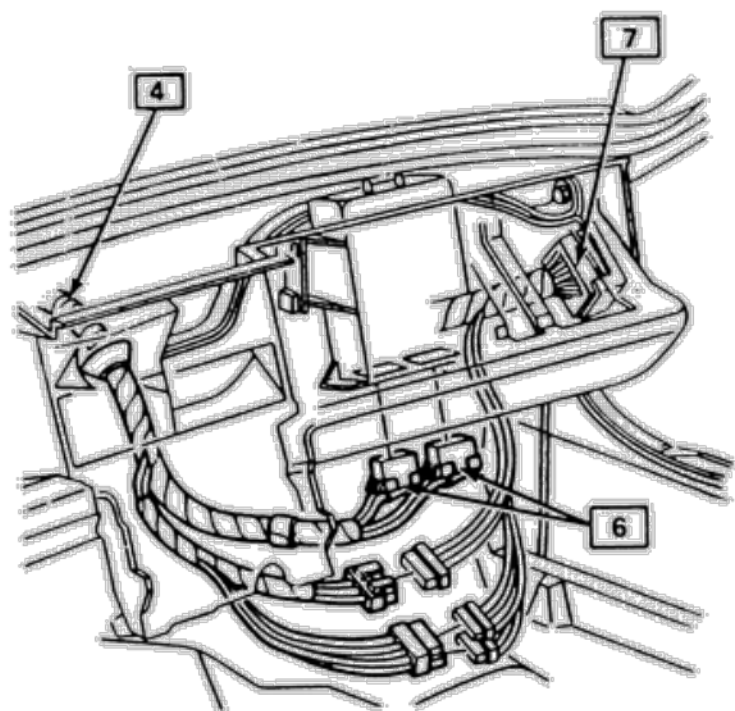
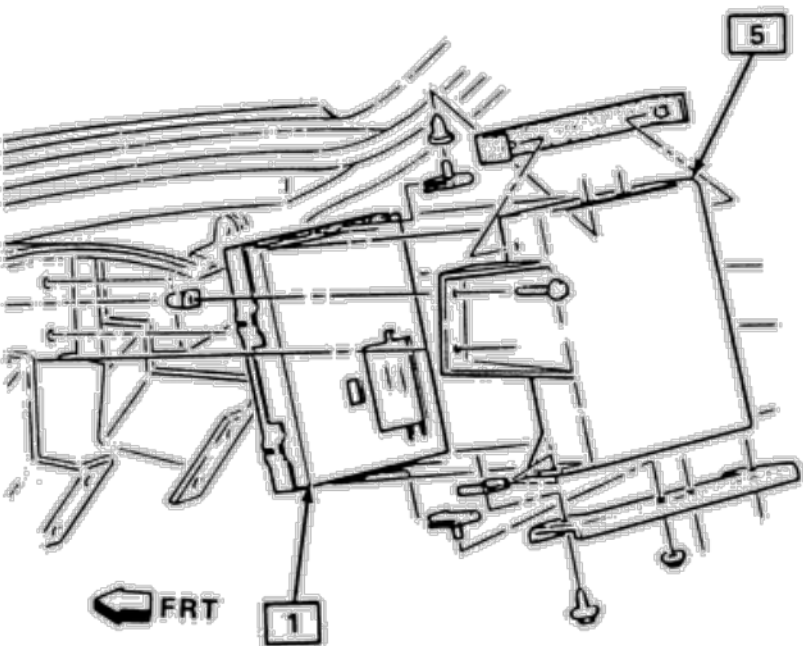
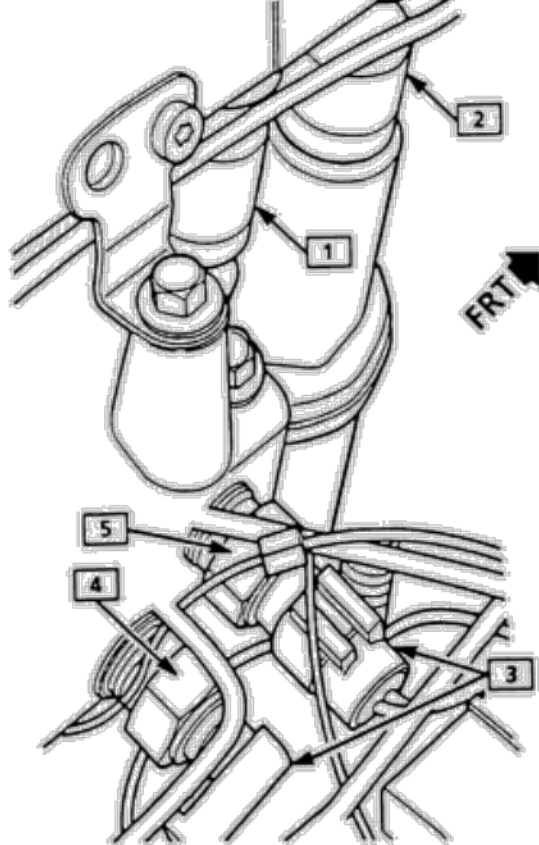
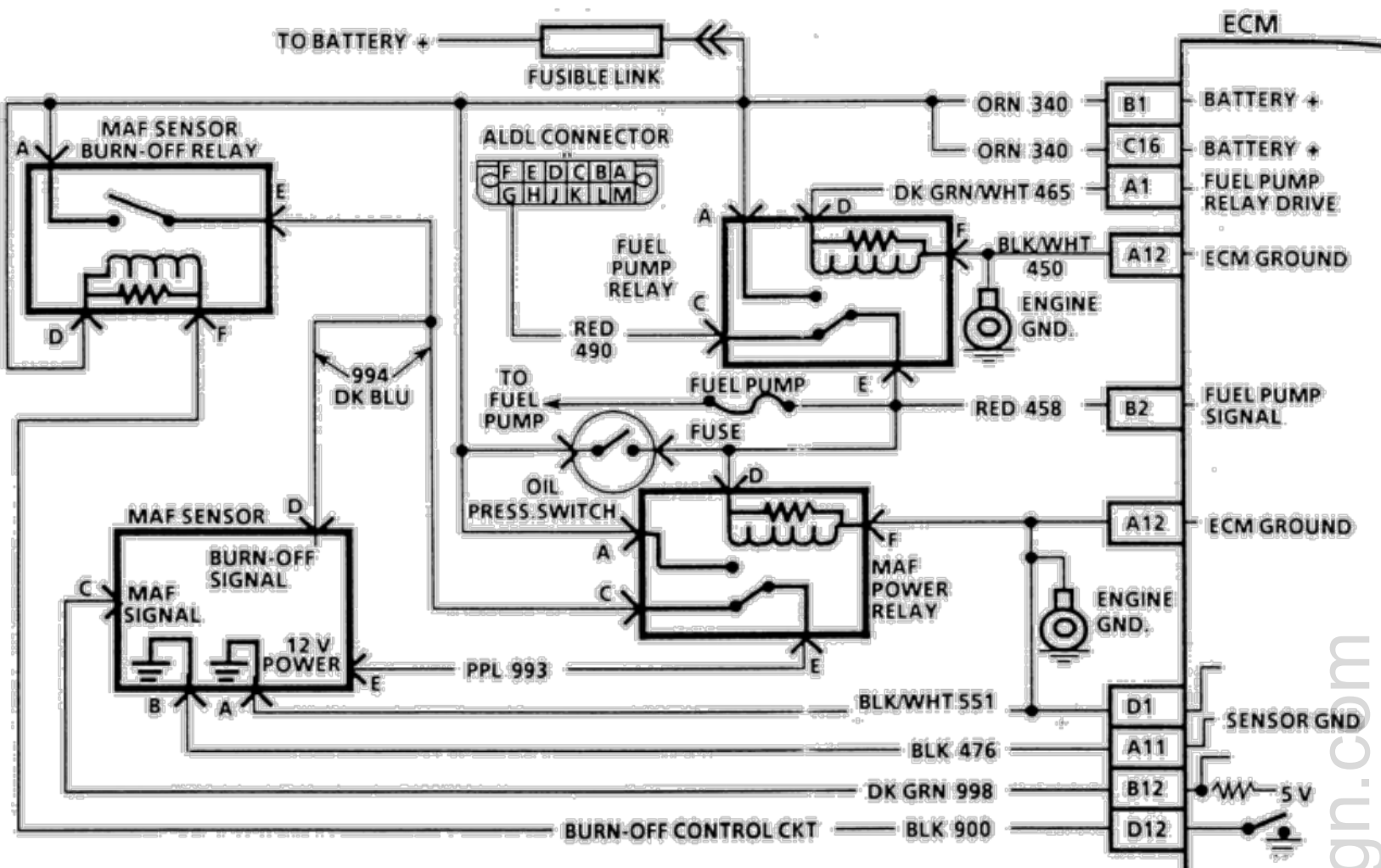


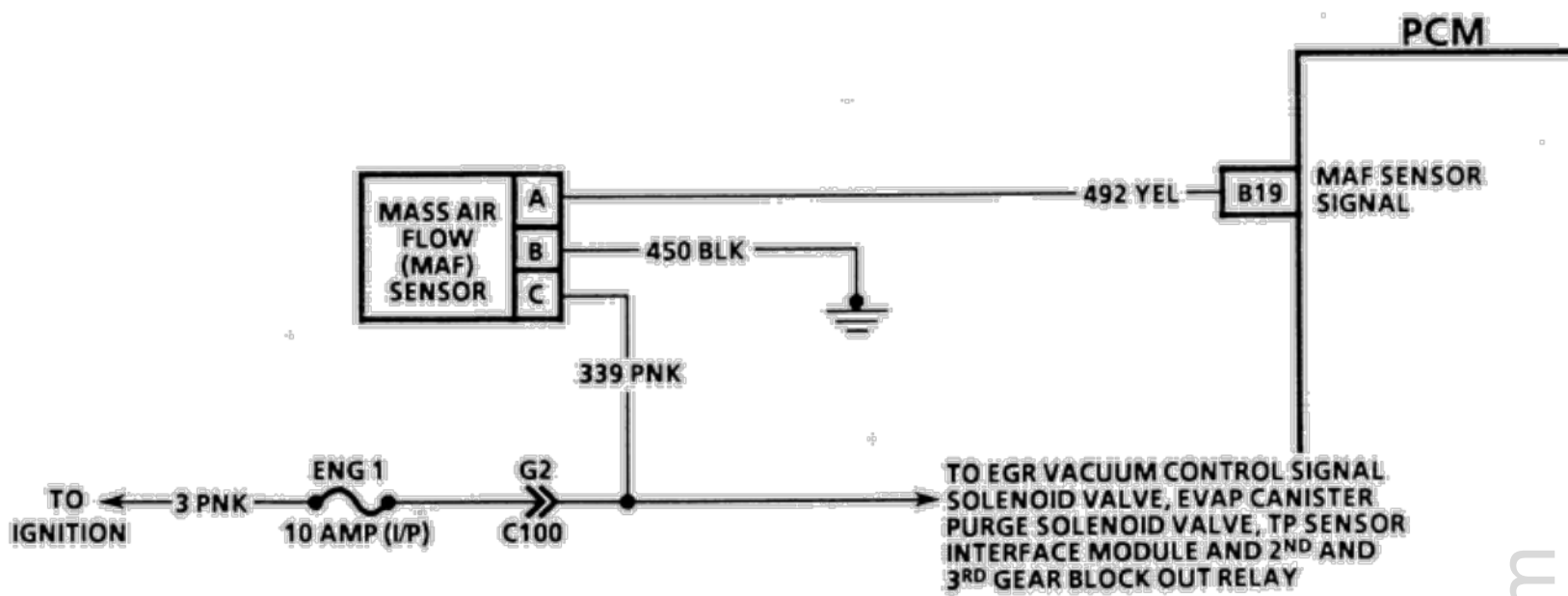


- | | |
|----------------------|--|
| 1 ECM | 6 ECM HARNESS—
CONNECTORS TO ECM |
| 4 ECM HARNESS | 7 I.P. WIRE HARNESS |
| 5 BRACKET—ECM | |

