

## Indigenous Development of High Voltage Plasma Switches for Pulse Power Applications

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### Abstract

The paper represents the recent research and technological efforts made by CSIR-CEERI for the design, development and characterization of different kinds of high power plasma switches, like Thyratrons (35kV/3kA) and Pseudospark Switches (25kV/5kA, 40kV/5kA and 50-70kV/10kA) for different pulse power applications. Such plasma switches are presently being imported and have always been the subject to import restrictions, causing hurdles in Indian efforts for advancing technologies in high energy research areas. These high power plasma switches have always been the key components of pulsed power systems including modulators, linear accelerators, synchrotron sources, crowbar circuits, cargo scanning systems, sterilization, etc. [1-5]. Very recently CSIR-CEERI have developed 35kV/3kA thyratrons for their use in line type pulse modulator for linear accelerator applications at BARC, Mumbai. In addition, different prototypes of single gap (25kV/5kA), double gap (40kV/5kA) and triple gap (50-70kV/10kA) pseudospark switches (PSS) have been designed and developed for very high voltage pulsed applications [4-7]. The design, development and characterization issues of these plasma switches have been presented. The research work on design and development of high voltage ( $\geq 30$  kV) and high current ( $\geq 5$  kA) pseudospark switches for low jitter and fast pulse power applications have also been discussed. The switching characterization of the developed thyratrons and PSS prototypes have been carried out at different operating and circuit conditions, such as, gas pressure, voltage, triggering, pulse repetition rate and circuit parameters [4-7]. The testing results of the switching characterizations of the developed Thyratrons and PSS have validated the designed specifications.

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### Paper Code :

Paper Code	PUE
Preferred mode of presentation	POSTER