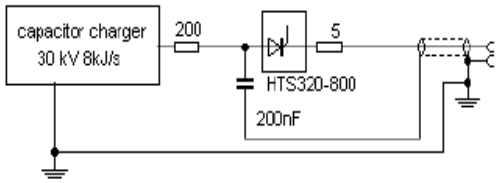
Hydropuls 2

Pulse generator for sterilisation of liquids



For sterilisation of liquids and other applications in food processing high voltage pulse generators are needed at a realatively low load impedance (nominal around 50 Ohm). As the waveform is not essential for this application, SCR switch modules are favoured for this application as they provide rather high switching power for reasonable costs. As for this application short circuits are possible as well as open outputs, both cases have to be considered in design. Main design goals were ruggedness, simple setup, and versatible usability. Pulse triggering is done internally. The waveform corresponds to a capacitor discharge, with around 0.5 µs rise time and an exponential decay.

Voltage and current

Internal capacitor charger 30 kV 8 kJ/s.
Internal pulse capacitor 200 nF, maximum stored energy 90 J (62 J at 25 kV).
Output impedance, defined by internal current limiting resistor, 5 Ohm. The current limiting resistor is rated for 600 W dissipated power and includes temperature surveillance. The maximum possible short circuit current 6 kA.
The pulse generator is designed for continuous operation at 25 kV, 50 Ohm nominal load and 100 Hz repetition rate.
Although the design load is 50 Ohm, other impedances are possible. Larger impedances (up to around 5 kOhm) should be possible without problems; smaller impedances may be possible if the average power is reduced, otherwise the current limiting resistors will be overheated and the generator will shut down.

Waveform and frequency

The pulse corresponds to a capacitor discharge with fast rise time (~0.5 µs) and a decay which depends on the connected load. With 50 Ohm nominal load and 200 nF the decay time constant is 11 µs. Frequency can be adjusted in the range 1-100 Hz.

Control, surveillance

Control and eventual parallelization is done by the analog interface.
Voltage monitor output 1:3000
Current monitor output 10mV/A
The internal capacitor charger is disabled as long as a voltage >300V is present at the output. Operation is resumed earliest 1ms after that. This provides the switch some time to recover and prevents the unit from working on no load conditions.

Environmental conditons

Environmental temperature 5-35 ° C
humidity 0-90%,
Protection: class I, IP 55
Grid supply voltage 3*400V.
The cooling is done by internal air cooling the expected internal losses of around 1.5 kW will be dissipated by the housing. In the case of difficult environmental conditions it is possible to implement an additional water cooled heat exchanger within the housing.

Mechanical size, scope of delivery

19" rack, type Schroff Variostar IP55 600*600*1400 mm. It is also possible to include two generators within one rack, in this case the rack size is 600*600*2000 mm.
~10m output cable RG11
manual, full documentation including circuit diagrams.

Safety

externer Interlock.
In case of load fault the pulse generator switches of and has to be restarted manually.
Regulations concerning electromagnetic compatibility will be fullfilled.

Parallelisability

Up to 5 units (eventually more on request) may be paralelled in case of low load impedance and higherpower demand.

Recommendation

For surveillance of current and voltage during pulses adigital oscilloscope is recommended.

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