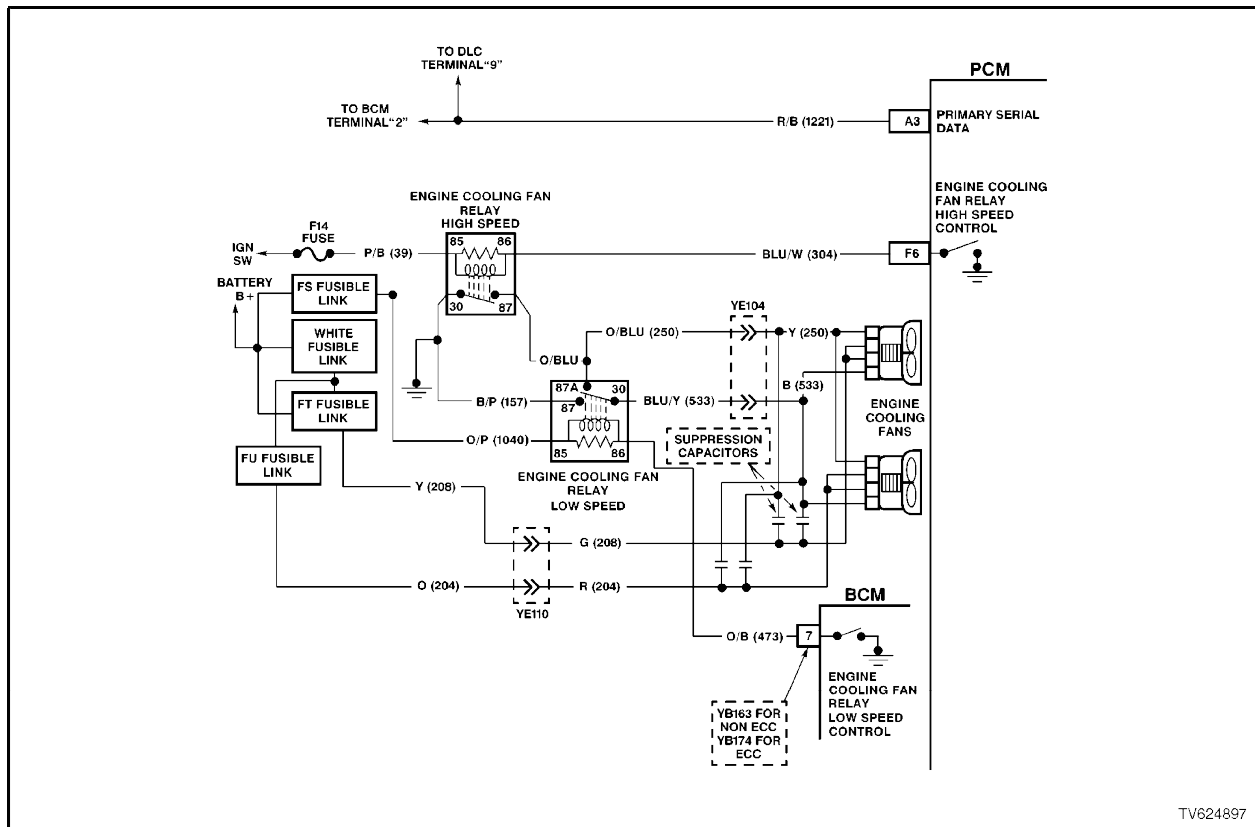


CHART A-12.1 V6 PCM - ELECTRIC FAN CONTROL



TV624897

CIRCUIT DESCRIPTION:

The both V6 engine have two (2) two speed electric radiator fan motors which provides the primary means of moving air through the engine radiator. The two (2) two speed electric cooling fan's are used to cool engine coolant flowing through the radiator. It is also used to cool the refrigerant flowing through the A/C condenser.

The engine cooling fan high speed relay is controlled by the PCM. The PCM controls the earth path for the engine cooling fan high speed relay.

The low speed of the electric fan is controlled by the PCM through special Data Communication to the BCM. The BCM controls the earth path for the engine cooling fan low speed relay.

Both relays are used to control the earth paths to the electric motor's that drives both five bladed fan's.

