Distributors & Ignition Systems

HITACHI ELECTRONIC IGNITION — DATSUN/NISSAN

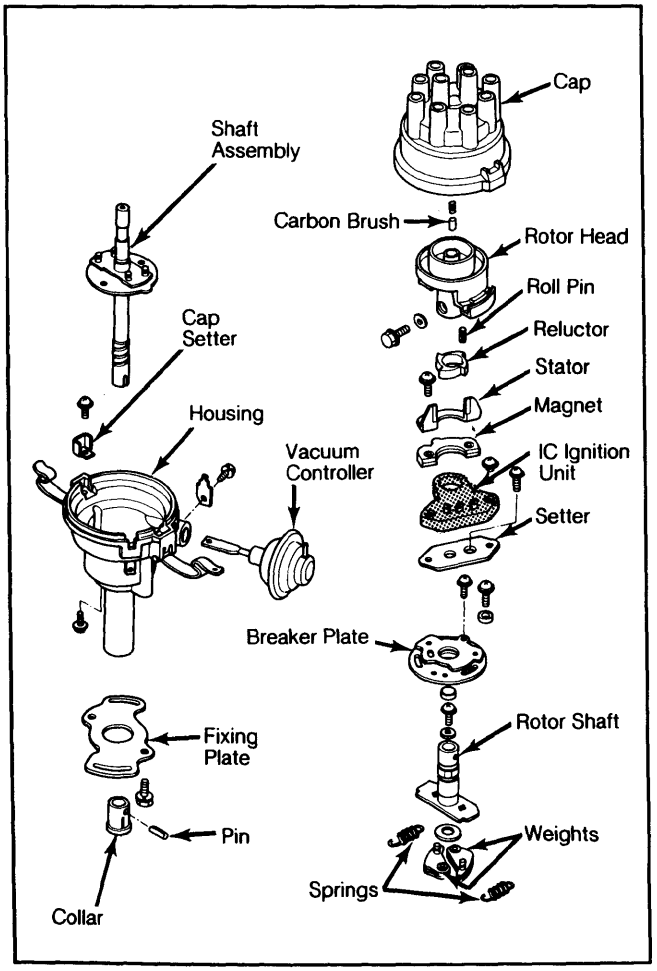
200SX, 210, 280ZX (Except Turbo), 310, Maxima, Pickup, Sentra, Stanza

DESCRIPTION

NOTE: For information on the Datsun/Nissan 280ZX Turbo models, see Datsun/Nissan Electronic Concentrated Engine Control article in the Computerized Engine Control section.

Two different basic ignition systems are used, with additional minor variations between Datsun/Nissan models. However the principle of operation on all systems is the same. Both systems use an electronic distributor, an IC ignition unit, ignition coil(s), battery and wiring harness. *See Figs. 1 through 5.*

Fig. 1: Dissassembled View of Hitachi Distributor



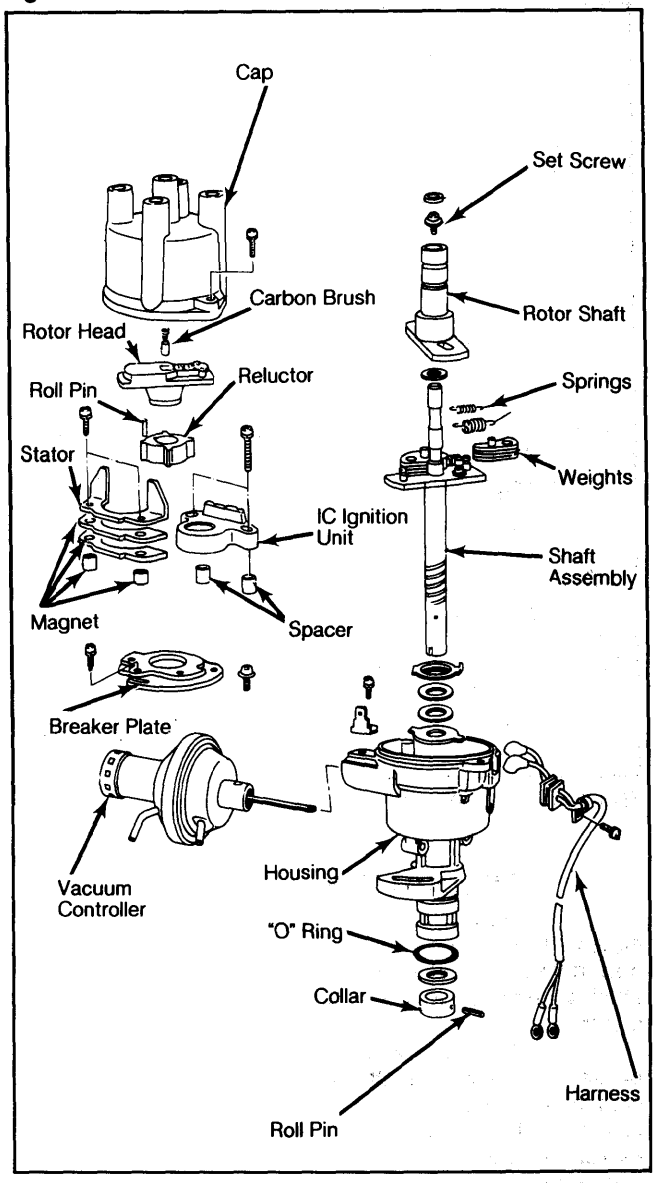
This design is used on 200SX, Pickup, & Stanza models.

