

$4\frac{1}{2}$ in. \times $3\frac{1}{2}$ in. RECTANGULAR FACED,
DUAL TRACE OSCILLOSCOPE TUBE

ISSUE 1
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BRIEF DATA

A high sensitivity $4\frac{1}{2}$ in. \times $3\frac{1}{2}$ in. split beam dual trace oscilloscope tube having provision for brightness equalisation, independent astigmatism correction and incorporating mesh P.D.A.

HEATER

V_h	6.3	V
I_h	0.3 (approx.)	A

RATINGS (Absolute)

	Max.	Min.	
V_{a4}	12	6	kV
V_{a3}	2.0	1.0	kV
V_{a2}	1.0	-	kV
V_{a1}	2.0	1.0	kV
$-V_{g1}$	200	-	V
$+V_{g1}$	0	-	V
V_{h-k} Cathode positive			
d.c.	200	-	V
pk.	300	-	V
Cathode negative			
d.c.	125	-	V
pk.	250	-	V
V_{x-a3}	500	-	V
V_{y-a3}	250	-	V
V_{g2-a1}	± 200	-	V
V_{g3-a1}	± 200	-	V
I_k	500	-	μA
R_{g1-k}	1.0	-	M Ω
R_{x-a3}	1.0	-	M Ω
R_{y-a3}	100	-	K Ω
$V_{s1'}$, $s1''-a3$	200	-	V
V_{s3-a3}	200	-	V
V_{s2-a3}	200	-	V
Ratio ($V_{a4}/a3$)	10	-	

THE M-O VALVE CO. LTD.

BROOK GREEN WORKS · LONDON · W.6

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1300P

SCREEN

Fluorescence	Green	White
Phosphorescence	Green	Yellowish Green
Persistence	1-5 ms	10 - 60 secs
E.I.A. Phosphor Code	P31	P7
G.E.C. Phosphor Code	74	96

Other screens are available to special order (see data sheet "Phosphor Codes").

CAPACITANCES (Max.)

C _k -all	5.0	pF
C _{g1} -all	10.0	pF
C _{y1'} -y _{2'}	1.0	pF
C _{y1''} -y _{2''}	1.0	pF
C _{x1} -x ₂	3.0	pF
C _{y1'} -all (less y _{2'})	4.5	pF
C _{y2'} -all (less y _{1'})	6.5	pF
C _{y1''} -all (less y _{2''})	6.5	pF
C _{y2''} -all (less y _{1''})	4.5	pF
C _{x1} -all (less x ₂)	6.5	pF
C _{x2} -all (less x ₁)	6.5	pF
C _{g3} -all	8.5	pF

EQUIPMENT DESIGN RANGE

	Max.	Min.	
V _{a2} (for focus)	220	40	V/kV _{a3}
-V _{g1} (for cut-off)	67	30	V/kV _{a1}
-V _{g3} (for blanking) (w. r. t. a ₁)	30	-	V/kV _{a1}
Deflection factor D _y	3.8	2.87	V/cm/kV _{a3}
Deflection factor D _x	6.8	5.6	V/cm/kV _{a3}

TYPICAL OPERATION (all operating voltages with respect to cathode)

V _{a4}	10	kV
V _{a3}	1.5	kV
V _{a2} (for focus)	60 - 330	V
V _{a1}	1.5	kV
-V _{g1} (for cut-off)	100 max.	V
V _{g2} (nom)	1.5	kV
V _{g3} (nom)	1.5	kV
D _y (max.)	5.7	V/cm
D _x (max.)	10.2	V/cm
V _{s1'} (nom)	1.48	kV
V _{s1''} (nom)	1.44	kV
V _{s3} (nom)	1.480	kV
V _{s2} (nom)	1.5	kV
*Line width (typical)	0.4	mm

*At 5μA in each beam and measured by shrinking raster.

Minimum Scanned Area

x	10	cm
y (each beam)	6	cm
y (overlap)	6	cm

Beam Blanking

A potential of 30V/kV_{a3} negative with respect to a₁, applied to the beam blanking electrode g₃ will completely cut off both beams. This electrode should not be used as a brightness control.

Beam Equality

The brightness of the traces may be equalised at low level by the application of a suitable potential to the beam equalising electrode, g₂.

Astigmatism Correction

Adjustment of the potentials on s₁' and s₁" relative to their nominal values, may be used for the purpose of independent astigmatism control. The difference between the y plate mean potential levels should be kept within 20V to minimise the effects of astigmatism and deflection defocusing.

Pattern Correction

Barrel and pincushion effects may be minimised by applying the appropriate potential to s₂. However this 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 face, and may be aligned with this axis by means of an axial coil placed about the cone in the region shown in the outline drawing. When the tube is operated under the quoted typical operating conditions, 35 ampere turns should be allowed for alignment.

Background Suppression

Background illumination of the phosphor may be reduced and contrast improved by applying -20V to s₃ with respect to s₂.