ENGINE COOLING FAN LOW SPEED:

The engine cooling fan low speed relay is energised by the BCM. The PCM determines when to enable the engine cooling fan low speed based on inputs from the A/C request signal, vehicle speed and engine coolant temperature. The engine cooling low speed fan will be turned "ON" when:

- A/C request indicated (YES) and
- Vehicle speed less than 54 Km/h
- OR -
- Coolant temperature is greater than 104 degrees C and will remain on until coolant temperature goes down below 99 degrees C

ENGINE COOLING FAN HIGH SPEED:

The engine cooling fan high speed is controlled by the PCM based on input from the Engine Coolant Temperature Sensor (ECT). The PCM will only turn "ON" the engine cooling fan high speed if the engine cooling low speed fan has been "ON" for 2 seconds and the following conditions are satisfied.

- There is a BCM message response fault which will cause a DTC 92.
- An engine coolant temperature sensor failure is detected, such as DTC 14,15,16,17, or 91.
- Coolant temperature greater than 109 degrees C.

If the fan low speed was "OFF" when the criteria was met to turn the fan high speed "ON", the fan high speed will come "ON" 5 seconds after the fan low speed is turned "ON". The engine cooling fan High speed relay can also be enable by the A/C Refrigerant Pressure Sensor. The A/C Refrigerant Pressure Sensor will provide a signal to the PCM when A/C pressure becomes to high approximately 1770 kPa.

TEST DESCRIPTION:

Number(s) below refer to step number(s) on the diagnostic chart.

2. This entire diagnostic procedure must begin with a "cold" engine - at ambient air temperature. If the coolant is hot when diagnosis is performed, replacement of good parts will result. Fan should not be running if engine coolant temperature is less than 99 degrees C and air conditioning is not "ON".
10. On A/C equipped vehicles, the engine cooling fan High speed relay should energise by the PCM, as soon as the PCM energises the A/C clutch.

STEP	ACTION	VALUE	YES	NO
1.	Was the "On-Board Diagnostic" (OBD) System Check performed?		Go to Step 2.	Go to OBD System Check
2.	1. Ignition "ON", engine stopped. 2. Engine coolant temperature below 99 degrees C. Are both electric fan motor's running ?		Go to Step 3	Go to Step 9
3.	1. Ignition "OFF". 2. Remove the Radiator Fan High Speed Relay. 3. Ignition "ON". Does both fan's continue to run ?		Go to Step 4	Go to Step 5
4.	1. Ignition "ON". 2. Remove Radiator Fan Low Speed Relay from relay housing. Does both fan's continue to run ?		Go to Step 13	Go to Step 16
5.	1. Ignition "ON". 2. Probe Radiator Fan High Speed Relay harness connector circuit 304 with a test light to +12 volts. Is the test light "ON"?		Go to Step 6	Go to Step 8
6.	1. Ignition "OFF". 2. Disconnect PCM connectors. 3. Ignition "ON". 4. Using test light, probe Radiator Fan High Speed Relay harness connector circuit 304 with a test light connected to +12 volts. Is the test light "ON" ?		Go to Step 14	Go to Step 7
7.	Replace PCM. Refer to Section 6C1-3 Service Operations, for PCM Security Link procedure. Is action complete?		Verify Repair	
8.	Replace Radiator Fan High Speed Relay.		Verify Repair	

STEP	ACTION	VALUE	YES	NO
9.	1. Ignition "ON". 2. Using the scan tool, Select HIGH FAN relay control. 3. Turn "ON" "HIGH FAN" with up/down arrow keys. Do both cooling fan's operate in high fan mode?		Go to Step 20	Go to Chart A-12.2 in this Section
10.	Is the vehicle equipped with A/C?		Go to Step 11	Go to Step 12
11.	1. Start engine, allow to idle. 2. Turn A/C "ON". 3. Electric fan's should run when the A/C clutch engages. NOTE: If A/C clutch will not engage, refer Chart A-11.1 or Chart A-11.3 in this Section . Do the fan's run when A/C clutch is engaged?		Go to Step 12	Go to Step 9
12.	The electric fan's circuit are OK.		Verify Operation	
13.	1. Connect a test light to +12 volts. 2. Probe circuit's 533 and 250 of Radiator Fan Low Speed Relay. Is the test light "ON" ?		Go to Step 15	Go to Step 18
14.	Repair short to earth in circuit 304.		Verify Repair	
15.	Repair short to earth in circuit 533 and/or circuit 250.		Verify Repair	
16.	1. Ignition "ON". 2. Probe Fan Low Speed Relay harness connector circuit 473 with a test light connected to +12 volts. Is the test light "ON"?		Go to Step 17	Go to Step 21
17.	1. Ignition "OFF". 2. Check for short to earth on circuit 473. Was a short to earth found ?		Verify Repair	Go to Step 18

