LIMITING VALUES (Absolute maximum rating system)

Final accelerator voltage	$V_{g8(\ell)}$	max.	18 kV
Post deflection accelerator mesh electrode voltage	V_{g7}	max.	2500 V
Geometry control electrode voltage	V_{g6}	max.	2500 V
Interplate shield voltage	V_{g5}	max.	2500 V
Astigmatism control electrode voltage	V_{g4}	max.	2500 V
Focusing electrode voltage	V_{g3}	max.	2500 V
First accelerator voltage	V_{g2}	max.	2500 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
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_{ℓ}	max.	8 mW/cm^2
Control grid circuit resistance	R_{g1}	max.	1 MΩ

PHILIPS

D14-302GH/93

INSTRUMENT CATHODE-RAY TUBE

14 cm diagonal rectangular flat-faced oscilloscope tube with domed mesh and metal-backed screen with internal graticule. The tube has side connections to the x and y-plates, and is intended for use in compact oscilloscopes with up to 150 MHz bandwidth. This tube features a 1,5 W cathode with short warm-up time (quick-heating cathode).

blue binder, tab 4

QUICK REFERENCE DATA

Final accelerator voltage	$V_{g8(\ell)}$	16,5 kV
Display area		100 x 80 mm^2
Deflection coefficient		
horizontal	M_x	8,7 V/cm
vertical	M_y	4,7 V/cm

OPTICAL DATA

Screen		metal-backed phosphor
type		GH, colour green
persistence		medium short
Useful screen dimensions	$\geqslant$	100 x 80 mm^2
Useful scan		
horizontal	$\geqslant$	100 mm
vertical	$\geqslant$	80 mm
Spot eccentricity in horizontal and vertical directions	$\leqslant$	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

PHILIPS

MECHANICAL DATA

Dimensions and connections

See outline drawings	
Overall length (socket included)	⩽ 397 mm
Face dimensions	⩽ 100 x 120 mm^2
Net mass	approx. 1 kg
Base	14 pin, all glass

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.

Accessories

Socket, supplied with tube	type 55572
Side contact connector (7 required)	type 55561
Final accelerator contact connector	connection to final accelerator electrode is made via an EHT cable attached to the tube

FOCUSING	electrostatic
DEFLECTION	double electrostatic
x-plates	symmetrical
y-plates	symmetrical
Angle between x and y-traces	90 ± 1°
Angle between y-trace and y-axis of the internal graticule	⩽ 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.

* The tube is provided with a rotation coil, concentrically wound around the tube neck, enabling the alignment of the y-trace with the mechanical y-axis of the screen. The coil has 2000 turns and a maximum resistance of 650 Ω. Under typical operating conditions, a maximum of 40 ampere-turns are required for the maximum rotation of 5°. This means the required current is 20 mA maximum at a required voltage of 13 V.

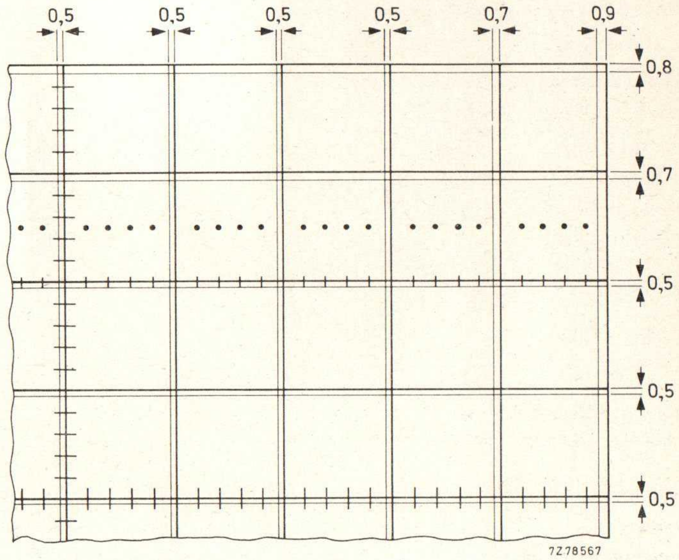

Fig. 6 Quarter of graticule with horizontal and vertical line pairs, see note 6 on opposite page.

