

## INSTRUMENT CATHODE-RAY TUBE

14 cm diagonal rectangular flat-faced oscilloscope tube with domed post-deflection acceleration mesh and metal-backed screen, primarily intended for use in compact oscilloscopes with 25 to 50 MHz bandwidth.

### QUICK REFERENCE DATA

Final accelerator voltage	$V_{g8(\ell)}$	10 kV
Display area		100 x 80 mm <sup>2</sup>
Deflection coefficient		
horizontal	$M_x$	12,8 V/cm
vertical	$M_y$	6,3 V/cm

### SCREEN

Metal-backed phosphor

	colour	persistence
D 14-290GH	green	médium short

Useful screen dimensions	≥	100 x 80 mm <sup>2</sup>
Useful scan		
horizontal	≥	100 mm
vertical	≥	80 mm
Spot eccentricity in horizontal and vertical directions	≤	6,5 mm

### HEATING

Indirect by a.c. or d.c.; parallel supply

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

### MECHANICAL DATA

Mounting position: any

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

Net mass	approx. 1000 g
Base	14 pin, all glass
Final accelerator contact	small ball (JEDEC J1-25)



**Dimensions and connections**

See also outline drawing

Overall length	≤	343 mm
Face dimensions	≤	100 x 120 mm <sup>2</sup> (note 1)

**Accessories**

Socket, supplied with tube	type 55566
Mu-metal shield	type 55592
Final accelerator contact connector	type 55569

**FOCUSING**

electrostatic

**DEFLECTION**

double electrostatic

x-plates	symmetrical
y-plates	symmetrical

Angle between x and y-traces  $90 \pm 1^\circ$ Angle between x-trace and horizontal axis of the face  $\leq 5^\circ$  \*

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

**CAPACITANCES**

x <sub>1</sub> to all other elements except x <sub>2</sub>	C <sub>x1(x2)</sub>	7 pF
x <sub>2</sub> to all other elements except x <sub>1</sub>	C <sub>x2(x1)</sub>	7 pF
y <sub>1</sub> to all other elements except y <sub>2</sub>	C <sub>y1(y2)</sub>	4 pF
y <sub>2</sub> to all other elements except y <sub>1</sub>	C <sub>y2(y1)</sub>	4 pF
x <sub>1</sub> to x <sub>2</sub>	C <sub>x1x2</sub>	2,2 pF
y <sub>1</sub> to y <sub>2</sub>	C <sub>y1y2</sub>	1,3 pF
Control grid to all other elements	C <sub>g1</sub>	6 pF
Cathode to all other elements	C <sub>k</sub>	4,5 pF

\* The tube is provided with a rotation coil, concentrically wound around the tube neck, enabling the alignment of the x-trace with the mechanical x-axis of the screen. The coil has 1000 turns and a resistance of max. 350 Ω. Under typical operating conditions, max. 35 ampere-turns are required for the max. rotation of 5°. This means the required current is max. 35 mA at a required voltage of max. 12 V.

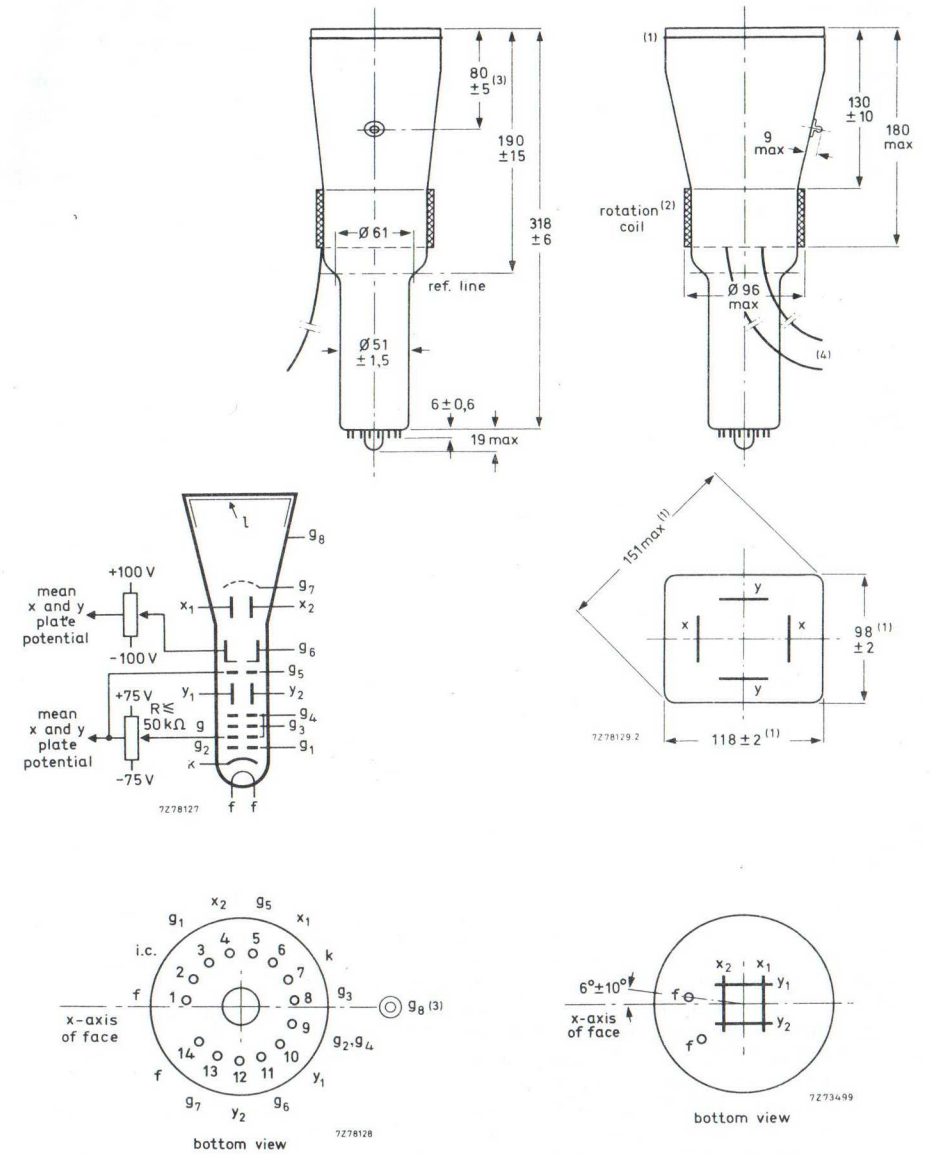
**Notes to the drawings on opposite page.**

