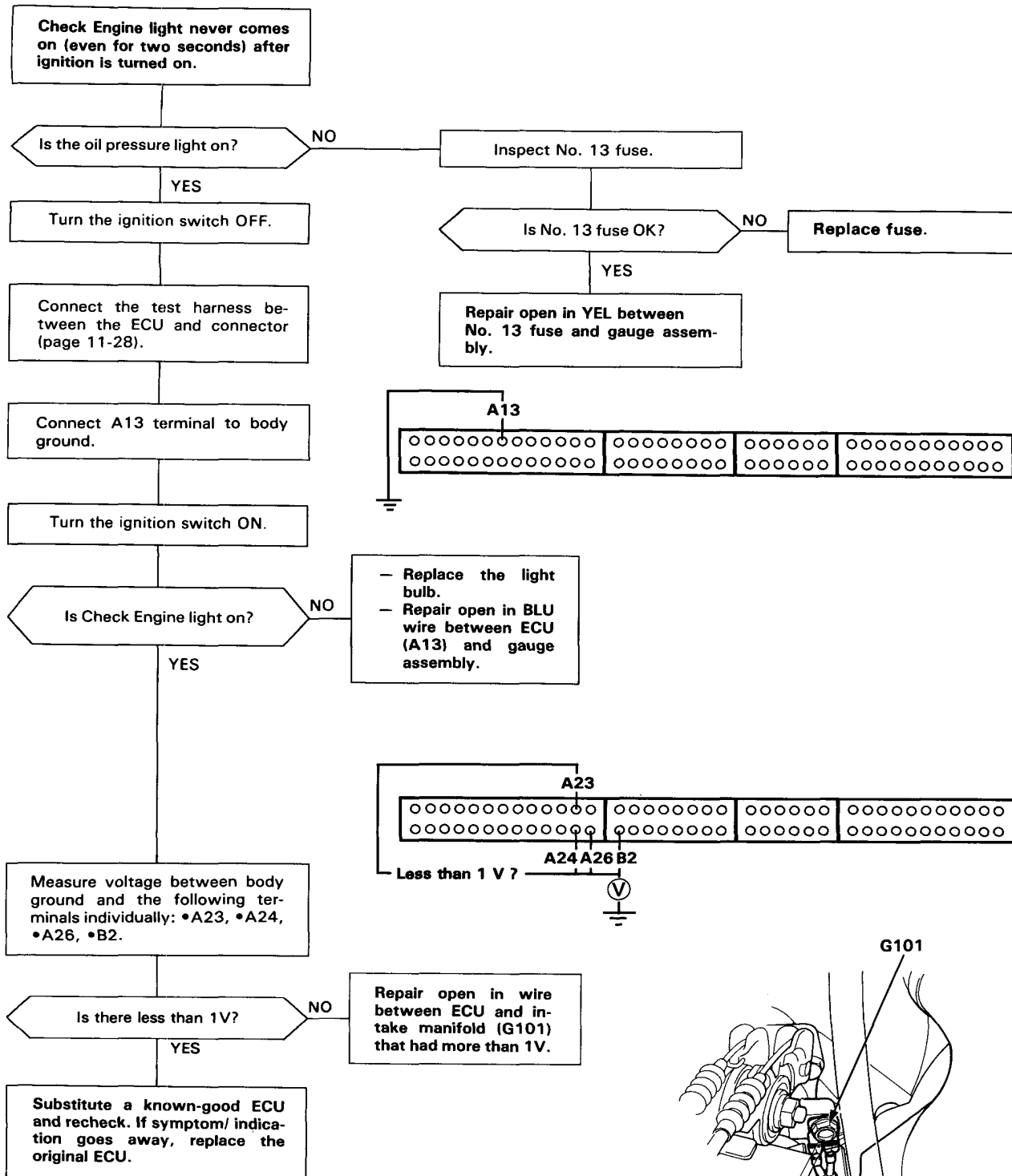
4. **A/C Compressor Clutch Relay**
When the ECU receives a demand for cooling from the air conditioning system (compressor control unit), it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.
5. **Purge Control Solenoid Valve (Except KT)**
When the coolant temperature is below 70°C (158°F), the ECU supplies a ground to the purge control solenoid valve which cuts vacuum to the purge control valve.
6. **Bypass Low Control Solenoid Valve (BLCSV), Bypass High Control Solenoid Valve (BHCSV)**
When engine speed is below 3,100 min⁻¹ (rpm), BHCSV and BLCSV are activated by a signal from the ECU. Intake air flows through a long chamber path, increasing torque at low engine speed.
When engine speed is 3,200—3,800 min⁻¹ (rpm), BLCSV is deactivated by the ECU. Intake air flows through a short chamber path, increasing mid-range torque.
When the engine speed is above 3,900 min⁻¹ (rpm), BLCSV and BHCSV are deactivated by the ECU. This creates a very short intake path and increases high-speed torque.
7. **EGR Control Solenoid Valve (EGR CSV) (Except KQ)**
When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECU supplies ground to the EGRCSV which supplies regulated vacuum to the EGR valve.
8. **Pressure Regulator Control Solenoid Valve (PRCSV)**
At engine start if the coolant temperature is above 105°C (221°F) or the intake air temperature is above 89°C (192.2°F), the PRCSV is energized, cutting manifold vacuum to the fuel pressure regulator for about 80 seconds.
9. **Air Suction Control Solenoid Valve (ASCSV) (Except KY, KQ, KT)**
During deceleration with the throttle valve closed, the ECU energizes the ASCSV which supplies vacuum to the air suction valve.

ECU Back-up Functions

1. **Fail-Safe-Function**
When an abnormality occurs in a signal from a sensor, the ECU ignores that signal and assumes a pre-programmed value that allows the engine to continue to run.
2. **Back-up Function**
When an abnormality occurs in the ECU itself, the injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.
3. **Self-diagnosis Function (Check Engine light)**
When an abnormality occurs in a signal from a sensor, the ECU lights the Check Engine light and stores the failure code in erasable memory. When the ignition is initially turned on, the ECU supplies ground for the Check Engine light for two seconds.

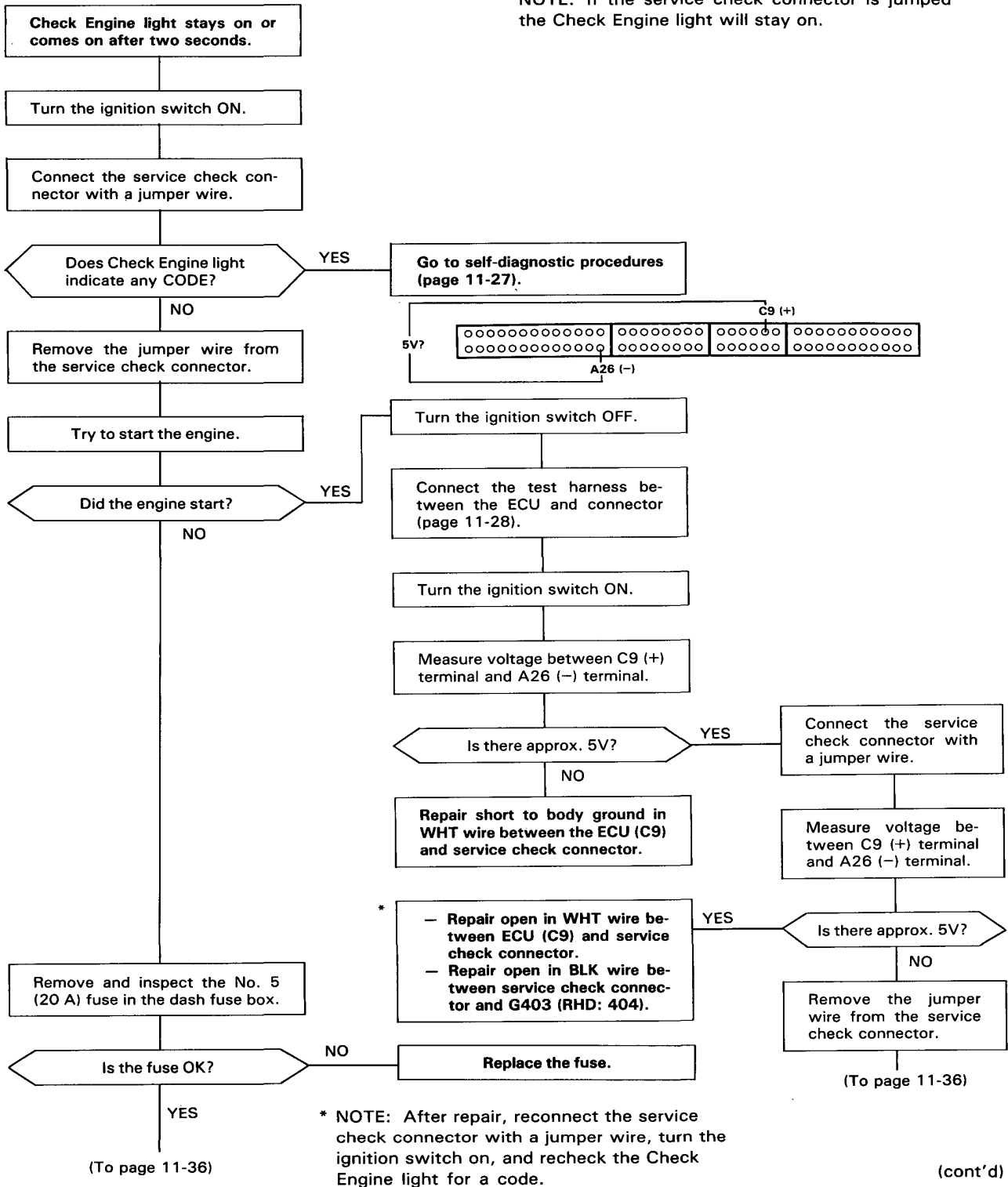
PGM-FI Control System

Troubleshooting Flowchart — ECU



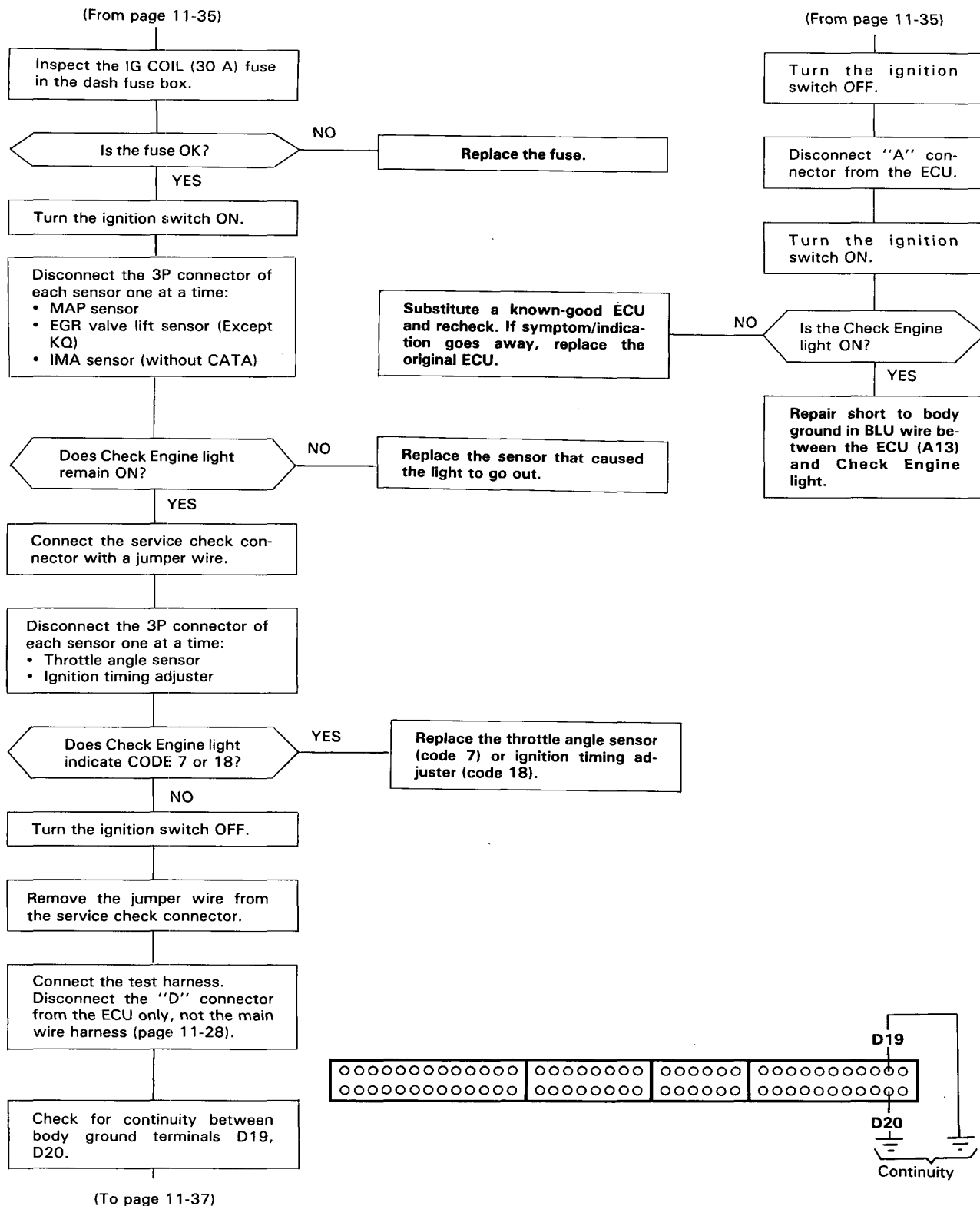


NOTE: If the service check connector is jumped the Check Engine light will stay on.



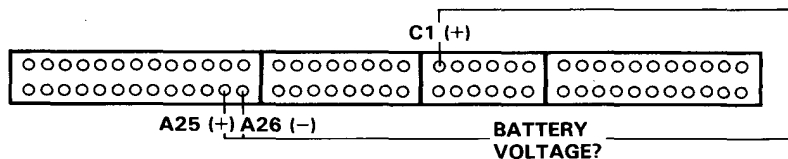
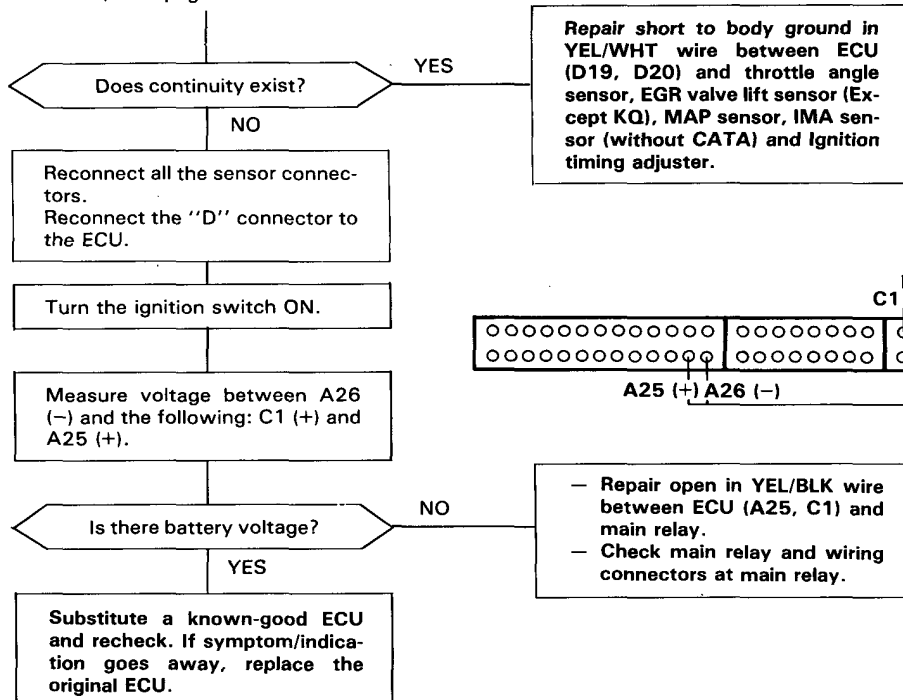
PGM-FI Control System

Troubleshooting Flowchart — ECU (cont'd)



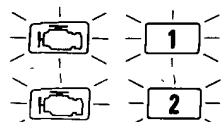


(From page 11-36)



PGM-FI Control System

Troubleshooting Flowchart — Oxygen Sensors [with CATA]



Self-diagnosis Check Engine light indicates code 1: A problem in the Left Oxygen (O₂) Sensor circuit.

Self-diagnosis Check Engine light indicates code 2: A problem in the Right Oxygen (O₂) Sensor circuit.

The oxygen sensors detect the oxygen content in the exhaust gas and signal the ECU. In operation, the ECU receives the signals from the sensors and varies the duration during which fuel is injected. The oxygen sensors have internal heaters. The heaters stabilize the sensors' output. The oxygen sensors are installed in the exhaust manifolds.

ZIRCONIA ELEMENT

HEATER

SENSOR TERMINAL

HEATER TERMINAL

VOLTAGE (V)

STOICHIOMETRIC AIR-FUEL RATIO

RICH ← AIR-FUEL RATIO → LEAN

- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 1 (Left O₂ sensor) and/or 2 (Right O₂ sensor) are indicated.

Do the ECU Reset Procedures (page 11-25).

Warm up engine to normal operating temperature (cooling fan comes on).

Run engine for 60 seconds.

Road test with the transmission in 2nd gear (M/T: 4th gear). Starting at 1200 min⁻¹ (rpm) accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

Is Check Engine light on and does it indicate CODE 1 or CODE 2?

NO

Intermittent failure, system is OK at this time. Check for poor connections or loose wires at the O₂ sensors and ECU.

YES

Go to page 11-44 and perform test for CODE 43 or CODE 44.



PGM-FI Control System

Troubleshooting Flowchart — Oxygen Sensor Heater [with CATA]

 **41** Self-diagnosis Check Engine light indicates code 41: A problem in the Left Oxygen (O₂) Sensor Heater circuit.

 **42** Self-diagnosis Check Engine light indicates code 42: A problem in the Right Oxygen (O₂) Sensor Heater circuit.

 **41** or **42**

- Engine is running.
- Check Engine light has been reported on. With service check connector jumped (page 11-24), CODE 41 and/or 42 are indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine.

Is Check Engine light on and does it indicate CODE 41 or 42?

NO

Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at O₂ sensors and ECU.

YES

Stop the engine

Disconnect the 4P connector from the O₂ sensor.

Measure resistance between terminals C and D on the O₂ sensor.

Is there 10–20 Ω?

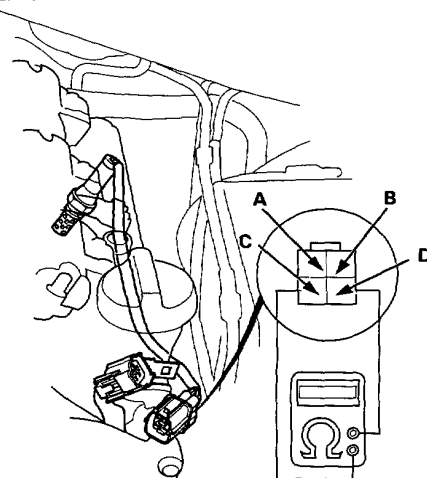
NO

Replace O₂ sensor.

YES

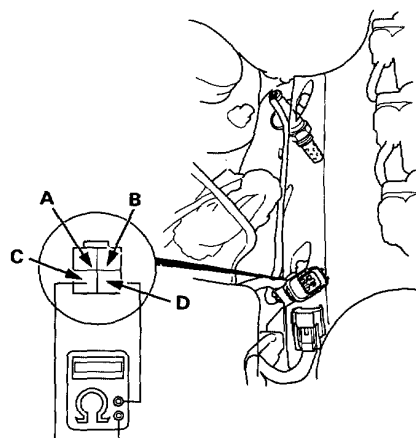
(To Page 11-41)

LEFT:



10–20 Ω
DIGITAL CIRCUIT TESTER
07411–0020000

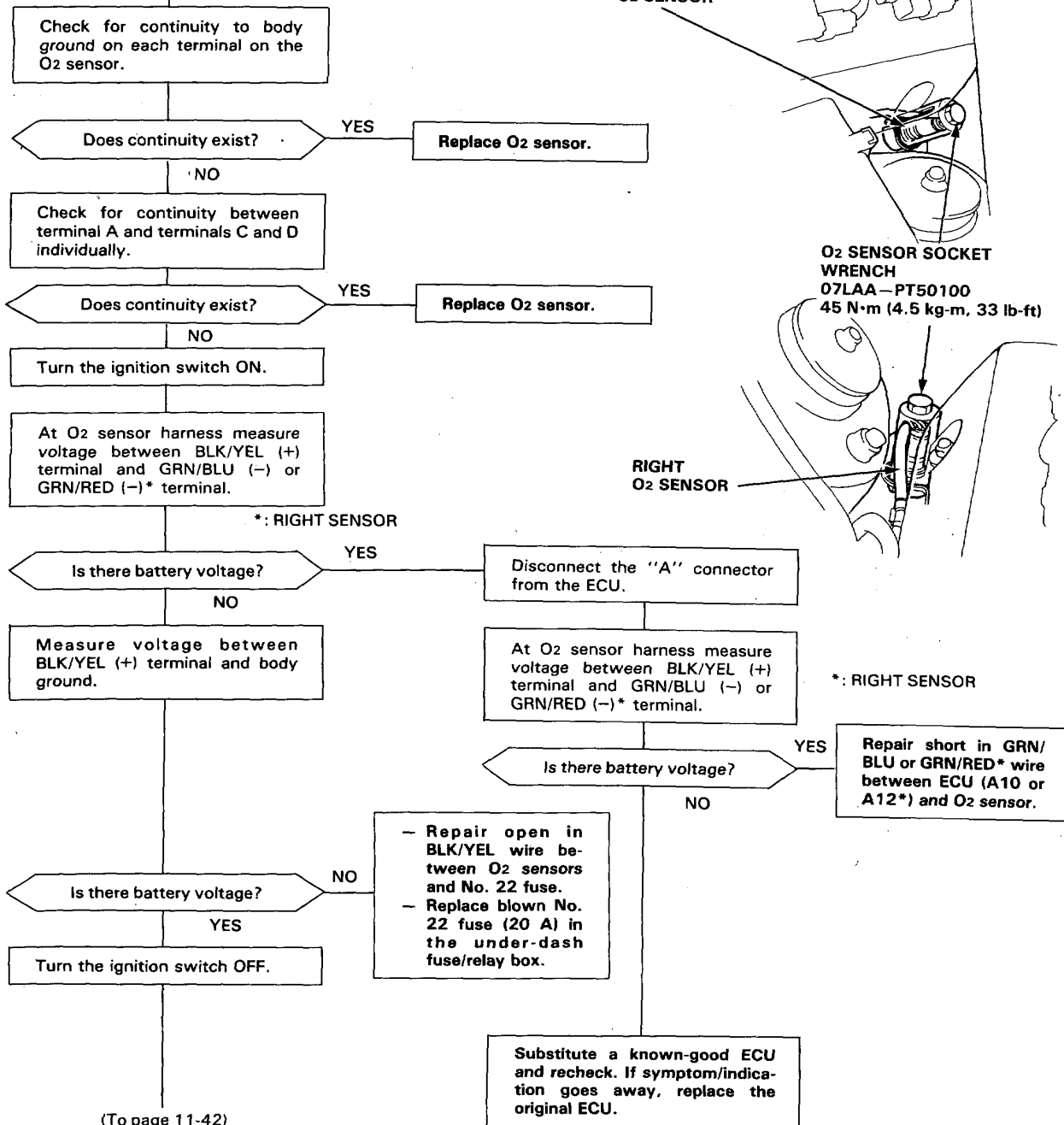
RIGHT:



10–20 Ω
DIGITAL
CIRCUIT TESTER
07411–0020000



(From page 11-40)



(To page 11-42)

(cont'd)

PGM-FI Control System

Troubleshooting Flowchart — Oxygen Sensor Heater (cont'd)

(From page 11-41)

Reconnect the 4P connector to O₂ sensor.

Connect the test harness "A" connector to the main wire harness only, not the ECU (page 11-28).

Turn the ignition switch ON.

Measure voltage between A10 (+) or A12 (+)* terminal and A23 (-) terminal.

BATTERY VOLTAGE

A23 (-)

A10 (+) A12 (+)*

*: RIGHT

*: RIGHT SENSOR

Is there battery voltage?

NO

Repair open in GRN/BLU or GRN/RED* wire between ECU (A10 or A12*) and O₂ sensor.

YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

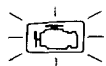


PGM-FI Control System

Troubleshooting Flowchart — Fuel Supply System [with CATA]

 **43** Self-diagnosis Check Engine light indicates code 43: Most likely a problem in the Left Oxygen (O₂) Sensor circuit or a problem in the Left Fuel Supply System.

 **44** Self-diagnosis Check Engine light indicates code 44: Most likely a problem in the Right Oxygen (O₂) Sensor circuit or a problem in the Right Fuel Supply System.

 **43** or **44**

NOTE: If 43 or 44 code is accompanied by the Check Engine light and poor driveability, go to page 11-95 Fuel Supply System.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 43 and/or 44 are indicated.
- or continued from code 1 or 2.

Do the ECU Reset Procedures (page 11-25).

Warm up engine to normal operating temperature (cooling fan comes on).

Hold engine at 3,000 min⁻¹ (rpm) for 2 minutes.
(A/T: Transmission in **N** or **P**.)

Is the Check Engine light on and does it indicate CODE 43 or 44?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at O₂ sensors and ECU.

YES

Turn the ignition switch OFF.

Connect the test harness between the ECU and connector (page 11-28).

With the ignition switch OFF, wait for at least two minutes.

Install a jumper wire on the test harness between A10 and A26 (left): or A12 and A26 (right).

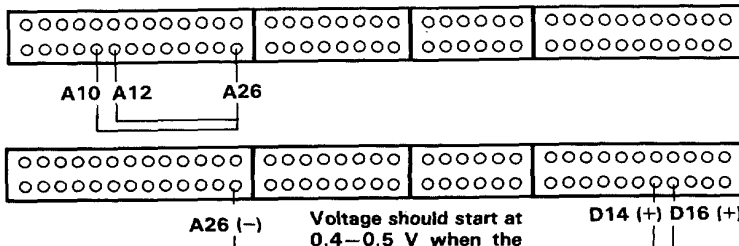
Turn the ignition switch ON.

Measure voltage between D14 (+) (left) or D16 (+) (right) terminal and A26 (-) terminal as soon as the ignition switch is turned on.

(To page 11-45)

NOTE:

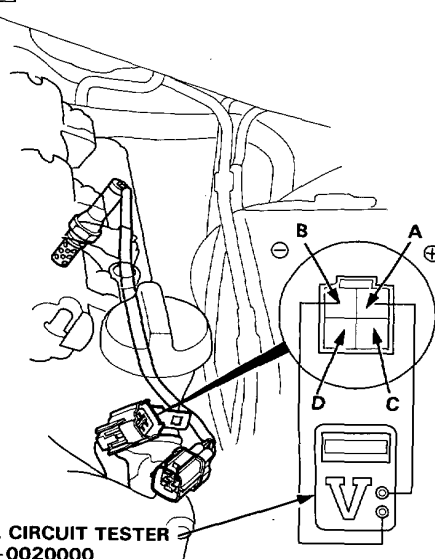
- Use DIGITAL CIRCUIT TESTER (07411-0020000) or equivalent.
- Use 2 Volt range.



Voltage should start at 0.4–0.5 V when the ignition switch is first turned on, and decrease to below 0.1 V in less than two minutes.



Diagram illustrating the 40-pin connector layout for the 68000. The connector is divided into four sections: A26 (-) with 26 pins, D14 (+) with 14 pins, D16 (+) with 16 pins, and a final section with 4 pins. The pins are arranged in two rows of 20 pins each.

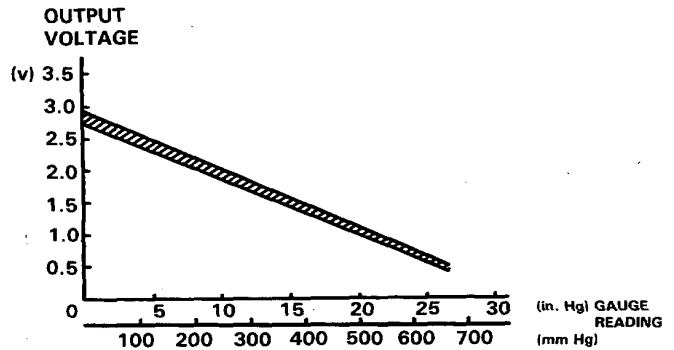
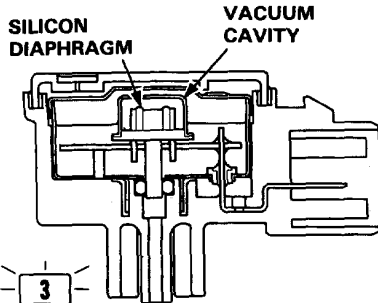


PGM-FI Control System

Troubleshooting Flowchart — MAP Sensor

-  **3** Self-diagnosis Check Engine light indicates code 3: An electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.
-  **5** Self-diagnosis Check Engine light indicates code 5: Most likely mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor System.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECU.



- Engine is warm and running.
- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 3 is indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine and allow it to idle.

Is Check Engine light on and does it indicate CODE 3?

YES

Turn the ignition switch OFF.

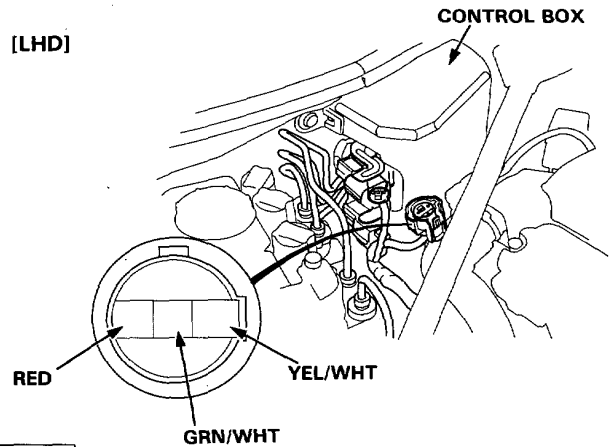
Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

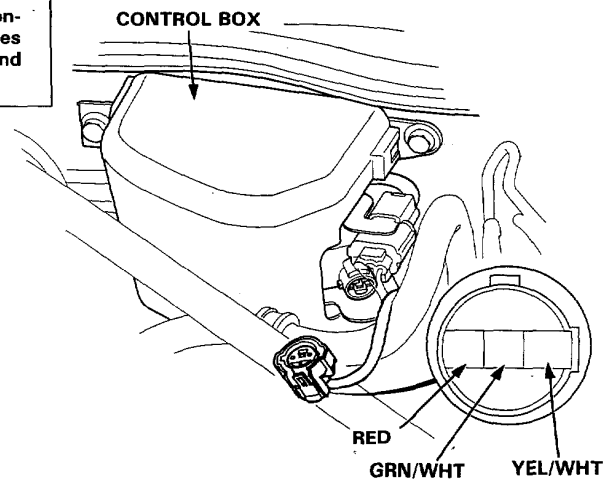
(To page 11-47)

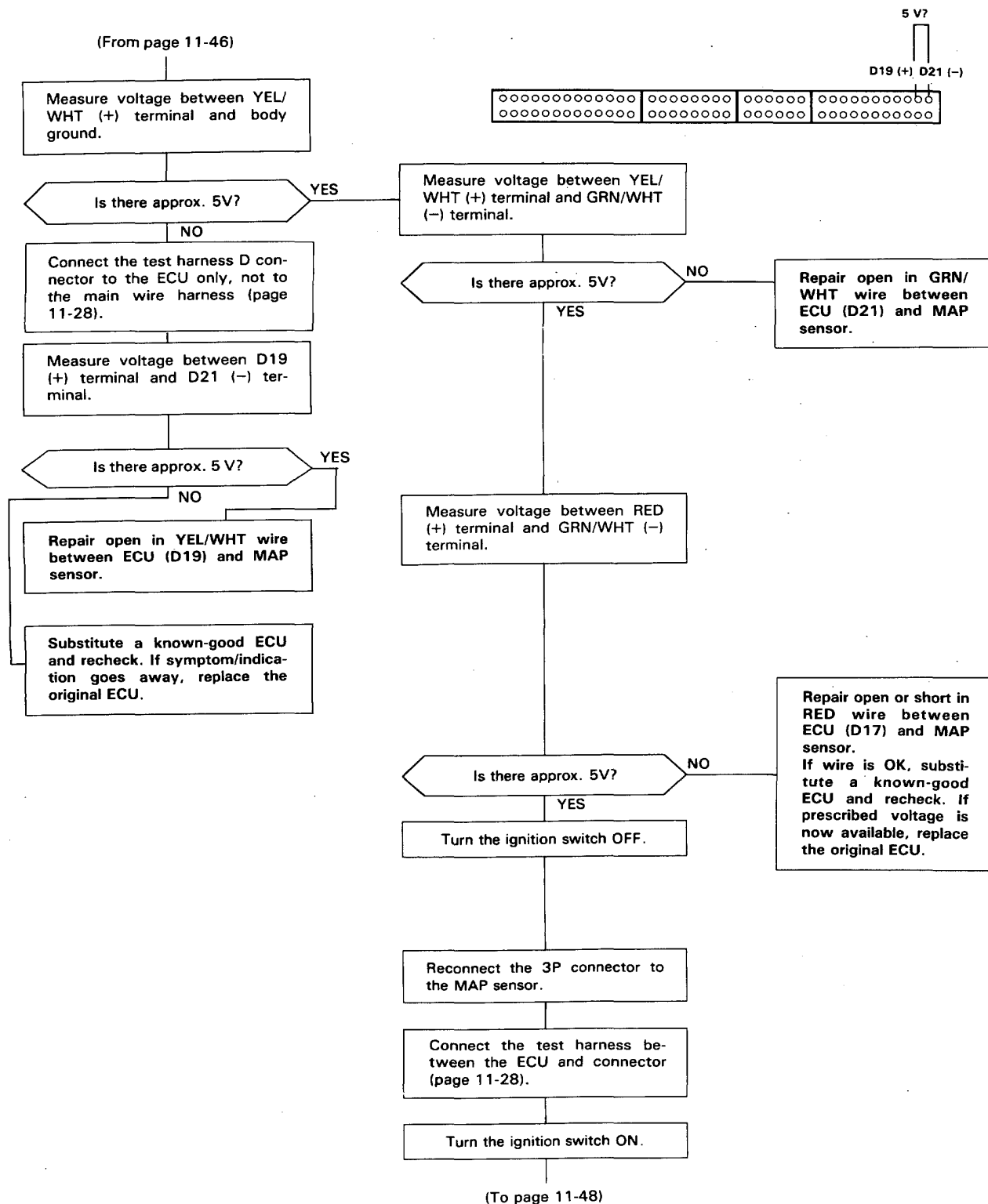
Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at MAP sensor and ECU.

