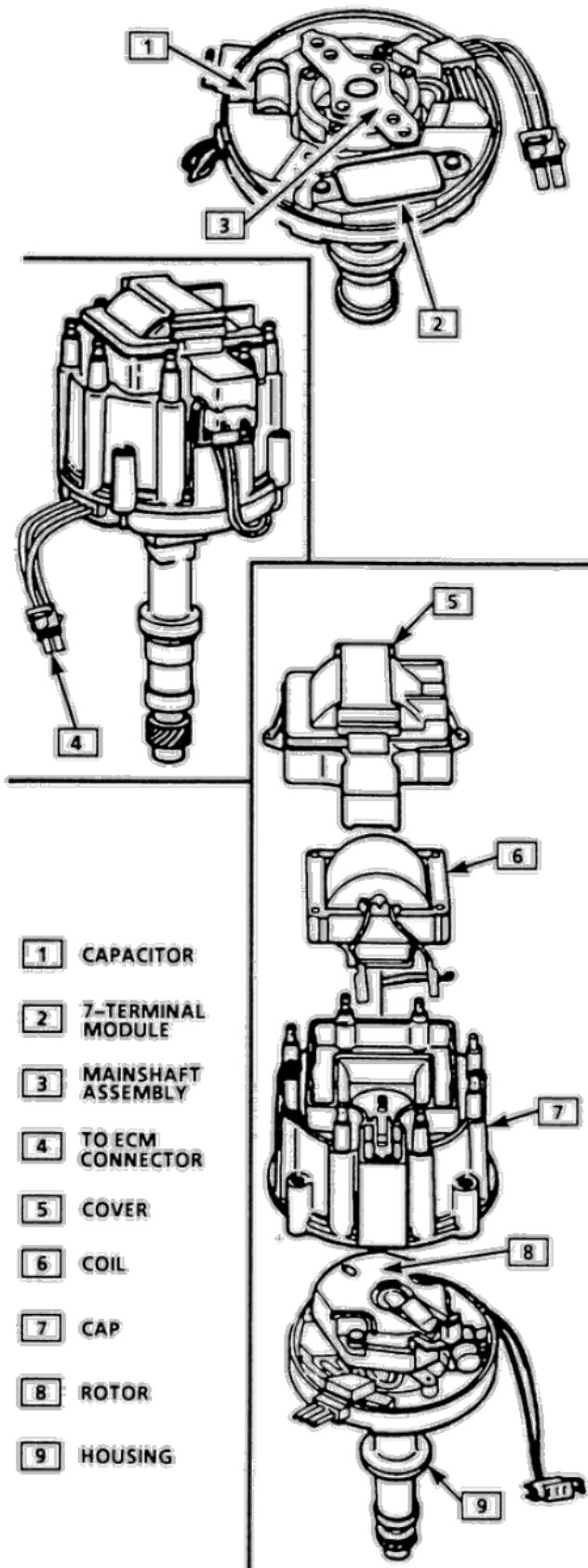
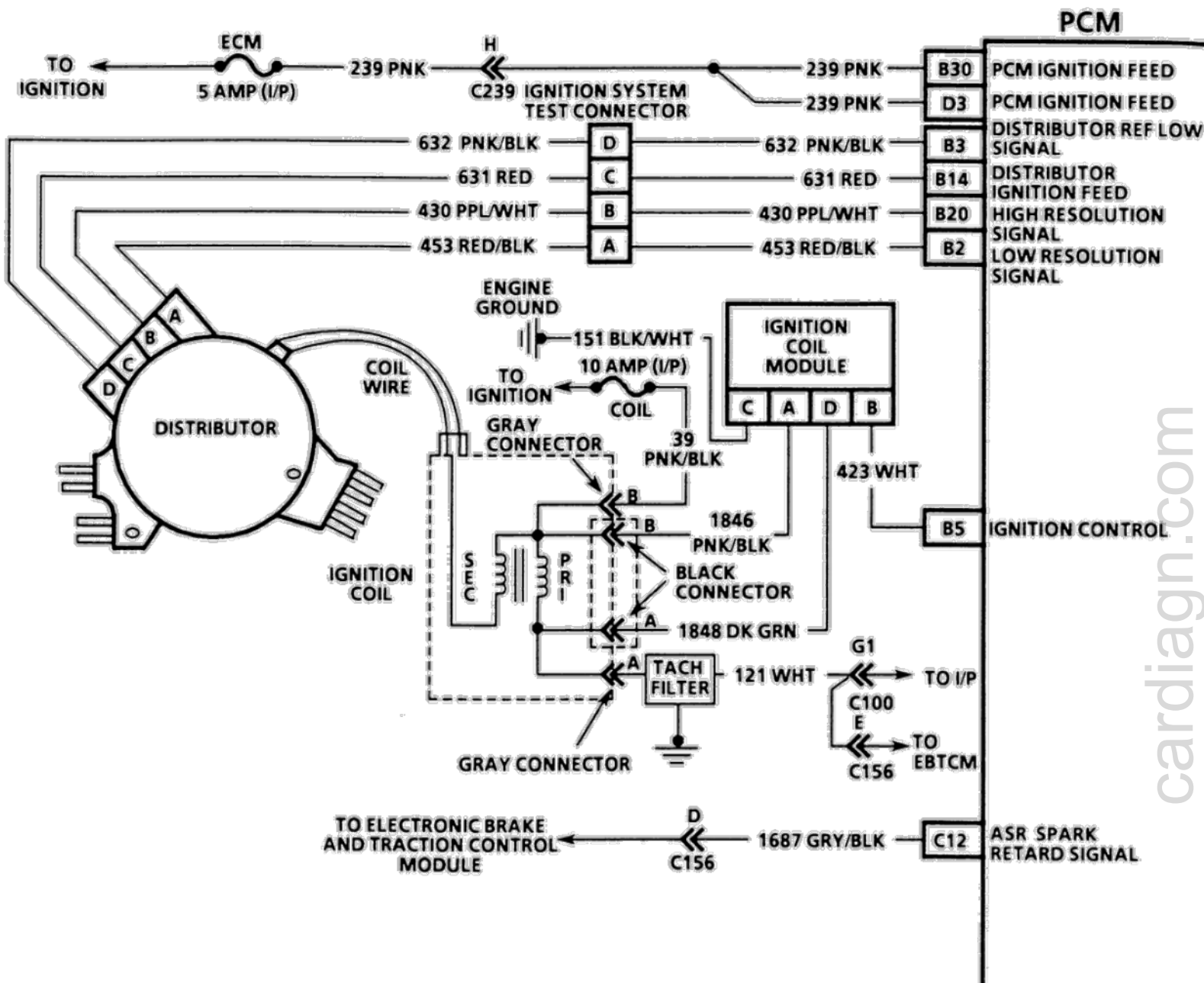
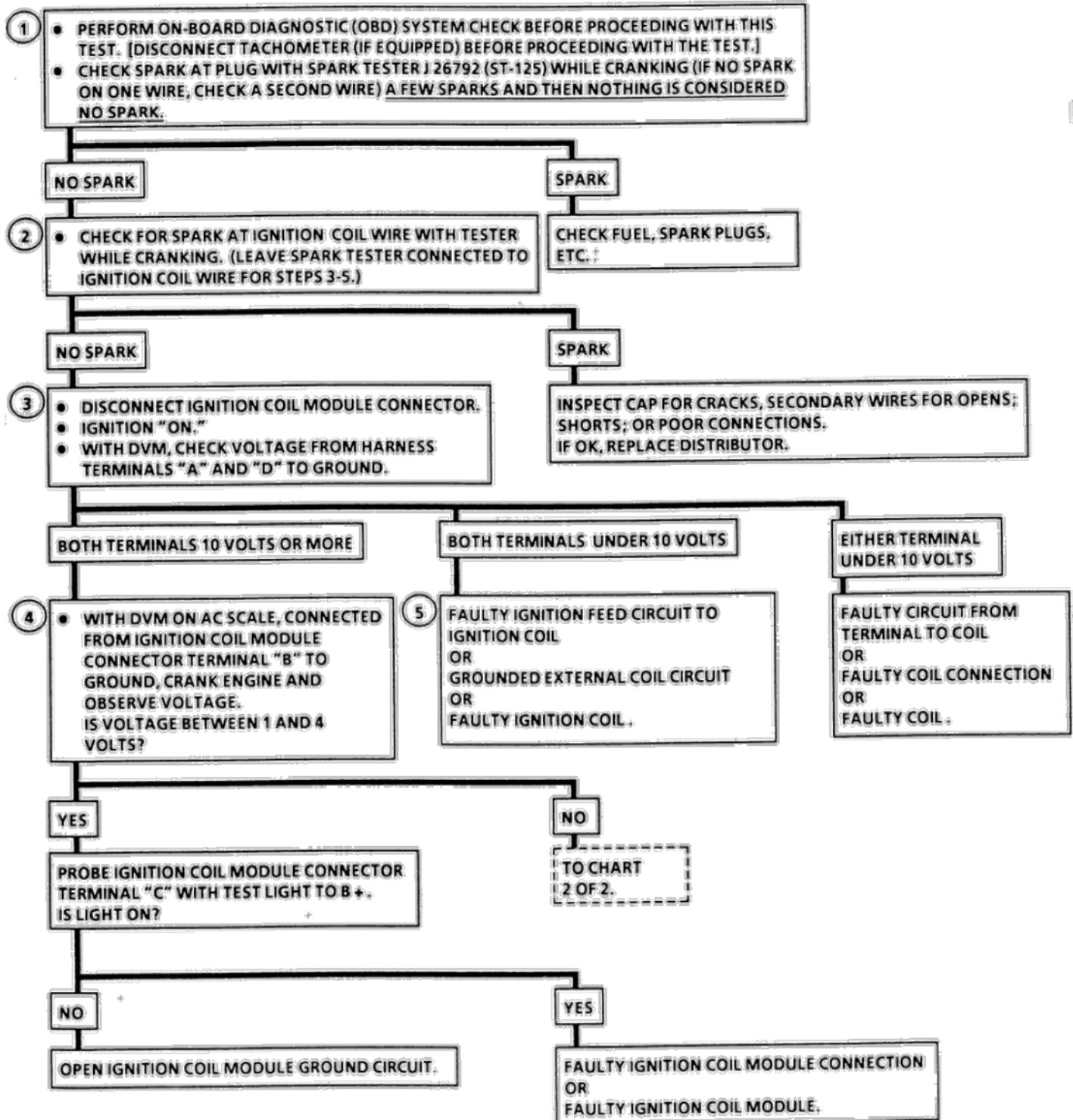


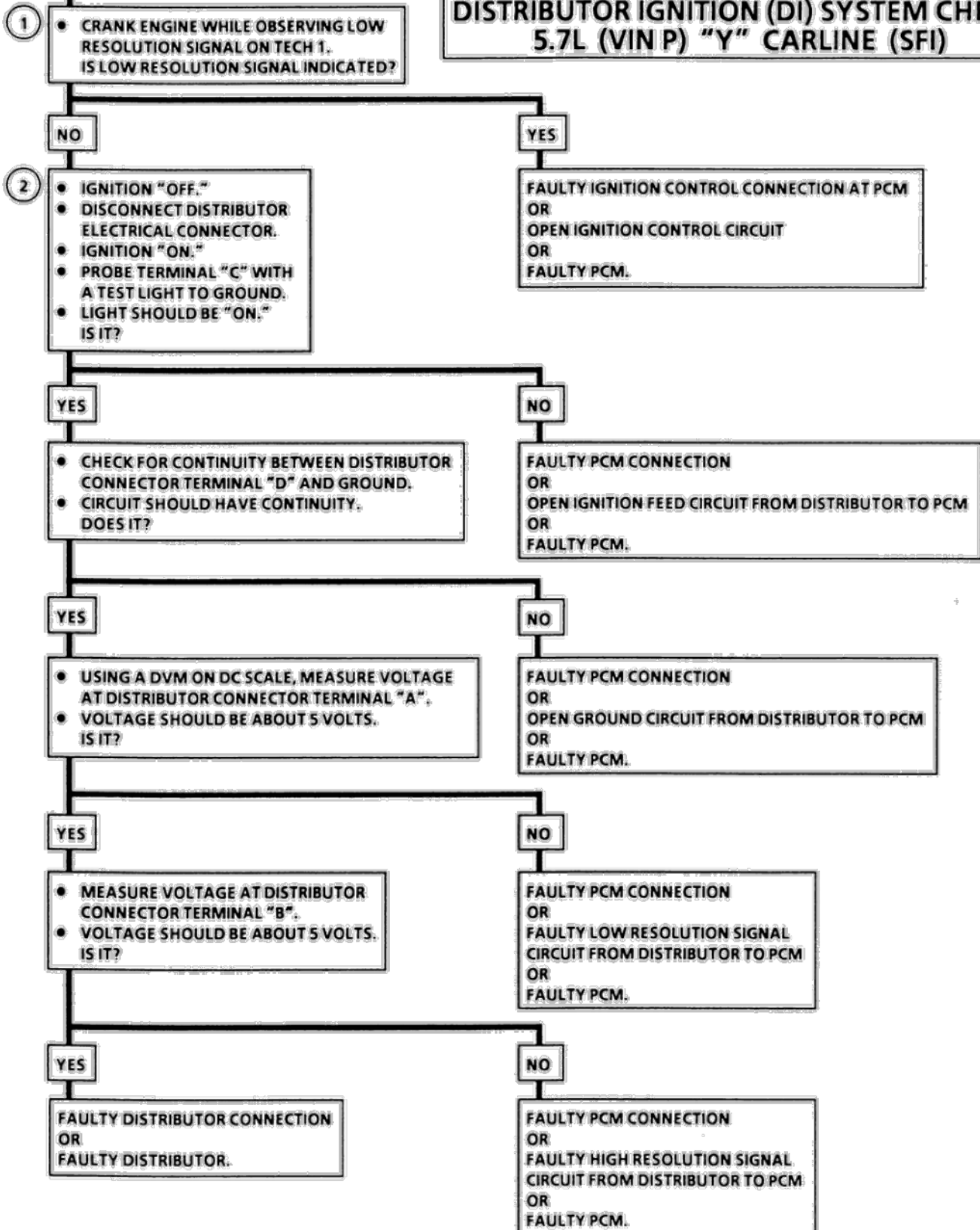


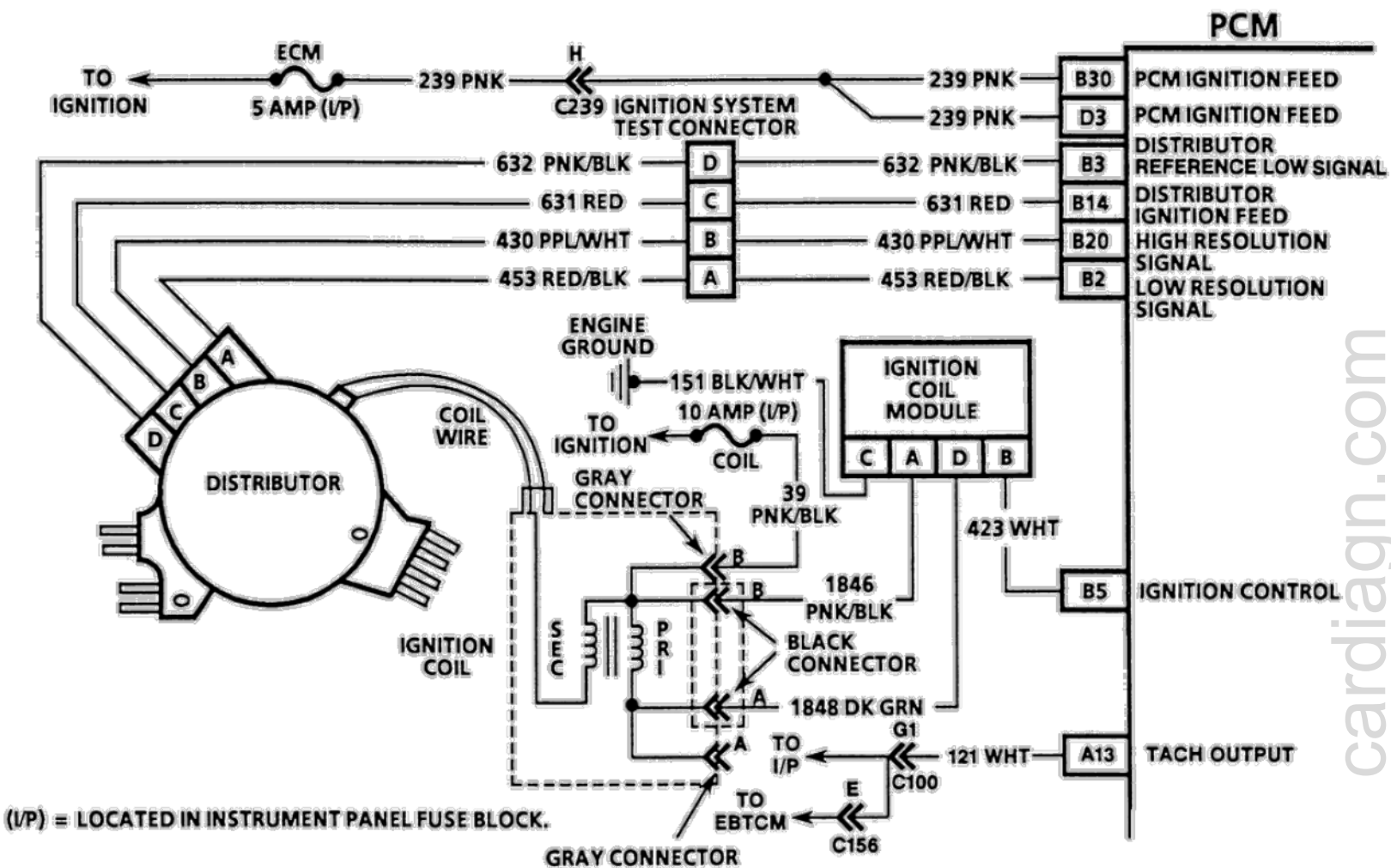


(Page 1 of 2)
DISTRIBUTOR IGNITION SYSTEM CHECK
5.7L (VIN P) "Y" CARLINE (SFI)

