

IGNITION SYSTEM - BOSCH BREAKERLESS

DESCRIPTION

The Bosch electronic ignition system consists of a ignition control unite, a breakerless distributor, a single or dual ballast resistor, a high output ignition coil, an ignition switch, and battery.

Some models may use a resistor wire rather than a ballast resistor. Standard centrifugal and vacuum advance/retard mechanisms are used.

The distributor contains a rotating trigger wheel and a stationary magnetic pick-up coil (unless it is repositioned by vacuum diaphragm) .

OPERATION

Inside the distributor, a trigger wheel turns with the distributor shaft. The trigger wheel has one tooth or lug for each engine cylinder.

As the trigger wheel rotates past the pole of the magnetic pick-up coil, a magnetic field is created that continually builds and collapses. This produces a low voltage electrical signal.

This signal passes to the control module, which controls the dwell angle and at the same time interrupts the ignition coil's primary circuit. This induces the high secondary coil output voltage that fires the spark plugs.

ROTOR

Set ohmmeter to x1000 scale. With ignition off and distributor cap removed, connect ohmmeter leads across rotor. Compare reading with specifications.

ROTOR SPECIFICATION

Application	Ohms
Volvo	4000-6000

SPARK PLUG WIRES

1) If the spark plug connectors have sheet metal jackets, identified by the following symbol (two diodes facing each other), they contain "air gap" resistors. Wires cannot be checked for resistance using an ohmmeter. An oscilloscope must be used.

2) On Volvo, connect ohmmeter to ends of spark plug wires. Wire resistance should be 4600-6600 ohms per 3 feet.

BALLAST RESISTOR

Disconnect wiring at ballast resistors and connect ohmmeter across resistor terminals. Resistance must be 0.8-1.1 ohms.

1) Remove coil tower high tension lead and hold 3/4" (19 mm) from ground. Crank engine. If spark is present, go to step 10). If no spark is available, go to next step.

2) Check voltage at terminal 15 of coil. If no voltage is present, check ballast resistor, ignition switch and wiring. If voltage is present, go to next step.

3) Check voltage drop across transistor by connecting voltmeter to terminal 1 of coil and ground. Voltmeter reading should be 0.5-2.0 volts. If voltage is incorrect, go to step 6). If voltage is correct, go to next step.

4) Check pick-up coil resistance by connecting ohmmeter across terminal 7 and 31d at distributor. Resistance reading should be 950-1250 ohms. If reading is incorrect, replace pick-up coil. If reading is correct, go to next step.

5) Check pick-up coil for grounds by connecting ohmmeter to either terminal of pick-up coil and ground. Resistance reading should be infinity. If reading is incorrect, replace pick-up coil. If reading is correct, replace ignition control module.

6) If voltage drop is more than 0.5-2.0 volts, go to next step. If voltage drop is less than 0.5 volts, check for 1-2 ohms resistance in ignition coil by connecting an ohmmeter across coil terminal 1 and 15. If reading is correct, replace ignition control module. If not, replace ignition coil.

7) Turn ignition on. Connect voltmeter between terminal 15 of ignition control module and ground. If voltage is not present, repair wire coming from ballast resistor. If voltage is present, go to next step.

8) With ignition on, connect voltmeter between terminal 16 of ignition control module and ground. If voltage is not present, repair wire coming from terminal 1 of ignition coil. If voltage is present, go to next step.

9) Ensure that ignition control module is properly grounded by disconnecting connector plug at module. Connect voltmeter across plug terminal 31 and ground. If reading is 0 volts, replace ignition control module. If reading is incorrect, repair ground wire.

10) Check ignition timing. If timing is incorrect, adjust as necessary. If timing is correct, check voltage across coil terminal 1 of ignition coil and ground. If voltage is incorrect, replace ignition control module.

11) If voltage is correct and if the engine does not start, check and/or replace spark plugs, rotor, cap, ignition wires, and fuel system. If voltage is correct and if the engine starts, go to next step.

12) Check dwell angle. If dwell angle is incorrect, replace ignition control module. If dwell angle is correct, ensure that coil output voltage is 20,000 by holding coil high tension lead about 3/4" (19 mm) from ground.

13) If coil output is correct, ignition system is okay. If coil output is incorrect, check and/or replace spark plugs, rotor, cap, and ignition wires. If output voltage is now correct, ignition system is okay.

14) If output voltage is still incorrect, install a known good ignition coil. If output voltage is now correct, replace ignition coil. If output voltage is still incorrect, install old coil. Replace ignition control module.