[LHD]



[RHD]





(cont'd)

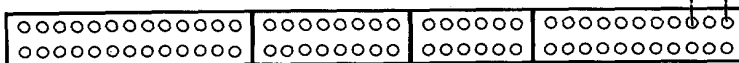
PGM-FI Control System

Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 11-47)

Measure voltage between D17 (+) terminal and D21 (-) terminal.

3 V ?
D17 (+) D21 (-)



Is there approx. 3 V ?

NO

Replace MAP sensor.

YES

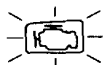
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

(cont'd)



PGM-FI Control System

Troubleshooting Flowchart — MAP Sensor (cont'd)



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 5 is indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine and keep engine rpm at idle.

Is Check Engine light on and does it indicate CODE 5?

YES

Stop the engine.

Disconnect #21 hose from the throttle body base, connect vacuum pump to the hose and apply vacuum.

Does it hold vacuum?

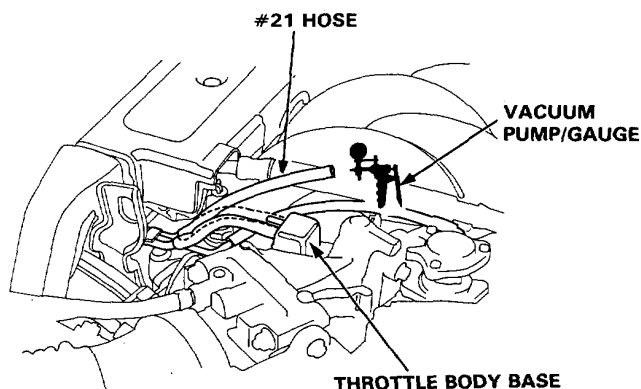
YES

Connect a T-fitting from a vacuum gauge between the throttle body base and #21 hose.

(To page 11-51)

NO

- Intermittent failure, system is OK at this time (test drive may be necessary).
- Check vacuum hoses, pipes and connections.
- Make sure all connectors are secure.



Connect a vacuum pump to the MAP sensor and apply vacuum.

Does it hold vacuum?

YES

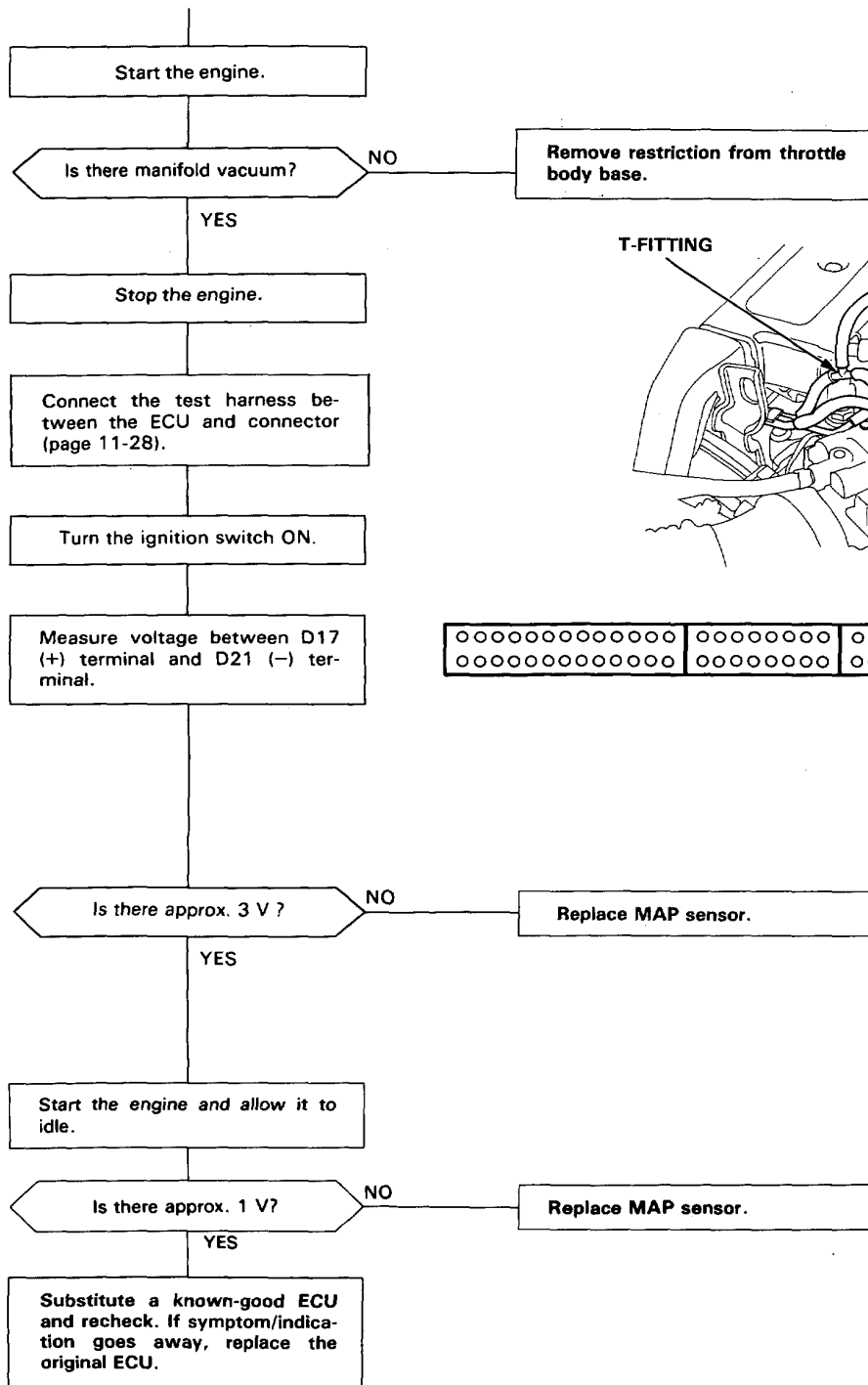
Repair vacuum leak in hose routing between MAP sensor and intake manifold.

NO

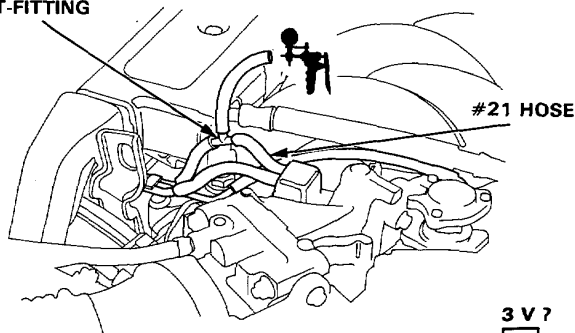
Replace MAP sensor.



(From page 11-50)



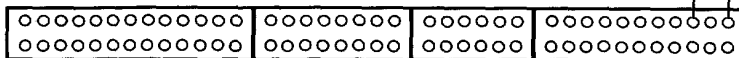
T-FITTING



#21 HOSE

3 V?

D17 (+) D21 (-)

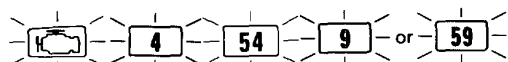


PGM-FI Control System

Troubleshooting Flowchart — CRANK/CYL Sensor

-  **4** Self-diagnosis Check Engine light indicates code 4: A problem in the circuit of the CRANK 1 Sensor.
-  **54** Self-diagnosis Check Engine light indicates code 54: A problem in the circuit of the CRANK 2 Sensor.
-  **9** Self-diagnosis Check Engine light indicates code 9: A problem in the circuit of the CYL 1 Sensor.
-  **59** Self-diagnosis Check Engine light indicates code 59: A problem in the circuit of the CYL 2 Sensor.

The CRANK sensor determines timing for fuel injection and ignition of each cylinder and also detects engine speed. The CYL sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder and ignition timing.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 4, 54, 9 and/or 59 are indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine.

Is Check Engine light on and does it indicate CODE 4, 54, 9 or 59?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at CRANK/CYL sensor and ECU.

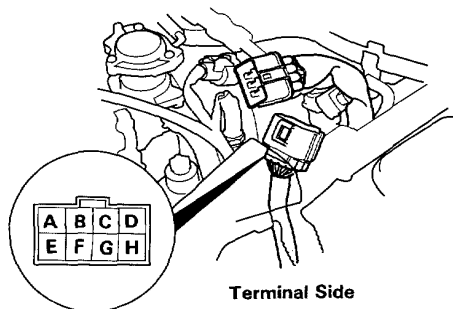
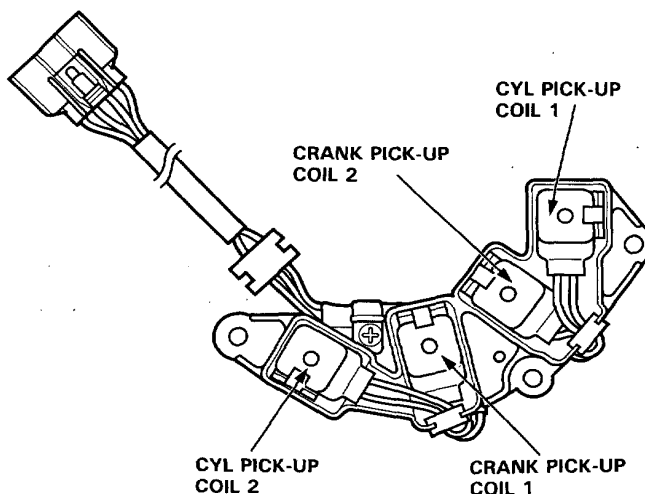
YES

Stop the engine.

Remove the engine harness cover.

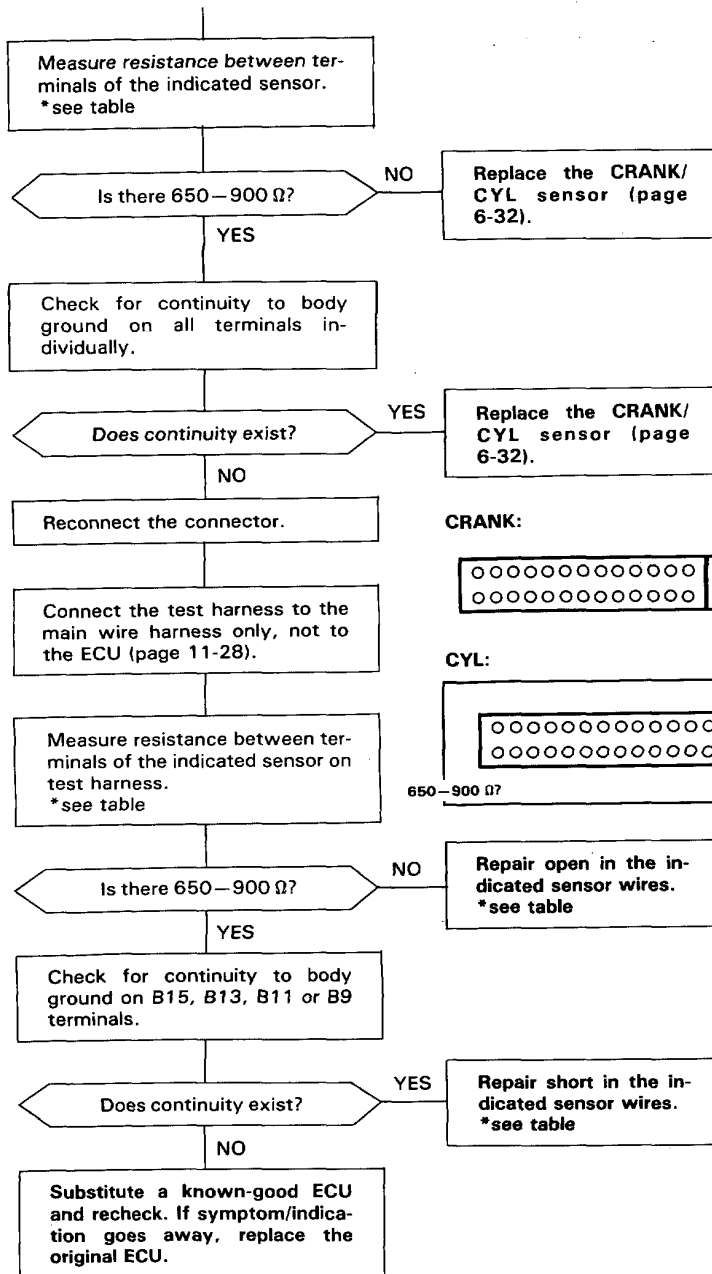
Disconnect the 8P connector from the CRANK/CYL sensor.

(To page 11-53)

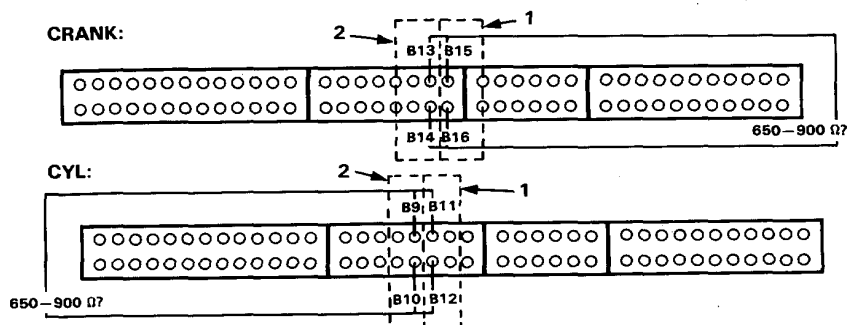




(From page 11-52)

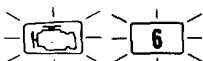


SENSOR	CODE	SENSOR TERMINAL	ECU TERMINAL	WIRE COLOR
CRANK 1	4	A	B15	PNK
		B	B16	GRY
CRANK 2	54	C	B14	GRN/WHT
		D	B13	BLK/WHT
CYL 1	9	G	B12	BLU/YEL
		H	B11	YEL/GRN
CYL 2	59	E	B9	ORN
		F	B10	WHT



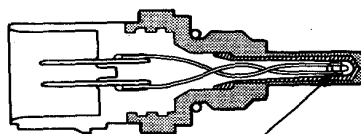
PGM-FI Control System

Troubleshooting Flowchart — TW Sensor



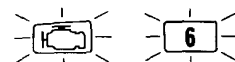
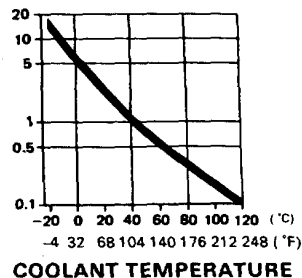
Self-diagnosis Check Engine light indicates code 6: A problem in the Coolant Temperature (TW) Sensor circuit.

The TW sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the coolant temperature increases as shown below.



THERMISTOR

RESISTANCE
(k Ω)



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 6 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 6?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at TW sensor and ECU.

YES

Warm up engine to normal operating temperature (cooling fan comes on).

Turn the ignition switch OFF.

Remove the engine harness cover.

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400 Ω ?

NO

Replace TW sensor.

YES

(To page 11-55)



(From page 11-54)

Turn the ignition switch ON.

Measure voltage between RED/
WHT and body ground.

Is there approx. 5V?

NO

Connect the test harness D connector to the ECU only, not to the main wire harness (page 11-28).

Measure voltage between D13 (+) terminal and D22 (-) terminal.

Is there approx. 5V?

NO

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

YES

Measure voltage between RED/
WHT (+) terminal and GRN/WHT
(-) terminal.

Is there approx. 5V?

NO

Repair open in GRN/
WHT wire between
ECU (D22) and TW
sensor.

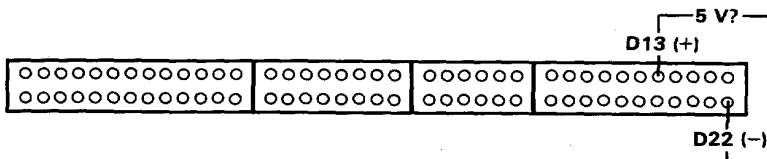
YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

GRN/WHT

RED/WHT

TW SENSOR

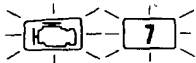


YES

Repair open or short in RED/WHT wire between ECU (D13) and sensor.

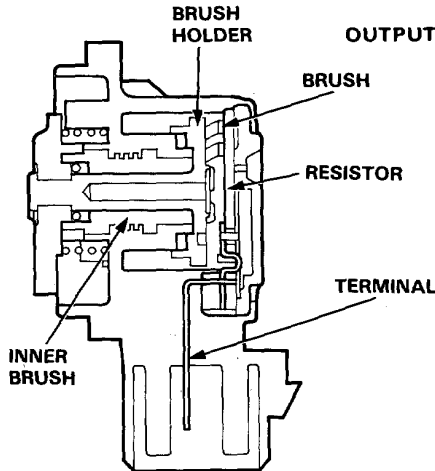
PGM-FI Control System

Troubleshooting Flowchart — Throttle Angle Sensor

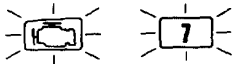
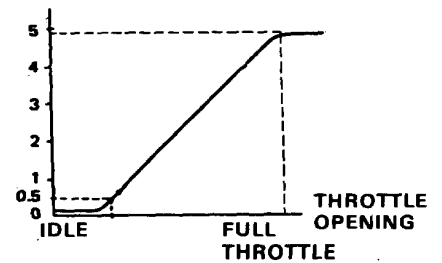


Self-diagnosis Check Engine light indicates code 7: A problem in the Throttle Angle Sensor circuit.

The throttle angle sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle angle changes, the throttle angle sensor varies the voltage signal to the ECU.



OUTPUT VOLTAGE (V)



- Engine is running.
- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 7 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 7?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at throttle angle sensor and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the throttle angle sensor.

Turn the ignition switch ON.

Measure voltage between YEL/ WHT (+) terminal and GRN/ WHT (-) terminal.

Is there approx. 5V ?

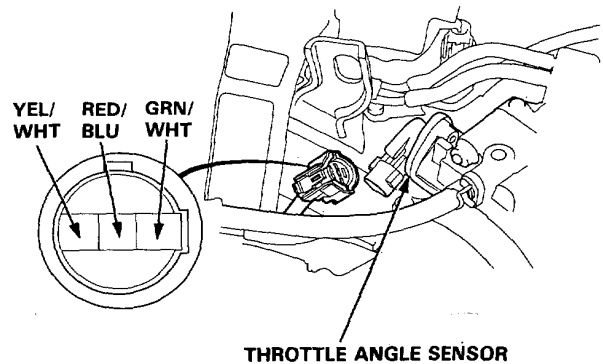
NO

Measure voltage between YEL/ WHT (+) terminal and body ground.

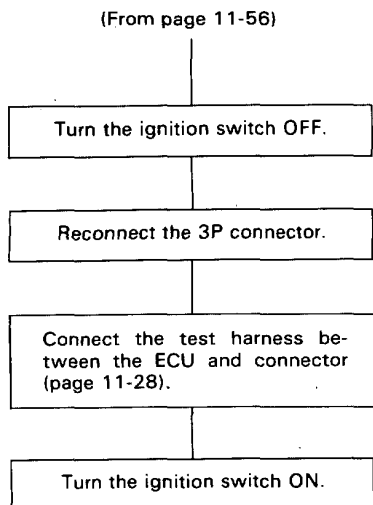
YES

(To page 11-57)

(To page 11-57)



THROTTLE ANGLE SENSOR



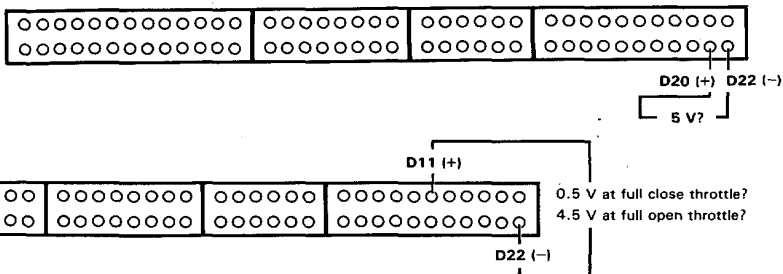
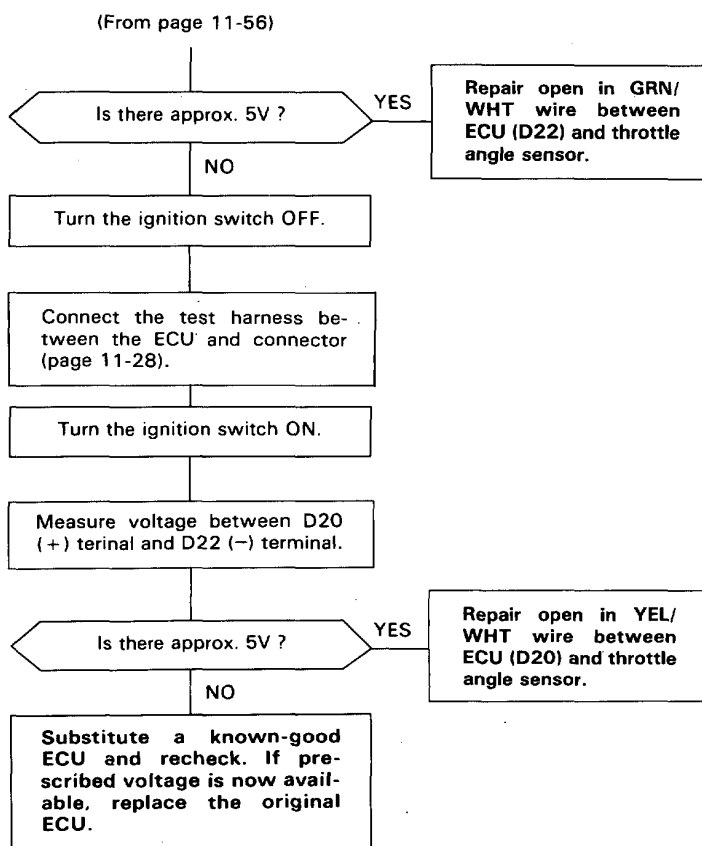
Measure voltage between D11(+) terminal and D22 (-) terminal.

Is voltage 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to approx. 4.5 V as the throttle is depressed.

NO

YES

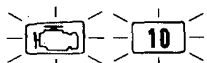
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



- Replace throttle angle sensor.
- Repair open or short in RED/BLU wire between ECU (D11) and throttle angle sensor.

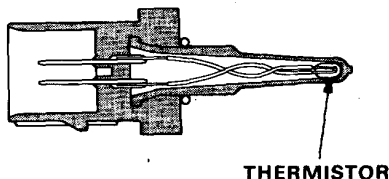
PGM-FI Control System

Troubleshooting Flowchart — TA Sensor

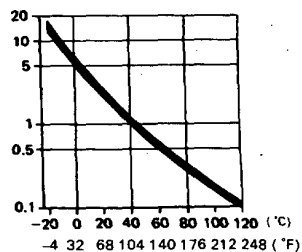


Self-diagnosis Check Engine light indicates code 10: A problem in the Intake Air Temperature (TA) Sensor circuit.

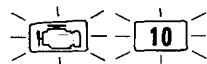
The TA sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.



RESISTANCE (k Ω)



INTAKE AIR TEMPERATURE



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 10 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 10?

NO

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 0.4 — 4.0 k Ω ?

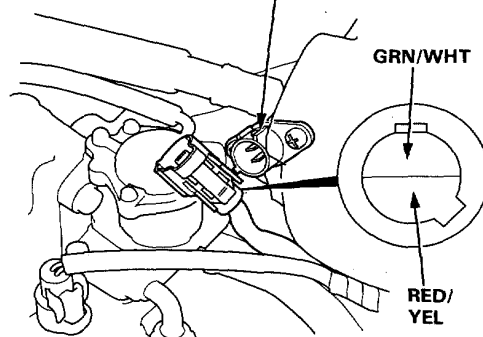
NO

Replace TA sensor.

YES

(To page 11-59)

TA SENSOR

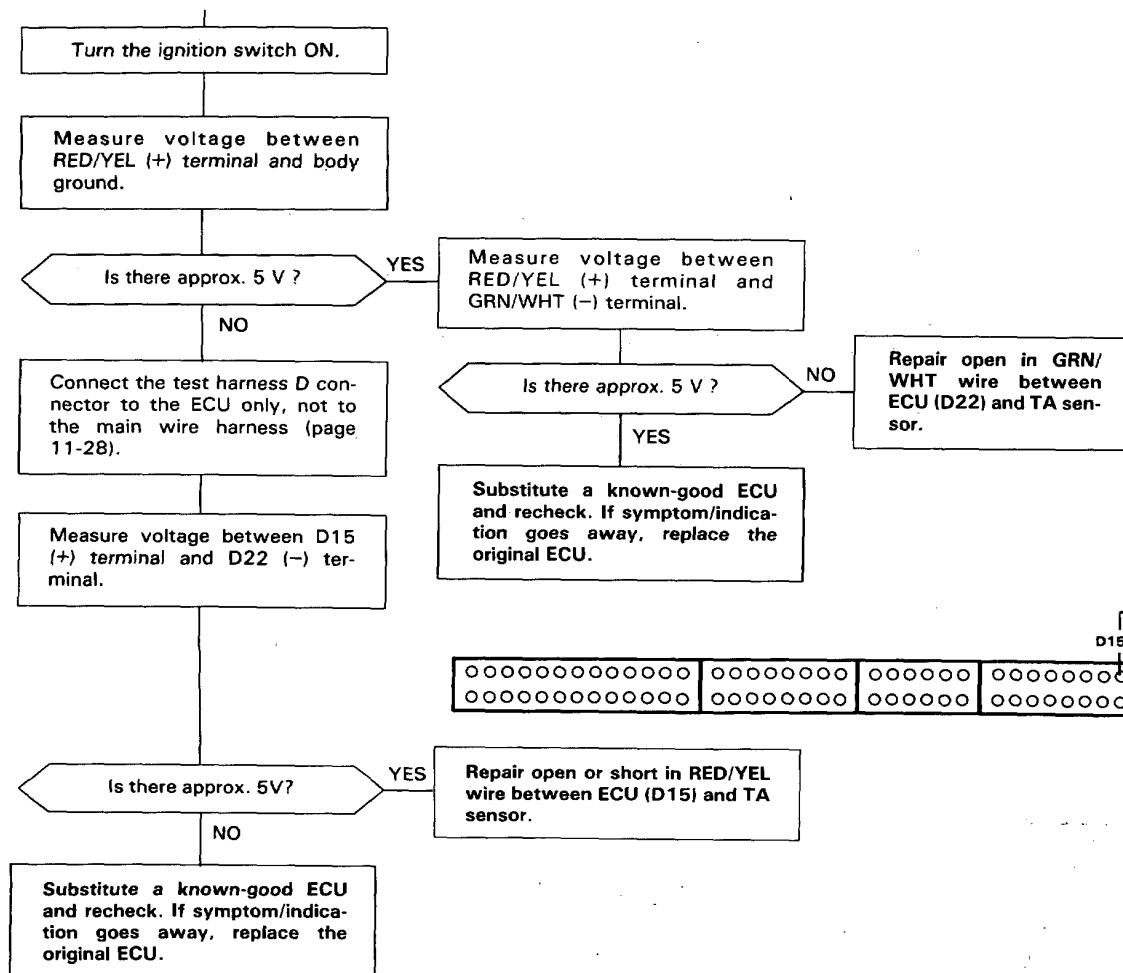


GRN/WHT

RED/
YEL



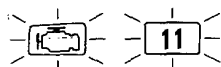
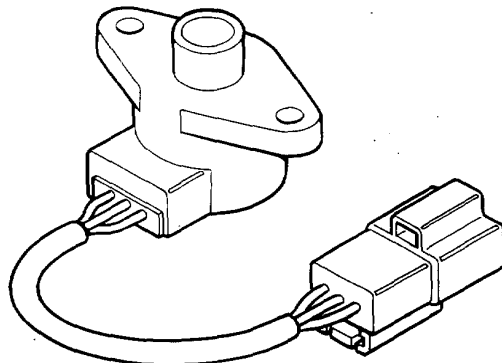
(From page 11-58)



PGM-FI Control SYSTEM

Troubleshooting Flow Chart — IMA Sensor [Without CATA]

 **11** Self-diagnosis Check Engine light indicates code 11: Most likely a problem in the IMA Sensor circuit.
The IMA sensor is selected resistance device used to control idle mixture.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 11 is indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine.

Is Check Engine light on and does it indicate CODE 11?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at IMA sensor and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the IMA sensor.

Measure resistance between A terminal and C terminal on IMA sensor harness.

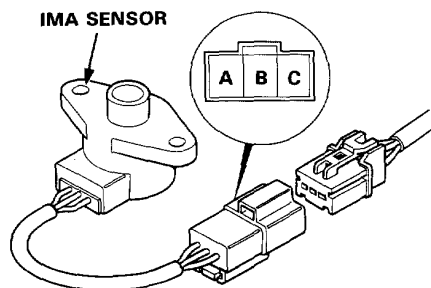
Is there 3.5—6.5 k Ω ?

NO

Replace IMA sensor.

YES

(To page 11-61)





(From page 11-60)

Measure resistance between A and B terminals and between C and B terminals.

Does the sum of the two resistance checks equal 3.5–6.5 k Ω ?

NO

Replace IMA sensor.

YES

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (–) terminal on the wire harness.

Is there approx. 5 V?

NO

Measure voltage between YEL/WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Connect the test harness between the ECU and connector (page 11-28).

Turn the ignition switch ON.

Measure voltage between D14 (+) terminal and D22 (–) terminal.

Is voltage 0.5–4.5 V?

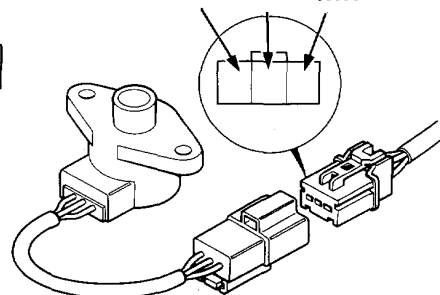
NO

Repair open or short in PNK wire between ECU (D14) and IMA sensor.

YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

GRN/WHT PNK YEL/WHT



Repair open in GRN/WHT wire between ECU (D22) and IMA sensor.

Is there approx. 5 V?

YES

NO

Turn the ignition switch OFF.

Connect the test harness between the ECU and connector (page 11-28).

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (–) terminal.

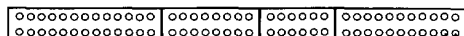
Is there approx. 5 V?

YES

Repair open in YEL/WHT wire between ECU (D20) and IMA sensor.

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.



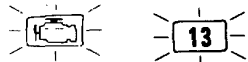
D20 (+) D22 (–)
5 V?

PGM-FI Control System

Troubleshooting Flowchart — PA Sensor

 **13** Self-diagnosis Check Engine light indicates code 13: A problem in the Atmospheric Pressure (PA) Sensor.

The PA sensor is built into the ECU.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 13 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 13?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).

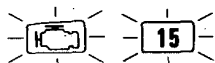
YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



PGM-FI Control System

Troubleshooting Flowchart — Ignition Output Signal



Self-diagnosis Check Engine light indicates code 15: A problem in the Ignition Output Signal circuit.

- Check Engine light has been reported on.
- With service check connector jumped (see page 11-24), CODE 15 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 15?

NO

Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at igniter unit, ECU and G102.

YES

Turn the ignition switch OFF.

Disconnect the 8P connector from the igniter unit.

Check for continuity to body ground on C and F terminals individually.

Does continuity exist?

NO

Repair open in BLK wire between 8P connector and G102.

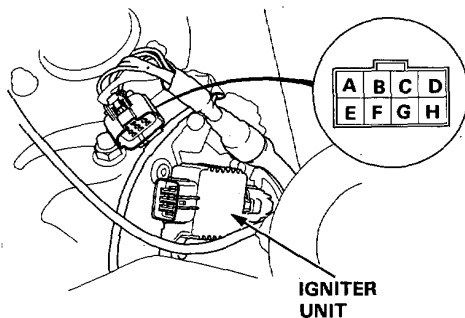
YES

Disconnect the 6P connector from the igniter unit.

Connect the test harness between the ECU and connector (page 11-28).

NOTE:
Inspection of igniter unit secondary circuit (Section 23).

(To page 11-65)



*1:

IGNITER UNIT SECONDARY TERMINAL (8P)	IGNITION COIL (2P)	WIRE COLOR
A	No. 1	WHT
B	No. 2	WHT/GRN
C	GROUND	BLK
D	No. 3	WHT/BLK
E	No. 4	WHT/BLU
F	GROUND	BLK
G	No. 5	WHT/YEL
H	No. 6	WHT/RED



(From page 11-64)

Check for continuity between body ground and the following terminals: A21, A22, B8, B6, B4, B3.

