

Fuel and Emission

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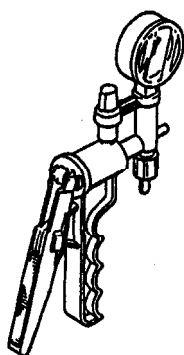
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Special Tools

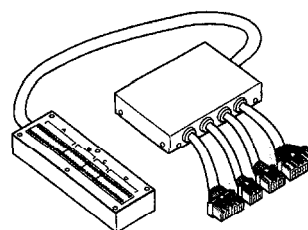
Special Tools				
Ref. No.	Tool Number	Description 1	Q'ty	Page Reference
①	A973X-041 -XXXXX	Vacuum Pump/Gauge	1	1 I-44, 114, 118, 120, 129, 137, 140
②	KS-AHM-32-003	Digital Multimeter	1	11-21, 32, 37
③	07LAJ-PT3010A	Test Harness	1	11-21
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⑦	07406-0040001	Fuel Pressure Gauge	1	11-88



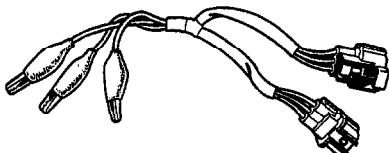
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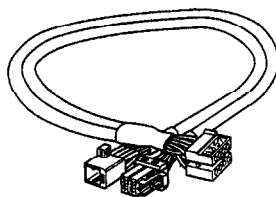
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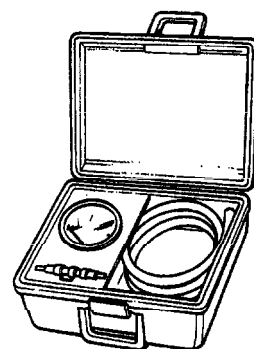
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④



⑤



⑥

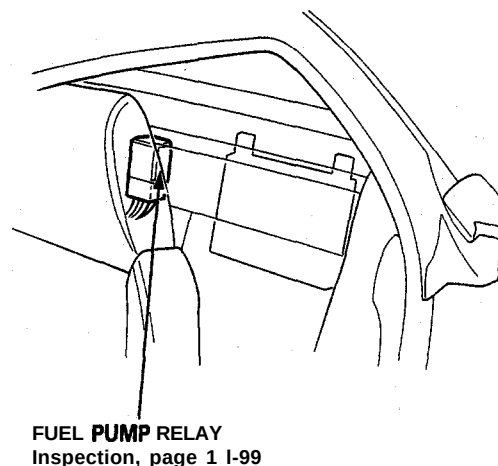
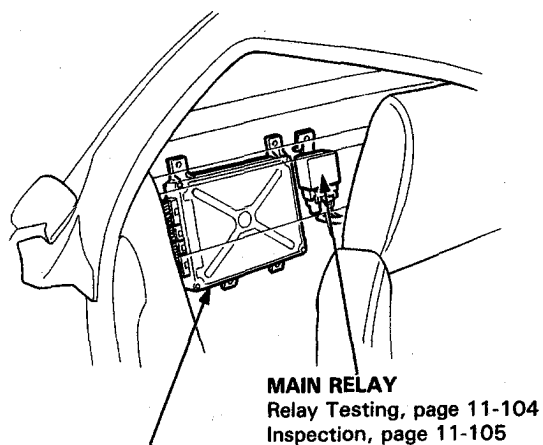
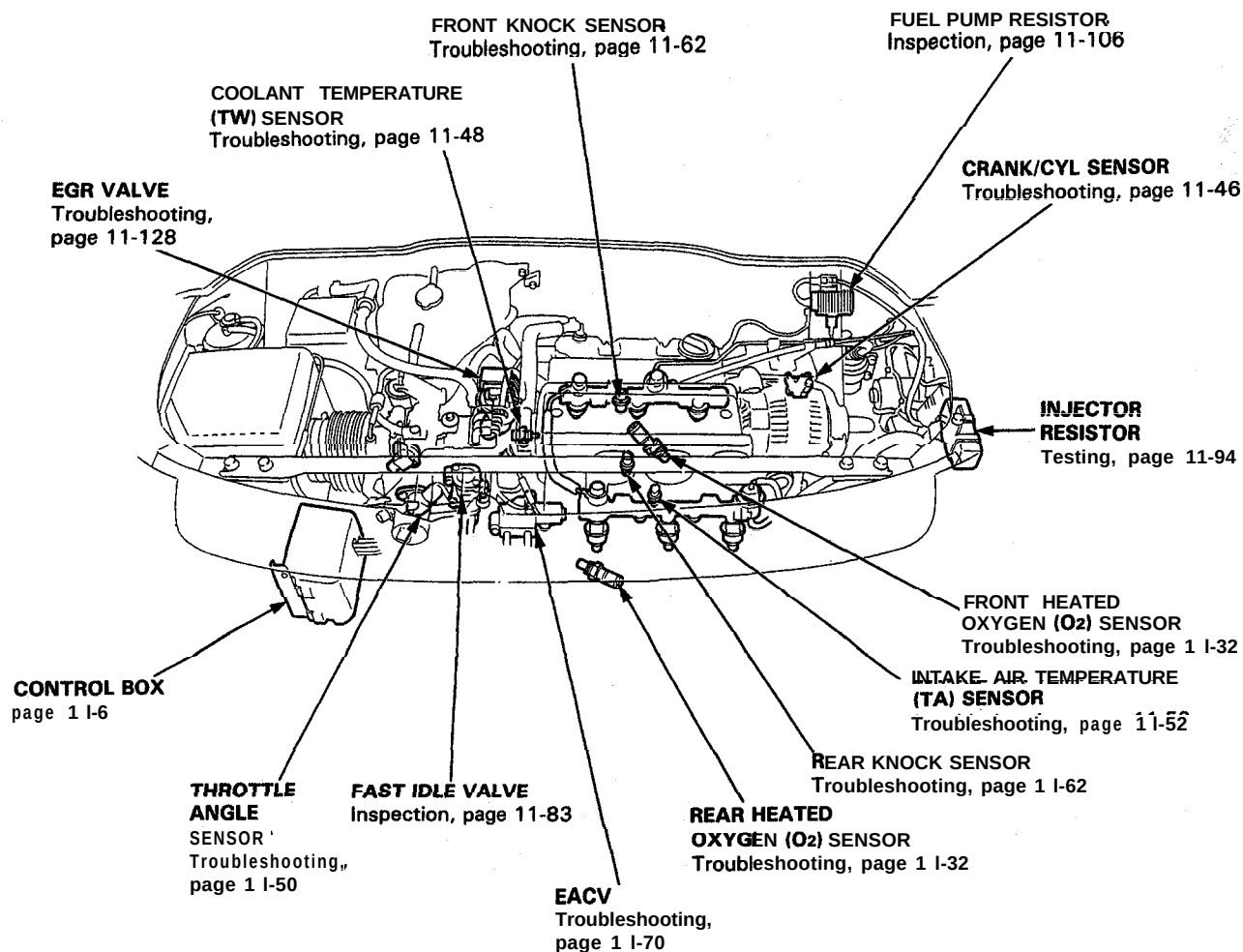


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Component Locations

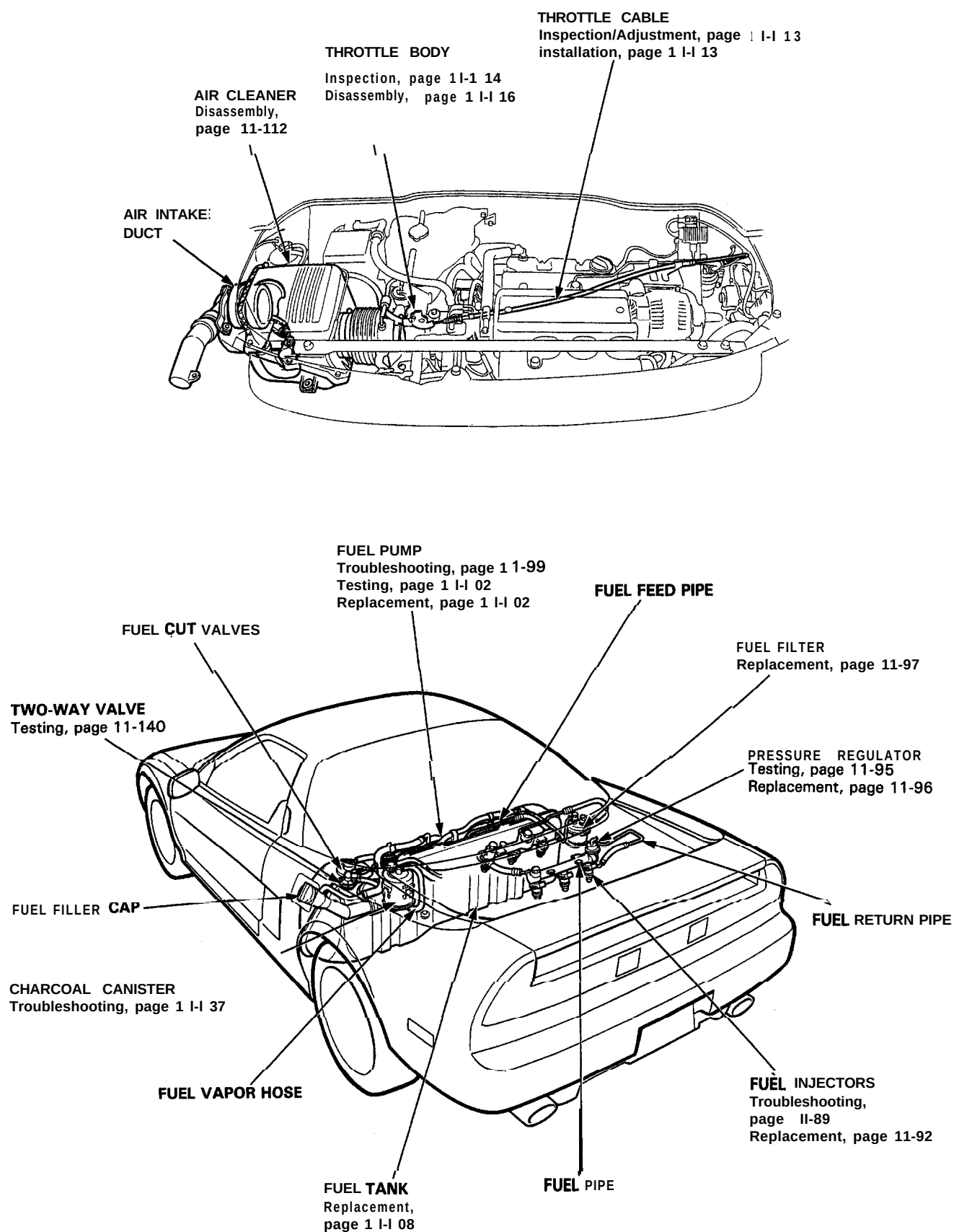
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ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 1 I-26

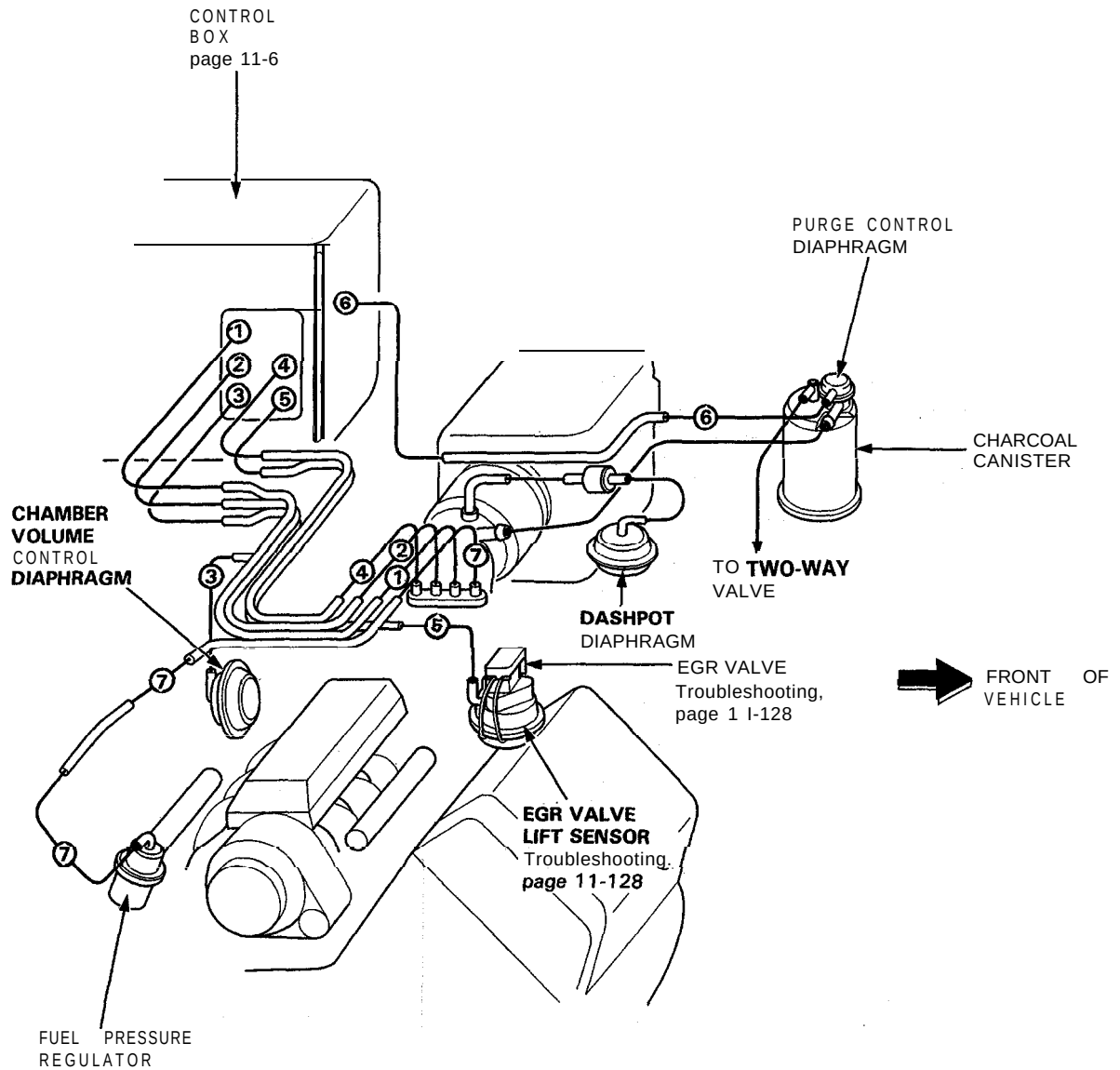
Component Locations

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System Description

Vacuum Connections

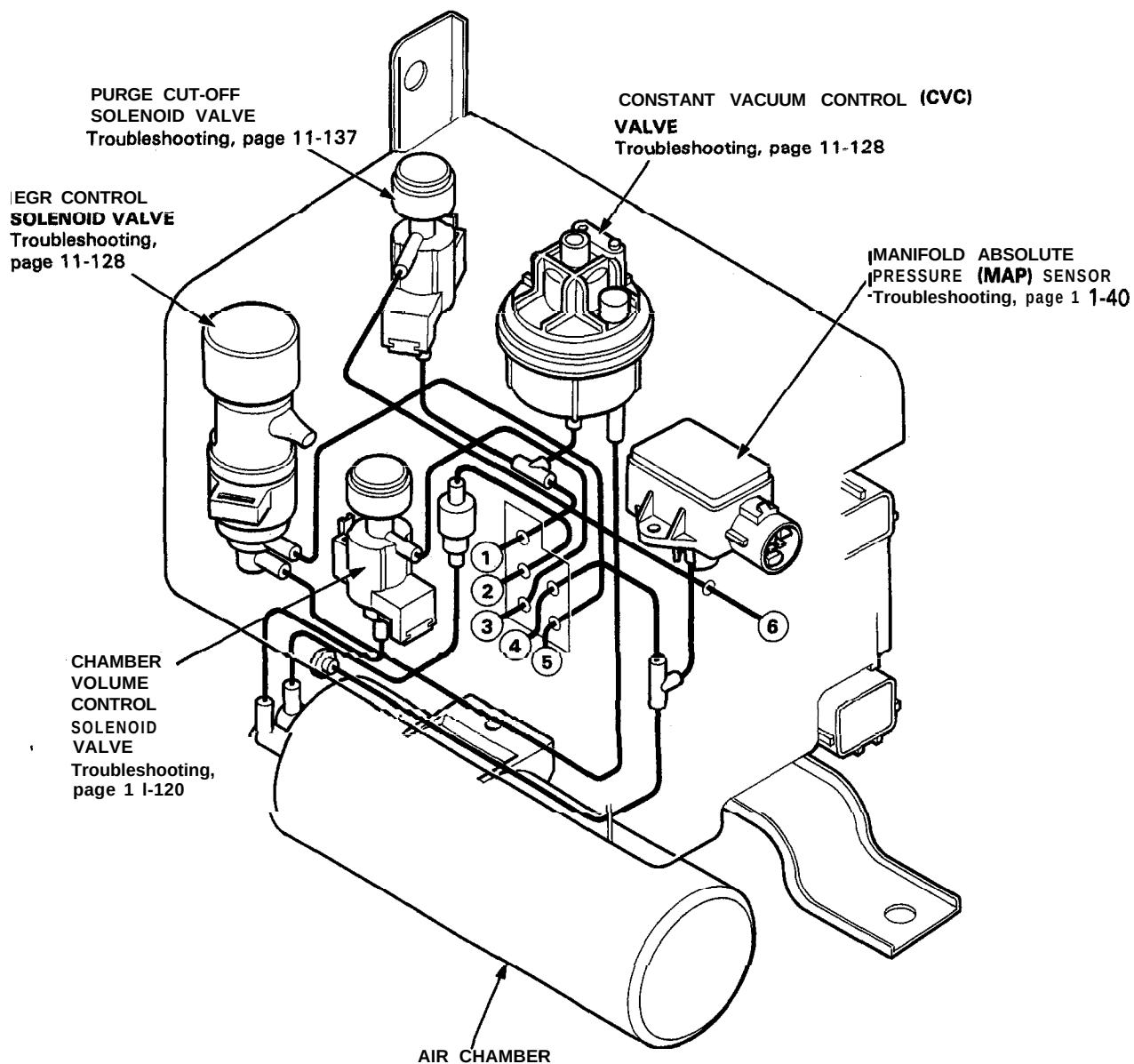


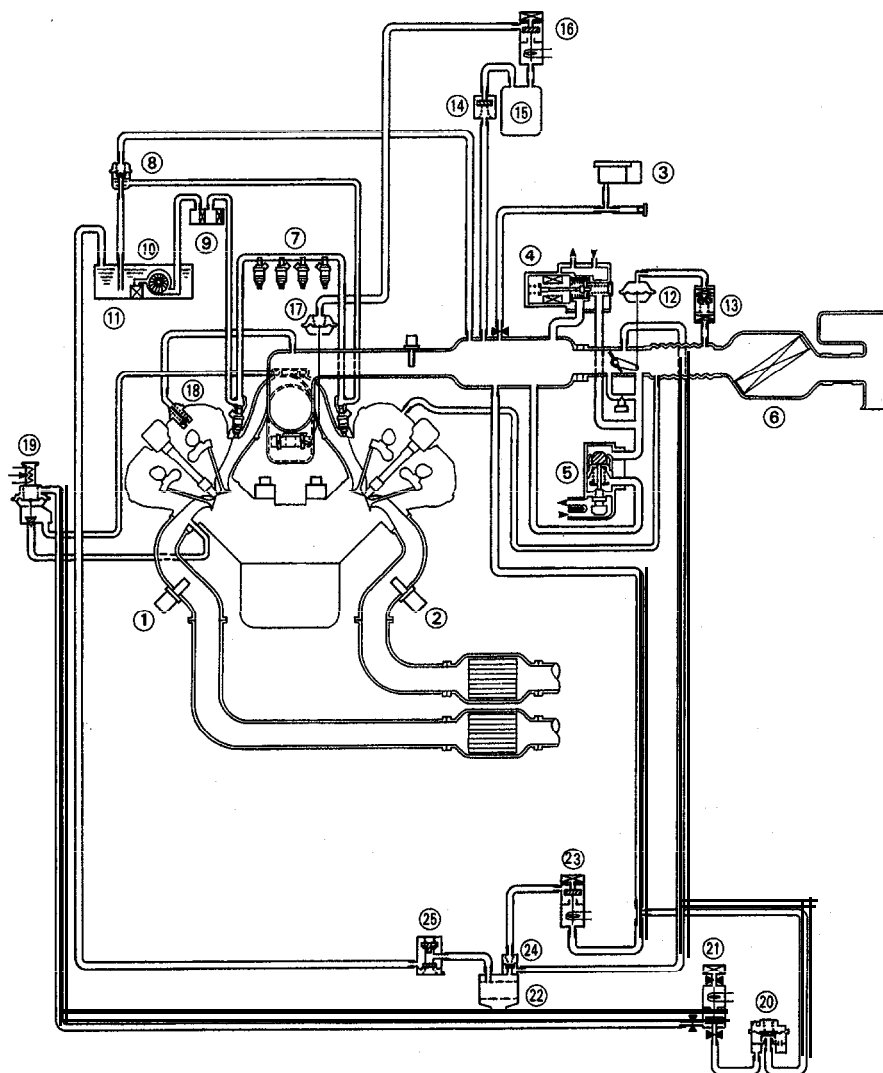
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System Description

Vacuum Connections (cont'd)

Control Box



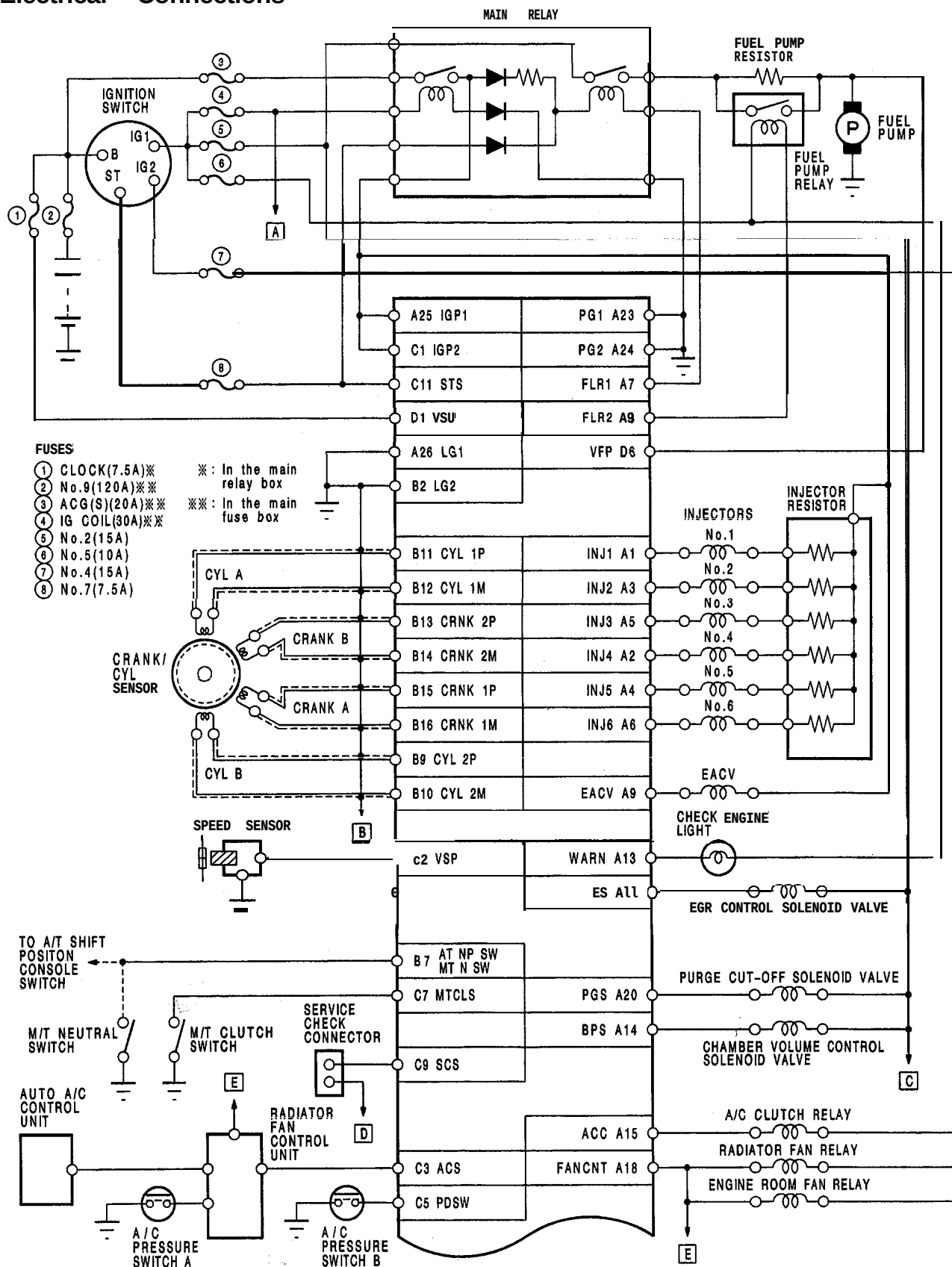


- ① FRONT OXYGEN (O_2) SENSOR
- ② REAR OXYGEN (O_2) SENSOR
- ③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ④ ELECTRONIC AIR CONTROL VALVE (EACV)
- ⑤ FAST IDLE VALVE
- ⑥ AIR CLEANER
- ⑦ FUEL INJECTOR
- ⑧ PRESSURE REGULATOR
- ⑨ FUEL FILTER
- ⑩ FUEL PUMP
- ⑪ FUEL TANK
- ⑫ DASHPOT DIAPHRAGM
- ⑬ DASHPOT CHECK VALVE

- ⑭ CHECK VALVE
- ⑮ AIR CHAMBER
- ⑯ CHAMBER VOLUME CONTROL SOLENOID VALVE
- ⑰ CHAMBER VOLUME CONTROL DIAPHRAGM
- ⑱ PCV VALVE
- ⑲ EGR VALVE
- ⑳ CONSTANT VACUUM CONTROL (CVC) VALVE
- ㉑ EGR CONTROL SOLENOID VALVE
- ㉒ CHARCOAL CANISTER
- ㉓ PURGE CUT-OFF SOLENOID VALVE
- ㉔ PURGE CONTROL DIAPHRAGM VALVE
- ㉕ TWO-WAY VALVE

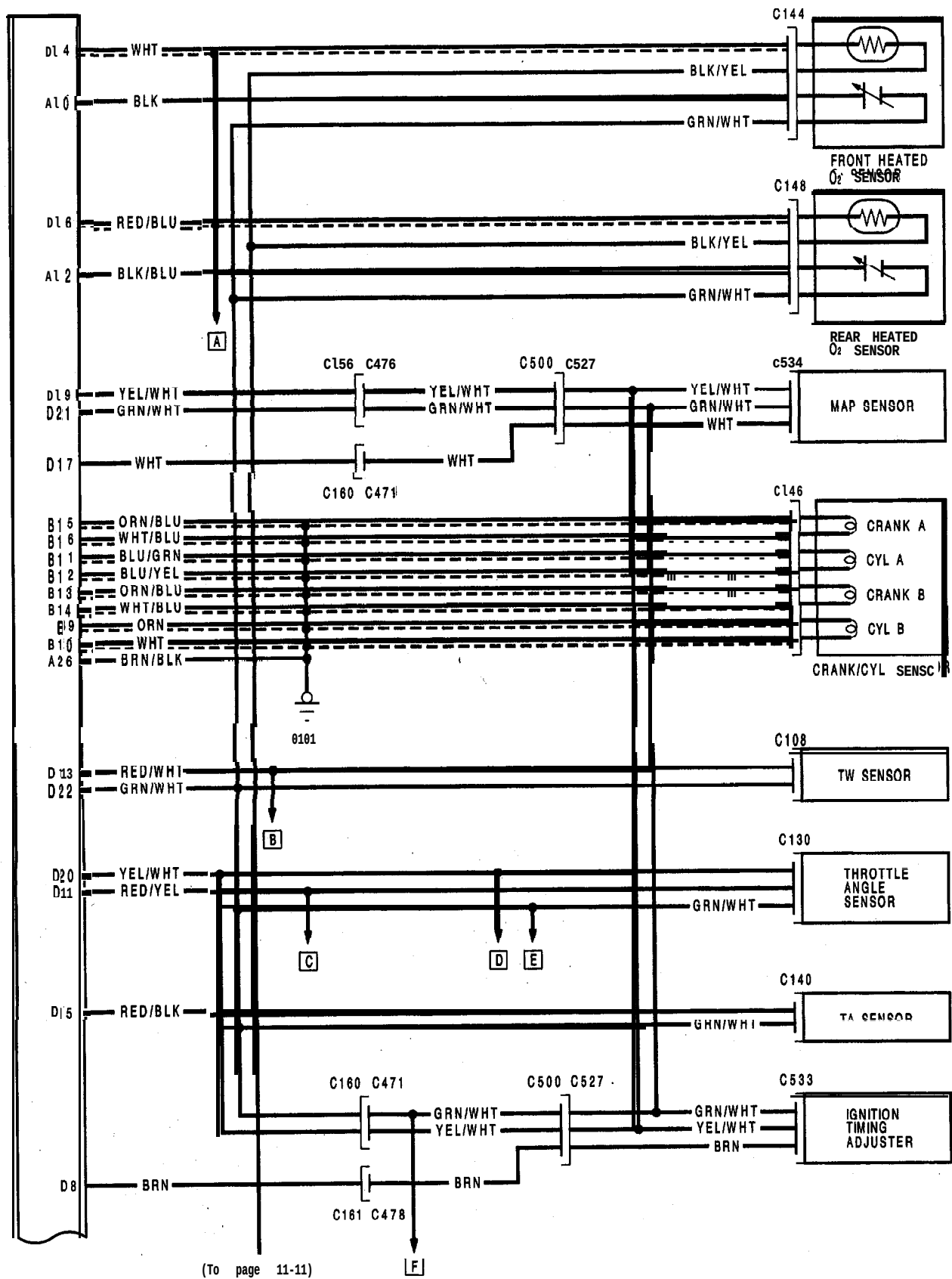
System Description

Electrical Connections



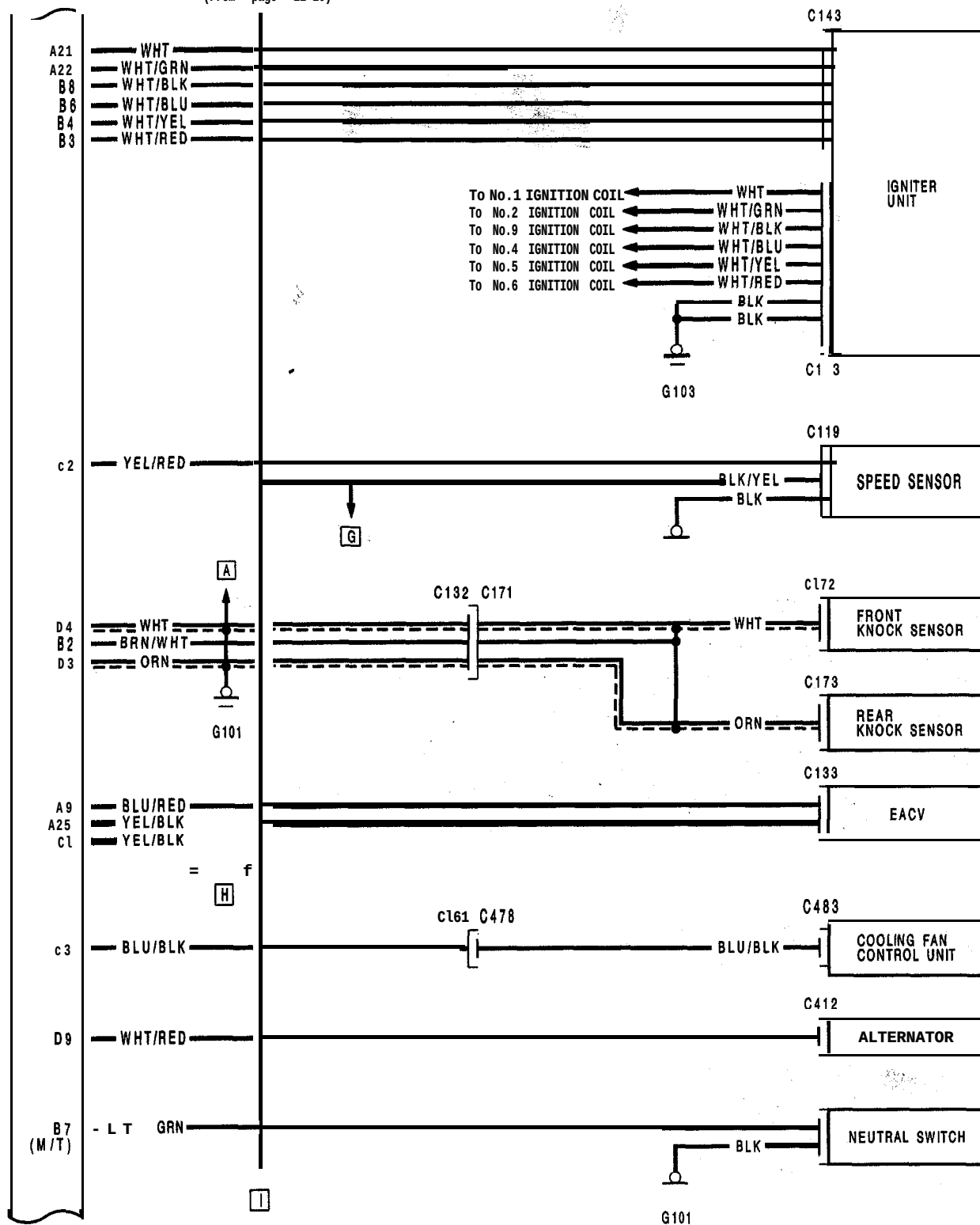
System Description

Electrical Connections (cont'd)





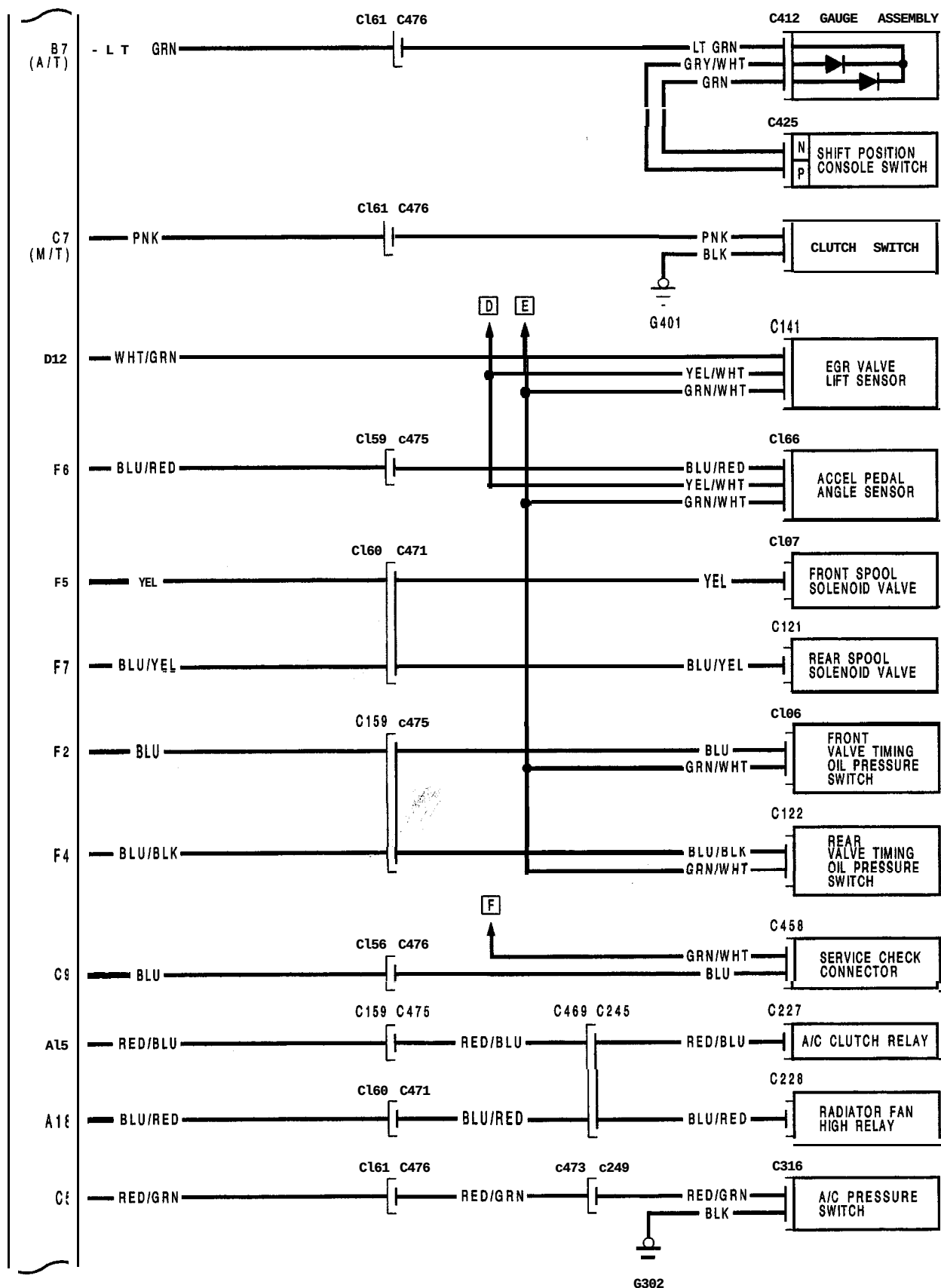
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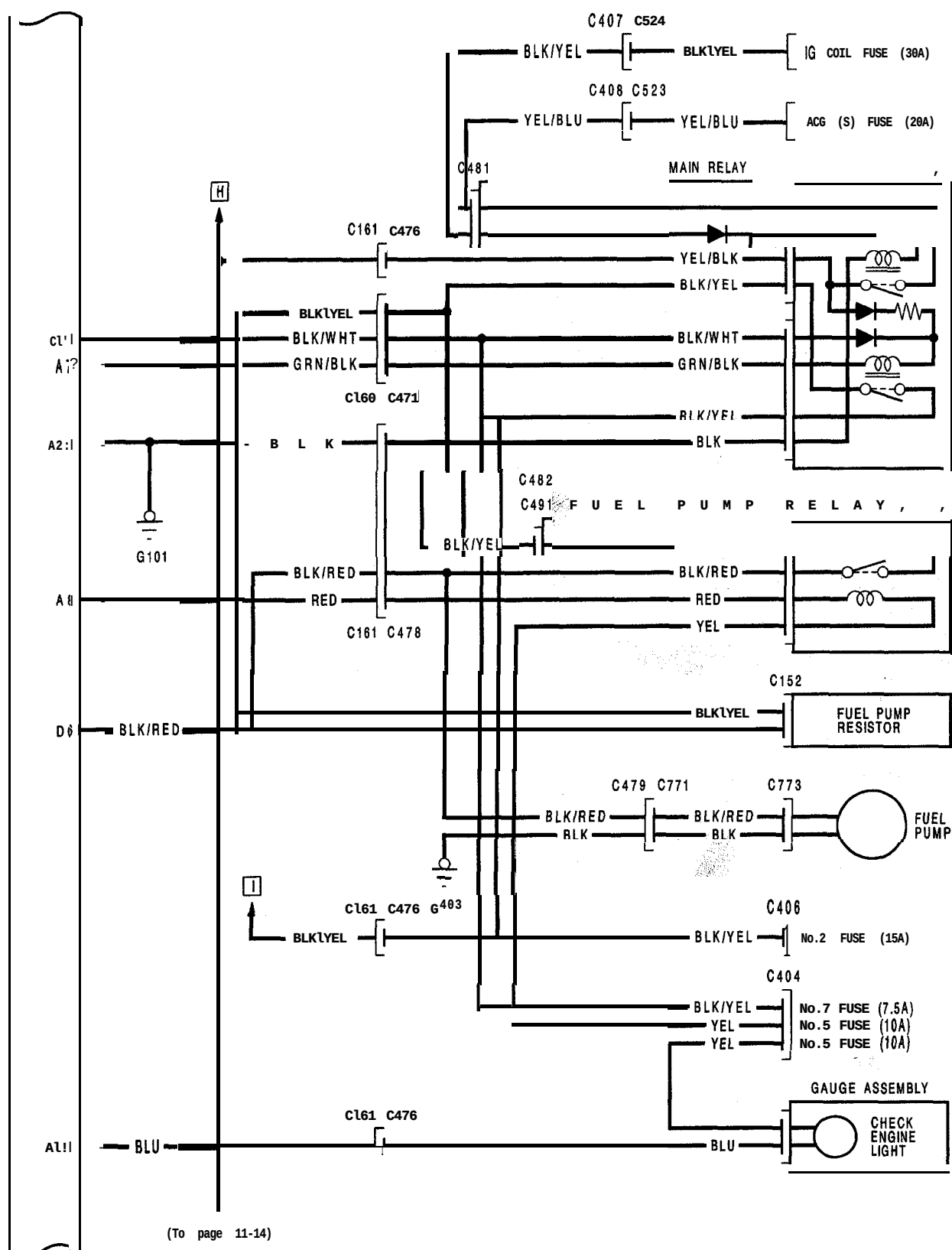


