

I - SYSTEM/COMPONENT TESTS

Article Text

1992 Dodge Colt

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Saturday, April 27, 2002 05:51PM

ARTICLE BEGINNING

1992 ENGINE PERFORMANCE

Chrysler Motors/Mitsubishi System & Component Testing

Dodge; Colt

Eagle; Summit

Mitsubishi; Mirage

Plymouth; Colt

INTRODUCTION

Before testing separate components or systems, perform procedures in F - BASIC TESTING article in the ENGINE PERFORMANCE Section. Since many computer-controlled and monitored components set a trouble code if they malfunction, also perform procedures in G - TESTS W/CODES article in the ENGINE PERFORMANCE Section.

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

COMPUTERIZED ENGINE CONTROLS

CONTROL UNIT

NOTE: For Engine Control Unit (ECU) location, see ENGINE CONTROL UNIT (ECU) LOCATION table. To identify ECU power and ground circuits, see L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

Ground Circuits

1) Turn ignition off. Using an ohmmeter, check continuity between chassis ground and ECU ground terminals. See GROUND TERMINAL IDENTIFICATION table. Ohmmeter should indicate zero ohms. If reading is not zero ohms, repair open circuit between ECU connector and ground.

2) Connect voltmeter negative lead to chassis ground. Connect positive lead to ECU ground terminals. See GROUND TERMINAL IDENTIFICATION table. With engine running, voltmeter should indicate less than one volt. If voltmeter reading is greater than one volt, check for open, corrosion or loose connection in ground circuit.

GROUND TERMINAL IDENTIFICATION TABLE

Application	ECU Terminal
All Models	101 & 106

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Power Circuits

Turn ignition on. Check for battery voltage on ECU power terminals 102 & 107. If battery voltage is not present, check operation of MPI control relay near right kick panel.

ENGINE SENSORS & SWITCHES

BAROMETRIC PRESSURE SENSOR

Sensor is a part of airflow sensor assembly. See G - TESTS W/CODES article in the ENGINE PERFORMANCE Section.

COOLANT TEMPERATURE SENSOR

1) Remove coolant temperature sensor. Sensor is located near thermostat housing (2-wire connector). Place end of sensor in water, with terminal connector portion of sensor slightly above water.

2) Gradually heat water, and read resistance values across terminal connectors. See COOLANT TEMPERATURE SENSOR RESISTANCE table. If resistance is not within specification, replace sensor.

COOLANT TEMPERATURE SENSOR RESISTANCE TABLE

Temperature °F (°C)	Resistance Ohms
Mirage	
32 (0)	5900
68 (20)	2500
104 (40)	2700
176 (80)	300
All Others	
32 (0)	5800
68 (20)	2400
104 (40)	1100
176 (80)	300

CRANK ANGLE SENSOR

See IGNITION SYSTEM.

DETONATION SENSOR

See IGNITION SYSTEM.

EGR TEMPERATURE SENSOR (CALIFORNIA)

See EXHAUST GAS RECIRCULATION (EGR) under EMISSION SYSTEMS & SUB-SYSTEMS.

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IDLE POSITION SWITCH - 1.5L

1) Disconnect Motor Position Sensor (MPS) connector. Connect ohmmeter lead between ground and MPS connector terminal No. 4. See Fig. 2.

2) With accelerator pedal pressed, no continuity should be present. With accelerator pedal released, continuity should be present. If switch continuity is not as specified, replace Idle Speed Control Servo assembly.

IDLE POSITION SWITCH - MIRAGE 1.6L DOHC

1) Disconnect idle position switch single-wire connector. Check for continuity between switch terminal and switch body (ground).

2) With accelerator pedal pressed, no continuity should be present. With accelerator released, continuity should be present. If idle position switch continuity is not as specified, replace idle position switch.

INHIBITOR SWITCH (AUTOMATIC TRANSMISSION)

Switch is mounted to automatic transaxle, near shift lever mechanism. Testing information is not available from manufacturer. See L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE Section.

