Semiconductor Based Bipolar Marx Modulator EPULSUS-BM1-25

EPULSUS is a registered trademark from EnergyPulse Sytems for high performance pulse generators proposed for industrial applications where the efficiently use of energy, in the shape of precise repetitive energy pulses, is the pathway to accomplish the best results.
The EPULSUS-BM1-25 is a semiconductor based bipolar Marx Modulator design with state-off-the art semiconductor technology projected for operation with resistive and capacitive type loads, with almost square wave voltage repetitive positive and/or negative pulses.

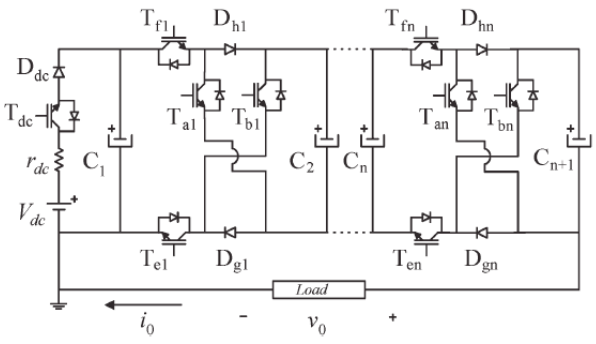
Overall characteristics

- Almost square wave pulse modulator for resistive and capacitive type loads
- Flexible pulse width and repetition rate operation
- Positive pulse voltage range up to 25 kV
- Peak current range up to 250 A
- Voltage pulse rise time 250 ns
- 11 kW maximum output power, three phase with neutral
- Short-circuit protection
- CE Marked

The EPULSUS-BM1-25 comes within a normalized grounded metallic enclosure with forced air ventilation and IP54 index protection. A multi protection system, with interlocks and physical protections, keeps the operator from any accidental contact with high voltage. The modulator is controlled with an industrial PLC, which guarantees a high level of performance and safety, such that any failure will not cause an unsafe condition. In addition, the use of a PLC allows for an easier integration in an industrial environment. Finally, a local touch screen display for programming and diagnostic gives more flexible and user-friendly interface to the operator.

Technical data

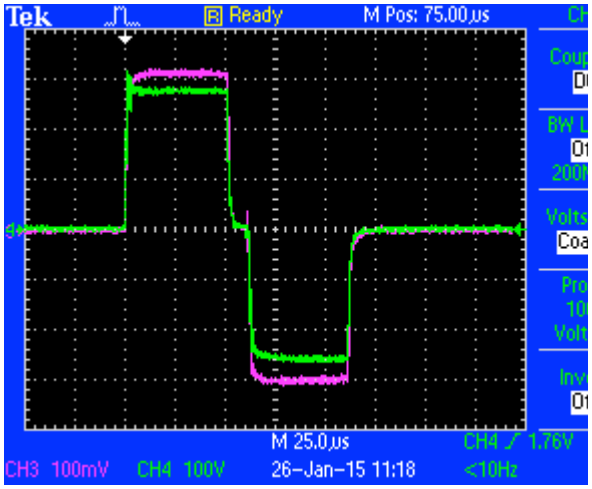
In the EPULSUS-BM1-25 simplified conceptual modular solid-state Marx topology shown right, each cell comprises an energy storing capacitor, four IGBT and two diodes for charging capacitors C_i by power supply U_{dc} in parallel and to connected capacitors C_i in series with the load for generating first the positive and then, after a flexible relaxation time, the negative pulse into the load.



The modular topology used enables the use of relatively low voltage components, 1 kV, and the scaling up for others voltage, simplifying the maintenance.

Operation examples

Typical 25 kV / 30 A pulse waveform on a 800 Ω resistor, 50 µs width positive and negative pulses, with 10 µs relaxation time, and 100 Hz repetition rate,
Magenta line: current 10 A/div
Green line: voltage 10 kV/div



Operations notes

The frequency is limited to 200 Hz by software (higher value can be set on request as well as burst mode operation). The duty cycle can be select freely, limited by power constraints for charging the capacitors.

Outer characteristics

- Standard galvanized steel enclosure with 2000x600x500 mm and 250 kg
- Mains input 400 V_{ac} cable supplied
- Output cable 3m URM67 supplied with external
- Touch screen for programming output voltage, frequency and pulse width, and for monitoring capacitors voltage, output voltage and current pulse, output power and internal temperature
- Other input signals for integration in an industrial process are possible

Safety and protections

- Safety interlocks and reset condition after power on
- Slow output overcurrent protection above 250 A
- Fast output short-circuit protection above 300 A
- Series 2.2 Ω resistance for increasing overall output stability and short-circuit protection

EnergyPulse Systems, Lda
Estrado do Paço do Lumiar
Pólo Tecnológico de Lisboa, Lote 3
1600-546 Lisbon, Portugal
Tel: +351-217101733
website: www.energypulsesystems.com