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System Description

Electrical Connections (cont'd)



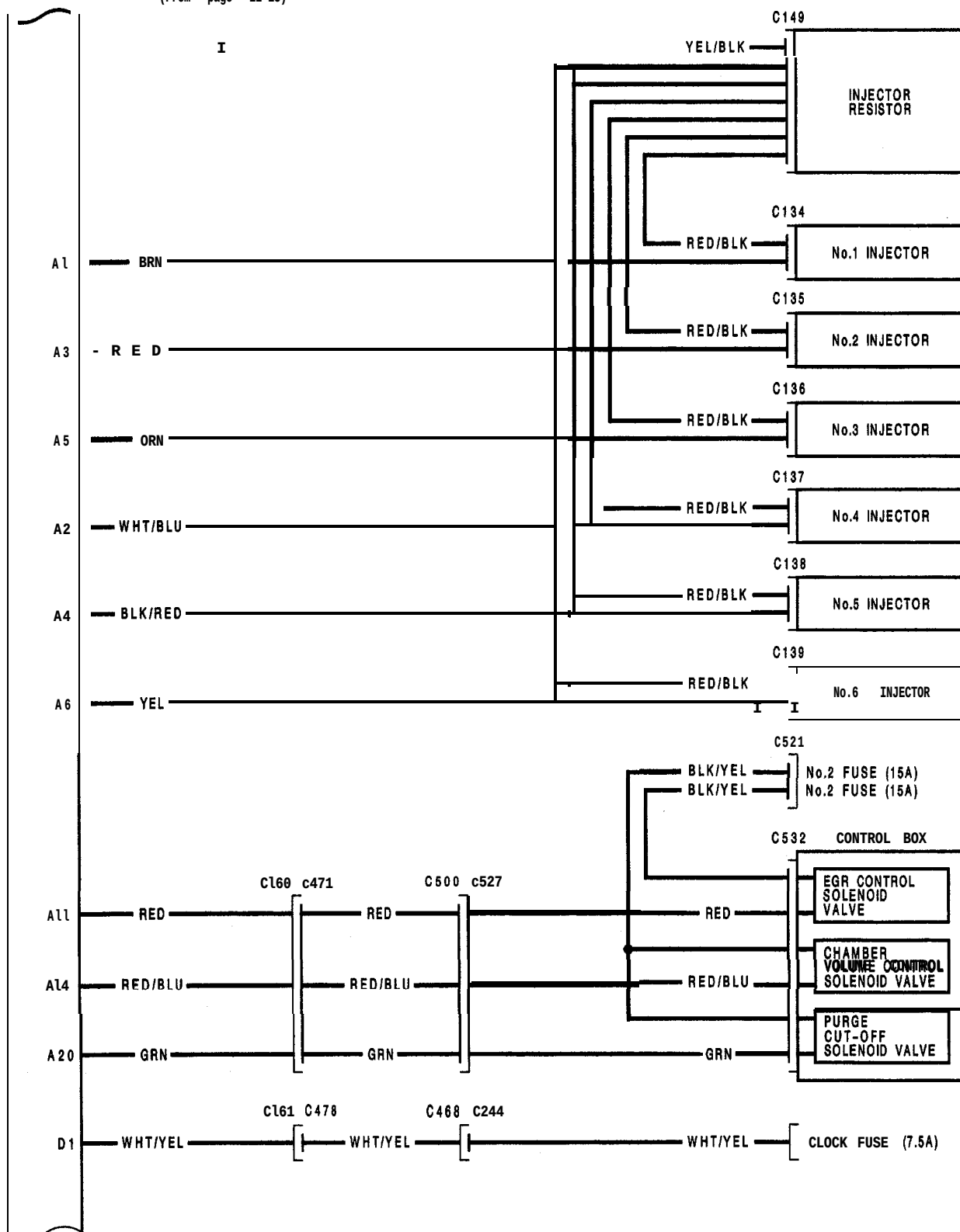


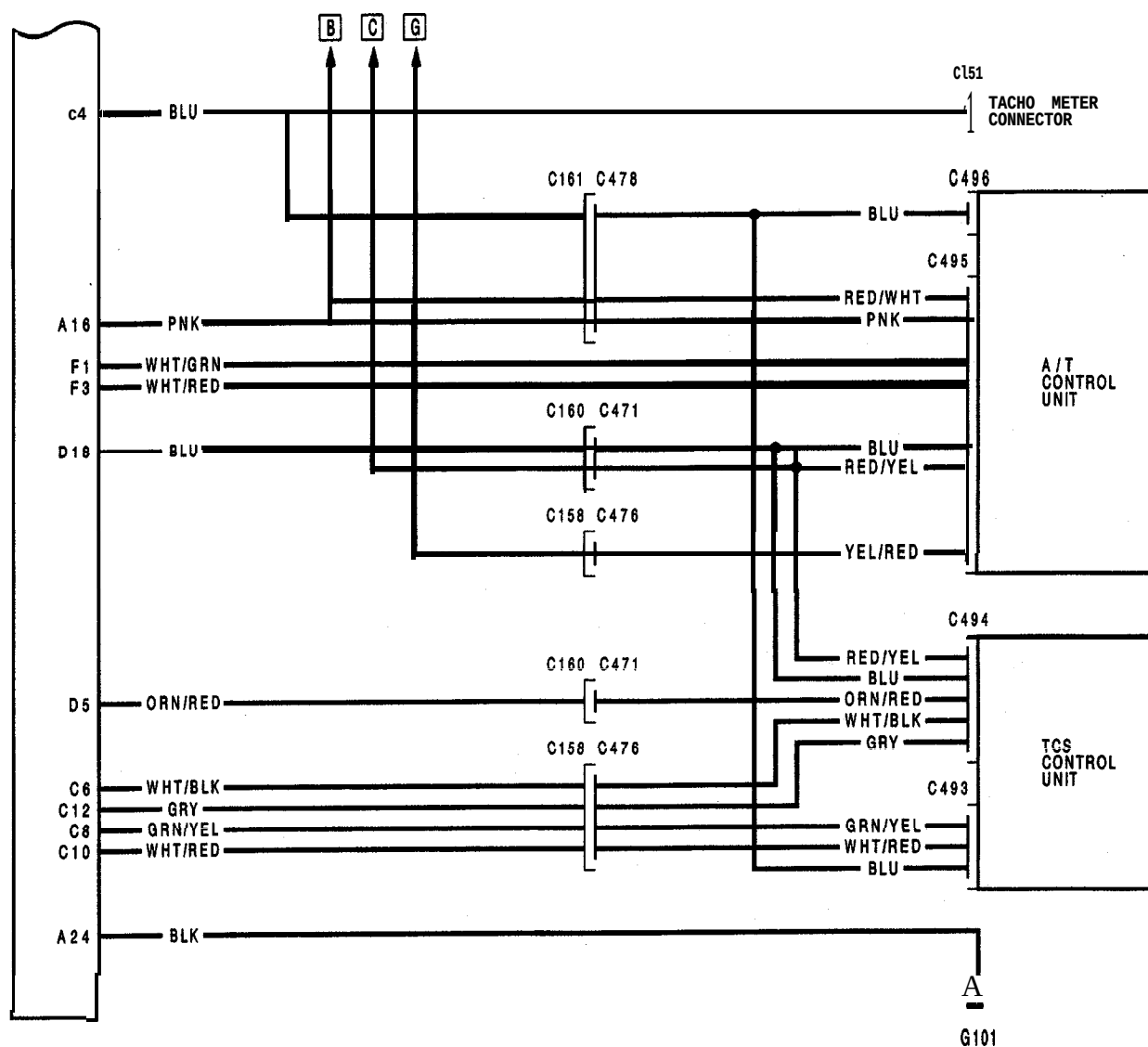
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System Description

Electrical Connections (cont'd)

(From page 11-13)





Troubleshooting

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	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	SPOOL SOLENOID VALVE
	SYMPTOM	26	30, 32, 36	40	46	48	50	52	54	56	6-15
	CHECK ENGINE LIGHT TURNS ON	 or 									
	CHECK ENGINE LIGHT BLINKS	 or 	 or 	 or 	 or 						
	ENGINE WON'T START	③			③					①	
	DIFFICULT TO START ENGINE WHEN COLD	BU		③	③	①			③		
IRREGULAR IDLING	WHEN COLD FAST IDLE SPEC	BU				③					
	ROUGH IDLE	BU		③							
	WHEN WARM RPM TOO HIGH	BU									
	WHEN WARM RPM TOO LOW	BU									
FREQUENT STALLING	WHILE WARMING UP	BU				③					
	AFTER WARMING UP	BU							③		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU			③						
	FAILS EMISSION TEST	BU	③	②							
	LOSS OF POWER	BU		③			②				③

* 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.



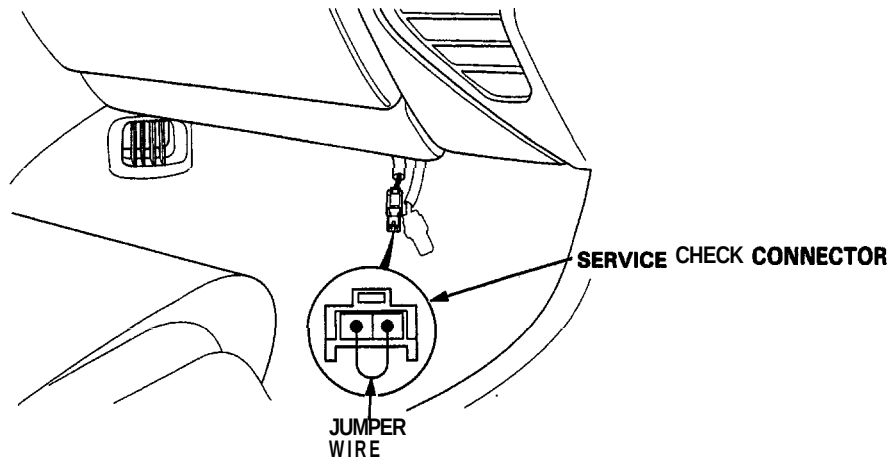
PGM-FI			IDLE CONTROL				FUEL SUPPLY				EMISSION CONTROL			
VALVE TIMING OIL PRESSURE SWITCH	VEHICLE SPEED SENSOR	IGNITION TIMING ADJUSTER	KNOCK SENSOR	A/T FI SIGNAL A	A/T FI SIGNAL B	ELEC- TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	FUEL METERING	FUEL PUMP	OTHER FUEL SUPPLY	AIR INTAKE	EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
6-17	58	60	62	64	64	70	66	89	38	99	86	110	128	124
22 or 52	17	18	23 or 53	30	31	14		16	43 or 44 45 or 46	47			12	
								2			3			
							2			2				
						1	2							
2						1		2					3	
						1	2							
						1		2						
						1	2				3			
						3	1				2		3	
						3		1					3	
								2	3		3			1
3			3					3		2	1	3		3

Troubleshooting

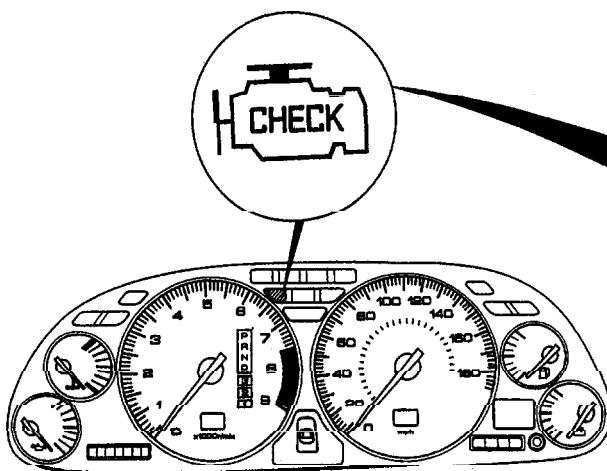
-Self-diagnostic Procedures

I. 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).



2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by a 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

Short blinks: S e n P r o b l e m C O D E 1
= See Problem CODE 3
= See Problem CODE 13

Long short

Simultaneous Problems:

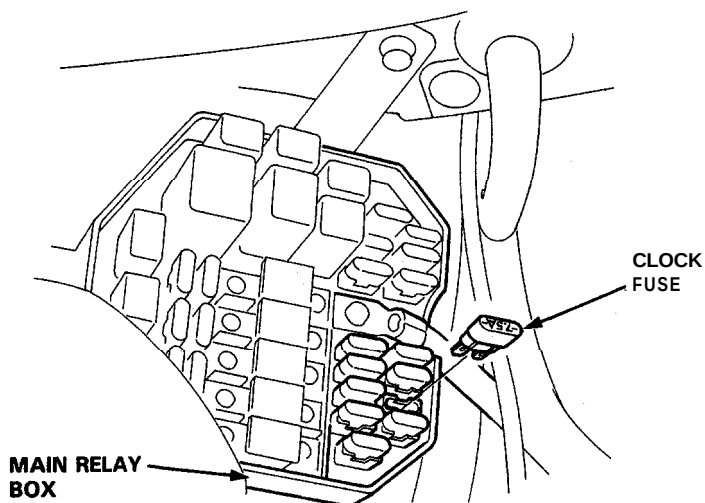
Long short blinks: = See Problem CODE 1 and 3
= Sea Problem CODE 3 and 4
= See Problem CODE 3 and 14



II. ECU Reset Procedure

1. Turn the ignition switch off.
2. Remove the CLOCK fuse (7.5 A) from the main relay box for 10 seconds to reset ECU.

NOTE: Disconnecting the CLOCK 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.



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

1. Remove the Jumper Wire.

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

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

(cont'd)

Troubleshooting

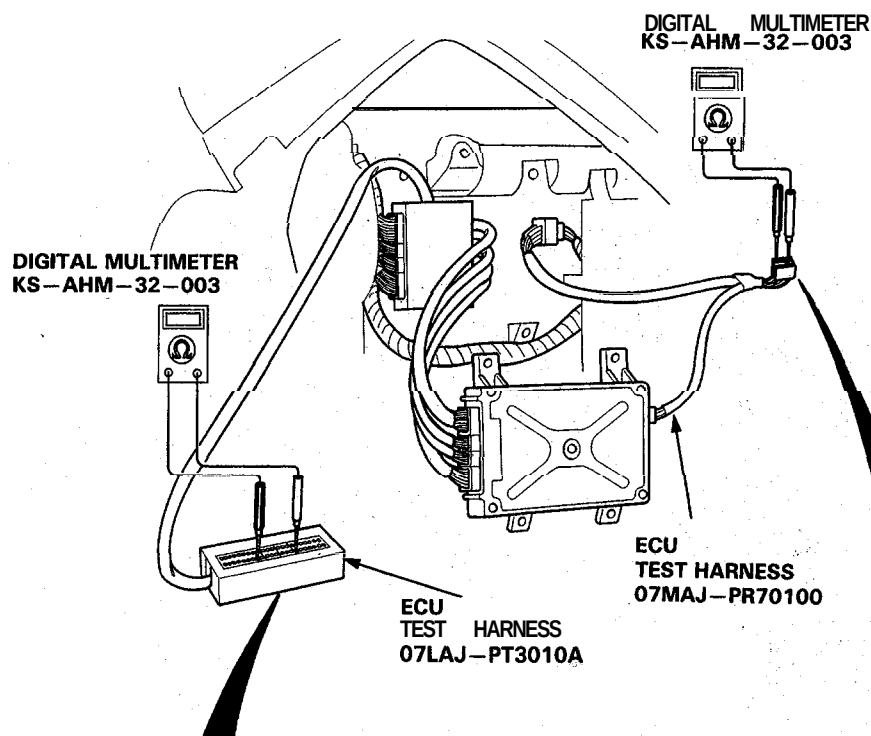
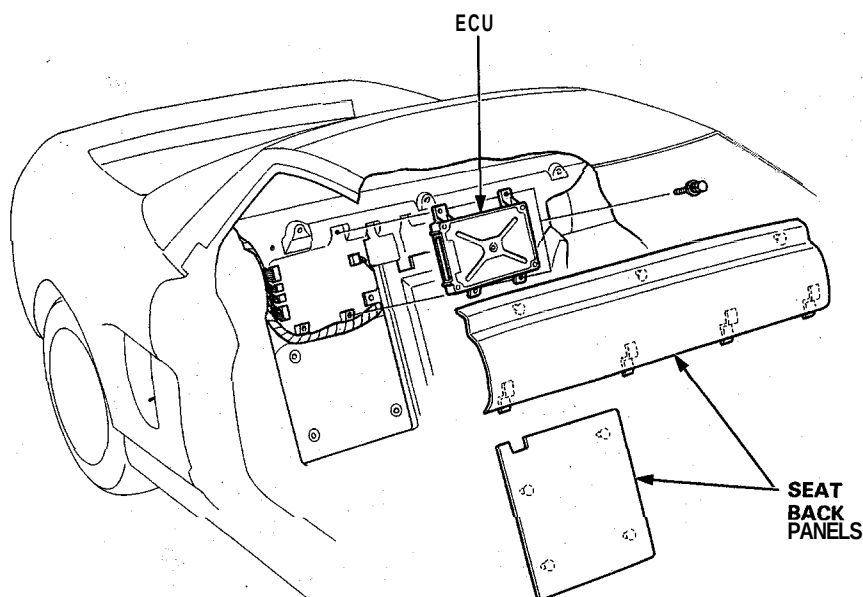
• Self-diagnostic Procedures (cont'd)

SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
	ECU	11-26
	FRONT OXYGEN SENSOR	11-30
	REAR OXYGEN SENSOR	11-30
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	1 1-40
5		
4	CRANK ANGLE A	1 1-46
6	COOLANT TEMPERATURE (TW SENSOR)	11-48
7	THROTTLE ANGLE	11-50
9	No. 1 CYLINDER POSITION A (CYL SENSOR)	11-46
10	INTAKE AIR TEMPERATURE (TA SENSOR)	11-52
12	EXHAUST GAS RECIRCULATION SYSTEM (EGR)	11-128
13	ATMOSPHERIC PRESSURE (PA SENSOR1)	1 1 - 5 4
14	ELECTRONIC AIR CONTROL (EACV)	11-70
15	IGNITION OUTPUT SIGNAL	11-56
16	FUEL INJECTOR	1 1-89
17	VEHICLE SPEED SENSOR	11-58
18	IGNITION TIMING ADJUSTMENT	11-60
21	FRONT SPOOL SOLENOID VALVE	6-1 5
22	FRONT VALVE TIMING OIL PRESSURE SWITCH	6-17
23	FRONT KNOCK SENSOR	1 1-62
30	A/T FI SIGNAL A	11-64
31	A/T FI SIGNAL B	11-64
35	TC STB SIGNAL	19-100
36	TCFC SIGNAL	19-102
41	FRONT OXYGEN SENSOR HEATER	11-32
42	REAR OXYGEN SENSOR HEATER	11-32
43	FRONT FUEL SUPPLY SYSTEM	11-36
44	REAR FUEL SUPPLY SYSTEM	11-36
45	FRONT FUEL METERING	11-38
46	REAR FUEL METERING	11-38
47	FUEL PUMP	11-99
51	REAR SPOOL SOLENOID VALVE	6-15
52	REAR VALVE TIMING OIL PRESSURE SWITCH	6-17
53	REAR KNOCK SENSOR	11-62
54	CRANK ANGLE B	11-46
59	No. 1 CYLINDER POSITION B (CYL SENSOR)	11-46

- 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 D indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 and 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D indicator light. If it comes on, see page 14-52.
- The Check Engine light and TCS indicator light may come on simultaneously when the self-diagnosis indicator blinks 3, 5, 6, 13, 15, 16, 17, 35 and 36. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the TCS indicator light. If it comes on, see page 19-84.
- The Check Engine light does not come on when there is a malfunction in the A/T FI signal. However, when the two terminals of the service check connector are connected with a jumper wire and, the Check Engine light will indicate the codes.



If the inspection for a particular failure code requires the ECU test harness, remove the seat back panels. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



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	F1	F3	F5	F7			
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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	F2	F4	F6	F8			
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

TERMINAL LOCATION

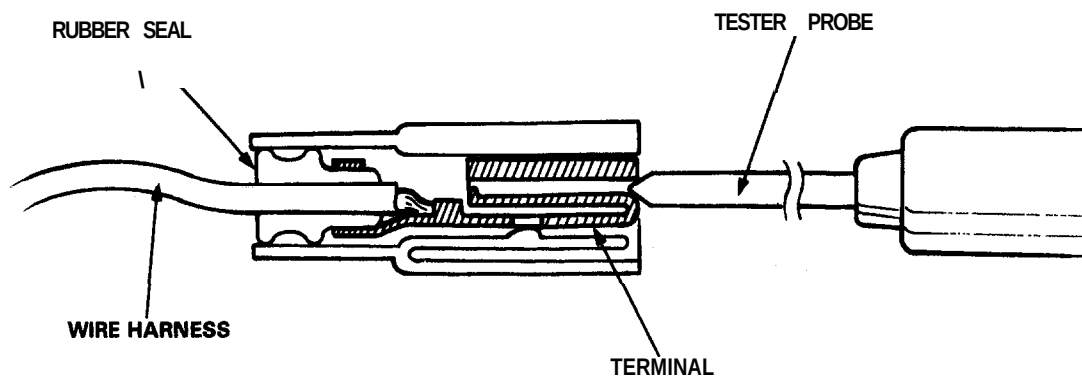
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Troubleshooting

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 ECU 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)

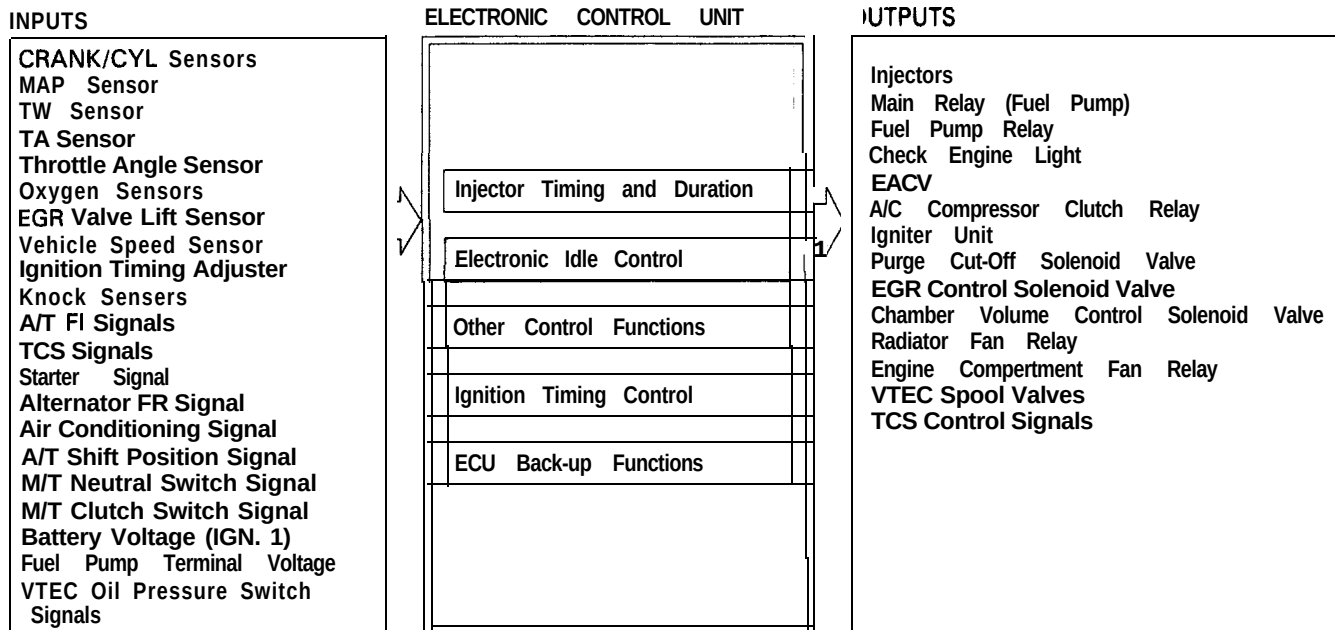
The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

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 ECUs), 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 ECU 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.
- A Knock Control System is also used. When detonation is detected by the knock sensor, the ignition timing is retarded.

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 which 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 which 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.
- Excellent engine performance is achieved through the use of VTEC (Variable Valve Timing and Lift Electronic Control System), intake manifold chamber control and discharge volume control of 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 1,500 rpm.
- Fuel cut-off action also takes place when engine speed exceeds, 8,300 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 Cut-off Solenoid Valve

When the coolant temperature is below 70°C (158°F), the ECU supplies a ground to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.

6. Chamber Volume Control Solenoid Valve (CVCSV)

When the engine rpm is below 4,800 rpm the CVCSV is activated by a signal from the ECU, intake air flows through a smaller chamber, then high torque is delivered. At speeds higher than 4,800 rpm, both solenoid valves are deactivated by the ECU, and intake air flows through the a larger chamber in order to increase airflow.

7. EGR Control Solenoid Valve (EGR CSV)

When the EGR is required for control of oxides of nitrogen (NO_x) emissions, the ECU supplies ground to the EGRCSV which supplies regulated vacuum to the EGR 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

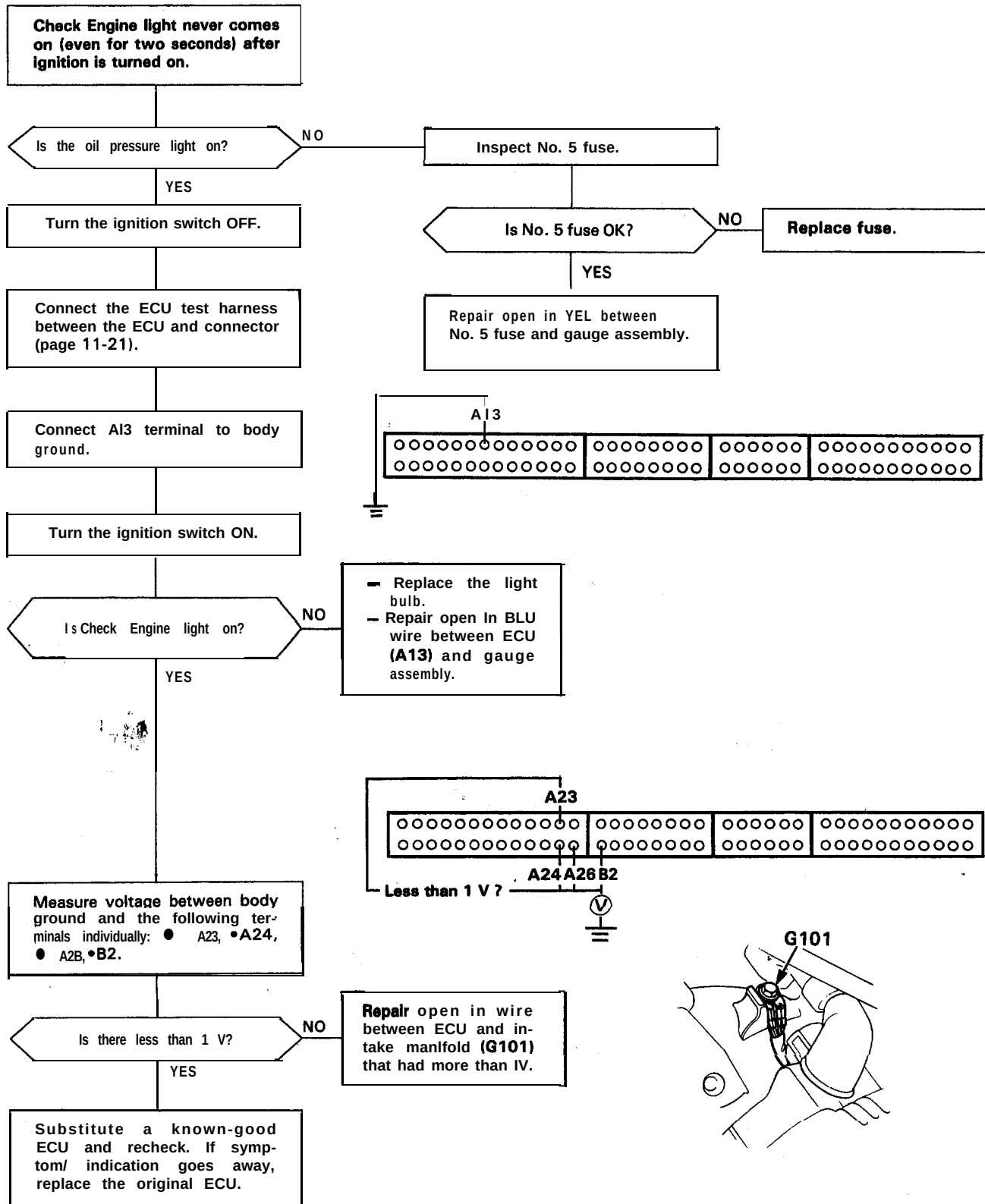
When an abnormality occurs in the ECU itself, the injectors are controlled by a back-up circuit independent of the system in order to permit minimal diving.

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.

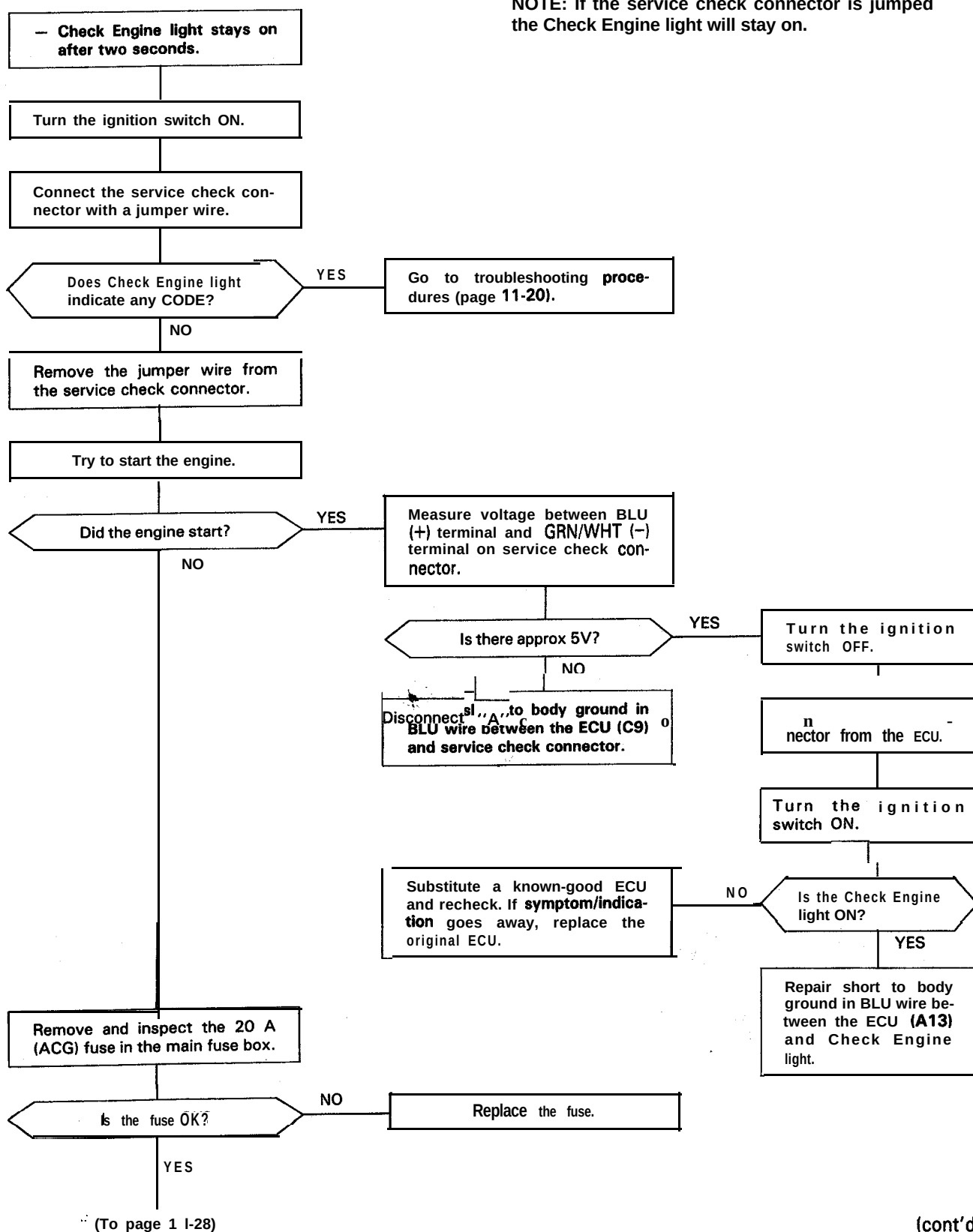
PGM-FI Control System

-Troubleshooting Flowchart — ECU —





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



(cont'd)

PGM-FI Control System

— Troubleshooting Flowchart — ECU (cont'd)

(From page 1 I-27)

Inspect the IG COIL (30 A) fuse in the main fuse box.

Is the fuse OK?

NO

Replace the fuse.

YES

Turn the ignition switch ON.

Disconnect the 3P connector of each sensor one at a time:

- MAP sensor
- EGR valve lift sensor
- Accelerator pedal angle sensor

Does Check Engine light remain ON?

NO

Replace the sensor that caused the light to go out upon its disconnection.

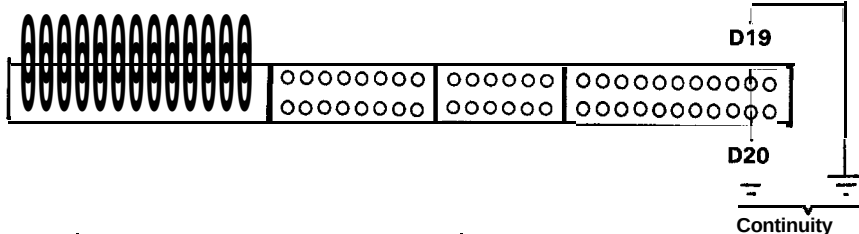
YES

Connect the service check connector with a jumper wire.

Disconnect the 3P connector of each sensor one at a time:

- Throttle angle sensor
- Ignition timing adjuster

1



Does Check Engine light indicate CODE 7 or 18?

YES

Replace the throttle angle sensor or ignition timing adjuster.

NO

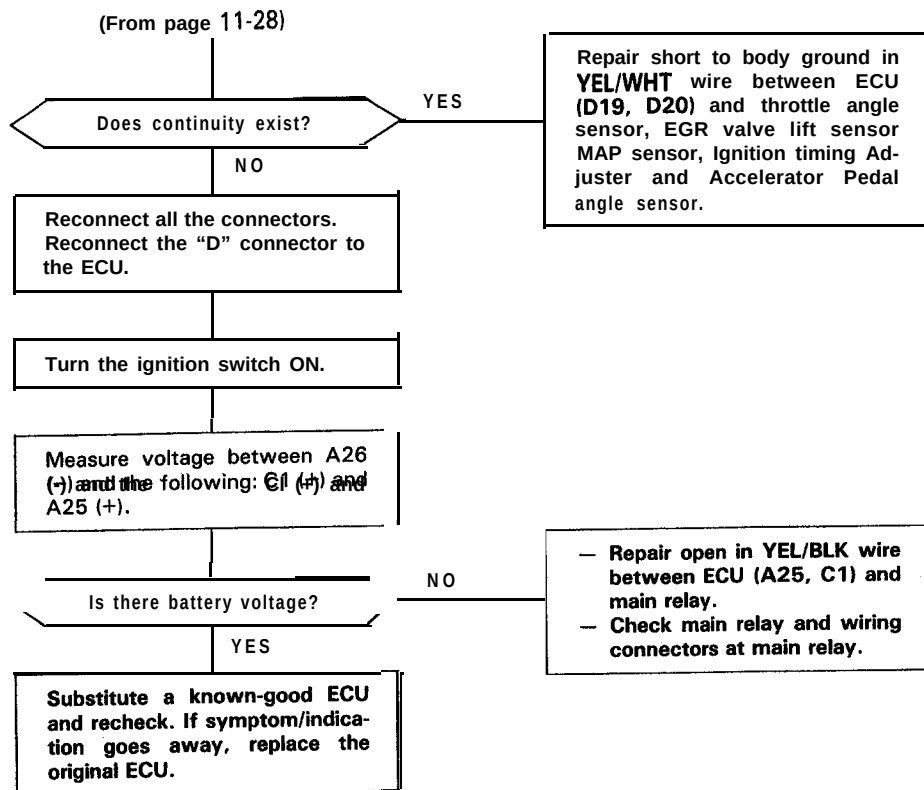
Turn the ignition switch OFF.

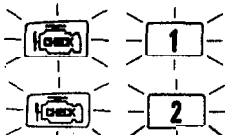
Remove the jumper wire from the service check connector.

Connect the ECU test harness. Disconnect the "D" connector from the ECU only, not the engine wire harness (page 11-21).

Check for continuity between body ground and the following terminals; D19, D20.

(To page 11-29)

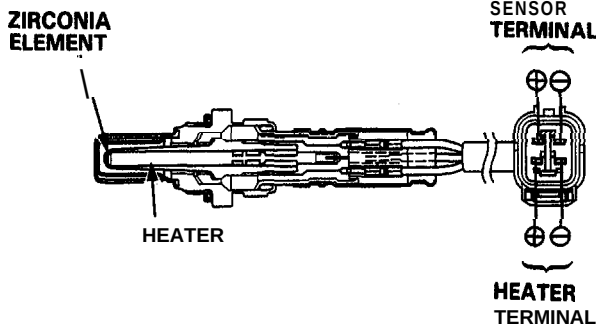




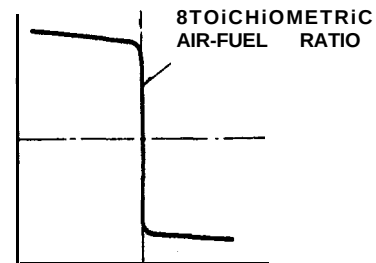
Self-diagnosis Check Engine light indicates code 1: A problem in the Front Oxygen (O₂) Sensor circuit.

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

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

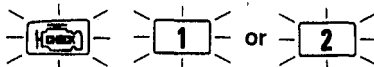


VOLTAGE (V)



8TOICHIOMETRIC
AIR-FUEL RATIO

RICH ← AIR- + LEAN
FUEL RATIO



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 1 (Front O₂ sensor) and/or 2 (Rear O₂ sensor) are indicated.

Do the ECU Reset Procedures (page 11-19).

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

Run engine for 80 seconds.

Road test with the transmission in 4th gear, starting at 1200 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 C144, C148.

YES

Go to page 11-38 and perform test for CODE 43 or CODE 44.



PGM-FI Control System

Troubleshooting Flowchart — Oxygen Sensor Heater

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

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

 **41** or **42**

- Engine is running.
- Check Engine light has been reported on, with service check connector jumped (page 11-18), CODE 41 and/or 42 are indicated.

Do the ECU Reset Procedures (page 11-19).

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 sensor C144, C148 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.

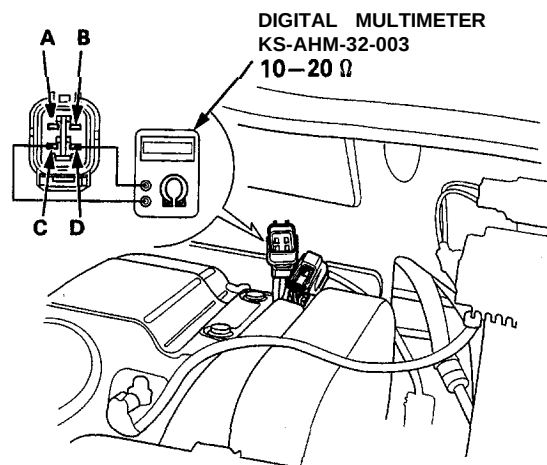
Is there 10–20 Ω?