Does continuity exist?

YES

Repair short in each terminal wire.

NO

Check for continuity between terminals of 6P connector and ECU individually. *See table 2.

Does continuity exist?

NO

Repair open in each terminal wire.

YES

Substitute a known-good igniter unit and recheck.

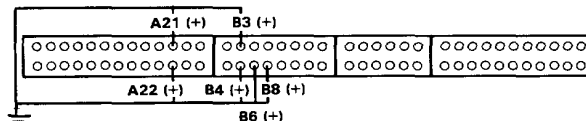
Does Check Engine light indicate CODE 15?

NO

Replace the original igniter unit.

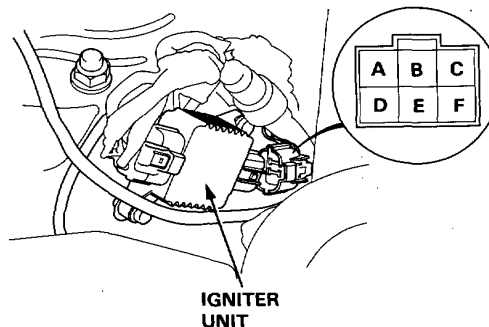
YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



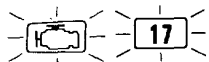
*2:

IGNITER UNIT PRIMARY TERMINAL (6P)	ECU TERMINAL	WIRE COLOR
A	B8 (No. 3)	BLU
B	A22 (No. 2)	BRN
C	A21 (No. 1)	PNK
D	B3 (No. 6)	RED
E	B4 (No. 5)	GRY
F	B6 (No. 4)	GRN



PGM-FI Control System

Troubleshooting Flowchart — Vehicle Speed Sensor



Self-diagnosis Check Engine light indicates code 17: A problem in the Vehicle Speed Sensor circuit.

The signal generated by the speed sensor, produces pulses when the front wheels turn.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 17 is indicated.

Do the ECU Reset Procedures (page 11-25).

Road test necessary.
In 2nd gear accelerate to 4,000 min^{-1} (rpm), then decelerate to 1,500 min^{-1} (rpm) with throttle fully closed.

Is Check Engine light on and does it indicate CODE 17?

NO

Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at speed sensor and ECU.

YES

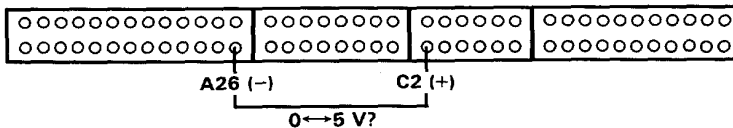
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

⚠ WARNING Block rear wheels before jacking up front of car.

Connect the test harness between the ECU and connector (page 11-28).

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between C2 (+) terminal and A26 (-) terminal.



Does voltage pulse 0 V and 5 V?

NO

- Repair open or short in YEL/RED wire between ECU (C2) and the speed sensor.
- Faulty speed sensor.
- Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

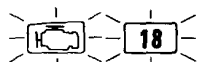
YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



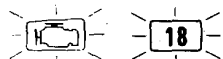
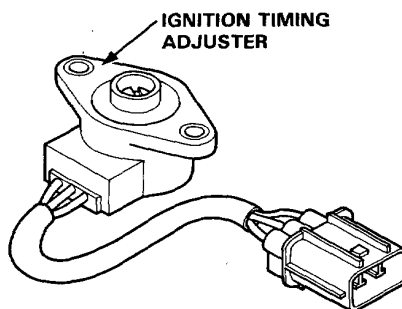
PGM-FI Control System

Troubleshooting Flowchart — Ignition Timing Adjuster



Self-diagnosis Check Engine light indicates code 18: A problem in the Ignition Timing Adjuster circuit.

The ignition timing adjuster allows the electronic ignition advance to be set to 15° BTDC at idle.



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 18 is indicated.

Do the ECU Reset Procedures (page 11-25).

Turn the ignition switch ON.

Is Check Engine light on and does it indicate CODE 18?

NO

Intermittent failure system is OK at this time (Test drive may be necessary). Check for poor connections or loose wires at ignition timing adjuster and ECU.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the control box.

Measure resistance between A terminal and C terminal on Ignition timing adjuster.

Is there 3.5—6.5 kΩ?

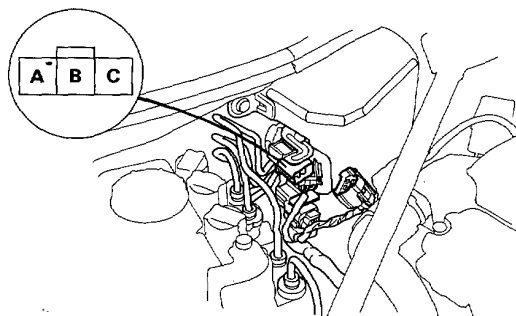
NO

Replace Ignition timing adjuster (Section 23).

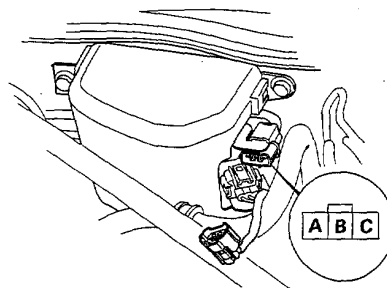
YES

(To page 11-69)

[LHD]



[RHD]





[LHD]

(From page 11-68)

Measure resistance between A and B terminals and between C and B terminals.

Does the sum of the two resistance checks equal 3.5–6.5 kΩ?

NO

Replace Ignition timing adjuster (Section 23).

YES

Turn the ignition switch ON.

Measure voltage between YEL/ WHT (+) terminal and GRN/ WHT (–) terminal on the main wire harness.

Is there approx. 5 V?

NO

Measure voltage between YEL/ WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Reconnect 3P connector.

Connect the test harness between the ECU and connector (page 11-28).

Turn the ignition switch ON.

Measure voltage between D8 (+) terminal and D22 (–) terminal.

Is there 0.5–4.5 V?

NO

Repair open or short in BLU/YEL (RHD: BRN) wire between ECU (D8) and Ignition timing adjuster.

YES

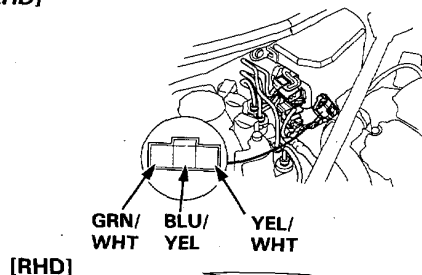
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Is there approx. 5 V?

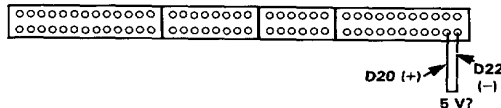
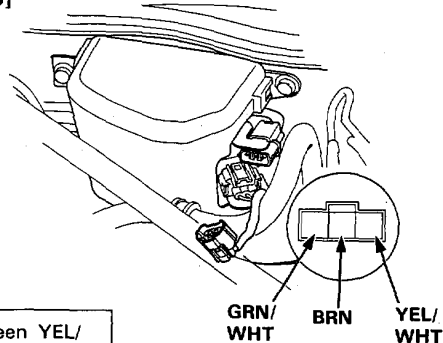
NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Repair open in YEL/ WHT wire between ECU (D20) and Ignition timing adjuster.



[RHD]



D20 (+)
D22 (–)
5 V?

Idle Control System

System Troubleshooting Guide

NOTE:

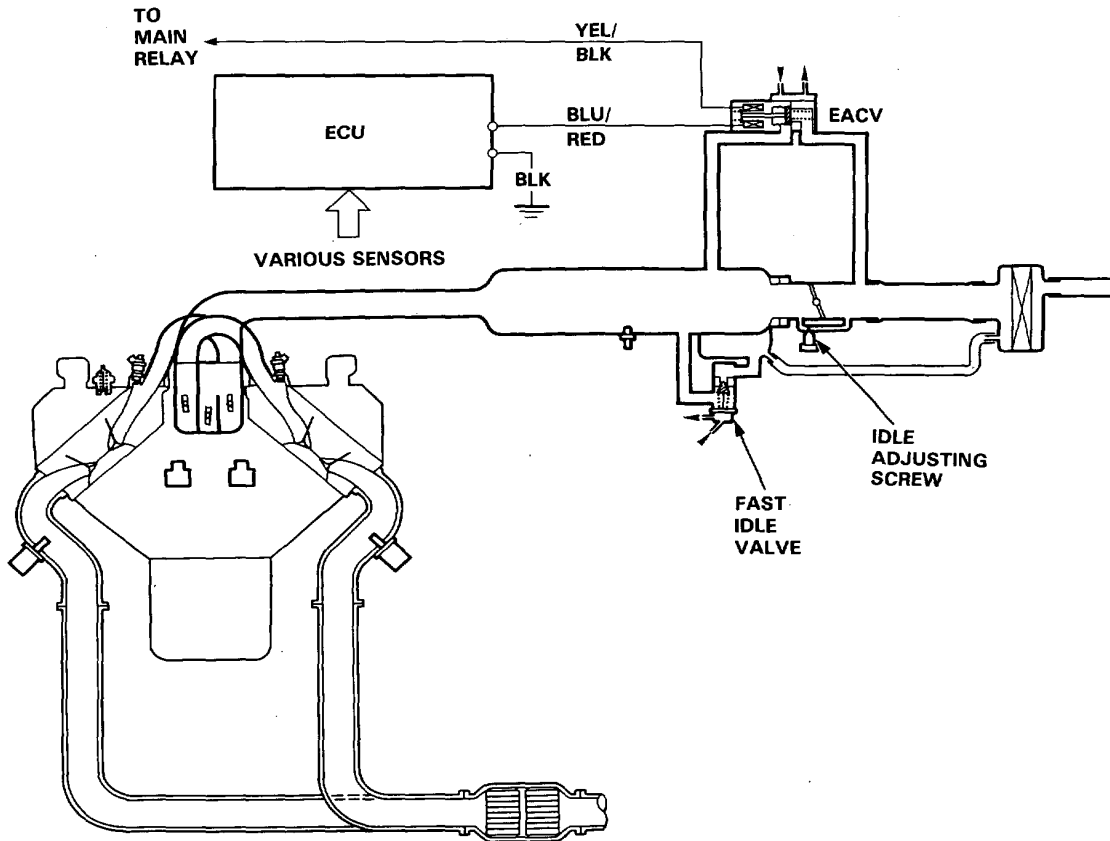
- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Check Engine light does not blink CODE 14, go to inspection described on page 11-73.

PAGE	SUB SYSTEM	IDLE ADJUSTING SCREW	EACV	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL	M/T NEUTRAL SWITCH SIGNAL	M/T CLUTCH SWITCH SIGNAL	STARTER SWITCH SIGNAL	BRAKE SWITCH SIGNAL	P/S OIL PRESSURE SWITCH SIGNAL	FAST IDLE VALVE	AIR BOOST VALVE	HOSES AND CONNECTIONS
SYMPTOM		93	74	76	78	80	82	84	86	88	90	91	92	*
DIFFICULT TO START ENGINE WHEN COLD												①	②	
WHEN COLD FAST IDLE OUT OF SPEC (1,000—2,000 min ⁻¹ , rpm)		③	②									①		
ROUGH IDLE			②											①
WHEN WARM ENGINE SPEED TOO HIGH		③	①								③	②		③
WHEN WARM ENGINE SPEED TOO LOW	Idle speed is below specified engine speed (no load)	②	①											
	Idle speed does not increase after initial start up.		①											
	On models with automatic transmission, the idle speed drops in gear		②			①								
	Idle speed drops when air conditioner is ON		②	①										
	Idle speed drops when steering wheel is turning		②								①			
	Idle speed fluctuates with electrical load		②		③									①
FREQUENT STALLING	WHILE WARMING UP	②	①											
	AFTER WARMING UP	①	②											
FAILS EMISSION TEST														①



System Description

The idle speed of the engine is controlled by the Electronic Air Control Valve (EACV). The valve changes the amount of air bypassing into the intake manifold in response to electric current sent from the ECU. When the EACV is activated, the valve opens to maintain the proper idle speed.

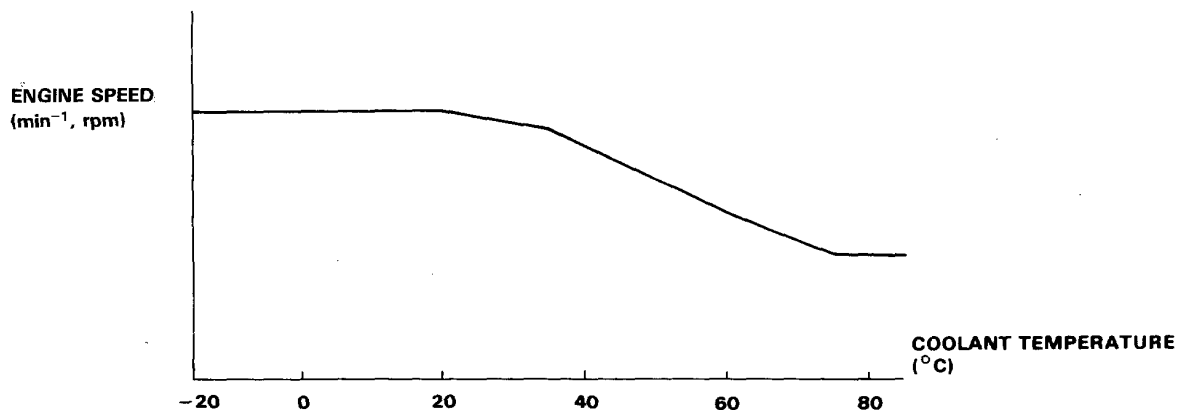


(cont'd)

Idle Control System

System Description (cont'd)

1. After the engine starts, the EACV opens for a certain time. The amount of air is increased to raise the idle speed about $150 - 30 \text{ min}^{-1}$ (rpm).
2. When the coolant temperature is low, the EACV is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the coolant temperature.

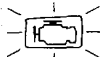




1. When the idle speed is out of specification and the Check Engine light does not blink CODE 14, check the following items:
 - Adjust the idle speed (page 11-93)
 - Air conditioning signal (page 11-76)
 - Alternator FR signal (page 11-78)
 - A/T shift position signal (page 11-80)
 - M/T neutral switch signal (page 11-82)
 - M/T clutch switch signal (page 11-84)
 - Starter switch signal (page 11-86)
 - Brake switch signal (page 11-88)
 - P/S oil pressure switch signal (page 11-90)
 - Fast idle valve (page 11-91)
 - Air boost valve (page 11-92)
 - Hoses and connections
 - EACV and its mounting O-rings
2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 11-93).
 - If the idle speed still cannot be adjusted to specification (and the Check Engine light does not blink CODE 14) after EACV replacement, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

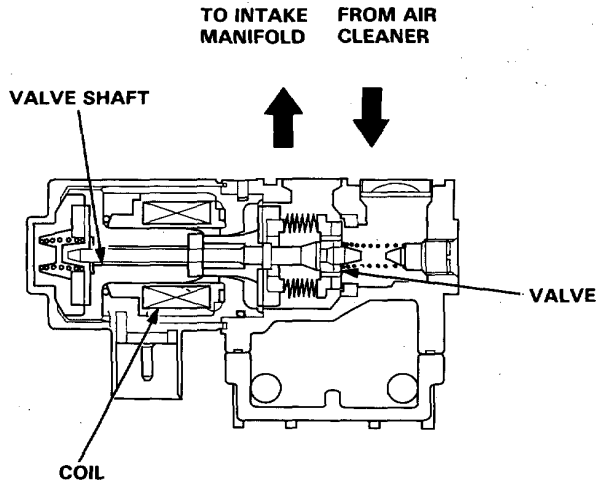
Idle Control System

Troubleshooting Flowchart — EACV

**14**

Self-diagnosis Check Engine light indicates code 14: A problem in the Electronic Air Control Valve (EACV) circuit.

The EACV changes the amount of air bypassing the throttle body in response to a current signal from the ECU in order to maintain the proper idle speed.

**14**

- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 14 is indicated.

Do the ECU Reset Procedures (page 11-25).

Start the engine.

Is Check Engine light on and does it indicate CODE 14?

NO

With the engine running and the accelerator pedal released disconnect the 2P connector on the EACV.

YES

Remove the 2P connector from the EACV.

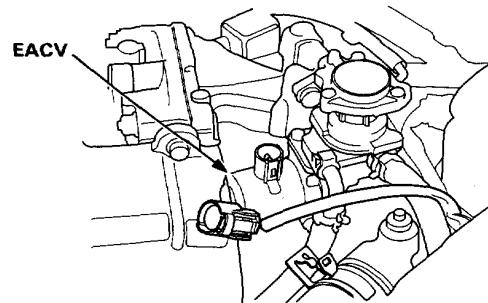
Is there a reduction in engine speed?

YES

Intermittent failure, system is OK at this time (test driving may be necessary). Check for poor connection or loose wires at EACV and ECU.

NO

Substitute a known-good EACV and retest.



(To page 11-75)



(From page 11-74)

Measure voltage between the YEL/BLK wire and body ground.

Is there battery voltage?

NO

Repair open in YEL/BLK wire between EACV and main relay.

YES

Turn the ignition switch off and reconnect the 2P connector the EACV.

Connect the test harness "A" connector to the main wire harness only, not the ECU (page 11-28).

Turn the ignition switch ON.

Momentarily connect A9 terminal to A26 terminal several times.

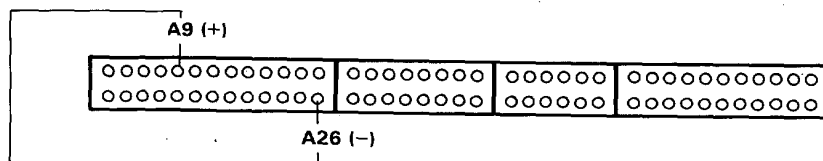
Does the EACV click?

YES

Substitute a known-good ECU and retest. If symptom/indication goes away, replace the original ECU.

NO

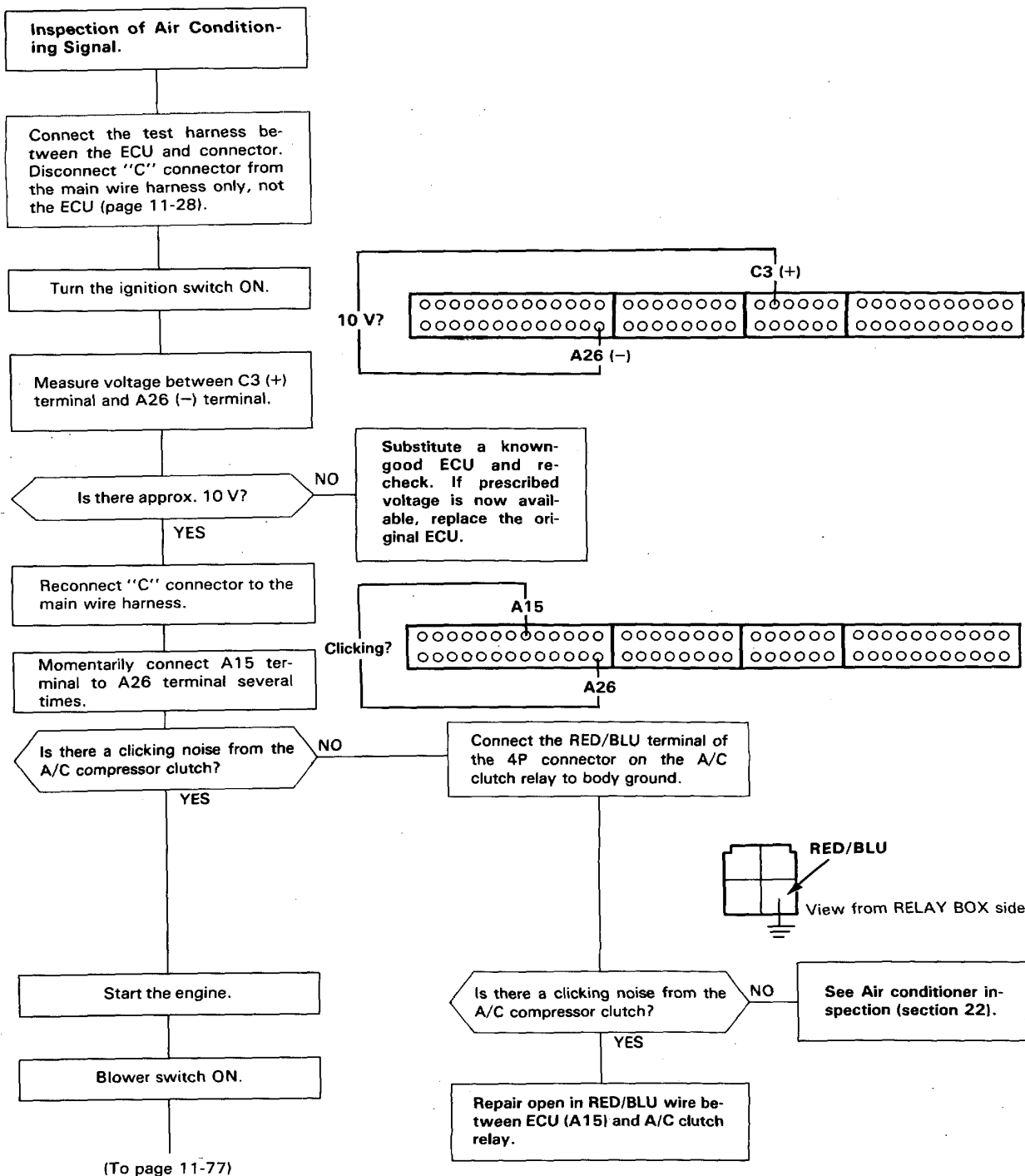
Repair open or short in BLU/RED wire between EACV and ECU. If the wire is OK, replace the EACV.



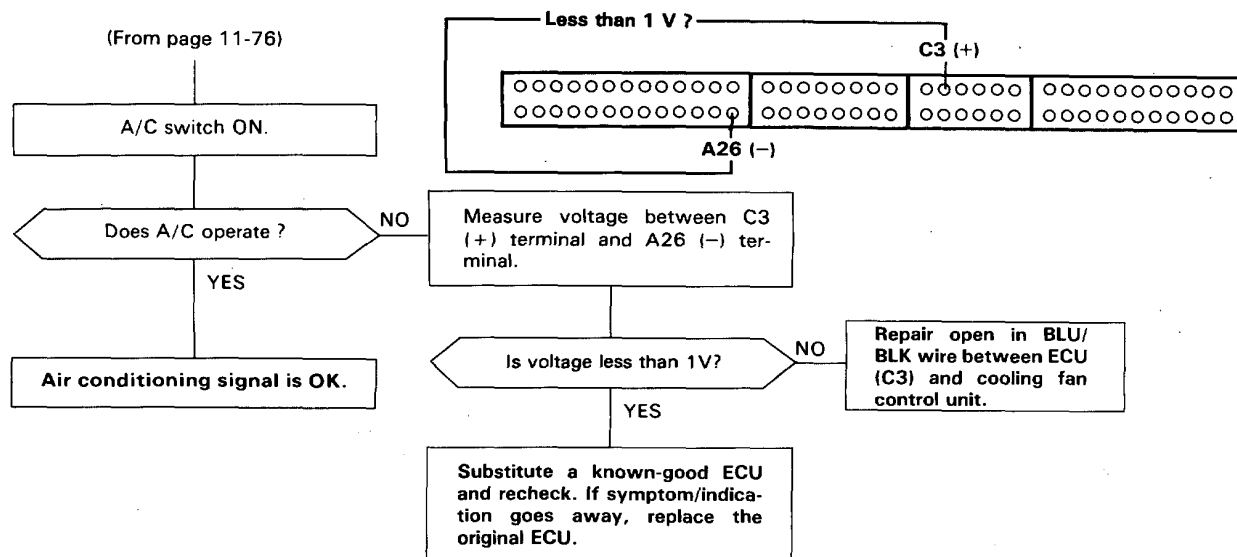
Idle Control System

Troubleshooting Flowchart — Air Conditioning Signal

This signals the ECU when there is a demand for cooling from the air conditioning system.



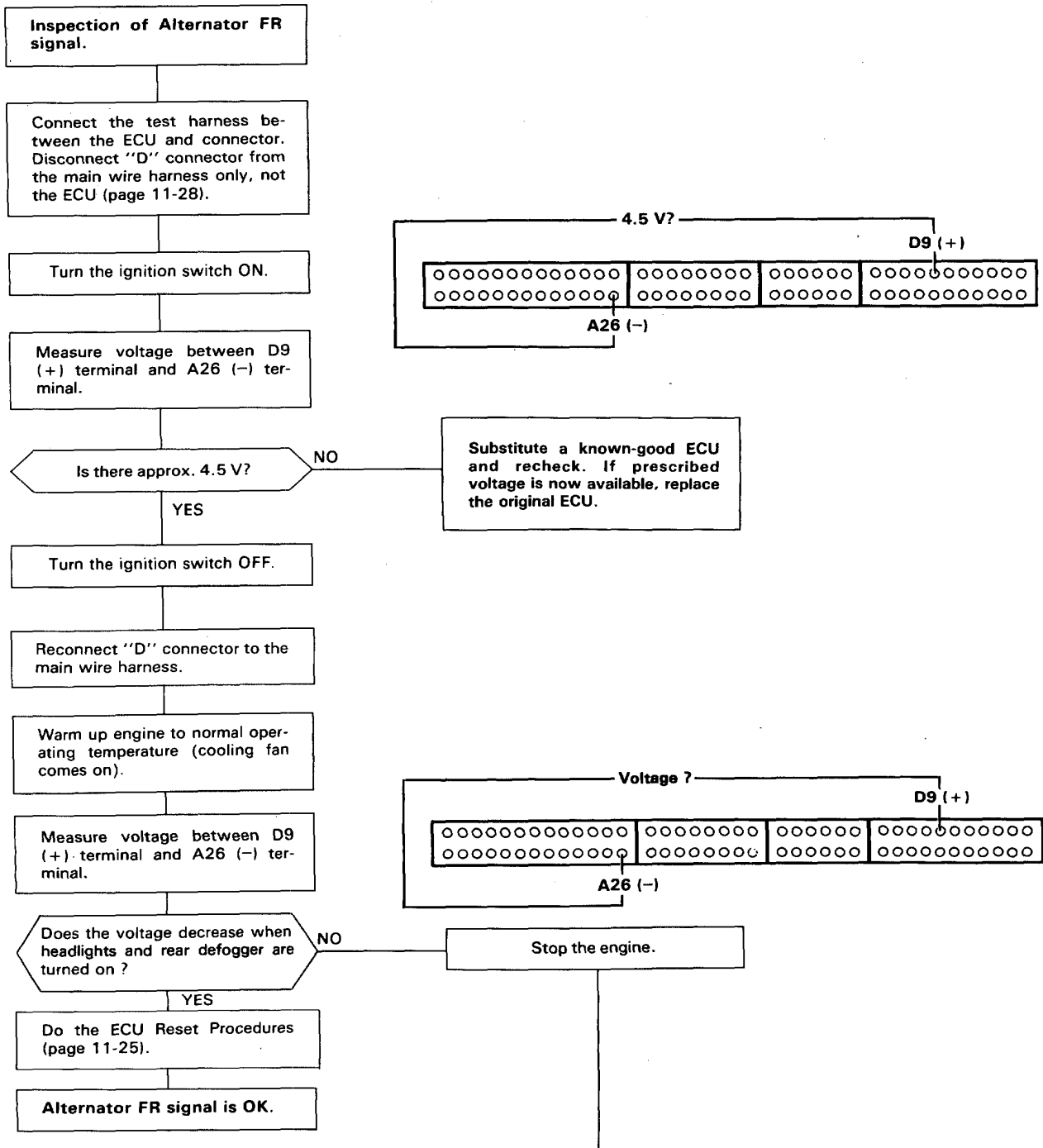
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Idle Control System

Troubleshooting Flowchart — Alternator FR Signal

This signals the ECU when the alternator is charging.



(To page 11-79)



(From page 11-78)

Disconnect "D" connector from ECU only, not the main wire harness.

Disconnect the negative battery cable from the battery.

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

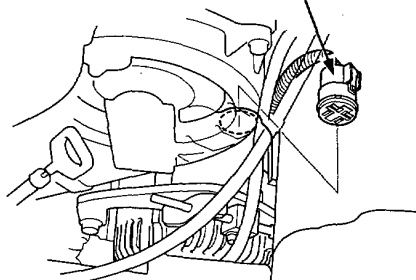
YES

Disconnect GRN connector from the alternator.

NO

Disconnect GRN connector from the alternator.

GRN CONNECTOR



Connect WHT/RED wire to body ground.

Check for continuity between D9 terminal and body ground.

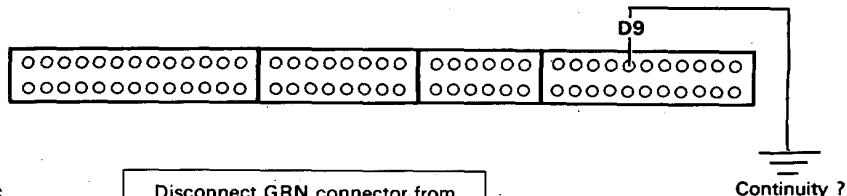
Does continuity exist ?

YES

NO

Repair open in WHT/RED wire between ECU (D9) and alternator.

See Alternator Inspection (section 23).



Check for continuity between D9 terminal and body ground.

Does continuity exist ?

NO

See Alternator Inspection (section 23).

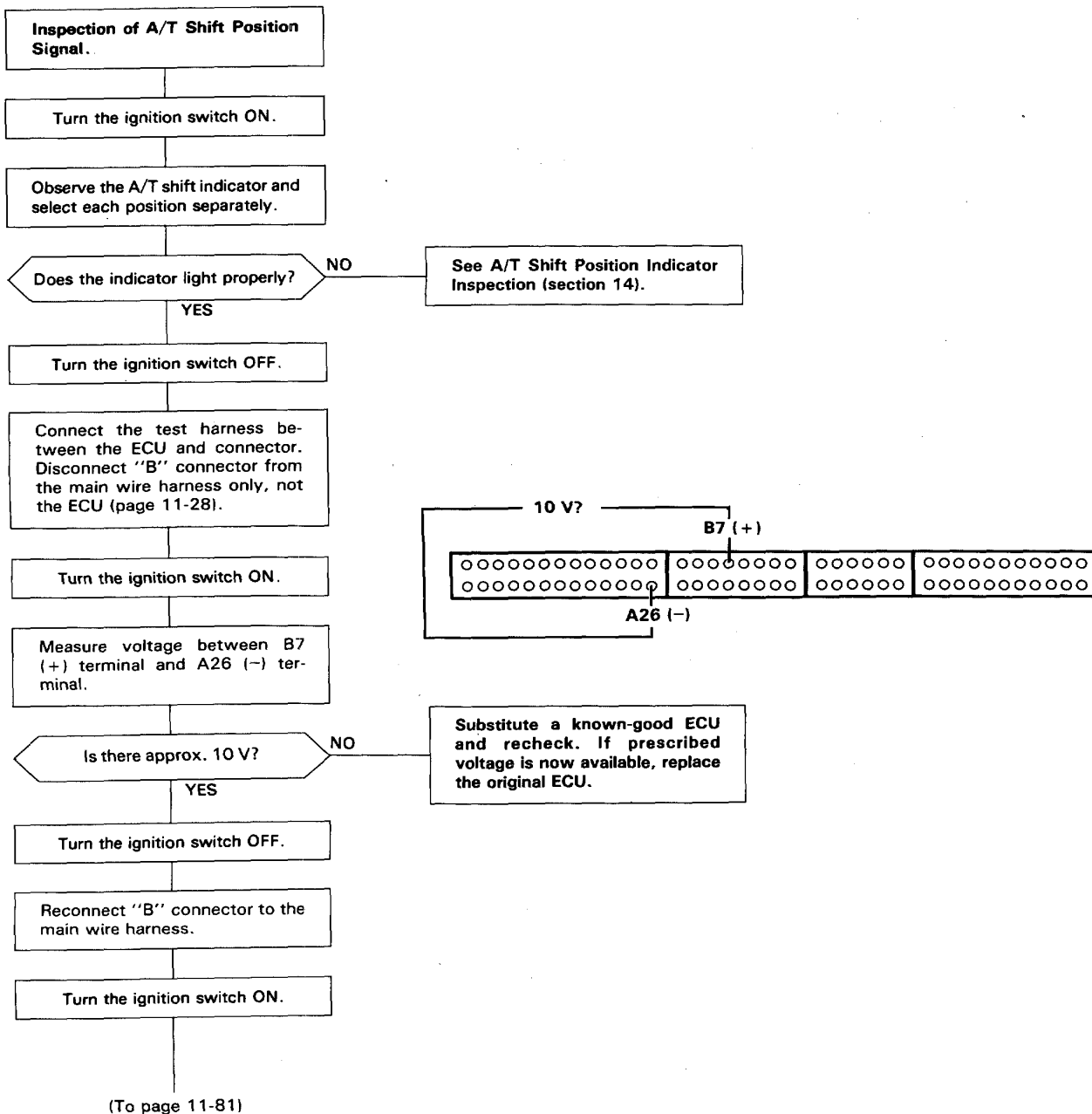
YES

Repair short in WHT/RED wire between ECU (D9) and alternator.

