

**S.S.C.****Advance Technical Information**

1474-C

**1400C****SERIES****ISSUE 1****8 × 10cm FLAT FACED OSCILLOSCOPE TUBE**

(1400J similar, but with deflection plates to base)  
 ≡ 014-180 *brnaw*

**BRIEF DATA**

A rectangular, flat faced, single gun oscilloscope tube with spiral p.d.a., thin aluminium backed screen and 8 × 10cm display. *Side connections*

|                               |        |      |
|-------------------------------|--------|------|
| Final anode voltage (p.d.a.)  | 4      | kV   |
| Display area                  | 8 × 10 | cm   |
| Y deflection factor ( $D_y$ ) | 8.5    | V/cm |
| X deflection factor ( $D_x$ ) | 15.5   | V/cm |

**HEATER**

|       |     |   |
|-------|-----|---|
| $V_h$ | 6.3 | V |
| $I_h$ | 0.3 | A |

**RATINGS (Absolute)**

|                           | Max. | Min. |    |
|---------------------------|------|------|----|
| $V_{a4}$                  | 7.0  | 3.5  | kV |
| $V_{a3}$                  | 1.7  | 0.6  | kV |
| Ratio ( $V_{a4}/V_{a3}$ ) | 4    | —    | —  |
| $V_{a2}$                  | 1.0  | 0    | kV |
| $V_{a1}$                  | 1.75 | 0.6  | kV |
| — $V_{g1}$                | 200  | 1.0  | V  |
| $V_{g2-a1}$               | ±200 | —    | V  |
| $V_{y-a3}$                | 500  | —    | V  |
| $V_{x-a3}$                | 500  | —    | V  |
| $V_{h-k}$                 | ±150 | —    | V  |
| $R_{g1-k}$                | 1.5  | —    | MΩ |
| $R_{y-a3}$                | 100  | —    | kΩ |
| $R_{x-a3}$                | 500  | —    | kΩ |

Voltage ratings are to cathode unless otherwise shown.

**SCREEN**

|                      |        |
|----------------------|--------|
| Fluorescence         | Green  |
| Phosphorescence      | Green  |
| Persistence          | 1.5 ms |
| E.I.A. phosphor code | P31    |
| G.E.C. phosphor code | 74     |

# 1400C SERIES

## CAPACITANCES (Typical)

|                                          |      |    |
|------------------------------------------|------|----|
| C <sub>k</sub> -all                      | 4.4  | pF |
| C <sub>g1</sub> -all                     | 9.3  | pF |
| C <sub>g2</sub> -all                     | 10.0 | pF |
| C <sub>y1</sub> -y <sub>2</sub>          | 1.2  | pF |
| C <sub>y1</sub> -all less y <sub>2</sub> | 2.7  | pF |
| C <sub>y2</sub> -all less y <sub>1</sub> | 3.0  | pF |
| C <sub>x1</sub> -x <sub>2</sub>          | 2.1  | pF |
| C <sub>x1</sub> -all less x <sub>2</sub> | 4.1  | pF |
| C <sub>x2</sub> -all less x <sub>1</sub> | 4.1  | pF |

## EQUIPMENT DESIGN RANGE

|                                                         | Max. | Min. |                       |
|---------------------------------------------------------|------|------|-----------------------|
| V <sub>a2</sub> (for focus)                             | 400  | 175  | V/kV <sub>a3</sub>    |
| -V <sub>g1</sub> (for cut-off)                          | 65   | 35   | V/kV <sub>a1</sub>    |
| V <sub>g2</sub> (for blanking) (w.r.t. a1)              | 60   | —    | V/kV <sub>a1</sub>    |
| D <sub>y</sub> (at V <sub>a4</sub> /V <sub>a3</sub> =4) | 8.5  | 6.9  | V/cm/kV <sub>a3</sub> |
| D <sub>x</sub> (at V <sub>a4</sub> /V <sub>a3</sub> =4) | 15.5 | 12.7 | V/cm/kV <sub>a3</sub> |
| V <sub>a3</sub> (astigmatism correction)                | +50  | -50  | V/kV <sub>a3</sub>    |
| V <sub>s</sub> (pattern correction)                     | +50  | -50  | V/kV <sub>a3</sub>    |

