

# SYSTEM & COMPONENT TESTING

## 2001 Chevrolet Camaro

2001 ENGINE PERFORMANCE  
System & Component Testing - Cars

Except Metro & Prizm

### MODEL IDENTIFICATION

Vehicle model is identified by fourth character of Vehicle Identification Number (VIN). VIN is stamped on metal pad on top of left end of instrument panel, near windshield. See MODEL IDENTIFICATION table.

#### MODEL IDENTIFICATION

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

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

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### INTRODUCTION

Before testing separate components or systems, perform all procedures listed in appropriate BASIC DIAGNOSTIC PROCEDURES article. Since many computer-controlled and monitored components will set a DTC if they malfunction, it is also recommended self-diagnostics be performed. See appropriate SELF-DIAGNOSTICS article.

**NOTE:** Testing individual components does not isolate shorts or opens. Perform all voltage tests with a DVOM with a minimum 10-megohm input impedance, unless stated otherwise in test procedure. Use ohmmeter to isolate wiring harness shorts or opens.

### AIR INDUCTION SYSTEMS

**NOTE:** Manufacturer does not provide testing procedures for many individual systems and components. For system and component testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

### SUPERCHARGER

For component testing, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## MULTI-RAM SYSTEM DIAGNOSIS (3.0L)

NOTE: Powertrain Control Module (PCM) may also be referred to as Engine Control Module (ECM).

1) Perform powertrain diagnostic system check. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK in appropriate SELF-DIAGNOSTICS article. After performing OBD system check, go to next step.

2) Connect scan tool to Data Link connector (DLC). Retrieve DTCs. If DTCs P1112 or P1113 are not set, go to next step. If DTC P1112 or P1113 is set, perform appropriate diagnostic test. See appropriate SELF-DIAGNOSTICS article.

3) Visually inspect system. Check for disconnected or damaged vacuum hoses and/or components. Check linkage between vacuum actuators and valves for binding or interference with hoses. Ensure wiring is routed properly and not damaged. If problem does not exist, go to next step. If problem exists, repair as necessary and go to step 14).

4) Start engine and observe vacuum actuator linkages for switchover valves. Using scan tool, command each valve on and off. If both valves operate, go to next step. If either valve does not operate, go to step 6).

5) Turn ignition off. Remove duct from between intake resonance switchover valve and throttle body. Hold throttle plates open to view moveable divider in back of intake manifold. Move actuator linkage by hand and ensure divider moves with linkage. Look down passages in intake resonance switchover valve to view moveable divider between 2 sides of valve. Move actuator linkage by hand to ensure divider moves with linkage. If both valves operate properly, system is okay. If either valve does not operate, go to step 13).

6) Using scan tool, exit device control. Disconnect manifold vacuum supply hose at solenoid valve while observing actuator linkage. If actuator does not move when vacuum is disconnected, go to next step. If actuator moves when vacuum is disconnected, go to step 10).

7) Check for vacuum at manifold vacuum supply hose. If vacuum exists, go to next step. If vacuum does not exist, go to step 11).

8) Disconnect other hose from solenoid valve and connect hoses together using suitable vacuum connector. If actuator linkage does not operate, go to next step. If actuator linkage operates, go to step 10).

9) Disconnect vacuum hose from actuator. If vacuum exists, go to step 13). If vacuum does not exist, go to step 12).

10) Replace solenoid valve. After repairs, go to step 14).

11) Repair vacuum supply hose or plugged vacuum source. After repairs, go to step 14).

12) Repair vacuum hose to actuator. After repairs, go to step 14).

13) Replace valve/actuator assembly. After repairs, go to next step.

14) Start engine. Observe vacuum actuator linkages for switchover valves. Using scan tool, command each valve on and off. If both valves operate, system is okay. If either valve does not operate, go to step 2).

## COMPUTERIZED ENGINE CONTROLS

### PCM POWER & GROUND CHECK

NOTE: To identify circuits, see WIRING DIAGRAMS article.

Ground Circuits

1) Using DVOM, check for continuity to ground at PCM ground

terminals. See Fig. 1. See WIRING DIAGRAMS article. Resistance should be zero ohms. If resistance is not zero ohms, repair open in ground circuit.

2) Connect negative lead of DVOM to a known-good ground. Backprobe positive lead of voltmeter to each PCM ground terminal. With vehicle running, DVOM should indicate less than one volt. If DVOM reading is greater than one volt, check for open, short to voltage, corrosion or loose connection in ground circuit.

#### Power Circuits

1) Using DVOM, check for battery voltage between PCM continuous power terminal(s) and ground. See Fig. 1. See WIRING DIAGRAMS article. If battery voltage is not present, check for open fuse or fusible link. If fuse or fusible link is okay, check for open in circuit between PCM continuous power terminal and power source.

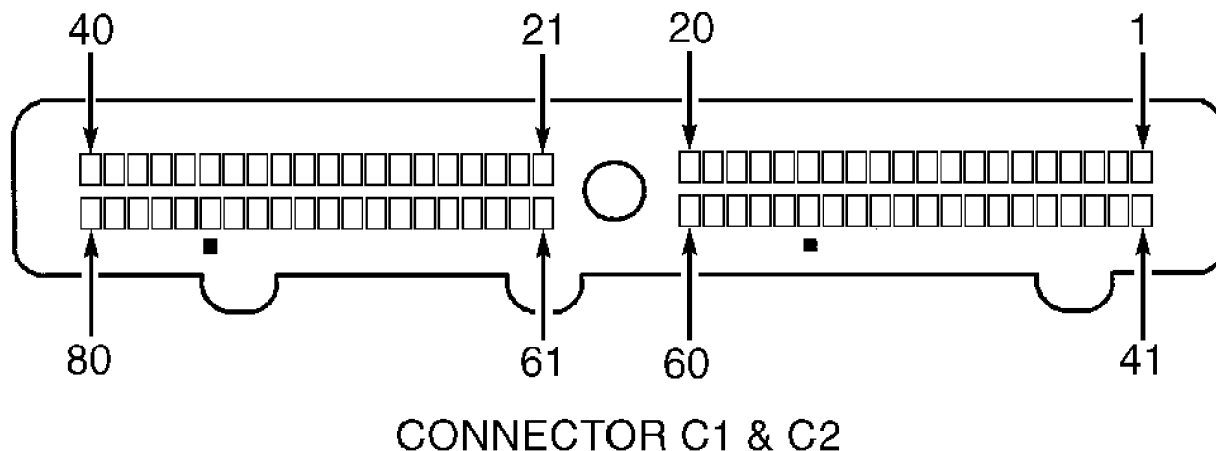
2) Turn ignition switch to RUN position. Using DVOM, check for battery voltage between PCM ignition power terminals and ground. If battery voltage is not present, check IGN fuse. If fuse is okay, check for open in circuit between battery and ignition switch, and between ignition switch and PCM ignition power terminal. If circuits are okay, check for defective ignition switch.

3) Connect DVOM between ground and PCM starter (crank) signal terminal. On vehicles with manual transmission/transaxle, depress clutch pedal. On vehicles with automatic transmission/transaxle, place gearshift lever in Park. On all vehicles, turn ignition switch to START position. Battery voltage should be present only when ignition switch is in START position.

4) If voltage is not present, check CRANK fuse or fusible link between ignition switch and PCM starter (crank) signal terminal. If fuse or fusible link is okay, check for open in circuit between ignition switch and PCM starter (crank) signal terminal, or check for defective ignition switch.

#### PCM Harness Resistance

Turn ignition switch to LOCK position. Disconnect PCM and related component harness connectors. Check for open or short circuits between PCM harness connector terminal and component harness connector terminal. See Fig. 1. See WIRING DIAGRAMS article. If harness is open or shorted, repair as necessary.



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Fig. 1: Identifying Powertrain Control Module Harness Connector Terminals

Courtesy of General Motors Corp.

## ENGINE SENSORS & SWITCHES

NOTE: For additional sensor testing specifications, see appropriate SENSOR OPERATING RANGE CHARTS article.

NOTE: Perform powertrain diagnostic system check prior to testing, and after completing any repairs. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK in appropriate SELF-DIAGNOSTICS article.

Manufacturer does not provide testing procedures for many individual systems and components. For sensor and switch testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

### MANIFOLD ABSOLUTE PRESSURE SENSOR

2.2L (Cavalier & Sunfire) & 2.4L

Perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

3.1L (Lumina)

1) Perform powertrain diagnostic system check. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK under SELF-DIAGNOSTIC SYSTEM in appropriate SELF-DIAGNOSTICS article. After performing system check, go to next step.

2) Check for the following conditions. If problem does not exist, go to next step. If problem exists, repair as necessary. After repairs, go to step 14).

- \* MAP sensor seal damaged or missing.
- \* Vacuum hoses disconnected, damaged or incorrectly routed.
- \* Intake manifold vacuum leaks.
- \* Vacuum leak at throttle body.
- \* Vacuum leaks in EGR system.
- \* Faulty PCV system.

3) Disconnect MAP sensor harness connector. Turn ignition on, engine off. Using scan tool, observe MAP sensor parameter. If scan tool displays zero volts, go to next step. If scan tool does not display zero volts, go to step 12).

4) Connect a 3-amp fused jumper wire between MAP sensor signal circuit (Light Green wire) and MAP sensor reference voltage circuit (Gray wire) at MAP sensor harness connector. Turn ignition on, engine off. Observe MAP sensor parameter. If scan tool displays 4.95 volts, go to next step. If scan tool does not display 4.95 volts, go to step 8).

5) Using test light connected to battery voltage, probe MAP sensor signal circuit (Light Green wire) at MAP sensor harness connector. Observe MAP sensor parameter. If scan tool displays 4.95 volts, go to next step. If scan tool does not display 4.95 volts, go to step 9).

6) Turn ignition off. Check for faulty MAP sensor harness connections. If connections are okay, go to next step. If connections are not okay, repair as necessary. After repairs, go to step 14).

7) Check for open or high resistance in MAP sensor ground circuit (Orange/Black wire). If ground circuit is okay, go to step 11). If ground circuit is not okay, repair as necessary. After repairs, go to step 14).

8) Check for open or high resistance in MAP sensor 5 volt reference circuit (Gray wire). If MAP sensor 5 volt reference circuit is okay, go to step 10). If MAP sensor 5 volt reference circuit is not okay, repair as necessary. After repairs, go to step 14).

9) Check for open, short to ground or short to sensor ground circuit (Orange/Black wire) in MAP sensor signal circuit (Light Green wire). If MAP sensor signal circuit is okay, go to next step. If MAP sensor signal circuit is not okay, repair as necessary. After repairs, go to step 14).

10) Check for poor MAP sensor signal circuit connection at PCM. If connection at PCM is okay, go to next step. If connection at PCM is not okay, repair as necessary. After repairs, go to step 14).

11) Turn ignition off. Disconnect PCM harness connectors. Turn ignition on. Check for short to voltage in MAP sensor reference voltage circuit (Gray wire). If short to voltage does not exist, go to next step. If short to voltage exists, repair as necessary. After repairs, go to step 14).

12) Replace MAP sensor. After repairs, go to step 14).

13) Replace PCM. After repairs, go to next step.

14) Start engine and idle. While observing MAP sensor parameter on scan tool, increase engine RPM. If MAP sensor valve changes, system is okay. If MAP sensor valve does not change, go to step 2).

### 3.1L (Except Lumina) 3.4L & 3.8L

1) Perform powertrain diagnostic system check. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK under SELF-DIAGNOSTIC SYSTEM in appropriate SELF-DIAGNOSTICS article. After performing system check, go to next step.

NOTE: In order to determine correct MAP sensor value of barometric pressure for any elevation, either compare MAP sensor value to BARO value in a known good vehicle or obtain local weather service barometer reading (in. Hg). Multiply reading by 3.4. Result indicates correct BARO value in kPa for your area.

2) Install scan tool. Turn ignition on, engine off. Using scan tool, monitor and record MAP sensor kPa. MAP sensor value should be within 3 kPa of BARO. If MAP sensor value is normal for altitude, go to next step. If MAP sensor value is not normal for altitude, go to step 7).

3) Using scan tool, observe MAP sensor kPa display. Start engine. If MAP sensor value changes, go to next step. If MAP sensor value does not change, go to step 7).

4) Turn ignition off. Disconnect vacuum source from MAP sensor. Leave MAP sensor connected to engine harness. Connect hand vacuum pump to MAP sensor. Turn ignition on, engine off. Observe MAP sensor kPa and slowly apply vacuum one in. Hg at a time. Each one in. Hg of vacuum should result in 3 to 4 kPa drop in MAP sensor display. Observe MAP sensor display for skip or jump while increasing vacuum up to 20 in. Hg. If MAP sensor display for skips or jumps, go to step 13). If MAP sensor display does not skip or jump, go to next step.

5) Observe MAP sensor kPa display with 20 in. Hg of vacuum applied to sensor. If kPa display is less than 34 kPa, go to next step. If kPa display is 34 kPa or more, go to step 7).

6) Disconnect hand held vacuum pump. If MAP sensor display returns to value specified in step 2), system is okay. If MAP sensor display does not return to value specified in step 2), go to step 13).

7) Turn ignition off. Disconnect MAP sensor harness connector. Turn ignition on, engine off. Using scan tool, observe MAP sensor voltage display. If more than zero volts exist, go to step 10). If more than zero volts does not exist, go to step 8).

8) Using fused jumper wire, jumper MAP sensor 5-volt reference circuit (Gray wire) to MAP sensor signal circuit (Light Green wire). Using scan tool, observe MAP sensor voltage display. If MAP sensor voltage is 4.7-5.2 volts, go to next step. If MAP sensor voltage is not 4.7-5.2 volts, go to step 11).

9) Remove jumper wire. Using test light connected to battery voltage, probe MAP sensor ground circuit (Orange/Black wire). If test light illuminates, go to step 13). If test light does not illuminate, go to step 12).