STEP	ACTION	VALUE	YES	NO
18.	Replace the BCM.		Verify Repair	
19.	1. Reinstall Radiator Fan High Speed Relay. 2. Ignition "ON". 3. Using the scan tool, Select LOW FAN. 4. Turn "ON" "LOW FAN "with up/down arrow keys. Does the radiator fan motor run?		Go to Step 10	Go to Chart A-12.3 in this Section
20.	1. Ignition "ON" 2. Using the scan tool; Select HIGH FAN relay control. 3. Turn "ON" "HIGH FAN "with up/down arrow keys. 4. While fan is running, remove Radiator Fan High Speed Relay. Did the cooling fan motor reduce to a lower running speed ?		Go to Step 19	If radiator fan motor turned "OFF", Go to Chart A-12.3 in this Section
21.	Check for short to earth in circuit 250. Was a problem found?		Verify Repair	Go to Step 22
22.	Replace Radiator Fan Low Speed Relay. Is action complete?		Verify Repair	

TEST DESCRIPTION:

Number(s) below refer to step number(s) on the diagnostic chart.

3. This checks the fused power circuit to the Radiator Fan High Speed Relay.
7. This step checks for proper power supply to both circuits of both fan motors.

STEP	ACTION	VALUE	YES	NO
1.	Was the "On-Board Diagnostic" (OBD) System Check performed?		Go to Step 2.	Go to OBD System Check .
2.	From Chart A-12.1 Check fusible links FS, FT, FU, and White fusible link for open. Was a problem found?		Go to Step 8	Go to Step 3
3.	1. Ignition "OFF". 2. Remove Radiator Fan High Speed Relay. 3. Ignition "ON" 4. Probe relay socket, circuit 39 with test light connected to earth Is test light "ON" ?		Go to Step 4	Go to Step 10
4.	1. Ignition "ON". 2. Probe Radiator Fan High Speed Relay socket circuit 304 with a test light connected to +12 volts. 3. Using scan tool, Select HIGH FAN, enable fan "ON" with up/down arrows. Is test light "ON"?		Go to Step 5	Go to Step 9
5.	1. Ignition "ON". 2. Reinstall Radiator Fan High Speed Relay. 3. Back-probe Radiator Fan High Speed Relay harness connector circuit 250 with test light connected to +12 volts. 4. Using scan tool, Select HIGH FAN, enable fan "ON" with up/down arrow keys. Is test light "ON"		Go to Step 6	Go to Step 11

STEP	ACTION	VALUE	YES	NO
6.	1. Ignition "ON". 2. Disconnect both electric cooling fan wiring harness connector. 3. Probe both fan harness connector, circuits 533 and 250 with a test light to +12 volts. 4. Using scan tool, Select HIGH FAN, enable fan "ON" by pressing up/down arrow keys. Is test light "ON" for both circuits ?		Go to Step 7	Go to Step 13
7.	Probe both fan harness connector power feed circuits, with a test light connected to earth. Is test light "ON" for all circuits ?		Go to Step 12	Go to Step 15
8.	1. Check for short to earth that caused fusible link to blow 2. Check that the engine cooling fan motor is not drawing too much current. Is action complete ?		Verify Repair	
9.	1. Ignition "ON". 2. Using scan tool, Select HIGH FAN, enable output by pressing up/down arrow keys. 3. Backprobe PCM terminal "F6" with a test light connected to +12 volts. Is test light "ON"?		Go to Step 14	Go to Step 16
10.	Repair open or short to earth in circuit 39. Replace fuse if blown.		Verify Repair	

