High Voltage Products. High Voltage Experts

G2
High Voltage Generator

The Data Sheet

Plasma

Plasma is generated from a gas by introducing energy, usually applied by an electric field with alternating voltage in the range of some kHz to several MHz. The voltage for initiating the plasma process becomes lower when reducing gas pressure. The downside is that you need a sealed reactor and a vacuum pump.

There are countless applications for plasma at normal atmospheric pressure. Plasma sterilisates. It kills germs, spores, viruses and bacteria in food products, paints, textiles and breathing air. Plasma ablates material. It cleans and degreases surfaces and improves the adhesion prior to painting, glueing or electroplating. Plasma enforces chemical reactions. It passivates or oxidates surfaces of metals to protect against corrosion or or to ease consecutive treatments.

Its reactivity is usable for purifying exhaust gases of engines and incinerators or from paint shops containing solvents. Toxic molecules are converted into less dangerous ones. Plasma makes gases emit its characteristic spectrum. With a spectrometer you can analyze the contents of a gas filling inside transparent materials, such as glass tubes and light bulbs.

For all these applications no liquid is used. You neither have to supply nor to dispose or decontanimate any such liquid. And there is no need for filters or catalytic converters that have to be replaced periodically.

When using plasma the energy introduced goes directly into the process. There is no detour via thermal energy from heating or incineration. Thus total heat dissipation is considerably lower and efficiency is much higher than with conventional approaches.

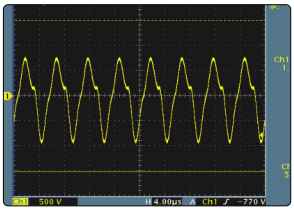
Generator

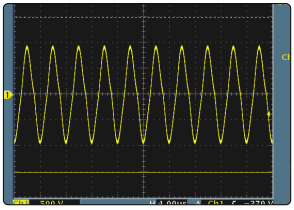
The high voltage generators we offer are designed for use at normal atmospheric pressure. This is the most economic way to go for many in-line production applications as well as for all kinds of research and development.

Our generators are built with all-air insulation. Thus there are no parts that require regular service. Plus you can use them in clean room environments without risking pollution.

You can program all settings of the generator independently. This makes our generators the ideal choice for research and development, process engineering, and science. Plus when going live its automation interface make the integration into a production line seamlessly easy.

Function





The G2 converts an intermediate DC voltage into square unipolar pulses with programmable frequency, width and amplitude. These pulses are transformed to high voltage and coupled to the electrode.

The high voltage generates a plasma at a dielectrically insulated electrode (barrier), even at normal atmospheric pressure. This effects are known as barrier or corona discharge.

The system of transformer inductance plus the capacitance of the cable and your load builds a resonant circuit. Applying high voltage pulses results in a (quasi-)sinusoidal voltage across your load. Thus electromagnetic interference is considerably lower than with other types of generators.

The output pulse train can be periodically blanked by means of pulse packet modulation. This allows a burst mode operation to stabilize the plasma formation. You can set all variables freely and indepently via menus on a large liquid chrystal display with only a few keystrokes and a data wheel.

The G2 is short-circuit and open-circuit proof. Several independent current limiters control the mains current, the average current and the peak current. On the mains supply side an active power factor correction (PFC) and a mains filter reduce harmonics and smoothe the operating current
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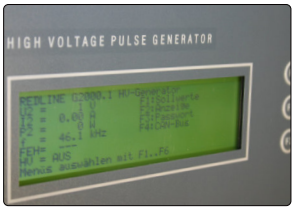
Front panel view

Rear panel view (Note: RS-485 interface and monitor outputs are not available on the G2.)

Control

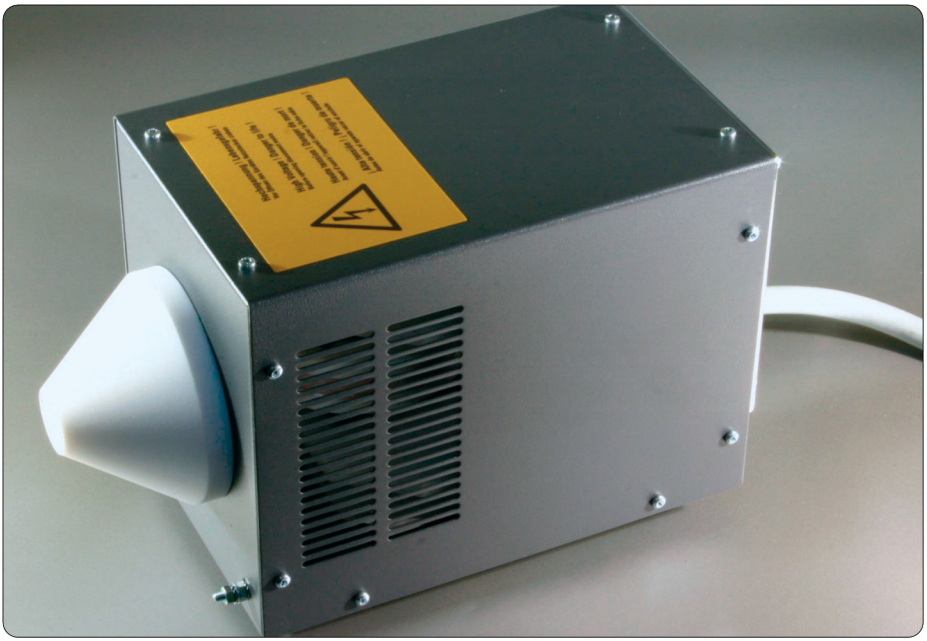
You can program all variables of the generator either via the front panel menu or remotely via its CAN interface. For production environments there is a set of digital control and monitor lines to control the G2 remotely.



