NIPPONDENSO ELECTRONIC IGNITION SYSTEM

Subaru
1600 (Except 4-WD)
1800
Toyota
Celica
Corolla
Corona
Cressida
Land Cruiser
Pickup
Supra
Tercel

DESCRIPTION

Nippondenso electronic ignition system includes a breakerless distributor, an ignitor (ignition control unit), a special ignition coil, an ignition signal generating mechanism (pick-up coil assembly) and ignition switch.

The distributor consists of a housing, rotor and cap. It contains a timing rotor (reluctor), magnet, and pick-up coil assembly. A transistorized ignitor is separate from the distributor. See *Fig. 1*. Distributors contain conventional centrifugal and vacuum advance mechanisms.

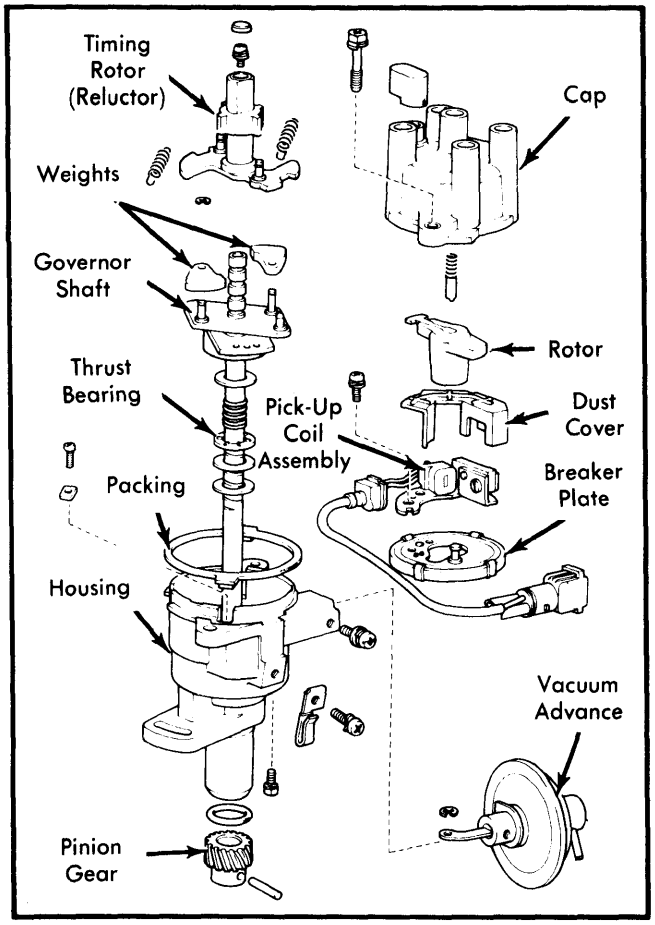

Fig. 1 Disassembled View of Nippondenso Distributor (Toyota Model Shown)

OPERATION

As the timing rotor turns with the distributor shaft, its teeth (one for each engine cylinder) pass the pick-up coil assembly. See *Fig. 2*. As the air gap changes with the approach and passing of each tooth, the magnetic field varies. This creates a signal in the pick-up coil assembly.

The ignitor senses this signal and turns the ignition coil primary circuit on and off. This causes voltage to build and collapse, resulting in a voltage surge in the secondary that fires the spark plugs.

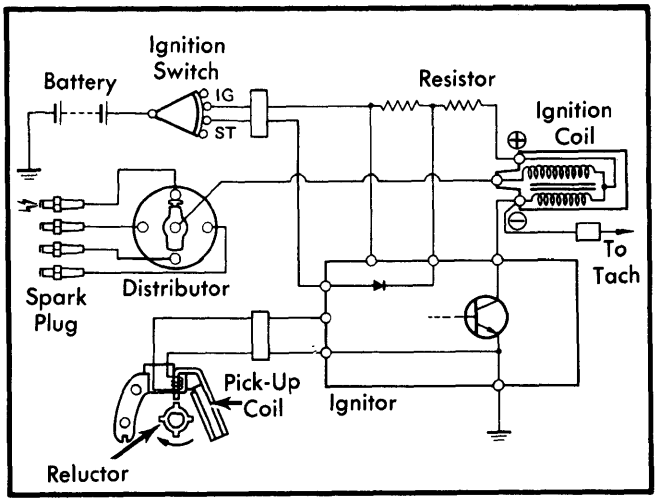

Fig. 2 Schematic of Typical Toyota Electronic Ignition Circuit (Federal Celica and Corona)

SPECIFICATIONS

Centrifugal & Vacuum Advance – *See Specifications Tables in this section.*

ADJUSTMENT

Timing Rotor (Reluctor)-to-Pick-Up Coil Air Gap – Using a flat feeler gauge, check air gap. Gap should be .008-.016" (0.2-0.4 mm). If not, loosen screws and move pick-up coil against feeler gauge of proper thickness. Tighten screws and recheck air gap.