NO

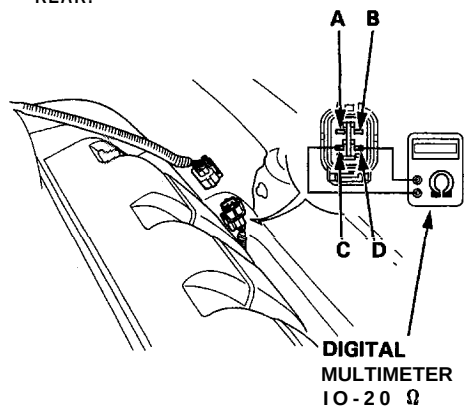
Replace O₂ sensor.

YES

FRONT:



REAR:





(From page 1 I-321)

Check for continuity to body ground on each terminal on the O₂ sensor.

Does continuity exist?

YES

Replace O₂ sensor.

NO

Check for continuity between terminal A and terminals C and D individually.

Replace O₂ sensor.

YES

NO

Turn the ignition switch ON.

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

*: REAR

Is there battery Voltage?

YES

Disconnect the "A" connector from the ECU.

NO

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

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

*: REAR

Is there battery voltage?

YES

Repair short in BLK or BLK/BLU* wire between ECU (A10 or A12*) and front O₂ sensor.

NO

Is there battery voltage?

NO

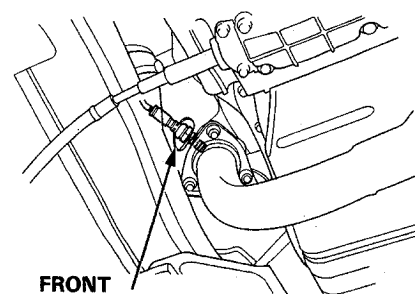
- Repair open in BLK/YEL wire between the O₂ sensor and Main Relay.
- Replace blown No. 2 fuse (15 A) in the dash fuse box.

YES

Turn the ignition switch OFF.

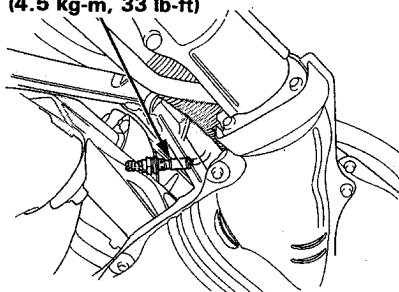
(To page 1 I-34)

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



**FRONT
O₂ SENSOR**
45 N·m
(4.5 kg-m, 33 lb-ft)

**REAR
O₂ SENSOR**
45 N·m
(4.5 kg-m, 33 lb-ft)

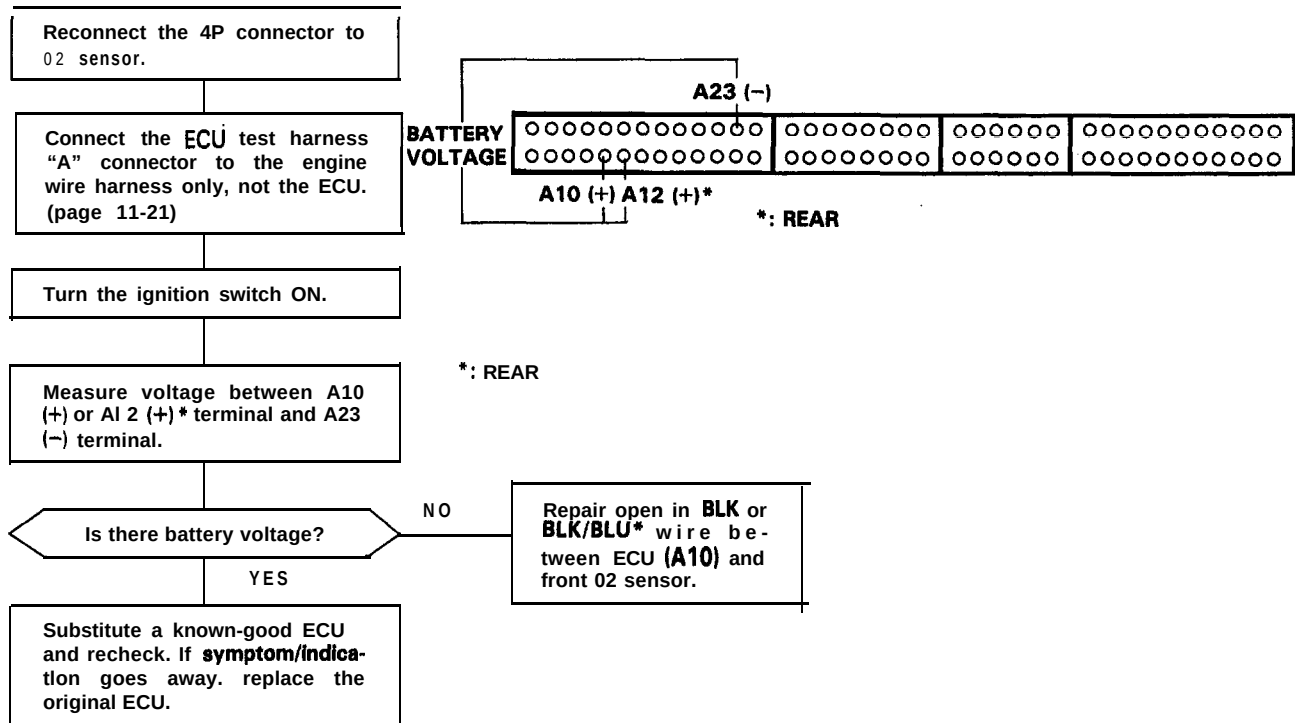


(cont'd)

ECM-PI Control System

-Troubleshooting Flowchart — Oxygen Sensor Heater (cont'd)

(From page 1 I-33)





PGM-FI Control System

Troubleshooting Flowchart — Fuel Supply System

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

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

 **43** or **44**

NOTE: If 43 or 44 code are accompanied by the Check Engine light and poor driveability, go to page 1 I-86 Fuel Supply System.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18). CODE 43 and/or 44 are indicated.
- or continued from code 1 or 2.

Do the ECU Reset Procedures (page 11-19).

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

Hold engine at 3,000 rpm for 2 minutes.
(A/T: Transmission is  or .)

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 sensor C144, C148 and ECU.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (11-21).

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

Install a jumper wire on the ECU test harness between A10 and A26 (front): or A12 and A26 (rear).

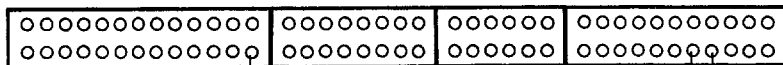
Turn the ignition switch ON.

Measure voltage between D14 (+) (front) or D16 (+) (rear) terminal and A26 (−) terminal as soon as the ignition switch is turned on.

(To page 1 I-37)

NOTE:

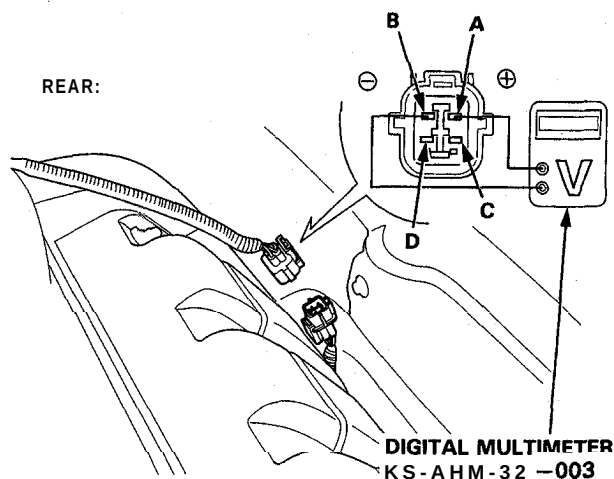
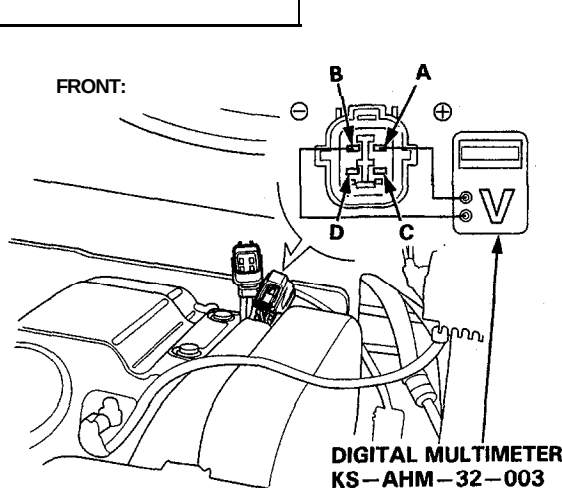
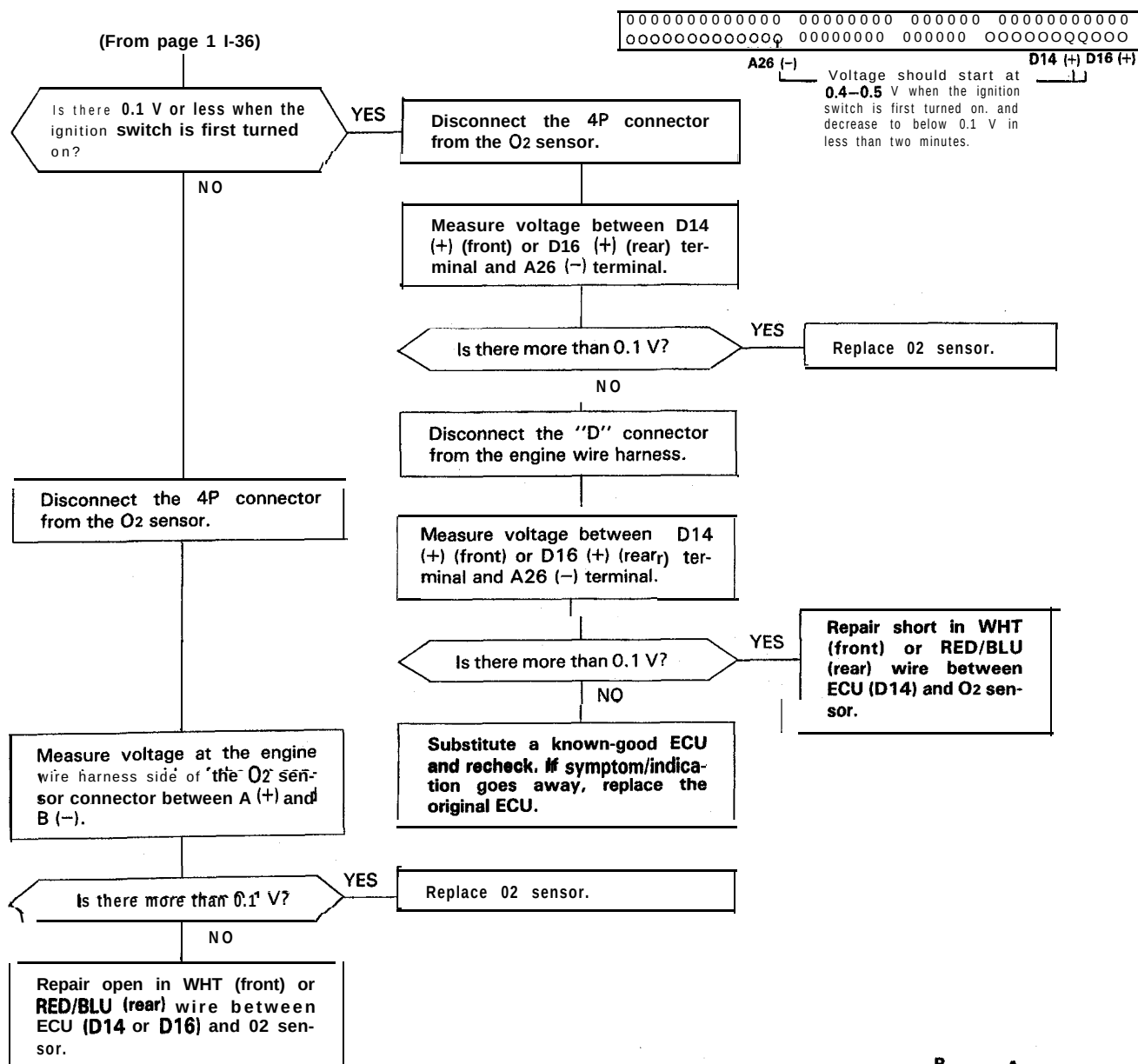
- Use DIGITAL MULTIMETER (KS-AHM-32-003) or equivalent.
- Use 2 Volt range.



A28 (−)

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.

D14 (+) D16 (+)



PGM-FI Control System

Troubleshooting Flowchart — Fuel Metering System

 **45** Self-diagnosis Check Engine light indicates code 45: Most likely a problem in the Front Fuel Metering System.

 **46** Self-diagnosis Check Engine light indicates code 46: Most likely a problem in the Rear Fuel Metering System.

 **45** or **46**

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 45 and/or 48 are indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine

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

Do the Road Test. •

Does Check Engine light indicate CODE 45 and/or 46?

YES

Turn the ignition switch OFF.

Relieve fuel pressure (page 11-91).

Attach the fuel pressure gauge and measure the fuel pressure at idle (page 11-92).

Is the pressure less than 230 kpa?

NO

See page 11-101 for fuel filter replacement and page 11-106 for fuel pump inspection.

YES

Substitute a known-good MAP sensor.

Do the ECU Reset Procedures (page 11-19).

Do the Road Test. *

Intermittent failure, system is OK at this time.

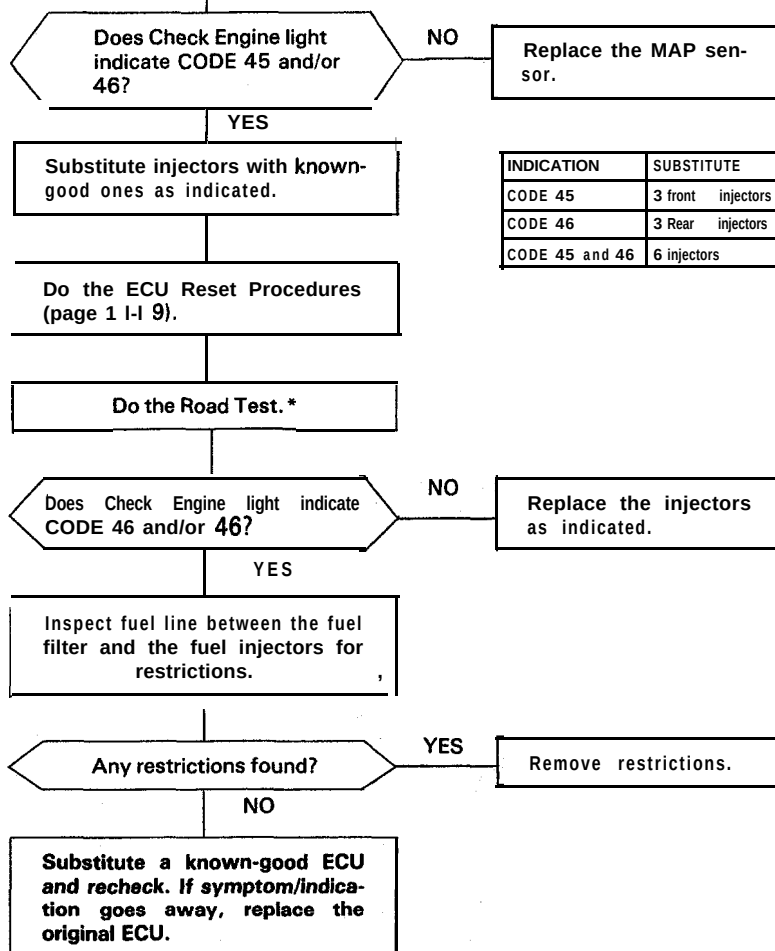
• Road Test

- Place the gear shift or selector lever in 3rd gear (M/T) or D position (A/T), cruise at exactly 35 mph for at least 10 seconds.
- Remove your foot from the throttle until the vehicle decels below 30 mph.
- Accelerate to 35 mph and cruise at exactly 35 mph for at least 10 seconds.
- The **cruise/decel** procedure must be repeated 10 times.
- Stop the vehicle, and turn off the ignition switch.
- Start the engine.
- The **cruise/decel** procedure must be repeated 5 times.

(To page 11-39)

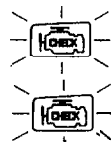


(From page 1 I-38)



PG M- FI Control System

-Troubleshooting Flowchart — MAP Sensor —



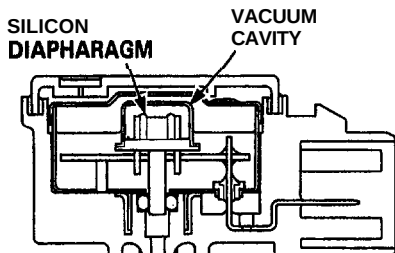
3

Self-diagnosis check Engine light indicates code 3: Most likely 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.



3

- Engine is warm and running.
- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 3 is indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine and allow it to idle.

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

NO

YES

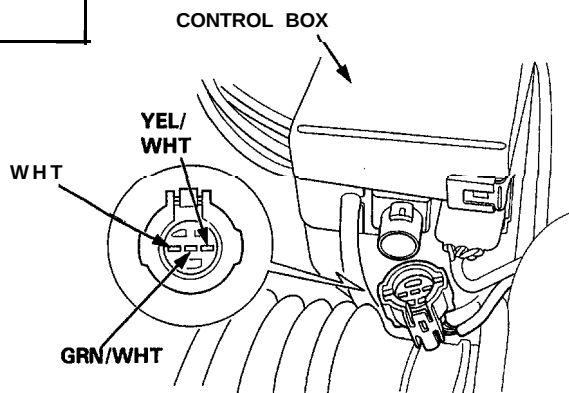
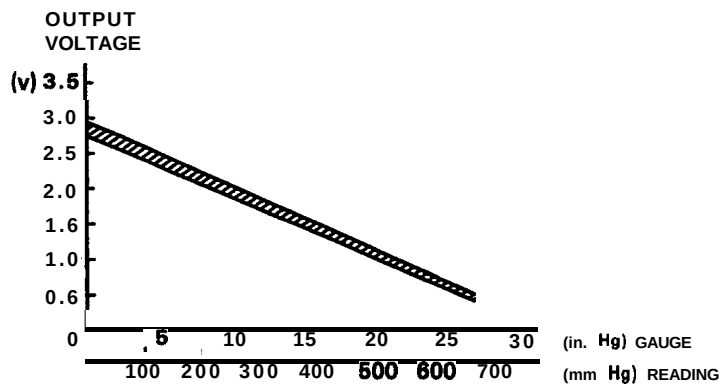
Turn the ignition switch OFF.

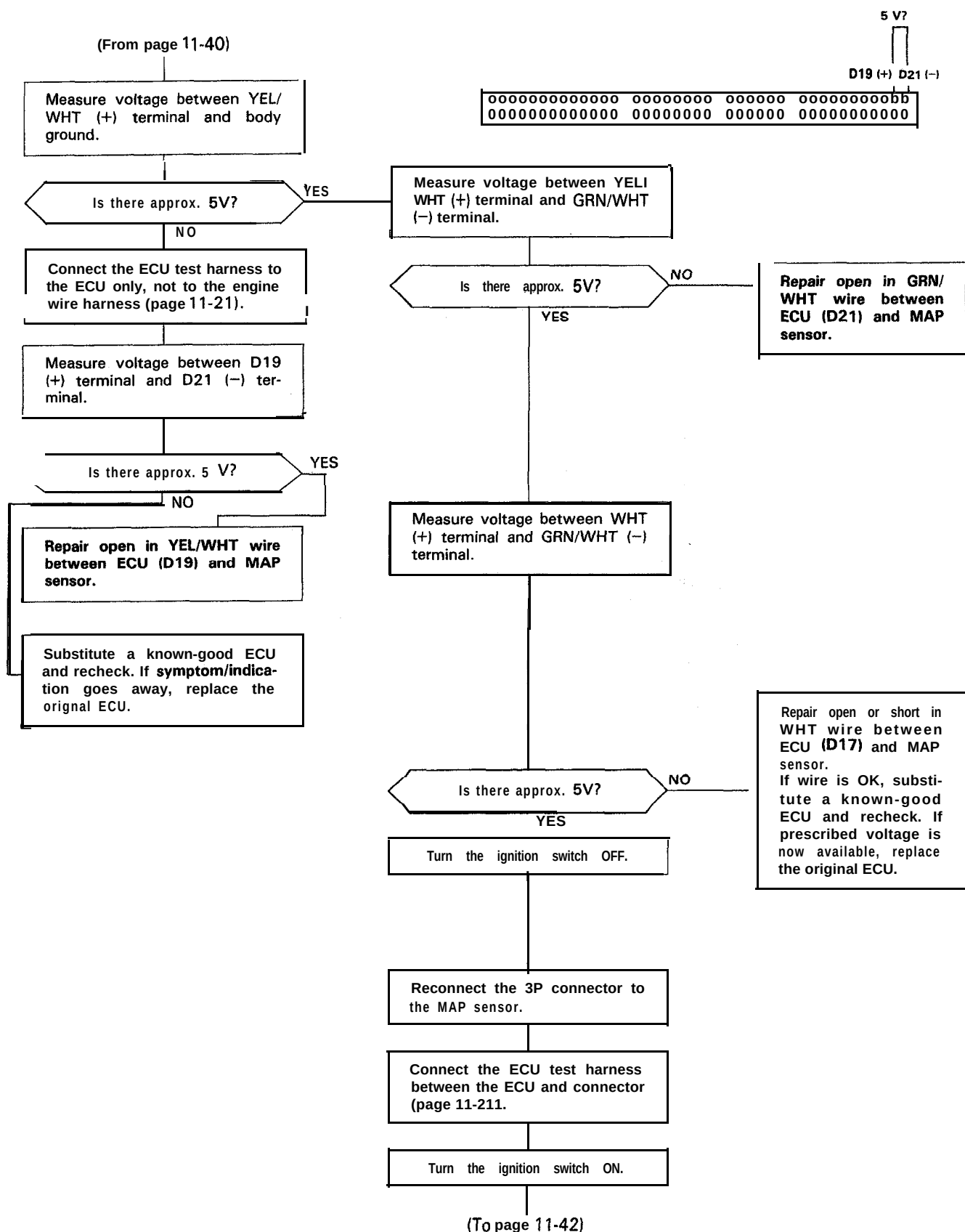
Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

(To page 11-41)

Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at MAP sensor C534 and ECU.



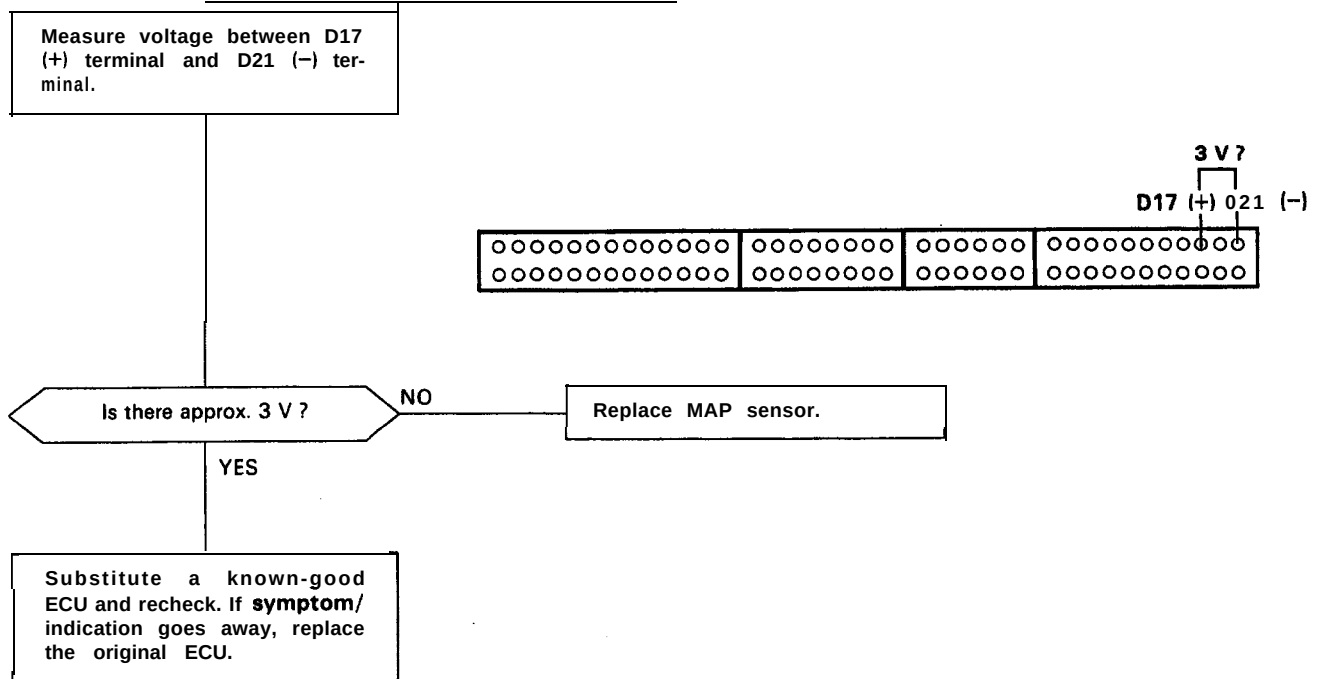


(cont'd)

PG M - FI Control System

-Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 1 I-41)

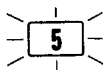
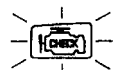




(cont'd)

PGM-FI Control System

- Troubleshooting Flowchart — MAP Sensor (cont'd) —



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 5 is indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine and keep engine rpm at idle.

Is Check Engine light on and does it indicate CODE 57

NO

YES

Stop the engine.

Disconnect #4 hose from the throttle body, connect vacuum pump to the hose and apply vacuum.

Does it hold vacuum?

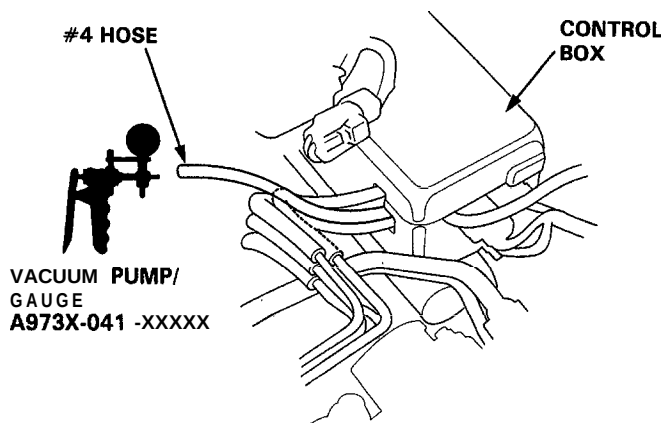
NO

YES

Connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 11-45)

- 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.

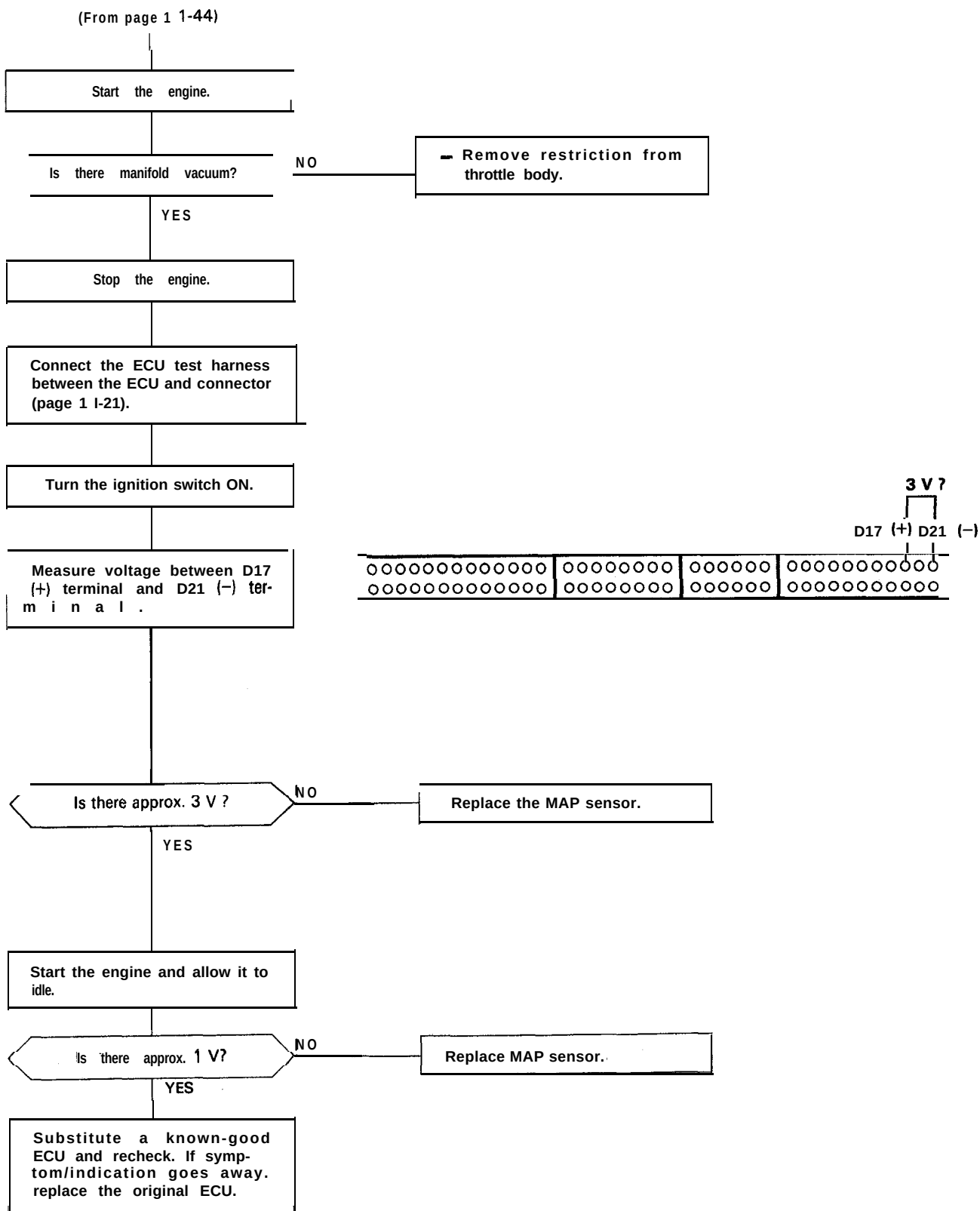
Does it hold vacuum?

NO

YES

Replace MAP sensor.

Replace #4 hose.



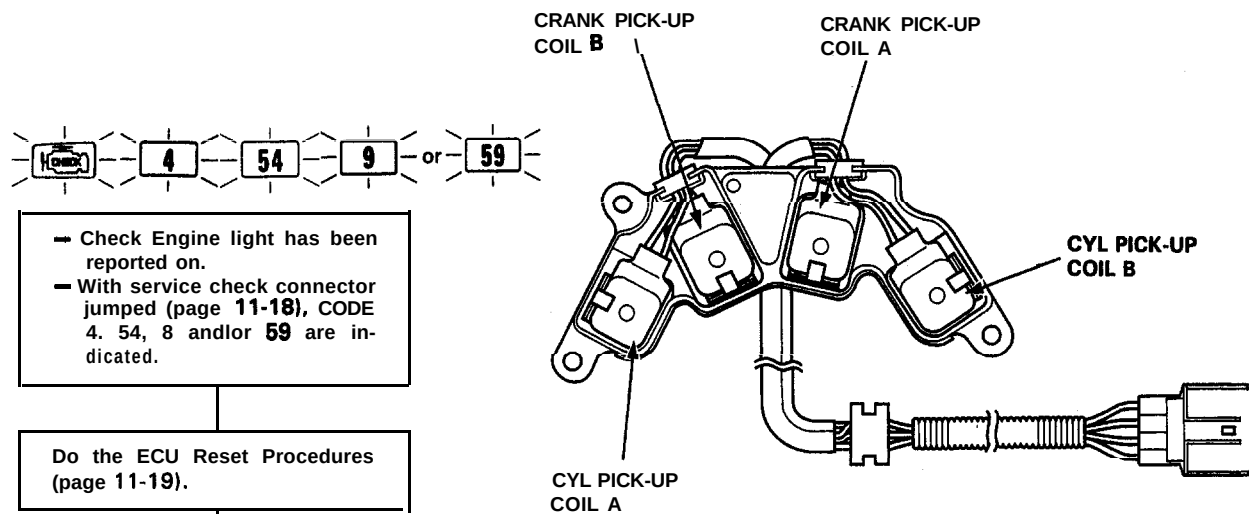
PG M - FI Control System

Troubleshooting Flowchart

CRANK/CYL Sensor

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

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



- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 4, 54, 8 and/or 59 are indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine.

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

NO

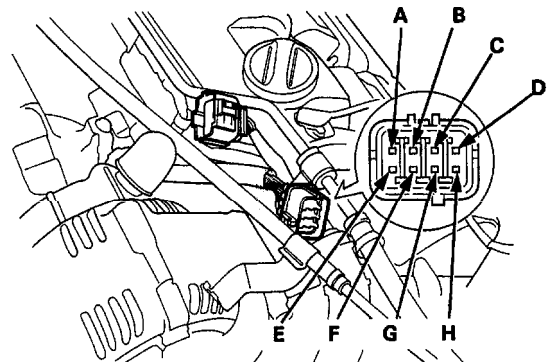
YES

Stop the engine.

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

(To page 1 I-47)

Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at CRANK/CYL sensor connector C148 and ECU.





(From page 1 I-46)

Measure resistance between terminals of the indicated sensor

Is there 650-850 Ω

YES

Check for continuity to body ground on A-H terminals individually.

Does continuity exist?

NO

Reconnect the connector.

Connect the ECU test harness to the engine wire harness only, not to the ECU (page 1 I-21).

Measure resistance between terminals of the indicated sensor on ECU test harness.
*see table

Is there 650-850 Ω ?

YES

Check for continuity to body ground on B15, B13, B11 or B9 terminals.

Does continuity exist?

NO

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

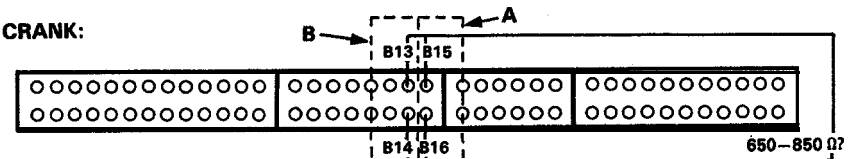
NO

Replace the CRANK/
CYL sensor (page 6-27).

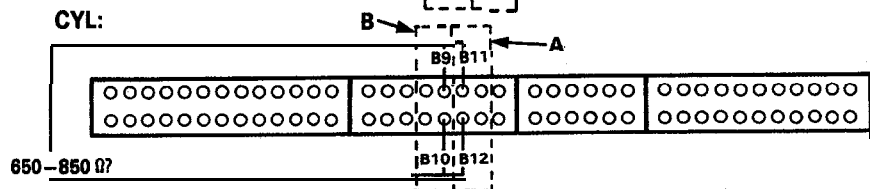
YES

Replace the CRANK/
CYL sensor (page 6-27).

CRANK:



CYL:



NO

Repair open in the **indicated** sensor wires.
*see table

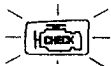
YES

Repair short in the **indicated** sensor wires.
*see table

*,

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

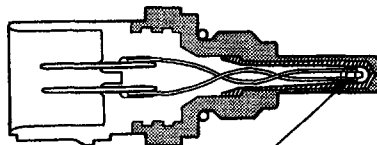
-Troubleshooting Flowchart — TW Sensor



6

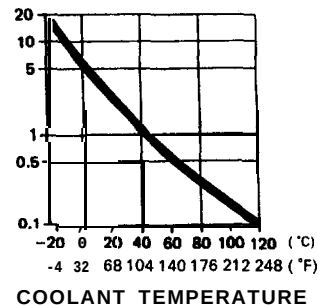
Self-diagnosis Check Engine light indicates code 6: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

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)



6

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18). CODE 6 is indicated.

Do the ECU Reset Procedures (page 11-19).

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 CI08 and ECU.

YES

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

Turn the ignition switch OFF.

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 1 I-49)



(From page 1 l-48)

Turn the ignition switch ON.

Measure voltage between RED/
WHT and body ground.

Is there approx. 5V ?

YES

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

NO

Is there approx. 5V ?

NO

Repair open in
GRN/WHT wire bet-
ween ECU (D22) and
TW sensor.

YES

Substitute a known-good ECU
and recheck. If symptom/indica-
tion goes away, replace the origi-
nal ECU.

A/T only

Disconnect the 22P connector
from the A/T control unit.

Is there approx. 5V?

YES

Replace the A/T control unit.

NO

Connect the ECU test harness to
the ECU only, not to the engine
wire harness (page 11-21).

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

Is there approx. 5V?

YES

Repair open in RED/WHT wire
between ECU (D13), A/T control
unit and sensor.

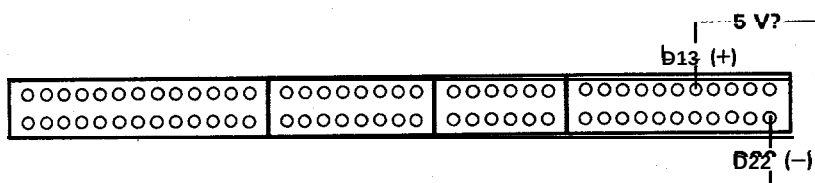
NO

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

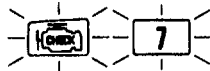
TW SENSOR

GRN/WHT

RED/WHT

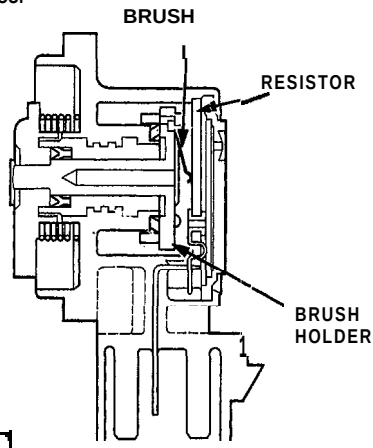


-Troubleshooting Flowchart — Throttle Angle Sensor

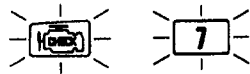
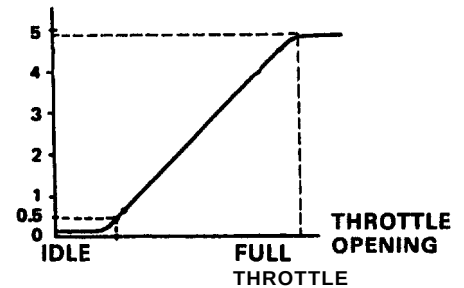


Self-diagnosis Check Engine light indicates code 7: Most likely a problem in the Throttle Angle Sensor circuit.

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 11-18), CODE 7 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch ON.

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

NO

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?

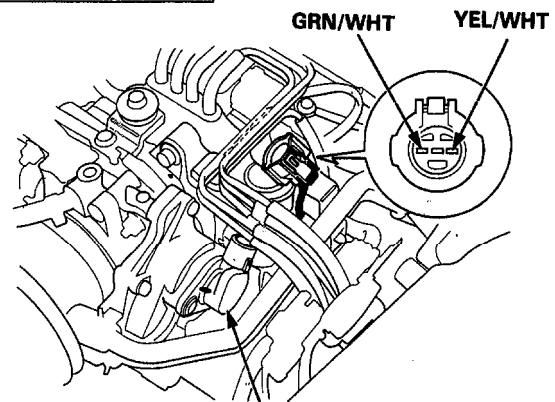
NO

YES

(To page 1 I-51)

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

Check for poor connections or loose wires at throttle angle sensor CI 30 and ECU.



