HITACHI ELECTRONIC IGNITION SYSTEMS – DATSUN

200SX
210
280ZX
310
510
810
Pickup

DESCRIPTION

Two different systems are used on Datsun models in 1980, however the principle of operation is the same. Both systems use an electronic distributor, an IC ignition unit, ignition coil(s), battery and wiring harnesses. See *Figs. 1 through 4.*

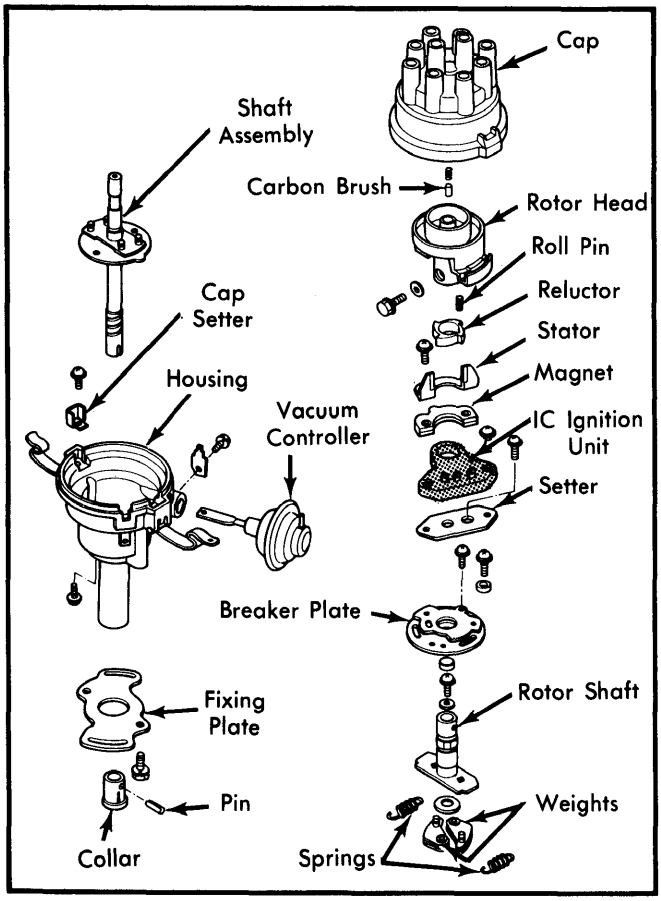

Fig. 1 Disassembled View of Hitachi Distributor (Calif. 510 and 200SX Models)

The system for all models except California 510 and 200SX is similar to the 1979 system. California 510 and 200SX have 4-cylinder engines with 8 spark plugs. Therefore they have a special distributor cap (8 spark plug wire outlet terminals and 2 coil wire inlet terminals). These models also use 2 ignition coils, one for the spark plugs on the exhaust side of the engine and one for the spark plugs on the intake side.

California 510 and 200SX models also differ in that the IC ignition unit is located inside the distributor, stator and magnet assembly has a different shape, IC ignition unit has a 3-pin connector rather than a 2-pin connector, and IC ignition unit contains only 4 internal circuits and 2 transistors, instead of 5 circuits found on other models.

All models except California 510 and 200SX have IC ignition unit mounted externally on distributor housing. Unit is connected with 2 wires to pick-up coil located inside distributor. These models also have a fusible link between battery and ignition