INTAKE AIR TEMPERATURE SENSOR

1) Sensor is incorporated in airflow sensor assembly inside air filter housing. Disconnect airflow sensor connector. See Fig. 1.

2) Measure resistance between terminals No. 4 and 6 of airflow sensor connector (sensor side of connector).

3) Replace airflow sensor assembly if air temperature sensor resistance is not within specification. See INTAKE AIR TEMPERATURE SENSOR RESISTANCE table.

INTAKE AIR TEMPERATURE SENSOR RESISTANCE TABLE

Temperature °F (°C)	Resistance Ohms
32 (0)	6000
68 (20)	2700
176 (80)	400



Fig. 1: Airflow Sensor Connector Terminal ID
Courtesy of Mitsubishi Motor Sales of America.

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NOTE: Some engines are not equipped with Motor Position Sensor (MPS). MPS may be a separate unit mounted to throttle body or it may be incorporated in ISC motor assembly, depending on vehicle application.

MOTOR POSITION SENSOR - 1.5L

1) Disconnect MPS connector. See Fig. 2. Connect ohmmeter lead to ground. Connect other ohmmeter lead to terminal No. 3 of sensor connector. If continuity is not present, repair wiring harness as necessary. If continuity is present, go to next step.

2) Connect ohmmeter leads to terminals No. 2 and 3. Resistance for all models should be 4000-6000 ohms. If resistance is not within specified range, replace MPS.

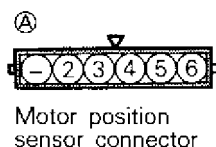


Fig. 2: Motor Position Sensor Connector Terminal ID
Courtesy of Mitsubishi Motor Sales of America

CAUTION: DO NOT apply more than 6 volts to ISC motor.

4) Operate ISC motor by connecting a 6-volt source directly to appropriate terminals of ISC motor connector. See IDLE SPEED CONTROL (ISC) MOTOR OPERATION TEST under IDLE CONTROL SYSTEM.

5) While operating ISC motor, measure resistance between MPS connector terminals No. 3 and 5. Observe ohmmeter during ISC motor operation. If MPS resistance does not vary within a 4000-6000 ohm range or if resistance does not change smoothly, replace MPS (vehicles with separate MPS) or ISC motor assembly (vehicles with MPS incorporated in ISC).

OXYGEN (O2) SENSOR (2-WIRE)

1) On all models, warm engine until coolant temperature is 185-205°F (85-96°C). Disconnect O2 sensor connector. See Fig. 3.

2) Connect digital voltmeter between terminal No. 1 and ground. Repeatedly race engine and observe O2 sensor output voltage. If output is not 0.6-1.0 volt, replace O2 sensor.

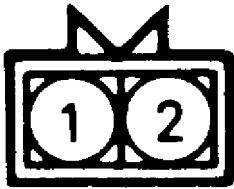
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Fig. 3: O2 Sensor Connector Terminal ID (2-Wire)
Courtesy of Mitsubishi Motor Sales of America.

OXYGEN (O2) SENSOR (4-WIRE HEATED)

1) Warm engine until coolant temperature is 185-205°F (85-95°C). Disconnect O2 sensor connector. See Fig. 4. Check resistance of O2 sensor heater element. Connect ohmmeter between specified heater terminals of O2 sensor connector. See

O2 SENSOR 4-WIRE CONNECTOR TERMINAL IDENTIFICATION table.

2) When O2 sensor is at 68°F (20°C), resistance should be approximately 12 ohms. If resistance is not within specification, replace O2 sensor.

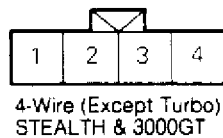


Fig. 4: O2 Sensor Connector Terminal ID (4-Wire)
Courtesy of Mitsubishi Motor Sales of America.

