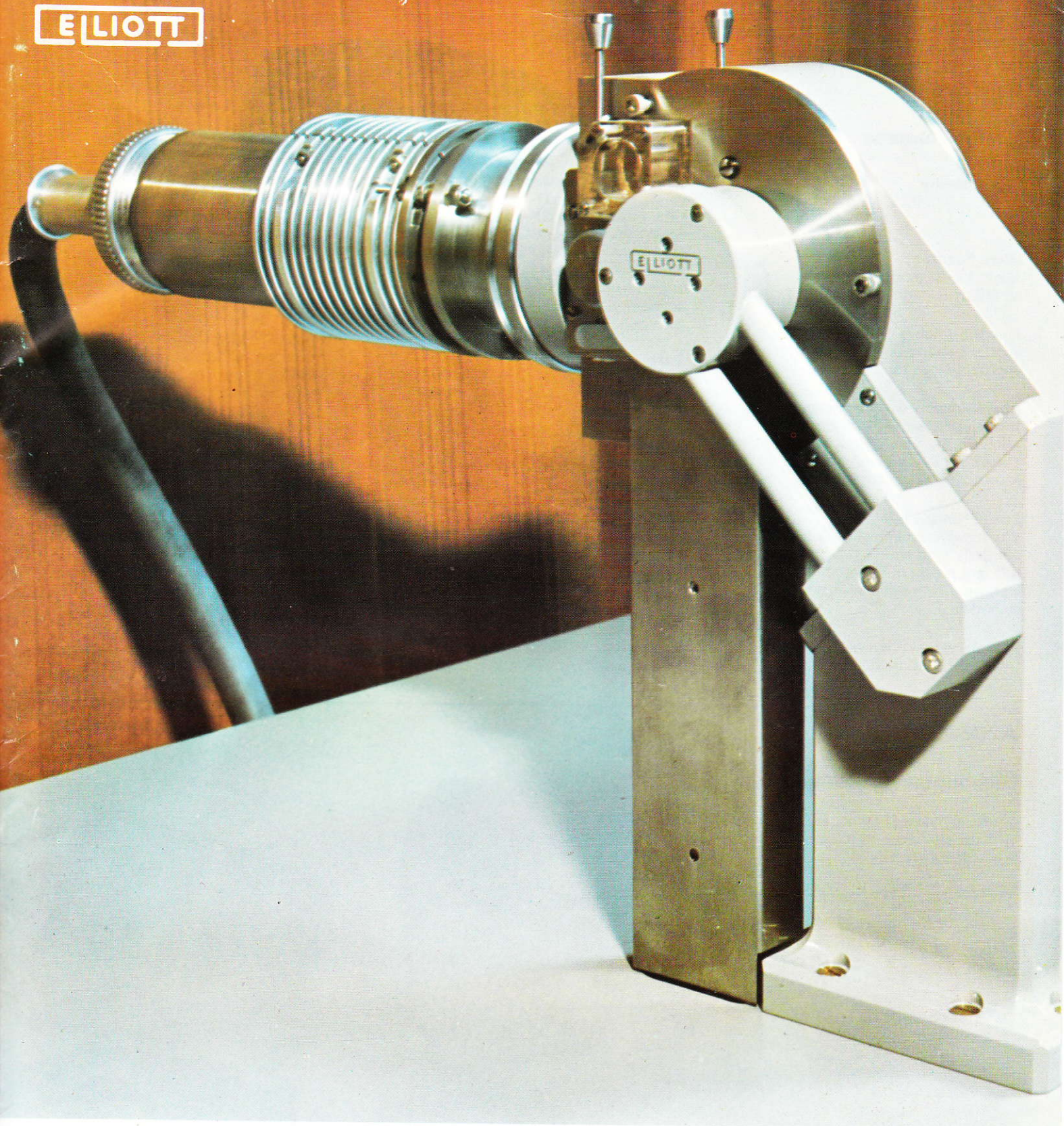


E|LIOTT



GX 20 ROTATING ANODE X-RAY DIFFRACTION GENERATOR

**MARCONI
AVIONICS**

GX 20 ROTATING ANODE X-RAY DIFFRACTION GENERATOR

Design Features

High Intensity

Micro Focus

Micro-focus cathodes are available with all Elliott Rotating Anode Generators.