The ignition system for 210, 280ZX, 310, Maxima, and Sentra models uses one ignition coil with a single spark plug for each engine cylinder.

The second system, used on 200SX, Pickup, and Stanza 4-cylinder models, uses 8 spark plugs. These models use special distributor caps, having 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.

Fig. 2: Disassembled View of Hitachi Distributor



This design is used on 310 & Sentra models.

On 200SX, 310, Pickup, Sentra, and Stanza models, the IC ignition unit is located inside the distributor. The stator and magnet assembly also has a different shape than those of other models.

Depending upon the distributor used, the IC ignition unit may have a 2-pin connector (210, 280ZX, 310, Maxima, and Sentra), a 3-pin connector (Pickup), or a 4-pin connector (200SX and Stanza). The IC ignition unit internal circuits also vary from model to model.

On 210, 280ZX, and Maxima models, the IC ignition unit is mounted externally on the distributor housing. The unit is connected with 2 wires to a pick-up coil located inside distributor. These models also have a fusible link between battery and ignition switch.

The 280ZX and Maxima models, which have 6-cylinder engines, feature reluctors and stators with 6 teeth. Other models have 4-cylinder engines with 4-tooth reluctors and either 2-tooth or 4-tooth stators.

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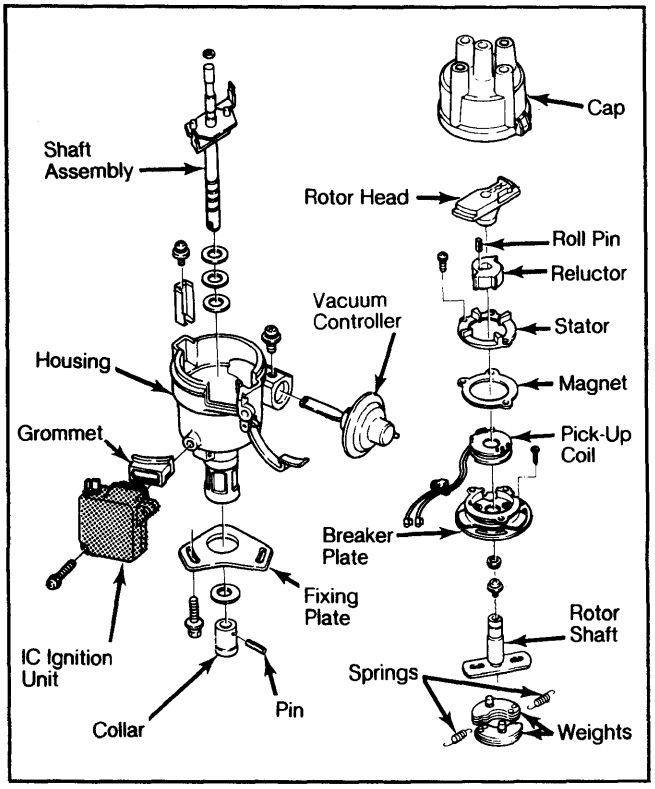
Fig. 3: Disassembled View of Hitachi Distributor



This design is used on 210, 280ZX, & Maxima models.

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.

