CS-005

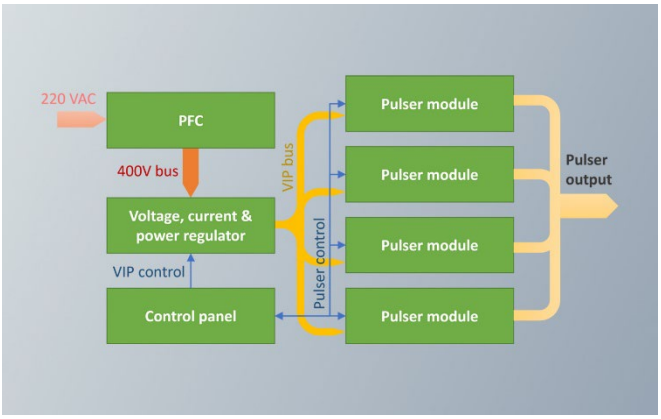
Grom high-current pulse PSU

Synertronic designs

Grom-S delivers a robust, cost-effective solution for generating high-speed, high-current pulses with fine control over key parameters, making it suitable for both research and industrial environments.

Challenge

Many laboratory and industrial applications require precise, high-speed current pulses for testing, measurement, and control, but commercially available pulse generators can be costly and may not offer the flexibility needed for specialized experiments. Achieving fast rise and fall times, high current amplitudes, and adjustable pulse parameters is technically challenging, especially when balancing cost, reliability, and ease of use.



Engineering Approach

The Grom-S project was developed to address these needs by creating a fast current pulse generator with a settable pulse current up to 600 A and a maximum pulse voltage of 35 V, depending on load.

The device features rapid rise and fall times (<1 μ s at 100 A), adjustable pulse repetition rates (1–50 kHz), and configurable pulse widths (2–30 μ s). It also supports selectable pulse polarity, including automatic cycling, to accommodate a wide range of experimental setups.

The design draws on advances in modular pulse generator circuits and current balancing techniques to ensure reliable, repeatable performance under varying load conditions.

Outcome & Impact

Grom-S delivers a robust, cost-effective solution for generating high-speed, high-current pulses with fine control over key parameters, making it suitable for both research and industrial environments. Its flexibility and performance are comparable to state-of-the-art pulse generators used in scientific and engineering applications, supporting experiments that require precise

timing and current control.
The project demonstrates how targeted engineering can provide accessible, high-performance tools for advanced laboratory work.

Tools & Configuration

- Hardware: Fast current pulse generator with settable current (0–600 A), voltage (up to 35V), rise/fall times (<1 μ s at 100 A), repetition rate (1–50 kHz), pulsewidth (2–30 μ s), and selectable polarity
- Control: Adjustable parameters for current, voltage, pulse width, repetition rate, and polarity.

Summary

The project involved hardware design and system integration, leveraging best practices in pulse generator development to achieve high performance and adaptability, in line with trends in modern laboratory instrumentation.