

**2001 Cadillac Catera**

2000-01 ENGINE COOLING Electric Cooling Fans - Cars

**2000-01 ENGINE COOLING****Electric Cooling Fans - Cars****MODEL IDENTIFICATION**

**NOTE:** For electric cooling fan diagnosis on 2000 Prizm, see appropriate **MANUAL A/C-HEATER SYSTEMS** article.

**MODEL IDENTIFICATION - CARS**

<b>Body Code <sup>(1)</sup></b>	<b>Model</b>
"C"	Park Avenue
"E"	Eldorado
"F"	Camaro & Firebird
"G"	Aurora
"H"	Bonneville & LeSabre
"J"	Cavalier & Sunfire
"K"	DeVille & Seville
"M"	Metro
"N"	Alero, Grand Am & Malibu
"S"	Prizm
"V"	Catera
"W"	Century, Grand Prix, Intrigue, Lumina, Monte Carlo & Regal
"Y"	Corvette
"J"	Saturn "L" Series
"Z"	Saturn "S" Series

(1) Vehicle body code is fourth character of VIN.

**DESCRIPTION & OPERATION****ELECTRIC COOLING FAN CONTROL**

All Models Except Catera

All FWD and some RWD vehicles use an electric cooling fan. The electric cooling fan is used for radiator and A/C condenser cooling. Cooling fan operates when A/C is on and when engine coolant temperature exceeds a specific value. One or more cooling fan relays may be used. For cooling fan relay location, see **COOLING FAN RELAY LOCATION** table.

**COOLING FAN RELAY LOCATION**

<b>Application</b>	<b>Location</b>
"C" Body	Right Front Of Engine Compartment, In Fuse/Relay Block
"E" Body	Mounted On Lower Radiator Support
"K" Body	In Underhood Fuse Block On Right Side Of Engine Compartment
"F" Body	In Underhood Electrical Center, On Left Inner Fender Panel

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Application	Location	Identification
"C" Body	Right Front Of Engine Compartment, In Fuse/Relay Block	Fuse Block, On Right Side Of Engine Compartment
"E" Body	Mounted On Lower Radiator Support	Fuse Block, On Right Side Of Engine Compartment
"K" Body	In Underhood	Fuse Block On Right Side Of Engine Compartment
"J" Body	Right Side Of Engine Compartment	Relay Block At Corner Of Engine Compartment
"F" Body	In Underhood	Electrical Center, In Underhood Panel
"N" Body	On Left Inner Underhood Panel	Function Block, At Left Side Of Engine Compartment
"W" Body		
Except Lumina		Inside Electrical Center At Right Side Of Engine Compartment
Lumina		Inside Electrical Centers At Right & Left Front Of Engine Compartment
"V" Body		In ECM Housing, In Left Front Of Engine Compartment
"Y" Body		In Underhood Electrical Center In Front Of Battery
Metro		In Engine Compartment Relay Box Near Battery
Prizm		
Fuse/Relay Block No. 1		Left Front Of Engine Compartment, To Left Of Air Cleaner
Fuse/Relay Block No. 2		Left Front Of Engine Compartment, To Left Of Battery
Saturn "L" Series		In Cooling Fan Control Module, Next To Battery
Saturn "S" Series		In Underhood Fuse Block, In Left Front Of Engine Compartment

### SCAN TOOL

A variety of information is transmitted through Data Link Connector (DLC). This data is transmitted at a high frequency which requires the use of Tech 2 Scan Tool. Other types of scan tools are available and may function and provide adequate information for diagnostic work. Always refer to scan tool manufacturer's instructions.

### TROUBLE SHOOTING

#### PRELIMINARY INFORMATION

This article contains only the text required to test electric cooling fans. Other diagnostic information may be referenced while performing electric cooling fan diagnosis. See appropriate ENGINE PERFORMANCE articles for complete information on engine control systems.

Trouble shoot cooling fan using appropriate diagnostic information provided. For cooling fan relay location, see **COOLING FAN RELAY LOCATION** table.

To help save diagnostic time, always check for blown fuses or fusible links before proceeding with any testing. If fuses are blown, locate and repair short circuit before replacing fuses. Ensure all related relay and wire harness connections are clean and tight. Repair as necessary. See **WIRING DIAGRAMS** for component, terminal and wire color identification.

**NOTE:** Vehicles may be equipped with a PCM/ECM using an Electronically Erasable Programmable Read Only Memory (EEPROM). When replacing PCM/ECM, the new PCM/ECM must be programmed.

## ELECTRIC COOLING FAN CIRCUIT DIAGNOSIS

To help save diagnostic time, check cooling system fluid level, water pump belt condition and tension. Always check for blown fuses or fusible links before proceeding with any testing. If fuses are blown, locate and repair short circuit before replacing fuses. Ensure all related relay and wire harness connections are clean and tight. Repair as necessary. See **WIRING DIAGRAMS**.

**WARNING:** Vehicles may be equipped with a PCM using an Electronically Erasable Programmable Read Only Memory (EEPROM). When replacing PCM, new PCM must be programmed.

### 1.0L & 1.3L METRO

#### Description

Cooling fan is controlled by Powertrain Control Module (PCM) through cooling fan relay based on inputs from engine coolant temperature sensor. PCM turns on the cooling fan when coolant temperature sensor rises above 208° F (97.5°C) and turns off cooling fan when coolant temperature sensor drops less than 199°F (92.5°C). PCM controls cooling fan motor by grounding cooling fan relay control circuit which closes fan relay contacts.

#### Diagnosis

1. Install scan tool. Turn ignition on, engine off. Verify ECT sensor reading is less than 194°F (90°C). If cooling fan is not operating, go to next step. If cooling fan is operating, go to step 3 .
2. Turn ignition on, engine off. Using scan tool, clear DTCs. Command fan on and then off. If cooling fan operated when commanded on and shut off when commanded off, go to **DIAGNOSTIC AIDS** . If fan did not operate when commanded on and shut off when commanded off, go to step 7
3. Ensure ECT is less than 194°F (90°C). Disconnect cooling fan relay located in relay box near battery. If cooling fan is not operating, go to next step. If cooling fan is operating, go to step 5 .
4. Using test light connected to battery voltage, probe cooling fan relay connector cavity No. 2 (Blue wire). If test light illuminates, go to step 6 . If test light does not illuminate, go to step 16 .
5. Repair short to power in Blue or Blue/Red wire between cooling fan relay and cooling fan motor. See **WIRING DIAGRAMS** . After repairs, go to step 19 .
6. Check for short to ground in Blue wire between PCM and cooling fan relay. repair as necessary. After repairs, go to step 19 . If repair was not necessary, go to step 17 .
7. Turn ignition on. Using test light connected to ground, probe cooling fan relay cavity No. 1 (Black/White wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 14 .
8. Using test light connected to ground, probe cooling fan relay cavity No. 4 (Black/Blue wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 15 .
9. Connect a fused jumper between cooling fan relay connector cavities No. 3 (Blue/Red wire) and No. 4 (Black/White wire). If cooling fan operates, go to next step. If cooling fan does not operate, go to step 12 .
10. Using test light connected to battery voltage, probe cooling fan connector cavity No. 2 (Blue wire). Using scan tool, command cooling fan on. If test light illuminates, go to step 16 . If test light does not illuminate, go

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to next step.

11. Check for open in Blue wire between PCM and cooling fan relay. Repair as necessary. After repairs, go to step 19 . If repair was not necessary, go to step 17 .
12. Check for open in Blue or Blue/Red wire between cooling fan relay and cooling fan motor. Repair as necessary. See **WIRING DIAGRAMS** . After repairs, go to step 19 . If repair was not necessary, go to next step.
13. Check for open or poor terminal contact in Black wire between cooling fan motor and ground. Repair as necessary. After repairs, go to step 19 . If repair was not necessary, go to step 18 .
14. Repair open in Black/White wire between cooling fan relay terminal No. 1 and junction block. After repairs, go to step 19 .
15. Repair open in Black/Blue wire between cooling fan relay terminal No. 4 and fuse box. After repairs, go to step 19 .
16. Replace cooling fan relay. After repairs, go to step 19 .
17. Replace PCM. After repairs, go to step 19 .
18. Replace cooling fan motor. After repairs, go to next step.
19. Using scan tool, clear any DTCs and road test vehicle within freeze frame conditions that caused DTC to set. If any DTCs set, go to appropriate DTC. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If no DTCs are stored, system is okay at this time.

### Diagnostic Aids

Whenever vehicle owner complains of an overheating problem, determine if complaint was due to an actual boilover, or TEMP light or gauge indicated overheating. Whenever gauge or light indicates overheating, but no boilover is detected, gauge or light circuit should be checked. Gauge accuracy can also be checked by comparing engine coolant temperature sensor reading with gauge reading.

If engine is actually overheating, and gauge indicates overheating, but cooling fan is not coming on, ECT sensor has probably shifted out of calibration and should be replaced. Whenever engine is overheating and cooling fan is on, cooling system should be checked.

### 1.8L PRIZM

**NOTE:** For electric cooling fan diagnosis on 2000 Prizm, see appropriate MANUAL A/C-HEATER SYSTEMS article.

### Description

Engine cooling fan system consists of 2 electric cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage on 2 individual power circuits, from fuse and relay block 1 and from junction block 2. During high speed operation, which is when ECT reaches 199°F (93°C) or A/C system pressure exceeds 220 psi, PCM removes ground for fan 1 and fan 2 relays through cooling fan relay control circuit. This de-energizes fan 2 relay which switches relay contacts and provides a ground path for auxiliary fan motor. At the same time, fan 1 relay is de-energized, closing relay contacts and providing battery voltage on main fan motor supply voltage circuit to main fan motor.

During low speed operation, which is when A/C is operating and Engine Coolant Temperature (ECT) is less than 181°F (83°C), PCM supplies ground path for fan 1 and fan 2 relays through cooling fan relay control circuit. This energizes both relays, opens fan 1 relay contacts and switches contacts in fan 2 relay. Engine main relay supplies battery voltage through cooling fan motor supply voltage circuit to auxiliary fan motor. When A/C is operating, compressor clutch (MG) relay energizes fan 3 relay. Ground path for auxiliary fan motor is through switched contacts in fan 2 relay, through closed contacts of fan 3 relay and through main fan motor to ground. Result is a

series circuit with both fans running at low speed.

During high speed fan operation, both engine cooling fans have their own power and ground path. Result is a parallel circuit with both fans running at high speed. A/C high pressure switch is in series with PCM controlled ground for coils of fan 1 and fan 2 relays. If A/C system pressure exceeds 220 psi, pressure switch opens ground circuit to coils of fan 1 and 2 relays. This has same effect as if PCM had removed ground for relays. PCM will control ground for fan relays based on input from ECT sensor in order to maintain cooling system at normal operating temperature.

Main and auxiliary fan motors run at half speed in series configuration when all of the following conditions occur:

- A/C system is operating.
- A/C system pressure is less than 178 psi.
- ECT is less than 181°F (83°C).

Main and auxiliary fan motors run at full speed in parallel configuration when either of the following conditions occur:

- ECT reaches 199°F (93°C).
- A/C system pressure exceeds 220 psi.

#### Main Cooling Fan Inoperative

1. Review **DESCRIPTION**, and then go to next step.
2. Run engine until operating temperature is reached and thermostat opens. If cooling fans operate, problem is intermittent. If cooling fans do not operate, go to next step.
3. Exchange fan 1 relay with known good relay (fan 3 relay, A/C MG relay, or horn relay). If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
4. Stop engine. Disconnect main fan motor connector. Connect test light across main fan motor connector. Start engine. If test light illuminates, go to step 12. If test light does not illuminate, go to next step.
5. Check main fan motor ground circuit (White/Black wire) for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
6. Check main fan motor supply voltage circuit (Black/Red wire) for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
7. Check supply voltage circuit to fuse and relay block 1 for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
8. Check fan 1 relay switch supply voltage circuit for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
9. Check engine main relay switch supply voltage circuit for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
10. Check engine main relay control circuit (Black/Yellow wire) for open. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
11. Remove fuse and relay block 1 from inner fender. Repair poor connections or high resistance in fuse and relay block 1 connectors. After repairs, go to step 14.
12. Check main fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 14. If problem was not found, go to next step.
13. Replace main fan motor. After repairs, go to next step.
14. Operate system to verify repair.

#### Auxiliary Cooling Fan Inoperative

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1. Review **DESCRIPTION** , and then go to next step.
2. Run engine until operating temperature is reached and thermostat opens. If cooling fans operate, problem is intermittent. If cooling fans do not operate, go to next step.
3. Stop engine. Disconnect auxiliary fan motor connector. Connect test light across auxiliary fan motor connector. Start engine. If test light illuminates, go to step 7 . If test light does not illuminate, go to next step.
4. Check auxiliary fan motor supply voltage circuit (Blue/Red wire) for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
5. Remove fan 2 relay from fuse and relay block 2. Check White wire between auxiliary fan motor and fan 2 relay for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
6. Replace fan 2 relay. After repairs, go to step 9 .
7. Check auxiliary fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
8. Replace auxiliary fan motor. After repairs, go to next step.
9. Operate system to verify repair.

### Cooling Fan Inoperative At Low Speed

1. Review **DESCRIPTION** , and then go to next step.
2. Connect scan tool. Ensure engine is less than operating temperature. Move blower speed switch to any position except OFF. Depress A/C switch to ON position. Using scan tool, command A/C compressor clutch (MG) relay on. When MG relay is energized, cooling fans will also turn on at low speed. If cooling fans operate at low speed, problem is intermittent. If cooling fans do not operate at low speed, go to next step.
3. Exchange fan 3 relay with a known good relay (fan 1 relay, A/C MG relay or horn relay). If cooling fans operate at low speed, go to step 8 . If cooling fans do not operate at low speed, go to next step.
4. Check fan 3 relay coil supply voltage circuit (Black/White wire) for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
5. Check fan 3 relay coil ground circuit (White/Black wire) for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
6. Check White/Red wire between fan 3 relay and fan 2 relay for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
7. Repair open in fan 3 relay switch supply voltage circuit (White wire). After repairs, go to step 9 .
8. Replace fan 3 relay. After repairs, go to next step.
9. Operate system to verify repair.

### Cooling Fan Operates Continuously

1. Review **DESCRIPTION** , and then go to next step.
2. Ensure Engine Coolant Temperature ECT is less than 199°F (93°C). Depress A/C switch to OFF position. Turn blower switch to OFF position. Turn ignition switch on. If only main fan motor is running continuously, go to step 4 . If not only main fan motor is running continuously, go to next step.
3. If only auxiliary fan motor is running continuously, go to step 8 . If both fans are running continuously, go to step 11 .
4. Remove fan 1 relay from fuse and relay block 1. If main fan motor runs, go to next step. If main fan motor does not run, go to step 6 .
5. Repair short to voltage in main fan motor supply voltage circuit (Black/Red wire). After repairs, go to step 17 .
6. Check fan 1 relay control circuit (Blue/Black wire) for open. If problem was found, repair as necessary. After repairs, go to step 17 . If problem was not found, go to next step.

