THE M-O VALVE
COMPANY LIMITED

1300M

Brimar SE5/2A CV9337

GEC

DOUBLE GUN CATHODE RAY TUBE

BRIEF DATA

A high sensitivity double-gun oscilloscope tube with a 13 cm (5¼ inch) diameter faceplate and helical post deflection acceleration. The two identical electron guns have a common horizontal deflection system and independent vertical deflection systems.

HEATER

Heater voltage	6.3	V
Heater current (total)	0.6 or 1.2	A

SCREEN

Tube normally supplied with 24 phosphor as 1324M.

Fluorescence	Green	
Phosphorescence	Green	
Persistence	1 – 5	ms
EIA phosphor code	P31	
GEC phosphor code	24	
Pro Electron phosphor code	GH	

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

EQUIPMENT DESIGN RANGE

		Max	Min	
Focus voltage	V_{a2}	400	200	$V/kV_{a1,3}$
Control grid voltage for spot cut-off	$-V_{g1}$	60	30	V/kV_{a1}
Blanking voltage	V_{g3}	50	–	V/kV_{a1}
Y deflection factor	D_y (at $V_{a4}/V_{a3} = 4$)	6.6	5.4	$V/cm/kV_{a3}$
X deflection factor	D_x (at $V_{a4}/V_{a3} = 4$)	21	17	$V/cm/kV_{a3}$
p.d.a. spiral current		10	–	$\mu A/kV_{a3-a4}$

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RATINGS (Absolute)

		Max	Min	
Fourth anode voltage	V_{a4}	8.0	3.0	kV
Third anode voltage	V_{a3}	2.0	0.8	kV
Ratio	V_{a4}/V_{a3}	4.0	–	–
Focus voltage	V_{a2}	1.5	0	kV
First anode voltage	V_{a1}	2.0	0.8	kV
Control grid voltage	$-V_{g1}$	200	0	V
Y plate to third anode voltage	$V_{y\text{-}a3}$	200	–	V
X plate to third anode voltage	$V_{x\text{-}a3}$	500	–	V
Heater - cathode voltage	$V_{h\text{-}k}$	180	–	V
Heater-cathode circuit resistance	$R_{h\text{-}k}$	1.5	–	MΩ
Y deflector plate circuit resistance	$R_{y\text{-}a3}$	0.25	–	MΩ
X deflector plate circuit resistance	$R_{x\text{-}a3}$	5.0	–	MΩ
Grid to cathode circuit resistance	$R_{g1\text{-}k}$	1.5	–	MΩ
Geometry correction voltage	V_{s1}	2.0	0.8	kV
Trace registration voltage	V_{g2}	2.0	0.8	kV
Beam blanking voltage	V_{g3}	2.0	0.8	kV

CAPACITANCES (each gun)

Cathode to all other electrodes	5.5	pF
Control grid to all other electrodes	8.5	pF
Blanking plate to all other electrodes (both guns)	12.0	pF
Deflector plates y1 to y2	2.5	pF
Deflector plates y1 to all electrodes except y2	4.0	pF
Deflector plates y2 to all electrodes except y1	4.0	pF
Deflector plates x1 to x2	4.0	pF
Deflector plates x1 to all electrodes except x2	4.0	pF
Deflector plates x2 to all electrodes except x1	4.0	pF

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

Fourth anode voltage	V_{a4}	4.0	kV
Third anode voltage	V_{a3}	1.0	kV
Focus voltage	V_{a2}	290.0	V
First anode voltage	V_{a1}	1.0	kV
Control grid voltage for spot cut-off	$-V_{g1}$	45.0	V
Nominal trace registration voltage	V_{g2}	1.0	kV
Nominal beam blanking voltage	V_{g3}	1.0	kV
Nominal geometry correction voltage	V_{s1}	1.0	kV
Maximum y deflection factor	D_y	6.6	V/cm
Maximum x deflection factor	D_x	21.0	V/cm
*Typical line width (for type 24 phosphor		0.4	mm

*Measured by means of a shrinking raster at the geometric centre of the face-plate.

DISPLAY CHARACTERISTICS

Minimum Scanned Area

x axis	10	cm
y (each gun)	6	cm
y (overlap)	4	cm

The centre of the 10 x 4 cm overlap rectangle will fall within a circle of 3 mm radius centred on the geometric centre of the faceplate.

Beam Blanking

A potential of 50 V/kV_{a1} (preferably negative) with respect to a1 applied to the blanking electrode g3, will completely cut off both beams. This electrode should not be used as a brightness control.

Superimposition of Traces

The vertical traces may be superimposed along the vertical diameter by adjustment of the potential of the trace registration electrode g2, relative to a1, A range of adjustment of ± 10 V/kV_{a1} may be required. Superimposition of the vertical traces at the extremes of x deflection may then be effected by adjustment of the relative cathode potentials. Provision should be made for a potential difference of up to 40 V/kV_{a3} between the two cathodes for this purpose.

