Motorcraft Solid State Ignition

Ford Motor Co.: 1976-78 Capri, Fiesta

DESCRIPTION & OPERATION

The Motorcraft Solid State Ignition used on Capri and Fiesta utilizes a Bosch built breakerless distributor and Motorcraft electronic control module and coil. When ignition switch is on, primary circuit is on and coil is energized. As distributor shaft rotates, the distributor generates signals causing module to break the primary current and induce secondary voltage in coil. A timing circuit in module turns primary circuit on again to energize coil for next spark cycle. Dwell varies with engine speed and cannot be altered, so measurement and adjustment is not required.

ELECTRONIC CONTROL MODULE

Module contains seven color coded wires. *See Fig. 2.* Module receives power from ignition switch through Red wire while engine is running and through White wire while engine is cranking. Orange and Purple wires transmit signals from distributor while Green wire receives primary ignition current from coil which is then transmitted to ground at distributor through Black wire. System protection is provided through Blue wire, which is a fusible link. The electronic module cannot be repaired.

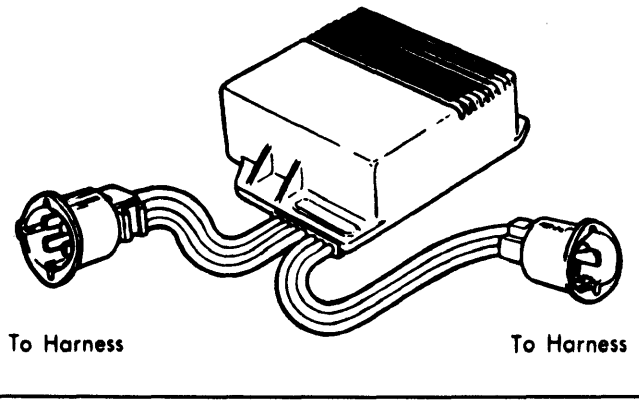

Fig. 1: Electronic Control Module

DISTRIBUTOR

The Solid State distributor is similar in appearance to conventional distributors with the following differences. The cam and advance plate assembly has been replaced by a sleeve and advance plate assembly. The spring loaded upper and lower breaker plate assembly is replaced by a base plate mounted to base casting and fitted with a magnetic pickup assembly secured by a retaining ring. The breaker cam is replaced by an armature with poles and secured to sleeve and plate assembly. Movement of these poles passing by core of magnetic pickup assembly signals module to turn primary current off. Diaphragm assembly has a different rod. The shaft gear, weights, springs, cap and rotor have not been changed.

IGNITION COIL

Ignition coil is oil filled and can easily be identified by tower terminals which are labelled "BAT" (battery) and "DEC" (Distributor Electronic Control). Solid state system coil and standard coils cannot be interchanged.

SYSTEM PROTECTION

System is protected against electrical currents produced or used by any vehicle component during normal operation. Damage to ignition system can occur if proper testing procedures are not followed.

TESTING

MODULE BIAS TEST

With ignition on, measure voltage between engine ground and Red Wire (pin No. 4). If voltage is less than battery voltage, repair Red wire to module.

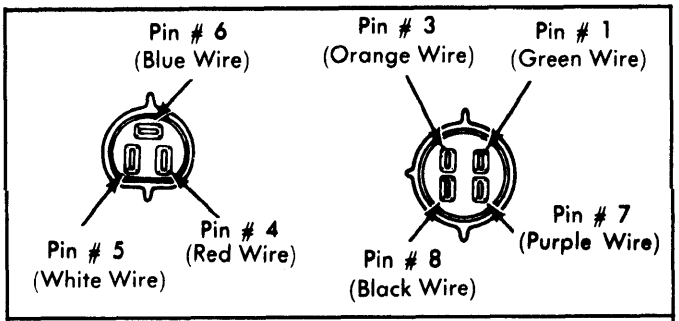

Fig. 3: Harness Connector Pins

BATTERY SOURCE TEST

1) Without disconnecting coil, connect voltmeter between coil "BAT" terminal and engine ground. Connect a jumper wire from coil "DEC" terminal to a known good ground.