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7. Replace fan 1 relay. After repairs, go to step 17 .
8. Remove fan 2 relay from fuse and relay block 2. If auxiliary fan motor runs, go to next step. If auxiliary fan motor does not run, go to step 10 .
9. Repair short to ground in White wire between auxiliary fan motor and fuse and relay block 2. After repairs, go to step 17 .
10. Replace fan 2 relay. After repairs, go to step 17 .
11. Remove fan 3 relay from fuse and relay block 2. If both fan motors run, go to next step. If both fan motors do not run, go to step 14 .
12. Check fan 2 relay control circuit (Blue/Black wire), including A/C refrigerant pressure switch, for open. If problem was found, repair as necessary. After repairs, go to step 17 . If problem was not found, go to next step.
13. Check ECT sensor for incorrect performance or for incorrect input to PCM. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If ECT sensor is operating correctly, replace PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. After repairs, go to step 17 .
14. Check A/C MG relay for continuity between terminals No. 3 (Black/White wire) and No. 5 (Blue/Red wire). Check fan 3 relay for continuity between terminals No. 3 (White/Red wire) and No. 5 (White wire). If continuity exists in either relay, go to next step. If continuity does not exist in either relay, go to step 16 .
15. Replace faulty relay. After repairs, go to step 17 .
16. Repair short to voltage in fan 3 relay coil supply voltage circuit (Black/White wire). After repairs, go to next step.
17. Operate system to verify repair.

### 1.9L SATURN "S" SERIES

#### Description

A fan control relay is used by Powertrain Control Module (PCM) to control engine cooling fan operation. Engine cooling fan is turned on or off by PCM dependent upon engine coolant temperature, vehicle speed or A/C request. Under high ambient temperatures, fan may run up to 4 minutes with key off.

Under normal operating conditions, cooling fan motor operates whenever Engine Coolant Temperature (ECT) is greater than 222°F (106°C) or A/C relay is commanded on less than 70 MPH. Cooling fan motor will turn off when temperature drops less than 212°F (100°C), cooling fan motor can run up to 4 minutes or until ECT drops less than 225°F (107°C) with ignition off. If DTC P0117 or P0118 is set, PCM will command cooling fan relay on to protect engine and transaxle until condition is corrected.

#### Cooling Fan Inoperative

**NOTE: If DTC P0480 or P1480 are present, diagnose DTC first. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE.**

1. Connect scan tool. Turn ignition on, engine off. Using scan tool, command cooling fan relay on and off. If cooling fan motor follows command, problem is intermittent. If cooling fan motor does not follow command, go to next step.
2. Remove cooling fan relay from underhood fuse block. Connect jumper wire between left rear and right front terminals of relay connector or install known good relay. If cooling fan runs, check relay connector. If connector is good, replace relay. If cooling fan does not run, go to next step.
3. Reinstall cooling fan relay. Disconnect cooling fan motor. Connect test light between terminals of cooling fan motor harness connector. Using scan tool, command cooling fan relay on. If test light is on, check cooling fan motor connector. If connector is good, replace cooling fan motor. If test light is not on, go to next step.

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4. Connect test light between cooling fan connector terminal "B" (Light Blue wire) and ground. With cooling fan commanded on, if test light is on, repair Black wire between cooling fan motor and ground. With cooling fan commanded on, if test light is off, repair open in Light Blue wire between underhood fuse block and cooling fan motor.

### Cooling Fan Always On

**NOTE: If DTC P0480 or P1480 are present, diagnose DTC first. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE.**

1. Connect scan tool. Turn ignition on, engine off. Using scan tool, command cooling fan relay on and off. If cooling fan motor follows command, problem is intermittent. If cooling fan motor does not follow command, go to next step.
2. Remove cooling fan relay. If cooling fan motor runs, repair short to voltage in Light Blue wire between underhood fuse block and cooling fan motor. If fan motor does not run, replace cooling fan relay.

### 2.2L & 2.4L CAVALIER & SUNFIRE

#### Description

Cooling fan is controlled by Powertrain Control Module (PCM) through cooling fan relay based on inputs from engine coolant temperature sensor, intake air temperature sensor, A/C control switch, A/C refrigerant pressure sensor and Vehicle Speed Sensor (VSS). PCM controls cooling fan motor by grounding cooling fan relay control circuit which closes fan relay contacts.

Cooling fan relay is commanded on when:

- Engine coolant temperature reaches 223°F (106°C) or greater.
- A/C refrigerant pressure exceeds 190 psi.
- During extended idle conditions less than 5 MPH.
- After vehicle is shut off if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fan will stay on for approximately 3 minutes.

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Powertrain Control Module (PCM). If communication with PCM is established, go to next step. If communication with PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

#### Cooling Fan Inoperative

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**. If diagnostic system check has been performed, go to next step.
2. Install a scan tool. Turn ignition on, engine off. Using scan tool, command cooling fan on and off. If engine



cooling fan turns on and off with each command, problem is intermittent. If engine cooling fan does not turn on and off with each command, go to next step.

3. Turn ignition off. Remove cooling fan relay. Turn ignition on, engine off. Probe battery voltage circuit (terminal No. 30) of cooling fan relay switch side with test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 7 .
4. Connect fused jumper (20-amp) between battery voltage circuit (terminal No. 30) of cooling fan relay and cooling fan motor supply voltage circuit (terminal No. 87) of cooling fan relay. If cooling fan operates, go to step [10](#) . If cooling fan does not operate, go to next step.
5. Turn ignition off. Disconnect cooling fan connector. Turn ignition on, engine off. Probe cooling fan motor supply voltage circuit (Light Blue wire) at harness connector with test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 8 .
6. Probe harness connector of cooling fan motor with test light between cooling fan motor connector terminals. If test light illuminates, go to step 11 . If test light does not illuminate, go to step 9 .
7. Repair battery positive circuit (Red wire) of cooling fan relay. After repairs, go to step 14 .
8. Repair supply voltage circuit (Light Blue wire) of cooling fan motor. After repairs, go to step 14 .
9. Repair ground circuit (Black/White wire) of cooling fan motor. After repairs, go to step 14 .
10. Check cooling fan relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 14 . If problem was not found, go to step 12 .
11. Check cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 14 . If problem was not found, go to step 13 .
12. Replace cooling fan relay. After repairs, go to step 14 .
13. Replace cooling fan motor. After repairs, go to next step.
14. Operate system to verify repair.

#### Cooling Fan Always On

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** . If diagnostic system check has been performed, go to next step.
2. Turn ignition on, engine off. If engine cooling fan runs all the time, go to next step. If engine cooling fan does not run all the time, problem is intermittent.
3. Remove cooling fan relay. If cooling fan turned off, go to step 5 . If cooling fan did not turn off, go to next step.
4. Repair short to power in cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 7 .
5. Check cooling fan relay for poor connections. If problem was found, repair as necessary. After repairs, go to step 7 . If problem was not found, go to next step.
6. Replace cooling fan relay. After repairs, go to next step.
7. Operate system to verify repair.

#### Diagnostic Aids

Whenever owner complains of an overheating problem, determine if complaint was due to an actual boilover, or TEMP light or gauge indicated overheating. Whenever gauge or light indicates overheating, but no boilover is detected, gauge or light circuit should be checked. Gauge accuracy can also be checked by comparing engine coolant temperature sensor reading with gauge reading.

If engine is actually overheating, and gauge indicates overheating, but cooling fan is not coming on, ECT sensor has probably shifted out of calibration and should be replaced. Whenever engine is overheating and cooling fan is on, cooling system should be checked.

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### 2.2L & 3.0L SATURN "L" SERIES

#### Description

Cooling fan control module is used by Powertrain Control Module (PCM) or Engine Control Module (ECM) to control engine cooling fan operation. Engine cooling fans are turned on or off by PCM/ECM dependent upon engine coolant temperature or A/C system pressure. Under high ambient conditions, fans may run for several minutes after key is turned off.

#### Cooling Fan Diagnosis

1. Install scan tool. Turn ignition on, engine off. If DTCs P0480 or P0481 are present, repair DTCs first. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If DTCs are not present, using scan tool, perform 3 SPEED FAN test while monitoring each fan speed. If both fans work correctly at all 3 speeds, problem is intermittent. If both fans do not work correctly at all 3 speeds, go to next step.
2. Using scan tool, command both engine cooling fans off. Check COOL FAN 1 fuse (30-amp) and COOL FAN 2 fuse (30-amp). If either fuse is blown, replace appropriate fuse and retest. If fuse blows again, repair short to ground in appropriate power feed circuit between fuse and cooling fan control unit. If fuses are okay, go to next step.
3. Disconnect cooling fan control unit. Using DVOM, measure voltage at cooling fan control unit connector C1 terminal "D" and connector C2 terminal "B". If battery voltage is present at both terminals, go to next step. If battery voltage is not present on both terminals, repair open in appropriate circuit between underhood fuse block and cooling fan control unit.
4. Using DVOM, measure voltage between cooling fan control unit connector C2 terminal "B" and connector C1 terminal "A". If battery voltage is present, go to next step. If battery voltage is not present, repair ground circuit (Black wire) between cooling fan control unit and ground.
5. Reconnect cooling fan control unit. Using scan tool, perform 3 SPEED FAN test. Test one speed at a time, checking COOL FAN 1 fuse (30-amp) and COOL FAN 2 fuse (30-amp) at each speed. If neither fuse blows, go to next step. If COOL FAN 1 fuse blows, check power feeds to engine cooling fan 1 for short to ground. If COOL FAN 2 fuse blows, check power feeds to engine cooling fan 2 for short to ground.
6. If either engine cooling fan runs when both fans are commanded off, go to next step. If neither fan runs when both fans are commanded off, go to step 8 .
7. Disconnect cooling fan control unit. Check for short to voltage in appropriate engine cooling fan power feed circuit. If problem was found, repair appropriate circuit. If problem was not found, replace cooling fan control unit.
8. See **COOLING FAN SYMPTOMS (2.2L)** table or **COOLING FAN SYMPTOMS (3.0L)** table for appropriate circuit related to a specific failure. If problem is found, repair as necessary. If problem is not found, replace cooling fan control unit.

#### COOLING FAN SYMPTOMS (2.2L)

Symptom	Probable Circuit
Cooling Fan 1 Inoperative, All Speeds	Open In White Wire Between Fan Control Unit & Cooling Fan Or Cooling Fan 1
Cooling Fan 2 Inoperative, All Speeds	Open In Black Wire Between Cooling Fan 2 & Ground Or Cooling Fan 2
Cooling Fan 1 & 2 Inoperative, Low Speed And/Or Cooling Fan 1 Inoperative, High Speed	Open In Light Blue Wire Between Cooling Fan Control Unit & Cooling Fan 1 Or Open In Gray Wire Between Cooling Fan Control Unit & Cooling Fan 2
Cooling Fan 1 Inoperative & Cooling Fan 2 On High, Low Speed, & Cooling Fan Inoperative, Medium Speed	Short To Voltage In White Wire Between Cooling Fan Control Unit & Cooling Fan 1
Cooling Fan 2 Inoperative, & Cooling Fan 1 on	Short To Ground In White Wire Between Cooling Fan

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High, Low Speed	Control Unit & Cooling Fan 1
Cooling Fan 1 Inoperative, Medium Speed	Open In Red Wire Between Cooling Fan Control Unit & Cooling Fan 1
Cooling Fan 2 Inoperative, Medium Speed	Open In Black Wire Between Cooling Fan Control Unit & Cooling Fan 2

### COOLING FAN SYMPTOMS (3.0L)

Symptom	Probable Circuit
Cooling Fan 1 Inoperative, All Speeds	Open In Orange Wire Between Fan Control Unit & Cooling Fan Or Open In Black Wire Between Cooling Fan Control Unit & Cooling Fan
Cooling Fan 2 Inoperative, All Speeds	Open In Black Wire Between Cooling Fan 2 & Ground
Cooling Fan 1 and 2 Inoperative, Low Speed, & Cooling Fan 1 Inoperative, High Speed Or Cooling Fan 2 Inoperative, High Speed	Open In Yellow Wire Between Cooling Fan Control Unit & Cooling Fan 1 Or Open In Orange Wire Between Cooling Fan Control Unit & Cooling Fan 2
Cooling Fan 2 Inoperative, & Cooling Fan 1 on High, Low Speed	Short To Ground In Orange Wire Between Cooling Fan Control Unit & Cooling Fan 1
Cooling Fan 1 Inoperative, Medium Speed	Open In Black Wire Between Cooling Fan Control Unit & Cooling Fan 1
Cooling Fan 2 Inoperative, Medium Speed	Open In Green Wire Between Cooling Fan Control Unit & Cooling Fan 2

### 2.4L, 3.1L & 3.4L ALERO, GRAND AM & MALIBU

#### Description

**NOTE: Cooling fan series/parallel relay may also be referred to as cooling fan mode control relay.**

Electric cooling fans are controlled by Body Control Module (BCM), which sends a signal to the PCM to turn fans on. Relays are energized when PCM grounds appropriate relay control circuit. Current flows from COOL FAN fuse No. 1 (30-amp) and COOL FAN fuse No. 2 (15-amp) in underhood electrical center through cooling fan relay contacts. This supplies battery voltage to cooling fan motors. When cooling fan relay No. 1 control circuit is grounded, both cooling fan motors run at low speed. When both relay control circuits are grounded, all 3 relays are energized, allowing both cooling fan motors to run at high speed.

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery positive voltage from underhood junction block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery positive voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan series/parallel relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan relay control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for left cooling fan. At same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there

own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

The PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 230°F (110°C).
- A/C refrigerant pressure exceeds 240 psi.
- When certain DTCs set.

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

#### Cooling Fan Inoperative

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**. If diagnostic system check has been performed, go to next step.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed cooling fans turn on and off with each command, go to next step. If low speed cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay will occur.

3. Using scan tool, command fans high speed on and off. If high speed cooling fans turn on and off with each command, problem is intermittent. If high speed cooling fans do not turn on and off with each command, go to step 13.
4. Turn ignition off. Disconnect cooling fan 1 relay. Turn ignition on, engine off. Probe battery voltage circuit of cooling fan 1 relay switch side using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 20.
5. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan 1 relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 15. If both cooling fans do not operate in low speed, go to next step.
6. Leave fused jumper wire in place of cooling fan 1 relay. Remove cooling fan series/parallel relay. Connect fused jumper (20-amp) between left cooling fan motor low circuit (White wire) of cooling fan series/parallel relay and right cooling fan motor supply voltage circuit (Black wire for Alero and Grand Am or Gray wire

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for Malibu) of cooling fan series/parallel relay. If both cooling fans operate in low speed, go to step 16 . If both cooling fans do not operate in low speed, go to next step.