NOTE: This short will have resistance. A complete short would have set a DTC.

10) Check MAP sensor signal circuit (Light Green wire) for short to voltage. Repair as necessary. After repairs, go to step 2). If circuit is okay, go to step 15).

11) Check MAP sensor 5-volt reference signal circuit (Gray wire) for high resistance. Repair as necessary. After repairs, go to step 2). If circuit is okay, go to step 15).

12) Check MAP sensor ground circuit (Orange/Black wire) for high resistance. Repair as necessary. After repairs, go to step 2). If circuit is okay, go to step 15).

13) Check MAP sensor connector for poor connection or terminal contact. Repair as necessary. After repairs, go to step 2). If circuit is okay, go to next step.

14) Replace MAP sensor. After repairs, go to step 2).

15) Inspect PCM for poor connection or terminal contact. Repair as necessary. After repairs, go to step 2). If PCM connections are okay, go to next step.

16) Replace PCM. After repairs, go to step 2).

## PARK NEUTRAL POSITION SWITCH

See appropriate ELECTRONIC CONTROLS article in AUTOMATIC TRANSMISSIONS for testing procedures.

## MODULES, MOTORS, RELAYS & SOLENOIDS

NOTE: Manufacturer does not provide testing procedures for many individual systems and components. For module, motor, relay and solenoid testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

### MOTORS

Idle Air Control (IAC) Motor  
See IDLE CONTROL SYSTEM.

### RELAYS

A/C Compressor Clutch Relay  
See appropriate MANUAL A/C-HEATER SYSTEMS or AUTOMATIC A/C-HEATER SYSTEMS article in AIR CONDITIONING & HEATING.

Fuel Pump Relay  
Fuel pump relay is located in underhood fuse/relay block. To test fuel pump relay, see FUEL PUMP ELECTRICAL CIRCUIT under appropriate NO START - ENGINE CRANKS OKAY in appropriate BASIC DIAGNOSTIC PROCEDURES article.

### SOLENOIDS

NOTE: Perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## FUEL SYSTEM

**WARNING:** ALWAYS release fuel pressure before disconnecting any fuel injection-related component. DO NOT allow fuel to contact engine or electrical components.

Manufacturer does not provide testing procedures for many individual systems and components. For fuel system testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

**NOTE:** Perform powertrain diagnostic system check prior to testing, and after completing any repairs. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK in appropriate SELF-DIAGNOSTICS article.

## FUEL DELIVERY

**NOTE:** For fuel system pressure testing, see appropriate BASIC DIAGNOSTIC PROCEDURES article.

### Fuel Pump Circuit

See FUEL PRESSURE under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES article.

### Fuel Pressure Regulator

See FUEL PRESSURE under FUEL SYSTEMS in BASIC DIAGNOSTIC PROCEDURES article.

## FUEL CONTROL

**NOTE:** Retrieve DTCs and perform appropriate DTC test before performing FUEL INJECTOR CIRCUIT DIAGNOSIS. See appropriate SELF-DIAGNOSTICS article. Also, ensure all mechanical and ignition coil/module circuit malfunctions are repaired before performing fuel injector circuit diagnosis.

**NOTE:** Allow engine to cool down to avoid irregular readings due to "hot soak" fuel boiling. To prevent flooding, the fuel injector balance test should not be performed more than once without starting and running engine.

**NOTE:** If injectors are dirty, they should be cleaned using approved injector cleaning procedure before performing fuel injector balance test.

### Fuel Injector Balance Test

1) If fuel injector coil test has been performed, go to next step. If fuel injector coil test has not been performed, perform fuel injector coil test. See FUEL INJECTOR COIL TEST.

2) If engine coolant temperature is less than 201°F (94°C), go to step 4). If engine coolant temperature is greater than 201°F (94°C), go to next step.

3) Allow engine to cool until coolant temperature is less than 201°F (94°C), then go to next step.

4) Install fuel pressure gauge. Turn ignition on, and then off. Bleed air from fuel pressure gauge. Using scan tool, energize fuel pump. Observe fuel pressure gauge reading. See appropriate FUEL PUMP PRESSURE table. If fuel pressure reading is within specification, go to next step. If fuel pressure reading is not within specification, perform fuel system diagnosis. See appropriate BASIC DIAGNOSTIC PROCEDURES article.

5) Turn fuel pump off. Observe fuel pressure gauge. If fuel pressure remains constant, go to next step. If fuel system does not remain constant, perform fuel system diagnosis. See appropriate BASIC

DIAGNOSTIC PROCEDURES article.

NOTE: Perform step this step on each injector.

6) Disconnect fuel injectors harness connector. Using appropriate fuel injector adapter, connect Fuel Injector Tester (J-39021) to fuel injector. Connect fuel injector tester power leads to appropriate battery terminals. Set amperage supply selector switch on fuel injector tester to Balance Test 2.5-amp position. Turn ignition on, and then off. Record fuel pressure reading (first reading). Energize injector by depressing PUSH TO START TEST button on injector tester and hold until fuel pressure gauge stabilizes. Record fuel pressure reading (second reading). Subtract first reading from second reading (this result is pressure drop value). Add pressure drop value for each injector together and divide total by total number of injectors. If any injector's drop value is greater or less than average drop value by 1.5 psi, replace faulty injector(s) as necessary. If no injector's drop value is greater or less than average drop value by 1.5 psi, repair by symptom. See appropriate TROUBLE SHOOTING - NO CODES article.

FUEL PRESSURE SPECIFICATIONS (EXCEPT SATURN)

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Application	(1) psi (kg/cm <sup>2</sup> )
2.2L & 2.4L .....	53-59 (3.8-4.2)
3.0L .....	40-46 (2.8-3.2)
3.1L & 3.4L .....	52-59 (3.7-4.2)
3.5L, 4.0L & 4.6L .....	41-47 (2.9-3.3)
3.8L	
Camaro & Firebird .....	48-54 (3.4-3.8)
Bonneville, Grand Prix, Park Avenue & Regal .....	48-55 (3.4-3.9)
All Others .....	52-59 (3.7-4.2)
5.7L .....	55-62 (3.9-4.4)

(1) - Specification listed is with ignition on and engine off.

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FUEL PRESSURE SPECIFICATIONS (SATURN)

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Application	(1) psi (kg/cm <sup>2</sup> )
1.9L .....	40-55 (2.8-3.9)
2.2L .....	50-60 (3.5-4.2)
3.0L .....	65 (4.6)

(1) - Specification listed is with ignition on and engine off.

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Fuel Injector Coil Test

1) Perform powertrain diagnostic system check. See appropriate POWERTRAIN DIAGNOSTIC SYSTEM CHECK in SELF DIAGNOSTICS article.

2) Using scan tool, check engine coolant temperature. If scan tool displays 50-90°F (10-32°C), go to next step. If scan tool does not display 50-90°F (10-32°C), go to step 4).

3) Disconnect fuel injector connector. Using DVOM, measure resistance of each fuel injector. Resistance for all injectors should be 11-14 ohms. If resistance is not as specified, go to step 6). If resistance is as specified, see INJECTOR COIL TEST DIAGNOSTIC AIDS.

4) Disconnect fuel injector multi-way connector. Using DVOM, measure resistance of each fuel injector. Record each fuel injector



value. Subtract lowest resistance value from highest resistance value. If difference is equal to, or less than, 3 ohms, see INJECTOR COIL TEST DIAGNOSTIC AIDS. If resistance difference is not as specified, go to next step.

5) Add all fuel injector resistance values, to obtain total resistance value. Divide total resistance value by number of fuel injectors, to obtain average resistance value. Subtract lowest and highest individual fuel injector resistance values from average resistance value. Replace fuel injector with greatest resistance difference, above or below average. Repair as necessary. After repairs, go to step 7).

6) If resistance of fuel injector(s) is not 11-14 ohms, replace fuel injector(s). After repairs, go to next step.

7) Operate system in order to verify repair. If system does not operate properly, go to step 2).

#### Injector Coil Test Diagnostic Aids

Monitoring misfire current counters, or misfire graph, may help isolate fuel injector causing condition.

Operating vehicle over a wide temperature range may help isolate fuel injector causing condition.

Perform fuel injector coil test within conditions of customers concern. A fuel injector condition may only be apparent at a certain temperature, or under certain conditions. If fuel injector coil test does not isolate condition perform fuel injector balance test. See FUEL INJECTOR BALANCE TEST.

#### Injector Leak Test (1.9L)

1) Disconnect negative battery terminal. Remove air intake tube and resonator. Install Fuel Gauge Bar Kit (SA9127E) to fuel pressure test port. Bleed system pressure through bleed hose.

2) Disconnect fuel pressure regulator vacuum hose. Remove fuel lines from bracket, leaving fuel supply lines attached to fuel rail assembly and connectors. Disconnect and plug fuel return line from fuel rail.

3) Remove fuel rail assembly retaining bolts. Pull fuel rail back far enough that injector nozzles are visible but still in intake ports. Secure fuel rail to intake manifold with wire.

4) Wipe off any fuel or debris from fuel injector tips. Place a clean, White towel directly under fuel injectors, with towel lightly touching each fuel injector tip to easily spot a leaky injector.

5) Reconnect negative battery terminal. Ensure battery is fully charged. Cycle ignition on and off several times. DO NOT start engine. Observe fuel injector tips for 5 minutes. Fuel rail pressure should be about 46 psi (3.23 kg/cm<sup>2</sup>) with fuel rail return line plugged. Run test at least twice. Replace any leaky fuel injector.

6) Bleed fuel pressure through bleed hose and remove fuel pressure gauge. Reinstall fuel rail, fuel return line and pressure regulator vacuum hose. Lubricate injector "O" rings and male end of steel line with clean engine oil prior to installation. Start engine and check for fuel leaks.

#### Fuel Pump Relay

See RELAYS under MODULES, MOTORS, RELAYS & SOLENOIDS.

## IDLE CONTROL SYSTEM

NOTE: For idle control system testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

NOTE: Perform powertrain diagnostic system check prior to testing, and after completing any repairs. See POWERTRAIN DIAGNOSTIC SYSTEM CHECK in appropriate SELF-DIAGNOSTICS article.

## IDLE AIR CONTROL SYSTEM (2.2L, 2.4L, 3.1L, 3.4L, 3.5L, 3.8L & 4.0L)

### Diagnostic Procedures

1) Perform powertrain diagnostic system check. See appropriate POWERTRAIN DIAGNOSTIC SYSTEM CHECK in SELF DIAGNOSTICS article.

NOTE: Ensure engine speed stabilizes with each commanded RPM change to determine if engine speed stays within 60 RPM for automatic transmission and/or within 100 RPM for manual transmission of commanded RPM.

2) Set parking brake and block drive wheels. Install scan tool. Start engine. Turn all accessories off. Using scan tool RPM control function, slowly increment engine speed to 1800 RPM, then to 600 RPM. Then to 1800 RPM. Exit RPM control function. If engine RPM stabilizes within 60 RPM for automatic transmission and/or within 100 RPM for manual transmission of commanded RPM during test, see DIAGNOSTIC AIDS. If engine RPM does not stabilize as specified, go to next step.

3) Turn ignition off. Disconnect IAC valve harness connector. See WIRING DIAGRAMS article. Connect IAC System Motor Analyzer (J 37027-A) to IAC valve. Start engine. Using IAC system motor analyzer, command IAC valve in until about 600 RPM is reached and then command IAC valve out until about 1800 RPM is reached. Return engine RPM to desired idle as indicated on scan tool data list. If engine RPM steadily decreased to about 600 RPM and increased to about 1800 RPM when IAC valve was commanded in and out, go to step 5). If engine RPM did not decrease and increase as specified, go to next step.

4) If idle RPM is high and can not be controlled by IAC motor driver, go to step 11). If idle RPM is not high and can be controlled by IAC motor driver, go to step 12).

5) Using a test light connected to ground, probe one IAC valve circuit at IAC valve harness connector. See WIRING DIAGRAMS article. Start engine. Using IAC system motor analyzer, command low RPM while observing scan tool until IAC counts start to increment, then command high RPM until IAC counts start to increment. Observe test light while incrementing IAC counts. Return engine to idle as indicated on scan tool data list. Repeat procedure for other three IAC valve circuits. If test light remained on (never flashing) while IAC counts where incrementing at any IAC valve circuits during test, go to step 10). If test light did not remain on while incrementing IAC counts, go to next step.

6) If test light remained off (never flashing) while IAC Counts where incrementing at any IAC valve circuits, go to step 9). If test light did not remain off, go to next step.

7) Using Connector Test Adaptor Kit (J 35616-A) connect a test light between IAC coil "A" low circuit and IAC coil "A" high circuit at IAC valve harness connector. Using IAC system motor driver, command low RPM while observing scan tool until IAC counts start to increment, then command high RPM until IAC counts start to increment. Observe test light while incrementing IAC counts. Return engine speed to desired idle as indicated on scan tool data list. Repeat procedure on IAC coil "B" low circuit and IAC coil "B" high circuit. If test light stayed illuminated (never flashing) while IAC counts where incrementing, go to next step. If test light did not remain illuminated while IAC counts where incrementing, go to step 16).

8) Check for poor connection at IAC valve harness connector. Repair as necessary. After repairs, go to step 17). If IAC valve harness connections are okay, see DIAGNOSTIC AIDS.

9) Turn ignition off. Disconnect PCM harness connectors. Check for open or short to ground in IAC valve circuit where test light remained off. Repair as necessary. After repairs, go to step 17). If circuits are okay, go to step 13).

