

MARELLI ELECTRONIC IGNITION SYSTEM

Fiat Spider 2000, Spider 2000 Turbo

NOTE: Fiat X1/9 models are equipped with Bosch Electronic Ignition Systems.

DESCRIPTION

The Marelli electronic ignition system consists of an ignition coil, electronic control module, and a breakerless distributor. See Fig. 1.

Marelli distributors are equipped with conventional centrifugal and vacuum advance mechanisms. A 4-tooth trigger (reluctor) is mounted on the distributor shaft, and combines with the pick-up coil assembly to provide the control module with electrical signals required.

The control module and ignition coil are mounted on a finned, cast aluminum base which not only cools the units, but also provides the system ground. See Fig. 2.

The control module's current limiter provides a constant current flow to the primary circuit, preventing coil damage.

The module analyzes the electrical signals from the distributor pick-up coil assembly, and provides the coil with proper dwell time and spark timing regardless of engine speed.

OPERATION

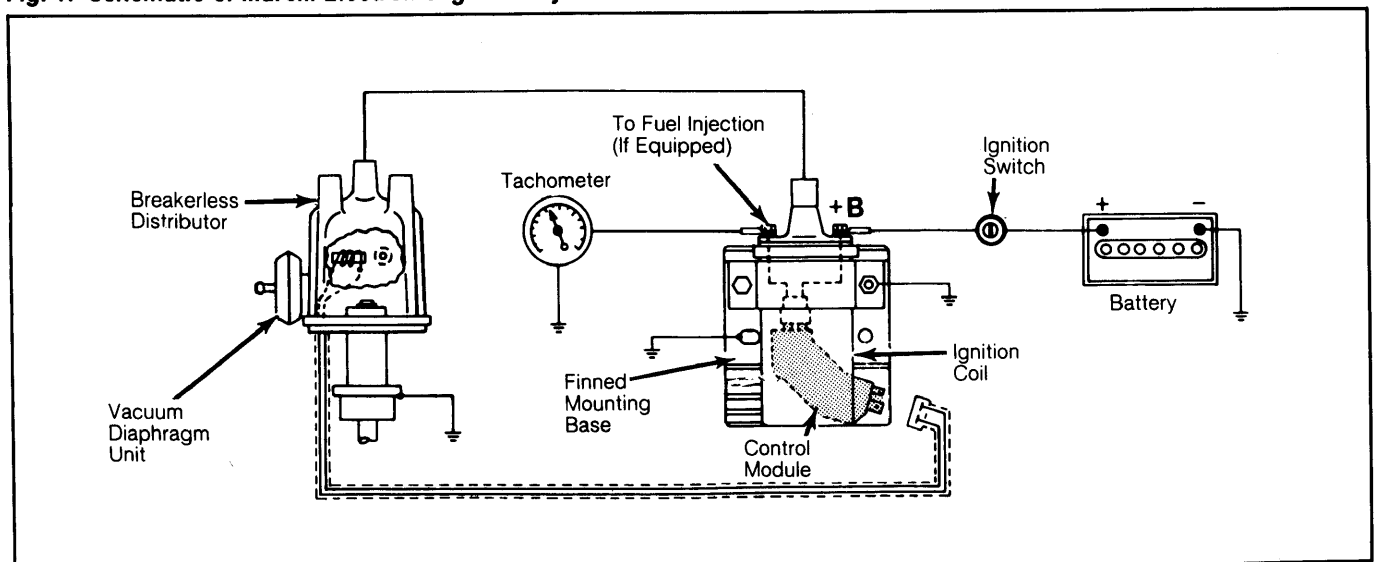
Primary voltage is supplied to the ignition coil by the battery, through the ignition switch. There are no resistors in the Marelli system.

As the distributor shaft rotates, the teeth of the trigger approach and then pass the stator pole in the pick-up coil assembly.

This creates and collapses a magnetic field, causing an electrical signal or impulse. This impulse is fed to the control module. As this signal is received, the control module opens and closes the ignition coil primary circuit.

This causes a high voltage surge in the coil secondary windings, firing the spark plugs.