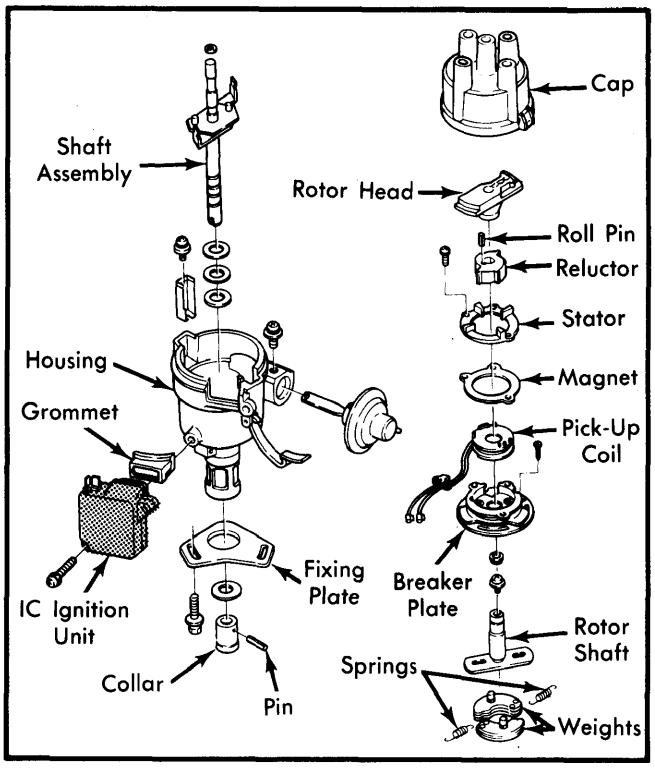

Fig. 2 Disassembled View of Hitachi Distributor (All Models Except Calif. 510 and 200SX) (280ZX and 810 – 6-Tooth Reluctors and Stators)

switch. The 280ZX and 810 models, which have 6-cylinder engines, feature reluctors and stators with 6 teeth, while other models have 4-cylinder engines with 4-tooth reluctors and stators.

OPERATION

Regardless of model, all distributors are equipped with a reluctor and stator, although the shapes may differ. The reluctor, which is mounted on the rotor shaft assembly, turns with the distributor shaft inside the stator.

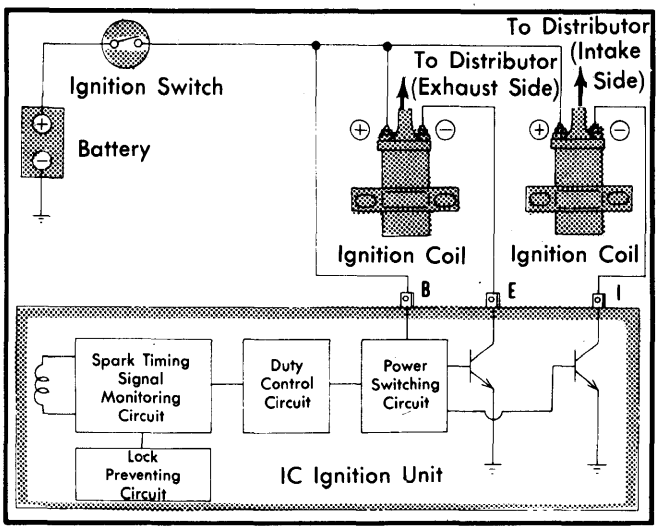

Fig. 3 IC Ignition Unit Circuit Diagram (Calif. 510 and 200SX Models)

HITACHI ELECTRONIC IGNITION SYSTEMS – DATSUN (Cont.)

As each reluctor tooth approaches and then passes the stator teeth, the magnetic field changes, creating an electrical signal in the pick-up coil (combined with IC ignition unit of California 510 and 200SX models). This signal is received and processed by the IC ignition unit, which then turns on or cuts off current flow to the ignition coil primary circuit. When current to the primary is turned off, this creates a voltage surge in the secondary that fires the spark plugs. Ignition timing is therefore controlled by the relationship of the reluctor to the stator.

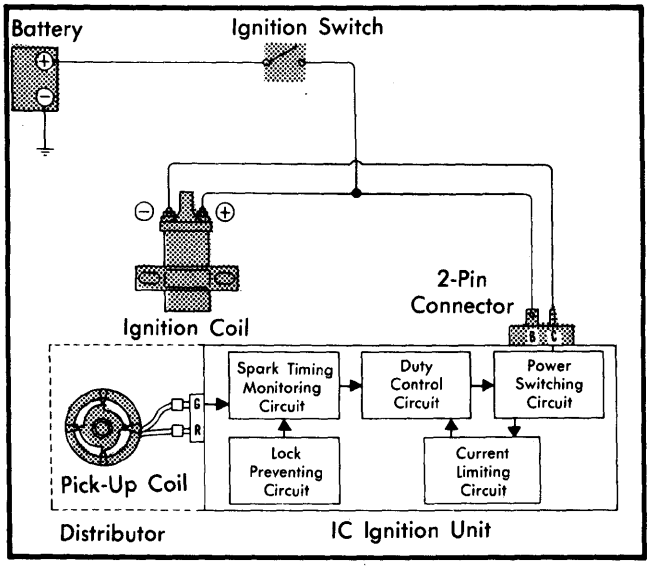

Fig. 4 IC Ignition Unit Circuit Diagram (All Models Except Calif. 510 and 200SX)

The IC ignition unit contains 5 circuits on most models (4 circuits and 2 transistors on California 510 and 200SX models). These circuits perform the following functions. *See Figs. 3 and 4.*

- Spark Timing Signal Monitoring Circuit – Monitors and amplifies signal from distributor pick-up coil.
- Lock-Preventing Circuit – Cuts off ignition coil primary current when ignition switch is "ON" and engine is not running.
- Duty Control Circuit – Controls the ratio of ignition coil primary current on-off time (equivalent to dwell angle).
- Power Switching Circuit – Makes or breaks the primary circuit current of ignition coil.
- Current Limiting Circuit – Not on California 510 or 200SX models. Controls the current value so that excessive current will not flow through power switching circuit.

