

**31B82**

CATHODE RAY TUBE—ALL ELECTROSTATIC 5" DIA.

Helical Post Deflection Acceleration

For High Performance Oscillography

**GENERAL**

The 31B82 is a precision Cathode Ray Tube designed for high performance oscillography. It has high deflection sensitivity and a helical post-deflection accelerator which allows the application of high p.d.a. ratios. The screen is aluminised and the deflector plates are brought out to side arms.

**RATING**

|                                                   |                  |        |
|---------------------------------------------------|------------------|--------|
| Heater Voltage                                    | $V_h$            | 6.3 V  |
| Heater Current                                    | $I_h$            | 0.6 A  |
| Maximum Final Anode Voltage                       | $V_{a4(max)}$    | 12 kV  |
| Maximum Second Anode Voltage                      | $V_{a2(max)}$    | 800 V  |
| Maximum First and Third Anode Voltage             | $V_{a1,a3(max)}$ | 2 kV   |
| Maximum Negative Grid Voltage                     | $V_g(max)$       | -200 V |
| Maximum Positive Grid Voltage                     | $V_g(max)$       | 0* V   |
| Maximum Third Anode Peak Voltage to X or Y plates | $V_{a3(pk)max}$  | 500 V  |
| Maximum Heater/Cathode Voltage                    | $V_{h-k(max)}$   | 180 V  |
| Maximum Isolating Shield Voltage                  | $V_{is(max)}$    | 2.1kV  |
| Maximum Deflector Plate Shield Voltage            | $V_{def(max)}$   | 2.1kV  |

\* The grid must not become positive with respect to cathode.

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**INTER-ELECTRODE CAPACITANCES (pF)†**

|                                          |              |     |
|------------------------------------------|--------------|-----|
| Cathode/All other electrodes             | $c_{k-all}$  | 4.6 |
| Grid/All other electrodes                | $c_{g-all}$  | 6.4 |
| X1 Deflecting Plate/X2 Deflecting Plate  | $c_{x1-x2}$  | 1.9 |
| Y1 Deflecting Plate/Y2 Deflecting Plate  | $c_{y1-y2}$  | 1.5 |
| X1 Deflecting Plate/All other electrodes | $c_{x1-all}$ | 3.5 |
| X2 Deflecting Plate/All other electrodes | $c_{x2-all}$ | 3.5 |
| Y1 Deflecting Plate/All other electrodes | $c_{y1-all}$ | 2.8 |
| Y2 Deflecting Plate/All other electrodes | $c_{y2-all}$ | 2.8 |

† With holder balanced out.

**POST DEFLECTION ACCELERATOR—Helical**

Resistance  $R_{pda}$  200–600  $M\Omega$

**ORIENTATION**

Looking at the screen with the p.d.a. contact to the left, a positive potential applied to X1 will deflect the spot to the left and a positive potential applied to Y1 will deflect the spot upward.

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**DIMENSIONS**

|                         |          |
|-------------------------|----------|
| Maximum Overall Length  | 469 mm   |
| Maximum Screen Diameter | 135.4 mm |
| Maximum Neck Diameter   | 52.55mm  |

**MOUNTING**

The tube should not be supported by the base alone, but should preferably be held in a rubber-lined clamping ring at the screen end together with a similar clamp round the magnetic screen close to the base.  
The socket should have sufficient freedom of movement to accommodate the tube overall length tolerance and a small amount of lateral float to ensure good pin contact without straining the base.