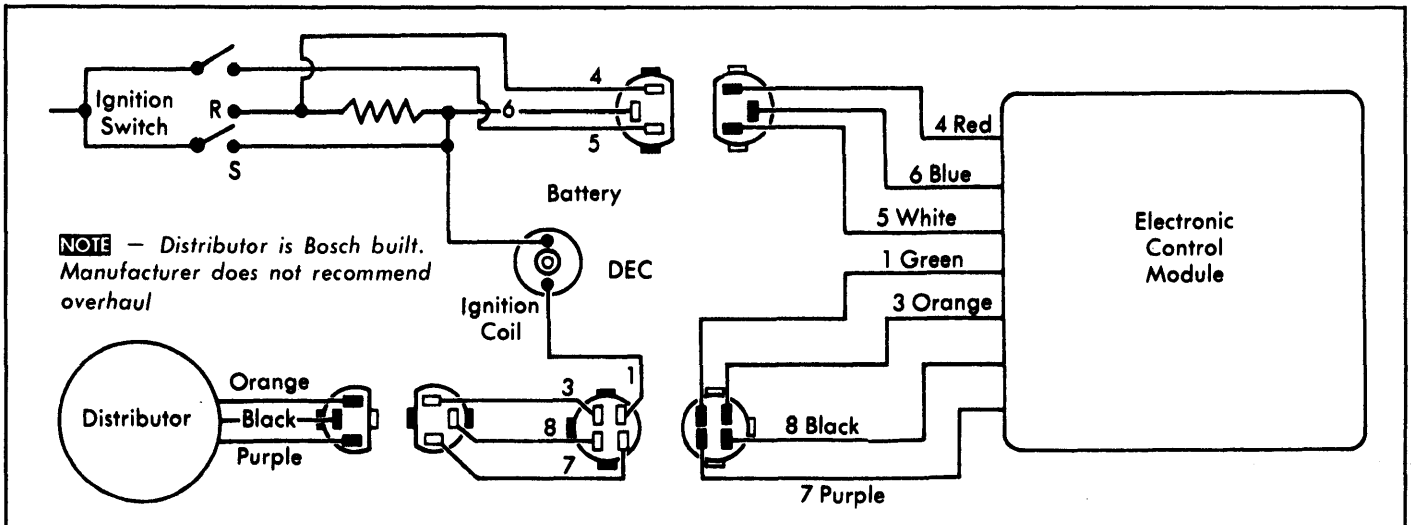

Fig. 2: Schematic of Breakerless Ignition System

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2) Turn all lights and accessories off and turn ignition on. A voltmeter reading between 4.9-7.9 volts indicates primary circuit from battery to coil is okay.
3) If reading is less than 4.9 volts, inspect primary wiring and resistance wire for worn insulation, broken strands and loose or corroded terminals. If reading is greater than 7.9 volts, check and replace resistance wire as necessary.

CRANKING TEST

With engine cranking, measure voltage between known god engine ground and White wire (pin No. 5). If voltage is not between 8-12 volts, repair White wire to module.

STARTING CIRCUIT TEST

If reading is not over 6 volts, the ignition by-pass circuit is open or grounded at starter solenoid or from ignition switch to White wire (pin No. 5). Check primary connections at coil.

DISTRIBUTOR HARDWARE TEST

1) Disconnect distributor 3-way pigtail. Connect voltmeter leads between Orange wire (pin No. 3) and Purple wire (pin No. 7). Crank engine and observe voltmeter. Voltmeter needle should oscillate. If needle does not oscillate, remove distributor cap and check for damage or incorrect assembly.
2) Armature must be tight on sleeve and roll pin, aligning armature, in position. Iron stator must not be broken and armature must rotate when engine is cranking. If internal components are okay, and voltmeter needle still will not oscillate, replace magnetic pick-up (stator assembly).

MAGNETIC PICK-UP TEST

1) With ignition off, there should be no continuity between Orange wire (pin No. 3) and Purple wire (pin No. 7). Check resistance between Black wire (pin No. 8) and engine ground. Reading should be zero ohms.
2) Check resistance between Orange wire (pin No. 3) and engine ground. Check resistance between Purple wire (pin No. 7) and engine ground. Both readings should be more than 70,000 ohms. If pick-up fails any test, it must be replaced.

IGNITION COIL TEST

With ignition off, check secondary resistance between Red wire (pin No. 4) and coil tower. Resistance should be 7000-13,000 ohms. Check primary resistance between Green wire (pin No. 1) and Blue wire (pin No. 6). Resistance should be 1-2 ohms. If resistance is within limits but the coil is still suspected, test coil on a standard coil tester. If reading differs from the original test, check for a defective harness.

SHORT TEST

If resistance between Green wire (pin No. 1) and engine ground is less than 4 ohms, check for a short to ground at coil "DEC" terminal or in Green wire to coil.

PRIMARY RESISTANCE WIRE TEST

Resistance between Red wire (pin No. 4) and Blue wire (pin No. 6). Resistance should be 1-2 ohms. If not, replace ignition resistance wire.

OVERHAUL

NOTE: Overhaul of the Bosch distributor is not recommended by the manufacturer. With the exception of the rotor and cap, if components of the distributor are found defective or damaged, the distributor must be replaced.

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