VERY HIGH RESOLUTION CATHODE-RAY TUBE

The M38-200 is a 38 cm, 70° data graphic display tube with a resolution of more than 6,6 line pairs per mm (corresponding to 3000 TV lines). Used in conjunction with deflection unit AT1991 it is eminently suitable for full page document display.
The resolution easily meets the stringent requirements of the CCITT recommendations for digital group III, high resolution facsimile transmission, and those of graphic displays for computer-aided design.

Tubes with white (W) or green (GH) screen phosphors are available. They have a metal backed screen and rim band for implosion protection.

QUICK REFERENCE DATA

Deflection angle	70°
Face diagonal	38 cm
Overall length	478 mm
Neck diameter	36,8 mm
Screen dimensions	226 mm x 291 mm
Resolution	1728 x 2288 pixels*

blue binder, tab 4

* Pixel = picture element.

ELECTRICAL DATA

Capacitances		
cathode to all other electrodes	C_k	4 pF
grid 1 to all other electrodes	C_{g1}	12 pF
final accelerator to external conductive coating	$C_{g3,\ g5(I)/m}$	1100 pF
final accelerator to tension band	$C_{g3,\ g5(I)/m'}$	220 pF
Focusing method	electrostatic	
Deflection method	magnetic*	
Deflection angle	approx. 70°	
Heating	indirect by a.c. or d.c.	
heater voltage	V_f	6,3 V ± 5 %
heater current	I_f	190 mA**

OPTICAL DATA

Screen	metal-backed phosphor	
Phosphor type	GH	W
fluorescent colour	green	white
persistence	medium short	medium
Screen dimensions	226 mm x 291 mm	
Minimum useful screen diagonal	352 mm	
Preferable useful scanning area	200 mm x 270 mm	
Reduction for A4 size (297 mm x 210 mm)	9%	
Reduction for 11″ x 8½″ size (279 mm x 216 mm)	7,4%	
Light transmission of screen	approx. 50%	

* To obtain the best tube performance, deflection unit AT1991 should be used.
** Liable to be modified into 240 mA.

M38-200

LIMITING VALUES (Absolute maximum rating system)

Voltages are specified with respect to cathode unless otherwise stated.

Final accelerator voltage	$V_{g3,\ g5(\ell)}$	max.	20 kV
Focusing electrode voltage	V_{g4}	max.	8 kV
		min.	4 kV
First accelerator voltage	V_{g2}	max.	1,2 kV
Control grid voltage			
negative	$-V_{g1}$	max.	140 V
positive, non-repetitive	V_{g1}	max.	0 V
Cathode to heater voltage			
positive	V_{kf}	max.	250 V
positive peak	V_{kfp}	max.	300 V
negative	$-V_{kf}$	max.	135 V
negative peak	$-V_{kfp}$	max.	180 V

LIMITING CIRCUIT VALUES

Resistance between cathode and heater	R_{kf}	max.	1 MΩ
Impedance between cathode and heater (f = 50 Hz)	Z_{kf}	max.	500 kΩ
Grid 1 circuit resistance	R_{g1}	max.	1,5 MΩ
Impedance between cathode and earth	Z_k	max.	100 kΩ

X-RADIATION

Radiation emitted will not exceed 0,5 mR/h throughout the useful life of the tube when operated within the given ratings.

FLASHOVER PROTECTION

With the high voltage used with this tube internal flash-overs may occur. These may destroy the cathode of the tube. Therefore it is necessary to provide protective circuits, using spark gaps. The spark gaps must be connected as follows:

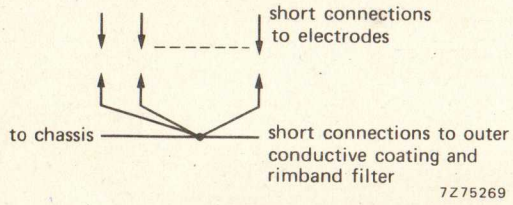

Fig. 12.

No other connections between the outer conductive coating and the chassis are permissible.

DEVELOPMENT SAMPLE DATA

MECHANICAL DATA (see also the figures on the following pages)

Overall length	478 ± 6,5 mm
Neck diameter	36,8 ± 0,8 mm
Base	JEDEC B12-246
Final accelerator contact	cavity contact, CT8; IEC 67-III-2
Mounting position	any
Implosion protection	rim band
Net mass	approx. 6 kg
Accessories	
socket	type 55589 or 55589A
final accelerator contact connector	type 55563
deflection unit	type AT1991

MECHANICAL DATA (continued)