TYPICAL OPERATION

Conditions

Final accelerator voltage	$V_{g8(\ell)}$	16,5 kV	
Post deflection accelerator mesh electrode voltage	V_{g7}	2200 V	
Geometry control electrode voltage	V_{g6}	2200 ± 100 V	(note 1)
Interplate shield voltage	V_{g5}	2200 V	(note 2)
First accelerator voltage	V_{g2}	2200 V	
Astigmatism control electrode voltage	V_{g4}	2200 ± 50 V	(note 3)
Focusing electrode voltage	V_{g3}	620 to 800 V	
Control grid voltage for visual extinction of focused spot	V_{g1}	−60 to −110 V	

Performance

Useful scan			
horizontal		≥ 100 mm	(note 4)
vertical		≥ 80 mm	(note 4)
Deflection coefficient			
horizontal	M_x	8,7 V/cm	
		≤ 9,8 V/cm	
vertical	M_y	4,7 V/cm	
		≤ 5,3 V/cm	
Line width	l.w.	typ. 0,37 mm	(note 5)
Grid drive for 10 μA screen current		approx. 30 V	
Geometry distortion		see note 6	
Deviation of deflection linearity		3%; 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 and y-plate potentials 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 $V_{g8(\ell)}/V_{g2} = 7,5$. If this ratio is smaller, 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. A graticule consisting of horizontal and vertical line pairs according to Fig. 6, is aligned with the electrical x-axis of the tube. With optimum corrections applied (including orthogonality correction), any horizontal or vertical trace will fall between these line pairs.
7. Deviation of linearity is defined as the proportional deviation of the deflection coefficient over any division on the x-axis and y-axis from the average values over the central eight (horizontal) and central six (vertical) divisions respectively.

CAPACITANCES

x_1 to all other elements except x_2	$C_{x1(x2)}$	5 pF
x_2 to all other elements except x_1	$C_{x2(x1)}$	5 pF
y_1 to all other elements except y_2	$C_{y1(y2)}$	1,7 pF
y_2 to all other elements except y_1	$C_{y2(y1)}$	2 pF
x_1 to x_2	C_{x1x2}	3 pF
y_1 to y_2	C_{y1y2}	1,6 pF
Control grid to all other elements	C_{g1}	6 pF
Cathode to all other elements	C_k	2,7 pF
Focusing electrode to all other electrodes	C_{g3}	5 pF