10) Turn ignition on. Check for short to voltage on IAC valve circuit where test lamp remained illuminated. Repair as necessary. After repairs, go to step 17). If circuits are okay, go to step 13)

11) Visually and physically inspect for the following:

- \* Throttle body damage and tampering.
- \* Skewed TP sensor signal.
- \* Throttle lever screw tampering (if equipped).
- \* Vacuum leaks.
- \* Faulty, incorrectly installed PCV valve and hose (if equipped).
- \* Throttle shaft binding.
- \* Throttle linkage or cruise control linkage binding (if equipped).

Remove IAC valve. Inspect for the following:

- \* Clogged IAC passage.
- \* Excessive deposits on throttle plate.
- \* Excessive deposits in throttle bore.
- \* Excessive deposits on IAC valve pintle.

Repair as necessary. After repairs, go to step 17). If all listed components are okay, go to step 14).

12) Visually and physically inspect for the following:

- \* Throttle body damage and tampering.
- \* Throttle lever screw tampering (if equipped).
- \* Restricted air intake system.
- \* Excessive deposits on throttle plate.
- \* Excessive deposits in throttle bore.
- \* Remove IAC valve and inspect for excessive deposits on IAC valve pintle and in IAC valve passage.

Repair as necessary. After repairs, go to step 17). If all listed components are okay, go to step 14).

13) Check for poor PCM harness connections. Repair as necessary. After repairs, go to step 17). If PCM connections are okay, go to step 16).

14) Check for poor IAC valve harness connection. Repair as necessary. After repairs, go to step 17). If IAC valve harness connection is okay, go to next step.

15) Replace IAC valve. After repairs, go to step 17).

16) Replace PCM. After repairs, go to next step.

17) Using scan tool, clear any DTCs that may have set. Turn ignition off for 30 seconds. Operate vehicle within conditions to verify repair.

#### Diagnostic Aids

Inspect for the following conditions:

- \* Skewed high TP sensor.
- \* Restricted air intake system.
- \* Objects blocking IAC passage or throttle bore.
- \* Correct Positive Crankcase Ventilation (PCV) valve, properly installed and proper operation of PCV valve

(if equipped).

- \* Proper operation and installation of all air intake components.
- \* Proper installation and operation of Mass Air Flow (MAF) sensor (if equipped).
- \* Tampered with or damaged throttle stop screw.
- \* Tampered with or damaged throttle plate, throttle shaft, throttle linkage, or cruise control linkage (if equipped).
- \* Excessive deposits in IAC passage or on IAC pintle.
- \* Excessive deposits in throttle bore or on throttle plate.
- \* Vacuum leaks
- \* Excessive engine load caused by faulty transmission, power steering, alternator, etc.
- \* High or unstable idle condition caused by a non-IAC system problem that can not be overcome by IAC valve.
- \* Low or unstable idle condition caused by a non-IAC system problem that can not be overcome by IAC valve.

## **IGNITION SYSTEM**

NOTE: For basic ignition system checks, see appropriate BASIC DIAGNOSTIC PROCEDURES article.

NOTE: For ignition system testing, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## **EMISSION SYSTEMS & SUBSYSTEMS**

NOTE: For emission and subsystem testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## **AIR INJECTION**

Electric AIR Pump

NOTE: For electric AIR pump testing, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## **EXHAUST GAS RECIRCULATION**

WARNING: Use protective gloves, or allow exhaust system to cool, before servicing exhaust system components.

NOTE: Manufacturer does not provide testing procedures for many individual systems and components. For EGR system testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

NOTE: For EGR system diagnosis, see appropriate INSPECTION/MAINTENANCE PROCEDURES in appropriate SELF DIAGNOSTICS article.

Exhaust System Check

1) Remove heated oxygen sensor. Install exhaust backpressure tester in place of oxygen sensor. Start engine and let idle. If pressure reading is not 1.25 psi or greater, go to next step. If pressure reading is 1.25 psi or greater, go to step 3).

2) Increase engine speed to 2000 RPM. If pressure reading is greater than 3 psi, go to next step. If pressure reading is not greater than 3 psi, go to step 5).

3) Check exhaust system for crushed pipe, internal muffler damage or heat distress. If problem does not exist, go to next step. If problem exists, repair as necessary and go to step 5).

4) Replace catalytic converter. After repairs, go to next step.

5) Operate vehicle within conditions under which original symptom was noted. If system operate properly, system is okay. If system does not operate properly, go to step 1).

## FUEL EVAPORATION

NOTE: Ensure all vacuum line and EVAP system components are not damaged or missing before proceeding with this test.

EVAP Control System Diagnosis (3.1L Luminia)

1) Perform powertrain diagnostic system check. See appropriate POWERTRAIN DIAGNOSTIC SYSTEM CHECK in SELF DIAGNOSTICS article.

2) If any DTC is set, perform appropriate DTC test in SELF-DIAGNOSTICS article. If DTC is not set, go to next step.

3) Check EVAP system for the following conditions:

- \* Loose, incorrect, defective or missing fuel fill cap.
- \* Improperly routed, kinked or damaged EVAP system purge or vapor pipes.
- \* Pinched off or damaged fresh air vent hose.
- \* Damaged EVAP system components.
- \* Loose, missing or damaged service port dust cap and/or schrader valve.

Repair as necessary. After repairs, go to step 9). If above system checks are okay, go to next step.

4) Disconnect EVAP vapor pipe from fuel tank or EVAP canister. Turn ignition on, engine off. Using scan tool, observe fuel tank pressure parameter. If fuel tank pressure is about zero, go to next step. If fuel tank pressure is not about zero, see DTC P0453 in appropriate SELF DIAGNOSTICS article.

5) Reconnect all EVAP hardware. Install Fuel Tank Cap Adapter (J 41415-40) to fuel fill neck and fuel fill cap. Connect EVAP Pressure/Purge Diagnostic Station (J 41413) to fuel tank cap adaptor. Using scan tool, select SEAL option to seal EVAP system. Using EVAP station, pressurize system to 5 in. H<sub>2</sub>O (1.25 kPa) by slowly turning rotary switch to PRESSURE position. DO NOT exceed 5 in. H<sub>2</sub>O (1.25 kPa) pressure. If 5 in. H<sub>2</sub>O (1.25 kPa) is achieved, go to next step. If 5 in. H<sub>2</sub>O (1.25 kPa) is not achieved, see DTC P0440 in appropriate SELF DIAGNOSTICS article.

6) Using EVAP diagnostic station, maintain fuel tank pressure at 5 in. H<sub>2</sub>O (1.25 kPa). If scan tool indicates fuel tank pressure of 5 in. H<sub>2</sub>O (1.25 kPa), go to next step. If fuel tank pressure is not 5 in. H<sub>2</sub>O (1.25 kPa), see DTC P0452 in appropriate SELF DIAGNOSTICS article.

7) Using scan tool, command vent valve off. If pressure decrease is about 0 in. H<sub>2</sub>O (0 kPa) within 2 minutes with rotary switch in OFF/HOLD position, go to next step. If pressure decrease is not as specified, see DTC P0446 in appropriate SELF DIAGNOSTICS article.

8) Using EVAP station, increase fuel tank pressure to 5 in. H<sub>2</sub>O (1.25 kPa). Using scan tool, observe fuel tank pressure. If scan tool indicates fuel tank pressure decrease to 0 in. H<sub>2</sub>O (0 kPa) within 15 seconds, see DTC P1441 in appropriate SELF DIAGNOSTICS article. If fuel tank pressure is not as specified, go to next step.

9) Reconnect all EVAP hardware. Turn ignition on, engine off. Using scan tool, select SEAL option to seal EVAP system. Do not exceed

15 in H2O pressure. Using EVAP station, pressurize system to 15 in. H2O by slowly turning rotary switch to PRESSURE position. Monitor pressure with gauge on cart with rotary switch in OFF/HOLD position. If EVAP pressure decrease is less than 10 in. H2O within 2 minutes, see DTC P0442 in appropriate SELF DIAGNOSTICS article. If pressure is as specified, system is okay.

NOTE: The following procedure does not apply to 2.2L Saturn.

EVAP Control System Diagnosis (Except 3.1L Lumina)

For EVAP control system diagnosis, see appropriate INSPECTION/MAINTENANCE PROCEDURES in appropriate SELF DIAGNOSTICS article.

## POSITIVE CRANKCASE VENTILATION

Required Service

The PCV system may require service for obstructions if any of the following conditions exist:

- \* Rough idle.
- \* Stalling or slow idle speed.
- \* Oil leaks.
- \* Oil in air cleaner.
- \* Sludge in engine.

A leaking PCV valve or hose could cause:

- \* Rough idle.
- \* Stalling.
- \* High idle speed.

If engine idles rough, check for clogged PCV valve, or plugged or broken hoses BEFORE adjusting idle. Check PCV valve application to ensure correct valve is fitted. Replace PCV valve if required.

Checking PCV Valve Function

1) Disconnect PCV valve vacuum hose from cylinder head cover. Run engine at idle. Place thumb over open end of PCV valve vacuum hose to check for vacuum. If vacuum does not exist, check for obstruction in source vacuum supply. If source vacuum supply is okay, replace PCV valve.

2) Turn ignition off. Remove PCV valve. Shake valve and listen for rattle of check valve inside PCV valve. If a clear rattle is not heard, replace PCV valve.

3) Visually inspect valve for varnish or deposits which may make PCV valve operation sticky or restricted, or cause incomplete seating of valve. Replace as necessary.

4) Engine must be sealed for PCV system to function as designed. If leakage, sludging or dilution of oil is noted and PCV system is functioning properly, check engine for cause and repair as required to ensure PCV system will continue to function properly.

5) An engine operating without any crankcase ventilation can be damaged, so it is important to replace PCV valve and air cleaner breather (if equipped) at regular intervals (at least every 30,000 miles). Check all hoses and clamps for failure or deterioration.

## MISCELLANEOUS CONTROLS

NOTE: Although some of the controlled devices listed here are not technically engine performance components, they can affect

driveability if they malfunction.

NOTE: Manufacturer does not provide testing procedures for many individual systems and components. For system and component testing not listed, perform related DTC testing procedure. See appropriate SELF-DIAGNOSTICS article.

## A/C COMPRESSOR CLUTCH CONTROLS

NOTE: For A/C compressor clutch circuit testing, see appropriate MANUAL A/C-HEATER SYSTEMS article in AIR CONDITIONING & HEATING.

## ELECTRIC COOLING FAN

NOTE: For electric cooling fan circuit testing, see appropriate ELECTRIC COOLING FANS article in ENGINE COOLING.

## TRANSMISSION

NOTE: For transmission electronic controls testing, see appropriate ELECTRONIC CONTROLS article in AUTOMATIC TRANSMISSIONS. For component circuit identification, see WIRING DIAGRAMS article.

## COMPONENT LOCATIONS

NOTE: Component location tables for Saturn vehicles are not available. Refer to appropriate illustrations. See Figs. 2-8.

### COMPONENT LOCATIONS (2.2L VIN 4 & 2.4L VIN T - CAVALIER & SUNFIRE)

Component	Location
A/C Compressor Clutch Relay	.... Left Side Of Engine Compartment, In Underhood Fuse/Relay Center
A/C Refrigerant Pressure Sensor	..... Right Front Of Engine Compartment, Below Coolant Surge Tank
Camshaft Position (CMP) Sensor	..... Right Center Of Engine, Above Oil Filter
Convenience Center	..... Right Upper Side Of Instrument Panel
Cooling Fan Relay	..... Left Side Of Engine Compartment, In Underhood Fuse/Relay Center
Crankshaft Position (CKP) Sensor	..... Rear Center Of Engine, Below CMP Sensor
Cruise Control Module	..... Right Rear Of Engine Compartment
Data Link Connector (DLC)	..... Lower Left Side Of Instrument Panel
Electronic Ignition Control Module	..... Rear Center Of Engine
Engine Coolant Level Switch	..... Right Side Of Engine Compartment, On Surge Tank
Engine Coolant Temperature (ECT) Sensor	..... Top Left Front Of Engine
Engine Oil Pressure Sensor	..... Right Center Of Engine
EVAP Canister Purge Solenoid	..... Left Rear Of Engine, Below Cylinder Head
EVAP Canister Vent Solenoid	..... Right Front Corner Of Engine Compartment, Behind Fascia
Fuel Injectors	..... Left Top Of Engine, On Fuel Rail
Fuel Pump Relay	..... Left Side Of Engine Compartment, In Underhood Fuse/Relay Center
Fuel Tank Pressure Sensor	..... On Fuel Tank

Idle Air Control (IAC) Valve ..... Front Of Throttle Body  
 Intake Air Temperature  
 (IAT) Sensor ..... Top Of Engine, On Air Intake Duct  
 Knock Sensor ..... Rear Center Of Engine, Next To CKP Sensor  
 Manifold Absolute  
 Pressure (MAP) Sensor ..... Left Side Of Throttle Body  
 Post-Converter Oxygen Sensor ..... Under Rear Passenger Compartment,  
 Rear Of Catalytic Converter  
 Powertrain Control Module (PCM) ..... Right Front Corner Of Engine  
 Compartment, Behind Fascia  
 Pre-Converter Oxygen Sensor ..... In Exhaust Manifold  
 Throttle Position (TP) Sensor ..... Left Top Of Throttle Body  
 Transaxle Range Switch ..... Left Rear Of Engine Compartment  
 Underhood Fuse/Relay Center ..... Left Side Of Engine Compartment  
 Vehicle Speed Sensor (A/T) ..... Left Rear Of Transaxle  
 Vehicle Speed Sensor (M/T) ..... Rear Center Of Engine

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COMPONENT LOCATIONS (2.4L VIN T - ALERO & GRAND AM)

