

WINTERBURN CD Ignition comparison to Standard Kettering (points/condenser) Ignition

WINTERBURN

KETTERING

<p>The WINTERBURN Capacitor Discharge Ignition has a long duration spark compared to other CD ignitions, but shorter than the Kettering Inductive Ignition. It has very high power. The design produces a multiphase spark (alternating current) with the first spark event negative polarity, and then alternating between positive and negative. The spark length and its characteristic waveform are affected very little by combustion chamber conditions, unlike the Kettering system. The WINTERBURN CDI is the type of CD ignition that allows alternating current flow. In addition, this method is optimized to extend the oscillation longer than other designs. On every oscillation, the gap voltage rises above that required to sustain a spark during the spark event. This produces a series of very high powered sparks of alternating polarity within the single, long spark event. This feature makes it very difficult for the spark to 'blow out'.</p>	<p>Often times, more spark energy than CD ignitions. Do not believe advertising hype by major companies producing racing style CD ignitions that quote the energy stored in the capacitor as the spark energy. It's untrue. However, despite a higher total energy spark than most CD ignitions, (at least for a narrow rpm band and providing battery voltage is sufficient), most of that energy is wasted and does not contribute to igniting fuel. Energy becomes available as the coil's magnetic field collapses, trading voltage for current once the spark forms. This process, although quick, results in lower power as the spark voltage drops and stays low, delivering its energy over a longer period of time (typically about 1.2 milliseconds).</p>
<p>Extremely long Spark Plug life. Few misfires mean cleaner spark plugs. Also, the WINTERBURN CD ignition uses a large discharge capacitor (2.2uF) but not so large as to cause erosion. Experiments show a discharge capacitor larger than 2.4uF will shed metal from spark gap with WINTERBURN CD.</p>	<p>Spark Plug life is limited due to carbon fouling and increased erosion (increased erosion caused by larger total spark energy)</p>
<p>Distributor points last upwards of 60 thousand miles providing rubbing block is lubricated occasionally. Points adjustment is not critical, but should be checked and adjusted every 30 thousand miles. Rubbing block wear decreases after 12000 miles or so as rubbing block beds into cam surface with no decrease in ignition performance. The WINTERBURN CD ignition purposely wastes 0.4 amps of current through the points to keep them clean (a small electrical current prevents corrosion and a greyish paste that will form otherwise in some engines due to what is thought to be a combination of ozone and oil fumes). On dirty point contact surfaces, a small amount of arcing will be seen (if you could see through the</p>	<p>Distributor points usually need filing every 6000 miles at a minimum and ignition performance drops off quickly as points burn and become pitted. Rarely will a set last beyond 30 thousand miles with the need to file contact surfaces occasionally to maintain performance. The points burn as they are small and need to break up to 4 amps of current with the inductive kick of the ignition coil primary making the burning even worse. Point burning is quite dramatic with sparks being ejected up to 1/8 inch away from the point contact surfaces continuously while the engine is running.</p>

