ABRIDGED DATA

7-inch diameter tubes with triode guns and optical quality flat faceplates. Designed for use in flying spot scanner applications.

Neck Diameter	1·378 inches	(35 mm)
Deflection Angle (to scan nominal diameter of 165mm)	42	Degrees
Deflection Method		Magnetic
Focus Method (*See Note* 1)		Magnetic
E.H.T. Voltage	25	kV

GENERAL

Electrical and General

Cathode	Indirectly Heated, Oxide Coated	
Heater Voltage	4·0	V
Heater Current	550±10%	mA
Faceplate		Clear
Screen (*See Note* 2)		Aluminised
Inter-electrode Capacitances:		
Grid to all other electrodes, less than	9·0	pF
Cathode to all other electrodes, less than	9·0	pF
Final Anode to external conductive coating	1500	pF Approx

Mechanical

Overall Length	21·339 inches	(542 mm)	Max
Overall Diameter	7·441 inches	(189 mm)	Max
Normality of Faceplate to Neck Axis			90°±30′
Faceplate Thickness	0·354±0·039 inch	(9·0±1·0mm)	
Nominal Screen Diameter	6·496 inches	(165mm)	
Useful Screen Areas			*See Note* 3
Neck Diameter	1·398 inches	(35·5 mm)	Max
Net Weight	4·5 pounds	(2·1 kg)	Approx
Base			B.S.448–B8O
Final Anode Connection			B.S.448–CT8
Mounting Position			*See Note* 4

Cooling

The faceplate may require forced-air cooling when the tube is used at high ratings.

MAXIMUM AND MINIMUM RATINGS
(Absolute Values)

(All voltages with respect to cathode)

	Min	*Max*	
Anode 1 Voltage	20	35	kV
Grid Voltage, negative value (*See Note* 5)	—	250	V
Heater to Cathode Voltage (*See Note* 6):			
Cathode negative	—	150	V
Cathode positive	—	200	V
Peak Heater to Cathode Voltage:			
Cathode positive (*See Note* 7)	—	410	V
Cathode Current (Mean) (*See Note* 8)	—	330	μA
Grid to Cathode Resistance	—	1·5	MΩ
Grid to Cathode Impedance (at 50c/s)	—	0·5	MΩ
Heater to Cathode Resistance		*See Note* 9	

TYPICAL OPERATING CONDITIONS

Anode Voltage	25	kV
Spark Trap and External Conductive Coating (*See Note* 10)	Earth Potential	
Grid Voltage for cut-off	−75 to −125	V
Grid Drive for 100μA beam current	25 to 41	V
Focus Power	*See Note* 11	
Line Width (*See Note* 12):		
by shrinking raster method	0·14	mm
by measuring microscope method	0·17	mm

OPTIMUM BEAM FOCUSING

In order to obtain minimum spot size, the magnetic axis of the focus coil should be aligned with the electron beam. This may be done either by adjusting the position of the focus coil (*See Method* 1), or by fitting additional deflection coils to adjust the position of the beam (*See Method* 2). In each case a.c. focusing (*See page* 3) may be used to identify the optimum alignment condition.

Method 1

Adjustment of the focus coil position

The mounting of the focus coil should be such that the coil can be moved in any direction, i.e. vertically, horizontally and tilted about either the vertical or horizontal axis. An a.c. current is passed through the focus coil and the position of the coil is adjusted until the optimum alignment is reached. (*See* * *A.C. Focusing.*)

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Method 2

Electromagnetic deflection of the beam

Two sets of alignment coils are fitted on the tube neck, between the cathode and the focus coil. Each set of coils is capable of deflecting the beam slightly in both X and Y directions. The currents in the alignment coils are adjusted to give correct alignment of the beam. (*See* * *A.C. Focusing.*)

**A.C. Focusing*

An alternating current is passed through the focus coil such that the positive and negative excursions of the current each produce a focused spot. Provided there is no current through the main deflection coils, the picture on the tube faceplate will consist of a defocused area and two focused spots. The optimum focusing condition is obtained when the two focused spots coincide at the centre of the defocused spot.

Change of Screen Characteristics During Life

During the first 5 hours of operation the afterglow persistence decreases and this is accompanied by a decrease in light output due to the phosphor ageing. The raster should be overscanned during initial setting up and ageing, to avoid a variation in light output across the final raster.