Component	Location
A/C Compressor Clutch Relay	Left Side Of Engine Compartment, In Underhood Junction Block
A/C Refrigerant Pressure Sensor	Front Of Engine Compartment
Camshaft Position (CMP) Sensor	Top Left Side Of Engine
Cooling Fan Control Relays No. 1 & 2	Left Side Of Engine Compartment, In Underhood Junction Block
Crankshaft Position (CKP) Sensor	Lower Left Side Of Engine, Near Oil Filter
Cruise Control Module	Right Side Of Engine Compartment
Data Link Connector (DLC)	Lower Left Side Of Instrument Panel
Electronic Ignition Control Module	Top Right Rear Of Engine
Engine Coolant Level Switch	Right Side Of Engine Compartment
Engine Coolant Temperature (ECT) Sensor	Right Rear Of Engine
Engine Oil Pressure Sensor	Top Rear Of Engine
EVAP Canister Purge Solenoid	Lower Left Front Of Engine
EVAP Canister Vent Solenoid	Under Rear Of Vehicle
Fuel Injectors	Top Of Engine, On Fuel Rail
Fuel Pump Relay	Left Side Of Engine Compartment, In Underhood Junction Block
Fuel Tank Pressure Sensor	Under Rear Of Vehicle
Idle Air Control (IAC) Valve	Left Side Of Engine
Intake Air Temperature (IAT) Sensor	Top Rear Of Engine
Knock Sensor	Right Rear Side Of Engine
Left Instrument Panel Junction Block	Left Side Of Instrument Panel
Manifold Absolute Pressure (MAP) Sensor	Left Side Of Engine
Mass Airflow (MAF) Sensor	Top Left Side Of Engine
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	Below Left Side Of Instrument Panel, Near Steering Column
Pre-Converter Oxygen Sensor	In Exhaust Manifold
Right Instrument Panel Junction Block	Right Side Of Instrument Panel
Throttle Position (TP) Sensor	On Throttle Body Assembly
Transaxle Range Switch	Left Side Of Engine Compartment, On Top Of Transaxle
Underhood Junction Block	Left Side Of Engine Compartment



Vehicle Speed Sensor ..... Rear Of Engine/Transaxle

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COMPONENT LOCATIONS (3.0L VIN R - CATERA)

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Component	Location
Accelerator Pedal Position (APP) Sensor	On Accelerator Pedal Mounting Bracket
A/C Compressor Clutch Relay	At Left Front Of Engine Compartment, In ECM Housing
A/C Refrigerant Pressure Switch	Mounted In A/C Compressor/Condenser Hose, Below A/C Control Switch
Camshaft Position (CMP) Sensor	Front Of Engine Block
Cooling Fan Control Relay	At Left Front Of Engine Compartment, In ECM Housing
Crankshaft Position (CKP) Sensor	Left Rear Of Engine Block
Data Link Connector (DLC)	Under Left Side Of Instrument Panel
Electronic Brake/Traction Control Module (EBTCM)	At Left Front Of Engine Compartment, In ECM Housing
Engine Control Module (ECM)	At Left Front Of Engine Compartment, In ECM Housing
Engine Controls Power Relay	At Left Front Of Engine Compartment, In ECM Housing
Engine Coolant Temperature (ECT) Sensor	Mounted In Coolant Bridge
Engine Oil Pressure Sensor	Lower Right Front Of Engine
EVAP Canister Purge Solenoid	Right Rear Of Intake Manifold Plenum
EVAP Canister Tank Solenoid	On Top Of Fuel Tank
Fuel Injectors	In Intake Manifold
Fuel Pump Relay	At Left Front Of Engine Compartment, In ECM Housing
Fuel Tank Pressure Sensor	Inside Fuel Tank
Fuse Block	Behind Left Side Of Instrument Panel
Ignition Coil	Top Of Cylinder
Intake Air Temperature (IAT) Sensor	Part Of MAF Sensor
Intake Plenum Switch-Over Solenoid	Left Rear Of Engine
Intake Resonance Switch-Over Solenoid	Left Rear Of Engine
Knock Sensor	At Right & Left Side Of Engine Block
Mass Airflow (MAF) Sensor	Located In Air Intake Passage Between Air Cleaner & Resonance Chamber
Oxygen Sensors (O2S)	In Front & Rear Of Catalytic Converters
Power Distribution Fuse Block	Left Side Of Engine Compartment, Attached To ECM
Secondary Air Injection Pump Relay	At Left Front Of Engine Compartment, In ECM Housing
Secondary Air Injection Pump Solenoid	Left Front Center Of Engine Compartment
Theft Deterrent Module	On Ignition Lock Cylinder, Upper Right Side Of Steering Column
Throttle Position (TP) Sensor	Attached To Throttle Body
Transaxle Range Switch	Left Side Of Transaxle
Transmission Control Module (TCM)	Behind Right Side Of Instrument Panel

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COMPONENT LOCATIONS (3.1L VIN J - CENTURY)

Component	Location
A/C Refrigerant Pressure Sensor	... Left Side Of Engine Compartment, On Accumulator
Camshaft Position (CMP) Sensor	..... Front Of Engine, Below Intake Plenum
Crankshaft Position (CKP) Sensor (7X)	..... Right Side Of Engine, Below Exhaust Manifold
Crankshaft Position (CKP) Sensor (24X)	..... Right Front Side Of Engine, Behind Harmonic Balancer
Cruise Control Module	..... Left Side Of Engine Compartment, Mounted To Strut Tower
Data Link Connector (DLC)	..... Under Left Side Of Instrument Panel, Right Of Steering Column
EGR Valve	..... Upper Left Side Of Engine, Near Throttle Body
Engine Coolant Temperature (ECT) Sensor	..... Top Left Side Of Engine, Below Throttle Body
Engine Oil Level Switch	..... In Oil Pan, Lower Front Center
Engine Oil Pressure Switch	..... Lower Left Side Of Engine, Above Starter
EVAP Canister Purge Solenoid	..... Top Rear Of Engine, Behind Ignition Control Module
EVAP Canister Vent Solenoid	..... Behind Left Rear Fascia Splash Shield, In Wheelwell
Fuel Injectors	..... In Intake Manifold
Fuse Block	..... Right Side Of Instrument Panel, In Door Opening
Idle Air Control (IAC) Valve	..... On Throttle Body
Ignition Control Module	..... Top Right Side Of Engine
Intake Air Temperature (IAT) Sensor	..... Left Front Of Engine Compartment, On Air Intake Duct
Knock Sensor (Bank No. 1)	..... Left Side Of Lower Engine, Above Starter
Knock Sensor (Bank No. 2)	..... In Engine Block, Rear Center, Below Exhaust Manifold
Manifold Absolute Pressure (MAP) Sensor	..... Top Rear Of Engine, Above Valve Cover
Mass Airflow (MAF) Sensor	..... Left Front Of Engine, In Air Intake Duct
Post-Converter Oxygen Sensor	..... Rear Of Catalytic Converter
Powertrain Control Module (PCM)	..... Left Side Of Engine, In Air Cleaner Assembly
Pre-Converter Oxygen Sensor	.... Behind Center Of Engine, In Exhaust Manifold
Throttle Position (TP) Sensor	..... On Throttle Body
Transaxle Range Switch	..... Left Of Engine, On Transaxle
Underhood Junction Block	..... Right Side Of Engine Compartment, Mounted To Strut Tower
Vehicle Speed Sensor	..... Lower Right Side Of Engine Compartment, On Transaxle

COMPONENT LOCATIONS (3.1L VIN J - MALIBU)

Component	Location
A/C Compressor Clutch Relay	.... Left Side Of Engine Compartment, In Underhood Junction Block
A/C Refrigerant Pressure Sensor	..... Front Of Engine Compartment
Camshaft Position (CMP) Sensor	..... Top Rear Of Engine
Cooling Fan Control Relays No. 1 & 2	..... Left Side Of Engine Compartment, In Underhood Junction Block
Crankshaft Position (CKP) Sensor (7X)	..... Lower Rear Of Engine
Crankshaft Position (CKP) Sensor (24X)	..... Lower Rear Of Engine
Cruise Control Module	..... Right Side Of Engine Compartment
Data Link Connector (DLC)	..... Under Left Side Of Instrument Panel
EGR Valve	..... Top Rear Of Engine
Engine Coolant Level Switch	.... In Right Side Of Engine Compartment
Engine Coolant Temperature (ECT) Sensor	..... Top Left Of Engine
Engine Oil Level Switch	..... Rear Of Engine
Engine Oil Pressure Sensor	..... Top Left Of Engine
EVAP Canister Purge Solenoid	..... Lower Front Of Engine
EVAP Canister Vent Solenoid	..... Under Rear Of Vehicle
Fuel Injectors	..... In Intake Manifold
Fuel Pump Relay	..... Left Side Of Engine Compartment, In Underhood Junction Block
Fuel Tank Pressure Sensor	..... Under Rear Of Vehicle
Idle Air Control (IAC) Valve	..... Top Left Side Of Engine
Ignition Control Module	..... Top Rear Of Engine
Left Instrument Panel Junction Block	..... Left Side Of Instrument Panel
Right Instrument Panel Junction Block	..... Right Side Of Instrument Panel
Intake Air Temperature (IAT) Sensor	..... Top Left Side Of Engine
Knock Sensor	..... On Front Of Engine
Manifold Absolute Pressure (MAP) Sensor	..... Top Rear Of Engine
Mass Airflow (MAF) Sensor	..... Top Left Side Of Engine
Post-Converter Oxygen Sensor	..... Rear Of Catalytic Converter
Powertrain Control Module (PCM)	..... Below Left Side Of Instrument Panel, Near Steering Column
Pre-Converter Oxygen Sensor	.... Top Rear Of Engine, In Left Exhaust Manifold
Throttle Position (TP) Sensor	..... Top Left Side Of Engine
Transaxle Range Switch	..... Left Side Of Engine
Underhood Junction Block	..... On Left Side Of Engine Compartment
Vehicle Speed Sensor	..... Rear Of Engine/Transaxle

COMPONENT LOCATIONS (3.1L VIN J - LUMINA)

Component	Location
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A/C Refrigerant Pressure  
 Sensor ..... Right Side Of Engine Compartment,  
 Below Accumulator

Camshaft Position (CMP)  
 Sensor ..... Right Side Of Engine, Below Intake  
 Plenum

Crankshaft Position  
 (CKP) Sensor (7X) ..... Lower Rear Of Engine

Crankshaft Position  
 (CKP) Sensor (24X) ..... Right Front Side Of Engine, Behind  
 Harmonic Balancer

Cruise Control Module ..... Left Side Of Engine Compartment, Near  
 Strut Tower

Data Link Connector (DLC) ..... Under Instrument Panel, Right Of  
 Steering Column

EGR Valve ..... Upper Left Side Of Engine

Engine Coolant  
 Temperature (ECT)  
 Sensor ..... Top Left Side Of Engine, Below  
 Throttle Body

Engine Oil Level Sensor ..... Center Of Engine, Above Starter

EVAP Canister Purge  
 Solenoid ..... Top Rear Of Engine, On Intake  
 Manifold, Below Ignition Control  
 Module

EVAP Canister Vent  
 Solenoid ..... Behind Left Rear Fascia Splash Shield,  
 In Wheelwell

Fuel Injectors ..... In Intake Manifold

Fuse Block ..... Right Side Of Instrument Panel, In  
 Door Opening

Fuel Tank Pressure Sensor ..... In Fuel Tank

Idle Air Control (IAC)  
 Valve ..... Top Of Engine, Front Of Throttle Body

Ignition Control Module ..... Top Center Rear Of Engine

Intake Air Temperature  
 (IAT) Sensor ..... Left Front Of Engine Compartment, On  
 Air Intake Duct

Knock Sensor (Bank No. 1) ..... On Front Of Engine, Above Starter

Knock Sensor (Bank No. 2) ... Rear Of Engine, Below Exhaust Manifold

Manifold Absolute  
 Pressure (MAP) Sensor ..... Top Rear Of Engine, On Intake Plenum,  
 Near Ignition Control Module

Mass Airflow (MAF) Sensor ..... Left Front Of Engine Compartment, In  
 Air Intake Duct

Post-Converter Oxygen  
 Sensor ..... Rear Of Catalytic Converter

Powertrain Control  
 Module (PCM) ..... Right Side Of Engine Compartment,  
 Forward Of Strut Tower

Pre-Converter Oxygen  
 Sensor ..... Rear Of Engine, In Exhaust Manifold

Throttle Position (TP)  
 Sensor ..... Top Of Engine, On Throttle Body

Transaxle Range Switch ..... Left Of Engine, On Transaxle

Underhood Junction  
 Blocks No. 1 & 2 ..... On Right Or Left Side Of Engine  
 Compartment, Forward Of Strut Tower

Vehicle Speed Sensor ..... Right Rear Of Engine, On Transaxle

Component	Location
A/C Refrigerant Pressure Sensor	Left Side Of Engine Compartment, On Accumulator
Body Control Module (BCM)	Below Left Side Of Instrument Panel, Left Of Steering Column
Camshaft Position (CMP) Sensor	Front Of Engine, Below Intake Plenum
Crankshaft Position (CKP) Sensor (7X)	Lower Right Side Of Engine Below Exhaust Manifold
Crankshaft Position (CKP) Sensor (24X)	Front Of Engine, Behind Harmonic Balancer
Cruise Control Module	Left Side Of Engine Compartment, Mounted To Strut Tower
Data Link Connector (DLC)	Under Instrument Panel, Right Of Steering Column
EGR Valve	Top Right Rear Of Engine, Near Throttle Body
Engine Coolant Temperature (ECT) Sensor	Top Left Rear Of Engine, Below Throttle Body
Engine Oil Level Switch	Center Of Engine Oil Pan
Engine Oil Pressure Switch	Front Of Engine, Above Starter
EVAP Canister Purge Solenoid	Top Right Side Of Engine, Behind Ignition Control Module
EVAP Canister Vacuum Switch	Top Rear Of Engine, On Intake Manifold, Behind Ignition Control Module
EVAP Canister Vent Solenoid	Behind Left Rear Fascia Splash Shield, In Wheelwell
Fuel Injectors	In Intake Manifold
Fuse Block	Right Side Of Instrument Panel
Idle Air Control (IAC) Valve	On Throttle Body
Ignition Control Module	Top Right Side Of Engine
Intake Air Temperature (IAT) Sensor	Left Front Of Engine Compartment, On Air Intake Duct
Knock Sensor	Left Side Of Engine, Above Starter
Manifold Absolute Pressure (MAP) Sensor	Top Right Side Of Engine, Above Valve Cover
Mass Airflow (MAF) Sensor	Left Front Of Engine Compartment, In Air Intake Duct
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	Left Side Of Engine Compartment, Inside Air Cleaner Assembly
Pre-Converter Oxygen Sensor	In Exhaust Manifold
Throttle Position (TP)	