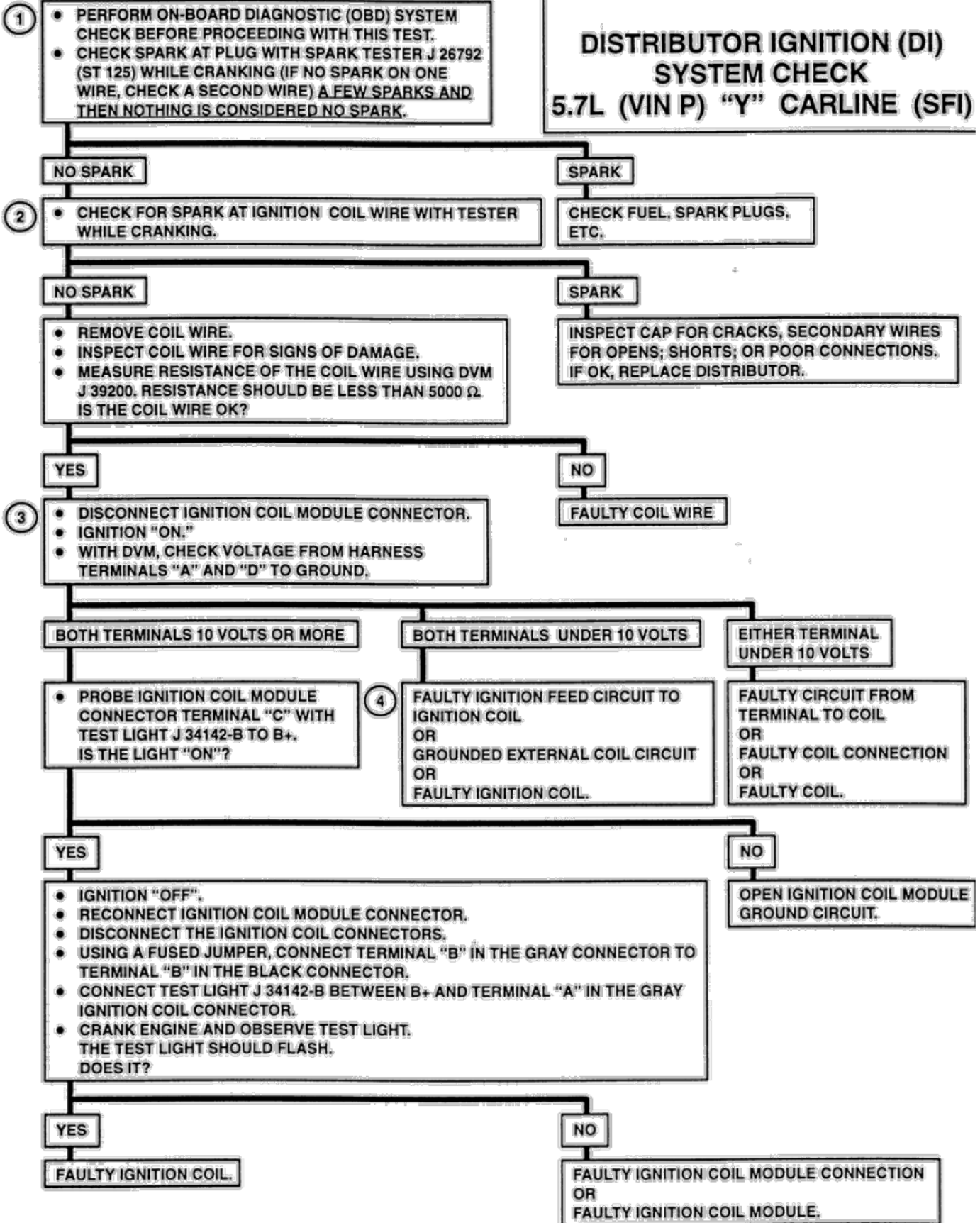


DISTRIBUTOR IGNITION (DI) SYSTEM CHECK 5.7L (VIN P) "Y" CARLINE (SFI)

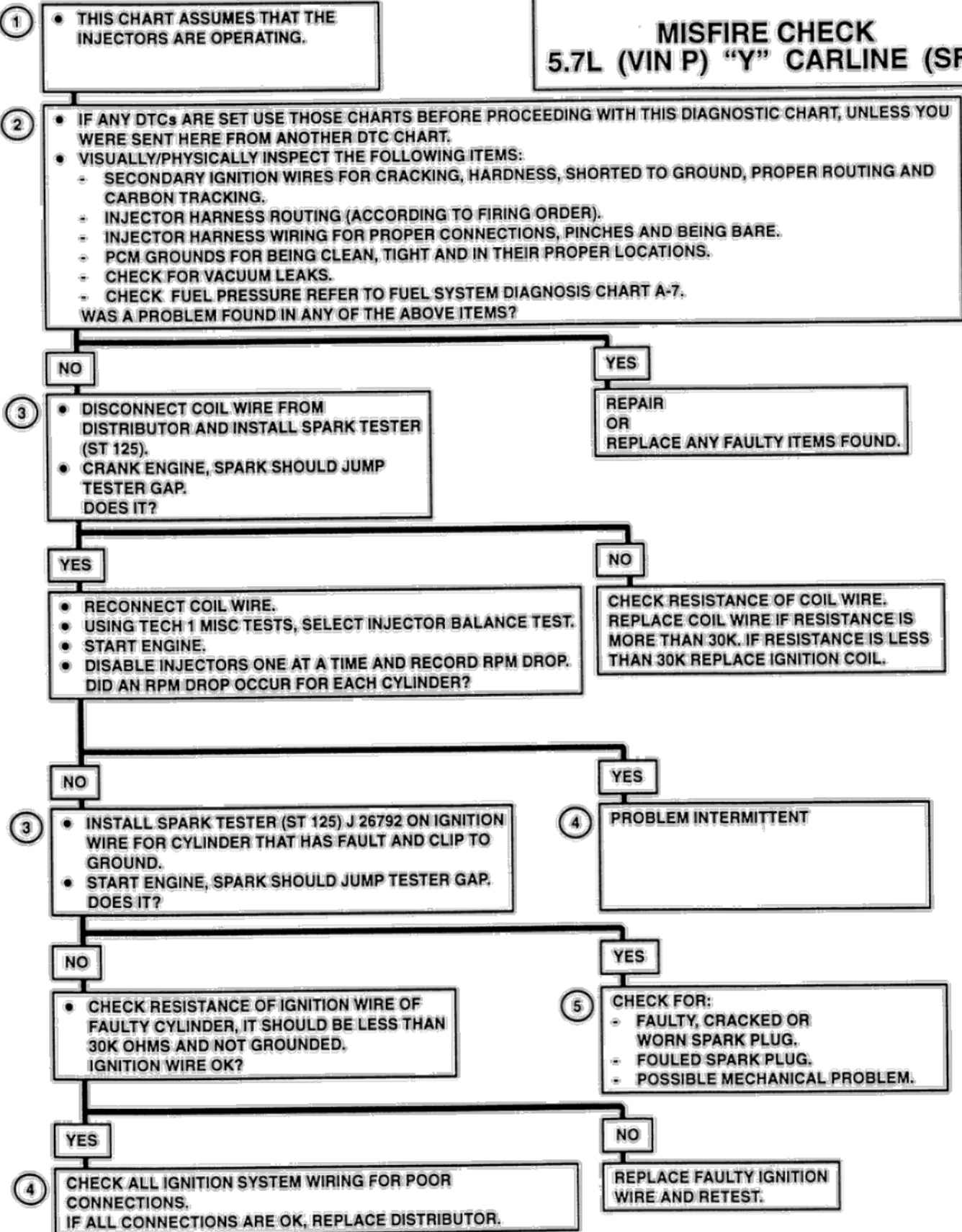


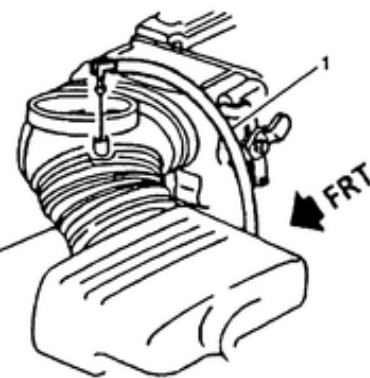
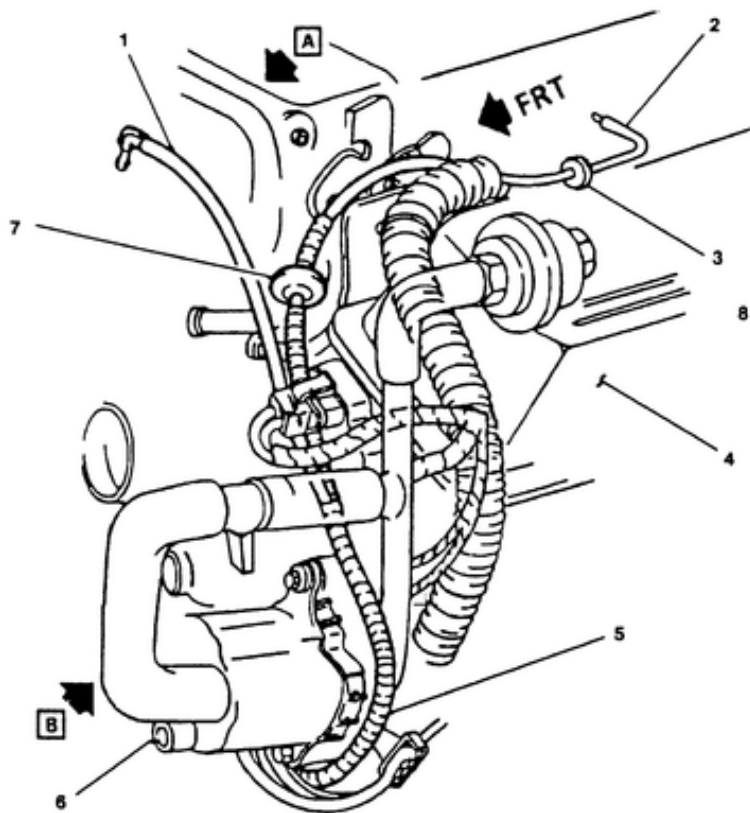


DISTRIBUTOR IGNITION (DI) SYSTEM CHECK 5.7L (VIN P) "Y" CARLINE (SFI)

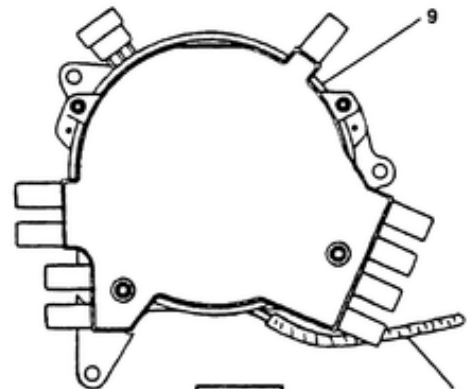


MISFIRE CHECK 5.7L (VIN P) "Y" CARLINE (SFI)