STEP	ACTION	VALUE	YES	NO
11.	With test light connected to +12 volts, back probe Radiator Fan High Speed Relay harness connector circuit 157. Does test light illuminate?		Go to Step 17	Go to Step 18
12.	Check for poor connection at both fan motor's. If OK, replace the electric fan motor that did not operate.		Verify Repair	
13.	Check for open in circuits 533 or 250. Was a problem found?		Verify Repair	Go to Step 18
14.	Repair open in circuit 304.		Verify Repair	
15.	Repair open circuit in fan motor power circuit that did not light test light.		Verify Repair	
16.	Check for short to voltage in circuit 304, or faulty connection at PCM, if OK replace PCM.		Verify Repair	
17.	Replace Radiator Fan High Speed Relay.		Verify Repair	
18.	Check for open in earth circuit 157. Was a problem found?		Verify Repair	Go to Step 19
19.	Replace Radiator Fan Low Speed Relay.		Verify Repair	

TEST DESCRIPTION:

Number(s) below refer to step number(s) on the diagnostic chart.

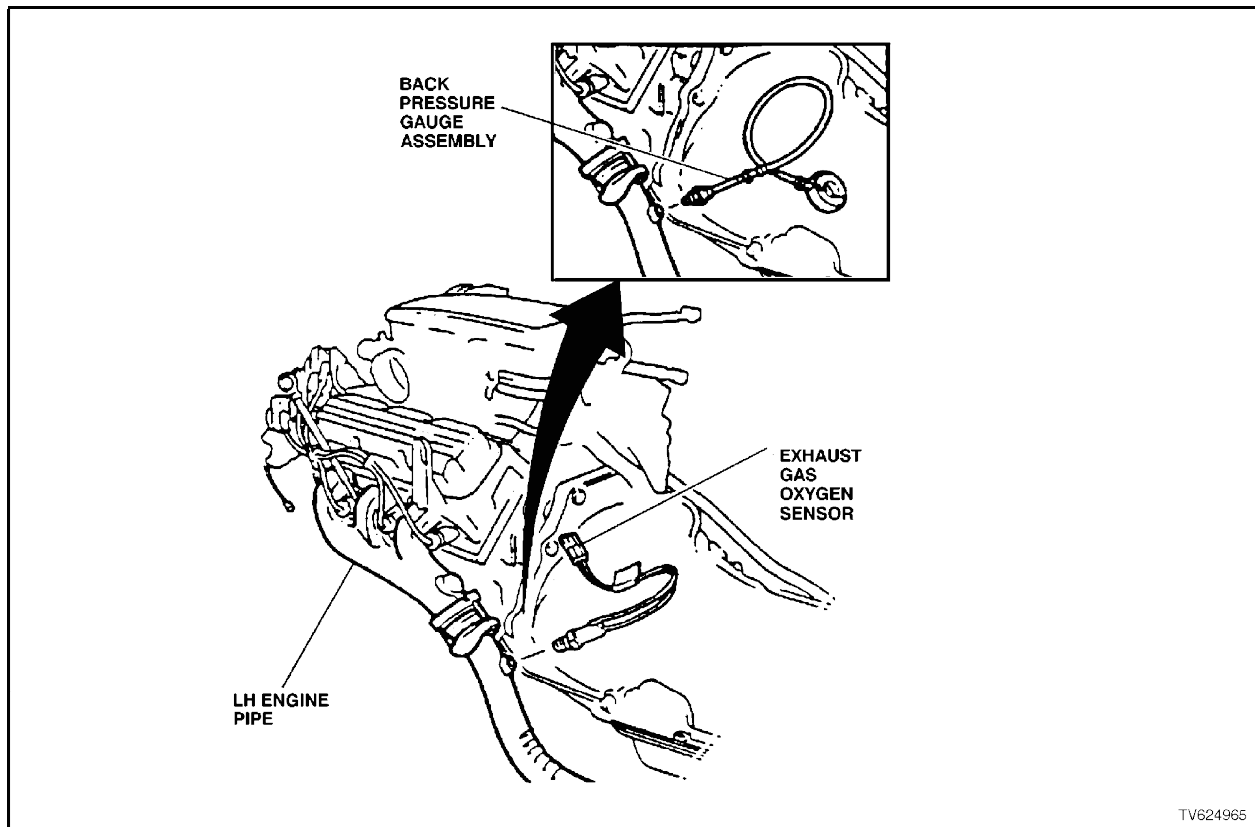
3. This checks the FS fusible link power supply to the Radiator Fan Low Speed Relay.

