

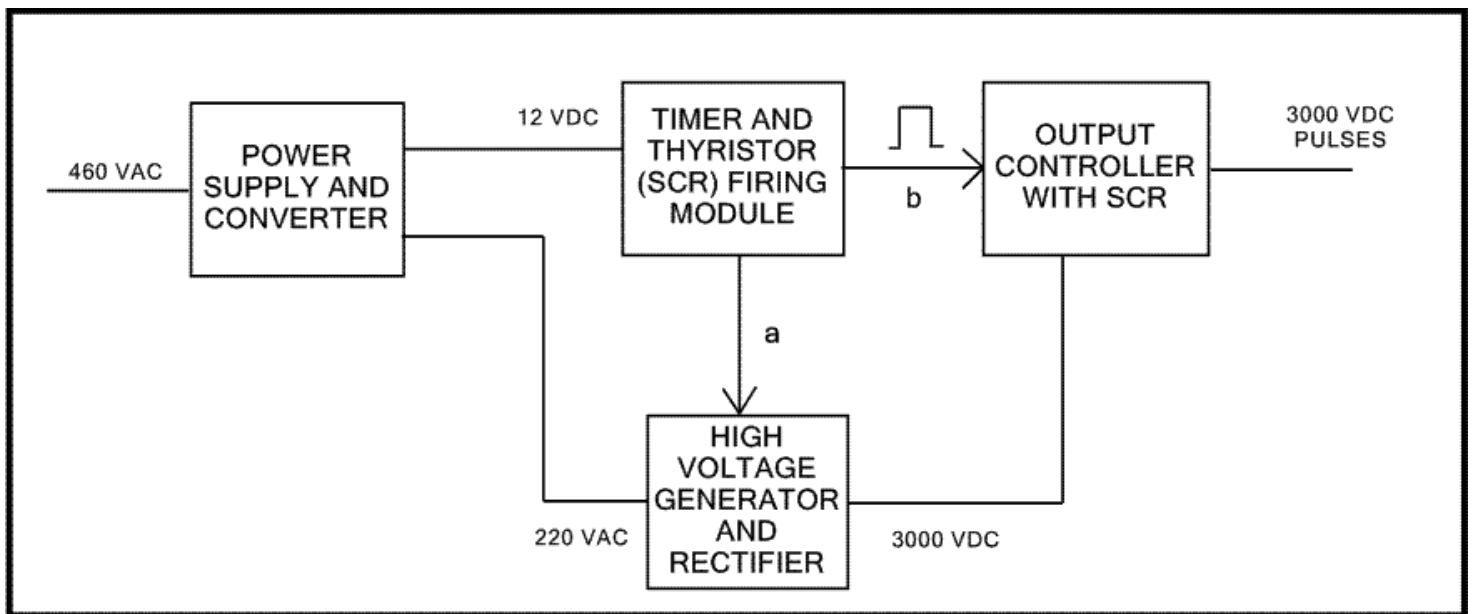
High Energy Low Tension Spark Ignition System

How it works:

The system comprises of four basic sections.

- 1) Power supply and converter.
- 2) Timer and SCR firing unit.
- 3) High voltage generator and rectifier.
- 4) Output controller

Block diagram of operation



Power supply and converter consists of power step down transformers for and rectifiers. It receives 460-480 volts AC at 50/60Hz and produces outputs of 220 volts AC 50/60Hz (supplied to high voltage generator and rectifier) and 12 volts (supplied to timer and thyristor firing module).

The timer and thyristor firing module consists of electronic timers with two outputs. One output feeds the high voltage generator and rectifier through path a, while the other output feeds the Output controller with SCR. The two outputs function alternately in such a way that when path "a" is on, path "b" is off and vice versa. Trimmers and potentiometers on the timer module are used to adjust the timing duration from 1 second to 10 seconds. The high voltage generator and rectifier receives 220 volts AC once the equipment is powered and is enabled through path "a" signal to convert the 220 volts AC to 3000 volts DC. This conversion takes 3 stages

- i) Conversion of 220 volts AC to 3000 volts AC using series of step up transformers.
- ii) Conversion of 3000 volts AC to 3000 volts DC using high voltage high current diodes type 6A10.
- iii) Use of 3000 volts, 330uf capacitors (cascaded bank) to store energy ready to be discharged to spark plugs.