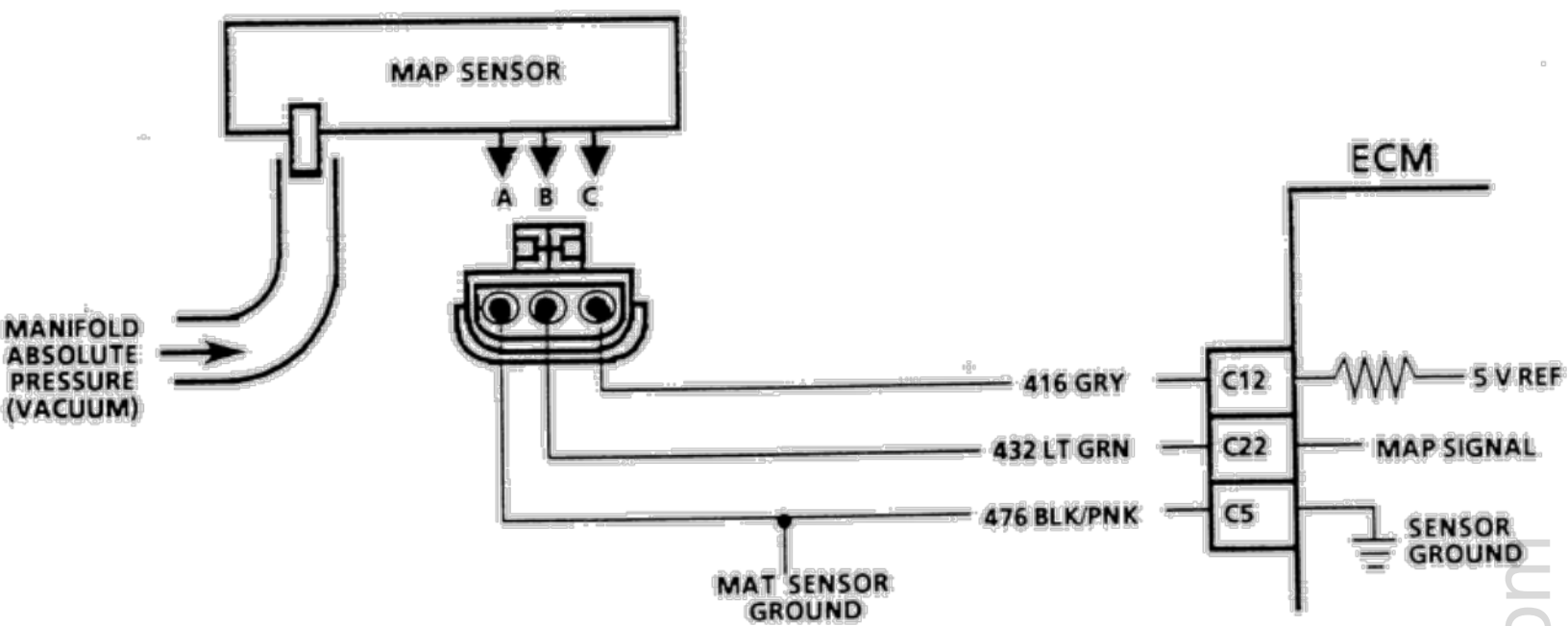


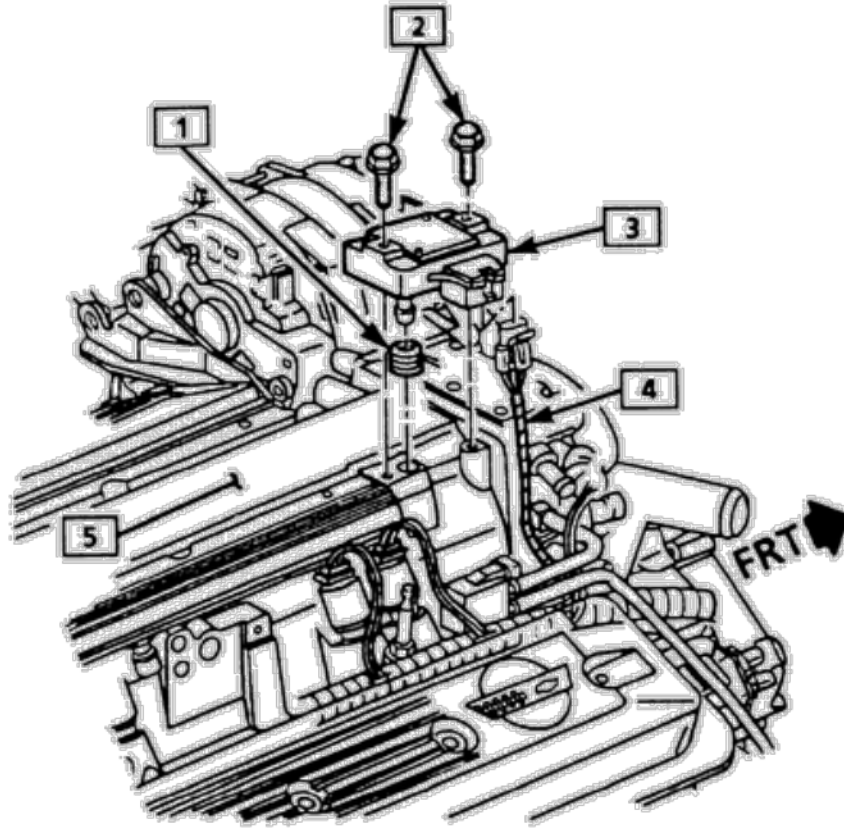
-
- 1** #1 CYLINDER SECONDARY INJECTOR
 - 2** #1 CYLINDER PRIMARY INJECTOR
 - 3** ELECTRICAL CONNECTORS
 - 4** COOLANT TEMPERATURE SENSOR - GAGE
 - 5** COOLANT TEMPERATURE SENSOR (CTS) - ECM



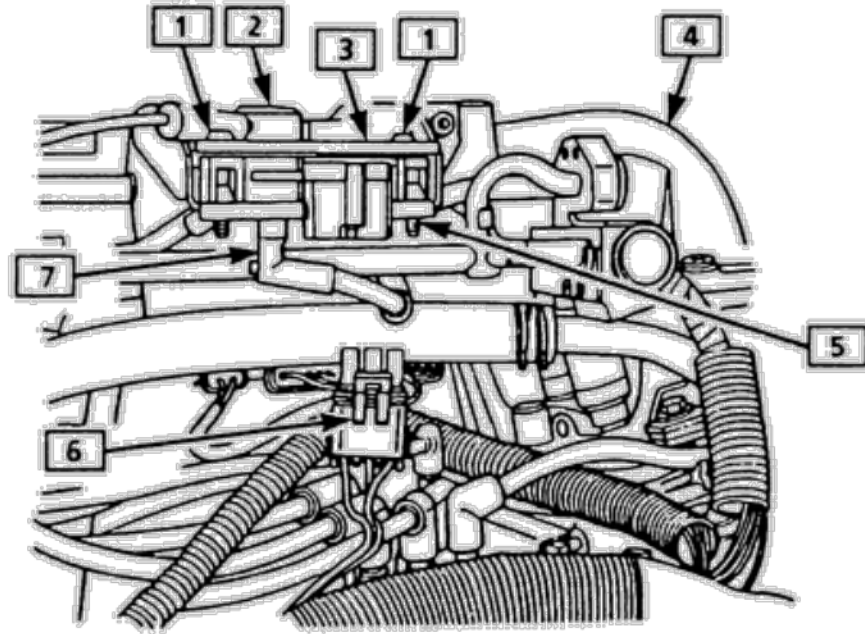


(I/P) = LOCATED IN INSTRUMENT PANEL FUSE BLOCK.

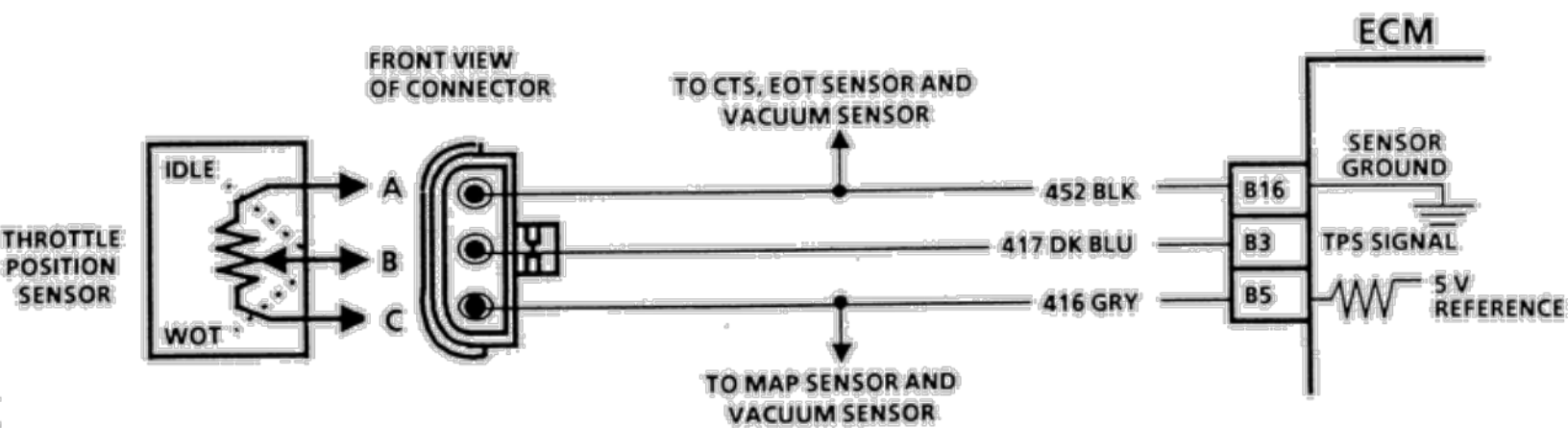


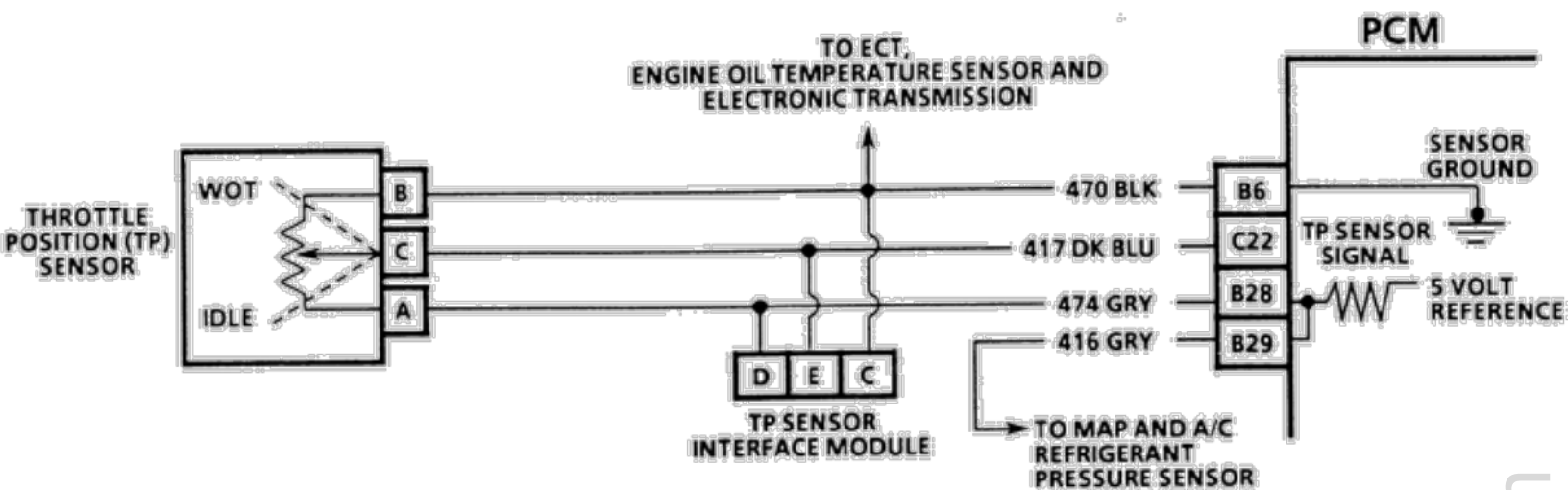


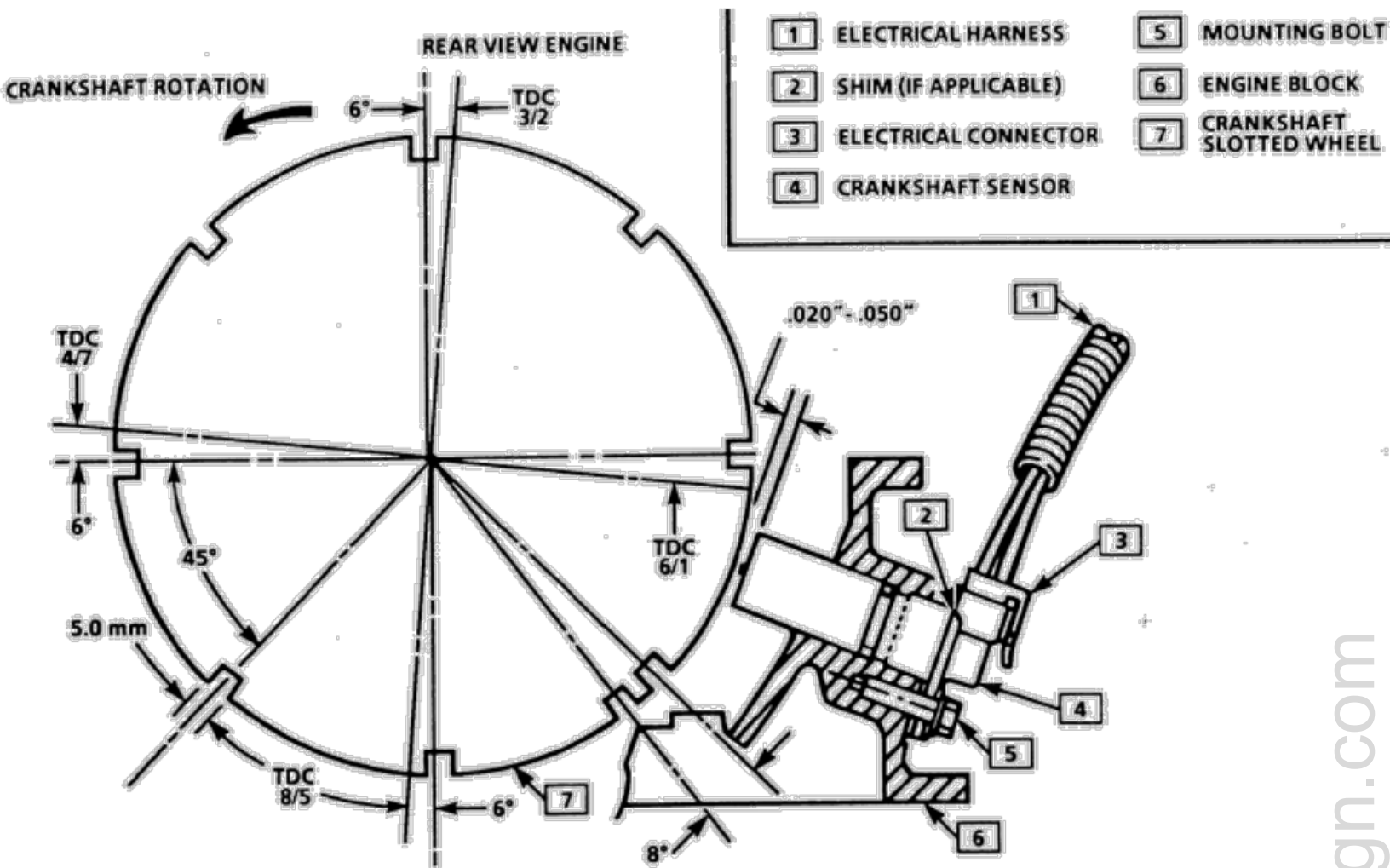
-
- | | |
|----------|---------------------------|
| 1 | MAP SENSOR SEAL |
| 2 | 6 N·m (50 lb. in.) |
| 3 | MAP SENSOR |
| 4 | MAP SENSOR HARNESS |
| 5 | INTAKE MANIFOLD |

