

FERRANTI

LOW VOLTAGE X-RAY TUBE

A low power X-ray tube with copper target, suitable for radiographic work on materials which are appreciably transparent to low voltage X-rays, e.g., plastics and thin metals. The electrical characteristics and focus properties of the tube may be varied by the application of suitable potentials to a control electrode which is positioned around the directly heated tungsten filament.

The B110 is not designed as a micro-focus type tube but is primarily intended for use in applications employing comparatively low power and where a fairly fine focus is required, and where the cost of a conventional high power X-ray tube is not justified.

PHYSICAL DETAILS.

Base	...	...	International Octal.
Max. Overall Length	...	...	265 mm.
Max. Diameter	...	...	40 mm.
Top Cap	...	...	CT3.
Mounting Position	...	...	Any.
Target	...	...	Copper.

PIN CONNECTIONS.

*Pin 1	} —Filament.	Pin 5—Grid.	
*Pin 2		Pin 6—No Pin.	
Pin 3—No Connection.		*Pin 7	} —Filament.
Pin 4—No Connection.		*Pin 8	
T.C.—Target.			

RATINGS.

Max. Target Voltage	...	...	50 kV. D.C.
			25 kV. A.C.
Max. Target Dissipation (continuous)	...	...	25 watts.
†Max. Target Dissipation (intermittent)	...	...	500 watts.
Max. Negative Grid Voltage	...	...	1400 volts.
Max. Filament Current	...	...	6 amps.

CHARACTERISTICS OF TYPICAL TUBE.

Filament Current	...	5.8	5.8	5.8	amps.
Target Voltage (D.C.)	...	15	35	35	kV.
Grid Bias	...	-150	-550	-650	volts.
Target Current	...	1.2	0.8	0.05	mA.

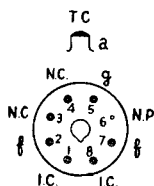
TYPICAL OPERATION (1). D.C. operation with Grid Bias.

Filament Current	...	...	5.5 amps.
Filament Voltage	...	...	3.6 volts (approx.).
Target Voltage	...	...	40 kV. D.C.
Grid Voltage	...	...	0 to -1400 volts.
‡Spot Size	...	...	0.8 mm.

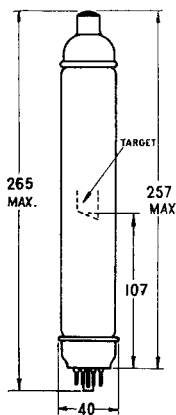
TYPICAL OPERATION (2). D.C. operation with Auto Bias.

Filament Current	...	...	5.8 amps.
Filament Voltage	...	...	3.9 volts. (approx.).
Target Voltage	...	...	15 kV. D.C.
Auto Bias Resistor	...	...	100 kΩ
Target Current (mean)	...	...	1.5 mA.

B110



**Base
Connections
Underside View
of Base**



All dimensions shown are in millimetres. (max.)





TYPICAL OPERATION (3). A.C. operation with Auto Bias.

Filament Current	...	...	5.8 amps.
Filament Voltage	...	...	3.9 volts (approx.).
Target Voltage	...	...	15 kV. A.C.
Auto Bias Resistor	...	...	100 k Ω
Target Current (mean)	...	...	0.7 mA.

MODE OF OPERATION.

Adjust the filament current to 5.5 amps. and connect the grid to one side of the filament. Raise the target voltage steadily to the required figure, and as the target voltage is increasing adjust the filament current so that the target dissipation does not exceed 25 watts. If it is desired to operate with a smaller focal spot, it may be necessary to apply a negative potential of 400—900 volts to the grid and then increase the filament current slightly until sufficient beam current is available.

The tube may be operated at constant filament current, and target current adjusted by changing the grid bias voltage.

The target current may be compensated for variations of mains input voltage and tube characteristics by feedback circuits which adjust either the filament current or the grid bias voltage.

The target voltage should be increased gradually from zero to the required operating potential.

The filament current should be kept as low as possible, consistent with obtaining the required target current.

Care must be taken during transport and handling to avoid mechanical shocks to the tube.

Suitable shielding should be provided to protect the operator from radiation when the tube is working.

NOTES.

*One filament lead should be connected to both pins 1 and 2, and the other lead to both pins 7 and 8.

†The tube should never be operated at the maximum intermittent target dissipation for periods of more than 20 seconds. Between two periods of intermittent operation the target must be allowed to cool completely. If the tube has been operated at the maximum rating, the cooling time will be approximately 15 minutes.

‡At Target Voltage 40 kV. D.C. Target Current 100 micro-amperes.