Idle Control System

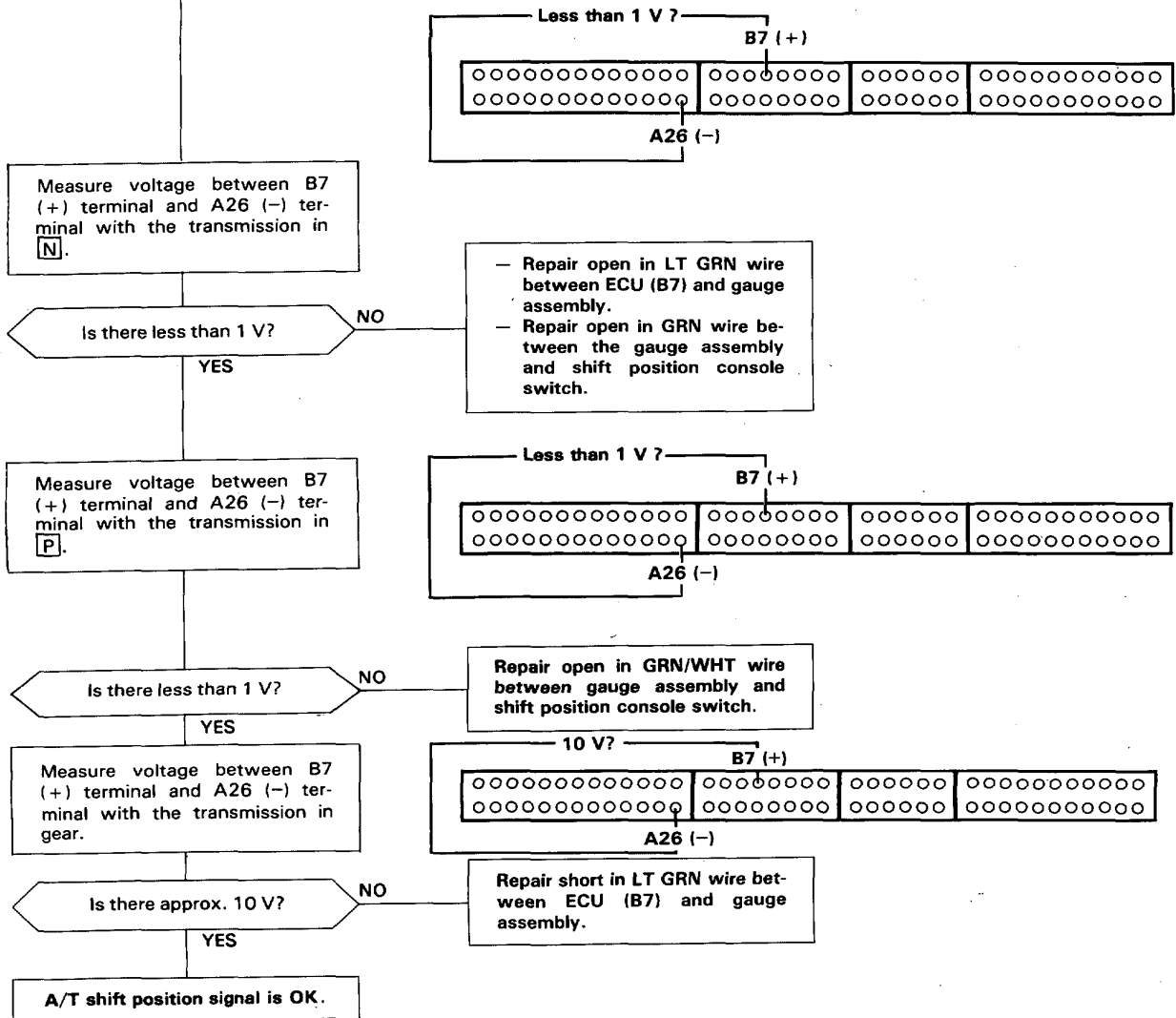
Troubleshooting Flowchart — A/T Shift Position Signal

This signals the ECU when the transmission is in Neutral or Park.





(From page 11-80)



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Idle Control System

Troubleshooting Flowchart — M/T Neutral Switch Signal

This signals the ECU when the transmission is in Neutral.

Inspection of M/T neutral Switch Signal

Connect the test harness between the ECU and connector (page 11-28).

Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A26 (-) terminal in Neutral position.

Is there voltage?

YES

Disconnect the 2P connector on the M/T neutral switch.

Connect WHT terminal to BLK terminal.

Is there voltage?

NO

Replace M/T neutral switch.

YES

Repair open in WHT wire between ECU (B7) and M/T neutral switch or BLK wire between M/T neutral switch and G101.

Is there approx. 10 V?

NO

Disconnect "B" connector from main wire harness only, not the ECU.

Is there approx. 10 V?

NO

Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

YES

Reconnect "B" connector to main wire harness and disconnect 2P connector on the M/T neutral switch.

Is there approx. 10 V?

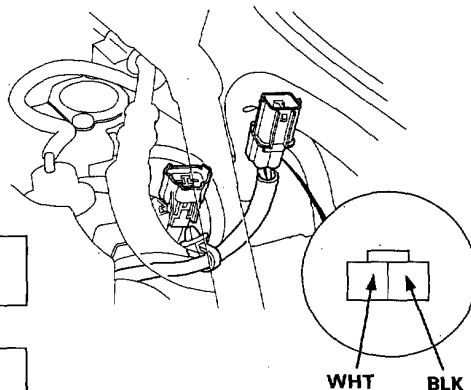
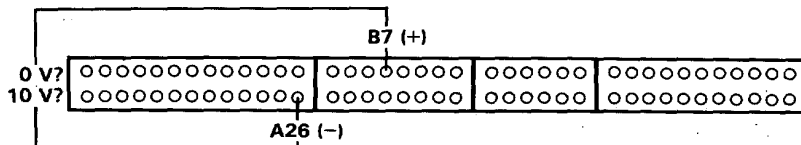
NO

Repair short in WHT wire between ECU (B7) and the M/T neutral switch.

YES

Replace M/T neutral switch.

M/T neutral switch signal is OK.

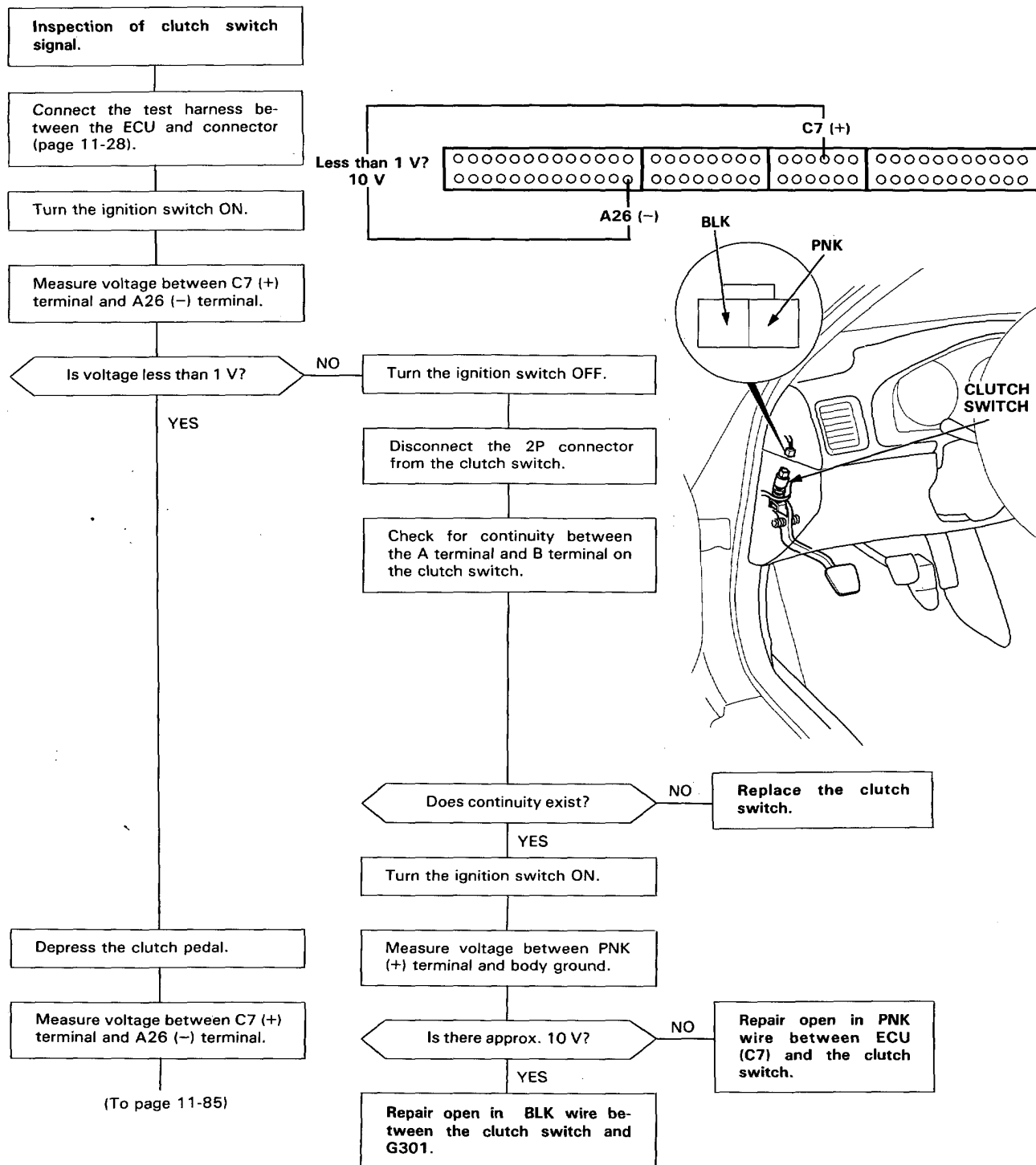


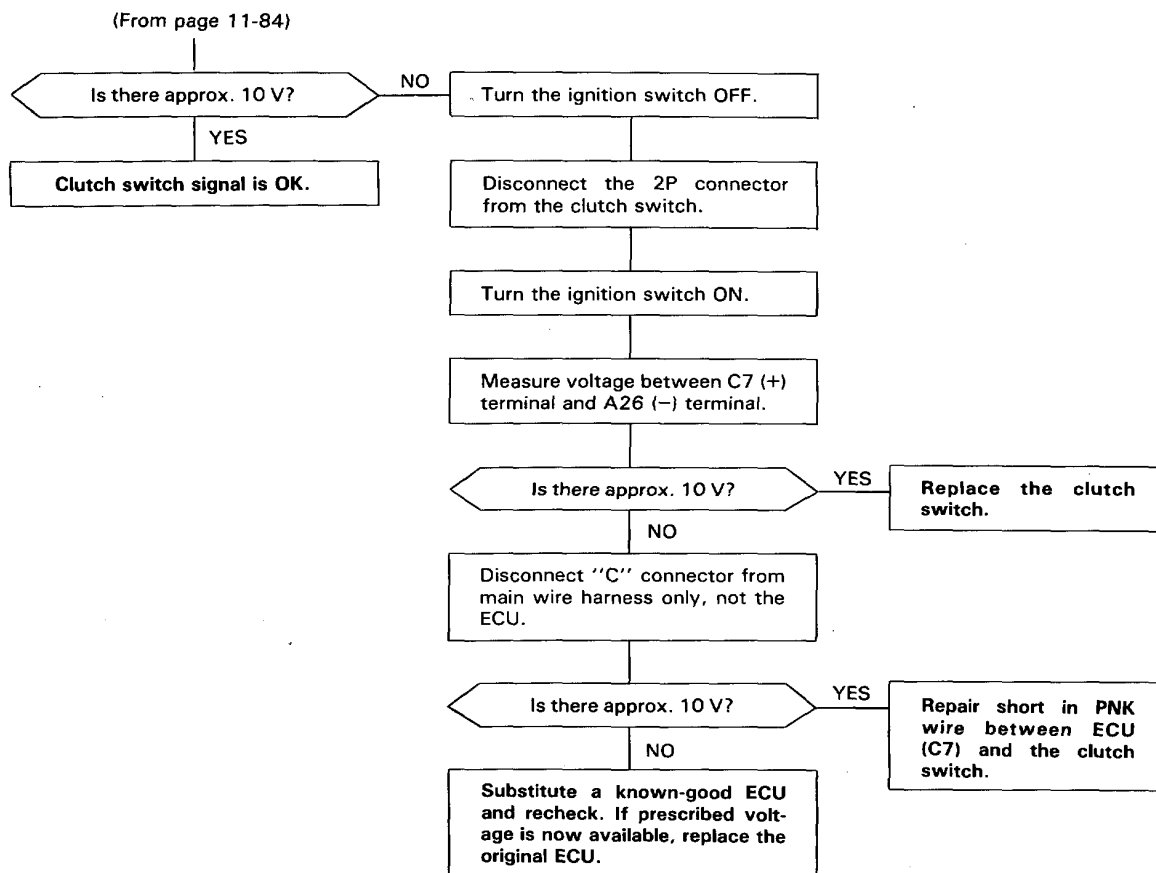


Idle Control System

Troubleshooting Flowchart — Clutch Switch Signal

This signals the ECU when the clutch is engaged.





Idle Control System

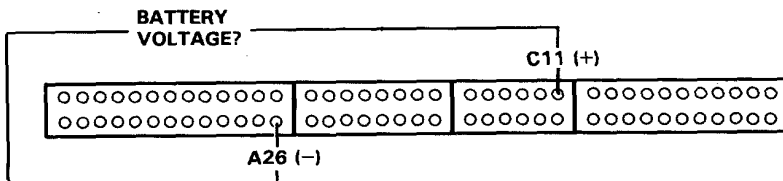
Troubleshooting Flowchart — Starter Switch Signal

This signals the ECU when the engine is cranking.

Inspection of Starter Switch Signal.

Connect the test harness between the ECU and connector (page 11-28).

Measure voltage between C11 (+) terminal and A26 (-) terminal when the ignition switch in the start position.



NOTE:

- M/T: Clutch pedal must be depressed.
- A/T: Transmission in ☐ N ☐ or ☐ P.

Is there battery voltage?

NO

YES

Inspect No. 14 fuse.

Is No. 14 fuse OK?

NO

Replace fuse.

YES

Repair open in BLK/WHT wire between ECU (C11) and No. 14 fuse.

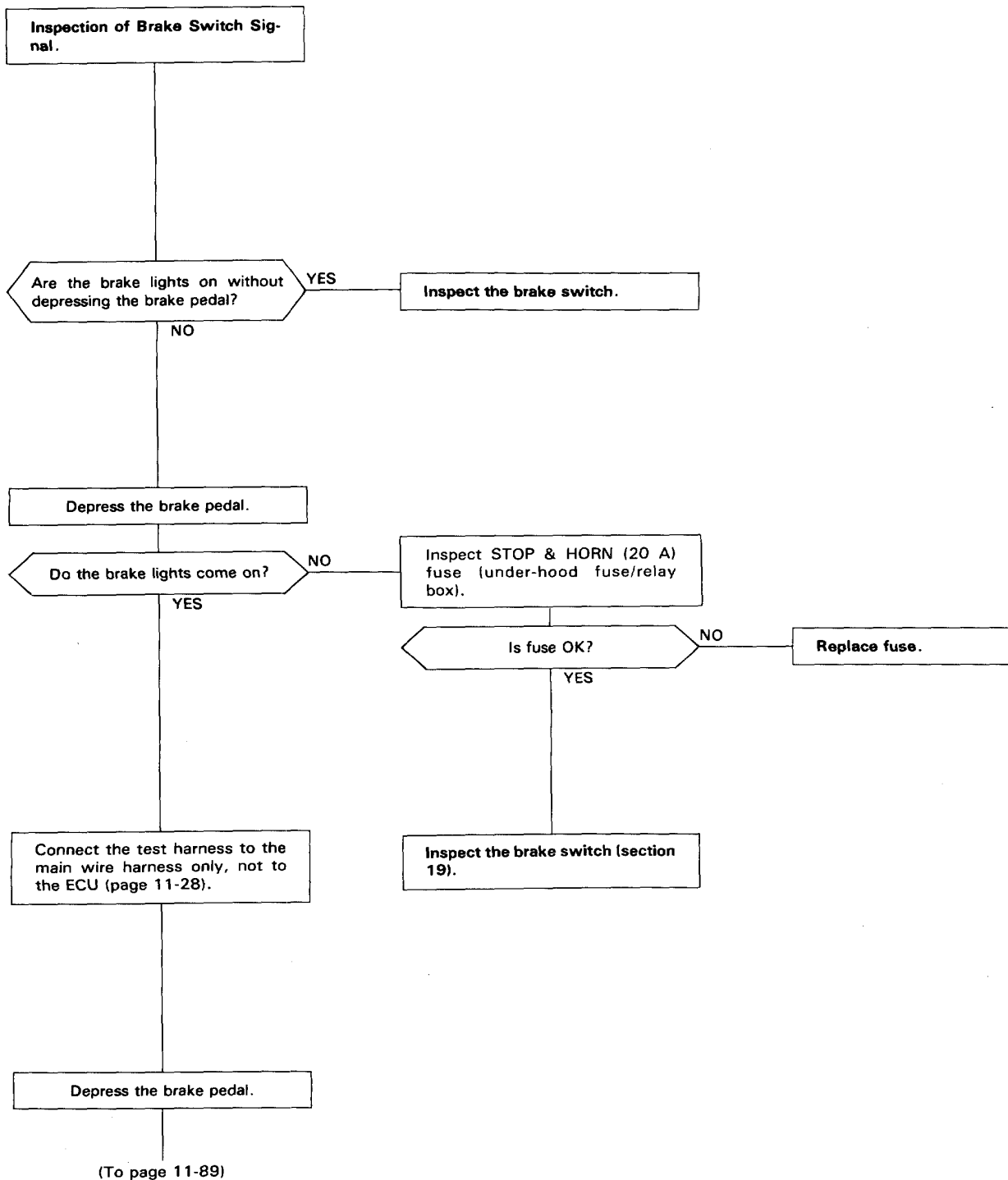
Starter switch signal is OK.



Idle Control System

Troubleshooting Flowchart — Brake Switch Signal

This signals the ECU when the brake pedal is depressed.





(From page 11-88)

Measure voltage between D2 (+) terminal and A26 (-) terminal with the brake pedal depressed.

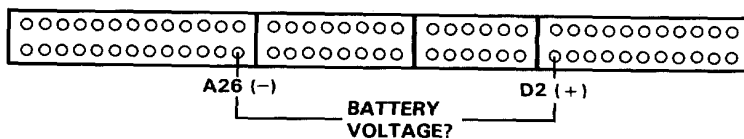
Is there battery voltage?

NO

Repair open in GRN/WHT wire between the brake switch and ECU (D2).

YES

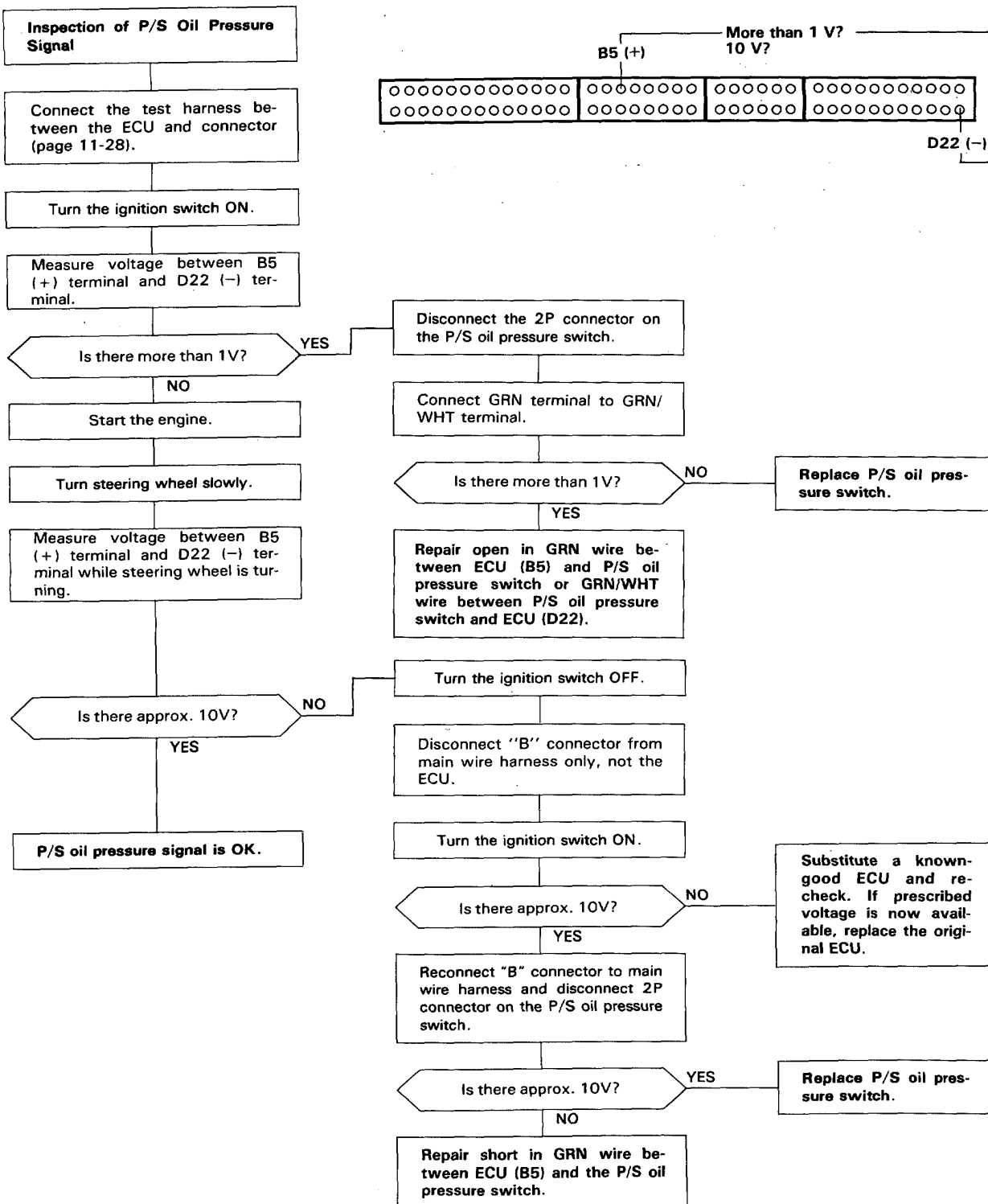
Brake switch signal is OK.



Idle Control System

Troubleshooting Flowchart — P/S Oil Pressure Signal

This signals the ECU when the power steering load is high.

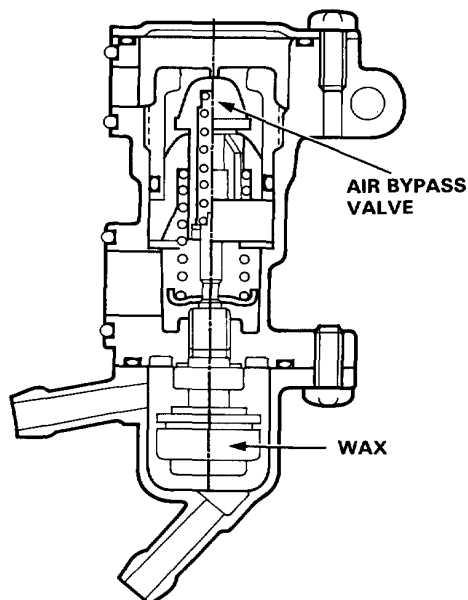
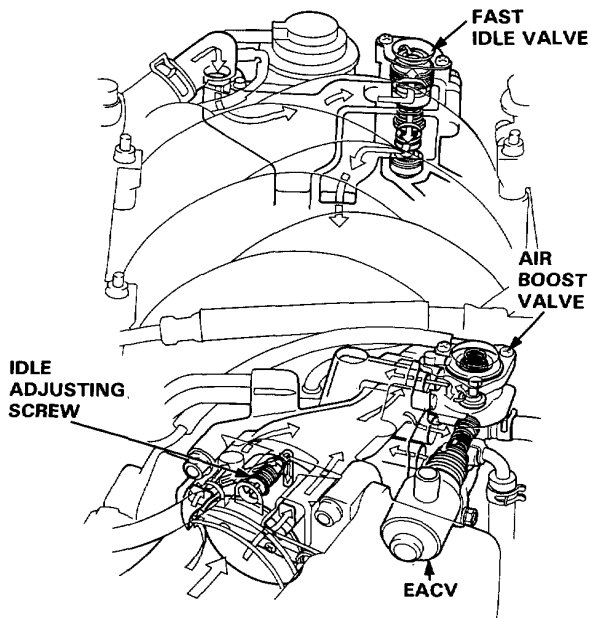




Fast Idle Valve

Description

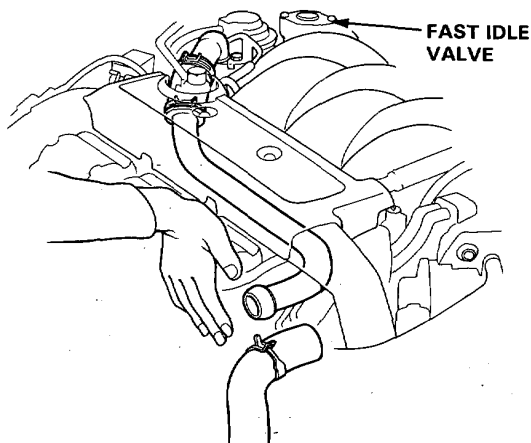
To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle air bypass valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the manifold.



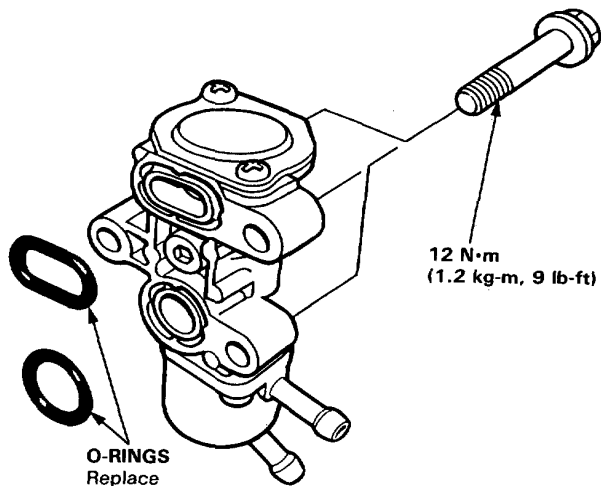
Inspection

NOTE: The fast idle valve is factory adjusted; it should not be disassembled.

1. Start the engine.
2. Remove the hose from pipe. Put your finger over the pipe and check for air flow (vacuum) with the engine cold (coolant temperature below 30°C, 86°F) and idling.



- If no vacuum is felt, replace the fast idle valve and retest.



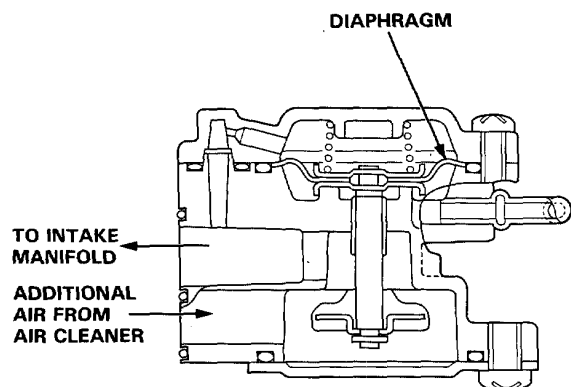
4. Warm up the engine (cooling fan comes on).
5. Check that the valve is completely closed. If not, air suction can be felt in the valve pipe.
 - If any suction is felt, the valve is leaking. Replace the fast idle valve and recheck.

Idle Control System

Air Boost Valve

Description

When cranking the engine, the air boost valve supplies additional air to the intake manifold to ease engine starting.

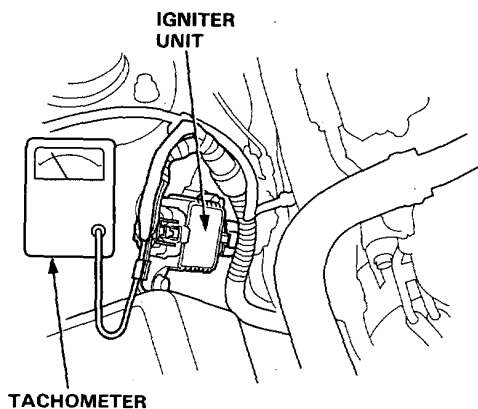




Idle Speed Setting

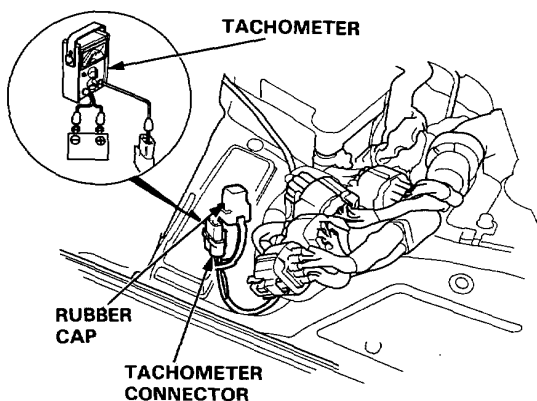
Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.
 - Connect a tachometer to loop of igniter unit.

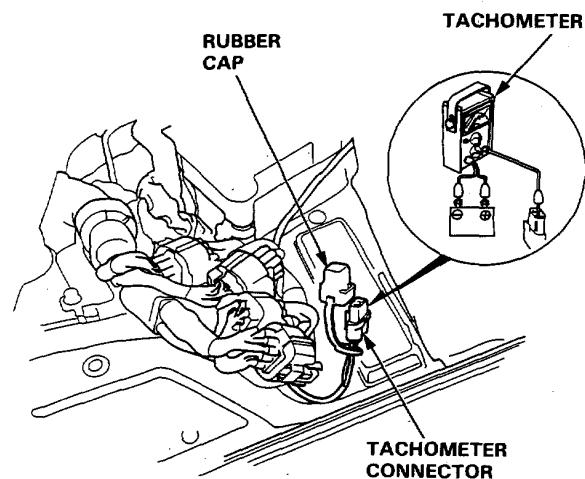


- Remove the rubber cap from the tachometer connector and connect a tachometer.

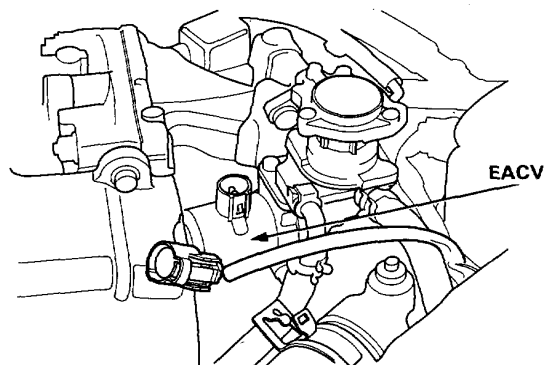
[LHD]



[RHD]



3. Disconnect the 2P connector from the EACV.



4. Start the engine with the accelerator pedal slightly depressed. Stabilize the engine speed at 1000, then slowly release the pedal until the engine idles.

(cont'd)

Idle Control System

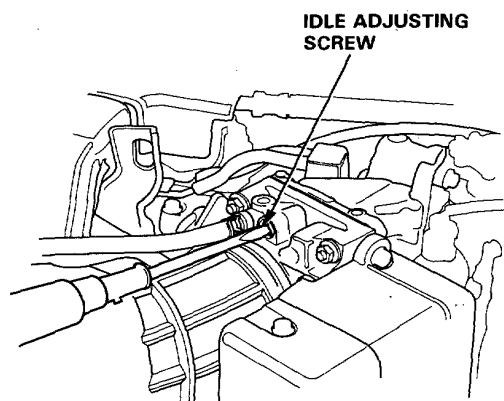
Idle Speed Setting (cont'd)

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

Manual	$450 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$480 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (in [N] or [P])

Adjust the idle speed, if necessary, by turning the idle adjusting screw.



6. Turn the ignition switch OFF.
7. **[LHD]**
Reconnect the 2P connector on the EACV, then remove No. 15 fuse in the under-dash fuse box for 10 seconds to reset the ECU.

NOTE: Disconnecting the No. 15 fuse also cancels the power seat settings.

[RHD]

Reconnect the 2P connector on the EACV, then remove BACK UP fuse in the under-hood fuse/relay box for 10 seconds to reset the ECU.

8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

NOTE: (KS) Remove No. 12 (RUNNING LIGHT, 7.5 A) fuse in the under-dash fuse box, then check that the headlights and side marker lights are off.

Manual	$650 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
Automatic	$600 \pm 50 \text{ min}^{-1} \text{ (rpm)}$ (in [N] or [P])

Fuel Supply System

System Troubleshooting Guide



NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE	SUB SYSTEM	FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMINATED FUEL
SYMPTOM		98	101	102	106	107	109	*
ENGINE WON'T START		③	③		③	①	②	③
DIFFICULT TO START ENGINE WHEN COLD OR HOT								①
ROUGH IDLE		①	②					③
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①	②	③		③		③
	FAILS EMISSION TEST	②	③	①				
	LOSS OF POWER	③	③		①	③		②
FREQUENT STALLING	WHILE WARMING UP			①				
	AFTER WARMING UP			①				

Fuel Supply System

System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, main relay, fuel filter, pressure regulator, injectors and injector resistor.

This system delivers pressure-regulated fuel to the injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

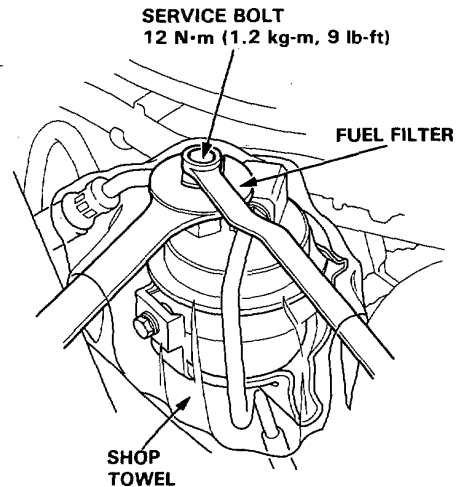
Relieving

⚠ WARNING

- Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area.
- Be sure to relieve fuel pressure while the engine is off.

