

The 1000H is a 4 in. dia. high sensitivity double gun tube with helical post deflection acceleration. It is intended for use in general purpose oscilloscopes where two independent signals are displayed on a common time base. The tube is also available with an aluminised screen giving higher trace brightness.

**BASE CONNECTIONS**

Base: B12F

- |                |                       |
|----------------|-----------------------|
| 1. g"          | 7. trace registration |
| 2. k"          | 8. a'2                |
| 3. h           | 9. beam blanking      |
| 4. h           | 10. NC                |
| 5. a"2         | 11. k'                |
| 6. a"1 and a'1 | 12. g'                |

Side contact (a4): CT8

Side pin connections as viewed from base and reading clockwise from base  
pin No. 3: x<sub>1</sub> x<sub>2</sub> a"3 y"2 y"1 IS y'2 y'1 a'3

**SCREEN**

Fluorescence	Green	White	Blue
Phosphorescence:	Green	Yellow-green	Blue
Persistence:	1 - 5ms	10 - 60s	1 - 5ms
E. I. A. phosphor code:	P31	P7	P11
G. E. C. phosphor code:	24	46	08

For aluminised tubes add 50 to G. E. C. phosphor codes

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

**HEATER**

V <sub>h</sub>	6.3	V
I <sub>h</sub>	1.2 (total)	A

**RATINGS (Design Centre)**

	Max	Min (aluminised tubes)	Min (non-aluminised tubes)	
V <sub>a4</sub>	8.0	4.0	3.0	kV
V <sub>a3</sub>	2.0	1.0	0.8	kV
V <sub>a2</sub>	1.5	-	-	kV
V <sub>a1</sub>	2.0	1.0	0.8	kV
*-V <sub>g</sub>	200	0	0	V
v <sub>x1, x2-a3 (pk)</sub>	500	-	-	V
v <sub>y1, y2-a3 (pk)</sub>	200	-	-	V
V <sub>h-k</sub>	180	-	-	V
R <sub>x-a3</sub>	5	-	-	MΩ
R <sub>y-a3</sub>	0.25	-	-	MΩ
R <sub>g-k</sub>	1.5	-	-	MΩ
V <sub>isolation shield</sub>	2.0	1.0	0.8	kV
V <sub>beam blanking</sub>	2.0	1.0	0.8	kV
V <sub>trace registration</sub>	2.0	1.0	0.8	kV

Post accelerator ratio (V<sub>a4</sub>/V<sub>a3</sub>) = 4:1 max

\*The d.c. value of the modulator voltage must never become positive with respect to cathode.

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## CAPACITANCES

ck-all:	5pF	cx2-all less x1:	3.7pF
cg-all:	8.3pF	cx1-all less x2:	3.7pF
cx1-x2:	3.7pF	cy1-all less y2:	3.3pF
cy1-y2:	2.0pF	cy2-all less y1:	3.3pF
	cbeam blanking:	12.0pF	

## TYPICAL OPERATION

Va4	4.5	kV
*Va3	1.2	kV
Va2 (for focus)	360	V
Va1	1.2	kV
-Vg (for cut-off)	54	V
Sx	19.5	V/cm
Sy	7.25	V/cm
Line width	0.35	mm
†Visolation shield	1.2	kV

\*It is recommended that individual adjustment of the a<sub>3</sub> potential be provided for astigmatism control.

†The inner end of the helix and the isolation shield are connected together inside the tube. With the correct potentials on these electrodes, barrel and pin cushion effects are minimised.

Superimposition of traces. The vertical traces may be superimposed along the vertical diameter by adjustment of the relative potentials of the trace registration electrode and a<sub>1</sub>.

An adjustment of the position of the y traces at extreme x-deflection may be effected by adjustment of the cathode potentials. A maximum difference of 20V/kVa<sub>3</sub> is required.

Flyback suppression (Re-trace blanking). A potential of 50V/kVa<sub>1</sub> negative with respect to a<sub>1</sub> applied to the beam blanking electrode will completely cut off both beams. This electrode should not be used as a trace brightness control.

## CHARACTERISTICS

Va2 (for focus)	200 to 400	V per kVa <sub>1,3</sub>
-Vg (for cut-off)	30 to 60	V per kVa <sub>1</sub>
*Sx	15.0 to 17.5	V/cm per kVa <sub>3</sub>
*Sy	5.4 to 6.67	V/cm per kVa <sub>3</sub>
†rh-k (min)	1.5	MΩ
rg-k (min)	10	MΩ
Post accelerator helix resistance:	50 to 350	MΩ
Visolation shield	967 to 1017	V per kVa <sub>3</sub>

\*The undeflected spots will lie within two circles of 4mm radius whose centres lie on the y axis ±8mm from the centre of the tube face.

Minimum scan amplitude:

x:	8cm
y (each gun):	6cm
y (overlap):	4cm

The centre of the 8cm x 4cm overlap rectangle will fall within a circle of 3mm radius from the centre of the tube face.

Minimum useful screen diameter: 9.5cm  
 Angle between deflection axes of each gun:  $90^\circ \pm \frac{1}{2}$   
 Angle between deflection axes of the two guns: x:  $\frac{1}{2}^\circ$  max  
 y:  $\frac{1}{2}^\circ$  max

\*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%.