4. This step checks for proper BCM operation for the Radiator Fan Low Speed Relay.

STEP	ACTION	VALUE	YES	NO
1.	Was the "On-Board Diagnostic" (OBD) System Check performed?		Go to Step 2.	Go to OBD System Check.
2.	1. Ignition "OFF". 2. Remove Radiator Fan Low Speed Relay. 3. Probe relay socket, circuit 250 with a test light connected to +12 volts. Is test light "ON" ?		Go to Step 7	Go to Step 3
3.	1. Ignition "OFF". 2. Remove Radiator Fan Low Speed Relay 3. Ignition "ON" 4. Probe relay socket, circuits 1040 with test light connected to earth Is test light "ON" ?		Go to Step 4	Go to Step 9
4.	1. Ignition "ON". 2. Probe Radiator Fan Low Speed Relay socket, circuit 473 with a test light connected to +12 volts. 3. Using scan tool, Select LOW FAN, enable fan "ON" with up/down arrow keys. Is test light "ON"?		Go to Step 5	Go to Step 8
5.	1. Ignition "ON". 2. Reinstall Radiator Fan Low Speed Relay. 3. Back-probe low speed relay wiring harness connector, circuit 533 with test light connected to +12 volts. 4. Using scan tool, Select LOW FAN, enable fan "ON" with up/down arrow keys. Is test light "ON"		Go to Step 10	Go to Step 6

STEP	ACTION	VALUE	YES	NO
6.	1. Ignition "OFF". 2. Disconnect both electric cooling fan wiring harness connector. 3. Probe both wiring harness connector circuit's 533 with test light connected to +12 volts. 4. Using scan tool, Select LOW FAN, enable fan "ON" with up/down arrow keys. Is test light "ON"		Go to Step 14	Go to Step 12
7.	Repair short to earth in circuit 250. Is action complete?		Verify Repair	
8.	1. Ignition "ON". 2. Using scan tool, Select LOW FAN, enable fan "ON". 3. Backprobe BCM terminal "7" with a test light connected to +12 volts. Is test light "ON"?		Go to Step 13	Go to Step 15
9.	Repair open in circuit which causes test light not to come "ON". Is action complete?		Verify Repair	
10.	Replace Radiator Fan Low Speed Relay. Is action complete?		Verify Repair	
11.	Repair short to earth		Verify Repair	
12.	Repair open in circuits 533 or 250. Is action complete?		Verify Repair	
13.	Repair open in circuit 473 between BCM and Radiator Fan Low Speed Relay. Is action complete?		Verify Repair	
14.	Replace Radiator fan motor that did not operate. Is action complete?		Verify Repair	
15.	Check for faulty connection at BCM, if OK replace BCM. Is action complete?		Verify Repair	

CHART A-13 V6 PCM - RESTRICTED EXHAUST CHECK



There are times when a restricted exhaust can cause a variety of owner complaints. Below is a list of some of these owner complaints.

- No power, sluggish
- Hesitation on acceleration
- Surges while driving
- Poor fuel economy
- Stalling
- Hard starting

Things that could cause a restricted exhaust:

- A. Collapsed exhaust pipe.
- B. Muffler. Loose baffles may cause internal restriction
- C. Catalytic converter. Things that can cause a catalytic converter to become restricted: (1) The use of LEADED FUEL (2) A very rich-running engine. This rich-running condition could be caused by fuel pressure too high, or by a malfunction in the engine control system (3) Engine in a bad state of tune. Worn parts in the ignition system can cause an engine misfire, which sends unburned fuel into the exhaust system. The catalytic converter "sees" this unburned fuel as a rich-running condition. (4) Push-starting the engine. This can send a tremendous amount of unburned fuel into the exhaust system.