MARELLI ELECTRONIC IGNITION SYSTEM

Fiat
Brava
Spider 2000
Strada

DESCRIPTION

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

NOTE – *Some Strada models may be equipped with Bosch electronic ignition systems.*

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 a 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, which 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.

SPECIFICATIONS

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

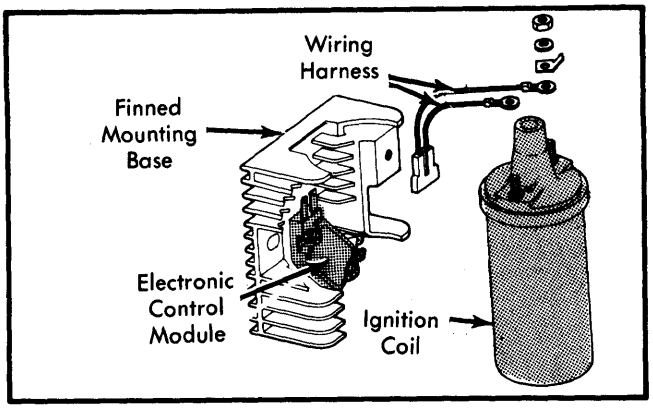

Fig. 2 Ignition Coil, Control Module and Base Assembly

ADJUSTMENT

Trigger-to-Pick-Up Coil Air Gap – Check air gap between trigger and stator pole piece of pick-up coil assembly, using a non-magnetic feeler gauge. Air gap should be .020-.024" (.5-.6 mm). If not to specification, loosen retaining screws and move advance plate to adjust gap. Tighten retaining screws and recheck air gap.

TESTING

CAUTION – *When working around 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".*

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.

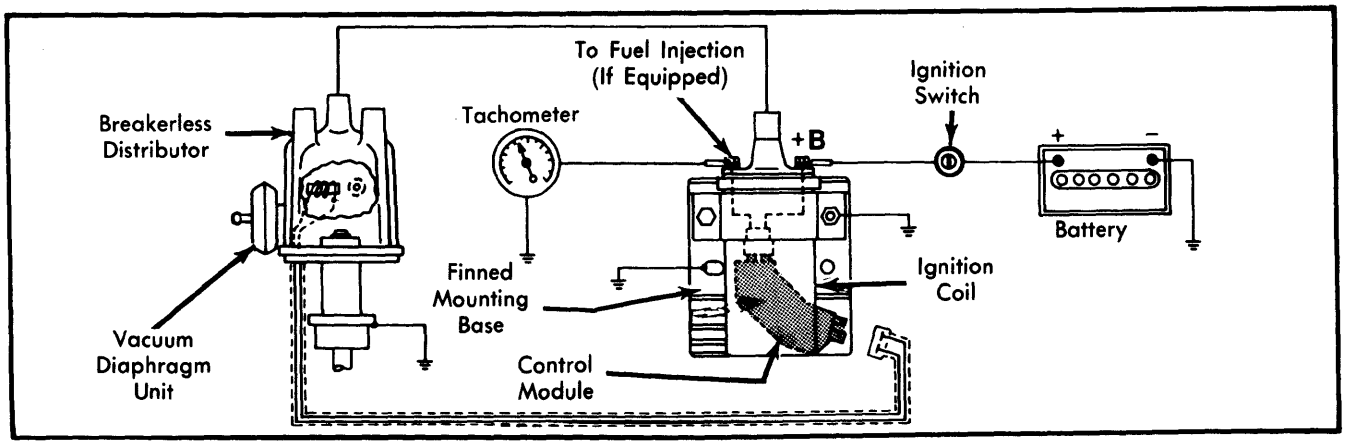

Fig. 1 Schematic of Marelli Electronic Ignition System

MARELLI ELECTRONIC IGNITION SYSTEM (Cont.)

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 be 12 volts. See *Fig. 3*. If not, check battery, ignition switch, wires and connectors.