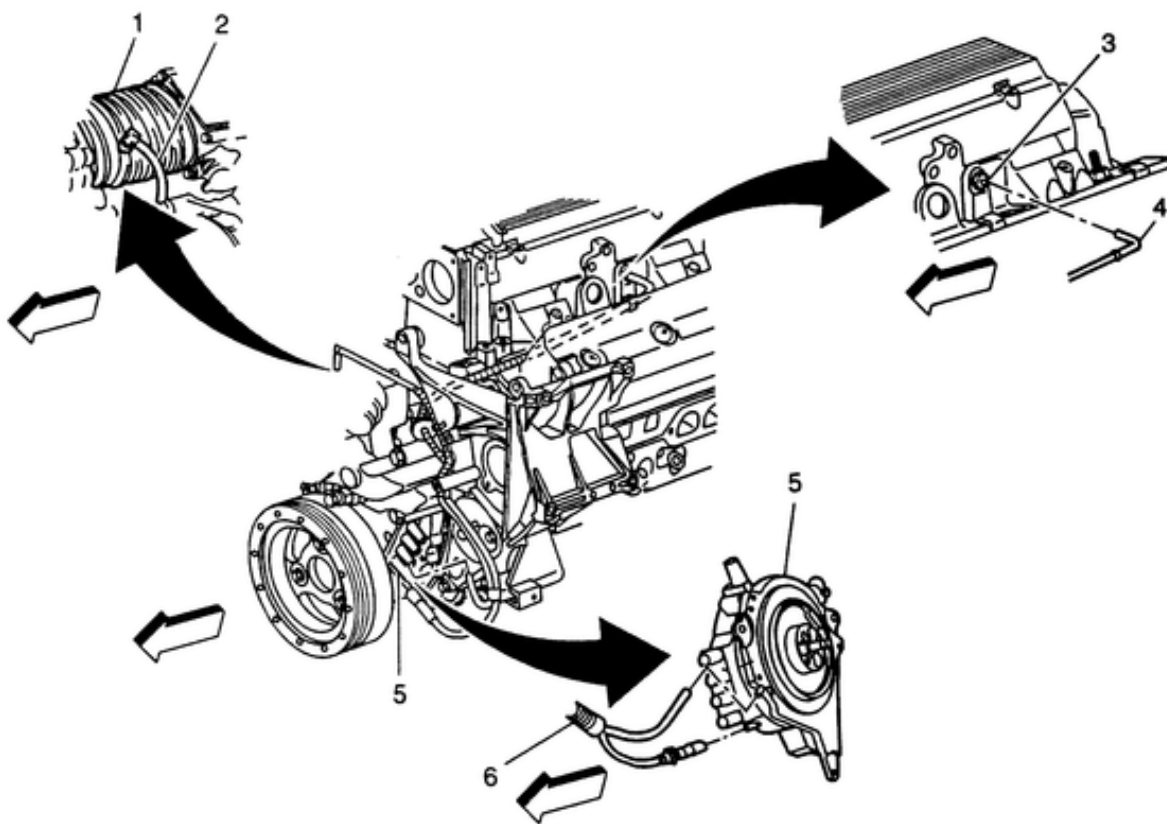
VIEW A



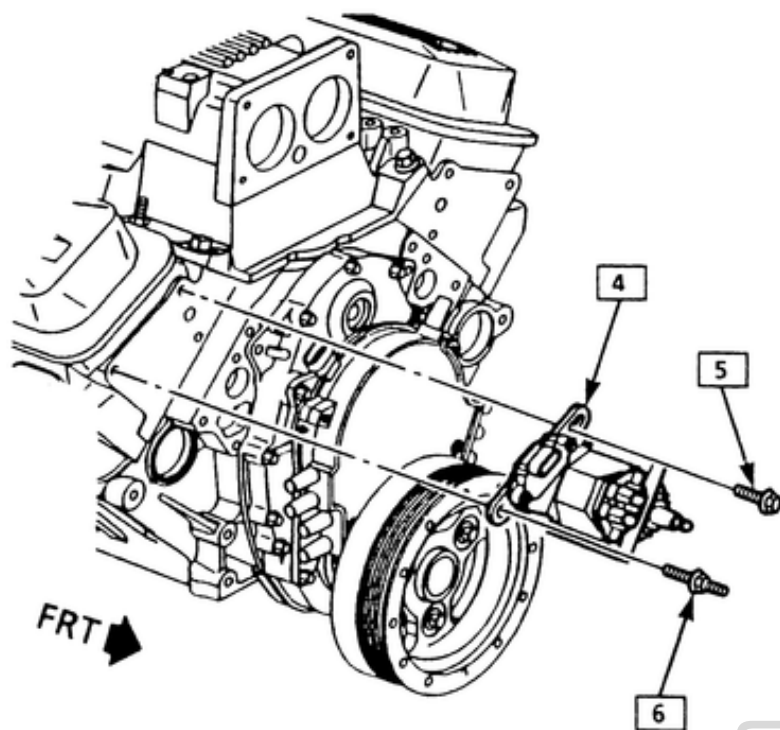
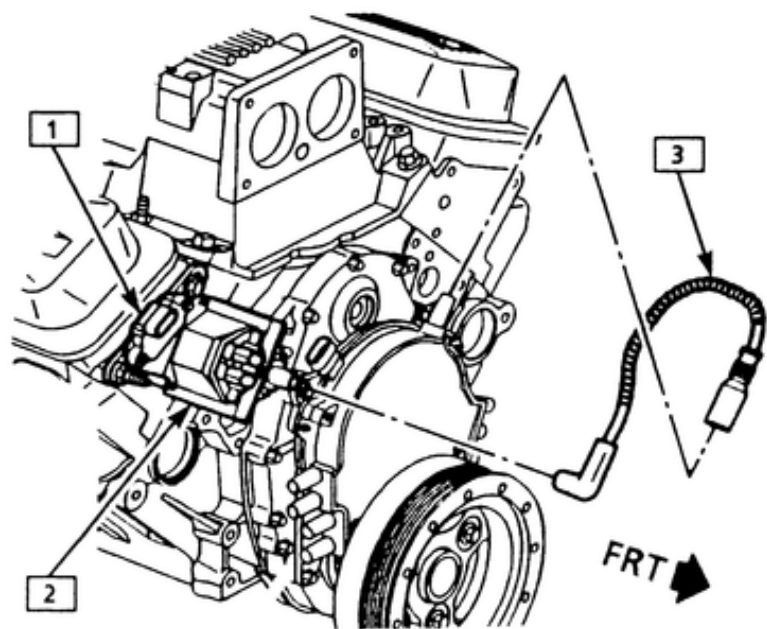
VIEW B

- 1 CLEAN AIR SUPPLY HOSE (FROM AIR INTAKE DUCT)
- 2 VACUUM HOSE (TO MANIFOLD VACUUM)
- 3 CHECK VALVE
- 4 VALVE COVER
- 5 VENT SYSTEM HARNESS

- 6 AIR PUMP
- 7 CHECK VALVE/FILTER
- 8 AIR INTAKE DUCT
- 9 DISTRIBUTOR

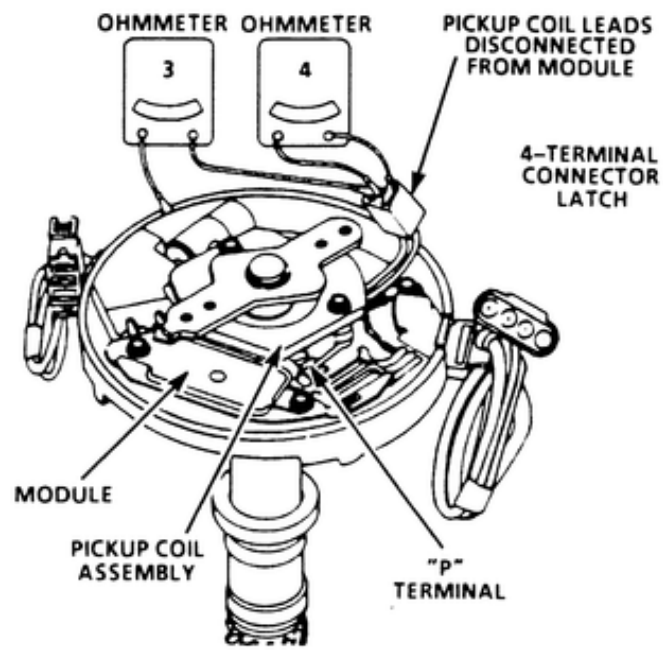


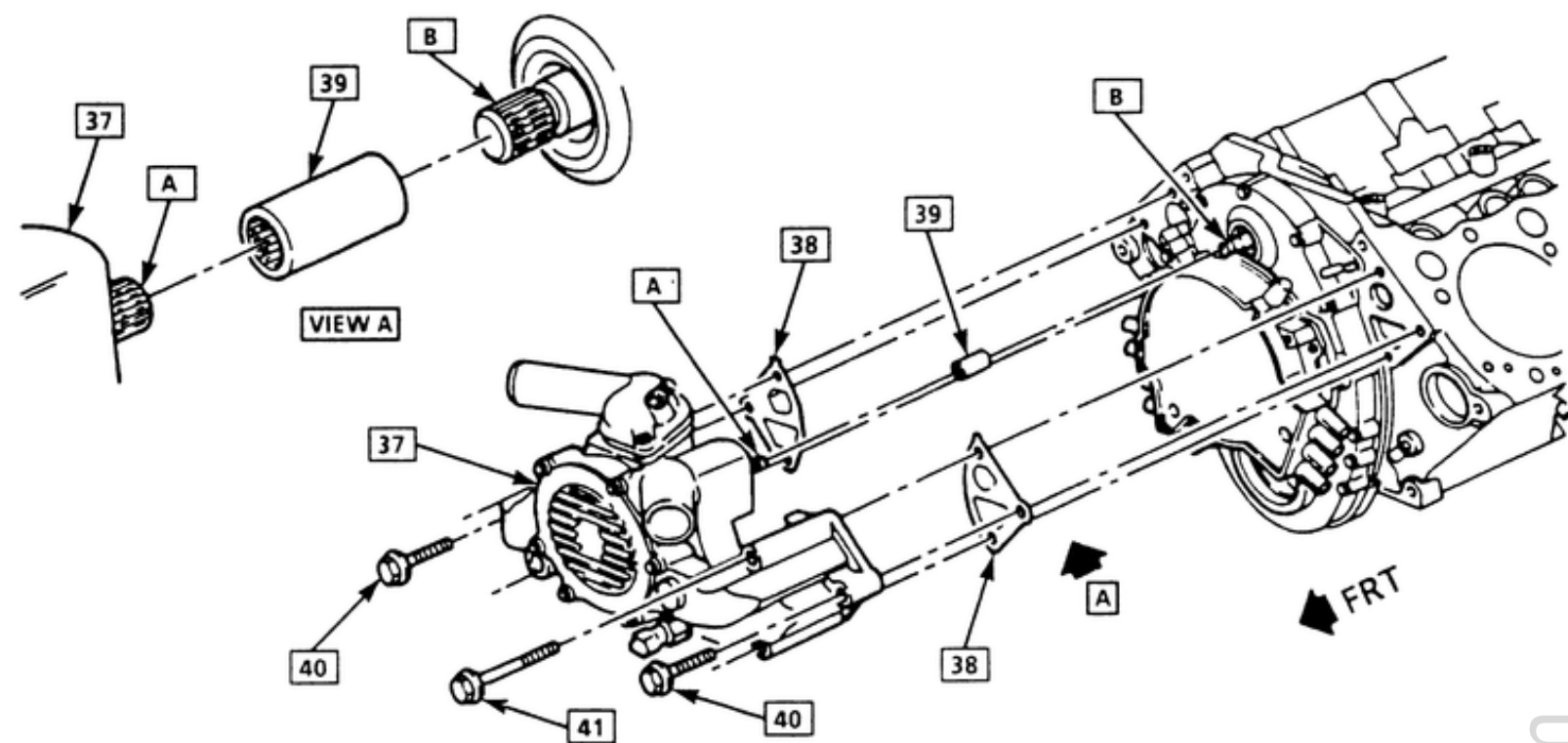
- (1) Air Intake Duct
- (2) Fresh Air Vacuum Line
- (3) Intake Manifold
- (4) Vent System Vacuum Line
- (5) Distributor
- (6) Distributor Vent System Vacuum Line