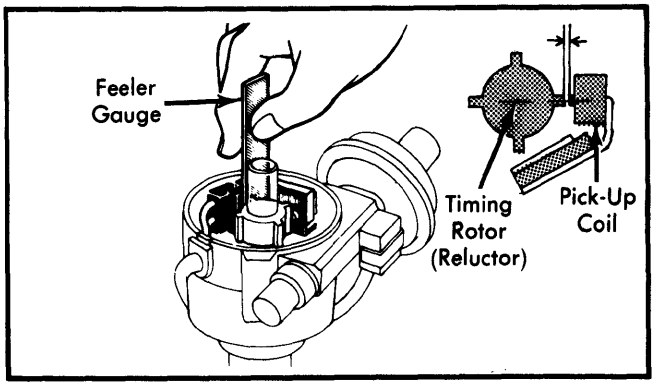

Fig. 3 Checking Timing Rotor-to-Pick-Up Coil Air Gap (Toyota Shown)

TESTING

CAUTION – *Be sure all connections are correct, as reverse battery polarity within the system will damage the ignitor (ignition control unit). Do not disconnect battery while engine is running or transistors may be damaged. Do not allow water to enter ignitor. If a tachometer is connected to system, connect tachometer positive lead to coil negative terminal.*

NIPPONDENSO ELECTRONIC IGNITION SYSTEM (Cont.)

CAUTION – *Be especially careful when checking Toyota systems, as a variety of ignition coil, ignitor, and resistor combinations are used. Connectors and wire colors also vary from model to model. Illustrations are for typical systems only.*

IGNITION COIL TEST

NOTE – *All tests on the ignition coil are made with an ohmmeter with the ignition switch in the "OFF" position. If the resistance for any test is not within specifications, replace ignition coil.*

Primary Coil Resistance – Connect an ohmmeter set in x1 range so leads touch coil positive and negative primary terminals (or connector terminals leading to them). See *Ignition Coil Resistance chart.*

Secondary Coil Resistance – Set an ohmmeter in the x100 range. Connect leads to coil primary terminal and to coil tower (high tension terminal). See *Ignition Coil Resistance chart.*

Resistor Resistance – Connect an ohmmeter, set in the x1 range, so that leads are connected to each side of resistor (or resistance wire), if equipped. See *Ignition Coil Resistance chart.*

Ignition Coil Resistance (Ohms)

Application	Primary Resistance	Secondary Resistance
Toyota		
Tercel①	0.4-0.5	8,500-11,500
Corolla		
Federal①	0.4-0.5	8,500-11,500
Calif.①	0.8-1.0	11,500-15,500
Celica & Corona		
Federal②	0.5-0.6	11,500-15,500
Calif.②	0.8-1.0	11,500-15,500
Pickup		
Federal③	1.3-1.7	12,000-16,000
Calif.①	0.8-1.0	11,500-15,500
Supra & Cressida①	0.5-0.6	11,500-15,500
Land Cruiser③	1.3-1.7	12,000-16,000
Subaru③	1.33-1.63	12,600-15,400

① – No external resistor or resistance wire.
② – Resistor resistance is 1.2-1.4 ohms.
③ – Resistor resistance is 1.1-1.3 ohms.

Insulation Resistance – Connect ohmmeter leads between coil positive terminal and mounting bracket of coil. Reading on all models should exceed 10,000 ohms (infinity).

High Tension Wire Resistance – Connect an ohmmeter, set in x1000 range, so that leads touch each end of high tension wires. Readings should not exceed 25,000 ohms. If so, replace wires.

