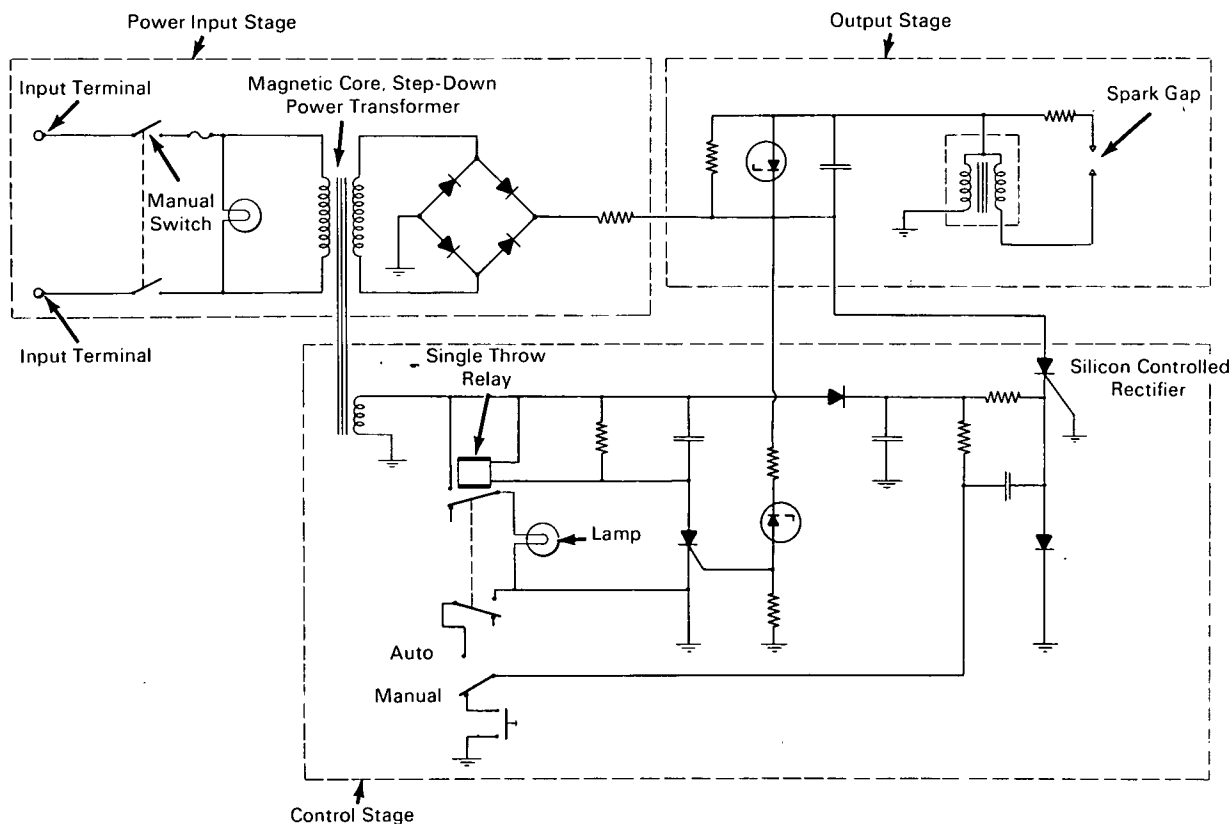


# NASA TECH BRIEF



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## High Voltage Pulse Generator



The high voltage pulse generator contains a new and improved circuit for generating a controllable, high voltage spark having a constant known energy output for testing the flash and ignition characteristics of nonmetallic materials in a controlled gas environment. The majority of prior art systems designed to produce a high voltage spark relate to automotive ignition circuits. Other discharge or spark-producing circuits

have been designed for use with flash tubes which are fired by a high voltage spark. However, in these prior art systems, the emphasis has not been directed toward production of a controlled, fixed energy spark; consequently, these circuits include no means which would insure a fixed energy discharge, or which would indicate the presence of a predetermined voltage across a dischargeable capacitive circuit.

(continued overleaf)

The high voltage pulse generator is illustrated in the schematic circuit diagram. A capacitive discharge circuit is employed to produce a controlled, high voltage, fixed energy spark. A fixed voltage for the spark discharge is provided by a storage capacitor connected in parallel with a zener diode. Discharge of the capacitor through the primary of an output transformer is controlled by a separately powered control circuit which employs a silicon controlled rectifier (SCR) as a switching device. A zener diode in the control circuit is subject to the storage capacitor voltage; when the desired capacitor voltage is reached, the diode is driven into conduction to fire a second SCR in the control circuit; this in turn activates a relay to energize a ready lamp indicating that the circuit is prepared to deliver a fixed energy spark. The charge circuit is manually fired by closing a switch, or is automatically fired each time the circuit is prepared to deliver the fixed energy spark by linking the switching mechanism to the relay. After each discharge, the first SCR is automatically commutated by the back EMF of the output transformer, and the second SCR is commutated by the ac input to the control circuit.

**Notes:**

1. The unique features of this invention include the provision of an automatic discharge control which operates only when the proper spark-producing voltage is present, and the provision of means for fixing an exact voltage across the storage capacitor, and indicating the presence of such voltage by a signal.
2. Requests for further information may be directed to:  
Technology Utilization Officer  
Manned Spacecraft Center  
Houston, Texas 77058  
Reference: TSP69-10548

**Patent status:**

This invention is owned by NASA, and a patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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