ABRIDGED DATA

16-inch diameter radar tubes for use with valve or transistor scan amplifiers. Two sets of scan coils may be fitted for alpha-numeric character display.

Neck Diameter	1·378 inches (35mm)	
Deflection Angle	50	Degrees
Deflection Method		Magnetic
Focus Method (*See Note* 1)		Magnetic
E.H.T. Voltage	15	kV

GENERAL

Electrical

Cathode	Indirectly Heated, Oxide Coated	
Heater Voltage (*See Note* 2)	6·3	V
Heater Current	0·3 ± 10%	A
Faceplate		Clear
Screen (*See Note* 3)		Aluminised
Inter-electrode Capacitances:		
Grid to all other electrodes, less than	12	pF
Cathode to all other electrodes, less than	12	pF

Mechanical

Overall Length	29·646 inches	(753 mm)	Max←
Overall Diameter	16·142 inches	(410 mm)	Max
Useful Screen Diameter	14·567 inches	(370 mm)	Min
Neck Diameter (*See Page* 9)	1·398 inches	(35·5 mm)	Max
Net Weight	24 pounds	(11 kg)	Approx
Base			B.S.448–B12A
Final Anode Connection			Cavity Cap B.S.448–CT8
Mounting Position			*See Note* 4

← Indicates a change

ENGLISH ELECTRIC

MAXIMUM AND MINIMUM RATINGS
(Absolute Values)

(All voltages with respect to cathode)

	Min	*Max*	
Anode 2 Voltage	9·0	15·5	kV
Anode 1 Voltage	250	600	V
Grid Voltage, negative value (*See Note* 5) ..	0	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)	—	150	μA
Grid to Cathode Resistance	—	1·5	MΩ
Grid to Cathode Impedance (at 50c/s)	—	0·5	MΩ
Heater to Cathode Resistance		*See Note* 8	

TYPICAL OPERATING CONDITIONS

Anode 2 Voltage	15	kV
Anode 1 Voltage	300	V
Grid Voltage for cut-off	−30 to −70	V
Grid Drive for 100μA beam current ..	20 to 35	V
Line Width (*See Note* 9)	0·35	mm
Astigmatism (*See Note* 10)	20	% Max

OPTIMUM BEAM FOCUSING

In order to obtain maximum brightness and minimum spot size, it is necessary to carry out the following procedure.

(*a*) Stray magnetic fields should be minimised in the region of the gun structure by fitting a tubular mumetal shield over the neck.

(*b*) The beam may be centred in the defining aperture by a small magnet, located in the region of the grid and adjusted to give maximum brightness.

(*c*) 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.

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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 Note * below*).

Method 2

Electromagnetic deflection of the beam

Two sets of alignment coils are fitted on the tube neck, between the beam defining aperture and the focus coil (*See Diagram, Page* 8). 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 Note * below*).

**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.

NOTES

1. The focus coil should be positioned so that the focusing field is entirely on the screen side of the beam defining aperture. When using a focus coil having a short air gap, the centre of the air gap should be approximately 170mm from the reference plane.
2. The heater is suitable for series or parallel operation. In series operation the surge heater voltage must not exceed $9{\cdot}5V_{r.m.s.}$ when the supply is switched on and a current limiting device may be necessary in the circuit to ensure that this voltage is not exceeded.
3. Tubes in the T970 series have screens with the following characteristics.

Type	EEV Screen	Equivalent	Fluorescent Colour	Persistence
T970D	D*	E.V.S.007	Yellow-orange	Long
T970Y	Y*	P33	Orange	Long
T970Z	Z*	P26	Orange	Very Long

*This is a fluoride screen which is sensitive to burn and should not be operated with slow moving spots.

The tube can be manufactured with alternative screens, and customers'

enquiries are invited.

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 20° 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 $20V_{r.m.s.}$

