THE M-O VALVE
COMPANY LIMITED

1400J

Brimar D14-180

GEC

INSTRUMENT CATHODE RAY TUBE

BRIEF DATA

A rectangular flat faced, single gun, spiral p.d.a. tube with full 10 x 8 cm display for medium bandwidth applications. Features include electrostatic focus, electrostatic deflection and deflection beam-blanking.
The scan voltages required for this tube can be obtained from transistorised deflection circuits.

	(i)	(ii)	
Final anode voltage (p.d.a.)	5	4	kV
p.d.a. ratio	3.3:1	4:1	
Display area	8 x 10	8 x 10	cm
Y deflection factor (D_y)	<12.8	<8.7	V/cm
X deflection factor (D_x)	<24.8	<17	V/cm

length 384

HEATER

Heater voltage	6.3	V
Heater current	0.3	A

SCREEN

	1424J	1446J
Fluorescence	Green	White
Phosphorescence	Green	Yellowish-Green
Persistence	1–5 ms	10 - 60s
E.I.A. phosphor code	P31	P7
Pro Electron phosphor code	GH	GM
GEC phosphor code	24	46

Other screens can be supplied to special order.

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RATINGS (Absolute)

		Max	Min	
Fourth anode voltage	V_{a4}	7.0	2.0	kV
Third anode voltage	V_{a3}	2.5	0.8	kV
Ratio	V_{a4}/V_{a3}	4	1	
Focus voltage	V_{a2}	1.0	0	kV
First anode voltage	V_{a1}	2.2	0.8	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}	1.5	–	MΩ
Y deflector plate circuit resistance	R_{y-a3}	100	–	kΩ
X deflector plate circuit resistance	R_{x-a3}	500	–	kΩ
p.d.a. spiral resistance		–	50	MΩ

Voltage ratings are to cathode unless otherwise shown.

CAPACITANCES (Typical)

Heater + cathode to all other electrodes	3.3	pF
Control grid to all other electrodes	8.0	pF
Blanking plate to all other electrodes	11.0	pF
Deflector plates y1 to y2	1.5	pF
Deflector plates y1 to all electrodes except y2	5.0	pF
Deflector plates y2 to all electrodes except y1	5.5	pF
Deflector plates x1 to x2	2.0	pF
Deflector plates x1 to all electrodes except x2	6.2	pF
Deflector plates x2 to all electrodes except x1	6.2	pF

EQUIPMENT DESIGN RANGE

		Max	Min	
Focus voltage	V_{a2}	400	175	V/kV_{a3}
Control grid voltage for spot cut-off	$-V_{g1}$	65	35	V/kV_{a1}
Blanking voltage	$-V_{g2-a1}$	65	–	V/kV_{a1}
Y deflection factor	D_y (at $V_{a4}/V_{a3} = 4$)	8.7	7.0	$V/cm/kV_{a3}$
X deflection factor	D_x (at $V_{a4}/V_{a3} = 4$)	17	14	$V/cm/kV_{a3}$
Y deflection factor	D_y (at $V_{a4}/V_{a3} = 3.3$)	8.5	6.5	$V/cm/kV_{a3}$
X deflection factor	D_x (at $V_{a4}/V_{a3} = 3.3$)	16.5	12.5	$V/cm/kV_{a3}$
Astigmatism correction voltage	V_{a3}	+50	−50	V/kV_{a3}
Pattern correction voltage	V_s	+50	−50	V/kV_{a3}

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

		(i)	(ii)	
Fourth anode voltage . . .	V_{a4}	5	4	kV
Third anode voltage	V_{a3}	1.5	1	kV
Focus voltage	V_{a2}	260–600	175–400	V
First anode voltage	V_{a1}	1.5	1	kV
Control grid voltage for spot cut-off	$-V_{g1}$	52–98	35–65	V
Nominal blanking plate voltage	V_{g2}	1.5	1	kV
Nominal geometry correction voltage . . .	V_s	1.5	1	kV
Maximum y deflection factor .	D_y	12.8	8.7	V/cm
Maximum x deflection factor .	D_x	24.8	17.0	V/cm
*Line width (typical)		0.6	0.6	mm

*Measured by microscope at the centre of the tube face with a type 24 (P31) phosphor using a 5 μA pulsed line.