7. Leave fused jumper wire in place of cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan series/parallel relay and cooling fan motor supply voltage circuit of cooling fan series/parallel relay. If right cooling fan operates at high speed, go to step 11 . If right cooling fan does not operate at high speed, go to next step.
8. Leave fused jumper wire in place of cooling fan 1 relay. Install cooling fan series/parallel relay. Disconnect right cooling fan connector. If left cooling fan operates at high speed, go to step 24 . If left cooling fan does not operate at high speed, go to next step.
9. Leave fused jumper wire in place of cooling fan 1 relay. Connect fused jumper (20-amp) between right cooling fan motor harness connector terminals. If left cooling fan operates at high speed, go to step 18 . If left cooling fan does not operate at high speed, go to next step.
10. Leave fused jumper wire in place of cooling fan 1 relay. Connect fused jumper (20-amp) between cooling fan motor supply voltage circuit at right cooling fan harness connector and ground. If left cooling fan operates at high speed, go to step 23 . If left cooling fan does not operate at high speed, go to step 24 .
11. Leave fused jumper wire in cooling fan 1 relay. Install cooling fan series/parallel relay. Disconnect left cooling fan connector. Connect fused jumper (20-amp) between left cooling fan motor harness connector terminals. If right cooling fan operates at high speed, go to step 19 . If right cooling fan does not operate at high speed, go to next step.
12. Leave fused jumper wire in place of cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage and left cooling fan motor connector terminal "A" (White wire). If right cooling fan operates at high speed, go to step 21 . If right cooling fan does not operate at high speed, go to step 25 .
13. If right cooling fan operates properly at high speed, go to next step. If right cooling fan does not operate properly at high speed, go to step 17 .
14. Remove cooling fan series/parallel relay. Connect fused jumper (20-amp) between left cooling fan low circuit (White wire) at cooling fan series/parallel relay and ground circuit (Black wire) at cooling fan series/parallel relay. If left cooling fan operates properly at high speed, go to step 16 . If left cooling fan does not operate properly at high speed, go to step 22 .
15. Check cooling fan relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 31 . If problem was not found, go to step 26 .
16. Check cooling fan series/parallel relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 31 . If problem was not found, go to step 27 .
17. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 31 . If problem was not found, go to step 28 .
18. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 31 . If problem was not found, go to step 29 .
19. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 31 . If problem was not found, go to step 30 .
20. Repair battery voltage circuit of cooling fan 1 relay, switch side. After repairs, go to step 31 .
21. Repair left cooling fan supply voltage circuit (Light Blue wire). After repairs, go to step 31 .
22. Repair left cooling fan ground circuit (Black wire between underhood fuse block and ground). After repairs, go to step 31 .
23. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 31 .
24. Repair right cooling fan supply voltage circuit (Black wire for 2000 Alero and Grand Am, Gray wire for all others). After repairs, go to step 31 .
25. Repair left cooling fan low circuit (White wire). After repairs, go to step 31 .
26. Replace cooling fan 1 relay. After repairs, go to step 31 .
27. Replace cooling fan series/parallel relay. After repairs, go to step 31 .

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28. Replace cooling fan 2 relay. After repairs, go to step 31 .
29. Replace right cooling fan. After repairs, go to step 31 .
30. Replace left cooling fan. After repairs, go to next step.
31. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** . If diagnostic system check has been performed, go to next step.
2. Turn ignition on, engine off. If one or both cooling fans are running all the time, go to next step. If one or both cooling fans are not running, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .
5. Repair short in left cooling fan supply voltage circuit (Light Blue wire). After repairs, go to step 8 .
6. Repair short in left cooling fan low circuit (White wire). After repairs, go to step 8 .
7. Repair short in right cooling fan supply voltage circuit (Black wire for 2000 Alero and Grand Am, Gray wire for all others). After repairs, go to next step.
8. Operate system to verify repair.

### 3.0L CATERA

#### Description

- **Auxiliary Fans Low Speed, Electric Cooling Fan Low Speed**

Battery voltage is supplied to heater water auxiliary pump whenever ignition switch is on. When engine temperature reaches 212°F (100°C), primary cooling fan temperature switch stage 1 will close, enabling fan control relay K26 to energize. When fan control relay K26 energizes, battery voltage from fuse 52 is applied to auxiliary coolant fan 1 (auxiliary engine coolant fan 1 is wired in series with auxiliary engine fan 2, through normally closed contacts of fan control relay K52. This will cause auxiliary coolant fans 1 and 2 to operate at low speed. Fan control relay K26 will also supply battery voltage to engine coolant fan resistor, voltage passes through resistor to electric coolant fan. Engine coolant fan resistor will cause engine coolant fan to operate at low speed. Primary cooling fan temperature switch stage 1 contacts will open when coolant temperature reaches 203°F (95°C). This will turn all 3 fans off, unless air conditioning system is on.

- **Auxiliary Fans High Speed**

When engine temperature reaches 221°F (105°C), secondary cooling fan temperature switch contacts will close and energize fan control relays K52 and K28. When fan control relay K52 energizes, it will ground terminal "B" of auxiliary engine coolant fan 1. Terminal "A" of auxiliary engine fan 1 still receives battery voltage from fan control relay K26. Auxiliary coolant fan 1 is no longer in series with auxiliary engine coolant fan 2 and will now operate at full speed. When fan control relay K28 is energized, battery voltage from fuse 40 will be applied to terminal "A" of auxiliary engine coolant fan 2. Auxiliary coolant fan 2 is no longer in series with auxiliary engine coolant fan 1 and operates at full speed. Terminal "B" of auxiliary coolant fan 2 is permanently grounded. With stage 1 contacts of primary cooling fan temperature switch closed, electric cooling fan will continue to operate. Secondary cooling fan temperature switch contacts will open when coolant temperature reaches 212°F (100°C). This will cause auxiliary engine coolant fans 1 and 2 to operate at low speed.

- **Electric Coolant Fan High Speed**

When engine coolant temperature reaches 230°F (110°C), primary cooling fan temperature switch stage 2 will close energizing fan control relay K67. When fan control relay K67 energizes, battery voltage from fuse 42 will be applied directly to terminal "A" of engine coolant fan (bypassing engine coolant fan resistor ) and engine coolant fan will operate at full speed. All other operations that were taking place before coolant temperature reached 230°F (110°C) will remain in effect. Primary cooling fan temperature switch stage 2 contacts will open when coolant temperature reaches 221°F (105°C) and primary engine coolant fan will shut off. At coolant temperatures above approximately 230°F (110°C), all 3 coolant fans are operating at full speed. Only 5 of 6 relays operate at this time, unless air conditioning system is turned on. In this case, fan control relay K87 and A/C compressor relay K60 will also operate.

### • Engine Cooling Fans (A/C Operation)

When A/C compressor is turned on, fan control relay K87 is energized and auxiliary engine coolant fans 1 and 2 will operate in low speed. In order to prevent inadmissible high refrigerant pressure in refrigerant circuit, auxiliary engine coolant fans 1 and 2 are switched from low speed to high speed at refrigerant pressures above approximately 275 psi. When pressure drops less than about 217 psi, auxiliary engine coolant fans 1 and 2 are switched back to low speed.

### • Water Auxiliary Pump

When ignition is off and engine coolant temperature reaches 212°F (100°C), primary cooling fan temperature switch stage 1 will close, enabling fan control relay K26 to energize. When fan control relay K26 energizes, battery voltage from fuse 52 is applied through normally closed auxiliary water pump relay K22, allowing water auxiliary pump to operate. Fan control relay K26 will also supply battery voltage to engine coolant resistor, allowing voltage to pass through resistor to electric cooling fan. Engine cooling fan resistor will cause engine cooling fan to operate at low speed. When engine coolant temperature reaches 203°F (95°C), primary cooling fan temperature switch stage 1 will open, de-energizing fan control relay K26. This will turn water auxiliary pump and engine cooling fan off.

#### Cooling Fan System Check

1. Turn ignition on, engine off. If heater water auxiliary pump operates, go to next step. If heater water auxiliary pump does not operate, repair heater water auxiliary pump as necessary.
2. Ensure engine temperature is less than 203°F (95°C). If auxiliary engine coolant fans and/or electric cooling fan operating with engine temperature less than 203°F (95°C), see **AUXILIARY COOLING FAN RUNS CONTINUOUSLY** . If auxiliary engine coolant fans and/or electric cooling fan are not operating with engine temperature less than 203°F (95°C), go to next step.
3. Connect fused jumper (5 amp) between fan control relay K26 diagnostic enable circuit and a known ground. Grounding fan control relay K26 diagnostic enable circuit will simulate closing of primary coolant fan temperature switch stage 1 contacts, this will energize fan control relay K26. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed, see **AUXILIARY COOLING FANS NO. 1 & 2 INOPERATIVE** .
4. Observe electric cooling fan. If electric cooling fan operating at low speed, go to next step. If electric cooling fan does not operate at low speed, see **COOLING FAN LOW SPEED INOPERATIVE** .
5. Turn ignition off. Leave all previously connected jumpers connected. If water auxiliary pump operates, go to next step. If water auxiliary pump does not operate, repair water auxiliary pump as necessary.
6. Turn ignition on, engine off. Leave all previously connected jumpers connected. Connect fused jumper (5 amp) between fan control relay K28 and fan control relay K52 diagnostic enable circuit and ground. Grounding fan control relay K28 and fan control relay K52 diagnostic enable circuit will simulate closing of secondary cooling fan temperature switch, this will energize fan control relay K28 and fan control relay K52. If auxiliary engine coolant fan 1 operates at high speed, go to next step. If auxiliary engine coolant fan 1 does

not operate at high speed, see **AUXILIARY ENGINE COOLING FAN NO. 1 INOPERATIVE** .

7. Observe auxiliary engine coolant fan 2. If auxiliary engine coolant fan 2 operates at high speed, go to next step. If auxiliary engine coolant fan 2 does not operate at high speed, see **AUXILIARY ENGINE COOLING FAN NO. 2 INOPERATIVE** .
8. Leave all previously connected jumpers connected. Connect fused jumper (5 amp) between fan control relay K67 diagnostic enable circuit and ground. Grounding fan control relay K67 diagnostic enable circuit will simulate closing of primary cooling fan temperature switch stage 2 contacts. This will energize fan control relay K67. If electric cooling fan operates at high speed, go to next step. If electric cooling fan does not operate at high speed, see **COOLING FAN HIGH SPEED INOPERATIVE** .
9. Remove all previously connected jumpers. Start engine. Turn A/C compressor clutch coil on. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed when compressor clutch coil is turned on, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed when compressor clutch coil is turned on, see **AUXILIARY COOLING FANS INOPERATIVE AT LOW SPEED** .
10. Install scan tool. Monitor engine coolant temperature using scan tool. Remove any previously connected jumpers. Turn A/C compressor clutch coil off. Allow engine to run until primary cooling fan temperature switch reaches 212°F (100°C). Stage 1 contacts should close and energize fan control relay K26. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed, go to step 12 .
11. Continue to allow engine to run until secondary cooling fan temperature switch reaches 221°F (105°C). Secondary cooling fan temperature switch should close and energize fan control relay K28 and fan control relay K52. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at high speed, go to step 15 . If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at high speed, go to step 16 .
12. Check control circuit (Brown/Blue wire) of fan control relay K26 for an open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
13. Check ground circuit (Black wire) of primary cooling fan temperature switch for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
14. Replace primary cooling fan temperature switch. After repairs, go to step 21 .
15. Continue to allow engine to run until primary cooling fan temperature switch reaches 230°F (110°C). Stage 2 contacts should close and energize fan control relay K67. If electric cooling fan operates at high speed, go to step 20 . If electric cooling fan does not operate at high speed, go to step 18 .
16. Check control circuit (Brown/White wire) of fan control relay K28 and fan control relay K52 for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
17. Replace secondary cooling fan temperature switch. After repairs, go to step 21 .
18. Check control circuit (Brown/White wire) of fan control relay K67 for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
19. Replace primary cooling fan temperature switch. After repairs, go to step 21 .
20. Install A/C manifold gauge set to monitor A/C refrigerant pressure. Turn A/C compressor clutch coil on. Continue to operate engine until A/C refrigerant pressure switch reaches 275 psi. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at high speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at high speed, see **AUXILIARY COOLING FANS INOPERATIVE AT HIGH SPEED** .
21. If engine cooling fans and auxiliary water pumps operate properly, system is okay.

#### Cooling Fan High Speed Inoperative

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.



**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

2. Turn ignition on, engine off. Remove fan control relay K67. Check diagnostic enable circuit (Brown/White wire) of relay K67 for open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
3. Check ignition voltage supply circuit (terminal No. 2) of K67 relay for open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
4. Check control circuit (terminal No. 6) of K67 relay for open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
5. Check battery voltage circuit (terminal No. 4) of relay K67 for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
6. Connect fused jumper (20-amp) between battery voltage circuit (terminal No. 4) of fan control relay K67 and electric cooling fan motor supply voltage circuit (terminal No. 8) of fan control relay K67. If electric cooling fan operates at high speed, go to next step. If electric cooling fan does not operate at high speed, go to step 9 .
7. Check fan control relay K67 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

8. Replace fan control relay K67. After repairs, go to step 13 .
9. Remove fused jumper (20-amp). Disconnect electric cooling fan connector. Check supply voltage circuit (Red/White wire) of electric cooling fan motor for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
10. Check ground circuit (Black wire) of electric cooling fan motor for open. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
11. Check electric cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 13 . If problem was not found, go to next step.
12. Replace electric cooling fan motor. After repairs, go to next step.
13. Operate system to verify repair.

#### Cooling Fan Low Speed Inoperative

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

2. Remove fan control relay K26. Check diagnostic enable circuit (Brown/Blue wire) of fan control relay K26 for open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
3. Check battery voltage circuit (terminal No. 3) of relay coil of fan control relay K26 for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.

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4. Check battery voltage circuit (terminal No. 2) of auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 of fan control relay K26 for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
5. Check battery voltage circuit (terminal No. 4) of electric cooling fan of fan control relay K26 for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
6. Connect fused jumper (20-amp) between battery circuit (terminal No. 4) of fan control relay K26 and electric cooling fan motor supply voltage circuit (terminal No. 5) of fan control relay K26. If electric cooling fan operates at low speed, go to next step. If electric cooling fan does not operate at low speed, go to step 9 .
7. Check fan control relay K26 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
8. Replace fan control relay K26. After repair, go to step 16 .
9. Check supply voltage circuit (Red/Blue wire) of engine coolant fan resistor for open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
10. Check supply voltage circuit (Red/White wire) of electric cooling fan for open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
11. Check ground circuit (Black wire) of electric cooling fan for open. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
12. Check integrity of engine coolant fan resistor. If engine coolant fan resistor is okay, go to step 14 . If engine coolant fan resistor is not okay, go to next step.
13. Replace engine coolant fan resistor. After repairs, go to step 16 .
14. Check electric cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 16 . If problem was not found, go to next step.
15. Replace electric cooling fan motor. After repairs, go to next step.
16. Operate system to verify repair.

### Auxiliary Engine Cooling Fan No. 1 Inoperative

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.
2. Turn ignition off. Connect fused jumper (5 amp) between fan control relay K26 diagnostic enable circuit (Brown/Blue wire) and ground. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine fan 2 do not operate at low speed, see **AUXILIARY COOLING FANS NO. 1 & 2 INOPERATIVE** .

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

3. Remove fused jumper (5 amp). Turn ignition on, engine off. Remove fan control relay K52. Check ignition voltage supply circuit (terminal No. 4) of fan control relay K52 connector for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
4. Turn ignition off. Check ground circuit (Black wire) of auxiliary engine coolant fan 1 of fan control relay K52 connector for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
5. Check control circuit (Brown/White wire) of fan control relay coil of fan control relay K52 connector for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
6. Check fan control relay K28 and fan control relay K52 diagnostic enable circuit (Brown/White wire) for open. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to

next step.