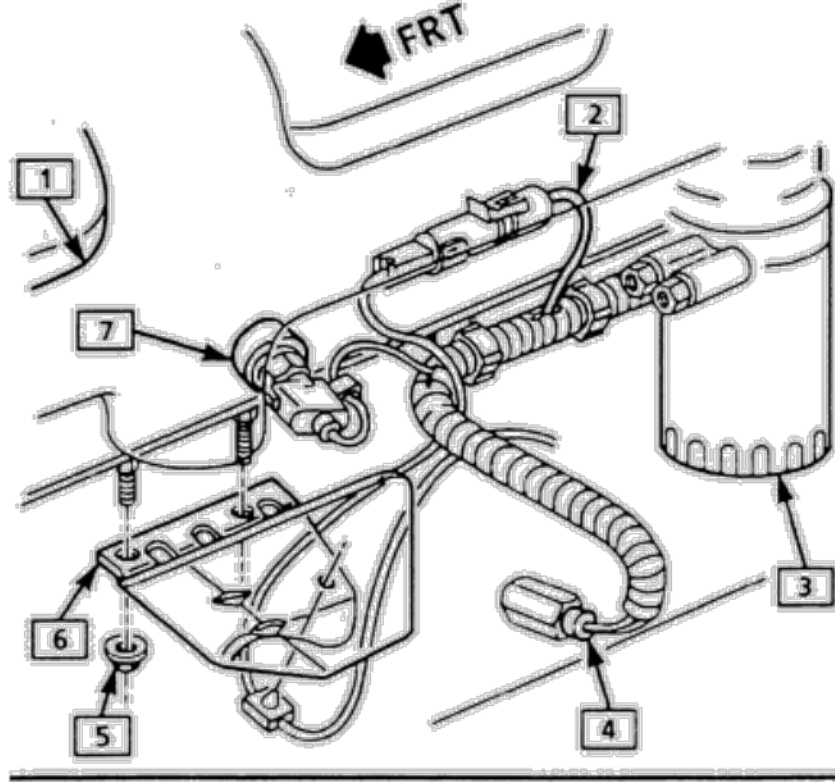


- 1** ATTACHING SCREW
- 2** FUEL PRESSURE REGULATOR
- 3** PROTECTIVE COVER
- 4** INTAKE PLENUM
- 5** MANIFOLD ABSOLUTE PRESSURE SENSOR
- 6** MAP SENSOR ELECTRICAL CONNECTOR
- 7** VACUUM HOSE

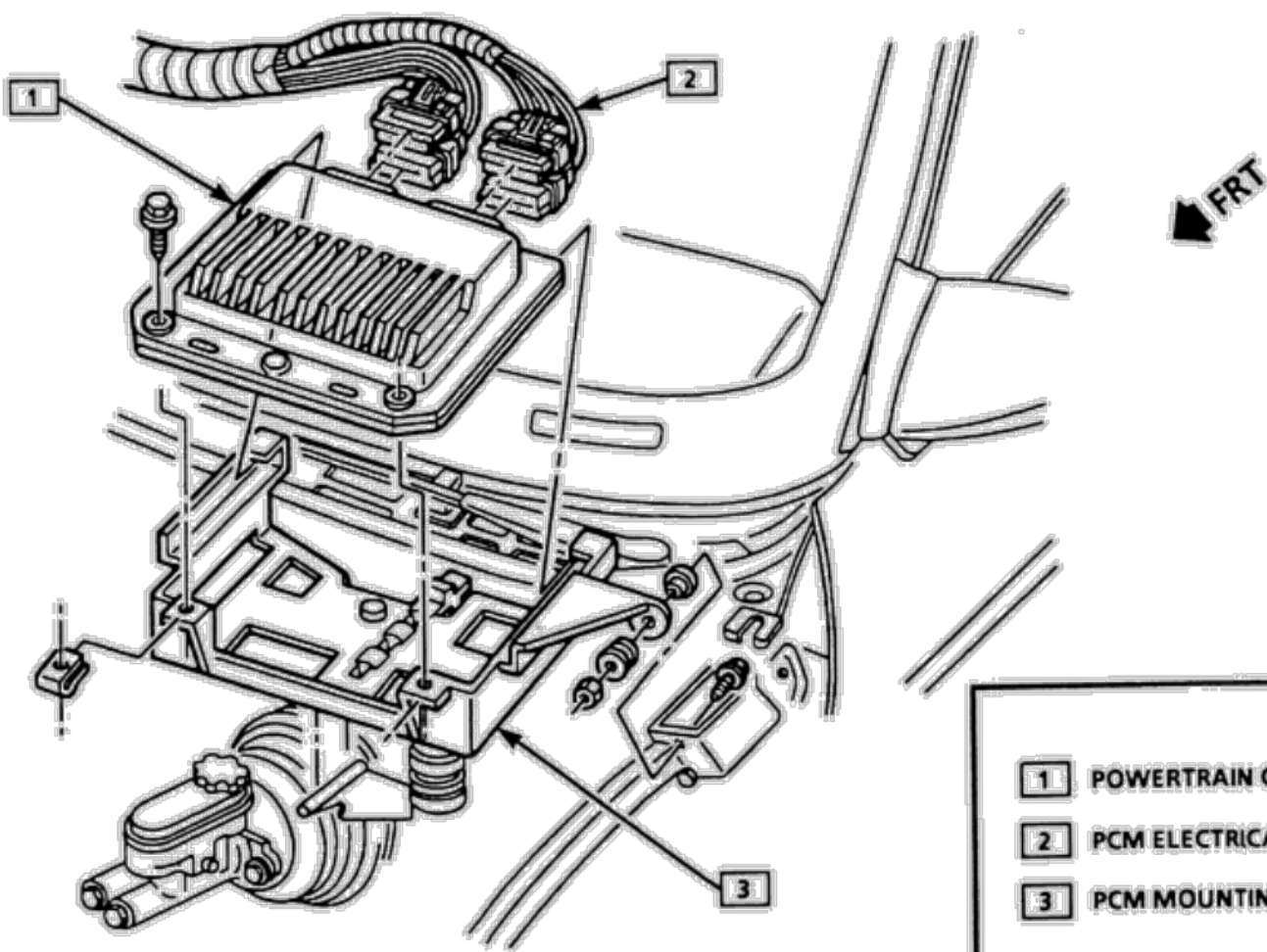




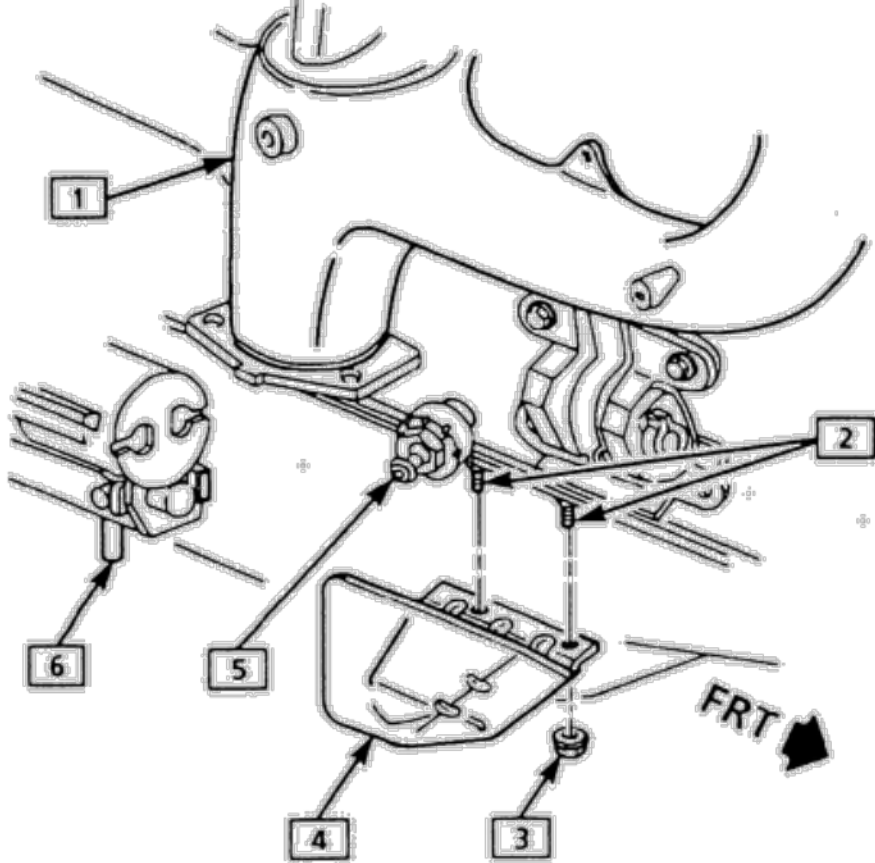




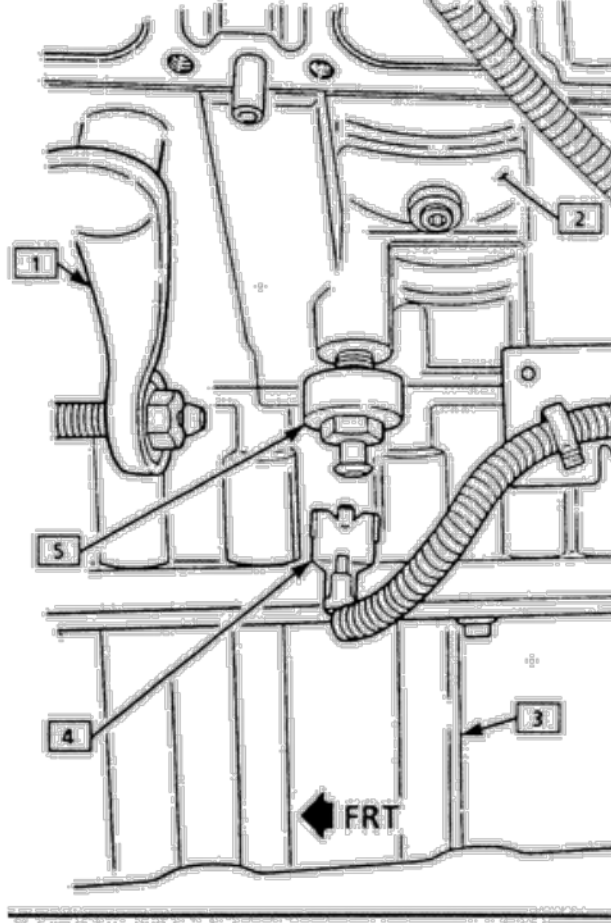
- 1** EXHAUST MANIFOLD
- 2** O₂ SENSOR HARNESS
- 3** ENGINE OIL FILTER
- 4** LOW OIL LEVEL SENSOR
- 5** 8.5 N·m (75 lb. in.)
- 6** KNOCK SENSOR SHIELD
- 7** KNOCK SENSOR



- 1** POWERTRAIN CONTROL MODULE (PCM)
- 2** PCM ELECTRICAL HARNESS
- 3** PCM MOUNTING BRACKET

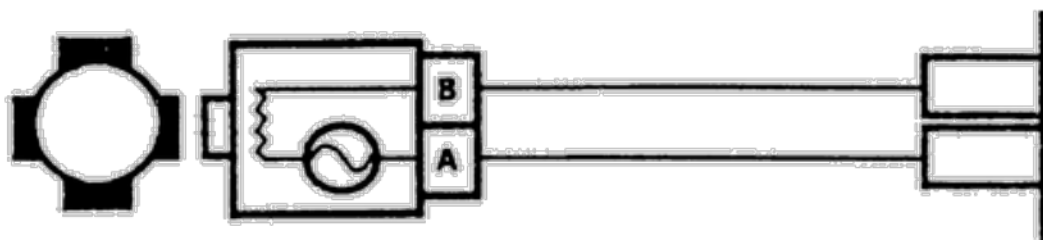


- | | |
|-------------------------------|------------------------------|
| 1 EXHAUST MANIFOLD | 4 KNOCK SENSOR SHIELD |
| 2 STUDS | 5 KNOCK SENSOR |
| 3 8.5 N·m (75 lb. in.) | 6 STARTER MOTOR |



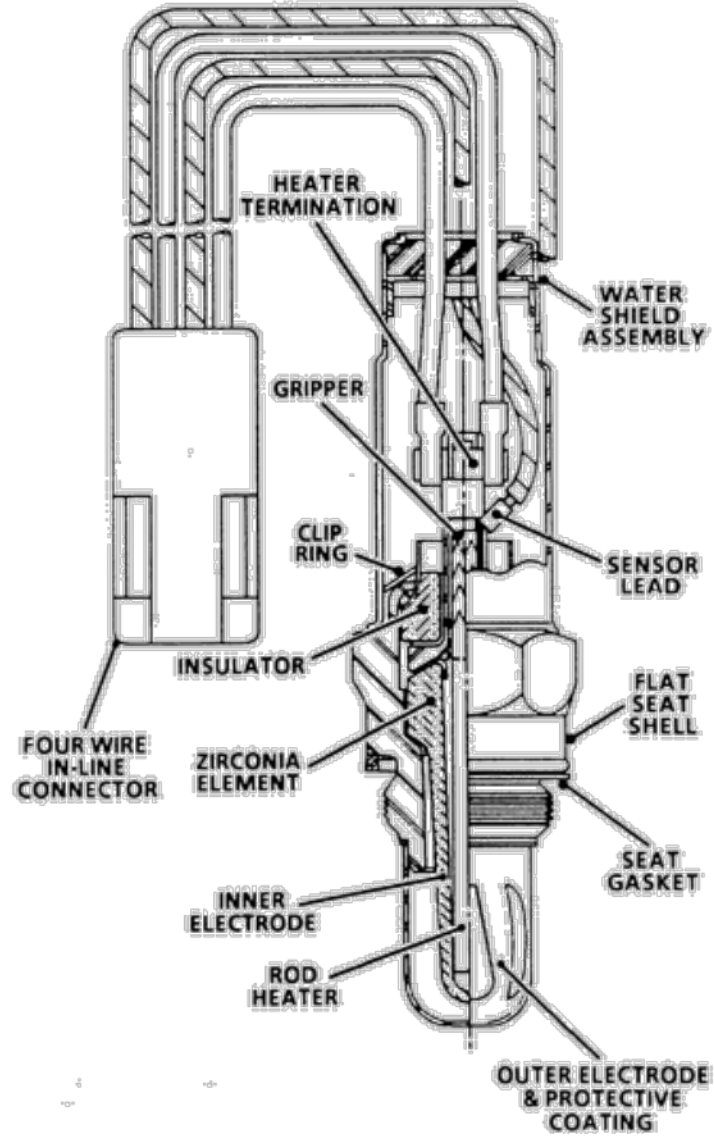
- 1** LEFT ENGINE MOUNTING BRACKET
- 2** ENGINE BLOCK
- 3** OIL PAN
- 4** ELECTRICAL CONNECTOR
- 5** KNOCK SENSOR