Sensor ..... On Throttle Body  
 Transaxle Range Switch .... Left Of Engine Compartment, On Transaxle  
 Underhood Junction Block ..... Right Side Of Engine Compartment,  
 Mounted To Strut Tower  
 Vehicle Speed Sensor ..... Right Rear Of Engine Compartment, On  
 Transaxle

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COMPONENT LOCATIONS (3.4L VIN E - ALERO & GRAND AM)

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Component	Location
A/C Compressor Clutch Relay ....	Left Side Of Engine Compartment, In Underhood Junction Block
A/C Refrigerant Pressure Sensor .....	Front Of Engine Compartment
Camshaft Position (CMP) Sensor .....	Top Rear Of Engine
Crankshaft Position (CKP) Sensor (7X) .....	Lower Rear Of Engine
Crankshaft Position (CKP) Sensor (24X) .....	Lower Rear Of Engine
Cruise Control Module .....	Right Side Of Engine Compartment
Data Link Connector (DLC) .....	Under Left Side Of Instrument Panel
EGR Valve .....	Top Rear Of Engine
Engine Coolant Level Switch .....	Right Side Of Engine Compartment
Engine Coolant Temperature (ECT) Sensor .....	Left Side Of Engine
Engine Oil Level Switch .....	Rear Of Engine
Engine Oil Pressure Sensor .....	Top Left Of Engine
EVAP Canister Purge Solenoid .....	Lower Front Of Engine
EVAP Canister Vent Solenoid .....	Under Rear Of Vehicle
Fuel Injectors .....	In Intake Manifold
Fuel Pump Relay .....	Left Side Of Engine Compartment, In Underhood Junction Block
Fuel Tank Pressure Sensor .....	Under Rear Of Vehicle
Idle Air Control (IAC) Valve .....	Top Left Side Of Engine
Ignition Control Module .....	Top Rear Of Engine
Left Instrument Panel Junction Block .....	Left Side Of Instrument Panel
Right Instrument Panel Junction Block .....	Right Side Of Instrument Panel
Intake Air Temperature (IAT) Sensor .....	Top Left Side Of Engine
Knock Sensor .....	On Front Of Engine
Manifold Absolute Pressure (MAP) Sensor .....	Top Rear Of Engine
Mass Airflow (MAF) Sensor .....	Top Left Side Of Engine
Post-Converter Oxygen Sensor .....	Rear Of Catalytic Converter
Powertrain Control Module (PCM) .....	Under Left Side Of Instrument Panel, Near Steering Column
Pre-Converter Oxygen Sensor ....	Rear Of Engine, In Exhaust Manifold
Throttle Position (TP) Sensor .....	Top Left Side Of Engine
Transaxle Range Switch .....	Left Side Of Engine
Underhood Junction Block .....	Left Side Of Engine Compartment
Vehicle Speed Sensor .....	Rear Of Engine/Transaxle

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COMPONENT LOCATIONS (3.4L VIN E - IMPALA & MONTE CARLO)

Component	Location
A/C Refrigerant Pressure Sensor	Front Of Engine Compartment
Camshaft Position (CMP) Sensor	Right Side Of Engine, Below Intake Plenum
Crankshaft Position (CKP) Sensor (7X)	Lower Rear Of Engine
Crankshaft Position (CKP) Sensor (24X)	Lower Front Of Engine, Behind Harmonic Balancer
Cruise Control Module	Left Side Of Engine Compartment
Data Link Connector (DLC)	Under Right Side Of Instrument Panel
EGR Valve	Top Rear Of Engine
Engine Coolant Temperature (ECT) Sensor	On Top Left Side Of Engine
Engine Oil Level Switch	Center Of Engine, Above Starter
Engine Oil Pressure Sensor	Front Of Engine Above Starter
EVAP Canister Purge Solenoid	Top Rear Of Engine, On Intake Manifold
EVAP Canister Vent Solenoid	Under Left Rear Side Of Vehicle
Fuel Injectors	In Intake Manifold
Fuel Tank Pressure Sensor	Top Of Fuel Sending Unit
Idle Air Control (IAC) Valve	Top Left Side Of Engine
Ignition Control Module	Top Rear Of Engine
Intake Air Temperature (IAT) Sensor	Top Left Side Of Engine
Knock Sensor	Left Side, Center Of Engine
Left Instrument Panel Junction Block	Left Side Of Instrument Panel
Manifold Absolute Pressure (MAP) Sensor	Top Rear Of Engine
Mass Airflow (MAF) Sensor	Top Left Side Of Engine
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	Left Side Of Engine Compartment, Inside Air Box
Pre-Converter Oxygen Sensor	Rear Of Engine, In Exhaust Manifold
Right Instrument Panel Junction Block	Right Side Of Instrument Panel
Throttle Position (TP) Sensor	Top Left Side Of Engine
Underhood Junction Block	Left Side Of Engine Compartment
Vehicle Speed Sensor	Rear Of Engine/Transaxle

COMPONENT LOCATIONS (3.5L VIN H - AURORA)

Component	Location
A/C Refrigerant Pressure Sensor	Left Side Of Engine Compartment, On Accumulator
Camshaft Position Sensor	Front Of Right Cylinder Head
Crankshaft Position Sensor	Left Side Of Engine
Exhaust Gas Recirculation (EGR) Valve	Top Rear Of Engine, Near Throttle Body
Engine Coolant Temperature (ETC) Sensor	Right Rear Of Engine, Below Throttle Body
Engine Oil Level Switch	Front Of Engine Oil Pan

EVAP Canister Purge Solenoid	Right Rear Corner Of Intake Manifold
Fuel Pump Relay	In Underhood Fuse Block
Fuel Tank Pressure Sensor	On Top Of Fuel Tank
Idle Air Control (IAC) Valve	On Throttle Body
Ignition Control Modules	Top Of Right & Left Cam Covers
Intake Air Temperature (IAT) Sensor	Left Rear Of Engine Compartment, In Air Cleaner Duct
Knock Sensor	Next To Oil Pressure Switch
Manifold Absolute Pressure (MAP) Sensor	Top Right Of Engine, Near Throttle Body
Mass Air Flow (MAF) Sensor	On Throttle Body Air Intake Duct
Post-Converter Oxygen Sensor	Behind Catalytic Converter
Powertrain Control Module (PCM)	Left Side Of Engine Compartment, Under Air Cleaner
Pre-Converter Oxygen Sensor	Right Side Of Engine, On Exhaust Manifold
Throttle Position (TP) Sensor	On Throttle Body
Vehicle Speed Sensor (VSS)	Top Right Side Of Transaxle Output Housing

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COMPONENT LOCATIONS (3.5L VIN H - INTRIGUE)

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Component	Location
A/C Refrigerant Pressure Sensor	Right Side Of Engine Compartment, On Accumulator
Air Solenoid Valve	On Bracket, Mounted To Upper Engine Mount
A/T Fluid Pressure Valve Position Switch	Inside Transaxle
A/T Fluid Temperature Sensor	Inside Transaxle
A/T Fluid Pressure Valve Position Switch	Inside Transaxle
A/T Input Speed Sensor	Inside Transaxle
Camshaft Position (CMP) Sensor	Right Top Rear Corner Of Engine, On Cam Carrier
Crankshaft Position (CKP) Sensor	Center Front Of Engine, Near Base Of Engine Oil Level Indicator
Cruise Control Module	Left Side Of Engine Compartment, Near Strut Tower
Data Link Connector (DLC)	Under Left Side Of Instrument Panel, Right Of Steering Column
EGR Valve	Left Rear Top Of Engine, Near Throttle Body
Electronic Brake Traction Control Module (EBTCM)	Left Side Of Engine Compartment, On Strut Tower
Engine Coolant Temperature (ECT) Sensor	Top Left Side Of Engine, Below Throttle Body
Engine Oil Level Switch	Center Of Engine Oil Pan
Engine Oil Pressure Switch	Right Lower Rear Of Engine, Above Transaxle
EVAP Canister Purge Solenoid	Rear Top Of Engine, Near Center Of Valve Cover



EVAP Canister Vent Solenoid	.....	Behind Left Rear Fascia Splash Shield, In Wheelwell
Fuel Injectors	.....	In Intake Manifold
Fuse Block	.....	Right Side Of Instrument Panel, In Door Opening
Idle Air Control (IAC) Valve	.....	Left Top Of Engine, On Throttle Body
Ignition Control Module	.....	On Top Of Engine Valve Cover
Intake Air Temperature (IAT) Sensor	.....	Left Front Of Engine Compartment, On Air Intake Duct
Knock Sensor	.....	Below Bank No. 1 Cylinder Head, Next To Engine Oil Pressure Switch
Manifold Absolute Pressure (MAP) Sensor	.....	Left Rear Top Of Engine, Near Throttle Body
Mass Airflow (MAF) Sensor	.....	Left Front Of Engine, Part Of Throttle Body
Post-Converter Oxygen Sensor	.....	Rear Of Catalytic Converter
Power Steering Cut-Out Switch	.....	Right Lower Rear Of Engine, On High Pressure Power Steering Line
Powertrain Control Module (PCM)	.....	Front Left Side Of Engine, Inside Of Air Cleaner Assembly
Pre-Converter Oxygen Sensor	....	Rear Of Engine, In Exhaust Manifold
Pressure Control Solenoid (A/T)	.....	Inside Transaxle
Secondary Air Injection (AIR) Pump	.....	Near Left Headlight Assembly
Throttle Position (TP) Sensor	.....	Top Of Engine, On Throttle Body
TCC PWM Solenoid (A/T)	.....	Inside Transaxle
Transaxle Range Switch	.....	Left Of Transaxle, Below Throttle Body
Underhood Junction Block	.....	On Right Side Of Engine Compartment, On Strut Tower
Vehicle Speed Sensor	.....	Right Rear Of Engine Compartment, On Transaxle
1-2 Shift Solenoid (A/T)	.....	Inside Transaxle
2-3 Shift Solenoid (A/T)	.....	Inside Transaxle

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COMPONENT LOCATIONS (3.8L VIN K & 1 - BONNEVILLE, LESABRE & PARK AVENUE)

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Component	Location
A/C Compressor Clutch Relay	..... Center Rear Of Engine Compartment, Below Right Underhood Junction Block
A/C Refrigerant Pressure Sensor	..... Right Front Of Engine Compartment, Near A/C Compressor
Body Control Module (BCM)	..... Under Right Side Of Instrument Panel
Camshaft Position (CMP) Sensor	..... Right Side Of Engine, Below Water Pump
Crankshaft Position (CKP) Sensor	..... Lower Right Side Of Engine, Behind Crankshaft Pulley
Cruise Control Module	..... Left Rear Of Engine Compartment, Near Wiper Motor
Data Link Connector (DLC)	..... Under Left Side Of Instrument Panel, On Sound Insulator
EGR Valve	..... At Left Side Of Engine, Near

		Throttle Body
Electronic Brake Traction Control Module (EBTCM)	.....	Left Front Of Engine Compartment, Near Base Of Radiator Support
Electronic Suspension Control Module	.....	Under Left Front Seat
Engine Coolant Temperature (ECT) Sensor	.....	Left Front Of Engine, Near Thermostat Housing
Engine Cooling Fan Relays (High & Low)	.....	Center Rear Of Engine Compartment, Below Left Junction Block
Engine Oil Level Switch	.....	Center Front Of Engine, In Oil Pan
EVAP Canister Purge Solenoid	.....	Right Rear Of Engine, Near Generator
EVAP Canister Vent Solenoid	.....	Left Front Corner Of Engine Compartment, On Top Of Vapor Canister
Fuel Injectors	.....	In Intake Manifold
Fuel Pump Module	.....	Left Front Of Trunk, Behind Trim Panel
Fuel Tank Pressure Sensor	.....	In Fuel Tank
Fuel Pump Relay	.....	Under Right Side Of Instrument Panel, In Fuse Block
Idle Air Control (IAC) Valve	.....	Left Of Engine, In Top Of Throttle Body
Ignition Control Module	.....	Top Right Of Engine, Under Ignition Coils
Intake Air Temperature (IAT) Sensor	.....	Left Front Of Engine Compartment, In Air Intake Duct
Knock Sensor (Bank No. 1)	.....	Lower Right Rear Of Engine, Right Of Starter
Knock Sensor (Bank No. 2)	.....	Lower Front Of Engine, Near Oil Filter Adapter
Left Instrument Panel Fuse Block	.....	Left Side Of Instrument Panel
Manifold Absolute Pressure (MAP) Sensor	.....	Left Rear Of Engine, Near EGR Valve
Mass Airflow (MAF) Sensor	.....	Center Left Of Engine, On Throttle Body
Post-Converter Oxygen Sensor	.....	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	.....	Left Front Of Engine Compartment, Near Air Cleaner Housing
Pre-Converter Oxygen Sensor	....	Rear Of Engine, In Exhaust Manifold
Right Instrument Panel Fuse Block	.....	Right Side Of Instrument Panel
Supercharger By-Pass Valve	.....	Left Front Of Engine, Near Engine Oil Fill
Theft Deterrent Module	.....	Under Right Side Of Instrument Panel
Throttle Position (TP) Sensor	.....	Center Left Of Engine, On Throttle Body
Transaxle Range Switch	.....	Left Side Of Transaxle, Below EGR Valve
Underhood Fuse Block (Left & Right)	.....	Center Rear Of Engine Compartment, Near Cowl
Vehicle Speed Sensor	.....	Right Rear Of Transaxle, Below Power Steering Pump

