

## INSTRUMENT CATHODE-RAY TUBE

14 cm diagonal, rectangular flat faced oscilloscope tube with mesh and metal backed screen.

| QUICK REFERENCE DATA               |             |          |                 |
|------------------------------------|-------------|----------|-----------------|
| Final accelerator voltage          | $V_{g7(l)}$ | 10       | kV              |
| Display area                       |             | 100 x 80 | mm <sup>2</sup> |
| Deflection coefficient, horizontal | $M_x$       | 15,5     | V/cm            |
| vertical                           | $M_y$       | 4,2      | V/cm            |

**SCREEN:** Metal backed phosphor

|           | Colour | Persistence  |
|-----------|--------|--------------|
| D14-120GH | green  | medium short |

|                                                          |   |          |                 |
|----------------------------------------------------------|---|----------|-----------------|
| Useful screen area                                       | > | 100 x 80 | mm <sup>2</sup> |
| Useful scan at $V_{g7(l)}/V_{g2, g4} = 6,7$ , horizontal | > | 100      | mm              |
| vertical                                                 | > | 80       | mm              |
| Spot eccentricity in horizontal and vertical directions  | < | 6        | mm              |

**HEATING :** Indirect by AC or DC: parallel supply

|                |       |     |    |
|----------------|-------|-----|----|
| Heater voltage | $V_f$ | 6,3 | V  |
| Heater current | $I_f$ | 300 | mA |

**MECHANICAL DATA**Dimensions and connections

See also outline drawing

|                                  |   |             |    |
|----------------------------------|---|-------------|----|
| Overall length (socket included) | < | 385         | mm |
| Face dimensions                  | < | 100 x 120   | mm |
| <u>Net mass</u>                  |   | approx. 900 | g  |

Base 14-pin all-glass

Dimensions in mm

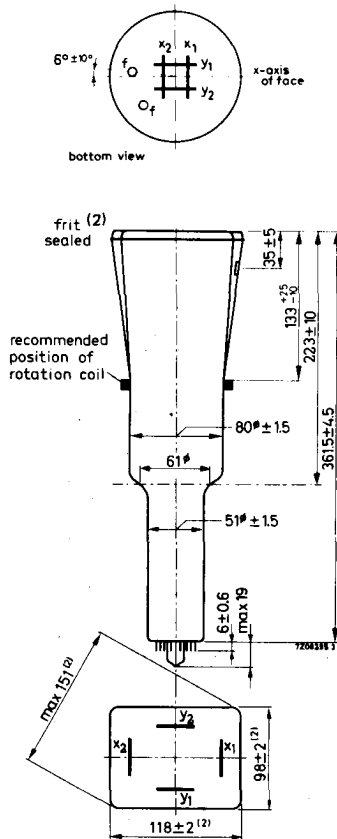


Fig. 1 Outlines.

- (1) The centre of the contact is located within a square of 10 mm x 10 mm around the true geometrical position.
- (2) The bulge at the frit seal may increase the indicated maximum dimensions by not more than 2 mm.

#### Mounting position any

The tube should not be supported by the base alone; under no circumstances should the socket be allowed to support the tube.

#### Accessories

Socket (supplied with tube)

type 55566

Final accelerator contact connector

type 55563A

Mu-metal shield

type 55581

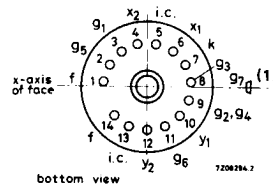


Fig. 2 Pin arrangement.

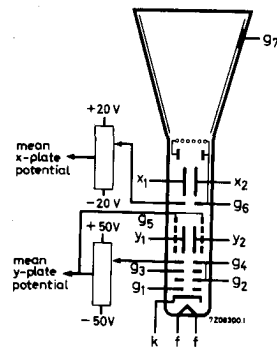


Fig. 3 Electrode configuration.

|                   |                      |
|-------------------|----------------------|
| <b>FOCUSING</b>   | electrostatic        |
| <b>DEFLECTION</b> | double electrostatic |
| x plates          | symmetrical          |
| y plates          | symmetrical          |

If use is made of the full deflection capabilities of the tube the deflection plates will intercept part of the electron beam; hence a low impedance deflection plate drive is desirable.

Angle between x and y traces  $90^\circ \pm 1^\circ$

Angle between x trace and the horizontal axis of the face  $< 5^\circ$  see note 6

#### LINE WIDTH

Measured with the shrinking raster method under typical operating conditions, adjusted for optimum spot size at a beam current  $I_b = 10 \mu A$ .

|                                        |             |      |    |
|----------------------------------------|-------------|------|----|
| Line width at the centre of the screen | l. w.       | 0,40 | mm |
| over the whole screen area             | l. w. av. < | 0,45 | mm |