- 1 IGNITION COIL DRIVER
- 2 IGNITION COIL
- 3 SECONDARY WIRE

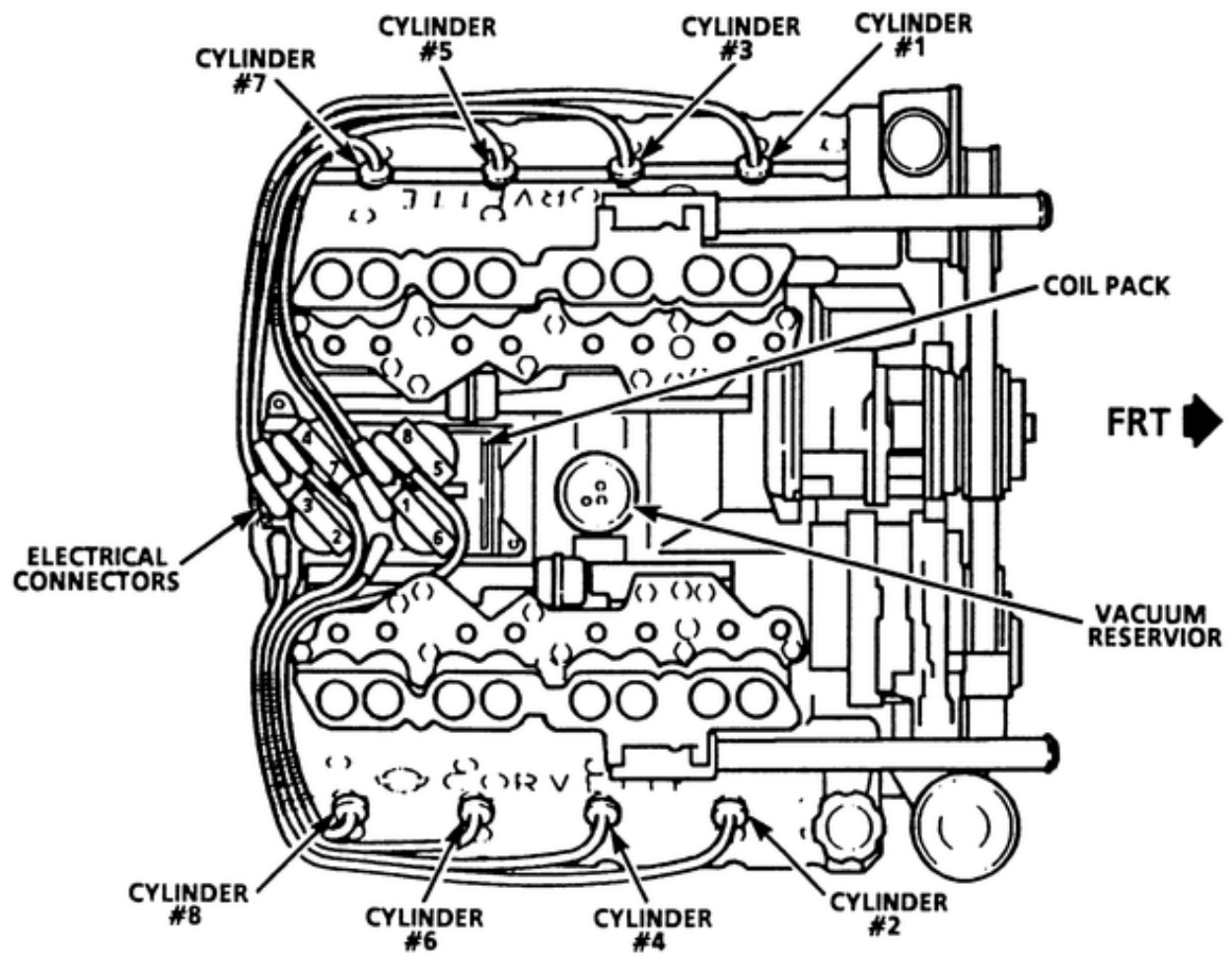
- 4 BRACKET
- 5 BOLT
- 6 STUD





- A** COOLANT PUMP SHAFT
- B** DRIVEN GEAR SHAFT
- 37** PUMP
- 38** GASKET

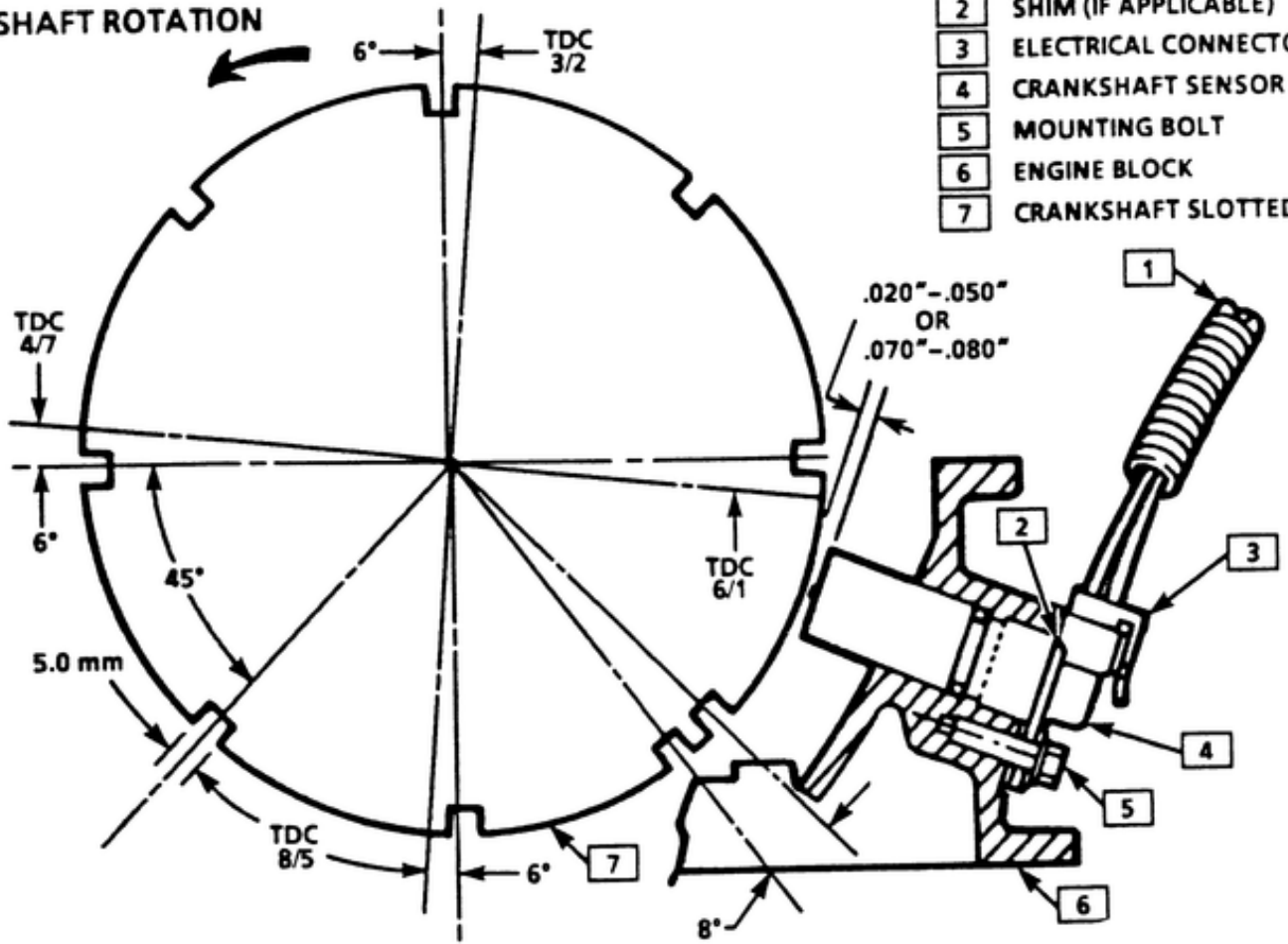
- 39** COUPLING
- 40** BOLT
- 41** BOLT

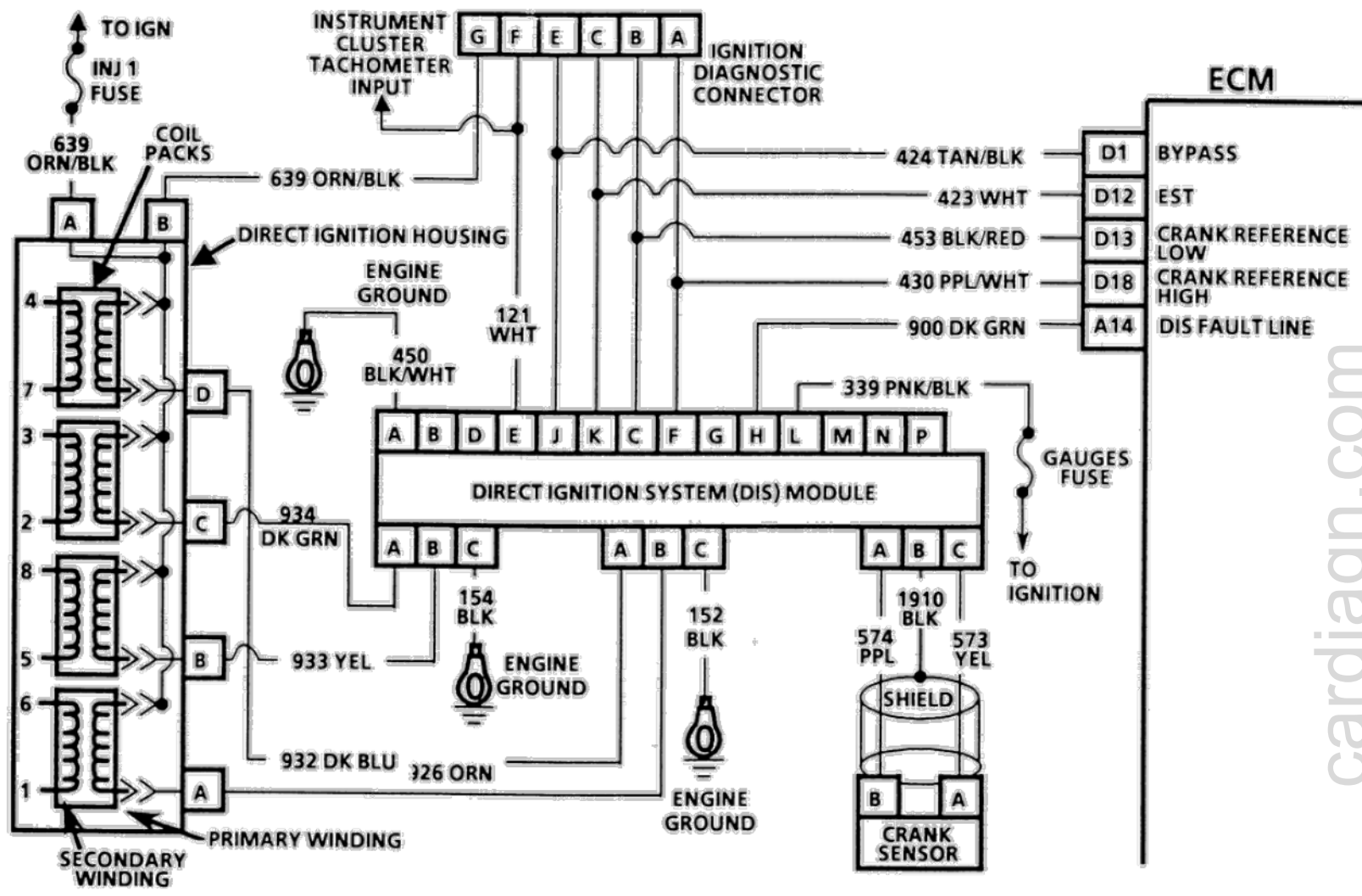


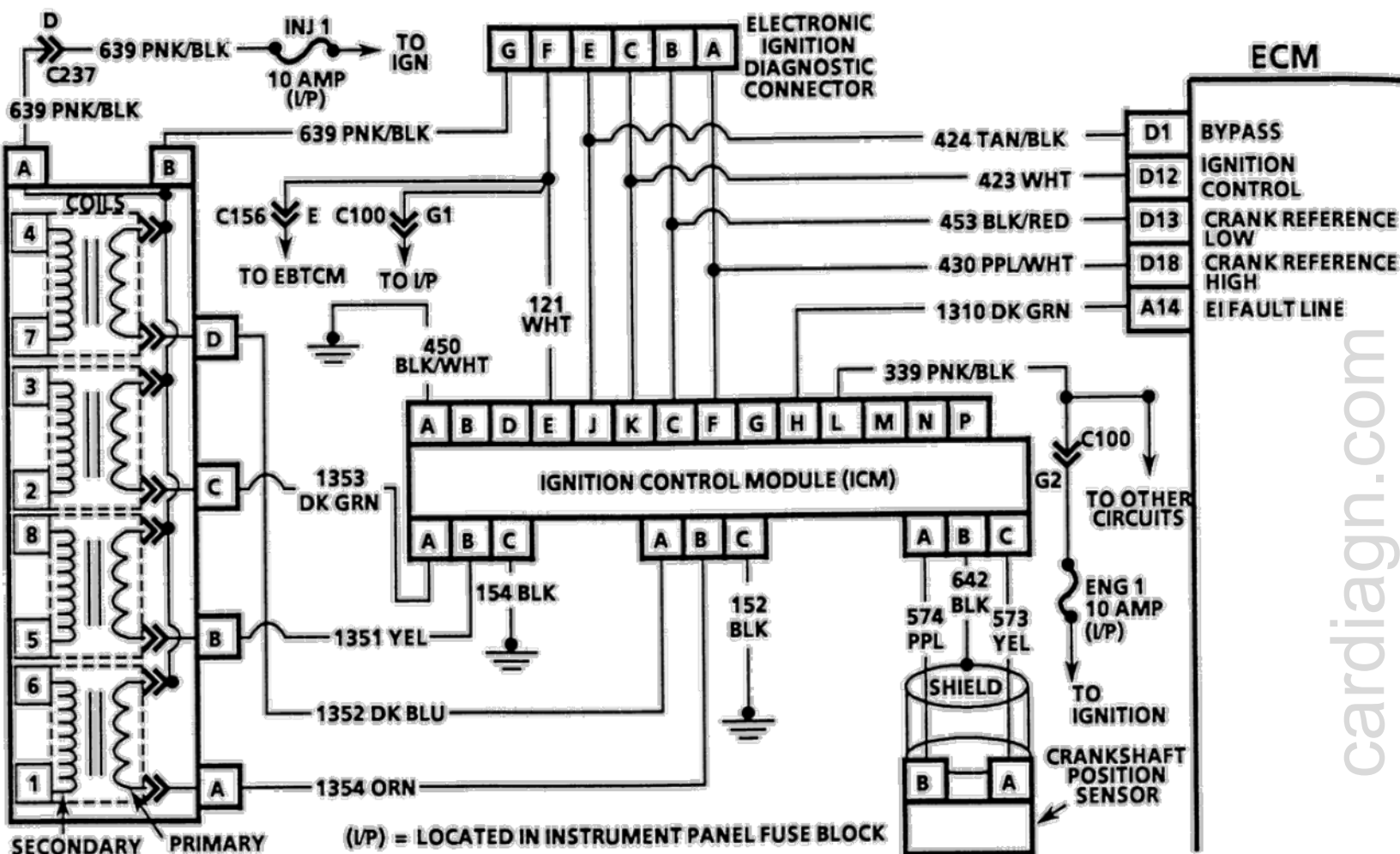
REAR VIEW ENGINE

CRANKSHAFT ROTATION

- 1 ELECTRICAL HARNESS
- 2 SHIM (IF APPLICABLE)
- 3 ELECTRICAL CONNECTOR
- 4 CRANKSHAFT SENSOR
- 5 MOUNTING BOLT
- 6 ENGINE BLOCK
- 7 CRANKSHAFT SLOTTED WHEEL







CHART

ELECTRONIC IGNITION (EI) SYSTEM/MISFIRE CHECK

5.7L (VIN J) "Y" CARLINE (SFI)

- ①
- USING TECH 1 SCAN TOOL, SELECT "MISCELLANEOUS TEST."
 - PERFORM "INJECTOR BALANCE" TEST WITH SCAN TOOL. DID INJECTOR BALANCE TEST FAIL?

YES

NO

NO TROUBLE FOUND.

- ②
- IGNITION "OFF".
 - REMOVE ECM CONNECTOR "A".
 - INSTALL SPARK TESTER J 26792 (ST-125) TO SPARK PLUG WIRE OF THE FAULTY CYLINDER(S) AND GROUND COMPANION CYLINDER IGNITION WIRE.
 - CRANK ENGINE AND CHECK FOR SPARK AT TESTER. DOES TESTER SHOW SPARK ON WIRE(S)?

NO

YES

- ③
- REMOVE PLENUM.
 - CHECK THE RESISTANCE OF EACH PLUG WIRE OF THE COIL WHICH DID NOT FIRE THE SPARK TESTER.
 - IS WIRE RESISTANCE LESS THAN 30,000 OHMS EACH AND IS THE WIRE NOT GROUNDED?

⑥

- CHECK FOR:
- FAULTY, WORN, OR DAMAGED SPARK PLUG(S).
 - PLUG FOULING, DUE TO ENGINE MECHANICAL FAULT.
 - PLUGS OK?

YES

NO

REPLACE FAULTY SPARK PLUG OR REPAIR ENGINE MECHANICAL FAULT.

YES

NO

REPLACE FAULTY WIRE(S).

- REMOVE BOTH HARNESS CONNECTORS FROM IGNITION COIL PLATE CONNECTOR.
- CHECK RESISTANCE OF COIL(S) PRIMARY AND SECONDARY WINDINGS.
- PRIMARY RESISTANCE 0.35 - 1.45 OHMS.
- SECONDARY RESISTANCE 5000 - 6500 OHMS. ARE RESISTANCES WITHIN SPECIFICATIONS?

YES

NO

FAULTY CONNECTION OR FAULTY COIL.

- REMOVE AFFECTED COIL(S). IS COIL(S) FREE OF CARBON TRACKING?

YES

NO

- ⑤
- FAULTY IGNITION COIL. ALSO CHECK FOR FAULTY PLUG WIRE CONNECTION(S) AND WIRE NIPPLE(S) FOR CARBON TRACKING.

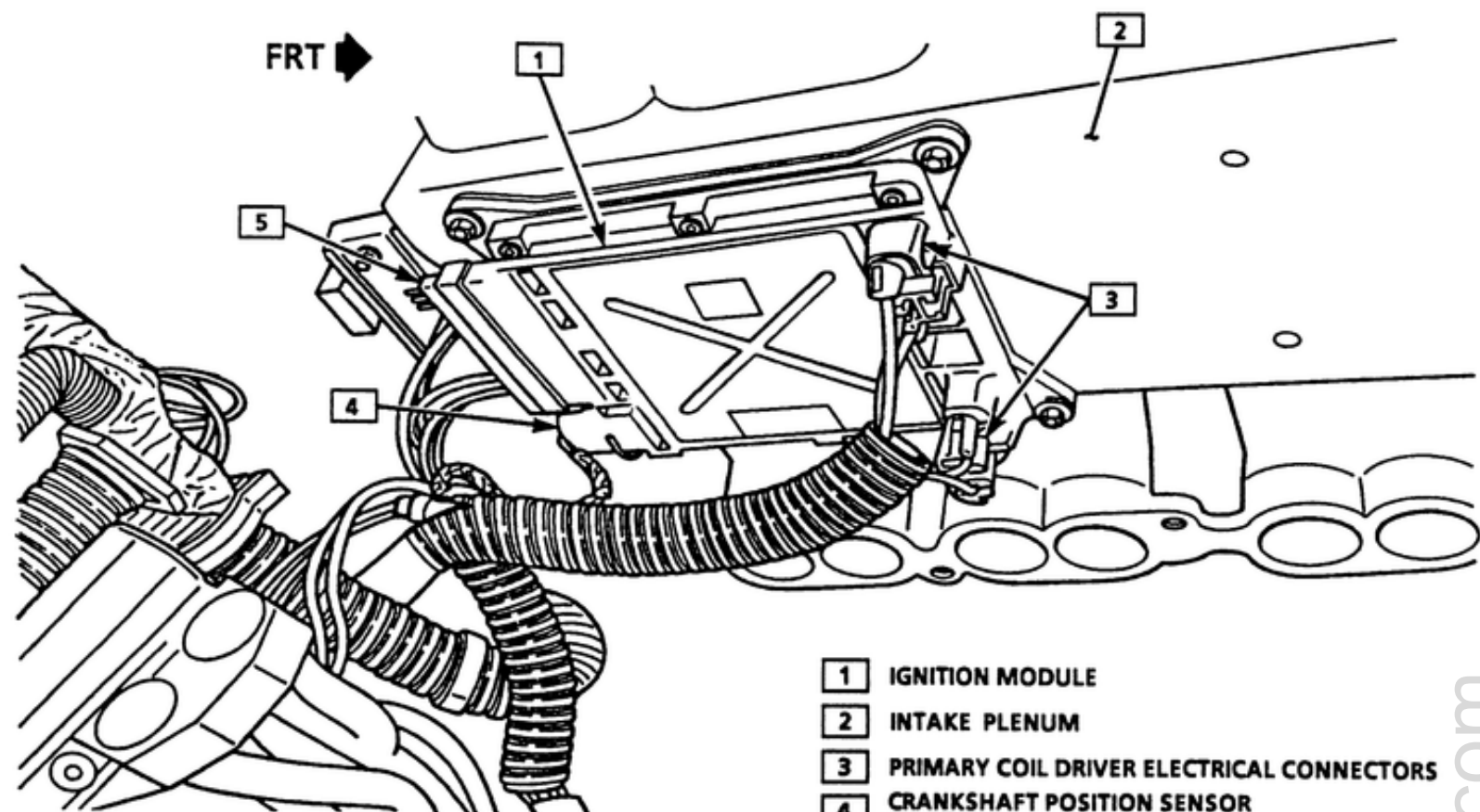
- ④
- SWITCH POSITION OF COILS AT PROBLEM CYLINDER.
 - RECONNECT BOTH HARNESS CONNECTORS TO IGNITION COIL PLATE CONNECTOR.
 - RECONNECT ALL OF THE ELECTRICAL CONNECTORS TO THE ELECTRONIC IGNITION CONTROL MODULE.
 - WILL SPARK JUMP TESTER GAP WHILE CRANKING ENGINE?

YES

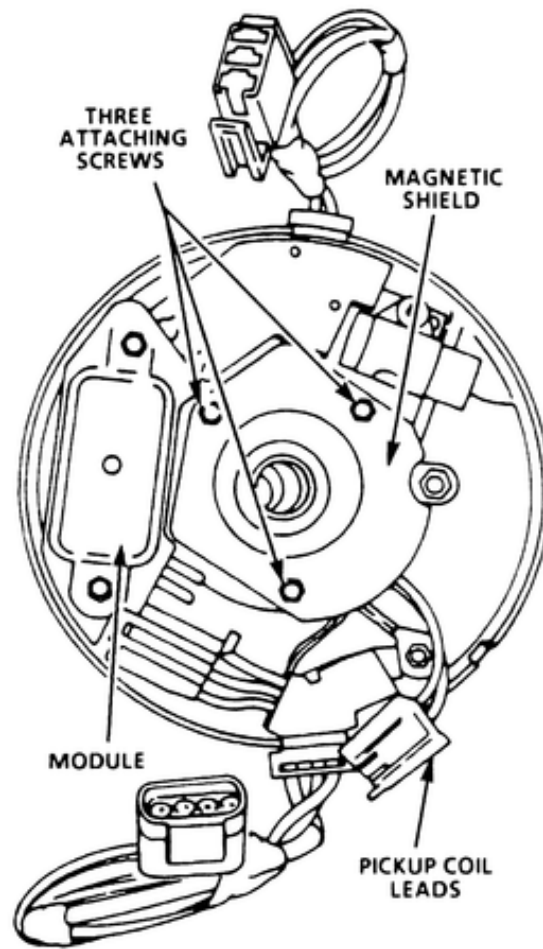
NO

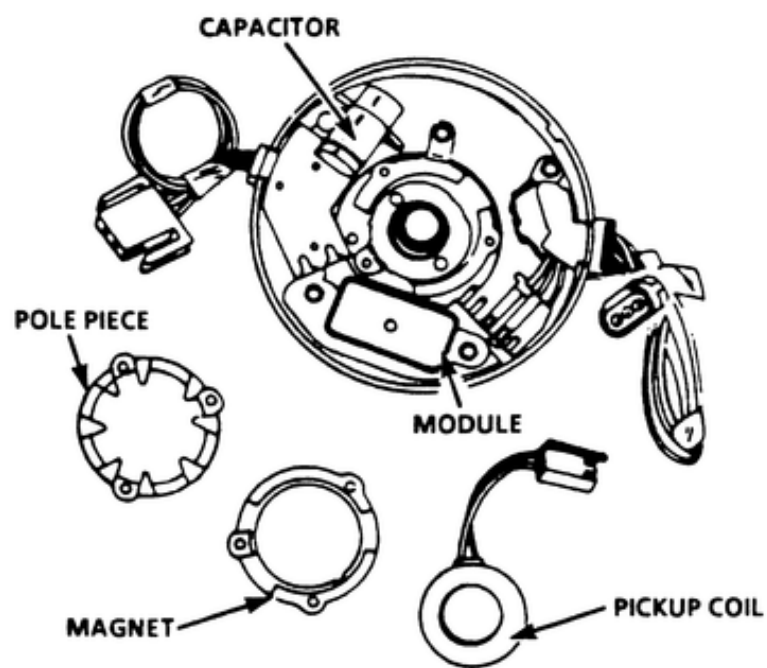
FAULTY IGNITION COIL.