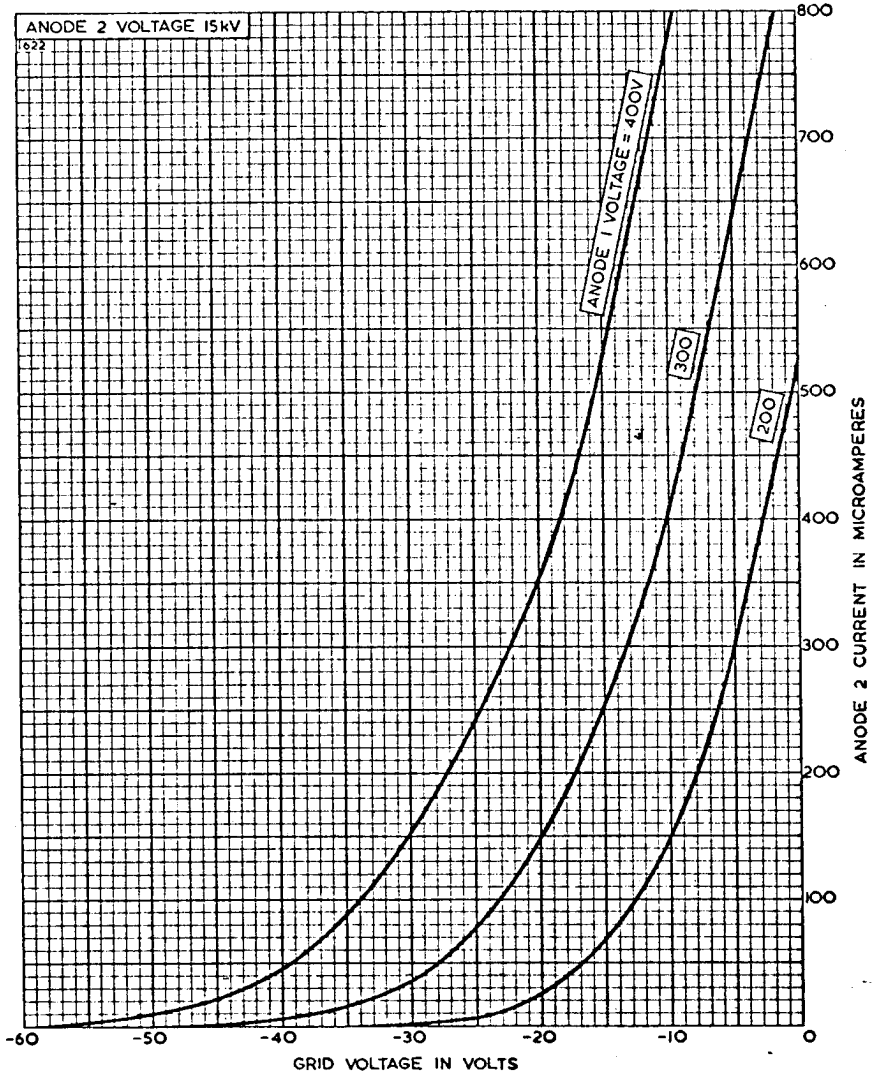
7. During a warming-up period not exceeding 45 seconds.

8. 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.

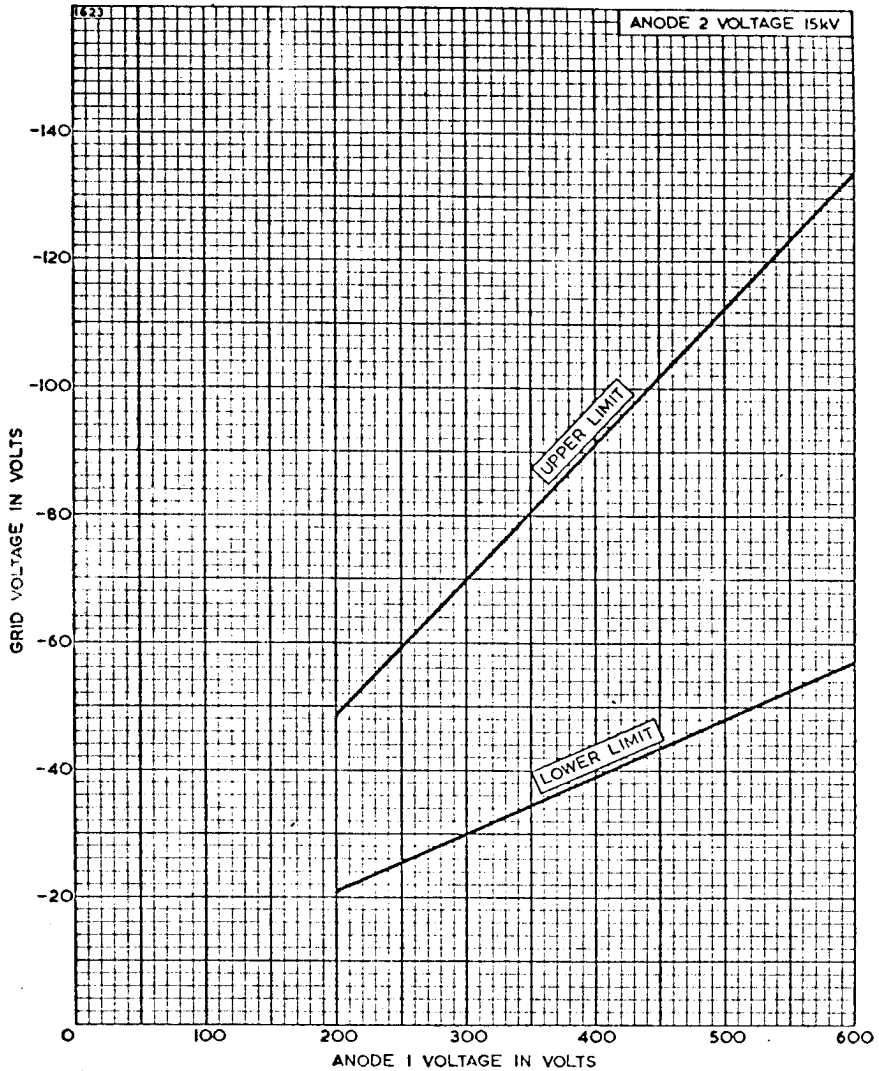
9. Measured under the following conditions:
   Pulsed line 370mm long
   Pulse length 100μsec
   Pulse repetition rate 50p.p.s.
   Beam current 100μA (peak)
   Modulation pulses and deflection waveform synchronised
   Line width measured with a microscope as in K1001/5.A.5.7.2.2.

