

Distributors & Ignition Systems

NIPPONDENSO ELECTRONIC IGNITION SYSTEM

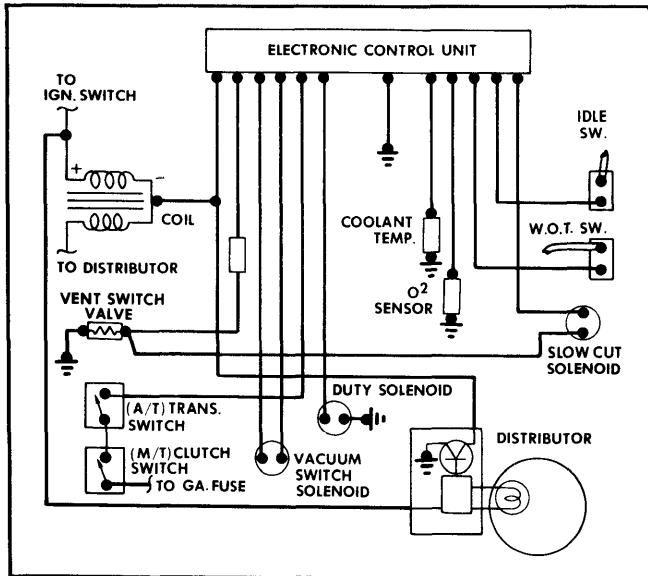
Chevrolet & GMC S10 Pickups with 1.9L 4-Cylinder Engines

DESCRIPTION

Two variations of electronic ignition are used with the 1.9L 4-cylinder engine, both making use of a Nippondenso distributor.

California models feature a computer, in addition to other ignition components. The computer is a part of the computerized engine control system. See Fig. 1.

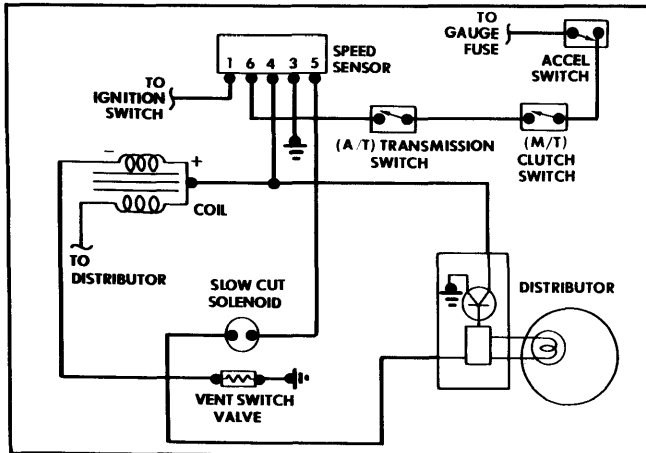
Fig. 1: Wiring Diagram of Nippondenso California System



California models have computerized engine control.

Federal models incorporate an engine speed sensor into the system, but have no computer. See Fig. 2.

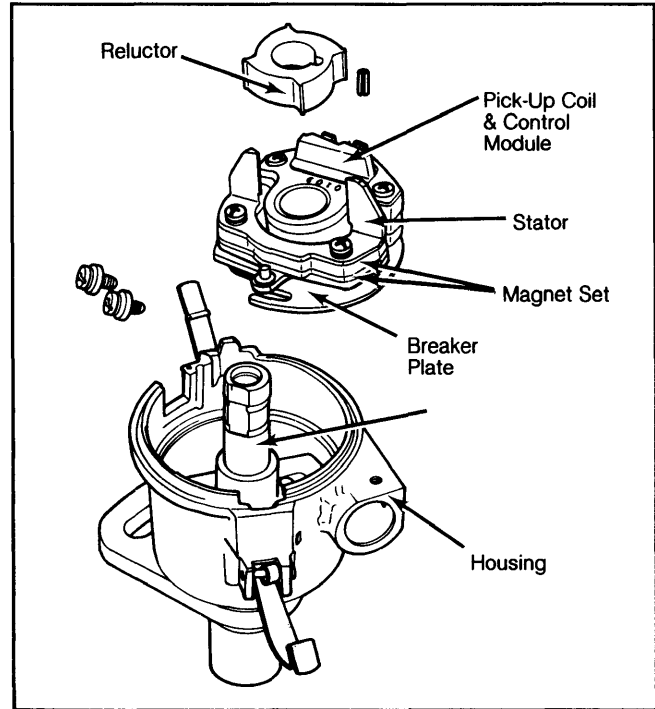
Fig. 2: Wiring Diagram of Nippondenso Federal System



Federal models have no computer.

