IGNITION COIL COMPARISON

By Dave Fiedler

Transistor Ignition Versus Breaker Point Ignition

Before discussing coil differences, it is important to understand the basic operation of an ignition coil. The function of any ignition coil is to convert a low voltage (12 volts or less) into a voltage high enough (25,000-plus volts) to jump the spark plug gap and ignite the fuel-air mixture in the engine cylinder. It performs this function by making use of the principle of induction. The internals of a coil consist of primary and secondary windings of wire coiled around a vertically mounted soft-iron core. Because of the ratio of primary to secondary windings, a small input voltage is transformed into a very large output voltage. One of the differences between a conventional breaker-point-style coil and a Transistor Ignition (TI) coil is the ratio of these windings. A TI coil uses higher ratio when compared to a conventional coil. In addition, the TI coil uses larger diameter wire in the primary winding which decreases the resistance and allows the coil to operate at higher current levels (approximately 7.5 amps). This high current enhances the coil's ability to produce a high output voltage.

An important point to remember is a conventional point-style ignition system is current-limited due to breaker point life, where a TI system is voltage-limited due to the electrical components used in amplifier construction.

A coil intended for breaker point usage will not work in a TI System for two reasons.

- One is the turn ratio -- due to the fact that a TI system operates at lower voltage (2.5-7.0 volts) there is not enough "step up" capabilities in a conventional coil because of a relatively low turn ratio.

- The other is the operating current -- a conventional coil has high primary winding resistance in order to control breaker point current to a value of approximately 4 amps. When this low current is combined with the low turns ratio of a point-style coil, the result is a substantial reduction in output voltage in a TI circuit.

Next, I would like to review GM part numbers versus usage. There were eight (8) different GM part numbers assigned to Corvette TI coils from 1964-1971 (see Application List). The difference electrically between these part numbers is small to virtually unmeasurable. Therefore, essentially any TI coil will work in any TI application. The only physical difference, other than the embossed numbers (the last three digits of the seven-digit GM part number), was the font of the Delco-Remy trademark of which there are numerous styles (there is no known documentation to clarify this detail) and a small tower change. On 1964/1965 coils (1115176, 1115203 and early 1115207, 1115210) there were four (4) holes, two each flanking the primary terminal studs. These holes were used to trap a tanged lock-washer. The use of these holes and the corresponding washer was discontinued in 1965.

Even though there were eight part numbers used to cover the range of TI coil applications, only one number was available for service. The other seven part numbers were used on the production line *only* and were never offered as service replacement coils.

The coil offered for service was 1115207 and consequently the only coil likely to be found in NOS condition. This coil came in three versions. The early one had the 207 number embossed in the case. The next version had the entire seven digit GM part number stenciled in bold white numerals on the case. The last version was made in Japan and can be identified by fine stenciled numerals (seven digit GM part number) and by a different coil tower. There are also some replacement coils available which duplicate the internals of an original TI coil. These coils are functionally correct but not technically correct because they have no embossment.

Currently, GM lists a coil for use with TI (GM part number 12337166), but I strongly recommend not trying to use it. I have received many calls from Corvette enthusiasts relating the problems they are having when attempting to use what is actually a breaker point coil.

In summary, when it comes to Transistor Ignition, there is a distinct difference between a TI coil and a coil for any other use. A TI coil can be checked and identified electrically with the use of an ohmmeter. To do this, check the resistance between the two primary terminals (positive to negative). If it's a TI coil, the results should be as follows (published resistance, at 75-degreesF):

Primary to Primary ..... 0.41-0.51 ohms

Conventional point style coils should read:

Primary to Primary ..... 1.24-1.46 ohms

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