Applied Pulsed Power, Inc.™

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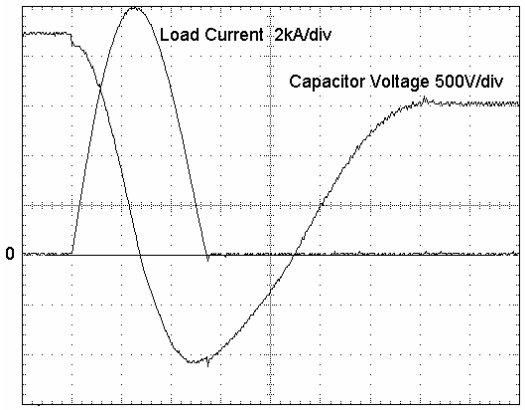
Versatile, Pulsed Magnetic Field Coil Driver with recovery of inductive energy and polarity reversal

This pulse generator drives inductive loads at high currents, short pulse widths and repetition rates up to 10 pulses/second, depending on the load. Inductive energy is recovered to minimize the power supply capacity, energy consumption and cooling requirements. The voltage polarity is reversed to its initial state to obtain the same direction of current flow in the load on each pulse. The amount of energy recovered depends on losses in the load. Switching, energy recovery and polarity reversal losses are less than 5% of the initial energy.



Typical driver capacitor voltage and load current traces. Time scale is 50 μs/division. Initial capacitor voltage of 2.2 kV is returned to 1.5 kV after 10 kA load pulse.

A rack mountable switch deck module contains the solid state switching, polarity reversal and power supply protection circuitry. An energy storage section has the capacitors and safety relays. Transient and reverse voltage protection is provided for the high voltage power supply. The output current is monitored by an internal Rogowski coil. An electrical or optical external trigger must be supplied. Rear panel connectors for remote operation and monitoring are provided.

The driver can be modified to accommodate different current, voltage, rise time and repetition rate requirements. Please consult with APP.

Specifications for Model S02 Pulsed Magnetic Field Coil Driver with Energy Recovery

<u>Maximum ratings</u> (not all max. ratings are achievable together):

Output current	12 kA max.
Voltage	4 kV max.
I_{rms}	200 A rms max.
Repetition rate	10 pps max.

<u>Other system specifications</u>:

dI/dt		1 kA/μs
Capacitance		400 μF
Energy at full voltage		3.2 kJ
Triggering (set with internal jumper)		Optical (HP HFBR-2521 optical receiver) or Electrical (⟨10 V, ⟨100 ns pulse)
Input		208 Vac +/- 10%, 30A, 3 phase, 50/60 Hz
Cooling		Water, 0.1gpm
Size:	Switch deck	19" rack mountable, 12.25" h., 24"d.
	Energy storage section	14" x 19" x 30"h.

Higher current, voltage, energy and repetition rate requirements can be met with appropriate design modifications. The pulser can readily be modified for peak current of 20 kA and the maximum rms current can likewise be extended to 400 A. The repetition rate may be extended to several hundred pulses/second, so long as the maximum rms current rating is not exceeded. The voltage rating may also be extended, with much higher voltage ratings possible, but requiring a commensurate level of engineering. Please consult with APP.

Since 1990, the mission of Applied Pulsed Power, Inc. has been the development of products for industrial applications where pulsed power technology has compelling advantages over existing methods. APP has been developing ion beam technology for industrial surface treatment for five years. The company also designs and supplies prototype systems including high power pulse generators, pulsed high magnetic field coils and high speed gas valves. We can work closely with you to meet your needs, often by modifying proven designs with a minimum of engineering costs.