DISG vs CDI

CDI Ignition Systems have been the mainstay of the high performance industry for as long as anyone can remember. Rather than recreate what is already available JEGS, along ICE Ignition, decided to find a better way! Using digital technology an ignition system was created offering the higher intensity of CDI systems and the longer duration of O.E variable dwell systems. These two factors combine to produce the greatest possible total spark energy* at virtually all RPM's.

Improved output is achieved by using a higher coil primary current, resulting in the secondary spark current being more intense. The system also uses MOSFET switching technology which is faster as well as minimizing heat dissipation and energy wastage, to produce the longest duration spark available.

The dwell period, that is the length of time the coil primary is switched on each cycle, to charge the coil in readiness for the next spark, is where the DISG system excels. The microprocessor software incorporates an algorithm that senses the rate of acceleration (or deceleration) of the engine and computes just how much shorter (or longer) the next 90 degrees (on a V8 engine) of engine rotation will be, before it actually happens, so it can turn on the coil ahead of time so it will reach full current at exactly the moment it needs to be turned off to produce the spark. At higher engine speeds, the microprocessor switches to an alternative program which deals with the problem of extinguishing the spark by turning the coil primary back on before the spark has gone out naturally. This is done so there will be sufficient time for the coil current to build up to the set amount of maximum energy for the next spark. It calculates the optimum compromise of time for coil charging versus time for spark duration.

The biggest difference between the DISG and CDI systems is the amount of total spark energy available between 1000 rpm and 8000 rpm or higher. Where the DISG system maintains a set intensity level with a varying amount of spark duration in time, to provide a constant amount of crank degrees of spark duration throughout the entire RPM range, CDI systems have a set intensity level and a set amount of spark duration in time, resulting in a short amount of crank degrees of spark duration at low to mid RPM levels, only growing to a reasonable level at the upper extremities (8000 rpm plus) of the RPM range. To understand this more fully, consider if 1.0 millisecond of spark equals 22 degrees of spark duration at 4000 rpm, then 0.5 of a millisecond of spark equals 22 degrees of spark duration at 8000 rpm. Conversely, if 0.15 of a millisecond of spark equals 3.3 degrees of spark duration at 4000 rpm, then 0.15 of a millisecond of spark will equal 6.6 degrees of spark duration at 8000 rpm.

There is no doubt that some CDI systems (only those that multiple spark) do provide a greater amount of total spark energy between 500 rpm and 900 rpm, where there is enough time to allow a greater amount of multiple sparks, and thus a greater amount of total spark energy. It is therefore possible a CDI system may provide a cleaner idle between 500 rpm and 900 rpm on an engine that is able to idle so low, due to its greater total spark energy at those idle speeds. However, once the engine speed rises above 900 rpm, the multiple sparks diminish rapidly, significantly reducing the total spark energy available. The time between these multiple sparks is also significantly longer. At approximately 3000 rpm, all CDI systems revert to a single high intensity / short duration spark, which can not provide as much total spark energy as a DISG system.

* - Total spark energy is calculated as a combination of spark intensity, spark duration and arc voltage. This is determined by measuring the voltage drop across a 100 OHM resistor going to earth in line with the spark from a KD2756 Tester Plug. This represents secondary current whereby spark intensity is expressed in milliamps and spark duration in milliseconds, the combination of which equals total spark energy expressed in millijoules.