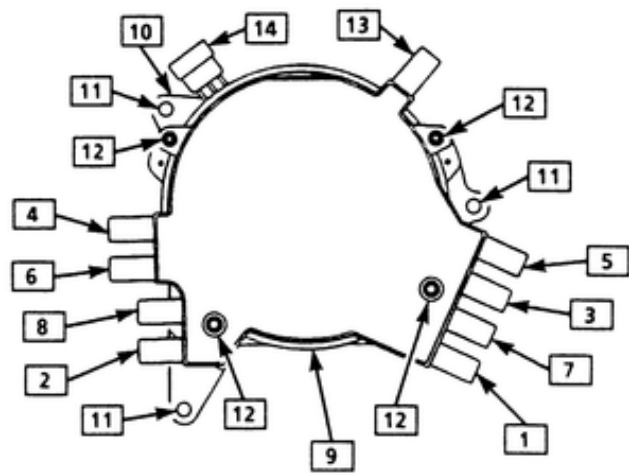
FAULTY CONNECTIONS OR FAULTY ELECTRONIC IGNITION CONTROL MODULE.



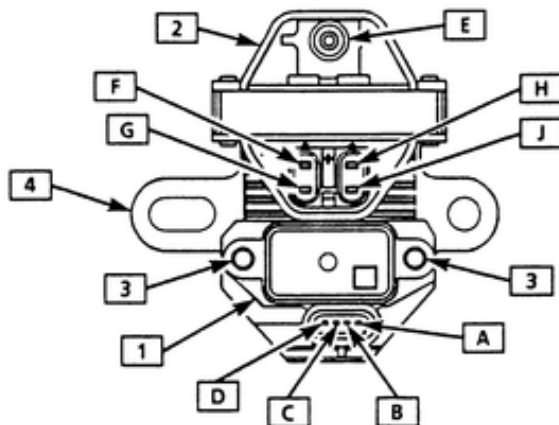
- 1** IGNITION MODULE
- 2** INTAKE PLENUM
- 3** PRIMARY COIL DRIVER ELECTRICAL CONNECTORS
- 4** CRANKSHAFT POSITION SENSOR ELECTRICAL CONNECTOR
- 5** 14 PIN ELECTRICAL CONNECTOR



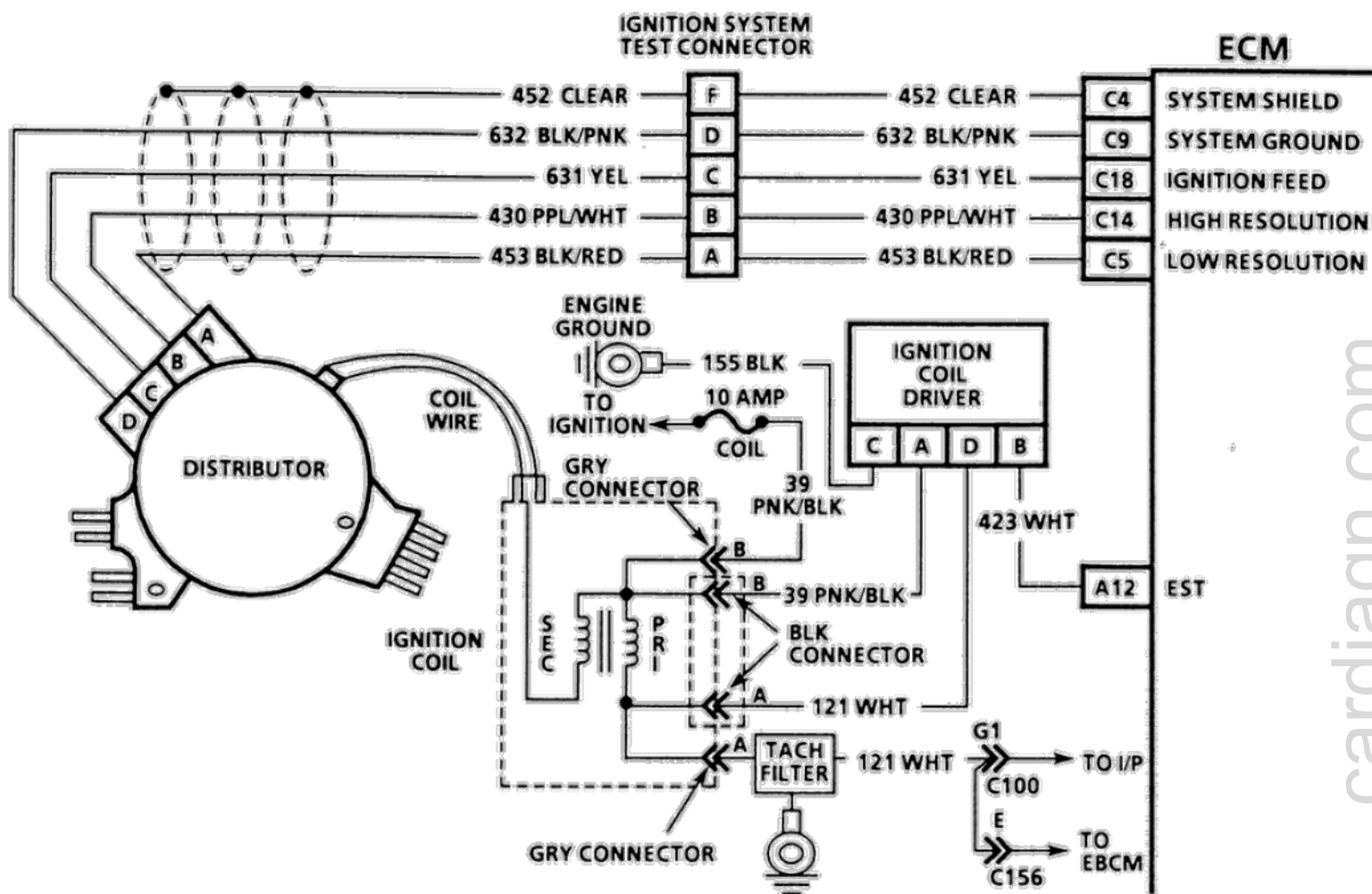




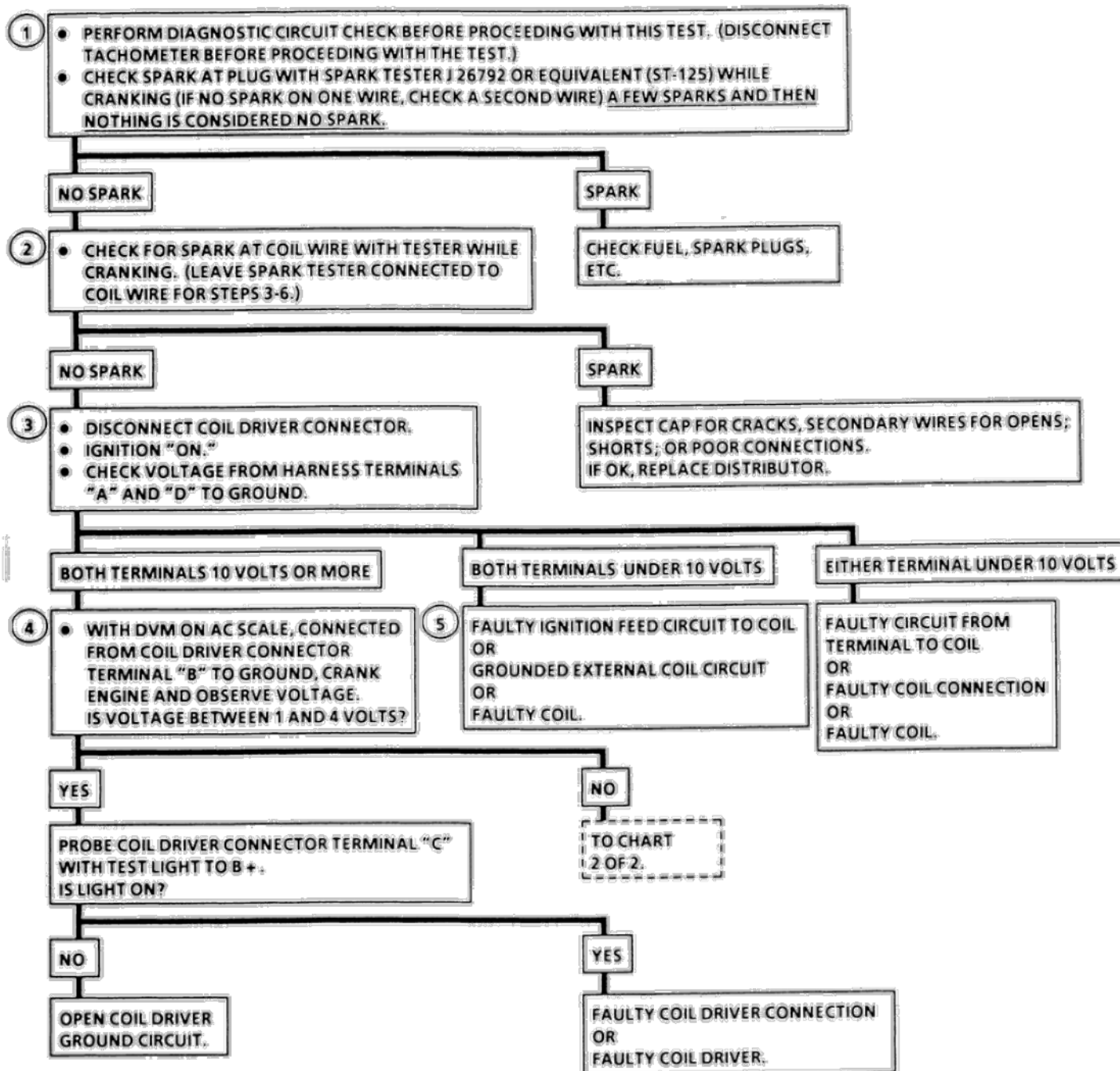
- 1** CONNECTOR (CYLINDER 1)
- 2** CONNECTOR (CYLINDER 2)
- 3** CONNECTOR (CYLINDER 3)
- 4** CONNECTOR (CYLINDER 4)
- 5** CONNECTOR (CYLINDER 5)
- 6** CONNECTOR (CYLINDER 6)
- 7** CONNECTOR (CYLINDER 7)
- 8** CONNECTOR (CYLINDER 8)
- 9** DISTRIBUTOR CAP
- 10** DISTRIBUTOR BASE ASSEMBLY
- 11** MOUNTING HOLES (3 PLACES)
- 12** ATTACHING SCREW (4 PLACES)
TIGHTEN TO 2.8 N·m (25 lb. in.)
- 13** SECONDARY TO IGNITION COIL CONNECTOR
- 14** 4-PIN CONNECTOR (TO ECM)



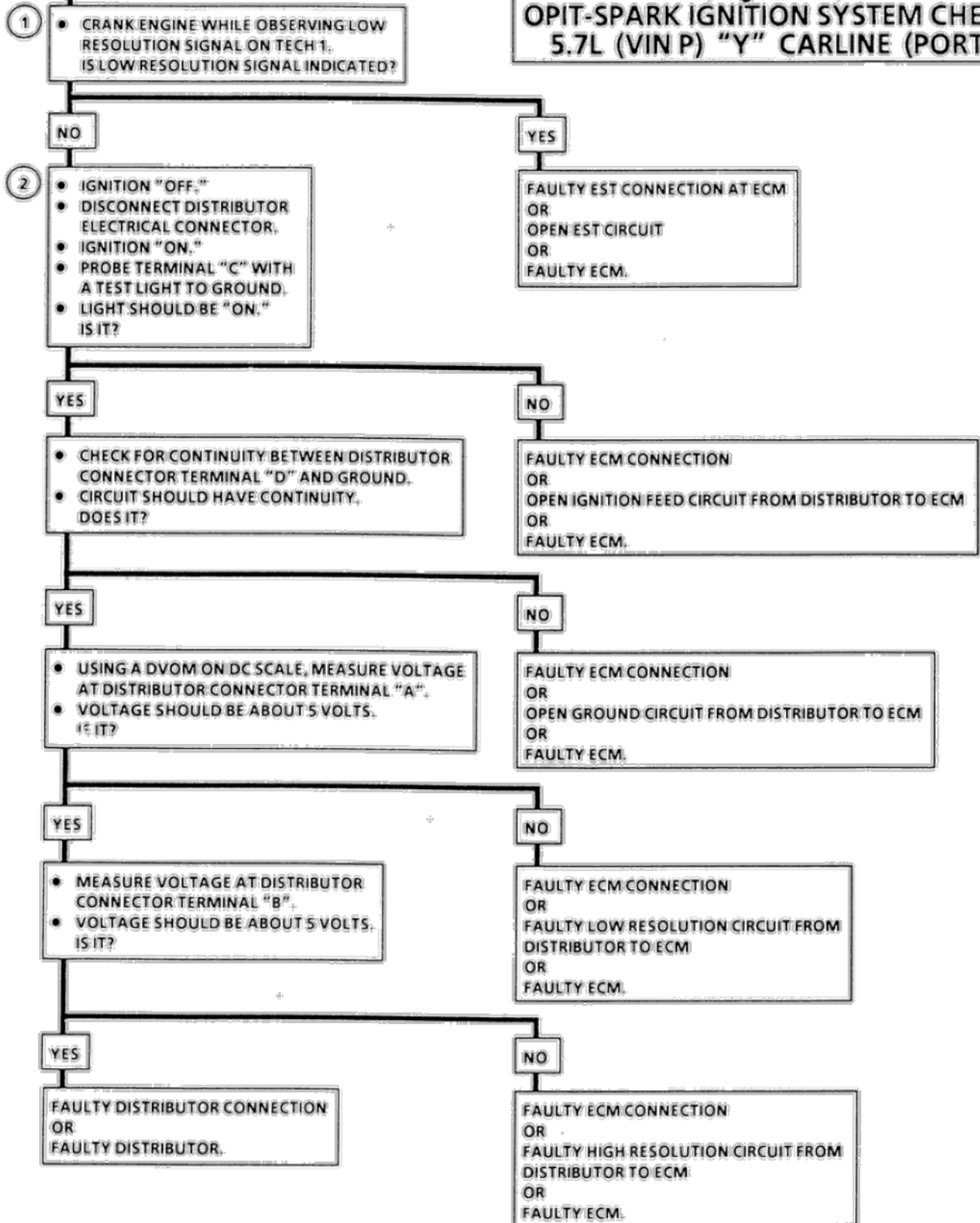
-
- 1** IGNITION COIL MODULE
 - A** TERMINAL "A" (TO IGNITION COIL B +)
 - B** TERMINAL "B" (TO ECM)
 - C** TERMINAL "C" (TO ENGINE GROUND)
 - D** TERMINAL "D" (TO IGNITION COIL)
 - 2** IGNITION COIL
 - E** SECONDARY TO DISTRIBUTOR CONNECTOR
 - F** TERMINAL "B" (TO MODULE TERMINAL "A")
 - G** TERMINAL "A" (TO MODULE TERMINAL "D")
 - H** TERMINAL "B" (TO COIL FUSE/IGN B +)
 - J** TERMINAL "A" (TO TACH FILTER)
 - 3** MOUNTING SCREW (2 PLACES)
TIGHTEN TO 1.7 N·m (14 lb. in.)
 - 4** BRACKET



(Page 1 of 2)
OPTI-SPARK IGNITION SYSTEM CHECK
5.7L (VIN P) "Y" CARLINE (PORT)



**OPIT-SPARK IGNITION SYSTEM CHECK
5.7L (VIN P) "Y" CARLINE (PORT)**



1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Diagnosis and testing procedures in this section should be used in conjunction with those in Section 4 (Emission Controls) and Section 5 (Fuel System) of this manual. This will enable you to diagnose problems involving all components controlled by the computer control module.

