

N - REMOVE/INSTALL/OVERHAUL

Article Text

1995 Cadillac Concours
For Ace Mechanics 123 Main Street San Diego Ca 92126
Copyright © 1997 Mitchell International
Friday, November 28, 2003 07:19PM

ARTICLE BEGINNING

1995 ENGINE PERFORMANCE

General Motors Corp. Removal, Overhaul & Installation

Cadillac; Concours, DeVille, Seville

* PLEASE READ THIS FIRST *

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION section before disconnecting battery.

INTRODUCTION

Removal, overhaul and installation procedures (when given by manufacturer) are covered in this article. If component removal and installation is primarily an unbolt and bolt-on procedure, only a simple torque specification may be supplied.

IGNITION SYSTEM

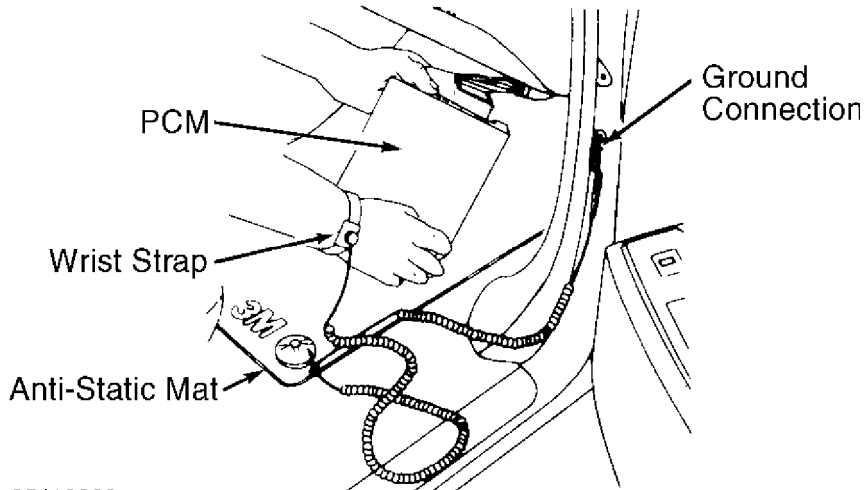
POWERTRAIN CONTROL MODULE (PCM)

CAUTION: Electronic components used in control systems are designed to carry very low voltages. As little as a 30-volt charge created by static electricity can cause a total or degrading failure in PCM or other electronic components containing integrated circuits. Before servicing PCM, ground yourself and ground work area to discharge stored electricity.

STATIC CHARGE TABLE (VOLTS)

	Relative Humidity	Relative Humidity
Movement	10-20%	65-90%
Handling Clear Plastic Bag ..	20,000	1200
Handling Vinyl Envelope	7000	600
Sliding On Velour Seat	15,000	400
Walking On Carpet	35,000	1500
Walking On Tile/Vinyl	12,000	50

CAUTION: DO NOT remove part from packaging until ready to install. Ground any static-proof package before opening. DO NOT touch electrical terminals of components unless properly grounded. DO NOT lay electrical components on car seat, carpeting or dashboard. Use electrostatic protection mat and ground strap whenever possible. See Fig. 1.



95J13366

Fig. 1: Servicing PCM Using 3M Anti-Static Mat
Courtesy of General Motors Corp.

NOTE: Before replacing PCM, carefully inspect all wiring and control components. Failure to test for short circuits may result in repeated PCM failure due to grounds and Quad-Driver failure. To prevent internal damage to PCM, ensure ignition switch is in OFF position when disconnecting or reconnecting PCM connectors or 12-volt components.

NOTE: When replacing defective PCM, remove knock sensor module or PROM from defective PCM. New PCM does not come equipped with knock sensor module or PROM (if applicable). Install knock sensor module or PROM into new PCM.

Removal

Ensure ignition switch is in OFF position. Disconnect negative battery cable. Remove electrical connectors from PCM. Remove PCM from vehicle. Remove access cover and remove knock sensor module or PROM (if applicable) from PCM.

Installation

Install knock sensor module or PROM (if applicable) in new PCM. Install access cover. Install PCM into vehicle. Connect electrical connectors to PCM. Reconnect negative battery cable to battery.

PROGRAMMABLE READ-ONLY MEMORY (PROM)

Removal

Disconnect negative battery cable. Remove PCM from vehicle. See POWERTRAIN CONTROL MODULE (PCM). Position PCM so access cover faces upward. Remove access cover from PCM. Using thumb and forefinger, squeeze both ends of PROM inward (outward on some models) and pull PROM up from access hole.

