

**Wheels:** A letter from RS says, “My friend has a 1991 Nissan Pathfinder 4-wheel-drive with a V-6. While she was driving, it quit running. I looked it over and found there was no spark to the plugs. I thought it was the coil so I replaced it, to no avail. I then replaced the ignition switch, rotor cap, and button – still no spark. I did a continuity check and the circuit is continuous. I then bought a condenser and resistor at a local dealer, but there is nothing on the wiring that even comes close to resembling these parts. The dealer could not tell me the location. I’ve looked at Chilton’s and Haynes’ books and still no information. Could you give me the location. Also, there is a part on the coil itself that they cannot identify. What else might be the problem. Any info would be greatly appreciated.”

**Halderman:** This vehicle is equipped with an optical sensor inside the distributor, which is used to signal a power transistor that then fires the ignition coil. The most likely cause for a no-spark condition is a defective power transistor, which is attached to the coil in this application.

**Wheels:** This sounds technical. Can you explain how an ignition system works?

**Halderman:** All production ignition systems use one or more ignition coils to create a high-voltage spark, which is then sent to a spark plug. The electrical arc across the electrodes of the spark plug is what ignites the air-fuel mixture in the combustion chamber. An ignition coil consists of a low-voltage winding called the primary winding and a high-voltage winding called the secondary winding. A sensor, such as an optical, magnetic, or Hall-effect sensor is used to trigger an ignition control module (ICM). Inside the ICM is a power transmitter, which then allows current to flow through the primary winding. To create a high-voltage pulse out of the coil, the current is turned off to the coil and the magnetic field created inside the coil collapses. This collapsing magnetic field cuts across the thousands of turns of fine wire of the secondary winding of the coil. Therefore, any fault in the triggering device or the ignition control module can cause a no-spark condition.

**Wheels:** What should RS have done when the engine did not start?

**Halderman:** My recommendation is that vehicles are too complex today and seeking professional help is almost always the best approach. For example, a professional service technician could likely diagnose the cause of this fault in an hour or less. Add the price of the part needed plus installation labor and the total is likely to be less than the cost of many unneeded parts. Check with neighbors, friends, and relatives for a recommendation of a shop or dealer that works on your brand of vehicle.