NOTE: An accurate diagnosis is the first step to problem solution and repair. For several of the following steps, a HEI spark tester, tool ST 125, to ground. Use of this tool is recommended, as there is more control of the high energy spark and less chance of being shocked. If a tachometer is connected to the TACH terminal on the distributor, disconnect it before proceeding with this test.

The symptoms of a defective components within the HEI system are exactly the same as those you would encounter in a conventional system. Some of these symptoms could be:

- Hard or no starting
- Rough idle
- Poor fuel economy
- Engine misses under load or while accelerating

If you suspect a problem in your ignition system, there are certain preliminary checks which you should carry out before you begin to check the electronic portions of the system. First, it is extremely important to make sure the vehicle battery is in a good state of charge. A defective or poorly charged battery will cause the various components of the ignition system to read incorrectly when they are being tested. Second, make sure all wiring connections are clean and tight, not only at the battery, but also at the distributor cap, ignition coil and at the computer control module.

The quickest and easiest test of the ignition system is to check the secondary ignition circuit first (check for spark). If the secondary circuit checks out properly, then the engine condition is probably not the fault of the ignition system. To check the secondary ignition circuit, perform a simple spark test. Remove one of the plug wires and insert a spark tester. If a normal spark occurs, then the problem is most likely not in the ignition system. Check for fuel system problems, or fouled spark plugs.

NOTE: For further diagnosis, please refer to component testing found later in this section.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

The distributor ventilation system is used on 1995–96 vehicles. The distributor ventilation system vacuum harness is connected to the air intake duct, the distributor and the intake manifold. The vacuum harness provides ventilation for the distributor, preventing any moisture from accumulating and causing ignition system problems or failure.

The distributor vacuum harness attaches to the air intake duct and the intake manifold with vacuum fittings. It connects to the distributor at two places with separately sized connectors.

Fig. 1: Distributor ventilation system components — 1995 vehicles

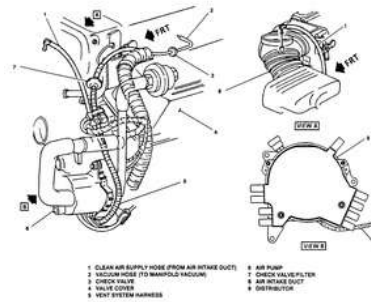
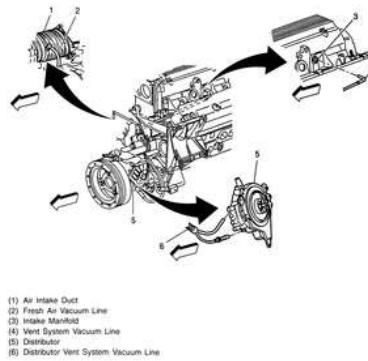


Fig. 2: Distributor ventilation system components — 1996 vehicles



1. Disconnect the distributor vacuum hose from the intake manifold. Connect a hand held vacuum pump to the distributor vacuum hose. Apply vacuum and observe the vacuum pump gauge. The vacuum should not build or should bleed off quickly.
2. If vacuum builds and does not bleed off quickly, check the system for blocked, restricted or collapsed hoses. Check the connections at the distributor cap for blockage. Check for a faulty check valve or check valve/filter.
3. If the vacuum bleeds off quickly, or does not build at all, leave the vacuum pump connected. Disconnect the distributor clean air supply hose from the air intake duct and plug it with a suitable stopper. Apply 10 in. Hg (34 kPa) of vacuum and observe the gauge. The vacuum should hold. If vacuum does not hold, check the system for vacuum leaks, damaged hoses or connections. Check the seal between the distributor cap and distributor and also, check the cap for cracks or damage. If vacuum does hold, proceed with the following steps.
4. Remove the stopper from the clean air supply hose. Disconnect the vacuum pump. Connect the vacuum pump to the clean air supply hose. Apply 10 in. Hg (34 kPa) of vacuum and observe the gauge. The vacuum should hold. If vacuum does NOT hold, the check valve is faulty and must be replaced. If the vacuum does hold, the system is OK, and you should check for a probable blocked or restricted vacuum source.
5. Once you determine the distributor ventilation system vacuum harness is operating properly, disconnect the vacuum gauge and reconnect the vacuum hose to the air intake duct.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Using an ohmmeter (on the high scale), connect the probes between the primary (low voltage) terminal and coil ground. The reading should be very high and infinity; if not, replace the coil.
2. Using an ohmmeter (on the low scale), connect the probes between both primary terminals. The reading should be very low or zero; if not, replace the coil.
3. Using an ohmmeter (on the high scale), connect the probes between a primary terminal and the secondary (high voltage) terminal. The reading should be high (not infinite); if not, replace the coil.

1990 Chevrolet CORVETTE

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

1. Check for spark at the spark plugs by attaching the HEI spark tester, tool ST 125, to one of the plug wires, grounding the HEI spark tester on the engine and cranking the starter.
2. Check fuel system, plug wires, and spark plugs. If spark is present, the HEI system is good.
3. If no spark occurs from EST distributor, disconnect the 4 terminal EST connector and recheck for spark. If spark is present, EST system service check should be performed.

1990 Chevrolet CORVETTE

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

Because of the high voltage produced by the distributorless ignition system and to avoid overstressing the coil/module, an inductive or neon type spark tester should be used to check for spark. These tools are commonly available at most auto parts stores. Follow the tool manufacturer's instructions to test for spark. Follow the diagnosis chart to check the ignition system.

Fig. 1: Ignition system wiring — 1990–91 5.7L (VIN J) engine

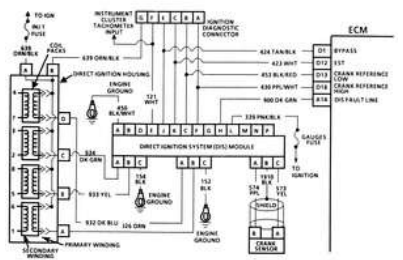


Fig. 2: Ignition system wiring — 1992–95 5.7L (VIN J) engine

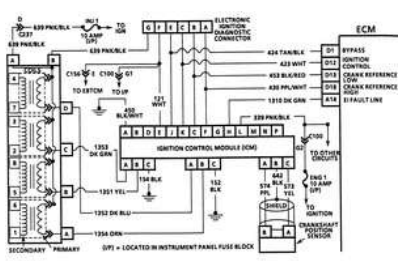
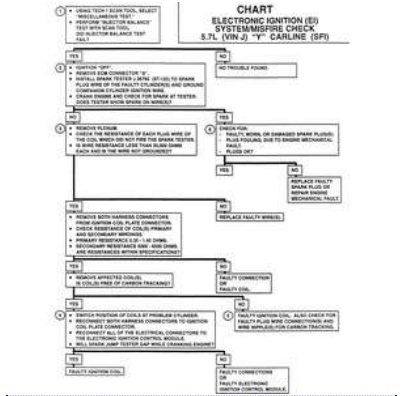


Fig. 3: Ignition system check — 5.7L (VIN J) engine



1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. With the engine off, disconnect a spark plug wire from a spark plug.
2. Connect the negative battery cable.
3. Connect a spark tester, such as tool ST-125, to the plug wire. Attach the clip to a good ground.
4. Have an assistant crank the engine. Check for spark at the tester. If there is no spark at one wire, check a second wire. It should be a bright blue color; if it is not, the coil may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. With the engine off, disconnect a spark plug wire from a spark plug.
2. Connect the negative battery cable.
3. Connect a spark tester, such as tool ST-125, to the plug wire. Attach the clip to a good ground.
4. Have an assistant crank the engine. Check for spark at the tester. If there is no spark at one wire, check a second wire. It should be a bright blue color; if it is not, the coil may be faulty.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Effective troubleshooting of the Opti-Spark ignition system requires a logical and systematic approach. The following charts are designed to help diagnose a no-spark condition or erratic spark plug firing. Refer to the system wiring chart before making any tester connections, and follow the steps in their prescribed order.

CAUTION
When handling secondary spark plug leads with the engine running or starting, insulated pliers must be used and care exercised to prevent a possible electrical shock.

Fig. 1: Ignition system wiring — 1992 5.7L (VIN P) engine

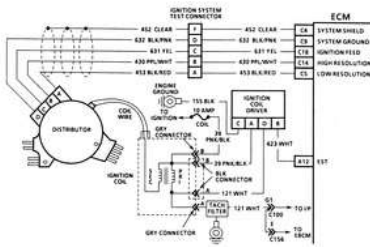


Fig. 2: Ignition system check (1 of 2) — 1992 5.7L (VIN P) engine

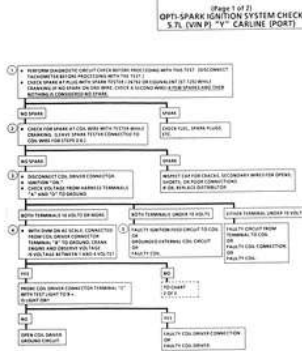


Fig. 3: Ignition system check (2 of 2) — 1992 5.7L (VIN P) engine

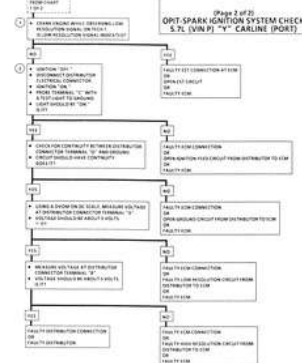
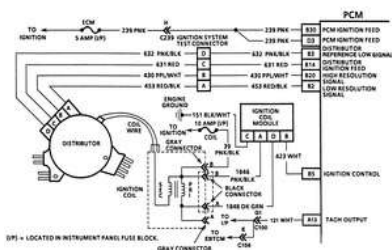
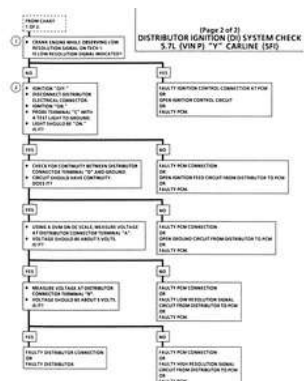
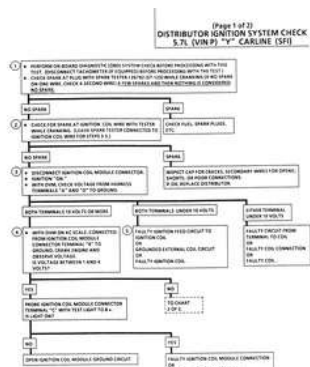
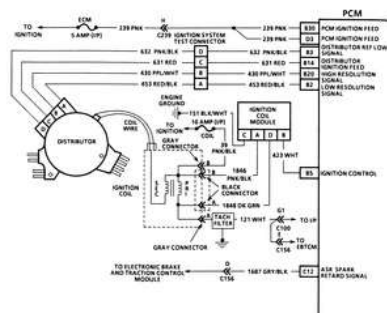


Fig. 4: Ignition system wiring — 1993–94 5.7L (VIN P) engine

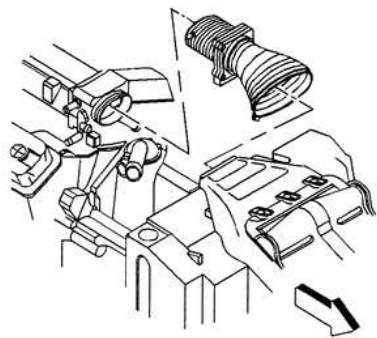


1990 Chevrolet CORVETTE

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

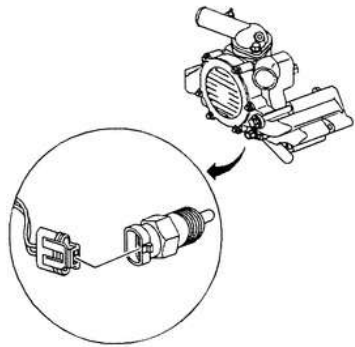
- 1. For 1995–96 vehicles, inspect the distributor ventilation system for proper ventilation.
- 2. Be sure the ignition is in the **OFF** or **LOCK** position. Disconnect the negative battery cable.
- 3. Detach the Intake Air Temperature (IAT) electrical connector.
- 4. Remove the air intake duct.

Fig. 1: Unfasten the retainers, then remove the air intake duct



- 5. Remove the accessory drive belt, as outlined in Section 1 of this manual.
- 6. Drain the engine cooling system into a suitable container.
- 7. Disconnect the water pump coolant hoses, and allow any remaining coolant to drain.
- 8. Detach the Engine Coolant Temperature (ECT) sensor electrical connector.

Fig. 2: Unplug the electrical connector from the ECT sensor



- 9. Remove the water pump and crankshaft balancer, as outlined in Section 3 of this manual.

Fig. 3: The water pump must be removed for access to the distributor

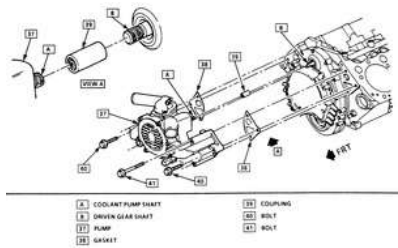
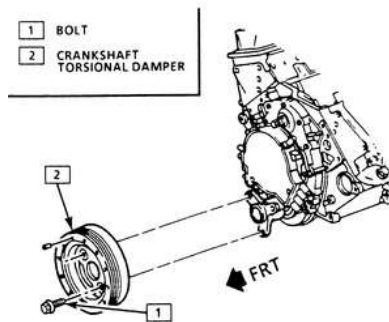


Fig. 4: You must also remove the crankshaft torsional damper, also known as the balancer

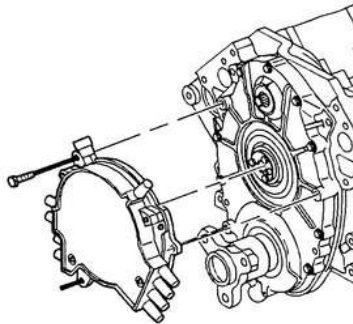


10. Remove the drive belt tensioner.

NOTE: The spark plug wire boots should be twisted $1/2$ turn in each direction while removing. Do not pull on the wires to remove them from the spark plugs. Pull on the boots or use a tool specifically designed for this purpose.

11. Label and disconnect the spark plug wires/harness from the distributor.
12. Unplug the 4-terminal ECM/PCM electrical connector from the distributor.
13. If equipped, disconnect the distributor vacuum harness from the distributor.
14. Loosen and remove the distributor attaching bolts.
15. Pull the distributor assembly forward until the driveshaft disengages from the end of the camshaft.

Fig. 5: Exploded view of the distributor mounting — 5.7L (VIN P and 5) engines



16. Mark the top surface of the driveshaft for proper alignment during installation.

To install:

NOTE: Replace the O-rings on the coupling shaft or ignition system performance may suffer. Lubricate the O-rings and the end of the camshaft.

WARNING

Don't try to fully seat the distributor using the distributor retainers. If the distributor will not seat by hand, it's not properly aligned with the camshaft. Rotate the crankshaft until the engine is at the number 1 cylinder TDC (camshaft sprocket pin at the 9 o'clock position). Rotate the distributor coupling until the camshaft sprocket pin slot aligns with the distributor base timing mark. Install the distributor using hand pressure to fully seat the distributor.