NOTE: Note reference notch locations in PROM and PCM for reassembly reference.

Installation

1) Ensure new PROM has same service number as old one. Position PROM squarely over PCM PROM access hole. Press on outer edges of PROM until PROM is firmly seated in PCM.

NOTE: Ensure reference notches in both PCM and PROM are properly aligned. If PROM is installed backward, PROM will be destroyed when ignition is turned on.

2) Install PROM access cover on PCM. Install PCM in vehicle. See POWERTRAIN CONTROL MODULE (PCM). Start engine and enter diagnostics. See appropriate G - TESTS W/CODES article in the ENGINE PERFORMANCE section below. Check for diagnostic trouble codes. See appropriate G - TESTS W/CODES article in the ENGINE PERFORMANCE section for code identification.

- * G - TESTS W/CODES - 4.6L (for Concours)
- * G - TESTS W/CODES - 4.6L (for Seville)
- * G - TESTS W/CODES - 4.9L (for DeVille)

3) If code(s) sets, PROM is either not fully seated in PCM or installed backward, has bent pins or is defective. If bent pins crack when trying to straighten, replace PROM. If PROM is installed backward or is defective, replace PROM.

KNOCK SENSOR MODULE

Removal & Installation

1) Disconnect negative battery cable. Remove PCM from vehicle. See POWERTRAIN CONTROL MODULE (PCM). Position PCM so access cover faces upward. Remove access cover from PCM.

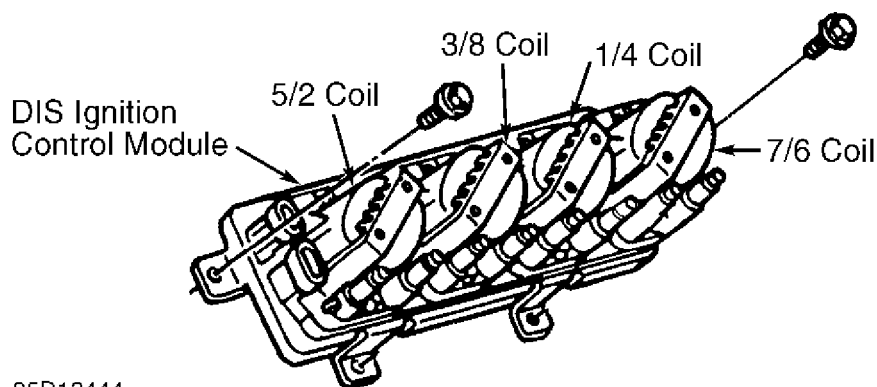
2) Using thumb and forefinger, squeeze both ends of knock sensor module inward and pull module up from access hole. To install, reverse removal procedure. Ensure module latches into holder in PCM.

Removal & Installation (4.6L)

1) Disconnect negative battery cable. Disconnect connectors at ignition control module. See Fig. 2. Disconnect spark plug wires from coil pack. Remove coil pack/ignition control module assembly. For ignition control module location, see COMPONENT LOCATIONS in appropriate I - SYSTEM/COMPONENT TESTING article in the ENGINE PERFORMANCE section below. Separate ignition coil(s) from ignition control module (if possible).

- * I - SYSTEM/COMPONENT TESTS - 4.6L (for Concours & Seville)
- * I - SYSTEM/COMPONENT TESTS - 4.9L (for DeVille)

2) To install, reverse removal procedure. Tighten ignition control module mounting bolts/nuts. Tighten mounting bolts/nuts to specification. See TORQUE SPECIFICATIONS.



95D13444

Fig. 2: Distributorless Ignition Control Module Components (4.6L)
Courtesy of General Motors Corp.

IGNITION CONTROL MODULE (HEI MAGNETIC)

NOTE: 4.9L is equipped with a HEI magnetic ignition system. The ignition control module is located within the distributor. Removal of distributor is not necessary for ignition control module replacement.

CAMSHAFT POSITION SENSOR

NOTE: 4.9L is equipped with a HEI magnetic ignition system. The camshaft position sensor is located within the distributor. Removal of distributor is not necessary for camshaft position sensor replacement.

Removal & Installation (4.6L)

Disconnect negative battery cable. Disconnect sensor harness connector. Remove camshaft position sensor bolt and remove sensor. To install, reverse removal procedure. Tighten sensor bolt to

specification. See TORQUE SPECIFICATIONS.