Use

The generator is designed to be mounted inside a cabinet. It must not be operated outside such a cabinet, except with appropriate safety measures.

The G2 is short-circuit proof. The output current is limited but not turned off. It is also open-circuit proof as long as the high voltage plug is connected. If it is not there is a good chance of electric discharge inside the connector.



External transformer, with single-ended output

External Transformer, with coaxial ouput (not visible, on rear)

Transformer

The generator is available with internal transformer or with external transformer.

Internal Transformer

The G2 with internal transformer connects to a coaxial high voltage cable. The cable and also the jack for the other end are available as accessories.

Using an internal transformer means that you have everything contained in one box.

External Transformer

The G2 without transfomer drives a separate external transformer. Both units are interconnected by a pair of control wires, which are included with the transformer. The external transformer is available with single-ended output or coaxial output.

Using an external transformer gives you the option to exchange the transformer. You may also use your own transformer with the generator.

Using an external transformer with single-ended output means placement of the transfomer near to the load with short wires. This allows operation at higher frequencies because you eliminate the capacitance of the coaxial cable.

Order Codes
Generators and Transformers

Generator G2 with Internal Transformer

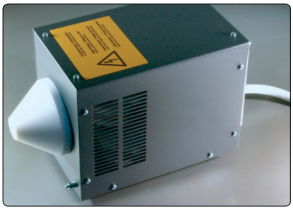
Coaxial cable and coaxial jack required for operation.

RED45.20.100.10	20kV$_{PP}$ 500W (standard model)
RED45.20.100.14	10kV$_{PP}$ 500W
RED45.20.100.40	20kV$_{PP}$ 2000W

Generator G2 without Transformer

Requires external transformer for operation.

RED45.20.100.20	500W (standard model)
RED45.20.100.50	2000W



External Transformer with Single Ended Output

High voltage connector included. Any wire might be used, with or without insulation, e.g. high voltage litz wire.
Cables to generator are included, length 3 meters.

RED31.35.10.10	20kV$_{PP}$ 500W (standard model)
RED31.35.10.20	10kV$_{PP}$ 500W
RED31.35.10.40	20kV$_{PP}$ 2000W

External Transformer with Coaxial Output

Coaxial cable and coaxial jack required for operation.
Cables to generator are included, length 3 meters.

RED31.35.12.10	20kV$_{PP}$ 500W (standard model)
RED31.35.12.40	20kV$_{PP}$ 2000W

Order Codes
Accessories

Coaxial Cable

Mates with generator with internal transformer or with external transformer with coaxial output. Coaxial jack on other end required. Different lengths available. Capacitance 100pF/m.

RED35.130.20.110	1 meter
RED35.130.20.115	1.5 meters
RED35.130.20.120	2 meters

Any length not mentioned is available on request. For the brave we also offer cables with only one connector and the other end open.

Coaxial Jack

Mates with coaxial cable. Mounting hole diameter 36mm.

RED34.36.11.131	

High Voltage Single-Ended Connector

Mates with external transformer with single ended output.
Litz wire has silicone insulation.

RED34.36.11.191	solder contact
RED35.4.96.2510	litz wire 25kV 1sqmm AWG30, per meter

Specification

Property	min	typ	max	unit
output voltage (1)(2)	0		20	kV_{PP}
output real power			500	W
frequency (3)	0.1		500	kHz
packet pulse or pause width	0.1		1000	ms
intermediate circuit voltage	0		300	V_{DC}
intermediate circuit current			4	A_{DC}
secondary inductance		10		mH
secondary capacitance		100		pF
secondary peak current		1.5		A

(1) The data applies to the model with 20kVpp / 500W output.
(2) The output voltage depends on frequency adjustment and load capacity.
(3) Frequencies above self-resonance (ca. 150 kHz) are usable for low-power applications only.

Environment	min	typ	max	unit
ambient temperature	0		40	°C
storage temperature	-10		70	°C
relative humidty	0.1		70 %	
mains voltage	207	230	253	V_{RMS}
mains current		4	10	A_{RMS}
mains frequency	48	50	62	Hz

Dimensions

Generator	min	typ	max	unit
height		176		mm
width		482		mm
depth (4)		420		mm
Single-Ended Transformer				
height		160		mm
width		132		mm
length (5)		210		mm
Coaxial Transformer				
height		160		mm
width		132		mm
length (5)		315		mm

(4) Depth is case only. Allow extra space for connectors extending to the rear.
(5) Length is case only.

Variants

All models shown are examples of our standard range. We are happy to tailor any product to your special requirements or do a new design from scratch, conforming to your specifications.

Disclaimer

All data, pictures and descriptions presented in this catalog is given at our best knowledge and thought to be reliable. However these may change at any time due to our commitment to continuous improvement. Thus we assume no responsibility that the data is up-to-date, correct or that a product is suitable for a certain use. If you need an approval for specified data or for the suitability of a product for your application please request a written confirmation before placing an order.