DISPLAY CHARACTERISTICS (Typical Operation)

Minimum Scanned Area	(i)	(ii)	
X axis	10	10	cm
Y axis	8	8	cm

This area will be centred on a point which is within 3 mm of the centre of the tube face.

The undeflected spot will lie within a square of side 10 mm at the centre of the tube face.

Beam Blanking

At a cathode current of 500 μA, a potential of $-65V/kV_{a1}$ 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.

Astigmatism Correction

Adjustment of the potential on a3 relative to the y plate mean potential may be used for the purpose of astigmatism correction. A range of adjustment of $\pm 50V/kV_{a3}$ should be allowed for this purpose.

Pattern Correction

Barrel or pincushion distortion may be minimised by the application of the appropriate potential to s with respect to the x plate mean potential. A range of adjustment of $\pm 50V/kV_{a3}$ should be allowed for this purpose. Astigmatism and pattern correction potentials are quoted for the condition where the x plate mean potential is equal to the y plate mean potential. If in any application, a difference between x and y plate mean potentials is unavoidable it is recommended that this difference should be kept to a minimum.

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 not exceed $12\sqrt{kV_{a4}}$.

Pattern Distortion

With pattern correction applied, the edges of a test raster will lie between two concentric rectangles 100 x 80 mm and 97.5 x 78 mm. The angle between the x and y axes will be $90^\circ \pm 1^\circ$.

Deflection Linearity

The deflection factor for a deflection of less than 75% of useful scan will not differ from that for a deflection of 25% by more than 2%.

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 round the magnetic shield near the base. The socket should have sufficient freedom of movement to accommodate overall length and base orientation tolerances.

WEIGHT

The weight of the tube alone is approximately 1.1 kg

BASE CONNECTIONS

Base : B 12 F

Pin 1:	g1
2:	hk
3:	h
4:	a2
5:	g2
6:	a3

Side contact (CT8) : a4

Pin 7:	y1
8:	y2
9:	s
10:	x1
11:	a1
12:	x2

MAGNETIC SHIELDING

A suitable magnetic shield can be obtained from 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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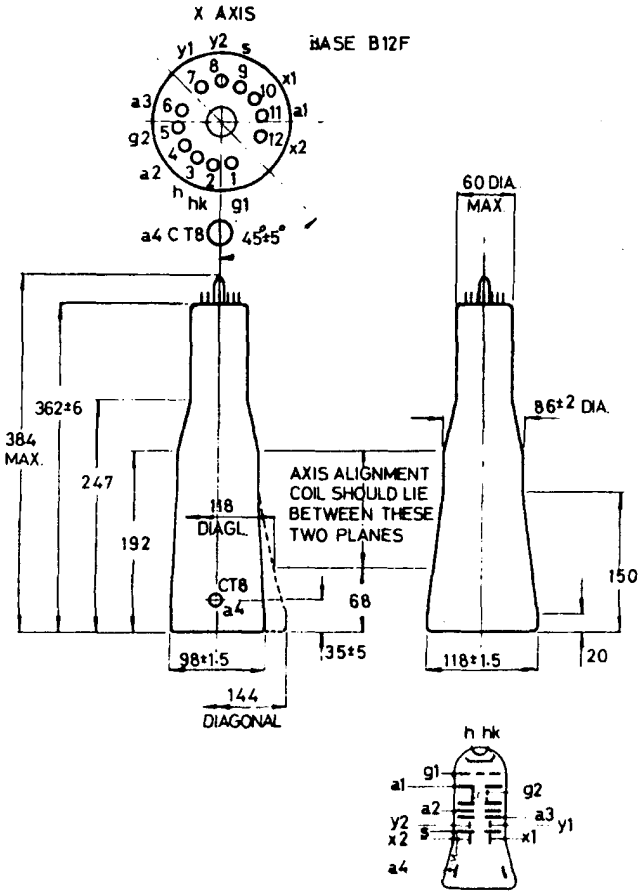

Dimensions in mm.