\*Pattern distortion. The edges of a test raster will lie between two concentric rectangles of 70mm x 40mm and 68.6mm x 39mm.

\*At post accelerator ratio  $V_{a4}/V_{a3} = 4$ .

†With heater  $\pm 125V$  to cathode.

The deflector plates are designed for symmetrical operation. The y plates may intercept part of the beam and low impedance deflection should be employed.

#### MAGNETIC SHIELDING

The shield should be of high permeability material, of a thickness determined by the magnetic field at the tube position. The shield should be earthed. Suitable shields are available from Oliver & Randall Co. Ltd., Telcon Metals Ltd., and Magnetic & Electrical Alloys Ltd.

#### MOUNTING

The tube should not be supported by the base alone, but should preferably be held in a suitable rubber mask at the screen and by a clamp round the magnetic shield near the base. Rubber masks are available from the Standard Insulator Co. Ltd.

#### SOCKET

The socket should have sufficient freedom of movement to accommodate the tube overall length and base orientation tolerances.

Suitable sockets are available from Carr Fastener Co. Ltd. (Type 77/842).

For the side contact and side pins, suitable connectors may be obtained from Carr Fastener Co. Ltd. (Type 77/699 and 75/602 respectively).

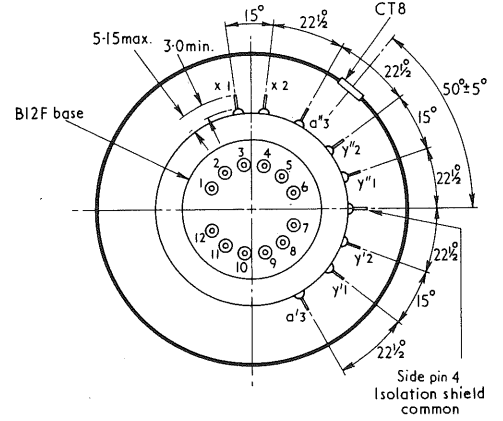
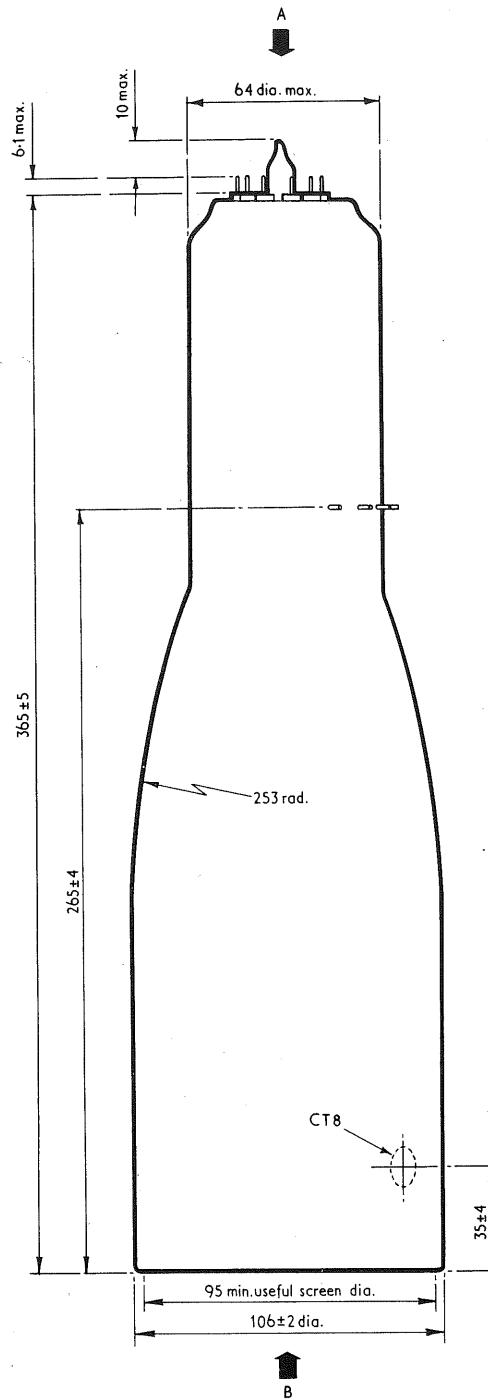
#### ORIENTATION

Looking at the screen with pins 9 and 10 of the base uppermost, a positive potential applied to  $x_1$  will deflect the spot to the left and a positive potential applied to  $y_1$  will deflect the spot upwards.

#### WEIGHT

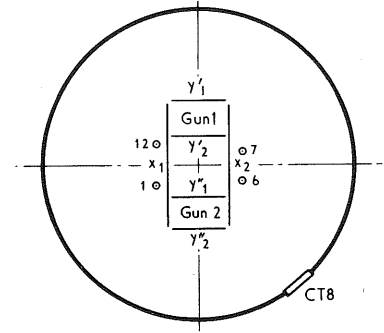
$2\frac{1}{4}$  lb (1 kg approx).

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View in direction of arrow A

Note: each pin can vary by 2½° in any direction.  
The X-trace can vary by ± 5° with respect to the CT8 side contact.



View in direction of arrow B

The position of the CT8 side contact relative to the contour of the bulb conforms to BS448:1953, section 6/18.

All dimensions are in millimetres