CAUTION: DO NOT apply battery voltage to O2 sensor output terminals; damage to O2 sensor could result.

3) Heat O2 sensor heater element by applying battery voltage to specified heater terminals. See O2 SENSOR 4-WIRE CONNECTOR TERMINAL IDENTIFICATION table.

4) Connect digital voltmeter between specified output terminals. See O2 SENSOR 4-WIRE CONNECTOR TERMINAL IDENTIFICATION table. Repeatedly race engine and observe O2 sensor output voltage. If

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O2 sensor output voltage is not 0.6-1.0 volt, replace O2 sensor.

O2 SENSOR 4-WIRE CONNECTOR TERMINAL IDENTIFICATION TABLE

Application	Heater Terminals	Output Terminals
Mirage 1.6L	3 & 4	1 & 2

POWER STEERING OIL PRESSURE SWITCH

1) Power steering oil pressure switch is mounted on power steering pump. Disconnect single-wire connector at switch. Start engine.

2) Connect ohmmeter between switch terminal and ground. If continuity is present with steering wheel in straight-ahead position, replace switch. If continuity is not present while turning steering wheel, perform POWER STEERING IDLE-UP SYSTEM TEST. See IDLE-UP SYSTEMS under IDLE CONTROL SYSTEM.

THROTTLE POSITION SENSOR

1) TPS is mounted to throttle body, at end of throttle shaft. Disconnect TPS connector. See Fig. 5. Using ohmmeter, measure total resistance between specified TPS connector terminals. See TPS CONNECTOR TERMINAL IDENTIFICATION table. If resistance is not 3500-6500 ohms, replace TPS.

2) Using an analog (needle-type) ohmmeter, measure variable resistance between specified TPS connector terminals. See TPS CONNECTOR TERMINAL IDENTIFICATION table.

3) Operate throttle valve from closed to wide open throttle. If resistance does not change smoothly within 3500-6500 ohms throughout throttle valve movement range, replace TPS.



Fig. 5: Throttle Position Sensor Connector Terminal ID (Mirage 1.6L)
Courtesy of Mitsubishi Motor Sales of America.

TPS CONNECTOR TERMINAL IDENTIFICATION TABLE

Application	Terminal No.
Total Resistance	1 & 4

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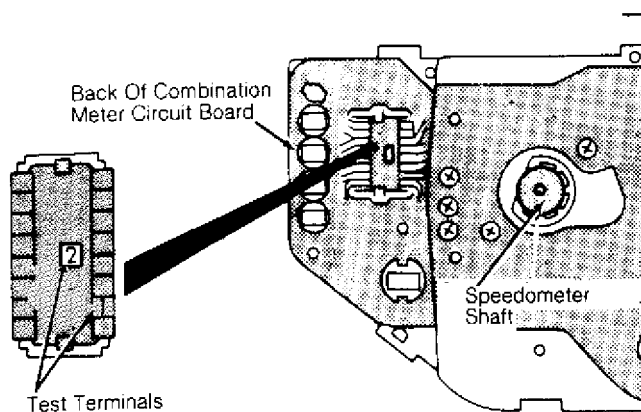
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Variable Resistance 2 & 4

VEHICLE SPEED SENSOR

1) Vehicle Speed Sensor (VSS) is located in speedometer assembly. Connect an ohmmeter between sensor test terminals on back of instrument panel. See Fig. 6.

2) Rotate speedometer cable. For each revolution of speedometer cable, sensor should make and break continuity 4 times. If ohmmeter reading does not fluctuate between continuity and no continuity or if sensor does not make and break continuity 4 times per revolution, replace sensor.



COLT, COLT 200, MIRAGE & SUMMIT

Fig. 6: Vehicle Speed Sensor Connector Terminal ID
Courtesy of Mitsubishi Motor Sales of America.

MOTORS, RELAYS & SOLENOIDS

MOTORS

ISC Motor

See IDLE CONTROL SYSTEM.