CRANKSHAFT POSITION SENSOR (DIS)

Removal & Installation (4.6L)

Disconnect negative battery cable. Disconnect sensor harness connector. Remove bolt/nut and sensor from engine block. Inspect crankshaft sensor "O" ring for wear, cracks or other damage. Replace as necessary. Lubricate NEW "O" ring with engine oil before installing. To install, reverse removal procedure. Tighten sensor bolt/nut to specification. See TORQUE SPECIFICATIONS.

IGNITION COIL (DIS)

Removal & Installation (4.6L)

Disconnect negative battery cable. Remove spark plug wires from coils. Remove nuts or screws attaching ignition coils to ignition control module. Remove coils. To install, reverse removal procedure.

IGNITION COIL (HEI MAGNETIC)

NOTE: 4.9L is equipped with a HEI magnetic ignition system. The ignition coil is located on the distributor cap. Removal of distributor is not necessary for ignition coil replacement.

FUEL SYSTEM

FUEL PRESSURE RELIEF

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

1) Fuel system is under pressure. Relieve pressure before servicing fuel system. Fuel pressure may be relieved using one of 2 different methods.

2) One method is to disconnect fuel pump connector. Start engine and allow to run until it stops. Operate starter for 3 seconds to remove remaining fuel from fuel lines. Reconnect fuel pump once repair is complete.

3) The other method is to install Fuel Pressure Gauge (J-34730-1) on fuel pressure test port. When installing fuel pressure gauge, wrap shop towel around pressure connection to absorb fuel leakage. Place gauge bleed hose in container. Open bleed valve to bleed fuel pressure.

THROTTLE BODY

N - REMOVE/INSTALL/OV

NOTE: Ensure residual fuel pressure is relieved before working on

throttle body.

Removal

1) Relieve fuel pressure. See FUEL PRESSURE RELIEF.

Disconnect negative battery cable. Remove air intake ducts. Disconnect and mark electrical connections and vacuum hoses from throttle body. Disconnect control cables from throttle body.

2) Drain cooling system and remove coolant hoses to throttle body (if applicable). Remove throttle body retaining bolts. Remove throttle body and gasket.

NOTE: Identification number is stamped on throttle body. Use identification number to order replacement components.

Installation

1) To install, reverse removal procedure using NEW gasket. Tighten retaining bolts to specification. See TORQUE SPECIFICATIONS. Refill cooling system (if drained).

2) If installing new Idle Air Control (IAC) valve, ensure IAC pintle length setting is adjusted before installation. See IDLE AIR CONTROL (IAC) VALVE. Adjust idle speed and TP sensor (if removed, and if adjustable). See D - ADJUSTMENTS article in the ENGINE PERFORMANCE section.

FUEL PRESSURE REGULATOR

NOTE: On 4.6L, fuel pressure regulator and fuel rail are serviced as an assembly only. DO NOT remove pressure regulator or pressure regulator cover from fuel rail.

Removal (4.9L)

1) Relieve fuel pressure. See FUEL PRESSURE RELIEF.

Disconnect negative battery cable. Remove air intake duct (if necessary). Disconnect pressure regulator vacuum hose. Remove fuel return line and "O" ring from pressure regulator.

2) Remove pressure regulator screws. Remove pressure regulator from fuel rail. Remove pressure regulator retainer and spacer assembly from fuel rail (if equipped). Remove fuel inlet "O" ring from pressure regulator. Remove and discard filter screen if dirty.

Installation

To install, reverse removal procedure. DO NOT reuse "O" rings. Lubricate fuel inlet "O" ring with oil and install in regulator. Replace filter screen as necessary. Tighten screws to specification. See TORQUE SPECIFICATIONS.

FUEL RAIL & INJECTORS

NOTE: If injector is replaced, ensure replacement injector has the same part number as injector removed.

Removal (4.6L)

1) Relieve fuel pressure. See FUEL PRESSURE RELIEF.

Disconnect negative battery cable. Remove intake manifold top cover. Disconnect IAT sensor connector. Disconnect crankcase vent pipe at air intake duct. Remove air intake duct with air cleaner housing. Remove EGR pipe at throttle body spacer.

2) Disconnect brake booster vacuum hose at intake manifold vacuum fitting. Disconnect front bank spark plug wires and lay aside. Disconnect injector electrical connectors and MAP sensor connector. Remove transaxle vent hose and vacuum lines from ISC actuator bracket. Remove vacuum manifold at throttle body. Disconnect fuel rail ground wire at rear cylinder head.

3) Disconnect vacuum hose at fuel pressure regulator. Disconnect quick connect fittings at fuel rail. Lift fuel rail and injector assembly out of intake manifold housing. See Fig. 3. Remove injectors from fuel rail. Remove injector "O" rings and seals, and discard.

