DUCELLIER ELECTRONIC IGNITION — RENAULT

18i, Le Car, Fuego

NOTE: Fuego Turbo models uses a Ducellier-Renault Electronic Ignition System with computer control. See appropriate article in this section

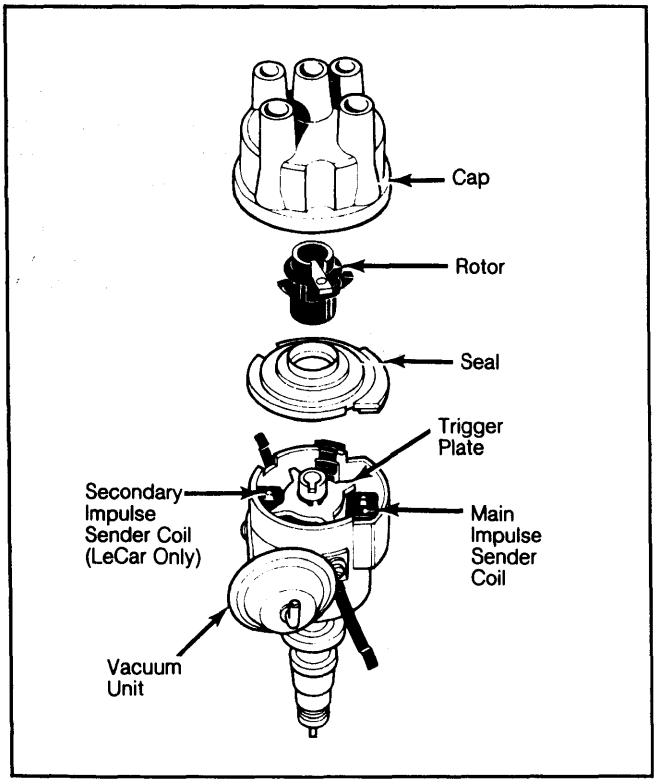
DESCRIPTION

Ducellier electronic ignition system consists of a Ducellier breakerless distributor, a Delco-Remy ignition coil and electronic control unit, an ignition switch and necessary wiring.

The distributor contains both centrifugal and vacuum advance mechanisms. Dual pick-up versions (Le Car only) have both main and secondary impulse sender coils (pick-up coils).

Single pick-up versions (18i and Fuego) have a single impulse sender (pick-up coil). The distributor also contains a trigger plate (reluctor), seal, rotor, and cap. *See Fig. 1.*

Fig. 1: Exploded View of Le Car Distributor



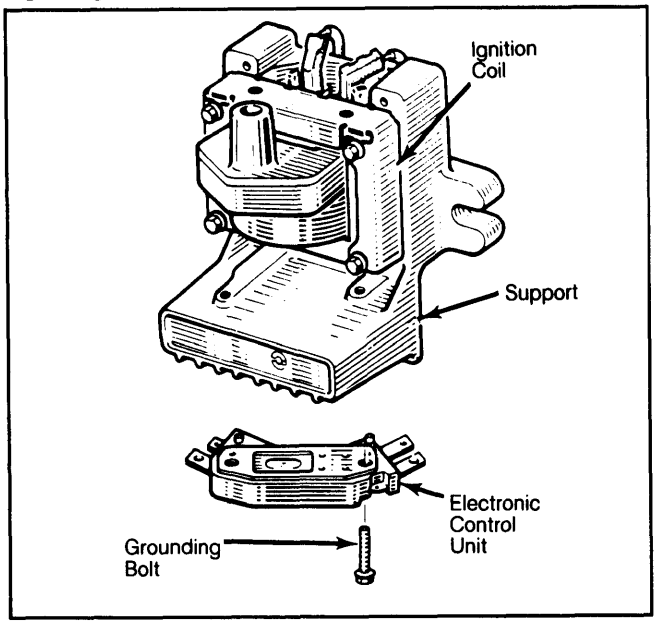
18i and Fuego have only a main impulse sender coil.

The ignition coil and electronic control unit are mounted to a common support, that provides both good grounding and cooling of the electronic control unit. *See Fig. 2.*

Silicone grease, which comes with each electronic control unit, is applied between the unit and support to provide improved heat transfer. Since both units are grounded through the common support base, all mounting bolts should be snug.