17. Install the distributor assembly into position with the driveshaft in the end of the camshaft. Rotate the distributor coupling until the camshaft sprocket pin slot aligns with the camshaft sprocket pin. Slide the distributor onto the end of the camshaft until fully seated on the engine front cover.
18. Install the distributor mounting bolts. Tighten to 8–9 ft. lbs. (11–12 Nm).
19. Attach the 4-pin ECM/PCM connector.
20. If equipped, attach the distributor vacuum harness to the distributor.
21. Connect the spark plug wires to the distributor, as tagged during removal.
22. Install the drive belt tensioner.
23. Install the crankshaft balancer and water pump, as outlined in Section 3 of this manual.
24. Attach the ECT sensor connector.
25. Refill the cooling system with the proper type and amount of coolant.
26. Install the accessory drive belt.
27. Install the air intake duct and attach the IAT sensor electrical connector.
28. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

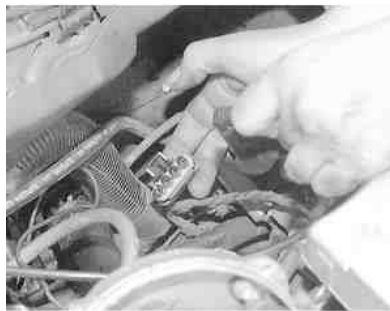
Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Remove the air cleaner cover and/or intake manifold plenum extension, as necessary.
3. Remove the distributor shield.
4. Disconnect the ignition switch battery feed wire and tachometer lead (if equipped) from the distributor cap.
5. Tag and unplug the coil connectors from the cap. Do NOT use a screwdriver, or equivalent tool to release the locking tabs.
6. Remove the distributor cap by using a screwdriver to turn the 4 retaining latches counterclockwise, or unfastening the 4 retaining screws, depending upon the vehicle. Move the distributor cap out of the way.
7. Detach the 4-terminal ECM harness from the distributor ECM connector.

Fig. 1: Remove the ECM electrical connector retaining clip . .



Fig. 2: . . . then unplug the 4-terminal ECM connector



8. If necessary for access, tag and disconnect the spark plug wires, then release the spark plug wire harness latches, then remove the wiring harness retainer. The spark plug wire numbers are indicated on the retainer.

Fig. 3: Use a paint marker to matchmark the position of the rotor to the distributor housing



9. Unfasten the distributor clamp and hold-down clamp. Make sure to mark the position of the rotor in relation of the distributor housing, and the distributor housing to the engine. Pull the distributor up until the rotor just stops turning counterclockwise, then mark the rotor position again.

Fig. 4: The distributor hold-down bolt is located under the distributor

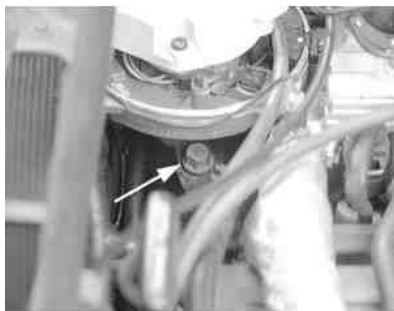


Fig. 5: The easiest way to loosen the distributor hold-down bolt is with a stubby wrench



Fig. 6: Remove the distributor hold-down bolt and clamp

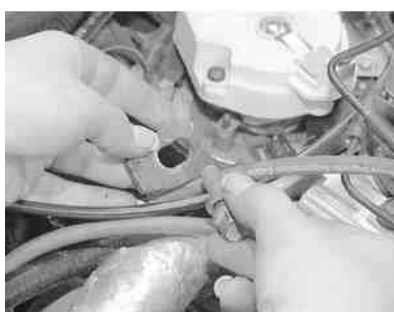


Fig. 7: Pull the distributor up until the rotor just stops turning, then mark the rotor position again



WARNING

To ensure proper ignition timing, the distributor **MUST** be installed with the rotor correctly positioned as marked.

10. Remove the distributor from the engine.

Fig. 8: After all the matchmarks are made, the distributor can be pulled up and out of the engine



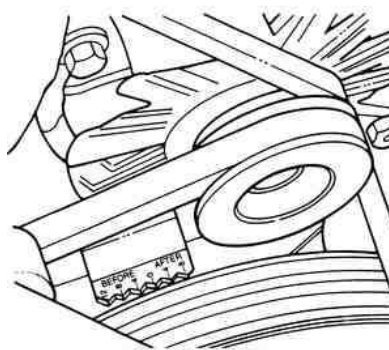
Fig. 9: Place a rag or shop towel in the distributor mounting hole to prevent debris from falling into the engine



To install:

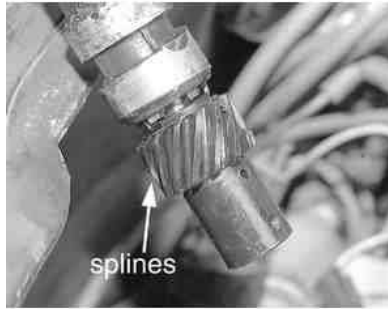
11. If the engine was accidentally cranked, after the distributor was removed, perform the following steps for installation:
 - A. Remove the No. 1 spark plug.
 - B. Place vehicles equipped with manual transmissions in "Neutral", or automatic transmissions in "Park". Place your finger over the No. 1 spark plug hole, then slowly crank the engine until compression is felt.
 - C. Align the timing mark on the crankshaft pulley to "0" (TDC) on the engine timing indicator.

Fig. 10: Align the timing mark on the crankshaft pulley to "0" (TDC) on the engine timing indicator



- D. Turn the distributor rotor to point between the No. 1 and No. 8 spark plug towers.
 - E. Install the distributor by following the remaining steps.
12. Install the distributor in the vehicle, positioning the rotor and housing as marked during removal.

Fig. 11: The distributor shaft splines must mesh correctly for proper installation



13. Install the distributor hold-down clamp and bolt, and hand-tighten.
14. Attach the 4-terminal ECM harness connector.
15. Position the distributor cap over the distributor and secure the 4 latches by turning them clockwise with a screwdriver, or installing the 4 retaining screws, as applicable.
16. Attach the coil connectors to the cap, as tagged during removal. Make sure the locking tabs are fastened securely.
17. Connect the tachometer lead (if equipped) and the ignition switch battery feed wire to the distributor cap.
18. If removed, attach the spark plug wires, as tagged during removal, then install and secure the wire retainers.
19. Connect the negative battery cable. Check the ignition timing, as outlined in Section 1 of this manual.
20. Tighten the distributor hold-down bolt to 25 ft. lbs. (34 Nm).
21. Install the distributor shield.
22. Install the air cleaner cover and/or intake manifold plenum extension, as necessary.

1990 Chevrolet CORVETTE

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

NOTE: To avoid confusion, remove and tag the spark plug wires one at a time, for replacement.

If a distributor is not keyed for installation with only one orientation, it could have been removed previously and rewired. The resultant wiring would hold the correct firing order, but could change the relative placement of the plug towers in relation to the engine. For this reason it is imperative that you label all wires before disconnecting any of them. Also, before removal, compare the current wiring with the accompanying illustrations. If the current wiring does not match, make notes in your book to reflect how your engine is wired.

Fig. 1: 5.7L (VIN 8) Engines Engine firing order: 1-8-4-3-6-5-7-2 Distributor rotation: clockwise

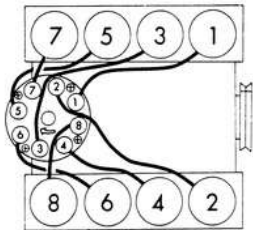
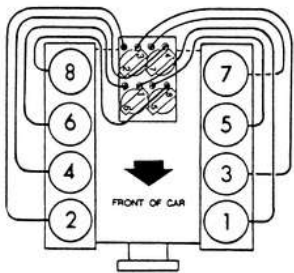
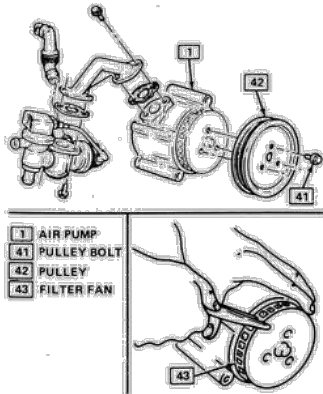


Fig. 2: 5.7L (VIN J) Engines Engine firing order: 1-8-4-3-6-5-7-2 Distributorless Ignition System



16-3

Fig. 3: 5.7L (VIN P and 5) Engines Engine firing order: 1-8-4-3-6-5-7-2 Distributor rotates with camshaft



1990 Chevrolet CORVETTE

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

The 5.7L (VIN P and 5) engines utilize the Opti-Spark distributor ignition system, which consists of a distributor assembly, control circuitry and an external coil. In the Opti-Spark system, all ignition timing is controlled by the Engine Control Module (ECM) or Powertrain Control Module (PCM), based on signals from the distributor's internally mounted optical camshaft position sensor. There is no way to bypass the ECM/PCM control or to adjust/set ignition timing on this system.

NOTE: In later years, this system is referred a simply the Distributor Ignition (DI) system.

The distributor assembly is mounted directly to the front end of the camshaft, next to the water pump. It directs the spark from the ignition coil to the appropriate spark plug secondary wire, through the rotor. The secondary output connectors in the distributor cap are each connected to an individual spark plug. The connectors in the cap are arranged for convenience in routing the spark plug wire harness assemblies. The corresponding cylinder number is molded into the distributor cap next to each output connector.

Fig. 1: Opti-Spark distributor ignition system components — 5.7L (VIN P and 5) engines

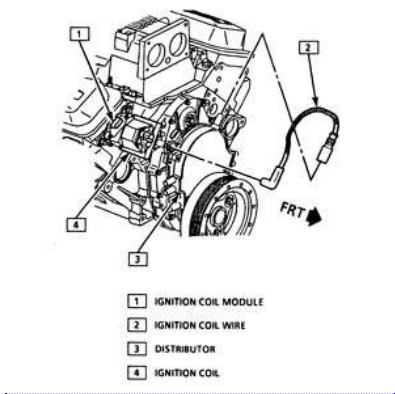


Fig. 2: View of the distributor assembly, including the cylinder identification — 5.7L (VIN P and 5) engines

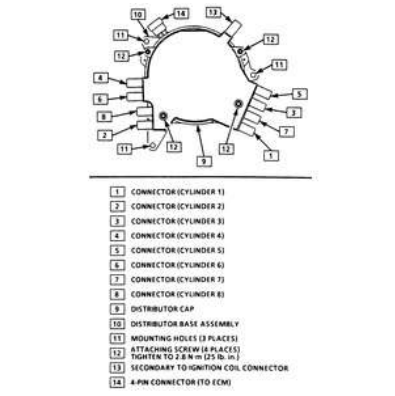
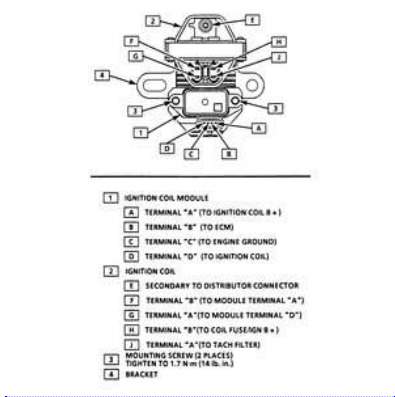


Fig. 3: Ignition coil and module used on the 5.7L (VIN P and 5) engines



The distributor also contains a signal disk and 2 optical Camshaft Position (CMP) sensor assemblies. These components send signals to the ECM/PCM for spark timing control.

The ignition coil/ignition control module assembly provides spark to the distributor assembly, timed by signals from the ECM/PCM. The ECM/PCM combines the camshaft position information supplied by the distributor with other system parameters and calculates the required spark advance and coil dwell. The ECM/PCM signals the ignition control module, which turns on, then off, the primary current to the ignition coil. When the primary current flow stops, high voltage induced in the ignition coil secondary winding becomes the spark voltage for the spark plug. The spark voltage is delivered to the distributor assembly through the coil secondary wire, and is then directed to the proper spark plug connector by the distributor rotor.

1990 Chevrolet CORVETTE

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

The distributorless ignition system, also referred to as Direct Ignition System (DIS) or Electronic Ignition (EI) system is found on 1990–95 vehicles equipped with the 5.7 (VIN J) engine. This system uses a "waste spark" method of spark distribution. Each cylinder is paired with its opposing cylinder in the firing order, so that one cylinder on the compression stroke fires simultaneously with an opposing cylinder which is on the exhaust stroke. Since the cylinder on the exhaust stroke requires little of the available voltage to fire its plug, most of the voltage is used to fire the cylinder on compression. The process reverses when the cylinders reverse roles.

Components of this system include the ignition coil pack, ignition control module, crankshaft position sensor assembly, crankshaft reluctor ring, camshaft sensor and the Engine Control Module (ECM) or Powertrain Control Module (PCM). The coil pack consists of four separate, interchangeable, ignition coils. The ignition module or Ignition Control Module (ICM) is located under the intake plenum and is connected to the ECM/PCM. The ignition coil module controls the primary circuit to the coils, turning them on and off.

Fig. 1: Location of the ignition coil pack, and cylinder identification — 5.7L (VIN J) engine

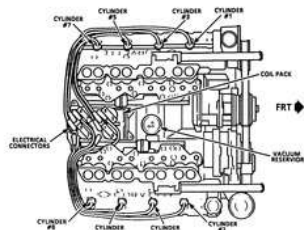
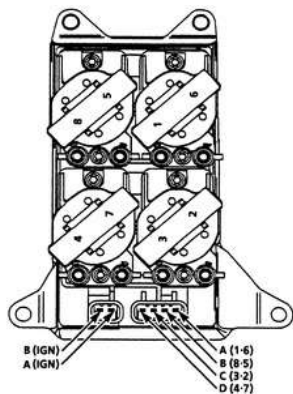
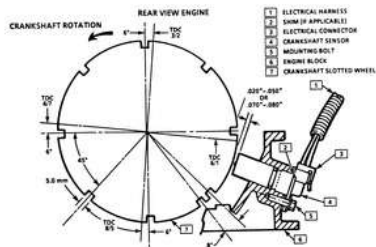


Fig. 2: The ignition coil pack contains 4 separate coils



A magnetic crankshaft position sensor assembly is used in this system. The sensor protrudes from the engine block, within approximately 0.050 in. (1.27mm) of the crankshaft reluctor. The reluctor is a special wheel cast onto the crankshaft assembly that has nine machined slots, eight of which are equally spaced 45 degrees apart, and the ninth is spaced 8 degrees from one of the other slots. As the reluctor rotates with the crankshaft, the slots change the magnetic field of the crankshaft position sensor assembly, causing an induced voltage pulse. By counting the time between pulses, the ignition control module can recognize the pulse of the seventh slot. Based on this pulse caused by the seventh slot, the ignition control module sends the reference signal to the ECM/PCM to calculate crankshaft position, used to fire coils in correct sequence, and engine speed.

Fig. 3: Crankshaft and sensor operation, based on engine rotation



Base ignition timing is preset when the engine is manufactured, and no adjustment is possible. Timing advance and retard are accomplished through the ECM/PCM with ignition control and knock sensor systems.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

The General Motors/Delco-Remy High Energy Ignition (HEI) system is a breakerless, pulse-triggered, transistor controlled, inductive discharge ignition system. It is used on 1984–91 vehicles equipped with the 5.7L (VIN 8) engine. The entire HEI system (except for the ignition coil) is contained within the distributor cap.

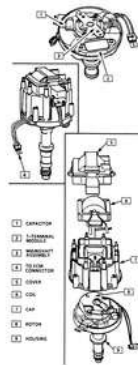
The distributor contains the electronic ignition module, and the magnetic pick-up assembly which contains a permanent magnet, a pole piece with internal teeth, and a pick-up coil (not to be confused with the ignition coil). The ignition coil is mounted to the top of the distributor cap.

The HEI distributor is equipped to aid in spark timing changes which is necessary to maintain emissions, economy and performance. This is achieved by the Electronic Spark Timing (EST) control system. On these vehicles, timing changes are electronically regulated through the computer control module, which monitors information from the various engine sensors, computes the desired spark timing and signals the distributor to change the timing accordingly. With this distributor, no vacuum or centrifugal advances are used.

In the HEI system, as in other electronic ignition systems, the breaker points have been replaced with an electronic switch, a transistor, which is located within the ignition module. This switching transistor performs the same function the points did in a conventional ignition system; it simply turns coil primary current on and off at the correct time. Essentially, the electronic and conventional ignition systems operate on the same principal.

The module which houses the switching transistor is controlled (turned on and off) by a magnetically generated impulse induced in the pick-up coil. When the teeth of the rotating timer align with the teeth of the pole piece, the induced voltage in the pick-up coil signals the electronic module to open the coil primary circuit. The primary current then decreases and a high voltage is induced in the ignition coil secondary windings which is then directed through the rotor and high voltage leads (spark plug wires) to fire the spark plugs.

Fig. 1: Exploded view of the HEI distributor, which is used on 1984–91 vehicles



In essence then, the pick-up coil module system simply replaces the conventional breaker points and condenser. The condenser found within the distributor is for radio suppression purposes only and has nothing to do with the ignition process. The module automatically controls the dwell period, increasing it with increasing engine speed. The HEI system features a longer spark duration which is instrumental in firing lean and Exhaust Gas Recirculation (EGR) diluted fuel/air mixtures. Since dwell is automatically controlled, it cannot be adjusted. The module itself is non-adjustable and non-repairable and must be replaced if found defective.

