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. This tube features a 1,5 W cathode with short warm-up time (quick-heating cathode).

QUICK REFERENCE DATA

Final accelerator voltage	$V_{g8(\ell)}$	10 kV
Display area		100 x 80 mm²
Deflection coefficient		
horizontal	M_x	12,8 V/cm
vertical	M_y	6,3 V/cm

OPTICAL DATA

Screen		metal-backed phosphor
type		GH, colour green
persistence		medium short
Useful screen dimensions	⩾	100 x 80 mm²
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	240 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)

blue binder, tab 4

Dimensions and connections

See also outline drawing

Overall length	⩽	343 mm
Face dimensions	⩽	100 x 120 mm^2 (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	⩽	5° *

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_1 to all other elements except x_2	$C_{x1(x2)}$	7 pF
x_2 to all other elements except x_1	$C_{x2(x1)}$	7 pF
y_1 to all other elements except y_2	$C_{y1(y2)}$	4 pF
y_2 to all other elements except y_1	$C_{y2(y1)}$	4 pF
x_1 to x_2	C_{x1x2}	2,2 pF
y_1 to y_2	C_{y1y2}	1,3 pF
Control grid to all other elements	C_{g1}	6 pF
Cathode to all other elements	C_k	2,7 pF

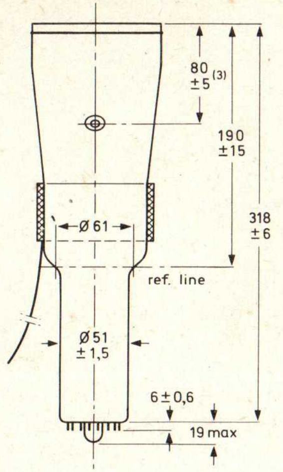
* The tube is provided with a rotation coil, concentrically wound around the tube neck, enabling the alignment of the x-trace with the mechanical x-axis of the screen. The coil has 1000 turns and a resistance of max. 350 Ω. Under typical operating conditions, max. 35 ampere-turns are required for the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

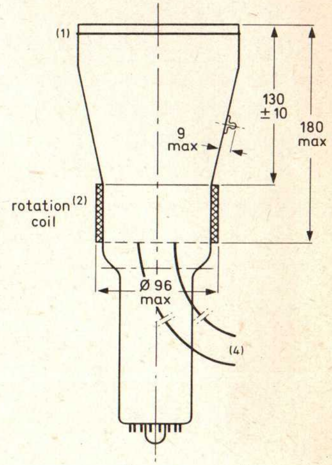
Notes to the drawings on opposite page.

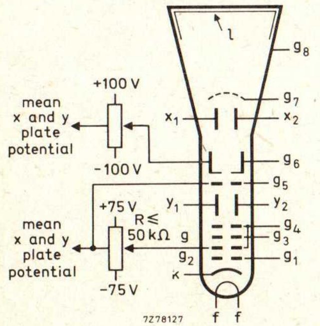
1. The bulge at the frit seal may increase the indicated maximum dimensions by not more than 2 mm.
2. The coil is fixed to the envelope by means of adhesive tape.
3. The centre of the contact is situated within a square of 10 mm x 10 mm around the true geometrical position.
4. The length of the connecting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

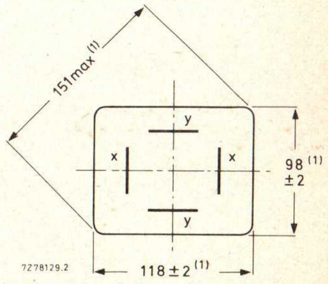
DIMENSIONS AND CONNECTIONS

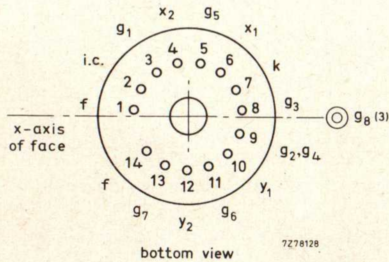
For notes to the drawings see bottom of opposite page.

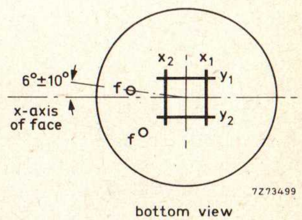












TYPICAL OPERATION

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 ± 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	$\Delta V_{g2, g4}$	± 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		⩾	100 mm	(note 4)
Useful scan vertical		⩾	80 mm	(note 4)
Deflection coefficient horizontal	M_x		12,8 V/cm	
		⩽	14 V/cm	
Deflection coefficient vertical	M_y		6,3 V/cm	
		⩽	7 V/cm	
Line width	l.w.	≈	0,38 mm	(note 5)
Deviation of linearity of deflection		⩽	2 %	(note 6)
Grid drive for 10 μA screen current		≈	20 V	
Geometry distortion	see note 7			

NOTES

1. The geometry control electrode voltage V_{g6} should be adjusted within the indicated range (values with respect to the mean x-plate potential).
2. 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.
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 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.
5. 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 μA.
6. 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.
7. 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.

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
Cathode to heater voltage negative	$-V_{kf}$	max.	125 V
Grid drive, average		max.	20 V
Screen dissipation	W_{ℓ}	max.	8 mW/cm²
Voltage between astigmatism control electrode and any deflection plate	$V_{g4/x}$	max.	500 V
	$V_{g4/y}$	max.	500 V
Control grid circuit resistance	R_{g1}	max.	1 MΩ