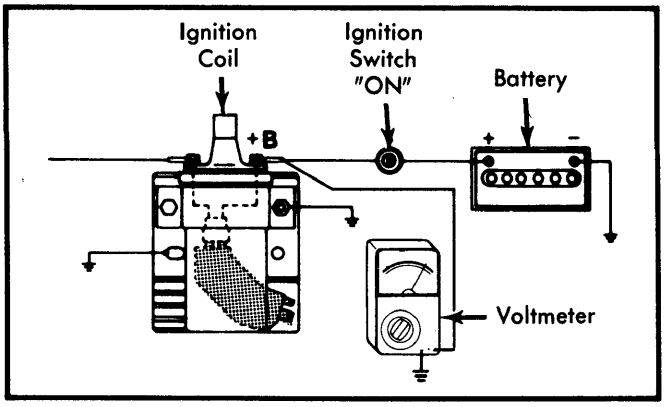

Fig. 3 Voltmeter Hookup for System Input Voltage Check

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*.

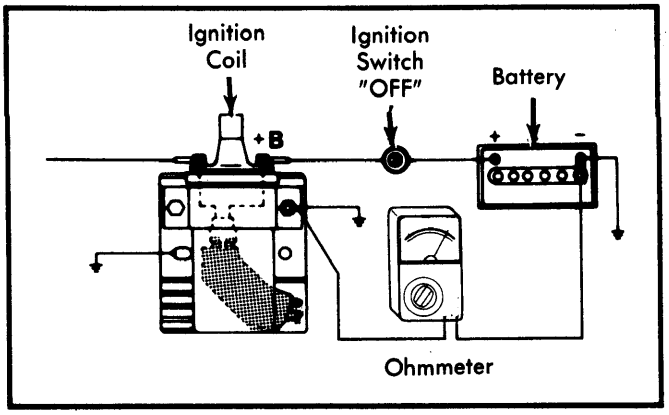

Fig. 4 Ohmmeter Hookup for Ground Circuit Check

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.

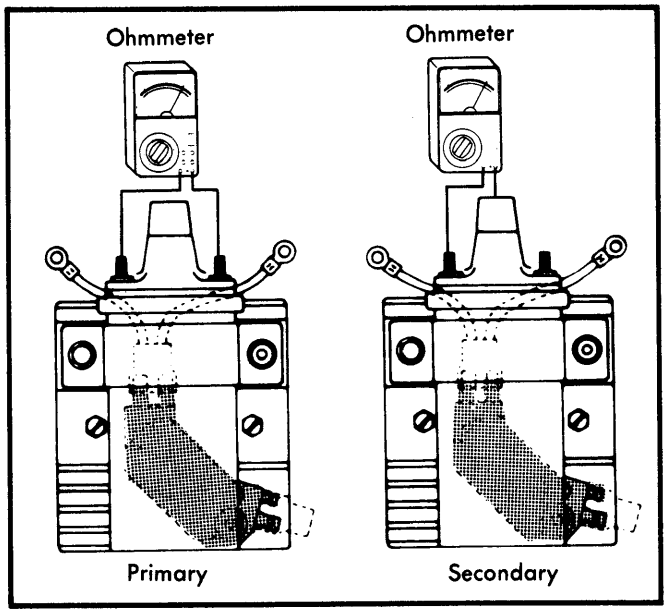

Fig. 5 Ohmmeter Hookup for Ignition Coil Primary and Secondary Resistance Check

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*.

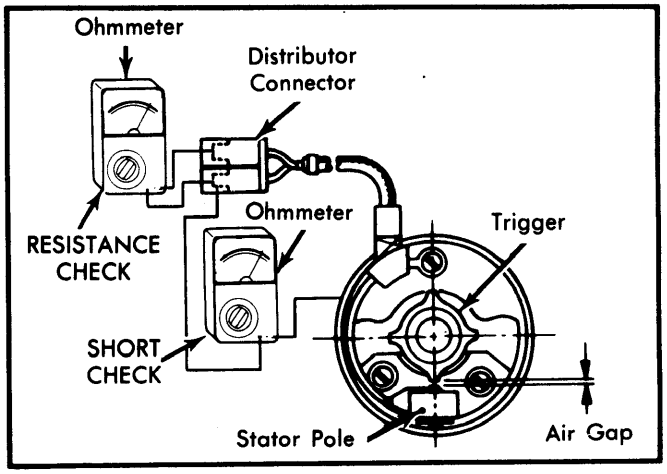

Fig. 6 Ohmmeter Hookups for Pick-Up Coil Resistance and Short Check

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*.