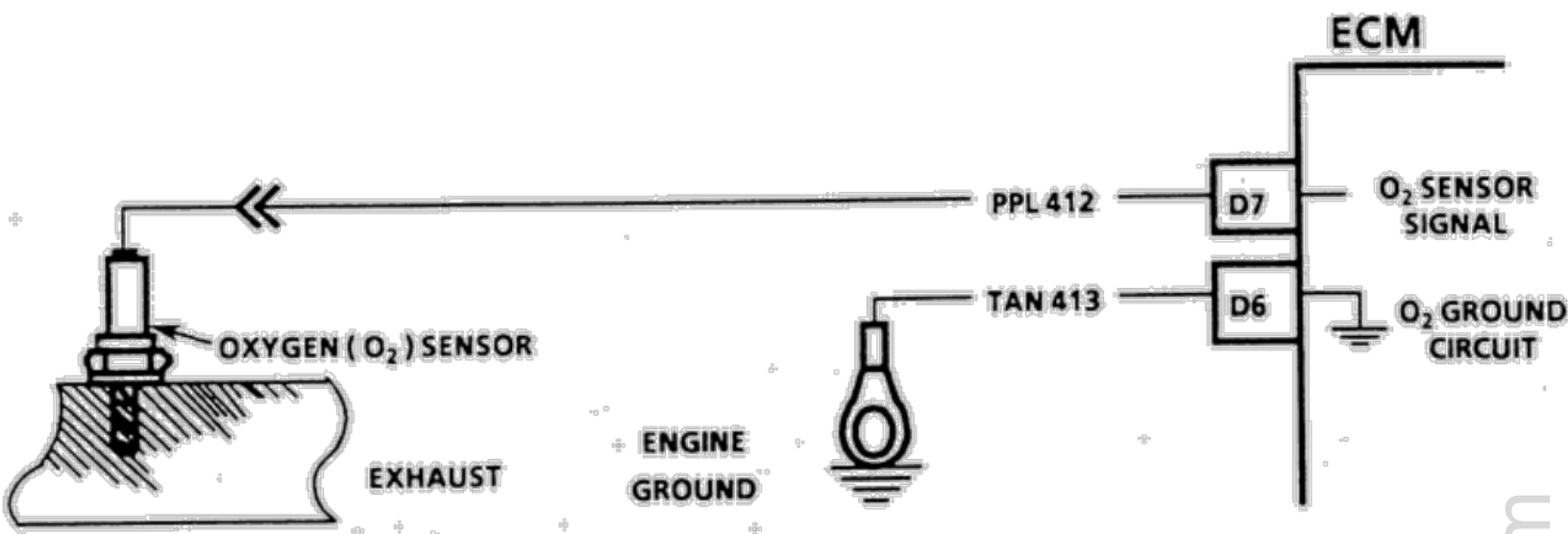
VEHICLE
SPEED SENSOR
(TRANS MOUNTED)

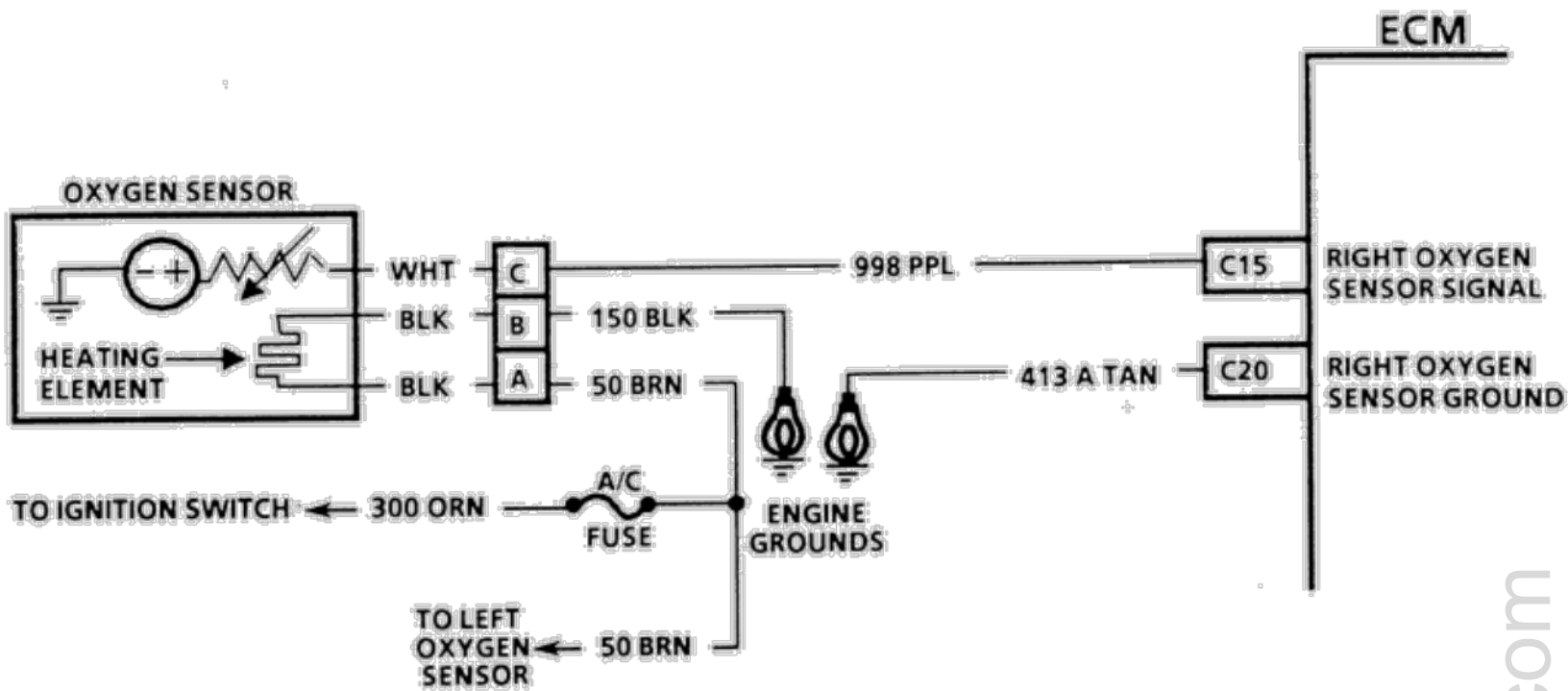


VSS INPUT HIGH

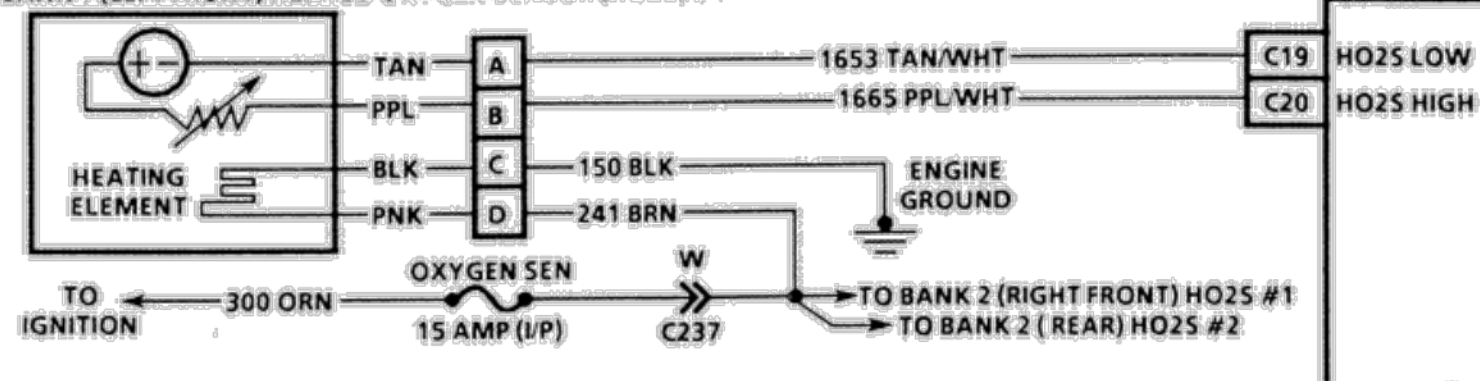
VSS INPUT LOW



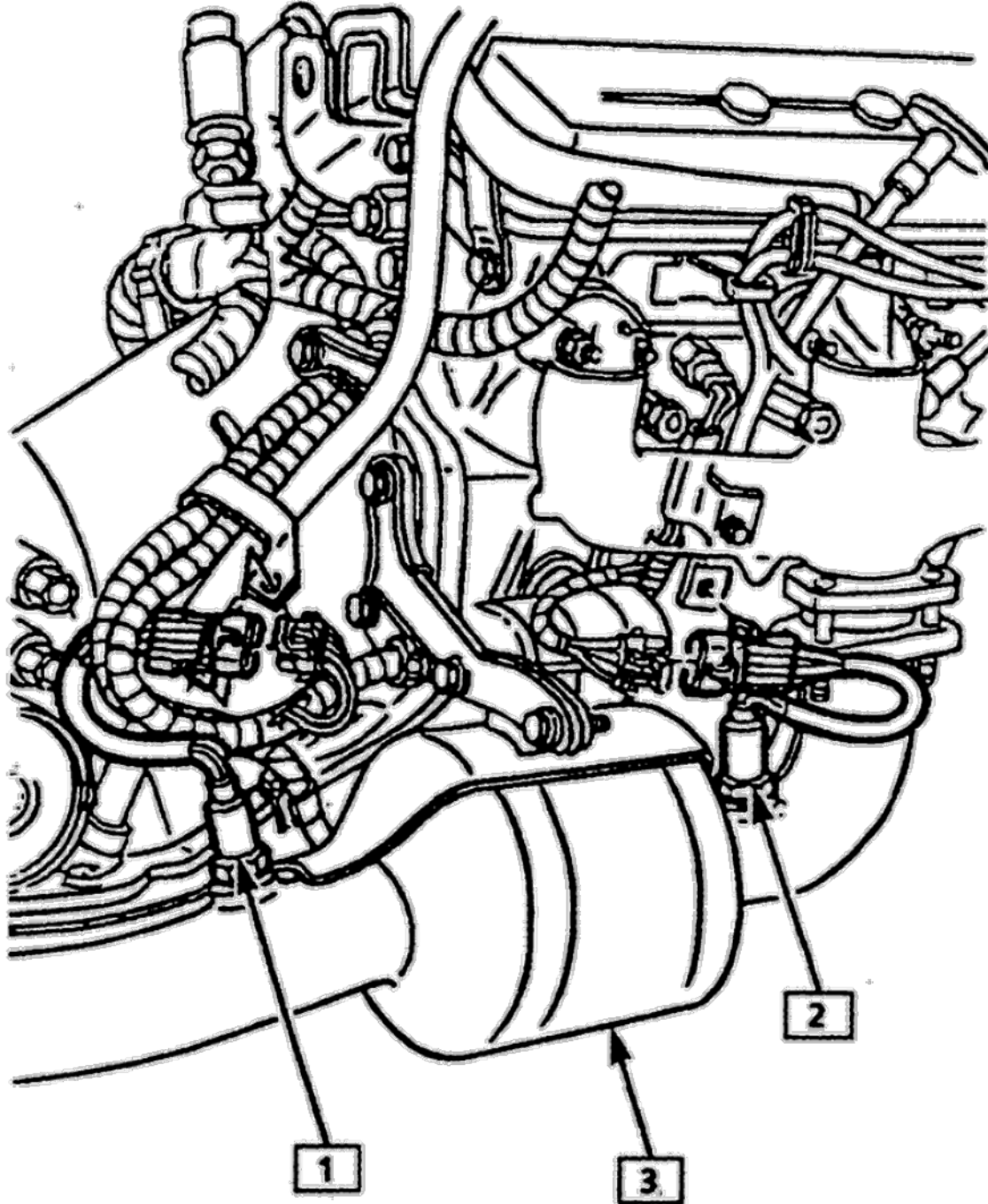




BANK 1 (LEFT FRONT) HEATED OXYGEN SENSOR (HO2S) #1

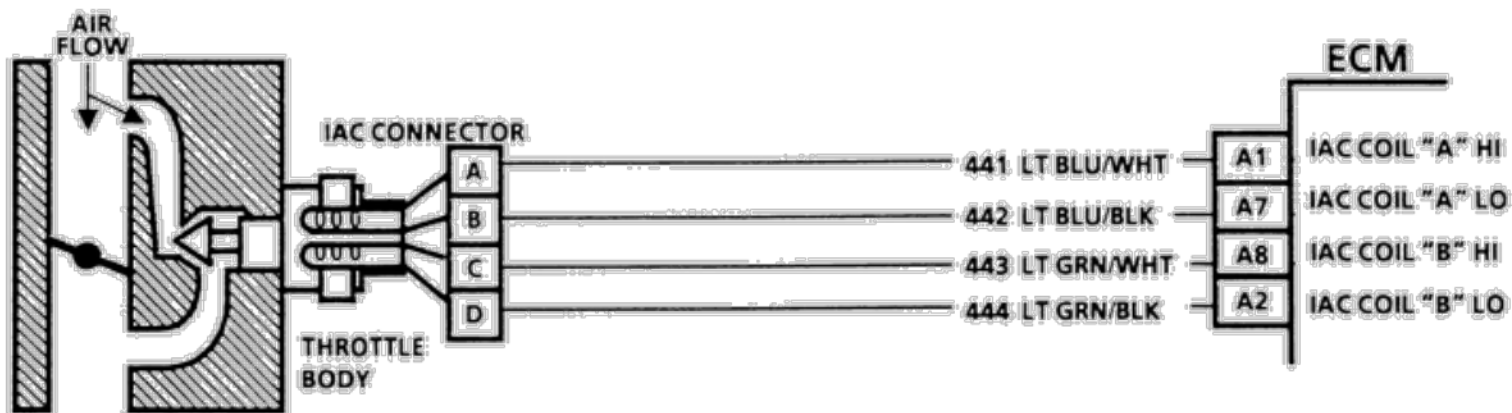


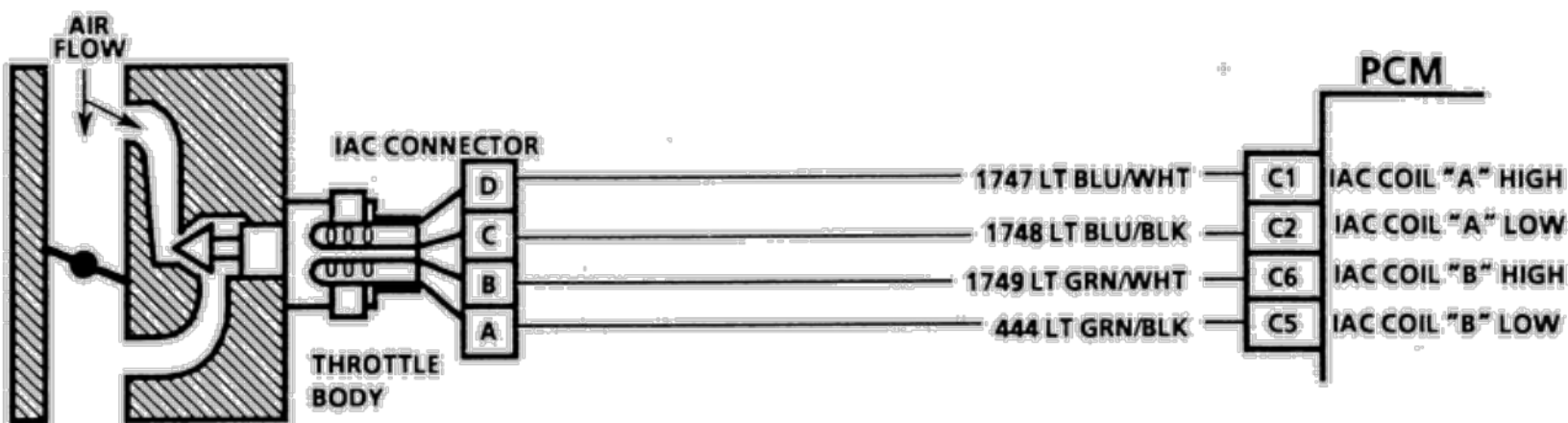
(I/P) = LOCATED IN INSTRUMENT PANEL FUSE BLOCK.