The ignition coil is encased in epoxy resin instead of oil. The electronic control unit receives, amplifies, and sends electronic signals to provide proper spark timing.

Fig. 2: Ignition Coil and Electronic Control Unit Assembly

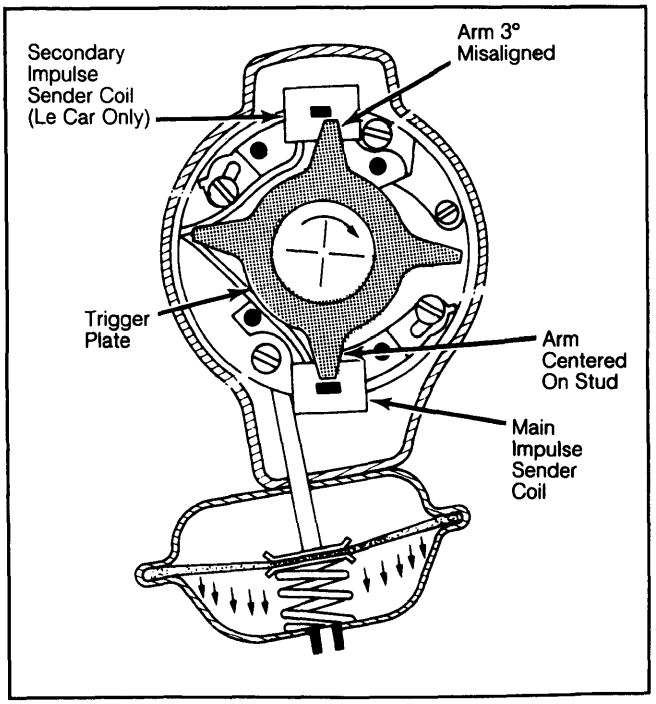


OPERATION

The distributor contains a trigger plate that turns with the distributor shaft. *See Fig. 3.* The impulse sender coil or coils are located inside the distributor housing.

The main coil is located near the vacuum diaphragm. On dual pick-up models, a secondary coil is located directly opposite (offset 3° for proper ignition timing during warm-up).

Fig. 3: Le Car Internal Distributor Components



18i and Fuego have only a main impulse sender coil.

DUCELLIER ELECTRONIC IGNITION — RENAULT (Cont.)

On dual pick-up models, when oil temperature is below 59°F (15°C), the secondary impulse sender operates to provide 3° additional advance (6° total).

When oil temperature reaches 59°F (15°C), a relay switches operation to the main impulse sender. Ignition timing returns from 6° to 3° BTDC. The 2 impulse senders never operate at the same time.

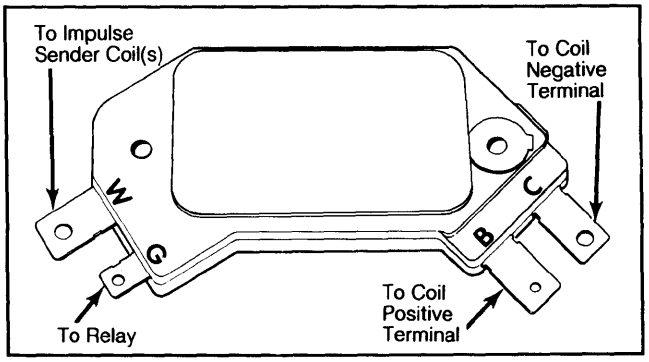
As the rotating trigger plate approaches and passes the impulse sender coil, a magnetic field builds and collapses, sending a signal to the electronic control unit. This signal opens and closes a transistor in the electronic control unit, turning the primary circuit in the ignition coil on and off.

When the primary coil circuit is turned off, a high voltage surge occurs in the coil secondary circuit, providing spark to the spark plugs through the distributor rotor, cap and secondary wires.

The electronic control unit has 4 terminals. *See Fig. 4.* Terminals "W" and "G" are connected to the distributor impulse sender coil. On dual pick-up models, terminal "G" is connected through a relay switch, that activates either the main or secondary impulse sender coil.

Terminal "B" is connected to the coil positive terminal and terminal "C" to the coil negative terminal. The unit is grounded, through one of its mounting bolts, to the support shared with the ignition coil.