IGNITOR TESTS

CAUTION – *Be especially careful when checking Toyota systems, as 2 different procedures are used, depending upon vehicle model.*

Federal Celica, Corona and Pickup Models – 1) Turn ignition switch on. Connect voltmeter negative lead to a good ground. On Celica and Corona models connect the positive voltmeter lead to the resistor positive terminal. On Pickup models, unplug harness connector at the ignitor and touch positive voltmeter lead, in turn, to each terminal (A and B). All readings should be 12 volts.

2) Unplug the wiring connector from the distributor. Using a 1.5 volt dry cell battery, connect the positive battery pole to the White wire terminal and the negative battery terminal to the Pink wire terminal. Connect negative voltmeter lead to ground and positive lead to ignition coil negative terminal.

3) Voltmeter reading should be 12 volts. Reverse battery connections and recheck voltage at coil negative terminal. It should be 1-2 volts. If not, replace ignitor.

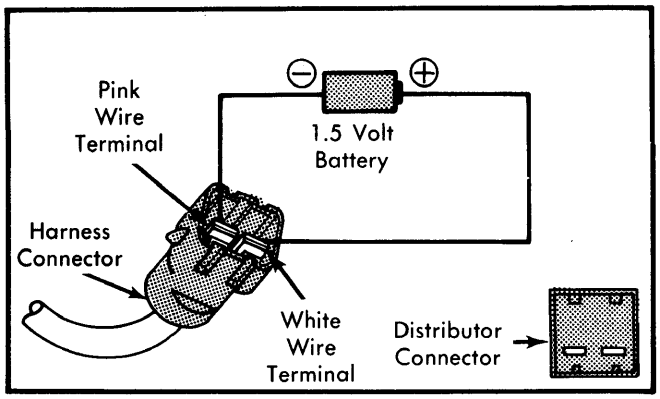

Fig. 4 Checking Ignitor Operation with 1.5 Volt Battery (Toyota Celica, Corona & Pickup Models Shown – Others Have Connections Reversed)

Other Toyota Models – 1) Turn ignition switch on. Connect negative voltmeter lead to a good ground and positive lead to ignition coil positive terminal. Voltage reading should be 12 volts.

2) Next, connect voltmeter positive lead to ignition coil negative terminal, with negative lead still connected to ground. Voltage should still be 12 volts.

3) Unplug wiring connector from distributor. Using a 1.5 volt dry cell battery, connect battery positive pole to Pink wire terminal and negative pole to White wire terminal. Do NOT apply voltage for more than 5 seconds. Voltage at negative terminal of ignition coil should now read 5 volts less than battery voltage. If not, replace ignitor.

IGNITION SYSTEM TEST

NOTE – *Although this information applies basically to Subaru models, the same principle applies to Toyota models with resistors or resistance wires.*

1) Turn ignition switch "ON". Connect negative lead of a voltmeter to ground and positive lead (in turn) to each of the resistor terminals "a" and "b". One reading should be battery voltage, the other reading should be one half that voltage. If so, proceed to step **10).**

2) If there was no voltage at either terminal in step **1)**, check wiring harness, connector, ignition switch and fuse between

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battery and resistor. Check for broken wires, poor connections, and battery condition.

3) If there was voltage at only one of the resistor terminals in step **1)**, turn ignition switch "ON" and disconnect lead wire from terminal having no voltage. Check resistor terminal for voltage. If none, replace resistor. If voltage now exists, check wiring harness between resistor and positive terminal of ignition coil for short circuit. Repair or replace as necessary.

4) If there was voltage at both terminals, but one was not about one-half battery voltage, turn ignition switch "ON". Connect voltmeter negative lead to ground and positive lead to ignition coil negative terminal. Reading should be battery voltage.

5) If not, turn ignition switch "ON" and connect voltmeter negative lead to ground and positive lead to ignition coil positive terminal. Reading should be battery voltage. If not, replace ignition coil. If battery voltage is shown, check wiring harness between resistor and ignition coil positive terminal. Check for broken wires, poor connections and repair as necessary.

6) If voltage at ignition coil negative terminal in step **4)**, was battery voltage, turn ignition switch "OFF". Using an ohmmeter set in the x1 range, measure resistance between ignitor side and ground. Resistance should be less than 0.5 ohm. If not, check ground wire for proper contact at regulator bracket

7) If resistance was less than 0.5 ohm in step **6)**, proceed to the next step, step **8)**.