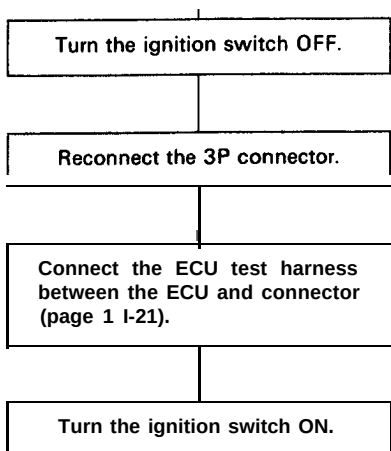
THROTTLE ANGLE SENSOR

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

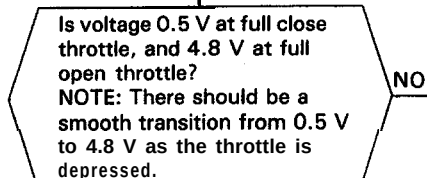
(To page 11-51)



(From page 11-50)



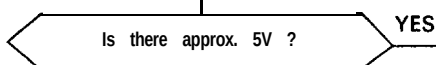
Measure voltage between D11(+) terminal and D22(-) terminal.



YES

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

(From page 11-50)



YES

Repair open in **GRN/**WHT wire between ECU (**D22**) and throttle angle sensor.

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

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

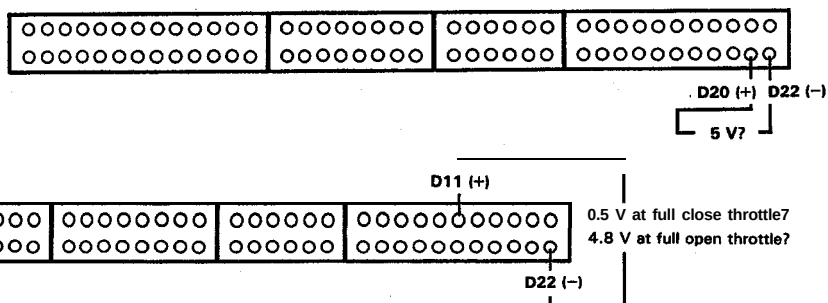
Is there approx. 5V ?

YES

Repair open in **YEL/**WHT wire between ECU (**D20**) and throttle angle sensor.

NO

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



A/T only

Disconnect the 22P connector from the A/T control unit.

Is voltage 0.5 V at full close throttle, and 4.8 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to 4.8 V as the throttle is depressed.

NO

- Replace throttle angle sensor.
- Repair open or short in **RED/YEL** wire between ECU (**D11**), A/T control unit and throttle angle sensor.

YES

Replace the **A/T** control unit.

PG M-FI Control System

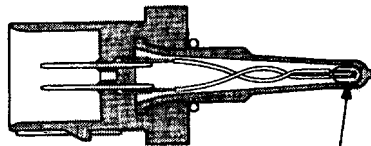
-Troubleshooting Flowchart — TA Sensor —



10

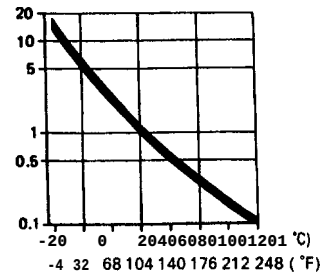
Self-diagnosis Check Engine light indicates code 10: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.

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

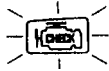


THERMISTOR

RESISTANCE (k Ω)



INTAKE AIR TEMPERATURE



10

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 10 is indicated.

Do the ECU Reset Procedures (page 11-19).

I 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.

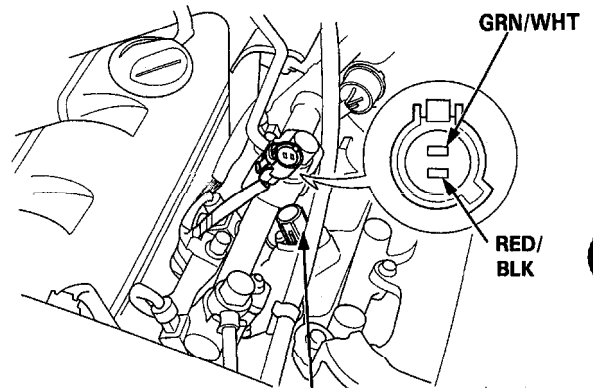
Is there 1-4 k Ω ?

NO

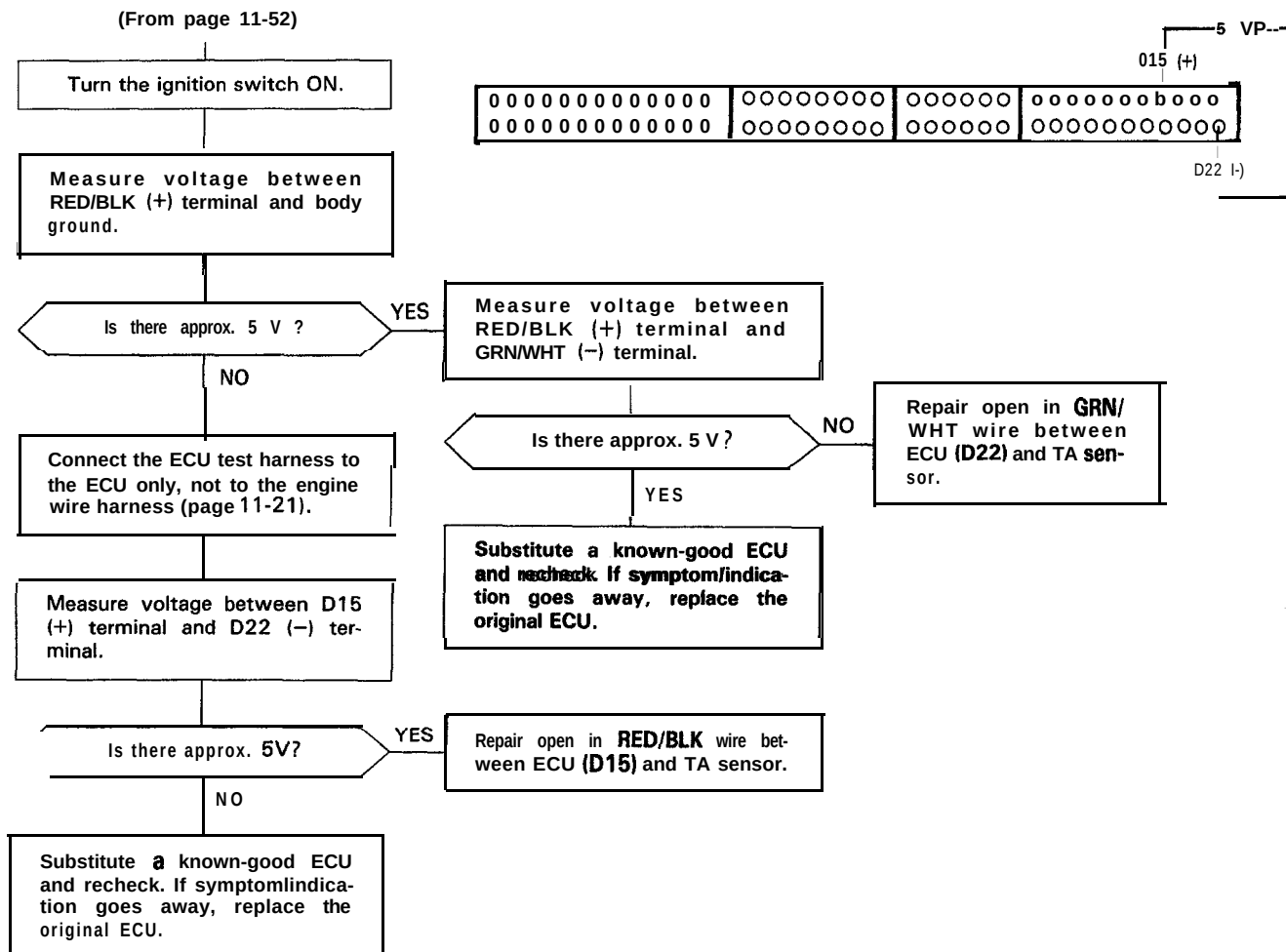
Replace TA sensor.

YES

(To page 1 I-53)



TA SENSOR



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.



13

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 13 is indicated.

Do the ECU Reset Procedures (page 11-19).

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

Turn the ignition switch OFF.

Connect the ECU test harness to the engine wire harness not to the ECU (page 11-21).

Disconnect the 20P connector from the TCS control unit.

Check for continuity between D5, terminal and body ground.

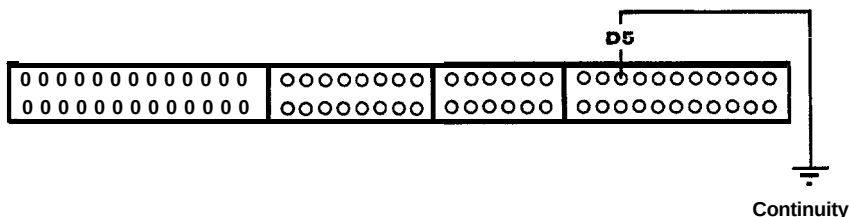
Does continuity exist?

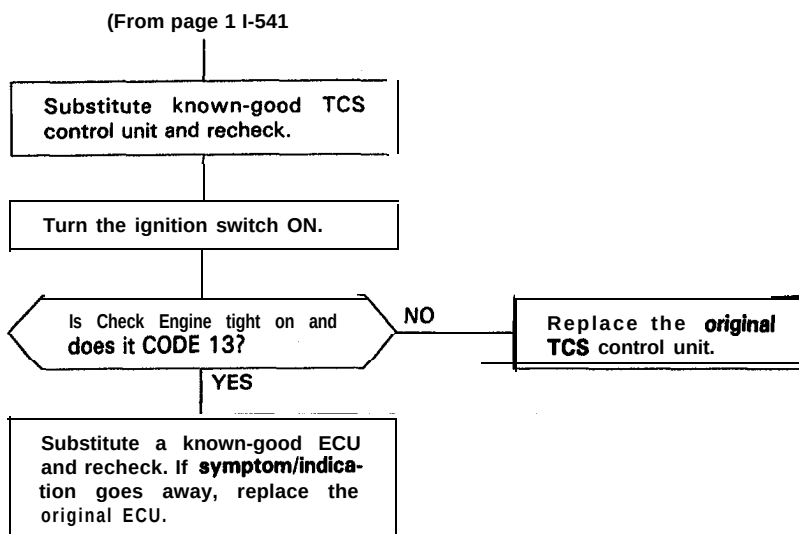
YES

Repair short in **RED/ORN** wire between ECU (**D5**) and the TCS control unit.

NO

(To page 11-54)





- Troubleshooting Flowchart — Ignition Output Signal —



15

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 1 I-18), CODE 15 is indicated.

Do the ECU Reset Procedures (page 11-19).

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 C143, CI 23 and ECU.

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

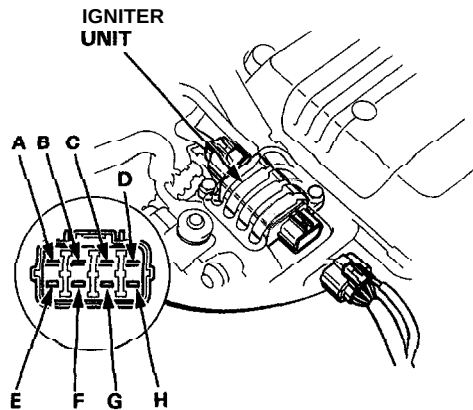
Repair open in **BLK** wire between 8P connector and G103.

YES

Disconnect the 6P connector from the igniter unit.

Connect the ECU test harness between the ECU and connector (page 1 I-21).

(To page 1 I-57)



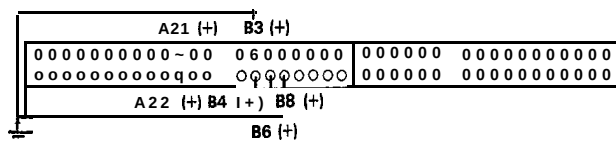
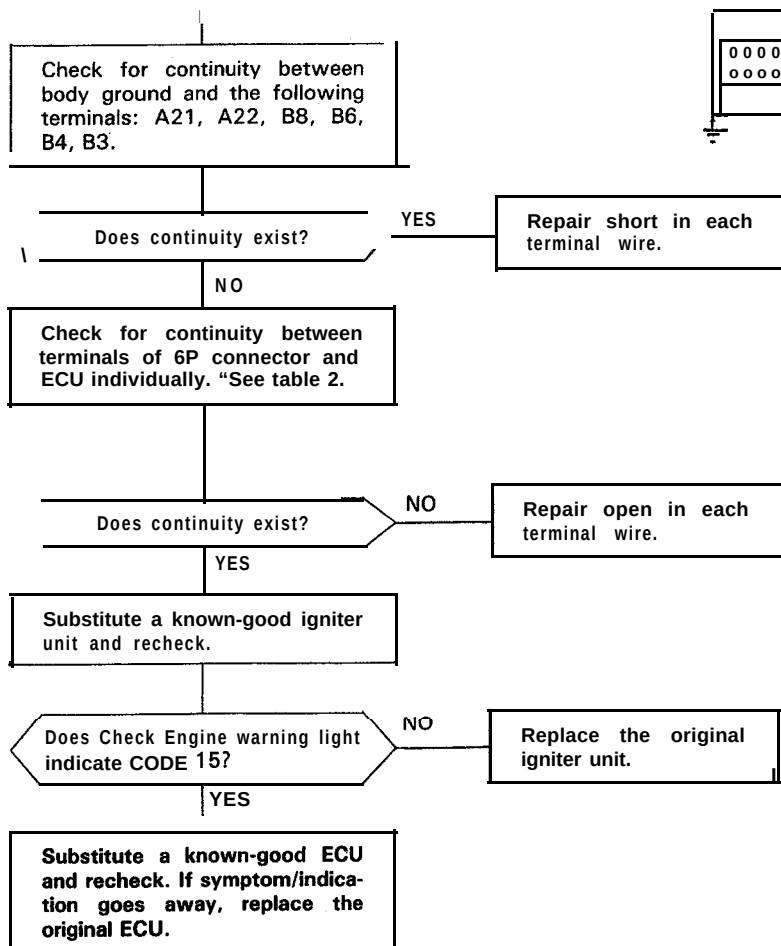
• 1

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

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

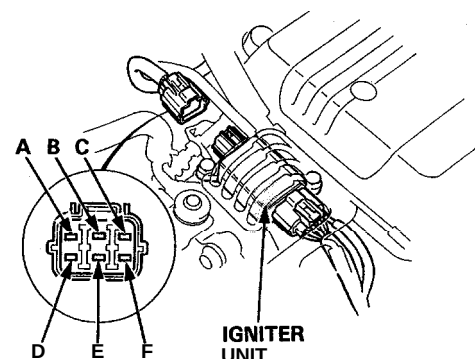


(From page 11-56)



*2:

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



PGM-FI Control System

-Troubleshooting Flowchart — Vehicle Speed Sensor—

**17**

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 1 I-18). CODE 17 is indicated.

Do the ECU Reset Procedures (page 11-19).

Road test necessary.
In 2nd gear accelerate to 3,500 rpm, then decelerate to 1,500 rpm with throttle fully closed.

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

YES

Raise the car.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

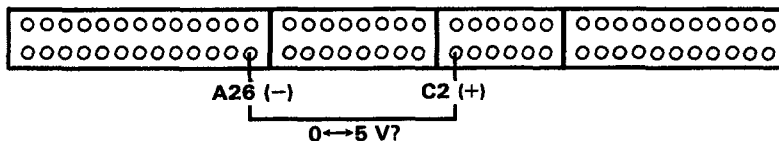
Slowly rotate left rear wheel and measure voltage between C2 (+) terminal and A26 (-) terminal.

Does voltage pulse 0 V and 5 V?

YES

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

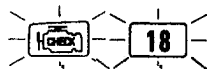
NO

Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at and (located at left shock tower).**⚠ WARNING** Make sure lifts are placed properly. (See page I-8.)

- 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.

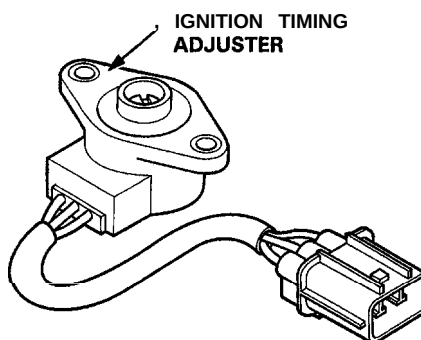


Troubleshooting Flowchart — ignition Timing Adjuster



Self-diagnosis Check Engine lights 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 is on.
- With service check connector jumped (page 11-18), CODE 18 is indicated.

Do the ECU Reset Procedures (page 1 I-19).

Turn the ignition switch ON.

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

NO

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 3-6 kΩ?

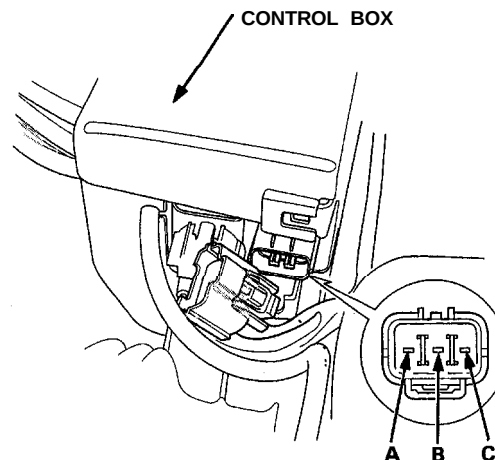
NO

Replace Ignition timing adjuster (Section 23).

YES

(To page 1 I-61)

Intermittent failure system is OK at this time (Test drive may be necessary). Check for poor connections or loose wires at the Ignition Timing adjuster connector C533 and ECU.





(From page 1 I-60)

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

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

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.

Is there approx. 5 V?

YES

Repair open in GRN/WHT wire between ECU (D22) and Ignition timing adjuster.

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

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

Turn the ignition switch OFF.

Reconnect 3P connector.

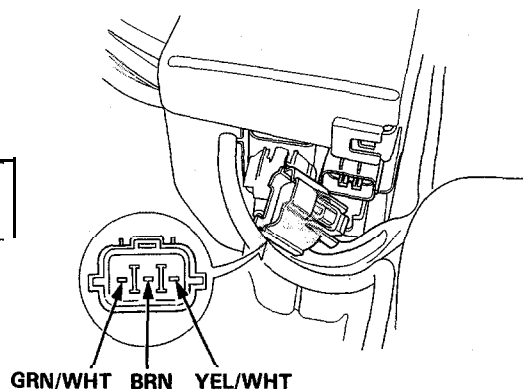
Turn the ignition switch ON.

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

Turn the ignition switch ON.

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

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



Is there 0.5-4.5 V?

NO

Repair open or short in 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.

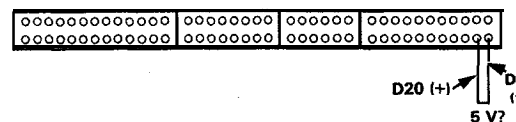
Is there approx. 5 V?

YES

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

NO

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



PGM-FI Control System

Troubleshooting Flowchart ~~Knock Sensor~~ Knock Sensor



23

Self-diagnosis Check Engine light indicates code 23: A problem in the circuit of the Front Knock Sensor.



53

Self-diagnosis Check Engine light indicates code 53: A problem in the circuit of the Rear Knock Sensor.



23

or **53**

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 23 and/or 53 are indicated.

Do the ECU Reset Procedures (page 1 I-19).

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

Hold engine at 3000–4000 rpm for 10 seconds.
(A/T: Transmission is **N** or **P**)

Is Check Engine light on and does it indicate CODE 23 or 53?

NO

Intermittent failure, system is OK at this time.

YES

Turn the ignition switch OFF.

Connect the ECU test harness to the engine wire harness only, not to the ECU (page 11-21).

Disconnect the, knock sensor connector from the engine wire harness.

Check for continuity between D4 or D3*, terminal and body *ground.

Does continuity exist?

YES

REAR

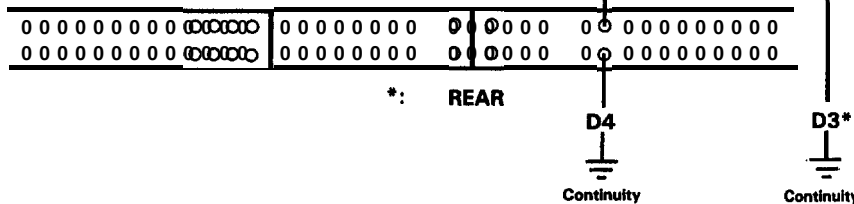
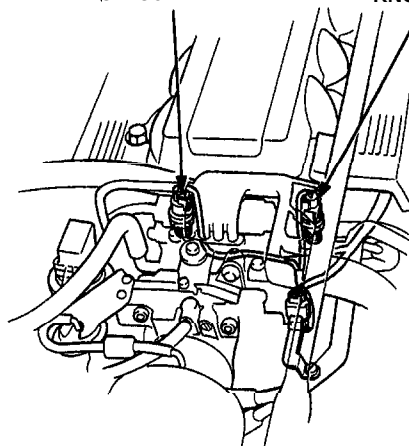
Repair short in WHT or ORN* wire between ECU (D4 or D3*) and the knock sensor.

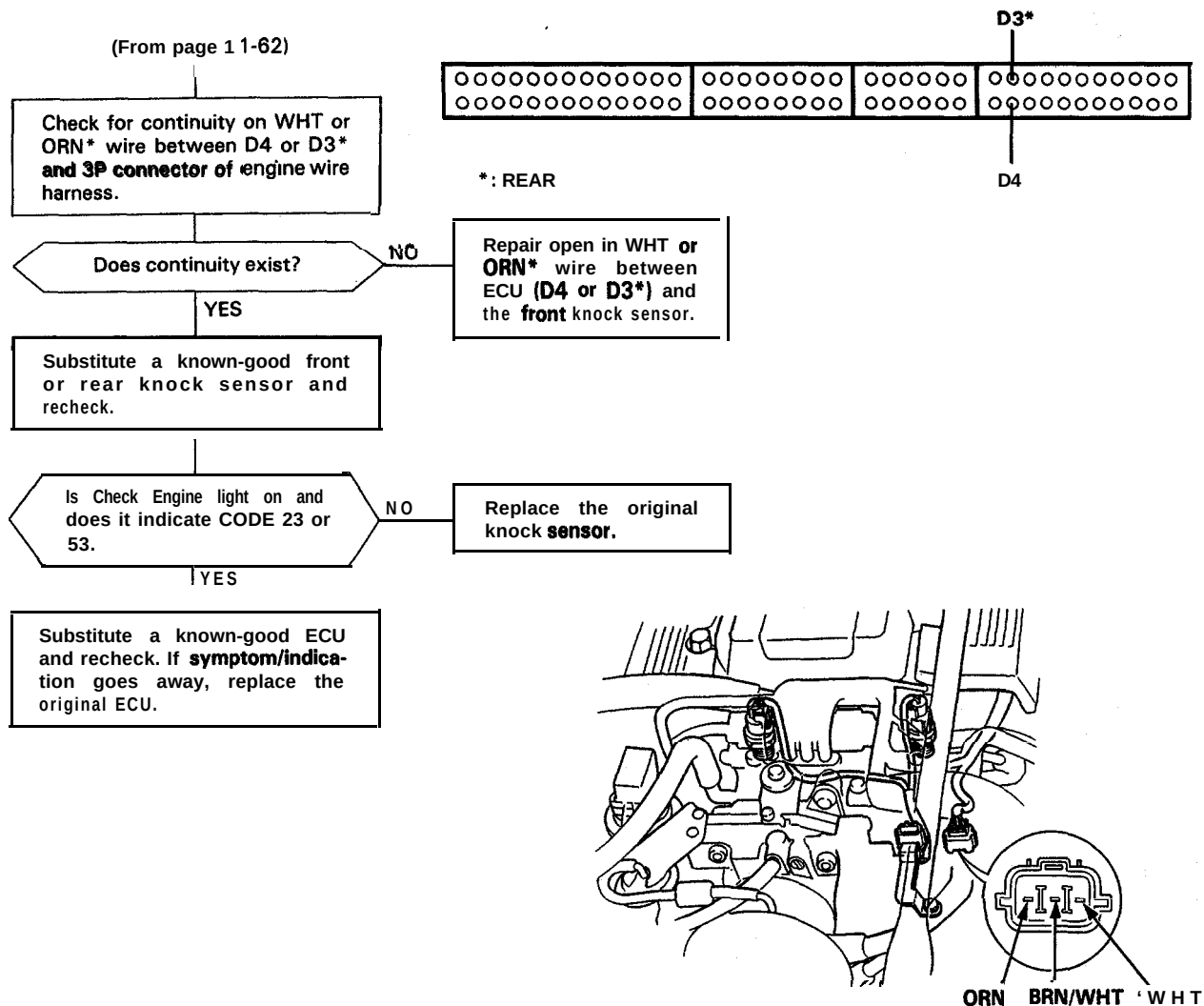
NO

(To page 1 I-63)

FRONT KNOCK SENSOR

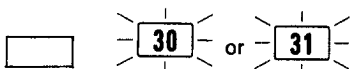
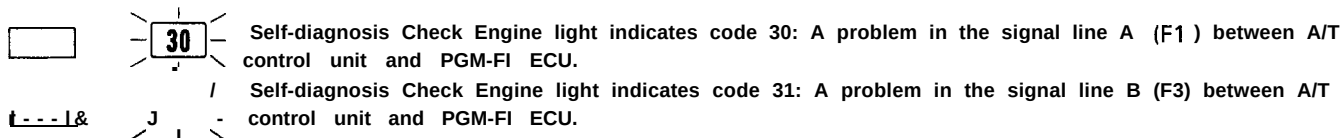
REAR KNOCK SENSOR





PGM-FI Control System

Troubleshooting Flowchart — A/T FI Signal



- Check Engine light isn't on.
- With service check connector jumped (page 11-18), CODE 30 and/or 31 are indicated.

Do the ECU Reset Procedures (page 1 I-19).

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

Does Check Engine light indicate) NO
CODE 30 or 31?

Intermittent failure,
system is OK at this time.

YES

Turn the ignition switch OFF.

Connect the test harness to the floor wire harness only, not to the ECU (page 1 I-21).

Disconnect the 22P connector from the A/T control unit.

Check for continuity between F1 or F3*, terminal and body ground.

*: SIGNAL 8

C

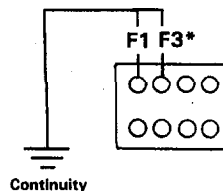
Does continuity exist?

YES

Repair short in WHT/GRN or WHT/RED* wire between ECU (F1 or F3*) and the A/T control unit.

NO

(To page 1 I-65)



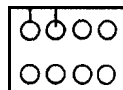


(From page 1 I-64)

F1 F3*

Check for continuity on WHT/GRN or WHT/RED* wire between F1 or F3* and 22P connector of the A/T control unit.

AL B



Does continuity exist?

NO

Repair open in WHT/GRN or WHT/RED* wire between ECU (F1 or F3*) and the A/T control unit.

YES

Substitute a known-good A/T control unit and recheck.

Does Check Engine light indicate CODE 30 or 31?

NO

Replace the original A/T control unit.

YES

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

Idle Control System

System Troubleshooting Guide

NOTE:

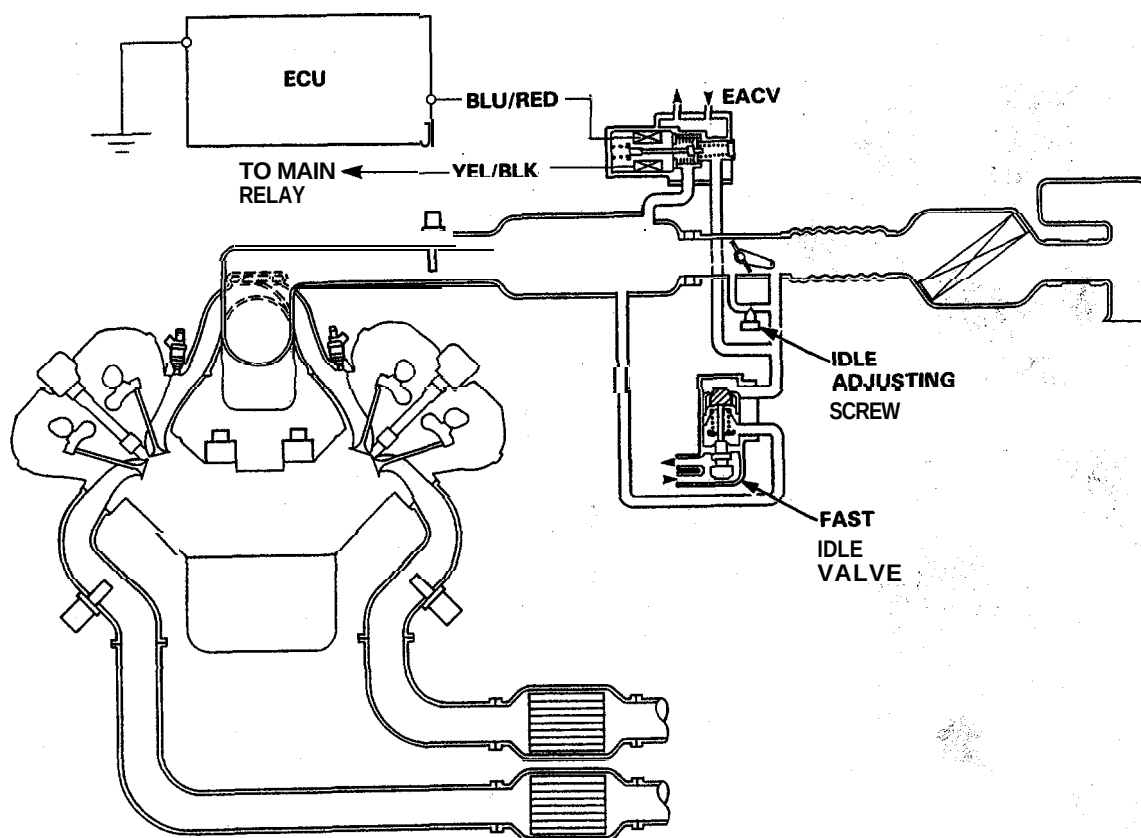
- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows 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 11-70.

PAGE	SUB SYSTEM	IDLE ADJUST-ING SCREW	EACV	AIR CONDI-TIONING SIGNAL	ALTER-NATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL	M/T NEUTRAL SWITCH SIGNAL	M/T CLUTCH SWITCH SIGNAL	STARTER SWITCH SIGNAL	FAST IDLE VALVE	HOSES AND CONNEC-TIONS
SYMPTOM		86	70	72	74	76	78	80	a2	83	.
DIFFICULT TO START ENGINE WHEN COLD										①	
WHEN COLD FAST IDLE OUT OF SPEC (1,000—2,000 rpm)		③	②							①	
ROUGH IDLE			②								①
WHEN WARM RPM TOO HIGH		③	①							②	③
WHEN WARM RPM TOO LOW	Idle speed is below specified rpm (no load)	②	①								
	Idle speed does not increase after initial start up.		①								
	On models with automatic transmis-sion, the idle speed drops in gear		②			①					
	Idle speeds drops when air conditioner in ON		②	①							
	Idle speed fluctuates with electrical load		②								①
FREQUENT STALLING	WHILE WARMING UP		①								
	AFTER WARMING UP	①									
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.

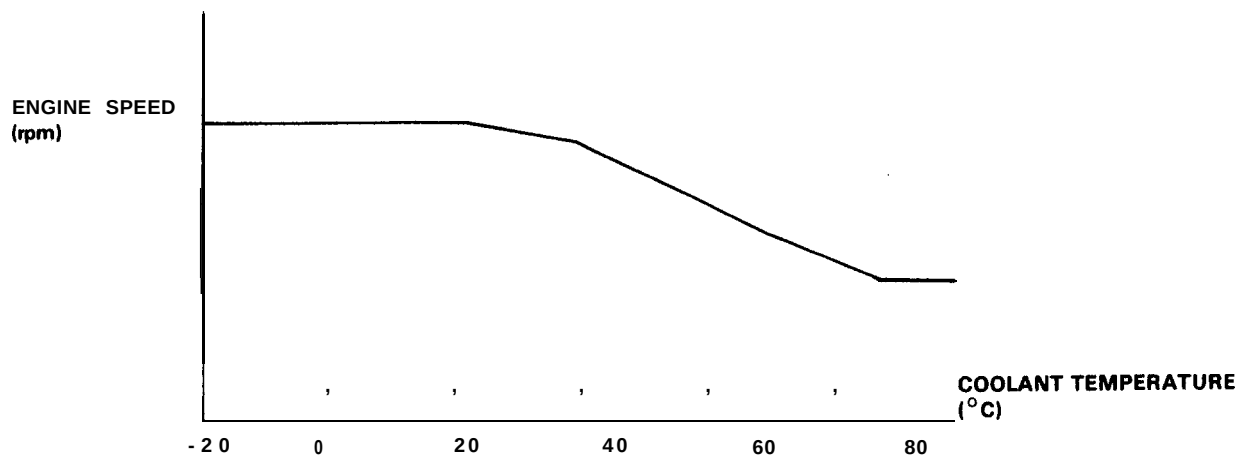


(cont'd)

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 150-300 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 warning light does not blink CODE 14, check the following items:
 - . Adjust the idle speed (page 1 I-84)
 - . Air conditioning signal (page 1 I-72)
 - . Alternator FR signal (page 1 I-74)
 - . A/T shift position signal (page 1 I-76)
 - . M/T neutral switch signal (page 1 I-78)
 - . M/T clutch switch signal (page 1 I-80)
 - . Starter switch signal (page 1 I-82)
 - . Fast idle valve (page 1 I-83)
 - . 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 11-84).
 - If the idle speed still cannot be adjusted to specification (and the Check Engine warning 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

Troubleshooting



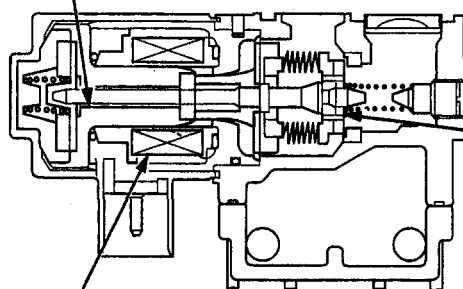
14

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.

TO INTAKE FROM AIR
MANIFOLD CLEANER

VALVE SHAFT



VALVE

COIL



14

- Check Engine light has been reported on.
- With service check connector jumped (page 1 I-18), CODE 14 is indicated.

Do the ECU Reset Procedures (page 11-19).

Start the engine.

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

NO

Intermittent failure, system is OK at this time (test driving may be necessary). Check for poor connection or loose wires at EACV **C133** and ECU.

YES

Stop the engine.

Connect the ECU test harness "A" connector to the engine wire harness only, not the ECU (page 1 I-21).

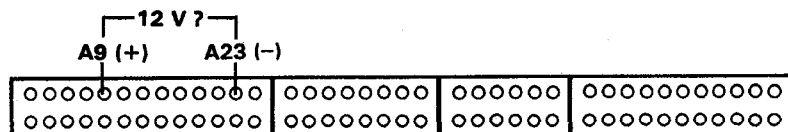
Turn the ignition switch ON.

(To page 1 I-71)



(From page 1 1-70)

Measure voltage between A9 (+) terminal and A23 (-) terminal.



Is there battery voltage?

YES

Replace EACV.

NO

Remove the C133 connector from the EACV and connect a jumper wire* to the two pins on the wire harness connector.

CAUTION:
* the "A" connector must be disconnected for this test or the ECU will be damaged.

Measure voltage between A9 (+) terminal and A23 (-) terminal.

Is there battery voltage?

YES

Replace EACV.

NO

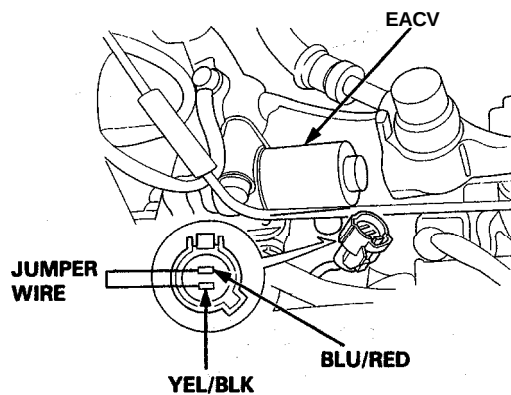
Measure voltage between the YEL/BLK wire on C133 and body ground.

Is there battery voltage?

NO

YES

Repair open in BLU/RED wire between ECU (A9) and EACV.



(cont'd)

Idle Control System

-Troubleshooting Flowchart — Air Conditioning Signal

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

Inspection of Air Conditioning Signal.

Connect the ECU test harness between the ECU and connector. Disconnect "C" connector from the engine wire harness only, not the ECU (page 1 I-21).

Turn the ignition switch ON.

Measure voltage between C3 (+) terminal and A26 (-) terminal.

Is there approx. 10 V?

YES

Reconnect "C" connector to the engine wire harness.

Momentarily connect A15 terminal to A26 terminal several times.

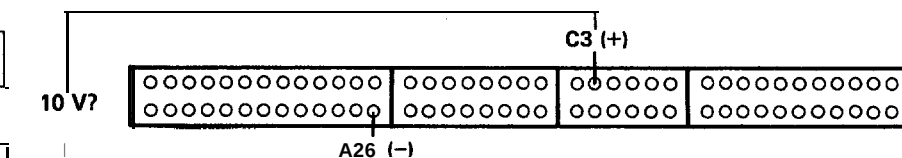
Is there a clicking noise from the A/C compressor clutch?

YES

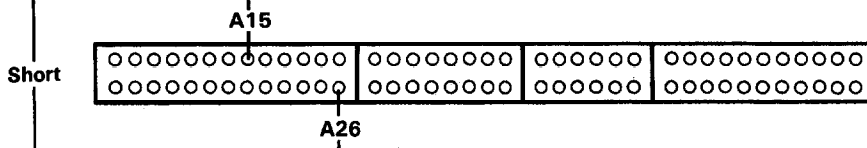
Start the engine.

Blower switch ON.

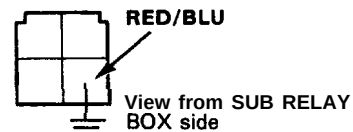
(To page 1 I-73)



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



Connect the RED/BLU terminal of the 4P connector on the A/C clutch relay to body ground.



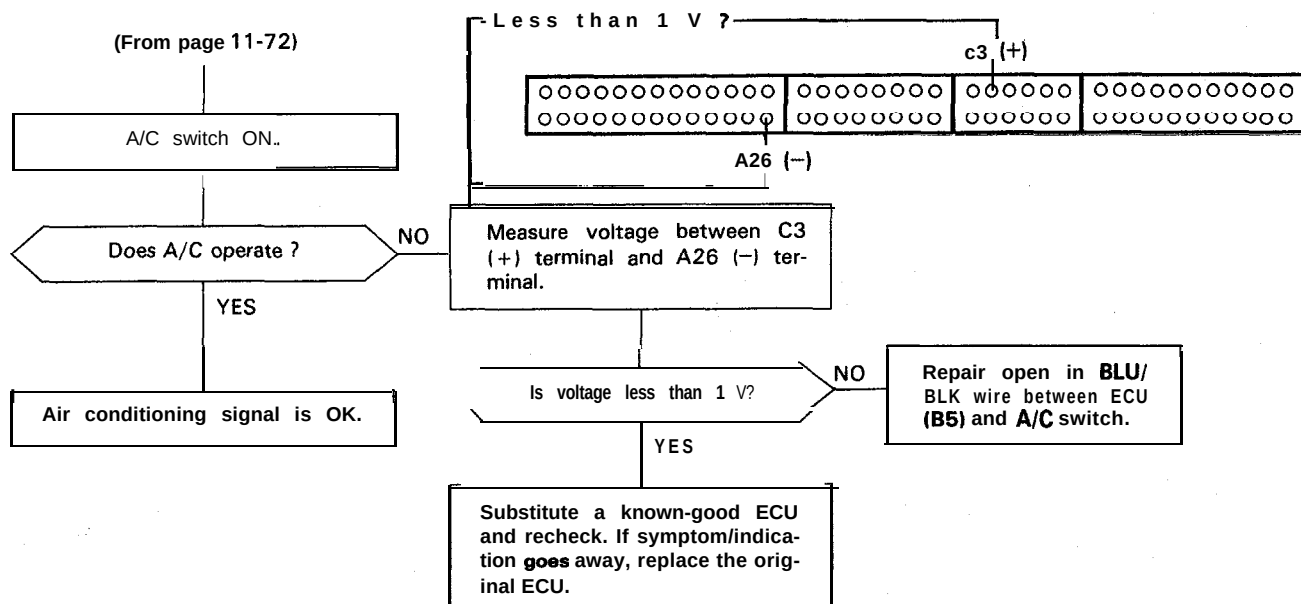
Is there a clicking noise from the A/C compressor clutch?

