

# RF Power Stage, Operation Frequency 2.0 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  $\Omega$  MHV (H4) plug sockets
- output frequency: 2.0 MHz
- amplitude of the output signal (each output against ground):  
0...500 V min., 0...700 V typ.
- internal capacitance per output against ground: approx. 240 pF
- quality factor of the output resonance circuit: approx. 250
- required capacitive load per output against ground:  
approx. 130 pF<sup>†</sup> (consisting of 60 pF for the capacitance of the load incl. connector and 70 pF for the connection cable)
- regulation of the symmetry:  $\pm 20$  pF

### Input

- dc inputs: 50  $\Omega$  BNC plug sockets
- dc bias voltage (*DC Input*):  $\pm 200$  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  $\mu$ 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 3.3 kg

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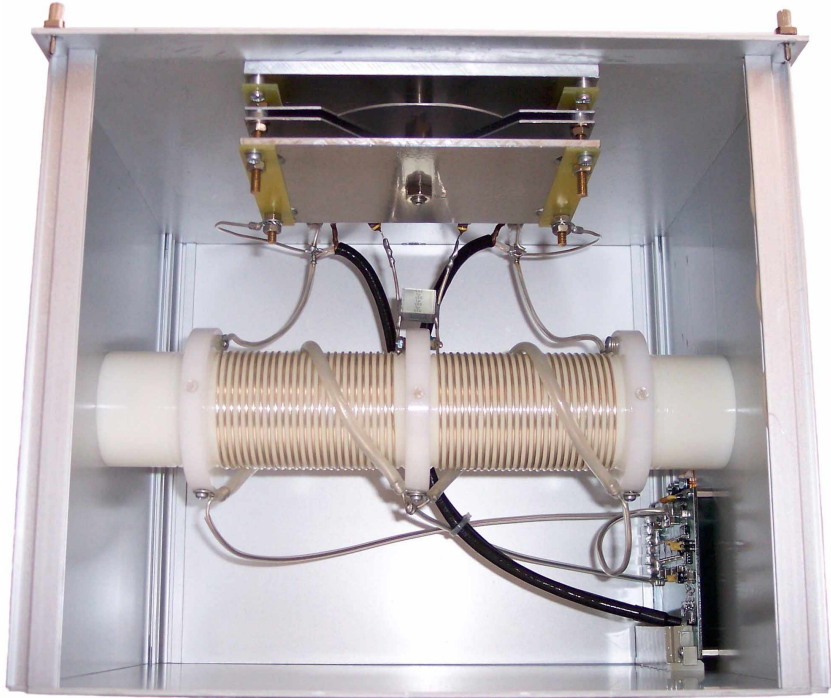
<sup>†</sup> or upon customer specification

## Capacitors for adjusting the control electronics

Capacitor, value	Function
C8, C12 47 pF + 0 pF	time delay of the trigger signal (phase between the signals <i>Synchro</i> and <i>Oscillator</i> )
C1, C3 100 pF + 22 pF	free-running oscillator frequency of the PLL circuit
C9 220 pF	filter cut-off frequency of the PLL circuit
C7, C11 1 nF + 220 pF	width of the switching pulses of the output stage (MOS-FET T1)
C14, C17 1 nF + 220 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

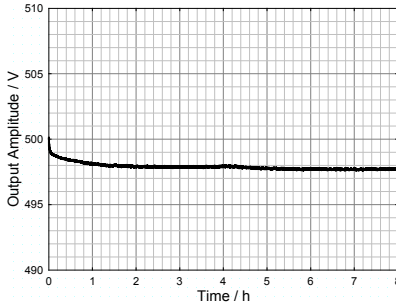


Fig. 1. Long-term stability of the output voltage.

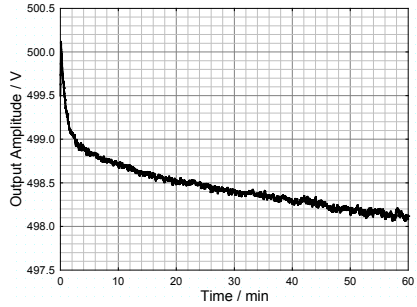


Fig. 2. Detail of the output voltage drift after switching on the generator.

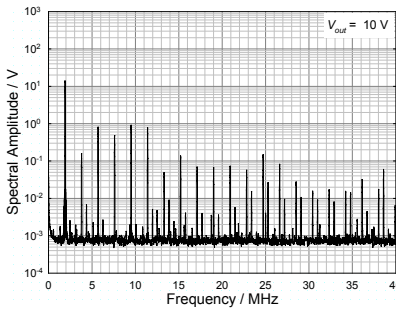


Fig. 3. Frequency spectrum of the output voltage at 10 V amplitude.

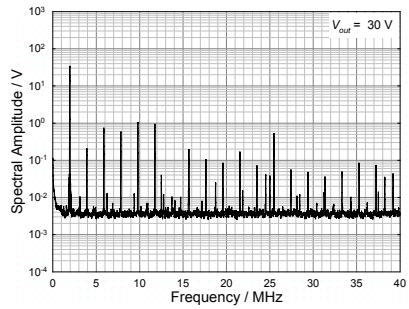


Fig. 4. Frequency spectrum of the output voltage at 30 V amplitude.

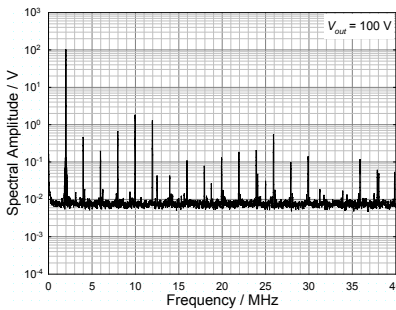


Fig. 5. Frequency spectrum of the output voltage at 100 V amplitude.

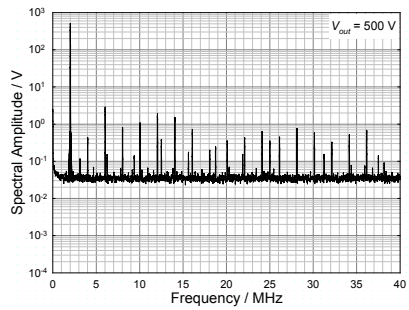


Fig. 6. Frequency spectrum of the output voltage at 500 V amplitude.

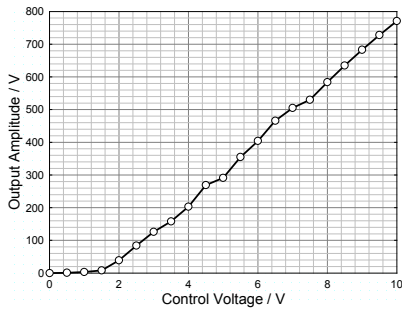


Fig. 7. Conversion characteristics. Dependency of the output voltage amplitude on the control voltage.

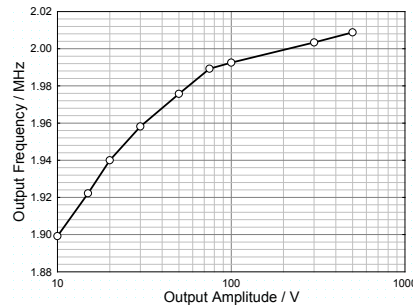


Fig. 8. Change of the frequency of the output voltage with its amplitude.