Fig. 1: Schematic of Marelli Electronic Ignition System

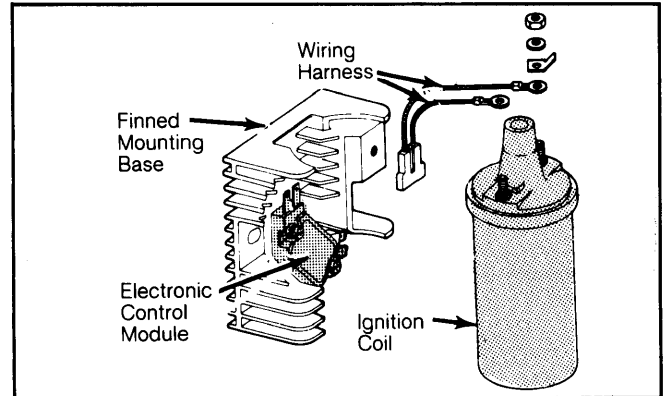


SPECIFICATIONS

CENTRIFUGAL & VACUUM ADVANCE

See the appropriate Distributor Specifications Tables in this section.

Fig. 2: Exploded View of Ignition Coil, Control Module, and Base Assembly



ADJUSTMENT

TRIGGER-TO-PICK-UP COIL AIR GAP

1) Using a non-magnetic feeler gauge, check air gap between the trigger and the stator pole piece of pick-up coil assembly. Air gap should be .020-.024" (.5-.6 mm).

2) If not to specifications, loosen retaining screws, and move advance plate to adjust gap. Tighten retaining screws, and recheck air gap.

TESTING

CAUTION: When working around ignition coil, do not ground wire lead to tachometer. Be careful not to disconnect high tension terminal of coil with engine running. Make all resistance checks with the ignition switch "OFF".

Distributors & Ignition Systems

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ROTOR RESISTANCE CHECK

Using an ohmmeter set at the x1000 scale, check the rotor resistance for 4,000-6,000 ohms. Replace if resistance varies considerably.

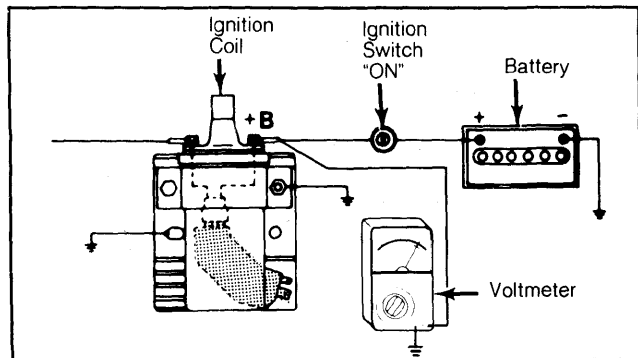
IGNITION SYSTEM CHECK

With ignition system in the "MAR" (RUN) position, inspect wiring and connectors. Be sure heat dissipater (module and coil base), power unit, and battery are properly grounded. Be sure coil and distributor connectors are firmly attached to control module terminals.

SYSTEM INPUT VOLTAGE CHECK

1) With the ignition key in the "MAR" (RUN) position and engine shut off, attach positive voltmeter lead to ignition coil positive (+B) terminal. Attach negative lead to ground. Voltage should read 12 volts. See Fig. 3. If not, check battery, ignition switch, wires, and connectors.

Fig. 3: Voltmeter Hookup for System Input Voltage Check



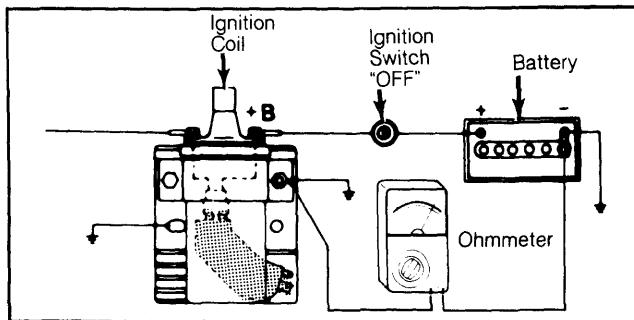
Voltmeter should read 12 volts.

2) Move positive voltmeter lead to ignition coil negative terminal. Voltage should be within 0.3 volts of voltage recorded at coil positive terminal. If not as specified, make Ignition Coil Resistance Check.

GROUND CIRCUIT CHECK

1) Turn ignition switch "OFF". Connect ohmmeter leads to battery ground terminal and ignition coil ground stud. See Fig. 4.

Fig. 4: Ohmmeter Hookup for Ground Circuit Check



Ohmmeter should read less than 0.2 ohm.

2) Resistance reading should be less than 0.2 ohms. If resistance is higher, check support, mounting, and battery ground connections. Also check that control module casing is clean and that all mounting bolts are clean and tight.