7. Check fan control relay K52 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 9 . If problem was not found, go to next step.
8. Replace fan control relay K52. After repairs, go to next step.
9. Operate system to verify repair.

#### Auxiliary Engine Cooling Fan No. 2 Inoperative

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.
2. Turn ignition off. Connect fused jumper (5 amp) between fan control relay K26 diagnostic enable circuit and ground. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed, See **AUXILIARY COOLING FANS NO. 1 & 2 INOPERATIVE** .

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

3. Turn ignition on, engine off. Remove fan control relay K28. Check battery voltage circuit (Red wire) of fan control relay K28 connector for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
4. Check ignition voltage supply circuit (Brown wire) of fan control relay K28 connector for open. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
5. Check supply voltage circuit (Red/White wire) of auxiliary engine coolant fan 2 for open. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
6. Check control circuit (Brown/White wire) of relay coil of fan control relay K28 connector for open. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
7. Check diagnostic enable circuit (Brown/White wire) of fan control relay K28 for open. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
8. Check fan control relay K28 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 10 . If problem was not found, go to next step.
9. Replace fan control relay K28. After repairs, go to next step.
10. Operate system to verify repair.

#### Auxiliary Cooling Fans No. 1 & 2 Inoperative

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

2. Remove fan control relay K26. Check battery voltage circuit (Red wire) of relay coil of fan control relay K26 connector for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
3. Check battery voltage circuit (Red wire) of auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 of fan control relay K26 connector for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.

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4. Check supply voltage circuit (Red/White wire) of auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 of fan control relay K26 connector for short to ground or open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
5. Check supply voltage circuit (Red wire) of electric cooling fan of fan control relay K26 connector for short to ground. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
6. Check control circuit (Brown/Blue wire) of relay coil of fan control relay K26 connector for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
7. Place fan control relay K26 back in ECM housing. Disconnect auxiliary engine coolant fan 1 connector. Connect fused jumper (5 amp) between fan control relay K26 diagnostic enable circuit and ground. Connect test light between supply voltage circuit (Red/White wire) of auxiliary engine coolant fan 1 connector and ground. If test light illuminates, go to step 10 . If test light does not illuminate, go to next step.
8. Check fan control relay K26 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
9. Replace fan control relay K26. After repairs, go to step 21 .
10. Leave fused jumper (5 amp) in place. Remove fan control relay K52 Connect auxiliary engine fan 1 connector. Connect fused jumper (20-amp) between ground circuit (terminal No. 2) of auxiliary engine coolant fan 1 of fan control relay K52 connector and ground. If auxiliary engine coolant fan 1 operates, go to step 14 . If auxiliary engine coolant fan 1 does not operate, go to next step.
11. Check ground circuit (Brown/Green wire) of auxiliary engine coolant fan 1 for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
12. Check auxiliary engine coolant fan 1 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
13. Replace auxiliary engine coolant fan 1. After repairs, go to step 21 .
14. Check ground circuit of auxiliary engine coolant fan 2 for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
15. Leave fused jumper (5 amp) wire in place. Connect a 20 A fused jumper wire between ground circuit (terminal No. 2) of auxiliary engine coolant fan 1 of fan control relay K52 connector and supply voltage circuit (terminal No. 5) of auxiliary engine coolant fan 2 of fan control relay K52 connector. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to step 19 . If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed, go to next step.
16. Check supply voltage circuit (Red/White wire) of auxiliary engine coolant fan 2 for open. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
17. Check auxiliary engine coolant fan 2 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
18. Replace auxiliary engine coolant fan 2. After repairs, go to step 21 .
19. Check fan control relay K52 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 21 . If problem was not found, go to next step.
20. Replace fan control relay K52. After repairs, go to next step.
21. Operate system to verify repair.

### Auxiliary Cooling Fans Inoperative At Low Speed

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.
2. Turn ignition off. Connect fused jumper (5 amp) between fan control relay K26 diagnostic enable circuit (Brown/Blue wire) and ground. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 do not operate at low speed, see **AUXILIARY COOLING FANS NO. 1 & 2 INOPERATIVE** .

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

3. Remove fused jumper. Turn ignition on, engine off. Remove fan control relay K87. Check battery voltage circuit (terminal No. 4) of fan control relay K87 connector for open. If problem was found, repair as necessary. After repairs, go to step 11 . If problem was not found, go to next step.
4. Check ground circuit (terminal No. 6) of relay coil of fan control relay K87 connector for open. If problem was found, repair as necessary. After repairs, go to step 11 . If problem was not found, go to next step.
5. Start engine. Turn A/C compressor on. Connect test light between supply voltage circuit (terminal No. 2) of fan control relay coil of fan control relay K87 connector and ground. If test light illuminates, go to step 8 . If test light does not illuminate, go to next step.
6. Check supply voltage circuit (Green wire) for open. If problem was found, repair as necessary. After repairs, go to step 11 . If problem was not found, go to next step.
7. See DIAGNOSTIC SYSTEM CHECK in appropriate AUTOMATIC A/C-HEATER SYSTEMS article. After repairs, go to step 11 .
8. Check supply voltage circuit (terminal No. 4) of auxiliary engine coolant fan 1 of fan control relay K87 connector for open. If problem was found, repair as necessary. After repairs, go to step 11 . If problem was not found, go to next step.
9. Check fan control relay K87 connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 11 . If problem was not found, go to next step.
10. Replace fan control relay K87. After repairs, go to next step.
11. Operate system to verify repair.

#### Auxiliary Cooling Fans Inoperative At High Speed

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.
2. Start engine. Turn A/C compressor on. With engine running, locate coolant fan test connector within ECM housing. Connect fused jumper between cooling fan relay control circuit (Brown/White wire) of coolant fan diagnostic enable circuit and ground. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 operate at high speed, go to step 4 . If Auxiliary fan 1 and Auxiliary fan 2 do not operate at high speed, go to next step.

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

3. Check auxiliary cooling fan relay control circuit (Brown/White wire) or coolant fan diagnostic enable circuit for open or high resistance. If problem was found, repair as necessary. After repairs, go to step 5 . If problem was not found, replace fan control relay K28. After repair, go to step 5 .
4. Check A/C refrigerant pressure cycling switch signal circuit (Brown/White wire) or A/C refrigerant pressure cycling switch ground circuit (Black wire) for open or high resistance. If problem was found, repair as necessary. After repairs, go to next step. If problem was not found, replace A/C compressor refrigerant pressure switch. After repairs, go to next step.
5. Operate system to verify repair.

#### Auxiliary Cooling Fan Runs Continuously

1. Perform **COOLING FAN SYSTEM CHECK** . Go to next step.

2. Turn ignition off. Ensure engine temperature is less than 203°F (95°C). Install A/C manifold gauge set to check A/C compressor refrigerant pressure switch is less than 217psi. If auxiliary engine coolant fan 1, auxiliary engine coolant fan 2, and electric cooling fan all operating at low speed, go to next step. If auxiliary engine coolant fan 1, auxiliary engine coolant fan 2, and electric cooling fan all operating at low speed, go to step 6.
3. Check diagnostic enable circuit (Brown/Blue wire) of fan control relay K26 for short to ground. If problem was found, repair as necessary. After repairs, go to step 29. If problem was not found, go to next step.

**CAUTION: Installation of proper relay is critical. If an enhanced relay (equipped with a diode) is installed into a position requiring a standard relay (equipped without a diode) excessive current will damage any components associated with relay or its associated circuits.**

4. Check control circuit (terminal No. 6) of relay coil of fan control relay K26 for short to ground. If problem was found, repair as necessary. After repairs, go to step 29. If problem was not found, go to next step.
5. Replace primary cooling fan temperature switch. After repairs, go to step 29.
6. If electric cooling fan is operating at low speed, go to step 10. If electric cooling fan is not operating at low speed, go to next step.
7. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 are operating at low speed, go to next step. If auxiliary engine coolant fan 1 and auxiliary engine coolant fan 2 are not operating at low speed, go to step 15.
8. Remove fan control relay K26. Connect test light between supply voltage circuit (terminal No. 2) of auxiliary engine coolant fan 1 of fan control relay K26 connector and ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 11.
9. Remove fan control relay K87. Connect test light between supply voltage circuit (terminal No. 3) of relay coil of fan control relay K87 connector and ground. If test light illuminates, see DIAGNOSTIC SYSTEM CHECK in appropriate AUTOMATIC A/C-HEATER SYSTEMS article. If test light does not illuminate, go to step 12.
10. Check supply voltage circuit (terminal No. 4) of electric cooling fan of fan control relay K26 connector for short to voltage. If problem was found, repair as necessary. After repairs, go to step 29. If problem was not found, go to step 13.
11. Replace fan control relay K26. After repairs, go to step 29.
12. Check supply voltage circuit of auxiliary engine coolant fan 1 of fan control relay K26 connector (terminal No. 2) and fan control relay K87 connector (terminal No. 8) for short to voltage. If problem was found, repair as necessary. After repairs, go to step 29. If problem was not found, go to step 14.
13. Replace fan control relay K26. After repairs, go to step 29.
14. Replace fan control relay K87. After repairs, go to step 29.
15. Turn ignition on, engine off. If auxiliary engine coolant fan 2 operates at high speed, go to next step. If auxiliary engine coolant fan 2 does not operate at high speed, go to step 24.
16. Remove fan control relay K28. Using DVOM, check continuity between control circuit (terminal No. 6) of relay coil of fan control relay K28 connector and ground. If continuity exists, go to next step. If continuity does not exist, go to step 19.
17. Check control circuit (terminal No. 6) of relay coil of fan control relay K28 for short to ground. If problem was found, repair as necessary. After repairs, go to step 29. If problem was not found, go to next step.
18. Replace secondary cooling fan temperature switch. After repairs, go to step 29.
19. Using DVOM, check continuity between control circuit (terminal No. 5) of relay coil of fan control relay K28 from A/C compressor refrigerant pressure switch and ground. If continuity exists, go to next step. If continuity does not exist, go to step 22.
20. Check control circuit (terminal No. 5) of relay coil of fan control relay K28 from A/C compressor refrigerant

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pressure switch for short to ground. If problem was found, repair as necessary. After repairs, go to step 29 . If problem was not found, go to next step.

21. Replace A/C compressor refrigerant pressure switch. After repairs, go to step 29 .
22. Check supply voltage circuit (Red/White wire) of auxiliary engine coolant fan 2 for short to voltage. If problem was found, repair as necessary. After repairs, go to step 29 . If problem was not found, go to next step.
23. Replace fan control relay K28. After repairs, go to step 29 .
24. If electric cooling fan operates at high speed, go to next step. If electric cooling fan does not operate at high speed, go to step 29 .
25. Remove fan control relay K67. Check control circuit (terminal No. 6) of relay coil of fan control relay K67 connector for short to ground. If problem was found, repair as necessary. After repairs, go to step 29 . If problem was not found, go to next step.
26. Replace primary cooling fan temperature switch. After repairs, go to step 29 .
27. Check supply voltage circuit (terminal No. 4) of electric cooling fan of fan control relay K67 connector for short to voltage. If problem was found, repair as necessary. After repairs, go to step 29 . If problem was not found, go to next step.
28. Replace fan control relay K67. After repairs, go to next step.
29. Connect all connectors and components that were disconnected. Verify auxiliary engine coolant fans 1 and 2 operate properly.

### 3.1L & 3.8L "W" BODY (CENTURY & REGAL)

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood accessory wiring junction block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan 2 relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan 3 relay through high speed cooling fan relay control circuit. This energizes cooling fan 2 relay coil, closes relay contacts, and provides a ground path for left cooling fan. At the same time, cooling fan 3 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- When A/C is requested and ambient temperature is greater than 122°F (50°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands high speed fans on under the following conditions:

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- Engine coolant temperature reaches 230°F (110°C).
- A/C refrigerant pressure exceeds 240 psi.
- When certain DTCs set.

### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

### Cooling Fan Inoperative

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**. If diagnostic system check has been performed, go to next step.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command **FANS LOW SPEED** on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE: Before PCM changes speed of cooling fans, a 3-second delay will occur.**

3. Using scan tool, command **FANS HIGH SPEED** on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE: Following this step, DO NOT remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).**

4. Remove cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan 1 relay and cooling fan motor supply voltage circuit of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 13. If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cooling fan 2 relay. Connect a second fused jumper (20-amp) between left cooling fan low reference circuit of cooling fan 2 relay and right cooling fan supply voltage circuit of cooling fan 2 relay. If both cooling fans operate in low speed, go to step 14. If both cooling fans do not operate in low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery voltage circuit of cooling fan 2 relay and cooling fan motor supply voltage circuit of cooling fan 2 relay. If right cooling fan operates in high speed, go to step 9. If right cooling fan does not operate in high speed, go to next step.
7. Install cooling fan 2 relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan motor harness connector. If left cooling fan operates in high speed, go to step 16. If left cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (White wire) of



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right cooling fan electrical connector and ground. If left cooling fan operates in high speed, go to step 20 . If left cooling fan does not operate in high speed, go to step 21 .

9. Install cooling fan 2 relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) wire between terminals of left cooling fan motor harness connector. If right cooling fan operates in high speed, go to step 17 . If cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and left cooling fan low circuit (Gray wire) of left cooling fan connector. If right cooling fan operates in high speed, go to step 18 . If right cooling fan does not operate in high speed, go to step 22 .
11. If right cooling fan operates in high speed, go to next step. If right cooling fan does not operate in high speed, go to step 15 .
12. Disconnect cooling fan 2 relay. Connect fused jumper (20-amp) between left cooling fan low reference circuit of cooling fan 2 relay and ground circuit of cooling fan 2 relay. If left cooling fan operates properly in high speed, go to step 14 . If left cooling fan does not operate properly in high speed, go to step 19 .
13. Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cooling fan 3 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair left cooling fan motor supply voltage circuit (White wire). After repairs, go to step 28 .
19. Repair left cooling fan ground circuit. After repairs, go to step 28 .
20. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair right cooling fan motor supply voltage circuit (White wire). After repairs, go to step 28 .
22. Repair left cooling fan low reference circuit (Gray wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan 2 relay. After repairs, go to step 28 .
25. Replace cooling fan 3 relay. After repairs, go to step 28 .
26. Replace right cooling fan. After repairs, go to step 28 .
27. Replace left cooling fan. After repair, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** . If diagnostic system check has been performed, go to next step.
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan 2 relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in left cooling fan supply voltage circuit (Light Blue wire). After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit (Gray wire). After repairs, go to step 8 .

7. Repair short to voltage in right cooling fan supply voltage circuit (White wire). After repairs, go to next step.
8. Operate system to verify repair.

#### Diagnostic Aids

Check for poor connections at PCM, cooling fan relays and cooling fan motors. Inspect harness connectors for damaged, corroded or backed-out terminal pins. Inspect related wiring harnesses for damage or improper routing.