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COMPONENT LOCATIONS (3.8L VIN K - CAMARO & FIREBIRD)

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Component	Location
A/C Refrigerant Pressure Sensor .....	Above Right Front Wheel Well, Attached To Refrigerant Line
Air Pump Relay .....	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Body Control Module (BCM) .....	Under Right Side Of Instrument Panel, Near Blower Motor
Camshaft Position (CMP) Sensor .....	Top Rear Center Of Engine
Crankshaft Position (CKP) Sensor .....	Lower Front Of Engine
Data Link Connector (DLC) .....	Under Instrument Panel, Right Of Steering Column
Electronic Brake Control Module (EBCM) .....	Mounted With Brake Pressure Modulator Valve, On Top Of Left Frame Rail
EGR Valve .....	On Left Front Of Engine, In Front Of Ignition Control Module
Engine Coolant Temperature (ECT) Sensor .....	On Front Side Of Engine, Under Throttle Body
Engine Oil Level Sensor .....	Center Of Engine, On Oil Pan
EVAP Canister Purge Solenoid .....	On Right Side Of Engine, Next To Injector No. 2
EVAP Canister Vent Solenoid .....	Top Right Of Engine, Part Of EVAP Canister
Fuel Injectors .....	In Intake Manifold
Fuel Pump Relay .....	In Left Front Of Engine Compartment, In Underhood Electrical Center
Instrument Panel Fuse Block .....	Behind Left Side Of Instrument Panel
Ignition Control Module .....	On Top Left Front Side Of Engine
Intake Air Temperature (IAT) Sensor .....	On Air Duct, In Front Of Intake Manifold
Knock Sensors .....	On Left & Right Sides Of Engine Block
Manifold Absolute Pressure (MAP) Sensor ....	Mounted To Right Side Of Intake Manifold
Mass Airflow (MAF) Sensor .....	On Air Duct, In Front Of Intake Manifold
Post-Converter Oxygen Sensor .....	Rear Of Catalytic Converter
Powertrain Control Module (PCM) .....	In Engine Compartment, Behind Right Shock Tower
Pre-Converter Oxygen Sensor .....	Rear Of Engine, In Exhaust Manifold
Throttle Actuator Control (TAC) Module .....	On Accelerator Pedal Bracket
Transmission Range Switch .....	Under Center Console, At Base Of Shift Lever

Underhood Electrical Center	In Left Front Of Engine Compartment, In Front Of Wheelwell
Vehicle Speed Sensor (A/T)	On Rear Right Side Of Transmission
Vehicle Speed Sensor (M/T)	On Rear Left Side Of Transmission

COMPONENT LOCATIONS (3.8L VIN K & 1 - GRAND PRIX)

Component	Location
A/C Refrigerant Pressure Sensor	Left Side Of Engine Compartment, On Accumulator
Body Control Module (BCM)	Below Left Side Of Instrument Panel, Left Of Steering Column
Camshaft Position (CMP) Sensor	Right Rear Of Engine, Above Crankshaft Pulley
Crankshaft Position (CKP) Sensor	Right Front Of Engine, Behind Harmonic Balancer
Cruise Control Module	Left Side Of Engine Compartment, Mounted On Strut Tower
Data Link Connector (DLC)	Under Left Side Of Instrument Panel, Right Of Steering Column
EGR Valve	Upper Left Side Of Engine, Near Throttle Body
Electronic Brake Traction Control Module (EBTCM)	Left Side Of Engine Compartment, On Strut Tower
Engine Coolant Temperature (ECT) Sensor	Top Left Side Of Engine, Below Throttle Body
Engine Oil Level Switch	Front Of Engine, On Oil Pan
Engine Oil Pressure Switch	Right Rear Of Engine, Next To Oil Filter
EVAP Canister Purge Solenoid	At Top Front Of Engine, On Intake Manifold, Near Fuel Injectors
EVAP Canister Vacuum Switch (VIN K)	Top Rear Of Engine, On Intake Manifold, Behind Generator
EVAP Canister Vacuum Switch (VIN 1)	Top Front Of Engine, On Intake Manifold, Near Fuel Injectors
EVAP Canister Vent Solenoid	Behind Left Rear Fascia Splash Shield, In Wheelwell
Fuel Injectors	In Intake Manifold
Fuel Pump Resistor	Mounted To Outside Right Front Frame Rail, Forward Of Wheel
Fuse Block	Behind Right Side Of Instrument Panel
Idle Air Control (IAC) Valve	Top Of Engine, On Front Of Throttle Body
Ignition Control Module	Top Right Of Engine
Intake Air Temperature (IAT) Sensor	Left Front Of Engine Compartment, In Air Intake Duct
Knock Sensor (Bank No. 1)	On Front Of Engine, Above Starter
Knock Sensor (Bank No. 2)	On Rear Of Engine, Below Exhaust Manifold

Manifold Absolute Pressure (MAP) Sensor (VIN K)	Top Right Side Of Intake Manifold
Manifold Absolute Pressure (MAP) Sensor (VIN 1)	Top Rear Of Engine, Near Fuel Injectors
Mass Airflow (MAF) Sensor	On Left Front Of Engine, Part Of Throttle Body
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	Left Side Of Engine Compartment, Inside Air Cleaner Assembly
Pre-Converter Oxygen Sensor	Rear Of Engine, In Exhaust Manifold
Supercharger By-Pass Valve	Top Front Of Engine, Near Fuel Injectors
Throttle Position (TP) Sensor	Top Of Engine, On Throttle Body
Transaxle Range Switch	Left Rear Of Engine Compartment, On Transaxle
Underhood Junction Block	Right Side Of Engine Compartment, Mounted To Strut Tower
Vehicle Speed Sensor	Right Rear Of Engine Compartment, In Transaxle

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COMPONENT LOCATIONS (3.8L VIN K - IMPALA & MONTE CARLO)

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Component	Location
A/C Refrigerant Pressure Sensor	Right Side Of Engine Compartment, Below Accumulator
Camshaft Position (CMP) Sensor	Right Side Of Engine, Above Crankshaft Pulley
Crankshaft Position (CKP) Sensor	Lower Rear Of Engine
Cruise Control Module	Left Side Of Engine Compartment, Near Strut Tower
Data Link Connector (DLC)	Under Instrument Panel, Right Of Steering Column
EGR Valve	Upper Left Side Of Engine
Engine Coolant Temperature (ECT) Sensor	Top Left Side Of Engine
Engine Oil Level Switch	Front Center Of Engine Oil Pan
Engine Oil Pressure Switch	Front Of Engine, Above Starter
EVAP Canister Purge Solenoid	Top Front Of Engine, Near Center Of Valve Cover
EVAP Canister Vent Solenoid	Behind Left Side Of Rear Fascia Splash Shield In Wheelwell
Fuel Injectors	In Intake Manifold
Fuse Block	Right Side Of Instrument Panel, In Door Opening
Idle Air Control (IAC) Valve	Top Of Engine, Front Of Throttle Body Assembly
Ignition Control Module	Top Right Front Of Engine
Intake Air Temperature (IAT) Sensor	Left Front Of Engine Compartment, On Air Intake Duct
Knock Sensor (Bank No. 1)	Front Of Engine, Above Starter
Knock Sensor (Bank No. 2)	Lower Right Rear Of Engine, Below Exhaust Manifold

Manifold Absolute Pressure (MAP) Sensor	.....	Top Front Of Engine, On Throttle Body Adapter
Mass Airflow (MAF) Sensor	.....	Left Front Of Engine Compartment, In Air Cleaner Duct
Pre-Converter Oxygen Sensor	.....	Rear Of Engine, In Exhaust Manifold
Post-Converter Oxygen Sensor	.....	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	.....	Right Side Of Engine Compartment, Forward Of Strut Tower
Theft Deterrent Module	.....	Behind Right Side Of Instrument Panel
Throttle Position (TP) Sensor	.....	Top Of Engine, On Throttle Body
Transaxle Range Switch	.....	Left Of Engine, On Transaxle
Underhood Junction Block	.....	Left Or Right Side Of Engine Compartment, Forward Of Strut Tower
Vehicle Speed Sensor	.....	Right Rear Of Engine, On Transaxle

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COMPONENT LOCATIONS (3.8L VIN K & 1 - REGAL)

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Component		Location
A/C Refrigerant Pressure Sensor	.....	Right Side Of Engine Compartment, On Accumulator
Camshaft Position (CMP) Sensor	.....	Right Side Of Engine, Above Crankshaft Pulley
Crankshaft Position (CKP) Sensor	.....	Right Side Of Engine, Behind Harmonic Balancer
Cruise Control Module	.....	Left Side Of Engine Compartment, Mounted On Strut Tower
Data Link Connector (DLC)	.....	Under Left Side Of Instrument Panel, Right Of Steering Column
EGR Valve	.....	Left Rear Top Of Engine, Near Throttle Body
Electronic Brake Traction Control Module (EBTCM)	.....	Below Left Side Of Instrument Panel, Left Of Steering Column
Engine Coolant Temperature (ECT) Sensor	.....	Top Left Side Of Engine, Below Throttle Body
Engine Oil Level Switch	.....	Front Of Engine, In Center Of Oil Pan
Engine Oil Pressure Switch	.....	Lower Right Rear Of Engine, Above Transaxle
EVAP Canister Purge Solenoid	.....	Top Of Engine, Near Center Of Valve Cover
EVAP Canister Vent Solenoid	.....	Behind Left Side Of Rear Fascia Splash Shield In Wheelwell
Fuel Injectors	.....	In Intake Manifold
Fuel Pump Resistor	.....	Mounted To Outside Right Front Frame Rail, Forward Of Front Wheel
Fuse Block	.....	Right Side Of Instrument Panel, In Door Opening
Idle Air Control (IAC) Valve (VIN K)	.....	Left Top Of Engine, On Throttle Body
Idle Air Control (IAC) Valve		

(VIN 1)	.....	Left Rear Of Engine, On Supercharger
Ignition Control Module	.....	Top Right Front Of Engine
Intake Air Temperature (IAT) Sensor	.....	Left Front Of Engine Compartment, In Air Intake Duct
Knock Sensor (Bank No. 1)	.....	On Front Of Engine, Above Starter
Knock Sensor (Bank No. 2)	.....	On Rear Of Engine, Below Exhaust Manifold
Manifold Absolute Pressure (MAP) Sensor (VIN K)	.....	Top Of Engine, Right Side Of Intake Manifold
Manifold Absolute Pressure (MAP) Sensor (VIN 1)	.....	Top Rear Of Engine, Above Valve Cover
Mass Airflow (MAF) Sensor	.....	Left Front Of Engine, Part Of Throttle Body Assembly
Post-Converter Oxygen Sensor	.....	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	.....	Front Left Side Of Engine, Inside Air Cleaner Assembly
Pre-Converter Oxygen Sensor	.....	Rear Of Engine, In Exhaust Manifold
Supercharger By-Pass Valve	.....	Top Left Of Engine, Above Valve Cover
Throttle Position (TP) Sensor	.....	Top Of Engine, On Throttle Body
Transaxle Range Switch	.....	Left Of Engine, On Transaxle
Underhood Junction Block	.....	Right Side Of Engine Compartment, Mounted To Strut Tower
Vehicle Speed Sensor	.....	Lower Right Side Of Engine Compartment, On Transaxle

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COMPONENT LOCATIONS (4.0L VIN C - AURORA)

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Component	Location
Camshaft Position (CMP) Sensor	On Front Of Right Cylinder Head
Crankshaft Position Sensor (CKP) "A" & "B"	Lower Left Side Of Engine Near Oil Filter
Engine Coolant Temperature (ECT) Sensor	Right Rear Of Engine Near EGR Valve
Engine Oil Level Switch	Left Side Of Oil Pan
EVAP Canister Purge Solenoid	Right Rear Corner Of Intake Manifold
Exhaust Gas Recirculation (EGR) Valve	Top Center Rear Of Engine
Fuel Sender	Top Of Fuel Tank
Fuel Tank Pressure Sensor	Under Fuel Sensor Access Panel
Idle Air Control (IAC) Valve	On Throttle Body
Ignition Coils	Top Right & Left Sides Of Engine, Under Intake Manifold Top Cover
Ignition Control Module (Right & Left)	Top Of Right & Left Cam Cover
Knock Sensor	On Top Of Engine, Under Intake Manifold Top Cover
Manifold Absolute Pressure (MAP) Sensor	Top Rear Of Engine
Mass Airflow (MAF) Sensor	On Throttle Body Air Intake Duct
Post-Converter Oxygen Sensor	On Exhaust Pipe Behind Catalytic

	Converter
Powertrain Control Module (PCM)	Left Side Of Engine Compartment, Under Air Cleaner
Pre-Converter Oxygen Sensor	In Right & Left Exhaust Manifold
Throttle Position (TP) Sensor	On Throttle Body
Vehicle Speed Sensor (VSS)	Top Right Side Of Transaxle Output Housing

COMPONENT LOCATIONS (4.6L VIN Y & 9 - DEVILLE, ELDORADO & SEVILLE)