Dimensions in mm

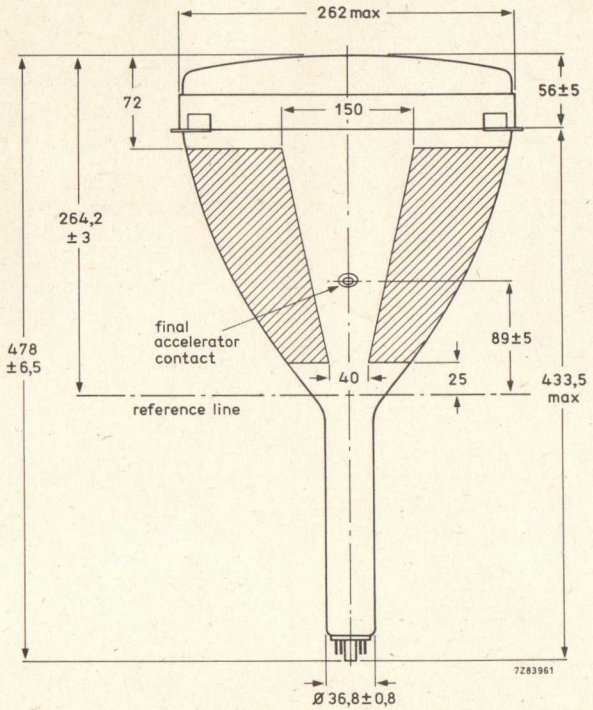

Fig. 1a.

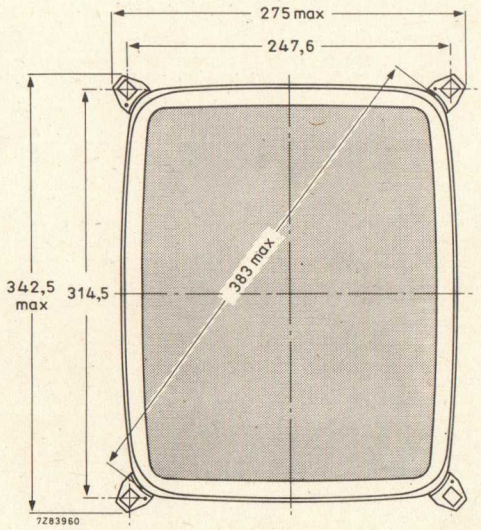

Fig. 1b.

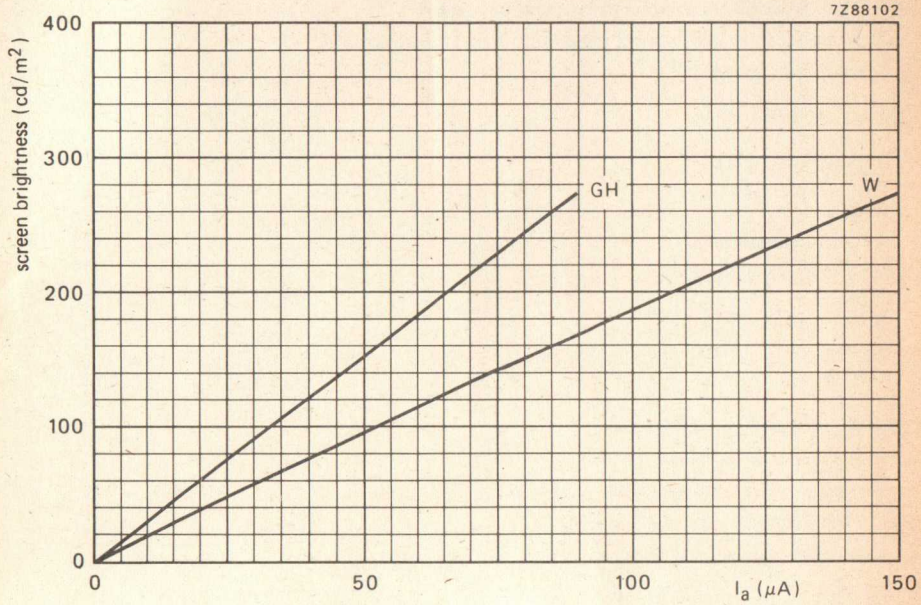

Fig. 11.