MARELLI ELECTRONIC IGNITION SYSTEM (Cont.)

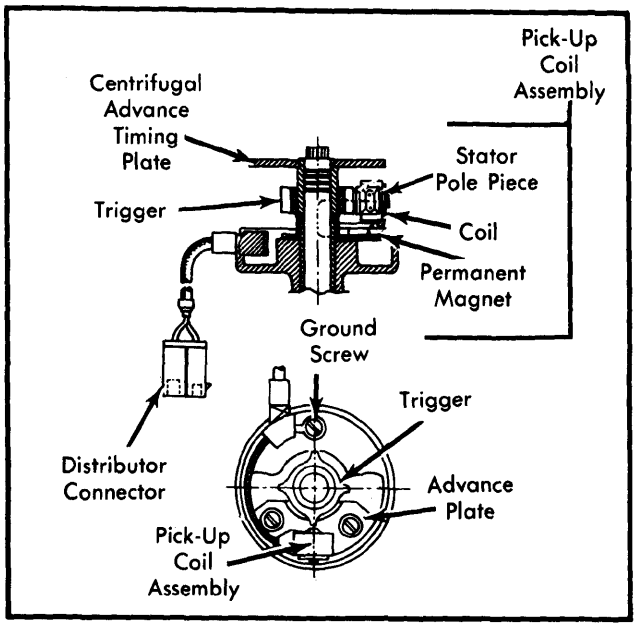

Fig. 7 Interior View of Marelli Distributor

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 ¼" (5-6 mm) from a good engine ground, using insulated pliers. See *Fig. 8*.

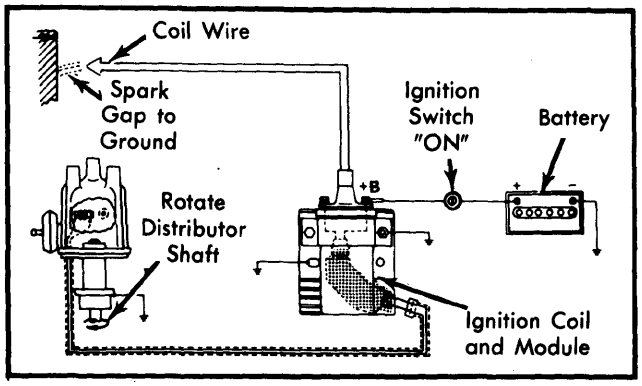

Fig. 8 Coil Wire Hookup for Making Control Module Check

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.

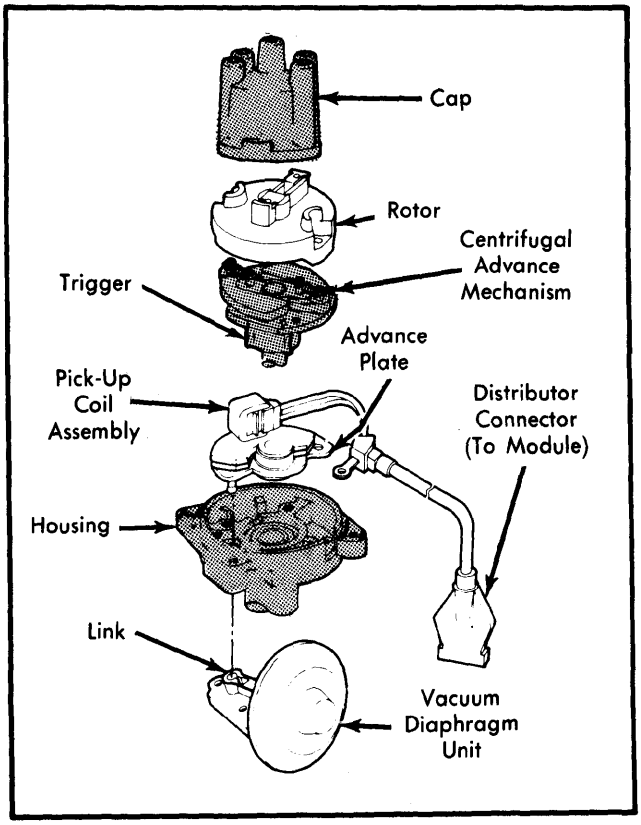

Fig. 9 Disassembled View of Marelli Distributor

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 and 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.