All circuits are contained in one IC ignition unit. Failure of any circuit requires replacement of entire IC ignition unit.

SPECIFICATIONS

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

ADJUSTMENTS

Air Gap – When installing reluctor and stator or checking air gap, loosen screws and center stator around reluctor so that there is equal air gap between each set of reluctor teeth and matching stator teeth. *See Fig. 5.* Then tighten screws securing stator. Standard air gap is .012-.020" (.3-.5 mm).

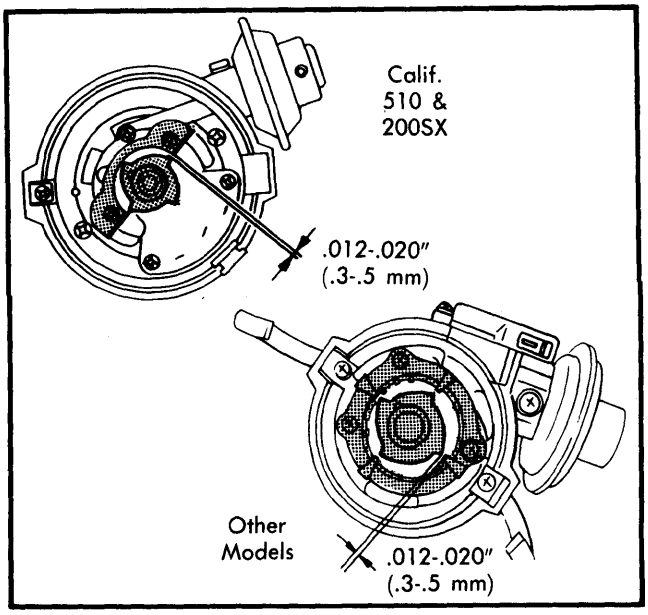

Fig. 5 Checking Reluctor-to-Stator Air Gap

Breaker Plate – If breaker plate does not move smoothly in response to vacuum controller, apply grease to steel balls. If necessary, replace breaker plate assembly.

TESTING

SYSTEM SPARK TEST

1) Turn ignition switch "OFF". On 6-cylinder engines, disconnect EFI fusible link and cold start valve. On 4-cylinder engines, disconnect anti-dieseling solenoid valve connector to cut off fuel supply to engine.

2) Disconnect high tension cable from distributor. Hold cable about ¼" (4-5 mm) from engine block. Crank engine and check for sparks at cable-to-block gap.

3) If sparks occur, the IC ignition system is OK and no further ignition checks are required. If no sparks occur, proceed with tests that follow.

BATTERY VOLTAGE CHECK

1) Turn ignition switch to "OFF" position. Connect positive lead of voltmeter to battery positive terminal. Connect negative lead to battery negative terminal. Read and record battery voltage. If below 11.5 volts, battery charging or starting system is faulty.

2) With ignition switch still "OFF" and voltmeter still hooked to battery, remove coil wire from distributor and connect it to a good ground. Crank engine and record cranking voltage registered on voltmeter. If voltage reading is less than 9.6 volts, battery charging or starting system is faulty.

SECONDARY WIRING CHECK

Connect an ohmmeter, in turn, to each spark plug wire. Attach one lead to terminal inside distributor cap and other lead to

HITACHI ELECTRONIC IGNITION SYSTEMS – DATSUN (Cont.)

other end of wire. Resistance reading should be less than 30,000 ohms. If resistance is higher, replace high tension cables and/or distributor cap.

IGNITION COIL RESISTANCE CHECK

Primary Resistance – 1) Turn ignition switch "OFF". Remove coil wires to isolate coil from system. See *Fig. 6*. Set ohmmeter to x1 range. Connect ohmmeter leads to two primary terminals of coil. California 510 and 200SX models should show a resistance reading of 1.04-1.27 ohms. All other models should read 0.84-1.02 ohms.