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt on top of the fuel filter.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Remove fuel filler cap.
3. Use a box end wrench on the 6 mm service bolt at the fuel filter, while holding the special banjo bolt with another wrench.
4. Place a rag or shop towel over the 6 mm service bolt.
5. Slowly loosen the 6 mm service bolt one complete turn.



NOTE:

- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt, whenever the service bolt is loosened to relieve fuel pressure.
- Replace all washers whenever the bolts are removed to disassemble parts.



Inspection

1. Relieve fuel pressure (page 11-96).
2. Remove the service bolt on the fuel filter while holding the banjo bolt with another wrench. Attach the fuel pressure gauge.
3. Start the engine. * Measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

*: If the engine will not start turn the ignition switch on, wait for two seconds, turn it off then back on again and read the fuel pressure.

Pressure should be:

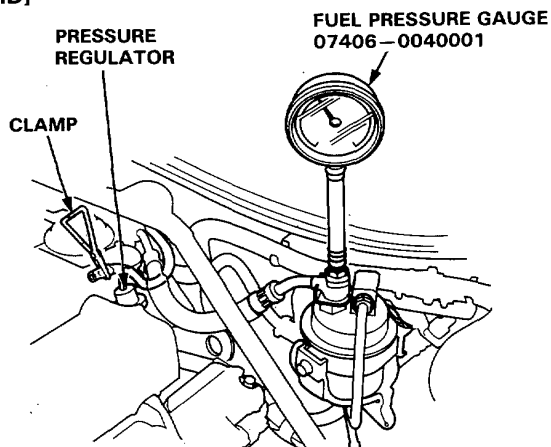
265–314 kPa (2.7–3.2 kg/cm², 38–46 psi)

4. Reconnect vacuum hose to the pressure regulator.

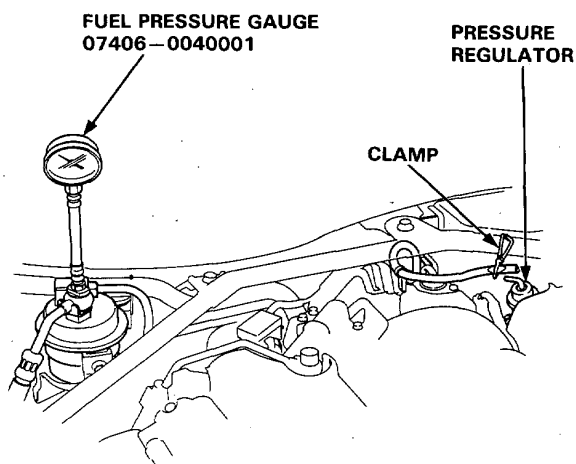
Pressure should be:

206–255 kPa (2.1–2.6 kg/cm², 31–37 psi)

[LHD]



[RHD]



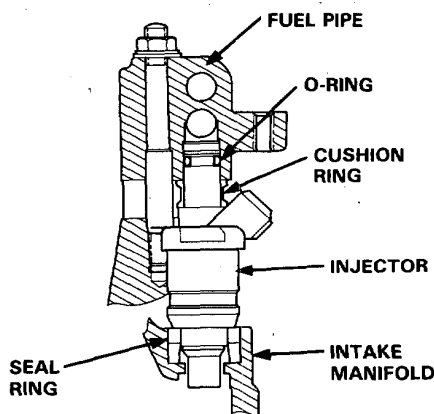
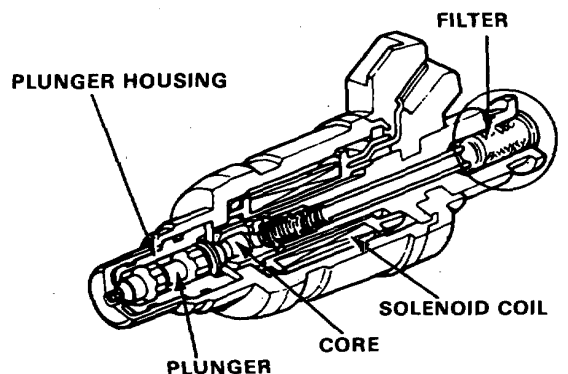
- If the fuel pressure is not as specified, first check the fuel pump (page 11-108). If the pump is OK, check the following:
 - If the pressure is higher than specified, inspect for:
 - Pinched or clogged fuel return hose or piping.
 - Faulty pressure regulator (page 11-102).
 - If the pressure is lower than specified, inspect for:
 - Clogged fuel filter.
 - Faulty pressure regulator (page 11-102).
 - Leakage in the fuel line.

Fuel Supply System

Fuel Injectors

Description

The injectors are a solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open (i.e., the duration the current is supplied to the solenoid coil). The injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.

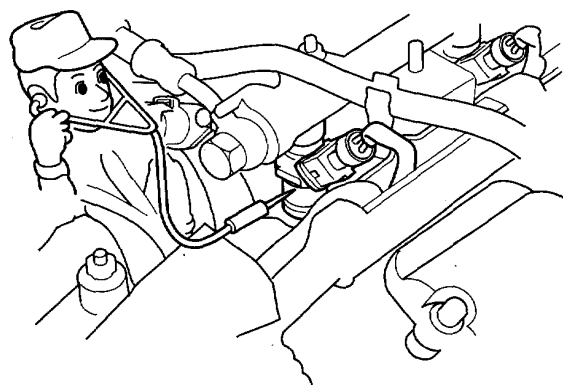


Testing

NOTE: Check the following items before testing idle speed, ignition timing and idle CO %.

If the engine will run:

1. With the engine idling, disconnect each injector connector individually and inspect the change in the idling speed.
 - If the idle speed drop is almost the same for each cylinder, the injectors are normal.
 - If the idle speed or quality remains the same when you disconnect a particular injector, replace the injector and re-test.
2. Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



- If any injector fails to make the typical clicking sound, check the sound again after replacing the injector.
- If clicking sound is still absent, check the following:
 - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the main relay and the resistor.
 - Whether the resistor is open or corroded (page 11-101).
 - Whether there is any short-circuiting, wire breakage or poor connection in the RED/BLK wire between the resistor and the injector.
 - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

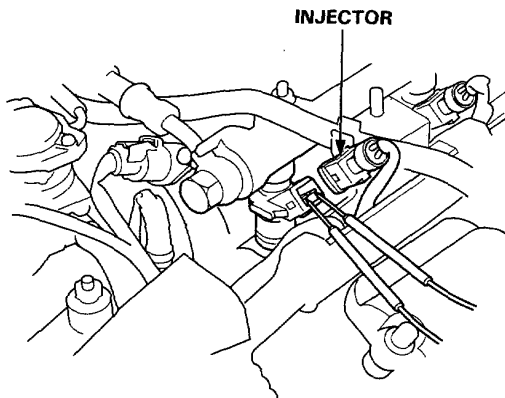
If all is OK, check the ECU (page 11-20, 22).



If the engine cannot be started:

1. Remove the connector of the injector and measure the resistance between the 2 terminals of the injector.

Resistance should be: 1.5–2.5 Ω



- If the resistance is not as specified, replace the injector.
- If the resistance is as specified, check the fuel pressure (page 11-97).
- If the fuel pressure is as specified, check the following:
 - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the main relay and the resistor.
 - Whether the resistor is open or corroded (page 11-101).
 - Whether there is any short-circuiting, wire breakage, or poor connection in the RED/BLK wire between the resistor and the injector.
 - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

If all is OK, check the ECU (page 11-20, 22).

Replacement

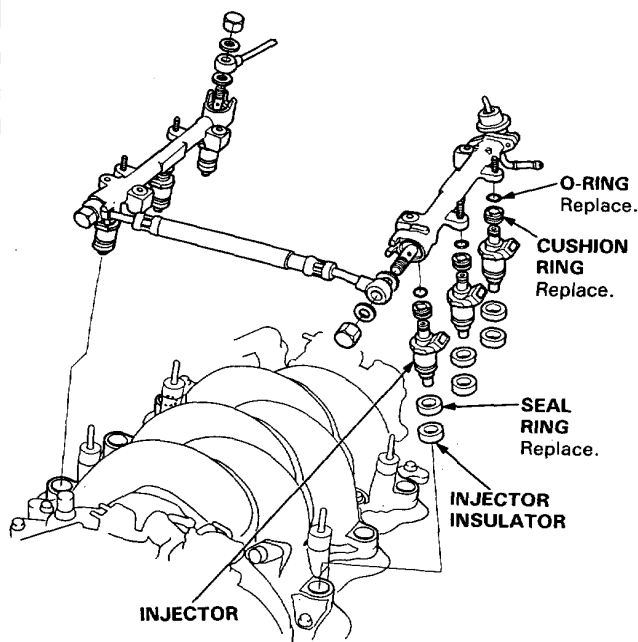
⚠ WARNING Do not smoke when working on the fuel system.

Keep open flames away from your work area.

1. Relieve fuel pressure (page 11-96).
2. Remove the engine harness covers.
3. Disconnect the connectors from the injectors.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

NOTE: Place a rag or shop towel over the hoses before disconnecting them.

5. Disconnect the fuel hose from the fuel pipe.
6. Loosen the retainer nuts on the fuel pipe and harness holder.
7. Disconnect the fuel pipe.
8. Remove the injectors from the intake manifold.



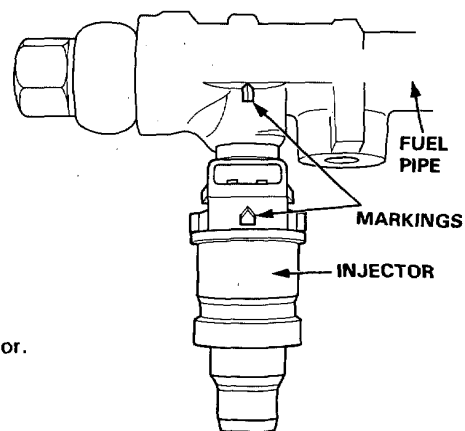
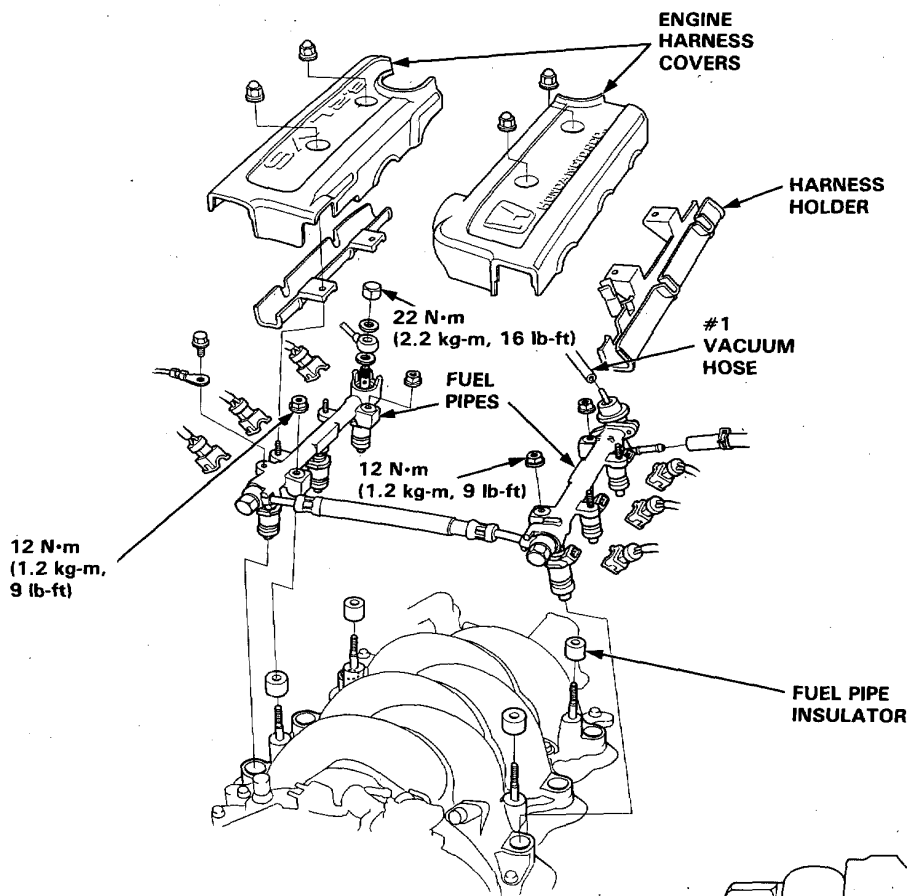
9. Slide new cushion rings onto the injectors.
10. Coat new O-rings with clean engine oil and put them on the injectors.
11. Insert the injectors into the fuel pipe first.
12. Coat new seal rings with clean engine oil and press them into the intake manifold.

Fuel Supply System

Fuel Injectors (cont'd)

13. Install the injectors and fuel pipe assembly in the manifold.

CAUTION: To prevent damage to the O-ring, install the injectors in the fuel pipe first, then install them in the intake manifold.



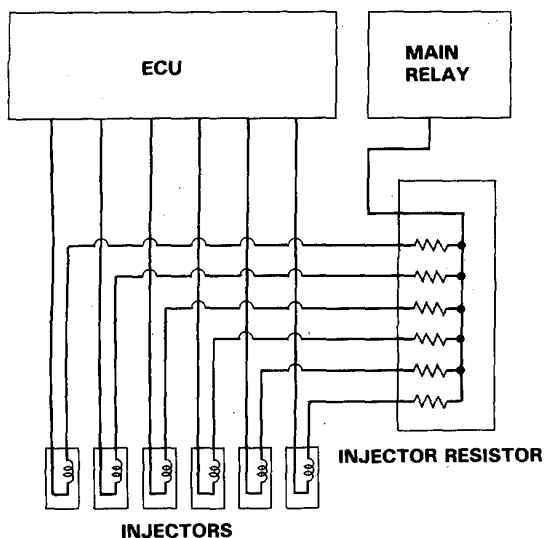
14. Align the center line on the connector with the mark on the fuel pipe.
15. Install and tighten the retainer nuts.
16. Connect the fuel hose to the fuel pipe.
17. Connect the vacuum hose and fuel return hose to the pressure regulator.
18. Install the connectors on the injectors.
19. Install the engine harness covers.
20. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.



Injector Resistor

Description

The resistor lowers the current supplied to the injectors to prevent damage to the injector coils. This allows a faster response time of the injectors.

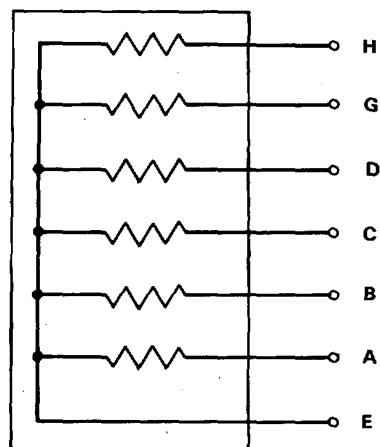
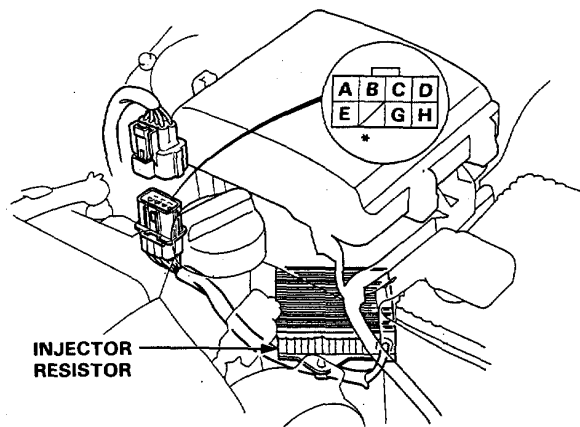


Testing

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (A, B, C, D, G and H) and the power terminal (E).

Resistance should be: 5—7 Ω

*: NOT USED



- Replace the resistor with a new one if any of the resistances are outside of the specification.

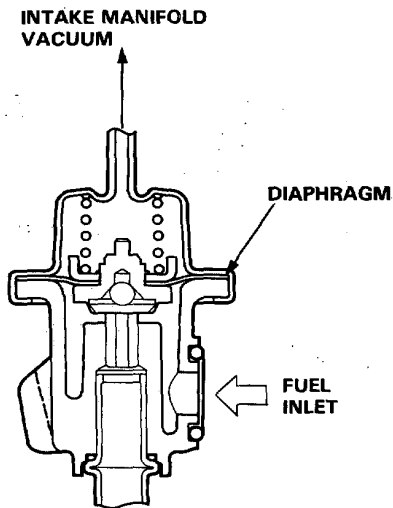
Fuel Supply System

Pressure Regulator

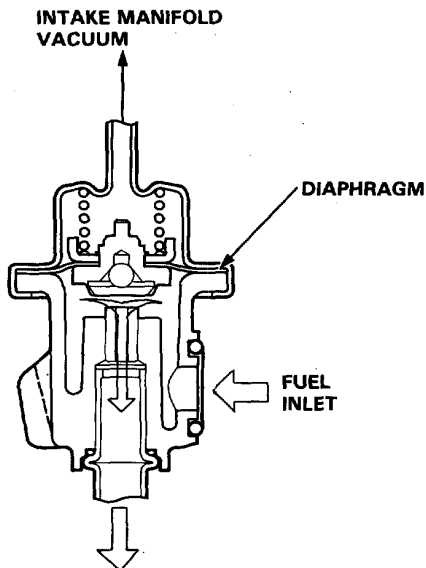
Description

The fuel pressure regulator maintains a constant fuel pressure to the injectors. When the difference between the fuel pressure and manifold pressure exceeds 2.55 kg/cm^2 (36 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSE



OPEN



Testing

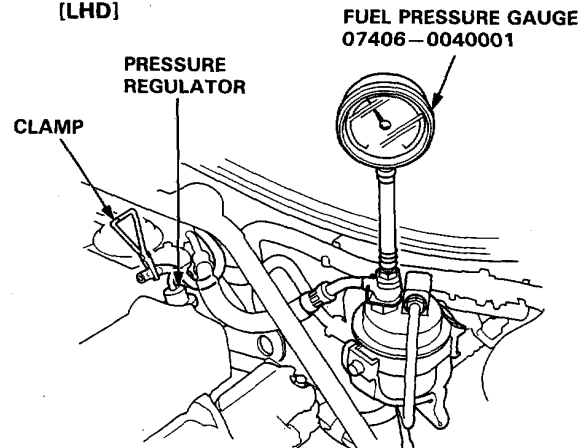
⚠ WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach a pressure gauge to the service port of the fuel filter (page 11-97).

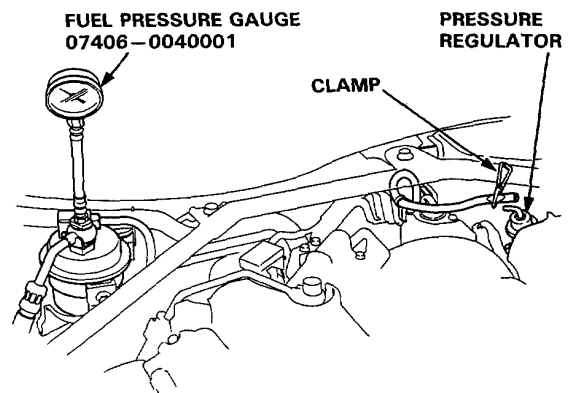
Pressure should be:

265–314 kPa (2.7–3.2 kg/cm², 38–46 psi)
(with the regulator vacuum hose disconnected)

[LHD]



[RHD]

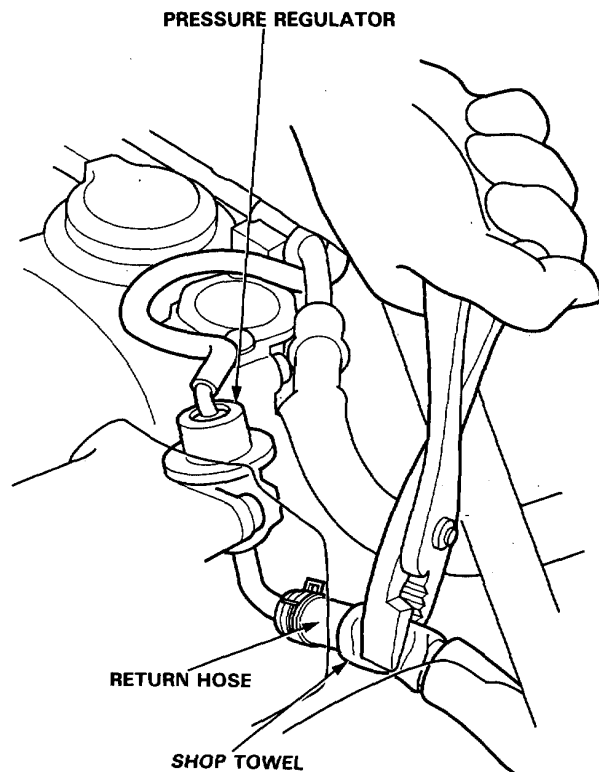


2. Reconnect the vacuum hose to the pressure regulator.



3. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected again.

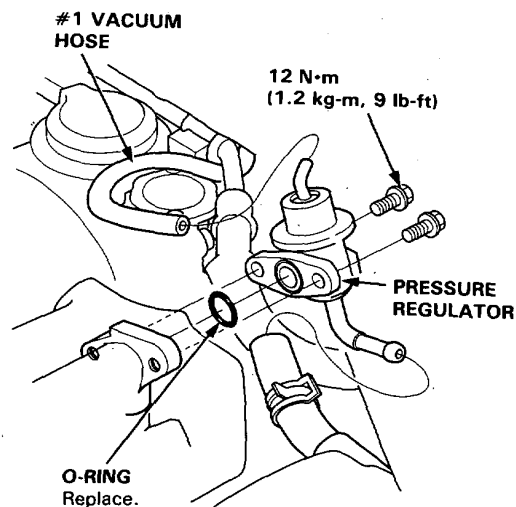
- If the fuel pressure did not rise, check to see if it rises with the fuel return hose lightly pinched.
- If the fuel pressure still does not rise, replace the pressure regulator.



Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 11-96).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:

- Replace the O-ring.
- When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

(cont'd)

Fuel Supply System

Pressure Regulator (cont'd)

Pressure Regulator Control Solenoid Valve Troubleshooting Flowchart

Inspection of Pressure Regulator Control Solenoid Valve.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Disconnect the #1 vacuum hose from the pressure regulator and connect a vacuum gauge to the hose.

Is there manifold vacuum?

YES

Turn the ignition switch OFF.

Disconnect the 4P connector from the control box

Connect battery positive to terminal D (KQ: B) and battery negative to terminal C (KQ: A) of the solenoid valve.

Start the engine and allow it to idle.

VACUUM PUMP/GAUGE

#1 VACUUM HOSE

PRESSURE REGULATOR

Disconnect the 4P connector from the control box.

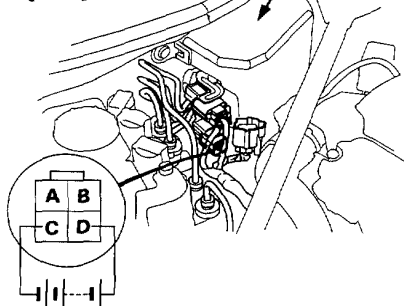
Is there vacuum?

YES

Repair short to ground in LT GRN wire between ECU (A19) and 4P connector.
If wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

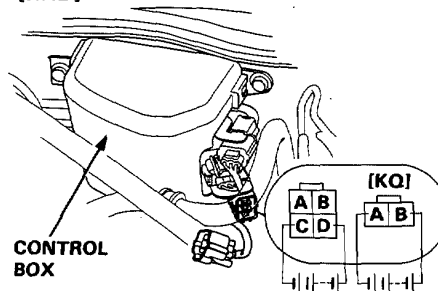
Check the #1 and #3 vacuum hose. If hoses are OK, replace the solenoid valve.

[LHD]



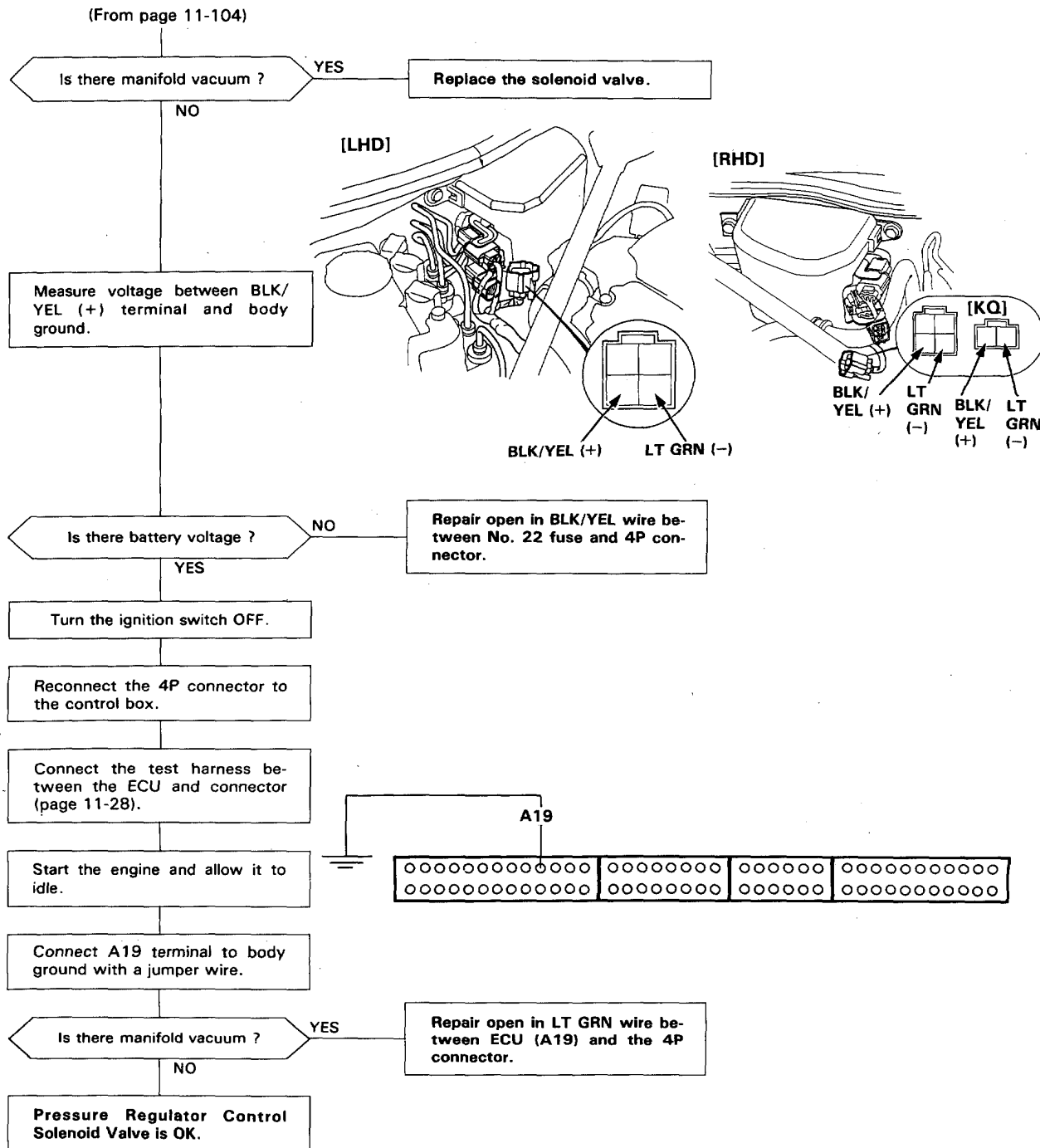
CONTROL BOX

[RHD]



CONTROL BOX

(To page 11-105)



Fuel Supply System

Fuel Filter

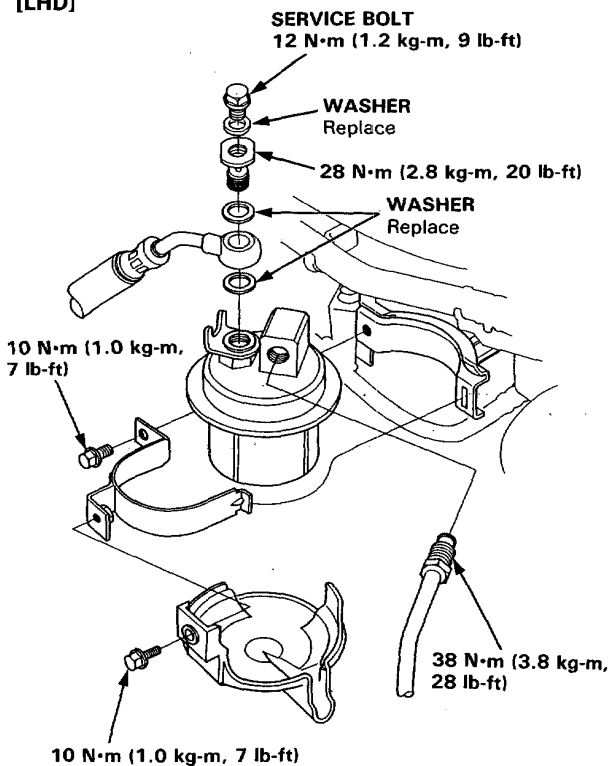
Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

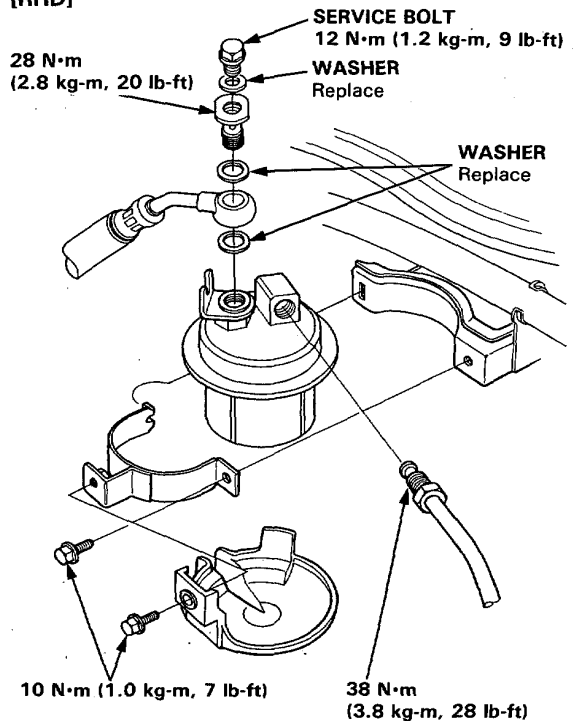
The filter should be replaced every 2 years or 40,000 km (24,000 miles), whichever comes first or whenever the fuel pressure drops below the specified value (265–314 kPa, 2.7–3.2 kg/cm², 38–46 psi with the pressure regulator vacuum hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (page 11-96).
3. Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.
4. Remove the fuel filter clamp and fuel filter.
5. When assembling, use new washers, as shown.

[LHD]



[RHD]



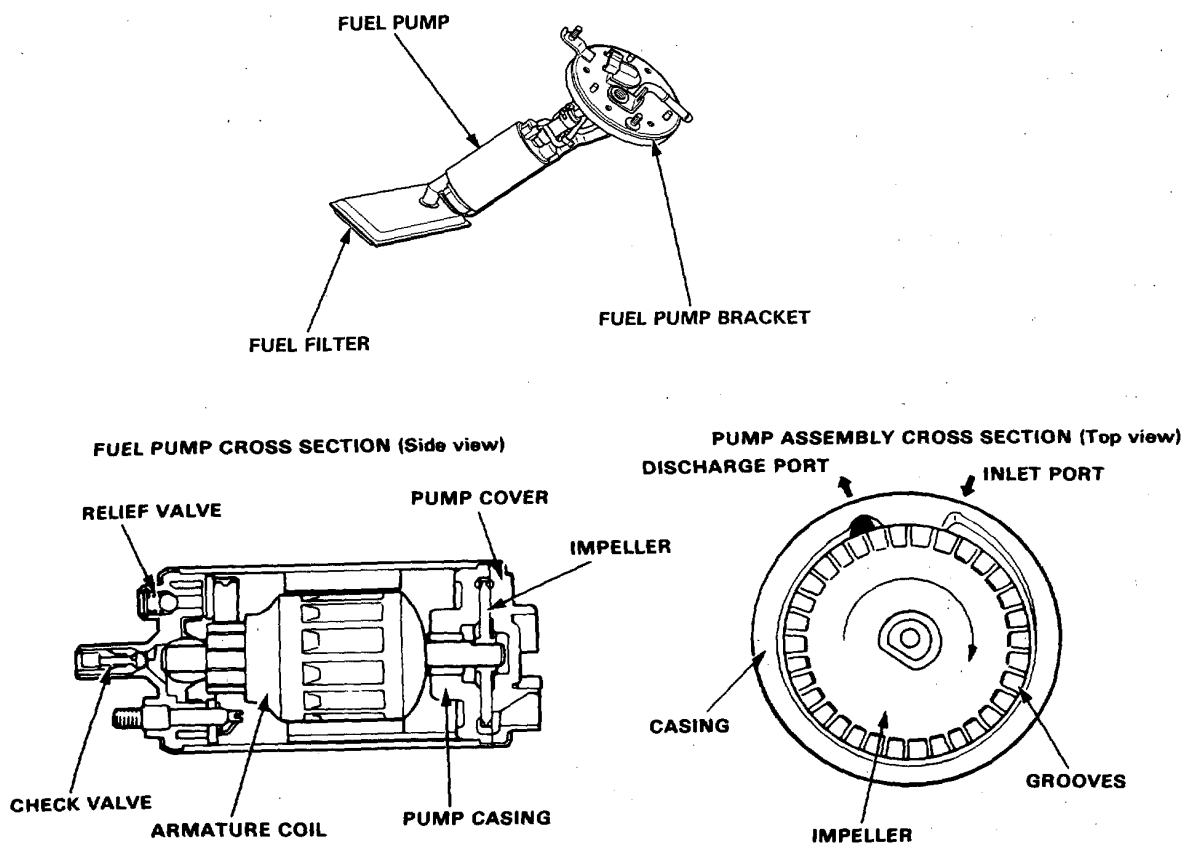
NOTE: Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



Fuel Pump

Description

Because of its compact impeller design, the fuel pump is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.



