

OSCILLOSCOPE TUBE with flat face, post deflection acceleration by means of a helical electrode and all glass base

### SCREEN

| Type     | Fluorescence    | Phosphorescence | Persistence  |
|----------|-----------------|-----------------|--------------|
| D10-12BE | Blue            | Blue            | Medium short |
| D10-12GH | Green           | Green           | Medium short |
| D10-12GL | Yellowish green | Yellowish green | Medium short |
| D10-12GM | Purplish blue   | Yellowish green | Long         |

Useful screen diameter 90 mm

Useful scan at  $V_{g6}/V_{g4} = 4$

in the x direction full scan

in the y direction 60 mm

The useful scan may vertically be shifted max. 4 mm with respect to the geometric centre of the face plate

For further screen properties please refer to front of this section

### HEATING

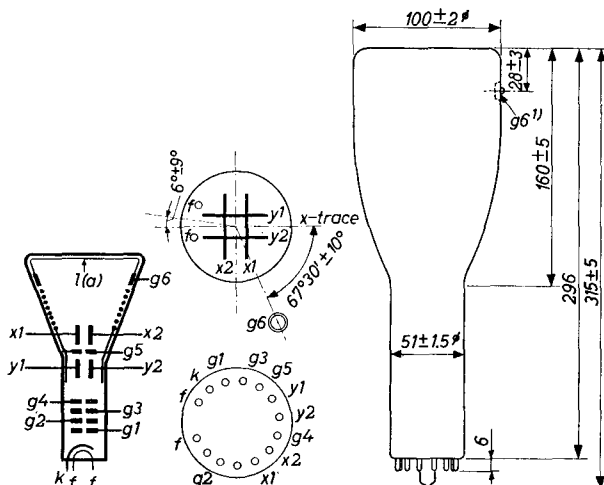
Indirect by A.C. or D.C.; parallel supply

Heater voltage  $V_f = 6.3 \text{ V}$

Heater current  $I_f = 0.3 \text{ A}$

### CAPACITANCES

|                                                           |             |   |        |
|-----------------------------------------------------------|-------------|---|--------|
| Grid No.1 to all other electrodes                         | $C_{g1}$    | = | 4.0 pF |
| Cathode to all other electrodes                           | $C_k$       | = | 3.0 pF |
| $x_1$ plate to all other electrodes<br>except $x_2$ plate | $C_{x1}$    | = | 4.0 pF |
| $x_2$ plate to all other electrodes<br>except $x_1$ plate | $C_{x2}$    | = | 4.0 pF |
| $y_1$ plate to all other electrodes<br>except $y_2$ plate | $C_{y1}$    | = | 3.0 pF |
| $y_2$ plate to all other electrodes<br>except $y_1$ plate | $C_{y2}$    | = | 3.0 pF |
| $x_1$ plate to $x_2$ plate                                | $C_{x1-x2}$ | = | 2.0 pF |
| $y_1$ plate to $y_2$ plate                                | $C_{y1-y2}$ | = | 1.7 pF |



Dimensions in mm

Base: 14 p. all glass

$g_5$  = isolation shield

The post accelerator helix is connected between  $g_6$  and  $g_5$   
The resistance of the helix is min. 50 MΩ

**MOUNTING POSITION:** any

The tube should not be supported by the base alone

#### ACCESSORIES

Socket 55566

Mu-metal shield 55541

**NET WEIGHT** 660 g

<sup>1</sup>) Recessed small ball cap

|                                                         |                      |
|---------------------------------------------------------|----------------------|
| <u>FOCUSING</u>                                         | electrostatic        |
| <u>DEFLECTION</u>                                       | double electrostatic |
| x plates                                                | symmetrical          |
| y plates                                                | symmetrical          |
| Angle between x and y traces $90^{\circ} \pm 1^{\circ}$ |                      |

## LINE WIDTH

|                          |                           |
|--------------------------|---------------------------|
| Post accelerator voltage | $V_{g6} = 4000 \text{ V}$ |
| Grid No.4 voltage        | $V_{g4} = 1000 \text{ V}$ |
| Grid No.2 voltage        | $V_{g2} = 1000 \text{ V}$ |
| Beam current             | $I_b = 10 \mu\text{A}$    |
| Line width               | $l.w. = 0.35 \text{ mm}$  |

## OPERATING CHARACTERISTICS

|                                      |                                               |
|--------------------------------------|-----------------------------------------------|
| Post accelerator voltage             | $V_{g6} = 4000 \text{ V}$                     |
| Isolation shield voltage             | $V_{g5} = 1000 \pm 100 \text{ V } ^1)$        |
| Second accelerator voltage           | $V_{g4} = 1000 \pm 50 \text{ V } ^1)$         |
| Focusing electrode voltage           | $V_{g3} = 20 \text{ to } 200 \text{ V}$       |
| First accelerator voltage            | $V_{g2} = 1000 \text{ V}$                     |
| Grid No.1 voltage                    | $V_{g1} = -25 \text{ to } -67 \text{ V } ^2)$ |
| Deflection factor                    |                                               |
| horizontal                           | $M_x = \text{max. } 31 \text{ V/cm}$          |
| vertical                             | $M_y = \text{max. } 11.2 \text{ V/cm}$        |
| Deviation of linearity of deflection | $= \text{max. } 2 \% ^1)^3)$                  |
| Pattern distortion                   | $= \text{max. } 2 \% ^1)^4)$                  |
| Undelected spot position             | $R = 5 \text{ mm } ^5)$                       |