Component	Location
Camshaft Position (CMP) Sensor	Right Rear Of Engine
Cooling Fan Relays	Rearward Of Radiator, Center Bottom Between Cooling Fans
Crankshaft Position (CKP) Sensors	Front Center Of Engine
Cruise Control Module	Left Rear Of Engine Compartment, On Left Strut Tower
Data Link Connector (DLC)	Under Instrument Panel, On Hood Release Bracket
EGR Valve	Top Left Rear Of Engine, Rear Of Throttle Body
Engine Coolant Temperature (ECT) Sensor	Left Rear Corner Of Engine, Near Base Of Rear Engine Lift Hook
Engine Oil Level Switch	Front Center Bottom Of Engine, In Oil Pan
Engine Oil Pressure Switch	Front Center Of Engine, Near Top Of Oil Filter
EVAP Canister Purge Solenoid	Left Rear Corner Of Engine, Near Cam Cover
EVAP Canister Vacuum Switch	Left Rear Corner Of Engine, Near Cam Cover
Front Oxygen Sensor	Center Front Of Engine, In Exhaust Manifold
Fuel Injectors	In Intake Manifold
Idle Air Control (IAC) Valve	Top Of Engine, On Front Of Throttle Body
Ignition Control Module	Right Top Of Engine, Below Ignition Coils
Intake Air Temperature (IAT) Sensor	Left Front Of Engine Compartment, Attached To Air Cleaner Assembly
Knock Sensor	Center Of Engine, Under Intake Manifold, In Cylinder Valley
Manifold Absolute Pressure (MAP) Sensor	Top Front Of Engine, Right Of Throttle Body
Mass Airflow (MAF) Sensor	Top Of Engine, On Air Inlet Of Throttle Body
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control	



Module (PCM)	.....	Lower Left Front Of Engine Compartment, Under Air Cleaner Assembly
Pre-Converter Oxygen Sensor	.....	Forward Of Catalytic Converter
Power Steering Pressure Switch	.....	Right Rear Of Engine
Rear Oxygen Sensor	.....	Center Rear Of Engine, In Exhaust Manifold
Throttle Position (TP) Sensor	.....	Top Of Engine, On Front Of Throttle Body
Transaxle Range Switch	.....	Left Of Transaxle, Near Base Of Rear Engine Lift Hook
Underhood Junction Block	....	In Engine Compartment, Forward Of Left Strut Tower
Vehicle Speed Sensor	.....	Right Side Of Transaxle, Near Right Engine Mount

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COMPONENT LOCATIONS (5.7L VIN G - CAMARO & FIREBIRD)

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Component		Location
A/C Refrigerant Pressure Sensor	.....	Above Right Front Wheelwell, Attached To Refrigerant Line
A/C Compressor Clutch Relay	.....	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Air Pump Relay	.....	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Air Solenoid Relay	.....	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Body Control Module (BCM)	.....	Under Right Side Of Instrument Panel, Near Blower Motor
Camshaft Position (CMP) Sensor	.....	Mounted In Top Rear Center Of Engine
Crankshaft Position (CKP) Sensor	.....	In Lower Front Of Engine
Cruise Control Module	.....	At Front Left Frame, In Front Of Wheelwell
Data Link Connector (DLC)	.....	Under Instrument Panel, Right Of Steering Column
EGR Valve	.....	Left Rear Of Engine, Mounted To Intake Manifold
Electronic Brake Control Module (EBCM)	.....	Mounted On Top Of Left Front Frame Rail, With Brake Pressure Modulator Valve
Engine Coolant Temperature (ECT) Sensor	.....	On Lower Left Side Of Engine, Above Generator
Engine Cooling Fan Relay	.....	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Engine Oil Level Switch	.....	On Lower Right Side Of Engine, In Oil Pan
EVAP Canister Purge Solenoid	....	On Right Center Of Engine, Mounted To Manifold
EVAP Canister Vent Solenoid	.....	On Top Right Side Of Engine, Part

Fuel Injectors	Of EVAP Canister In Intake Manifold
Fuel Pump Relay	In Left Front Corner Of Engine Compartment, In Underhood Electrical Center
Idle Air Control (IAC) Valve	On Right Front Of Engine, On Throttle Body
Ignition Coil	On Valve Cover At Top Of Each Cylinder
Ignition Control Module	On Valve Cover At Top Of Each Cylinder
Inflatable Restraint Sensing & Diagnostic Module (SDM)	On Floor Tunnel, Below Rear Of Console
Instrument Panel Fuse Block	... Behind Left Side Of Instrument Panel
Intake Air Temperature (IAT) Sensor	On Air Duct, In Front Of Intake Manifold
Knock Sensors	On Center Of Engine, Below Intake Manifold
Manifold Absolute Pressure (MAP) Sensor	On Right Side Of Intake Manifold
Mass Airflow (MAF) Sensor	On Air Duct, In Front Of Intake Manifold
Post-Converter Oxygen Sensor	Rear Of Catalytic Converter
Powertrain Control Module (PCM)	On Right Side Of Engine Compartment, Rear Of Wheelwell
Pre-Converter Oxygen Sensor	.... Rear Of Engine, In Exhaust Manifold
Reverse Lock-Out Solenoid	On Rear Left Side Of Transmission
Secondary Air Injection Bleed Valve Solenoid	Mounted On Right Front Frame Rail
Secondary Air Injection Pump Motor	On Front Left Frame Rail, In Engine Compartment
Skip Shift Solenoid	On Center Left Side Of Transmission
Star Connector	Under Left Side Of Instrument Panel, Near DLC
Throttle Position (TP) Sensor	Mounted On Front Of Throttle Body
Underhood Electrical Centers	In Left Front Corner Of Engine Compartment
Vehicle Speed Sensor (A/T)	On Rear Right Side Of Transmission
Vehicle Speed Sensor (M/T)	On Rear Left Side Of Transmission

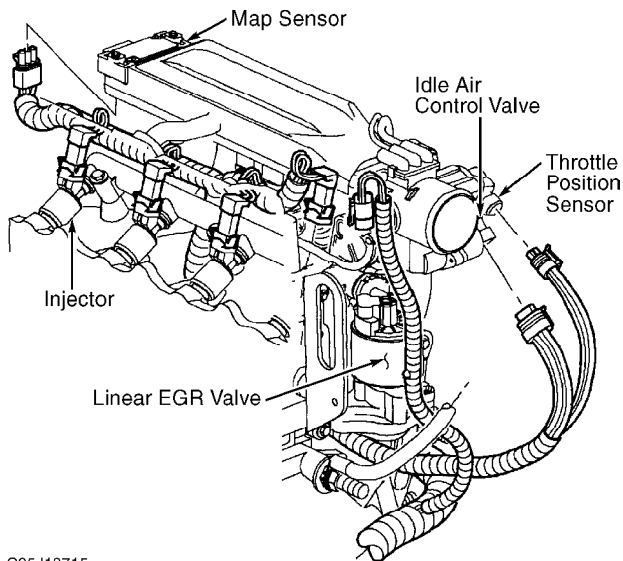
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#### COMPONENT LOCATIONS (5.7L VIN G - CORVETTE)

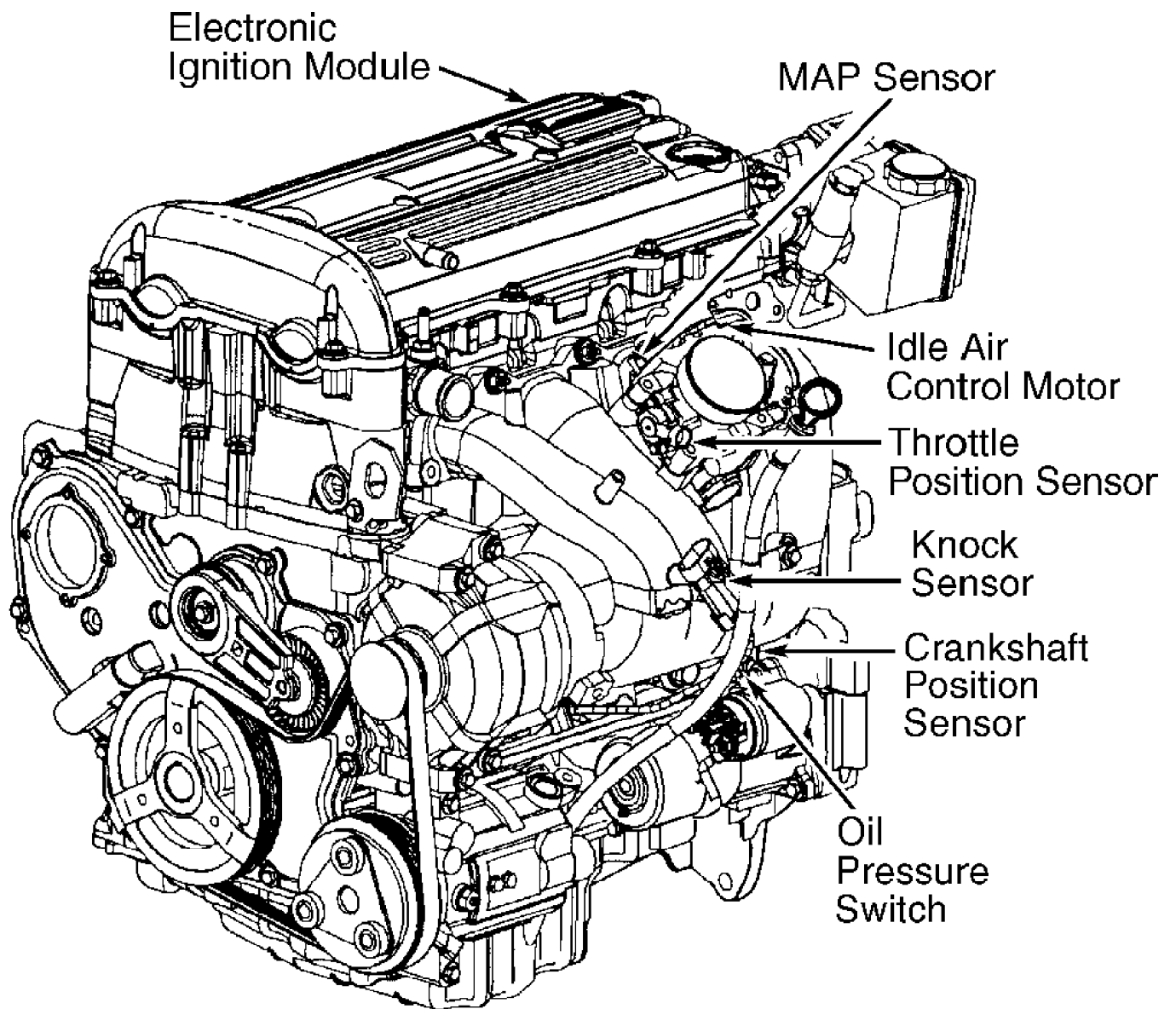
Component	Location
A/C Refrigerant Pressure Sensor	Attached To A/C Evaporative Tube
Body Control Module (BCM)	Mounted On Toe Board
Cooling Fan Relays	In Right Side Of Engine Compartment, In Underhood Electrical Center
Data Link Connector (DLC)	Under Left Side Of Instrument Panel
EGR Valve	At Left Rear Of Engine, On Intake Plenum
Engine Coolant Temperature (ECT) Sensor	Left Side Of Engine, Below Generator

Engine Oil Level Sensor ..... Left Side Of Oil Pan  
 EVAP Canister Purge Solenoid ..... At Left Side Of Engine, On Intake Manifold  
 EVAP Canister Vacuum Switch ..... At Left Side Of Engine, On Intake Manifold  
 Fuel Injectors ..... In Intake Manifold  
 Ignition Control Modules .... On Valve Cover At Top Of Each Cylinder  
 Intake Air Temperature (IAT) Sensor ..... Front Center Of Engine, In Air Intake Duct  
 Knock Sensors ..... Center Of Engine, Below Intake Manifold  
 Manifold Absolute Pressure (MAP) Sensor ..... Rear Of Intake Manifold  
 Mass Airflow (MAF) Sensor ..... Top Of Air Cleaner Assembly  
 Post-Converter Oxygen Sensor ..... Rear Of Catalytic Converter  
 Powertrain Control Module (PCM) ..... On Right Side Of Engine Compartment, Rear Of Wheelwell  
 Pre-Converter Oxygen Sensor ..... Rear Of Engine, In Exhaust Manifold  
 Throttle Actuator Control Module ..... Mounted On Side Of Powertrain Control Module, Below Battery  
 Throttle Actuator Motor ..... Left Side Of Throttle Body  
 Throttle Position (TP) Sensor ..... On Throttle Body  
 Transaxle Range Switch ..... Left Side Of Transmission  
 Underhood Electrical Center ..... Right Side Of Engine Compartment, Between Wheelwell & Instrument Panel  
 Vehicle Speed Sensor ..... At Top Right Of Differential