As each reluctor tooth approaches and then passes the stator teeth, the magnetic field changes, creating an electrical signal in the pick-up coil. The pick-up coil is combined with the IC ignition unit on 200SX, 310, Pickup, Sentra, and Stanza models. This signal is received and processed by the IC ignition unit.

The IC ignition unit then turns on or cuts off current flow to the ignition coil primary circuit. When current to the primary is turned off, a high voltage surge is created in the secondary circuit, which fires the spark plug. Ignition timing is controlled by the relationship of the reluctor to the stator.

The IC ignition unit usually contains 4 or 5 circuits, which perform the following functions:

- 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 all models. Controls the current valve 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.

Fig. 4: IC Ignition Unit Circuit Diagram

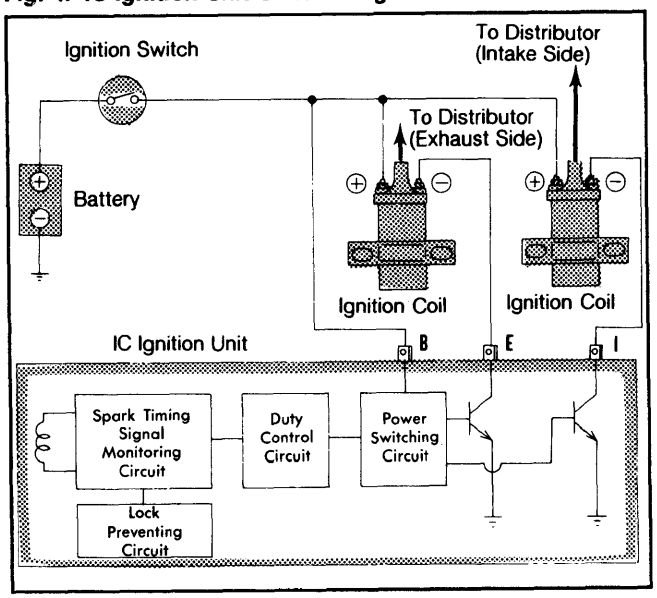


Diagram is for 4-cylinder systems with 8 spark plugs.

Fig. 5: IC Ignition Unit Circuit Diagram

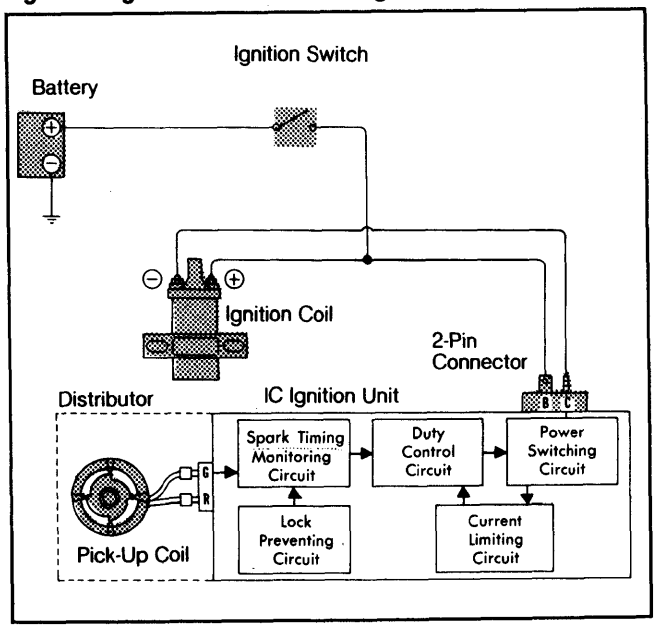


Diagram is for models with externally-mounted IC ignition units.

SPECIFICATIONS

CENTRIFUGAL & VACUUM ADVANCE

See the appropriate Distributor Specifications Tables in this section.