X-RAY WARNING

X-Rays are produced when tubes in the T966 series are operated with anode voltages above 16kV (absolute value). These rays can constitute a health hazard unless the tubes are adequately shielded for X-ray radiation. This is entirely a function of high voltage devices and does not reflect on the design of the tubes.

NOTES

1. The centre of the air gap of the focus coil should be approximately 110mm from the reference plane.
2. Tubes in the T966 series have screens with the following characteristics

Type	EEV Screen	Equivalent	Fluorescent Colour	Persistence
T966A	A	P24	Green	1μsec to 10% approx.
T966C	C	P16	Bluish-purple	0·1μsec to 10% approx.

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3. The useful screen area is defined by the optical quality requirements of the screen; several sizes are available as follows:

Raster Size	Orientation	Scanning Standard	Code
102×76mm	0±15°	405 625	4/4 4/6
94×70mm	0±15°	405 625	5/4 5/6
105×40mm	45±15°	405 625	6/4 6/6

The orientation of the raster is referred to a plane containing the anode contact and the tube axis. It is defined by the angle between this plane and the plane containing the mid points of the longer sides of the raster and the tube axis. This angle is measured in an anti-clockwise direction from the plane of the anode contact, viewed from the screen end.

Other quality areas can be supplied to special order.

The code reference is added to the tube type number in order to identify a particular variant, e.g. T966A–6/4.

4. The tube may be mounted in any position except with the screen down and the axis of the tube making an angle of less than 50° with the vertical.

5. The d.c. value of grid bias must not be allowed to become positive with respect to the cathode except during the period immediately after switching the equipment on or off when it may be allowed to rise to +1V. The maximum positive grid excursion may reach 2V and at this voltage the grid current may be expected to be approximately 2mA.

6. To avoid excessive hum, the a.c. component of the heater to cathode voltage should be as low as possible, preferably less than $20V_{r.m.s.}$ The heater should preferably be connected to the cathode.

7. During a warming-up period not exceeding 45 seconds.

8. Means must be provided for the instantaneous removal of beam current in the event of a failure of either or both time bases. Unless such a safety device is incorporated, a failure of this type will result in the immediate destruction of the screen of the tube.

9. When the heater is in a series chain or earthed, the impedance between the cathode and earth at 50c/s must not exceed 100kΩ. When the heater is supplied from a separate transformer, the heater to cathode resistance must not exceed 1MΩ.

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10. The spark trap and external conductive coating should be connected by a low impedance path to the h.t. supply return. The purpose of this is to isolate from the grid and its associated circuits any occasional, non-destructive discharges which sometimes occur when starting after prolonged shutdown.

11. The focus power required is equivalent to approximately 800 ampere-turns using a long gap focus coil.

12. Measured under the following conditions:
    Pulsed line 100mm long
    Pulse length 100μsec
    Pulse repetition rate 50p.p.s.
    Beam current 100μA peak.

    The method used for line width measurement with a microscope is as in K1001.