10. Measured under the following conditions:
    Undeflected, focused, pulsed spot
    Pulse length 0·1μsec
    Pulse repetition rate 50p.p.s.
    Beam current 100μA (peak).

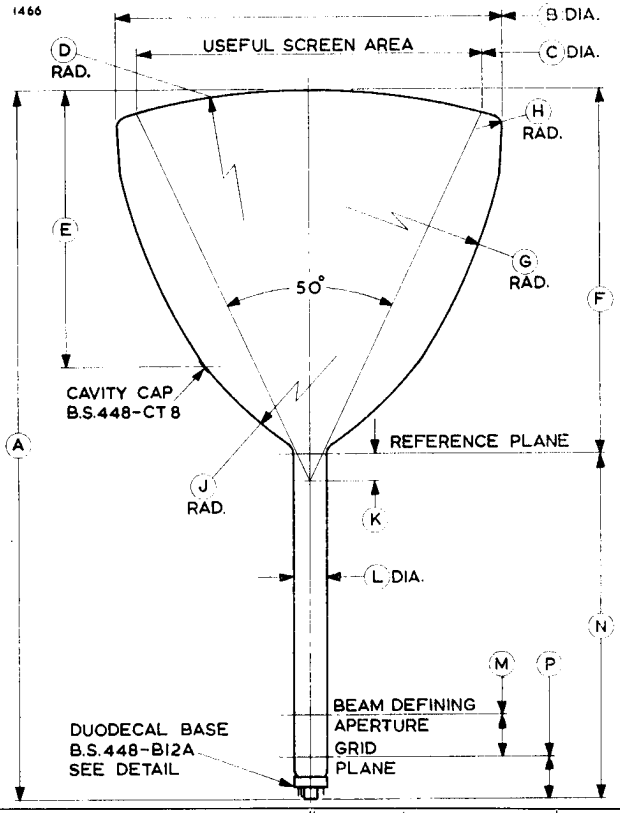
GRID VOLTAGE CHARACTERISTICS



GRID VOLTAGE CUT-OFF LIMITS



OUTLINE



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	29·252 ± 0·394	743·0 ± 10·0	J	16·732	425·0 ←
B	15·984 ± 0·157	406·0 ± 4·0	K	1·260 Max	32·0 Max
C	14·567 Min	370·0 Min	L	1·378 $^{+0·020}_{-0·039}$	35·0 $^{+0·5}_{-1·0}$
D	27·560	700·0	M	1·772	45·0
E	11·417 ± 0·394	290·0 ± 10·0	N	14·291 ± 0·236	363·0 ± 6·0 ←
F	14·961 ± 0·157	380·0 ± 4·0	P	1·732	44·0
G	23·504	597·0			
H	0·472	12·0			

Inch dimensions have been derived from millimetres.

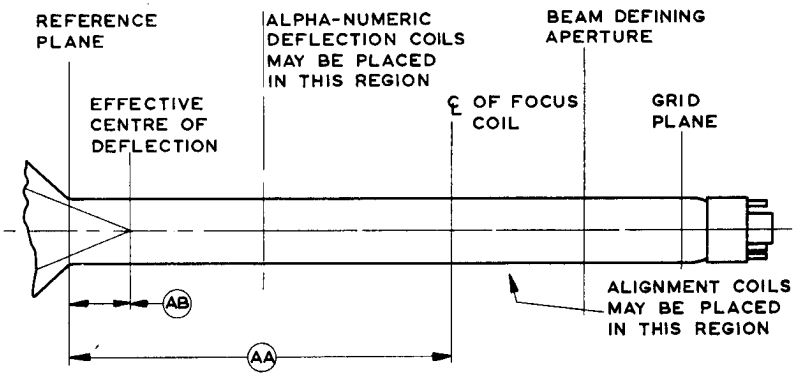
Note The mean axis of the neck will pass within 3mm of the geometric centre of the tube face and within 1° of a normal to a plane tangential to the geometric centre of the tube face.

