

RF Power Stage, Operation Frequency 0.5 MHz

Version 1.00



Manual

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Technical Data

Features

- exchangeable power stage for the modular radio-frequency (rf) generator
- adjustment of the symmetry of the output voltage
- control of the dc bias voltages of the output signal

Output

- rf outputs: 50 Ω MHV (H4) plug sockets
- output frequency: 0.5 MHz
- amplitude of the output signal (each output against ground):
0...500 V min., 0...600 V typ.
- internal capacitance per output against ground: approx. 370 pF
- quality factor of the output resonance circuit: approx. 100
- required capacitive load per output against ground:
approx. 130 pF[†] (consisting of 60 pF for the capacitance of the load incl. connector and 70 pF for the connection cable)
- regulation of the symmetry: ± 20 pF

Input

- dc inputs: 50 Ω BNC plug sockets
- dc bias voltage (*DC Input*): ± 200 V max.
- capacitance of the dc inputs: approx. 720 nF,
this consists of 220 nF between each input and the ground (capacitors C3 and C4) and 1 μ F between the inputs (capacitor C7, all in Fig. 4 in the documentation of the basic device)
- surge protection: 200 V Transil diodes

General

- metallic 19" plug-in unit, width 54 HP, height 6 U, insertion depth 221 mm,
front panel: clear anodized, case: transparent passivated
- weight: about 5.3 kg

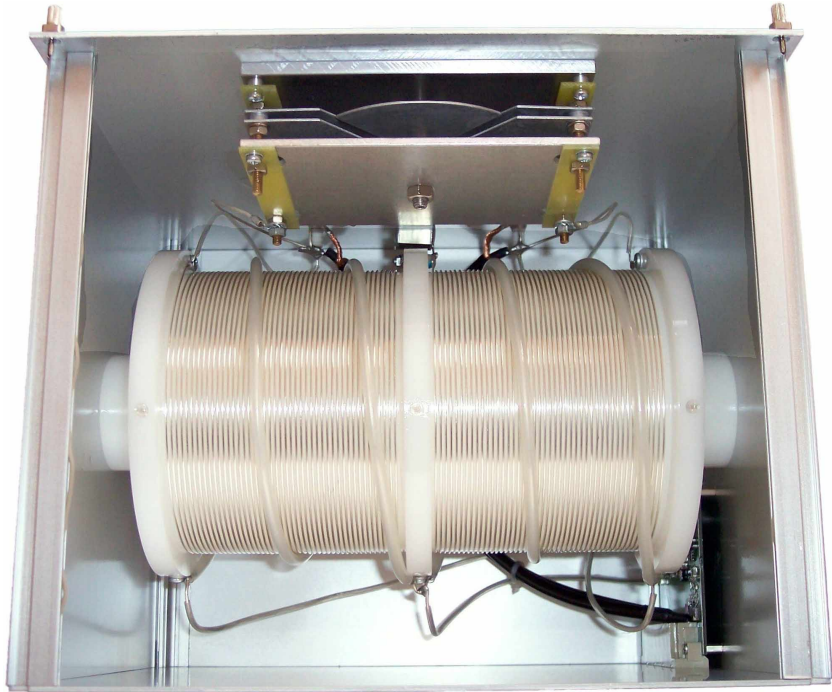
[†] or upon customer specification

Capacitors for adjusting the control electronics

Capacitor, value	Function
C8, C12 0 pF + 0 pF	time delay of the trigger signal (phase between the signals <i>Synchro</i> and <i>Oscillator</i>)
C1, C3 560 pF + 68 pF	free-running oscillator frequency of the PLL circuit
C9 1,0 nF	filter cut-off frequency of the PLL circuit
C7, C11 2,2 nF + 0 pF	width of the switching pulses of the output stage (MOS-FET T1)
C14, C17 2,2 nF + 0 pF	width of the switching pulses of the output stage (MOS-FET T2)

For a detailed description, see the chapter "Adjustment at the rf power stage" and Fig. 6 in the documentation of the basic device.

Inner assembly of the rf power stage



The photograph shows the top view of the opened case of the rf power stage. In the center is the transformer *TR*, above, at the front plate, the variable capacitor *C8*, and down right at the rear panel, the printed circuit board with the control electronics (see the chapter "Adjustment at the rf power stage" and Fig. 6 in the documentation of the basic device).