-
- 1** BANK 2 HO2S #2 (CATALYST MONITOR)
 - 2** BANK 2 HO2S #1
 - 3** WARM UP THREE-WAY CATALYTIC CONVERTER

1-6-87





1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

NOTE: The 5.7L (VIN J) engine is the only engine which uses a Camshaft Position (CMP) sensor.

The PCM uses the CMP sensor to determine the position of the No. 1 piston during its power stroke. This signal is used by the PCM to calculate fuel injection mode of operation.

If the cam signal is lost while the engine is running, the fuel injection system will shift to a calculated fuel injected mode based on the last fuel injection pulse, and the engine will continue to run.

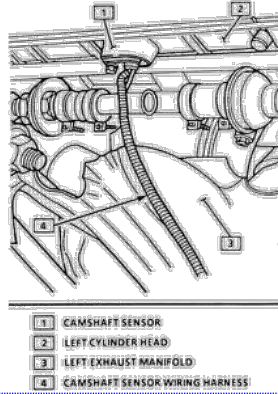
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

VIN J Engine

1. Disconnect the negative battery cable.
2. If necessary, remove the intake manifold.
3. Detach the CMP sensor electrical connector.
4. Clean the area around the CMP sensor to avoid getting debris in the engine.
5. Remove the CMP sensor retaining bolt, then remove the sensor from the engine.

Fig. 1: Location of the Camshaft Position (CMP) sensor — 5.7L (VIN J) engine



To install:

6. Install the CMP sensor and retaining bolt. Tighten the bolt to 18 ft. lbs. (25 Nm).
7. Attach the CMP sensor electrical connector.
8. Install the intake manifold.
9. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

[VIN J Engines](#)

NOTE: The best method to test this sensor is by using an oscilloscope.

The camshaft position sensor used on these engines is a 3-wire, Hall effect type sensor. The sensor requires power and ground to function. When performing this test, backprobe all connectors.

1. Visually check the connector, making sure it is connected properly and all of the terminals are straight, tight and free of corrosion.
2. With the ignition in the **ON** position, check the sensor voltage using an oscilloscope. When the starter is briefly operated, a square wave pattern, alternating from 0–12 volts should be seen at terminal B. If the voltage is within specification, the sensor is functional
3. If the sensor voltage is not within specifications, use a DVOM to check terminal A for battery positive (B+). If battery positive (B+) is not present, check the circuit continuity and repair as necessary.
4. If battery positive (B+) is present at terminal A, check terminal C for proper ground. If ground is not present check the circuit for continuity and repair as necessary.
5. If the sensor and circuits are functional, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

The CKP sensor provides a signal through the ignition module which the PCM uses as a reference to calculate RPM and crankshaft position.

Fig. 1: View of the Crankshaft Position (CKP) sensor used on VIN J engines

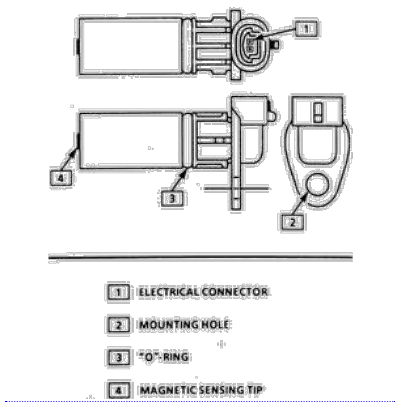
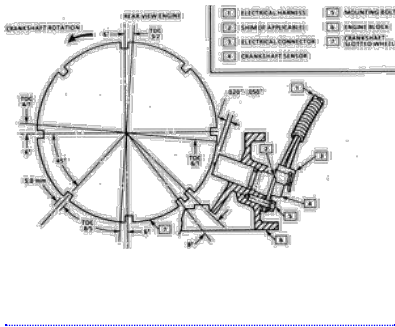


Fig. 2: Crankshaft and CKP sensor relation — VIN J engine



1990 Chevrolet CORVETTE

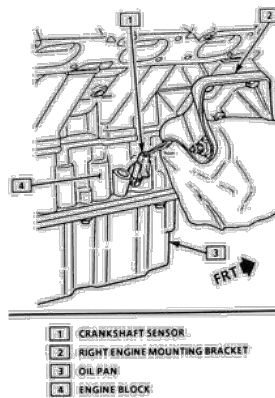
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

[VIN J Engine](#)

1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle.
3. Unfasten any necessary retainers, then remove CKP sensor shield.
4. Detach the CKP sensor electrical connector.
5. Unfasten the CKP sensor mounting bolt, then remove the sensor from the vehicle.
6. If equipped, remove the sensor shim.

Fig. 1: The CKP sensor is mounted in the lower right side of the engine block, between cylinders 4 & 6, just above the oil pan



To install:

7. Lubricate the CKP sensor O-ring with clean engine oil. If used, install the sensor shim.
8. Position the CKP sensor and install the mounting bolt. Tighten the bolt to 71 inch lbs. (8 Nm).
9. Attach the sensor electrical connector.
10. Install the CKP sensor shield, securing with the retainers as necessary.
11. Carefully lower the vehicle, then connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: The best method to test this sensor is by using an oscilloscope.

1. Visually check the connector, making sure it is connected properly and all of the terminals are straight, tight and free of corrosion.
2. If a Tech 1® or equivalent scan tool is available, scan the CKP or RPM parameter while cranking the engine. If signals are indicated, the CKP sensor is functioning properly.
3. If the scan tool is not available, use a digital multimeter set to the ohms setting, then check the resistance across the sensor terminals. The resistance should measure about 500 –1200 ohms at about 70°F. The resistance will vary with temperature.

NOTE: This test must be performed with the ignition **ON** and the engine **OFF**.

4. Using a thin piece of steel, check the tip of the sensor to see if it is magnetized.
5. Using a digital multimeter set to the millivolts AC scale, connect the test probes to the sensor.
6. Rotate the reluctor ring to activate the sensor signal. Use the starter to crank the engine.
7. Voltage should be seen as the reluctor ring is rotated. If the reluctor is rotated quickly, a signal of at least 200 millivolts AC should be seen.
8. If the sensor and circuits are functional, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: Whenever the term **Electronic Control Module (ECM)** is used in this manual, it will refer to the engine control computer, whether it is a **Powertrain Control Module (PCM)** or **Electronic Control Module (ECM)**.

The heart of the electronic control system, which is found on the vehicles covered by this manual, is a computer control module. The module gathers information from various sensors, then controls fuel supply and engine emission systems. Most early model vehicles are equipped with an Engine Control Module (ECM) which, as its name implies, controls the engine and related emissions systems. Later model vehicles may be equipped with a Powertrain Control Module (PCM). This is similar to the original ECMs, but is designed to control additional systems as well. The PCM may control the manual transmission shift lamp or the shift functions of the electronically controlled automatic transmission.

Regardless of the name, all computer control modules are serviced in a similar manner. Care must be taken when handling these expensive components in order to protect them from damage. Carefully follow all instructions included with the replacement part. Avoid touching pins or connectors to prevent damage from static electricity.

All of these computer control modules contain a Programmable Read Only Memory (PROM) chip, MEM-CAL or EEPROM that contains calibration information specific to the vehicle application. For all applications except those equipped with an EEPROM, this chip is not supplied with a replacement module, and must be transferred to the new module before installation. If equipped with an Electronically Erasable Programmable Read Only Memory (EEPROM), it must be reprogrammed after installation. Some later model vehicles have a Knock Sensor (KS) module, mounted in the PCM. The KS module contains the circuitry that allows the PCM to utilize the Knock Sensor signal to diagnose the circuitry.

WARNING

To prevent the possibility of permanent control module damage, the ignition switch **MUST** always be OFF when disconnecting power from or reconnecting power to the module. This includes unplugging the module connector, disconnecting the negative battery cable, removing the module fuse or even attempting to jump start your dead battery using jumper cables.

In the event of an ECM failure, the system will default to a pre-programmed set of values. These are compromise values which allow the engine to operate, although at a reduced efficiency. This is variously known as the default, limp-in or back-up mode. Driveability is almost always affected when the ECM enters this mode.

1990 Chevrolet CORVETTE

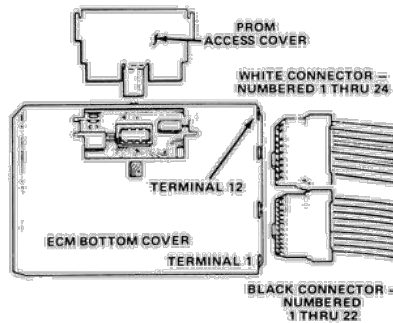
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. For 1984 vehicles equipped with a PROM, remove it from the ECM as follows:

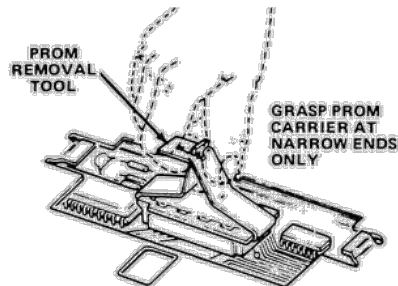
- A. Turn the ECM so the bottom cover is facing up.
- B. Remove the slide off PROM access cover.

Fig. 1: The PROM cover slides off for access to the PROM carrier — 1984 vehicles



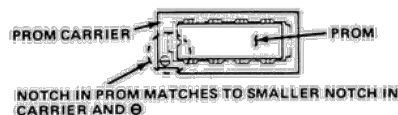
- C. Use a suitable PROM removal tool to carefully grasp the PROM carrier at the narrow ends, as shown in the accompanying figure. Gently rock the carrier from end to end while applying a firm upward force and remove the PROM from the ECM. Make sure to note the reference end of the PROM carrier, then carefully position the PROM carrier aside.

Fig. 2: You will need a suitable tool to rock the PROM carrier out of the ECM



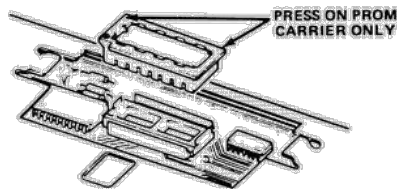
NOTE: If installing a new PROM, make sure the notch in the PROM is matched to the small notch in the carrier.

Fig. 3: You must note the reference end of the PROM for proper installation



- D. Take the PROM (which is mounted in the PROM carrier), and position the carrier squarely over the PROM socket with the small notched end of the carrier aligned with the small notch socket at the pin 1 end. Press on the PROM carrier until it is firmly seated in its socket.

Fig. 4: Press the PROM carrier squarely into the socket



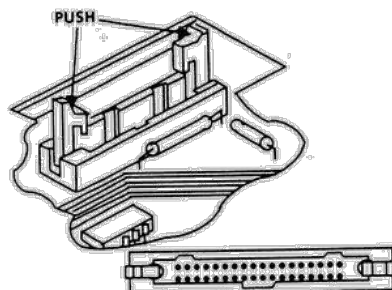
WARNING

If the PROM is installed backward and the ignition switch is turned

ON, the PROM will be destroyed.

- E. Reinstall the access cover on the ECM.
2. For 1985–95 vehicles equipped (except 1994–95 VIN P engines) with a MEM-CAL or PROM, transfer it as follows:
 - A. Remove the access cover.
 - B. Using 2 fingers, push both retaining clips back away from the MEM-CAL. At the same time, grasp the MEM-CAL at both ends then carefully lift it up out of the socket.

Fig. 5: Use 2 fingers to push the retaining clips away from the MEM-CAL or PROM to remove it

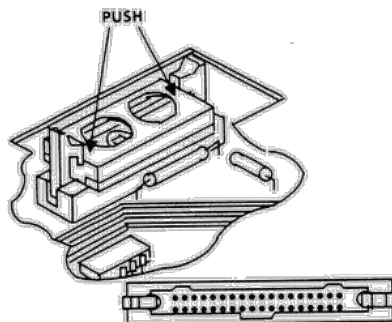


WARNING

Do NOT remove the MEM-CAL cover.

- C. Note the MEM-CAL alignment notches for installation.
- D. Place the MEM-CAL in the socket, pressing on the ends of the MEM-CAL only. The small notches must be aligned.

Fig. 6: When installing the MEM-CAL or PROM, push it in on the ends, NOT the middle



- E. Press on the ends of the MEM-CAL until the retaining clips snap into the ends of the MEM-CAL. Do NOT press on the middle of the MEM-CAL, only press on the ends.
- F. Install the access cover, then install the ECM, as outlined earlier in this section.
3. For 1994–96 VIN P or 5 engine, equipped with a Knock Sensor (KS) module, remove the control module access cover, then remove the KS module by pressing the clips in toward each other and lifting the module out.

