

Technology Snapshot

Technology Licensing Opportunity

M-Resistor

Value Proposition

M-Resistor adds an adjustable spark-gap path to isolated ground, improving protection across different voltage conditions while also giving personnel a clear visual view of the internal assembly and adjustment process.

Technology Readiness Level 4

IP Information for S-167698

U.S. Patent pending

Contact Information

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Overview

M-Resistor, developed by Los Alamos National Laboratory, offers pulsed power operators a more protective and more inspectable way to manage reflected energy in high-voltage systems. Unlike prior resistor designs that could fail internally without obvious signs and could return damaging energy to the power supply, M-Resistor adds an adjustable spark-gap path to isolated ground, improving protection across different voltage conditions while also giving personnel a clear visual view of the internal assembly and adjustment process. That combination supports longer equipment life, lower risk of surprise failures and greater operator confidence in demanding test and research environments.

How it Works

M-Resistor works by serving as a charge resistor for a MARX generator while also providing a controlled path for unwanted reflected energy. During normal operation, low-voltage current can charge the system, but if a reflected pulse occurs, the adjustable spark switch can divert that energy to an isolated



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ground instead of allowing it to travel back into the power supply. The adjustable gap lets the operator match the setting to the voltage being used, and the clear epoxy housing allows direct visual inspection of the internal condition and spark switch position.

Advantages

- Helps protect power supplies from damaging reflected energy
- Adds an adjustable response for different operating voltages
- Improves worker visibility during setup and inspection
- Makes internal damage easier to detect because of clear epoxy potting
- Uses an isolated ground path to improve system safety
- Fits pulsed power environments that need a practical fail-safe layer

Technology Description

M-Resistor is an improved resistor assembly derived from an earlier X-ray charge resistor architecture, but modified to address inspection, grounding and reflected-energy protection limitations identified in prior use. The M-Resistor design replaces a steel enclosure with a dense plastic case and uses clear

Continued on reverse

Technology Description continued

epoxy potting so internal components remain visible for inspection. A central feature is the inclusion of an adjustable spark switch, or spark air gap, that can be set by a worker according to the voltage used to energize the system. That adjustability adds operating flexibility, missing from prior products.

M-Resistor is intended for MARX-generated pulsed power technology and is designed to route reflected electrical pulses to a secondary isolated ground rather than back to the power supply or through the coaxial cable ground conductor.

Market Applications

- **Pulsed Power Systems** (research platforms, test systems, laboratory pulse generation)
- **Instrumentation** (charging systems, protective interfaces, power conditioning assemblies)
- **Defense** (pulsed X-ray systems, evaluation platforms, hardened test assets)
- **Industrial Electronics** (specialty power equipment, high-voltage integration packages, reliability upgrades)
- **Scientific Research Infrastructure** (physics laboratories, experimental facilities, university-scale pulsed power setups)