

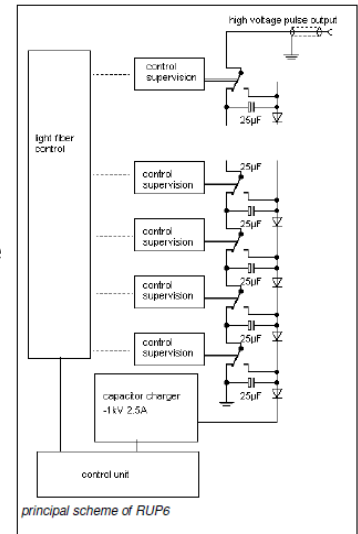
RUP6-20

Rossendorfer Universal Pulse Generator

The RUP6 is a new universal solid state pulse generator which may be constructed for voltages from 5 kV to 30 kV. Prominent features are high pulse current, very high efficiency, scaleability of the voltage and an ultra fast switching off in case of arcs.

The RUP6 consists of numbers of 1 kV pulse modules which are charged in parallel and are switched in series during pulse. Power supply and modulator are integrated within this principle. An advantage compared to tubes is the much easier scaleability for higher or lower voltages. Absolute synchronous switching of all modules is not necessary with this principle, even failure of complete modules will only lead to decreased output voltage but not to total destruction.

The realisation was done entirely with standard electronic components, therefore fascilating economic manufacturing.



Current and Voltage

maximum output pulse voltage 20 kV
maximum output power 2.5 kW, decreasing with duty cycle. $P_{out} = P_{max} * (1 - frequency * (pulse\ width + 150\mu s))$

output impedance about 28 Ohm, corresponding to 1.4 Ohm per module.

internal pulse capacity about 1.25 µF, corresponding to 25 µF per module.

peak current 30-50 A, depending on pulse width.
Overcurrent (>60A) for more than 2 µs will activate short circuit switch off. The inherent short circuit current limit (at maximum voltage) is about 190 A.

An Arc (sudden short circuit within a pulse) will initiate switch off within 500 ns

average current 125 mA max., at 15 kV 150 mA max.

Wave Form and Frequency

square wave with variable pulse width and variable frequency

rise time about 200-300 ns

fall time 3 µs maximum, eventually faster depending on load.

pulse width 0.5 µs - 100 µs, using external control or computer control also longer. Principally the internal pulse capacitor should not discharge more than 10 % of the maximum rated voltage. Without load, maximum pulse width may be 2 seconds. Duty cycle can be chosen nearly arbitrarily, it has only to be noted that maximum possible output power will decrease to zero when the duty cycle is approaching 100%, as the internal power supply is off during pulse and starts again after end of pulse with a 150µs delay.

maximum frequency 3 kHz up to 20 kV, 2.5 kHz

max. up to 18 kV

control of voltage, pulse width and frequency by potentiometers on the front or alternatively by computer control via RS 232 interface. Pulse control may also be done by external TTL signal at the control input at the front.

Mechanical, included items

19" rack, 600 * 550 * 1582 mm

grid supply 230V, single phase

output cable RG11, 2 meter

monitor outputs for voltage and current.

meters for module voltage and average output current.

Internal controller, addressable by RS232, with the following functionalities:

programmable pulse generator

control of output voltage

wave form control (peak current, peak voltage)

generator state (OK/error)

Arc counter, pulse counter

RS232 light fibre cable

software for PC

documentation

Safety

external interlock

a fast short circuit detection protects the pulse modules from damage by short circuit or arcing in the load.

short circuit currents are inherently limited to 190 A.

The pulse generator is compatible to regulations about electromagnetic compatibility (EMV).

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