NO

See Air conditioner inspection (section 22).

YES

Repair open in RED/BLU wire between ECU (A15) and A/C clutch relay.



Idle Control System

-Troubleshooting Flowchart ——— Alternator FR Signal ———

This signals the PGM-FI ECU when the alternator is charging.

Inspection of Alternator FR signal.

Connect the ECU test harness between the ECU and connector. Disconnect "D" connector from the engine wire harness only, not the ECU (page 11-21).

Turn the ignition switch ON.

Measure voltage between D9 (+) terminal and A26 (-) terminal.

Is there approx. 5 V?

NO

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

YES

Turn the ignition switch OFF.

Reconnect "D" connector to the engine wire harness.

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

Measure voltage between D9 (+) terminal and A26 (-) terminal.

Does the voltage decrease when headlights and rear defogger are turned on?

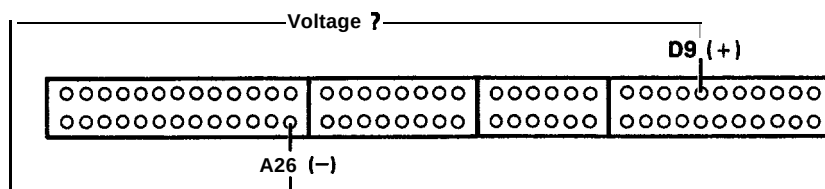
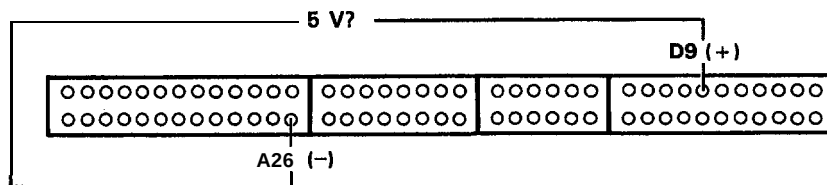
NO

Stop the engine.

YES

Alternator FR signal is OK.

(To page 1 I-75)





(From page 1 I-74)

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

Disconnect the negative battery cable from the battery.

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

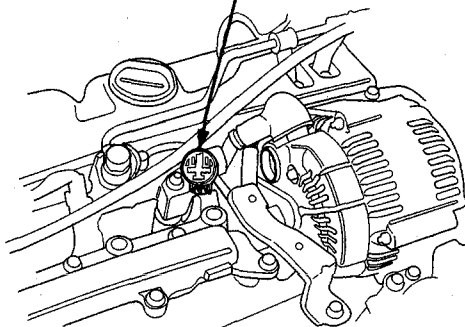
YES

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.

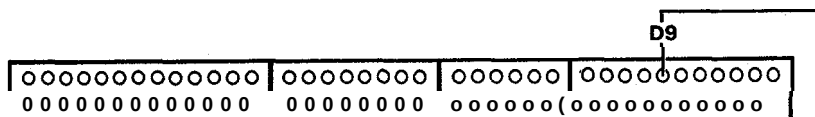
Does continuity exist ?

YES

NO

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

See Alternator Inspection.



Continuity 7

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

NO

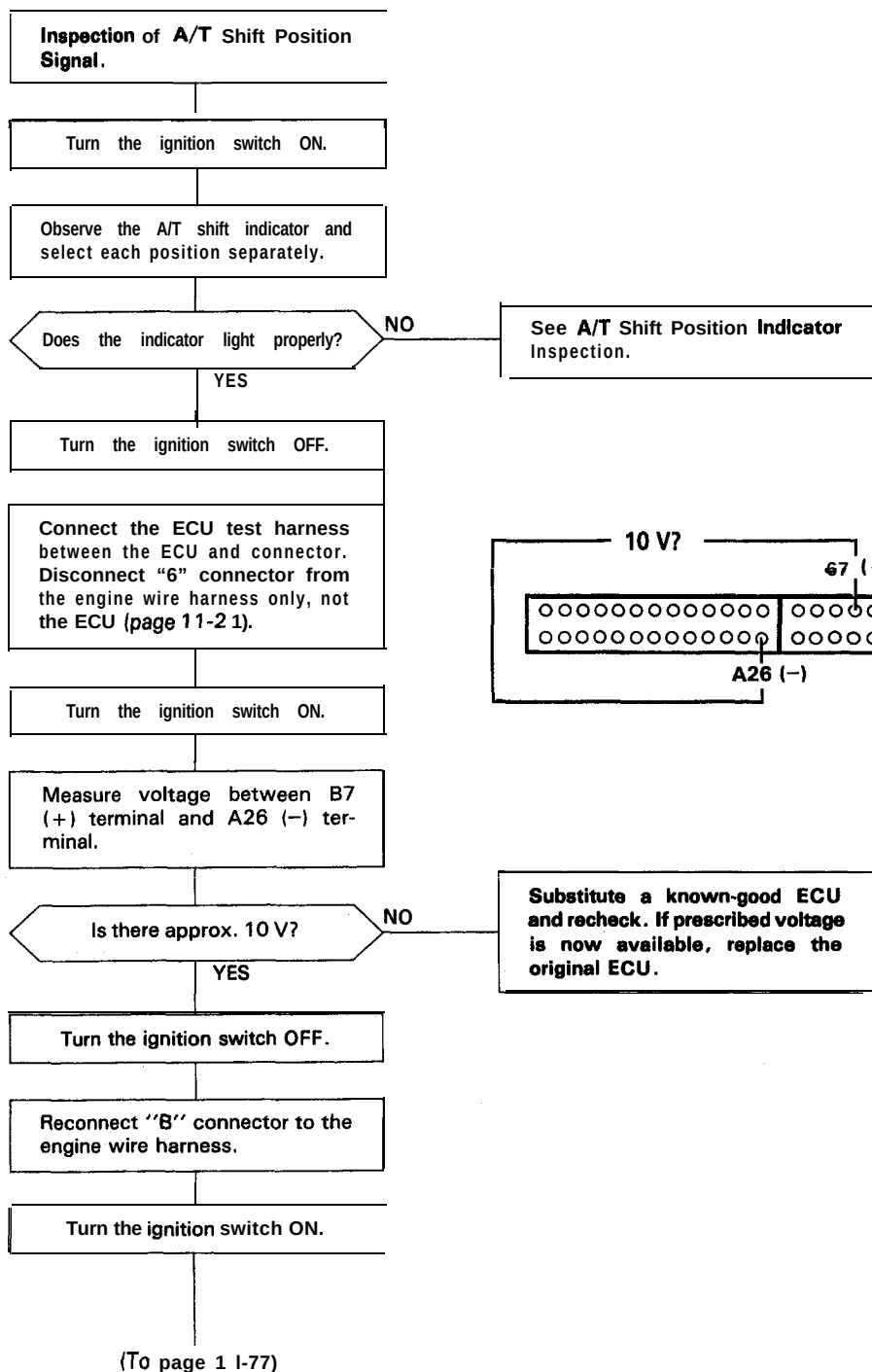
See Alternator Inspection.

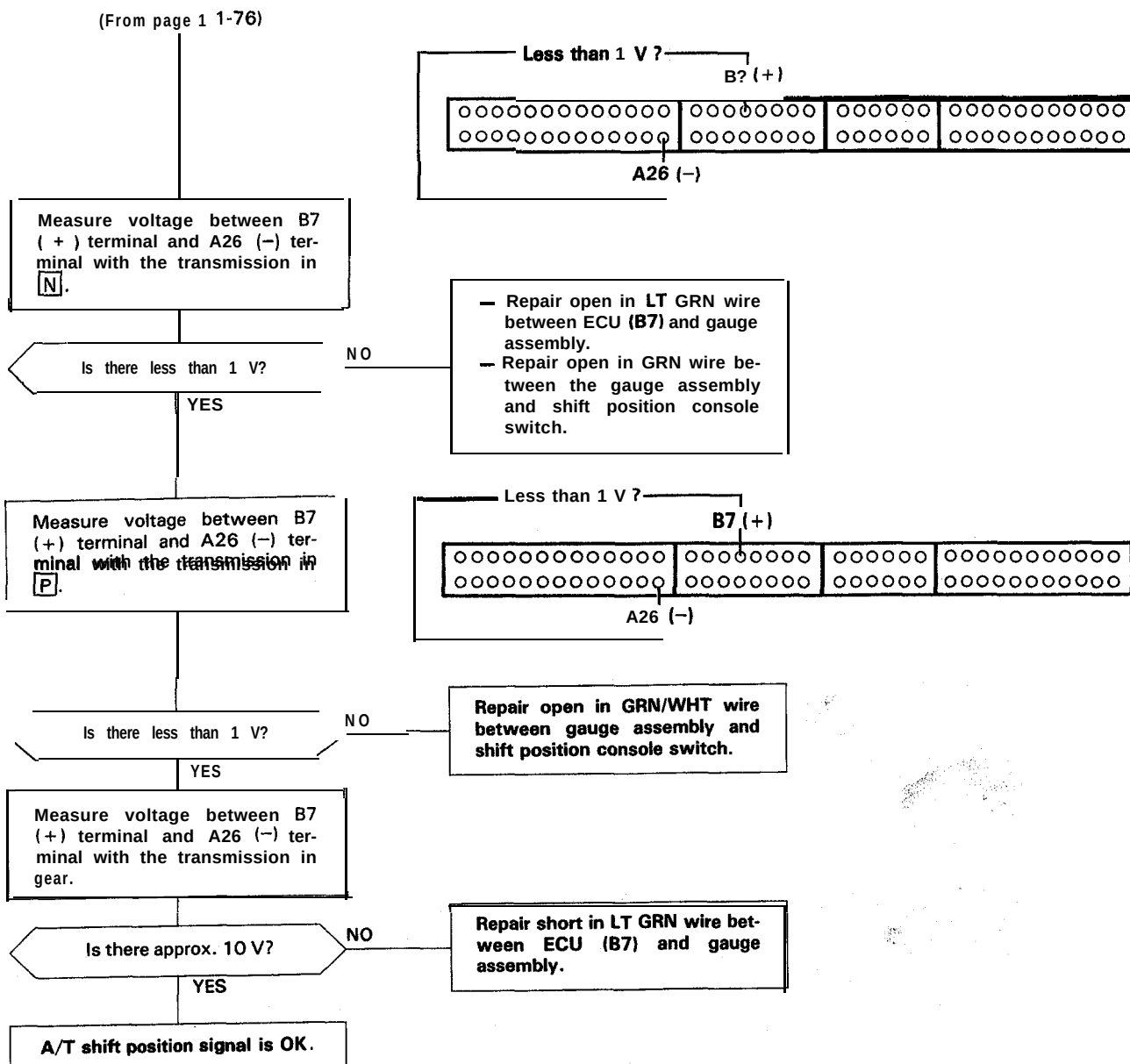
YES

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

-Troubleshooting Flowchart — A/T Shift Position Signal —

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





Idle Control System

Troubleshooting Flowchart — M/T Neutral Switch Signal

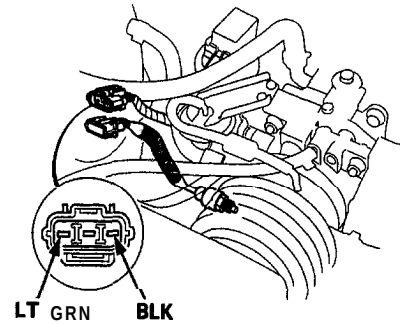
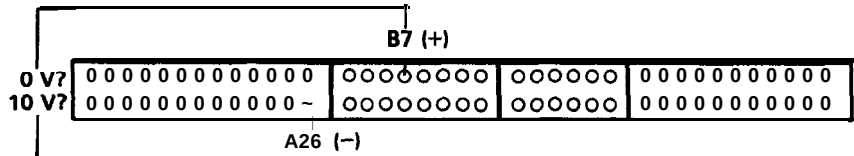
This signals the PGM-FI ECU when the transmission is in Neutral.

inspection of M/T neutral Switch Signal

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

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



Is there voltage?

YES

Disconnect the 3P connector on the MIT neutral switch.

NO

Connect LT GRN terminal to BLK terminal.

Shift transmission in gear.

Is there voltage?

NO

Replace M/T neutral switch.

YES

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

Is there approx. 10 V?

NO

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

YES

M/T neutral switch signal is OK.

Is there approx. 10 V?

NO

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

YES

Reconnect "B" connector to main wire harness and disconnect 3P connector on the M/T neutral switch.

Is there approx. 10 V?

NO

Repair short in LT GRN wire between ECU (B7) end the M/T neutral switch.

YES

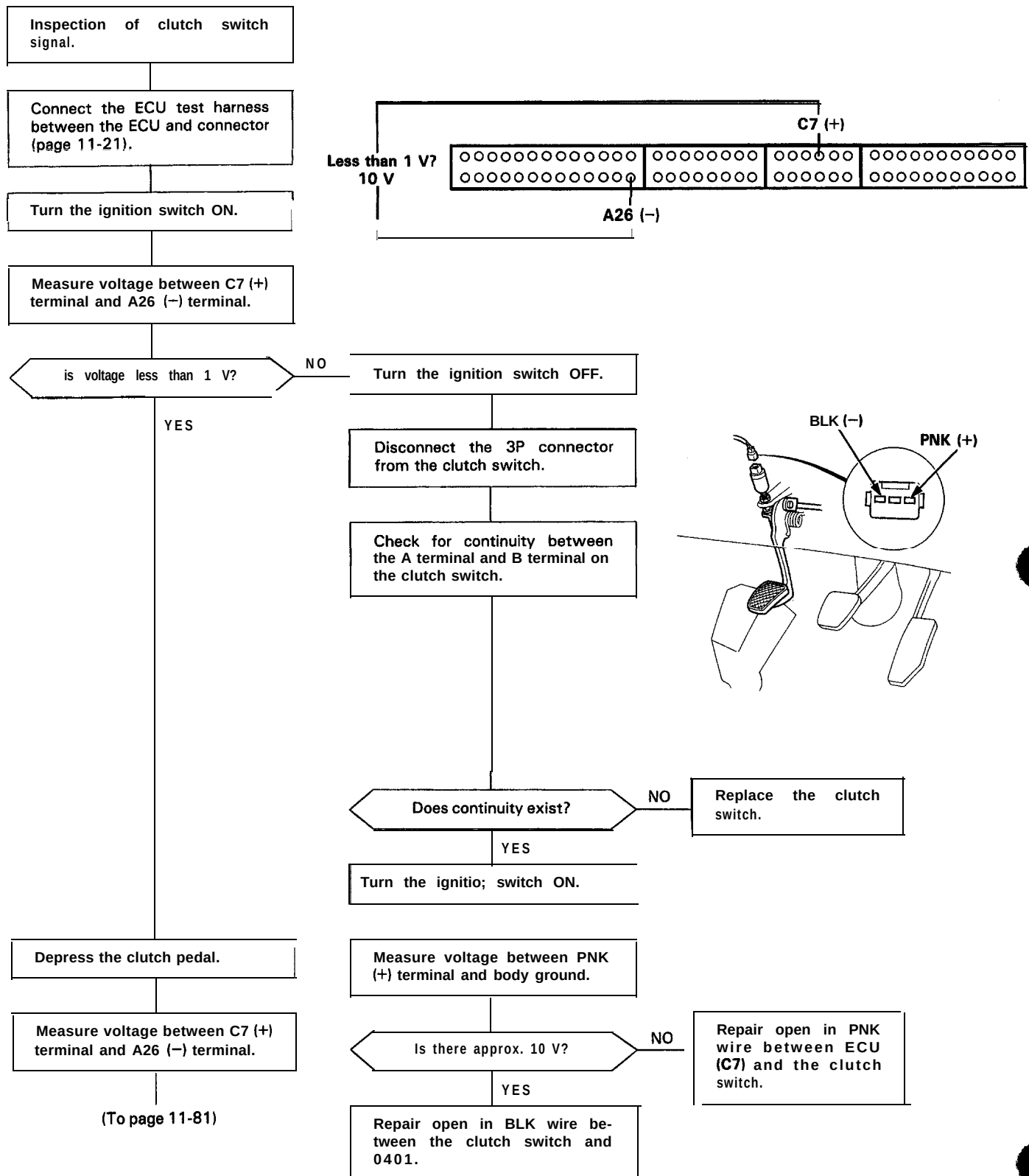
Replace M/T neutral switch.

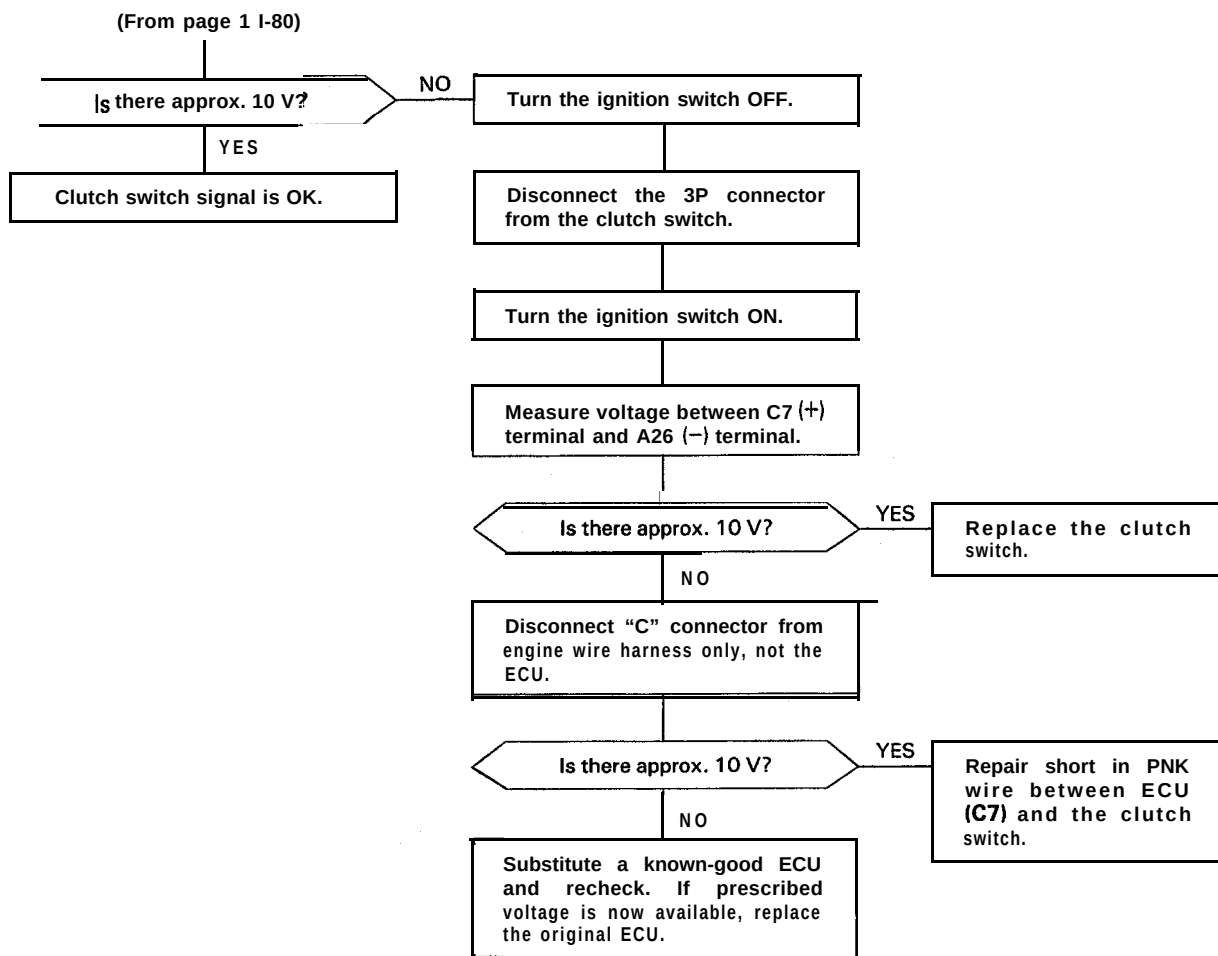


Idle Control System

Troubleshooting Flowchart — Clutch Switch Signal

This signals the PGM-Fi ECU when the clutch is engaged.





Idle Control System

-Troubleshooting Flowchart — Starter Switch Signal

This signals the PGM-FI ECU when the engine is cranking.

Inspection of Starter Switch Signal.

Connect the ECU test harness between the ECU and connector (page 1 I-211).

Measure voltage between C11 (+) terminal and A26 (-) terminal.

Is there battery voltage ?

YES

Starter switch signal is OK.

NO

Inspect No. 7 fuse.

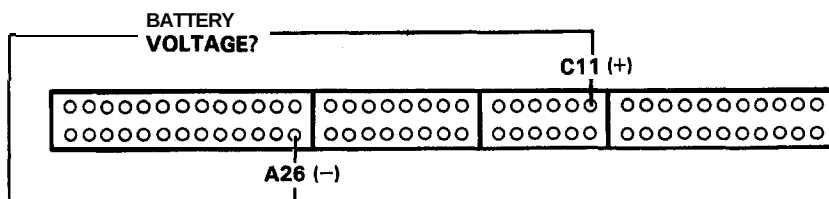
Is No. 7 fuse OK ?

YES

Repair open in BLK/WHT wire between ECU (C11) and No. 7 fuse.

NO

Replace fuse.



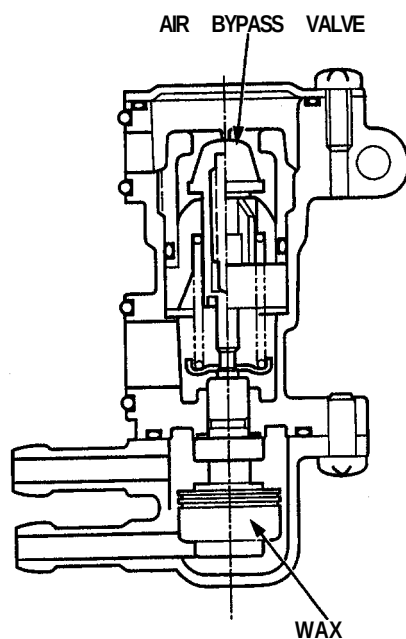
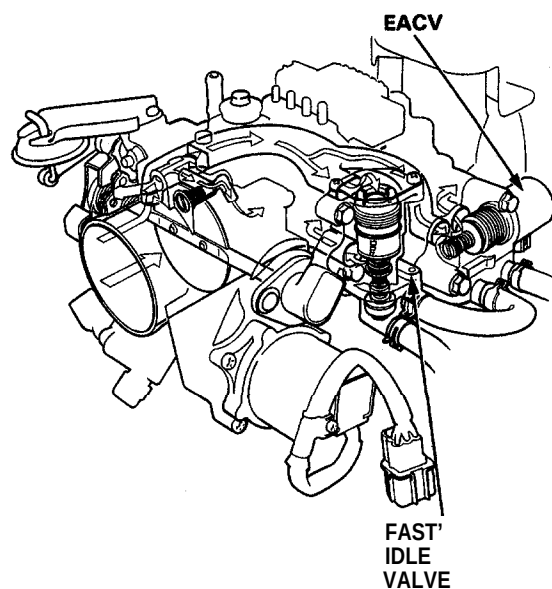
NOTE: Clutch pedal must be depressed on M/T models.



Fast Idle Valve

Description

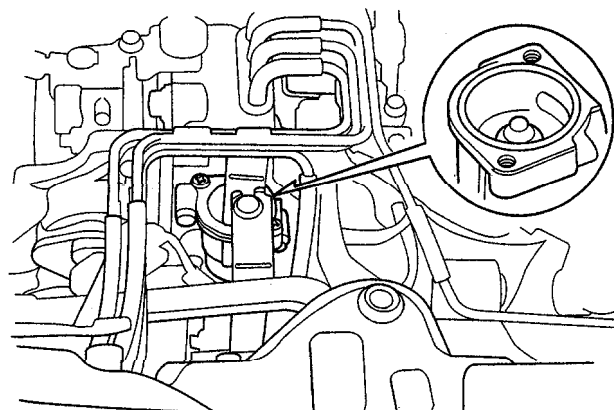
To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle air bypass valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into 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.



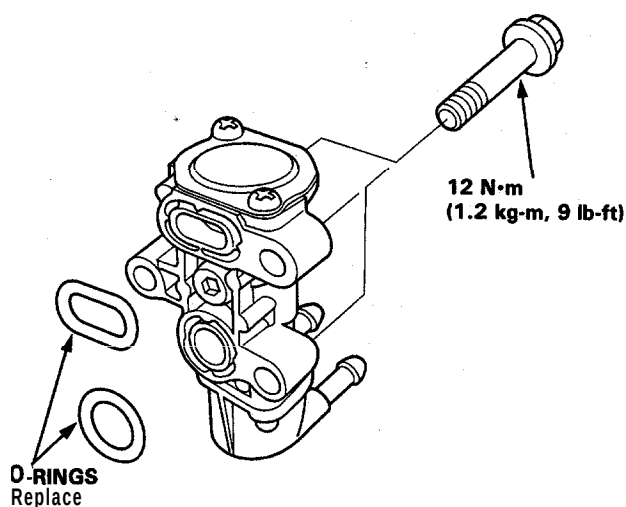
Inspection

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

1. Start the engine.
2. Remove the cover of the fast idle valve.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F) and idling.



- If not, 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 seat area.
 - If any suction is felt, the valve is leaking. Replace the fast idle valve and recheck.

Idle Control System

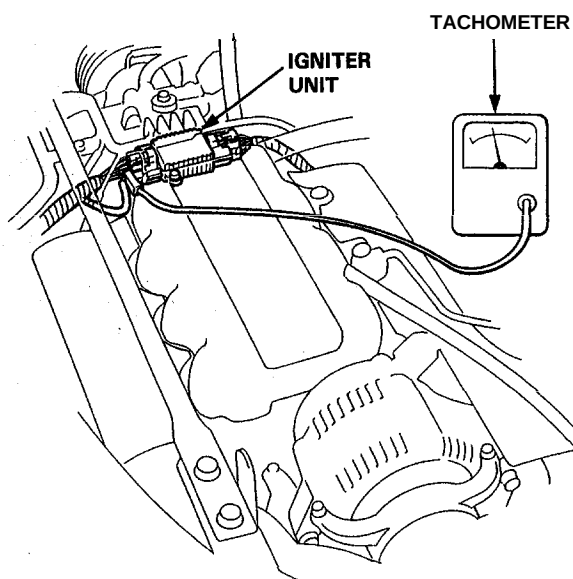
— Idle Speed Setting

Inspection/Adjustment

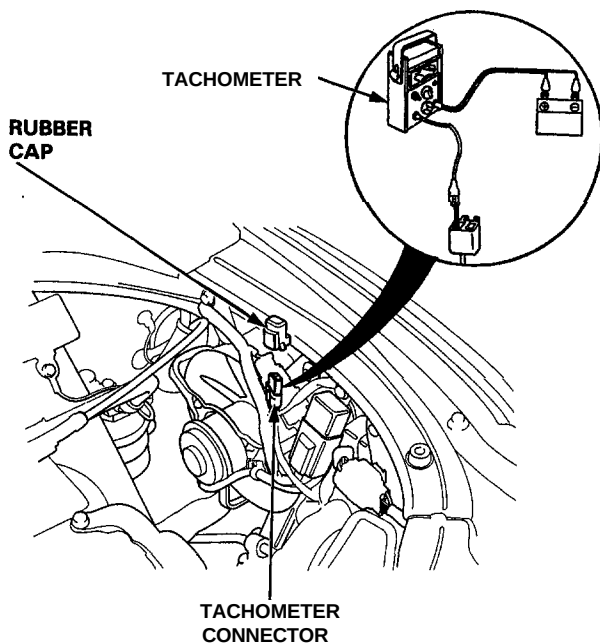
1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).

2. Connect a tachometer.

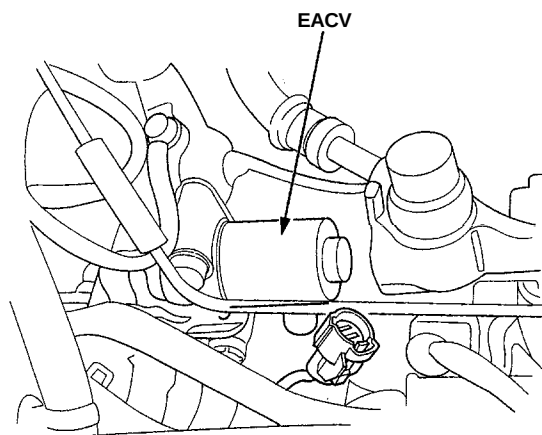
- Connect a tachometer to loop of igniter unit secondary, or...



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



3. Disconnect the 2P connector from the EACV.



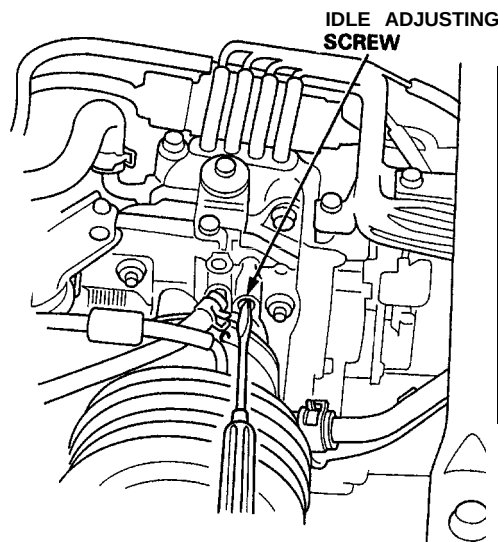
4. Start the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1000, then slowly release the pedal until the engine idles.

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

Idle speed should be:

Manual	650 ± 50 rpm
Automatic	600 ± 50 rpm (in gear)

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





6. Turn the ignition switch OFF.

7. Reconnect the 2P connector on the EACV, then remove CLOCK fuse in the main relay box for 10 seconds to reset ECU.

8. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	800 $\pm$ 50 rpm
Automatic	750 $\pm$ 50 rpm (in gear)

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	FUEL PUMP RELAY FUEL PUMP RESISTOR	CONTAMINATED FUEL
SYMPTOM.		89	94	95	97	98	103	106	.
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	③
	FAILS EMISSION TEST	②	③	①					
	LOSS OF POWER	③	③		①	③		③	②



System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, fuel pump relay, fuel pump resistor, 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

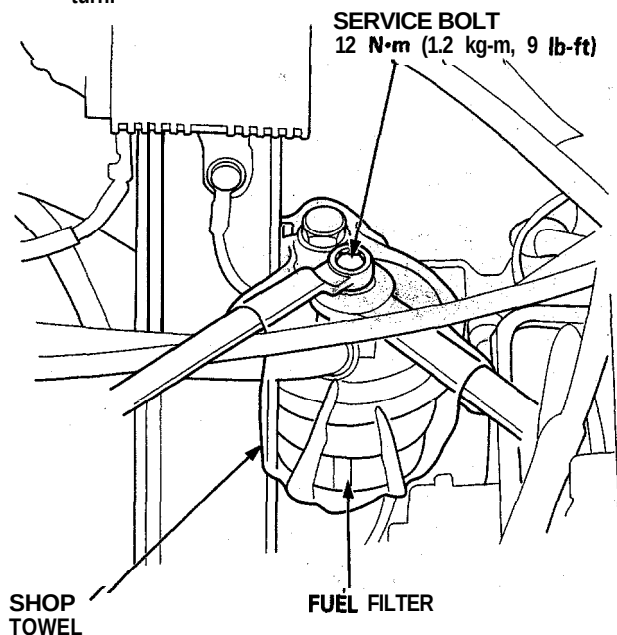
Relieving

⚠ 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 at 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.

(cont'd)

Fuel Supply System

— Fuel Pressure (cont'd)

Inspection

1. Relieve fuel pressure (page 1 I-87).
2. Remove the service bolt on the fuel filter while holding the banjo bolt with another wrench and 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.

Pressure should be:

323-363 kPa (3.30-3.70 kg/cm², 46-53 psi)

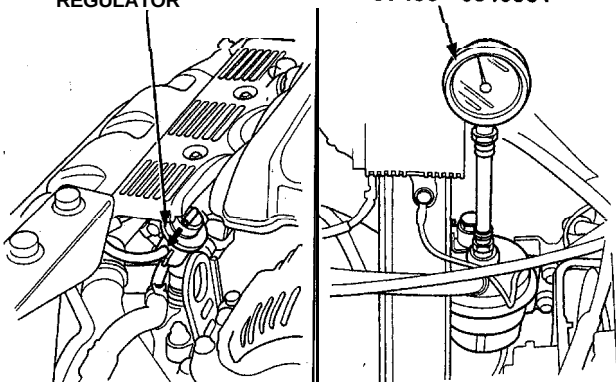
4. Reconnect vacuum hose to the pressure regulator.

Pressure should be:

250-304 kPa (2.55-3.10 kg/cm², 36-44 psi)

PRESSURE
REGULATOR

FUEL PRESSURE GAUGE
07406-0040001



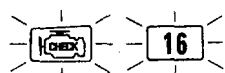
- If the fuel pressure is not as specified, first check the fuel pump (page 1 I-99). If the pump is OK, check the following:

- If the pressure is higher than specified, inspect for:
 - . Pinched or clogged fuel return hose or piping.
 - . Faulty pressure regulator (page 1 I-95).
- If the pressure is lower than specified, inspect for:
 - . Clogged fuel filter.
 - . Pressure regulator failure (page 1 I-95).
 - . Leakage in the fuel line.



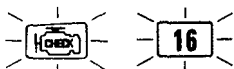
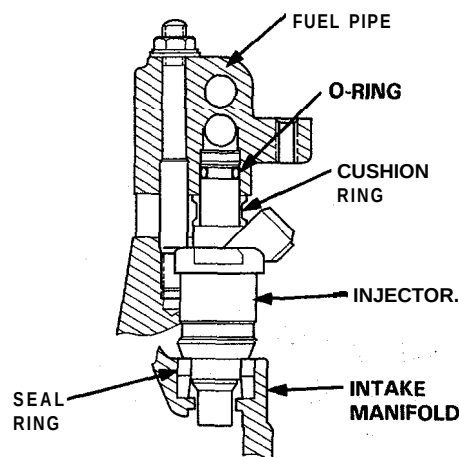
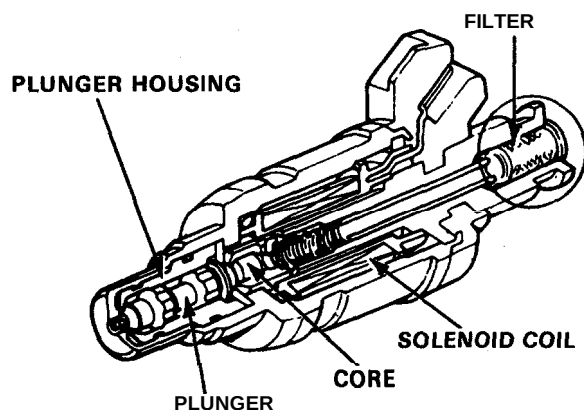
Fuel Injectors

Troubleshooting Flowchart



Self-diagnosis Check Engine light indicates code 16: A problem in the fuel injector circuit.

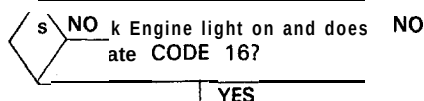
The injectors are the solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected close to the intake valve. Because the needle valve lift and the fuel pressure 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.



- Check Engine light has been reported on.
- With service check connector jumped (page 1 I-18), CODE 18 is indicated.

Do the ECU Reset Procedures (page 1 I-19).

Turn the ignition switch to START position.



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

(To page 1 I-90)

(cont'd)

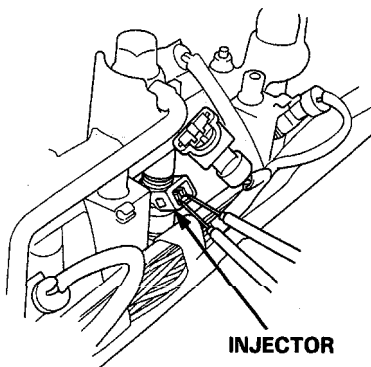
-Fuel Injectors (cont'd)

(From page 1 I-89)

Turn the ignition switch OFF.

Disconnect the 2P connector from the injector that does not click.

Measure resistance between the 2 terminals of the injector.



Is there 1.5—2.5Ω?

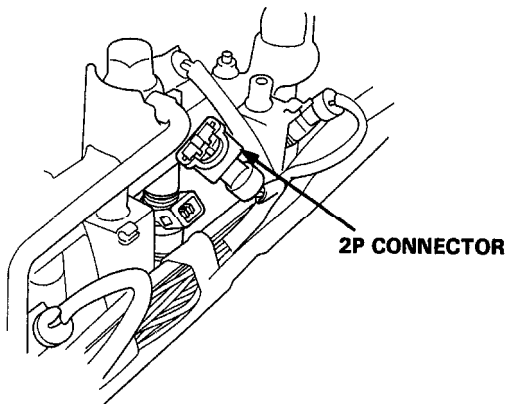
NO

Replace the injector/ injectors that are not 1.5—2.5Ω.

YES

Turn the ignition switch ON.

Measure voltage between RED/ BLK (+) terminal on the 2P connector and body ground.



Is there battery voltage ?

NO

Turn the ignition switch OFF.

Disconnect 8P connector on the injector resistor.

Turn the ignition switch ON.

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

YES

(To page 11-91)

(To page 11-91)



(From page 11-90)

Reconnect the 2P connector to the injector.

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 11-21).

Turn the ignition switch ON.

Measure voltage between A23 (-) terminal and following terminals.

- No. 1 injector: A1 (+) terminal.
- No. 2 injector: A3 (+) terminal.
- No. 3 injector: A5 (+) terminal.
- No. 4 injector: A2 (+) terminal.
- No. 5 injector: A4 (+) terminal.
- No. 6 injector: A6 (+) terminal.

Is there battery voltage ?

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

(From page 11-90)

Is there battery voltage?

NO

Repair open in the YEL/BLK wire between the injector resistor and the main relay.

YES

Test the of injector resistor (page 11-96)

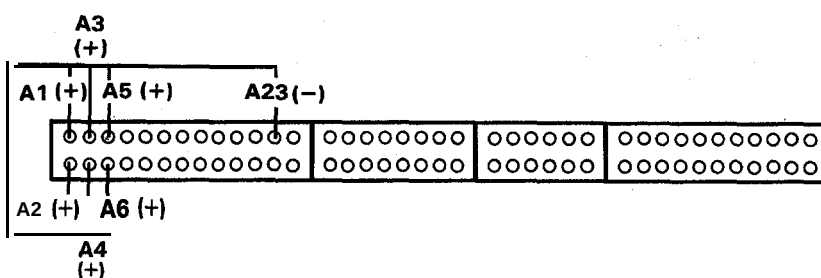
Is the injector resistor testing OK?

NO

Replace injector resistor.

YES

- Replace the injector resistor.
- Repair open RED/BLK wire between 2P connector and resistor.



Repair open in the wire between the ECU (A1, A3, A5, A2, A4 or A6) and the injector.