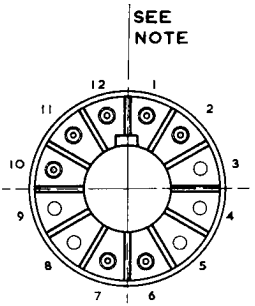
← Indicates a change

ENGLISH ELECTRIC

OUTLINE DETAILS

1203





Ref.	Inches	Millimetres
AA	6·693	170
AB	1·260 Max	32·0 Max

Inch dimensions have been derived from millimetres.

Note The anode cavity cap will be in line with the base key to within 15°.

Pin	Element	Pin	Element
1	Heater	8	No Pin
2	Grid	9	No Pin
3	No Pin	10	Anode 1
4	No Pin	11	Cathode
5	No Pin	12	Heater
6	No Connection	Cavity	
7	No Connection	Cap	Anode 2

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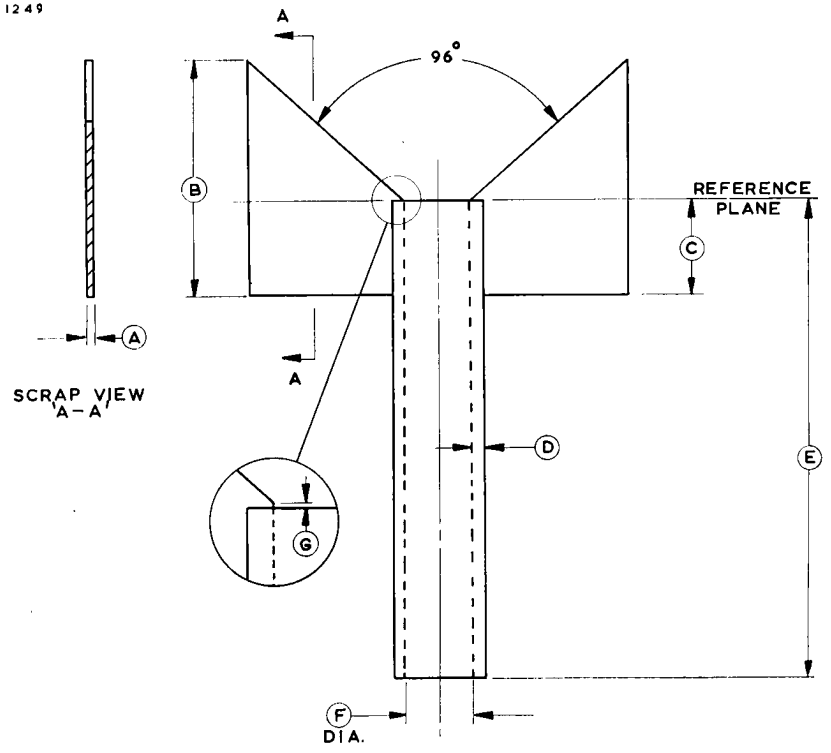
NECK GAUGE



The gauge shown above will pass freely over base and neck to the reference line, and when rotated through 360° the blades of the gauge will contact the flared neck at the reference line only.

Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	0·125	3·18	F	$1{\cdot}417^{+0{\cdot}003}_{-0{\cdot}000}$	$36{\cdot}0^{+0{\cdot}08}_{-0{\cdot}00}$
B	$4{\cdot}921 \pm 0{\cdot}039$	$125{\cdot}0 \pm 1{\cdot}0$			
C	$1{\cdot}969 \pm 0{\cdot}039$	$50{\cdot}0 \pm 1{\cdot}0$	G	$0{\cdot}000^{+0{\cdot}002}_{-0{\cdot}000}$	$0{\cdot}00^{+0{\cdot}05}_{-0{\cdot}00}$
D	$0{\cdot}252 \pm 0{\cdot}012$	$6{\cdot}4 \pm 0{\cdot}3$			
E	$9{\cdot}843 \pm 0{\cdot}039$	$250{\cdot}0 \pm 1{\cdot}0$			

Inch dimensions have been derived from millimetres except dimension A.

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