DIMENSIONS AND CONNECTIONS

Dimensions in mm

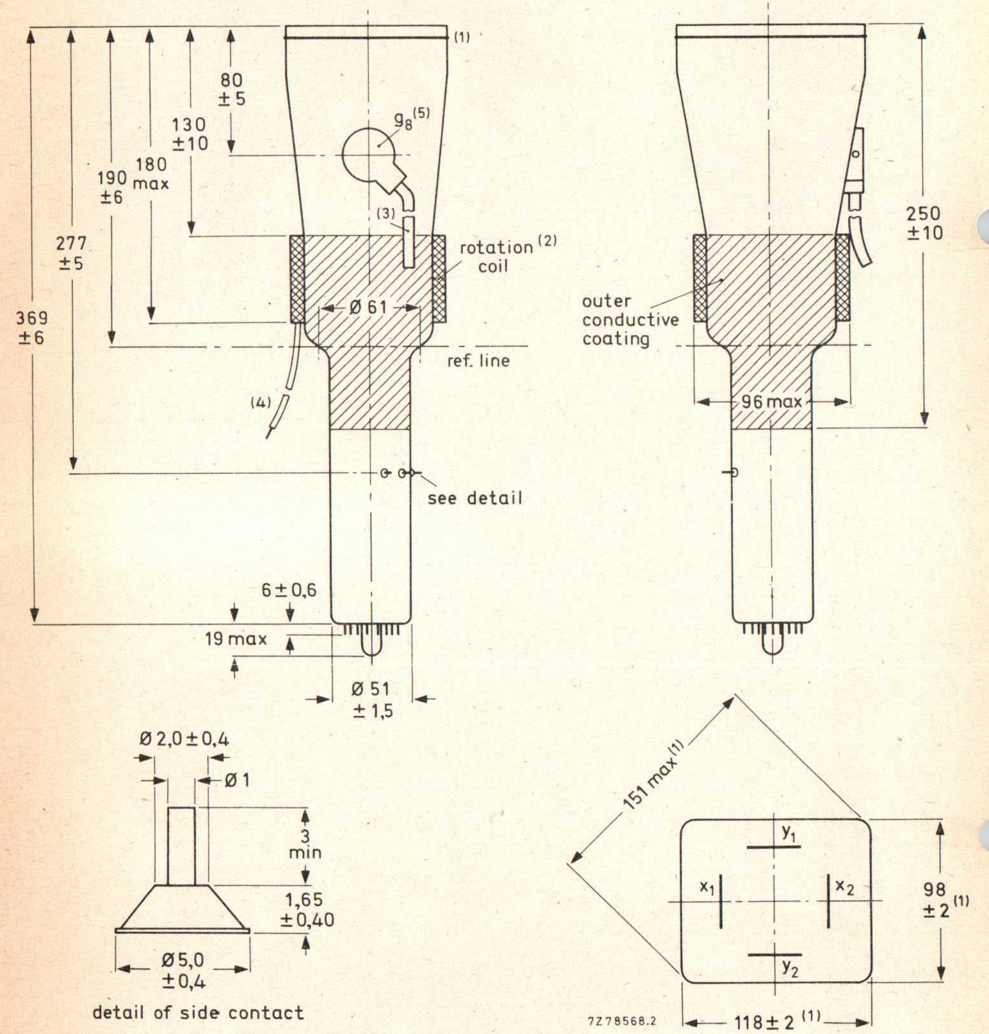

Fig. 1 Outlines; for notes see bottom of opposite page.

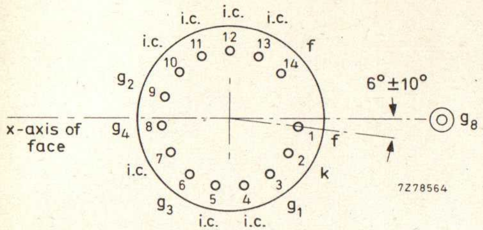

Fig. 2 Pin arrangement; bottom view.

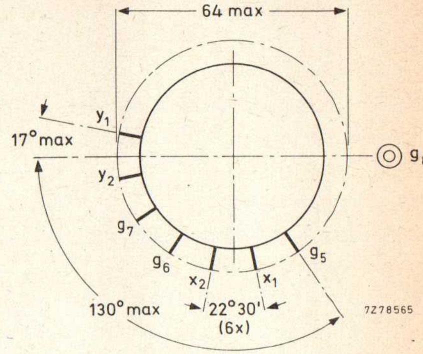

Fig. 3 Side-contact arrangement; bottom view.

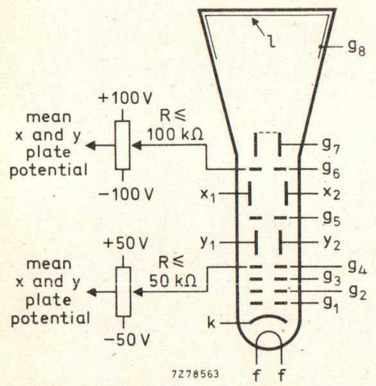

Fig. 4 Electrode configuration.

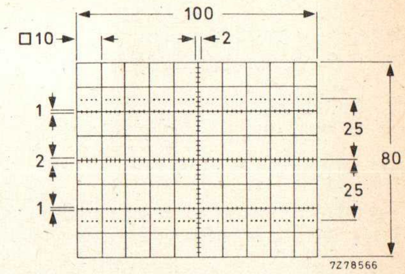

Fig. 5 Internal graticule.
Line thickness = 0,2 mm;
dot diameter = 0,4 mm.

Notes to the drawing 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. EHT cable; minimum length is 530 mm.
4. Connection cable, comprising two wires for connection of the rotation coil, and one green wire for earthing the outer conductive coating. Minimum cable length is 400 mm.
5. The centre of the final accelerator contact is situated within a square of 10 mm x 10 mm around the true geometrical position.