(cont'd)

Fuel Injectors (cont'd)

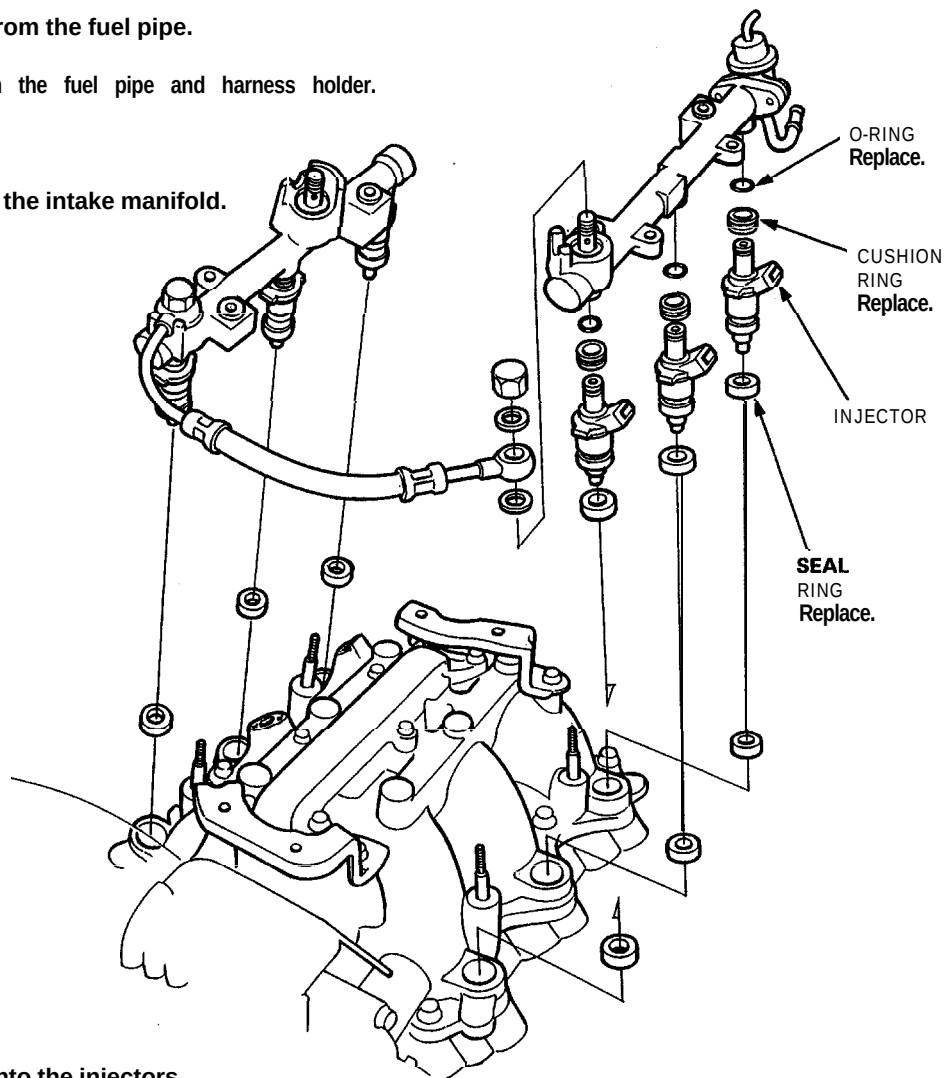
Replacement

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

1. Relieve fuel pressure (page 1 I-87).
2. Remove the intake manifold 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.

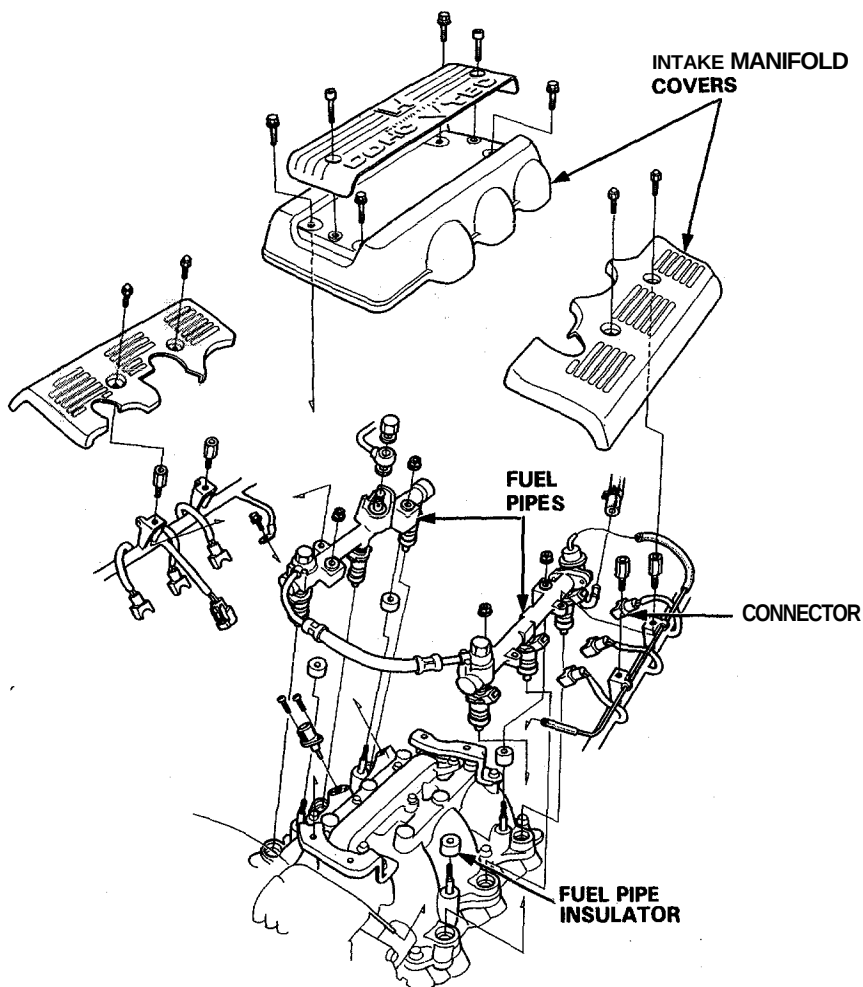


9. Slide new cushion rings onto the injectors.
10. Coat new O-rings with clean engine oil and put them on the injectors.
11. Insert the injectors into the fuel pipe first.
12. Coat new seal rings with clean engine oil and press them into the intake manifold.



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.

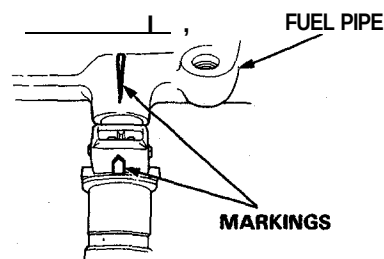
16. Connect the fuel hose to the fuel pipe.

17. Connect the vacuum hose and fuel return hose to the pressure regulator.

18. Install the connectors on the injectors.

19. Install the intake manifold 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.

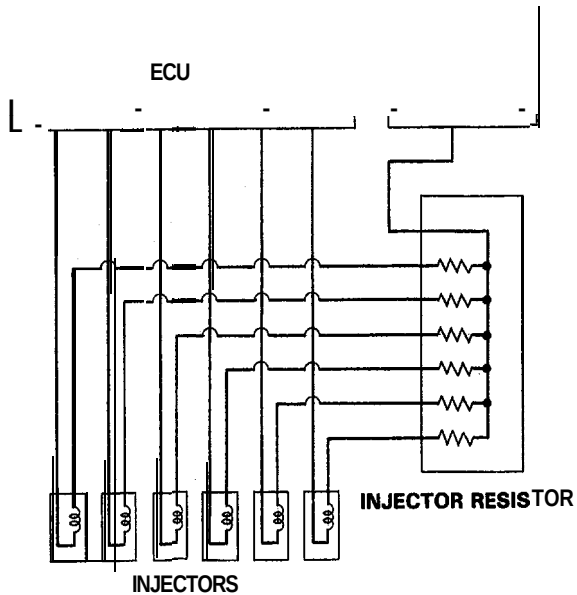


Fuel Supply System

Injector Resistor

Description

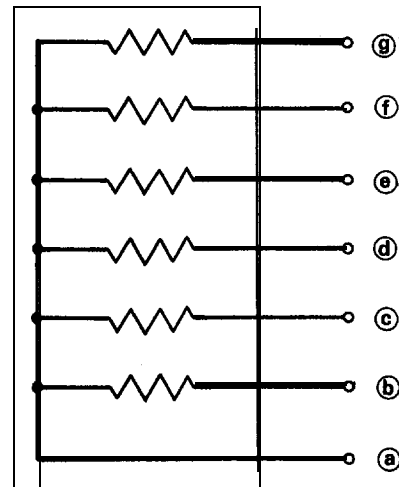
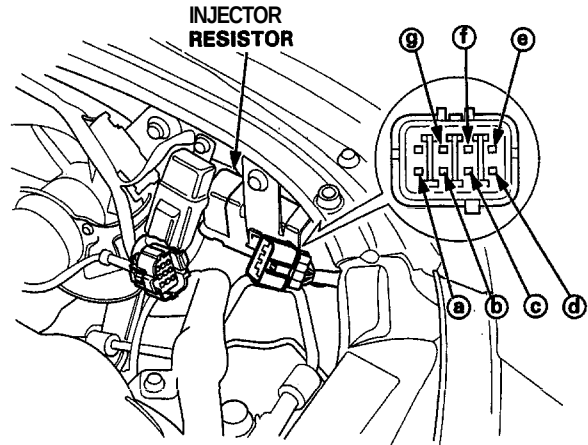
The resistor lowers the current supplied to the injectors to prevent damage to the injector coils. This allows a faster response time of the injectors.



Testing

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (b, c, d, e, f and g) and the power terminal (a).

Resistance should be: 5-7 Ω



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

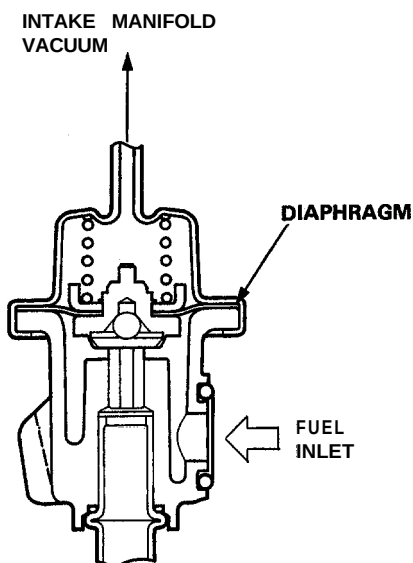


Pressure Regulator

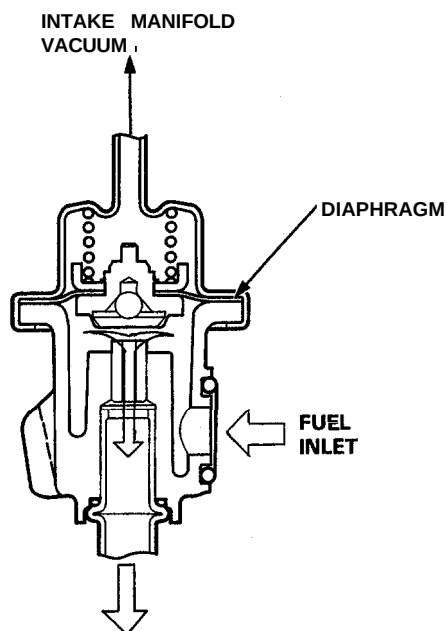
Description

The fuel pressure regulator maintains a constant fuel pressure to the injectors. When the difference between the fuel pressure and manifold pressure exceeds 3.5 kg/cm² (50 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSE



OPEN



Testing

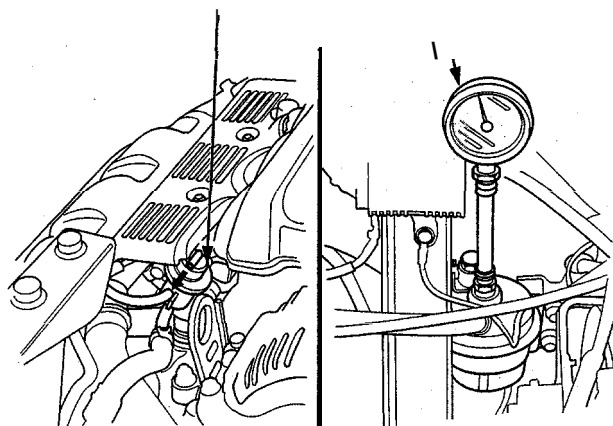
⚠ WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach a pressure gauge to the service port of the fuel filter (page 1 I-88).

Pressure should be:
323-363 kpa (3.30-3.70 kg/cm², 46-53 psi)
(with the regulator vacuum hose disconnected)

PRESSURE
REGULATOR

FUEL PRESSURE GAUGE
07406-0040001



2. Reconnect the vacuum hose to the pressure regulator.

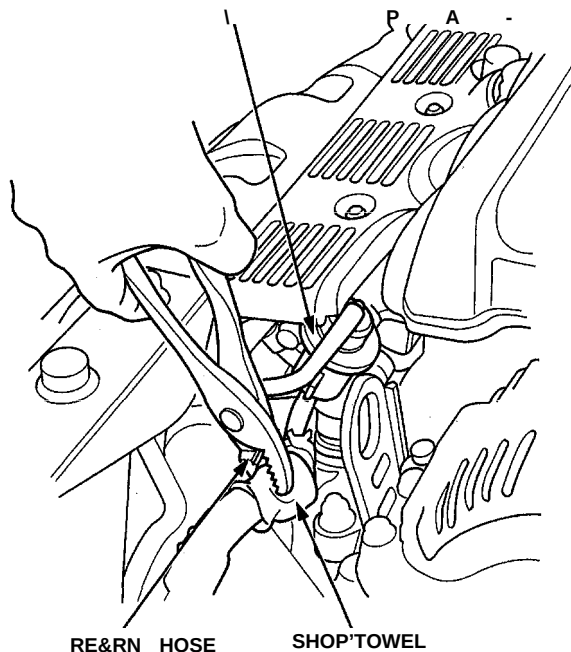
(cont'd)

Fuel Supply System

Pressure Regulator (cont'd)

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.

PRESSURE REGULATOR

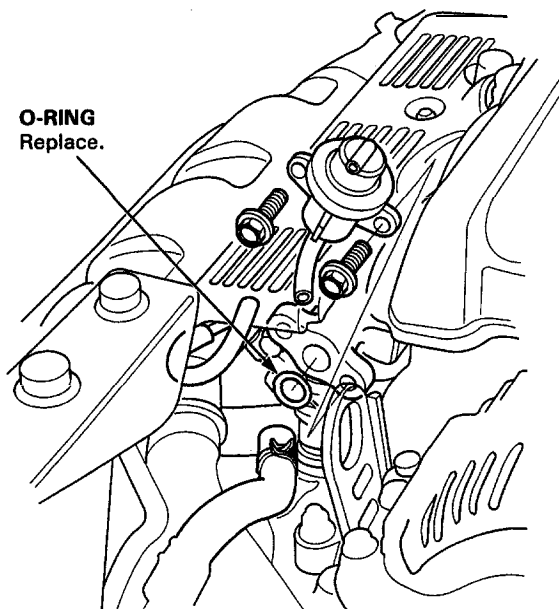


Replacement

⚠ 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 1 I-87).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.

O-RING
Replace.



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.



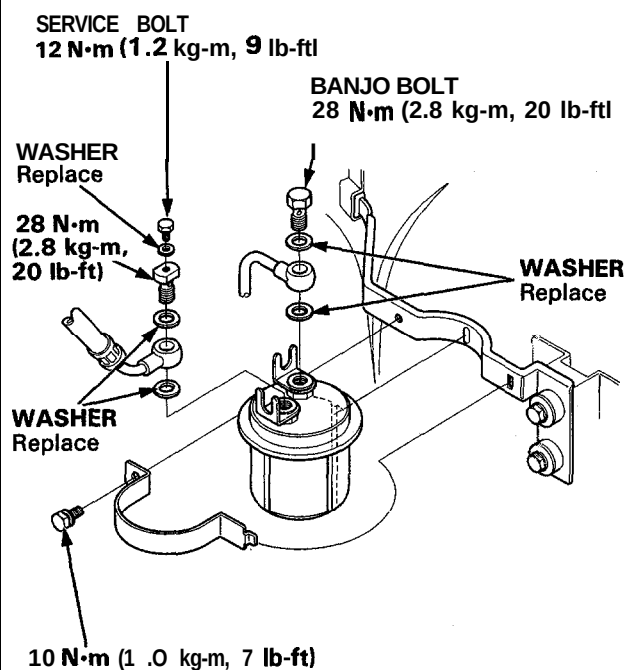
-Fuel Filter

Replacement

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

The filter should be replaced: every 4 years or 60,000 miles (96,000 km), whichever comes first or whenever the fuel pressure drops below the specified value (323-363 kPa, 3.30-3.70 kg/cm², 46-53 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 1 I-87).
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.

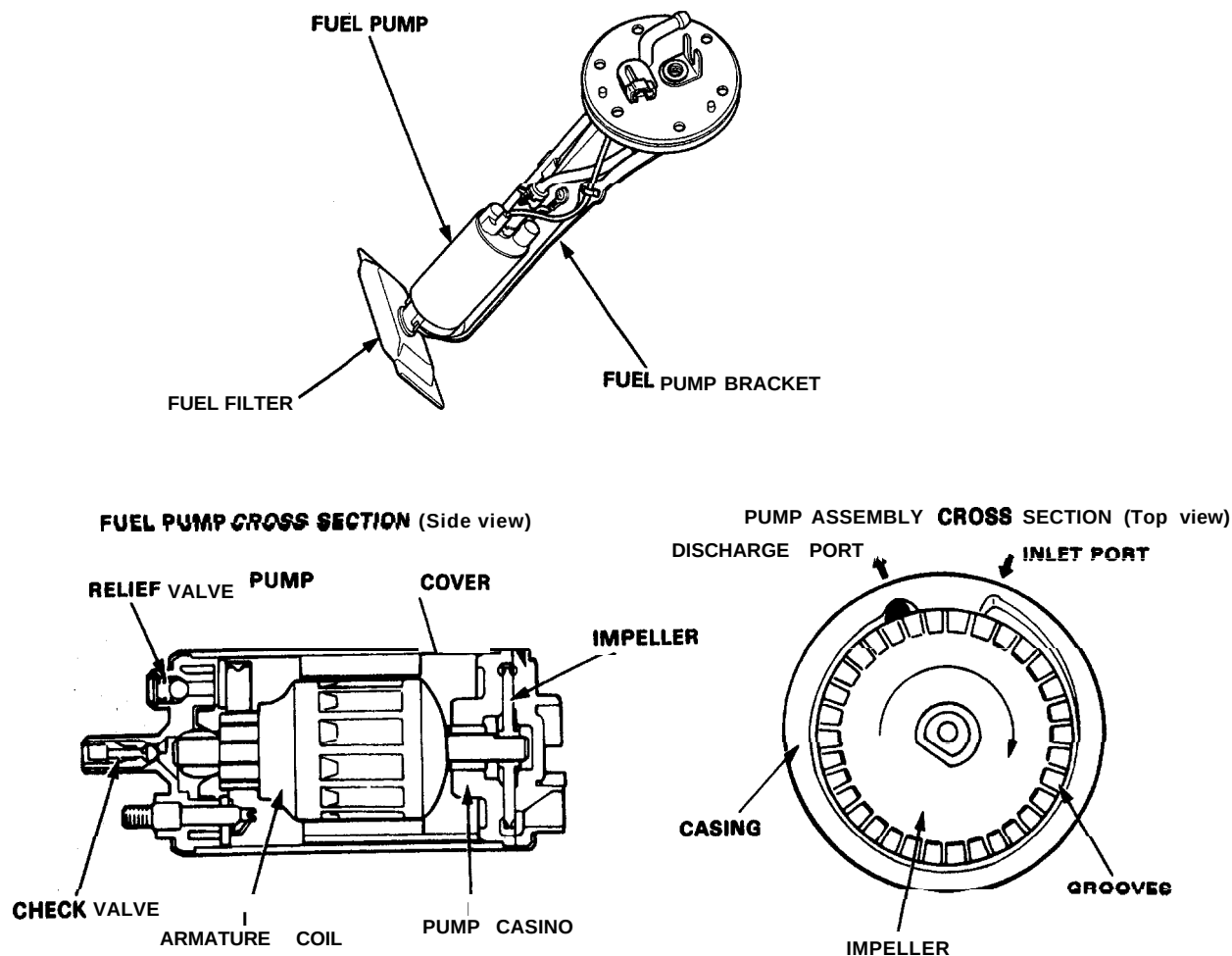


Fuel Supply System

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.



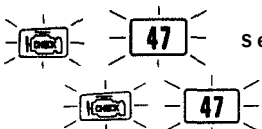
The fuel pump is comprised of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet port, and a discharge port. The pump assembly consists of the impeller (driven by the motor), the pump casing (which forms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

OPERATION

- (1) When the engine is started, the main relay actuates the pump, and the motor turns together with 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.



Troubleshooting Flowchart



Self-diagnosis Check Engine light indicates code 47: A problem in the fuel Pump circuit.

- Check Engine light has been reported on.
- With service check connector jumped (page 11-18), CODE 47 is indicated.

Do the ECU Reset Procedures (page 11-19).

Turn the ignition switch to START position.

Does the engine start?

YES

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

Is the check Engine light on and does it indicate CODE 47?

YES

(To page 1 I-I 00)

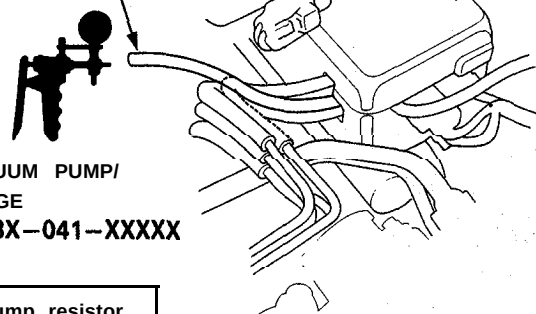
NO

Inspect the fuel pump resistor (page 11-108).

#4 HOSE

VACUUM PUMP/
GAUGE
A973X-041-XXXXX

CONTROL
BOX



Turn the ignition switch OFF.

Disconnect #4 hose from the install pipe, connect vacuum pump to the hose.

Apply vacuum 300 to 400 mmHg.

Start the engine

Hold engine speed at 6500 rpm for 10 seconds.

Is the check Engine warning light on and does it indicate CODE 47?

YES

(To page 1 I-I 100)

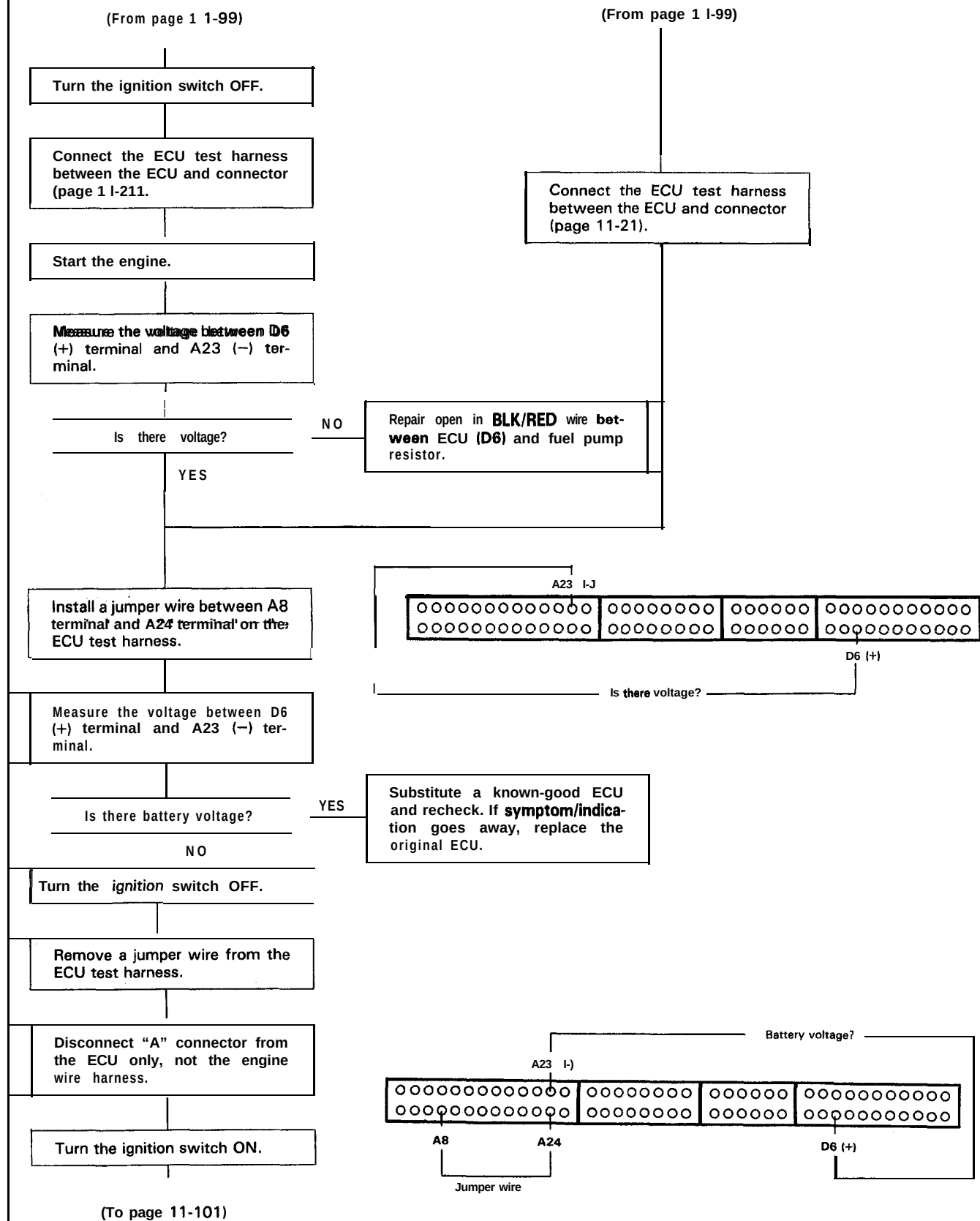
NO

Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at fuel pump, main relay, fuel pump relay and fuel pump resistor.

(cont'd)

Fuel Supply System

Fuel Pump (cont'd)





(From page 1 I-100)

Measure the voltage between A8 (+) terminal and A23 (-) terminal.

Is there battery voltage?

YES

Replace Fuel Pump Relay.

NO

Turn the ignition switch OFF.

Install a jumper wire between YEL (+) terminal and RED (-) terminal on the fuel pump relay connector.

Turn the ignition switch ON.

Measure the voltage between A8 (+) terminal and A23 (-) terminal.

Is there battery voltage?

YES

Replace fuel pump relay..

NO

Remove a jumper wire.

Measure the voltage between YEL (+) terminal (on the fuel pump relay connector) and body ground (-).

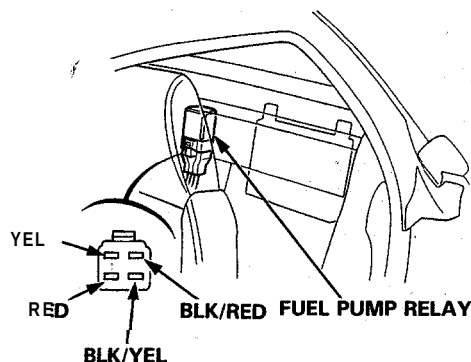
Is there battery voltage?

NO

Repair open in YEL wire between No. 5 fuse and fuel pump relay.

YES

Repair open in RED wire between ECU (A8) and fuel pump relay.



CAUTION:

*the "A" connector must be **disconnected** for this test or the ECU will be damaged.

(cont'd)

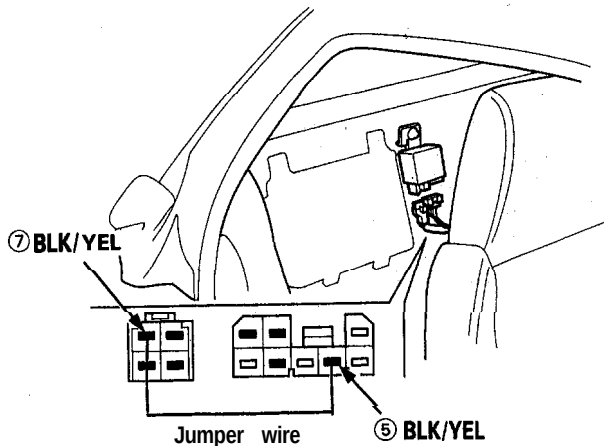
Fuel Supply System

Fuel Pump (cont'd)

Testing

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

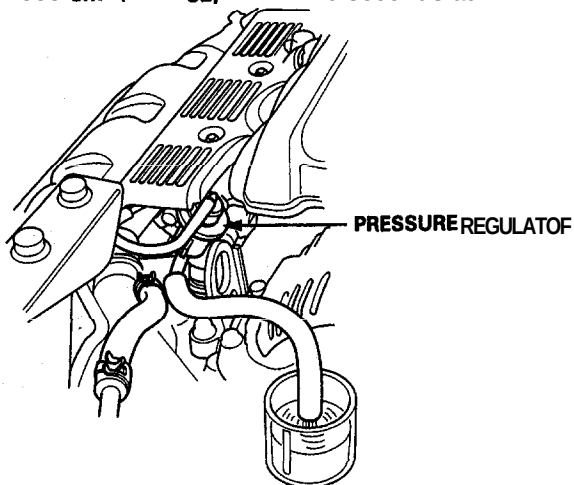
1. With the ignition switch OFF, disconnect the main relay connector.
2. Connect a jumper wire between the BLK/YEL wire ⑥ and BLK/YEL wire ⑦.



3. Relieve fuel pressure as described on page 1 I-87 then tighten the service bolt.
4. Disconnect the fuel return hose from the regulator.
5. Turn the ignition switch ON for 10 seconds and measure the amount of fuel flow.

Amount should be:

333 cm³ (11.2 oz) min. in 10 seconds at 12 V

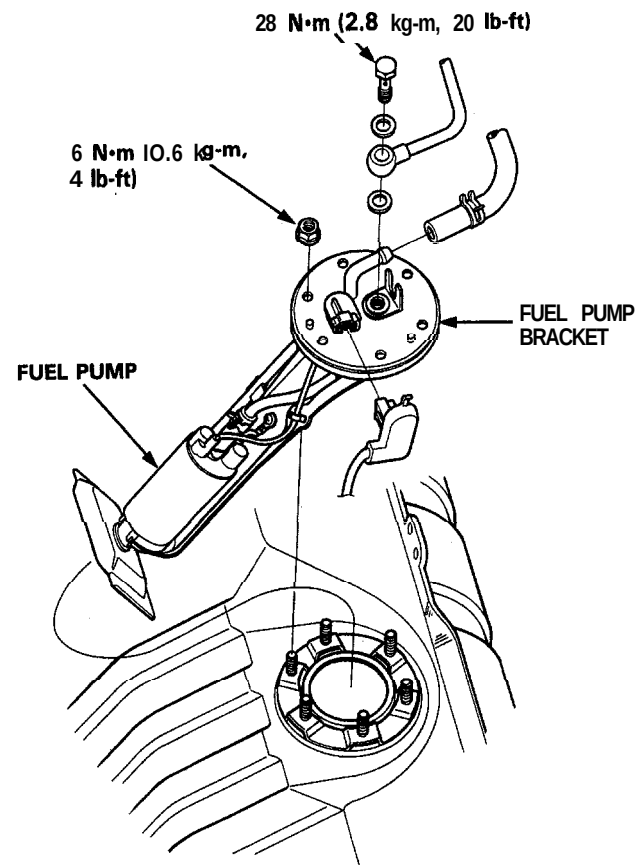


- If fuel flow is less than 333 cm³ (11.2 oz), or there is no fuel flow, check for:
 - Clogged fuel filter.
 - Clogged fuel line.
 - Pressure regulator failure (page 1 I-95).

Replacement

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

1. Remove the fuel tank (page 1 I-108).
2. Disconnect the connector from the fuel pump.
3. Remove the fuel pump mounting nuts.
4. Remove the fuel pump from the fuel tank.



Main Relay

Fuel Supply System

-Main Relay (cont'd)

Troubleshooting Flowchart

— Engine will not start
— inspection of main relay.

Disconnect the main relay connectors.

Measure the voltage between YEL/BLU terminal ① and body ground.

Is there battery voltage?

NO

Replace ACG fuse.

YES

Turn the ignition switch ON.

Measure the voltage between BLK/YEL terminal ⑥ and body ground.

Is there battery voltage?

NO

Replace No. 2 fuse.

YES

Measure the voltage between BLK/YEL terminal ⑥ and body ground.

Is there battery voltage?

NO

Replace IG COIL fuse.

YES

Turn the ignition switch START position.

Measure the voltage between BLK/WHT terminal ④ and body ground.

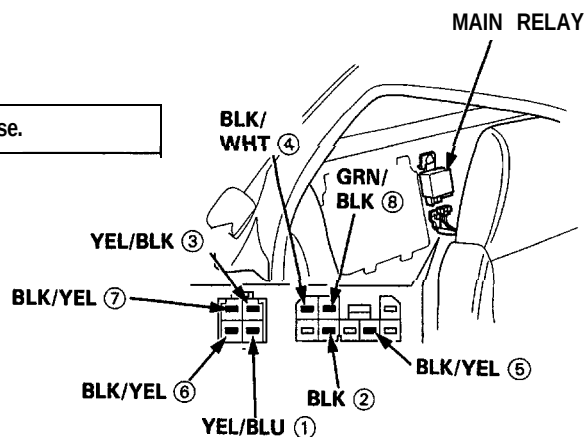
Is there battery voltage?

NO

Replace No. 7 fuse.

YES

(To page 1 I-105)





(From page 1 1 • 104)

Turn the ignition switch off.

Connect the ECU test harness between the ECU and connector. Disconnect "A" connector from the engine wire harness only, not the ECU (page 1 1-21).

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

Does continuity exist?

NO

Repair open in GRN/BLK wire between ECU (A71 and Main Relay.

YES

battery voltage?
n

A23 (-) A25 (+)



Turn the ignition switch ON.

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

Is there battery voltage?

NO

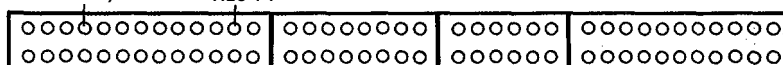
Replace main relay.

YES

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

1 v or less?

A7 (+) A23 (-)



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

NO

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

YES

Replace main relay.

Fuel Supply System

-Fuel Pump Resistor

Troubleshooting Flowchart

- Engine will not start.
- Inspection of fuel pump resistor.

Disconnect the fuel pump resistor connector.

Turn the ignition switch ON.

Measure the voltage between BLK/YEL (+) (on harness side) and body ground (-).

Is there battery voltage? (for 2 seconds)

NO

Inspect the main relay (page 11-104)

YES

Turn the ignition switch OFF.

Install a jumper wire between two terminals on the wire harness side of fuel pump resistor.

Turn the ignition switch to START position.

Does the engine start?

YES

Replace fuel pump resistor.

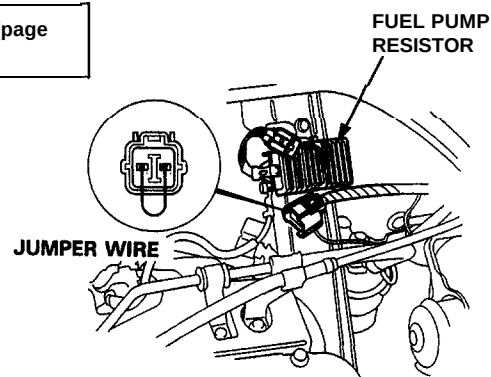
NO

Turn the ignition switch OFF.

Disconnect the fuel pump connector.

Turn the ignition switch ON.

(To page 11-107)





(From page 1 I-106)

Measure the voltage between
BLK/RED (+) (on wire harness
side of fuel pump) and body
ground.

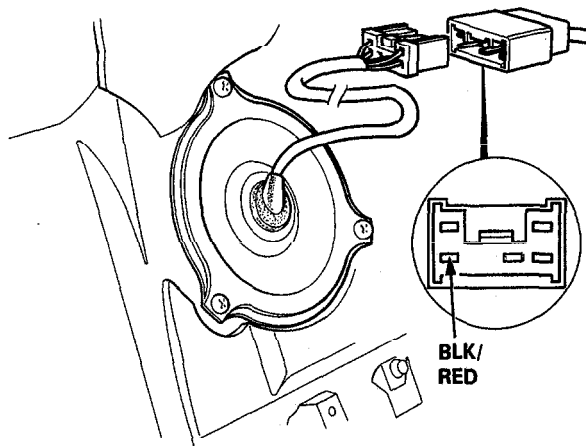
Is there battery voltage?
(for 2 seconds)

YES

Inspect the fuel pump
(page 1 I-102)

NO

Repair open in **BLK/RED** wire be-
tween the fuel pump resistor and
the fuel pump.



81-107-107

Fuel Supply System

- Fuel Tank

Replacement

⚠ WARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Make sure lifts are placed properly. (See page I-6.)

1. Raise the car.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove the center rod (Section 5).
4. Disconnect the M/T shift cable and M/T clutch cable or A/T shift cable from the transmission (Section 14).
5. Disconnect the 6P connector from the fuel tank.
6. Disconnect the hoses.