The fuel pump is comprised of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet port, and a discharge port. The pump assembly consists of the impeller (driven by the motor), the pump casing (which forms the pumping chamber), and the pump cover.

OPERATION

- (1) When the engine is started, the main relay actuates the pump, and the motor turns the impeller. Differential pressure is generated by the numerous grooves around the impeller.
- (2) Fuel entering the inlet port flows inside the motor from the pumping chamber and is forced through the discharge port via the check valve. If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.
- (3) When the engine stops, the pump stops automatically. However, a check valve closes by spring action to retain the residual pressure in the line, helping the engine to restart more easily.

(cont'd)

Fuel Supply System

Fuel Pump (cont'd)

Testing

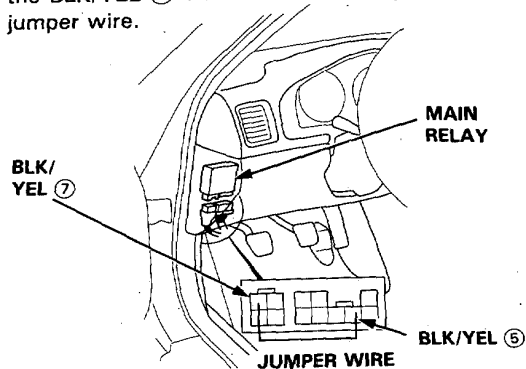
⚠ WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; When it is ON, you will hear some noise if you hold your ear to the fuel filler port with the fuel filler cap removed. The fuel pump should run for two seconds when the ignition switch is first turned on. If the pump does not make noise, check as follows:

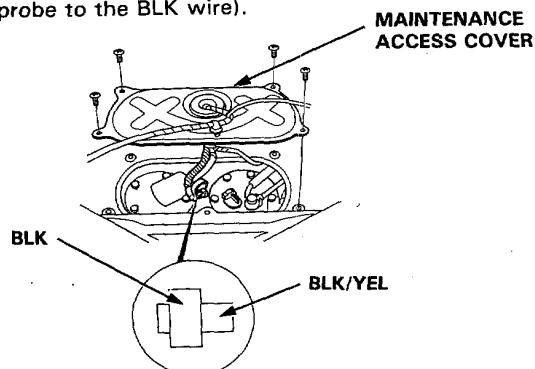
1. Remove the rear seats (section 20).
2. Remove the maintenance access cover.
3. Disconnect the 2P connector from the fuel pump.

CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

4. Disconnect the main relay connector and connect the BLK/YEL ⑤ wire and BLK/YEL ⑦ wire with a jumper wire.



5. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the BLK/YEL wire, negative probe to the BLK wire).

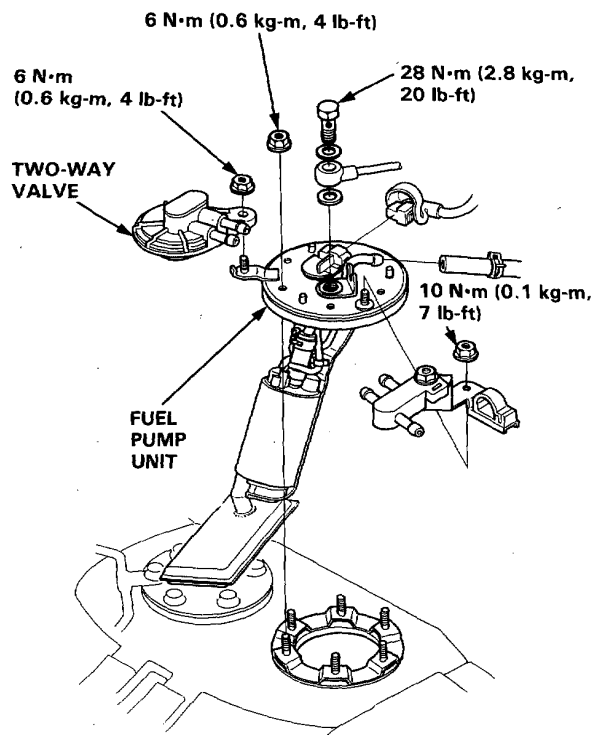


- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the fuel pump ground and wire harness (page 11-109).

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Remove the rear seats (section 20).
2. Remove the maintenance access cover.
3. Disconnect the connector from the fuel pump.
4. Remove the fuel pump mounting nuts.
5. Remove the fuel pump from the fuel tank.

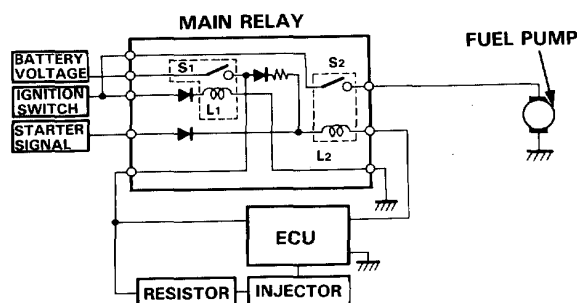




Main Relay

Description

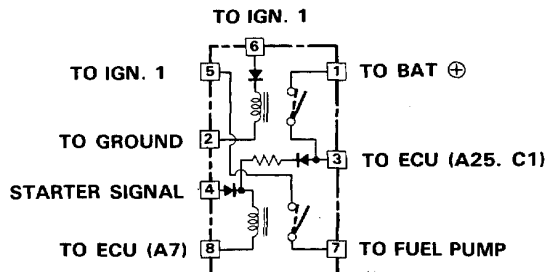
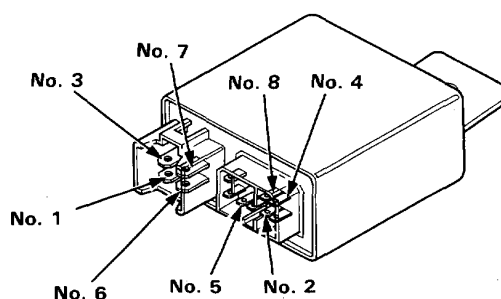
This relay is installed at the left side of the cowl. The main relay actually contains two individual relays. One relay is energized whenever the ignition is on. It supplies battery voltage to the ECU, power to the injectors, and power for the second relay. The second relay is energized for 2 seconds when the ignition is switched on, and when the engine is running. It supplies power to the fuel pump.



Relay Testing

NOTE: If the car starts and continues to run, the main relay is OK.

1. Remove the main relay.
2. Attach the battery positive to the No. 4 terminal and the battery negative to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.
 - If there is continuity, go on to step 3.
 - If there is no continuity, replace the relay and retest.



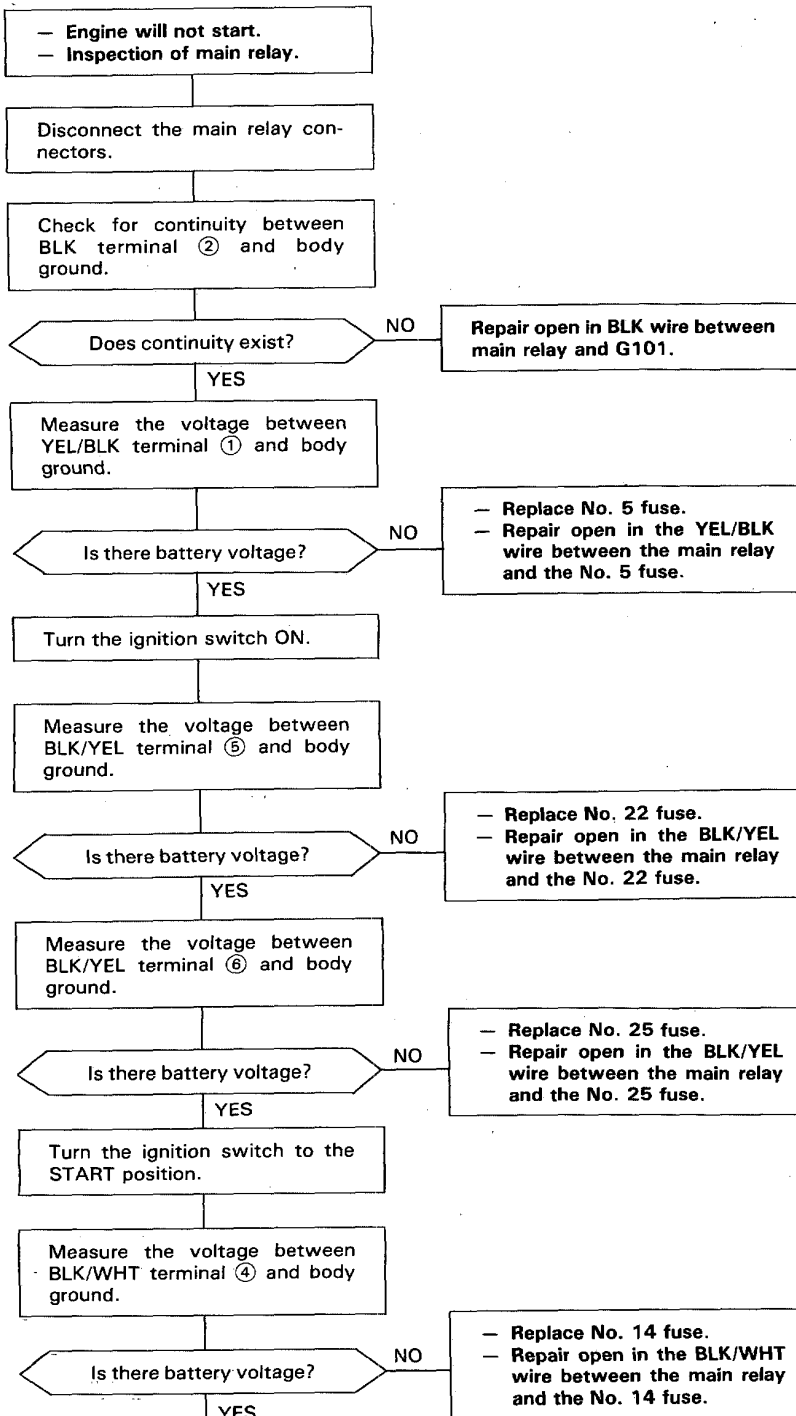
3. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.
 - If there is continuity, go on to step 4.
 - If there is no continuity, replace the relay and retest.
4. Attach the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.
 - If there is continuity, the relay is OK. If the fuel pump still does not work, go to Harness Testing in the next column.
 - If there is no continuity, replace the relay and retest.

(cont'd)

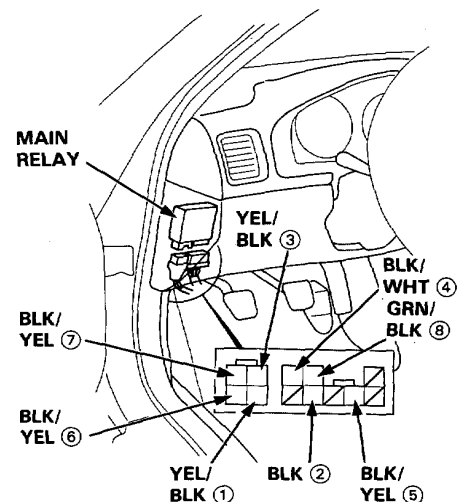
Fuel Supply System

Main Relay (cont'd)

Troubleshooting Flowchart



(To page 11-111)





(From page 11-110)

Turn the ignition switch off.

Connect the test harness between the ECU and connector. Disconnect "A" connector from the main wire harness only, not the ECU (page 11-28).

Check for continuity between GRN/BLK terminal ⑧ and A7 terminal.

Does continuity exist?

NO

Repair open in GRN/BLK wire between ECU (A7) and main relay.

YES

Reconnect "A" connector to the main wire harness.

Connect the main relay connectors.

Turn the ignition switch ON.

Measure the voltage between A25 (+) terminal and A23 (-) terminal.

Is there battery voltage?

NO

— Replace main relay.
— Repair open in the YEL/BLK wire between the ECU (A25) and the main relay.

YES

Measure the voltage between A7 (+) terminal and A23 (-) terminal.

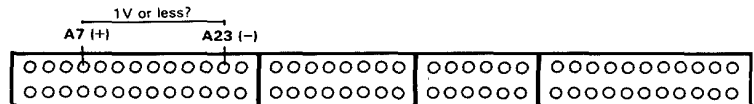
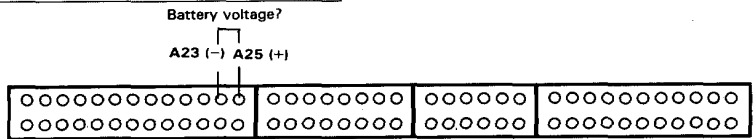
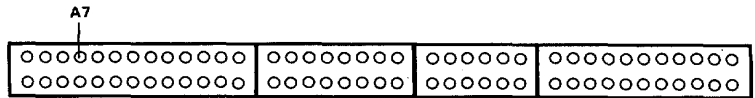
Is there 1V or less?
(for 2 seconds)

NO

Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

Check the main relay (page 11-109).



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Fuel Supply System

Fuel Tank

Replacement

⚠ WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.

1. Raise the car.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the connectors from the fuel gauge sending unit and the fuel pump.
4. Disconnect the hoses.

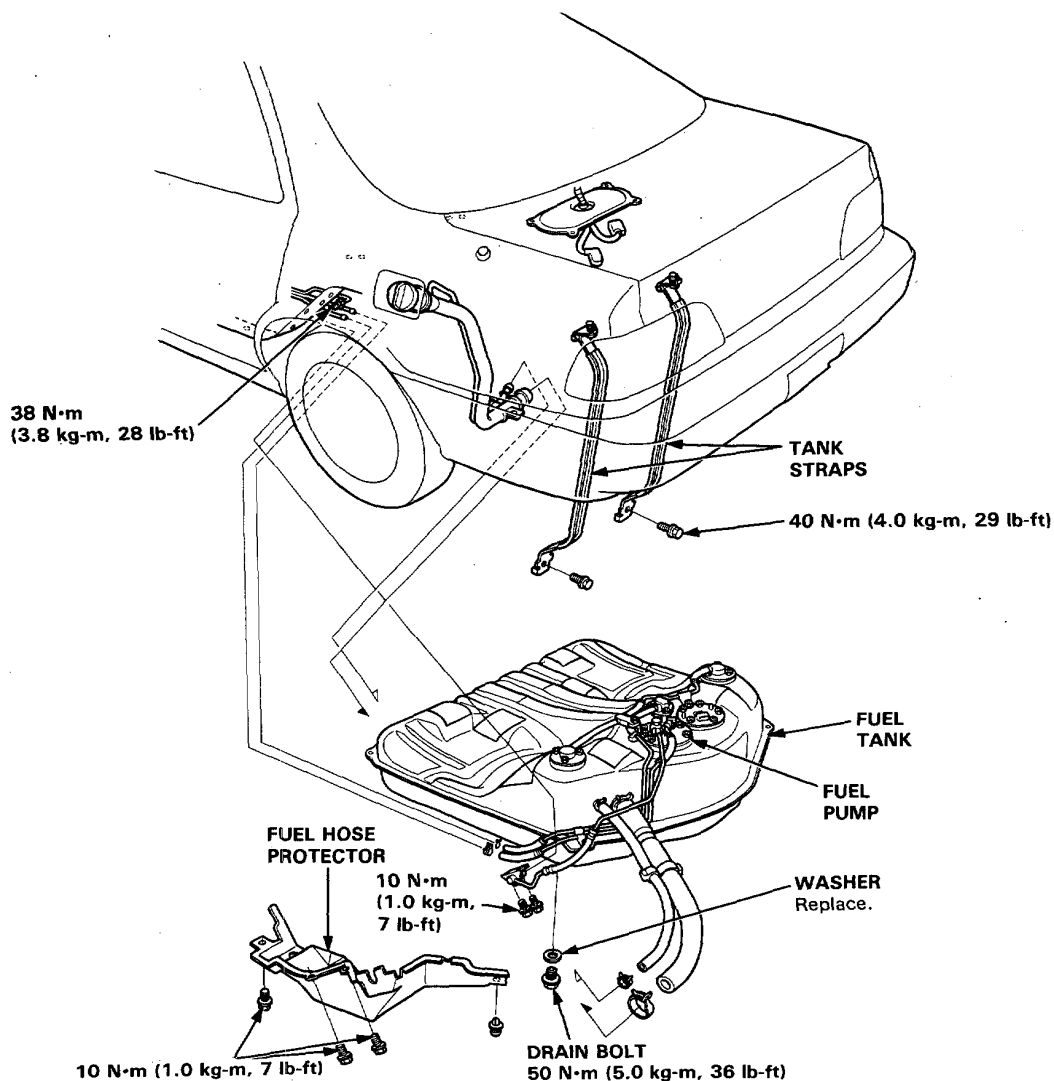
CAUTION:

- When disconnecting the hoses, slide back the clamps, then twist hoses as you pull to avoid damaging them.

5. Place a jack, or other support, under the tank.
6. Remove the strap bolts and nuts, and let the straps fall free.
7. Remove the fuel tank.

NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.

8. Install a new washer on the drain bolt, then install parts in the reverse order of removal.



Air Intake System



System Troubleshooting Guide

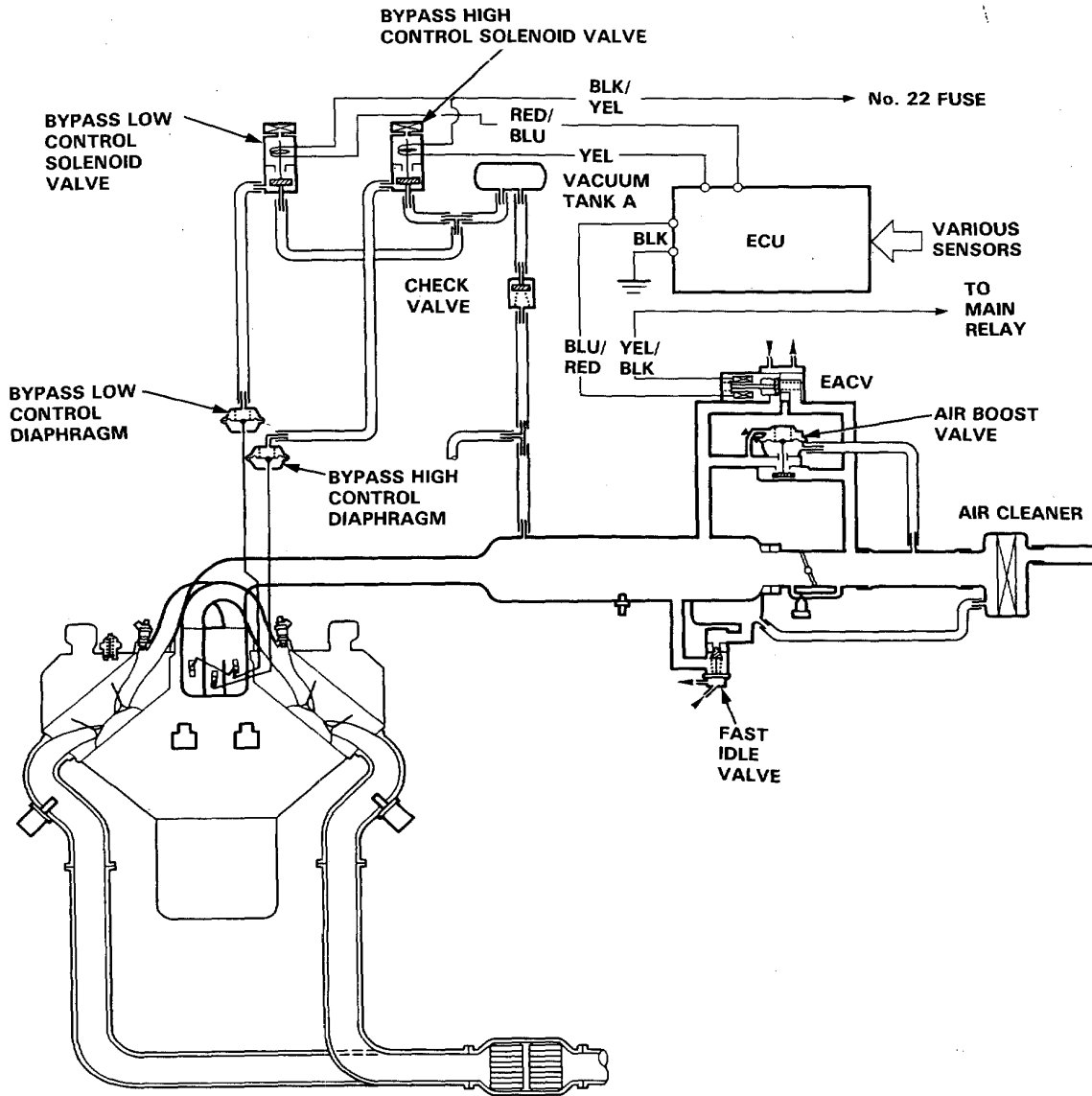
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.

PAGE	SUB SYSTEM	THROTTLE CABLE	THROTTLE BODY	CHAMBER VOLUME CONTROL SYSTEM
SYMPTOM		116	117	120
WHEN COLD FAST IDLE OUT OF SPEC		③	②	①
WHEN WARM ENGINE SPEED TOO HIGH		②	①	
LOSS OF POWER			①	②

Air Intake System

System Description

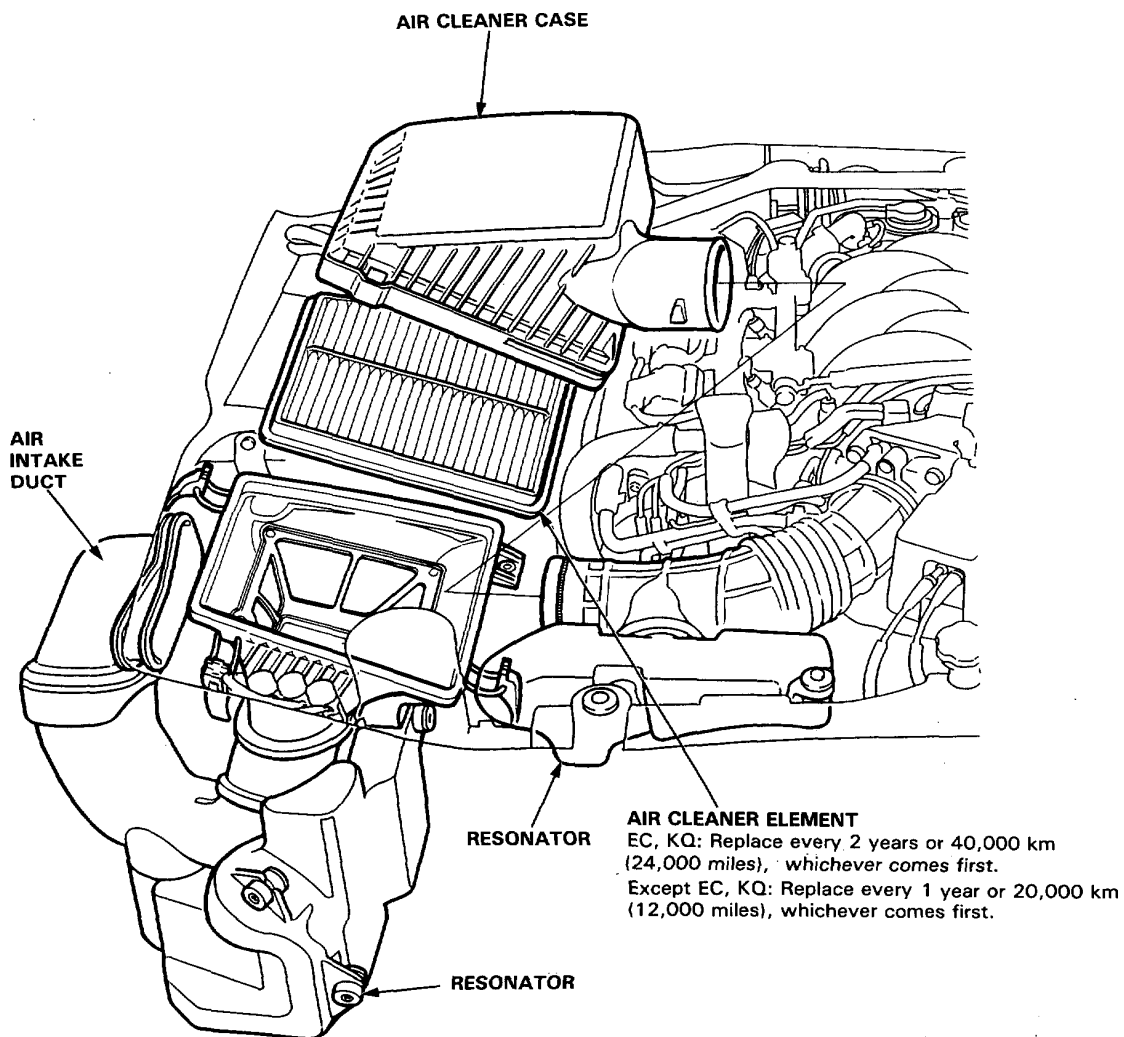
The system supplies air for all engine needs. It consists of the air cleaner, air intake pipe, throttle body, EACV, fast idle mechanism, and intake manifold. A resonator in the air intake pipe provides additional silencing as air is drawn into the system.





Air Cleaner

Air Cleaner Element Replacement

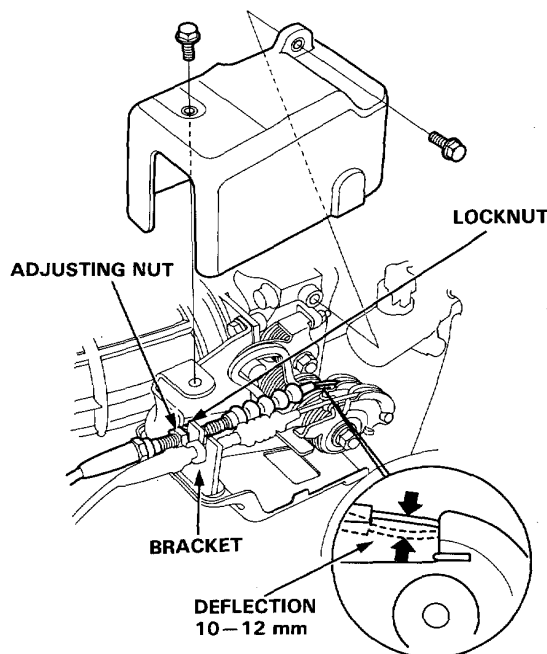


Air Intake System

Throttle Cable

Inspection/Adjustment

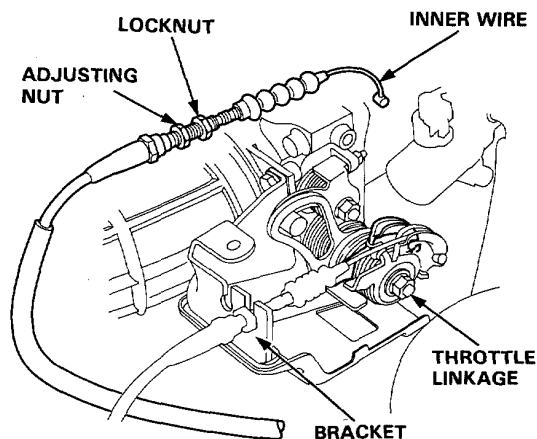
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10–12 mm (0.39–0.47 in.)



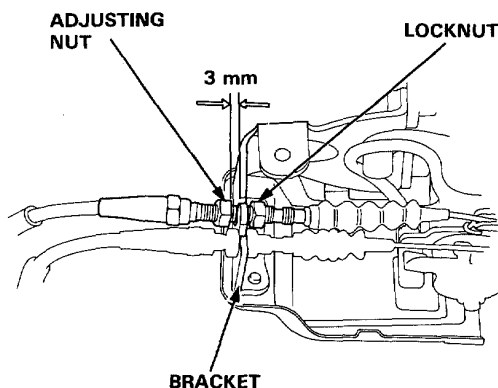
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
2. Warm up the engine to normal operating temperature (the cooling fan comes on).



3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10–12 mm. If not, see Inspection/Adjustment.

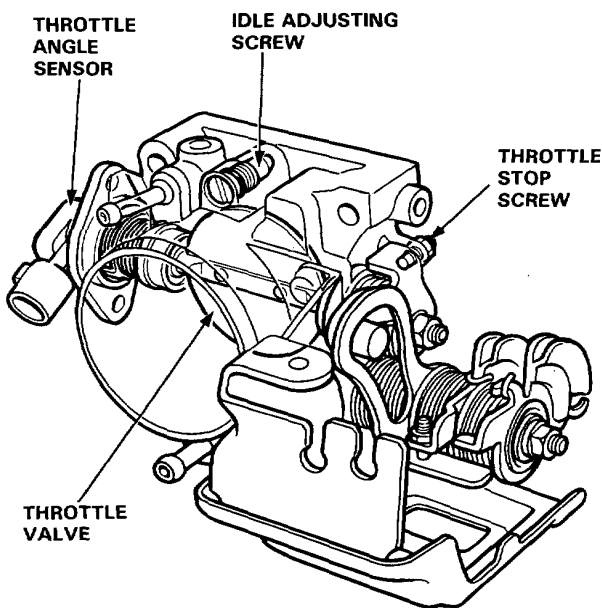




Throttle Body

Description

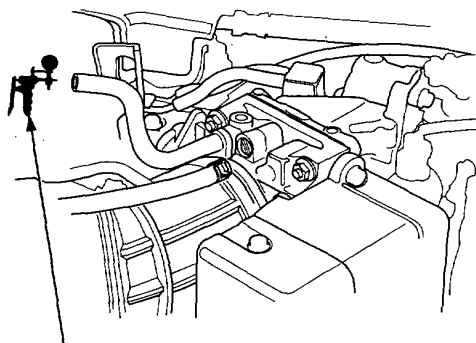
The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant which is fed from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the canister/purge port are located on the top of the throttle body.



Inspection

CAUTION: Do not adjust the throttle stop screw. It is preset at the factory.

1. Start the engine and allow it to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.



VACUUM PUMP/GAUGE

3. Allow the engine to idle and check that the gauge indicates no vacuum.
 - If there is vacuum, check the throttle cable (page 11-116).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
 - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
 - If there are any abnormalities in the above steps, check for:
 - Excessive wear or play in the throttle valve shaft.
 - Sticky or binding throttle lever at full close position.
 - Clearance between throttle stop screw and throttle lever at full close position.

(cont'd)

Air Intake System

Throttle Body (cont'd)

There should be
no clearance.

THROTTLE LEVER

THROTTLE
LEVER

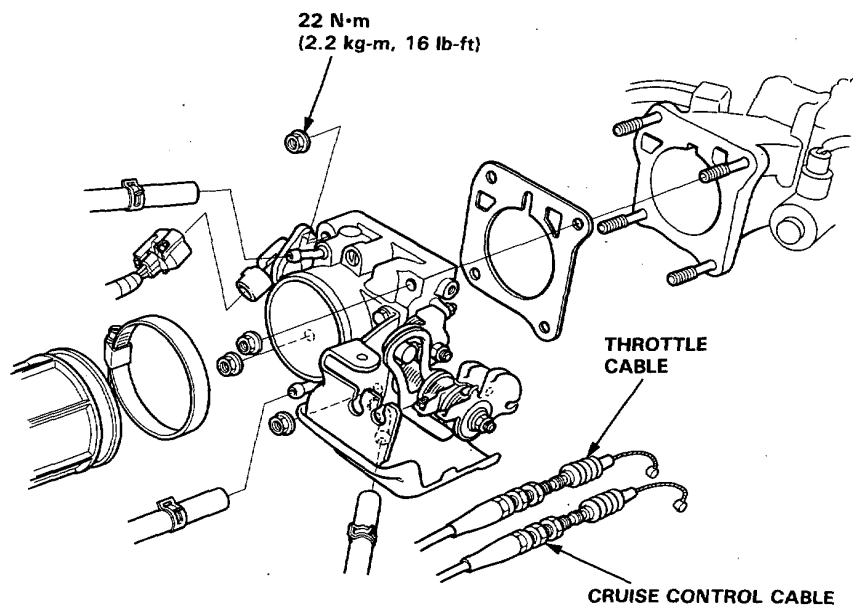
THROTTLE STOP SCREW.
(Non-adjustable)

Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.



