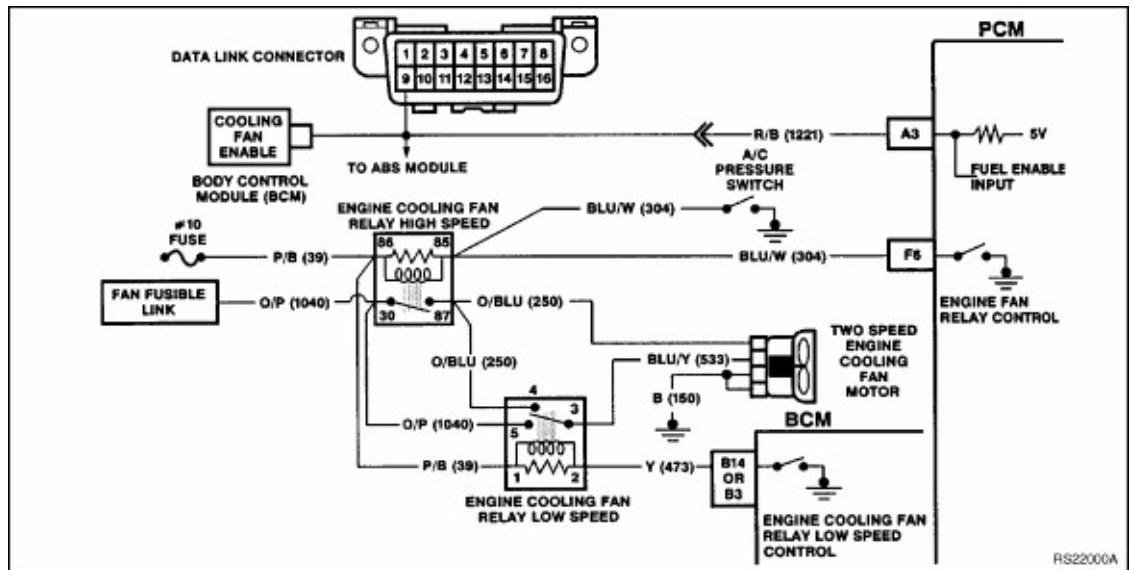


**CHART A-12.1 V6 PCM (1 of 2)**



## ELECTRIC FAN CONTROL

### Circuit Description:

The V6 engine has a two speed electric fan which provides the primary means of moving air through the engine radiator. The two speed electric cooling fan is 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 high current flow to power the electric motor that drives the five bladed fan

### 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 64 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.
- 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 speed engine cooling fan relay can also be enable by the A/C pressure switch. The A/C pressure switch will provide an earth path 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

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 relay should be energised by the PCM, as soon as the PCM energises the A/C clutch.

## CHART A-12.1 V6 PCM (1 of 2)

### ELECTRIC FAN CONTROL

STEP	ACTION	VALUE	YES	NO
1.	Was the "On-Board Diagnostic" (OBD) System Check performed?		Go to Step 2.	Go to <a href="#">OBD System Check</a> in this Section.
2.	1. Ignition "ON", engine stopped. 2. Engine coolant temperature below 99 degrees C. 3. Is electric fan running ?		Go to Step 3	Go to Step 11
3.	1. Ignition "OFF". 2. Remove "ENG. FAN" relay from relay housing. 3. Ignition "ON". 4. Does the fan continue to run ?		Go to Step 4	Go to Step 5
4.	1. Ignition "ON". 2. Remove "LO. FAN" relay from relay housing. 3. Does the fan continue to run ?		Go to Step 15	Go to Step 18
5.	1. Ignition "ON". 2. Probe fan relay harness connector circuit 304 with a test light to +12 volts. 3. Is the test light "ON"?		Go to Step 7	Go to Step 10
6.	1. Unplug the A/C pressure switch? 2. Is the test light "ON"?		Go to Step 16	Go to Step 8
7.	1. Unplug the PCM. 2. Is the test light "ON"?		Go to Step 6	Go to Step 9
8.	Check for high A/C pressure. If pressure OK, replace the A/C pressure switch Is action complete ?		Verify Repair	
9.	Replace PCM. Is action complete ?		Verify Repair	
10.	Replace tested cooling fan relay. Is action complete ?		Verify Repair	
11.	1. Ignition "ON". 2. Using the TECH 1; Select F4: MISC. TESTS; F0: OUTPUT TESTS F3: HIGH FAN. 3. Turn "ON" "ENG. FAN" with up/down arrow keys. 4. Does the cooling fan operate?		Go to Step 22	Go to Chart A-12.2 in this Section
12.	Is the vehicle equipped with A/C?		Go to Step 13	Go to Step 14
13.	1. Start engine, allow to idle. 2. Turn A/C "ON". 3. Electric fan should run when the A/C clutch ....engages. Note: If A/C clutch will not engage, refer <a href="#">CHART A-11.1</a> or CHART A-11.3 in this Section .		Go to Step 14	Go to Step 9
14.	The electric fan circuit is OK. Does overheating problem exist?		Go to DTC 14 in this Section	
15.	1. Connect a test light to earth.		Go to Step 17	Go to Step 20

15

2. Probe circuit 250 and circuit 533 of both the engine fan relays.
3. Is the test light "ON" for either circuit ?

16

1. Repair short to earth in circuit 304 from A/C pressure switch to engine fan relay.

Verify Repair

17.

