



DOUBLE GUN  
CATHODE RAY TUBE

**BRIEF DATA**

10x8 cm

A high sensitivity double gun oscilloscope tube with a 14cm (5½ inch) diagonal rectangular faceplate, mesh post deflection acceleration, aluminium backed screen and compensated deflection blanking system. The two identical electron guns have completely independent horizontal and vertical deflection systems.

length 391 mm

Final anode voltage (p.d.a.)	8.0	kV
Display area (each beam)	4 x 10	cm
Overlap	2.0	cm
Y deflection factor (Dy)(max)	5.0	V/cm
X deflection factor (Dx)(max)	12	V/cm

**HEATER**

$V_h$	6.3	V
$I_h$ (approx. both guns)	1.2	A

**SCREEN**

Fluorescence	Bluish-White
Phosphorescence	Yellow
Persistence	10-60 sec
E.I.A. phosphor code	P7
GEC phosphor code	96
Pro-Electron phosphor code	GM

**EQUIPMENT DESIGN RANGE**

	Max	Min	
$V_{a2}$ (for focus)	400	150	V/k $V_{a3}$
$-V_{g1}$ (for cut-off)	100	30	V/k $V_{a1}$
$\pm V_{g2}$ (for blanking)(w.r.t. a1)	80	—	V/k $V_{a1}$
Dy (at $V_{a4}/V_{a3} = 8$ )	5.0	—	V/cm/k $V_{a3}$
Dx (at $V_{a4}/V_{a3} = 8$ )	12	—	V/cm/k $V_{a3}$
p.d.a. spiral current	10	—	$\mu$ A/k $V_{a3-a4}$

## RATINGS (Absolute)

	Max	Min	
$V_{a4}$	10	6.0	kV
$V_{a3}$	2.0	0.9	kV
Ratio ( $V_{a4}/V_{a3}$ )	8.0	—	
$V_{a2}$	1.5	0	kV
$V_{a1}$	2.0	0.9	kV
$-V_{g1}$	200	1.0	V
$V_{y-a3}$	200	—	V
$V_{x-a3}$	500	—	V
$V_{h-k}$	$\pm 150$	—	V
$R_{h-k}$	0.1	—	M $\Omega$
$R_{y-a3}$	0.1	—	M $\Omega$
$R_{x-a3}$	0.5	—	M $\Omega$
$R_{g1-k}$	1.0	—	M $\Omega$
$V_{g2}$	2.0	0.9	kV
$V_{(\text{neck, box})}$	2.0	0.9	kV
$V_{(\text{igs, ogs, lips})}$	2.0	0.9	kV
$V_{(\text{mesh})}$	2.0	0.9	kV

Voltage ratings are with respect to cathode, unless otherwise indicated.

## CAPACITANCES (each gun) typical

	Gun'	Gun''	
$C_{k-\text{all}}$	4.0	4.0	pF
$C_{g1-\text{all}}$	12.5	12.5	pF
$C_{g2-\text{all}}$	5.6	5.6	pF
$C_{y1-y2}$	2.5	2.5	pF
$C_{y1-\text{all less } y2}$	3.0	5.0	pF
$C_{y2-\text{all less } y1}$	5.0	3.0	pF
$C_{x1-x2}$	4.2	4.2	pF
$C_{x1-\text{all less } x2}$	3.5	3.5	pF
$C_{x2-\text{all less } x1}$	3.5	3.5	pF

## TYPICAL OPERATION

$V_{a4}$	8.0	kV
$V_{a3}$	1.0	kV
$V_{a2}$ (for focus)	150–380	V
$V_{a1}$	1.0	kV
$-V_{g1}$ (for cut-off)(max)	100	V

$V_{g2}$ (nom)	1.0	kV
$V_s$ (neck, box)	1.0	kV
$V_s$ (igs, lips)	1000 (-50/+50)	V
$V_s$ (ogs)	1000 (-50/+150)	V
$V_s$ (mesh)	980	V
Dy (max)	5.0	V/cm
Dx (max)	12	V/cm
*Typical line width (for type 96 phosphor)	0.44	mm

\*Measured by means of a shrinking raster at the geometric centre of the face-plate at 5.0 $\mu$ A beam current.

### Minimum Scanned Area

x (each gun)	10	cm
x (overlap)	10	cm
y (each gun)	4	cm
y (overlap)	2	cm

Gun' fills +30 to -10mm and gun'' fills +10 to -30mm about the geometric major axis of the screen.

### Beam Blanking

A potential of -80V/kV $_{a1}$  (preferable) or +100V/kV $_{a1}$  with respect to  $V_{a1}$  applied to either or both of the blanking electrodes ( $g2'$  and  $g2''$ ) will completely cut-off either or both beams. Blanking electrodes should not be used as brightness controls.

### 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  $\pm 50$ V/kV $_{a3}$  should be allowed for this purpose.

### Pattern Correction

Barrel or pincushion distortion may be minimised by the application of appropriate potentials to the s electrodes relative to the x plate mean potential. Ranges of adjustment (see Typical Operation) 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 face plate and may be aligned with this axis by means of the field from an axial coil placed about the cone of the tube.

## **DISPLAY CHARACTERISTICS**

### **Pattern Distortion**

For each beam, with pattern correction applied, the edges of a test raster will lie between two concentric rectangles of 100 x 40 and 94 x 36mm. The angle between x and y axes (each beam) will be  $90^\circ \pm 1.5^\circ$  max.

The angle between y axes at screen centre  $1.5^\circ$  max.

The angle between x axes at screen centre  $1.5^\circ$  max.

### **Deflection Defocusing**

The ratio of line width, measured at the centre of a vertical line placed at the centre of the screen, to the corresponding line width measured at edge of the horizontal window will not exceed 2.5:1.

### **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 15mm squares whose centres lie on the geometric y axis and  $\pm 7.5$ mm from the geometric centre of the faceplate. Gun' spot falls in upper square and gun'' in lower square.

### **Orientation**

Looking at the screen with pins 3 and 4 of the base uppermost a positive potential applied to x1' or x1'' will deflect the appropriate 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 must not be supported by the base alone. It is recommended that the tube should be held by a rubber mask at the screen and a clamp around the magnetic shield near the base, a resilient packing being located between the shield and the tube. The socket should have sufficient freedom of movement to accommodate the maximum overall tube length and base orientation tolerances.

## BASE CONNECTIONS

Base: B12F	Side contact (CT8): a4
Pin 1: g1'	Pin 7: g2''
2: k'	8: a2''
3: h	9: a1'
4: h	10: a1''
5: a2'	11: k''
6: g2'	12: g1''

## WEIGHT

The weight of the tube is 2.0kg (approx).

## ACCESSORIES

Part	Manufacturer	Type No.
Base sockets	Carr Fastener Co. Ltd., Stapleford, Notts.	77/842
CT8 connector	Pressac Ltd., Leopold Street, Long Eaton, Nottingham. NG10 4QL.	(cover) 12/426 (clip) 10/425
Side pin connectors	Auto Precision Ltd., Glendere Street, Bristol 5.	WS1
Magnetic shield	Magnetic Shields Ltd., Headcorne Road, Staplehurst, Tonbridge, Kent.  Q-Fab Ltd., Milnathort, Kinross, Scotland. KY13 7XB.	

## **WARNING**

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

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