RELAYS

NOTE: For internal wiring diagram of MPI control relay, see
L - WIRING DIAGRAMS article in the ENGINE PERFORMANCE
Section.

MPI CONTROL RELAY LOCATION TABLE

Application	Location
All Models	Forward of center console.

MPI Control Relay (Mirage 1.6L)

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1) For relay location, see MPI CONTROL RELAY LOCATION table. Check for battery voltage at terminal No. 10 of relay connector. See Fig. 7. If battery voltage is present, go to step 3). If battery voltage is not present, check circuit between relay and battery, including fusible link No. 1. Go to next step.

2) Apply battery voltage to terminal No. 10. Battery voltage should not be present at terminals No. 4 and 5. Apply battery voltage to terminal No. 10, and ground terminal No. 8. Battery voltage should now be present at terminals No. 4 and 5.

3) Apply battery voltage to terminal No. 3. Battery voltage should not be present at terminal No. 2. Apply battery voltage to terminal No. 3, and ground terminal No. 7. Battery voltage should now be present at terminal No. 2.

4) Apply battery voltage to terminal No. 9. Battery voltage should not be present at terminal No. 2. Apply battery voltage to terminal No. 9, and ground terminal No. 6. Battery voltage should now be present at terminal No. 2. Replace relay if it does not test as specified.

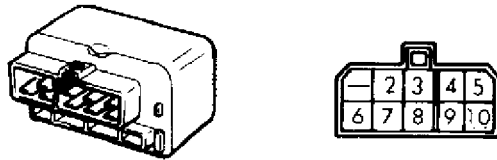


Fig. 7: MPI Control Relay Connector ID (1.6L)
Courtesy of Mitsubishi Motor Sales of America.

MPI Control Relay (1.5L)

1) For relay location, see MPI CONTROL RELAY LOCATION table. Check for battery voltage at terminal No. 4 of relay connector. See Fig. 8. If battery voltage is present, go to step 3). If battery voltage is not present, check circuit between relay and battery, including fusible link No. 1. Go to next step.

2) Disconnect wiring harness connector at relay. Remove relay. Check continuity, in turn, between terminal No. 4 and following: terminals No. 1, 2 and 3. If there is no continuity, go to next step. If there is continuity, replace relay.

3) Check diode operation between terminals No. 6 and 8. If there is continuity in only one direction, go to next step. If there is no continuity in either direction or if there is continuity in both directions, replace relay.

4) Measure resistance between terminals No. 6 and 7. If resistance is approximately 35 ohms, go to next step. If resistance is not approximately 35 ohms, replace relay.

5) Measure resistance, in turn, between terminal No. 5 and following: terminals No. 2 and 3. In both tests, if resistance is approximately 95 ohms, go to next step. If resistance is not approximately 95 ohms, replace relay.

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6) Connect positive lead of 12-volt source to terminal No. 7 and negative lead to terminal No. 6. If there is continuity between terminals No. 1 and 4, go to next step. If there is no continuity, replace relay.

7) Connect positive lead of 12-volt source to terminal No. 5 and negative lead to terminal No. 2. If there is continuity between terminals No. 1 and 4, go to next step. If there is no continuity, replace relay.

8) Connect positive lead of 12-volt source to terminal No. 5 and negative lead to terminal No. 3. If there is continuity between terminals No. 1 and 4, go to next step. If there is no continuity, replace relay.

9) Connect positive lead of 12-volt source to terminal No. 8 and negative lead to terminal No. 6. Check continuity, in turn, between terminal No. 4 and following: terminals No. 3 and 2. If continuity exists, relay is okay. If there is no continuity, replace relay.