### 3.1L "W" BODY (LUMINA)

#### Description

Power for fan motors is supplied through engine wiring harness junction block 1 and engine wiring harness junction block 2. Cooling fan relays are energized when current flows from MaxiFuse(R) 1 in engine wiring harness junction block 1 and FAN 3 fuse (25 amp) in engine wiring harness junction block 2 through relay coils to ground through Powertrain Control Module (PCM). Low speed fans control circuit is grounded for low speed fans operation. Low speed fans control circuit and high speed fans control circuits are all grounded for high speed fans operation.

During low speed fans operation, PCM supplies a ground path for fan control relay 1. This closes fan control relay 1 contacts, allowing current to flow from engine wiring harness junction block 1 through relay contacts to engine coolant fan motor 1. During low speed operation, ground path for engine coolant fan motor 1 is through fan control relay 2 and engine coolant fan motor 2. Result is a series circuit with both cooling fans running at low speed.

During high speed cooling fan operation, PCM supplies a ground path for fan control relay 1. PCM also supplies a ground path for fan control relay 2 and fan control relay 3. This closes all 3 cooling fan relays. During high speed fan operation, both right and the left engine cooling fans are supplied current from engine wiring harness junction block 1 and engine wiring harness junction block 2 and each cooling fan has its own ground path.

#### Cooling Fan Functional Check

1. Perform Powertrain On-Board Diagnostic (OBD) System Check in under appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If no DTCs are present, go to next step.
2. Install scan tool. Engine coolant temperature must be less than 212°F (100°C) for all fan diagnoses. Turn Ignition on, engine and A/C off. If cooling fans are off, go to next step. If cooling fans are not off, see [PROCEDURE NO. 1](#).
3. Using scan tool, command low speed fans on. If both cooling fans are on, go to next step. If both cooling fans are not on, see [PROCEDURE NO. 2](#).

**NOTE:** Allow a 3-5 second delay before determining if fans have switched from low to high speed.

4. Using scan tool, command high speed fans on. If both cooling fans switch to high speed, go to next step. If both cooling fans do not switch to high speed, see [PROCEDURE NO. 3](#).
5. Exit outputs screen on scan tool. Idle engine leaving A/C OFF. If cooling fans on, go to step 7.
6. Turn A/C on. If cooling fans are on, system is okay. If cooling fans are not on, go to step 8.
7. If scan tool displays A/C request as YES, see TESTING in appropriate MANUAL A/C-HEATER SYSTEMS article. If scan tool does not display A/C request as YES, go to step 9.
8. If scan tool displays A/C request as YES, see appropriate A/C COMPRESSOR CLUTCH CONTROLS article. If scan tool does not display A/C request as YES, see TESTING in appropriate MANUAL A/C-HEATER SYSTEMS article.
9. Replace PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE.

**Procedure No. 1**

1. If cooling fan functional check has been performed, go to next step. If cooling fan functional check has not been performed, see **COOLING FAN FUNCTIONAL CHECK** .
2. Disconnect fan control relay 1. Turn ignition on, engine off. If both fans are off, go to step 9 . If both fans are not off, go to next step.
3. Disconnect fan control relay 2. If both fans are off, go to step 5 . If both fans are not off, go to next step.
4. Remove fan control relay 3. If both fans are off, go to step 7 . If both fans are not off, go to step 11 .
5. Disconnect engine coolant fan motor 1. Probe fan feed terminal (Light Blue wire) of engine coolant fan motor 1 connector using test light connected to ground. If test light illuminates, go to step 12 . If test light does not illuminate, go to next step.
6. Probe fan control relay 2 switch feed terminal (Black wire) at engine coolant fan motor 1 connector using test light connected to ground. If test light illuminates, go to step 13 . If test light does not illuminate, go to step 17 .
7. Probe high speed fans control circuit (Dark Blue wire) at fan control relay 2 connector using test light connected to battery voltage. If test light illuminates, go to next step. If test light does not illuminate, go to step 16 .
8. Turn ignition off. Leave test light installed. Disconnect PCM. Turn ignition on, engine off. If test light is still illuminated, go to step 15 . If test light is not still illuminated, go to step 18 .
9. Probe low speed fans control circuit (Dark Green wire) at fan control relay 1 connector using test light connected to battery voltage. If test light illuminates, go to next step. If test light does not illuminate, go to step 14 .
10. Turn ignition off. Leave test light installed. Disconnect PCM. Turn ignition on, engine off. If test light is still illuminated, go to step 15 . If test light is not still illuminated, go to step 18 .
11. Check engine coolant fan motor 1 feed circuit (Light Blue wire) for short to voltage. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to step 16 .
12. Repair short to voltage in engine coolant fan motor 2 feed circuit (White wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
13. Repair short to voltage in fan control relay 2 switch feed circuit (Black wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
14. Replace fan control relay 1. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
15. Repair short to ground in high speed fans control circuit (Dark Green wire) or low speed fans control circuit (Dark Blue wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
16. Replace fan control relay 3. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
17. Replace fan control relay 2. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
18. Replace PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

**Procedure No. 2**

1. If cooling fan functional check has been performed, go to next step. If cooling fan functional check has not been performed, see **COOLING FAN FUNCTIONAL CHECK** .
2. If either fan turned on when low speed fans was commanded on, go to next step. If neither fan turned on when low speed fans was commanded on, go to step 5 .
3. Using scan tool, command high speed fans on. If inoperative fan from previous step turned on, go to next step. If inoperative fan from previous step did not turn on, go to step 20 .
4. Disconnect fan control relay 3. If inoperative fan from step 2 turned off, go to step 23 . If inoperative fan from step 2 did not turn off, go to step 22 .

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5. Disconnect fan control relay 1. Using scan tool, command low speed fans on. Probe low speed fans control circuit (Dark Green wire) at fan control relay 1 connector using test light connected to battery voltage. If test light illuminates, go to next step. If test light does not illuminate, go to step 13 .
6. Probe both feed circuits (Orange wire and Red wire) at fan control relay 1 connector using test light connected to ground. If test light illuminates for both circuits, go to next step. If test light does not illuminate for both circuits, go to step 24 .

**NOTE: Leave fused jumper in place for remainder of this procedure.**

7. Connect fused jumper (30-amp) between switch feed circuit (Red wire) and engine coolant fan motor 1 feed circuit (Light Blue wire) at fan control relay 1 connector. If both fans turn on, go to step 25 . If both fans do not turn on, go to next step.
8. Disconnect engine coolant fan motor 1. Probe engine coolant fan motor 1 feed circuit (Light Blue wire) at fan harness connector using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 27 .
9. Connect second fused jumper (30-amp) between engine coolant fan motor 1 harness connector terminals. If engine coolant fan motor 2 turns on, go to step 17 . If engine coolant fan motor 2 does not turn on, go to next step.
10. Reconnect engine coolant fan motor 1. Disconnect fan control relay 2. Probe switch feed circuit (Black wire) at fan control relay 2 connector using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 28 .
11. Using second fused jumper, connect fused jumper between switch feed circuit (Black wire) and engine coolant fan motor 2 feed circuit (White wire) at fan control relay 2 connector. If both fans turn on, go to step 29 . If both fans do not turn on, go to next step.
12. Reconnect fan control relay 2. Disconnect engine coolant fan motor 2. Probe engine coolant fan motor 2 feed circuit (White wire) at fan harness connector terminal using test light connected to ground. If test light illuminates, go to step 16 . If test light does not illuminate, go to step 19 .
13. Ensure test light is still connected. Turn ignition off. Disconnect PCM. Probe low speed fans control circuit (Dark Green wire) at PCM connector using fused jumper (15 amp) connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 15 .
14. Check PCM connector for poor connections. Check engine wiring harness junction block 1 for open or poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to step 31 .
15. Repair open or short to voltage in low speed fans control circuit. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
16. Check fan motor ground circuit (Black wire) for open or poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to next step.
17. Check fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to next step.
18. Replace fan motor. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
19. Repair open in engine coolant fan motor 2 feed circuit (White wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

**NOTE: If fuse is open, locate and repair short to ground on load circuit or shorted component.**

20. Check supply circuit to inoperative fan for open or short to ground. If problem was found, repair as necessary. Replace fuse. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, replace fuse. Then go to next step.

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21. Replace fan which was not operating. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
22. Replace fan control relay 3. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
23. Check the following circuits/components for short:
  - Fan control relay 2 switch feed circuit (Black wire).
  - Engine coolant fan motor 2 feed circuit (White wire).
  - Engine coolant fan motor 2.
  - Engine wiring harness junction block 1.

If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to step 29 .

**NOTE: If fuse is open, locate and repair short to ground on load circuit or shorted component.**

24. Repair open or grounded circuit for circuit that did not illuminate test light. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
25. Check fan control relay 1 connector for poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to next step.
26. Replace fan control relay 1. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
27. Repair open in engine coolant fan motor 1 feed circuit (Light Blue wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
28. Repair open in fan control relay 2 switch feed circuit (Black wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
29. Check fan control relay 2 connector for poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to next step.
30. Replace fan control relay 2. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
31. Replace PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

### Procedure No. 3

1. If cooling fan functional check has been performed, go to next step. If cooling fan functional check has not been performed, see **COOLING FAN FUNCTIONAL CHECK** .
2. Using scan tool, command low speed fans on. Command high speed fans on while observing fans. If both fans operate with no change, go to step 8 . If both fans did not operate with no change, go to next step.
3. If engine coolant fan motor 1 stopped operating, go to step 9 . If engine coolant fan motor 1 did not stop operating, go to next step.
4. Disconnect fan control relay 3. Probe high speed fans control circuit (Dark Blue wire) at fan control relay 3 connector using test light connected to battery voltage. Using scan tool, command high speed fans on. If test light illuminates after a few seconds, go to next step. If test light does not illuminate after a few seconds, go to step 12 .
5. Probe coil feed circuit (Red wire) at fan control relay 3 connector using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 13 .
6. Probe switch feed circuit (Red wire) at fan control relay 3 connector using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 14 .
7. Install fused jumper (30-amp) between switch feed circuit (Red wire) and engine coolant fan motor 2 feed circuit (White wire) at fan control relay 3 connector. If engine coolant fan motor 2 turns on, go to step 15 . If engine coolant fan motor 2 does not turn on, go to step 16 .

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8. Turn ignition off. Disconnect PCM. Disconnect fan control relay 1. Install fused jumper (30-amp) between switch feed circuit (Red wire) and engine coolant fan motor 1 feed circuit (Light Blue wire) at fan control relay 1 connector. Turn ignition on, engine off. Probe high speed fans control circuit (Dark Blue wire) at PCM harness connector using fused jumper connected to ground. If fans switch from low to high speed, go to step [22](#) . If fans do not change from low to high speed, go to step 17 .
9. Disconnect fan control relay 2. Probe high speed fans control circuit (Dark Blue wire) at fan control relay 2 connector using test light connected to battery voltage. Using scan tool, command high speed fans on. If test light illuminates after a few seconds, go to next step. If test light does not illuminate after a few seconds, go to step 18 .
10. Probe ground circuit (Black wire) at fan control relay 2 connector using test light connected to battery voltage. If test light illuminates, go to next step. If test light does not illuminate, go to step 19 .
11. Probe coil feed circuit (Orange wire) at fan control relay 2 connector using test light connected to ground. If test light illuminates, go to step 20 . If test light does not illuminate, go to step 21 .
12. Repair open in high speed fans control circuit (Dark Blue wire) between fan control relay 3 and PCM. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

**NOTE:** If fuse is open, locate and repair short to ground on load circuit or shorted component.

13. Repair open or short in fan control relay 3 coil feed circuit (Red wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

**NOTE:** If fuse is open, locate and repair short to ground on load circuit or shorted component.

14. Repair open in fan control relay 3 switch feed circuit (Red wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
15. Replace fan control relay 3. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
16. Repair open in engine coolant fan motor 2 feed circuit (White wire) between fan control relay 3 and engine coolant fan motor 2. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
17. Repair open or short to battery voltage in high speed fans control circuit (Dark Blue wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
18. Repair open in high speed fans control circuit (Dark Blue wire) between fan control relay 2 and PCM. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
19. Repair open in ground circuit (Black wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
20. Replace fan control relay 2. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

**NOTE:** If fuse is open, locate and repair short to ground on load circuit or shorted component.

21. Repair open in fan control relay 2 coil feed circuit (Orange wire). After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .
22. Check PCM connectors for poor connections. If problem was found, repair as necessary. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** . If problem was not found, go to next step.
23. Replace PCM. See appropriate REMOVAL, OVERHAUL & INSTALLATION article in ENGINE PERFORMANCE. After repairs, perform **COOLING FAN FUNCTIONAL CHECK** .

Check for poor connections at PCM, cooling fan relays and cooling fan motors. Inspect harness connectors for damaged, corroded or backed-out terminal pins. Inspect related wiring harnesses for damage or improper routing.

### 3.1L & 3.8L "W" BODY (GRAND PRIX)

**NOTE:** Cooling fan circuit utilizes 3 cooling fan relays. Relays directly controlling fan motors are 4-pin type and are referred to as No. 1 and 2. Relay determining cooling fan motor low speed or high speed operation is referred to as 5-pin relay in this test. See WIRING DIAGRAMS .

#### Description

##### • 3.1L

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood accessory wiring junction block. During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cool fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cool fan relay and right cooling fan. Result is a series circuit with both fans running at low speed. During high speed operation, PCM supplies ground path for cool fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cool fan 2 relay and cool fan relay through high speed cooling fan relay control circuit. This energizes cool fan relay coil, closes relay contacts, and provides a ground path for left cooling fan. At same time, cool fan 2 relay coil is energized closing relay contacts and provides battery positive voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. The result is a parallel circuit with both fans running at high speed.

##### • 3.8L

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood accessory wiring junction block. During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cool fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cool fan relay and left cooling fan. Result is a series circuit with both fans running at low speed. During high speed operation PCM supplies ground path for cool fan 1 relay through low speed cooling fan relay control circuit. After 3-second delay, PCM supplies ground path for cool fan 2 relay and cool fan relay through high speed cooling fan relay control circuit. This energizes cool fan relay coil, closes relay contacts, and provides a ground path for right cooling fan. At same time cool fan 2 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to left cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- When A/C is requested and ambient temperature is greater than 122°F (50°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 230°F (110°C).
- A/C refrigerant pressure exceeds 240 psi.
- When certain DTCs set.

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Powertrain Control Module (PCM). If communication with PCM is established, go to next step. If communication with PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE (3.1L)** , **COOLING FAN INOPERATIVE (3.8L)** , **COOLING FAN ALWAYS ON (3.1L)** or **COOLING FAN ALWAYS ON (3.8L)** .
4. If scan tool does not display DTCs beginning with "U", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

#### Cooling Fan Inoperative (3.1L)

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4 .

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay occurs.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11 .