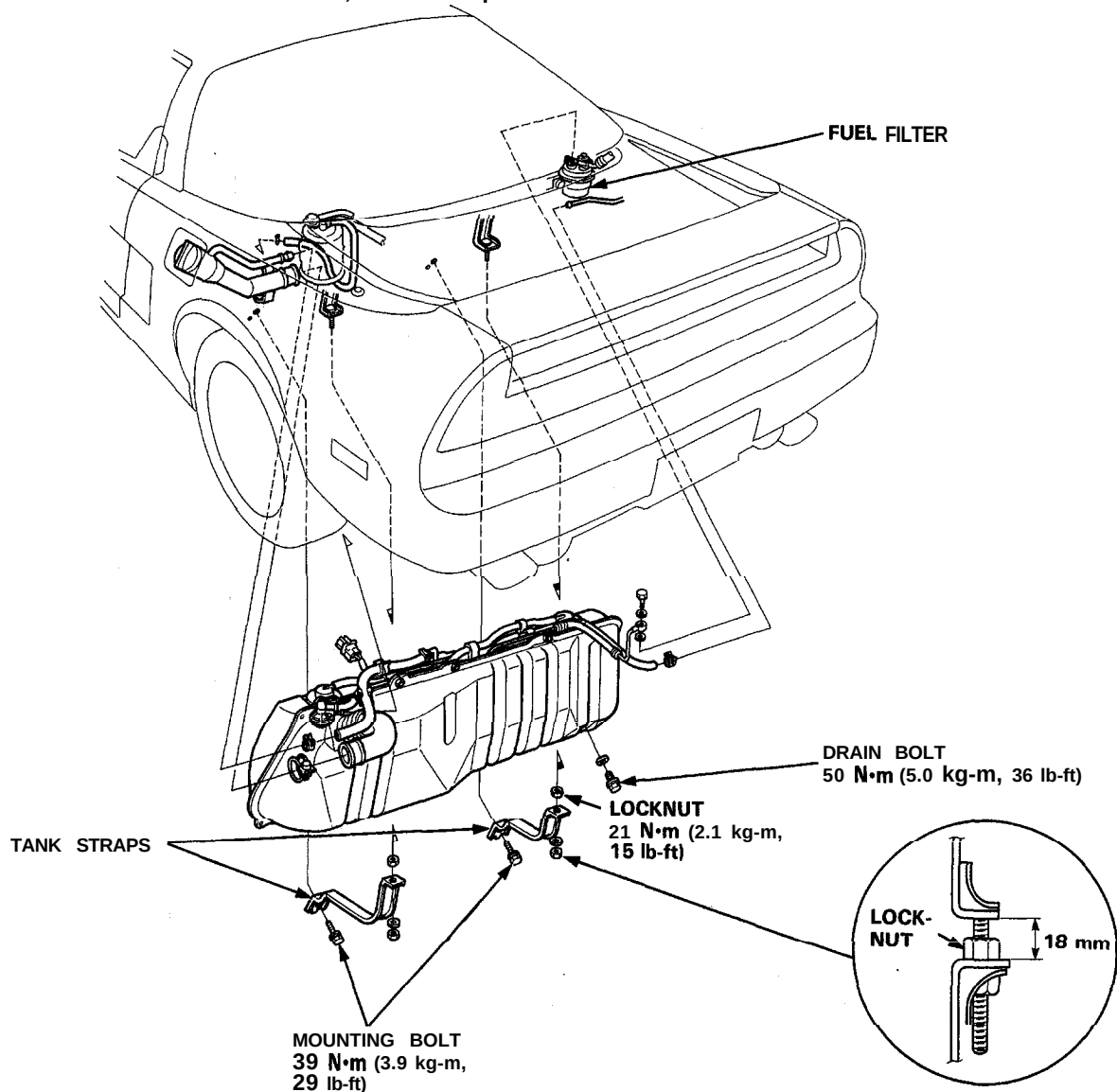
CAUTION:

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

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

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

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





10/10/2020

10/10/2020

Air Intake System

System Troubleshooting Guide

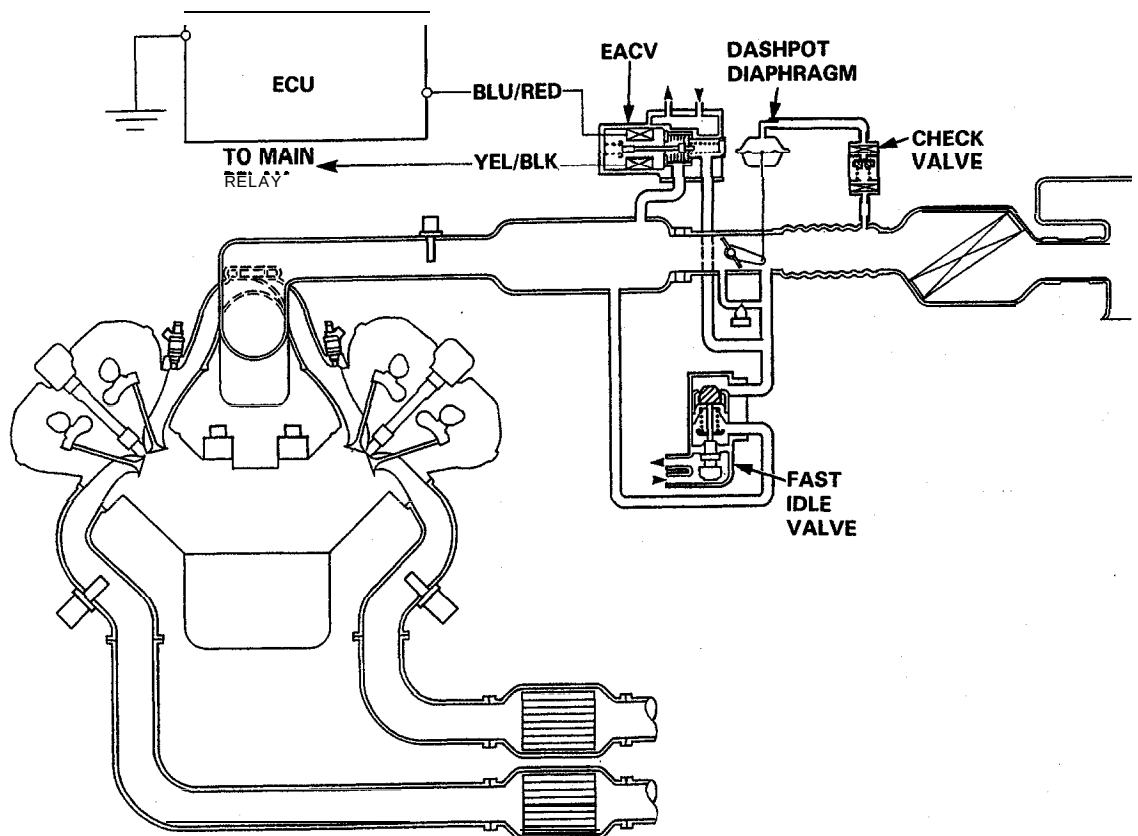
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows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

PAGE	SUB SYSTEM	THROTTLE CABLE	THROTTLE BODY	DASHPOT SYSTEM	CHAMBER VOLUME CONTROL SYSTEM
SYMPTOM		113	114	117	119
WHEN COLD FAST IDLE OUT OF SPEC		③	②		①
WHEN WARM RPM TOO HIGH		②	①	③	
LOSS OF POWER			①		②



System Description

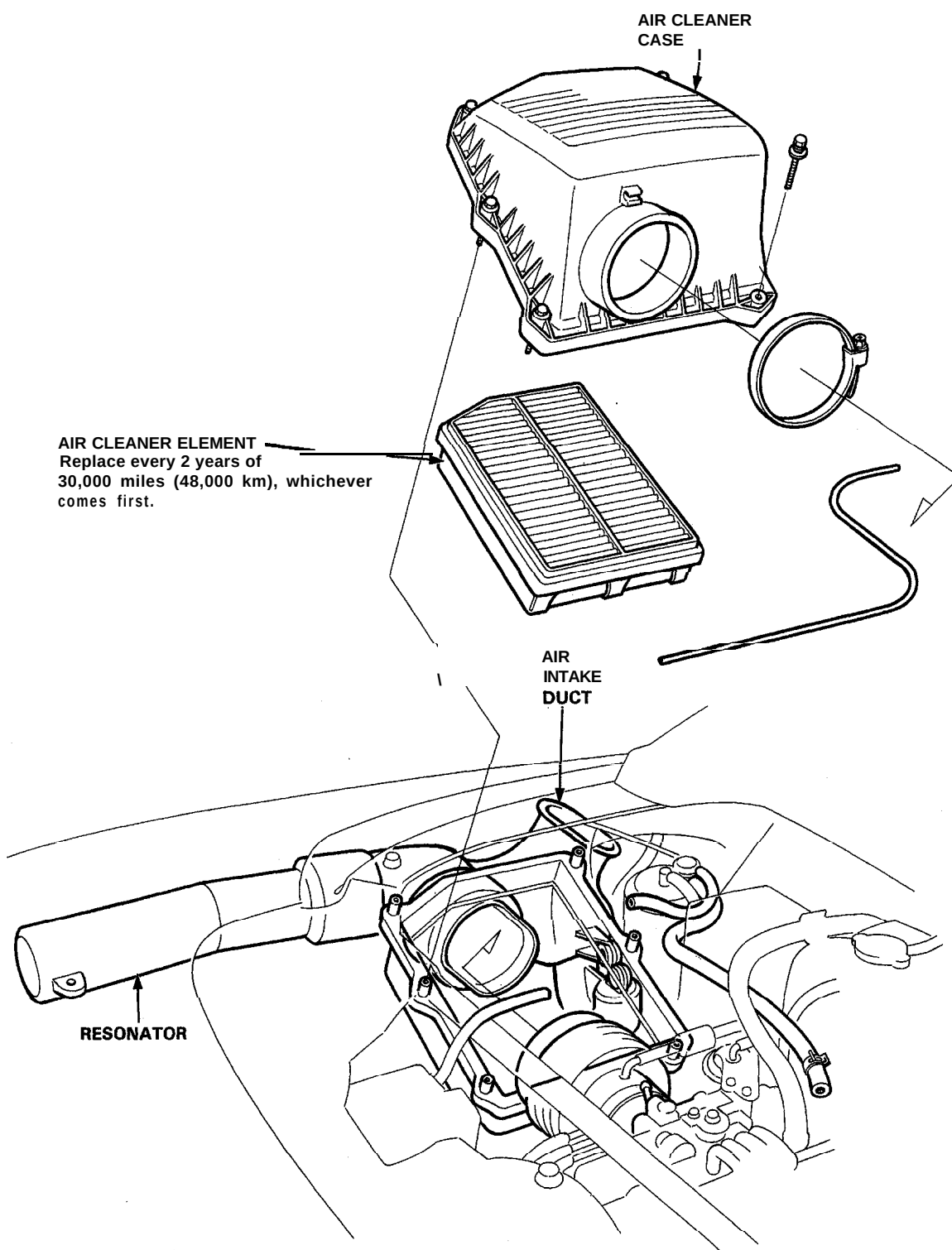
The system supplies air for all engine needs. It consists of the air cleaner, air intake pipe, throttle body, EACV, fast idle mechanism, and intake manifold. A resonator in the air intake pipe provides additional silencing as air is drawn into the system.



Air Intake System

Air Cleaner

Air Cleaner Element Replacement

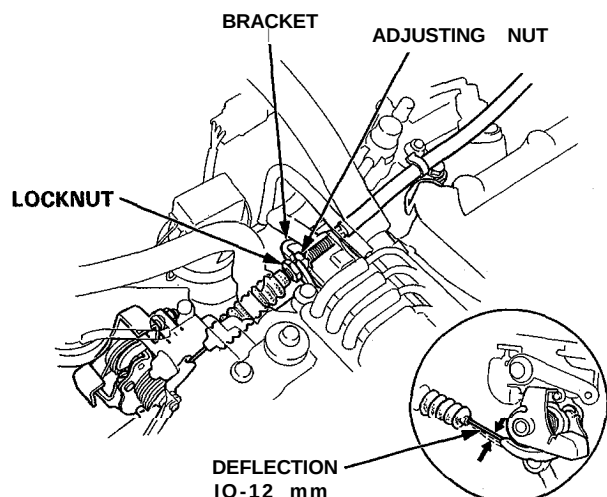




Throttle Cable

Inspection/Adjustment

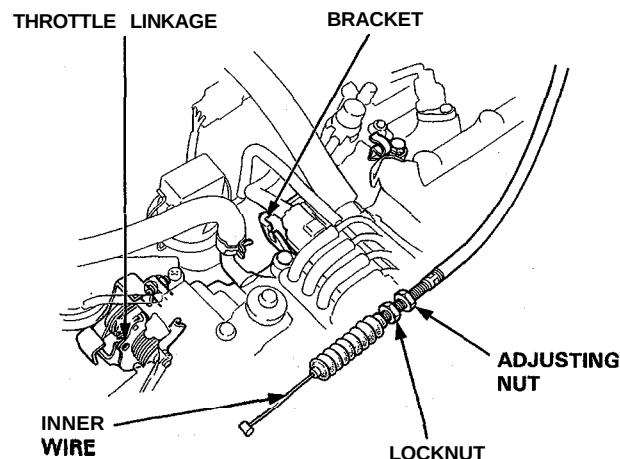
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10- 12 mm (0.39-0.47 in.)



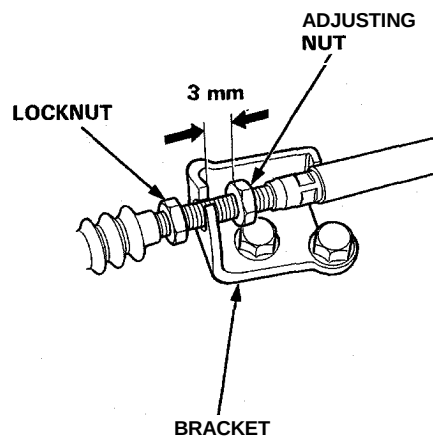
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure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

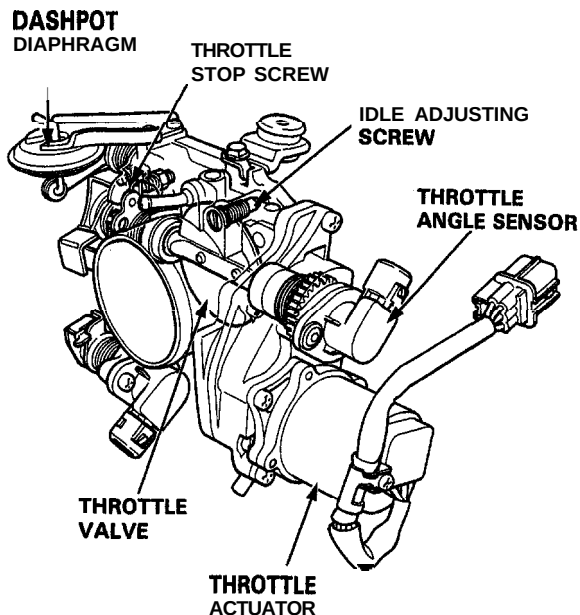


Air Intake System

Throttle Body

Description

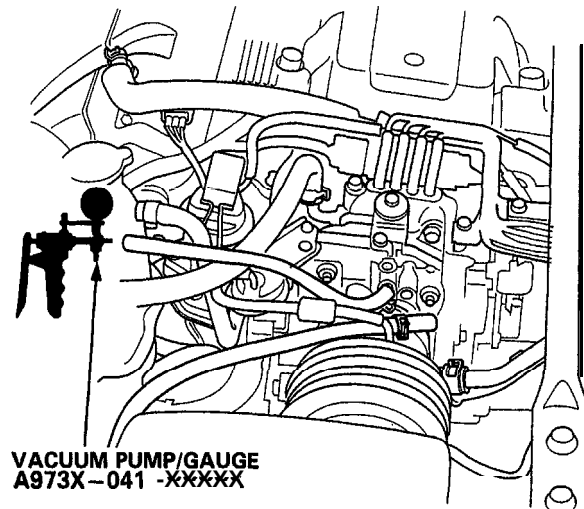
The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant which is fed from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the canister/purge port are located on the top of the throttle body. A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



Inspection

CAUTION: Do not adjust the throttle stop screw since it 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.

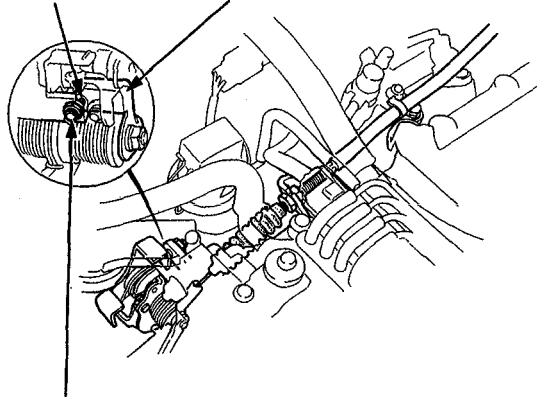


3. Allow the engine to idle and check that the gauge indicates no vacuum.
 - If there is vacuum, check the throttle cable (page 1 I-13).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
 - If the gauge indicates no vacuum, check the throttle body port. If 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.



There should be
no clearance.

THROTTLE LEVER



THROTTLE STOP SCREW.
(Non-adjustable)

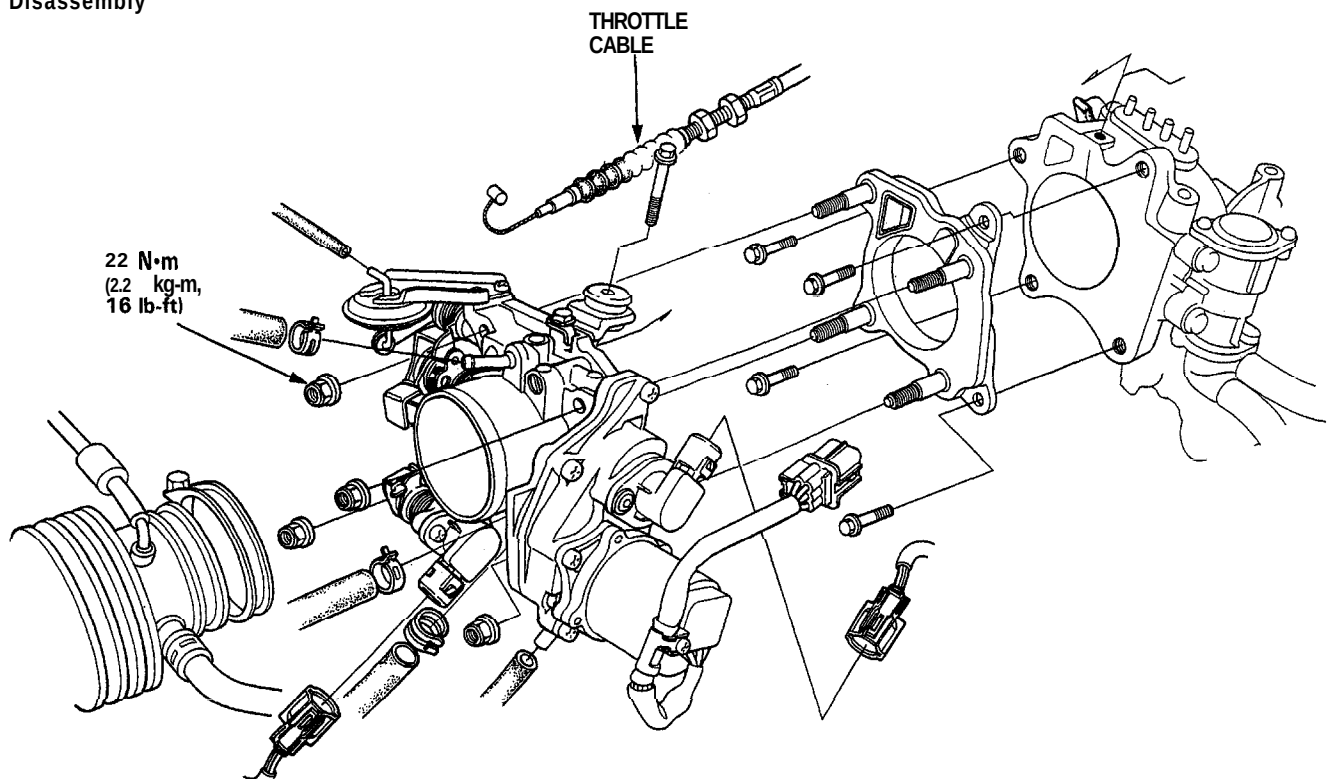
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

Air Intake System

-Throttle Body (cont'd)

Disassembly

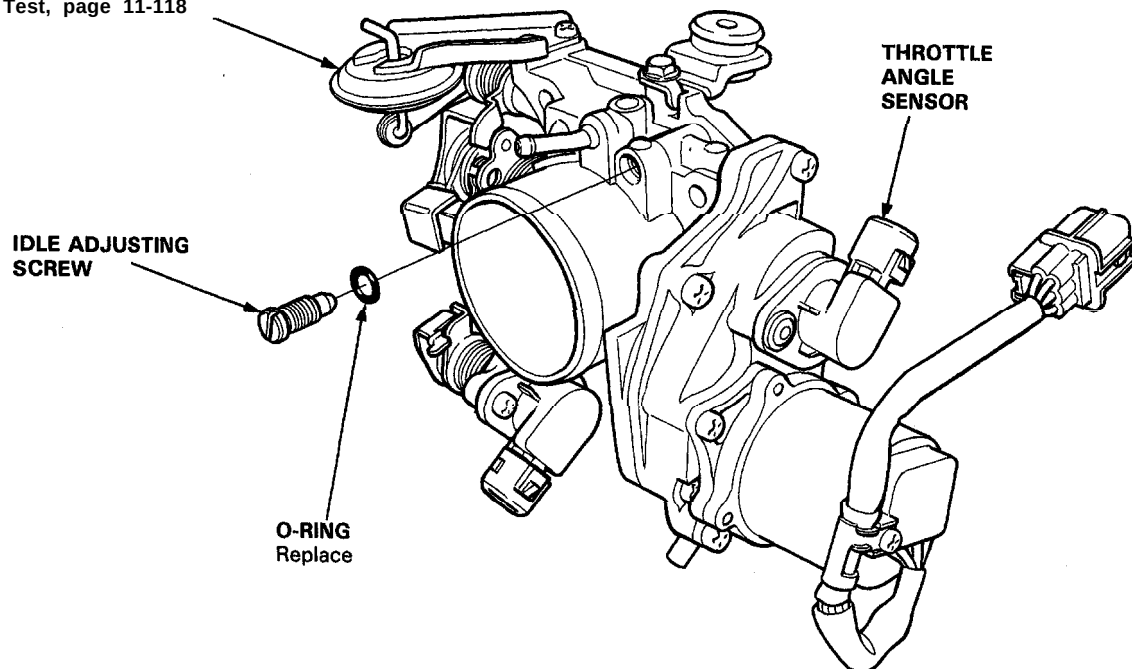


CAUTION:

- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (page 1 I-I 13).

DASHPOT DIAPHRAGM

Test, page 11-118

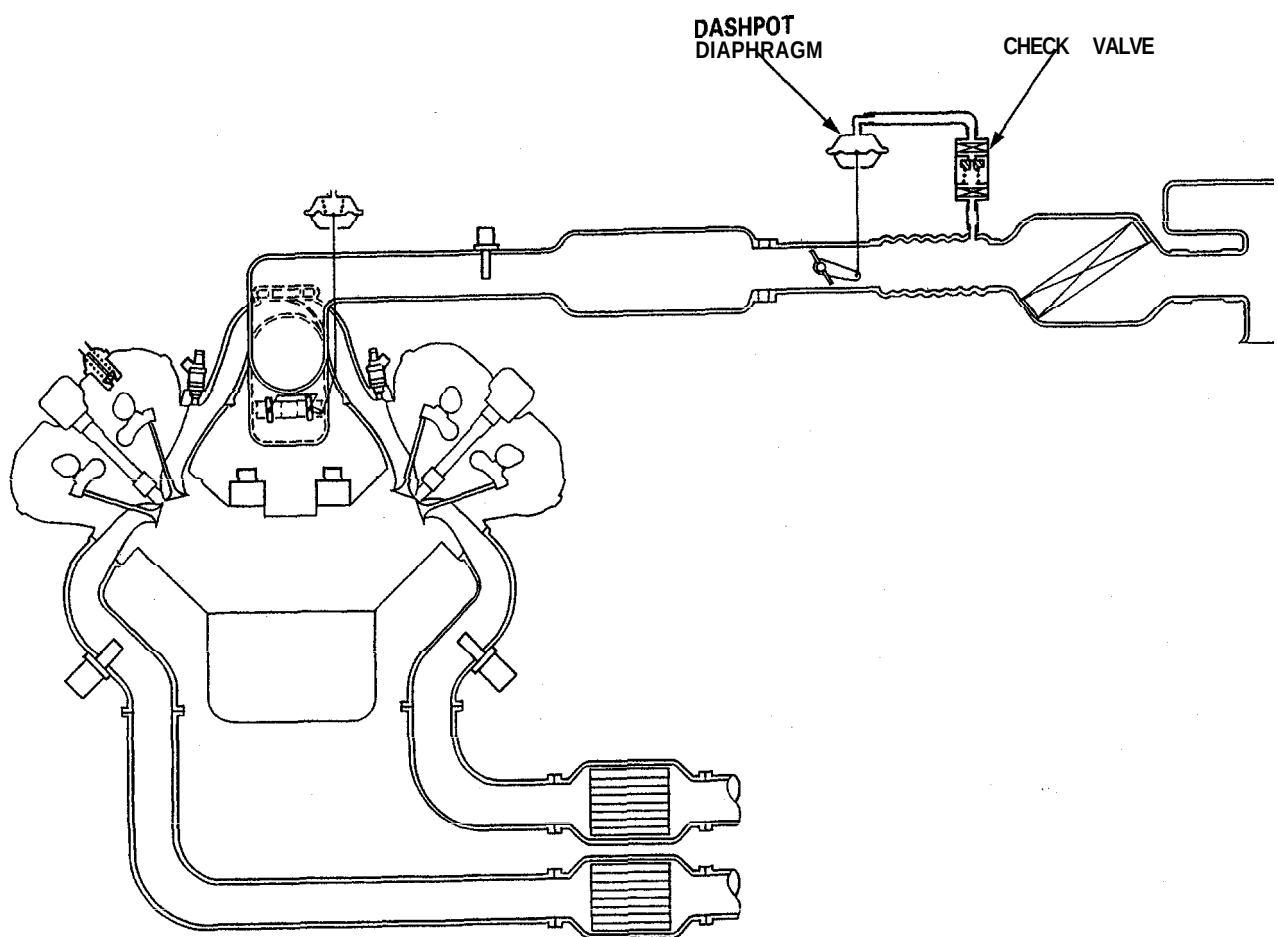




• Dashpot System

Description

The dashpot is employed to slow the closing of the throttle valve during gear shifting or deceleration.

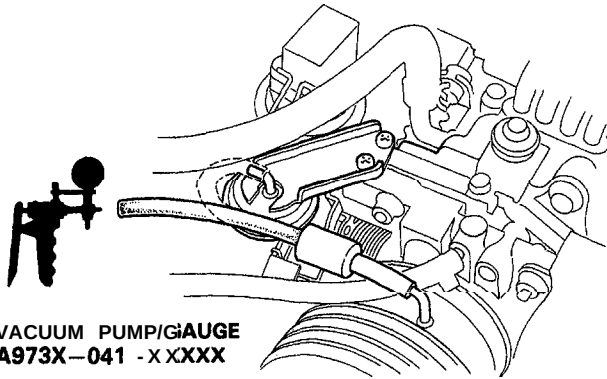


Air Intake System

Dashpot System

Testing

1. Check the vacuum line for leaks, blockage or a disconnected hose.
2. Disconnect the vacuum hose from the dashpot diaphragm, and connect a vacuum pump to the hose.

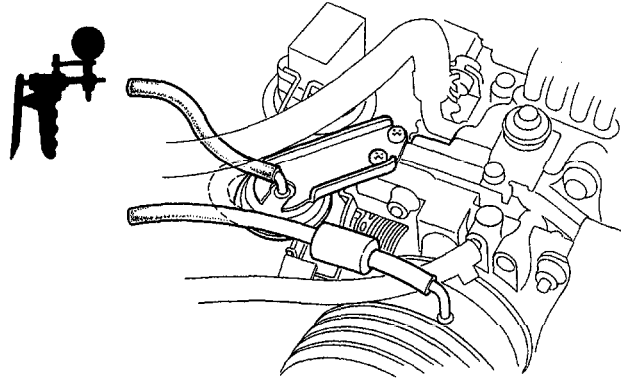


3. Apply vacuum and check the speed the vacuum goes out.

Vacuum should go out slowly.

- If the vacuum holds or goes out quickly, replace the dashpot check valve and retest.

4. Connect a vacuum pump to the dashpot diaphragm.



5. Apply vacuum and check that the rod pulls in and vacuum holds.

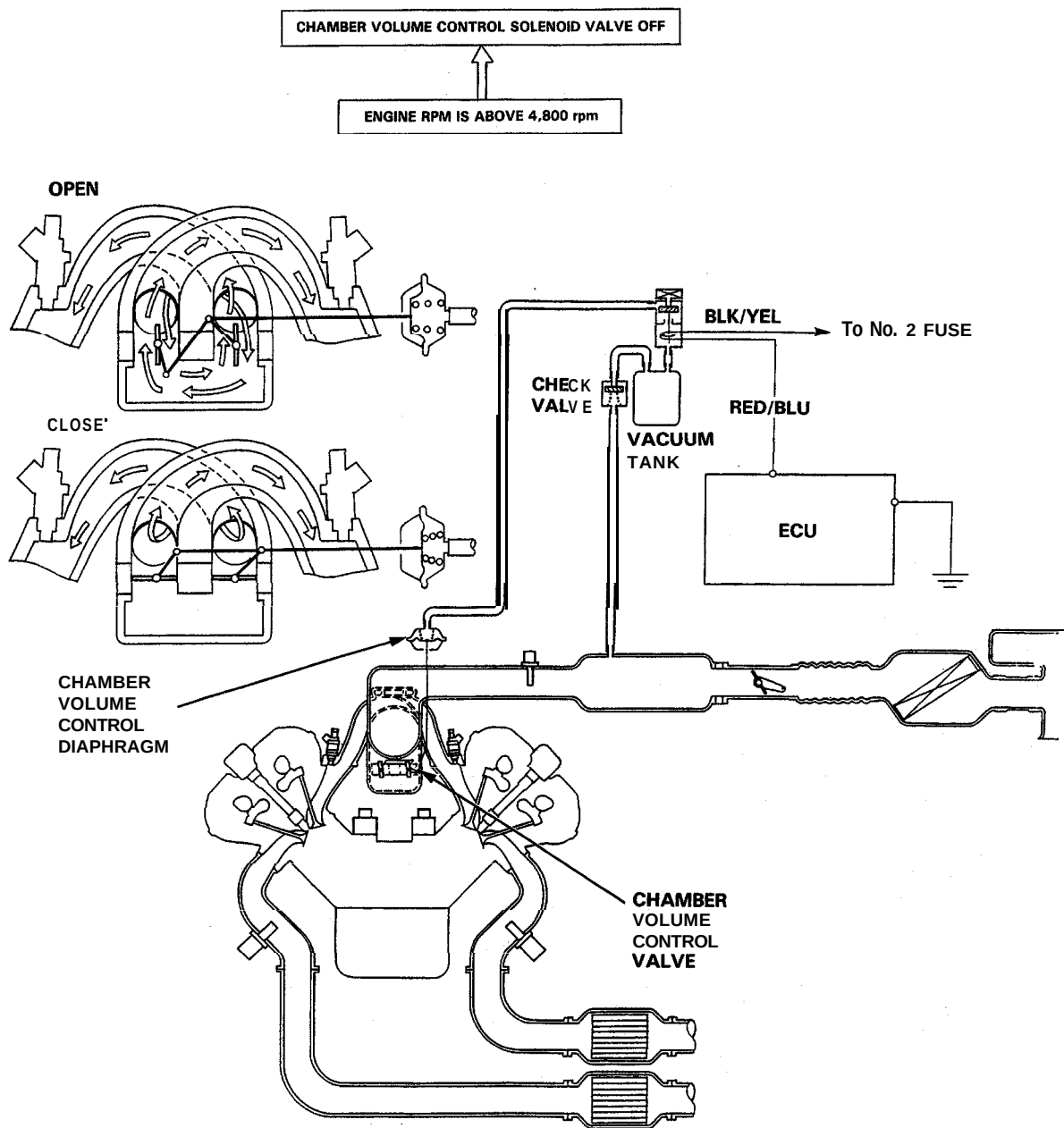
- If the vacuum does not hold or the rod does not move, replace the dashpot diaphragm and retest.



Chamber Volume Control System

Description

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



(cont'd)

Air Intake System

Chamber Volume Control System (cont'd)

Troubleshooting Flowchart

Inspection of Chamber Volume Control System.

Start engine and allow it to idle.

Remove # 3 vacuum hose from the chamber volume control diaphragm and connect vacuum gauge to the hose.

Is there vacuum?

YES

(To page 11-1211)

NO

Disconnect the lower hose on chamber volume control solenoid valve in the control box and connect a vacuum gauge to the hose.

Is there vacuum?

YES

Disconnect the 6P connector from the control box.

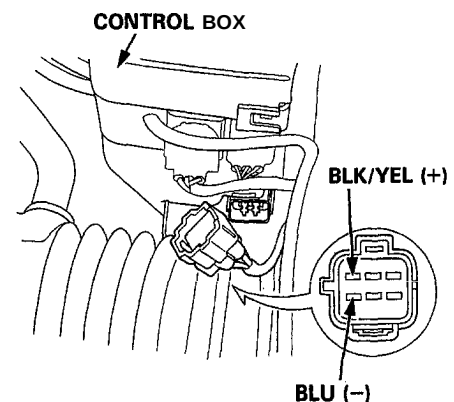
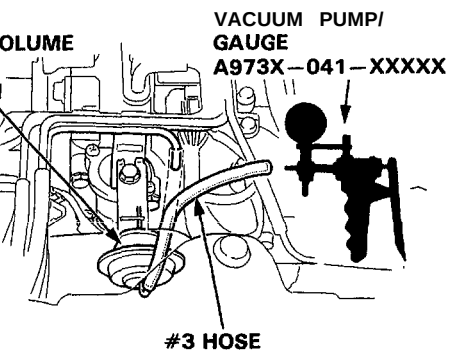
Measure voltage between BLK/YEL (+) terminal and BLU (-) terminal.

Is there battery voltage?

NO

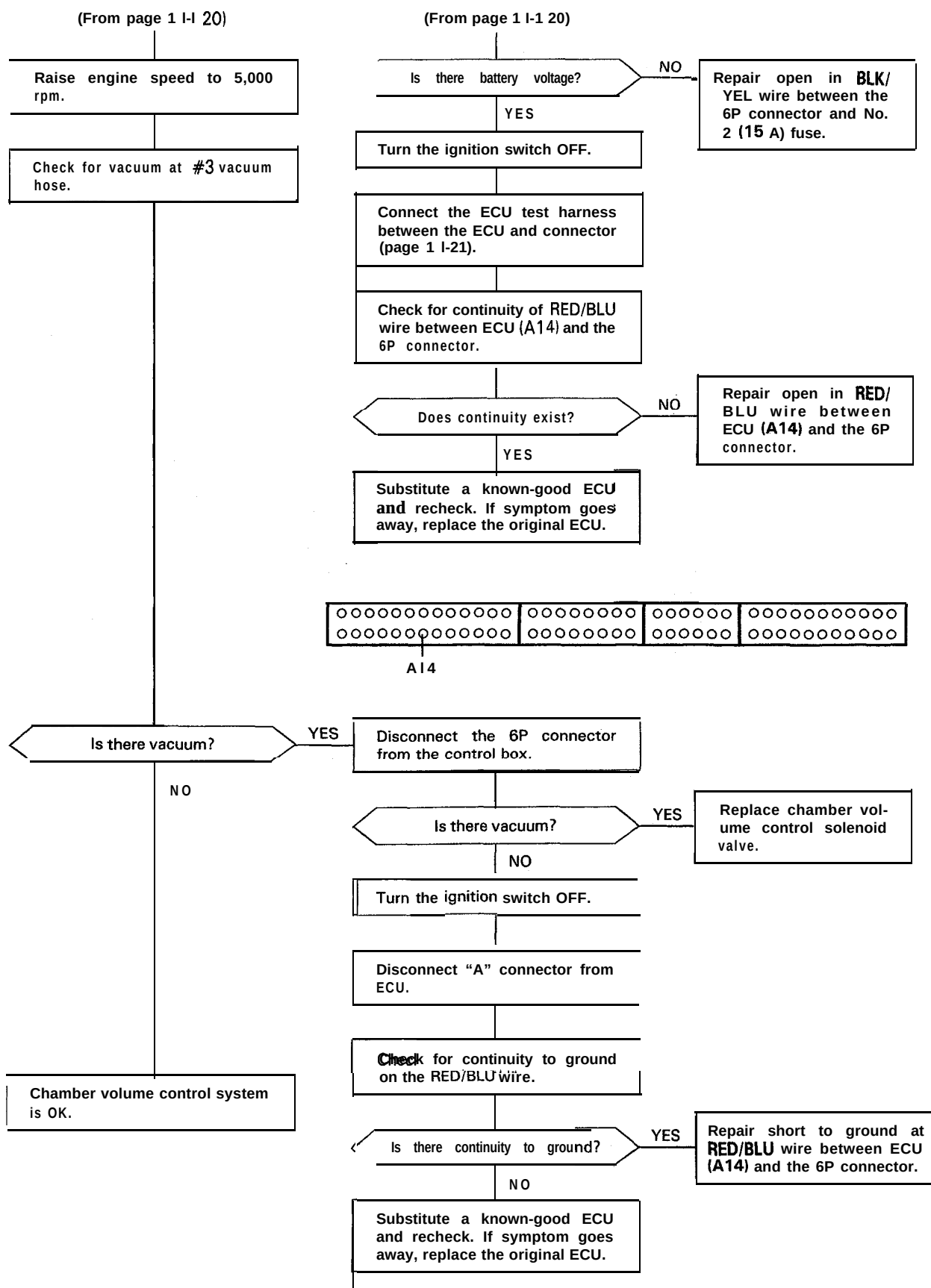
Measure voltage between BLK/YEL (+) terminal and body ground.

(To page 11-121)



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

Replace the chamber volume control solenoid valve.

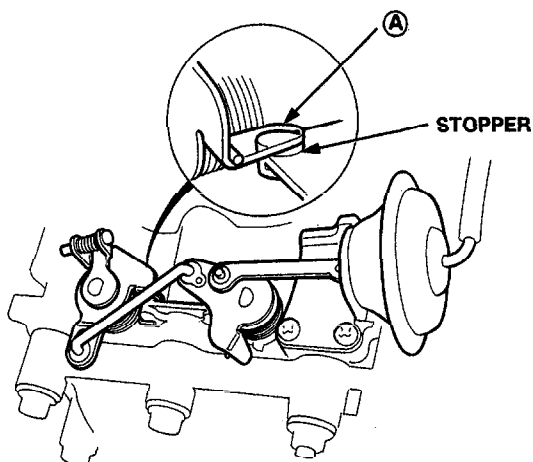


Air Intake System

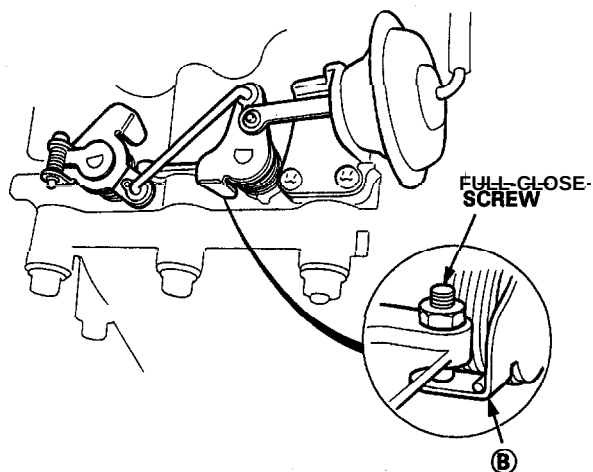
Chamber Volume Control Valve Test

CAUTION: Do not adjust the chamber volume control valve full-close screw. It was preset at the factory.

1. Check the chamber volume control valve shaft for binding or sticking.
2. Check the chamber volume control valve for smooth movement.
3. Check the A of the chamber volume control valve is in close contact with the stopper when the bypass valve is fully open.



4. Check that B of the chamber volume control valve is in close contact with the full-close screw when the valve is fully closed.

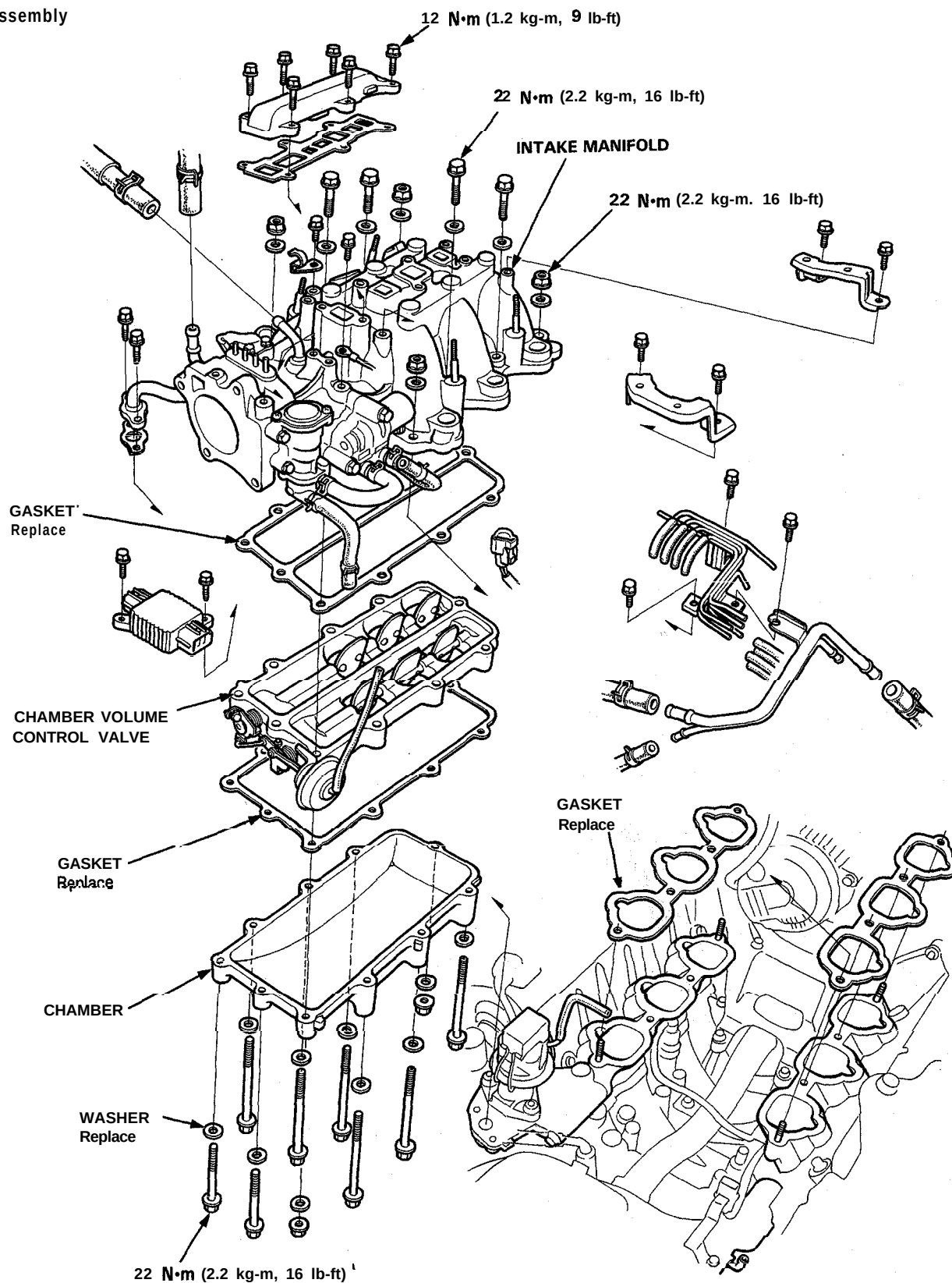


- If any fault is found, clean the linkage and shafts with carburetor cleaner.
- If the problem still exists after cleaning, disassemble the intake manifold and check the chamber volume control valve (page 1 I-I 23).