Low Vibration

Spatial stability of the X-ray source approximately 1 μ m after warm up.

Approximately Gaussian Energy Distribution in the Focal Spot

Unlike many fine focus X-ray tubes the GX20. has no "double humping" in the focal spot energy distribution.

Long Filament Life

The focusing system permits use of a relatively large emitting surface giving a substantial gain in filament life as compared with other micro-focus cathodes.

Pure Beryllium Windows

Inherent filtration 0.2mm of Be.

These equipments are complete X-ray generators, consisting of fine-focus rotating anode X-ray tubes together with associated vacuum systems, closed circuit cooling systems and a 50kV stabilised constant potential high voltage generator.

The X-ray Tubes

The continuously pumped X-ray tubes have rotating anode assemblies driven by an electric motor. The tubes' cathodes are fully insulated and demountable. The combination of the fine-focus cathode with the rotating anode provides a reliable and continuous X-ray source of very high intensity, thereby greatly facilitating X-ray diffraction work by reducing the exposure times which would otherwise be required.

Tube Power Supplies

The power supplies for the tube are of advanced design, employing solid-state techniques throughout to ensure the very high stability of output needed. Digital selection gives repeatability of desired voltage settings. The current in the X-ray tube is also selected and stabilised within 0.1% by a similar type of system controlling the filament heating transformer. A variable bias supply is included to enable focal spot conditions to be optimised for each cathode configuration employed.

Cooling System

A closed circuit cooling system is incorporated in the equipment to ensure an adequate flow of water in the anode

independent of the quality, pressure and quantity of available site supplies.

Control System

The control system consists of a number of sub-units, each devoted to a specific group of circuit functions. Several of the sub-units are in the form of plug-in printed circuit boards which are extremely easy to exchange during servicing. The operator's controls and indicators are grouped on two small panels which are mounted one above the other at a convenient height in the control rack.

The control system uses solid-state techniques exclusively.

Integrated Trip Protection Circuit

Flashover protection is provided. This is sensitive to surges of current. Isolated surges cause the high voltage supply to be shut off and then automatically restored at a controlled rate to the pre-set level. The high voltage supply will only shut off completely if the surges occur frequently or if they are severe.

This protection circuit is adjustable according to conditions of use. Not only does the flashover protection circuit protect the generator itself from the effects of surges it also protects the X-ray tube.

ACCESSORIES

Demountable Anodes

Specially balanced demountable anodes with various target materials are now available for the GX20

Material	Type No.	Rating
Copper	F710000	See curves
Silver	F833000	As copper
Molybdenum	F832000	As copper
Chromium	F830000	60% of copper
Iron	F831000	40% of copper

Other materials, such as aluminium, can be supplied to special order.

Focusing Cups

In order to change the focus size, it is a simple matter of changing a focusing cup and re-setting the filament. The following focusing cups are now available.

	Size on Anode	Projected Point	Projected Line
F525029	3mm x 0.3mm	0.3mm x 0.3mm	3.0mm x 0.03mm
F525028	1mm x 0.1mm	0.1mm x 0.1mm	1.0mm x 0.01mm
F525026	2mm x 0.2mm	0.2mm x 0.2mm	2.0mm x 0.02mm

Inquiries are invited for different size focusing cups to meet specific needs.