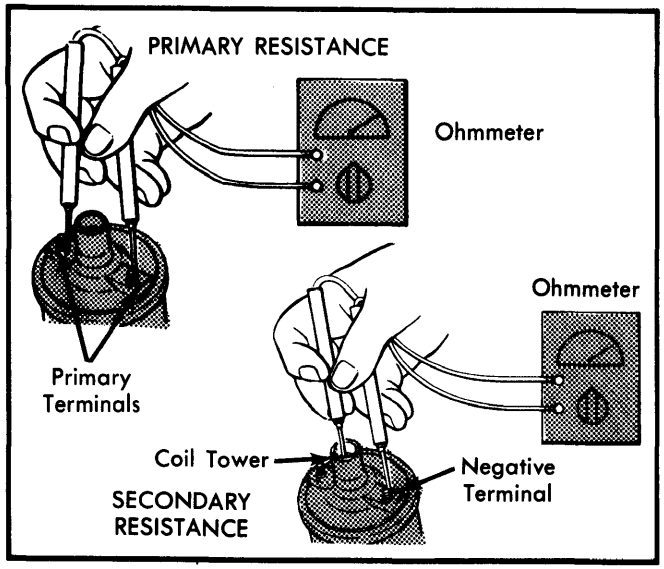

Fig. 6 Ohmmeter Hookup for Coil Resistance Checks

2) If resistance reading is OK, but engine will not start, check ignition switch and wiring from switch to coil and IC ignition unit. If reading is not within specifications, replace ignition coil.

Secondary Resistance – With ignition switch "OFF", set an ohmmeter to the x1000 range. Connect one lead to coil negative terminal and other lead to coil tower. See *Fig. 6*. Resistance for California 510 and 200SX models should be 7,400-11,000 ohms. All other models should be 8,200-12,400 ohms. If not, replace ignition coil.

POWER SUPPLY CIRCUIT CHECK

California 510 and 200SX – Connect a voltmeter positive lead to connector removed from "B" terminal of IC ignition unit inside distributor. See *Fig. 7*. Connect voltmeter negative lead to side of distributor. Turn ignition switch "ON". If reading is less than 11.5 volts, check wiring from ignition switch to IC ignition unit.

All Other Models – 1) Connect voltmeter positive lead to "B" terminal (black and white wire) of IC ignition unit connector. See *Fig. 8*. Connect negative lead to side of distributor. Turn ignition switch "ON". If below 11.5 volts, check wiring from ignition switch to IC ignition unit.

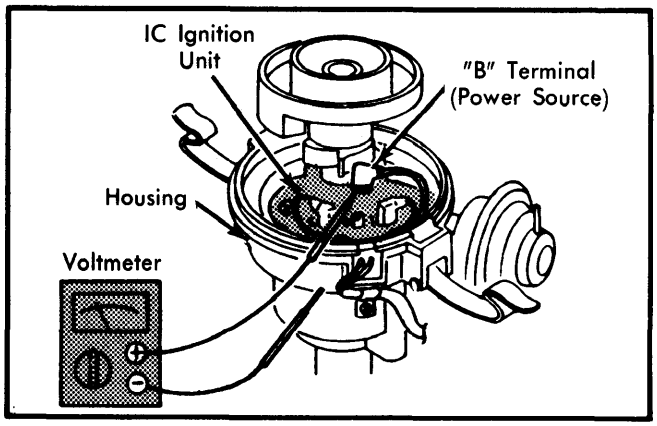

Fig. 7 Voltmeter Hookup for Power Supply Check (Calif. 510 & 200SX Models)

2) To check power supply while cranking engine, remove high tension wire from distributor and ground it. Connect voltmeter positive lead to "B" terminal (black and white wire) of IC ignition unit connector. Connect negative lead to side of distributor. Turn ignition switch to "START" position. Note voltmeter reading.

3) If voltage reading is more than 1 volt below battery CRANKING voltage and/or is below 8.6 volts, check ignition switch and wiring from switch to IC ignition unit.

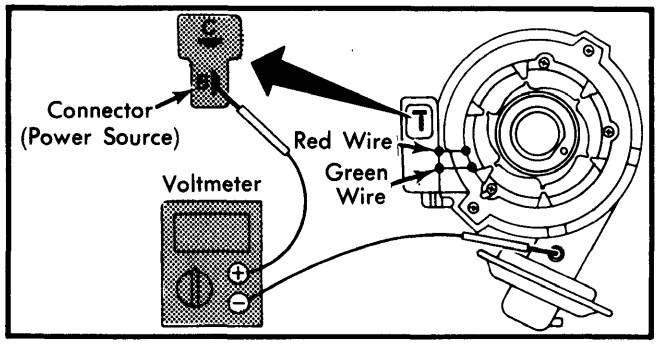

Fig. 8 Voltmeter Hookup for Power Supply Check (All Models Except Calif. 510 & 200SX)

IGNITION PRIMARY CIRCUIT CHECK

NOTE – *This test does not apply to California 510 and 200SX models.*

1) Connect voltmeter positive lead to "C" terminal (blue wire) of IC ignition unit connector. See *Fig. 9*. Attach negative lead to side of distributor. Turn ignition switch "ON".