<p>distributor cap) as the current cleans the point contact surfaces. This is minor and actually prolongs the life of the points and reduces the resistance at the contact surfaces.</p>	
<p>Will operate with or without the ignition condenser. A shorted ignition condenser will prevent the CD ignition from triggering just as it will prevent the Kettering from operating, with the exception that the condenser may be disconnected KETTERING requires the ignition condenser to help the ignition points break cleanly without arcing excessively (primary purpose). A leaky condenser will reduce ignition performance. A failed condenser, either shorted or open-circuit and the CD will once again be functional. will prevent the ignition from operating.</p> <p>Available output voltage drops very little over the rpm range up to 8000rpm (8cyl) and for variations in battery voltage. Max rpm before misfiring occurs is 8000rpm on an 8 cylinder and double that for a 4 cylinder engine. The trigger circuit ignores points bounce so this has no effect on high speed operation. The WINTERBURN CD produces less peak voltage than the Kettering at about 2500rpm (8cyl), but for all other speeds and for low battery voltage, its available voltage is always higher than the Kettering. However, the maximum available voltage is kept within reasonable limits to protect vital stock ignition components.</p>	<p>Available output voltage (with a typical coil) starts at 20kV, peaking at 35kV at about 2500rpm (8cyl), dropping very quickly with rising rpm to less than 5kv at 6000rpm (8cyl). This is due to less dwell time (time for current to saturate the ignition coil primary) and points bounce which exacerbates the problem. If battery voltage is reduced, the available output voltage also drops, and spark energy even more.</p>
<p>Provides nearly full spark energy down to 3.7 volts (6V systems) and 5 volts (12V systems) battery input voltage to start a car with a weak battery. (CD power supply charges the 2.2uF internal capacitor to nearly full voltage even when the battery is almost dead)</p>	<p>Spark energy and voltage drop off quickly with reducing battery voltage. Non-linear relationship means that when the battery voltage drops by half, the spark energy drops to one quarter its former value.</p>
<p>Not dependent on starter speed for easy starting due to full starting energy while battery voltage is low while on the starter, and because the CD trigger is not particular about how quickly the points open.</p>	<p>A fast turning starter makes the Kettering system start an engine easier by opening the points faster. Slow opening points tend to leak-off current through the arcing at the contacts and if the starter is turned slowly enough, a spark will not be generated. Combined with the usual low battery voltage while on starter, the result could be a car that won't start unless it is pushed.</p>
<p>Starting is easier due to the high power of the CD ignition spark. That high power is available immediately and at all engine speeds. The high</p>	<p>Current often leaks to ground through carbon fouled centre electrode or through condensation at the plug gap (which often occurs after sitting over</p>

<p>power capability is also what enables a CD ignition to overcome spark plug fouling and still create a spark. For a given ignition coil driven inductively either with points or a transistor switch, the Winterburn CDI will provide ten times the spark voltage with a badly fouled spark plug. Experimental data using a 126 thousand ohm shunt resistance (to simulate a badly fouled spark plug) in parallel with the spark gap, reveals that Kettering and transistor switch can only muster a 300-500V spark. When the Winterburn CDI is connected to the same coil, the spark voltage rises to 4000V to 7500V depending on the coil. It's this feature that allows CD ignitions to fire through carbon fouled, wet, or gasoline soaked spark plugs. In one dramatic demonstration, with a 1971 Fiat Spider, the spark plug insulators were completely immersed in rain water (they reside in little 'bathtubs') and the engine still ran (albeit roughly) with the WINTERBURN ignition system.</p>	<p>night). Fuel soaked plug gaps from misfiring or too much choke will make plug gaps harder to penetrate and current also leaks to ground via centre electrode insulator. Car may not start and if it does, it may not run well until thoroughly warm.</p>
<p>The WINTERBURN CD Ignition delivers high power throughout the rpm range resulting in very few misfires with high current to ignite fuel over a wider range of mixtures. This is accomplished in part by extending the duration of the CD ignition to approximately 350 microseconds depending on the original equipment ignition coil already on the car. With some coils, the spark is extended even further (up to 0.5milliseconds) due to low losses that allow the alternating current spark to continue longer. A CD spark has a characteristic blue colour and sounds like a miniature crack of lightning. The Kettering system has an orange spark with a 'crackling sound' that is not as loud.</p>	<p>Ignition is at its best at low and medium rpm but becomes very weak as rpm rises or battery voltage falls. At 3500rpm an 8 cylinder engine is starting to miss frequently in a random nature that goes unnoticed by the driver. Every miss results in lost power and raw fuel out the tail pipe.</p>
<p>More complete combustion and fewer misfires equals better fuel economy and power. Testing in the 1960s showed a minimum of 5% improvement in fuel economy with a 4 cylinder and double that with an 8 cylinder.</p>	<p>Increased fuel consumption, lower power, and carbon deposits in engine will shorten engine life. Frequent tune-ups with the associated time and cost. Ignition coil life lower when using this system due to heating effect of using coil to store energy.</p>