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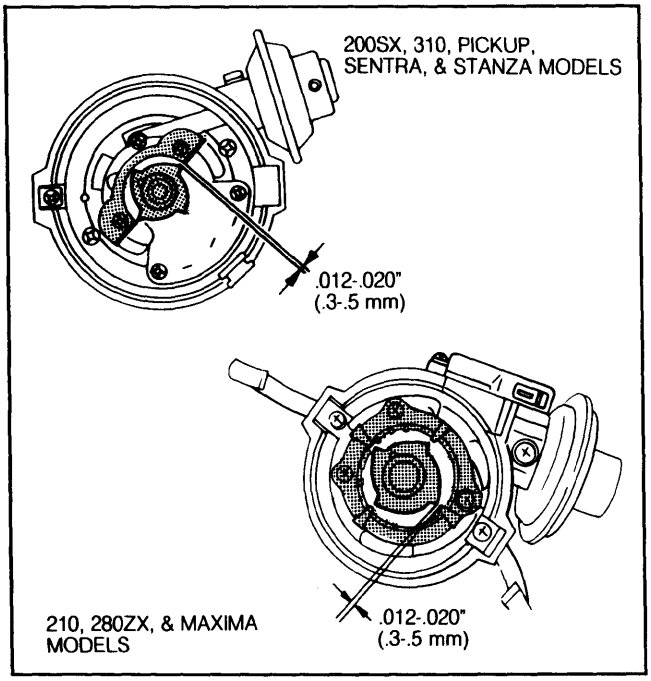
ADJUSTMENTS

AIR GAP

When installing reluctor and stator or checking air gap, loosen screws and center stator around reluctor. There should be equal air gap between each set of reluctor teeth and its matching stator teeth. *See Fig. 6.* Then tighten screws securing stator. Standard air gap is .012-.020" (.3-.5 mm).

Fig. 6: Checking Reluctor-to-Stator Air Gap



Air gap is the same for all models

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 coil wire from distributor. Hold wire about 1/4" (6 mm) from engine block. Crank engine and check for sparks at wire-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

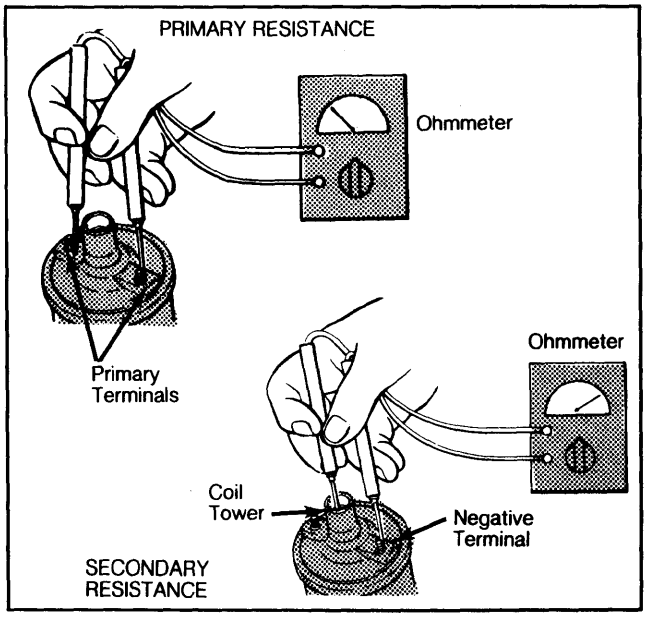
Connect an ohmmeter, in turn, to each spark plug wire. Attach one lead to terminal inside distributor cap and other lead to other end of wire. Resistance reading should be less than 30,000 ohms. If resistance is higher, replace high tension cables and/or distributor cap.

IGNITION COIL RESISTANCE CHECK

Primary Resistance

1) Turn ignition switch "OFF". Remove coil wires to isolate coil from system. *See Fig. 7.* Set ohmmeter to x1 range. Connect ohmmeter leads to the 2 primary terminals of coil. The 200SX, 310, Pickup, and Sentra models should show a resistance reading of 1.04-1.27 ohms. All other models should read 0.84-1.02 ohms.

Fig. 7: Ohmmeter Hookup for Coil Resistance Checks



Resistance varies between different models.

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 the other lead to coil tower. *See Fig. 7.* Resistance for 200SX, 310, Pickup, and Sentra models should be 7,300-11,000 ohms. All other models should be 8,200-12,400 ohms. If not, replace ignition coil.

POWER SUPPLY CIRCUIT CHECK

200SX, 310, Pickup, Sentra, & Stanza

Connect voltmeter positive lead to connector removed from "B" terminal of IC ignition inside distributor. *See Fig. 8.* Connect voltmeter negative lead to side of