Fig. 7: Unfasten the retainers, then remove the KS module access cover

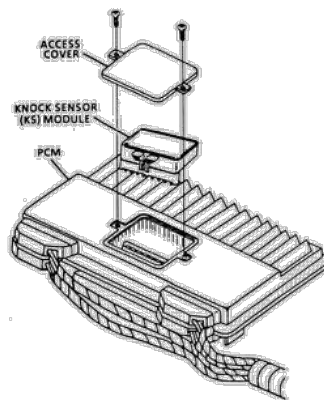
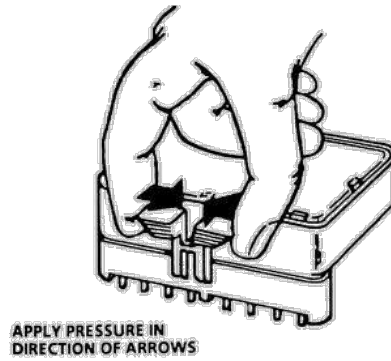


Fig. 8: Push the KS module retaining tabs toward each other, then lift the module out of the PCM



1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

- 1. Make sure the ignition switch is turned **OFF**, then disconnect the negative battery cable.

CAUTION

To prevent the possibility of permanent control module damage, the ignition switch **MUST** always be OFF when disconnecting power from or reconnecting power to the module. This includes unplugging the module connector, disconnecting the negative battery cable, removing the module fuse or even attempting to jump your dead battery using jumper cables.

- 2. Locate the computer control module. On 1984–89 vehicles, it is located in the passenger compartment, under the right hand (passenger's) side of the instrument panel. On 1990–96 vehicles, the module is located in the engine compartment, mounted against the left hand (driver's) side of the firewall, near the brake master cylinder and booster.
- 3. For 1984–89 vehicles, unfasten the retainers, then remove the right side kick/hush panel.
- 4. Remove the computer control module mounting hardware.
- 5. If equipped, remove the electrical connector cover.
- 6. Detach the electrical connectors from the control module.
- 7. Remove the computer control module from the passenger or engine compartment.

Fig. 1: Exploded view of the Engine Control Module (ECM)
location — 1984 vehicle shown

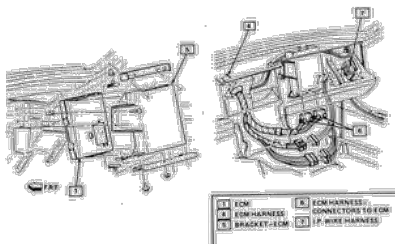


Fig. 2: View of the ECM — 1985–89 vehicles

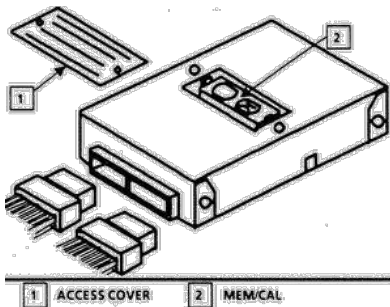


Fig. 3: Exploded view of the ECM with the cover and MEM-CAL — 1990–95 vehicles, except 1994–95 VIN P

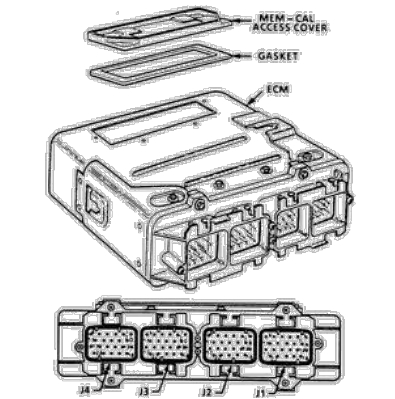
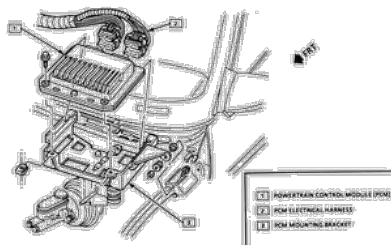


Fig. 4: PCM location and mounting — 1994–96 VIN P & 5 engines



To install:

NOTE: If the control module is being replaced, the PROM, MEM-CAL or Knock Sensor (KS) module must be transferred to the new module, as outlined later in this section. Also, make sure the service number on the new module is the same as the defective module.

8. Attach the electrical connectors to the computer control module.
9. Position the control module in its mounting location and secure with the mounting hardware.
10. If equipped, install the electrical connector cover.
11. For 1984–89 vehicles, install the right side kick-hush panel and secure with the retainers.

NOTE: On 1994–96 vehicles equipped with a VIN P or 5 engine, the replacement PCM is not supplied with an EEPROM program. The replacement PCM must be reprogrammed with a Tech 1® , or equivalent scan tool, with the proper software application for your vehicle. If the PCM is not reprogrammed, the car will not run.

12. Check that the ignition switch is **OFF**, then connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

Most engine functions are affected by the coolant temperature. Determining whether the engine is hot or cold is largely dependent on the temperature of the coolant. An accurate temperature signal to the PCM is supplied by the coolant temperature sensor or Engine Coolant Temperature (ECT) sensor. The coolant temperature sensor is a thermistor mounted in the engine coolant stream. A thermistor is an electrical device that varies its resistance in relation to changes in temperature. Low coolant temperature produces a high resistance and high coolant temperature produces low resistance. The PCM supplies a signal of 5 volts to the coolant temperature sensor through a resistor in the PCM and measures the voltage. The voltage will be high when the engine is cold and low when the engine is hot.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. If necessary, raise and safely support the vehicle, then drain the cooling system into a suitable container, to a level below the ECT sensor.
3. If raised, lower the vehicle.
4. For VIN 8, P and 5 engine, remove the air inlet duct.
5. For VIN J engines, remove the intake plenum as outlined in Section 3 of this manual.
6. Unplug the ECT electrical connector.

WARNING

Be careful when handling the ECT sensor. Damaging the sensor could adversely affect fuel injection system operation.

7. Carefully unthread the ECT sensor.

Fig. 1: Location of the ECT sensor — VIN 8 engine

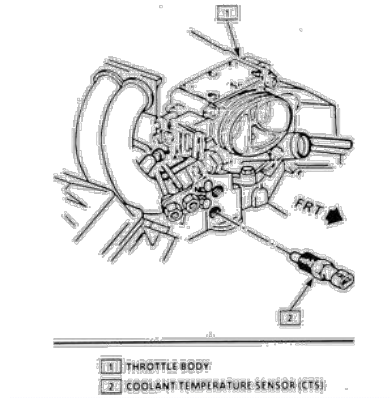


Fig. 2: The Engine Coolant Temperature (ECT) sensor is located in the water pump on VIN P & 5 engines

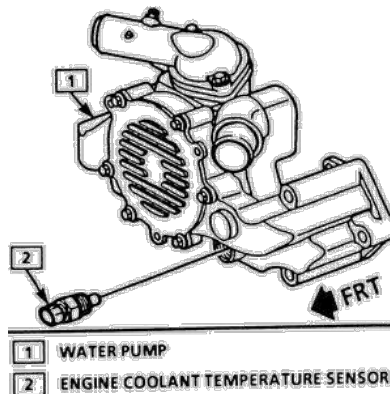
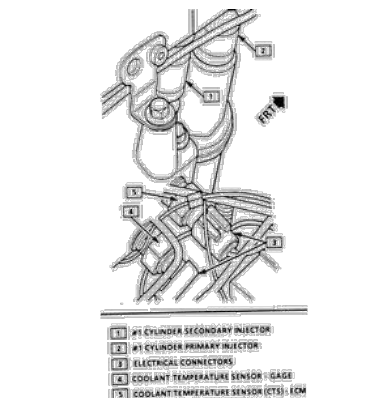


Fig. 3: On VIN J engines, the ECT sensor is located under the intake plenum



To install:

8. Coat the threads of the sensor with a suitable sealer.
9. Install the coolant temperature sensor and tighten as follows:
 - A. VIN 8 engine: 9 ft. lbs. (12 Nm)
 - B. VIN P & 5 engines: 17 ft. lbs. (23 Nm)

C. VIN J engine: 20 ft. lbs. (27 Nm).

10. Attach the electrical connector.
11. For VIN J engines, install the intake plenum.
12. For the VIN 8, P and 5 engines, install the rear air intake duct.
13. Fill the cooling system as required.
14. Connect the negative battery cable.
15. Start the engine and check for leaks.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1.

Remove the ECT sensor from the vehicle.
2.

Immerse the tip of the sensor in a container of water.
3.

Connect a digital ohmmeter to the two terminals of the sensor.
4.

Using a calibrated thermometer, compare the resistance of the sensor to the temperature of the water. Refer to the accompanying resistance value chart.

Fig. 1: Engine Coolant Temperature (ECT) sensor and Intake Air Temperature (IAT) sensor temperature vs. resistance values

TEMPERATURE VS. RESISTANCE VALUES		
(APPROXIMATE)		
°C	°F	OHMS
100	212	177
90	194	241
80	176	332
70	158	467
60	140	667
50	122	973
45	113	1188
40	104	1459
35	95	1802
30	86	2238
25	77	2796
20	68	3520
15	59	4450
10	50	5670
5	41	7280
0	32	9420
-5	23	12300
-10	14	16180
-15	5	21450
-20	-4	28680
-30	-22	52700
-40	-40	100700

5.

Repeat the test at two other temperature points, heating or cooling the water as necessary.
6.

If the sensor does not meet specifications, it must be replaced.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Engine idle speeds are controlled by the PCM through the IAC valve mounted on the throttle body. The PCM sends voltage pulses to the IAC motor windings causing the IAC motor shaft and pintle to move in or out a given distance (number of steps) for each pulse (called counts). The movement of the pintle controls the airflow around the throttle plate, which in turn, controls engine idle speed. IAC valve pintle position counts can be observed using a scan tool. Zero counts correspond to a fully closed passage, while 140 counts or more corresponds to full flow.

Idle speed can be categorized in 2 ways: actual (controlled) idle speed and minimum idle speed. Controlled idle speed is obtained by the PCM positioning the IAC valve pintle. Resulting idle speed is determined by total air flow (IAC/passage + PCV + throttle valve + calibrated vacuum leaks). Controlled idle speed is specified at normal operating conditions, which consists of engine coolant at normal operating temperature, air conditioning compressor **OFF**, manual transmission in neutral or automatic transmission in **D**.

Minimum idle air speed is set at the factory with a stop screw. This setting allows a certain amount of air to bypass the throttle valves regardless of IAC valve pintle positioning. A combination of this air flow and IAC pintle positioning allows the PCM to control engine idle speed. During normal engine idle operation, the IAC valve pintle is positioned a calibrated number of steps (counts) from the seat. No adjustment is required during routine maintenance. Tampering with the minimum idle speed adjustment may result in premature failure of the IAC valve or improperly controlled engine idle operation.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: On some models it may be necessary to remove the air inlet assembly.

1. Disconnect the negative battery cable.
2. Detach the IAC valve electrical connector.
3. Remove the IAC valve by performing the following:
 - A. On thread-mounted units, use a 1 1/4 in. (32mm) wrench.
 - B. On flange-mounted units, remove the mounting screw assemblies.
4. Remove the IAC valve, then remove the and discard the IAC valve gasket or O-ring.

Fig. 1: View of the 2 types of thread mounted IAC valves used on early Corvettes

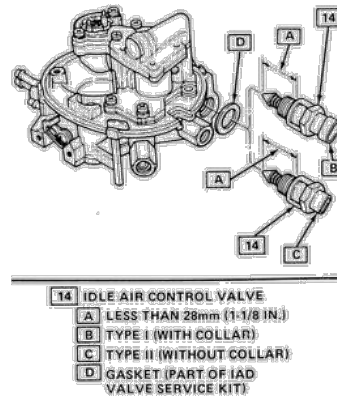
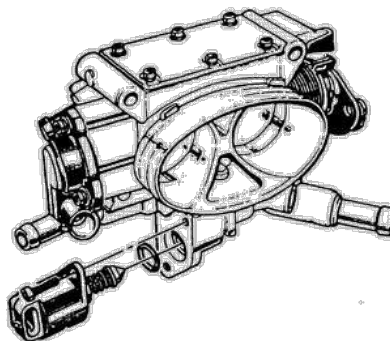


Fig. 2: Later vehicles use IAC valves which are secured with screws



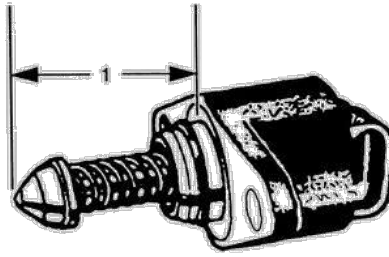
To install:

5. Clean the mounting surfaces by performing the following:

WARNING
NEVER soak the IAC valve in any liquid cleaner or solvent!

 - A. If servicing a thread-mounted valve, remove the old gasket material from the surface of the throttle body to ensure proper sealing of the new gasket.
 - B. If servicing a flange-mounted valve, clean the IAC valve surfaces on the throttle body to assure proper seal of the new O-ring and contact of the IAC valve flange.
6. If installing a new IAC valve, measure the distance between the tip of the IAC valve pintle and the mounting flange. If the distance is greater than 1.102 in. (28mm), use finger pressure to slowly retract the pintle. The force required to retract the pintle of a new valve will not cause damage to the valve. If reinstalling the original IAC valve, do not attempt to adjust the pintle in this manner.

Fig. 3: If installing a new IAC valve, measure the distance of the pintle extension (1)



7. Install the IAC valve into the throttle body by performing the following:
 - A. With thread-mounted valves, install with a new gasket. Using a $1 \frac{1}{4}$ in. (32mm) wrench, tighten to 13 ft. lbs. (18 Nm).
 - B. With flange-mounted valves, lubricate a new O-ring with transmission fluid and install on the IAC valve. Install the IAC valve to the throttle body. Install the mounting screws using a suitable thread locking compound. Tighten to 27 inch lbs. (3 Nm).
8. Attach the IAC valve electrical connector.
9. Connect the negative battery cable.
10. No physical adjustment of the IAC valve assembly is required after installation. Reset the IAC valve pintle position by performing the following:
 - A. Depress the accelerator pedal slightly.
 - B. Start the engine and run for 5 seconds.
 - C. Turn the ignition switch to the **OFF** position for 10 seconds.
 - D. Restart the engine and check for proper idle operation.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

- 1. Visually check the connector, making sure it is connected properly and all of the terminals are straight, tight and free of corrosion.
- 2. Unplug the IAC connector and check resistance between the IAC terminals. Resistance between terminals A to B and terminals C to D should be 40–80 ohms. If resistance is not within specification, the IAC valve must be replaced.