Installation

To install, reverse removal procedure. Coat NEW injector "O" rings with clean engine oil. Position fuel rail into intake manifold housing. Push down on rail to seat injectors in manifold housing. Tighten intake manifold cover bolts. See TORQUE SPECIFICATIONS. To complete installation, reverse removal procedure.

Removal (4.9L)

1) Remove air cleaner. Relieve fuel pressure. See FUEL PRESSURE RELIEF. Disconnect negative battery cable. Remove power steering pump and set aside.

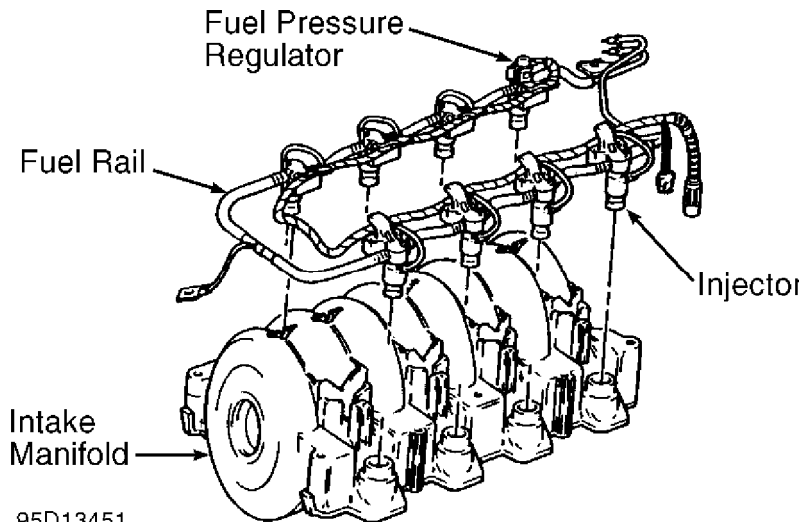
2) Disconnect vacuum lines to pressure regulator, brake booster, MAP sensor PCV, EGR valve and EGR solenoid. Disconnect accelerator cable, cruise control cable and bracket. Disconnect EGR solenoid electrical connectors. Drain coolant and disconnect coolant hose from thermostat housing.

3) Disconnect injector electrical connectors at rear of fuel rail assembly. Disconnect fuel inlet line from rear fuel rail assembly and fuel return line from pressure regulator. Discard "O" rings. Remove fuel rail attaching bolts. Remove fuel rail from intake manifold using equal force on both sides of fuel rail. See Fig. 3. Remove injector-to-fuel rail retaining clip. Remove injector from fuel rail. Remove injector "O" rings and discard.

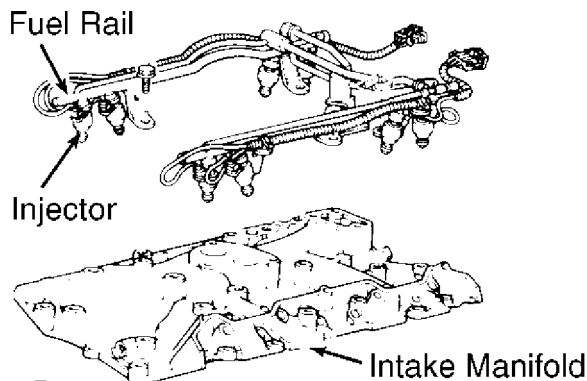
Installation

To install, reverse removal procedure. Coat NEW injector "O" rings with clean engine oil. Position fuel rail into intake manifold housing. Push down on rail to seat injectors in manifold housing. Tighten intake manifold cover bolts. See TORQUE SPECIFICATIONS. To complete installation, reverse removal procedure.

"O" rings with clean engine oil. Install injector-to-fuel rail retaining clip with open end facing injector electrical connection. Position fuel rail on intake manifold. Push down on rail to seat injectors in manifold. Tighten fuel rail retaining bolts. See TORQUE SPECIFICATIONS. To complete installation, reverse removal procedure.



95D13451
Fig. 3: Locating Fuel Rail Assembly Components (4.6L)



95F13453
Fig. 4: Locating Fuel Rail Assembly Components (4.9L)

IDLE SPEED CONTROL MOTOR (4.9L)

Removal & Installation

Remove air cleaner. Disconnect electrical connector. Remove retaining screws and Idle Speed Control (ISC) motor. To install, reverse removal procedure. To adjust ISC minimum and maximum authority, see D - ADJUSTMENTS article in the ENGINE PERFORMANCE section.

