

Automotive Engines 10th

Chapter 17 Ignition System Operation and Diagnosis

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. How does a Hall-effect sensor work?
2. How does a magnetic sensor work?
3. What harm can occur if the engine is cranked or run with an open (defective) spark plug wire?
4. How does a waste-spark ignition system work?
5. What does the heat range of a spark plug refer to?
6. How can 12 volts from a battery be changed to 40,000 volts for ignition?
7. Why should a spark tester be used to check for spark rather than a standard spark plug?
8. How is a magnetic sensor tested for resistance and AC voltage output?

Answer Key

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1. A Hall-effect sensor reacts to a magnetic field and produces a square wave output voltage signal.
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2. A magnetic sensor produces a varying voltage when the notch on the camshaft or crankshaft passes near the sensor and changes the strength of the magnetic field around the sensor.
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3. If a spark plug is open (unplugged or disconnected) when the engine is being cranked or running, the high voltage produced inside the ignition coil can arc, internally ruining the coil.
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4. Each end of the secondary winding of the ignition coil is attached to a spark plug, therefore, both plugs fire at the same time.
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5. The heat range of the spark plug refers to how rapidly the heat created at the tip is transferred to the cylinder head. A plug with a long ceramic insulator path runs hotter at the tip than a spark plug that has a shorter path because the heat must travel farther.
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6. Battery voltage is increased to 40,000 volts in the ignition coil by pulsing the primary windings on and off to ground through the module. The collapsing magnetic field around the primary winding induces the high-voltage change in the adjacent secondary winding.
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7. A spark tester is the preferred tool to use to check the operation of the ignition system because it loads the ignition coil and forces it to produce at least 25,000 volts.
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8. The resistance can be measured by disconnecting the connector to the pickup coil and measuring the resistance of the winding. Crank the engine then use a digital meter set to read AC volts.
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