DISPLAY CHARACTERISTICS**Pattern Distortion**

For both beams simultaneously with no pattern correction applied, the edges of the test rasters will lie between two concentric rectangles of 100mm \times 60mm and 98mm \times 58mm. The angle between x and y axes (each beam) will be $90^\circ \pm 1^\circ$. The angle between y axes (beams superimposed) will be $0^\circ \pm 1.5^\circ$.

1300P

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 a rectangle $1.2\text{cm} \times 2.0\text{cm}$ centred at the geometric centre of the faceplate, the greater dimension being aligned in the x axis. The maximum displacement between the spots in the y direction will be 10mm.

Orientation

Looking at the screen with pins 1 and 12 uppermost, a positive voltage applied to x_1 will deflect the beam to the left and a positive voltage applied to y_1' or y_1'' 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 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.

BASE CONNECTIONS

Base: B12F

Pin 1: g_1	Pin 7: g_3 (blanking)
2: k	8: a_3
3: h	9: s_3 (contrast)
4: h	10: a_1
5: a_2 (focus)	11: s_2 (geometry)
6: g_2 (beam equalising)	12: s_1' (astigmatism)

Side contact: (CT8): a_4

Side pin connections as viewed from the base and reading clockwise from base pin 12:-

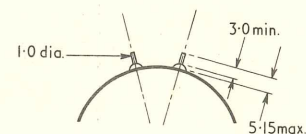
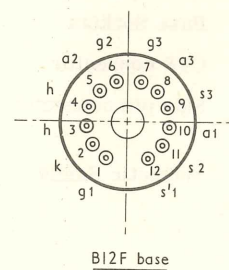
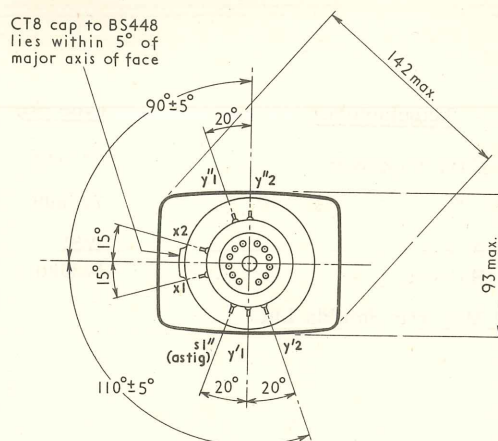
y_2' y_1' s_1'' (astigmatism) x_1 x_2 y_1'' y_2''

ACCESSORIES

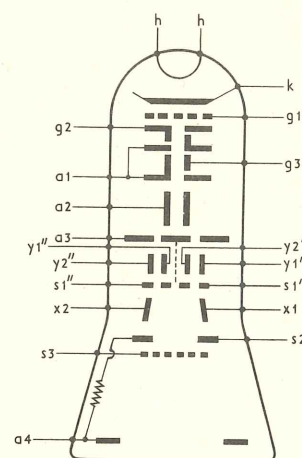
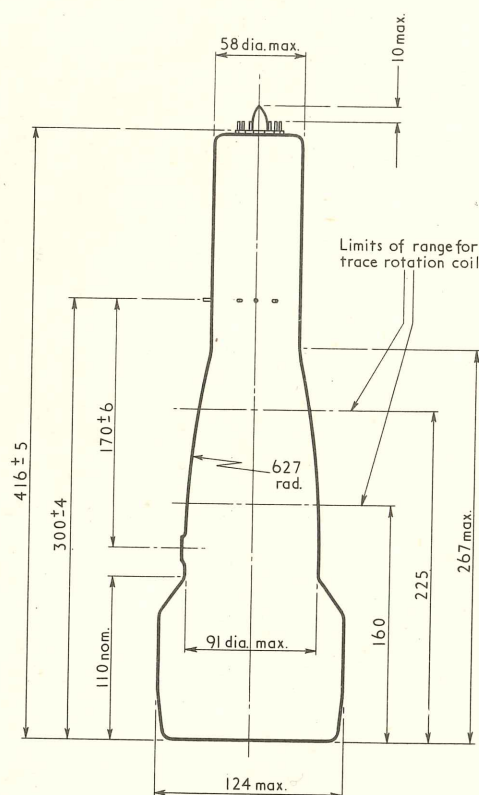
<u>Part</u>	<u>Manufacturer</u>	<u>Type No.</u>
Base Sockets	Carr Fastener	77/842
CT8 connector	" "	77/699
Side pin connector	A. E. I. Harwin.	WS1 W3000
Magnetic Shield	Magnetic Shields Ltd.	

Provision of circuit information in this publication does not imply a right to use any invention which may be involved and which is the subject of patents by whomsoever owned.

CT8 cap to BS448
lies within 5° of
major axis of face



Enlarged view of side pins
(Positional tolerance of each side pin
is 2.5° from datum)



870

All dimensions are in millimetres

OUTLINE DRAWING