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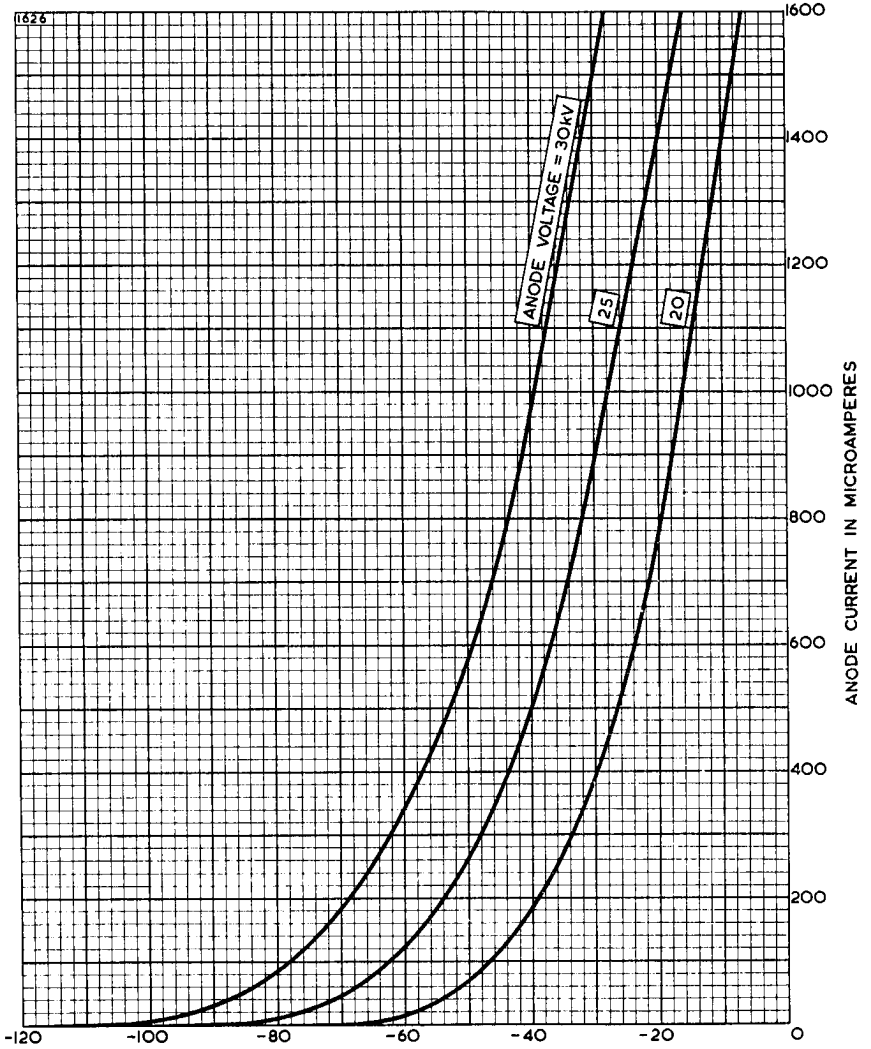
GRID VOLTAGE CHARACTERISTICS