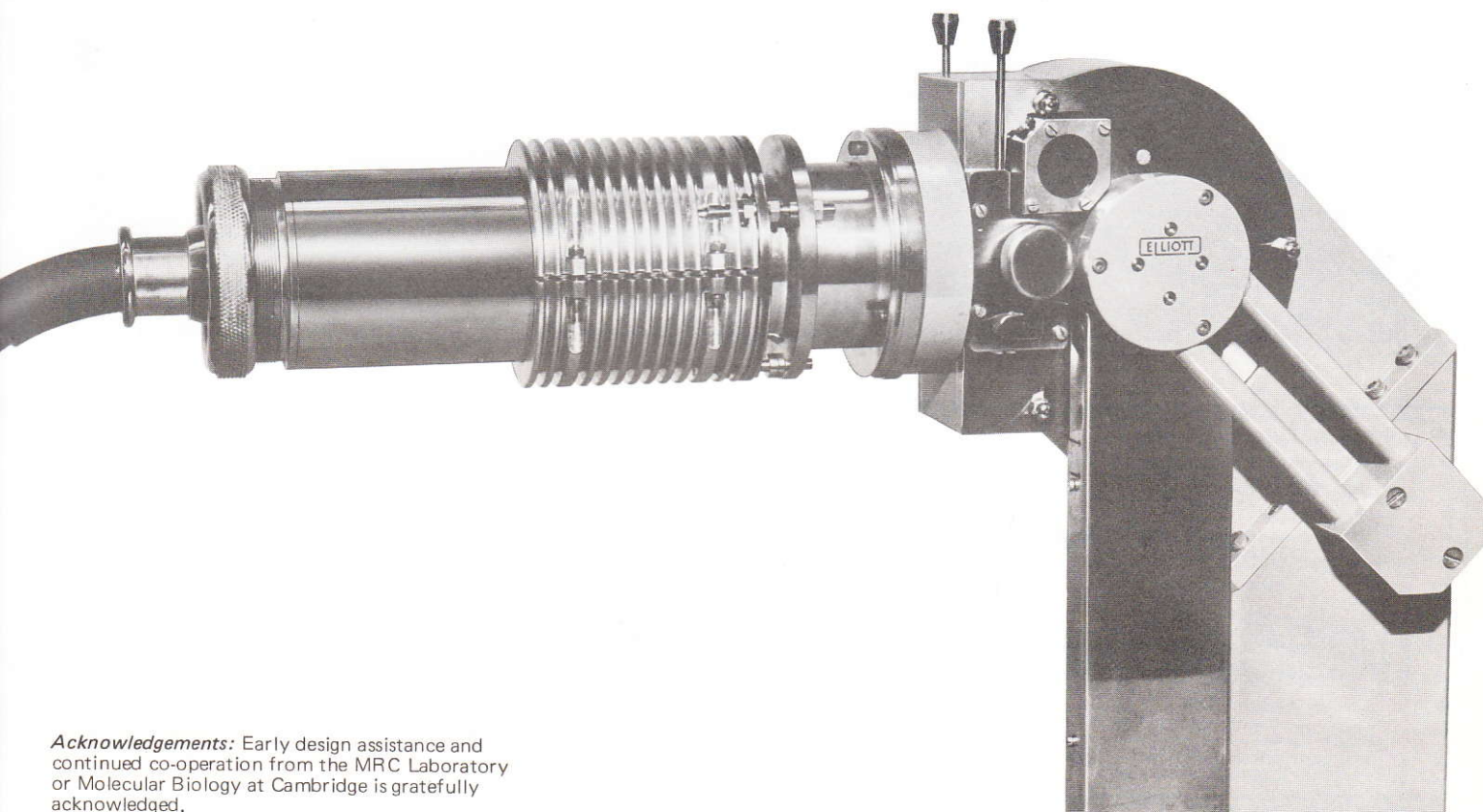


SPECIFICATION

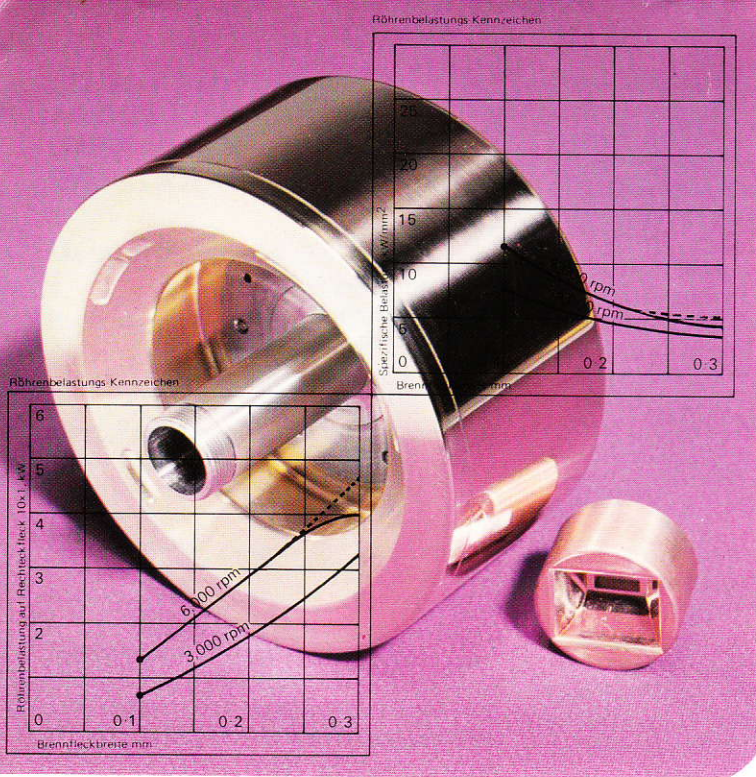
Anode diameter	3.5in (89mm)
Anode rotational speed	3,000rpm or 6,000rpm
Standard target	Cu
Number of windows	2 (RA2) 3 (RA3)
Inherent filtration	0.2mm beryllium
Focus sizes measured on anode	1mm x 0.1mm 2mm x 0.2mm 3mm x 0.3mm
Focal spot loading	1.2kW for 1mm focus 3.0kW for 2mm focus 4.0kW for 3mm focus