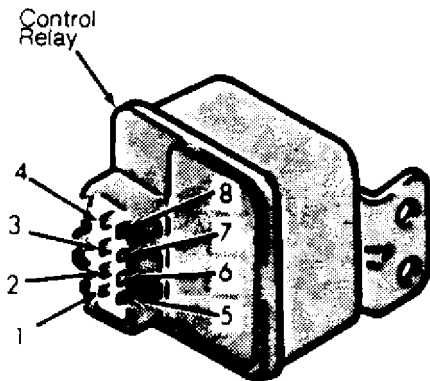


Fig. 8: MPI Control Relay Connector ID (1.5L)
Courtesy of Mitsubishi Motor Sales of America.

SOLENOIDS

Fuel Injector Solenoids

See FUEL CONTROL under FUEL SYSTEM.

FUEL SYSTEM

FUEL DELIVERY

NOTE: For fuel system pressure testing, see F - BASIC TESTING article in the ENGINE PERFORMANCE Section.

FUEL CONTROL

Fuel Injectors

1) Using a stethoscope, check operating sound of injector(s)

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during engine cranking or idling. If clicking sound is heard, injectors are okay. If clicking sound is not heard at each injector, go to step 2).

2) Disconnect injector electrical connector. Measure resistance between injector connector terminals. At 68°F (20°C), if resistance is not 13-16 ohms, replace injector.

3) If resistance is within specification, check injector wiring circuit for open or short to ground. If wiring circuit tests okay, replace injector.

IDLE CONTROL SYSTEM

IDLE SPEED CONTROL (ISC) MOTOR OPERATION TEST

NOTE: On DOHC engines, ISC motor controls a pintle-type air by-pass valve to regulate idle air by-pass volume. On SOHC engines, ISC motor adjusts throttle plate angle to regulate idle air by-pass volume.

CAUTION: DO NOT apply more than 6 volts to ISC motor.

1.5L

Connect 6-volt source across terminals No. 1 and 2 of ISC motor connector. See Fig. 9. Reverse leads of 6-volt source. If motor does not operate in both directions, replace ISC motor assembly.

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Fig. 9: ISC Motor Connector Terminal ID (1.5L)
Courtesy of Mitsubishi Motor Sales of America.

1.6L

1) Remove throttle body from intake plenum. Remove ISC motor from throttle body. Apply 6-volt source parallel to terminals No. 2 and 5 of ISC motor connector. See Fig. 10.

2) Apply source ground lead to ISC motor connector terminals No. 3 and 6. Note slight movement of ISC motor plunger. Remove ground leads from terminals No. 3 and 6.

3) Apply and remove source ground at terminals No. 1 and 6, 1 and 4, 3 and 4, and 3 and 6. Note slight movement of ISC motor plunger during each phase of test.

4) Beginning at terminal No. 6, reverse grounding sequence specified in steps 2) and 3). If motor does not operate when grounding any of specified terminals, replace ISC motor.

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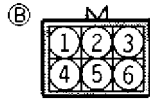


Fig. 10: ISC Motor Connector Terminal ID (1.6L)
Courtesy of Mitsubishi Motor Sales of America.

IDLE SPEED CONTROL (ISC) MOTOR RESISTANCE TEST

1.5L

Disconnect ISC motor connector. Connect ohmmeter between terminals No. 1 and 2 of ISC motor connector. See Fig. 9. If resistance is not 5-35 ohms at 68°F (20°C), replace ISC motor assembly.

1.6L

Measure resistance between terminals No. 1 and 2, 2 and 3, 4 and 5, and 5 and 6 of ISC motor connector. See Fig. 10. In each case, if resistance is not 28-33 ohms at 68°F (20°C), replace ISC motor assembly.

IDLE-UP SYSTEMS

Power Steering Idle-Up System Test

1) Disconnect pressure hose from power steering pump. Connect, in line, a pressure gauge and hoses capable of handling 300 psi (21 kg/cm²). Also connect a shutoff valve in line with pressure gauge. See Fig. 11.