## TYPICAL OPERATION

|                                |            |      |
|--------------------------------|------------|------|
| V <sub>a4</sub>                | 4          | kV   |
| V <sub>a3</sub>                | 1          | kV   |
| V <sub>a2</sub> (for focus)    | 175 to 400 | V    |
| V <sub>a1</sub>                | 1          | kV   |
| V <sub>g2</sub> (nom)          | 1          | kV   |
| V <sub>s</sub> (nom)           | 1          | kV   |
| -V <sub>g1</sub> (for cut-off) | 35 to 65   | V    |
| D <sub>y</sub> (max)           | 8.5        | V/cm |
| D <sub>x</sub> (max)           | 15.5       | V/cm |
| *Line width (typical)          | 0.7        | mm   |
| .. by shrinking raster         | 0.3 set.   |      |

\*For type 74 (P31) phosphor, measured by means of a microscope at the geometric centre of the faceplate, at a beam current of 5μA.

## Minimum Scanned Area

|   |    |    |
|---|----|----|
| x | 10 | cm |
| y | 8  | cm |

This area will be centred on a point which is within 3mm of the major and minor axes of the tube face.

## Beam Blanking

At a cathode current of 500μA, a potential of +60V/kV<sub>a1</sub> with respect to a1, applied to the blanking electrode g<sub>2</sub>, will completely cut off the beam. This electrode should not be used as a brightness control.

## Astigmatism Correction

Adjustment of the potential on a3 relative to the y plate mean potential may be used for the purpose of astigmatism correction. A range of adjustment of  $\pm 50\text{V/kV}_{a3}$  should be allowed for this purpose.

## Pattern Correction

Barrel or pincushion distortion may be minimised by the application of the appropriate potential to s with respect to the x plate mean potential. A range of adjustment of  $\pm 50\text{V/kV}_{a3}$  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.

## 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 of the tube in the region shown in the outline drawing. The maximum ampere turns required for axis alignment will not exceed  $12\sqrt{\text{kV}_{a4}}$ .

## DISPLAY CHARACTERISTICS

### Pattern Distortion

With pattern correction applied the edges of a test raster will lie between two concentric rectangles of  $100 \times 80\text{mm}$  and  $98 \times 77.5\text{mm}$ .  
The angle between the x and y axes will be  $90^\circ \pm 1^\circ$ .

### 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 spot will fall within a rectangle  $8 \times 10\text{mm}$  centred at the geometric centre of the faceplate, the greater dimension being parallel to the x axis.

## ORIENTATION

When looking at the screen with pins 6 and 7 of the base uppermost, a positive potential applied to x1 will deflect the beam to the left and a positive potential applied to y1 will deflect the beam upwards.

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## 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 overall length and base orientation tolerances.

## BASE CONNECTIONS

Base: B12 F

|        |    |
|--------|----|
| Pin 1: | g1 |
| 2:     | k  |
| 3:     | h  |
| 4:     | h  |
| 5:     | a2 |
| 6:     | a1 |

Side contact (CT8): a4

|        |    |
|--------|----|
| Pin 7: | g2 |
| 8:     | a3 |
| 9:     | IC |
| 10:    | IC |
| 11:    | s  |
| 12:    | IC |

Side pin connections as viewed from the base and reading clockwise from base pin 9:— y1, y2, x1, x2

## WEIGHT

The weight of the tube alone is approximately 1.0kgm.

## ACCESSORIES

| Part            | Manufacturer           | Type No. |
|-----------------|------------------------|----------|
| Base socket     | Carr Fastener Co. Ltd. | 77/842   |
| CT8 connector   | Carr Fastener Co. Ltd. | 77/699   |
| Magnetic shield | Magnetic Shields Ltd.  |          |

## WARNING

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

## CT8:a4

The boundary of permissible pin position zone aligns to the major axis of faceplate within  $\pm 5^\circ$ .

**92°max**

6.7 max

**B12F  
to BS 448**

-60 dia max

### Recommended position for axis alignment coil

External  
conductive  
coating

**CT8  
to BS448**

44.5 ± 2 d

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### Dimensio

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**Dimensions in mm**

## OUTLINE DRAWING

Cross section of faceplate  
on a plane 5.0mm back from  
the front surface