Power Supply

Maximum anode voltage	50kV
Maximum tube current	80mA
Maximum power (kV x mA)	4.0kW
Voltage stability	Better than 0.1%
Current stability	Better than 0.1%
Voltage ripple (max. peak to peak)	30 volts/mA (2.5kV max.)
Voltage range by digital selection	0–50kV by 1kV
Current range by digital selection	0–80mA by 1mA
Type of rectification	Constant potential voltage doubler using silicon diodes
Type of voltage stabiliser	Solid state servo using thyristor primary current control
Type of current control	Solid state servo using triac primary current control of filament transformer
Filament transformer maximum voltage	12V
Filament transformer maximum current	10A
Bias supply maximum voltage	500V d.c. approx.

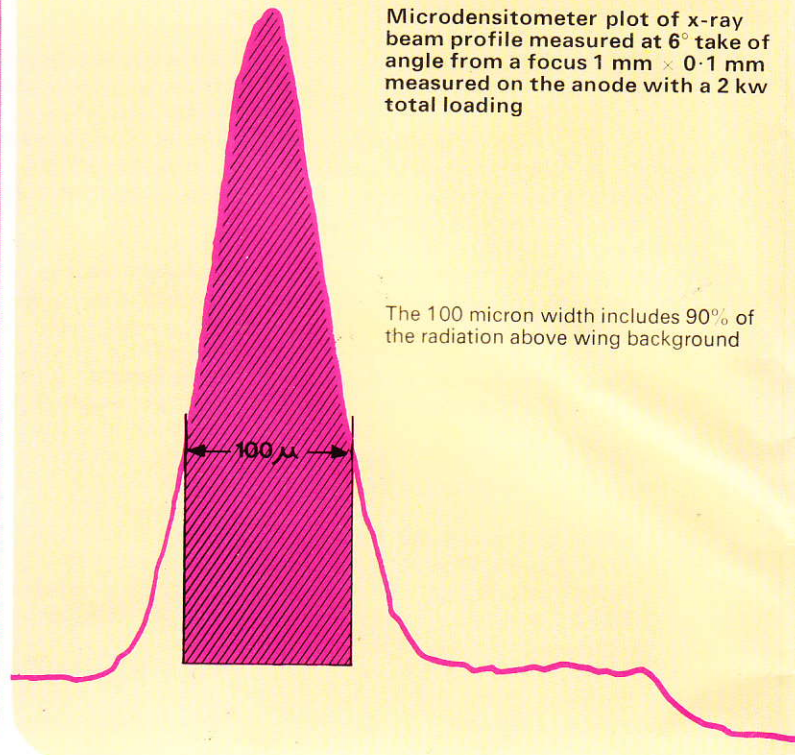


Acknowledgements: Early design assistance and continued co-operation from the MRC Laboratory or Molecular Biology at Cambridge is gratefully acknowledged.



Microdensitometer plot of x-ray beam profile measured at 6° take off angle from a focus 1 mm × 0.1 mm measured on the anode with a 2 kw total loading

The 100 micron width includes 90% of the radiation above wing background



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