The distributor has both vacuum and centrifugal advance mechanisms. It also houses a reluctor, stator, magnet set, and a pick-up coil and control module assembly. See Figs. 3 and 5. The system makes use of a conventional ignition coil with positive, negative, and secondary terminals.

Fig. 3: Distributor Breaker Plate Assembly



Note stator-to-pick-up coil and module relationship.

OPERATION

As the engine cranks, the distributor shaft turns, carrying with it the rotor shaft assembly. A reluctor (toothed wheel), mounted on the rotor shaft, turns inside a 2-pronged stator, which is attached to the magnet set.

As each reluctor tooth approaches and passes the stator upright prong, the magnetic field around the prong is broken. The pick-up coil and control module assembly is mounted inside the distributor, next to the magnet set and stator. Components are attached to the breaker plate assembly. See Fig. 3.

The build-up and collapse of the magnetic field causes the pick-up coil to send a signal to the control module. The module, in response, opens and closes the ignition coil primary circuit. Each time this occurs, a voltage surge occurs in the coil secondary circuit, firing the spark plugs.

On California models, the computer monitors the ignition system along with other engine sensors. The computer then makes calculations and adjusts the air/fuel ratio.

No ballast resistors or resistance wires are used with the system.

ADJUSTMENT

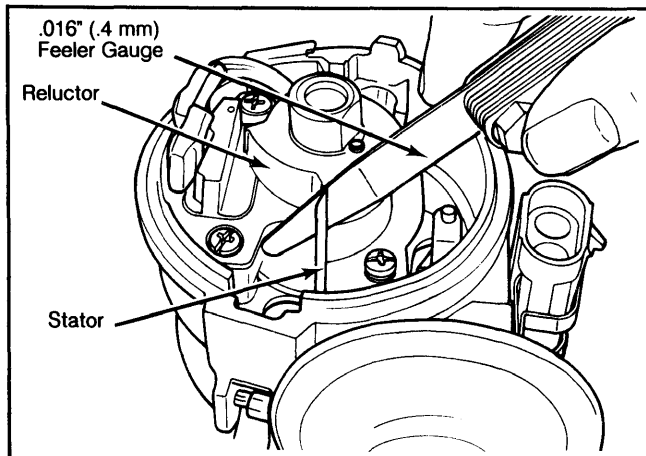
PICK-UP COIL AIR GAP

1) Using a feeler gauge, measure air gap between each tooth of the reluctor and stator prongs. See Fig. 4.

2) Air gap should read .012-.020" (.3-5 mm). If not to specifications, loosen 2 screws and adjust position of stator and magnets until gap is correct. Tighten screws and recheck air gap.

NIPPONDENSO ELECTRONIC IGNITION SYSTEM Cont.)

Fig. 4: Measuring Pick-Up Coil Air Gap



Insert gauge between stator prong and reluctor teeth.

TESTING

NOTE: When testing the ignition system, use either an ignition spark tester or modified spark plug (case grounded, with side electrode cut off).

IGNITION SYSTEM NO-START CHECK

1) Remove spark plug wire, and attach ignition tester to its end. Crank engine. If no spark, check a second spark plug wire in similar manner.

2) If spark resulted at either wire, ignition system is not at fault. Check fuel system, mechanical condition, and spark plugs. If no spark resulted at either wire, connect negative voltmeter lead to ground. In turn, touch positive lead to battery terminals of ignition coil and distributor, while cranking engine.

3) If voltage is below 7 volts, repair primary circuit (from battery terminals back to ignition switch and battery positive terminal. If voltage is above 7 volts, proceed to next step.

