BWO-Powered, GPIB Controlled mm-Wave Generator with Fast Sweep

- 37-170GHz in seven bands
- <0.2 ms full waveguide sweep time
- Smooth power/frequency dependence
- Fully packaged
- Program from front panel or GPIB bus
- Frequency accuracy 0.01%
- High output power

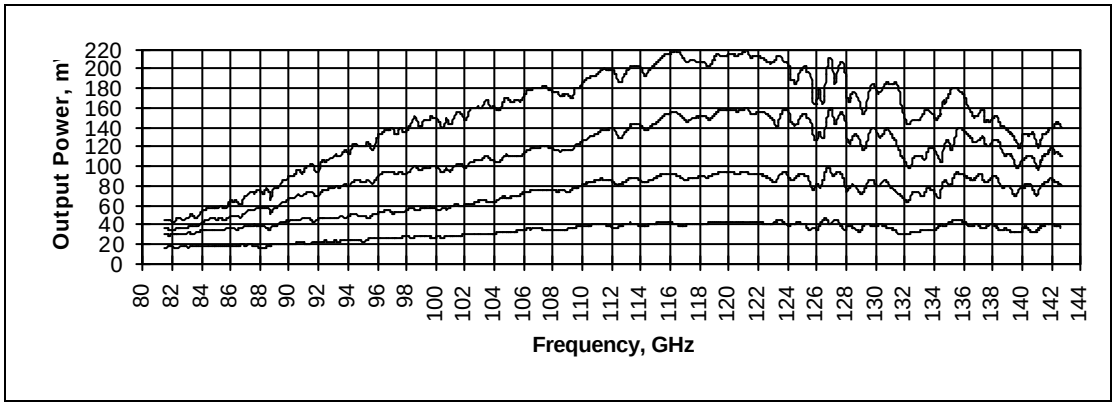
Applications

- L.O. for sweeping receivers
- Laboratory measurement and test equipment
- Plasma diagnostics: ECE and ECA radiometers, broadband sweeping interferometers and reflectometers
- Source for Network Analyzers
- Spectrometry

Description

ELVA-1's phase-lockable **G4-141xM/142xM (GPIB)** series combines the best features of the **G4-141x/142x** (extremely fast sweep, excellent frequency accuracy, phase locking capability and external frequency control) with those of the **G4-00X** (program from GPIB bus, built-in programmable generator for frequency sweep). The rugged High Voltage power supply is specially designed to withstand the rapid voltage changes inherent in BWO deceleration. Our unique Control Unit provides both frequency control in «Fixed Frequency mode», and Final/Initial frequency setting and indication in «Sweep mode». 256 levels of output power are available, controlled from the front panel or a GBIP bus.

Each generator is individually calibrated for output power versus frequency, with different power levels and frequency versus control voltage relationships. The resulting data (supplied with the unit) for a 90-140 GHz model are illustrated in the plot below:



ELVA-1 Millimeter-wave Division

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These generators are completely self-contained, including all control and power supply systems required to drive the BWO tube. A separate, external transformer is included for U.S. customers, to accommodate standard 110V/60Hz AC line power. The BWO tube is fully protected against application of improper operating voltages.

New to this series is a BWO «Turbo Mode». This feature allows the BWO to achieve extremely high output power for pulsed operations. For instance, the typical peak output power of the G4-142bM in Turbo Mode is 150 mW. Turbo Mode is intended for brief, pulsed operation only, as in a tokamak shot for plasma diagnostic experiments. The use of Turbo Mode in CW applications will severely shorten the life of the tube.

Specifications

MODEL NUMBER	G4-141M	G4-141aM	G4-141bM	G4-141cM	G4-141dM	G4-142bM	G4-142cM
Frequency Range, GHz	37-54	40-60	50-75	60-90	75-110	90-140	110-170
Output waveguide size, mm	5.69x2.84 WR22	4.8x2.4 WR19	3.8x1.9 WR15	3.1x1.5 WR12	2.54x1.27 WR10	2.03x1.02 WR8	1.7x0.83 WR6
Wavequide Flange	UG-383/U	UG-383/U-M	UG-385/U	UG-387/U	UG-387/U-M	UG-387/U-M	UG-387/U-M
Minimum CW power, mW							
Normal mode	20	20	20	20	15	15	10
Turbo mode	30	30	30	30	30	80	40
Typical peak power, mW							
Normal mode	40	40	40	40	60	60	40
Turbo mode	80	80	80	80	120	150	80

Common Specifications

Frequency accuracy in the CW mode, %	±0.01
Fullband Sweep Time, ms	0.2
Maximum CW frequency stability for 15 min	$\pm 2 \cdot 10^{-4}$
Residual FM max	$\pm 5 \cdot 10^{-5}$
Output power regulation range, dB	0-20
Output VSWR	1.5
Interval square-wave modulation frequencies, kHz	1
Sweep time, ms	0.2-1000
External square-wave modulation frequencies, kHz	1-100
Voltage for External Frequency Control, VDC	0 … +10
Voltage for External Power Control, VDC	+50 … +200 or 0 … +10
Operating temperature range, C°	5-40
AC Input Voltages:	220 V, 50 Hz
Consumed power, VA	400
Size, mm	495 x 180 x 480
Weight, kg	23

For a small additional charge, customers may select the BWO tube for their generator from data on tubes in inventory. Power levels up to twice the stated specification are often available. A GPIB card and software for PC microcomputer operation are available at extra cost. Delivery can be implemented within 10-12 weeks ARO. All ELVA-1 generators are warranted by the manufacturer for one year after receipt.

The first G4-142bM was custom-designed for FOM-Instituut voor Plasmafysica Rijnhuizen, The Netherlands, and is used for ECE imaging diagnostics on their RTP Tokamak.

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