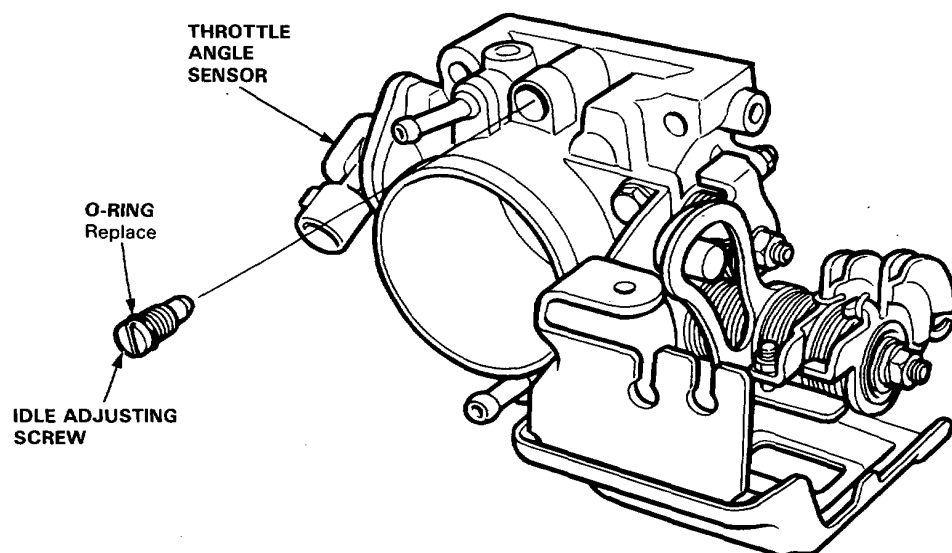
Throttle Body (cont'd)

Disassembly



CAUTION:

- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (page 11-116) and the cruise control cable (section 23).



Air Intake System

Chamber Volume Control System

Description

Satisfactory power performance is achieved by closing and opening the bypass control valves. High torque at low engine speed is achieved when the valves are closed, whereas high power at high engine speed is achieved by when the valves are opened.

BYPASS LOW CONTROL SOLENOID VALVE
OFF

ENGINE SPEED IS ABOVE 3,300
 min^{-1} (rpm)

BYPASS HIGH CONTROL SOLENOID VALVE
OFF

ENGINE SPEED IS ABOVE 4,000
 min^{-1} (rpm)

LOW VALVE : CLOSED
HIGH VALVE : CLOSED

HIGH VALVE

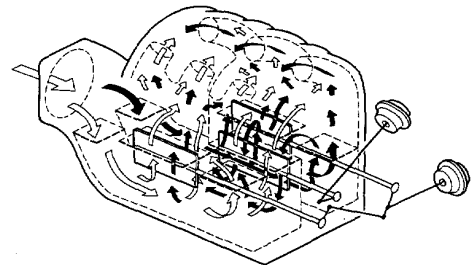
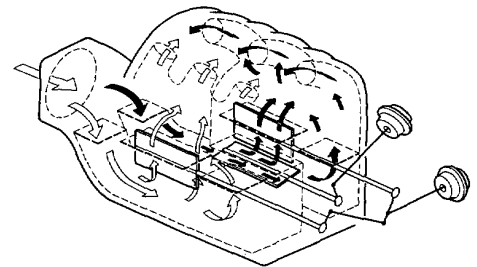
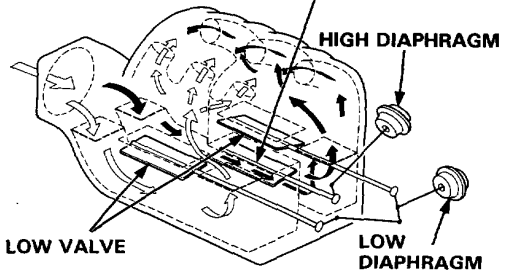
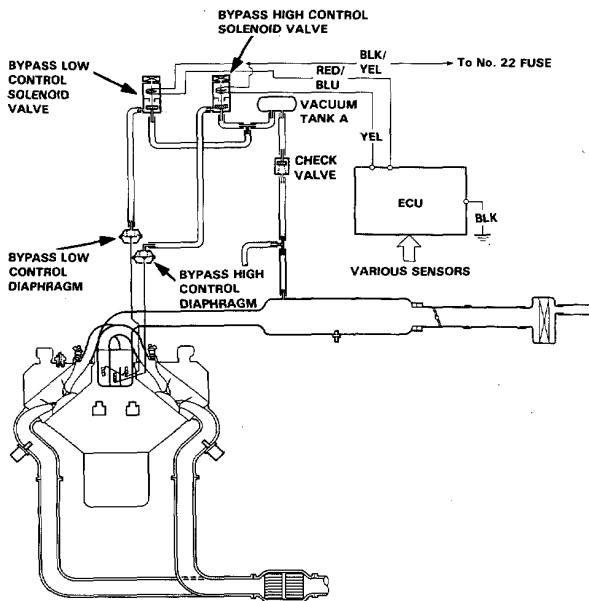
HIGH DIAPHRAGM

LOW VALVE

LOW DIAPHRAGM

LOW VALVE : OPEN
HIGH VALVE : CLOSED

LOW VALVE: OPEN
HIGH VALVE: OPEN





Troubleshooting Flowchart

Inspection of Chamber Volume Control System.

Start engine and allow it to idle.

Remove # 2 vacuum hose from the bypass low control diaphragm and connect vacuum gauge to the hose.

Is there vacuum?

NO

Disconnect the #4 hose on bypass low control solenoid valve and connect a vacuum gauge to the hose.

Is there vacuum?

NO

Repair the blockage or vacuum leak between the vacuum tank and the intake manifold.

YES

Disconnect the 6P connector.

Measure voltage between BLK/YEL (+) terminal and RED/BLU (-) terminal.

Is there battery voltage?

YES

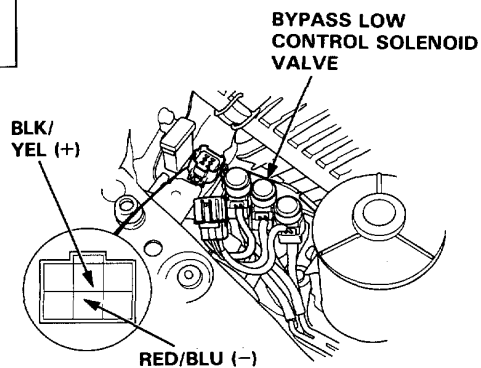
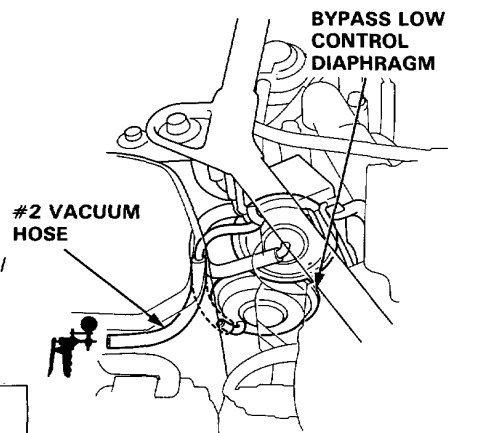
Replace the bypass low control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

(To page 11-122)

(To page 11-122)



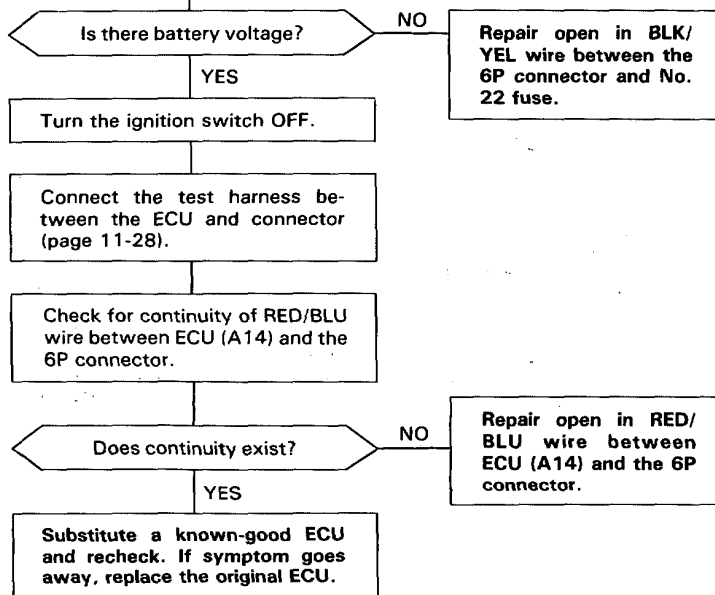
(cont'd)

Air Intake System

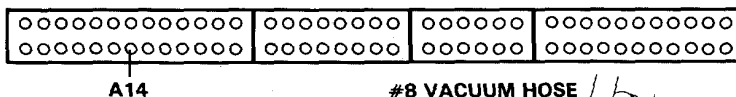
Chamber Volume Control System (cont'd)

(From page 11-121)

(From page 11-121)



Remove #8 vacuum hose from the bypass high control diaphragm and connect vacuum gauge to the hose.



VACUUM PUMP/GAUGE

#8 VACUUM HOSE

BYPASS HIGH CONTROL DIAPHRAGM

Is there vacuum?

NO

Disconnect the #4 hose on bypass high control solenoid valve and connect a vacuum gauge to the hose.

Is there vacuum?

NO

Repair the blockage or vacuum leak between the vacuum tank and the intake manifold.

YES

Disconnect the 6P connector.

Measure voltage between BLK/YEL (+) terminal and YEL (-) terminal.

BYPASS HIGH CONTROL SOLENOID VALVE

BLK/YEL (+)

YEL (-)

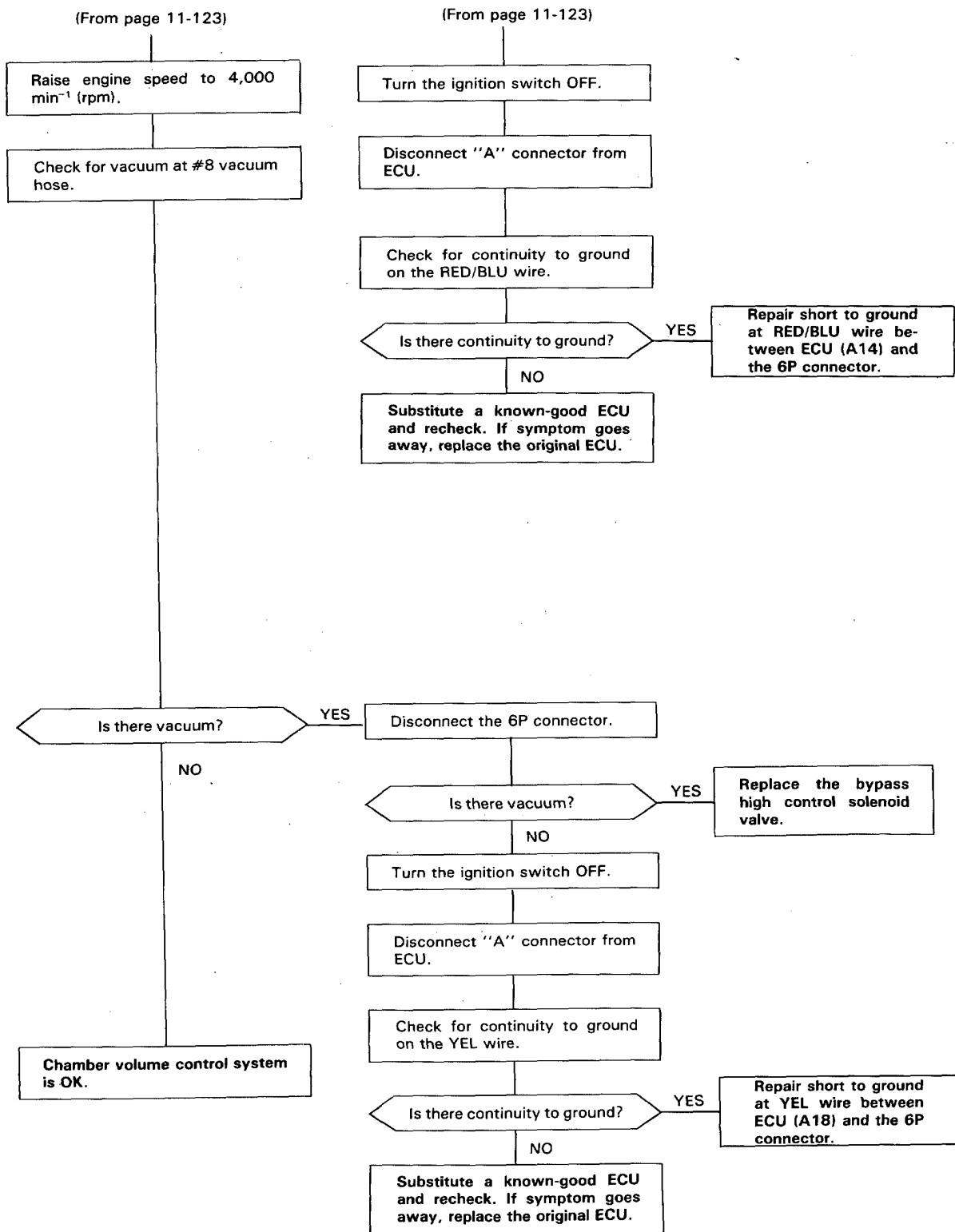
(To page 11-123)

(To page 11-123)



Air Intake System

Chamber Volume Control System (cont'd)

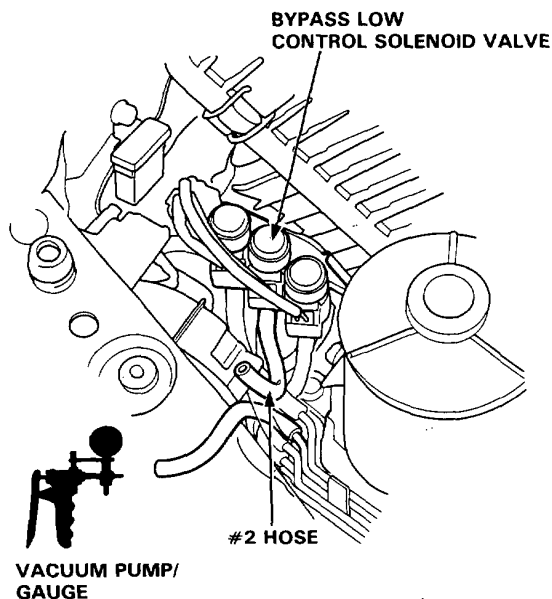




Bypass Control Valve Test

Bypass Low Control Valve

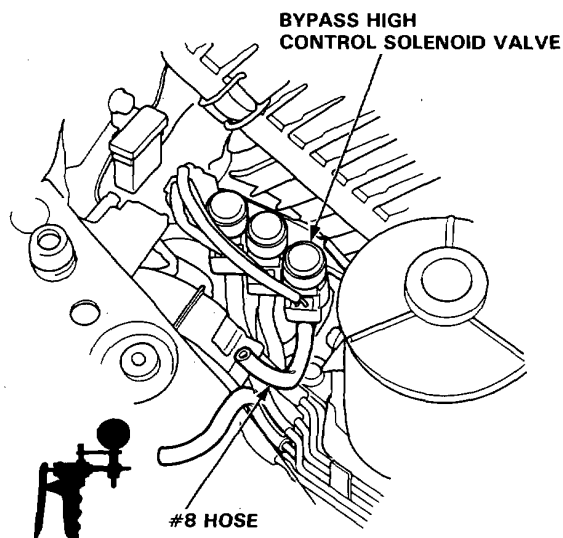
1. Disconnect the #2 hose from the vacuum hose manifold and attach a vacuum pump to the vacuum hose manifold.



2. Apply vacuum and verify that the diaphragm holds vacuum and that as the vacuum is applied and released the diaphragm rod moves in and out.
- If the diaphragm does not hold vacuum or the diaphragm rod does not move in and out, replace the Bypass Control Valve and retest.

Bypass High Control Valve

1. Disconnect the #8 hose from the vacuum hose manifold and attach a vacuum pump to the vacuum hose manifold.

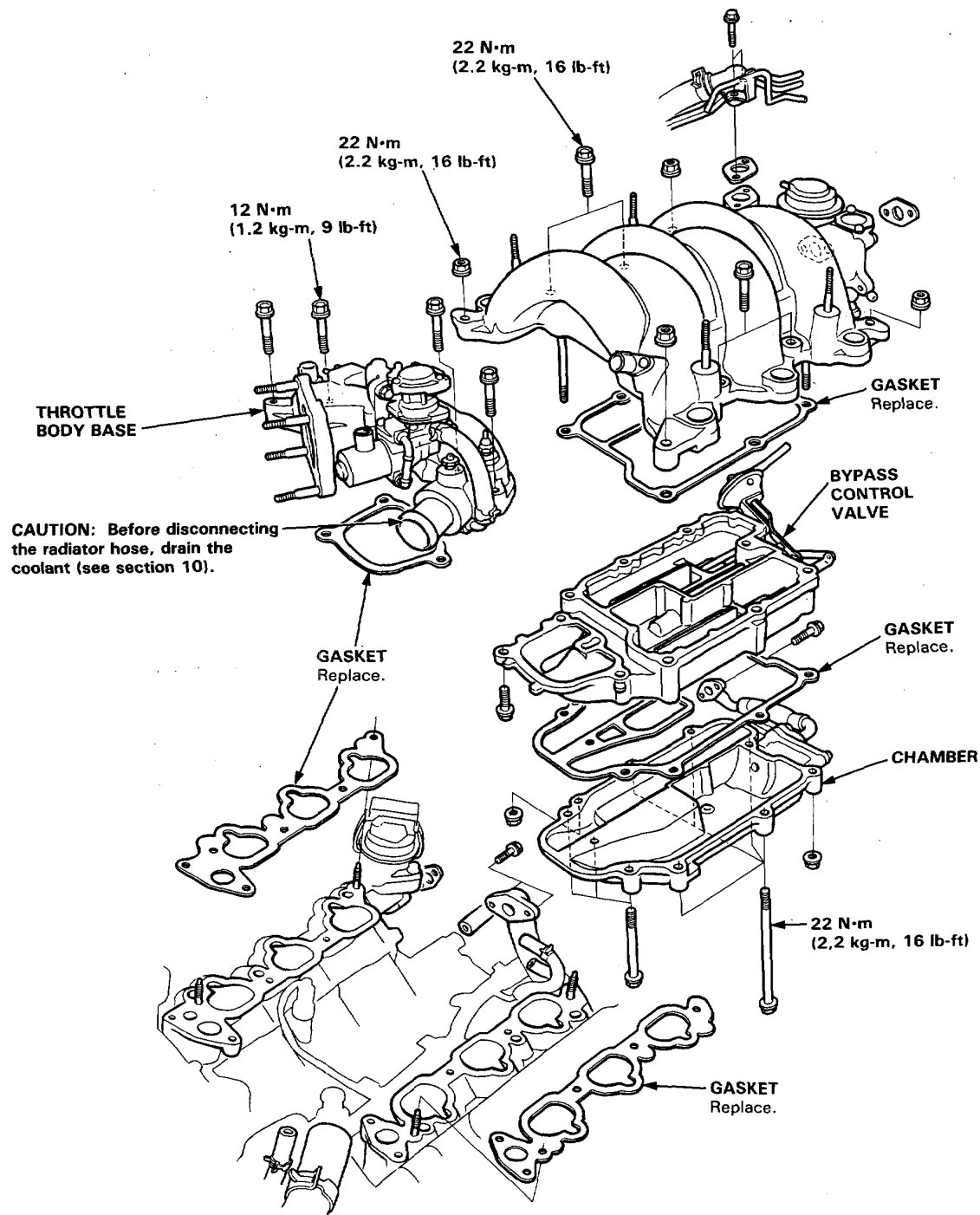


2. Apply vacuum and verify that the diaphragm holds vacuum and that as the vacuum is applied and released the diaphragm rod moves in and out.
- If the diaphragm does not hold vacuum or the diaphragm rod does not move in and out, replace the Bypass Control Valve and retest.

Air Intake System

Chamber Volume Control System

Disassembly



Emission Control System

System Troubleshooting Guide



NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE	SUB SYSTEM	CATALYTIC CONVERTER (Except KY, KT)	EGR SYSTEM (Except KQ)	AIR INJECTION SYSTEM (Except KY, KQ, KT)	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS (Except KT)
	SYMPTOM	129	131	138	141	142
	ROUGH IDLE		①		②	
FREQUENT STALLING	AFTER WARMING UP		①			
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①			
	FAILS EMISSION TEST	①	③			②
	LOSS OF POWER	①	②	③		

Emission Control System

System Description

The emission control system includes a three-way catalytic converter, exhaust gas recirculation (EGR) system, crankcase ventilation system, air injection system and evaporative control system. The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

⚠ WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check and adjust the idle speed, if necessary (page 11-93).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

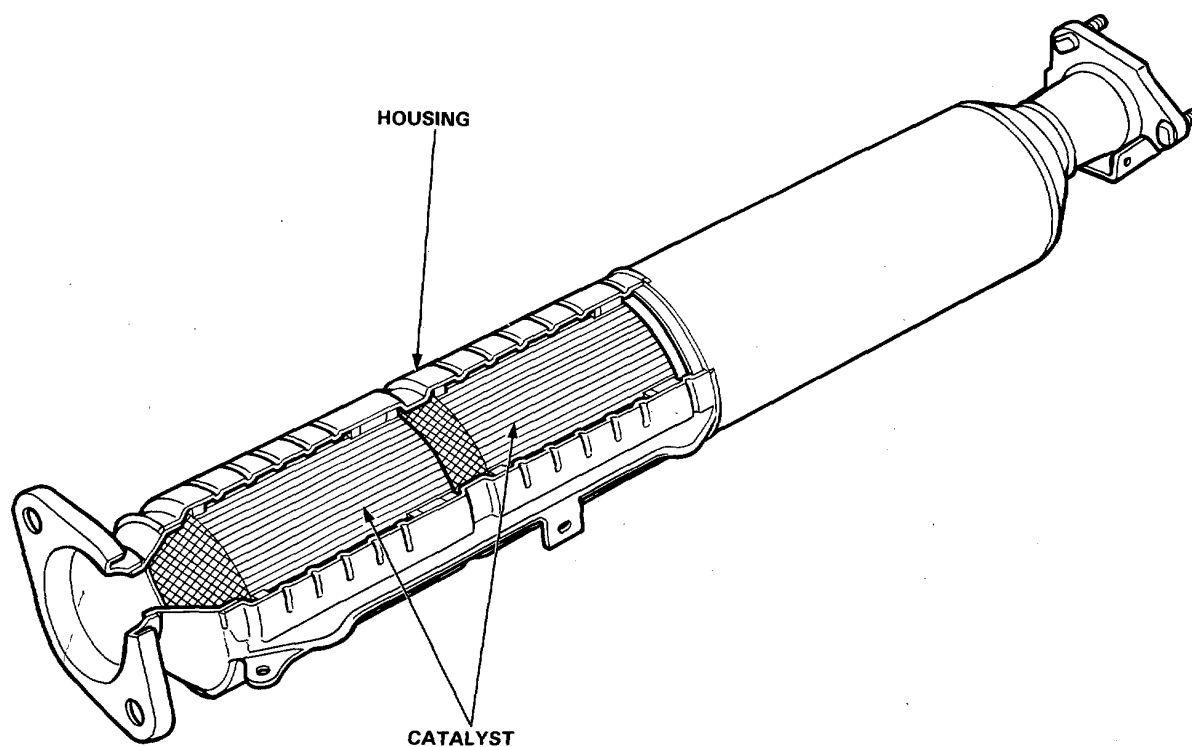
CO meter should indicate 0.1 % maximum.



Catalytic Converter

Description

The 3-way catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas to carbon dioxide (CO₂), dinitrogen (N₂) and water vapor.



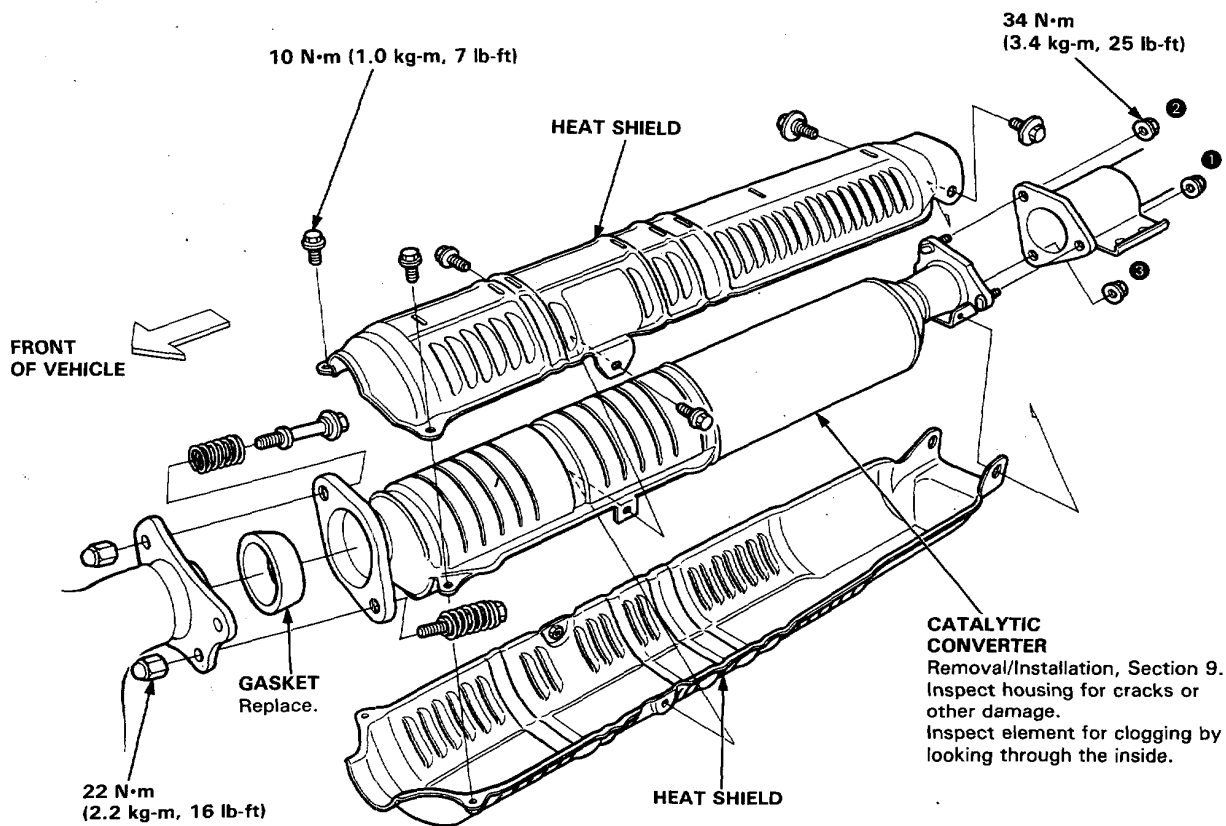
(cont'd)

Emission Control System

Catalytic Converter (cont'd)

Inspection

If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if any of the visible area is damaged or plugged.





Exhaust Gas Recirculation System

Troubleshooting Flowchart

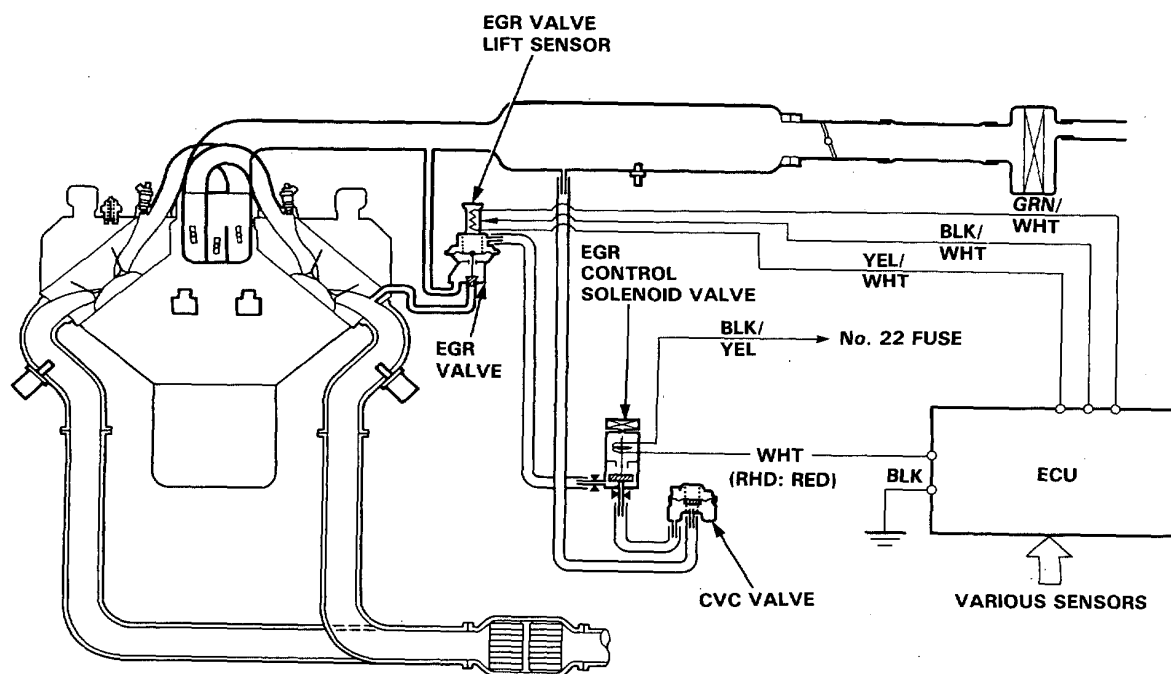


12

Self diagnosis Check Engine light indicates code 12: Most likely a problem in the Exhaust Gas Recirculation (EGR) system.

The EGR System is designed to reduce oxides of nitrogen emissions (NOx) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, CVC valve, EGR control solenoid valve, ECU and various sensors.

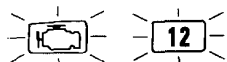
The ECU memory contains ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECU. The ECU then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the ECU cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.



(cont'd)

Emission Control System

Exhaust Gas Recirculation System (cont'd)



- Check Engine light has been reported on.
- With service check connector jumped (page 11-24), CODE 12 is indicated.

Do the ECU Reset Procedures (page 11-25).

Road test necessary: Warm up the engine to normal operating temperature (cooling fan comes on). Drive the car on the road for approx. 10 minutes. Keep the engine speed in the 1700–2500 range.

Is Check Engine light on and does it indicate CODE 12?

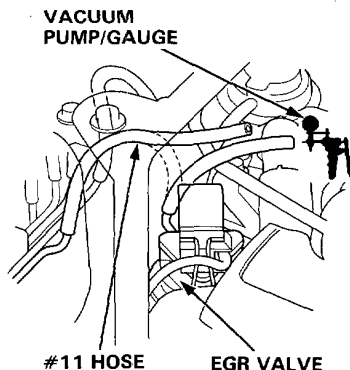
YES

With the engine at idle, disconnect the #11 hose from the EGR valve and connect a vacuum pump/gauge to the hose.

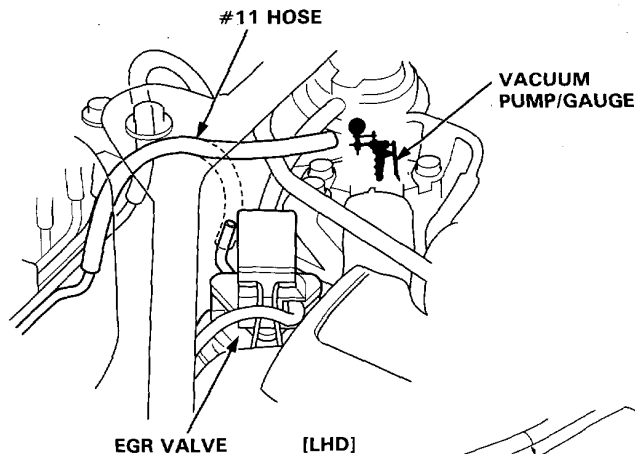
Is there any vacuum?

NO

Move the vacuum pump/gauge to the EGR valve.



(To page 11-133)

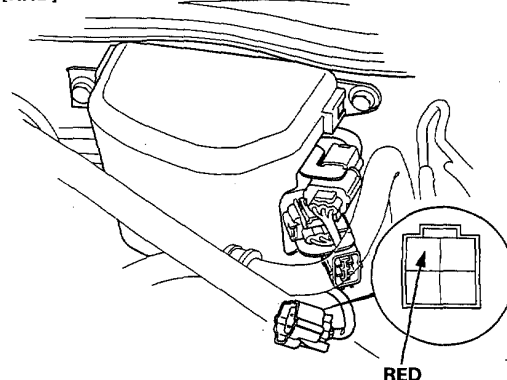


Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at EGR valve, control box and ECU.