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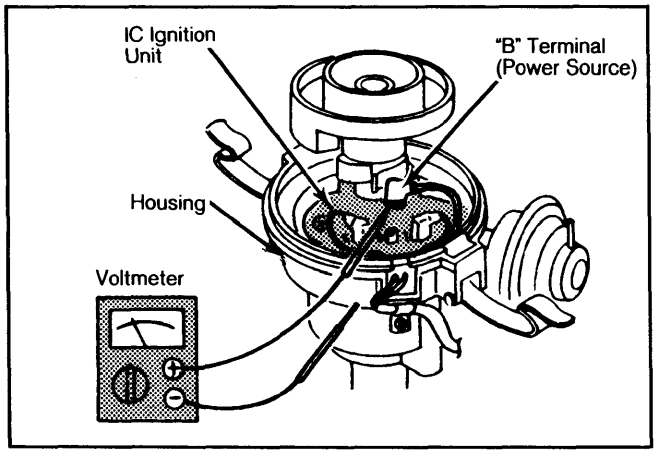
distributor. Turn ignition switch "ON". If reading is less than 11.5 volts, check wiring from ignition switch to IC ignition unit.

Fig. 8: Voltmeter Hookup for Power Supply Check

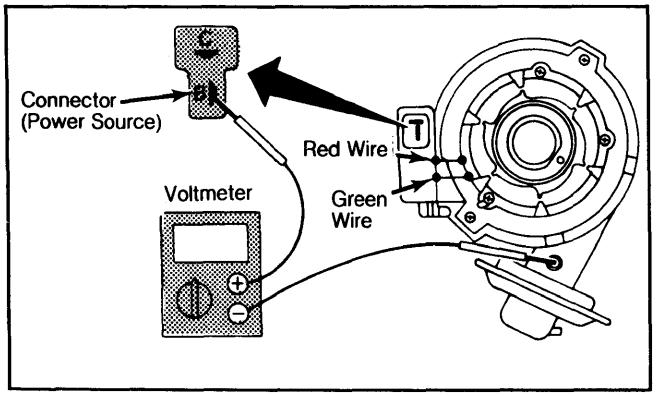


Test applies to 200SX, 310, Pickup, Sentra, & Stanza models.

210, 280ZX, & Maxima

Connect voltmeter positive lead to "B" terminal (black and white wire) of connector removed from IC ignition unit. *See Fig. 9.* 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. 9: Voltmeter Hookup for Power Supply Check



This test applies to 210, 280ZX, & Maxima models.

POWER SUPPLY CIRCUIT CRANKING CHECK

1) To check power supply while cranking engine, remove high tension coil wire from distributor and ground it. Connect voltmeter as outlined in Power Supply Circuit Check. *See Figs. 8 and 9.* Turn ignition switch to "START" position. Note voltmeter reading.

2) 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.

IGNITION PRIMARY CIRCUIT CHECK

200SX, 310, Pickup, Sentra, & Stanza

1) Attach a voltmeter negative lead to side of distributor. On 310 and Sentra models connect voltmeter positive lead to blue wire removed from IC ignition unit.

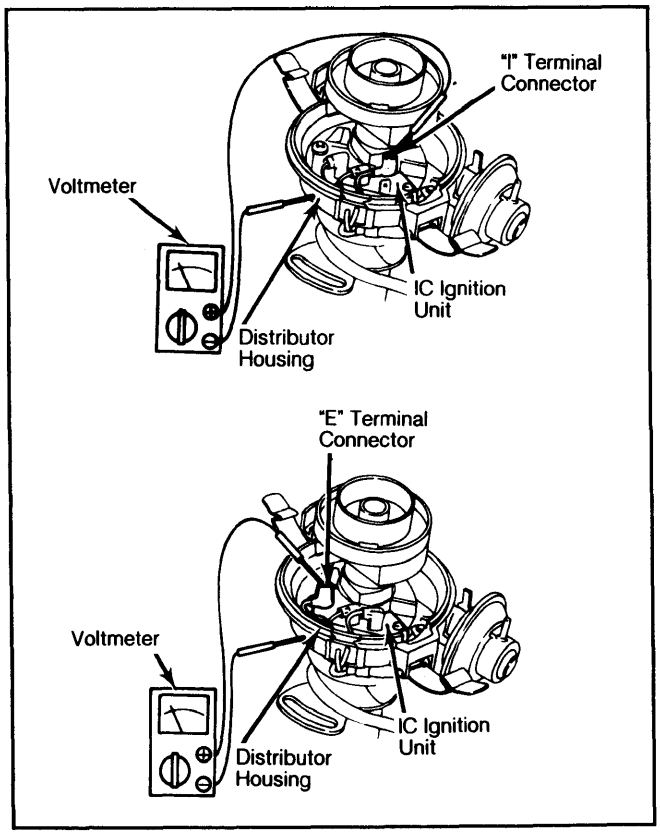
2) On 200SX, Pickup, and Stanza models, connect the voltmeter positive lead to "I" terminal of IC ignition unit connector, and then to the "E" terminal of IC ignition unit connector. *See Fig. 10.*

3) Turn ignition switch "ON" after lead has been attached to each terminal. Voltage readings should be 11.5-12.5 volts. If reading is below specifications, recheck coil primary resistance. If voltage is correct, proceed to IC Ignition Unit Ground Circuit Check.