**NOTE:** Following this step, do not remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).

4. Disconnect cool fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of the cool fan 1 relay and cooling fan motor supply voltage circuit (White wire) of cool fan 1 relay. If both cooling fans operate in low speed, go to step 13 . If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cool fan relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit of cool fan relay and right cooling fan supply voltage circuit of cool fan relay. If both cooling fans operate in low speed, go to step 14 . If both cooling fans do not operate in low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery voltage circuit of cool fan relay and cooling fan motor supply voltage circuit of cool fan relay. If right cooling fan operates in high speed, go to step 9 . If right cooling fan does not operate in high speed, go to next step.
7. Install cool fan relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit of right cooling fan electrical connector and cooling fan ground circuit of right cooling fan electrical connector. If left cooling fan operates in high speed, go to



- step 16 . If left cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit of right cooling fan electrical connector and ground. If left cooling fan operates in high speed, go to step 20 . If left cooling fan does not operate in high speed, go to step 21 .
  9. Install cool fan relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between motor supply voltage circuit of left cooling fan electrical connector and low reference circuit of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 17 . If right cooling fan does not operate in high speed, go to next step.
  10. Connect second fused jumper (20-amp) between battery voltage and left cooling fan low reference circuit of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 18 . If right cooling fan does not operate in high speed, go to step 22 .
  11. If right cooling fan is operating properly in high speed, go to next step. If right cooling fan is not operating properly in high speed, go to step 15 .
  12. Disconnect cool fan relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit of cool fan relay and ground circuit of cool fan relay. If left cooling fan operates properly in high speed, go to step 14 . If left cooling fan does not operate properly in high speed, go to step 19 .
  13. Check cool fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
  14. Check cool fan relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
  15. Check cool fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
  16. Check right cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
  17. Check left cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
  18. Repair left cooling fan supply voltage circuit. After repairs, go to step 28 .
  19. Repair left cooling fan ground circuit. After repairs, go to step 28 .
  20. Repair right cooling fan ground circuit. After repairs, go to step 28 .
  21. Repair right cooling fan motor supply voltage circuit. After repairs, go to step 28 .
  22. Repair left cooling fan low reference circuit. After repairs, go to step 28 .
  23. Replace cool fan 1 relay. After repairs, go to step 28 .
  24. Replace cool fan relay. After repairs, go to step 28 .
  25. Replace cool fan 2 relay. After repairs, go to step 28 .
  26. Replace right cooling fan. After repairs, go to step 28 .
  27. Replace left cooling fan. After repairs, go to next step.
  28. Operate system to verify repair.

#### Cooling Fan Inoperative (3.8L)

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4 .

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay occurs.

3. Disconnect cool fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of the cool fan 1 relay and cooling fan motor supply voltage circuit (White wire) of cool fan 1 relay. If both cooling fans operate in low speed, go to step 11 . If both cooling fans do not operate in low speed, go to next step.

**NOTE: Following this step, do not remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).**

4. Disconnect cool fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of the cool fan 1 relay and cooling fan motor supply voltage circuit (White wire) of cool fan 1 relay. If both cooling fans operate in low speed, go to step 13 . If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cool fan relay. Connect the second fused jumper (20-amp) between right cooling fan low reference circuit of cool fan relay and left cooling fan motor supply voltage circuit of cool fan relay. If both cooling fans operate in low speed, go to step 14 . If both cooling fans do not operate in low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery voltage circuit of cool fan relay and cooling fan motor supply voltage circuit of cool fan relay. If left cooling fan operates in high speed, go to step 9 . If left cooling fan does not operate in high speed, go to next step.
7. Install cool fan relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit of left cooling fan electrical connector and cooling fan ground circuit of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 16 . If right cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit of left cooling fan electrical connector and ground. If right cooling fan operates in high speed, go to step 20 . If right cooling fan does not operate in high speed, go to step 21 .
9. Install cool fan relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between motor supply voltage circuit of right cooling fan electrical connector and low reference circuit of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 17 . If left cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 18 . If left cooling fan does not operate in high speed, go to step 22 .
11. If left cooling fan is operating properly in high speed, go to next step. If left cooling fan is not operating properly in high speed, go to step 15 .
12. Disconnect cool fan relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit of cool fan relay and ground circuit of cool fan relay. If right cooling fan operates properly in high speed, go to step 14 . If right cooling fan does not operate properly in high speed, go to step 19 .
13. Check cool fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cool fan relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cool fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair right cooling fan supply voltage circuit. After repairs, go to step 28 .
19. Repair right cooling fan ground circuit. After repairs, go to step 28 .

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20. Repair left cooling fan ground circuit. After repairs, go to step 28 .
21. Repair left cooling fan supply voltage circuit. After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit. After repairs, go to step 28 .
23. Replace cool fan 1 relay. After repairs, go to step 28 .
24. Replace cool fan relay. After repairs, go to step 28 .
25. Replace cool fan 2 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On (3.1L)

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cool fan relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in left cooling fan supply voltage circuit. After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit. After repairs, go to step 8 .
7. Repair short to voltage in right cooling fan supply voltage circuit. After repairs, go to next step.
8. Operate system to verify repair.

### Cooling Fan Always On (3.8L)

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cool fan relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan supply voltage circuit. After repairs, go to step 8 .
6. Repair short to voltage in right cooling fan low reference circuit. After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan supply voltage circuit. After repairs, go to next step.
8. Operate system to verify repair.

### Diagnostic Aids

Check for poor connections at PCM, cooling fan relays and cooling fan motors. Inspect harness connectors for damaged, corroded or backed-out terminal pins. Inspect related wiring harnesses for damage or improper routing.

### 3.4L & 3.8L "W" BODY (IMPALA & MONTE CARLO)

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a

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series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from engine wiring harness junction block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from FAN CONT 1 fuse through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cooling fan 2 relay and left cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies ground path for cooling fan 2 relay and cooling fan 3 relay through high speed cooling fan relay control circuit. This energizes cooling fan 2 relay coil, closes relay contacts, and provides a ground path for right cooling fan. At the same time, cooling fan 3 relay coil is energized closing relay contacts and provides battery voltage from FAN CONT 2 fuse on cooling fan motor supply voltage circuit to left cooling fan. During high speed fan operation, both engine cooling fans have their own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- When A/C is requested and ambient temperature is greater than 122°F (50°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 230°F (110°C).
- A/C refrigerant pressure exceeds 240 psi.
- When certain DTCs set.

### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate BODY CONTROL MODULES article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.

### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fan, a 3-second delay occurs.

- Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11 .

**NOTE:** Do not remove fused jumper (20-amp) connected during this step. Use a second fused jumper (20-amp) while performing the following steps.

- Disconnect cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit (Orange wire) of cooling fan 1 relay and cooling fan motor supply voltage circuit (Gray wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 13 . If both cooling fans do not operate in low speed, go to next step.
- Disconnect cooling fan 2 relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan 2 relay and left cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 2 relay. If both cooling fans operate in low speed, go to step 14 . If both cooling fans do not operate in low speed, go to next step.
- Connect second fused jumper (20-amp) between battery voltage circuit (Orange wire) of cooling fan 2 relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 2 relay. If left cooling fan operates in high speed, go to step 9 . If left cooling fan does not operate in high speed, go to next step.
- Install cooling fan 2 relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 16 . If right cooling fan does not operate in high speed, go to next step.
- Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of left cooling fan electrical connector and ground. If right cooling fan operates in high speed, go to step 20 . If right cooling fan does not operate in high speed, go to step 21 .
- Install cooling fan 2 relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 17 . If left cooling fan does not operate in high speed, go to next step.
- Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit (White wire) of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 18 . If left cooling fan does not operate in high speed, go to step 22 .
- If left cooling fan operates properly in high speed, go to next step. If left cooling fan does not operate properly in high speed, go to step 15 .
- Disconnect cooling fan 2 relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan 2 relay and ground circuit (Black wire) of cooling fan 2 relay. If right cooling fan operates properly in high speed, go to step 14 . If right cooling fan does not operate properly in high speed, go to step 19 .
- Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
- Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
- Check cooling fan 3 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
- Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
- Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
- Repair right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 28 .

19. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit (White wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan 2 relay. After repairs, go to step 28 .
25. Replace cooling fan 3 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

#### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If neither cooling fan is on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan 2 relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 8 .
6. Repair short to voltage in right cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

### 3.5L "W" BODY (INTRIGUE)

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood accessory wiring junction block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cooling fan 2 relay and left cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan 3 relay through high speed cooling fan relay control circuit. This energizes cooling fan 2 relay coil, closes relay contacts, and provides a ground path for right cooling fan. At the same time, cooling fan 3 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to left cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands Low Speed Fans on under the following conditions:

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- Engine coolant temperature exceeds approximately 223°F (106°C).
- When A/C is requested and ambient temperature is more than 122°F (50°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut, off if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 230°F (110°C).
- A/C refrigerant pressure exceeds 240 psi.
- When certain DTCs set.

### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate BODY CONTROL MODULES article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.

### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fan, a 3-second delay occurs.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE:** Do not remove fused jumper (20-amp) connected during this step. Use a second fused jumper (20-amp) while performing the following steps.

4. Remove cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan 1 relay and cooling fan motor supply voltage circuit (White wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 13. If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cooling fan 2 relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (Gray wire) of cooling fan 2 relay and left cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 2 relay. If both cooling fans operate in low speed, go to step 14. If both cooling fans do not operate in low speed, go to next step.

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6. Connect second fused jumper (20-amp) between battery voltage circuit of cooling fan 2 relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 2 relay. If left cooling fan operates in high speed, go to step 9 . If left cooling fan does not operate in high speed, go to next step.
7. Install cooling fan 2 relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operated in high speed, go to step 16 . If right cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of left cooling fan electrical connector and ground. If right cooling fan operates in high speed, go to step 20 . If right cooling fan does not operate in high speed, go to step 21 .
9. Install cooling fan 2 relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 17 . If left cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit (Gray wire) of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 18 . If left cooling fan does not operate in high speed, go to step 22 .
11. If left cooling fan is operating properly in high speed, go to next step. If left cooling fan is not operating properly in high speed, go to step 15 .
12. Disconnect cooling fan 2 relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (Gray wire) of cooling fan 2 relay and ground circuit (Black wire) of cooling fan 2 relay. If right cooling fan operates properly in high speed, go to step 14 . If right cooling fan does not operate properly in high speed, go to step 19 .
13. Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cooling fan 3 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check left cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check right cooling fan motor connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair right cooling fan motor supply voltage circuit (White wire). After repairs, go to step 28 .
19. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit (Gray wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan 2 relay. After repairs, go to step 28 .
25. Replace cooling fan 3 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If neither cooling fan is on,



problem is intermittent.

3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan 3 relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan motor supply voltage circuit (White wire). After repairs, go to step 8 .
6. Repair short to voltage in right cooling fan low reference circuit (Gray wire). After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

#### Diagnostic Aids

If cooling fans remain on when commanded off and no DTCs are set, most likely cause is either a stuck relay or short to voltage in cooling fan circuit. If a symptom is traced to faulty circuit in underhood junction block, block must be replaced as a unit. If symptom is intermittent, check for poor connections or bare wiring.

### 3.5L & 4.0L AURORA

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fan relays receive battery voltage from underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cooling fan series/parallel relay and left cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for right cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to the left cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands Low Speed Fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- Fans will switch from low to off when coolant drops less than 216°F (102°C).
- A/C operation is requested.
- After vehicle is shut off, if coolant temperature at key-off is more than 304°F (151°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM switches fans to high speed under the following conditions:

- Engine coolant temperature reaches 234°F (112°C).
- A/C refrigerant pressure exceeds 240 psi.
- Fans will return to low speed operation if refrigerant pressure drops less than 190 psi.

- When certain DTCs set.

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Panel Cluster (IPC), Dash Integration Module (DIM) and Powertrain Control Module (PCM). If communication with IPC, DIM and PCM is established, go to next step. If communication with IPC, DIM and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", go to next step. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
5. If scan tool displays DTCs beginning with "P", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "B", see appropriate **SELF-DIAGNOSTIC SYSTEM** article in **BODY CONTROL MODULES**.

#### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.

**NOTE:** Cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See **WIRING DIAGRAMS** for proper identification.

2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay occurs.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE:** Following this step, do not remove fused jumper (20-amp) connected during this step. While performing the following steps, use a second fused jumper (20-amp).

4. Disconnect cooling fan 1 relay. Connect first fused jumper (20-amp) between battery positive voltage circuit of cooling fan 1 relay and motor supply voltage circuit (Gray wire) of cooling fan 1 relay. If both cooling fans operate at low speed, go to step 13. If both cooling fans do not operate at low speed, go to next step.
5. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and left cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If both cooling fans operate at low speed, go to step 14. If both cooling fans do not operate at low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery positive voltage circuit of cooling fan series/parallel relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If left

cooling fan operates at high speed, go to step 9 . If left cooling fan does not operate at high speed, go to next step.

7. Install cooling fan series/parallel relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates at high speed, go to step 16 . If right cooling fan does not operate at high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of left cooling fan electrical connector and ground. If right cooling fan operates at high speed, go to step 20 . If right cooling fan does not operate at high speed, go to step 21 .
9. Install cooling fan series/parallel relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates at high speed, go to step 17 . If left cooling fan does not operate at high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit (White wire) of right cooling fan electrical connector. If left cooling fan operates at high speed, go to step 18 . If left cooling fan does not operate at high speed, go to step 22 .
11. If left cooling fan is operating properly at high speed, go to next step. If left cooling fan is not operating properly at high speed, go to step 15 .
12. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and ground circuit (Black wire) of cooling fan series/parallel relay. If right cooling fan operates properly at high speed, go to step 14 . If right cooling fan does not operate properly at high speed, go to step 19 .
13. Check cooling fan 1 relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 23 .
14. Check cooling fan series/parallel relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 24 .
15. Check cooling fan 2 relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 25 .
16. Check left cooling fan connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 26 .
17. Check right cooling fan connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 27 .
18. Repair right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 28 .
19. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit (White wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan series/parallel relay. After repairs, go to step 28 .
25. Replace cooling fan 2 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

#### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .

**NOTE:** Cooling fan 1 relay and cooling fan 2 relay are improperly identified in

**underhood fuse block. See WIRING DIAGRAMS for proper identification.**

2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 8 .
6. Repair short to voltage in right cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

### 3.8L BONNEVILLE & LESABRE

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cooling fan series/parallel relay and left cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan relay control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for right cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to left cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 244°F (118°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 234°F (112°C).
- A/C refrigerant pressure exceeds 237 psi.
- When certain DTCs set.

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see SCAN TOOL

DOES NOT POWER UP in appropriate BODY CONTROL MODULES article.

2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE in appropriate BODY CONTROL MODULES article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE in appropriate BODY CONTROL MODULES article.

#### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.

**NOTE:** Cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See WIRING DIAGRAMS for proper identification.

2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay occurs.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE:** Following this step, do not remove fused jumper (20-amp) connected during this step. While performing the following steps, use a second fused jumper (20-amp).