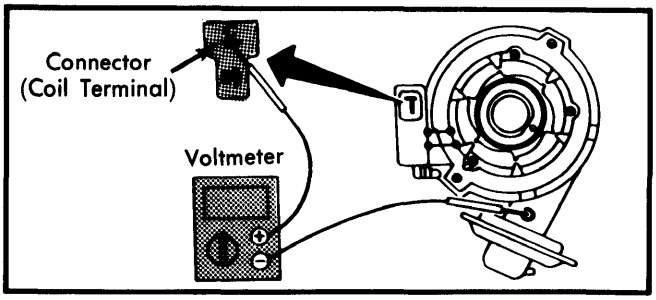

Fig. 9 Voltmeter Hookup for Ignition Primary Circuit Check

HITACHI ELECTRONIC IGNITION SYSTEMS – DATSUN (Cont.)

2) If voltage is 11.5-12.5 volts, proceed to IC Unit Ground Circuit Test. If voltage reading is below 11.5 volts, check Coil Primary Resistance, if not previously done.

IC IGNITION UNIT GROUND CIRCUIT CHECK

NOTE – *This test does not apply to California 510 and 200SX models.*

1) Connect voltmeter negative lead to battery negative terminal. See *Fig. 10*. Connect positive lead to exterior of vacuum controller. Pull high tension wire from distributor cap and ground it. Turn ignition switch to "START" position and observe voltmeter reading while cranking engine.

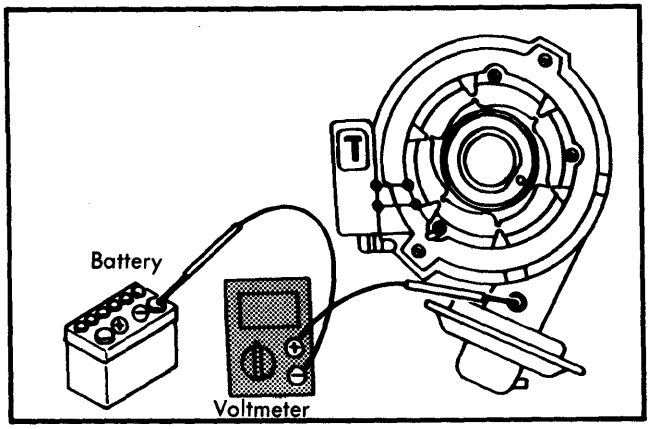

Fig. 10 Voltmeter Hookup for IC Ignition Unit Ground Circuit Check

2) If voltage reads 0.5 volts or less, proceed to Pick-Up Coil Resistance Check. If voltage is more than 0.5 volts, check distributor ground wiring from chassis to battery, including battery connections.

PICK-UP COIL RESISTANCE CHECK

NOTE – *This test does not apply to California 510 and 200SX models.*

1) For this test, engine should be at operating temperature. Turn ignition switch "OFF". Connect an ohmmeter set to x100 scale to pick-up coil terminals (red and green wires). See *Fig. 11*.

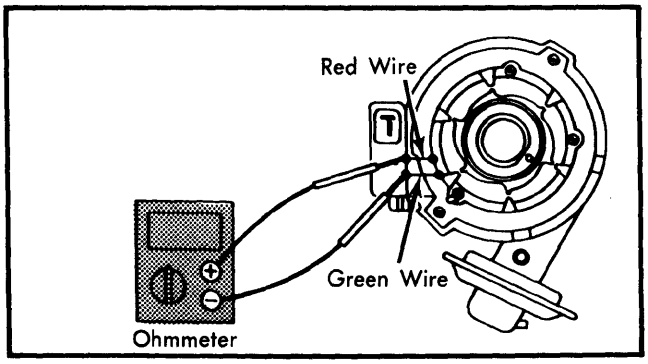

Fig. 11 Ohmmeter Hookup for Pick-Up Coil Resistance Check

2) If ohmmeter reading is approximately 400 ohms, proceed to Pick-Up Coil Output Check. If ohmmeter reading varies widely from 400 ohms, check pick-up coil and wires leading to it.