4) Turn ignition switch "OFF". Connect the ohmmeter leads to positive and negative terminals of ignition coil. Check for an open circuit in the coil. If open, replace ignition coil.

5) If ignition coil is not open, turn ignition switch "ON". Connect voltmeter negative lead to ground, and touch positive lead to ignition coil negative terminal. If voltage is below 5 volts, replace ignition coil.

6) If voltage is above 5 volts at negative terminal of coil, remove secondary wire from top of distributor. Attach ignition spark tester to end of coil wire. Crank engine and check for spark at tester.

7) If spark results, check distributor pick-up coil air gap. Clearance should be .012-.020" (.3-.5 mm) minimum on one side. If OK, replace rotor with a new one.

8) If no spark results at coil wire, check air gap at distributor pick-up coil. Clearance should be .012-.020" (.3-.5 mm) minimum on one side.

9) If gap is incorrect, adjust as necessary. If correct, replace control module (part of pick-up coil assembly). Repeat steps 1) through 5).

10) If spark results at tester, no-start problem has been corrected. If no spark results, original module

was not defective. Install original module, and replace ignition coil. Again, repeat steps 1) through 5). Spark should result at tester.

IGNITION SYSTEM CHECK WHEN ENGINE RUNS ROUGH

1) Remove spark plug wire from spark plug. Attach ignition spark tester to end of spark plug wire. Crank engine and watch for spark at tester.

2) If there is no spark, refer to "Ignition System No-Start Check." If spark occurs, check ignition timing. If necessary, adjust to correct. If timing is to specifications, check to see if dwell angle increased. If so, problem is not with ignition system. Check fuel system and spark plugs.

3) If dwell angle did not increase, check distributor pick-up coil air gap. See "Pick-Up Coil Air Gap" under "Adjustments". Adjust if necessary. If air gap is normal, replace control module.

IGNITION COIL PRIMARY RESISTANCE CHECK

1) Remove primary wires from ignition coil. Set ohmmeter in low range. Connect ohmmeter leads to coil positive and negative terminals (Leads may be touched to Red and White wire terminals in ignition coil harness connector).

2) Primary resistance should be .90-1.40 ohms. If not within specified range, replace ignition coil.

IGNITION COIL SECONDARY RESISTANCE CHECK

1) Remove primary wires and secondary wire from ignition coil. Set ohmmeter in high range. Connect ohmmeter leads to secondary tower and to either primary terminal (or White wire terminal in ignition coil harness connector).

2) Secondary resistance should measure 7,300-11,100 ohms. If not, replace ignition coil.

IGNITION COIL INSULATION RESISTANCE CHECK

1) Set ohmmeter in highest range. Connect ignition coil harness to coil primary terminals, if previously removed. Connect ohmmeter leads to Red wire terminal in coil harness and to coil outer shell.

2) Insulation resistance should be 10 megohms or more. Even if tester needle deflects slightly, ignition coil is poorly insulated and must be replaced.

SPARK PLUG AND COIL WIRE RESISTANCE

1) Examine wires for broken insulation, terminals, corrosion, or other damage. Replace if necessary.

2) Set ohmmeter to high range. Connect ohmmeter leads to each end of spark plug and coil secondary wires. Resistance should be 31,500-73,500 ohms per foot.