Astigmatism Correction

Adjustment of the potential on a3 relative to the y deflection plate mean potential may be used for the purpose of astigmatism correction. A range of adjustment of ± 30 V/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 s1 relative to the x plate mean potential. A range of adjustment from −30 to +30 V/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.

Pattern Distortion

For each beam with pattern correction applied, the edges of a test raster will lie between two concentric rectangles of 102 x 51 mm and 100 x 50 mm. The angle between x and y axes (each beam) will be 90 ° ± 1 °. The angle between y axes (beams superimposed) will be 0 ° ± 1.5 °.

Deflection Linearity

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

Spot Position

The focused and undeflected spots will fall within two 10 mm dia. circles whose centres lie on the geometric y – axis and ±10 mm from the geometric centre of the faceplate.

Orientation

Looking at the screen with pins 9 and 10 of the base uppermost a positive potential applied to x1 will deflect the beam to the left and a positive potential applied to y1' or y1'' will deflect the appropriate beam upwards.

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 the maximum overall tube length and base orientation tolerances.

BASE CONNECTIONS

Base: B12F

Pin 1 : g1''
2 : k''
3 : h
4 : h
5 : a2'' (focus)
6 : a2' (focus)

Side contact (CT8) : a4

Pin 7 : g1'
8 : k'
9 : g2 (trace registration)
10 : a1' and a1''
11 : g3 (beam blanking)
12 : IC

Side pin connections as viewed from base and reading clockwise from base pin 2:

x1 x2 a3'' y2'' y1'' s1 (geometry) a3' y2' y1'

WEIGHT

The weight of the tube alone is 1.25 kg (2¾ lb).

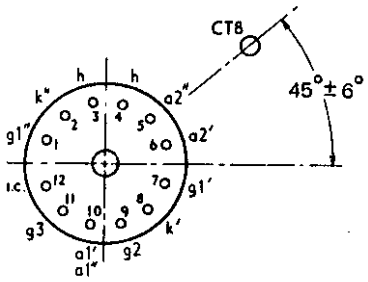
MAGNETIC SHIELDING

A suitable magnetic shield may be obtained from Magnetic Shields Ltd., Headcorn Road, Staplehurst, Tonbridge, Kent.

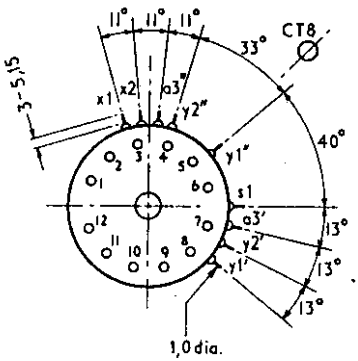
WARNING

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

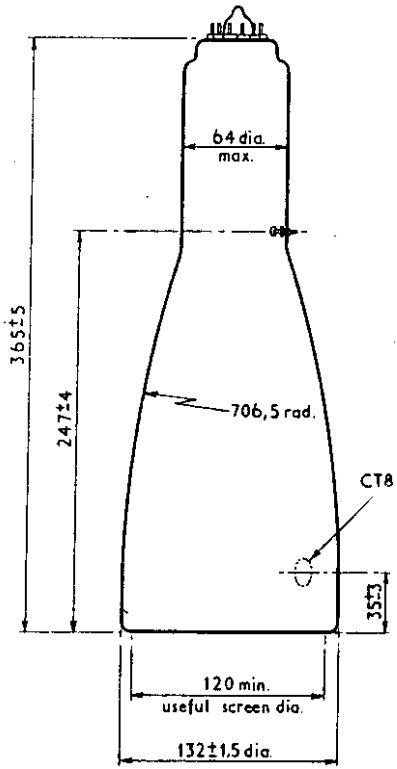
OUTLINE

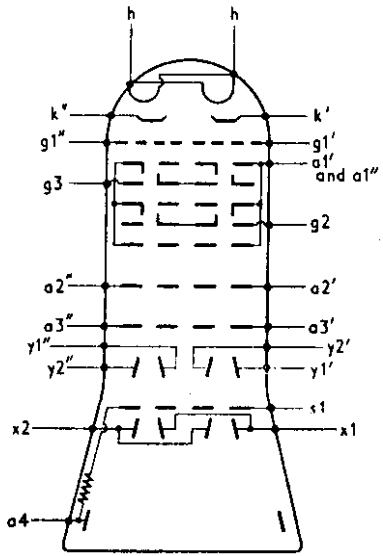


B12F Base



Minimum spacing between any side pins is 3.5 within a maximum total arc of 155°.





All dimensions are in mm