2) Bleed air from system by disabling ignition system and cranking engine while turning steering wheel completely from left to right several times. Start engine, and turn steering wheel back and forth to raise fluid temperature to approximately 122-140°F (50-60°C).

3) With engine idling, gradually close shutoff valve of pressure gauge to increase hydraulic pressure. If idle speed does not increase 200-250 RPM when fluid pressure reaches 213-284 psi (15-20 kg/cm²), replace power steering idle-up switch.

4) Gradually open shutoff valve. If engine speed does not return to curb idle speed between 100-142 psi (7-10 kg/cm²), replace power steering idle-up switch. Remove testing equipment. Bleed air from system as described in step 2).

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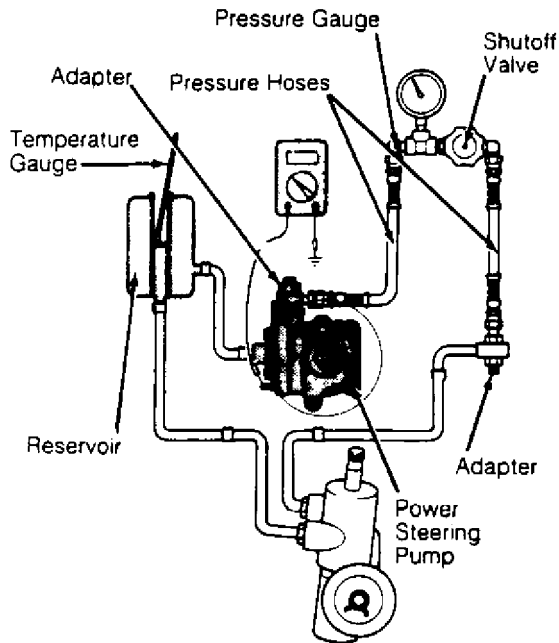


Fig. 11: Connecting Pressure Gauge Shutoff Valve Assembly
Courtesy of Mitsubishi Motor Sales of America.

IGNITION SYSTEM

NOTE: For basic ignition checks, see F - BASIC TESTING article in the ENGINE PERFORMANCE Section.

TIMING CONTROL SYSTEMS

Crank Angle Sensor

Crank angle sensor is located inside distributor on SOHC engines. Sensor is attached to cylinder head on DOHC engines. If malfunction occurs, Code 22 will set. For testing procedure, see G - TESTS W/CODES article in the ENGINE PERFORMANCE Section.

EMISSION SYSTEMS & SUB-SYSTEMS

EXHAUST GAS RECIRCULATION (EGR)

System Testing (Federal)

1) Disconnect Green-striped hose from throttle body, and connect vacuum pump to hose end. Plug nipple where hose was connected to throttle body. When engine is cold, 122°F (50°C) or less, and at idle, apply vacuum to disconnected hose. If idle does not change and vacuum bleeds down, system is okay.

2) When engine is hot, 205°F (95°C), and at idle, apply 1.8 in. Hg. If idle does not change and vacuum holds, system is okay. Using a vacuum pump, apply 7.7 in. Hg. If idle becomes unstable or

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engine stalls (and vacuum holds), system is okay.

System Testing (California)

1) Connect vacuum "T" fitting into Green-striped hose from EGR valve, and connect vacuum gauge to vacuum tee. When engine coolant temperature is 68°F (20°C) or less and engine is idling, snap throttle open to race engine. If no change in vacuum reading is detected on gauge, system is okay.

2) When engine coolant temperature is 158°F (70°C) or more and engine is idling, snap throttle open to race engine. If vacuum increases to 3.9 in. Hg or higher, system is okay.

3) Using vacuum pump, apply specified vacuum to open EGR valve. See EGR VALVE SPECIFICATIONS table. If idle becomes unstable or engine stalls, system is okay.

EGR Control Solenoid Valve (California)

1) EGR Control Solenoid Valve is located on center of firewall. Label and disconnect vacuum hoses and wiring harness from solenoid valve.