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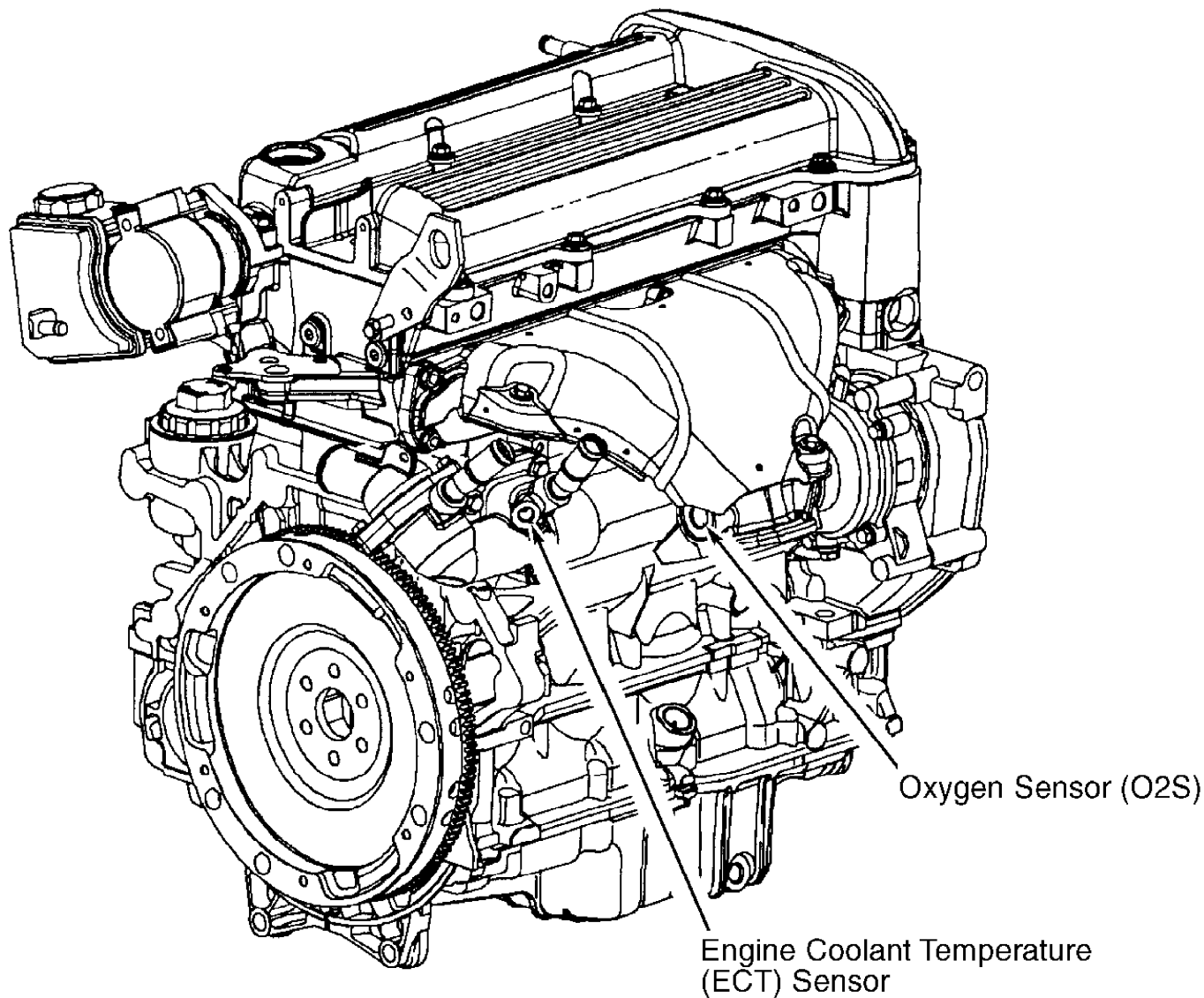


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 Fig. 2: Engine Component Locations (1.9L VIN 7 & 8 - Saturn)  
 Courtesy of General Motors Corp.



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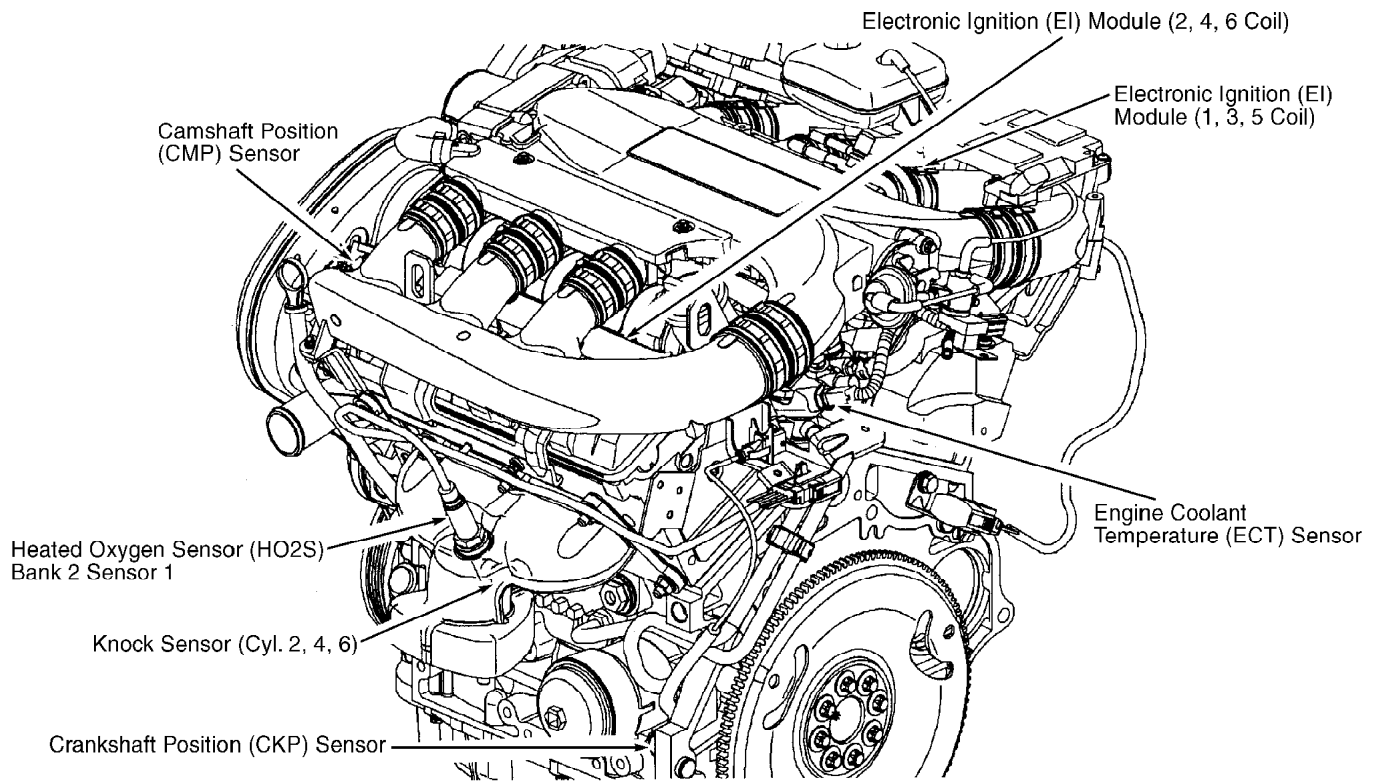
Fig. 3: Engine Component Locations (2.2L VIN F - Saturn - 1 Of 2)  
Courtesy of General Motors Corp.



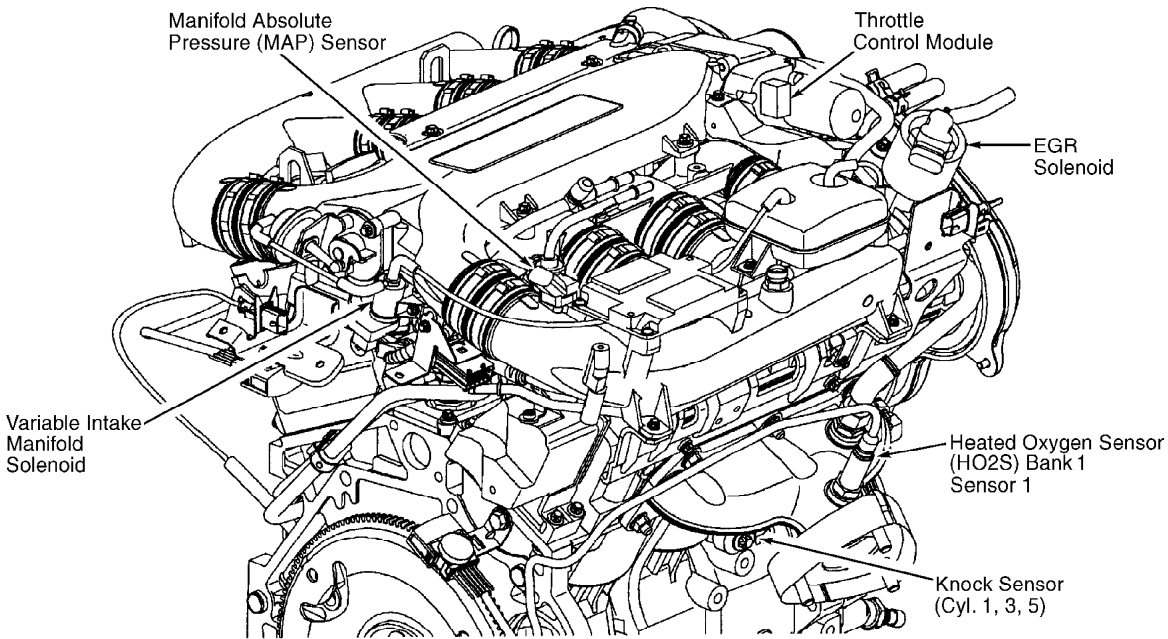
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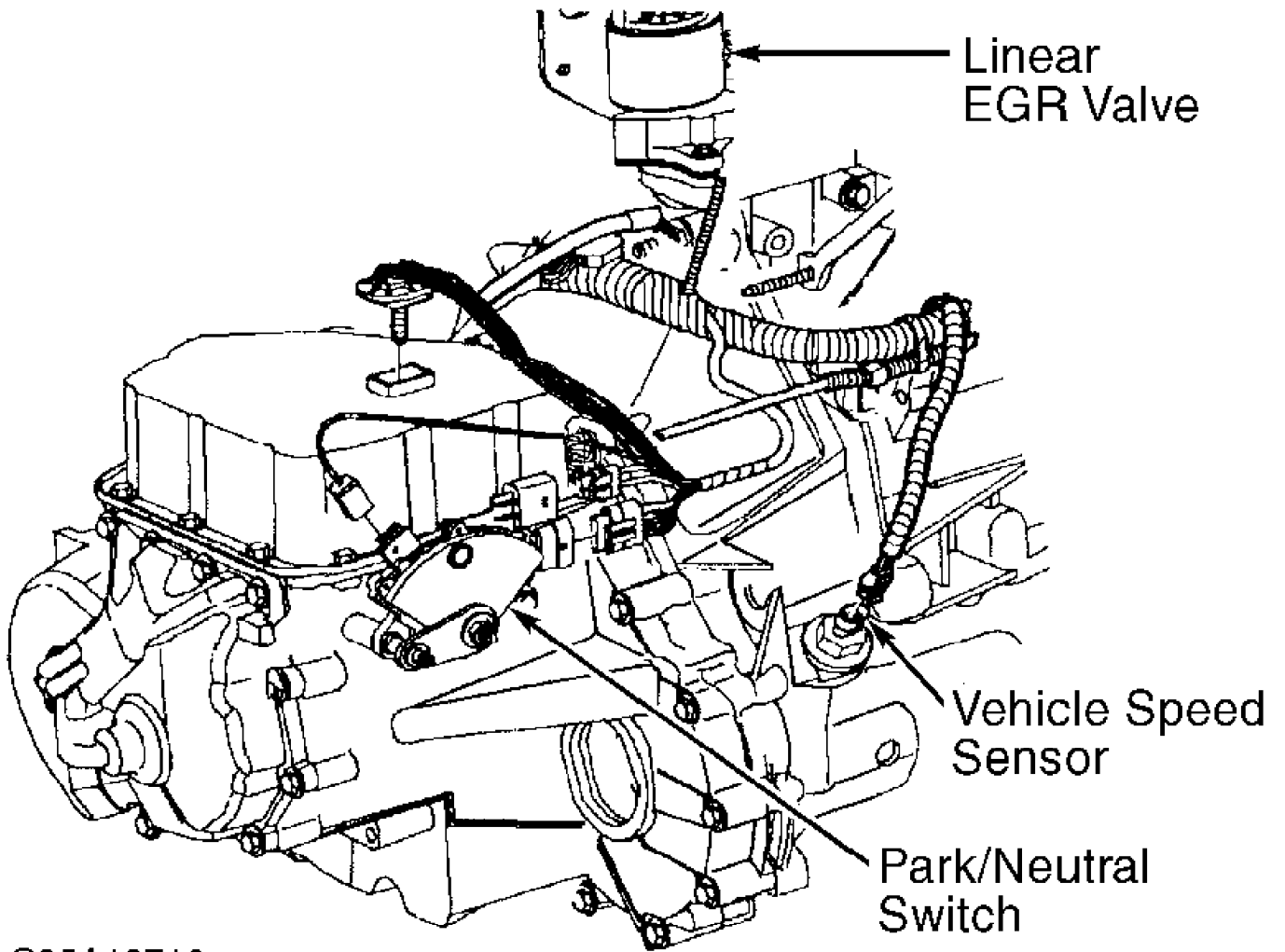
Fig. 4: Engine Component Locations (2.2L VIN F - Saturn - 2 Of 2)  
Courtesy of General Motors Corp.



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 Fig. 5: Engine Component Locations (3.0L VIN R - Saturn - 1 Of 2)  
 Courtesy of General Motors Corp.



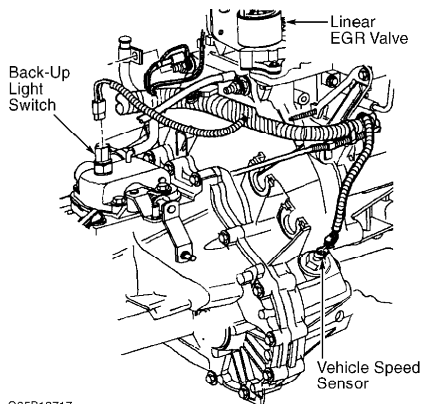
G98G63871 3.0L  
 Fig. 6: Engine Component Locations (3.0L VIN R - Saturn - 2 Of 2)  
 Courtesy of General Motors Corp.



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Fig. 7: Transmission Component Locations (1.9L VIN 7 & 8 - Saturn A/T)

Courtesy of General Motors Corp.



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Fig. 8: Transmission Component Locations (1.9L VIN 7 & 8 - Saturn M/T)

Courtesy of General Motors Corp.