Fig. 1: Idle Air Control (IAC) valve circuit — VIN 8 engines

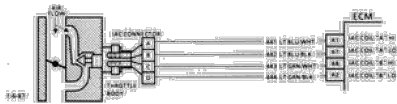
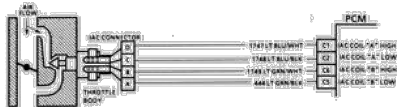


Fig. 2: Idle Air Control (IAC) valve circuit — VIN J, P & 5 engines



- 3. Check resistance between the IAC terminals A to C, A to D, B to C and B to D. Resistance should be infinite. If not, the IAC valve is faulty.
- 4. If the resistance is within specification, check the IAC circuits back to the PCM for continuity.
- 5. If the valve and circuits are functional, the computer control module may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

NOTE: On earlier model vehicles, the sensor is referred to as the Manifold Air Temperature (MAT) sensor.

The IAT sensor is a thermistor which supplies intake air temperature information to the PCM. The sensor produces high resistance at low temperatures and low resistance at high temperatures. The PCM supplies a 5 volt signal to the sensor and measures the output voltage. The voltage signal will be low when the air is cold and high when the air is hot. The IAT is located in or near the air intake duct.

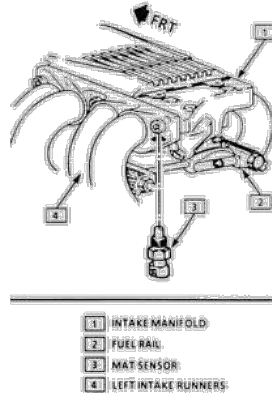
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

VIN 8 Engine

1. Disconnect the negative battery cable.
2. Remove the intake plenum, as outlined in Section 3 of this manual.
3. Detach the electrical connector.
4. Carefully back the sensor out of the plenum.

Fig. 1: On VIN 8 engines, the MAT (or IAT) is mounted in the intake plenum

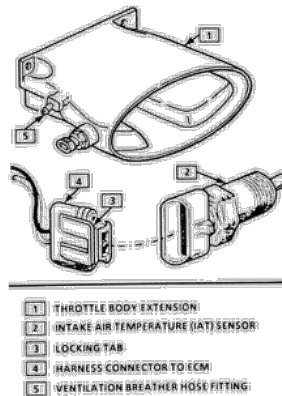


5. Installation is the reverse of the removal procedure.

VIN J, P and 5 Engines

1. Disconnect the negative battery cable.
2. Detach the sensor electrical connector locking tab and/or unplug detach the connector.
3. If equipped, unfasten the retaining clamp.
4. Carefully remove the sensor from the throttle body extension.

Fig. 2: On most vehicles, the IAT sensor is threaded into the throttle body extension



To install:

5. Install the sensor.
6. Attach the electrical connector.
7. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Remove the Intake Air Temperature (IAT) sensor from the vehicle.
2. Connect a digital ohmmeter to the two terminals of the sensor.
3. Using a calibrated thermometer, compare the resistance of the sensor to the temperature of the ambient air. Refer to the temperature vs. resistance chart.
4. Repeat the test at two other temperature points, heating or cooling the air as necessary with a hair dryer or other suitable tool.
5. If the sensor does not meet specifications, it must be replaced.

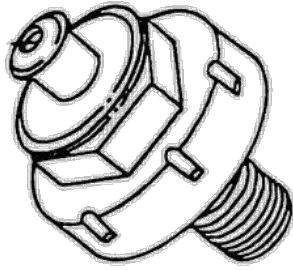
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

NOTE: Some vehicles use two knock sensors.

The knock sensor is usually mounted to the right and/or left lower side of the engine block. When spark knock or pinging is present, the sensor produces a voltage signal which is sent to the PCM. The PCM will then retard the ignition timing based on these signals.

Fig. 1: View of a typical Knock Sensor (KS)



KNOCK SENSOR (KS)

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Raise and properly support the vehicle.
3. Position a suitable drain pan under the vehicle, then drain the engine coolant.
4. If equipped, remove the knock sensor shield.
5. Disconnect the knock sensor wiring harness.

Fig. 1: Location of the left knock sensor on VIN P engines

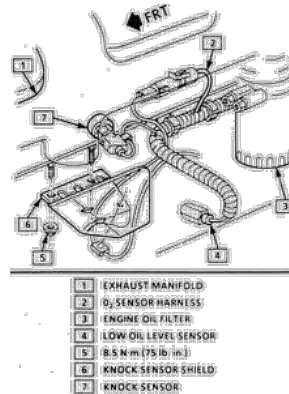


Fig. 2: The VIN P engine also has a right side knock sensor

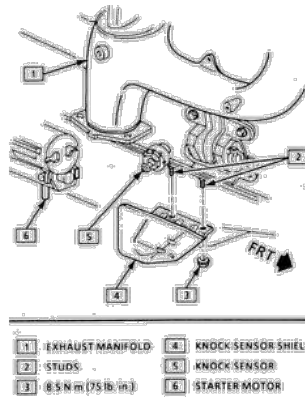
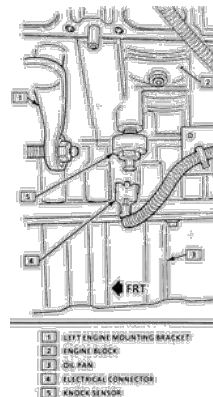


Fig. 3: Location of the knock sensor on VIN J engines



6. Remove the knock sensor from the engine block.

CAUTION

The knock sensor is mounted in the engine block cooling passage. Engine coolant in the block will drain when the sensor is removed.

7. Installation is the reverse of removal. Prior to installing the sensor, Do NOT apply any thread sealer to the KS threads. The sensor is coated at the factory and any additional sealant you may apply will negatively affect the ability of the sensor to detect knocking or pinging. Tighten the sensor to 14 ft. lbs. (19Nm).

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Connect a timing light to the vehicle, then start the engine.
2. Check that the timing is correct before testing the knock sensor operation.
3. If the timing is correct, tap on the front of the engine block with a metal object while observing the timing to see if the timing retards.
4. If the timing does not retard, the knock sensor may be defective.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

The MAP sensor measures the changes in intake manifold pressure, which result from engine load/speed changes and converts this information to a voltage output. The MAP sensor reading is the opposite of a vacuum gauge reading: when manifold pressure is high, MAP sensor value is high and vacuum is low. A MAP sensor will produce a low output on engine coast-down with a closed throttle while a wide open throttle will produce a high output. The high output is produced because the pressure inside the manifold is the same as outside the manifold, so 100 percent of the outside air pressure is measured.

The MAP sensor is also used to measure barometric pressure under certain conditions, which allows the PCM to automatically adjust for different altitudes.

The MAP sensor changes the 5 volt signal supplied by the PCM, which reads the change and uses the information to control fuel delivery and ignition timing.

1990 Chevrolet CORVETTE

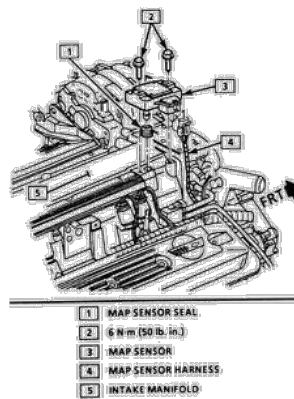
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Except VIN J Engines

1. Disconnect the negative battery cable.
2. Detach the MAP sensor electrical connector.
3. Unfasten the 2 sensor hold-down bolts, then remove the MAP sensor from the intake manifold.

Fig. 1: Exploded view of the MAP sensor — 1994 VIN P shown



To install:

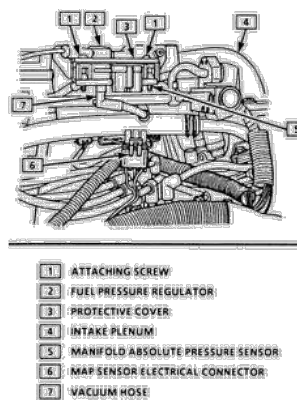
NOTE: If equipped, lightly coat the seal on the MAP sensor with clean engine oil.

4. Install the MAP sensor on the intake manifold.
5. Install the retaining bolts and tighten to 50 inch lbs. (6 Nm).
6. Attach the sensor electrical connector.
7. Connect the negative battery cable.

VIN J Engines

1. Disconnect the negative battery cable.
2. Remove the sensor hold-down bolts.
3. Remove the protective cover.
4. Detach the electrical connector and unplug the vacuum hose.
5. Remove the MAP sensor.

Fig. 2: Location of the MAP sensor — VIN J engines

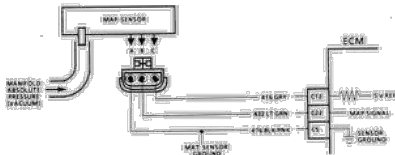


To install:

6. Instal the MAP sensor.
7. Attach the vacuum hose and electrical connector.
8. Install the protective cover.
9. Install the hold-down bolts and tighten to 50 inch lbs. (6 Nm).
10. Connect the negative battery cable.

1. Visually check the connector, making sure it is properly attached and all of the terminals are straight, tight and free of corrosion.
2. With the ignition **ON**, check the voltage between terminals A and B. It should be above 4 volts. Apply 15 in. Hg of vacuum at the MAP vacuum port and check the voltage again. The voltage should be 2 volts now.

Fig. 1: Manifold Absolute Pressure (MAP) sensor circuit



NOTE: When pumping up and releasing the vacuum, check to make sure the voltage readings are smooth. When applying vacuum to the sensor, the change in voltage should happen instantly. A slow change in voltage could point to a faulty sensor.

Fig. 2: MAP sensor voltage specifications

MAP											
kPa	100	90	80	70	60	50	40	30	20	10	0
Hg	29.6	26.6	23.7	20.7	17.7	14.8	11.8	8.9	5.9	2.9	0
V	4.9	4.4	3.8	3.3	2.7	2.2	1.7	1.1	0.6	0.3	0.3

3. If the sensor voltage is not within specification, check for a 5 volt reference at terminal C. If the reference signal is found, the sensor is faulty.
4. If the sensor and circuits are functional, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

The Mass Air Flow (MAF) sensor, found on some engines, measures the amount of air passing through it. The PCM uses this information to determine the operating condition of the engine, to control fuel delivery. A large quantity of air indicates acceleration, while a small quantity indicates deceleration or idle.

The MAF sensor used on these vehicles is of the hot-wire type. Current is supplied to the sensing wire to maintain a calibrated temperature, and as air flow increases or decreases the current will vary. This varying current is directly proportional to air mass.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

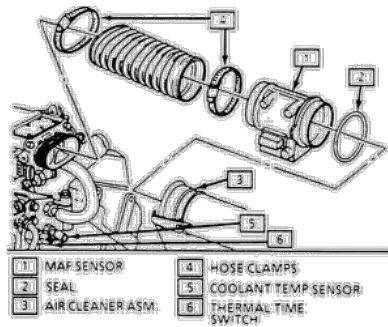
1. Disconnect the negative battery cable.

WARNING

Be extremely careful when handling the MAF sensor. Do not dent, or puncture the honeycell located at the air inlet end of the MAF sensor. Don't touch the sensing elements or allow anything to contact them. Do not drop the MAF sensor or handle it roughly.

2. Detach the sensor electrical connection.
3. Carefully spread the clamps and remove the air intake ducts from the MAF sensor.
4. Remove the sensor from the vehicle.

Fig. 1: Exploded view of the MAF sensor mounting — VIN 8 engine shown



To install:

NOTE: The arrows on the MAF sensor indicate air flow and MUST point toward the engine.

5. Position the MAF sensor into the air ducts and tighten the clamps to 36 inch lbs. (4 Nm) or crimp the clamps, as applicable. If necessary, you can use a very small amount of lubricant on the air duct to help ease installation. Be careful not to get the lubricant in the sensor.
6. Attach the sensor electrical connector.
7. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Visually check the connector, making sure it is connected properly and all of the terminals are straight, tight and free of corrosion.
2. With the engine running, lightly tap on the MAF sensor and wiggle the wires at the connector and watch for the idle to change. A common problem is MAF sensor wire damage.
3. Backprobe using a DVOM set to the Hertz scale between terminals A and B. Simulate operating conditions by blowing air across the sensor. There should be a frequency swing from the air crossing the wire in the sensor. A normal flow signal will be close to 1200 hertz. If the frequency is not shown, or not proportionate to the air blown across the sensor, the sensor is faulty.

Fig. 1: Mass Air Flow (MAF) sensor circuit — VIN 8 engines

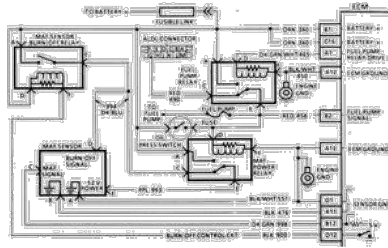
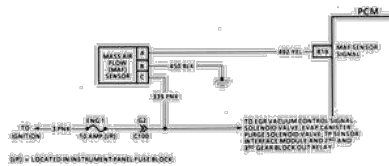


Fig. 2: Mass Air Flow (MAF) sensor circuit — VIN P engines



4. Check for battery positive (B+) on terminal C and ground on terminal B. If voltage or ground are not present, check the circuits back to the PCM for continuity.
5. If you receive the proper amount of voltage at the electrical connector and still have a driveability problem, replace the MAF sensor.
6. If the sensor and circuits are functional, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

There are two types of oxygen sensors used in these vehicles. They are the single wire oxygen sensors (O2S) and the heated oxygen sensor (HO2S). The oxygen sensor is a spark plug shaped device that is threaded into the exhaust manifold or exhaust pipe and protrudes into the exhaust stream which monitors the oxygen content of the exhaust gases. The difference between the oxygen content of the exhaust gases and that of the outside air generates a voltage signal that is sent to the computer control module. The control module monitors this voltage and, depending upon the value of the signal received, issues a command to adjust for a rich or a lean condition.