4. Disconnect cooling fan 1 relay. Connect first fused jumper (20-amp) between battery positive voltage circuit of cooling fan 1 relay and motor supply voltage circuit (Gray wire) of cooling fan 1 relay. If both cooling fans operate at low speed, go to step 13. If both cooling fans do not operate at low speed, go to next step.
5. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and left cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If both cooling fans operate at low speed, go to step 14. If both cooling fans do not operate at low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery positive voltage circuit of cooling fan series/parallel relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If left cooling fan operates at high speed, go to step 9. If left cooling fan does not operate at high speed, go to next step.
7. Install cooling fan series/parallel relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates at high speed, go to step 16. If right cooling fan does not operate at high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of left cooling fan electrical connector and ground. If right cooling fan operates at high speed, go to step 20. If right cooling fan does not operate at high speed, go to step 21.
9. Install cooling fan series/parallel relay. Disconnect right cooling fan electrical connector. Connect second

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fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates at high speed, go to step 17 . If left cooling fan does not operate at high speed, go to next step.

10. Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit (White wire) of right cooling fan electrical connector. If left cooling fan operates at high speed, go to step 18 . If left cooling fan does not operate at high speed, go to step 22 .
11. If left cooling fan is operating properly at high speed, go to next step. If left cooling fan is not operating properly at high speed, go to step 15 .
12. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and ground circuit (Black wire) of cooling fan series/parallel relay. If right cooling fan operates properly at high speed, go to step 14 . If right cooling fan does not operate properly at high speed, go to step 19 .
13. Check cooling fan 1 relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 23 .
14. Check cooling fan series/parallel relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 24 .
15. Check cooling fan 2 relay connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 25 .
16. Check left cooling fan connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 26 .
17. Check right cooling fan connector for poor connections. If problem is found, repair as necessary. After repairs, go to step 28 . If problem is not found, go to step 27 .
18. Repair right cooling fan motor supply voltage circuit. After repairs, go to step 28 .
19. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit (White wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan series/parallel relay. After repairs, go to step 28 .
25. Replace cooling fan 2 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .

**NOTE:** Cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See **WIRING DIAGRAMS** for proper identification.

2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step

- 8 .
6. Repair short to voltage in right cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

**Diagnostic Aids**

Check for poor connections at PCM, cooling fan relays and cooling fan motors. Inspect harness connectors for damaged, corroded or backed-out terminal pins. Inspect related wiring harnesses for damage or improper routing.

**3.8L PARK AVENUE****Description**

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery positive voltage on 2 individual circuits, from left underhood fuse block and right underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage from cool fan 1 fuse through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan series/parallel relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan relay control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for left cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage from cool fan 2 fuse on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 212°F (100°C).
- When A/C is requested and ambient temperature is greater than 39°F (4°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands high speed fans on under the following conditions:

- Engine coolant temperature reaches 226°F (108°C).
- A/C refrigerant pressure exceeds 244 psi.
- When certain DTCs set.

**Diagnostic System Check**

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see SCAN TOOL DOES NOT POWER UP in appropriate BODY CONTROL MODULES article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If

communication with IC and PCM is not established, see SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE in appropriate BODY CONTROL MODULES article.

3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE in appropriate BODY CONTROL MODULES article.

#### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.

**NOTE:** Cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See **WIRING DIAGRAMS** for proper identification.

2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay occurs.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 12.
4. Turn ignition off. Disconnect cooling fan 1 relay. Turn ignition on, engine off. Probe battery voltage circuit of cool fan 1 relay switch side using test light connected to ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 19.

**NOTE:** Following this step, do not remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).

5. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan 1 relay and cooling fan motor supply voltage circuit (Gray wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 14. If both cooling fans do not operate in low speed, go to next step.
6. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and right cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If both cooling fans operate in low speed, go to step 15. If both cooling fans do not operate in low speed, go to next step.
7. Connect second fused jumper (20-amp) between battery voltage circuit of cooling fan series/parallel relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If right cooling fan operates in high speed, go to step 10. If right cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 17. If left cooling fan does not operate in high speed, go to next step.
9. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of right cooling fan electrical connector and ground. If left cooling fan operates in high speed, go to step 22. If left cooling fan does not operate in high speed, go to step 23.
10. Install cooling fan series/parallel relay. Disconnect left cooling fan electrical connector. Connect second



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fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 18 . If right cooling fan does not operate in high speed, go to next step.

11. Connect second fused jumper (20-amp) between battery voltage and cooling fan low reference circuit (White wire) of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 20 . If right cooling fan does not operate in high speed, go to step 24 .
12. If right cooling fan is operating properly in high speed, go to next step. If right cooling fan is not operating properly in high speed, go to step 16 .
13. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and ground circuit (Black wire) of cooling fan series/parallel relay. If left cooling fan operates in high speed, go to step 15 . If left cooling fan does not operate in high speed, go to step 21 .
14. Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 30 . If problem was not found, go to step 25 .
15. Check cooling fan series/parallel relay connector for poor connections If problem was found, repair as necessary. After repairs, go to step 30 . If problem was not found, go to step 26 .
16. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 30 . If problem was not found, go to step 27 .
17. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 30 . If problem was not found, go to step 28 .
18. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 30 . If problem was not found, go to step 29 .
19. Repair battery voltage circuit of cool fan 1 relay switch side. After repairs, go to step 30 .
20. Repair left cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 30 .
21. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 30 .
22. Repair right cooling fan motor ground circuit (Black wire). After repairs, go to step 30 .
23. Repair right cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 30 .
24. Repair left cooling fan low reference circuit (White wire). After repairs, go to step 30 .
25. Replace cooling fan 1 relay. After repairs, go to step 30 .
26. Replace cooling fan series/parallel relay. After repairs, go to step 30 .
27. Replace cooling fan 2 relay. After repairs, go to step 30 .
28. Replace right cooling fan. After repairs, go to step 30 .
29. Replace left cooling fan. After repairs, go to next step.
30. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .

**NOTE:**      **Cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See WIRING DIAGRAMS for proper identification.**

2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .

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5. Repair short to voltage in left cooling fan motor supply voltage circuit (Gary wire). After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in right cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 8 .
8. Operate system to verify repair.

### Diagnostic Aids

Check for poor connections at PCM, cooling fan relays, and cooling fan motors. Inspect harness connectors for damaged, corroded or backed-out terminal pins. Inspect related wiring harnesses for damage and improper routing.

### 3.8L & 5.7L CAMARO & FIREBIRD

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage, from underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan 3 relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 3 relay and cooling fan 3 relay through high speed cooling fan relay control circuit. This energizes cooling fan 3 relay coil, closes relay contacts, and provides a ground path for left cooling fan. At the same time, cooling fan 3 relay coil is energized closing relay contacts and provides battery voltage on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- **3.8L**

- Engine coolant temperature exceeds approximately 221°F (105°C).
- When A/C is requested and ambient temperature is greater than 50°F (10°C).
- A/C refrigerant pressure exceeds 190 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

- **5.7L**

- Engine coolant temperature exceeds approximately 226°F (108°C).
- When A/C is requested and ambient temperature is greater than 50°F (10°C).
- A/C refrigerant pressure exceeds 215 psi.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 284°F (140°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

PCM commands high speed fans on under the following conditions:

- **3.8L**

- Engine coolant temperature reaches 235°F (113°C).
- A/C refrigerant pressure exceeds 275 psi.
- When certain DTCs set.

- **5.7L**

- Engine coolant temperature reaches 234°F (112°C).
- A/C refrigerant pressure exceeds 248 psi.
- When certain DTCs set.

**Diagnostic System Check**

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

**Cooling Fan Inoperative**

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fans, a 3-second delay will occur.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE:** Following this step, do not remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).

4. Remove cooling fan 1 relay. Connect fused jumper (20-amp) between battery voltage circuit (Red wire) of cooling fan 1 relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 13. If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cooling fan 3 relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit (Gray wire) of cooling fan 3 relay and right cooling fan motor supply voltage circuit (White wire) of cooling fan 3 relay. If both cooling fans operate in low speed, go to step 14. If both cooling fans do

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not operate in low speed, go to next step.

6. Connect second fused jumper (20-amp) between battery voltage circuit (Orange wire) of cooling fan 3 relay and cooling fan motor supply voltage circuit (White wire) of cooling fan 3 relay. If right cooling fan operates in high speed, go to step 9 . If right cooling fan does not operate in high speed, go to next step.
7. Install cooling fan 3 relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 16 . If left cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (White wire) of right cooling fan electrical connector and ground. If left cooling fan operates in high speed, go to step 20 . If left cooling fan does not operate in high speed, go to step 21 .
9. Install cooling fan 3 relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 17 . If right cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and low reference circuit (Gray wire) of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 18 . If right cooling fan does not operate in high speed, go to step 22 .
11. If right cooling fan is operating properly in high speed, go to next step. If right cooling fan is not operating properly in high speed, go to step 15 .
12. Disconnect cooling fan 3 relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit (Gray wire) of cooling fan 3 relay and ground circuit (Black wire) of cooling fan 3 relay. If left cooling fan operates properly in high speed, go to step 14 . If left cooling fan does not operate properly in high speed, go to step 19 .
13. Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cooling fan 3 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
19. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair right cooling fan motor supply voltage circuit (White wire). After repairs, go to step 28 .
22. Repair left cooling fan low reference circuit (Gray wire). After repairs, go to step 28 .
23. Replace cooling fan 1 relay. After repairs, go to step 28 .
24. Replace cooling fan 3 relay. After repairs, go to step 28 .
25. Replace cooling fan 2 relay. After repairs, go to step 28 .
26. Replace right cooling fan. After repairs, go to step 28 .
27. Replace left cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .

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2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 4 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan 3 relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit (Gray wire). After repairs, go to step 8 .
7. Repair short to voltage in right cooling fan motor supply voltage circuit (White wire). After repairs, go to next step.
8. Operate system to verify repair.

### Diagnostic Aids

If cooling fans operate all the time, check for DTC's before diagnosing cooling fans.

### 4.6L DEVILLE & SEVILLE

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage from underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage through cooling fan motor supply voltage circuit to right cooling fan. Ground path for right cooling fan is through cooling fan series/parallel relay and left cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan relay control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for right cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage on cooling fan motor supply voltage circuit to left cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.

PCM commands low speed fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- Transmission fluid temperature exceeds 302°F (150°C).
- A/C operation is requested.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 304°F (151°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

Engine cooling fans will switch from low to off when coolant temperature drops less than 216°F (102°C).

PCM commands high speed fans on under the following conditions:

- Engine coolant temperature reaches 234°F (112°C).
- Transmission fluid temperature is more than 304°F (151°C).

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- When certain DTCs set.

Engine cooling fans will switch from high to low, except when DTCs set, when coolant temperature drops less than 223°F (106°C).

### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate **BODY CONTROL MODULES** article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate **SELF-DIAGNOSTICS** article in **ENGINE PERFORMANCE**. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate **BODY CONTROL MODULES** article.

### Cooling Fan Inoperative

**NOTE:** Cooling fan relay designation changes between 2000 and 2001 models. See **RELAY IDENTIFICATION** table and **WIRING DIAGRAMS** for relay identification.

### RELAY IDENTIFICATION

Relay Designation	Function
2000	
Cool Fan 1 Relay	High Speed Relay
Cool Fan 2 Relay	Low Speed Relay
2001	
Cool Fan 1 Relay	Low Speed Relay
Cool Fan 2 Relay	High Speed Relay

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.

**NOTE:** On 2001 DeVille, cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See **WIRING DIAGRAMS** for proper identification.

2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fan, a 3-second delay will occur.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed cooling fans do not turn on and off with each command, go to step [11](#).

**NOTE:** Following this step, do not remove fused jumper (20-amp) connected during

**this step. While performing the following steps, use a second fused jumper (20-amp).**

4. Disconnect the cooling fan low speed relay. Connect fused jumper (20-amp) between battery voltage circuit of cooling fan low speed relay and cooling fan motor supply voltage circuit (Gray wire) of cooling fan low speed relay. If both cooling fans operate in low speed, go to step 13 . If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and left cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If both cooling fans operate in low speed, go to step 14 . If both cooling fans do not operate in low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery voltage circuit of cooling fan series/parallel relay and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If left cooling fan operates in high speed, go to step 9 . If left cooling fan does not operate in high speed, go to next step.
7. Install cooling fan series/parallel relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 16 . If right cooling fan does not operate in high speed, go to next step.
8. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of left cooling fan electrical connector and ground. If right cooling fan operates in high speed, go to step 20 . If right cooling fan does not operate in high speed, go to step 21 .
9. Install cooling fan series/parallel relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 17 . If left cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and right cooling fan low reference circuit (White wire) of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 18 . If left cooling fan does not operate in high speed, go to step 22 .
11. If left cooling fan is operating properly in high speed, go to next step. If left cooling fan is not operating properly in high speed, go to step 15 .
12. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between right cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and ground circuit (Black wire) of cooling fan series/parallel relay. If right cooling fan operates properly in high speed, go to step 14 . If right cooling fan does not operate properly in high speed, go to step 19 .
13. Check cooling fan low speed relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cooling fan series/parallel relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cooling fan high speed relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 28 .
19. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
22. Repair right cooling fan low reference circuit (White wire). After repairs, go to step 28 .
23. Replace cooling fan low speed relay. After repairs, go to step 28 .

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24. Replace cooling fan series/parallel relay. After repairs, go to step 28 .
25. Replace cooling fan 2 relay. After repairs, go to step 28 .
26. Replace left cooling fan. After repairs, go to step 28 .
27. Replace right cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .

**NOTE:** On 2001 DeVille, cooling fan 1 relay and cooling fan 2 relay are improperly identified in underhood fuse block. See **WIRING DIAGRAMS** for proper identification.

2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If left cooling fan turned off, go to step 6 . If left cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in right cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 8 .
6. Repair short to voltage in right cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

### 4.6L ELDORADO

#### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fan 1 relay, cooling fan series/parallel relay, and cooling fan 2 relay receive battery voltage at coil side of relay through A/C COMP fuse, located in the underhood fuse block. Cooling fan 1 relay and cooling fan 2 relay receive battery voltage at switch side of relay through COOL FANS fuse, located in right underhood fuse block.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan series/parallel relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan series/parallel relay through high speed cooling fan relay control circuit. This energizes cooling fan series/parallel relay coil, closes relay contacts, and provides a ground path for left cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have there own ground path. Result is a parallel circuit with both fans running at high speed.



PCM commands Low Speed Fans on under the following conditions:

- Engine coolant temperature exceeds approximately 223°F (106°C).
- Transmission fluid temperature exceeds 302°F (150°C).
- A/C operation is requested.
- After vehicle is shut off, if engine coolant temperature at key-off is greater than 304°F (151°C) and system voltage is more than 12 volts. Fans will stay on for approximately 3 minutes.

Engine cooling fans will switch from low to off when coolant temperature drops less than 216°F (102°C).

PCM commands High Speed Fans on under the following conditions:

- Engine coolant temperature reaches 234°F (112°C).
- Transmission fluid temperature is more than 304°F (151°C).
- When certain DTCs set.

Engine cooling fans will switch from high to low when the coolant temperature drops less than 223°F (106°C).

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate BODY CONTROL MODULES article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.

#### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fans low speed on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.

**NOTE:** Before PCM changes speed of cooling fan, a 3-second delay will occur.

3. Using scan tool, command fans high speed on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed cooling fans do not turn on and off with each command, go to step [13](#).
4. Check battery voltage circuit for open or short to ground. If problem was found, repair as necessary. After repairs, go to step 35. If problem was not found, go to next step.
5. Check cooling fan motor supply voltage circuit for short to ground. If problem was found, repair as necessary. After repairs, go to step 35. If problem was not found, go to next step.