Fig. 4: Electronic Control Unit Terminals



On single pick-up models, terminal "G" is attached directly to the impulse sender coil.

SPECIFICATIONS

CENTRIFUGAL & VACUUM ADVANCE

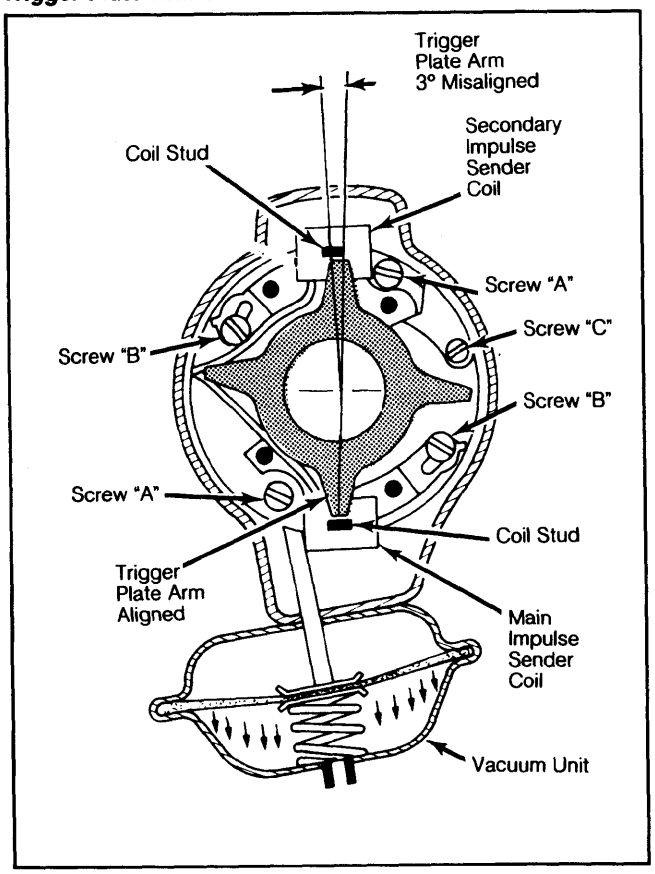
See the appropriate Distributor Specifications Table in this section.

ADJUSTMENTS

TRIGGER PLATE-TO-IMPULSE SENDER COIL AIR GAP

1) Loosen screws "A" and "B". *See Fig. 5.* Place an .018" (.45 mm) feeler gauge between pick-up coil stud and arm of the trigger plate. *See Fig. 6.* Move slotted coil base on screw "B" side until stud on top of coil touches feeler gauge. Tighten screws "A" and "B".

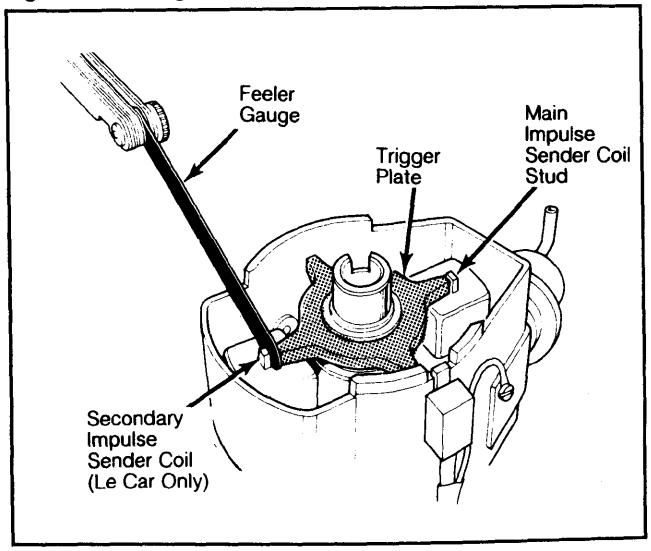
Fig. 5: Adjusting Ignition Timing by Misaligning Trigger Plate Arm 3°



This applies only to Le Car models.

2) Check air gap at all 4 arms of trigger plate. If gap is not within .012-.024" (.3-.6 mm) range for any arms of trigger plate and cannot be adjusted correctly, replace distributor.

Fig. 6: Checking Distributor Air Gap With Feeler Gauge



Check gap at each trigger plate tooth.