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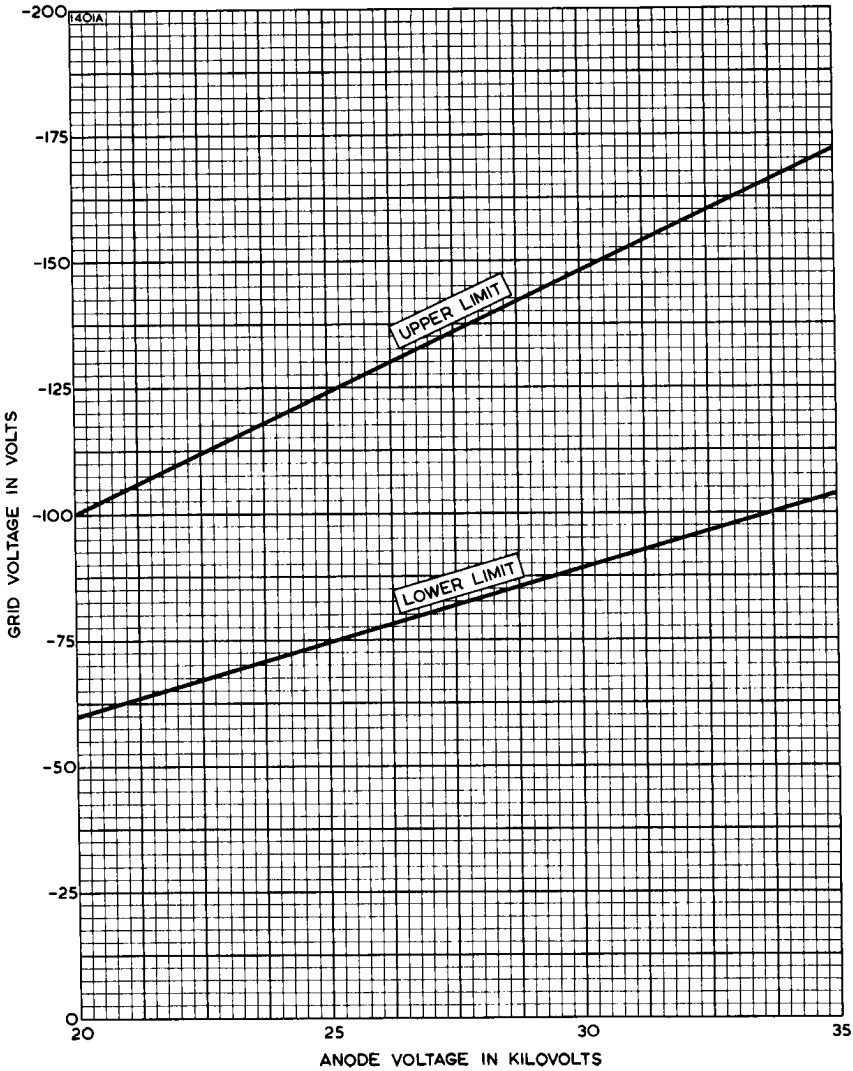
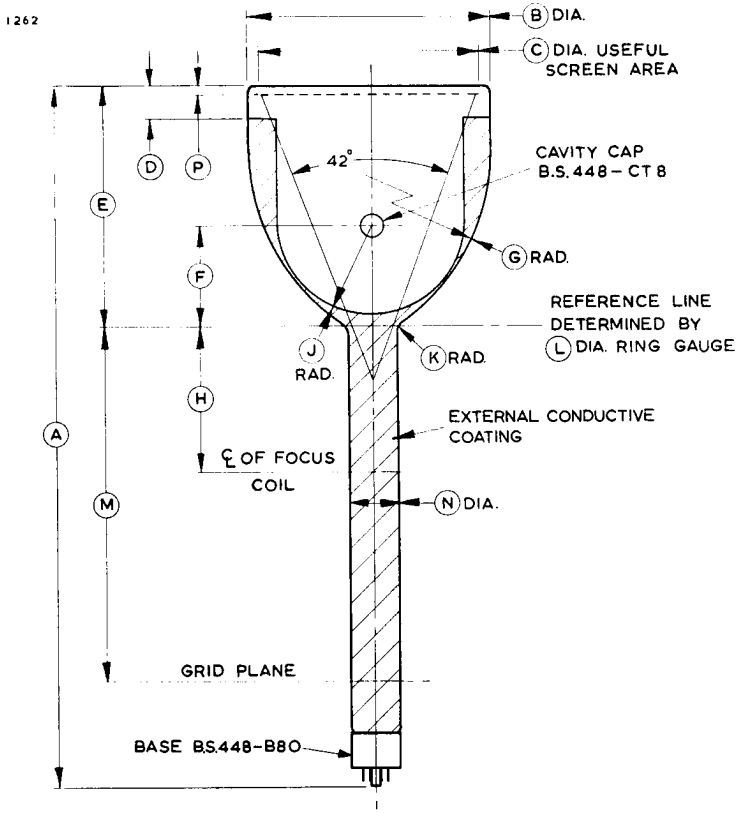
GRID VOLTAGE CUT-OFF LIMITS



OUTLINE



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	20·945 ± 0·394	532·0 ± 10·0	J	3·346	85·0
B	7·284 ± 0·157	185·0 ± 4·0	K	0·354	9·00
C	6·496	165·0	L	1·417	36·0
D	0·984 ± 0·394	25·0 ± 10·0	M	10·669	271·0
E	7·165 ± 0·157	182·0 ± 4·0	N	$1{\cdot}378^{+0{\cdot}020}_{-0{\cdot}039}$	$35{\cdot}0^{+0{\cdot}5}_{-1{\cdot}0}$
F	2·992 ± 0·157	76·0 ± 4·0	P	0·354 ± 0·039	9·00 ± 1·00
G	6·299	160·0			
H	4·331	110·0			

Inch dimensions have been derived from millimetres.

OUTLINE DETAIL

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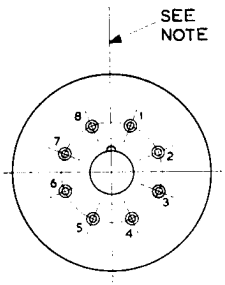

Pin	Element
1	Spark Trap and External Conductive Coating
2	Heater
3	No Connection
4	No Connection
5	Grid
6	No Connection
7	Heater
8	Cathode
Cap	Anode

Note. The base key will be in line with the Cavity Cap to within $\pm 15°$.

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