210, 280ZX, & Maxima

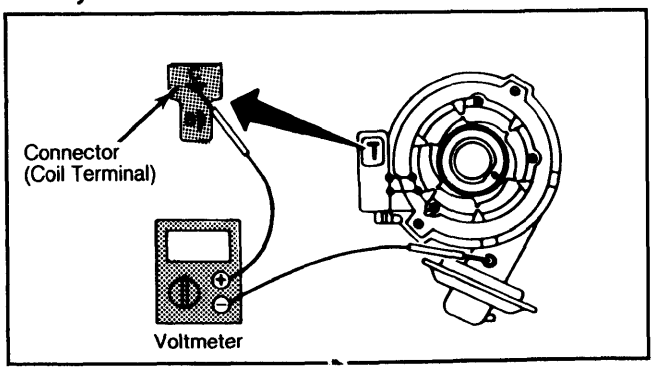
1) Connect voltmeter positive lead to "C" terminal (blue wire) of IC ignition unit connector. *See Fig. 11.* Attach negative lead to side of distributor. Turn ignition switch "ON".

Fig. 10: Voltmeter Hookup for Ignition Primary Circuit Check



Hookup is for 200SX, 310, Pickup, Sentra, & Stanza models.

Fig. 11: Voltmeter Hookup for Ignition Primary Circuit Check



Hookup is for 210, 280ZX, & Maxima models.

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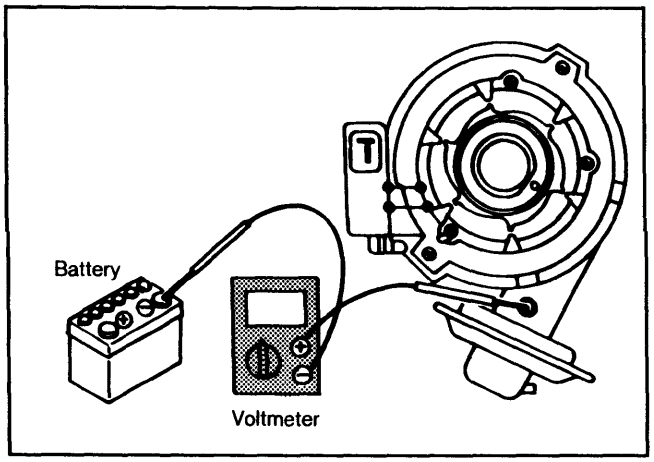
2) If voltage is 11.5-12.5 volts, proceed to IC Unit Ground Circuit Test. If voltage reading is below 11.5 volts, check Coil Primary Resistance, if not previously done.

IC IGNITION UNIT GROUND CIRCUIT CHECK

1) Connect voltmeter negative lead to battery negative terminal. *See Fig. 12.* 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.

2) If voltage reads 0.5 volts or less on Stanza models, replace IC ignition unit. On all other models, proceed to PICK-UP COIL RESISTANCE CHECK. On all models, if voltage is greater than 0.5 volts, check distributor ground wiring from chassis to battery, including battery connections. If ground is good, replace IC ignition unit.

Fig. 12: Voltmeter Hookup for IC Ignition Unit Ground Circuit Check



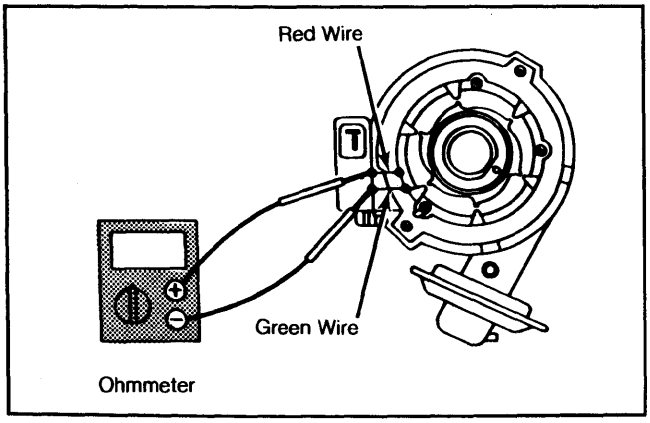
This hookup applies to all Datsun models.