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IGNITION TIMING OF SECONDARY IMPULSE SENDER

Le Car Model Only

1) Set trigger plate-to-impulse sender coil air gap. Loosen screw "B" (for secondary sender) and screw "C". *See Fig. 5.* Align trigger plate arm with main impulse sender coil so that the center of its stud aligns with edge (not center) of trigger plate arm. Tighten screws "B" and "C".

2) This provides 3° additional advance when engine oil temperature is below 59°F (15°C).

DIAGNOSIS & TESTING

NOTE: Before testing components, be sure battery is properly charged, all wires are sound and connections are secure. Inspect distributor cap and rotor for cracks or carbon tracking. Turn ignition "OFF" when connecting test equipment or when replacing parts.

CAUTION: Before replacing "defective" parts such as the ignition coil, distributor or electronic control unit, check that the electrical system is operative. Particularly check the oil thermoswitch on the right-hand side of the oil pan and the relay which it controls. Also check all wiring and connectors.

ENGINE STARTS WHEN COLD BUT STALLS WHEN IT WARMS UP

NOTE: This applies only to Le Car models.

If engine starts normally and runs well, but stalls when oil temperature reaches 59°F (15°C), the main impulse sender coil is defective. Both impulse coils must be replaced.

IGNITION DEFECT OCCURS DURING ENGINE OPERATION

If ignition defect occurs during normal engine operation, check condition of spark plug wires, coil high tension wire and spark plugs. If engine surges or misfires due to ignition malfunction, and wires and spark plugs are not defective, replace electronic control unit.

NOTE: Never disconnect spark plug wires when engine is running. This may cause high voltage to seek ground through distributor body, causing rotor damage or trigger plate deterioration.

TESTING SYSTEM WHEN ENGINE WILL NOT START

In cold start situations, where the engine will not start, perform the following tests.

SPARKING TEST

1) With engine oil temperature below 59°F (15°C), turn ignition switch to "ON" position. Remove distributor cap.

2) Disconnect the high tension coil wire from distributor and hold it approximately 1/4" from a good ground. Ground should be as far away as possible from the ignition coil and electronic control unit.

3) Move a magnet in a spiral motion over secondary impulse sender stud (Le Car) or main sender stud (18i or Fuego). A spark should jump from the gap to ground as magnet passes over coil.

NOTE: If performing this test on Le Car, and oil temperature is above 59°F (15°C), pass magnet over main impulse sender instead of secondary sender.

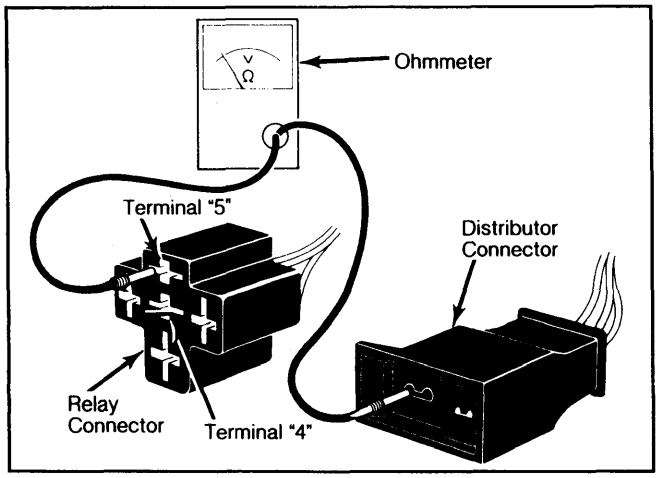
4) If spark occurs but engine will not start, problem is in distributor cap, rotor, spark plug wires or fuel system. If no spark occurs, proceed with component checks.

IMPULSE SENDER COIL CHECK

NOTE: Do not use a test light to check distributor impulse sender coil. High voltage may damage the coil.

1) Be sure impulse sender coil feed wires have not been cut. Disconnect the 5-wire relay connector and the 3-wire distributor connector (2 black wires, 1 gray). *See Fig. 7.*

Fig. 7: Ohmmeter Hookup for Checking Impulse Sender Coils



Ohmmeter needle should move.

