



### **Ignition Systems:**

The purpose of the ignition system is to create a spark that will ignite the fuel-air mixture in the cylinder of an engine. It must do this at exactly the right instant and do it at the rate of up to several thousand times per minute for each cylinder in the engine. If the timing of that spark is off by a small fraction of a second, the engine will run poorly or not run at all. To learn more about how an engine works, go to our [Short Course on Automobile Engines](#).

The ignition system sends an extremely high voltage to the spark plug in each cylinder when the piston is at the top of its compression stroke. The tip of each spark plug contains a gap that the voltage must jump across in order to reach ground. That is where the spark occurs.

The voltage that is available to the spark plug is somewhere between 20,000 volts and 50,000 volts or better. The job of the ignition system is to produce that high voltage from a 12 volt source and get it to each cylinder in a specific order, at exactly the right time.

Let's see how this is done.

The ignition system has two tasks to perform. First, it must create a voltage high enough (20,000+) to arc across the gap of a spark plug, thus creating a spark strong enough to ignite the air/fuel mixture for combustion. Second, it must control the timing of the spark so it occurs at the exact right time and send it to the correct cylinder.

The ignition system is divided into two sections, the primary circuit and the secondary circuit. The low voltage primary circuit operates at battery voltage (12 to 14.5 volts) and is responsible for generating the signal to fire the spark plug at the exact right time and sending that signal to the ignition coil. The ignition coil is the component that converts the 12 volt signal into the high 20,000+ volt charge. Once the voltage is stepped up, it goes to the secondary circuit which then directs the charge to the correct spark plug at the right time.