PICK-UP COIL RESISTANCE CHECK

210, 280ZX, & Maxima Only

1) For this test, engine should be at operating temperature. Turn ignition switch "OFF". Connect an ohmmeter, set to the x10 scale, to pick-up coil terminals (red and green wires). *See Fig. 13.*

Fig. 13: Ohmmeter Hookup for Pick-Up Coil Resistance Check



Check applies only to 210, 280ZX, & Maxima models.

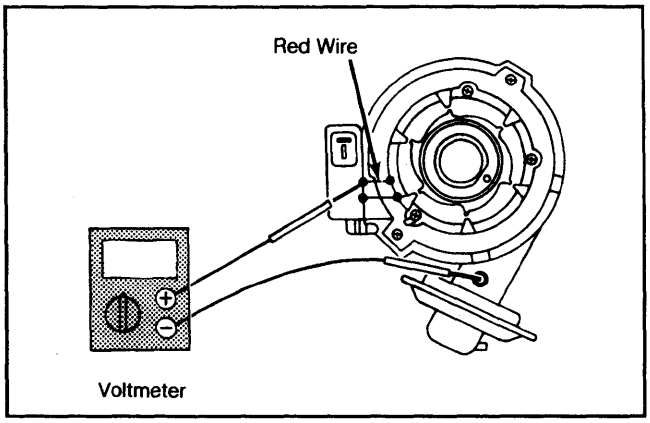
2) If ohmmeter reading is approximately 400 ohms, proceed to Pick-Up Coil Output Check. If ohmmeter reading varies widely from 400 ohms, check pick-up coil and wires leading to it.

PICK-UP COIL OUTPUT CHECK

210, 280ZX, & Maxima Only

1) Engine should be at operating temperature. Connect a voltmeter, set to the low scale (0-5 volt), with positive lead connected to pick-up coil terminal with red wire. *See Fig. 14.* Attach negative lead to side of distributor.

Fig. 14: Voltmeter Hookup for Pick-Up Coil Output Check



Check can only be made on 210, 280ZX, & Maxima models.

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

200SX & Pickup

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.

210, 280ZX, & Maxima

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.

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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.

310, Sentra, & Stanza

1) Remove distributor cap and rotor head. Remove vacuum controller and lift harness from housing. Insert a flat-bladed screwdriver under lower side of reluctor, and carefully pry reluctor from shaft to avoid distorting teeth. Remove roll pin from reluctor.

2) Remove breaker plate assembly, IC ignition unit and spacer. Remove unit setter, magnet and stator from breaker plate. Drive roll pin from shaft and remove pinion or collar.

3) Remove shaft assembly from housing. Remove packing from top of rotor shaft, and unscrew rotor shaft set screw. Remove rotor shaft. Remove weights and springs from shaft assembly.

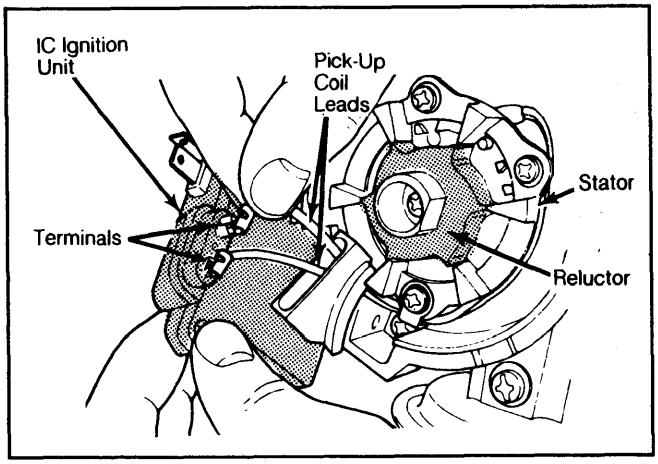
REASSEMBLY

All Models

1) To assemble, reverse disassembly procedure. 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. 15.*

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. 15: Connecting Pick-Up Coil Terminals



Instructions apply to 210, 280ZX, & Maxima models.