<sup>1)2)3)4)5)</sup> See page 4

- <sup>1</sup>) In general the voltages on  $g_5, g_4$  and the average potential of the deflection plates should be equal

Variation of the isolation shield voltage (max. 10% of  $V_{g_4}$ ) serves to correct pincushion and barrel pattern distortion

A small potential difference (max.  $\pm 5\%$  of  $V_{g_4}$ , obtained by varying  $V_{g_4}$ ) between the y plates and  $g_4$  may be desirable for obtaining optimum sharpness

- <sup>2</sup>) For visual extinction of the focused spot
- <sup>3</sup>) The sensitivity (of both x and y plate pairs separately) for a deflection of less than 75% of the useful scan will not differ more than 2% from the sensitivity for a deflection of 25% of the useful scan
- <sup>4</sup>) With a vertical or horizontal line which is adjusted so that the centre of the line touches the sides of a square of 51 mm, no points of the centre of the line will be within a concentric square of 49 mm
- <sup>5</sup>) With the tube shielded the spot will be within a circle of 5 mm radius, the circle being centered with respect to the tube face
- <sup>6</sup>) If use is made of the full deflection capabilities of the tube, the deflection plates will intercept part of the electron beam near the edge of the scan; a low impedance deflection plate drive is therefore desirable
- <sup>7</sup>) Values to be taken into account for the calculation of the  $V_{g_5}$ -potentiometer

## LIMITING VALUES (Absolute limits)

|                                                                          |                              |                                |
|--------------------------------------------------------------------------|------------------------------|--------------------------------|
| Post accelerator voltage                                                 | $V_{g6}$                     | = max. 5000 V<br>= min. 1500 V |
| Isolation shield voltage                                                 | $V_{g5}$                     | = max. 2200 V                  |
| Second accelerator voltage                                               | $V_{g4}$                     | = max. 2200 V<br>= min. 1000 V |
| Focusing electrode voltage                                               | $V_{g3}$                     | = max. 1500 V                  |
| First accelerator voltage                                                | $V_{g2}$                     | = max. 2200 V<br>= min. 1000 V |
| Grid No.1 voltage                                                        |                              |                                |
| negative                                                                 | $-V_{g1}$                    | = max. 200 V                   |
| positive                                                                 | $+V_{g1}$                    | = max. 0 V                     |
| peak positive                                                            | $+V_{g1p}$                   | = max. 2 V                     |
| Ratio $V_{g6}/V_{g4}$                                                    | $V_{g6}/V_{g4}$              | = max. 4                       |
| Peak voltage between second<br>accelerator and any deflec-<br>tion plate | $V_{g4-x} p$<br>$V_{g4-y} p$ | = max. 500 V<br>= max. 500 V   |
| Voltage between cathode and<br>heater                                    |                              |                                |
| cathode positive                                                         | $V_{kf}(k \text{ pos})$      | = max. 200 V                   |
| cathode negative                                                         | $V_{kf}(k \text{ neg})$      | = max. 125 V                   |
| Accelerator grids                                                        |                              |                                |
| dissipation                                                              | $W_{g2, g4}$                 | = max. 6 W                     |
| Screen dissipation                                                       | $W_{\ell}$                   | = max. 3 mW/cm <sup>2</sup>    |

## CIRCUIT DESIGN VALUES

|                                               |                                                    |                        |
|-----------------------------------------------|----------------------------------------------------|------------------------|
| Focusing voltage                              | $V_{g3} = 50 \text{ to } 200 \text{ V}$            | per kV of $V_{g2, g4}$ |
| Grid No.1 voltage <sup>2)</sup>               | $-V_{g1} = 25 \text{ to } 67 \text{ V}$            | per kV of $V_{g2}$     |
| Deflection factors at $V_{g6}/V_{g2, g4} = 4$ |                                                    |                        |
| horizontal                                    | $M_x = \text{max. } 31 \text{ V/cm}$               | per kV of $V_{g4}$     |
| vertical                                      | $M_y = \text{max. } 11.2 \text{ V/cm}$             | per kV of $V_{g4}$     |
| Grid No.1 circuit<br>resistance               | $R_{g1} = \text{max. } 1.5 \text{ M}\Omega$        |                        |
| Deflection plate<br>resistance                | $R_x = R_y = 6)$                                   |                        |
| Grid No.3 current                             | $I_{g3} = -30 \text{ to } +10 \text{ }\mu\text{A}$ | <sup>7)</sup>          |

<sup>2) 6) 7)</sup> See page 4



| D10-12BE | D10-12GH | D10-12GL | D10-12GM   |
|----------|----------|----------|------------|
| page     | sheet    |          | date       |
| 1        | 1        |          | 1963.02.02 |
| 2        | 2        |          | 1963.02.02 |
| 3        | 3        |          | 1963.02.02 |
| 4        | 4        |          | 1963.02.02 |
| 5        | 5        |          | 1963.02.02 |
| 6        | FP       |          | 2000.01.21 |