8) Turn ignition switch off. Disconnect 2-pin (Toyota) or 3-pin (Subaru) distributor connector. Disconnect high tension wire at distributor and hold it 1/4" from engine block. Turn ignition switch on. Check if spark jumps when a small voltage (1-6 volts) is applied intermittently on termnals "1" (pink wire) and "3" (white wire) on ignitor side of connector. *See Fig. 5.*

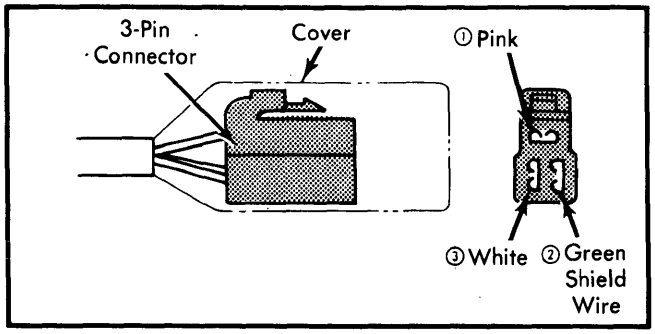

Fig. 5 Conducting Tests at Distributor Connector (Subaru Shown)

CAUTION — *Do not use battery voltage (12 volts) for this test or ignitor may be damaged.*

9) If spark jumps gap, there is no problem with the ignition system. If no spark occurs, replace ignitor.

10) If in step **1)**, the voltage at one resistor terminal was one-half that of the other, turn ignition switch "ON". *See Fig. 3.* Connect negative lead of voltmeter to a good ground and positive lead to ignition coil negative terminal. If reading is not below 0.5 volt, check wiring harness for shorts, check loose connections at coil negative terminal and repair as necessary. If no problem is found, perform steps **8)** and **9)** again.

11) If in step **10)** reading was below 0.5 volts, turn ignition switch "OFF" and disconnect 2-pin connector. Using an ohmmeter set to the x100 range, connect leads to terminals "1" (pink wire) and "2" (white wire) on distributor side of 2-pin (Toyota) or 3-pin (Subaru) connector. Reading should be 130-190 ohms for all models.

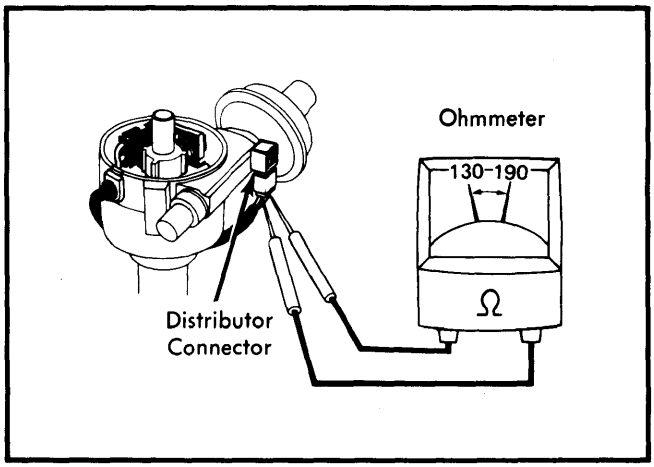

Fig. 6 Checking Pick-Up Coil Resistance (Toyota Shown)

12) If resistance reading is incorrect, replace pick-up coil assembly. If correct, turn ignition switch "OFF" and check timing rotor (reluctor)-to-pick-up coil air gap. If not .008-.016" (0.2-0.4 mm), adjust as necessary. If air gap is correct, perform steps **8)** and **9)** again.

OVERHAUL

Disassembly — **1)** Remove distributor cap rotor, dust cover, and packing. Remove pick-up coil assembly, vacuum advance mechanism, breaker plate and drive pinion.

2) Remove 2 screws from bottom of distributor housing and using a plastic hammer, carefully drive out shaft. Remove thick washer, bearing, thin washer, spring, and blue washer from shaft.

3) Remove governor springs, cam cap, timing rotor (reluctor), weight snap ring and weights.

Reassembly — Assemble in reverse order, noting the following:

- Lightly grease timing rotor (reluctor) inner surface. Install on shaft aligning mark on stopper plate ("15.5" mark on Subaru; "10" mark on Celica, Corona, and Pickups; and "13.5" on Corolla) with stopper.
- When installing breaker plate, align 4 clips of plate with 4 grooves in housing.
- When replacing pinion, replace pin and pinion as a set.
- Adjust air gap between timing rotor and pick-up coil.