

G.E.C.**CATHODE RAY
TUBES**11,5 × 9 cm RECTANGULAR FACED
DUAL TRACE OSCILLOSCOPE TUBE

10 × 6

**1300P
series**

ISSUE 1

*used in EM1/SE 102
Telegquipment D53***BRIEF DATA**

A high sensitivity split beam dual trace oscilloscope tube with a 11,5×9cm faceplate. The tube has provision for brightness equalisation, independent astigmatism correction and incorporates mesh p. d. a.

Final anode voltage (p. d. a.)	10	kV
Display area @ $V_{a4} = 6,7V_{a3}$ (each beam)	6 x 10	cm
Overlap	6	cm
Deflection factor (Dy)	< 5,7	V/cm
Deflection factor (Dx)	< 10,2	V/cm

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
Ratio ($V_{a4}/a3$)	10	-	
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 (mean)	500	-	μA
R_{g1} -k	1,0	-	MΩ
R_x -a3	1,0	-	MΩ
R_y -a3	100	-	kΩ
$V_{s1'}$, $s1''$ -a3	200	-	V
V_{s3} -a3	200	-	V
V_{s2} -a3	200	-	V

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1300P series

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.)

Ck-all	5,0	pF
Cg1-all	10,0	pF
Cy1'-y2'	1,0	pF
Cy1"-y2"	1,0	pF
Cx1-x2	3,0	pF
Cy1'-all (less y2')	4,5	pF
Cy2'-all (less y1')	6,5	pF
Cy1"-all (less y2")	6,5	pF
Cy2"-all (less y1")	4,5	pF
Cx1-all (less x2)	6,5	pF
Cx2-all (less x1)	6,5	pF
Cg3-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}
p.d.a. spiral current	10	-	μA/kV _{a3-a4}

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)	1,45	kV
V_{s3} (nom)	1,48	kV
V_{s2} (nom)	1,5	kV
*Line width (typical for type 74 phosphor)	0,4	mm

*At $5\mu A$ 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, $g2$. A range of adjustment of $-16,6$ to $+6,6 V/kV_{a1}$ should be allowed for this purpose.

Astigmatism Correction

Adjustment of the potentials on $s1'$ and $s1''$, relative to their nominal values, may be used for the purpose of independent astigmatism correction of the two traces. A range of adjustment of $\pm 14V/kV_{a3}$ should be allowed on $V_{s1'}$ and $\pm 20V/kV_{a3}$ on $V_{s1''}$ for this purpose. In order to minimise astigmatism and errors in geometry it is recommended that differences between the mean potentials of each deflection system and also $a3$ should be kept to a minimum.

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 faceplate, and may be aligned with this axis by means of the field from an axial coil placed about the cone in the region shown in the outline drawing. The maximum ampere turns required for axis alignment will be given by $12\sqrt{kV_{a4}}$.

Background Suppression

Background illumination of the phosphor may be reduced and contrast improved by applying -20V to s_3 with respect to s_2 .

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 $0^\circ \pm 1,5^\circ$.

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 square 2,0cm \times 2,0cm centred at the geometric centre of the faceplate,

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.

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BASE CONNECTIONS

Base: B12F

Pin 1: g1	Pin 7: g3 (blanking)
2: k	8: a3
3: h	9: s3 (contrast)
4: h	10: a1
5: a2 (focus)	11: s2 (geometry)
6: g2 (beam equalising)	12: s1' (astigmatism)

Side contact: (CT8): a4

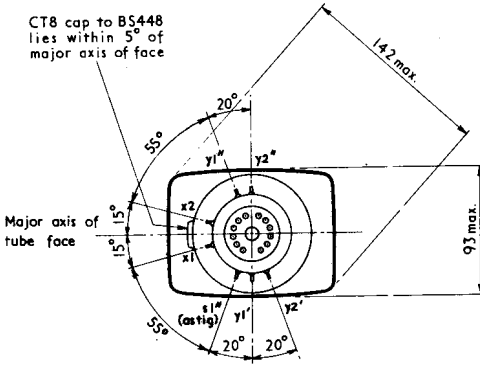
Side pin connections as viewed from the base and reading clockwise from base pin 12:-

y2' y1' s1" (astigmatism) x1 x2 y1" y2"

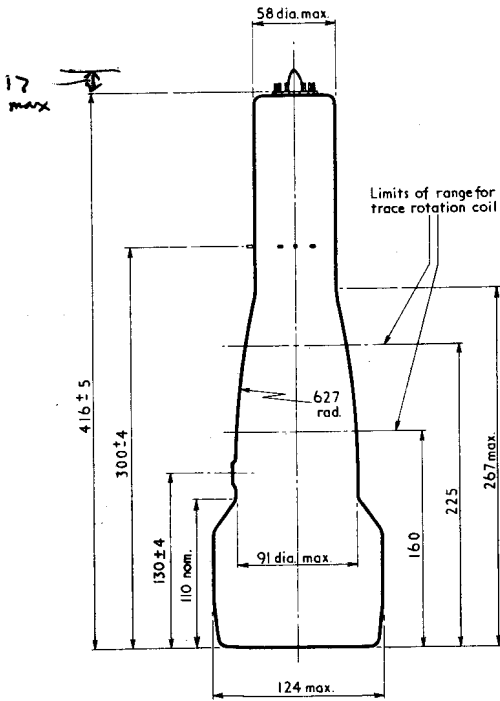
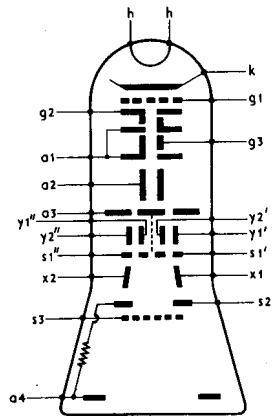
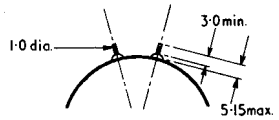
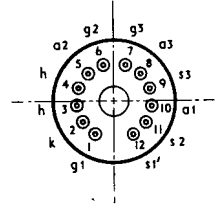
ACCESSORIES

<u>Part</u>	<u>Manufacturer</u>	<u>Type No.</u>
Base Sockets	Carr Fastener	77/84
CT8 connector	" "	77/69
Side pin connector	A. E. I. Harwin.	WS1 W300
Magnetic Shield	Magnetic Shields Ltd.	

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Positional tolerance of each side pin is $2,5^\circ$ from datum



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All dimensions are in millimetres

OUTLINE DRAWING