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	EGR SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
SYMPTOM			126	128	134	135
ROUGH IDLE				①	②	
FREQUENT STALLING AFTER WARM- ING UP POOR PERFORMANCE	AFTER WARM- ING UP			①		
	FAILS EMISSION TEST		①	③		②
	LOSS OF POWER		①	②		



— System Description —

The emission control system includes a three-way catalytic converter, exhaust gas recirculation (EGR) system, crankcase ventilation 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.

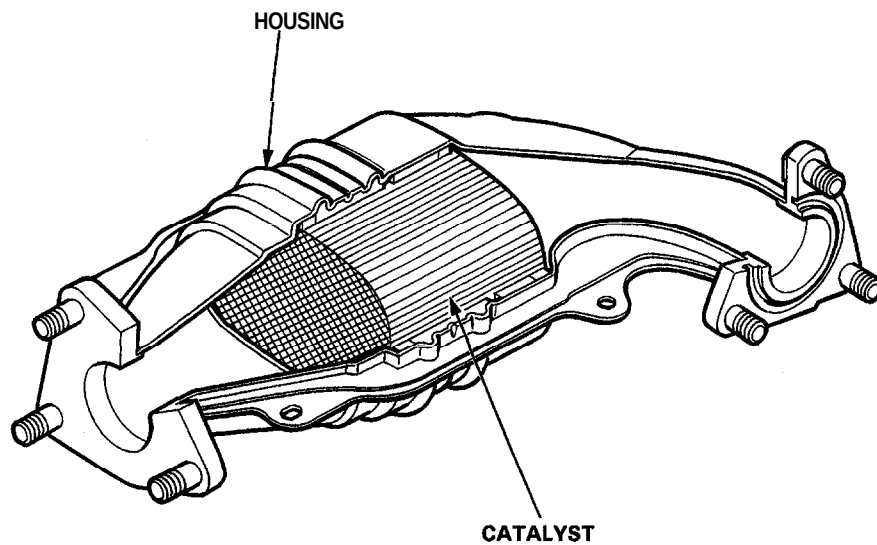
1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 1 I-84).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

CO meter should indicate 0.1 % maximum.

■ Catalytic Converter

Description

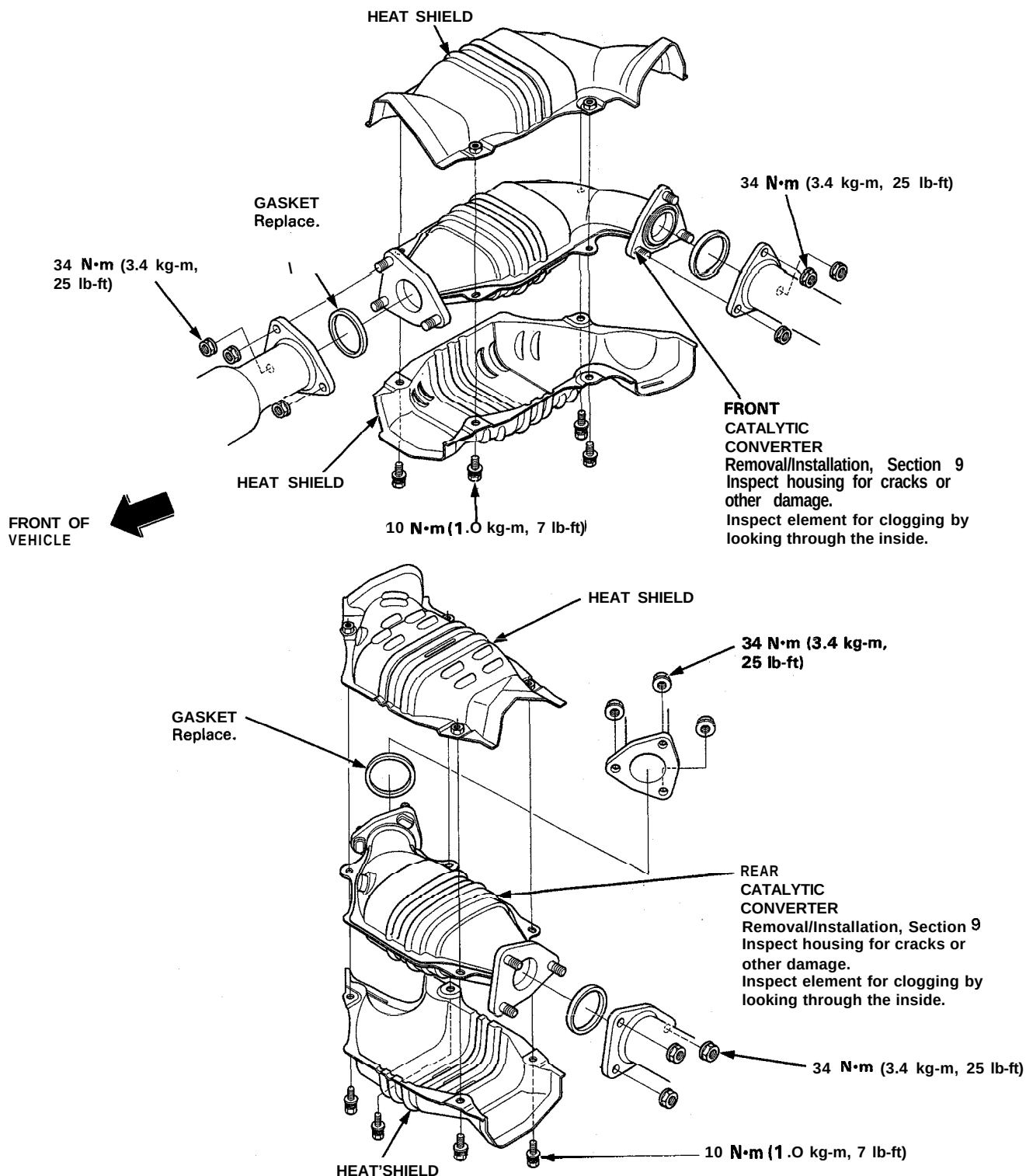
The d-way catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO₂), dinitrogen (N₂) and water vapor





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.



Emission Control System

-Exhaust Gas Recirculation System

Troubleshooting Flowchart

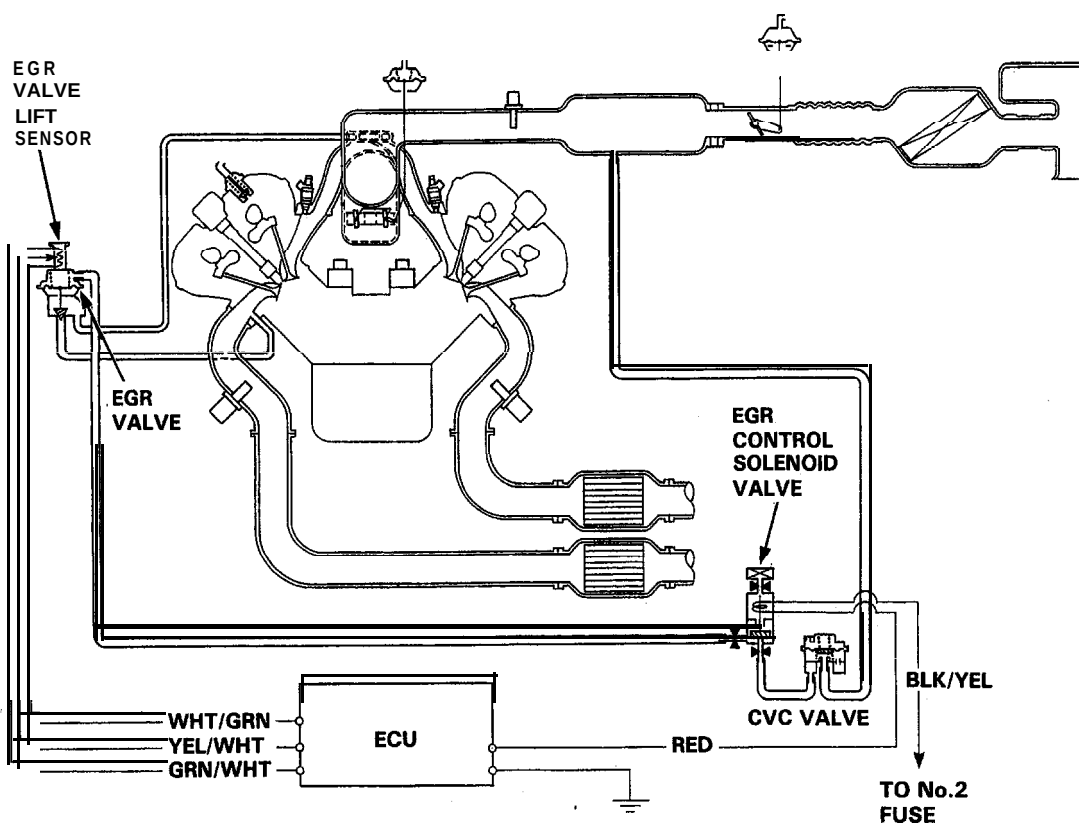


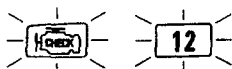
12

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, PGM-FI ECU and various sensors.

The ECU contains memories for 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.





- Check Engine light has been reported on.
- With service check connector jumped (page 1 I-18), CODE 12 is indicated.

Do the ECU Reset Procedures (page 1 I-19).

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. Try to keep the engine speed in the 1700—2600 range.

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

NO

Intermittent failure, system is OK at this time.
Check for poor connections or loose wires at EGR valve C141, and control box C532.

YES

With the engine at idle, disconnect the #5 hose from the EGR valve and connect a vacuum pump/gauge to the hose.

Is there any vacuum?

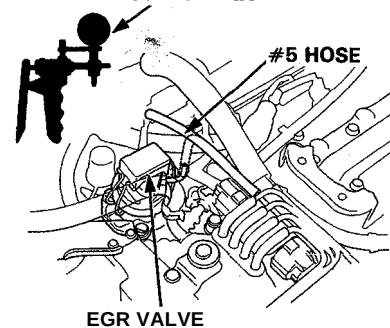
YES

Disconnect 8P connector from the control box and check the #5 hose for vacuum again.

NO

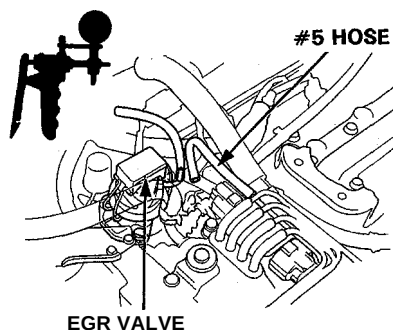
Move the vacuum pump/gauge to the EGR valve.

VACUUM
PUMP/GAUGE
A973X-041-XXXXX



#5 HOSE

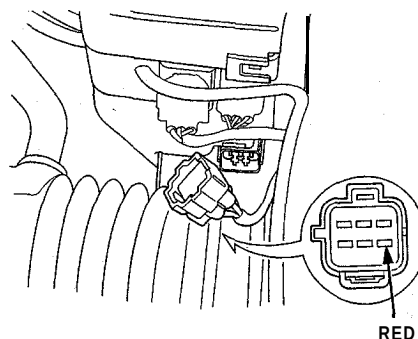
EGR VALVE



#5 HOSE

EGR VALVE

(To page 1 I-I 27)



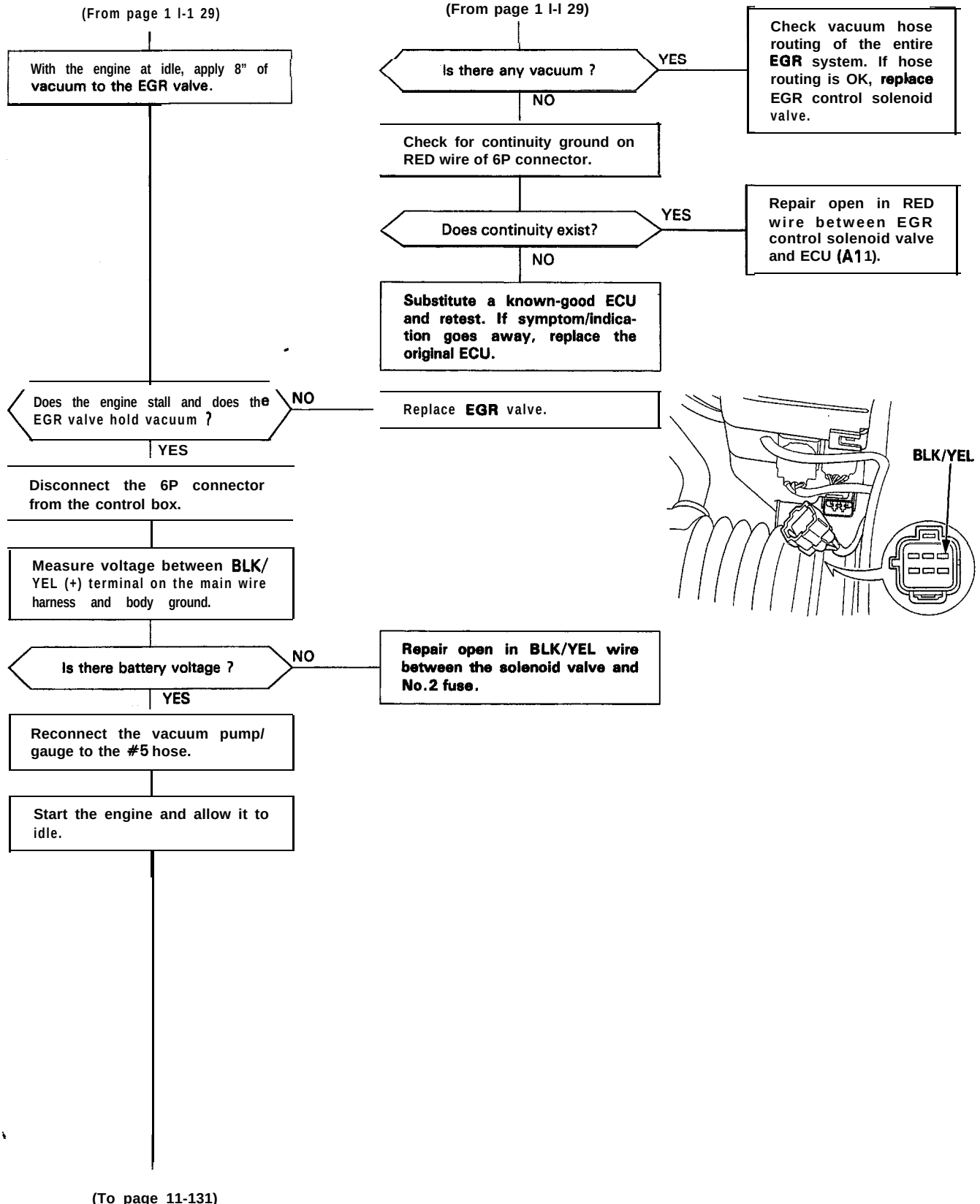
RED

(To page 11-127)

(cont'd)

Emission Control System

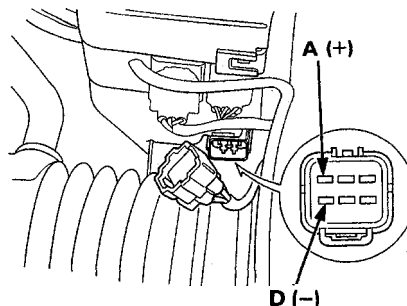
- Exhaust Gas Recirculation System (cont'd)





(From page 1 I-I 30)

Connect the battery positive terminal to the A terminal of the 6P connector. While watching the vacuum gauge, connect the battery negative terminal to the D terminal.



Is there approx. 8" within 1 second?

NO

Turn the ignition switch OFF and inspect the #1 and #5 hoses for leaks, restrictions, or misrouting.

YES

Turn the ignition switch OFF and reconnect the 6P connector.

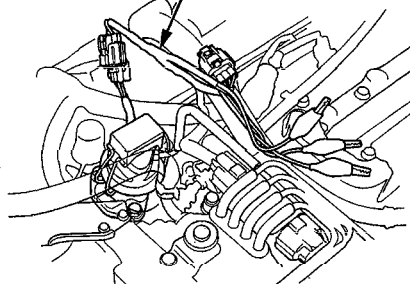
Are the hoses OK?

NO

Connect as necessary.

YES

TEST HARNESS
07LAJ-PT30200



EGR
CONTROL
SOLENOID
VALVE

CVC VALVE

VACUUM PUMP/
GAUGE
A973X-041-XXXXX

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 6" - 10" of vacuum?

NO

Replace CVC valve.

YES

Replace the EGR control solenoid valve.

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

Turn the ignition switch ON.

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

Is there approx. 5 V?

NO

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

YES

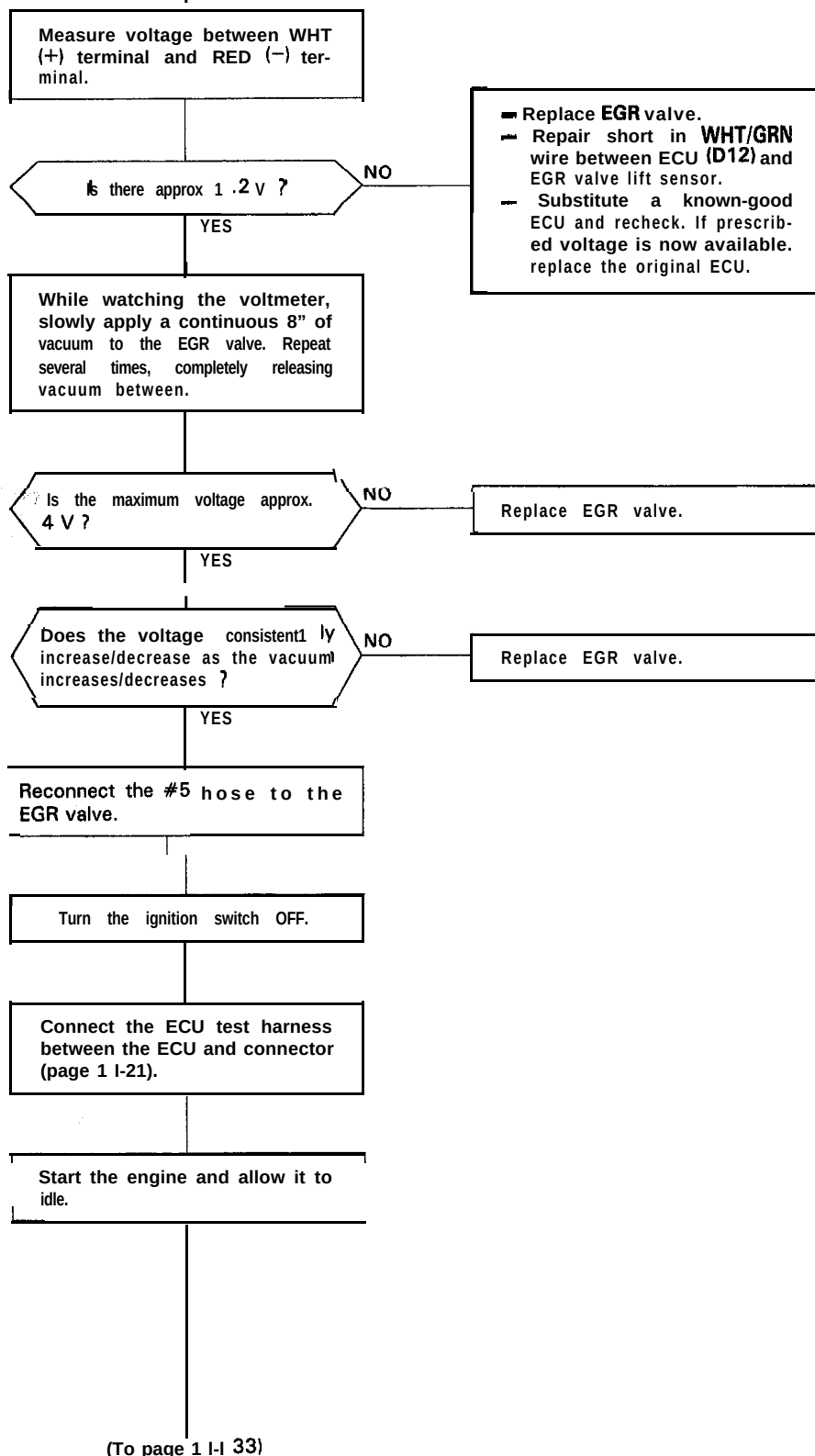
(To page 1 I-I 32)

(cont'd)

Emission Control System

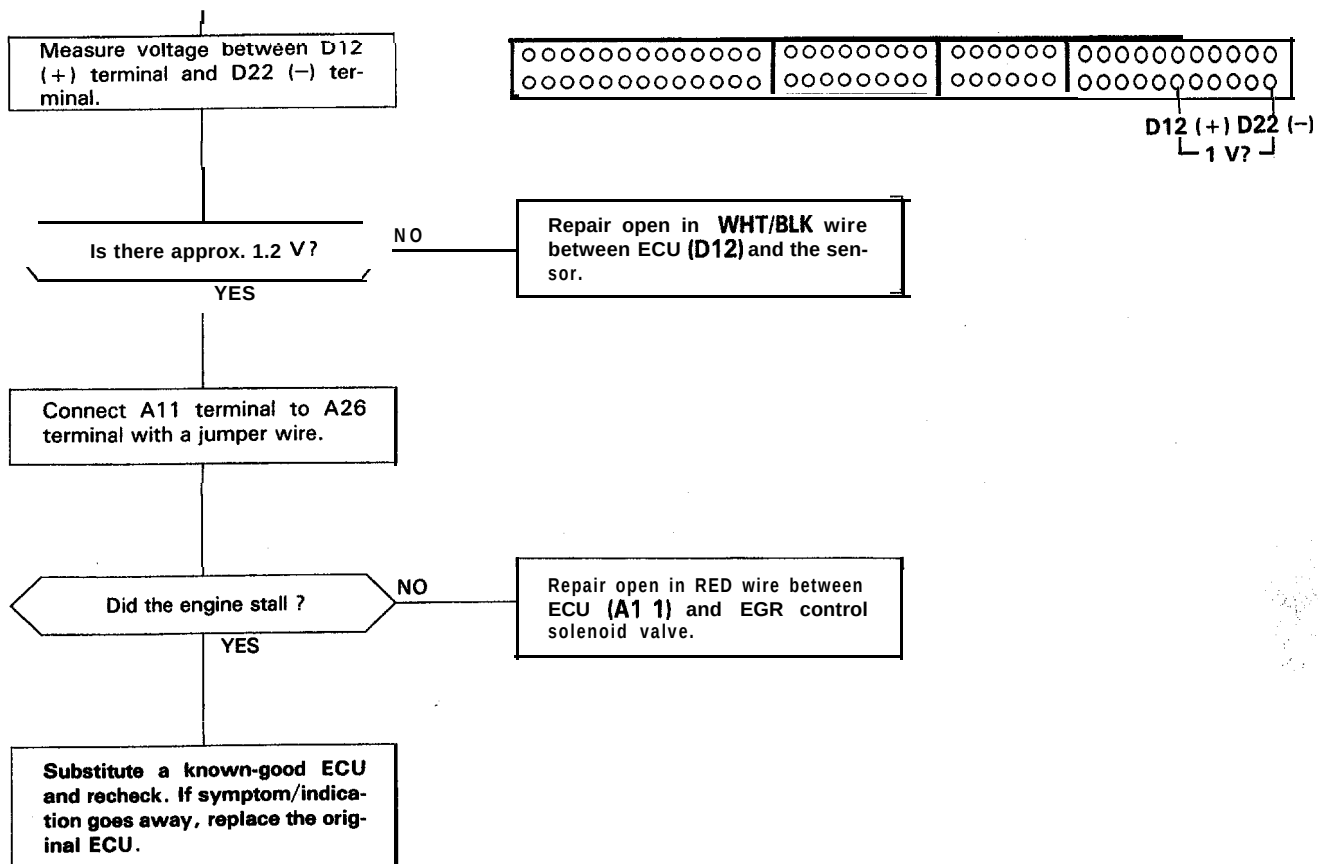
Exhaust Gas Recirculation System (cont'd)

(From page 1 I-I 31)





(From page 1 I-I 32)

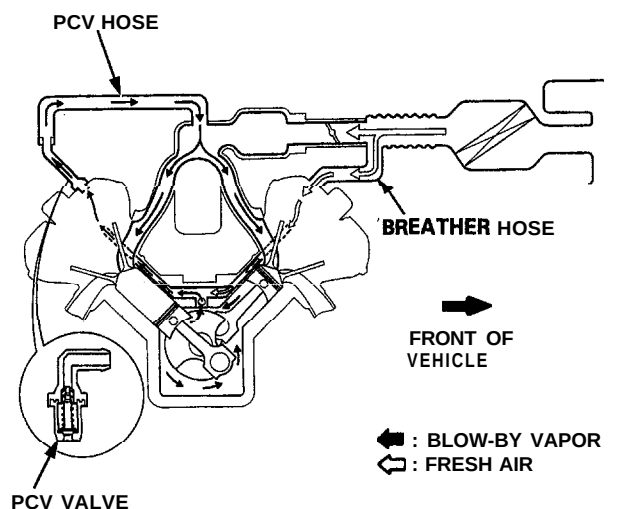


Emission Control System

- Positive Crankcase Ventilation System

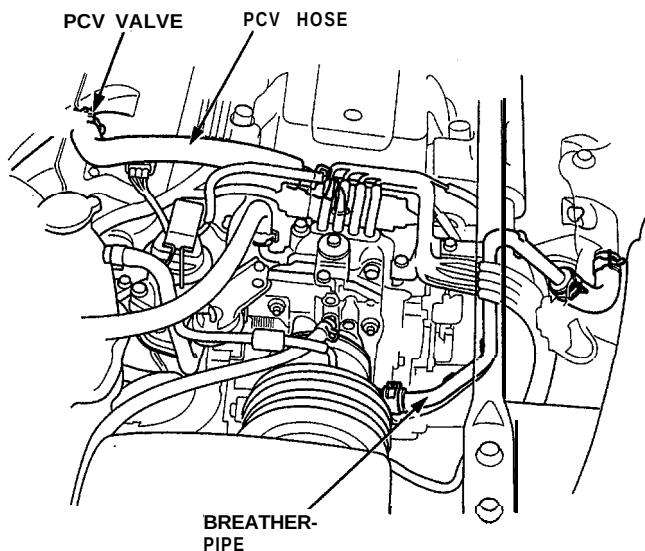
Description

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.

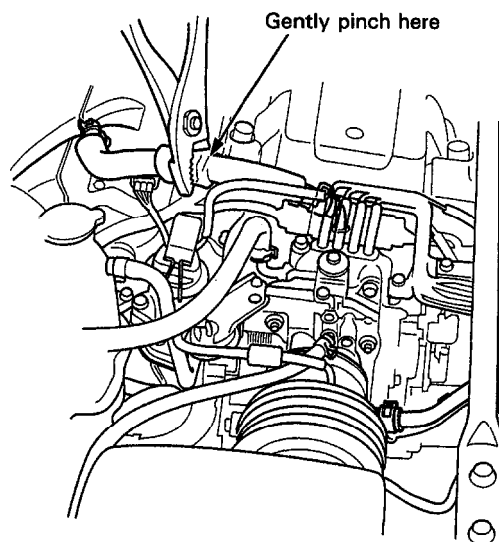


Inspection

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.



~ Evaporative Emission Controls

Description

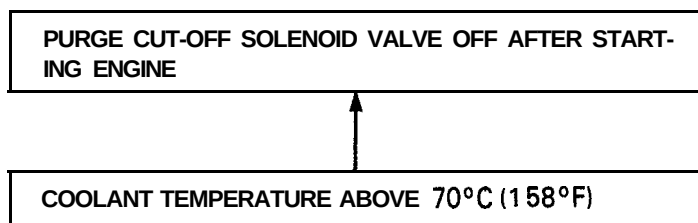
The evaporative *controls* are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

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 cut-off solenoid valve.

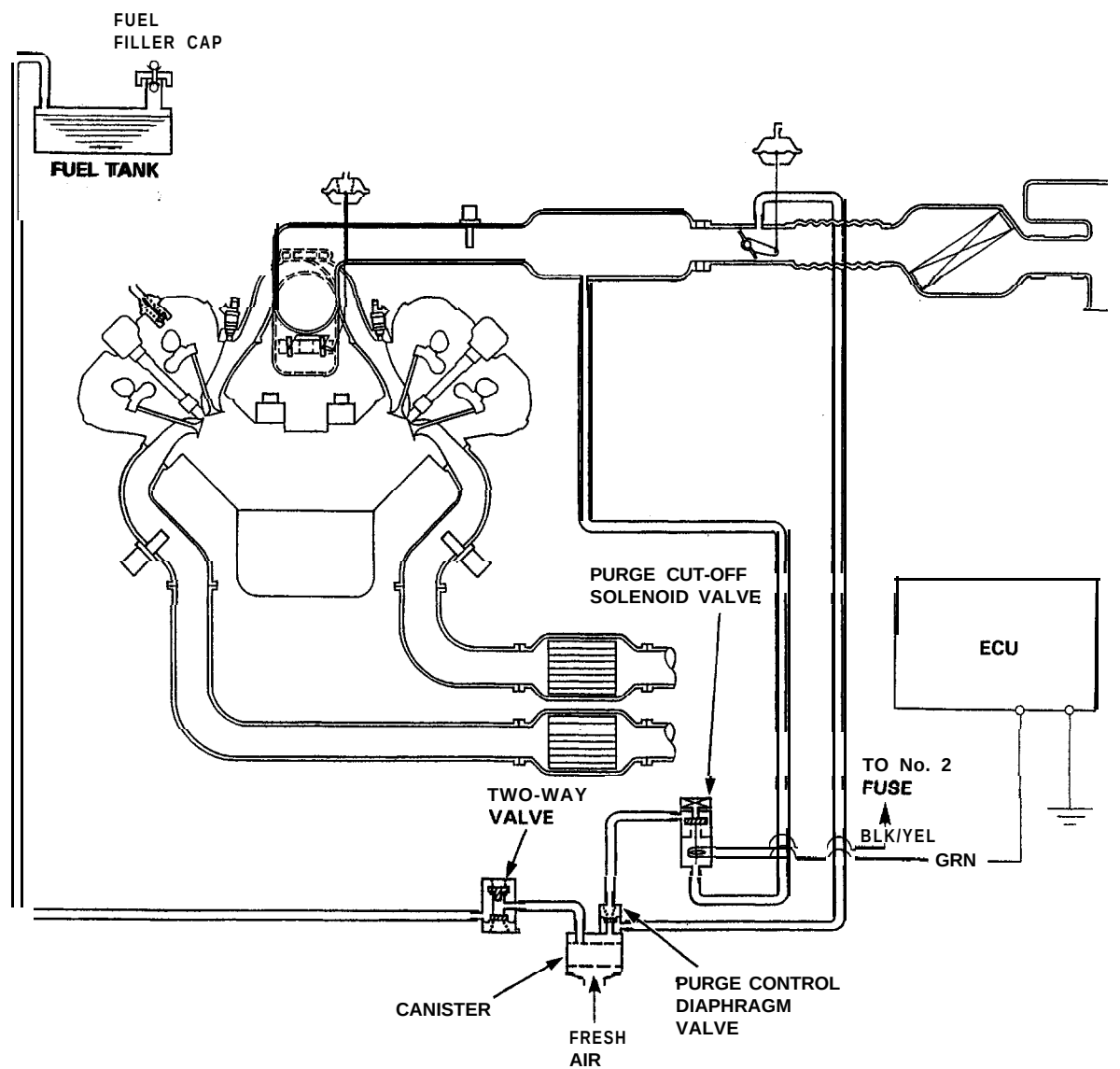


C. Fuel Tank Vapor Control System

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)

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).

Is there vacuum ?

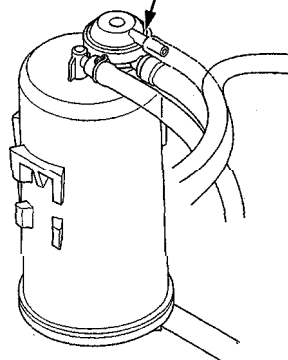
NO

(To page 1 I-I 38)

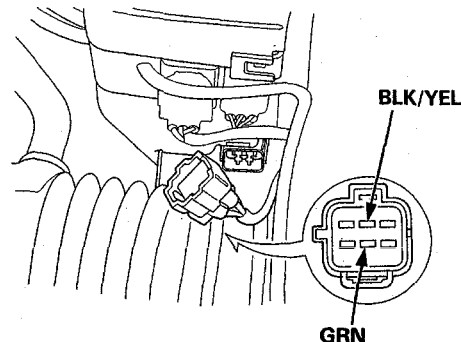
YES

Disconnect the 6P connector.

PURGE CONTROL
DIAPHRAGM VALVE



VACUUM PUMP/GAUGE
A973X-041 -XXXXX



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

Is there battery voltage ?

YES

Inspect vacuum hose routing.
If OK, replace purge cut-off solenoid valve.

NO

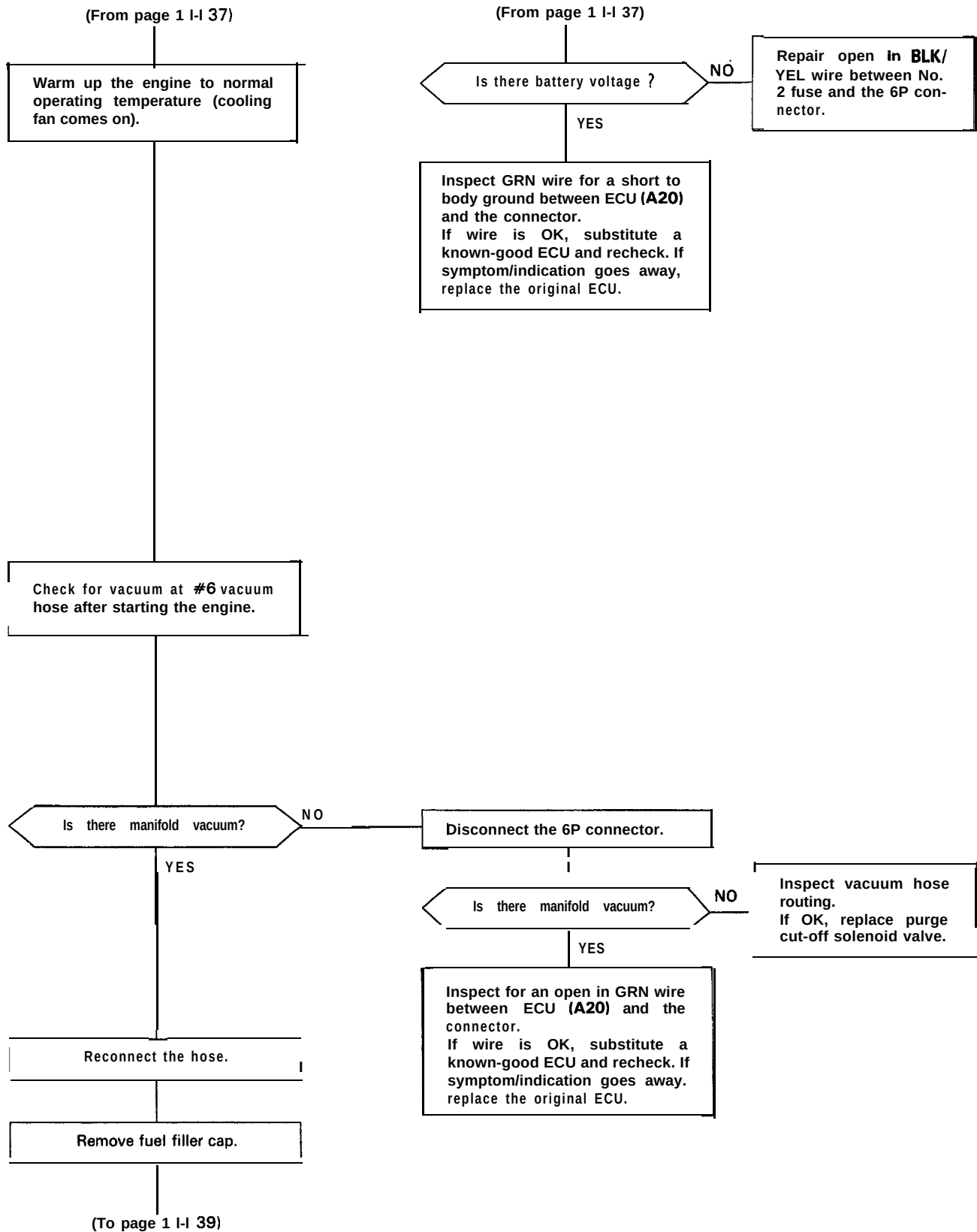
Measure voltage between BLK/
YEL (+) terminal and body ground.

(To page 1 I-I 38)

(cont'd)

Emission Control System

Evaporative Emission Controls (cont'd)





(From page 1 I-I 38)

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to 3,500 rpm.

Does vacuum appear on gauge within 1 minute?

YES

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

NO

Connect a vacuum gauge to the canister purge hose and raise the engine speed to 3,500 rpm.

Does vacuum appear on the gauge?

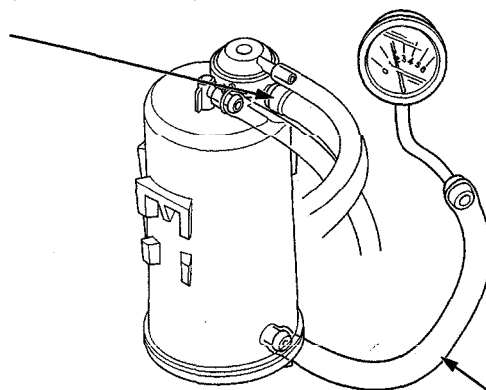
YES.

Replace the canister.

NO

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

PURGE HOSE



VACUUM/PRESSURE
GAUGE, 0-4 in. Hg
07JAZ-001000A

PURGE AIR
HOSE

(cont'd)

Emission Control System

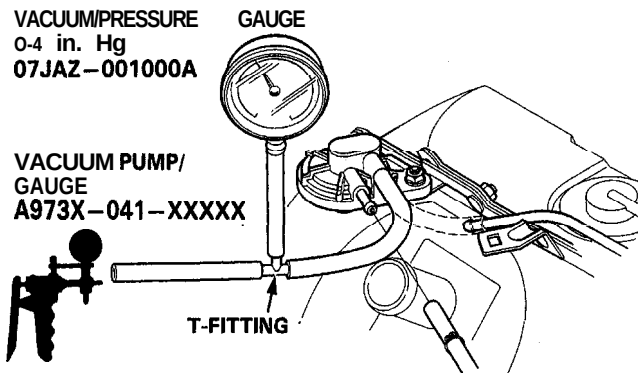
- Evaporative Emission Controls (cont'd)

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.

VACUUM/PRESSURE
0-4 in. Hg
07JAZ-001000A

VACUUM PUMP/
GAUGE
A973X-041-XXXXX

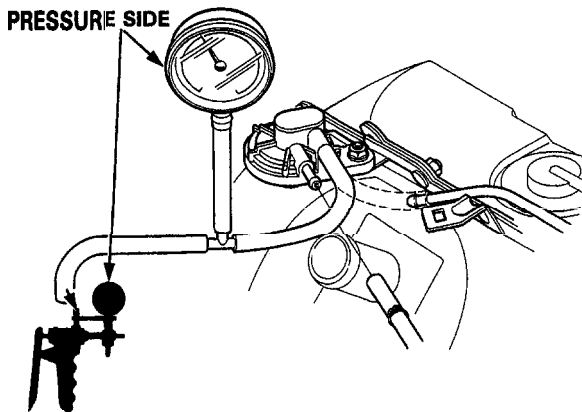


3. Apply vacuum slowly and continuously while watching the gauge.

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), stall 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.