PICK-UP COIL OUTPUT CHECK

NOTE – *This test does not apply to California 510 and 200SX models.*

1) Engine should be at operating temperature. Connect a voltmeter, set at the low scale (0-5 volt), with positive lead connected to pick-up coil terminal with red wire. See *Fig. 12*. Attach negative lead to side of distributor.

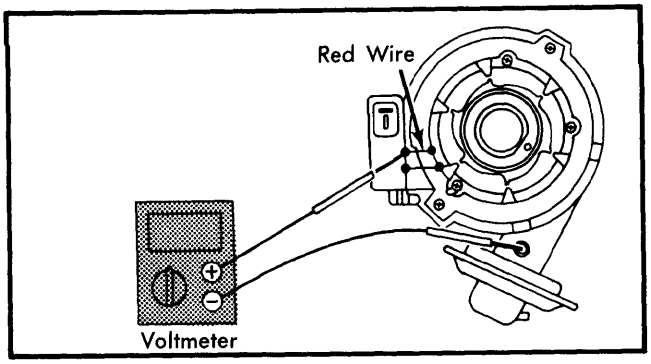

Fig. 12 Voltmeter Hookup for Pick-Up Coil Output Check

2) Turn ignition switch to "START" position and check for movement of voltmeter needle while cranking engine. If needle wavers and the no spark condition still exists, replace IC ignition unit.

3) If needle is steady, check physical condition of pick-up coil and reluctor. Check wiring and connector between pick-up coil and IC ignition unit.

OVERHAUL

Disassembly (Calif. 510 and 200SX) – **1)** Remove distributor cap and rotor head. Pry reluctor from rotor shaft assembly. Use care not to damage teeth.

2) Remove IC ignition unit and unit setter. Remove stator and magnet. Remove vacuum controller and breaker plate. Mark housing and fixing plate. Remove fixing plate and collar. Remove rotor shaft and drive shaft. Mark rotor shaft and drive shaft. Remove packing from top of rotor shaft and remove rotor shaft from drive shaft.

3) Mark one governor spring and its bracket and one weight and its pivot pin. Remove springs and weights and apply grease to weights.

Disassembly (All Other Models) – **1)** Remove distributor cap and rotor head. Remove IC ignition unit by disconnecting harness connector, removing screws and disconnecting pick-up coil wires.

2) Remove stator and magnet. Remove vacuum controller and carefully pry reluctor from shaft. Remove roll pin, pick-up coil assembly and breaker plate assembly. Remove pin and pinion gear. Remove rotor shaft and drive shaft assembly.

HITACHI ELECTRONIC IGNITION SYSTEMS – DATSUN (Cont.)

3) Mark rotor and drive shafts for later assembly. Remove packing and rotor shaft set screw. Mark one of governor springs and its bracket; also one weight and its pivot pin. Remove weights and springs.

Reassembly (All Models) – 1) To assemble, reverse disassembly procedure, noting the following if it applies. Clean surfaces of IC ignition unit and distributor before assembling. Be sure pick-up coil leads (if equipped) are securely attached to IC ignition unit terminals. See *Fig. 13*.

2) Align match marks so parts are assembled in original positions. Be sure reluctor is centered in stator, before tightening stator screws. Drive in roll pin with its slit toward outer end of shaft. Grease top of rotor shaft. Check governor operation before installing distributor.

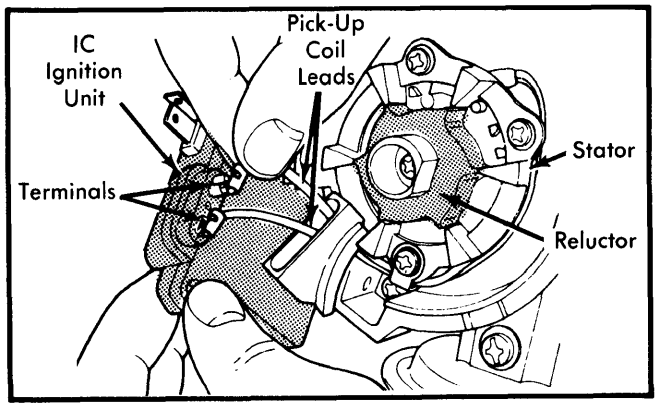

Fig. 13 Connecting Pick-Up Coil Terminals (All Models Except Calif. 510 & 200SX)