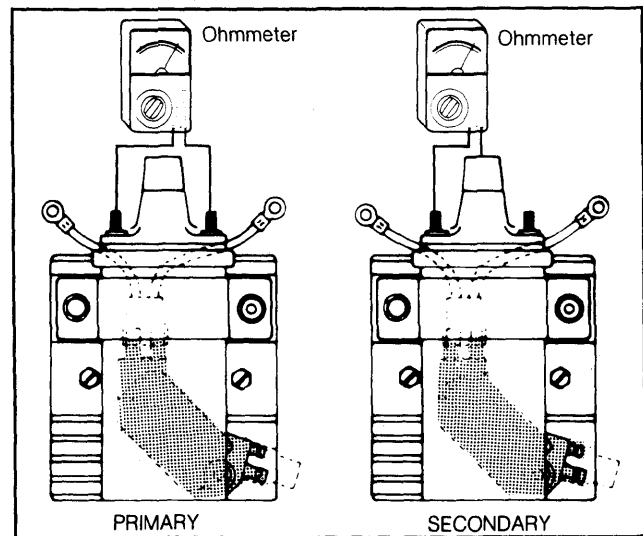
IGNITION COIL RESISTANCE CHECK

1) Using an ohmmeter set in the low scale, connect the leads to the positive and negative primary terminals of the ignition coil. See Fig. 5. Resistance reading should be .75-.81 ohm.

2) Change ohmmeter to the x1000 scale and connect leads to coil negative terminal and coil center tower. See Fig. 5. Resistance should be 10,000-11,000 ohms.

3) If either reading is not to specifications, replace ignition coil.

Fig. 5: Ohmmeter Hookup for Ignition Coil Primary and Secondary Resistance Check

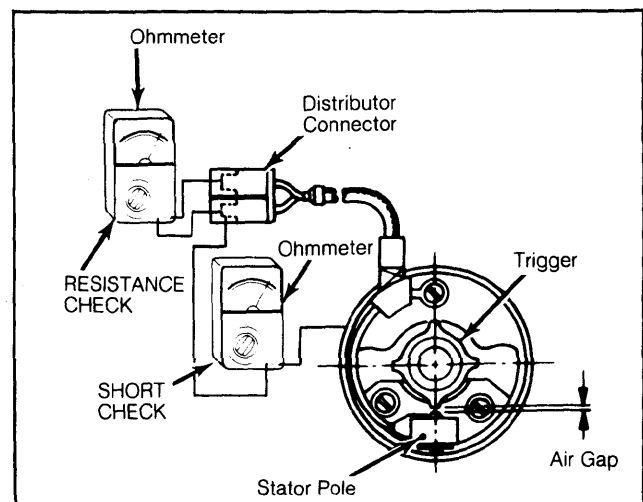


If not to specifications, replace coil.

PICK-UP COIL RESISTANCE AND SHORT CHECK

1) Turn the ignition switch "OFF". Disconnect 2-wire distributor connector. Connect an ohmmeter set in the x100 scale with one lead touching each terminal of distributor harness connector. See Fig. 6.

Fig. 6: Ohmmeter Hookups for Pick-Up Coil Resistance and Short Check

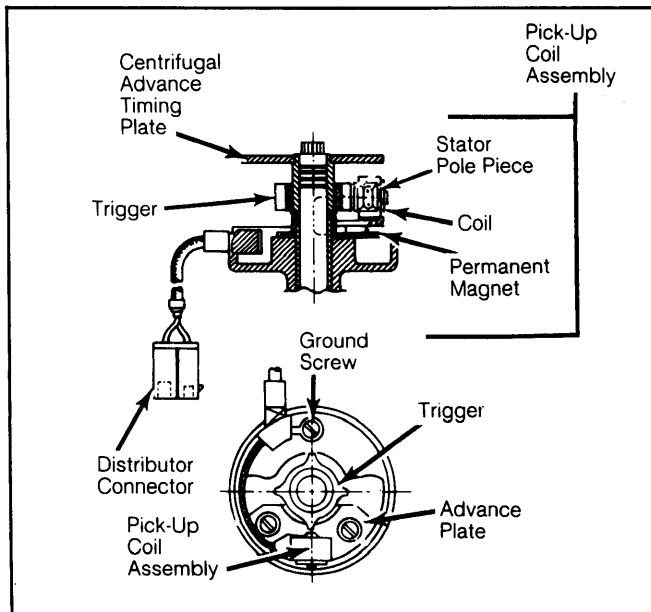


Replace pick-up coil if not to specifications.