2) Connect hand vacuum pump to vacuum nipple where Green-striped vacuum hose was connected. Apply vacuum and ensure vacuum does not hold. Apply battery voltage to one terminal of solenoid, and ground other. Ensure vacuum holds.

3) Using an ohmmeter, measure resistance between terminals of solenoid valve. At room temperature, reading should be 36-44 ohms. Replace solenoid if resistance is not to specification.

NOTE: EGR temperature sensor only determines if EGR is operating. An inoperative sensor will not affect driveability or exhaust emissions.

EGR Temperature Sensor (California)

1) Remove EGR temperature sensor from EGR valve. Place EGR temperature sensor in water. While increasing water temperature, measure resistance between wire terminals.

2) At a temperature of 122°F (50°C), resistance should be 60,000-80,000 ohms. At 212°F (100°C), resistance should be 11,000-14,000 ohms. Replace EGR temperature sensor if resistance differs significantly from specification.

EGR Thermo valve (1.6L Federal)

1) EGR Thermo valve is located below thermostat housing. Disconnect vacuum hoses from thermo valve, and connect a hand vacuum pump to a nipple of thermo valve.

2) With coolant temperature at 122°F (50°C) or less, ensure vacuum does not hold. At 176°F (80°C) or more, ensure vacuum holds.

EGR Valve

1) Remove EGR valve. Check valve for sticking, carbon deposits and damage. Clean valve with solvent if necessary. Apply 19.8 in. Hg to valve diaphragm. If valve does not hold vacuum, replace valve.

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2) Apply specified vacuum to valve diaphragm. See CLOSED IN. HG column in EGR VALVE SPECIFICATIONS table. If valve begins to open before vacuum reaches specification, replace valve.

3) Apply specified vacuum to valve diaphragm. See OPEN IN. HG column in EGR VALVE SPECIFICATIONS table. If valve is not completely open after vacuum has reached specification, replace valve.

EGR VALVE SPECIFICATIONS TABLE

Application	Closed		Open	
	In. Hg		In. Hg	
All Models	2.1	6.8	

FUEL EVAPORATION

System Test

1) Disconnect Red-striped purge hose from throttle body, and connect it to hand vacuum pump. Plug nipple on throttle body where purge hose was removed.

2) With engine coolant temperature at 140°F (60°C) or less and engine idling, apply 14.8 in. Hg. Ensure vacuum is held. Raise engine speed to 3000 RPM and again apply 14.8 in. Hg. Ensure vacuum is held.

3) With engine coolant temperature at 158°F (70°C) or more and engine idling, apply 14.8 in. Hg. Ensure vacuum is held. Turn engine off. Start engine and within 3 minutes of starting engine, apply vacuum. Ensure vacuum bleeds down.

4) With engine running for more than 3 minutes after starting, raise engine speed to 3000 RPM and apply 14.8 in. Hg. Ensure vacuum holds momentarily and then bleeds down.

NOTE: In step 4), vacuum should bleed down continuously if vehicle is at an altitude of 7200 feet (2200 m) or higher, or if intake air temperature is 122°F (50°C) or higher.

Purge Control Solenoid Valve

1) Purge Control Solenoid Valve is located on left center of firewall. Label and disconnect both vacuum hoses from solenoid valve. Disconnect electrical connector. Connect hand vacuum pump to solenoid valve nipple where Red-striped hose was connected. Apply vacuum to solenoid valve. Vacuum should hold.

2) Apply battery voltage to terminals of solenoid valve. Vacuum should bleed down when voltage is applied to terminals. Using an ohmmeter, check resistance across solenoid valve terminals. Reading should be 36-44 ohms at 68°F (20°C). If reading is not within specification, replace valve.

POSITIVE CRANKCASE VENTILATION (PCV)

PCV Valve

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Remove PCV valve, and insert thin screwdriver into threaded end of valve to ensure plunger moves.

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