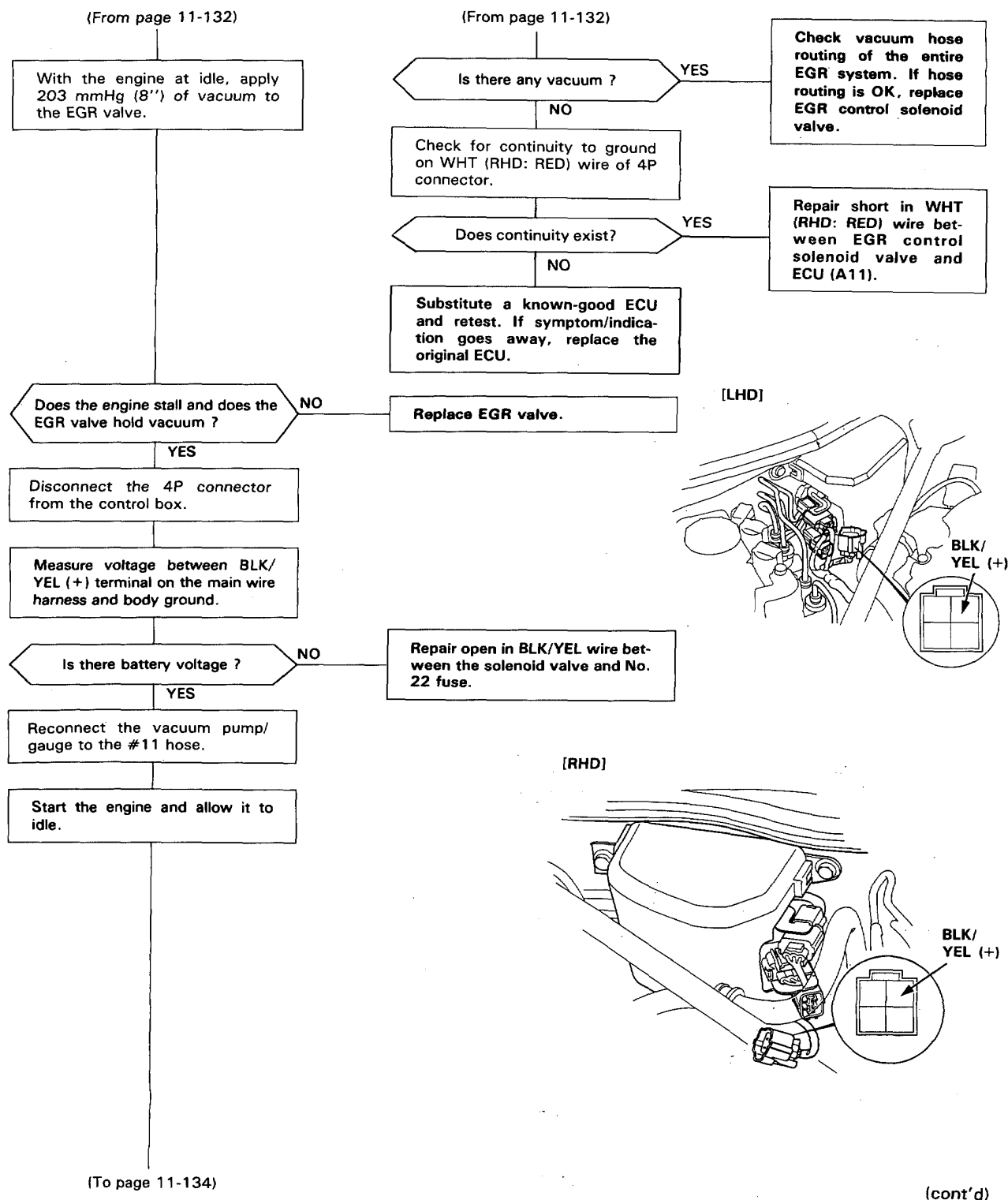
WHT

Disconnect 4P connector from the control box and check the #11 hose for vacuum again.

[RHD]



(To page 11-133)



Emission Control System

Exhaust Gas Recirculation System (cont'd)

(From page 11-133)

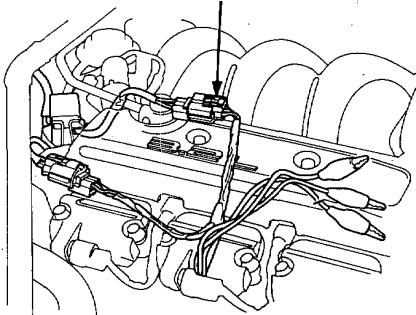
Connect the battery positive terminal to the A terminal of the 4P connector. While watching the vacuum gauge, connect the battery negative terminal to the B terminal.

Is there approx. 203mmHg (8") within 1 second?

YES

Turn the ignition switch OFF and reconnect the 4P connector.

TEST HARNESS
07LAJ-PT30200



Connect the test harness between the EGR valve lift sensor and engine wire harness.

Turn the ignition switch ON.

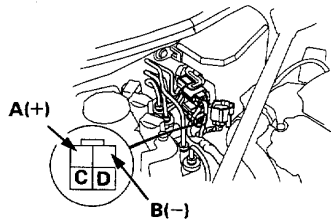
Measure voltage between RED (+) terminal and GRN (-) terminal.

Is there approx. 5 V?

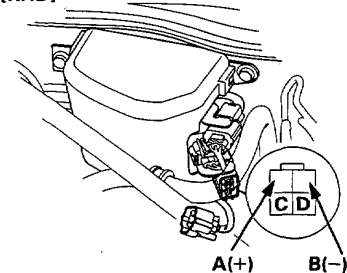
YES

(To page 11-135)

[LHD]



[RHD]



Turn the ignition switch OFF and inspect the #11 and #5 hoses for leaks, restrictions, or misrouting.

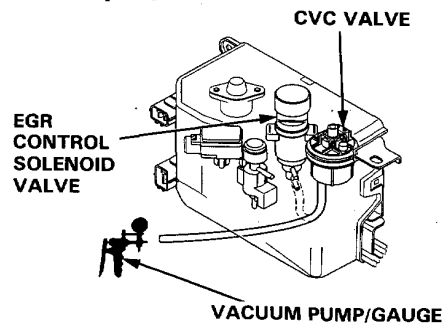
Are the hoses OK?

YES

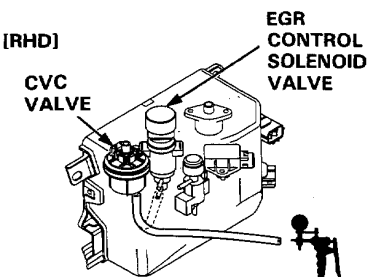
NO

Connect as necessary.

[LHD]



[RHD]



Disconnect the lower hose on EGR control solenoid valve and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.

Is there 152-254 mmHg (6"-10") of vacuum?

YES

NO

Replace CVC valve.

Replace the EGR control solenoid valve.

- Repair open in YEL/WHT wire between EGR valve and ECU (D20).
- Repair open in GRN/WHT wire between EGR valve and ECU (D22).



(From page 11-134)

Measure voltage between WHT (+) terminal and GRN (-) terminal.

Is there approx 1.2 V ?

NO

- Replace EGR valve.
- Repair short in BLK/WHT wire between ECU (D12) and EGR valve lift sensor.
- Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

While watching the voltmeter, slowly apply a continuous 203 mm Hg (8") of vacuum to the EGR valve. Repeat several times, completely releasing vacuum between.

Is the maximum voltage approx. 4 V ?

NO

Replace EGR valve.

YES

Does the voltage consistently increase/decrease as the vacuum increases/decreases ?

NO

Replace EGR valve.

YES

Reconnect the #11 hose to the EGR valve.

Turn the ignition switch OFF.

Connect the test harness between the ECU and connector (page 11-28).

Start the engine and allow it to idle.

(To page 11-136)

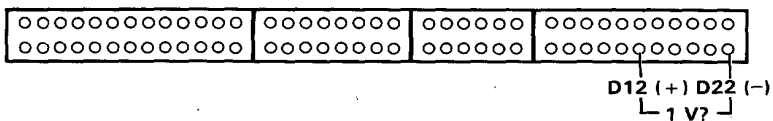
(cont'd)

Emission Control System

Exhaust Gas Recirculation System (cont'd)

(From page 11-135)

Measure voltage between D12 (+) terminal and D22 (-) terminal.



Is there approx. 1.2 V ?

NO

Repair open in BLK/WHT wire between ECU (D12) and the sensor.

YES

Connect A11 terminal to A26 terminal with a jumper wire.

Did the engine stall ?

NO

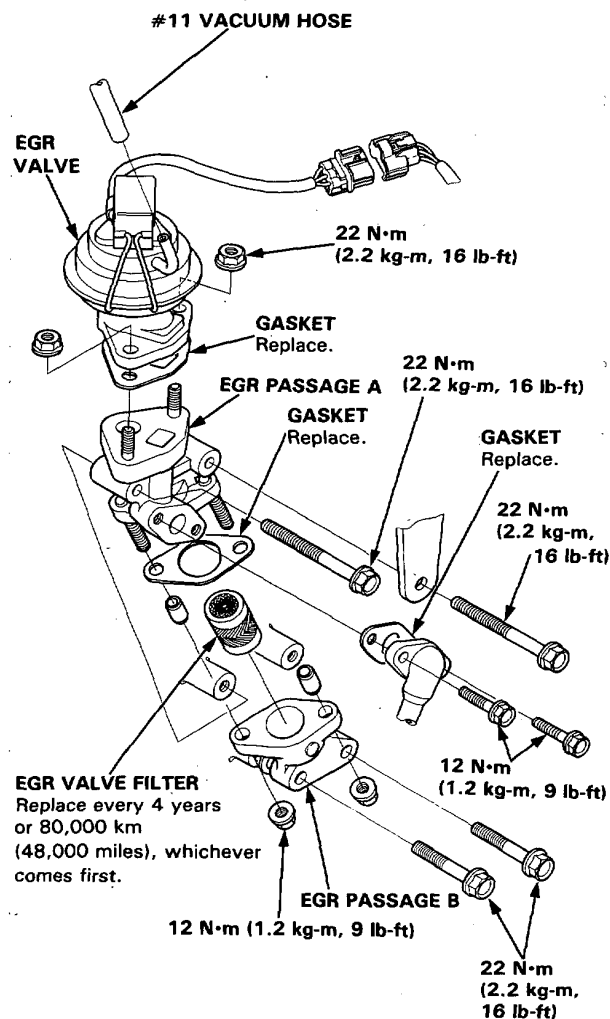
Repair open in WHT wire between ECU (A11) and EGR control solenoid valve.

YES

Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



EGR Valve Filter Replacement [without CATA]



EGR Valve Inspection [without CATA]

NOTE: Clean and inspect every 2 years or 40,000 km (24,000 miles), whichever comes first.

1. Remove the EGR valve.
2. Remove the carbon from the valve seat, body and main nozzle in the EGR valve with a wire brush or driver.

NOTE: When the valve clean, the valve should be seat.

3. Blow out the EGR valve with compressed air.
4. Install the EGR valve.
5. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
 - If the engine stall, replace the EGR valve.

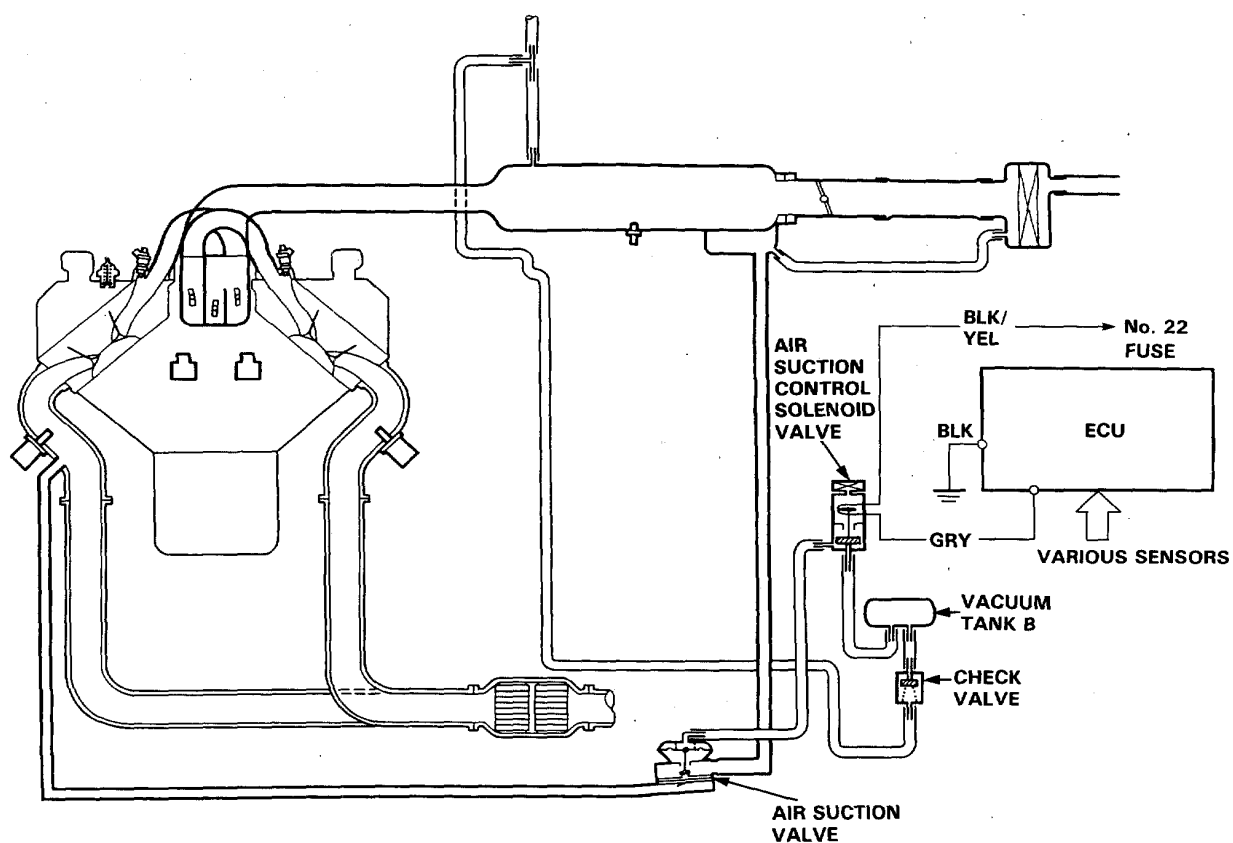
Emission Control System

Air Injection System

Description

This system is designed to improve emissions performance by supplying fresh air from the air cleaner into the exhaust manifold through the air suction valve.

When the air suction control solenoid valve is activated, manifold vacuum raises the diaphragm valve of the air suction valve. Fresh air from the air cleaner is introduced into the exhaust manifold through the reed valve of the air suction valve by the pulsation of the exhaust gas.



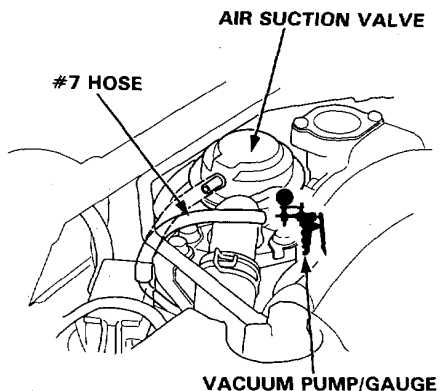


Troubleshooting Flowchart

Inspection of Air Injection System.

Start the engine and warm up to normal operating temperature (the cooling fan comes on).

Disconnect the #7 vacuum hose from the air suction valve and connect a vacuum gauge to the hose.



Is there vacuum?

YES

Disconnect the 6P connector.

NO

Is there vacuum?

YES

Check vacuum hose routing of entire air injection system. If hose routing is OK, replace air suction control solenoid valve.

NO

Inspect GRY wire for a short to body around between ECU (A17) and the 6P connector. If wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

Place the transmission in second or "2."

Check for vacuum during deceleration above 15 km/h (9 mph) and 1,500 min⁻¹ (rpm).

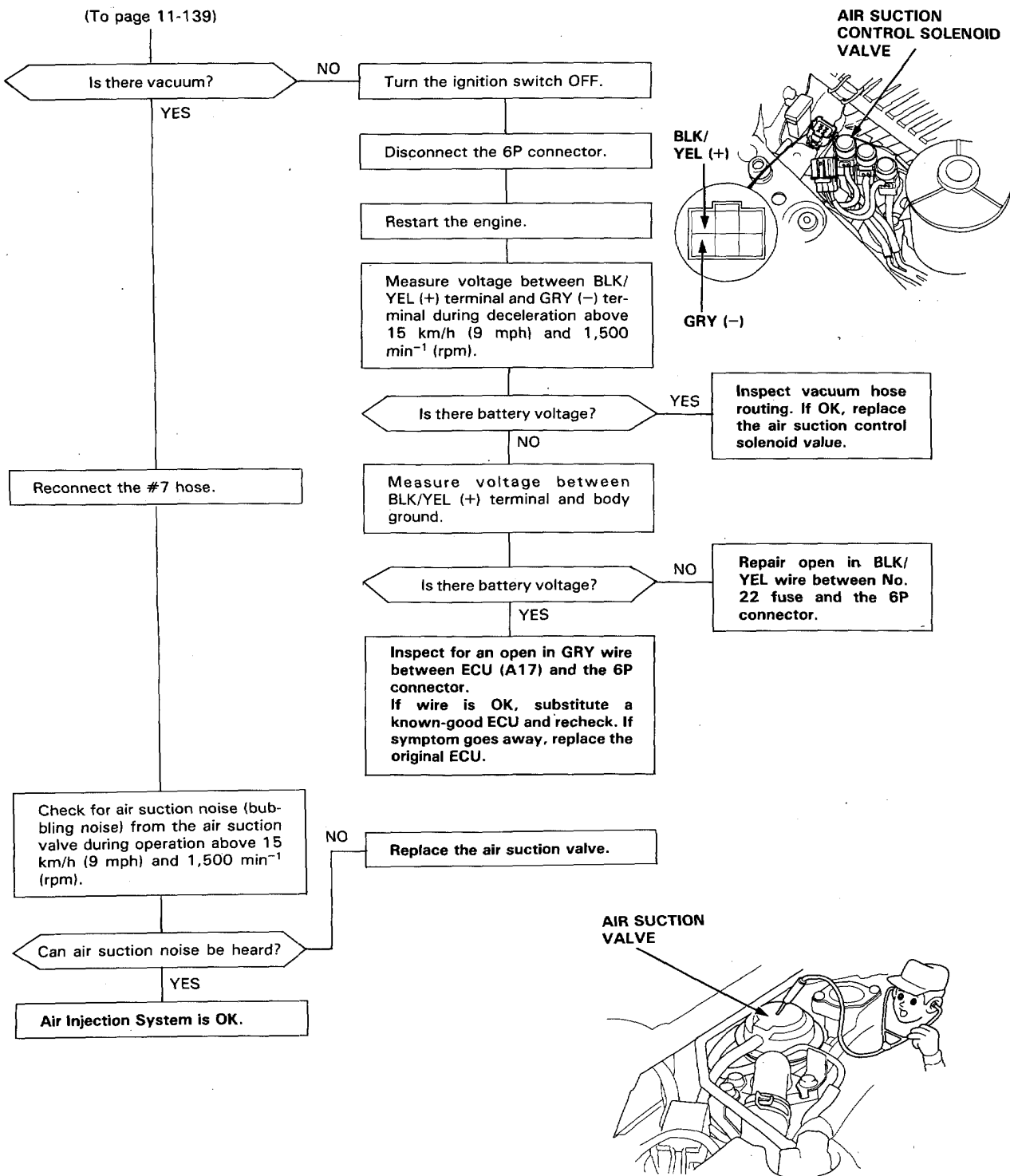
⚠ WARNING Block rear wheels before jacking up front of car.

(To page 11-140)

(cont'd)

Emission Control System

Air Injection System (cont'd)

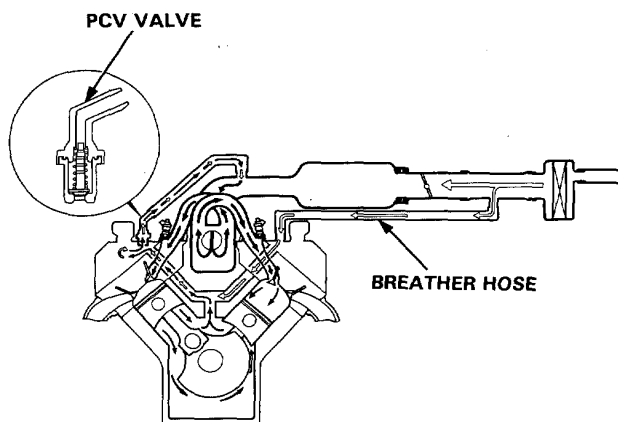




Positive Crankcase Ventilation System

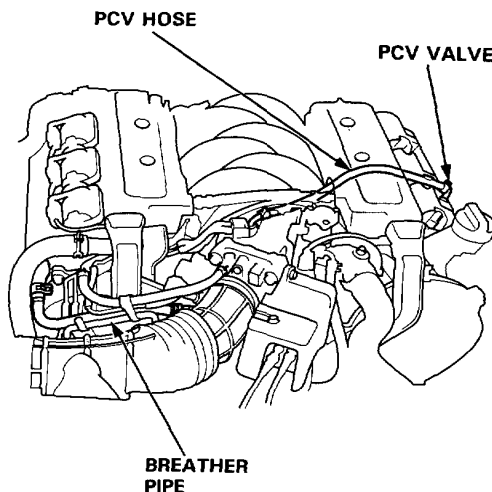
Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.

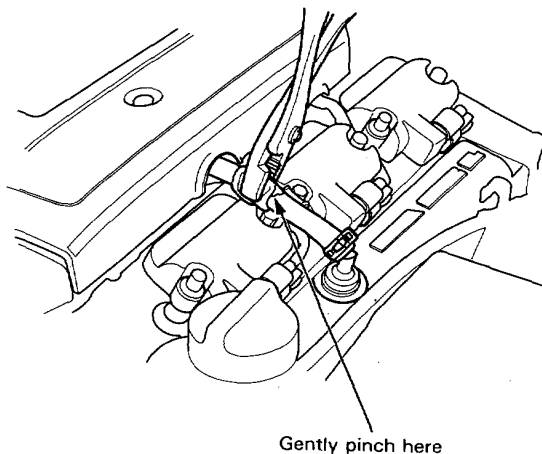


Inspection

1. Check the crankcase ventilation hoses and connections for leaks and clogging.



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.



- If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

Emission Control System

Evaporative Emission Controls

Description

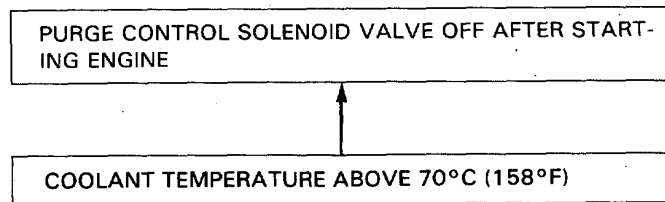
The evaporative controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Charcoal Canister

A canister for the temporary storage of fuel vapor until the fuel vapor can be purged from the canister into the engine and burned.

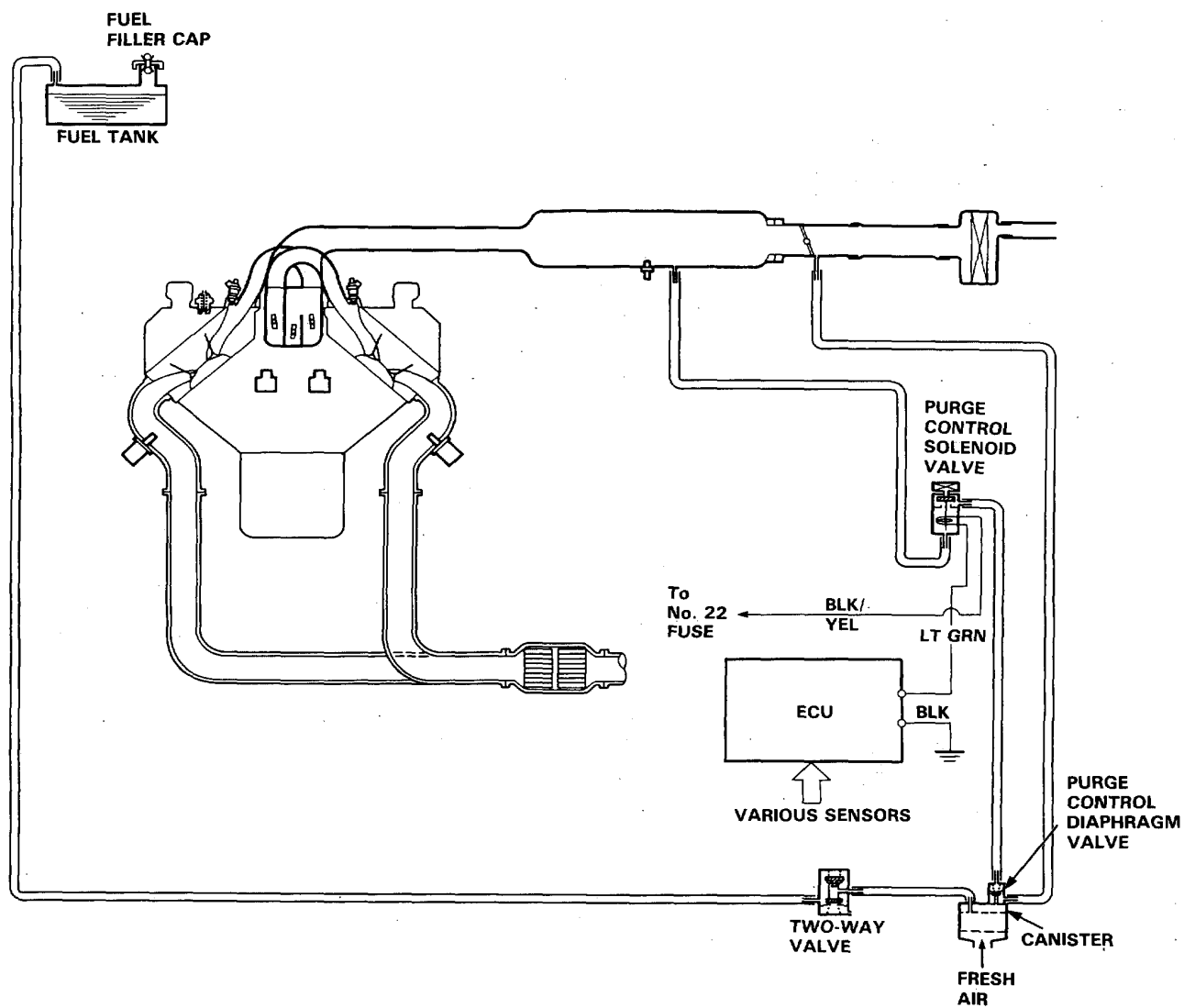
B. Vapor Purge Control System

Canister purging is accomplished by drawing fresh air through the canister and into a port on the throttle body. The purging vacuum is controlled by the purge control diaphragm valve and the purge control solenoid valve.



C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the two-way valve, the valve opens and regulates the flow of fuel vapor to the canister.



(cont'd)

Emission Control System

Evaporative Emission Controls (cont'd)

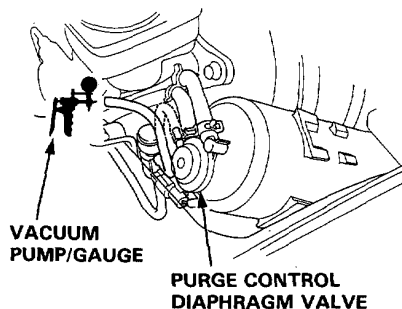
Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

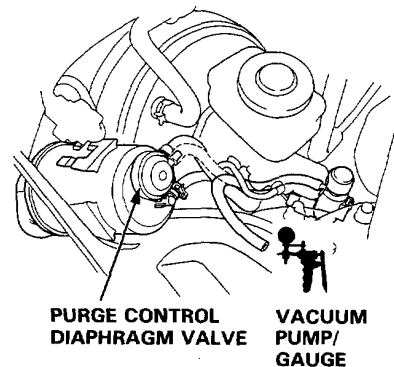
Disconnect vacuum hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.
NOTE: Engine coolant temperature must be below 70°C (158°F).

[LHD]



[RHD]



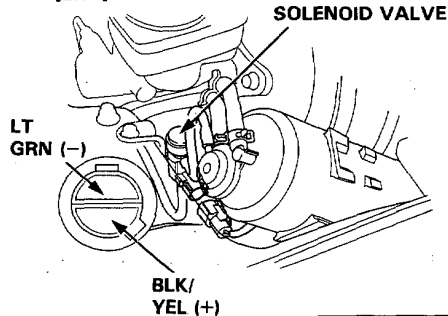
Is there vacuum ?

YES

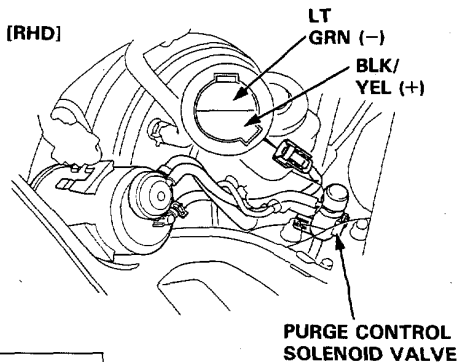
Disconnect the 2P connector.

NO

[LHD]



[RHD]



Measure voltage between BLK/YEL (+) terminal and LT GRN (-) terminal.

Is there battery voltage ?

YES

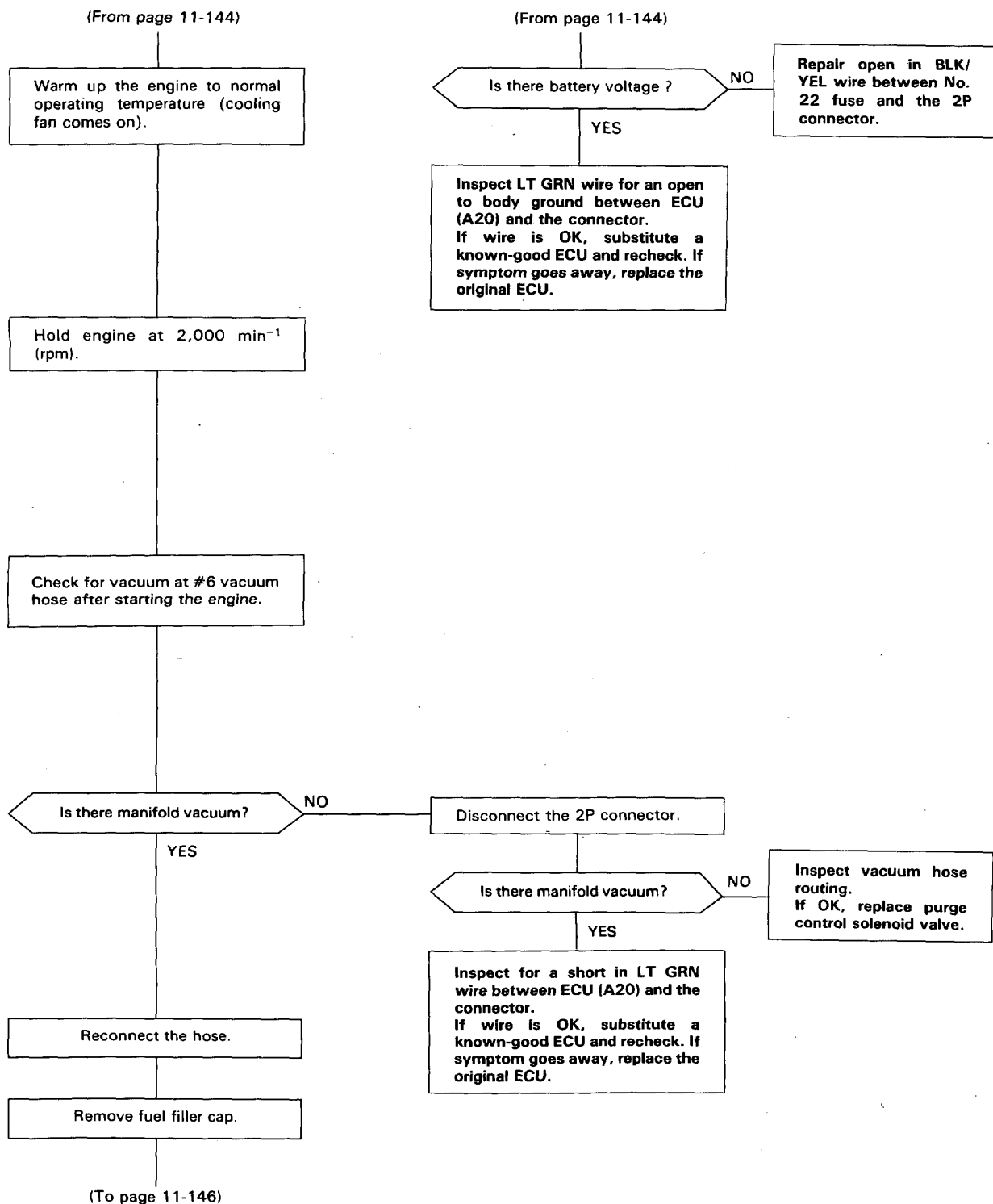
Inspect vacuum hose routing.
If OK, replace purge control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

(To page 11-145)

(To page 11-145)



Emission Control System

Evaporative Emission Controls (cont'd)

(From page 11-145)

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to $3,500 \text{ min}^{-1}$ (rpm).

Does vacuum appear on gauge within 1 minute?

YES

See two-way valve test to complete. Evaporative emission controls are OK.

NO

Connect a vacuum gauge to the canister purge hose and raise the engine speed to $3,500 \text{ min}^{-1}$ (rpm).

Does vacuum appear on the gauge?

YES

Replace the canister.

NO

Inspect the purge hose and throttle body port for pinch or blockage.

[LHD]

VACUUM PRESSURE GAUGE 0-4 in. Hg

PURGE HOSE

PURGE AIR HOSE

[RHD]

VACUUM PRESSURE GAUGE 0-4 in. Hg

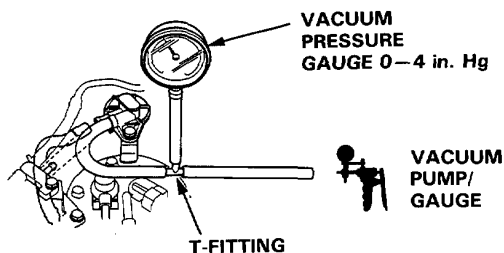
PURGE HOSE

PURGE AIR HOSE



Two-way Valve Test

1. Remove the fuel filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.

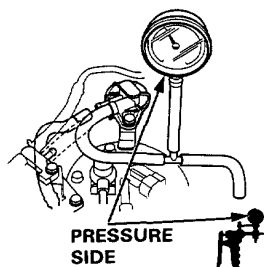


3. Apply vacuum slowly and continuously while watching the gauge.

Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in. Hg).

- If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and retest.

4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

Pressure should stabilize at 10 to 35 mmHg (0.4 to 1.4 in. Hg).

- If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the valve is OK.
- If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new valve and retest.