2) Connect lead of an ohmmeter to terminal 5 of the 5-wire relay harness connector. Connect the other ohmmeter lead to the double black wire terminal of distributor connector. The needle should move. If not, replace impulse sender coil or coils.

3) To check impulse sender coil(s) for shorts, connect ohmmeter lead to terminal 5 with second ohmmeter lead connected to distributor body. The needle should not move. If it does, replace impulse sender coil(s).

IGNITION COIL AND ELECTRONIC CONTROL UNIT CHECK

1) Turn the ignition switch to the "ON" position. Connect positive voltmeter lead to ignition coil positive terminal. Connect remaining lead to ignition coil negative terminal. *See Fig. 8.*

2) Quickly move a magnet back and forth over secondary impulse sender coil (Le Car) or main impulse sender coil (18i or Fuego). If voltmeter needle moves, but engine would not start, replace ignition coil. If needle does not move, replace ignition control unit.

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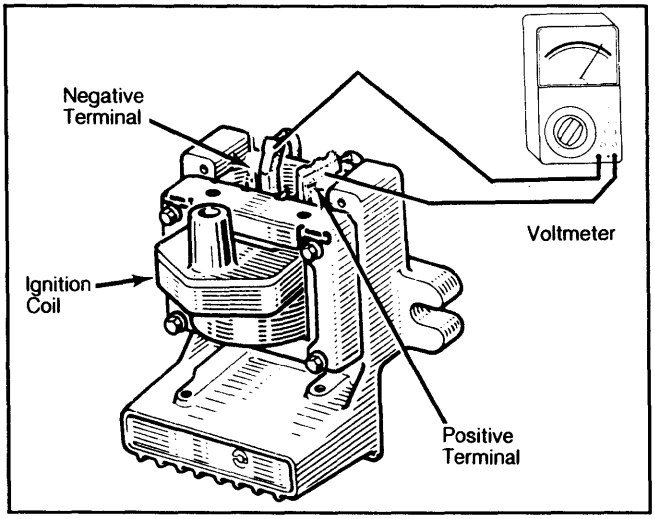
NOTE: This is only necessary when vehicle will not start, and other tests have been performed.

Fig. 8: Voltmeter Hookup for Checking Ignition Coil & Electronic Control Unit

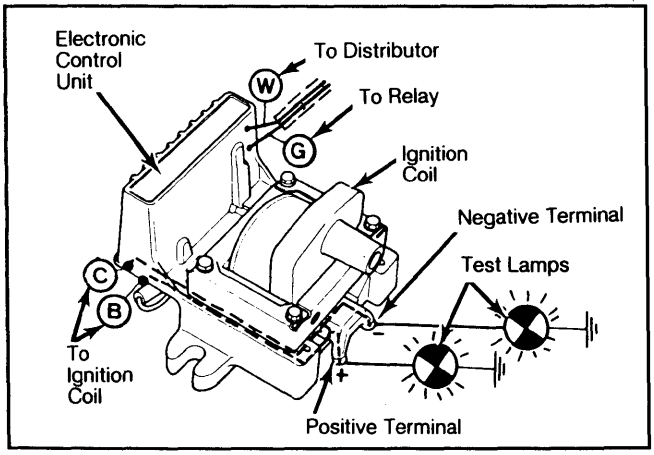


Attach leads to primary coil terminals.

ELECTRICAL CIRCUIT TEST

1) Connect a 12-volt test light between the coil positive terminal and ground. Turn ignition switch "ON". Test light should light. If not, check feed wire to coil. *See Fig. 9.*

Fig. 9: Test Lamp Hookup for Checking Ignition Coil Voltage



Test light should light.

2) Connect test light between coil negative terminal and ground. Turn ignition switch "ON". Test light should again light. If not, check if coil primary circuit is broken or if electronic control unit's power transistor is shorted.

OVERHAUL

DISASSEMBLY

1) Remove distributor cap, rotor and plastic seal. Remove screws attaching impulse sender coil(s) and remove coil(s) and trigger plate. Remove electrical connector from distributor body.

2) Remove vacuum advance unit. Remove drive pinion from distributor shaft and remove shaft and centrifugal advance mechanism from housing.

REASSEMBLY

Reverse disassembly procedure, adjusting air gap. Adjust ignition timing at secondary coil (if equipped).