The output controller basically consists of a high current and high voltage thyristor (silicon controlled rectifier, SCR) whose gate circuit is fired or triggered by signal from timer and firing module through path "b". 3000 volts DC is already present at the anode of the SCR waiting for the firing signal. Once the signal comes through path "b", 3000 volts DC becomes present at the SCR cathode thereby supplying high energy low tension power to the

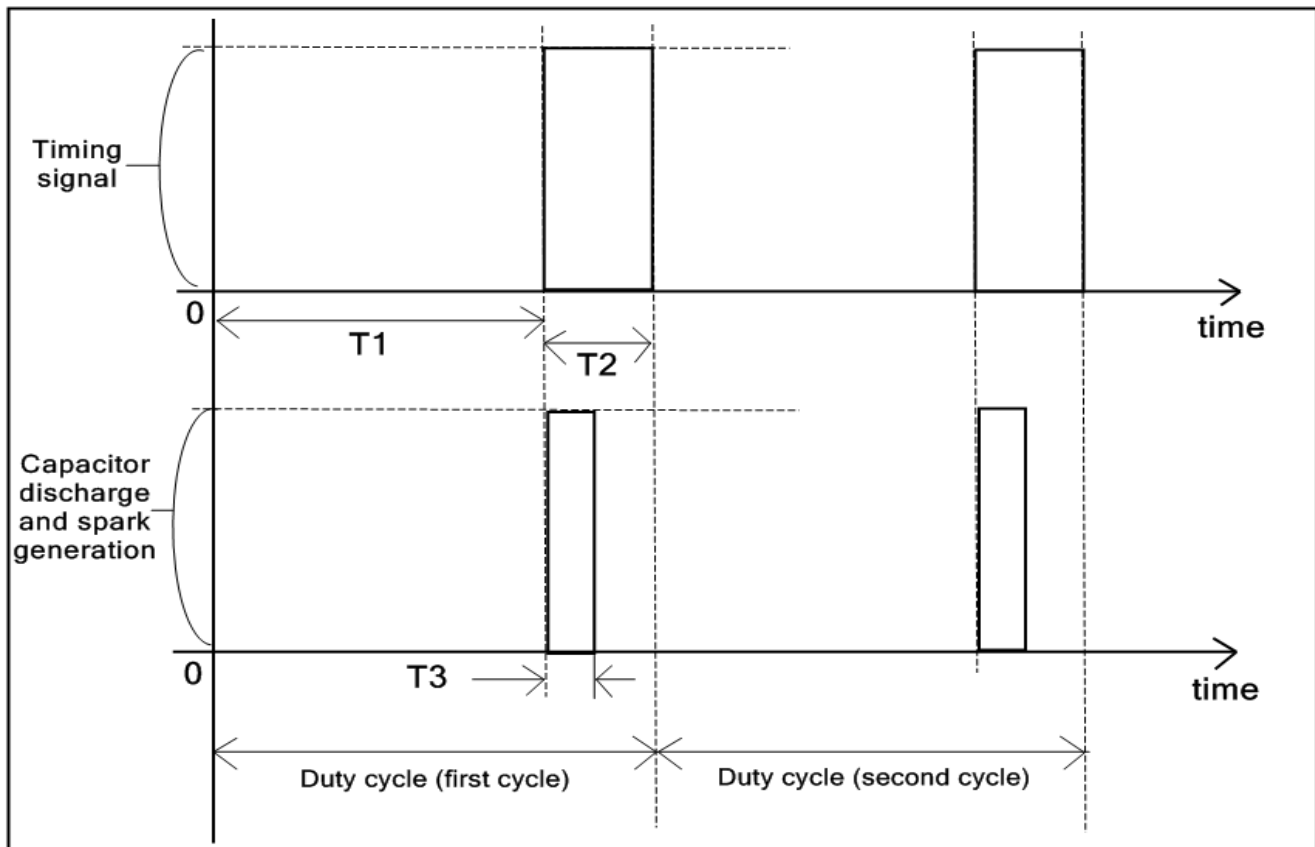
self exciting silicon based low tension ignition plug. At this instance, the energy stored in 3000 volts 330uf capacitor bank/ cascade is instantly discharged in form of a flame shaped high energy spark at the plug. Below is the operation sequence.

1) System is switched on, timer / firing module and high voltage generator / rectifier receive power. Timing function commences with signal present through path “a”. Path “a” signal enables high voltage generator and rectifier and therefore capacitor bank charging process begins.

2) After a time T1 (typically 2 seconds to 10 seconds), determined by settings in variable trimmer or potentiometer in timing module, signal through path “a” ceases. At this instance, DC voltage has built up to 3000 volts and becomes present at SCR anode in output controller. At this instance also, as path “a” signal ceases, path “b” signal commences and triggers the SCR, thereby producing high energy sparks.

3) Capacitor bank fully discharges, in time T3 (typically less than 500miliseconds, ms) which is less than T2 (pulse width) of timer duty cycle. T2 is relatively constant and has a value of 2 seconds enough to bias and sustain SCR throughout the capacitor bank discharge process.

4) Timer circuit resets and cycle commences again initiating capacitor bank charging process.
See signal diagram below.



SPECIFICATION:

Ignition Type	Low Tension, High Energy
Spark Energy	3kJ
Spark Tension	3kV
Spark Current	3kA
Spark Plug Gap Resistance at Ionization	1Ω
Set Spark Frequency	0.3Hz
Power Consumption	500W
Input Voltage	415-480 VAC 50/60 Hz Single Phase
Input Current	1A
Protection Class	
Explosion Proof	
Housing Material	
Ignition Control Panel Size	
Ignition Head Size	