

Ignitronpuls

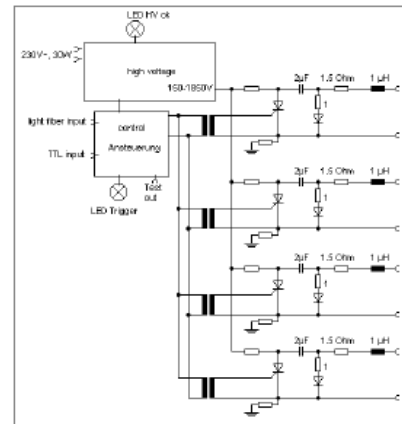
controller for Ignitrons

The assembly "Ignitron" was developed from a request for a reliable and economic trigger generator for a high power laser project at GSI.

The assembly can be used as well for other applications (e.g. surface treatment), where peak power is ultimate and demand for average power and frequency is minor.

main features:

- Peak Current 4 * 900 A
- Impedance 2 Ohm / Channel
- Voltage up to 1850V
- Up to 2 Hz repetition rate



Principal circuit diagram of the pulse generator

General Information

The assembly consists of 4 channels, which allow to trigger 4 ignitrons simultaneously. It is also possible to combine the 4 channels to achieve 4 times the current. The assembly includes a small power supply which charges the output capacitors to a maximum voltage of 1850V. These capacitors are then switched by fast thyristors to the output. The nominal output impedance of one channel is about 2 Ohms. For loads with deviating impedance it is possible to introduce a pulse transformer between output and load.

Triggering of the output pulse can be done alternatively by TTL signal on a BNC cable or by a light fiber signal.

Connectors:

grid supply 230V, 30W max., connection by 6.3 mm plug, protected with a 160 mA fuse.

TTL trigger input: Accepts signals from 0-10V.

Trigger level about 1.1 V, recommended are voltages >2.4V for a jitter < 300ns.

trigger using light fiber receiver HBFR2412. As transmitter the HBFR 1412 or HBFR1414, 820nm wave length is recommended.

Output connectors for connecting the load by 2 * 6.3 mm plugs each for 4 synchronously triggered channels.

Pulse shape and frequency (values for short circuit operation)

Stored energy up to 3.5J per channel with a maximum voltage of 1850V; the voltage can be adjusted in the range 150-1850V.

Peak current up to 900 A with 1850V charging voltage.

Delay trigger pulse to start of current rise 1.4µs, with triggering by light fiber delay is 1.6µs.

Time from begin of current rise to peak current: 1.5µs, maximum current rise rate 1000 A/µs.

decay time 90%-10%: 6µs.

pulse width resp. pulse shape are defined by the circuit and depend only on external load. For a load with higher impedance the peak current will be lower and the pulse width correspondingly longer.

The maximum frequency is 2 Hz; for full output power the maximum frequency is 0.5 Hz.

Triggering will occur with trigger signals with a width above 1.1µs. Noise signals <1µs will be suppressed. It is recommended that trigger signals should have a pulse width of at least 3µs. There should be at least a pause of 500ms before the next trigger is started.

Environment

recommended operating temperature 5-35 °C

humidity 0-80%, the assembly is designed for operation in dry room.

protection class I, IP 00

grid supply 230 V~, 35W max.

mechanical data

The assembly consists of a board, 220*310 mm, height about 60 mm, with holes for fastening at the edges.

The assembly is intended to be mounted within a housing.

The fastening bolts should be connected to ground within the housing.

Safety

During operation, there will be voltages up to 2kV on the assembly. It must be guaranteed that the board cannot be touched during operation.

According to its function, the assembly represents a serious potential for creating electronic disturbances. It is the responsibility of the user to limit the electronic disturbances to other electronic devices around.

24.03.2003