Typical characteristics

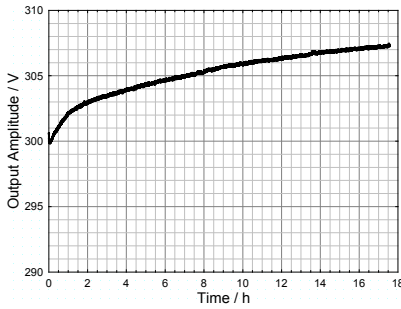


Fig. 1. Long-term stability of the output voltage.

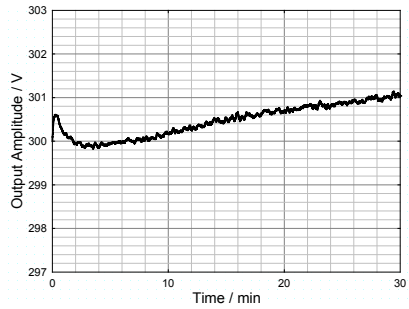


Fig. 2. Detail of the output voltage drift after switching on the generator.

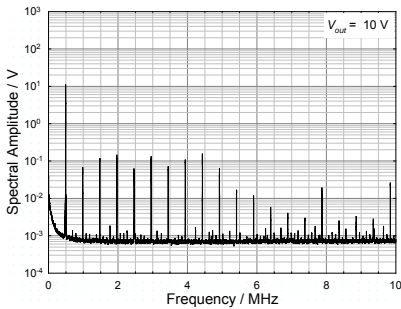


Fig. 3. Frequency spectrum of the output voltage at 10 V amplitude.

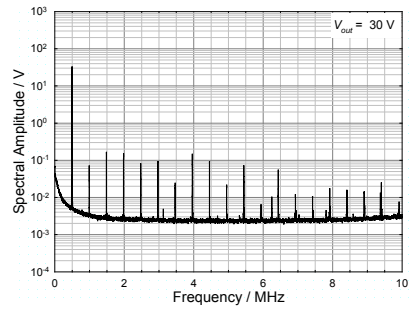


Fig. 4. Frequency spectrum of the output voltage at 30 V amplitude.

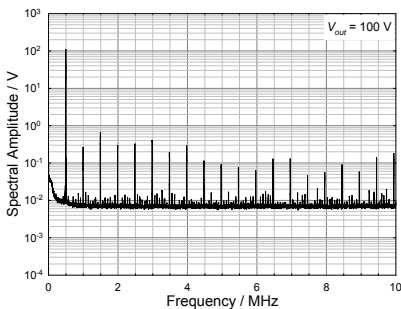


Fig. 5. Frequency spectrum of the output voltage at 100 V amplitude.

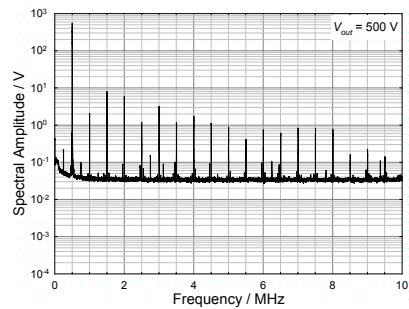


Fig. 6. Frequency spectrum of the output voltage at 500 V amplitude.

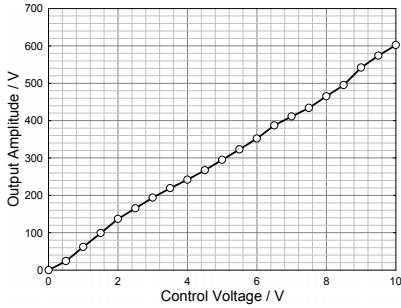


Fig. 7. Conversion characteristics. Dependency of the output voltage amplitude on the control voltage.

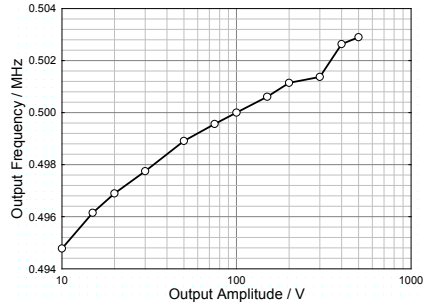


Fig. 8. Change of the frequency of the output voltage with its amplitude.