#### CAPACITANCES

|                                          |              |     |    |
|------------------------------------------|--------------|-----|----|
| $x_1$ to all other elements except $x_2$ | $C_{x1(x2)}$ | 6,5 | pF |
| $x_2$ to all other elements except $x_1$ | $C_{x2(x1)}$ | 6,5 | pF |
| $y_1$ to all other elements except $y_2$ | $C_{y1(y2)}$ | 5,0 | pF |
| $y_2$ to all other elements except $y_1$ | $C_{y2(y1)}$ | 5,0 | pF |
| $x_1$ to $x_2$                           | $C_{x1x2}$   | 2,2 | pF |
| $y_1$ to $y_2$                           | $C_{y1y2}$   | 1,7 | pF |
| Control grid to all other elements       | $C_{g1}$     | 5,5 | pF |
| Cathode to all other elements            | $C_k$        | 4,5 | pF |

## TYPICAL OPERATING CONDITIONS

|                                                       |                     |            |              |
|-------------------------------------------------------|---------------------|------------|--------------|
| Final accelerator voltage                             | $V_{g7(\ell)}$      | 10         | kV           |
| Interplate shield voltage                             | $V_{g6}$            | 1500       | V            |
| Geomrty control voltage                               | $\Delta V_{g6}$     | $\pm 15$   | V see note 1 |
| Deflection plate shield voltage                       | $V_{g5}$            | 1500       | V see note 2 |
| Focusing electrode voltage                            | $V_{g3}$            | 250 to 350 | V            |
| First accelerator voltage                             | $V_{g2, g4}$        | 1500       | V            |
| Astigmatism control voltage                           | $\Delta V_{g2, g4}$ | $\pm 50$   | V see note 3 |
| Control voltage for visual extinction of focused spot | $V_{g1}$            | -20 to -60 | V            |
| Grid drive for 10 $\mu$ A screen current              |                     | approx. 12 | V            |
| Deflection coefficient, horizontal                    | $M_x$               | 15, 5      | V/cm         |
|                                                       |                     | < 16       | V/cm         |
| vertical                                              | $M_y$               | 4, 2       | V/cm         |
|                                                       |                     | < 4, 6     | V/cm         |
| Deviation of linearity of deflection                  |                     | < 2        | % see note 4 |
| Geometry distortion                                   |                     | See note 5 |              |
| Useful scan, horizontal                               |                     | > 100      | mm           |
| vertical                                              |                     | > 80       | mm           |

## LIMITING VALUES (Absolute max. rating system)

|                                                                        |                       |                        |                    |
|------------------------------------------------------------------------|-----------------------|------------------------|--------------------|
| Final accelerator voltage                                              | $V_{g7(\ell)}$        | max. 11<br>min. 9      | kV<br>kV           |
| Interplate shield voltage and geometry control electrode voltage       | $V_{g6}$              | max. 2200              | V                  |
| Deflection plate shield voltage                                        | $V_{g5}$              | max. 2200              | V                  |
| Focusing electrode voltage                                             | $V_{g3}$              | max. 2200              | V                  |
| First accelerator and astigmatism control electrode voltage            | $V_{g2, g4}$          | max. 2200<br>min. 1350 | V<br>V             |
| Control grid voltage                                                   | $-V_{g1}$             | max. 200<br>min. 0     | V<br>V             |
| Cathode to heater voltage                                              | $V_{kf}$              | max. 125               | V                  |
|                                                                        | $-V_{kf}$             | max. 125               | V                  |
| Voltage between astigmatism control electrode and any deflection plate | $V_{g4/x}$            | max. 500               | V                  |
|                                                                        | $V_{g4/y}$            | max. 500               | V                  |
| Grid drive, average                                                    |                       | max. 20                | V                  |
| Screen dissipation                                                     | $W_\ell$              | max. 8                 | mW/cm <sup>2</sup> |
| Ratio $V_{g7(\ell)}/V_{g2, g4}$                                        | $V_{g7(\ell)}/V_{g4}$ | max. 6, 7              |                    |
| Control grid circuit resistance                                        | $R_{g1}$              | max. 1                 | M $\Omega$         |

## Notes

1. This tube is designed for optimum performance when operating at a ratio  $V_{g7(\phi)}/V_{g2, g4} = 6,7$ . The geometry electrode voltage should be adjusted within the indicated range (values with respect to the mean x-plate potential). A negative control voltage will cause some pincushion distortion and less background light, a positive control voltage will give some barrel distortion and a slight increase of background light.
2. The deflection plate shield voltage should be equal to the mean y-plate potential. The mean x-plate and y-plate potentials should be equal for optimum spot quality.
3. The astigmatism control electrode voltage should be adjusted for optimum spot shape. For any necessary adjustment its potential will be within the stated range.
4. The sensitivity at a deflection of less than 75% of the useful scan will not differ from the sensitivity at a deflection of 25% of the useful scan by more than the indicated value.
5. A graticule, consisting of concentric rectangles of 95 mm x 75 mm and 93 mm x 73,6 mm is aligned with the electrical x-axis of the tube. With optimum correction potentials applied a raster will fall between these rectangles.
6. To align the x trace with the horizontal axis of the screen, the whole picture can be rotated by means of a rotation coil. This coil will have 50 ampere turns for the indicated maximum rotation of  $5^\circ$  and should be positioned as indicated in the drawing.