DEVELOPMENT SAMPLE DATA

CIRCUIT DESIGN VALUES

Grid 4 current			
positive	I_{g4}	max.	25 μA
negative	$-I_{g4}$	max.	25 μA
Grid 2 current			
positive	I_{g2}	max.	5 μA
negative	$-I_{g2}$	max.	5 μA

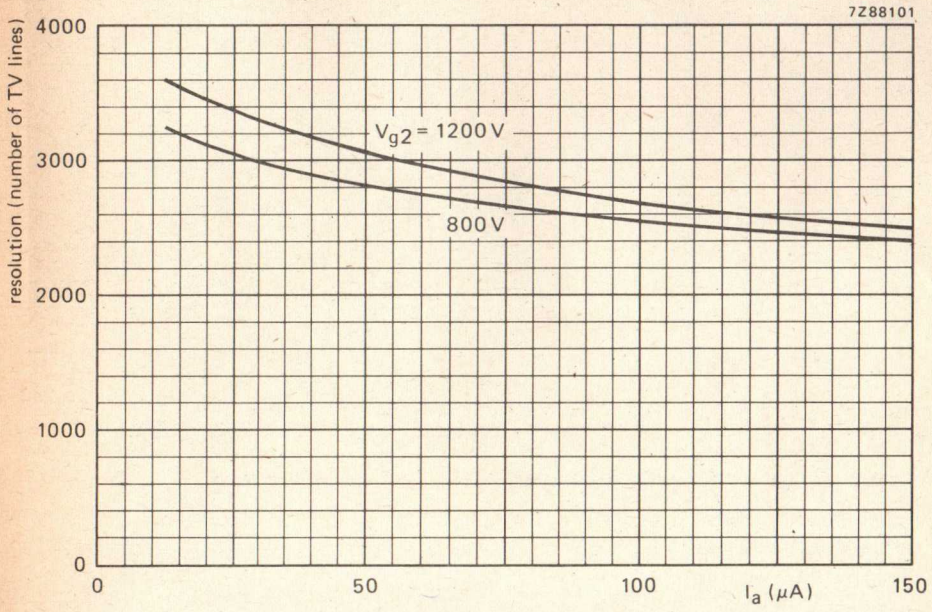

Fig. 9.

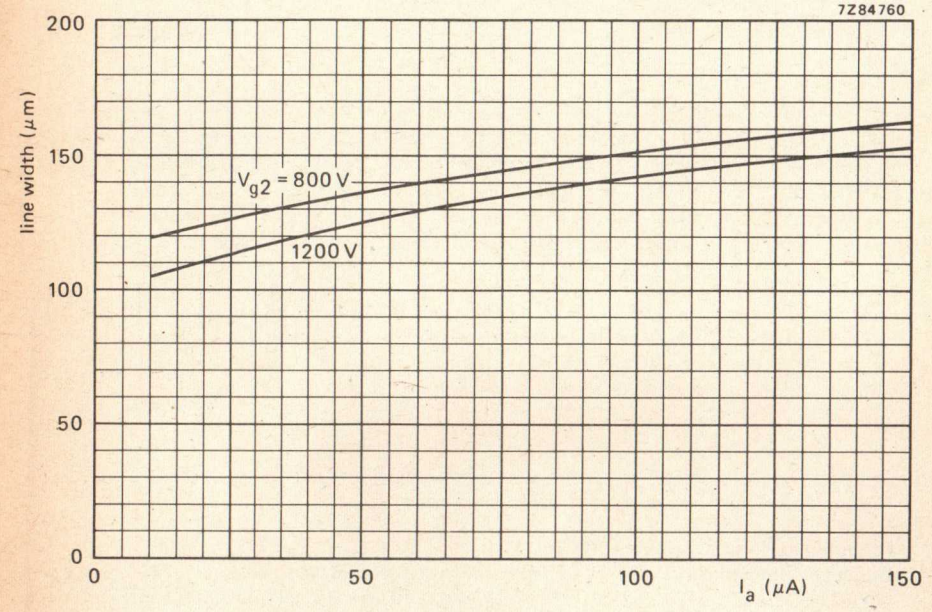

Fig. 10.

PHILIPS

DEVELOPMENT SAMPLE DATA

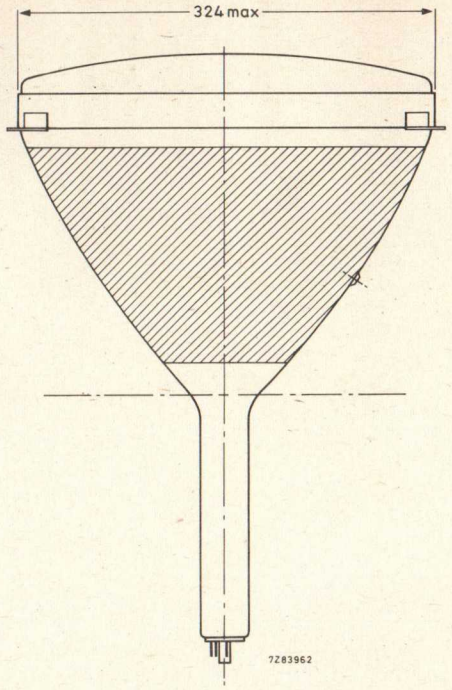

Fig. 1c.

