



Ignition Coils

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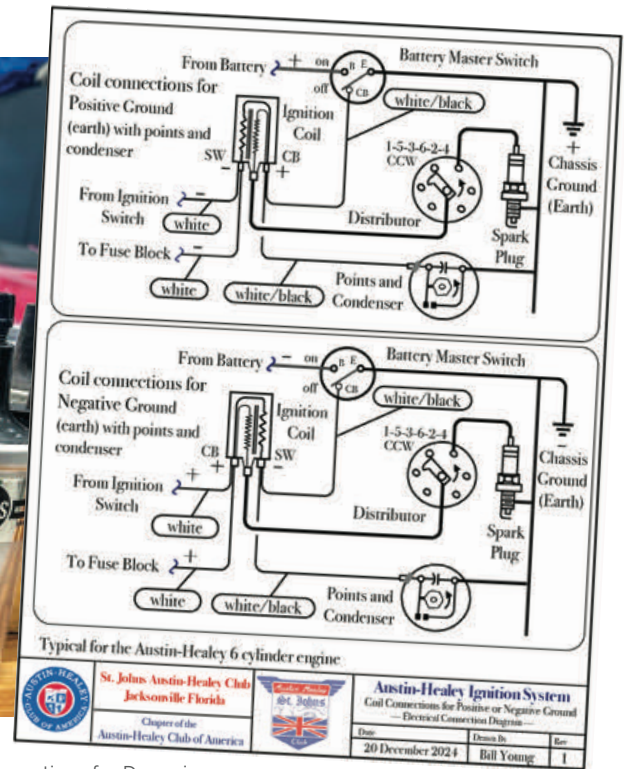


A family of old coils, with a friend of the family in the center.

It was back in 1831 that Michael Faraday discovered the Law of Electromagnetism predicting how a magnetic field will interact with an electric circuit to produce an electromotive force (EMF). This phenomenon, known as electromagnetic induction, is the fundamental operating principle for our ignition coils.

Nikola Tesla filed a patent in 1898 (#609,250) for an electrical ignitor system for gas engines using an ignition coil. Charles Kettering is recognized as the inventor of the electrical ignition system using the coils, breaker points, a capacitor (condenser) and a distributor. Lucas also played a prominent role in the development of the early ignition coil systems using a single coil to generate voltage from the battery and a distributor to deliver the voltage to the individual spark plugs. These Lucas oil-filled coils were used in all our Austin-Healeys during the production years.

The ignition coil is a small transformer with two coils, a primary coil that has only a few turns of heavy wire, and a secondary coil that has many turns of very thin wire. Both coils are wound



Coil Connections for Dummies.

around each other with an iron magnetic core. The primary coil is connected to the ignition switch battery voltage and its ground (earth) circuit is switched on and off by the contact breaker (points) in the distributor. The secondary coil is connected to the distributor feeding the spark plugs. When the primary coil is switched on, the current flows, creating a strong magnetic field around both coils. When it is switched off, the magnetic field collapses, inducing a high voltage in the secondary winding that creates a spark at the spark plug.

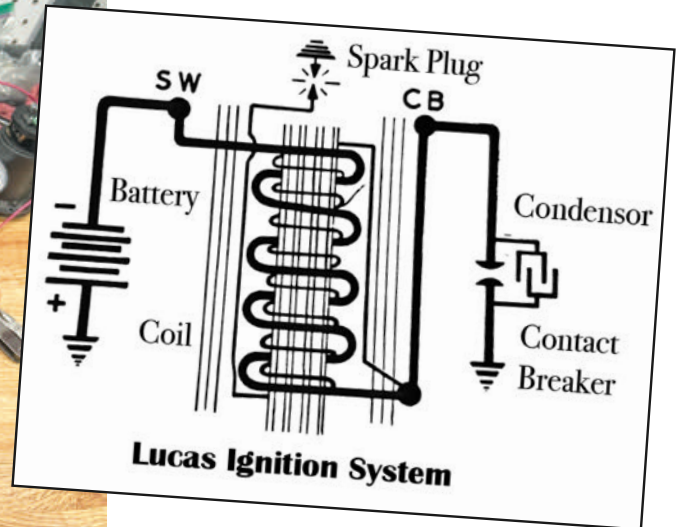
The ignition coil is an extraordinary device, most often overlooked because it seems to work forever without a problem. Consider this, if your six-cylinder Austin-Healey has 100,000 miles on the odometer, and these miles were put on at 3000 RPM (which is approximately 60 MPH or one mile per minute), and knowing the distributor rotates at 1/2 of the engine speed, the coil operated 9000 times per mile. Now with 100,000 miles, the coil provided a spark to the spark plugs an amazing 900 million times.

Coils can fail due to age, heat, and vibration. Some of the symptoms are:

- Poor gas mileage.
- Slow acceleration.
- Difficulty starting the engine.
- Rough idling and engine vibration.
- Misfiring or backfiring.
- Stalling at low RPM.
- Odd noises like sputtering, coughing, or banging.



Coil and distributor bench test.



Original Lucas coil connections ... it makes more sense after a few Spark Plug IPAs.

Perhaps it is time for a new coil?

Coils will work with positive or negative grounded electrical systems; however, spark plugs do care which way the electrons are flowing in the high-voltage circuit. With the engine running, the center electrode is substantially hotter than the outer electrode. Negatively charged electrons prefer to flow away from a hot electrode towards a colder electrode for best performance. There could be as much as a 15 to 30 percent loss of voltage required to make the spark jump the gap at the spark plug if the coil polarity is reversed. Early production coils were marked on the primary terminals with "SW" for Switch (connecting to the ignition switch) and "CB" for Contact Breaker (connecting to the points in the distributor). This was assuming the vehicle wiring was connected for positive ground (positive battery cable grounded on the chassis). If you reverse the battery polarity (going to negative ground), then the coil needs to be reconnected with "CB" to the ignition switch and "SW" to the distributor.

Later coils were marked on the primary terminals with a plus (+) and minus (-) symbol. For positive ground, the (+) terminal connects to the distributor and the (-) terminal connects to the ignition. For negative ground, the (-) terminal connects to the distributor and the (+) terminal connects to the ignition. See the electrical connection diagram in this article for further details.

A good ignition coil will provide the high voltage energy to the spark plugs for a smooth-running engine. Spark Plug IPA may help you be smooth-running as well. Spark Plug is a sour ale brewed by Jobsite Brewing Company in Stratford, Ontario, Canada, and is intentionally acidic, tart, and sour. Sour ale styles include Belgian Lambics, Flanders red ale, German Gose and Berliner Weisse.

Unlike modern brewing, which is done in a sanitary environment to guard against the intrusion of wild yeast, these ales are made by allowing wild yeast strains and bacteria into the brewing process. The taste has been described as mouth puckering, light bodied, and kind of juicy. What better way could there be to close out a day of working on your Austin-Healey ignition system than by having a couple of Spark Plug ales to keep your electrons going in the right direction. Cheers. **HM**

Mouth-watering, both literally and figuratively.