NOTE: ISC motor is factory-calibrated and should not be disassembled. Replace motor as a complete assembly only. DO NOT soak ISC motor in carburetor cleaner.

IDLE AIR CONTROL (IAC) VALVE

CAUTION: For calibration purposes, several different style IAC valves are used. Ensure replacement valve has the same part number as original valve.

Removal

Remove electrical connector from IAC valve. Remove IAC valve, gasket and "O" ring from throttle body assembly.

CAUTION: DO NOT extend or retract pintle if IAC valve has been in service, or damage to worm gear will result.

Installation

1) Inspect gasket or "O" ring for damage. Replace as necessary. Check the extended distance of IAC pintle before installing. Damage will occur if measurement is incorrect. Distance must not exceed 1 1/8" (28 mm). Measurement should be taken from valve housing flange to end of pintle cone.

2) To retract NEW IAC valve pintle, slowly exert finger pressure on valve. Install NEW "O" ring or gasket on valve. Coat "O" ring with clean engine oil. Install IAC valve. Tighten IAC valve to specification. See TORQUE SPECIFICATIONS. Install electrical connector. To reset IAC valve, refer to D - ADJUSTMENTS article in the ENGINE PERFORMANCE section.

FUEL PUMP

Removal & Installation

1) Disconnect negative battery cable. Relieve fuel pressure. See FUEL PRESSURE RELIEF under FUEL SYSTEM. Remove filler neck. Lower fuel tank. Disconnect fuel lines and electrical connection.

2) Remove fuel level sending unit and fuel pump retaining bolts or cam lock ring. Lift assembly from fuel tank and remove fuel pump from sending unit.

3) Pull fuel pump upward while pulling away from bottom support. Use care not to damage rubber insulator and strainer. To install, reverse removal procedure using NEW "O" ring and gasket.

THROTTLE POSITION (TP) SENSOR

Removal

Turn ignition switch to OFF position. Disconnect electrical connector from TP sensor. Remove TP sensor retaining screws. Remove TP sensor from throttle body.

Installation

1) With throttle valve in closed position, install TP sensor

throttle shaft. Install retaining screws and electrical connection.

2) TP sensor on 4.6L is self-zeroing and is not adjustable. On 4.9L with adjustable TP sensor, adjust TP sensor to specification and tighten retaining screws. See D - ADJUSTMENTS article in the ENGINE PERFORMANCE section.

OXYGEN SENSOR

Oxygen sensor is mounted in exhaust pipe, below exhaust manifold. It is equipped with a permanent pigtail which must remain intact when removing sensor.

Removal

1) Ensure sensor is free of contaminants. DO NOT use cleaning solvents of any type. Sensor may be difficult to remove when engine temperature is less than 120°F (48°C). Excessive removal force may damage threads in exhaust manifold or pipe.

2) Disconnect negative battery cable. Disconnect electrical connector from oxygen sensor. Carefully remove oxygen sensor from exhaust pipe.

CAUTION: Correct torque of oxygen sensor is critical to prevent crushing glass beads in graphite anti-seize compound. Crushing glass beads will cause sensor to seize in exhaust manifold. This may necessitate replacement of exhaust manifold at the next removal.

Installation

1) Whenever an oxygen sensor is removed, coat threads with anti-seize compound before it is reinstalled. New oxygen sensors already have this compound applied to threads.

2) Install oxygen sensor in exhaust pipe. Tighten sensor to 30 ft. lbs. (41 N.m). Reconnect electrical connector to oxygen sensor. Reconnect negative battery cable.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

AA

Application Ft. Lbs. (N.m)

Fuel System

Fuel Inlet & Return Line Nuts

4.9L 22 (30)

Fuel Rail Retaining Bolts

4.9L 18 (24)

Throttle Body Bolts

4.9L 14 (19)

EGR Pipe Bolt		
4.6L	21	(28)
Oxygen Sensor	30	(41)

INCH Lbs. (N.m)

Fuel Pressure Regulator Screws		
4.9L	44	(4.9)
Intake Manifold Cover Nuts		
4.6L	18	(2.0)
Throttle Body Bolts		
4.6L	106	(12)
Throttle Position Sensor Screw		
4.6L & 4.9L	20	(2.3)
Ignition System		
Camshaft Position Sensor Bolt		
4.6L	89	(10)
Crankshaft Position Sensor Bolt/Nut		
4.6L	89	(10)
Ignition Coil-To-Module Screws		
4.6L	30	(3.4)
Ignition Control Module/Coil Pack Mounting Bolts		
4.6L	106	(12)
AA		

END OF ARTICLE