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Dynamic Impedance Load for Over-current Testing of Semiconductor-based Marx Generators

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During tests in the frame of commissioning semiconductor based Marx generators short circuit of the load needs to be considered. Hence, a test-circuit comprising an electrolytic load in parallel to a switched inductance has been developed in order to test the over-current protection capabilities of the generator. Thereby, a triggered spark gap switch is used to shorten the output of the Marx generator via the inductance. The test setup has been designed for a voltage range between 4 kV and 150 kV. A set of electrolytic resistors allows for a variation of the load impedance. The resistors have been designed specifically to absorb the energy of a pulse train up to 1 MJ. The current rise under short-circuit conditions is adjusted by means of the inductance. The triggered spark gap enables switching with a defined delay and sufficiently low jitter. It comprises a trigatron-type trigger circuit and adjustable spherical electrodes. The contribution describes the design of resistors and spark gap switch and highlights the design-specialties for the intended application.

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