**NOTE:** Following this step, do not remove fused jumper (20-amp) that is connected

**during this step. While performing the following steps, use a second fused jumper (20-amp).**

6. Disconnect cooling fan 1 relay. Connect first fused jumper (20-amp) between battery positive voltage circuit (Red wire) of cooling fan 1 relay and cooling fan motor supply voltage circuit (Gray wire) of cooling fan 1 relay. If both cooling fans operate in low speed, go to step 15 . If both cooling fans do not operate in low speed, go to next step.
7. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and right cooling fan supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If both cooling fans operate in low speed, go to step 16 . If both cooling fans do not operate in low speed, go to next step.
8. Connect second fused jumper (20-amp) between battery voltage and cooling fan motor supply voltage circuit (Light Blue wire) of cooling fan series/parallel relay. If right cooling fan operates in high speed, go to step [11](#) . If right cooling fan does not operate in high speed, go to next step.
9. Install cooling fan series/parallel relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go to step 23 . If left cooling fan does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between cooling fan motor supply voltage circuit (Light Blue wire) of right cooling fan electrical connector and ground. If left cooling fan operates in high speed, go to step 27 . If left cooling fan does not operate in high speed, go to step 28 .
11. Install cooling fan series/parallel relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 24 . If left cooling fan does not operate in high speed, go to next step.
12. Connect second fused jumper (20-amp) between battery voltage and left cooling fan low reference circuit (White wire) of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 25 . If left cooling fan does not operate in high speed, go to step 29 .
13. If right cooling fan is operating properly in high speed, go to next step. If right cooling fan is not operating properly in high speed, go to step 19 .
14. Disconnect cooling fan series/parallel relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit (White wire) of cooling fan series/parallel relay and ground circuit (Black wire) of cooling fan series/parallel relay. If left cooling fan operates properly in high speed, go to step 16 . If left cooling fan does not operate properly in high speed, go to step 26 .
15. Check cooling fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to step 30 .
16. Check battery voltage circuit (Orange wire) of cooling fan series/parallel relay for open. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to next step.
17. Check high speed cooling fan relay control circuit (Dark Blue wire) of cooling fan series/parallel relay for open. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to next step.
18. Check cooling fan series/parallel relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to step 31 .
19. Check battery voltage circuit (Red wire) of cooling fan 2 relay for open. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to next step.
20. Check high speed cooling fan relay control circuit (Dark Blue wire) of cooling fan 2 relay for open. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to next step.
21. Check cooling fan motor supply voltage circuit (Light Blue wire) of right cooling fan for open. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to next step.
22. Check cooling fan 2 relay connector for poor connections. If problem was found, repair as necessary. After

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repairs, go to step 35 . If problem was not found, go to step 32 .

23. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to step 33 .
24. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 35 . If problem was not found, go to step 34 .
25. Repair left cooling fan supply voltage circuit (Gray wire). After repairs, go to step 35 .
26. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 35 .
27. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 35 .
28. Repair right cooling fan supply voltage circuit (Light Blue wire). After repairs, go to step 35 .
29. Repair left cooling fan low reference circuit (White wire). After repairs, go to step 35 .
30. Replace cooling fan 1 relay. After repairs, go to step 35 .
31. Replace cooling fan series/parallel relay. After repairs, go to step 35 .
32. Replace cooling fan 2 relay. After repairs, go to step 35 .
33. Replace right cooling fan. After repairs, go to step 35 .
34. Replace left cooling fan. After repairs, go to next step.
35. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cooling fan series/parallel relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .
5. Repair short to voltage in left cooling fan motor supply voltage circuit (Gray wire). After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit (White wire). After repairs, go to step 8 .
7. Repair short to voltage in right cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to next step.
8. Operate system to verify repair.

## 5.7L CORVETTE

### Description

Engine cooling fan system consists of 2 electrical cooling fans and 3 fan relays. Relays are arranged in a series/parallel configuration that allows Powertrain Control Module (PCM) to operate both fans together at low or high speeds. Cooling fans and fan relays receive battery voltage and ignition 1 voltage from underhood electrical center.

During low speed operation, PCM supplies ground path for low speed fan relay through low speed cooling fan relay control circuit. This energizes cooling fan 1 relay coil, closes relay contacts, and supplies battery voltage through cooling fan motor supply voltage circuit to left cooling fan. Ground path for left cooling fan is through cooling fan 3 relay and right cooling fan. Result is a series circuit with both fans running at low speed.

During high speed operation, PCM supplies ground path for cooling fan 1 relay through low speed cooling fan relay control circuit. After a 3-second delay, PCM supplies a ground path for cooling fan 2 relay and cooling fan 3

relay through high speed cooling fan relay control circuit. This energizes cooling fan 3 relay coil, closes relay contacts, and provides a ground path for left cooling fan. At the same time, cooling fan 2 relay coil is energized closing relay contacts and provides battery voltage on cooling fan motor supply voltage circuit to right cooling fan. During high speed fan operation, both engine cooling fans have their own ground path. Result is a parallel circuit with both fans running at high speed.

PCM will command low speed operation on at 226°F (108°C) and off at 217°F (103°C).

PCM will command high speed operation on at 235°F (113°C) and off at 226°F (108°C).

#### Diagnostic System Check

1. Install scan tool. If scan tool powers up, go to next step. If scan tool does not power up, see **SCAN TOOL DOES NOT POWER UP** in appropriate BODY CONTROL MODULES article.
2. Turn ignition on, engine off. Try to establish scan tool communication with Instrument Cluster (IC) and Powertrain Control Module (PCM). If communication with IC and PCM is established, go to next step. If communication with IC and PCM is not established, see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.
3. Select display DTC function for PCM. Record all displayed DTCs and status of displayed DTCs. If DTCs are displayed, go to next step. If no DTCs are displayed, see **COOLING FAN INOPERATIVE** or **COOLING FAN ALWAYS ON**.
4. If scan tool does not display DTCs beginning with "U", see appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If scan tool displays DTCs beginning with "U", see **SCAN TOOL DOES NOT COMMUNICATE WITH CLASS 2 DEVICE** in appropriate BODY CONTROL MODULES article.

#### Cooling Fan Inoperative

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK**.
2. Install scan tool. Turn ignition on, engine off. Using scan tool, command fan relay 1 on and off. If low speed engine cooling fans turn on and off with each command, go to next step. If low speed engine cooling fans do not turn on and off with each command, go to step 4.
3. Using scan tool, command fan relays 1, 2 & 3 on and off. If high speed engine cooling fans turn on and off with each command, problem is intermittent. If high speed engine cooling fans do not turn on and off with each command, go to step 11.

**NOTE: Following this step, do not remove fused jumper (20-amp) that is connected during this step. While performing the following steps, use a second fused jumper (20-amp).**

4. Disconnect cool fan 1 relay. Connect first fused jumper (20-amp) between battery voltage circuit of cool fan 1 relay and cooling fan motor supply voltage circuit (Light Blue wire) of cool fan 1 relay. If both cooling fans operate in low speed, go to step 13. If both cooling fans do not operate in low speed, go to next step.
5. Disconnect cool fan 3 relay. Connect second fused jumper (20-amp) between left cooling fan low reference circuit (Gray wire) of cool fan 3 relay and right cooling fan motor supply voltage circuit (White wire) of cool fan 3 relay. If both cooling fans operate in low speed, go to step 14. If both cooling fans do not operate in low speed, go to next step.
6. Connect second fused jumper (20-amp) between battery voltage and cooling fan motor supply voltage circuit (White wire) of cool fan 3 relay. If right cooling fan operates in high speed, go to step 9. If cooling fan does not operate in high speed, go to next step.
7. Install cool fan 3 relay. Disconnect right cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of right cooling fan electrical connector. If left cooling fan operates in high speed, go

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to step 16 . If left cooling fan does not operate in high speed, go to next step.

8. Connect second fused jumper (20-amp) between cooling fan supply voltage circuit (White wire) of right cooling fan electrical connector and ground. If left cooling fan motor operates in high speed, go to step 20 . If left cooling fan motor does not operate in high speed, go to step 21 .
9. Install cool fan 3 relay. Disconnect left cooling fan electrical connector. Connect second fused jumper (20-amp) between terminals of left cooling fan electrical connector. If right cooling fan motor operates in high speed, go to step 17 . If right cooling fan motor does not operate in high speed, go to next step.
10. Connect second fused jumper (20-amp) between battery voltage and left cooling fan low reference circuit (Gray wire) of left cooling fan electrical connector. If right cooling fan operates in high speed, go to step 18 . If right cooling fan does not operate in high speed, go to step 22 .
11. If right cooling fan operated in high speed, go to next step. If right cooling fan does not operate in high speed, go to step 15 .
12. Disconnect cool fan 3 relay. Connect a fused jumper (20-amp) between left cooling fan low reference circuit (Gray wire) of cool fan 3 relay and ground circuit (Black wire) of cool fan 3 relay. If left cooling fan operates properly in high speed, go to step 14 . If left cooling fan does not operate properly in high speed, go to step 19 .
13. Check cool fan 1 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 23 .
14. Check cool fan 3 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 24 .
15. Check cool fan 2 relay connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 25 .
16. Check right cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 26 .
17. Check left cooling fan connector for poor connections. If problem was found, repair as necessary. After repairs, go to step 28 . If problem was not found, go to step 27 .
18. Repair left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 28 .
19. Repair left cooling fan ground circuit (Black wire). After repairs, go to step 28 .
20. Repair right cooling fan ground circuit (Black wire). After repairs, go to step 28 .
21. Repair right cooling fan motor supply voltage circuit (White wire). After repairs, go to step 28 .
22. Repair left cooling fan low reference circuit (Gray wire). After repairs, go to step 28 .
23. Replace cool fan 1 relay. After repairs, go to step 28 .
24. Replace cool fan 3 relay. After repairs, go to step 28 .
25. Replace cool fan 2 relay. After repairs, go to step 28 .
26. Replace right cooling fan. After repairs, go to step 28 .
27. Replace left cooling fan. After repairs, go to next step.
28. Operate system to verify repair.

### Cooling Fan Always On

1. If diagnostic system check has been performed, go to next step. If diagnostic system check has not been performed, see **DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition on, engine off. If one or both cooling fans are on, go to next step. If one or both cooling fans are not on, problem is intermittent.
3. If both cooling fans are running continuously, go to step 5 . If both cooling fans are not running continuously, go to next step.
4. Remove cool fan 3 relay. If right cooling fan turned off, go to step 6 . If right cooling fan did not turn off, go to step 7 .

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5. Repair short to voltage in left cooling fan motor supply voltage circuit (Light Blue wire). After repairs, go to step 8 .
6. Repair short to voltage in left cooling fan low reference circuit (Gray wire). After repairs, go to step 8 .
7. Repair short to voltage in right cooling fan motor supply voltage circuit (White wire). After repairs, go to next step.
8. Operate system to verify repair.

### WIRING DIAGRAMS

### ALERO & GRAND AM

**BONNEVILLE & LESABRE**

**Fig. 2: Cooling Fan System Wiring Diagram (2000-01 Bonneville & LeSabre)**

**CAMARO & FIREBIRD**

**2001 Cadillac Catera**

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**Fig. 3: Cooling Fan System Wiring Diagram (2000-01 Camaro & Firebird)**

**CATERA**



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**Fig. 4: Cooling Fan System Wiring Diagram (2000-01 Catera)**

**CAVALIER & SUNFIRE**

**2001 Cadillac Catera**

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**Fig. 5: Cooling Fan System Wiring Diagram (2000-01 Cavalier & Sunfire)**

**CENTURY & REGAL**

**2001 Cadillac Catera**

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**Fig. 6: Cooling Fan System Wiring Diagram (2000-01 Century & Regal)**

**CORVETTE**

**2001 Cadillac Catera**

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**Fig. 7: Cooling Fan System Wiring Diagram (2000-01 Corvette)**

**DEVILLE**

**2001 Cadillac Catera**

2000-01 ENGINE COOLING Electric Cooling Fans - Cars

**Fig. 8: Cooling Fan System Wiring Diagram (2000-01 DeVille)**

**ELDORADO**

**2001 Cadillac Catera**

2000-01 ENGINE COOLING Electric Cooling Fans - Cars

Fig. 9: Cooling Fan System Wiring Diagram (2000 Eldorado)

**GRAND PRIX**

**2001 Cadillac Catera**

2000-01 ENGINE COOLING Electric Cooling Fans - Cars

**Fig. 10: Cooling Fan System Wiring Diagram (2000 Grand Prix)**

**IMPALA & MONTE CARLO**

**2001 Cadillac Catera**

2000-01 ENGINE COOLING Electric Cooling Fans - Cars

Fig. 11: Cooling Fan System Wiring Diagram (2000 Impala & Monte Carlo)

**INTRIGUE**



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Fig. 12: Cooling Fan System Wiring Diagram (2000-01 Intrigue)

**LUMINA**

**2001 Cadillac Catera**

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**Fig. 13: Cooling Fan System Wiring Diagram (2000-01 Lumina)**

**MALIBU**

**2001 Cadillac Catera**

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**Fig. 14: Cooling Fan System Wiring Diagram (2000 Malibu)**

**METRO**

**2001 Cadillac Catera**

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**Fig. 15: Cooling Fan System Wiring Diagram (2000-01 Metro)**

**PARK AVENUE**

**2001 Cadillac Catera**

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**Fig. 16: Cooling Fan System Wiring Diagram (2000-01 Park Avenue)**

**PRIZM**

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**Fig. 17: Cooling Fan System Wiring Diagram (2000-01 Prizm)**

**SATURN**

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**Fig. 18: Cooling Fan System Wiring Diagram (2000 Saturn "L" Series)**

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Fig. 19: Cooling Fan System Wiring Diagram (2000-01 Saturn "S" Series)

**SEVILLE**



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**Fig. 20: Cooling Fan System Wiring Diagram (2000-01 Seville)**

**ALERO & GRAND AM**

**2001 Cadillac Catera**

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**Fig. 21: Cooling Fan System Wiring Diagram (2001 Alero & Grand Am - 2.4L)**

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Fig. 22: Cooling Fan System Wiring Diagram (2001 Alero & Grand Am - 3.4L)

**AURORA**

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**Fig. 23: Cooling Fan System Wiring Diagram (2001 Aurora)**

**ELDORADO**

**2001 Cadillac Catera**

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Fig. 24: Cooling Fan System Wiring Diagram (2001 Eldorado)

**GRAND PRIX**

**2001 Cadillac Catera**

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Fig. 25: Cooling Fan System Wiring Diagram (2001 Grand Prix)

**IMPALA & MONTE CARLO**

**2001 Cadillac Catera**

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Fig. 26: Cooling Fan System Wiring Diagram (2001 Impala & Monte Carlo)

**MALIBU**

**2001 Cadillac Catera**

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Fig. 27: Cooling Fan System Wiring Diagram (2001 Malibu)

**SATURN**



**2001 Cadillac Catera**

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**Fig. 28: Cooling Fan System Wiring Diagram (2001 Saturn "L" Series)**

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