1. Repair short to voltage in circuit 250 or circuit 533.
2. Is repair complete?

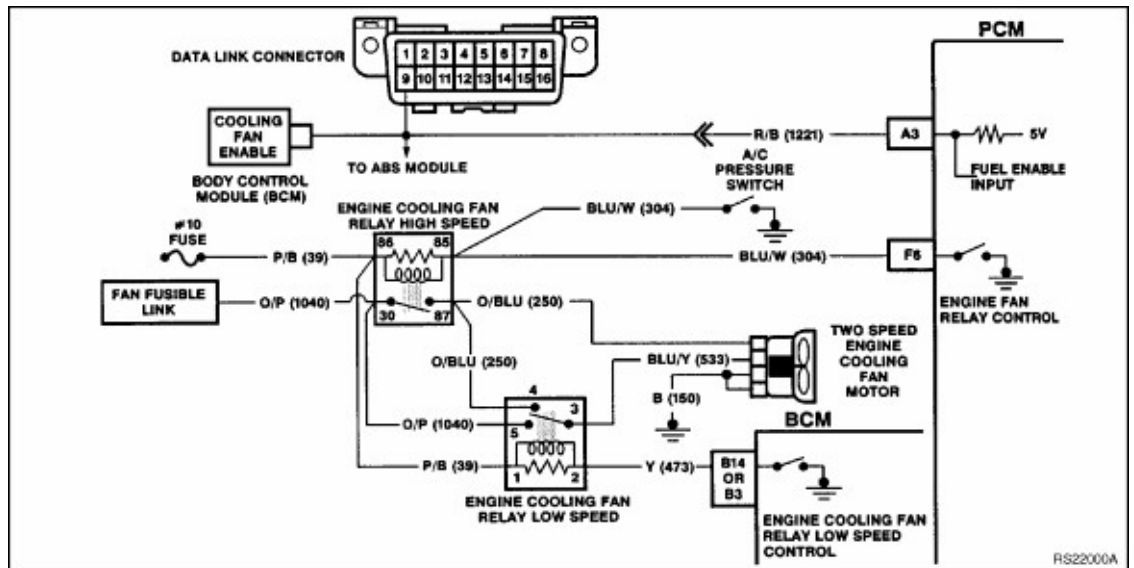
Verify Repair

18.

1. Ignition "ON".
2. Probe low fan relay harness connector circuit 473 with a test light connected to +12 volts.
3. Is the test light "ON"?

Go to Step 19

Go to Step 10



## CHART A-12.1 V6 PCM (2 of 2)

### ELECTRIC FAN CONTROL

#### Circuit Description:

The V6 engine has a two speed electric fan which provides the primary means of moving air through the engine radiator. The two speed electric cooling fan is 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 high current flow to power the electric motor that drives the five bladed fan

#### 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 64 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.

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 speed engine cooling fan relay can also be enable by the A/C pressure switch. The A/C pressure switch will provide an earth path 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 relay should be energised by the PCM, as soon as the PCM energises the A/C clutch.

## CHART A-12.1 V6 PCM (2 of 2)

### ELECTRIC FAN CONTROL

STEP	ACTION	VALUE	YES	NO
19.	1. Ignition "OFF". 2. Check for short to earth on circuit 473. 3. Was a short to earth found ?		Verify Repair	Go to Step 20
20.	1. Replace the BCM. 2. Is repair complete?		Verify Repair	
21.	1.Reinstall cooling fan low speed relay 2. Ignition ON. 3. Using the TECH 1; Select F5: FUNCTIONS, LOW FAN. 4. Turn "ON" Low fan with yes/no buttons. Does the cooling fan run?		Go to Step 12	Go to Chart A-12.3 in this Section
22.	1. Ignition "ON" 2. Using the TECH 1; Select F4: MISC. TESTS; F0: OUTPUT TESTS; F3: HIGH FAN. 3. Turn "ON" engine cooling fan high speed relay ("ENG. FAN"), enable fan "ON". 4. While fan is running, remove engine cooling fan low speed relay ("LO FAN"). 5. Did the cooling fan motor reduce to a lower running speed ?		Go to Step 21	Go to Chart A-12.2 in this Section