THE M-O VALVE
COMPANY LIMITED

900W

[Brimar D10-210 equivalent]

GEC

INSTRUMENT
CATHODE RAY TUBE

BRIEF DATA

3½" × 2¾"
display 7×5cm
A short 10cm diagonal (4 in) flat faced rectangular instrument tube with aluminised screen, mesh p.d.a. and deflection blanking. This tube is intended for use in general purpose and portable oscilloscopes. 230mm long

5y 9.8
5x 13.8

HEATER

Heater voltage	11	V
Heater current	68	mA

SCREEN

	974W	996W
Fluorescence	Green	Bluish-White
Phosphorescence	Green	Yellowish-Green
Persistence	1–5ms	10–60s
E.I.A. phosphor code	P31	P7
Pro Electron phosphor code	GH	GM
GEC phosphor code	74	96

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

RATINGS (Absolute)

		Max	Min	
Fourth anode voltage	V_{a4}	7.0	5.0	kV
Third anode voltage	V_{a3}	0.7	0.5	kV
Ratio	V_{a4}/V_{a3}	10	–	
Focus voltage	V_{a2}	300	–	V
First anode voltage	V_{a1}	0.7	0.5	kV
Control grid voltage	$-V_{g1}$	200	1.0	V
Blanking plate to first anode voltage	V_{g2-a1}	+200	−200	V
Y plate to third anode voltage	V_{y-a3}	500	–	V
X plate to third anode voltage	V_{x-a3}	500	–	V
Grid to cathode circuit resistance	R_{g1-k}	1.0	–	MΩ
Y deflector plate circuit resistance	R_{y-a3}	100	–	kΩ
X deflector plate circuit resistance	R_{x-a3}	250	–	kΩ

Voltage ratings are to cathode unless otherwise shown.

June 1975
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CAPACITANCES (Typical)

Control grid to all other electrodes	9.3	pF
Blanking plate to all other electrodes	8.5	pF
Deflector plates y1 to y2	0.9	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_{a3}
Control grid voltage for spot cut-off	$-V_{g1}$	109	42	V/kV_{a1}
Blanking voltage	$V_{g2\text{-}a1}$	+83	−83	V/kV_{a3}
Y deflection factor	Dy	16	10.8	$V/cm/kV_{a3}$
X deflection factor	Dx	23	18.3	$V/cm/kV_{a3}$
Astigmatism correction voltage	$V_{a3\text{-}y\ mean}$	+83	−83	V/kV_{a3}
Pattern correction voltage	$V_{s\text{-}x\ mean}$	+83	−83	V/kV_{a3}

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}	140–240	V
First anode voltage	V_{a1}	600	V
Control grid voltage for spot cut-off.	$-V_{g1}$	65–25	V
Nominal blanking plate voltage	V_{g2}	600	V
Nominal geometry correction voltage	V_s	600	V
Maximum y deflection factor	Dy	9.6	V/cm
Maximum x deflection factor	Dx	13.8	V/cm
Line width (typical)74 screen		0.35	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 measured over any 10mm of deflection in the appropriate axis will not vary by more than ±3½% within the minimum scanned area.

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 ±5° 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 $11\sqrt{kV_{a4}}$.

Beam Blanking (If g2 blanking not used join pins 5 & 10 externally)
Under typical operating conditions (i.e. $V_{a1} = V_{a3} = 600V$) and for a beam current (I_b) of 5μA a potential of 50V (preferably negative) with respect to a1, applied to the blanking electrode g2, will completely cut off the beam. This electrode should not be used as a brightness control.

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 480gm (approx.).

BASE CONNECTIONS

Base: B12F

Pin 1:	g1	Pin 7:	x2
2:	k + h	8:	s (geometry)/IPS/Mesh
3:	h	9:	y2
4:	a2 (focus)	10:	a1
5:	g2 (blanking)	11:	y1
6:	x1	12:	a3 (astigmatism)

Side contact (CT8): a4

ACCESSORIES

Base sockets	Pressac Ltd., Leopold Street, Long Eaton, Nottingham NG10 4QL.	
CT8 connector	Pressac Ltd.	(cover) 12/426 (clip) 10/425
Magnetic shield	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.

OUTLINE

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