

*improved 90W/010-210 Bureau*

# GEC

**INSTRUMENT  
CATHODE RAY TUBE**

*S<sub>y</sub> 4.2  
S<sub>x</sub> 13.0*

## BRIEF DATA

A short 10cm diagonal (4 in.) flat faced rectangular instrument tube with mesh p.d.a. This tube is intended for use in general purpose and portable oscilloscopes. *250 mm long*

## HEATER

Heater voltage . . . . .	11	V
Heater current . . . . .	68	mA

## SCREEN

Fluorescence . . . . .	Green
Phosphorescence . . . . .	Green
Persistence . . . . .	1-5ms
E.I.A. phosphor code . . . . .	P31
Pro Electron phosphor code . . . . .	GH
GEC phosphor code . . . . .	24

Other screens are available to special order (see data sheet 'CRT Screens').

## RATINGS (Absolute)

		Max	Min	
Fourth anode voltage . . . . .	V <sub>a4</sub>	7.0	2.0	kV
Third anode voltage . . . . .	V <sub>a3</sub>	1.0	0.5	kV
Ratio . . . . .	V <sub>a4</sub> /V <sub>a3</sub>	10	2.0	
Focus voltage . . . . .	V <sub>a2</sub>	600	—	V
First anode voltage + mesh . . . . .	V <sub>a1</sub> + mesh	1.0	0.5	kV
Control grid voltage . . . . .	-V <sub>g1</sub>	200	1.0	V
Y plate to third anode voltage . . . . .	V <sub>y-a3</sub>	500	—	V
X plate to third anode voltage . . . . .	V <sub>x-a3</sub>	500	—	V
Grid to cathode circuit resistance . . . . .	R <sub>g1-k</sub>	1.0	—	MΩ
Y deflector plate circuit resistance . . . . .	R <sub>y-a3</sub>	100	—	kΩ
X deflector plate circuit resistance . . . . .	R <sub>x-a3</sub>	250	—	kΩ

Voltage ratings are to cathode unless otherwise shown.

## CAPACITANCES (Typical)

Control grid to all other electrodes . . . . .	9.3	pF
Deflector plates y1 to y2 . . . . .	2.0	pF
Deflector plates y1 to all electrodes except y2 . . . . .	5.0	pF
Deflector plates y2 to all electrodes except y1 . . . . .	5.0	pF
Deflector plates x1 to x2 . . . . .	2.5	pF
Deflector plates x1 to all electrodes except x2 . . . . .	7.0	pF
Deflector plates x2 to all electrodes except x1 . . . . .	7.0	pF

## EQUIPMENT DESIGN RANGE

	Max	Min	
Focus voltage . . . . . $V_{a2}$	400	233	V/kV <sub>a3</sub>
Control grid voltage for spot cut-off . . . . . $-V_{g1}$	140	50	V/kV <sub>a1</sub>
Y deflection factor . . . . . $D_y$	7.0	5.0	V/cm/kV <sub>a3</sub>
X deflection factor . . . . . $D_x$	21.7	17	V/cm/kV <sub>a3</sub>
Astigmatism correction voltage . . . . . $V_{a3-y \text{ mean}}$	+83	-83	V/kV <sub>a3</sub>
Pattern correction voltage . . . . . $V_{s-x \text{ mean}}$	+83	-83	V/kV <sub>a3</sub>

## TYPICAL OPERATION (All operating potentials are with respect to cathode)

Fourth anode voltage . . . . . $V_{a4}$	6.0	kV
Third anode voltage . . . . . $V_{a3}$	600	V
Focus voltage . . . . . $V_{a2}$	140-250	V
First anode voltage + mesh . . . . . $V_{a1} + \text{mesh}$	580	V
Control grid voltage for spot cut-off . . . . . $-V_{g1}$	30-84	V
Nominal geometry correction voltage . . . . . $V_s$	600	V
Maximum y deflection factor . . . . . $D_y$	4.2	V/cm
Maximum x deflection factor . . . . . $D_x$	13.0	V/cm
Line width (typical) 24 screen . . . . .	0.4	mm

Measured by means of a shrinking raster at  $I_b = 5\mu A$

## DISPLAY CHARACTERISTICS (Typical Operation)

### Pattern Distortion

With pattern correction applied to s, the edges of a test raster will lie between two concentric rectangles of 70mm x 50mm and 68mm x 48mm. The angle between x and y axes will be  $90^\circ \pm 1^\circ$  measured at face centre.

### **X Deflection Linearity**

The deflection factor for a deflection of less than 75% of the useful scan will be equal to that for a deflection of 25% within approx 3%.

### **Spot Position**

The focused and undeflected spot will fall within a square 10mm x 10mm centred at the geometric centre of the faceplate.

### **Orientation**

Looking at the screen with pins 1 and 12 uppermost, a positive voltage applied to x1 will deflect the beam to the left and a positive voltage applied to y1 will deflect the beam upwards.

### **Minimum Scanned Area**

x major axis . . . . .	7.0	cm
y minor axis . . . . .	5.0	cm

This area will be centred on a point which is within 3mm of the major and minor axes of the tube face.

### **Axis Alignment**

The electrical x axis of the tube will lie within  $\pm 5^\circ$  of the major axis of the faceplate, and may be aligned with this axis by means of the field from an axial coil placed about the cone of the tube in the region shown in the outline drawing. The maximum ampere turns required for axis alignment will be given by  $11\sqrt{kV_a^4}$ .

### **MOUNTING**

The tube may be mounted in any position but should not be supported by the base alone. It should preferably be held in a suitable rubber mask at the screen and by a clamp around the magnetic shield near the base. The socket should have sufficient freedom of movement to accommodate the maximum overall tube length and base orientation tolerances.

### **WEIGHT**

The weight of the tube alone is 500gm (approx).

## BASE CONNECTIONS

Base:	B12F		
Pin 1:	g1	Pin 7:	x2
2:	k + h	8:	s (geometry)/IPS
3:	h	9:	y2
4:	IC	10:	a1 + Mesh
5:	a2 (focus)	11:	y1
6:	x1	12:	a3 (astigmatism)

Pins 4 and 10 must be connected externally.  
Side contact (CT8): a4

## ACCESSORIES

Base socket	The M-O Valve Co. Ltd.	
CT8 connector	The M-O Valve Co. Ltd.	(cover) 12/426 (clip) 10/425
Magnet shield a twist coil	Magnetic Shields Ltd., Headcorn Road, Staplehurst, Tonbridge, Kent.	

## WARNING

Care should be taken not to expose the tube to strong magnetic fields either in use or during storage.

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# OUTLINE

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