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The measurement of pulsed magnetic field by a non-contact differential ring

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ABSTRACT: A high-current pulse generator of 112.5kJ capacitor bank has been developed for electromagnetic pulse welding. It made up of six paralleled 18.75kJ modules, every module is mainly made up of four paralleled capacitor and a trigger vacuum switch. The high-current pulse generator has been designed and fabricated for maximum operating voltage of 25kV, peak current of 1MA. Using a non-contact measuring method for the measurement of pulsed magnetic field and pulsed current, it can design the structure of a differential ring. The main principle is that when the pulsed magnetic field passed through the center of the differential ring, due to electromagnetic induction principle, the differential ring generates a pulse current with respect to the pulsed magnetic field. At the same time, the load part of differential loop is connected with a low resistance. By measuring the voltage generated of the resistor and the Faraday's law of electromagnetic induction, can it calculate the size of the pulse current and pulse magnetic field.

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