

## HIGH VOLTAGE REED RELAYS IN MEDICAL PULSE POWER APPLICATIONS

### Background

Medical devices that deliver short bursts of electrical energy need precise, reliable switching at high voltage. Pulsed Field Ablation and defibrillation are two examples where the system must send a controlled pulse to the right place at the right time while maintaining patient safety and protecting the equipment.

In Pulsed Field Ablation, the generator shapes microsecond to millisecond pulses to create controlled effects in the targeted tissue. Defibrillators use different waveforms but share the need to discharge stored energy quickly and predictably. Many of these systems use matrices of relays to steer pulse paths and to isolate channels. Designers commonly choose reed relays to route signals, connect and disconnect energy storage, and keep patient connected circuits safely isolated.

Switching large amounts of energy in a short time raises familiar challenges. Fast current and voltage transitions can stress contacts and insulation. The design must control arcing, limit bounce, and maintain consistent performance through many cycles. Clearance and creepage, dielectric strength, and contact materials all influence safe operation at medical voltages. Even though pulses are brief, peak currents can cause local heating in contacts and interconnects, so thermal paths and layout still matter.

Space is often limited, especially in multi-channel systems. That pushes designs toward compact relay arrays with high insulation resistance and low parasitic capacitance, so the pulse shape is not distorted, and channels do not couple into each other. Hermetic or sealed constructions and stable contact resistance help maintain predictable behavior over time.

Reed relays offer fast operating and release times, typically under 2 ms, along with low leakage and stable contact resistance. The use of rhodium contacts and a sealed vacuum switching environment minimizes contact wear, inhibits arcing, and supports consistent performance over high-speed pulse cycling. These characteristics suit pulse routing, sensing paths, and isolation near the catheter interface. For many Pulsed Field Ablation customers, UL approval of the reed relay has also been an important requirement, supporting system safety certification and regulatory acceptance.




### Solution

A practical approach is to combine proven reed relay families for matrix routing with high voltage relay platforms for energy switching and inhibit functions.

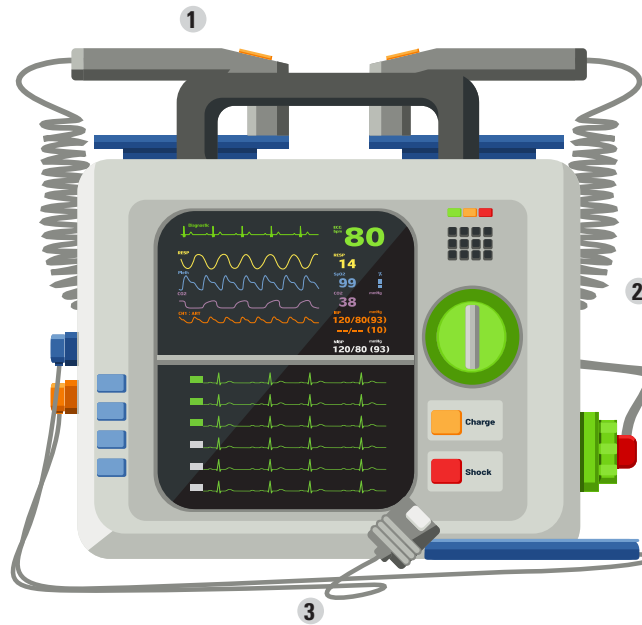
Reed relay families such as DAT200 series, DAT7 series, HR variants, S8 series, and custom options are well suited to dense matrices that need fast response and low leakage. These devices can support multipole routing, precision pulse steering, and consistent isolation in compact layouts.

When mechanical envelopes are tight, custom coil parameters, contact configurations, and mounting options can align the relays with the layout while preserving timing, thermal performance, and channel density. This combined strategy helps PFA systems, defibrillators, and other pulse power devices deliver energy precisely and safely while meeting medical isolation and reliability expectations.

## RECOMMENDED PRODUCTS

Reference on Diagram	Product	Features	Function
1	 DAT7 & DAT200 Series	<ul style="list-style-type: none"> <li>Reliable operation with compact size and fast switching, well-suited for multi-channel designs</li> </ul>	Pulse path control and isolation for routing pulses in relay matrices and general pulse power switching
2	 HR Variant	<ul style="list-style-type: none"> <li>High Insulation resistance in same footprint</li> </ul>	Higher demand relay switching positions
3	 S8 Series	<ul style="list-style-type: none"> <li>Very small form factor, low power drive</li> </ul>	Dense matrix layouts in space limited systems

## DEFIBRILLATOR



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