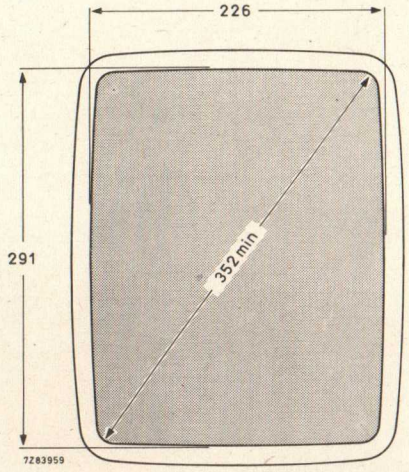

Fig. 2.

PHILIPS

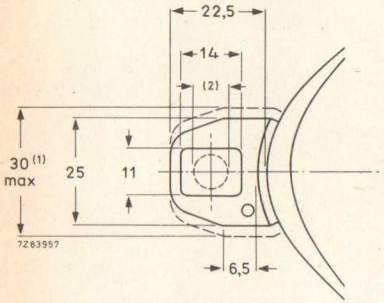

Fig. 3.

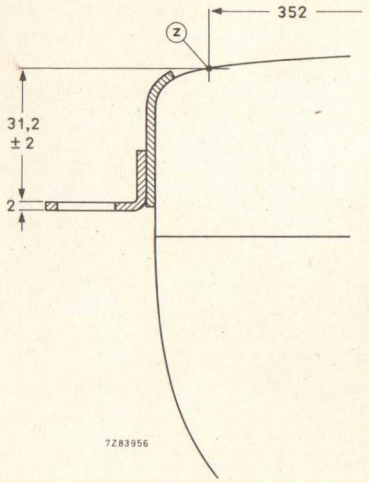

Fig. 4.

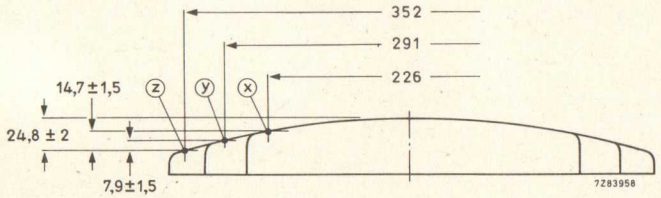

Fig. 5.

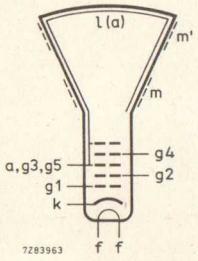

Fig. 6.

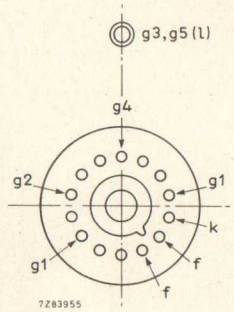

Fig. 7.

Notes

1. Minimum space to be reserved for mounting lugs.
2. The mounting screws in the cabinet must be situated within a circle with a diameter 7,5 mm drawn around the true geometrical positions (corners of a rectangle of 314,5 mm x 247,6 mm).

Reference line gauge, JEDEC 110

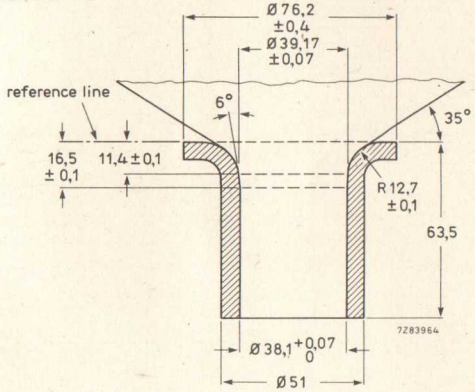

Fig. 8.

DEVELOPMENT SAMPLE DATA

RECOMMENDED OPERATING CONDITIONS; voltages with respect to cathode

Final accelerator voltage	$V_{g3, g5}$	18 kV
Focusing electrode voltage	V_{g4}	5 to 7 kV*
Dynamic focusing	V_{g4}	200 to 300 V**
First accelerator voltage	V_{g2}	800 V
Control grid voltage for visual extinction of focused spot	$-V_{g1}$	50 to 110 V
Grid drive for 30 μA screen current	V_d	approx. 20 V

RESOLUTION

With a beam current (I_a) of 50 μA and at least 20% modulation, the resolution under typical operating conditions is approx. 4 x 10^6 pixels on the useful screen area. The spot diameter at a brightness level of 50% is approx. 150 μm. For number of TV lines, line width, and screen brightness as a function of beam current, see Figs 9, 10 and 11.

* For optimum focus at screen centre.

** To obtain optimum focus over the whole useful screen area, dynamic correction voltages should be applied in N-S and E-W directions; these voltages should be adjustable separately within the indicated range.