Fig. 1: Typical oxygen sensor used on an early model vehicle

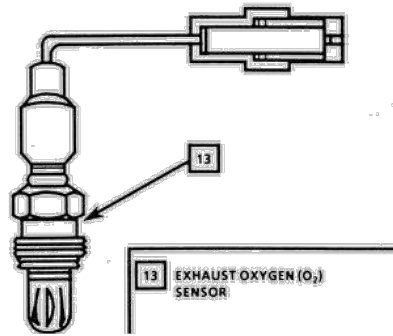
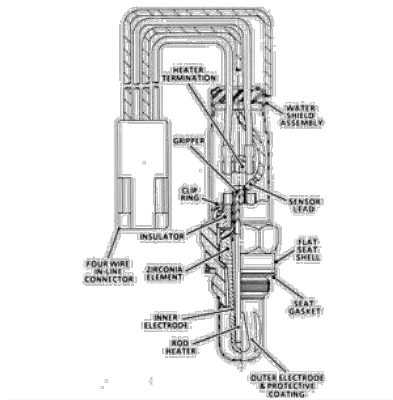


Fig. 2: Later model vehicles use one or more heated oxygen sensors



NOTE: Some vehicles are equipped with more than one oxygen sensor.

No attempt should ever be made to measure the voltage output of the sensor. The current drain of any conventional voltmeter would be such that it would permanently damage the sensor.

The proper operation of the oxygen sensor depends upon three basic conditions:

1. Good electrical connections. Since the sensor generates low currents, good clean electrical connections at the sensor are a must.
2. Outside air supply. Air must circulate to the internal portion of the sensor. When servicing the sensor, do not restrict the air passages.
3. Proper operating temperatures. The computer control module will not recognize the sensor's signals until the sensor reaches about 600°F (316°C).

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

WARNING

The sensors use a permanently attached pigtail and connector. This pigtail should not be removed from the sensor. Damage or removal of the pigtail or connector could affect proper operation of the oxygen sensor. Keep the electrical connector and louvered end of the sensor clean and free of grease. NEVER use cleaning solvents of any type on the sensor! The sensor may be difficult to remove when the engine temperature is below 120°F (48°C). Excessive removal force may damage the threads in the exhaust manifold or pipe; follow the removal procedure carefully.

1. Make sure the ignition is **OFF**, then disconnect the negative battery cable.
2. Locate the oxygen sensor. It protrudes from the exhaust manifold or exhaust pipe (it looks somewhat like a spark plug). It may be necessary to raise and safely support the vehicle to access the sensor.
3. Unplug the sensor electrical connector.

Fig. 1: Typical oxygen sensor location and mounting — 1990 VIN 8 shown

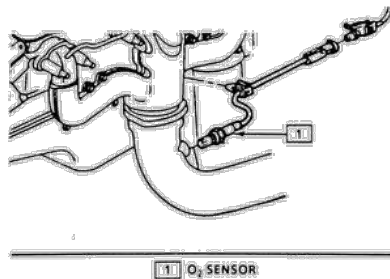


Fig. 2: Some vehicles, such as this 1990 VIN J, use a left and right bank oxygen sensor — left shown, right similar

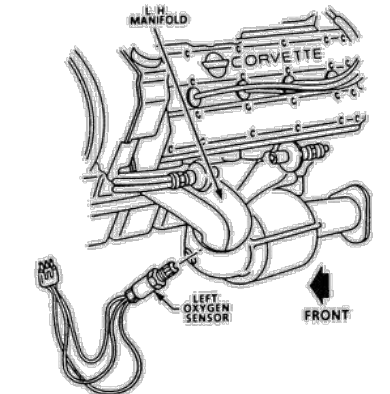
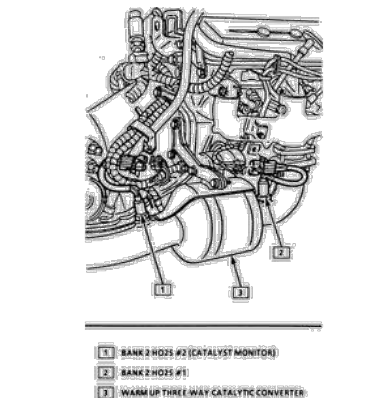


Fig. 3: Later model vehicles equipped with heated oxygen sensors may have 2 sensors on each bank



NOTE: There are special wrenches, either socket or open-end available from reputable retail outlets for removing the oxygen sensor. These tools make the job much easier and often prevent unnecessary damage.

4. Carefully unscrew the sensor, then remove the oxygen sensor from the manifold or pipe.

To install:

5. During and after the removal, be very careful to protect the tip of the sensor if it is to be reused. Do not let it to come in contact with fluids or dirt. Do not clean it or wash it.
6. Apply a coat of anti-seize compound to the bolt threads but DO NOT allow any to get on the tip of the sensor.

7. Install the sensor in the manifold or exhaust pipe. Tighten the sensor to 30 ft. lbs. (41 Nm) for VIN 8, P or 5 engines, or to 42 ft. lbs. (55 Nm) for VIN J engines.
8. Attach the electrical connector and ensure a clean, tight connection.
9. If raised, carefully lower the vehicle.
10. Connect the negative battery cable.

1990 Chevrolet CORVETTE

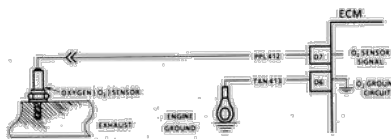
Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Oxygen Sensor (O2S)

1. Perform a visual inspection of the connector, making sure it is engaged properly and all of the terminals are straight, tight and free of corrosion.
2. Check the O2S sensor voltage between the terminal and ground. Voltage should be between 350–500 millivolts. If the voltage doesn't fall within this range, the sensor is faulty.

Fig. 1: Oxygen sensor circuit — 1988 vehicle shown, other years similar



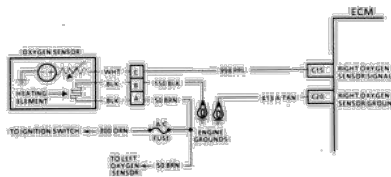
3. If the voltage is within specifications, recheck the voltage after starting the engine and running until it reaches normal operating temperature. With the engine running at 1200 rpm, then voltage should vary rapidly between 100–900 millivolts. If the voltage is not varying or not within the range, the sensor is faulty.
4. If the voltage is within specifications, check the circuits back to the PCM for continuity.
5. If the sensor and circuits are functioning properly, the PCM may be faulty.

Heated Oxygen Sensor

VIN J ENGINES

1. Disconnect the O2 sensor connector and install jumper wires from the sensor connector to the wiring harness.
2. Start the engine and allow it to reach operating temperature. This should take about ten minutes. Turn the engine OFF.
3. Connect the positive lead of a multimeter to the O2 sensor signal wire and the negative lead to the engine ground. Re-start the engine.

Fig. 2: Heated oxygen sensor circuit — VIN J engine

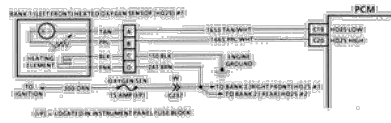


4. The voltage reading should be fluctuating rapidly as the O2 sensor detects varying levels of oxygen in the exhaust stream.
5. If the O2 sensor voltage does not fluctuate, the sensor may be defective or mixture could be extremely out of range.
6. If the O2 sensor reads above 550 millivolts constantly, the fuel mixture is probably too rich. If the (O2) sensor voltage reads below 350 millivolts constantly, the fuel mixture may be too lean or you may have an exhaust leak near the sensor.
7. Under normal conditions the O2 sensor should fluctuate high and low. Prior to condemning the O2 sensor, try forcing the system rich by restricting the air intake or lean by removing a vacuum line. If this causes the oxygen sensor to momentarily respond, look for problems in other areas of the system.

VIN P AND 5 ENGINES

1. Visually check the connector, making sure it is engaged properly and all of the terminals are straight, tight and free of corrosion.
2. Detach the sensor electrical connector and check resistance between terminals C and D. Resistance should be 10–15 ohms at 79°F. If resistance is not within specifications, the sensor heater is faulty.
3. If resistance is within specification, check for battery positive (B+) between connector terminals C and D with the ignition **ON**. If battery positive (B+) is not present, check the circuit continuity back to the PCM. If the circuits are functioning properly, the PCM may be faulty.

Fig. 3: Heated Oxygen Sensor (HO2S) sensor circuit — VIN
P and 5 engines



4. Check the HO2S sensor voltage between terminals A and B with the engine **OFF**. The voltage should be between 350–500 millivolts. If the voltage doesn't fall within that range, the sensor is faulty.
5. If the voltage is within specifications, recheck the voltage after heating the engine to normal operating temperature. With the engine running at 1200 rpm, then voltage should vary rapidly between 100–900 millivolts. If the voltage is not varying or not within the range, the sensor is faulty.
6. If the voltage is within specifications, check the circuits back to the PCM for continuity.
7. If the sensor and circuits are functioning properly, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

The TP sensor is mounted to the throttle body, opposite the throttle lever and is connected to the throttle shaft. Its function is to sense the current throttle valve position and relay that information to the PCM. Throttle position information allows the PCM to generate the required injector control signals. The TP sensor consists of a potentiometer which alters the flow of voltage according to the position of a wiper on the variable resistor windings, in proportion to the movement of the throttle shaft.

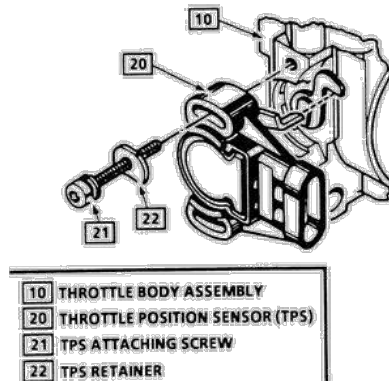
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Detach the TPS electrical connector.
3. Remove the mounting screws.
4. Remove the TPS and, if equipped, sensor seal from the throttle body.

Fig. 1: Typical Throttle Position (TP) sensor mounting



To install:

5. With the throttle valve in the normal closed idle position, install the throttle position on the throttle body, making sure that sensor pickup lever lines up with the tang on the throttle actuator lever.
6. Place the TP sensor in position. Align the TP sensor lever with the sensor drive lever on the throttle body.
7. Install the TP sensor mounting screws and tighten to 18 inch lbs. (2 Nm).
8. Attach the electrical connector.
9. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Visually check the connector, making sure it is properly attached and all of the terminals are straight, tight and free of corrosion.
2. With the ignition in the **ON** position, check the voltage at terminal B for VIN 8 and J, or terminal C for VIN P & 5 engines. The voltage should read less than 0.5 volts.
3. Operate the throttle, while watching the voltage. The voltage should increase smoothly to 5 volts as the throttle is opened.

Fig. 1: Throttle Position (TP) sensor circuit — VIN 8 and J engines

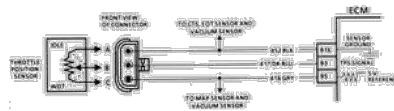
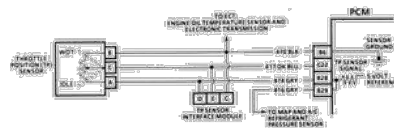


Fig. 2: Throttle Position (TP) sensor circuit — VIN P and 5 engines



4. If the voltage is not within specification, check the 5 volt reference signal circuit at terminal C for VIN 8 & J engines or terminal A for VIN P & 5 engines and ground the circuit at terminal B for the proper signal. If the correct signal is found, the sensor is faulty. If the proper signal is not found, check the circuits back to the computer control module for continuity.
5. If the circuits are functional, the PCM may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

The Vehicle Speed Sensor (VSS) is a pulse counter type input sensor which tells the PCM how fast the vehicle is being driven. An inductive sensor mounted in the tail housing of the transmission and a toothed reluctor wheel on the tail shaft. As the reluctor rotates, the teeth alternately interfere with the magnetic field of the sensor, creating an induced voltage pulse. The VSS produces an AC voltage signal increased with vehicle speed. The PCM processes this information, then sends a signal to the instrument panel, radio, chime module, and cruise control module.

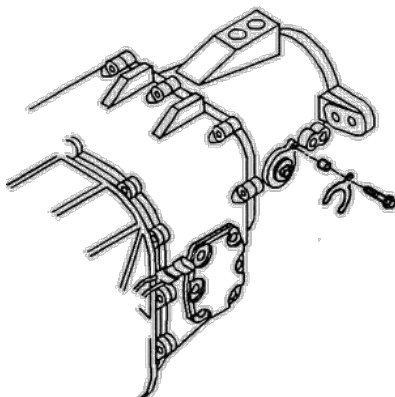
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

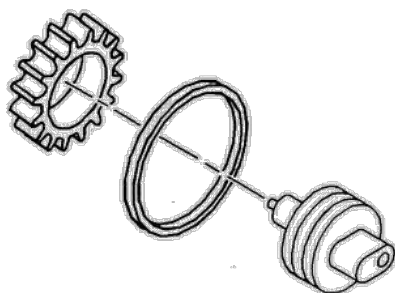
1. Disconnect the negative battery cable.
2. Raise and safely support the vehicle.
3. Unplug the VSS electrical connector.
4. Unfasten the retainer bolt, then remove the sensor retainer, and spacer.

Fig. 1: Remove the mounting bolt, the retainer and spacer



5. Remove the VSS from the transmission case.
6. If necessary, remove the O-ring seal and the speedometer driven gear from the sensor.

Fig. 2: Exploded view of the O-ring, gear and sensor



7. Installation is the reverse of the removal procedure. Tighten the mounting bolt to 89 inch lbs. (10 Nm).

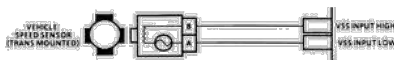
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Visually check the connector, making sure it is connected properly and all of the terminals are straight, tight and free of corrosion.
2. Detach the VSS electrical connector, then measure the voltage between the terminals while the rear wheels of the vehicle are rotated. The sensor should generate a sine wave voltage signal that increases in amplitude and frequency as the vehicle speed increases. If the voltage measures less than 0.5 volts, the sensor is bad and must be replaced.
3. Check the resistance between the sensor terminals. It should measure between 1300–1950 ohms. If not within the range, the sensor is bad and must be replaced.

Fig. 1: Vehicle Speed Sensor (VSS) circuit



-
4. Check the resistance between the VSS and transmission case. The resistance should be more than 10 megaohm. If the resistance is not within specifications, the sensor is faulty.
 5. If the resistance and voltage are within the proper ranges, check the sensor circuits for continuity.
 6. If the sensor and circuits are OK, the PCM may be faulty.