These engines are also with Electronic Spark Control (ESC). A knock sensor is mounted in the engine block. It is connected to the ESC module which is mounted to the cowl in the engine compartment. In response to engine knock, the sensor sends a signal to the ESC module. The module will then signal the ECM which will retard the spark timing in the distributor.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

Before proceeding with troubleshooting or HEI system service, please note the following precautions:

[Timing Light Use](#)

Inductive pick-up timing lights are the best kind to use with the HEI system. Timing lights which connect between the spark plug and the spark plug wire occasionally (not always) give false readings due to the high voltage of the HEI system which more easily leads to arcing.

[Spark Plug Wires](#)

The plug wires used with HEI systems are of a different construction than conventional wires. When replacing them, make sure you get the correct wires, since conventional point system wires won't carry the voltage. Also, handle them carefully to avoid cracking or splitting them and never pierce them.

[Tachometer Use](#)

Not all tachometers will operate or indicate correctly when used on a HEI system. While some tachometers may give a reading, this does not necessarily mean the reading is correct. In addition, some tachometers hook up differently from others. If you can't figure out whether or not your tachometer will work on your car, check with the tachometer manufacturer.

[HEI System Testers](#)

Instruments designed specifically for testing HEI systems are available from several tool manufacturers. Some of these will even test the module itself. However, most of the tests given in the following require only an ohmmeter and a voltmeter.

1990 Chevrolet CORVETTE

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

NOTE: For information on understanding electricity and troubleshooting electrical circuits, please refer to Section 6 of this manual.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

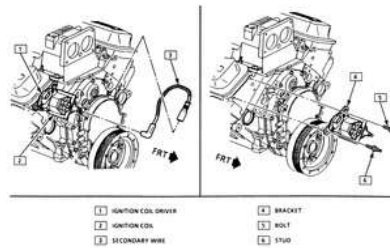
1. Disconnect the negative battery cable.
2. Detach the 4-terminal ECM connector from the driver.
3. Tag and detach the coil connectors.
4. Disconnect the coil secondary wire.

NOTE: On 1992 vehicles, the module is referred to as the ignition coil driver. On later vehicles, it is called the ignition coil module.

5. Remove the Ignition Coil Module (ICM) retaining bolt and stud from the engine.
6. Remove the ICM and bracket from the vehicle.
7. If necessary, remove the coil from the module and brackets, as follows:
 - A. Remove the bolts retaining the coil to the module and brackets. The coil may be held onto the brackets by rivets. If so, drill out the rivets to remove.
 - B. Remove the remaining screws and the ignition coil module from the assembly.

NOTE: Do not wipe the silicone grease from the bottom of the ignition coil assembly, if it is to be reinstalled.

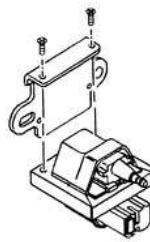
Fig. 1: Exploded view of the ignition coil, driver/module and bracket — 5.7L (VIN P) engine



To install:

8. If installing a new ignition coil module, spread the silicone grease included with the new module on the metal mounting face of the module and on the bracket where it seats. If reusing the old module, confirm that the grease is still present on the module.
9. Position the ignition coil module onto the bracket and install the retainers. Tighten the screws to 15 inch lbs. (1.7 Nm).
10. Install the coil to the brackets and install the screws provided with the replacement coil. Tighten the new screws to 25 inch lbs. (2.8 Nm).

Fig. 2: The ignition coil is mounted to the bracket with 2 retaining screws



11. Position the coil assembly onto the cylinder head assembly. Install the stud and tighten to 18 ft. lbs. (25 Nm).
12. Install the mounting screw and tighten to 18 ft. lbs. (25 Nm).
13. Engage the ignition coil harness and coil wiring connectors.
14. Attach the four-terminal ECM/PCM connector to the ignition coil module.
15. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Unplug the 4-terminal ECM connector from the ignition control module/driver.
3. Unfasten the 2 driver attaching screws.

To install:

NOTE: A package of silicone grease is included with the new driver/module. Spread the grease onto the metal face of the driver, and also on the mounting bracket where the driver seats. The grease is very important to proper driver cooling.

4. Position the driver and secure with the attaching screws. Tighten the screws to 14 inch lbs. (1.7 Nm).
5. Attach the 4-pin connector to the driver/module.
6. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: The ignition coil plate connector may also be referred to as the direct ignition housing.

1. Disconnect the negative battery cable.
2. Remove the intake plenum.
3. Tag and disconnect the spark plug wires from the ignition coil.
4. Detach the electrical connectors.
5. Unfasten the 4 ignition coil bracket retaining bolts.
6. Note the position of the coils, then remove the retaining bolts. There are 2 bolts per coil.
7. Remove the coils from the ignition coil plate connector.
8. Remove the ignition coil plate connector from the bracket.

To install:

9. Place the ignition coil plate connector on the bracket.
10. Install the 4 seals packaged with the ignition coil plate connector.
11. Position the coils on the ignition coil plate connector.
12. Install the coil retaining bolts and tighten to 40 inch lbs. (4.5 Nm).
13. Install the ignition coil plate connector bracket on the engine. Install the retaining bolts and tighten as follows:
 - A. M6-16 bolts: 89 inch lbs. (10 Nm).
 - B. M8-20 bolts: 19 ft. lbs. (26 Nm).
14. Attach the electrical connectors and spark plug wires, as tagged during removal.
15. Install the intake plenum, then connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Remove the intake plenum.
3. Tag and disconnect the spark plug wires from the ignition coil.
4. Unfasten the coil retaining bolts, then remove the coil from the module.

To install:

5. Position the coil to the module and secure with the retaining bolts. Tighten the bolts to 40 inch lbs. (4.5 Nm).
6. Attach the spark plug wires to the ignition coil, as tagged during removal.
7. Install the intake plenum.
8. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Disconnect the negative battery cable.
2. Remove the intake manifold plenum extension.
3. Tag and disconnect the secondary wires, then remove the retainer(s) from the distributor cap, and position aside.
4. Unfasten the 2 coil cover attaching screws, then lift the cover off.
5. Remove the 4 coil-to-cap attaching screws and lift the ignition coil and leads from the cap.

Fig. 1: The ignition coil is secured to the distributor cap with 4 screws

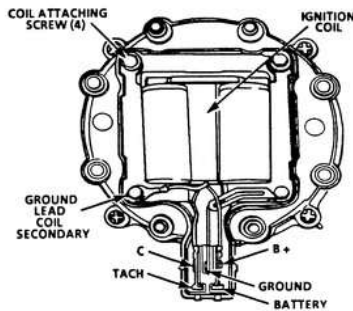
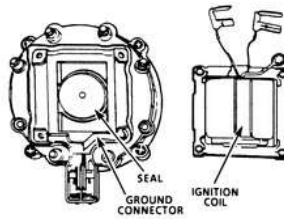


Fig. 2: View of the ignition coil removed from the distributor cap



6. Remove the ignition coil arc seal.
7. Clean the cap with a soft cloth and inspect for defects. Replace if necessary.

To install:

8. Place a new seal on the distributor cap.
9. Position the ignition coil to the distributor cap and secure with the retaining screws. Tighten the screws to 13 inch lbs. (1.5 Nm).
10. Attach the coil electrical leads.
11. Install the distributor cap cover.
12. Attach the secondary wires, as tagged during removal and install the retainer(s).
13. Install the intake manifold plenum extension.
14. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Remove the ignition coil(s).
2. Using an ohmmeter, check the resistance between the primary terminals on the underside of the coil. The resistance should be 0.35–1.45 ohms.
3. Check the resistance between the secondary terminals. It should be 5000–6,500 ohms.
4. If the coil failed either test, replace the coil.

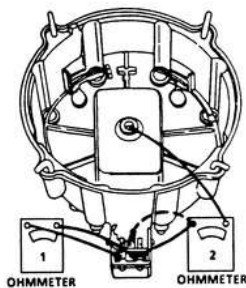
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Tag and detach the spark plug wires, and unplug the electrical connectors from the distributor cap and coil.
2. Use a screwdriver to turn the 4 latches, then remove the cap and coil assembly from the lower distributor housing.
3. Connect an ohmmeter, as shown in test 1, in the accompanying figure. The reading should be zero, or nearly zero. If not, replace the ignition coil.

Fig. 1: Connect the ohmmeter as shown to test the ignition coil



4. Using the high scale, connect the ohmmeter both ways, as shown in test 2 in the accompanying figure. The readings should NOT be infinite. Replace the coil ONLY if both readings are infinite.
5. If the coil is good, test the pick up coil, as outlined later in this section.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

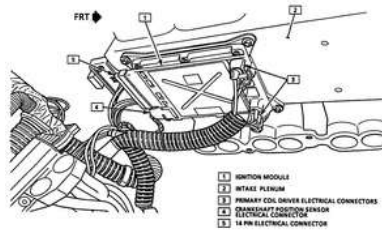
Fuel Delivery: FI | Fuel: GAS

The Ignition Control Module (ICM), is also referred to as simply the ignition module.

NOTE: Before removing the ignition control module, make sure to properly identify the module, then refer to the instruction sheet packaged with the replacement module.

1. Disconnect the negative battery cable.
2. Remove the intake plenum.
3. Detach the ignition module electrical connectors.
4. Unfasten the 4 retaining bolts, then remove the ignition module from the vehicle.

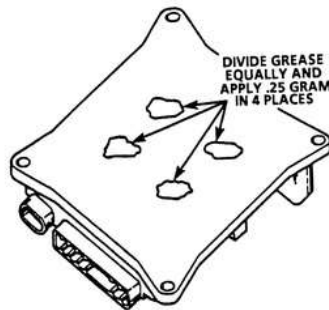
Fig. 1: The Ignition Control Module (ICM) is mounted to the intake plenum



To install:

5. Apply the silicone dielectric grease, supplied with the replacement kit, to the back of the ignition module, as shown in the accompanying figure.

Fig. 2: Divide the silicone grease in 4 parts, then apply evenly to the rear of the module



6. Place the ignition module in position, then secure with the retaining bolts. Tighten the bolts to 89 inch lbs. (10 Nm).
7. Attach the electrical connectors nearest the front of the engine to the ignition control module.
8. Install the intake plenum.
9. Install the 14-pin connector screw and tighten to 9 inch lbs. (1 Nm).
10. Connect the negative battery cable.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

NOTE: It is imperative that silicone lubricant be used under the module when it is installed, to prevent module failure due to overheating.

1. Disconnect the negative battery cable.
2. Remove the intake manifold plenum extension.
3. If necessary for access, tag and disconnect the spark plug wires from the distributor cap.
4. Remove the distributor cap and rotor, as outlined in Section 1 of this manual.
5. Unfasten the 2 module attaching screws, then lift the module up. Note the colors of the module leads, then disconnect them from the module.

Fig. 1: Remove the 2 ignition module retaining bolts

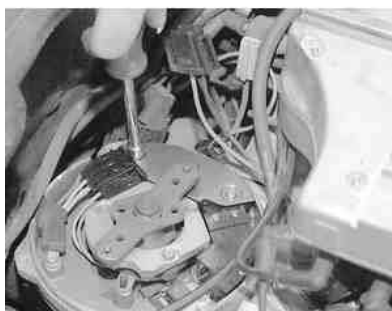


Fig. 2: Lift the module from the distributor, note the connector colors . . .

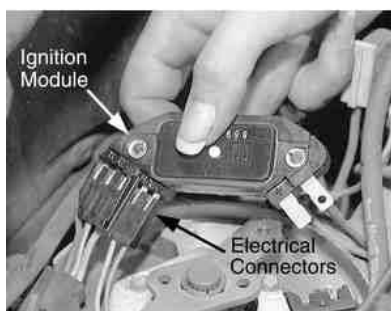
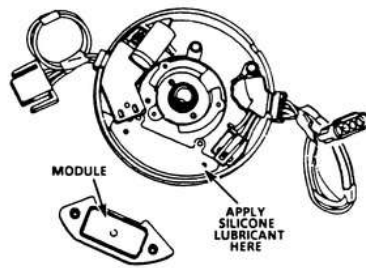


Fig. 3: . . . then detach the connectors and remove the module from the vehicle



6. If installing a new module, wipe the old silicone grease from the module and distributor base. If reinstalling the removed module, do NOT wipe the grease from the module or distributor base.

Fig. 4: Before installing the ignition module, apply silicone grease to the module to aid in heat dissipation



To install:

NOTE: If installing a new module, a packet of silicone grease will be included in the kit. Spread the grease on the metal face of the module and on the distributor base where the module seats. The grease is essential for module cooling.

7. Attach the leads to the module, noting the color code.
8. Install the module and secure with the retaining screws. Tighten the screws to 18 inch lbs. (2 Nm).
9. Install the rotor and distributor cap, as outlined in Section 1 of this manual.
10. If removed, connect the spark plug wires, as tagged during removal.
11. Install the intake manifold plenum extension.
12. Connect the negative battery cable.

1990 Chevrolet CORVETTE

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

Because of the complexity of the internal circuitry of the HEI/EST module, it is recommended the module be tested with an accurate module tester.

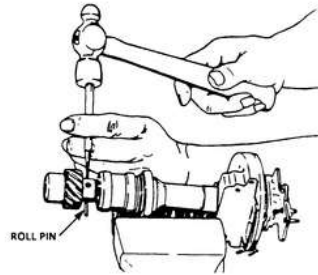
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

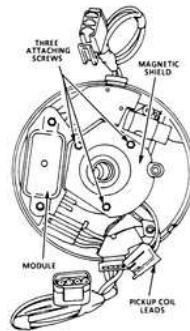
1. Disconnect the negative battery cable.
2. Remove the distributor from the vehicle. For details, please refer to the procedure later in this section. Remove the cap and rotor.
3. Matchmark the gear and shaft for installation purposes, then drive the roll pin from the gear and pull the shaft assembly from the distributor.

Fig. 1: Once the distributor is removed from the vehicle, use a hammer and punch to carefully drive the roll pin from the shaft



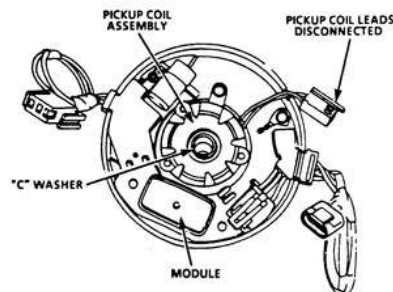
4. Unfasten the 3 retaining screws, then remove the magnetic shield from the distributor.

Fig. 2: The magnetic shield is held in place with 3 screws



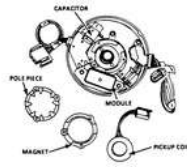
5. Remove the thin "C" washer (waved retaining ring), then lift the pick-up coil straight up to remove from the distributor.

Fig. 3: You must remove the thin "C" washer in order to remove the pickup coil



6. Remove the magnet and pole piece.

Fig. 4: Exploded view of the pick-up coil, magnet and pole piece



To install:

7. Install the pole piece and magnet.
8. Install the pickup coil and the thin "C" washer.
9. Assemble the shaft, gears parts and roll pin. Use the marks made during removal for alignment purposes.
10. Spin the distributor shaft to be sure the teeth do not touch. If the teeth make contact, loosen, then re-tighten the pickup coil teeth and Hall Effect Switch teeth (if used) to eliminate contact.
11. Install the rotor and cap, then install the distributor assembly. For details, please refer to the procedure located later in this section.
12. Connect the negative battery cable.

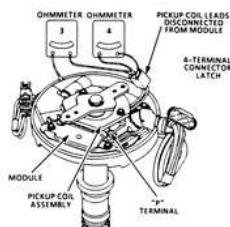
1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

1. Remove the rotor and pick-up coil leads from the module.
2. Using an ohmmeter, attach one lead to the distributor base and the second lead to one of the pick-up coil terminals of the connector, as shown in test 3 in the accompanying figure.
3. The reading should be infinite. If not, the pick-up coil is defective.
4. Attach both leads of the ohmmeter to the pick-up terminal ends of the connector, as shown in test 4 in the accompanying figure.

Fig. 1: Ohmmeter connections for testing the pick-up coil



5. The reading should be a steady value between 500–1500 ohms.
6. If the reading is not within the specifications, the pick-up coil is defective.

NOTE: While testing, flex the leads to determine if wire breaks are present under the wiring insulation.