**SCREEN PHOSPHORS**

| Type | Colour           | Persistence  | Application             |
|------|------------------|--------------|-------------------------|
| T1   | Green            | Medium       | Visual                  |
| T3   | Blue Actinic     | Short        | Photographic            |
| T4   | White            | Medium Short | Visual/<br>Photographic |
| T6   | Yellow Afterglow | Long         | Visual                  |
| T7   | Orange Afterglow | Very Long    | Visual                  |
| T8   | Yellow Afterglow | Medium Long  | Visual                  |

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**TYPICAL OPERATION**

|                                |             |                |
|--------------------------------|-------------|----------------|
| Final Anode Voltage            | $V_{a4}$    | 10 kV          |
| Second Anode Voltage           | $V_{a2}$    | 180 to 590 V   |
| First and Third Anode Voltage  | $V_{a1,a3}$ | 1.67kV         |
| Grid Bias Voltage for cut-off  | $V_g$       | -50 to -80 V   |
| Isolation Shield Voltage       | $V_{is}$    | 1.57 to 1.7*kV |
| Deflector Plate Shield Voltage | $V_{def}$   | 1.57 to 1.7†kV |

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

† Adjustment of the deflection plate shield potential controls the linearity of the Y deflection by variation of the edge effect of the Y deflection plates.

For many purposes the deflection plate shield (pin 12) may be connected externally to the isolation shield.

**DEFLECTION CHARACTERISTICS—Under above conditions**

|                         |       |                            |
|-------------------------|-------|----------------------------|
| Sensitivity of X Plates | $S_x$ | $\frac{560}{V_{a3}}$ mm/V  |
| Sensitivity of Y Plates | $S_y$ | $\frac{2800}{V_{a3}}$ mm/V |
| Useful X Plate Scan     |       | 10 cm                      |
| Useful Y Plate Scan     |       | 4 cm                       |

The undeflected spot will fall within a circle of 5 mm radius from the centre of the tube face.

Orthogonality of deflection axes :  $\pm 1\%$

The edges of a raster the size of the useful scan will not deviate from the mean rectangle by more than 1.5%.

## 31B82

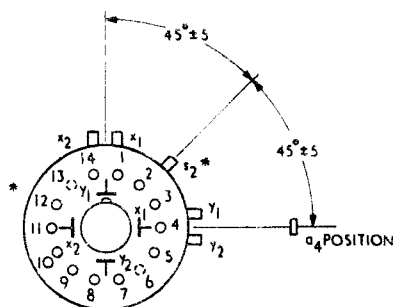
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SIDE CONTACT—CT8

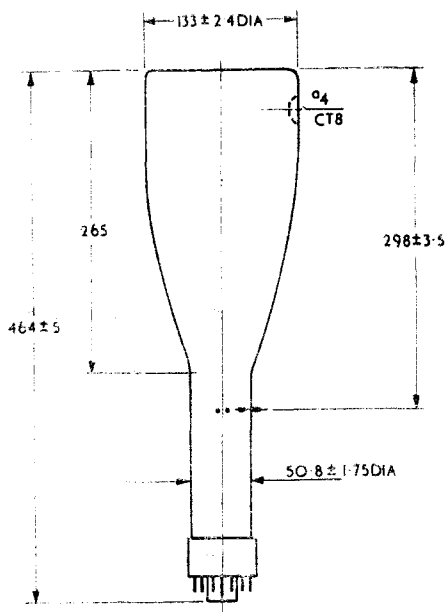
BASE—B14A (Diheptal)



Viewed from free end of pins.

## CONNECTIONS

|         |                        |        |
|---------|------------------------|--------|
| Pin 1   | Heater                 | h      |
| Pin 2   | Cathode                | k      |
| Pin 3   | Grid                   | g      |
| Pin 4   | No Connection          | NC     |
| Pin 5   | Second Anode           | a2     |
| Pin 6   | No Pin                 | NP     |
| Pin 7   | No Connection          | NC     |
| Pin 8   | No Connection          | NC     |
| Pin 9   | First and Third Anode  | a1, a3 |
| Pin 10  | No Connection          | NC     |
| Pin 11  | No Connection          | NC     |
| Pin 12* | Deflector Plate Shield | S1     |
| Pin 13  | No Pin                 | NP     |
| Pin 14  | Heater                 | h      |
| Cap     | Final Anode            | a4     |
| *       | Isolation Shield       | S2     |

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