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2) Pick-up coil resistance should be 700-800 ohms. If not, replace pick-up coil assembly. If system works intermittently, be sure pick-up coil wire in distributor is properly grounded. See Fig. 7.

Fig. 7: Interior View of Marelli Distributor



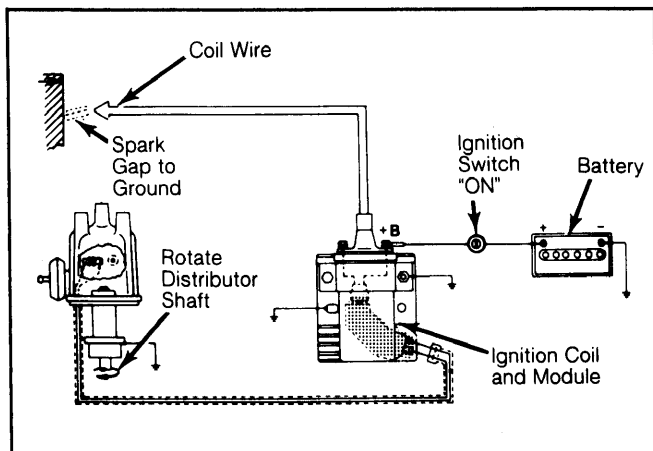
Trigger is integrally mounted on distributor shaft.

3) Next, attach ohmmeter leads to either terminal of distributor connector and to distributor housing. An infinity reading should exist. See Fig. 6. Also check air gap.

CONTROL MODULE CHECK

1) Be sure all ignition system wires and connectors are properly connected. Disconnect coil-to-distributor high voltage wire at the distributor. Hold wire about 1/4" from a good engine ground, using insulated pliers. See Fig. 8.

Fig. 8: Coil Wire Hookup for Making Control Module Check



If no sparks appear at gap, replace control module.

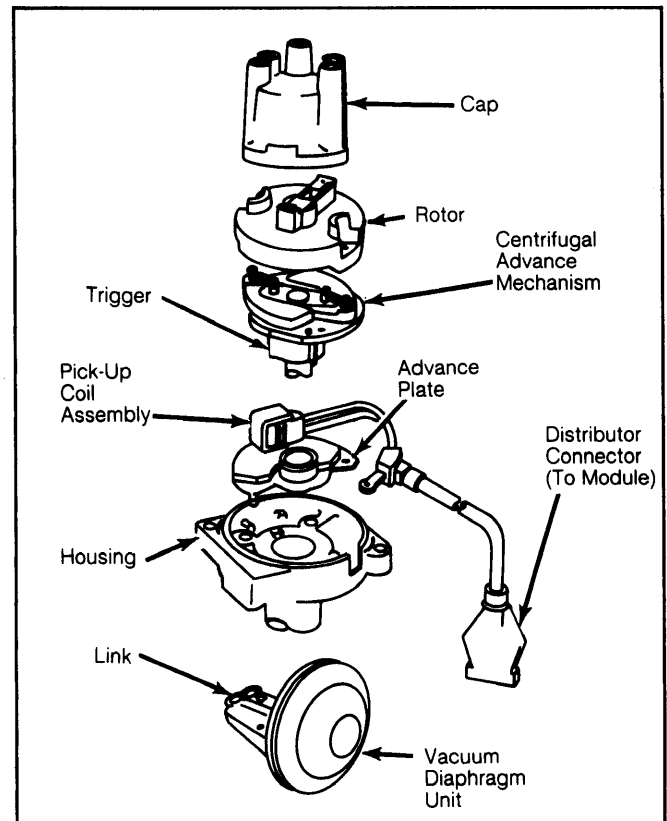
2) Crank engine and check for sparks at gap to ground. If previous tests have disclosed no problem and no spark exists at gap, replace control module.

OVERHAUL

DISASSEMBLY

1) Remove distributor cap and rotor. See Fig. 9. Remove pin securing pinion gear, and lift shaft and centrifugal advance mechanism (with integral trigger or reluctor) from housing.

Fig. 9: Disassembled View of Marelli Distributor



2) Remove pick-up coil ground screw and advance plate retaining screws. Disconnect vacuum diaphragm unit from peg on bottom of advance plate. Remove vacuum unit, pick-up coil assembly, and advance plate from housing.

REASSEMBLY

Install parts in reverse order of disassembly. Be sure pick-up coil ground screw is tight, and that vacuum unit is secured to peg on bottom of advance plate.