OVERHAUL

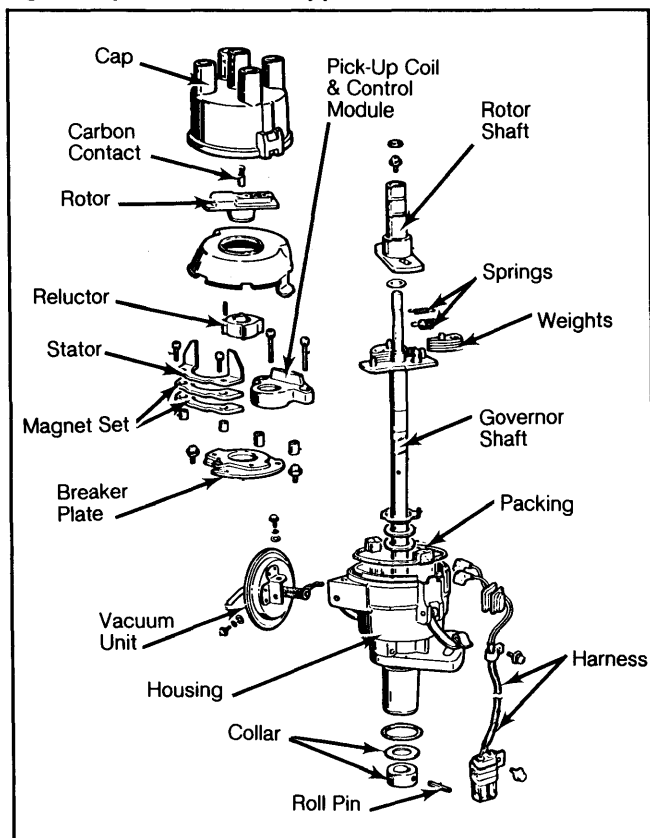
DISASSEMBLY

1) Remove the cap, rotor, and packing. Remove cover. Remove screws attaching vacuum unit, and lift out vacuum unit from housing. See Fig. 5.

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NIPPONDENSO ELECTRONIC IGNITION SYSTEM (Cont.)

Fig. 5: Exploded View of Nippondenso Distributor



Pick-up coil is built into control module.

2) Remove screw attaching harness assembly. Disconnect connectors (Pink and White wires) from control unit. Remove harness assembly from housing. Using 2 screwdrivers to pry upward on reluctor, remove reluctor from rotor shaft.

3) Remove 2 screws securing breaker plate assembly, and lift assembly from housing. Remove pick-up coil and control module assembly. Remove governor shaft assembly, packing, and screw attaching rotor shaft assembly.

NOTE: End of governor shaft is offset. To maintain original relationship of 2 shafts, scribe mark across rotor shaft and governor shaft before removal.

4) Remove rotor shaft from governor shaft. Remove governor weights and springs.

INSPECTION

1) Wash and clean disassembled parts. Do not wash inner face of vacuum unit. Check parts for wear or damage, correcting as necessary.

2) Check distributor cap and rotor head for cracks and carbon tracking. Check center carbon contact for wear.

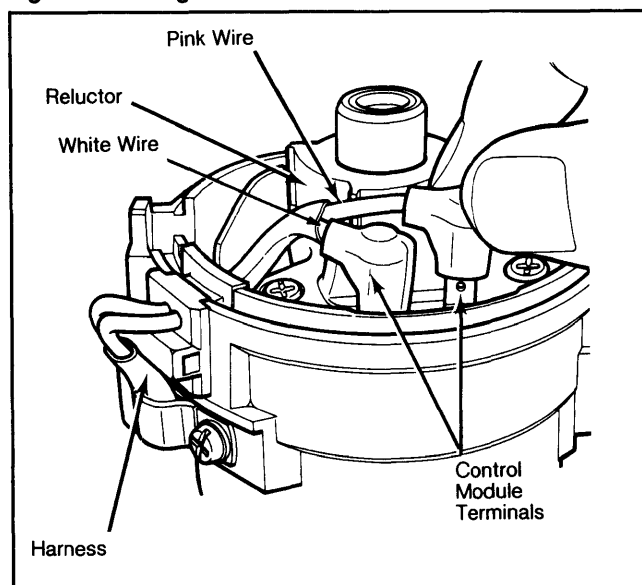
REASSEMBLY

To reassemble, reverse disassembly procedures, noting the following points:

- Governor springs should be fitted to spring hanger pin of governor shaft assembly with smaller hook end downward.

- Correctly align rotor and governor shafts, according to scribe marks made during installation.
- Use a new roll pin when installing collar.
- When installing breaker assembly, the edge at cutaway portion of base must be flush with edge of base fixing screw slot.
- Roll pin should be installed so that slot is parallel with cutaway portion of reluctor, as viewed from above.
- Harness terminal should be connected to pick-up coil and control module assembly as shown in Fig. 6. Install gasket after setting cover to housing.

Fig. 6 Attaching Harness to Control Module



Notice wire colors and their location.