1. The bulge at the frit seal may increase the indicated maximum dimensions by not more than 2 mm.
2. The coil is fixed to the envelope by means of adhesive tape.
3. The centre of the contact is situated within a square of 10 mm x 10 mm around the true geometrical position.
4. The length of the connecting leads of the rotation coil is min. 350 mm.



**DIMENSIONS AND CONNECTIONS**

For notes to the drawings see bottom of opposite page.



## TYPICAL OPERATION

## Conditions

Final accelerator voltage	$V_{g8(\ell)}$	10 kV	
Post deflection accelerator mesh electrode voltage	$V_{g7}$	2000 V	
Geometry control electrode voltage	$V_{g6}$	$2000 \pm 100$ V	(note 1)
Interplate shield voltage	$V_{g5}$	2000 V	(note 2)
First accelerator voltage	$V_{g2, g4}$	2000 V	
Astigmatism control electrode voltage	$\Delta V_{g2, g4}$	$\pm 75$ V	(note 3)
Focusing electrode voltage	$V_{g3}$	400 to 560 V	
Control grid voltage for visual extinction of focused spot	$V_{g1}$	-25 to -70 V	

## Performance

Useful scan			
horizontal	$\geq$	100 mm	(note 4)
vertical	$\geq$	80 mm	
Deflection coefficient			
horizontal	$M_x$	$12,8$ V/cm	
		$14$ V/cm	
vertical	$M_y$	$6,3$ V/cm	
		$7$ V/cm	
Line width	l.w.	$\approx 0,38$ mm	(note 5)
Deviation of linearity of deflection		$\leq 2$ %	(note 6)
Grid drive for $10 \mu A$ screen current		$\approx 20$ V	
Geometry distortion		see note 7	

## LIMITING VALUES (Absolute maximum rating system)

Final accelerator voltage	$V_{g8(\ell)}$	max. 12 kV	min. 9 kV
Post deflection accelerator mesh electrode voltage	$V_{g7}$	max. 2200 V	
Geometry control electrode voltage	$V_{g6}$	max. 2200 V	
Interplate shield voltage	$V_{g5}$	max. 2200 V	
Accelerator voltage	$V_{g2, g4}$	max. 2200 V	min. 1800 V
Focusing electrode voltage	$V_{g3}$	max. 2200 V	
Control grid voltage	$-V_{g1}$	max. 200 V	min. 0 V
Cathode to heater voltage			
positive	$V_{kf}$	max. 125 V	
negative	$-V_{kf}$	max. 125 V	
Grid drive, average		max. 20 V	
Screen dissipation	$W_{\ell}$	max. 8 mW/cm <sup>2</sup>	
Voltage between astigmatism control electrode and any deflection plate	$V_{g4/x}$	max. 500 V	
	$V_{g4/y}$	max. 500 V	

## NOTES

- The geometry control electrode voltage  $V_{g6}$  should be adjusted within the indicated range (values with respect to the mean x-plate potential).
- The interplate shield voltage should be equal to the mean x-plate potential. The mean x-plate and y-plate potentials should be equal for optimum spot quality.
- The astigmatism control electrode voltage should be adjusted for optimum spot shape. For any necessary adjustment its potential will be within the stated range.
- The tube is designed for optimum performance when operating at a ratio  $V_{g8(\ell)}/V_{g2, g4} = 5$ . If this ratio is smaller than 5, the useful scan may be smaller than 100 mm x 80 mm.
- Measured with the shrinking raster method in the centre of the screen with corrections adjusted for optimum spot size, at a beam current of  $10 \mu A$ .
- 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.
- A graticule consisting of concentric rectangles of 95 mm x 75 mm and 93 mm x 73 mm is aligned with the electrical x-axis of the tube. With optimum corrections applied, the edges of a raster will fall between these rectangles.

